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

Prepared For:

ASARCO

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APPENDIX J

DATA VALIDATION REPORTS

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DATA VALIDATION REPORTS

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SECTION 1

REMEDIAL INVESTIGATION
WATER SAMPLES
SUMMER 1997

DATA VALIDATION REPORT
ASARCO EL PASO COPPER SMELTER
REMEDIAL INVESTIGATION
WATER SAMPLES
SUMMER 1997

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GLOSSARY OF TERMS

CCB ..... Continuing Calibration Blank

CCV ..... Continuing Calibration Verification

CLP ..... Contract Laboratory Program

CRDL ..... Contract Required Detection Limit

FAA ..... Flame Atomic Absorption

GFAA ..... Graphite Furnace Atomic Absorption

HGAA ..... Hydride Generation Atomic Absorption

ICB ..... Initial Calibration Blank

ICP ..... Inductively Coupled Plasma

ICV ..... Initial Calibration Verification

IDL ..... Instrument Detection Limit

LCS ..... Laboratory Control Sample

MSA ..... Method of Standard Additions

PB ..... Preparation Blank

PRDL ..... Project Required Detection Limit

QAPP ..... Quality Assurance Project Plan

QC ..... Quality Control

RPD ..... Relative Percent Difference

RSD ..... Relative Standard Deviation

SOW ..... Statement of Work

TDS ..... Total Dissolved Solids

SUMMARY

This report covers groundwater samples collected during the Summer of 1997 for the Asarco El Paso Copper Smelter Remediation Investigation. This validation has been carried out according to requirements spelled out in the work plan (Asarco El Paso Copper Smelter Remedial Investigation Work Plan, November 1996), which are consistent with those given in the EPA's National Functional Guidelines for Inorganic Data Review (February 1994). Deviations from prescribed quality control procedures and/or exceedances of quality control samples have been noted, and results have been flagged in the database. Data validation codes are defined in Appendix 1, Table 1. Appendix 1 also includes a summary of flagged data (Table 2). The validated database for this data set is in Appendix 2.

Quality Control Violations :

⇒ The required frequency for field quality control samples was not met.

- Twelve field duplicates were required, and only four were submitted.
- Twelve field blanks were required, and none were collected.

⇒ The field SC measurement taken at EP-63 on 8/9/97 was rejected after comparison with the laboratory SC value and the TDS result. This is discussed further in Section 10.

⇒ The seven field SC measurements taken on August 26 were flagged as rejected. This is discussed in detail in Section 10, Interparameter Relationships, under lab vs field SC.

⇒ The field duplicate for TSS submitted on 8/26/97 had an RPD of 40%, indicating that there may be a lack of reproducibility in the TSS results for the samples collected on this day. A total of 5 results were flagged.

⇒ One laboratory control sample was out of control for dissolved zinc (122% recovery), resulting in a total of 12 flags to indicate the possibility of a high bias.

Given the failure to meet the required frequency of field quality control samples, it was not possible to evaluate the precision and accuracy of the data as set out in the project work plan. Overall, however, the Asarco El Paso Copper Smelter Remedial Investigation water results for Summer 1997 are deemed acceptable for the purposes of the project.

⇒ 1.0 percent of the data were flagged (20 out of 2084 results).

⇒ 0.4 percent of the data were flagged as rejected (8 out of 2084 results).

DATA VALIDATION REPORT

1. INTRODUCTION

This validation applies to inorganic analytes from 59 groundwater and 13 surface water samples collected during August and September of 1997 for the Asarco El Paso Copper Smelter Remedial Investigation. (One well, EP-87, was resampled on September 15, as it was dry in August.)

No samples were collected at the following 2 sites:

- There was no access to EM-7.
- EM-8 was dry.

The total number of samples included four field duplicates, one surface water and three groundwater duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)

  _X_ EPA CLP National Functional Guidelines for Inorganics Data Review
  _X_ Asarco El Paso Copper Smelter Remedial Investigation Work Plan, El Paso, Texas (November 1996)
  ___ Other

- Overall level of validation:

  ___ Contract Laboratory Program (CLP)
  _X_ Standard
  ___ Visual

  Notes: The validation consisted of a visual check of lab and field data, a check of laboratory and field quality control samples with flagging for any QC samples that were out of control limits.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.

  _X_ Yes
  ___ No

- All documentation of field procedures was provided as required.

  _X_ Yes
  ___ No

  Notes: One of the coolers was lost for samples collected on August 11 and 13, and the affected wells were resampled on the 26th. Field notes for the August 26 resampling were not included in the data package, but were provided upon request.

3. FIELD QUALITY CONTROL SAMPLES

The field quality control samples required by the work plan are 1 field blank (DI) and one field duplicate per day or per 20 samples, whichever is more frequent.

- **Field Blanks**: Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

  DI, trip, rinsate, or any other field blanks have been carried out at the proper frequency.
  ___Yes
  _X_No

  Notes: No field blanks were submitted with the samples, which were collected on 13 different days. Although no results were flagged due to the omission of field quality control samples, the lack of field blanks makes it difficult to evaluate the accuracy of low concentration results.

- **Field duplicates**

  Field duplicates have been collected at the proper frequency.
  ___Yes
  _X_No

  Notes: Samples were collected on thirteen different days. The project work plan requires at least one field duplicate per day. Field duplicates were submitted on only four of the thirteen sampling days.

Site	Sample Number	Date
EM-6	EPRI-9708-160/ 173	08/11/97
EP-68	EPRI-9708-133/ 174	08/14/97
SEP-10	EPRI-9708-175/ 179	08/15//97
EP-70R	EPRI-9708-135/ 180	08/26/97

  Field duplicates were not submitted on the following sampling days:

  08/06/97
  08/07/97
  08/08/97
  08/09/97
  08/12/97
  08/13/97
  08/16/97
  08/18/97
  09/16/97

  No results were flagged for the failure to meet the quality control sample frequency required by the project work plan. However, it is difficult to assess the reproducibility of sample results for the nine sampling days for which field duplicates were not submitted to the laboratory.

Field duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix.

___Yes
_X_ No

Notes: The field duplicate submitted for 8/26/97 was out of control limits for total suspended solids (TSS), with an RPD of 40% (sample, 6.5 ppm/ duplicate, 9.8 ppm). Five TSS results were flagged to indicate the possibility of lack of reproducibility due to the combined effects of variations in field sampling techniques, sample preparation, and laboratory analytical procedures.

Flagging: J_4/UJ_4

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**
  - ___ CLP-SOW
  - ___ SW-846
  - _X_ Methods for Chemical Analysis of Water and Wastes
  - ___ XRF Standard Operating Procedures

- **Holding times met**
  - _X_ Yes
  - ___No

- **Consistency with project requirements**

  Analyses were carried out as requested.
  - _X_ Yes
  - ___No

  Project specified methods were used.
  - _X_ Yes
  - ___No

5. DETECTION LIMITS

- Reporting detection limits met project required detection limits (PRDLs).

  Notes: With the exception of sulfate, the laboratory reporting limits for the August samples met the established PRDLs. Sulfate was reported down to 2 ppm, and the PRDL was set at 1 ppm.

- Instrument detection limits (IDLs) were provided by the laboratory.

  X_NA

  Notes: IDL verifications are not required for the project.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

  Preparation blanks were prepared and analyzed at the required frequency.
  _X_ Yes
  ___ No

  All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).
  _X_ Yes
  ___ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.
  _X_ Yes
  ___ No

- Matrix spike recoveries were within the required control limits (75-125%).
  _X_ Yes
  ___ No

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.
  _X_ Yes
  ___ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix, 35% or less for soil matrix). For low concentration data, that is if the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix, within ± 2 times the PRDL for soil matrix.
  _X_ Yes
  ___ No

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency
  _X_ Yes
  ___ No

- LCS recoveries were within the required control limits (80-120% for water).
  ___Yes
  _X_No

  Notes: For laboratory batch L971969, the LCS was out of control limits for total recoverable iron (recovery was 130%). However, the iron concentration in the LCS was only 0.100 ppm. A recovery of 130% would mean 30 ppb of contamination. Associated samples in the batch had iron concentrations between 3.2 and 5.9 ppm. At such levels, 30 ppb of contamination would have a negligible effect. Therefore, no iron results were flagged as a result of this LCS exceedance.

  For laboratory batch L971905, the LCS was out of control limits for dissolved zinc (recovery was 122%). For this batch, all zinc results above the reporting detection limit of 20 ppb were flagged to indicate the possibility of a high bias. This resulted in a total of twelve flags.

  Flagging: J_4

10. INTERPARAMETER RELATIONSHIPS

- The following relationships have been checked:
  _X_Total Recoverable vs Dissolved metals
  _X_Lab pH vs field pH.
  _X_TDS vs SC
  _X_Lab SC vs field SC
  ___Arsenic speciation/dissolved arsenic

  Lab pH vs field pH: This relationship was generally in order. For the 71 samples for which both lab and field pH were measured, all had percent differences less than or equal to 20%. All but two samples had per differences less than or equal to 15%.

  TDS vs SC: The ratio of TDS to SC should lie between 0.55 and 0.75. In natural waters with high sulfate, the ratio may be as high as 0.96. This ratio is intended to be a check on the accuracy of the TDS and SC measurements. (It should be noted that these measurements are less accurate in dilute waters.)

  This relationship was generally in order, with TDS to SC ratios ranging from 0.66 to 1.07. Sixteen samples had ratios equal to or greater than 0.85; for these samples, sulfate values ranged from 1,923 to 13,167 ppm.

  Lab SC vs field SC: After comparison with the laboratory SC result of 8100 µmhos/cm and the TDS result of 6442 ppm, the field SC measurement of 880 µmhos/cm recorded for EP-63 (EPRI-9708-128) was rejected. A transcription error is suspected, as the result seems to be off by a factor of ten.

  Otherwise, with the exception of samples collected on August 26, this relationship was in order. All percent differences were less than 14%.

  For the August 1997 sampling event, one sample cooler was lost, resulting in the resampling of six sites on August 26: EP-54, EP-56, EP-70R (sample and

field duplicate), EM-2, EM-4, and EM-5. The field SC measurements for the seven samples collected on August 26 were rejected for the following reasons:

- Field SCs for the sites that were resampled were uniformly low, around one fifth of the field SC values measured earlier.
- Field SCs measured for the original samples were in line with historical values; and when compared to the laboratory SC values, they showed percent differences of less than 4%.
- Laboratory SC values gave acceptable TDS to SC ratios.

11. HISTORICAL COMPARISON

The data for Summer 1997 were compared with historical results from previous data collected at the same sites. This was done for sites previously sampled for the El Paso Metals Investigation. A summary of the comparisons are in Appendix 1, Tables 3. This table includes:

- Any result where the current value differs by more than 3 standard deviations from the comparison period mean.
- Any result that is the highest or lowest value for the comparison period.

Following Table 3 are graphs of three parameters where a trend seems evident: depth to water level, specific conductivity, and total dissolved solids for EM-1.

As noted in the previous section, the field SC values for the August 26 resampling at EM-2, EM-5, and EM-6 are out of line with historical values, and have been flagged R to indicate that these values are unusable.

12. DATA QUALITY OBJECTIVES

Accuracy and precision data quality objectives for this project are for the quality control samples to be within control limits. Evaluation of field and laboratory QC samples give a measure of the actual precision and accuracy obtained.

However, given the failure to meet the required frequency of field quality control samples, it was not possible to evaluate the precision and accuracy of the data as set out in the project work plan.

Accuracy

The ability to recover a known amount of an analyte is a measure of accuracy. Accuracy is evaluated by laboratory matrix spikes and laboratory control samples for higher analyte concentrations, and by field blanks for analyte concentrations within five times the PRDL.

Ninety-nine percent (141 out of 143) of the laboratory control sample recoveries, and all of the matrix spike recoveries were within control limits, indicating good accuracy for the higher concentration results.

No field blanks were submitted with the August samples, however, making it difficult to evaluate the accuracy of low level results.

Precision

Duplicate measurements give a measure of reproducibility or precision.

All of the laboratory duplicate measurements and 99% of the field duplicate measurements (99 out of 100) were within control limits. However, **the required frequency of field duplicates was not met**.

Completeness

One measure of completeness is the percentage of valid results obtained. For the Summer 1997 sampling event, 99.6% of the results were valid (8 out of 2084 results were rejected).

Completeness is also evaluated by how well the sampling event met the requirements of the project work plan. Completeness is achieved when the number of valid measurements is sufficient to address all important issues about a site. The quality of sample analyses is assessed indirectly through the analysis of associated quality control samples.

The work plan sets the frequency of both field blanks (DI) and field duplicates at one in twenty samples or one per day, whichever is more frequent. As discussed in the field quality control sections, this frequency was not met, making it **impossible to evaluate the accuracy and precision of the data to the extent set out in the work plan**. For a total of thirteen days on which samples were collected,

- No field blanks were submitted, zero percent of the required number.
- Only four field duplicates were submitted, thirty percent of the required number.

DATA VALIDATION REPORT

Prepared by: **Clare Bridge**
Reviewed by: **Jenny Vanek**

REFERENCES

(References appropriate to this project have been checked)

_X_ Hem, J.D., 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd edition. US Geological Survey Water Supply Paper 2254.

_X_ Hydrometrics, 1996. Asarco El Paso Copper Smelter Remedial Investigation Work Plan, November 1996

___ U.S. Environmental Protection Agency, 1990. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition.

_X_ U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983. (EPA, 1983)

___ U.S. Environmental Protection Agency, 1995. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Document Number ILM04.0

_X_ U.S. Environmental Protection Agency, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February 1994.

APPENDIX 1

TABLES and GRAPHS

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

CODE		DEFINITION
J	-	The associated numerical value is an estimated quantity because quality control criteria were not met. Subscripts for the "J" qualifier: 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
UJ	-	The material was analyzed for, but was not detected above the associated value. Subscripts for the "UJ" qualifier: 1 - Blank contamination. Indicates possible high bias and/or false positive. 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
R	-	Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	-	Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

Table 2. Summary of Flagged Data
El Paso RI Waters, Summer 1997 Monitoring
(All values in ppm.)

Site	Sample No	Date	Parameter	Result	Flag	Bias	Reason for Flag
EM-2	EPRI-9708-156	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	871.0	R		Interparameter relationships
EM-4	EPRI-9708-158	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	2090.0	R		Interparameter relationships
			TOTAL SUSPENDED SOLIDS	15.0	J4		Field duplicate RPD = 40%
EM-5	EPRI-9708-159	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	1187.0	R		Interparameter relationships
			TOTAL SUSPENDED SOLIDS	36.0	J4		Field duplicate RPD = 40%
EP-6	EPRI-9708-102	08/06/97	ZINC (ZN)(DIS)	.021	J2	+22	Laboratory control sample R=122%
EP-13	EPRI-9708-105	08/07/97	ZINC (ZN)(DIS)	.052	J2	+22	Laboratory control sample R=122%
EP-15	EPRI-9708-107	08/07/97	ZINC (ZN)(DIS)	.022	J2	+22	Laboratory control sample R=122%
EP-20	EPRI-9708-108	08/07/97	ZINC (ZN)(DIS)	.057	J2	+22	Laboratory control sample R=122%
EP-29	EPRI-9708-115	08/07/97	ZINC (ZN)(DIS)	.022	J2	+22	Laboratory control sample R=122%
EP-35	EPRI-9708-116	08/07/97	ZINC (ZN)(DIS)	.026	J2	+22	Laboratory control sample R=122%
EP-51	EPRI-9708-118	08/26/97	TOTAL SUSPENDED SOLIDS	35.0	J4		Field duplicate RPD = 40%
EP-54	EPRI-9708-119	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	1980.0	R		Interparameter relationships
EP-56	EPRI-9708-121	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	1063.0	R		Interparameter relationships
EP-59	EPRI-9708-124	08/09/97	ZINC (ZN)(DIS)	.023	J2	+22	Laboratory control sample R=122%
EP-60	EPRI-9708-125	08/08/97	ZINC (ZN)(DIS)	.026	J2	+22	Laboratory control sample R=122%
EP-62	EPRI-9708-127	08/09/97	ZINC (ZN)(DIS)	.023	J2	+22	Laboratory control sample R=122%
EP-63	EPRI-9708-128	08/09/97	ZINC (ZN)(DIS)	.022	J2	+22	Laboratory control sample R=122%
EP-64	EPRI-9708-129	08/09/97	ZINC (ZN)(DIS)	.023	J2	+22	Laboratory control sample R=122%
EP-66	EPRI-9708-131	08/08/97	ZINC (ZN)(DIS)	.046	J2	+22	Laboratory control sample R=122%
EP-70R	EPRI-9708-135	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	1291.0	R		Interparameter relationships
			TOTAL SUSPENDED SOLIDS	6.5	J4		Field duplicate RPD = 40%
EP-70R (Dup)	EPRI-9708-180	08/26/97	SC (UMHOS/CM AT 25 C) (FLD)	1291.0	R		Interparameter relationships
			TOTAL SUSPENDED SOLIDS	9.8	J4		Field duplicate RPD = 40%

TABLE 3.

SUMMARY OF THE COMPARISON OF SAMPLING PERIOD DATA TO THE DATABASE PERIOD DATA, SHOWING PARAMETERS THAT ARE HIGHEST OR OR LOWEST OR THREE OR MORE STANDARD DEVATIONS FROM THE MEAN OF THE DATABASE PERIOD AND THE RELATIONSHIP TO THESE DATA

DataMan Program

SITE	SAMPLE DATE	RESULT mg/L	PARAMETER	COMPARISON DATABASE PERIOD	N	MIN (mg/L)	MEAN (mg/L)	MAX (mg/L)	STD DEVS FROM MEAN	RELATION DATABASE PERIOD
EM-1	08/13/97	7.0	PH	11/10/94-05/16/97	11	7.400000	7.7545	8.2	3.01	LOWEST
		58.0	TOTAL SUSPENDED SOLIDS	02/10/97-05/16/97	2	8.500000	17.7500	27.000000	3.08	HIGHEST
EM-2	08/26/97	68.0	TOTAL SUSPENDED SOLIDS	02/10/97-05/16/97	2	424.000000	462.0000	500.000000	7.33	LOWEST
		<.003	LEAD (PB) DIS	05/23/90-05/16/97	28	0.003000		<0.20		LOWEST
EM-4	08/26/97	89.38	DEPTH TO WATER LEVEL (FEET)	08/04/90-05/17/97	31	60.0	63.7252	90.46	3.95	
		15.0	TOTAL SUSPENDED SOLIDS	02/10/97-05/17/97	2	2.200000	7.6000	13.000000	0.97	HIGHEST
		27.9	WATER TEMPERATURE (C) (FLD)	08/04/90-05/17/97	30	17.0	21.6967	25.0	3.34	HIGHEST
EM-5	08/26/97	36.0	TOTAL SUSPENDED SOLIDS	02/10/97-05/16/97	2	12.000000	16.0000	20.000000	3.54	HIGHEST
		162.0	TOTAL ALKALINITY AS CACO3	08/04/90-05/16/97	18	34.	98.2222	146.000000	1.77	HIGHEST
		198.0	BICARBONATE (HCO3)	05/24/90-05/16/97	28	41.	127.9643	180.000000	1.74	HIGHEST
EM-6	08/11/97	3.1	TOTAL SUSPENDED SOLIDS	02/10/97-05/16/97	2	4.400000	10.2000	16.000000	0.87	LOWEST
EM-6	08/11/97	3.4	TOTAL SUSPENDED SOLIDS	02/10/97-05/16/97	2	4.400000	10.2000	16.000000	0.83	LOWEST

NOTES: All quantities in mg/L (Water) or mg/kg (Soil) unless noted. All results LABORATORY unless field (FLD) or calculated (CALC).
N: Number of samples in comparison data set; 50% of data set must be above lab detection limit before mean, median, & SD calculation.
A & R Flags were excluded from Statistics The detection limit was used in calculations.

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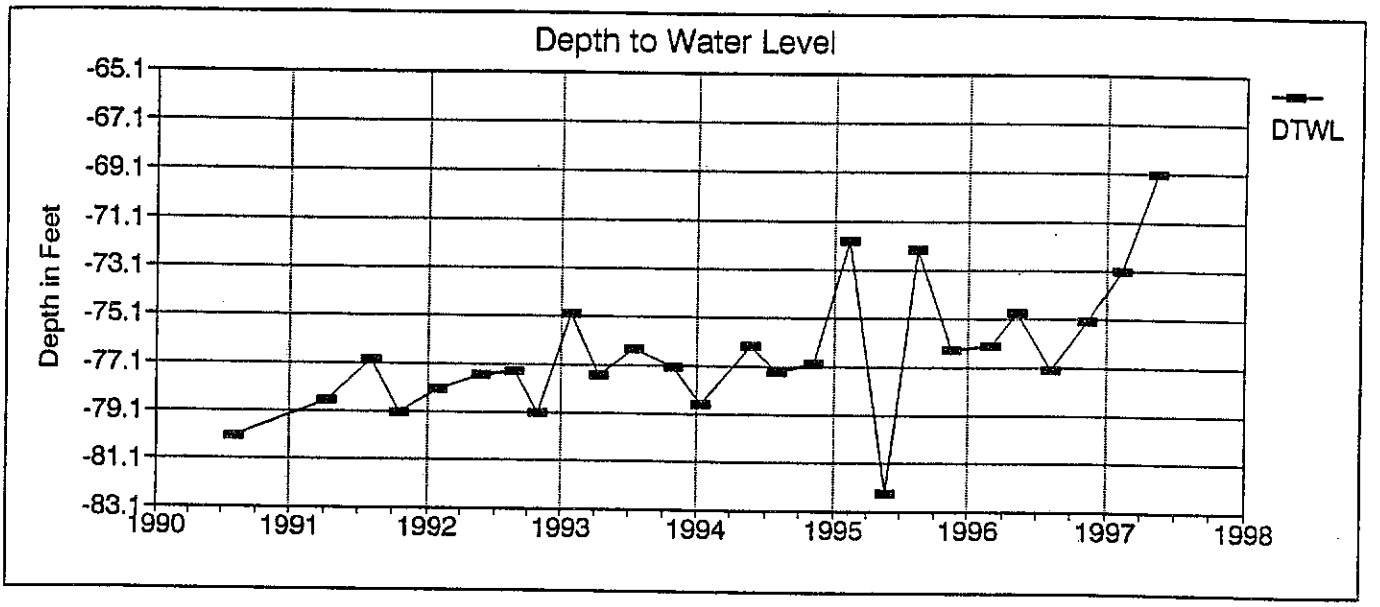
Datatst2 v2.0 9/93

Hydrometrics, Inc. 03/11/98

EM-1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Depth in Feet
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-67.1
-69.1
-71.1
-73.1
-75.1
-77.1
-79.1
-81.1
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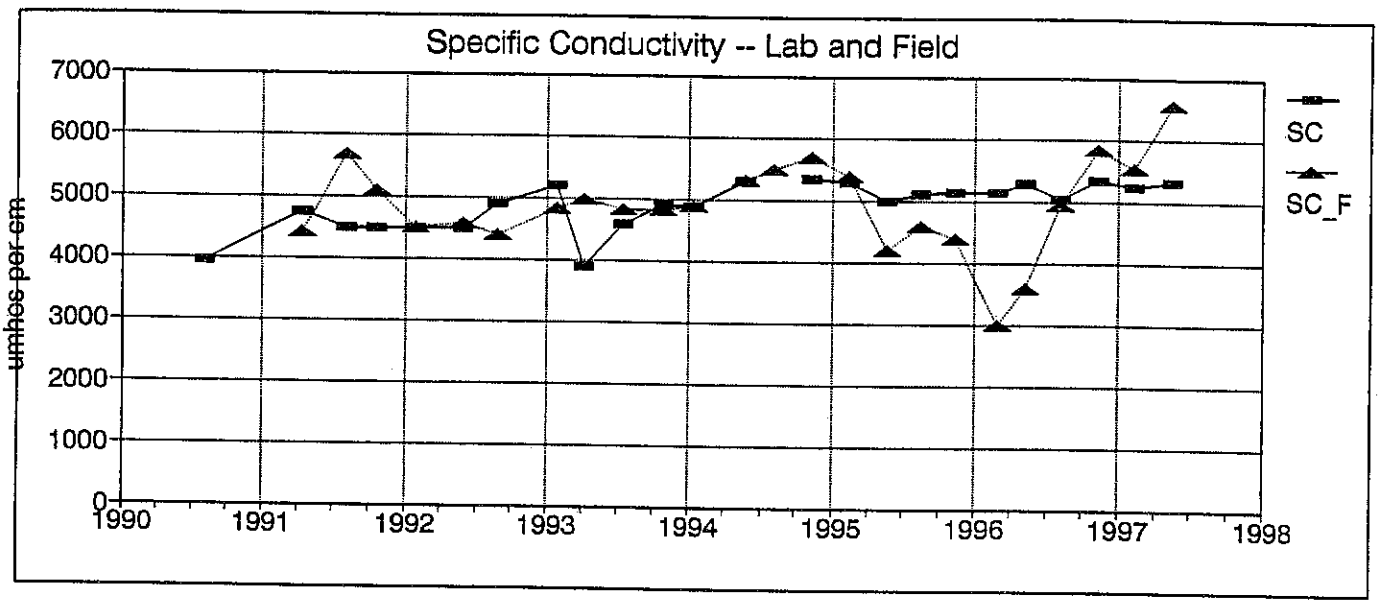
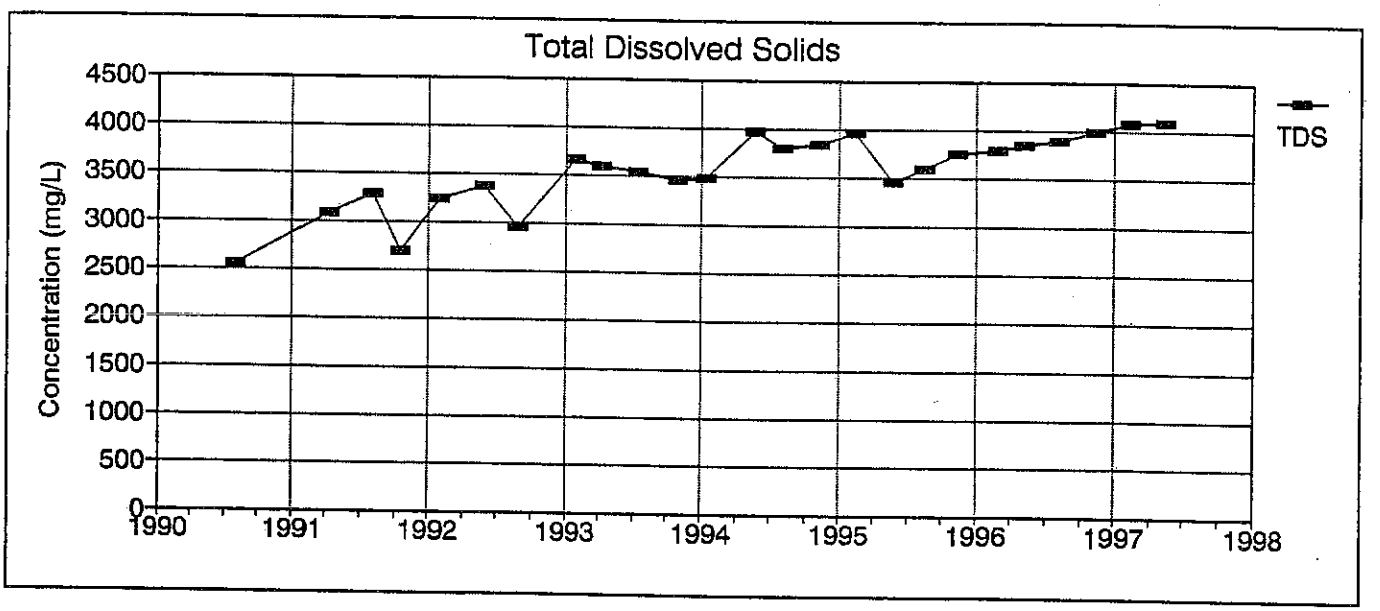
1993
1994
1995
1996
1997
1998
DTWL


Specific Conductivity -- Lab and Field
umhos per cm
7000
6000
5000
4000
3000
2000
1000
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
SC
SC_F


Total Dissolved Solids
Concentration (mg/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
TDS

APPENDIX 2

DATABASE

TABLE OF CONTENTS BY SITE TYPE

TABLE OF CONTENTS BY SITE TYPE

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-1	EM-2	EM-2		EM-4
SAMPLE DATE	08/13/97	08/11/97	08/26/97		08/11/97
SAMPLE TIME	07:40	17:30	14:00		15:45
LAB	TSC-SLC		TSC-SLC		
LAB NUMBER	L971944-32		L972044-5		
OTHER INFO			Resample		
SAMPLE NUMBER	EPRI-9708-155	EPRI-9708-156A	EPRI-9708-156		EPRI-9708-158A
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	77.85	63.8	62.51		61.38
OXYGEN (O) (FLD) DIS	4.05	6.28	NO MEAS		2.72
PH (FLD)	7.52	7.08	7.4		7.28
PH	7.8		7.9		
SC (UMHOS/CM AT 25 C)	5200.0		4550.0		
SC (UMHOS/CM AT 25 C) (FLD)	5210.0	4630.0	871.0	R	10570.0
TDS (MEASURED AT 180 C)	3948.0		3589.0		
TOTAL SUSPENDED SOLIDS	58.0		68.0		
WATER TEMPERATURE (C) (FLD)	25.3	24.9	26.7		24.9
-- MAJOR CONSTITUENTS --					
CALCIUM (CA) DIS	184.0		204.0		
MAGNESIUM (MG) DIS	100.0		74.0		
SODIUM (NA) DIS	900.0		831.0		
POTASSIUM (K) DIS	32.0		16.0		
TOTAL ALKALINITY AS CACO3	184.0		280.0		
BICARBONATE (HCO3)	224.0		342.0		
CARBONATE AS CO3	<1.0		<1.0		
SULFATE (SO4)	1849.0		1448.0		
CHLORIDE (CL)	687.0		497.0		
FLUORIDE (F)	.81		1.4		
-- NUTRIENTS --					
NITRATE + NITRITE AS N	.23		28.0		
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) DIS	.011		.84		
CADMIUM (CD) DIS	<.005		<.005		
CHROMIUM (CR) DIS	<.01		<.01		
COPPER (CU) DIS	<.025		<.025		
IRON (FE) DIS	<.1		<.1		
LEAD (PB) DIS	<.003		<.003		
SELENIUM (SE) DIS	.017		.16		
ZINC (ZN) DIS	.029		.025		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-4		EM-5	EM-5		EM-6		
SAMPLE DATE	08/26/97		08/11/97	08/26/97		08/11/97		
SAMPLE TIME	13:30		18:00	14:45		18:30		
LAB	TSC-SLC			TSC-SLC		TSC-SLC		
LAB NUMBER	L972044-6			L972044-7		L971944-10		
OTHER INFO	Resample			Resample				
SAMPLE NUMBER	EPRI-9708-158		EPRI-9708-159A	EPRI-9708-159		EPRI-9708-160		
-- PHYSICAL PARAMETERS --								
DEPTH TO WATER LEVEL (FEET)	89.38		14.48	14.49		35.55		
OXYGEN (O) (FLD) DIS	NO MEAS		0.96	NO MEAS		4.48		
PH (FLD)	7.5		7.65	7.64		7.25		
PH	7.9			8.0		7.9		
SC (UMHOS/CM AT 25 C)	10410.0			6160.0		4520.0		
SC (UMHOS/CM AT 25 C) (FLD)	2090.0	R	5970.0	1187.0	R	4480.0		
TDS (MEASURED AT 180 C)	7094.0			4700.0		3400.0		
TOTAL SUSPENDED SOLIDS	15.0	J4		36.0	J4	3.1		
WATER TEMPERATURE (C) (FLD)	27.9		24.8	25.8		25.8		
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	441.0			197.0		127.0		
MAGNESIUM (MG) DIS	198.0			46.0		80.0		
SODIUM (NA) DIS	1684.0			1238.0		897.0		
POTASSIUM (K) DIS	38.0			79.0		14.0		
TOTAL ALKALINITY AS CACO3	127.0			162.0		322.0		
BICARBONATE (HCO3)	155.0			198.0		393.0		
CARBONATE AS CO3	<1.0			<1.0		<1.0		
SULFATE (SO4)	450.0			1943.0		1707.0		
CHLORIDE (CL)	3507.0			742.0		422.0		
FLUORIDE (F)	1.3			6.1		2.2		
-- NUTRIENTS --								
NITRATE + NITRITE AS N	.3			.15		10.0		
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	.009			1.6		.03		
CADMIUM (CD) DIS	<.005			.08		<.005		
CHROMIUM (CR) DIS	<.01			<.01		<.01		
COPPER (CU) DIS	<.025			.046		<.025		
IRON (FE) DIS	<.1			.55		<.1		
LEAD (PB) DIS	<.003			.01		<.003		
SELENIUM (SE) DIS	.011			.027		.11		
ZINC (ZN) DIS	.031			.31		.03		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-6	EM-7	EM-8
SAMPLE DATE	08/11/97	08/15/97	08/15/97
SAMPLE TIME	18:40		
LAB	TSC-SLC	NO ACCESS	DRY
LAB NUMBER	L971944-11		
REMARKS	DUPLICATE	NO SAMPLE	NO SAMPLE
OTHER INFO		NO ACCESS	DRY
SAMPLE NUMBER	EPRI-9708-173	EPRI-9708-161	EPRI-9708-162
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	NO MEAS	NO ACCESS	DRY
OXYGEN (O) (FLD) DIS	NO MEAS		
PH (FLD)	NO MEAS		
PH	7.8		
SC (UMHOS/CM AT 25 C)	4500.0		
SC (UMHOS/CM AT 25 C) (FLD)	NO MEAS		
TDS (MEASURED AT 180 C)	3498.0		
TOTAL SUSPENDED SOLIDS	3.4		
WATER TEMPERATURE (C) (FLD)	NO MEAS		
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	135.0		
MAGNESIUM (MG) DIS	83.0		
SODIUM (NA) DIS	879.0		
POTASSIUM (K) DIS	15.0		
TOTAL ALKALINITY AS CACO3	330.0		
BICARBONATE (HCO3)	403.0		
CARBONATE AS CO3	<1.0		
SULFATE (SO4)	1653.0		
CHLORIDE (CL)	442.0		
FLUORIDE (F)	2.2		
-- NUTRIENTS --			
NITRATE + NITRITE AS N	8.2		
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.027		
CADMIUM (CD) DIS	<.005		
CHROMIUM (CR) DIS	<.01		
COPPER (CU) DIS	<.025		
IRON (FE) DIS	<.1		
LEAD (PB) DIS	<.003		
SELENIUM (SE) DIS	.11		
ZINC (ZN) DIS	.027		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-4	EP-5	EP-6
SAMPLE DATE	08/06/97	08/06/97	08/06/97
SAMPLE TIME	10:00	10:45	11:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971905-1	L971905-2	L971905-3
SAMPLE NUMBER	EPRI-9708-100	EPRI-9708-101	EPRI-9708-102
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	5.28	5.78	6.7
OXYGEN (O) (FLD) DIS	1.51	1.29	1.47
PH (FLD)	7.06	7.47	7.34
PH	7.7	7.7	7.9
SC (UMHOS/CM AT 25 C)	2350.0	3350.0	7320.0
SC (UMHOS/CM AT 25 C) (FLD)	2230.0	3330.0	7240.0
TDS (MEASURED AT 180 C)	1557.0	2342.0	6029.0
TOTAL SUSPENDED SOLIDS	14.0	199.0	1.9
WATER TEMPERATURE (C) (FLD)	29.0	29.2	29.6
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	135.0	96.0	411.0
MAGNESIUM (MG) DIS	36.0	39.0	128.0
SODIUM (NA) DIS	356.0	650.0	1409.0
POTASSIUM (K) DIS	17.0	16.0	36.0
TOTAL ALKALINITY AS CACO3	318.0	766.0	324.0
BICARBONATE (HCO3)	388.0	935.0	395.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	454.0	544.0	2632.0
CHLORIDE (CL)	356.0	424.0	914.0
FLUORIDE (F)	1.2	2.8	1.5
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<.05	<.05	11.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.16	.047	.032
CADMIUM (CD) DIS	<.005	<.005	<.005
CHROMIUM (CR) DIS	<.01	.016	<.01
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	1.1	.31	<.1
LEAD (PB) DIS	<.003	<.003	<.003
SELENIUM (SE) DIS	<.005	<.005	.033
ZINC (ZN) DIS	<.02	<.02	.021 J2

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-7	EP-13	EP-15
SAMPLE DATE	08/06/97	08/07/97	08/07/97
SAMPLE TIME	11:40	14:30	16:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971905-4	L971905-8	L971905-9
SAMPLE NUMBER	EPRI-9708-103	EPRI-9708-105	EPRI-9708-107
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	6.02	59.64	58.64
OXYGEN (O) (FLD) DIS	1.66	5.56	2.84
PH (FLD)	7.17	7.35	7.2
PH	7.8	7.7	7.8
SC (UMHOS/CM AT 25 C)	2810.0	12500.0	3150.0
SC (UMHOS/CM AT 25 C) (FLD)	2580.0	12410.0	2830.0
TDS (MEASURED AT 180 C)	1942.0	11243.0	2263.0
TOTAL SUSPENDED SOLIDS	12.0	52.0	220.0
WATER TEMPERATURE (C) (FLD)	27.8	29.1	29.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	103.0	434.0	125.0
MAGNESIUM (MG) DIS	34.0	73.0	44.0
SODIUM (NA) DIS	490.0	3087.0	525.0
POTASSIUM (K) DIS	12.0	110.0	13.0
TOTAL ALKALINITY AS CACO3	320.0	352.0	266.0
BICARBONATE (HCO3)	390.0	429.0	325.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	672.0	5745.0	889.0
CHLORIDE (CL)	320.0	673.0	315.0
FLUORIDE (F)	1.7	1.5	.93
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<.05	104.0	23.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.064	49.0	.076
CADMIUM (CD) DIS	<.005	.82	<.005
CHROMIUM (CR) DIS	<.01	<.01	<.01
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	1.0	<.1	<.1
LEAD (PB) DIS	<.003	.008	<.003
SELENIUM (SE) DIS	<.005	7.0	.17
ZINC (ZN) DIS	<.02	.052 J2	.022 J2

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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-20		EP-22		EP-23	
SAMPLE DATE	08/07/97		08/15/97		08/11/97	
SAMPLE TIME	10:10		16:45		10:15	
LAB	TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L971905-7		L971969-1		L971944-3	
SAMPLE NUMBER	EPRI-9708-108		EPRI-9708-110		EPRI-9708-111	
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	13.67		37.35		29.67	
OXYGEN (O) (FLD) DIS	1.98		2.92		1.17	
PH (FLD)	6.72		7.46		7.36	
PH	7.4		7.9		7.5	
SC (UMHOS/CM AT 25 C)	11160.0		8540.0		6790.0	
SC (UMHOS/CM AT 25 C) (FLD)	11270.0		8510.0		6640.0	
TDS (MEASURED AT 180 C)	10541.0		5188.0		5028.0	
TOTAL SUSPENDED SOLIDS	161.0		14.0		124.0	
WATER TEMPERATURE (C) (FLD)	22.8		26.8		26.2	
-- MAJOR CONSTITUENTS --						
CALCIUM (CA) DIS	584.0		106.0		218.0	
MAGNESIUM (MG) DIS	323.0		91.0		115.0	
SODIUM (NA) DIS	2070.0		1168.0		930.0	
POTASSIUM (K) DIS	71.0		180.0		80.0	
TOTAL ALKALINITY AS CACO3	328.0		1078.0		212.0	
BICARBONATE (HCO3)	400.0		1315.0		259.0	
CARBONATE AS CO3	<1.0		<1.0		<1.0	
SULFATE (SO4)	4582.0		1866.0		3239.0	
CHLORIDE (CL)	817.0		711.0		494.0	
FLUORIDE (F)	2.3		5.1		3.1	
-- NUTRIENTS --						
NITRATE + NITRITE AS N	235.0		100.0		.3	
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) DIS	1.2		.035		2.5	
CADMIUM (CD) DIS	.036		.006		<.005	
CHROMIUM (CR) DIS	<.01		<.01		<.01	
COPPER (CU) DIS	<.025		.031		<.025	
IRON (FE) DIS	<.1		<.1		.65	
LEAD (PB) DIS	<.003		.016		<.003	
SELENIUM (SE) DIS	.38		.32		.027	
ZINC (ZN) DIS	.057	J2	.64		.027	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-24	EP-25	EP-26
SAMPLE DATE	08/15/97	08/15/97	08/11/97
SAMPLE TIME	17:00	16:20	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971969-2	L971969-3	L971944-1
SAMPLE NUMBER	EPRI-9708-112	EPRI-9708-113	EPRI-9708-114
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	32.55	47.16	48.8
OXYGEN (O) (FLD) DIS	1.13	1.32	5.26
PH (FLD)	6.7	7.13	7.69
PH	8.0	7.4	7.2
SC (UMHOS/CM AT 25 C)	5150.0	5990.0	544.0
SC (UMHOS/CM AT 25 C) (FLD)	4660.0	5730.0	568.0
TDS (MEASURED AT 180 C)	3451.0	3995.0	395.0
TOTAL SUSPENDED SOLIDS	17.0	84.0	163.0
WATER TEMPERATURE (C) (FLD)	26.0	25.2	23.3
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	174.0	113.0	23.0
MAGNESIUM (MG) DIS	55.0	40.0	3.7
SODIUM (NA) DIS	910.0	1040.0	88.0
POTASSIUM (K) DIS	25.0	78.0	6.9
TOTAL ALKALINITY AS CACO3	800.0	990.0	37.0
BICARBONATE (HCO3)	976.0	1208.0	45.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	765.0	695.0	157.0
CHLORIDE (CL)	831.0	1127.0	43.0
FLUORIDE (F)	1.6	1.6	.86
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<.05	.94	2.3
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.47	3.0	.32
CADMIUM (CD) DIS	<.005	<.005	.62
CHROMIUM (CR) DIS	<.01	<.01	<.01
COPPER (CU) DIS	<.025	<.025	.21
IRON (FE) DIS	4.4	2.6	.12
LEAD (PB) DIS	<.003	<.003	.036
SELENIUM (SE) DIS	.014	.17	.079
ZINC (ZN) DIS	.035	.021	1.9

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-29	EP-35	EP-51	EP-51
SAMPLE DATE	08/07/97	08/07/97	08/11/97	08/26/97
SAMPLE TIME	09:30	10:40	14:00	11:45
LAB	TSC-SLC	TSC-SLC		TSC-SLC
LAB NUMBER	L971905-5	L971905-6		L972044-1
OTHER INFO				Resample
SAMPLE NUMBER	EPRI-9708-115	EPRI-9708-116	EPRI-9708-118A	EPRI-9708-118
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	13.35	13.43	48.82	49.12
OXYGEN (O) (FLD) DIS	2.77	5.98	0.7	9.4
PH (FLD)	7.41	7.55	6.73	7.25
PH	8.0	8.0		7.3
SC (UMHOS/CM AT 25 C)	3090.0	6530.0		11800.0
SC (UMHOS/CM AT 25 C) (FLD)	3110.0	6150.0	10400.0	10630.0
TDS (MEASURED AT 180 C)	2085.0	5678.0		9539.0
TOTAL SUSPENDED SOLIDS	1.1	4.8		35.0 J4
WATER TEMPERATURE (C) (FLD)	23.2	20.4	26.4	25.1
-- MAJOR CONSTITUENTS --				
CALCIUM (CA) DIS	79.0	395.0		655.0
MAGNESIUM (MG) DIS	27.0	176.0		478.0
SODIUM (NA) DIS	567.0	1124.0		1416.0
POTASSIUM (K) DIS	29.0	26.0		54.0
TOTAL ALKALINITY AS CACO3	312.0	196.0		214.0
BICARBONATE (HCO3)	381.0	239.0		261.0
CARBONATE AS CO3	<1.0	<1.0		<1.0
SULFATE (SO4)	742.0	2558.0		2125.0
CHLORIDE (CL)	289.0	575.0		2649.0
FLUORIDE (F)	3.0	.95		.78
-- NUTRIENTS --				
NITRATE + NITRITE AS N	7.6	67.0		115.0
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) DIS	.31	.4		.033
CADMIUM (CD) DIS	<.005	<.005		.034
CHROMIUM (CR) DIS	<.01	<.01		.029
COPPER (CU) DIS	<.025	<.025		.076
IRON (FE) DIS	<.1	<.1		1.4
LEAD (PB) DIS	<.003	<.003		<.003
SELENIUM (SE) DIS	.2	1.4		.22
ZINC (ZN) DIS	.022 J2	.026 J2		.53

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-53	EP-54	EP-54		EP-55
SAMPLE DATE	08/11/97	08/11/97	08/26/97		08/15/97
SAMPLE TIME	12:00	14:45	10:00		18:15
LAB	TSC-SLC		TSC-SLC		TSC-SLC
LAB NUMBER	L971944-4		L972044-2		L971969-13
OTHER INFO			Resample		
SAMPLE NUMBER	EPRI-9708-172	EPRI-9708-119A	EPRI-9708-119		EPRI-9708-120
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	67.6	68.58	68.59		54.35
OXYGEN (O) (FLD) DIS	7.74	1.64	NO MEAS		1.85
PH (FLD)	6.58	6.06	6.6		6.17
PH	7.2		6.9		7.0
SC (UMHOS/CM AT 25 C)	7790.0		11340.0		10550.0
SC (UMHOS/CM AT 25 C) (FLD)	7300.0	10470.0	1980.0	R	10700.0
TDS (MEASURED AT 180 C)	6739.0		10210.0		9746.0
TOTAL SUSPENDED SOLIDS	239.0		386.0		947.0
WATER TEMPERATURE (C) (FLD)	31.6	29.0	28.1		26.0
-- MAJOR CONSTITUENTS --					
CALCIUM (CA) DIS	394.0		432.0		569.0
MAGNESIUM (MG) DIS	89.0		276.0		373.0
SODIUM (NA) DIS	1450.0		1842.0		1602.0
POTASSIUM (K) DIS	147.0		345.0		227.0
TOTAL ALKALINITY AS CACO3	252.0		360.0		460.0
BICARBONATE (HCO3)	307.0		439.0		561.0
CARBONATE AS CO3	<1.0		<1.0		<1.0
SULFATE (SO4)	3200.0		5049.0		4747.0
CHLORIDE (CL)	494.0		891.0		945.0
FLUORIDE (F)	4.9		16.0		17.0
-- NUTRIENTS --					
NITRATE + NITRITE AS N	122.0		.24		<.05
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) DIS	51.0		22.0		62.0
CADMIUM (CD) DIS	1.3		5.7		.13
CHROMIUM (CR) DIS	<.01		<.01		<.01
COPPER (CU) DIS	<.025		.18		<.025
IRON (FE) DIS	<.1		13.0		229.0
LEAD (PB) DIS	<.003		<.003		.02
SELENIUM (SE) DIS	.76		.075		.28
ZINC (ZN) DIS	3.6		113.0		200.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-56	EP-56		EP-57	EP-58
SAMPLE DATE	08/11/97	08/26/97		08/16/97	08/16/97
SAMPLE TIME	09:30	09:20		09:15	11:00
LAB		TSC-SLC		TSC-SLC	TSC-SLC
LAB NUMBER		L972044-3		L971969-14	L971969-23
OTHER INFO		Resample			
SAMPLE NUMBER	EPRI-9708-121A	EPRI-9708-121		EPRI-9708-122	EPRI-9708-123
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	49.23	48.7		8.53	12.9
OXYGEN (O) (FLD) DIS	2.51	NO MEAS		1.0	0.24
PH (FLD)	7.34	7.25		7.3	6.54
PH		7.6		7.9	6.9
SC (UMHOS/CM AT 25 C)		5600.0		3330.0	11230.0
SC (UMHOS/CM AT 25 C) (FLD)	5470.0	1063.0	R	3370.0	11340.0
TDS (MEASURED AT 180 C)		4474.0		2510.0	9153.0
TOTAL SUSPENDED SOLIDS		243.0		452.0	7753.0
WATER TEMPERATURE (C) (FLD)	23.4	25.1		23.8	26.4
-- MAJOR CONSTITUENTS --					
CALCIUM (CA) DIS		255.0		129.0	463.0
MAGNESIUM (MG) DIS		63.0		87.0	161.0
SODIUM (NA) DIS		1026.0		587.0	2098.0
POTASSIUM (K) DIS		27.0		23.0	220.0
TOTAL ALKALINITY AS CACO3		262.0		1032.0	1900.0
BICARBONATE (HCO3)		320.0		1259.0	2318.0
CARBONATE AS CO3		<1.0		<1.0	<1.0
SULFATE (SO4)		1864.0		521.0	4586.0
CHLORIDE (CL)		666.0		284.0	989.0
FLUORIDE (F)		2.1		1.2	4.9
-- NUTRIENTS --					
NITRATE + NITRITE AS N		.77		3.8	<.05
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) DIS		1.9		1.1	1.4
CADMIUM (CD) DIS		.004		<.005	<.005
CHROMIUM (CR) DIS		<.01		<.01	<.01
COPPER (CU) DIS		<.025		<.025	<.025
IRON (FE) DIS		<.1		.6	2.7
LEAD (PB) DIS		.003		<.003	<.003
SELENIUM (SE) DIS		.048		.03	.16
ZINC (ZN) DIS		.026		.027	.022

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-59	EP-60	EP-61
SAMPLE DATE	08/09/97	08/08/97	08/16/97
SAMPLE TIME	10:30	09:30	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971905-12	L971905-11	L971969-16
SAMPLE NUMBER	EPRI-9708-124	EPRI-9708-125	EPRI-9708-126
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	12.9	9.0	9.58
OXYGEN (O) (FLD) DIS	2.08	2.44	2.3
PH (FLD)	6.98	6.98	7.15
PH	7.7	7.5	7.9
SC (UMHOS/CM AT 25 C)	4780.0	9140.0	9290.0
SC (UMHOS/CM AT 25 C) (FLD)	4750.0	8840.0	9210.0
TDS (MEASURED AT 180 C)	3693.0	8015.0	8194.0
TOTAL SUSPENDED SOLIDS	<1.0	8.9	562.0
WATER TEMPERATURE (C) (FLD)	26.8	25.9	26.9
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	191.0	360.0	455.0
MAGNESIUM (MG) DIS	93.0	152.0	185.0
SODIUM (NA) DIS	876.0	857.0	1723.0
POTASSIUM (K) DIS	105.0	14.0	22.0
TOTAL ALKALINITY AS CACO3	432.0	240.0	300.0
BICARBONATE (HCO3)	527.0	293.0	366.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1632.0	3055.0	3189.0
CHLORIDE (CL)	419.0	1345.0	891.0
FLUORIDE (F)	4.9	1.7	1.7
-- NUTRIENTS --			
NITRATE + NITRITE AS N	7.7	90.0	154.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	3.6	.007	<.005
CADMIUM (CD) DIS	<.005	<.005	<.005
CHROMIUM (CR) DIS	<.01	.011	<.01
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	<.1	.38	1.4
LEAD (PB) DIS	<.003	<.003	<.003
SELENIUM (SE) DIS	.18	.24	.42
ZINC (ZN) DIS	.023 J2	.026 J2	.021

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-65	EP-66	EP-67
SAMPLE DATE	08/16/97	08/08/97	08/12/97
SAMPLE TIME	10:00	07:50	09:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971969-15	L971905-10	L971944-21
SAMPLE NUMBER	EPRI-9708-130	EPRI-9708-131	EPRI-9708-132
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	8.25	10.02	41.62
OXYGEN (O) (FLD) DIS	0.35	6.7	1.5
PH (FLD)	7.15	7.05	6.74
PH	7.7	7.5	7.6
SC (UMHOS/CM AT 25 C)	7420.0	8390.0	4400.0
SC (UMHOS/CM AT 25 C) (FLD)	7360.0	8370.0	4490.0
TDS (MEASURED AT 180 C)	6449.0	7776.0	4098.0
TOTAL SUSPENDED SOLIDS	21.0	78.0	4.0
WATER TEMPERATURE (C) (FLD)	26.7	23.5	24.3
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	392.0	666.0	560.0
MAGNESIUM (MG) DIS	144.0	161.0	156.0
SODIUM (NA) DIS	1380.0	1505.0	488.0
POTASSIUM (K) DIS	24.0	52.0	19.0
TOTAL ALKALINITY AS CACO3	408.0	458.0	206.0
BICARBONATE (HCO3)	498.0	559.0	251.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2651.0	3474.0	1923.0
CHLORIDE (CL)	643.0	697.0	415.0
FLUORIDE (F)	2.1	3.2	.82
-- NUTRIENTS --			
NITRATE + NITRITE AS N	30.0	40.0	18.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	<.005	13.0	.015
CADMIUM (CD) DIS	<.005	<.005	<.005
CHROMIUM (CR) DIS	<.01	.011	<.01
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	<.1	<.1	<.1
LEAD (PB) DIS	<.003	<.003	<.003
SELENIUM (SE) DIS	.33	.26	.14
ZINC (ZN) DIS	<.02	.046 J2	.022

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-71R	EP-72	EP-73
SAMPLE DATE	08/12/97	08/12/97	08/12/97
SAMPLE TIME	10:00	11:50	16:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971944-19	L971944-18	L971944-17
SAMPLE NUMBER	EPRI-9708-136	EPRI-9708-137	EPRI-9708-138
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	49.9	61.4	70.75
OXYGEN (O) (FLD) DIS	0.43	0.37	5.73
PH (FLD)	6.79	6.77	6.88
PH	7.5	7.8	7.9
SC (UMHOS/CM AT 25 C)	6480.0	6220.0	6760.0
SC (UMHOS/CM AT 25 C) (FLD)	6560.0	6300.0	6760.0
TDS (MEASURED AT 180 C)	5636.0	5403.0	5763.0
TOTAL SUSPENDED SOLIDS	4.9	6.4	2.0
WATER TEMPERATURE (C) (FLD)	24.5	25.7	28.9
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	388.0	366.0	287.0
MAGNESIUM (MG) DIS	180.0	167.0	117.0
SODIUM (NA) DIS	1046.0	997.0	1048.0
POTASSIUM (K) DIS	21.0	25.0	388.0
TOTAL ALKALINITY AS CACO3	248.0	238.0	240.0
BICARBONATE (HCO3)	303.0	290.0	293.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2720.0	2767.0	3223.0
CHLORIDE (CL)	517.0	553.0	485.0
FLUORIDE (F)	.95	1.4	2.8
-- NUTRIENTS --			
NITRATE + NITRITE AS N	89.0	58.0	25.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.16	.48	.031
CADMIUM (CD) DIS	<.005	.21	<.005
CHROMIUM (CR) DIS	<.01	<.01	<.01
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	<.1	<.1	<.1
LEAD (PB) DIS	<.003	<.003	<.003
SELENIUM (SE) DIS	.28	.51	1.1
ZINC (ZN) DIS	<.02	.45	.03

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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-77	EP-78	EP-79
SAMPLE DATE	08/12/97	08/13/97	08/13/97
SAMPLE TIME	15:15	15:45	15:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971944-14	L971944-23	L971944-24
SAMPLE NUMBER	EPRI-9708-142	EPRI-9708-143	EPRI-9708-144
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	41.9	31.26	46.0
OXYGEN (O) (FLD) DIS	3.83	0.25	1.06
PH (FLD)	6.98	7.78	7.47
PH	8.4	8.0	8.0
SC (UMHOS/CM AT 25 C)	5400.0	2600.0	4890.0
SC (UMHOS/CM AT 25 C) (FLD)	5350.0	2640.0	4870.0
TDS (MEASURED AT 180 C)	4175.0	1773.0	3643.0
TOTAL SUSPENDED SOLIDS	752.0	9.8	20.0
WATER TEMPERATURE (C) (FLD)	25.7	24.6	27.1
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	240.0	46.0	59.0
MAGNESIUM (MG) DIS	58.0	26.0	71.0
SODIUM (NA) DIS	1034.0	492.0	1018.0
POTASSIUM (K) DIS	35.0	46.0	9.3
TOTAL ALKALINITY AS CACO3	308.0	282.0	388.0
BICARBONATE (HCO3)	364.0	344.0	473.0
CARBONATE AS CO3	6.0	<1.0	<1.0
SULFATE (SO4)	2129.0	807.0	1596.0
CHLORIDE (CL)	616.0	179.0	437.0
FLUORIDE (F)	2.6	4.9	4.1
-- NUTRIENTS --			
NITRATE + NITRITE AS N	.67	7.6	9.5
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	5.6	6.3	.011
CADMIUM (CD) DIS	.012	<.005	<.005
CHROMIUM (CR) DIS	<.01	<.01	.012
COPPER (CU) DIS	<.025	<.025	<.025
IRON (FE) DIS	<.1	<.1	<.1
LEAD (PB) DIS	.006	<.003	<.003
SELENIUM (SE) DIS	.034	.35	.17
ZINC (ZN) DIS	.025	.023	<.02

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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-83	EP-84	EP-85
SAMPLE DATE	08/13/97	08/13/97	08/13/97
SAMPLE TIME	18:30	18:00	12:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971944-28	L971944-29	L971944-30
SAMPLE NUMBER	EPRI-9708-148	EPRI-9708-149	EPRI-9708-150
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	28.0	7.15	15.4
OXYGEN (O) (FLD) DIS	5.75	3.33	0.32
PH (FLD)	7.47	7.39	7.33
PH	8.0	7.9	8.0
SC (UMHOS/CM AT 25 C)	3940.0	1958.0	2900.0
SC (UMHOS/CM AT 25 C) (FLD)	3960.0	1908.0	2890.0
TDS (MEASURED AT 180 C)	2910.0	1525.0	2126.0
TOTAL SUSPENDED SOLIDS	6.0	18.0	4.4
WATER TEMPERATURE (C) (FLD)	23.7	24.6	24.0
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	86.0	148.0	106.0
MAGNESIUM (MG) DIS	73.0	62.0	49.0
SODIUM (NA) DIS	748.0	224.0	495.0
POTASSIUM (K) DIS	12.0	8.5	32.0
TOTAL ALKALINITY AS CACO3	308.0	224.0	314.0
BICARBONATE (HCO3)	376.0	273.0	383.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1382.0	524.0	1034.0
CHLORIDE (CL)	359.0	184.0	193.0
FLUORIDE (F)	2.9	.8	3.6
-- NUTRIENTS --			
NITRATE + NITRITE AS N	8.2	8.4	7.3
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	.01	.1	3.1
CADMIUM (CD) DIS	<.005	.007	<.005
CHROMIUM (CR) DIS	<.01	<.01	<.01
COPPER (CU) DIS	<.025	.026	<.025
IRON (FE) DIS	<.1	<.1	<.1
LEAD (PB) DIS	<.003	.009	<.003
SELENIUM (SE) DIS	.053	.036	.22
ZINC (ZN) DIS	.021	.042	<.02

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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-89
SAMPLE DATE	08/12/97
SAMPLE TIME	14:30
LAB	TSC-SLC
LAB NUMBER	L971944-12
SAMPLE NUMBER	EPRI-9708-154
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	15.1
OXYGEN (O) (FLD) DIS	5.34
PH (FLD)	7.04
PH	7.9
SC (UMHOS/CM AT 25 C)	2780.0
SC (UMHOS/CM AT 25 C) (FLD)	2800.0
TDS (MEASURED AT 180 C)	2085.0
TOTAL SUSPENDED SOLIDS	5.4
WATER TEMPERATURE (C) (FLD)	25.7
-- MAJOR CONSTITUENTS --	
CALCIUM (CA) DIS	175.0
MAGNESIUM (MG) DIS	68.0
SODIUM (NA) DIS	379.0
POTASSIUM (K) DIS	21.0
TOTAL ALKALINITY AS CACO3	224.0
BICARBONATE (HCO3)	273.0
CARBONATE AS CO3	<1.0
SULFATE (SO4)	859.0
CHLORIDE (CL)	308.0
FLUORIDE (F)	.77
-- NUTRIENTS --	
NITRATE + NITRITE AS N	8.3
-- METALS & MINOR CONSTITUENTS --	
ARSENIC (AS) DIS	.01
CADMIUM (CD) DIS	<.005
CHROMIUM (CR) DIS	<.01
COPPER (CU) DIS	<.025
IRON (FE) DIS	<.1
LEAD (PB) DIS	<.003
SELENIUM (SE) DIS	.029
ZINC (ZN) DIS	.02

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R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-4	SEP-6	SEP-7
SAMPLE DATE	08/15/97	08/18/97	08/18/97
SAMPLE TIME	08:10	10:15	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971969-4	L971969-19	L971969-17
SAMPLE NUMBER	EPRI-9708-166	EPRI-9708-168	EPRI-9708-169
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	6.37	5.33	4.97
PH (FLD)	8.54	8.28	8.35
PH	8.4	8.4	8.4
SC (UMHOS/CM AT 25 C)	858.0	961.0	896.0
SC (UMHOS/CM AT 25 C) (FLD)	855.0	943.0	896.0
TDS (MEASURED AT 180 C)	571.0	643.0	594.0
TOTAL SUSPENDED SOLIDS	321.0	178.0	257.0
WATER TEMPERATURE (C) (FLD)	24.4	26.0	25.5
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	62.0	65.0	66.0
MAGNESIUM (MG) DIS	14.0	15.0	15.0
SODIUM (NA) DIS	104.0	121.0	115.0
POTASSIUM (K) DIS	8.1	8.3	8.0
TOTAL ALKALINITY AS CACO3	178.0	174.0	176.0
BICARBONATE (HCO3)	212.0	207.0	210.0
CARBONATE AS CO3	2.0	2.0	2.0
SULFATE (SO4)	149.0	176.0	157.0
CHLORIDE (CL)	74.0	85.0	75.0
FLUORIDE (F)	.66	.66	.66
-- NUTRIENTS --			
NITRATE + NITRITE AS N	.39	.76	.37
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	<.005	<.005	<.005
ARSENIC (AS) TRC	.005	.005	.006
CADMIUM (CD) DIS	<.005	<.005	<.005
CADMIUM (CD) TRC	<.005	<.005	<.005
CHROMIUM (CR) DIS	<.01	<.01	<.01
CHROMIUM (CR) TRC	<.01	.028	<.01
COPPER (CU) DIS	<.025	<.025	<.025
COPPER (CU) TRC	<.025	<.025	<.025
IRON (FE) DIS	<.1	<.1	<.1
IRON (FE) TRC	5.6	4.5	4.7
LEAD (PB) DIS	<.003	<.003	<.003
LEAD (PB) TRC	.008	.006	.005
SELENIUM (SE) DIS	<.005	<.005	<.005
SELENIUM (SE) TRC	<.005	<.005	<.005
ZINC (ZN) DIS	<.02	<.02	.02
ZINC (ZN) TRC	.035	.035	.035

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-11	SEP-12	SEP-13
SAMPLE DATE	08/15/97	08/15/97	08/15/97
SAMPLE TIME	10:20	09:05	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971969-8	L971969-6	L971969-5
SAMPLE NUMBER	EPRI-9708-176	EPRI-9708-177	EPRI-9708-178
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	6.33	6.34	7.0
PH (FLD)	8.42	8.47	8.47
PH	8.1	8.3	8.2
SC (UMHOS/CM AT 25 C)	814.0	850.0	854.0
SC (UMHOS/CM AT 25 C) (FLD)	810.0	834.0	852.0
TDS (MEASURED AT 180 C)	526.0	590.0	554.0
TOTAL SUSPENDED SOLIDS	432.0	224.0	305.0
WATER TEMPERATURE (C) (FLD)	27.3	25.2	24.1
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	60.0	61.0	61.0
MAGNESIUM (MG) DIS	14.0	14.0	14.0
SODIUM (NA) DIS	101.0	101.0	102.0
POTASSIUM (K) DIS	8.3	8.2	8.3
TOTAL ALKALINITY AS CACO3	162.0	176.0	180.0
BICARBONATE (HCO3)	198.0	215.0	220.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	140.0	134.0	141.0
CHLORIDE (CL)	73.0	68.0	76.0
FLUORIDE (F)	.57	.64	.65
-- NUTRIENTS --			
NITRATE + NITRITE AS N	.36	.38	.38
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	<.005	<.005	<.005
ARSENIC (AS) TRC	.005	.005	.005
CADMIUM (CD) DIS	<.005	<.005	<.005
CADMIUM (CD) TRC	<.005	<.005	<.005
CHROMIUM (CR) DIS	<.01	<.01	<.01
CHROMIUM (CR) TRC	<.01	<.01	<.01
COPPER (CU) DIS	<.025	<.025	<.025
COPPER (CU) TRC	<.025	<.025	<.025
IRON (FE) DIS	<.1	<.1	<.1
IRON (FE) TRC	5.0	5.2	5.4
LEAD (PB) DIS	<.003	<.003	<.003
LEAD (PB) TRC	.006	.009	.006
SELENIUM (SE) DIS	<.005	<.005	<.005
SELENIUM (SE) TRC	<.005	<.005	<.005
ZINC (ZN) DIS	<.02	<.02	<.02
ZINC (ZN) TRC	.037	.036	.026

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
4	EPRI-9708-100	L971905-1	08/06/97	EP-4
4	EPRI-9708-101	L971905-2	08/06/97	EP-5
4	EPRI-9708-102	L971905-3	08/06/97	EP-6
5	EPRI-9708-103	L971905-4	08/06/97	EP-7
5	EPRI-9708-105	L971905-8	08/07/97	EP-13
5	EPRI-9708-107	L971905-9	08/07/97	EP-15
6	EPRI-9708-108	L971905-7	08/07/97	EP-20
6	EPRI-9708-110	L971969-1	08/15/97	EP-22
6	EPRI-9708-111	L971944-3	08/11/97	EP-23
7	EPRI-9708-112	L971969-2	08/15/97	EP-24
7	EPRI-9708-113	L971969-3	08/15/97	EP-25
7	EPRI-9708-114	L971944-1	08/11/97	EP-26
8	EPRI-9708-115	L971905-5	08/07/97	EP-29
8	EPRI-9708-116	L971905-6	08/07/97	EP-35
8	EPRI-9708-118	L972044-1	08/26/97	EP-51
8	EPRI-9708-118A		08/11/97	EP-51
9	EPRI-9708-119	L972044-2	08/26/97	EP-54
9	EPRI-9708-119A		08/11/97	EP-54
9	EPRI-9708-120	L971969-13	08/15/97	EP-55
10	EPRI-9708-121	L972044-3	08/26/97	EP-56
10	EPRI-9708-121A		08/11/97	EP-56
10	EPRI-9708-122	L971969-14	08/16/97	EP-57
10	EPRI-9708-123	L971969-23	08/16/97	EP-58
11	EPRI-9708-124	L971905-12	08/09/97	EP-59
11	EPRI-9708-125	L971905-11	08/08/97	EP-60
11	EPRI-9708-126	L971969-16	08/16/97	EP-61
12	EPRI-9708-127	L971905-14	08/09/97	EP-62
12	EPRI-9708-128	L971905-15	08/09/97	EP-63
12	EPRI-9708-129	L971905-13	08/09/97	EP-64
13	EPRI-9708-130	L971969-15	08/16/97	EP-65
13	EPRI-9708-131	L971905-10	08/08/97	EP-66
13	EPRI-9708-132	L971944-21	08/12/97	EP-67
14	EPRI-9708-133	L971969-21	08/14/97	EP-68
14	EPRI-9708-135	L972044-4	08/26/97	EP-70R
14	EPRI-9708-135A		08/12/97	EP-70R
15	EPRI-9708-136	L971944-19	08/12/97	EP-71R
15	EPRI-9708-137	L971944-18	08/12/97	EP-72
15	EPRI-9708-138	L971944-17	08/12/97	EP-73
16	EPRI-9708-139	L971944-22	08/13/97	EP-74
16	EPRI-9708-140	L971944-16	08/12/97	EP-75
16	EPRI-9708-141	L971944-15	08/12/97	EP-76
17	EPRI-9708-142	L971944-14	08/12/97	EP-77
17	EPRI-9708-143	L971944-23	08/13/97	EP-78
17	EPRI-9708-144	L971944-24	08/13/97	EP-79
18	EPRI-9708-145	L971944-25	08/13/97	EP-80
18	EPRI-9708-146	L971944-26	08/13/97	EP-81
18	EPRI-9708-147	L971944-27	08/13/97	EP-82
19	EPRI-9708-148	L971944-28	08/13/97	EP-83
19	EPRI-9708-149	L971944-29	08/13/97	EP-84
19	EPRI-9708-150	L971944-30	08/13/97	EP-85
20	EPRI-9708-151	L971944-31	08/13/97	EP-86
20	EPRI-9708-152	L972231-1	09/15/97	EP-87
20	EPRI-9708-153	L971944-13	08/12/97	EP-88
21	EPRI-9708-154	L971944-12	08/12/97	EP-89
1	EPRI-9708-155	L971944-32	08/13/97	EM-1
1	EPRI-9708-156	L972044-5	08/26/97	EM-2
1	EPRI-9708-156A		08/11/97	EM-2
2	EPRI-9708-158	L972044-6	08/26/97	EM-4
1	EPRI-9708-158A		08/11/97	EM-4
2	EPRI-9708-159	L972044-7	08/26/97	EM-5
2	EPRI-9708-159A		08/11/97	EM-5
2	EPRI-9708-160	L971944-10	08/11/97	EM-6
3	EPRI-9708-161		08/15/97	EM-7
3	EPRI-9708-162		08/15/97	EM-8
22	EPRI-9708-163	L971969-11	08/15/97	SEP-1
22	EPRI-9708-164	L971969-7	08/15/97	SEP-2
22	EPRI-9708-165	L971969-18	08/18/97	SEP-3
23	EPRI-9708-166	L971969-4	08/15/97	SEP-4
23	EPRI-9708-168	L971969-19	08/18/97	SEP-6
23	EPRI-9708-169	L971969-17	08/18/97	SEP-7

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1		EPRI-9708-156A	08/11/97	EM-2
1		EPRI-9708-158A	08/11/97	EM-4
2		EPRI-9708-159A	08/11/97	EM-5
8		EPRI-9708-118A	08/11/97	EP-51
9		EPRI-9708-119A	08/11/97	EP-54
10		EPRI-9708-121A	08/11/97	EP-56
14		EPRI-9708-135A	08/12/97	EP-70R
3		EPRI-9708-161	08/15/97	EM-7
3		EPRI-9708-162	08/15/97	EM-8
4	L971905-1	EPRI-9708-100	08/06/97	EP-4
13	L971905-10	EPRI-9708-131	08/08/97	EP-66
11	L971905-11	EPRI-9708-125	08/08/97	EP-60
11	L971905-12	EPRI-9708-124	08/09/97	EP-59
12	L971905-13	EPRI-9708-129	08/09/97	EP-64
12	L971905-14	EPRI-9708-127	08/09/97	EP-62
12	L971905-15	EPRI-9708-128	08/09/97	EP-63
4	L971905-2	EPRI-9708-101	08/06/97	EP-5
4	L971905-3	EPRI-9708-102	08/06/97	EP-6
5	L971905-4	EPRI-9708-103	08/06/97	EP-7
8	L971905-5	EPRI-9708-115	08/07/97	EP-29
8	L971905-6	EPRI-9708-116	08/07/97	EP-35
6	L971905-7	EPRI-9708-108	08/07/97	EP-20
5	L971905-8	EPRI-9708-105	08/07/97	EP-13
5	L971905-9	EPRI-9708-107	08/07/97	EP-15
7	L971944-1	EPRI-9708-114	08/11/97	EP-26
2	L971944-10	EPRI-9708-160	08/11/97	EM-6
3	L971944-11	EPRI-9708-173	08/11/97	EM-6
21	L971944-12	EPRI-9708-154	08/12/97	EP-89
20	L971944-13	EPRI-9708-153	08/12/97	EP-88
17	L971944-14	EPRI-9708-142	08/12/97	EP-77
16	L971944-15	EPRI-9708-141	08/12/97	EP-76
16	L971944-16	EPRI-9708-140	08/12/97	EP-75
15	L971944-17	EPRI-9708-138	08/12/97	EP-73
15	L971944-18	EPRI-9708-137	08/12/97	EP-72
15	L971944-19	EPRI-9708-136	08/12/97	EP-71R
13	L971944-21	EPRI-9708-132	08/12/97	EP-67
16	L971944-22	EPRI-9708-139	08/13/97	EP-74
17	L971944-23	EPRI-9708-143	08/13/97	EP-78
17	L971944-24	EPRI-9708-144	08/13/97	EP-79
18	L971944-25	EPRI-9708-145	08/13/97	EP-80
18	L971944-26	EPRI-9708-146	08/13/97	EP-81
18	L971944-27	EPRI-9708-147	08/13/97	EP-82
19	L971944-28	EPRI-9708-148	08/13/97	EP-83
19	L971944-29	EPRI-9708-149	08/13/97	EP-84
6	L971944-3	EPRI-9708-111	08/11/97	EP-23
19	L971944-30	EPRI-9708-150	08/13/97	EP-85
20	L971944-31	EPRI-9708-151	08/13/97	EP-86
1	L971944-32	EPRI-9708-155	08/13/97	EM-1
9	L971944-4	EPRI-9708-172	08/11/97	EP-53
6	L971969-1	EPRI-9708-110	08/15/97	EP-22
24	L971969-10	EPRI-9708-179	08/15/97	SEP-10
22	L971969-11	EPRI-9708-163	08/15/97	SEP-1
24	L971969-12	EPRI-9708-171	08/15/97	SEP-9
9	L971969-13	EPRI-9708-120	08/15/97	EP-55
10	L971969-14	EPRI-9708-122	08/16/97	EP-57
13	L971969-15	EPRI-9708-130	08/16/97	EP-65
11	L971969-16	EPRI-9708-126	08/16/97	EP-61
23	L971969-17	EPRI-9708-169	08/18/97	SEP-7
22	L971969-18	EPRI-9708-165	08/18/97	SEP-3
23	L971969-19	EPRI-9708-168	08/18/97	SEP-6
7	L971969-2	EPRI-9708-112	08/15/97	EP-24
24	L971969-20	EPRI-9708-170	08/18/97	SEP-0
14	L971969-21	EPRI-9708-133	08/14/97	EP-68
14	L971969-22	EPRI-9708-174	08/14/97	EP-68
10	L971969-23	EPRI-9708-123	08/16/97	EP-58
7	L971969-3	EPRI-9708-113	08/15/97	EP-25
23	L971969-4	EPRI-9708-166	08/15/97	SEP-4
25	L971969-5	EPRI-9708-178	08/15/97	SEP-13
25	L971969-6	EPRI-9708-177	08/15/97	SEP-12
22	L971969-7	EPRI-9708-164	08/15/97	SEP-2

SECTION 2

REMEDIAL INVESTIGATION
WATER SAMPLES
WINTER 1998

DATA VALIDATION REPORT
ASARCO EL PASO COPPER SMELTER
REMEDIAL INVESTIGATION
WATER SAMPLES
WINTER 1998

Prepared by
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May 1998

GLOSSARY OF TERMS

CCB ..... Continuing Calibration Blank

CCV ..... Continuing Calibration Verification

CLP ..... Contract Laboratory Program

CRDL ..... Contract Required Detection Limit

FAA ..... Flame Atomic Absorption

GFAA ..... Graphite Furnace Atomic Absorption

HGAA ..... Hydride Generation Atomic Absorption

ICB ..... Initial Calibration Blank

ICP ..... Inductively Coupled Plasma

ICV ..... Initial Calibration Verification

IDL ..... Instrument Detection Limit

LCS ..... Laboratory Control Sample

MSA ..... Method of Standard Additions

PB ..... Preparation Blank

PRDL ..... Project Required Detection Limit

QAPP ..... Quality Assurance Project Plan

QC ..... Quality Control

RPD ..... Relative Percent Difference

RSD ..... Relative Standard Deviation

SOW ..... Statement of Work

TDS ..... Total Dissolved Solids

DATA VALIDATION REPORT

1. INTRODUCTION

This validation applies to inorganic analytes from 68 groundwater and 10 surface water samples collected during February of 1998 for the Asarco El Paso Copper Smelter Remedial Investigation.

The total number of samples included 2 groundwater field duplicates. A sample was not collected at site EP-87 because it was dry.

- Validation procedures used are generally consistent with:
(Check all that apply)
  - _X_ EPA CLP National Functional Guidelines for Inorganics Data Review
  - _X_ Asarco El Paso Copper Smelter Remedial Investigation Work Plan, El Paso, Texas (November 1996)
  - ___ Other

- Overall level of validation:
  - ___ Contract Laboratory Program (CLP)
  - _X_ Standard
  - ___ Visual

  Notes: The validation consisted of a visual check of lab and field data, a check of laboratory and field quality control samples with flagging for any QC samples that were out of control limits.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.
  - _X_ Yes
  - ___ No

- All documentation of field procedures was provided as required.
  - _X_ Yes
  - ___ No

3. FIELD QUALITY CONTROL SAMPLES

The field quality control samples required by the work plan are 1 field blank (DI) and one field duplicate per day or per 20 samples, whichever is more frequent.

- **Field Blanks**: Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

Sample Numbers	Site	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Exceedance	# of Flags
EPRI-9802-126	EP-61	total suspended solids	104.0	44.0	81% RPD	9
EPRI-9802-180(DUP)		arsenic (dis)	0.025	0.015	>± PRDL	7
		iron (dis)	0.35	1.0	96% RPD	9

No results were flagged for the failure to meet the quality control sample frequency required by the project work plan. However, it is difficult to assess the reproducibility of sample results for the eight sampling days for which field duplicates were not submitted to the laboratory.

Flagging: J_4/UJ_4

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**
  - ___ CLP-SOW
  - ___ SW-846
  - _X_ Methods for Chemical Analysis of Water and Wastes
  - ___ XRF Standard Operating Procedures

- **Holding times met**
  - ___ Yes
  - _X_ No

  Notes: Holding times for Asarco Technical Services Laboratory were not met for total suspended solids in Laboratory batch L980342. These exceedances resulted in a total of fifteen flags.

  Flagging: J_3/UJ_3

- **Consistency with project requirements**

  Analyses were carried out as requested.
  - _X_ Yes
  - ___No

  Project specified methods were used.
  - _X_ Yes
  - ___No

- Matrix spike recoveries were within the required control limits (75-125%).

  ___ Yes
  _X_ No

  Notes: For laboratory batch L980310, the matrix spike was out of control limits for dissolved iron (recovery was 70%). For this batch, all dissolved iron results were flagged to indicate the possibility of a low bias. This resulted in a total of sixteen flags.

  Flagging: J_4/UJ_4

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

  _X_ Yes
  ___ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix, 35% or less for soil matrix). For low concentration data, that is if the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix, within ± 2 times the PRDL for soil matrix.

  ___ Yes
  _X_ No

  Notes: Refer to the following table:

Laboratory Batch	Parameter	Exceedance	# of Flags
L980395	iron (dis)	>± PRDL	17
	zinc (dis)	>± PRDL	17
L980342	arsenic (dis)	>± PRDL	7
L980276	copper (dis)	>± PRDL	13
	iron (dis)	>± PRDL	11
	zinc (dis)	>± PRDL	11
L980371	lead (trc)	>± PRDL	10

The laboratory duplicate flags indicate the possibility of lack of reproducibility due to the combined effects of sample preparation, and laboratory analytical procedures.

Flagging: J_4/UJ_4

11. HISTORICAL COMPARISON

Where there were more than 3 existing data points, the data for February 1998 were compared with historical results.

- In no case did the current values differ by more than 3 standard deviations from the comparison period mean.
- In no case was the current value the highest or lowest value for the comparison period.

12. DATA QUALITY OBJECTIVES

- **Project data quality objectives (DQO's) met.**
  X Yes - for Accuracy and Precision
  X No - for Completeness

Data quality objectives for this project are for the quality control samples to be within control limits. Evaluation of field and laboratory QC samples give a measure of the actual precision and accuracy obtained.

Accuracy

The ability to recover a known amount of an analyte is a measure of accuracy. Accuracy is evaluated by laboratory matrix spikes and laboratory control samples for higher analyte concentrations, and by field blanks for analyte concentrations within five times the PRDL.

Ninety-nine percent of both laboratory control sample recoveries (128 out of 129) and matrix spike recoveries (75 out of 76) were within control limits, indicating good accuracy for the higher concentration results.

No field blanks were submitted with the February samples making it difficult to evaluate the accuracy of low level results.

Precision

Duplicate measurements give a measure of reproducibility or precision.

Ninety-five percent of the laboratory duplicate measurements (128 out of 135) and 94% of the field duplicate measurements (51 out of 54) were within control limits. However, the required frequency of field duplicates was not met.

Completeness

One measure of completeness is the percentage of valid results obtained. For the Winter El Paso RI monitoring, 99% of the results were valid, that is, not rejected.

Completeness is also evaluated by how well the sampling event met the requirements of the project work plan. Completeness is achieved when the number of valid measurements is sufficient to address all important issues

REFERENCES

(References appropriate to this project have been checked)

_X_ Hem, J.D., 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd edition. US Geological Survey Water Supply Paper 2254.

_X_ Hydrometrics, 1996. Asarco El Paso Copper Smelter Remedial Investigation Work Plan, November 1996

___ U.S. Environmental Protection Agency, 1990. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition.

_X_ U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983. (EPA, 1983)

___ U.S. Environmental Protection Agency, 1995. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Document Number ILM04.0

_X_ U.S. Environmental Protection Agency, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February 1994.

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

CODE		DEFINITION
J	-	The associated numerical value is an estimated quantity because quality control criteria were not met. Subscripts for the "J" qualifier: 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
UJ	-	The material was analyzed for, but was not detected above the associated value. Subscripts for the "UJ" qualifier: 1 - Blank contamination. Indicates possible high bias and/or false positive. 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
R	-	Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	-	Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

APPENDIX 1

TABLES

TABLE 2. SUMMARY OF FLAGGED DATA

El Paso Remedial Investigation
February 1998 Sampling Event

Site	Sample No	Lab No	Date	Parameter	Result (ppm)	Flag	Quality Control Sample Type
EM-1	EPRI-9802-155	L980395-22	02/19/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EM-2	EPRI-9802-156	L980395-5	02/17/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EM-4	EPRI-9802-157	L980395-4	02/17/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EM-6	EPRI-9802-159	L980395-8	02/17/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.045	J4	Lab Dup, >±PRDL
EM-7	EPRI-9802-160	L980395-21	02/19/98	IRON (FE)(DIS)	0.34	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.078	J4	Lab Dup, >±PRDL
EP-4	EPRI-9802-100	L980276-6	02/04/98	COPPER (CU)(DIS)	<0.025	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-5	EPRI-9802-101	L980276-7	02/04/98	COPPER (CU)(DIS)	<0.025	UJ4	Lab Dup, >±PRDL
				IRON (FE)(DIS)	0.21	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.021	J4	Lab Dup, >±PRDL
EP-6	EPRI-9802-102	L980276-8	02/04/98	SPECIFIC CONDUCTANCE	997.0	R	Hist. Comp. Lab vs Field SC
				COPPER (CU)(DIS)	<0.025	UJ4	Lab Dup, >±PRDL
				IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-7	EPRI-9802-103	L980276-9	02/04/98	SPECIFIC CONDUCTANCE	501.0	R	Hist. Comp. Lab vs Field SC
				COPPER (CU)(DIS)	<0.025	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-12	EPRI-9802-104	L980276-4	02/03/98	COPPER (CU)(DIS)	<0.025	UJ4	Lab Dup, >±PRDL
				IRON (FE)(DIS)	0.15	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-13	EPRI-9802-105	L980395-2	02/17/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.025	J4	Lab Dup, >±PRDL
EP-14	EPRI-9802-106	L980395-1	02/17/98	IRON (FE)(DIS)	0.17	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-15	EPRI-9802-107	L980395-3	02/17/98	IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-20	EPRI-9802-108	L980276-1	02/03/98	COPPER (CU)(DIS)	0.036	J4	Lab Dup, >±PRDL
				IRON (FE)(DIS)	0.11	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.063	J4	Lab Dup, >±PRDL
EP-21	EPRI-9802-109	L980395-15	02/18/98	TOTAL SUSPENDED SOLIDS	27.0	J4	Field Dup, 81% RPD
				ARSENIC (AS)(DIS)	0.062	J4	Field Dup, >±PRDL
				IRON (FE)(DIS)	0.17	J4	Field Dup, 96% RPD
				IRON (FE)(DIS)	0.17	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	0.038	J4	Lab Dup, >±PRDL
EP-22	EPRI-9802-110	L980395-14	02/18/98	TOTAL SUSPENDED SOLIDS	45.0	J4	Field Dup, 81% RPD
				ARSENIC (AS)(DIS)	0.035	J4	Field Dup, >±PRDL
				IRON (FE)(DIS)	<0.1	UJ4	Field Dup, 96% RPD

TABLE 2. SUMMARY OF FLAGGED DATA

El Paso Remedial Investigation
February 1998 Sampling Event

Site	Sample No	Lab No	Date	Parameter	Result (ppm)	Flag	Quality Control Sample Type
EP-60	EPRI-9802-125	L980310-5	02/05/98	IRON (FE)(DIS)	0.4	J4	Spike, 70% recovery
EP-61	EPRI-9802-126	L980395-10	02/18/98	TOTAL SUSPENDED SOLIDS	104.0	J4	Field Dup, 81% RPD
				ARSENIC (AS)(DIS)	0.025	J4	Field Dup, >±PRDL
				IRON (FE)(DIS)	0.35	J4	Field Dup, 96% RPD
				IRON (FE)(DIS)	0.35	J4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-61	EPRI-9802-180	L980395-11	02/18/98	TOTAL SUSPENDED SOLIDS	44.0	J4	Field Dup, 81% RPD
				ARSENIC (AS)(DIS)	0.015	J4	Field Dup, >±PRDL
				IRON (FE)(DIS)	1.0	J4	Field Dup, 96% RPD
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-62	EPRI-9802-127	L980310-3	02/05/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-63	EPRI-9802-128	L980310-4	02/05/98	IRON (FE)(DIS)	0.2	J4	Spike, 70% recovery
EP-64	EPRI-9802-129	L980310-2	02/05/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-65	EPRI-9802-130	L980395-12	02/18/98	TOTAL SUSPENDED SOLIDS	8.4	J4	Field Dup, 81% RPD
				ARSENIC (AS)(DIS)	0.009	J4	Field Dup, >±PRDL
				IRON (FE)(DIS)	<0.1	UJ4	Field Dup, 96% RPD
				IRON (FE)(DIS)	<0.1	UJ4	Lab Dup, >±PRDL
				ZINC (ZN)(DIS)	<0.02	UJ4	Lab Dup, >±PRDL
EP-66	EPRI-9802-131	L980310-6	02/05/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-67	EPRI-9802-132	L980342-2	02/11/98	TOTAL SUSPENDED SOLIDS	2.9	J3	Holding time
				ARSENIC (AS)(DIS)	0.015	J4	Lab Dup, >±PRDL
EP-67	EPRI-9802-179	L980342-3	02/11/98	TOTAL SUSPENDED SOLIDS	3.2	J3	Holding time
				ARSENIC (AS)(DIS)	0.015	J4	Lab Dup, >±PRDL
EP-68	EPRI-9802-133	L980342-4	02/11/98	TOTAL SUSPENDED SOLIDS	89.0	J3	Holding time
				ARSENIC (AS)(DIS)	<0.005	UJ4	Lab Dup, >±PRDL
EP-70	EPRI-9802-135	L980342-7	02/11/98	TOTAL SUSPENDED SOLIDS	<1.0	UJ3	Holding time
EP-71	EPRI-9802-136	L980342-6	02/11/98	TOTAL SUSPENDED SOLIDS	1.3	J3	Holding time
EP-72	EPRI-9802-137	L980342-8	02/11/98	TOTAL SUSPENDED SOLIDS	16.0	J3	Holding time
EP-73	EPRI-9802-138	L980342-11	02/12/98	TOTAL SUSPENDED SOLIDS	8.2	J3	Holding time
				ARSENIC (AS)(DIS)	0.023	J4	Lab Dup, >±PRDL
EP-75	EPRI-9802-140	L980310-13	02/06/98	IRON (FE)(DIS)	0.3	J4	Spike, 70% recovery
EP-76	EPRI-9802-141	L980310-12	02/06/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-77	EPRI-9802-142	L980342-9	02/12/98	TOTAL SUSPENDED SOLIDS	249.0	J3	Holding time
EP-78	EPRI-9802-143	L980310-16	02/06/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-79	EPRI-9802-144	L980310-15	02/06/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-80	EPRI-9802-145	L980310-7	02/05/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery
EP-81	EPRI-9802-146	L980310-8	02/05/98	IRON (FE)(DIS)	0.1	J4	Spike, 70% recovery

TABLE 2. SUMMARY OF FLAGGED DATA

El Paso Remedial Investigation
February 1998 Sampling Event

Site	Sample No	Lab No	Date	Parameter	Result (ppm)	Flag	Quality Control Sample Type
SEP-13	EPRI-9802-170	L980371-2	02/13/98	SPECIFIC CONDUCTANCE	207.0	R	Hist. Comp. Lab vs Field SC
				LEAD (PB)(TRC)	<0.003	UJ4	Lab Dup, >±PRDL

TABLE OF CONTENTS BY SITE TYPE

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-1	EM-2	EM-4
SAMPLE DATE	02/19/98	02/17/98	02/17/98
SAMPLE TIME	10:00	14:00	13:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980395-22	L980395-5	L980395-4
SAMPLE NUMBER	EPRI-9802-155	EPRI-9802-156	EPRI-9802-157
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	74.76	65.72	63.51
OXYGEN (O) (FLD) DIS	1.64	1.26	1.14
PH (FLD)	7.39	6.9	6.97
PH	7.5	7.7	7.4
SC (UMHOS/CM AT 25 C)	5480.0	4150.0	11150.0
SC (UMHOS/CM AT 25 C) (FLD)	6410.0	5450.0	14370.0
TDS (MEASURED AT 180 C)	4192.0	3159.0	7157.0
TOTAL SUSPENDED SOLIDS	50.0	20.0	<1.0
WATER TEMPERATURE (C) (FLD)	19.0	23.4	22.5
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	209.0	179.0	451.0
MAGNESIUM (MG) DIS	122.0	72.0	220.0
SODIUM (NA) DIS	1075.0	791.0	1950.0
POTASSIUM (K) DIS	28.0	15.0	40.0
BICARBONATE (HCO3)	227.0	322.0	156.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1695.0	1247.0	503.0
CHLORIDE (CL)	720.0	436.0	3358.0
FLUORIDE (F)	0.73	1.4	1.3
-- NUTRIENTS --			
NITRATE + NITRITE AS N	0.054	20.0	0.25
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.056	0.55	0.009
CADMIUM (CD) DIS	<0.005	<0.005	0.008
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1 UJ4	<0.1 UJ4	<0.1 UJ4
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	<0.005	0.12	<0.005
ZINC (ZN) DIS	<0.02 UJ4	<0.02 UJ4	<0.02 UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-4		EP-5		EP-6		
SAMPLE DATE	02/04/98		02/04/98		02/04/98		
SAMPLE TIME	08:30		08:50		09:10		
LAB	TSC-SLC		TSC-SLC		TSC-SLC		
LAB NUMBER	L980276-6		L980276-7		L980276-8		
SAMPLE NUMBER	EPRI-9802-100		EPRI-9802-101		EPRI-9802-102		
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	5.0		5.51		7.61		
OXYGEN (O) (FLD) DIS	1.91		0.68		3.1		
PH (FLD)	7.58		7.58		7.53		
PH	8.0		8.1		8.0		
SC (UMHOS/CM AT 25 C)	1595.0		3070.0		6060.0		
SC (UMHOS/CM AT 25 C) (FLD)	1563.0		3060.0		997.0	A	
TDS (MEASURED AT 180 C)	1076.0		2106.0		4491.0		
TOTAL SUSPENDED SOLIDS	54.0		30.0		10.0		
WATER TEMPERATURE (C) (FLD)	13.8		14.6		15.1		
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	74.0		78.0		246.0		
MAGNESIUM (MG) DIS	20.0		33.0		76.0		
SODIUM (NA) DIS	257.0		671.0		1167.0		
POTASSIUM (K) DIS	12.0		10.0		25.0		
BICARBONATE (HCO3)	300.0		895.0		581.0		
CARBONATE AS CO3	<1.0		<1.0		<1.0		
SULFATE (SO4)	346.0		519.0		1852.0		
CHLORIDE (CL)	190.0		361.0		954.0		
FLUORIDE (F)	1.1		2.3		1.3		
-- NUTRIENTS --							
NITRATE + NITRITE AS N	<0.05		0.14		<0.05		
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.068		0.059		0.023		
CADMIUM (CD) DIS	<0.005		<0.005		<0.005		
CHROMIUM (CR) DIS	<0.01		<0.01		<0.01		
COPPER (CU) DIS	<0.025	UJ4	<0.025	UJ4	<0.025	UJ4	
IRON (FE) DIS	0.91		0.21	J4	<0.1	UJ4	
LEAD (PB) DIS	<0.003		<0.003		<0.003		
SELENIUM (SE) DIS	0.005		0.005		0.009		
ZINC (ZN) DIS	<0.02	UJ4	0.021	J4	<0.02	UJ4	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-7			EP-12		EP-13	
SAMPLE DATE	02/04/98			02/03/98		02/17/98	
SAMPLE TIME	10:15			14:45		10:15	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980276-9			L980276-4		L980395-2	
SAMPLE NUMBER	EPRI-9802-103			EPRI-9802-104		EPRI-9802-105	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	6.62			63.07		60.03	
OXYGEN (O) (FLD) DIS	1.62			1.55		0.182	
PH (FLD)	7.3			6.76		6.95	
PH	7.9			7.4		7.7	
SC (UMHOS/CM AT 25 C)	2810.0			6580.0		11910.0	
SC (UMHOS/CM AT 25 C) (FLD)	501.0	A		7870.0		14100.0	
TDS (MEASURED AT 180 C)	1978.0			5491.0		10540.0	
TOTAL SUSPENDED SOLIDS	14.0			8.3		23.0	
WATER TEMPERATURE (C) (FLD)	16.0			21.2		22.4	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	119.0			437.0		348.0	
MAGNESIUM (MG) DIS	38.0			148.0		59.0	
SODIUM (NA) DIS	502.0			1093.0		2992.0	
POTASSIUM (K) DIS	9.6			21.0		102.0	
BICARBONATE (HCO3)	361.0			612.0		417.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	814.0			2603.0		5364.0	
CHLORIDE (CL)	344.0			666.0		634.0	
FLUORIDE (F)	1.3			0.92		1.4	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	0.076			32.0		103.0	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.076			1.2		48.0	
CADMIUM (CD) DIS	<0.005			<0.005		0.68	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	<0.025	UJ4		<0.025	UJ4	0.027	
IRON (FE) DIS	1.7			0.15	J4	<0.1	UJ4
LEAD (PB) DIS	<0.003			<0.003		<0.003	
SELENIUM (SE) DIS	<0.005			1.7		6.1	
ZINC (ZN) DIS	<0.02	UJ4		<0.02	UJ4	0.025	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-14	EP-15	EP-20
SAMPLE DATE	02/17/98	02/17/98	02/03/98
SAMPLE TIME	09:30	11:00	09:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980395-1	L980395-3	L980276-1
SAMPLE NUMBER	EPRI-9802-106	EPRI-9802-107	EPRI-9802-108
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	60.03	58.61	16.98
OXYGEN (O) (FLD) DIS	0.35	2.45	2.36
PH (FLD)	6.76	7.12	7.06
PH	7.5	7.7	7.4
SC (UMHOS/CM AT 25 C)	4520.0	3100.0	10800.0
SC (UMHOS/CM AT 25 C) (FLD)	6090.0	3980.0	13110.0
TDS (MEASURED AT 180 C)	3852.0	2299.0	9914.0
TOTAL SUSPENDED SOLIDS	2.6	86.0	74.0
WATER TEMPERATURE (C) (FLD)	24.9	23.1	21.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	383.0	122.0	536.0
MAGNESIUM (MG) DIS	97.0	43.0	320.0
SODIUM (NA) DIS	671.0	557.0	1919.0
POTASSIUM (K) DIS	51.0	11.0	63.0
BICARBONATE (HCO3)	323.0	262.0	349.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1707.0	885.0	5063.0
CHLORIDE (CL)	350.0	329.0	890.0
FLUORIDE (F)	1.5	0.84	1.9
-- NUTRIENTS --			
NITRATE + NITRITE AS N	17.0	17.0	201.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	1.3	0.031	0.96
CADMIUM (CD) DIS	<0.005	0.016	0.048
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	0.036 J4
IRON (FE) DIS	0.17 J4	<0.1 UJ4	0.11 J4
LEAD (PB) DIS	0.004	<0.003	<0.003
SELENIUM (SE) DIS	0.3	0.16	0.37
ZINC (ZN) DIS	<0.02 UJ4	<0.02 UJ4	0.063 J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-21			EP-22			EP-23	
SAMPLE DATE	02/18/98			02/18/98			02/04/98	
SAMPLE TIME	14:30			13:45			13:40	
LAB	TSC-SLC			TSC-SLC			TSC-SLC	
LAB NUMBER	L980395-15			L980395-14			L980276-12	
SAMPLE NUMBER	EPRI-9802-109			EPRI-9802-110			EPRI-9802-111	
-- PHYSICAL PARAMETERS --								
DEPTH TO WATER LEVEL (FEET)	26.3			35.1			23.73	
OXYGEN (O) (FLD) DIS	0.65			3.75			1.45	
PH (FLD)	7.3			7.49			7.42	
PH	8.0			7.6			7.7	
SC (UMHOS/CM AT 25 C)	5980.0			9900.0			6190.0	
SC (UMHOS/CM AT 25 C) (FLD)	8000.0			11910.0			7190.0	
TDS (MEASURED AT 180 C)	3770.0			6247.0			4183.0	
TOTAL SUSPENDED SOLIDS	27.0	J4		45.0	J4		45.0	
WATER TEMPERATURE (C) (FLD)	22.9			18.3			23.0	
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	65.0			253.0			192.0	
MAGNESIUM (MG) DIS	51.0			155.0			99.0	
SODIUM (NA) DIS	1108.0			1664.0			854.0	
POTASSIUM (K) DIS	466.0			281.0			76.0	
BICARBONATE (HCO3)	1935.0			889.0			307.0	
CARBONATE AS CO3	<1.0			<1.0			<1.0	
SULFATE (SO4)	511.0			2219.0			2484.0	
CHLORIDE (CL)	697.0			903.0			493.0	
FLUORIDE (F)	4.8			4.5			2.6	
-- NUTRIENTS --								
NITRATE + NITRITE AS N	<0.05			294.0			0.14	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	0.062	J4		0.035	J4		1.5	
CADMIUM (CD) DIS	<0.005			0.005			<0.005	
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01	
COPPER (CU) DIS	<0.025			0.035			<0.025	UJ4
IRON (FE) DIS	0.17	J4		<0.1	UJ4		0.25	J4
		J4			UJ4			
LEAD (PB) DIS	<0.003			0.018			<0.003	
SELENIUM (SE) DIS	0.095			0.59			0.019	
ZINC (ZN) DIS	0.038	J4		2.1			<0.02	UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-24			EP-25		EP-26	
SAMPLE DATE	02/18/98			02/18/98		02/04/98	
SAMPLE TIME	15:15			15:45		11:00	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980395-16			L980395-17		L980276-10	
REMARKS				NO SAMPLE			
SAMPLE NUMBER	EPRI-9802-112			EPRI-9802-113		EPRI-9802-114	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	21.7			46.51		50.44	
OXYGEN (O) (FLD) DIS	1.26					5.74	
PH (FLD)	6.74					7.58	
PH	8.1			7.6		7.4	
SC (UMHOS/CM AT 25 C)	5130.0			5420.0		202.0	
SC (UMHOS/CM AT 25 C) (FLD)	5820.0					239.0	
TDS (MEASURED AT 180 C)	3259.0			3218.0		145.0	
TOTAL SUSPENDED SOLIDS	16.0	J4		500.0	J4	100.0	
WATER TEMPERATURE (C) (FLD)	23.1					21.8	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	213.0			78.0		9.1	
MAGNESIUM (MG) DIS	47.0			39.0		2.0	
SODIUM (NA) DIS	1033.0			1232.0		26.0	
POTASSIUM (K) DIS	29.0			53.0		13.0	
BICARBONATE (HCO3)	1200.0			1588.0		26.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	305.0			147.0		46.0	
CHLORIDE (CL)	1027.0			937.0		12.0	
FLUORIDE (F)	2.6			1.6		0.78	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	<0.05			<0.05		1.4	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.031	J4		3.1		0.58	
CADMIUM (CD) DIS	<0.005			<0.005		0.18	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		0.042	J4
IRON (FE) DIS	0.2	J4		4.0	J4	<0.1	UJ4
		J4					
LEAD (PB) DIS	<0.003			<0.003		0.01	
SELENIUM (SE) DIS	<0.005			0.044		0.05	
ZINC (ZN) DIS	<0.02	UJ4		<0.02	UJ4	0.56	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-29	EP-35	EP-43
SAMPLE DATE	02/03/98	02/03/98	02/03/98
SAMPLE TIME	12:05	11:00	15:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980276-3	L980276-2	L980276-5
SAMPLE NUMBER	EPRI-9802-115	EPRI-9802-116	EPRI-9802-175
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	16.95	17.48	60.84
OXYGEN (O) (FLD) DIS	0.68	2.11	0.03
PH (FLD)	7.47	6.99	7.09
PH	8.0	7.6	7.5
SC (UMHOS/CM AT 25 C)	3100.0	6760.0	9590.0
SC (UMHOS/CM AT 25 C) (FLD)	3890.0	7940.0	11980.0
TDS (MEASURED AT 180 C)	2073.0	5859.0	6434.0
TOTAL SUSPENDED SOLIDS	13.0	14.0	35.0
WATER TEMPERATURE (C) (FLD)	23.0	21.1	22.6
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	52.0	443.0	261.0
MAGNESIUM (MG) DIS	20.0	170.0	145.0
SODIUM (NA) DIS	677.0	1108.0	1692.0
POTASSIUM (K) DIS	27.0	19.0	58.0
BICARBONATE (HCO3)	285.0	490.0	720.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	973.0	2654.0	1425.0
CHLORIDE (CL)	317.0	545.0	2405.0
FLUORIDE (F)	2.7	0.99	2.1
-- NUTRIENTS --			
NITRATE + NITRITE AS N	8.1	82.0	<0.05
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.29	0.37	1.2
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025 UJ4	<0.025 UJ4	<0.025 UJ4
IRON (FE) DIS	0.11 J4	0.1 J4	0.17 J4
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.19	4.1	0.15
ZINC (ZN) DIS	<0.02 UJ4	0.021 J4	<0.02 UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-49		EP-51		EP-52		
SAMPLE DATE	02/19/98		02/12/98		02/12/98		
SAMPLE TIME	13:00		11:30		11:00		
LAB	TSC-SLC		TSC-SLC		TSC-SLC		
LAB NUMBER	L980395-23		L980342-13		L980342-12		
REMARKS	NO SAMPLE						
SAMPLE NUMBER	EPRI-9802-117		EPRI-9802-118		EPRI-9802-176		
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	65.35		48.56		45.88		
OXYGEN (O) (FLD) DIS			0.03		2.0		
PH (FLD)			5.85		6.03		
PH	4.0		6.9		6.9		
SC (UMHOS/CM AT 25 C)	11440.0		11070.0		10870.0		
SC (UMHOS/CM AT 25 C) (FLD)			13050.0		13320.0		
TDS (MEASURED AT 180 C)	17442.0		8591.0		9266.0		
TOTAL SUSPENDED SOLIDS	430.0		36.0	J3	86.0	J3	
WATER TEMPERATURE (C) (FLD)			24.6		23.7		
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	466.0		690.0		581.0		
MAGNESIUM (MG) DIS	305.0		412.0		252.0		
SODIUM (NA) DIS	614.0		1322.0		2276.0		
POTASSIUM (K) DIS	207.0		51.0		23.0		
BICARBONATE (HCO3)	<1.0		256.0		642.0		
CARBONATE AS CO3	<1.0		<1.0		<1.0		
SULFATE (SO4)	7869.0		2550.0		3538.0		
CHLORIDE (CL)	782.0		2369.0		1468.0		
FLUORIDE (F)	25.0		7.3		6.3		
-- NUTRIENTS --							
NITRATE + NITRITE AS N	<0.05		133.0		130.0		
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	464.0		10.0		1.6		
CADMIUM (CD) DIS	43.0		3.9		0.71		
CHROMIUM (CR) DIS	0.047		<0.01		<0.01		
COPPER (CU) DIS	0.089		5.6		0.45		
IRON (FE) DIS	2381.0		1.8		0.55		
LEAD (PB) DIS	0.014		<0.003		0.043		
SELENIUM (SE) DIS	0.14		0.17		0.3		
ZINC (ZN) DIS	1900.0		61.0		3.6		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-53			EP-54		EP-55	
SAMPLE DATE	02/04/98			02/12/98		02/12/98	
SAMPLE TIME	14:15			14:30		14:15	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980276-13			L980342-15		L980342-14	
SAMPLE NUMBER	EPRI-9802-178			EPRI-9802-119		EPRI-9802-120	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	66.14			69.9		53.96	
OXYGEN (O) (FLD) DIS	1.43			1.94		1.21	
PH (FLD)	6.43			5.98		5.95	
PH	7.0			7.4		6.9	
SC (UMHOS/CM AT 25 C)	7590.0			10100.0		10510.0	
SC (UMHOS/CM AT 25 C) (FLD)	9580.0			11060.0		14030.0	
TDS (MEASURED AT 180 C)	6775.0			8548.0		9283.0	
TOTAL SUSPENDED SOLIDS	277.0			43.0	J3	2141.0	J3
WATER TEMPERATURE (C) (FLD)	23.2			25.8		26.1	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	527.0			414.0		522.0	
MAGNESIUM (MG) DIS	101.0			255.0		324.0	
SODIUM (NA) DIS	1264.0			1788.0		1794.0	
POTASSIUM (K) DIS	124.0			342.0		229.0	
BICARBONATE (HCO3)	256.0			566.0		878.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	3266.0			4900.0		4863.0	
CHLORIDE (CL)	515.0			790.0		922.0	
FLUORIDE (F)	5.9			5.7		22.0	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	97.0			3.1		<0.05	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	63.0			27.0		57.0	
CADMIUM (CD) DIS	1.4			2.0		0.042	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	0.032	J4		0.21		<0.025	
IRON (FE) DIS	<0.1	UJ4		2.3		99.0	
LEAD (PB) DIS	<0.003			<0.003		<0.003	
SELENIUM (SE) DIS	1.7			0.065		0.19	
ZINC (ZN) DIS	4.3			41.0		71.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-56	EP-57	EP-58
SAMPLE DATE	02/04/98	02/18/98	02/18/98
SAMPLE TIME	11:40	11:15	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980276-11	L980395-13	L980395-9
SAMPLE NUMBER	EPRI-9802-121	EPRI-9802-122	EPRI-9802-123
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	49.06	9.85	15.76
OXYGEN (O) (FLD) DIS	1.81	0.78	0.79
PH (FLD)	7.14	7.01	6.38
PH	7.8	7.5	6.8
SC (UMHOS/CM AT 25 C)	5520.0	2900.0	11510.0
SC (UMHOS/CM AT 25 C) (FLD)	6620.0	3530.0	13740.0
TDS (MEASURED AT 180 C)	4260.0	1978.0	9349.0
TOTAL SUSPENDED SOLIDS	448.0	42.0 J4	72.0 J4
WATER TEMPERATURE (C) (FLD)	22.8	21.9	18.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	256.0	89.0	497.0
MAGNESIUM (MG) DIS	63.0	76.0	198.0
SODIUM (NA) DIS	1043.0	500.0	2510.0
POTASSIUM (K) DIS	29.0	18.0	263.0
BICARBONATE (HCO3)	344.0	1176.0	1288.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2125.0	298.0	4006.0
CHLORIDE (CL)	681.0	261.0	851.0
FLUORIDE (F)	2.1	0.94	4.7
-- NUTRIENTS --			
NITRATE + NITRITE AS N	2.5	0.2	<0.05
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	2.2	0.98 J4	4.2
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	0.027 J4	<0.025	<0.025
IRON (FE) DIS	<0.1 UJ4	<0.1 UJ4 UJ4	0.9 J4
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.048	<0.005	0.027
ZINC (ZN) DIS	0.025 J4	0.022 J4	<0.02 UJ4

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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-59	EP-60	EP-61	EP-61
SAMPLE DATE	02/05/98	02/05/98	02/18/98	02/18/98
SAMPLE TIME	09:45	13:45	09:30	09:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980310-1	L980310-5	L980395-10	L980395-11
REMARKS				DUPLICATE
SAMPLE NUMBER	EPRI-9802-124	EPRI-9802-125	EPRI-9802-126	EPRI-9802-180
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	13.66	10.17	11.84	11.84
OXYGEN (O) (FLD) DIS	1.06	1.7	1.68	1.68
PH (FLD)	7.09	6.95	6.85	6.85
PH	7.3	7.3	7.3	7.4
SC (UMHOS/CM AT 25 C)	4640.0	8780.0	9200.0	9190.0
SC (UMHOS/CM AT 25 C) (FLD)	5630.0	10210.0	10350.0	10350.0
TDS (MEASURED AT 180 C)	3594.0	7495.0	8017.0	7997.0
TOTAL SUSPENDED SOLIDS	2.7	6.3	104.0 J4	44.0 J4
WATER TEMPERATURE (C) (FLD)	23.1	22.4	18.5	18.5
-- MAJOR CONSTITUENTS --				
CALCIUM (CA) DIS	168.0	584.0	477.0	477.0
MAGNESIUM (MG) DIS	83.0	237.0	201.0	210.0
SODIUM (NA) DIS	807.0	1366.0	2082.0	2118.0
POTASSIUM (K) DIS	95.0	14.0	23.0	24.0
BICARBONATE (HCO3)	503.0	317.0	388.0	398.0
CARBONATE AS CO3	<1.0	<1.0	<1.0	<1.0
SULFATE (SO4)	1551.0	3000.0	3213.0	3375.0
CHLORIDE (CL)	450.0	1278.0	857.0	826.0
FLUORIDE (F)	4.8	1.4	1.6	1.6
-- NUTRIENTS --				
NITRATE + NITRITE AS N	10.0	109.0	207.0	210.0
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) DIS	3.4	0.009	0.025 J4	0.015 J4
CADMIUM (CD) DIS	<0.005	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	0.034	<0.025	<0.025
IRON (FE) DIS	0.1 J4	0.4 J4	0.35 J4 J4	1.0 J4
LEAD (PB) DIS	<0.003	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.23	0.26	0.36	0.35
ZINC (ZN) DIS	<0.02	0.027	<0.02 UJ4	<0.02 UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-62			EP-63		EP-64	
SAMPLE DATE	02/05/98			02/05/98		02/05/98	
SAMPLE TIME	11:00			11:30		10:20	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980310-3			L980310-4		L980310-2	
SAMPLE NUMBER	EPRI-9802-127			EPRI-9802-128		EPRI-9802-129	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	9.64			9.42		12.27	
OXYGEN (O) (FLD) DIS	3.07			2.23		3.76	
PH (FLD)	7.16			7.08		7.98	
PH	7.4			7.4		7.9	
SC (UMHOS/CM AT 25 C)	5460.0			8210.0		10420.0	
SC (UMHOS/CM AT 25 C) (FLD)	5980.0			9590.0		10800.0	
TDS (MEASURED AT 180 C)	4317.0			6412.0		9250.0	
TOTAL SUSPENDED SOLIDS	20.0			102.0		22.0	
WATER TEMPERATURE (C) (FLD)	19.8			21.7		18.5	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	253.0			266.0		399.0	
MAGNESIUM (MG) DIS	114.0			157.0		141.0	
SODIUM (NA) DIS	935.0			1579.0		2200.0	
POTASSIUM (K) DIS	69.0			39.0		26.0	
BICARBONATE (HCO3)	393.0			532.0		256.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	2183.0			2893.0		4564.0	
CHLORIDE (CL)	473.0			1067.0		869.0	
FLUORIDE (F)	2.7			2.1		1.9	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	17.0			18.0		136.0	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.84			0.02		0.043	
CADMIUM (CD) DIS	<0.005			<0.005		<0.005	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	0.026			0.029		0.049	
IRON (FE) DIS	0.1	J4		0.2	J4	0.1	J4
LEAD (PB) DIS	<0.003			<0.003		<0.003	
SELENIUM (SE) DIS	0.39			0.2		0.65	
ZINC (ZN) DIS	0.023			0.03		0.024	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-65	EP-66	EP-67	EP-67
SAMPLE DATE	02/18/98	02/05/98	02/11/98	02/11/98
SAMPLE TIME	10:45	14:10	11:00	11:05
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980395-12	L980310-6	L980342-2	L980342-3
REMARKS				DUPLICATE
SAMPLE NUMBER	EPRI-9802-130	EPRI-9802-131	EPRI-9802-132	EPRI-9802-179
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	10.73	11.21	43.95	43.95
OXYGEN (O) (FLD) DIS	0.84	4.42	1.71	1.71
PH (FLD)	7.07	7.09	6.66	6.66
PH	7.5	7.6	7.3	7.3
SC (UMHOS/CM AT 25 C)	7500.0	7220.0	4470.0	4480.0
SC (UMHOS/CM AT 25 C) (FLD)	9190.0	8290.0	5820.0	5820.0
TDS (MEASURED AT 180 C)	6383.0	6329.0	4077.0	4056.0
TOTAL SUSPENDED SOLIDS	8.4 J4	5.6	2.9 J3	3.2 J3
WATER TEMPERATURE (C) (FLD)	20.4	21.9	24.1	24.1
-- MAJOR CONSTITUENTS --				
CALCIUM (CA) DIS	409.0	541.0	477.0	477.0
MAGNESIUM (MG) DIS	165.0	122.0	144.0	144.0
SODIUM (NA) DIS	1661.0	1194.0	511.0	510.0
POTASSIUM (K) DIS	24.0	45.0	16.0	17.0
BICARBONATE (HCO3)	521.0	443.0	251.0	256.0
CARBONATE AS CO3	<1.0	<1.0	<1.0	<1.0
SULFATE (SO4)	2718.0	3098.0	1896.0	1969.0
CHLORIDE (CL)	690.0	625.0	384.0	385.0
FLUORIDE (F)	2.0	3.0	0.72	0.72
-- NUTRIENTS --				
NITRATE + NITRITE AS N	58.0	44.0	19.0	19.0
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) DIS	0.009 J4	9.7	0.015 J4	0.015 J4
CADMIUM (CD) DIS	<0.005	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	0.032	<0.025	<0.025
IRON (FE) DIS	<0.1 UJ4 UJ4	0.1 J4	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.2	0.26	0.13	0.13
ZINC (ZN) DIS	<0.02 UJ4	0.024	0.02	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-68			EP-70		EP-71	
SAMPLE DATE	02/11/98			02/11/98		02/11/98	
SAMPLE TIME	11:30			14:45		14:15	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980342-4			L980342-7		L980342-6	
SAMPLE NUMBER	EPRI-9802-133			EPRI-9802-135		EPRI-9802-136	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	63.2			62.3		50.63	
OXYGEN (O) (FLD) DIS	7.59			0.56		0.82	
PH (FLD)	6.93			6.79		6.7	
PH	7.7			7.4		7.5	
SC (UMHOS/CM AT 25 C)	4980.0			6600.0		6770.0	
SC (UMHOS/CM AT 25 C) (FLD)	6080.0			8480.0		8670.0	
TDS (MEASURED AT 180 C)	3957.0			5373.0		5828.0	
TOTAL SUSPENDED SOLIDS	89.0	J3		<1.0	UJ3	1.3	J3
WATER TEMPERATURE (C) (FLD)	23.7			23.9		24.2	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	271.0			304.0		379.0	
MAGNESIUM (MG) DIS	114.0			159.0		180.0	
SODIUM (NA) DIS	765.0			1230.0		1168.0	
POTASSIUM (K) DIS	17.0			26.0		20.0	
BICARBONATE (HCO3)	244.0			290.0		305.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	1610.0			2464.0		2575.0	
CHLORIDE (CL)	638.0			608.0		574.0	
FLUORIDE (F)	0.68			1.1		0.8	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	33.0			78.0		114.0	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	<0.005	UJ4		1.4		0.14	
CADMIUM (CD) DIS	<0.005			0.014		<0.005	
CHROMIUM (CR) DIS	0.016			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		0.025	
IRON (FE) DIS	<0.1			<0.1		<0.1	
LEAD (PB) DIS	<0.003			<0.003		0.012	
SELENIUM (SE) DIS	0.28			0.22		0.26	
ZINC (ZN) DIS	<0.02			0.2		0.027	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-72			EP-73		EP-75	
SAMPLE DATE	02/11/98			02/12/98		02/06/98	
SAMPLE TIME	15:15			10:00		11:05	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980342-8			L980342-11		L980310-13	
SAMPLE NUMBER	EPRI-9802-137			EPRI-9802-138		EPRI-9802-140	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	61.85			71.25		55.45	
OXYGEN (O) (FLD) DIS	0.72			0.97		1.11	
PH (FLD)	6.72			6.84		6.86	
PH	7.4			7.6		7.2	
SC (UMHOS/CM AT 25 C)	6030.0			6850.0		19240.0	
SC (UMHOS/CM AT 25 C) (FLD)	7900.0			9340.0		23900.0	
TDS (MEASURED AT 180 C)	4975.0			5672.0		19043.0	
TOTAL SUSPENDED SOLIDS	16.0	J3		8.2	J3	49.0	
WATER TEMPERATURE (C) (FLD)	25.0			27.2		24.4	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	349.0			292.0		451.0	
MAGNESIUM (MG) DIS	158.0			125.0		476.0	
SODIUM (NA) DIS	1016.0			1185.0		4055.0	
POTASSIUM (K) DIS	25.0			417.0		655.0	
BICARBONATE (HCO3)	283.0			285.0		288.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	2209.0			2861.0		11195.0	
CHLORIDE (CL)	574.0			466.0		710.0	
FLUORIDE (F)	1.3			2.4		1.5	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	53.0			24.0		178.0	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.5			0.023	J4	18.0	
CADMIUM (CD) DIS	0.21			<0.005		0.022	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		0.086	
IRON (FE) DIS	<0.1			<0.1		0.3	J4
LEAD (PB) DIS	<0.003			0.004		<0.003	
SELENIUM (SE) DIS	0.36			1.2		4.49	
ZINC (ZN) DIS	0.53			0.022		0.14	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-76	EP-77	EP-78
SAMPLE DATE	02/06/98	02/12/98	02/06/98
SAMPLE TIME	10:20	08:45	14:55
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980310-12	L980342-9	L980310-16
SAMPLE NUMBER	EPRI-9802-141	EPRI-9802-142	EPRI-9802-143
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	49.22	40.7	31.13
OXYGEN (O) (FLD) DIS	0.34	1.1	0.73
PH (FLD)	7.22	7.0	7.69
PH	7.6	7.5	7.9
SC (UMHOS/CM AT 25 C)	4800.0	5330.0	2940.0
SC (UMHOS/CM AT 25 C) (FLD)	6000.0	6910.0	3780.0
TDS (MEASURED AT 180 C)	3704.0	4046.0	2004.0
TOTAL SUSPENDED SOLIDS	4.0	249.0 J3	10.0
WATER TEMPERATURE (C) (FLD)	22.1	23.8	23.8
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	159.0	228.0	61.0
MAGNESIUM (MG) DIS	90.0	51.0	33.0
SODIUM (NA) DIS	882.0	1067.0	483.0
POTASSIUM (K) DIS	63.0	34.0	57.0
BICARBONATE (HCO3)	476.0	329.0	337.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1527.0	1808.0	876.0
CHLORIDE (CL)	422.0	636.0	252.0
FLUORIDE (F)	1.9	2.4	4.2
-- NUTRIENTS --			
NITRATE + NITRITE AS N	4.7	0.4	11.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.54	5.7	5.9
CADMIUM (CD) DIS	<0.005	0.015	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.1 J4	<0.1	0.1 J4
LEAD (PB) DIS	0.005	0.005	<0.003
SELENIUM (SE) DIS	0.13	0.007	0.22
ZINC (ZN) DIS	0.07	0.024	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-79	EP-80	EP-81
SAMPLE DATE	02/06/98	02/05/98	02/05/98
SAMPLE TIME	14:20	15:15	15:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980310-15	L980310-7	L980310-8
SAMPLE NUMBER	EPRI-9802-144	EPRI-9802-145	EPRI-9802-146
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	45.09	11.98	18.81
OXYGEN (O) (FLD) DIS	0.63	0.88	2.94
PH (FLD)	7.42	7.14	7.0
PH	7.9	7.4	7.5
SC (UMHOS/CM AT 25 C)	4940.0	5040.0	2560.0
SC (UMHOS/CM AT 25 C) (FLD)	6700.0	6190.0	2980.0
TDS (MEASURED AT 180 C)	3770.0	4032.0	1967.0
TOTAL SUSPENDED SOLIDS	37.0	67.0	76.0
WATER TEMPERATURE (C) (FLD)	25.5	23.9	23.3
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	59.0	202.0	152.0
MAGNESIUM (MG) DIS	74.0	81.0	76.0
SODIUM (NA) DIS	1103.0	1000.0	331.0
POTASSIUM (K) DIS	12.0	14.0	17.0
BICARBONATE (HCO3)	466.0	520.0	527.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1748.0	1954.0	923.0
CHLORIDE (CL)	451.0	362.0	125.0
FLUORIDE (F)	3.9	1.3	1.6
-- NUTRIENTS --			
NITRATE + NITRITE AS N	11.0	7.1	9.4
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.007	0.018	0.32
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.1 J4	0.1 J4	0.1 J4
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.18	0.039	0.21
ZINC (ZN) DIS	<0.02	<0.02	0.025

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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-82			EP-83			EP-84	
SAMPLE DATE	02/11/98			02/06/98			02/06/98	
SAMPLE TIME	10:15			09:50			09:00	
LAB	TSC-SLC			TSC-SLC			TSC-SLC	
LAB NUMBER	L980342-1			L980310-11			L980310-10	
SAMPLE NUMBER	EPRI-9802-147			EPRI-9802-148			EPRI-9802-149	
-- PHYSICAL PARAMETERS --								
DEPTH TO WATER LEVEL (FEET)	15.5			27.14			7.48	
OXYGEN (O) (FLD) DIS	1.73			6.33			1.35	
PH (FLD)	6.94			7.51			7.18	
PH	7.6			7.8			7.4	
SC (UMHOS/CM AT 25 C)	4320.0			3720.0			2990.0	
SC (UMHOS/CM AT 25 C) (FLD)	5360.0			4670.0			3470.0	
TDS (MEASURED AT 180 C)	3099.0			2660.0			2293.0	
TOTAL SUSPENDED SOLIDS	5.4	J3		8.1			4.4	
WATER TEMPERATURE (C) (FLD)	21.9			21.8			18.6	
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	167.0			73.0			219.0	
MAGNESIUM (MG) DIS	87.0			66.0			104.0	
SODIUM (NA) DIS	780.0			735.0			390.0	
POTASSIUM (K) DIS	24.0			12.0			11.0	
BICARBONATE (HCO3)	394.0			361.0			295.0	
CARBONATE AS CO3	<1.0			<1.0			<1.0	
SULFATE (SO4)	1311.0			1161.0			942.0	
CHLORIDE (CL)	500.0			364.0			371.0	
FLUORIDE (F)	2.3			2.7			0.63	
-- NUTRIENTS --								
NITRATE + NITRITE AS N	9.1			7.6			11.0	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	0.006	J4		0.006			0.035	
CADMIUM (CD) DIS	<0.005			<0.005			0.007	
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01	
COPPER (CU) DIS	<0.025			<0.025			0.037	
IRON (FE) DIS	<0.1			0.1	J4		0.1	J4
LEAD (PB) DIS	<0.003			<0.003			0.018	
SELENIUM (SE) DIS	0.17			0.044			0.024	
ZINC (ZN) DIS	0.024			<0.02			0.048	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-85	EP-86	EP-87
SAMPLE DATE	02/05/98	02/06/98	02/06/98
SAMPLE TIME	16:15	13:50	09:20
LAB	TSC-SLC	TSC-SLC	HYDRO
LAB NUMBER	L980310-9	L980310-14	
REMARKS			NO SAMPLE
SAMPLE NUMBER	EPRI-9802-150	EPRI-9802-151	EPRI-9802-152
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	19.25	48.74	DRY
OXYGEN (O) (FLD) DIS	0.61	6.0	
PH (FLD)	7.34	7.53	
PH	7.7	7.8	
SC (UMHOS/CM AT 25 C)	2600.0	2640.0	
SC (UMHOS/CM AT 25 C) (FLD)	3140.0	3300.0	
TDS (MEASURED AT 180 C)	1882.0	1812.0	
TOTAL SUSPENDED SOLIDS	7.9	201.0	
WATER TEMPERATURE (C) (FLD)	22.8	22.3	
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	89.0	41.0	
MAGNESIUM (MG) DIS	43.0	33.0	
SODIUM (NA) DIS	431.0	497.0	
POTASSIUM (K) DIS	30.0	12.0	
BICARBONATE (HCO3)	356.0	383.0	
CARBONATE AS CO3	<1.0	<1.0	
SULFATE (SO4)	840.0	679.0	
CHLORIDE (CL)	179.0	287.0	
FLUORIDE (F)	3.4	2.5	
-- NUTRIENTS --			
NITRATE + NITRITE AS N	7.5	5.8	
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	2.9	<0.005	
CADMIUM (CD) DIS	<0.005	<0.005	
CHROMIUM (CR) DIS	<0.01	<0.01	
COPPER (CU) DIS	<0.025	<0.025	
IRON (FE) DIS	0.1 J4	0.1 J4	
LEAD (PB) DIS	<0.003	<0.003	
SELENIUM (SE) DIS	0.15	0.029	
ZINC (ZN) DIS	<0.02	<0.02	

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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-88			EP-89			EP-90	
SAMPLE DATE	02/12/98			02/11/98			02/17/98	
SAMPLE TIME	09:30			13:50			14:30	
LAB	TSC-SLC			TSC-SLC			TSC-SLC	
LAB NUMBER	L980342-10			L980342-5			L980395-6	
SAMPLE NUMBER	EPRI-9802-153			EPRI-9802-154			EPRI-9802-139	
-- PHYSICAL PARAMETERS --								
DEPTH TO WATER LEVEL (FEET)	27.73			15.12			53.9	
OXYGEN (O) (FLD) DIS	1.53			4.09			5.13	
PH (FLD)	7.24			7.0			7.12	
PH	7.8			7.7			7.8	
SC (UMHOS/CM AT 25 C)	5320.0			2770.0			2950.0	
SC (UMHOS/CM AT 25 C) (FLD)	6600.0			3600.0			3920.0	
TDS (MEASURED AT 180 C)	3946.0			1995.0			2132.0	
TOTAL SUSPENDED SOLIDS	60.0	J3		5.8	J3		129.0	
WATER TEMPERATURE (C) (FLD)	22.5			24.3			24.3	
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	59.0			165.0			117.0	
MAGNESIUM (MG) DIS	38.0			65.0			58.0	
SODIUM (NA) DIS	1344.0			378.0			510.0	
POTASSIUM (K) DIS	6.9			20.0			9.0	
BICARBONATE (HCO3)	339.0			266.0			298.0	
CARBONATE AS CO3	<1.0			<1.0			<1.0	
SULFATE (SO4)	1669.0			747.0			832.0	
CHLORIDE (CL)	448.0			314.0			316.0	
FLUORIDE (F)	1.9			0.7			0.51	
-- NUTRIENTS --								
NITRATE + NITRITE AS N	0.81			9.8			14.0	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	0.017	J4		<0.005	UJ4		0.18	
CADMIUM (CD) DIS	<0.005			<0.005			<0.005	
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01	
COPPER (CU) DIS	<0.025			<0.025			<0.025	
IRON (FE) DIS	<0.1			<0.1			<0.1	UJ4
LEAD (PB) DIS	<0.003			<0.003			<0.003	
SELENIUM (SE) DIS	0.011			0.013			0.75	
ZINC (ZN) DIS	0.031			<0.02			<0.02	UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	POND 1	POND 5	POND 6
SAMPLE DATE	02/19/98	02/19/98	02/19/98
SAMPLE TIME	08:15	08:30	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980395-18	L980395-19	L980395-20
SAMPLE NUMBER	EPRI-9802-171	EPRI-9802-172	EPRI-9802-173
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	8.15	7.33	5.9
PH (FLD)	7.85	7.99	8.1
PH	7.7	7.5	7.8
SC (UMHOS/CM AT 25 C)	25600.0	1152.0	3960.0
SC (UMHOS/CM AT 25 C) (FLD)	22900.0	1160.0	4430.0
TDS (MEASURED AT 180 C)	24898.0	775.0	2914.0
TOTAL SUSPENDED SOLIDS	8.8	1.8	23.0
WATER TEMPERATURE (C) (FLD)	8.58	12.3	16.1
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	411.0	41.0	103.0
MAGNESIUM (MG) DIS	135.0	6.9	11.0
SODIUM (NA) DIS	7362.0	195.0	938.0
POTASSIUM (K) DIS	329.0	6.3	17.0
BICARBONATE (HCO3)	154.0	92.0	73.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	14493.0	237.0	1363.0
CHLORIDE (CL)	1134.0	144.0	402.0
FLUORIDE (F)	21.0	0.91	5.1
-- NUTRIENTS --			
NITRATE + NITRITE AS N	23.0	1.2	1.2
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.59	0.14	1.8
CADMIUM (CD) DIS	15.0	0.04	0.13
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	0.47	0.34	1.0
IRON (FE) DIS	<0.1 UJ4	0.22 J4	0.76
LEAD (PB) DIS	0.09	0.26	0.25
SELENIUM (SE) DIS	0.91	0.026	0.08
ZINC (ZN) DIS	116.0	0.43	1.8

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-1			SEP-2		SEP-3	
SAMPLE DATE	02/13/98			02/13/98		02/13/98	
SAMPLE TIME	11:00			10:05		13:30	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L980371-7			L980371-4		L980371-10	
SAMPLE NUMBER	EPRI-9802-161			EPRI-9802-162		EPRI-9802-163	
-- PHYSICAL PARAMETERS --							
PH (FLD)	7.38			8.38		7.84	
PH	7.9			8.4		8.1	
SC (UMHOS/CM AT 25 C)	4580.0			1440.0		5410.0	
SC (UMHOS/CM AT 25 C) (FLD)	868.0	A		218.0	A	1054.0	A
TDS (MEASURED AT 180 C)	3300.0			961.0		3979.0	
TOTAL SUSPENDED SOLIDS	20.0			95.0		21.0	
WATER TEMPERATURE (C) (FLD)	18.6			10.5		20.5	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	203.0			84.0		216.0	
MAGNESIUM (MG) DIS	76.0			18.0		89.0	
SODIUM (NA) DIS	748.0			217.0		965.0	
POTASSIUM (K) DIS	67.0			7.5		54.0	
BICARBONATE (HCO3)	388.0			231.0		342.0	
CARBONATE AS CO3	<1.0			7.0		<1.0	
SULFATE (SO4)	1676.0			256.0		1832.0	
CHLORIDE (CL)	481.0			171.0		679.0	
FLUORIDE (F)	2.1			0.69		1.8	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	3.8			1.8		8.6	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.62			0.006		0.53	
ARSENIC (AS) TRC	0.58			0.009		0.5	
CADMIUM (CD) DIS	<0.005			<0.005		<0.005	
CADMIUM (CD) TRC	<0.005			<0.005		0.008	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
CHROMIUM (CR) TRC	<0.01			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		<0.025	
COPPER (CU) TRC	<0.025			<0.025		<0.025	
IRON (FE) DIS	<0.1			<0.1		<0.1	
IRON (FE) TRC	<0.1			1.6		<0.1	
LEAD (PB) DIS	<0.003			<0.003		<0.003	
LEAD (PB) TRC	<0.003	UJ4		0.004	J4	0.006	J4
SELENIUM (SE) DIS	0.12			<0.005		0.11	
SELENIUM (SE) TRC	0.11			<0.005		0.11	
ZINC (ZN) DIS	<0.02			<0.02		0.022	
ZINC (ZN) TRC	<0.02			0.022	J2	0.025	J2

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-4			SEP-7			SEP-9	
SAMPLE DATE	02/13/98			02/13/98			02/13/98	
SAMPLE TIME	09:00			11:30			13:15	
LAB	TSC-SLC			TSC-SLC			TSC-SLC	
LAB NUMBER	L980371-1			L980371-8			L980371-9	
SAMPLE NUMBER	EPRI-9802-164			EPRI-9802-165			EPRI-9802-166	
-- PHYSICAL PARAMETERS --								
PH (FLD)	8.41			8.49			8.18	
PH	8.4			8.5			8.2	
SC (UMHOS/CM AT 25 C)	1388.0			1479.0			1550.0	
SC (UMHOS/CM AT 25 C) (FLD)	197.7	A		249.0	A		278.0	A
TDS (MEASURED AT 180 C)	878.0			959.0			1030.0	
TOTAL SUSPENDED SOLIDS	106.0			47.0			44.0	
WATER TEMPERATURE (C) (FLD)	7.6			14.8			17.0	
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	86.0			83.0			71.0	
MAGNESIUM (MG) DIS	19.0			18.0			15.0	
SODIUM (NA) DIS	203.0			232.0			272.0	
POTASSIUM (K) DIS	8.0			7.9			8.9	
BICARBONATE (HCO3)	235.0			204.0			200.0	
CARBONATE AS CO3	7.0			11.0			<1.0	
SULFATE (SO4)	246.0			285.0			286.0	
CHLORIDE (CL)	160.0			178.0			206.0	
FLUORIDE (F)	0.73			0.71			0.7	
-- NUTRIENTS --								
NITRATE + NITRITE AS N	1.3			3.0			6.5	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	0.007			0.015			0.009	
ARSENIC (AS) TRC	0.01			0.02			0.01	
CADMIUM (CD) DIS	<0.005			<0.005			<0.005	
CADMIUM (CD) TRC	<0.005			<0.005			<0.005	
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01	
CHROMIUM (CR) TRC	<0.01			<0.01			<0.01	
COPPER (CU) DIS	<0.025			<0.025			<0.025	
COPPER (CU) TRC	<0.025			<0.025			<0.025	
IRON (FE) DIS	<0.1			<0.1			<0.1	
IRON (FE) TRC	1.6			0.6			0.6	
LEAD (PB) DIS	<0.003			<0.003			<0.003	
LEAD (PB) TRC	<0.003	UJ4		<0.003	UJ4		<0.003	UJ4
SELENIUM (SE) DIS	<0.005			<0.005			<0.005	
SELENIUM (SE) TRC	<0.005			<0.005			<0.005	
ZINC (ZN) DIS	<0.02			<0.02			0.035	
ZINC (ZN) TRC	<0.02			0.024	J2		0.031	J2

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-10		SEP-11		SEP-12		
SAMPLE DATE	02/13/98		02/13/98		02/13/98		
SAMPLE TIME	10:40		10:20		09:45		
LAB	TSC-SLC		TSC-SLC		TSC-SLC		
LAB NUMBER	L980371-6		L980371-5		L980371-3		
SAMPLE NUMBER	EPRI-9802-167		EPRI-9802-168		EPRI-9802-169		
-- PHYSICAL PARAMETERS --							
PH (FLD)	8.29		8.32		8.39		
PH	8.3		8.4		8.4		
SC (UMHOS/CM AT 25 C)	1474.0		1447.0		1422.0		
SC (UMHOS/CM AT 25 C) (FLD)	230.0	A	228.0	A	212.0	A	
TDS (MEASURED AT 180 C)	960.0		949.0		911.0		
TOTAL SUSPENDED SOLIDS	80.0		91.0		97.0		
WATER TEMPERATURE (C) (FLD)	11.0		11.5		9.4		
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	82.0		85.0		85.0		
MAGNESIUM (MG) DIS	17.0		18.0		18.0		
SODIUM (NA) DIS	228.0		225.0		211.0		
POTASSIUM (K) DIS	7.4		8.2		7.5		
BICARBONATE (HCO3)	229.0		224.0		223.0		
CARBONATE AS CO3	<1.0		7.0		10.0		
SULFATE (SO4)	264.0		259.0		253.0		
CHLORIDE (CL)	175.0		178.0		176.0		
FLUORIDE (F)	0.68		0.71		0.68		
-- NUTRIENTS --							
NITRATE + NITRITE AS N	3.0		2.5		1.8		
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.006		0.006		0.006		
ARSENIC (AS) TRC	0.008		0.008		0.008		
CADMIUM (CD) DIS	<0.005		<0.005		<0.005		
CADMIUM (CD) TRC	<0.005		<0.005		<0.005		
CHROMIUM (CR) DIS	<0.01		<0.01		<0.01		
CHROMIUM (CR) TRC	<0.01		<0.01		<0.01		
COPPER (CU) DIS	<0.025		<0.025		<0.025		
COPPER (CU) TRC	<0.025		<0.025		<0.025		
IRON (FE) DIS	<0.1		<0.1		<0.1		
IRON (FE) TRC	1.6		1.4		1.6		
LEAD (PB) DIS	<0.003		<0.003		<0.003		
LEAD (PB) TRC	<0.003	UJ4	0.011	J4	<0.003	UJ4	
SELENIUM (SE) DIS	<0.005		<0.005		<0.005		
SELENIUM (SE) TRC	<0.005		<0.005		<0.005		
ZINC (ZN) DIS	<0.02		0.02		<0.02		
ZINC (ZN) TRC	0.029	J2	0.025	J2	0.027	J2	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SBP-13	
SAMPLE DATE	02/13/98	
SAMPLE TIME	09:30	
LAB	TSC-SLC	
LAB NUMBER	L980371-2	
SAMPLE NUMBER	EPRI-9802-170	
-- PHYSICAL PARAMETERS --		
PH (FLD)	8.39	
PH	8.4	
SC (UMHOS/CM AT 25 C)	1394.0	
SC (UMHOS/CM AT 25 C) (FLD)	207.0	A
TDS (MEASURED AT 180 C)	911.0	
TOTAL SUSPENDED SOLIDS	95.0	
WATER TEMPERATURE (C) (FLD)	9.8	
-- MAJOR CONSTITUENTS --		
CALCIUM (CA) DIS	88.0	
MAGNESIUM (MG) DIS	19.0	
SODIUM (NA) DIS	209.0	
POTASSIUM (K) DIS	8.0	
BICARBONATE (HCO3)	234.0	
CARBONATE AS CO3	7.0	
SULFATE (SO4)	246.0	
CHLORIDE (CL)	166.0	
FLUORIDE (F)	0.7	
-- NUTRIENTS --		
NITRATE + NITRITE AS N	1.5	
-- METALS & MINOR CONSTITUENTS --		
ARSENIC (AS) DIS	0.005	
ARSENIC (AS) TRC	0.008	
CADMIUM (CD) DIS	<0.005	
CADMIUM (CD) TRC	<0.005	
CHROMIUM (CR) DIS	<0.01	
CHROMIUM (CR) TRC	<0.01	
COPPER (CU) DIS	<0.025	
COPPER (CU) TRC	<0.025	
IRON (FE) DIS	<0.1	
IRON (FE) TRC	1.6	
LEAD (PB) DIS	<0.003	
LEAD (PB) TRC	<0.003	UJ4
SELENIUM (SE) DIS	<0.005	
SELENIUM (SE) TRC	<0.005	
ZINC (ZN) DIS	<0.02	
ZINC (ZN) TRC	<0.02	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

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SECTION 3

XRF DATA FOR MAY-OCTOBER 1997

DATA VALIDATION REPORT
EL PASO REMEDIAL INVESTIGATION
XRF DATA for MAY - OCTOBER 1997

Prepared by
Hydrometrics, Inc.
2727 Airport Road
Helena, MT 59601

March 1998

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LIST OF APPENDICES

APPENDIX 1: Tables

APPENDIX 2: Database

GLOSSARY OF TERMS

CV ..... Calibration Verification

CLP..... Contract Laboratory Program

CRDL ..... Contract Required Detection Limit

IDL ..... Instrument Detection Limit

LCS..... Laboratory Control Sample

PRDL..... Project Required Detection Limit

QAPP..... Quality Assurance Project Plan

QC ..... Quality Control

RPD ..... Relative Percent Difference

SOW ..... Statement of Work

XRF ..... X-ray fluorescence

SUMMARY

This report summarizes the validation of XRF analysis results for soil samples collected from May 28 to October 30, 1997 for the Asarco El Paso Copper Smelter Remedial Investigation. The data have been reviewed in accordance with the project work plan (Asarco El Paso Copper Smelter Remedial Investigation, El Paso, Texas, November 1996). Deviations from the prescribed quality control procedures and/or exceedances of quality control limits have been noted in the text, and associated data have been identified as qualified by flagging the sample results in the database with data validation codes.

- All numbered tables are in Appendix 1. Data validation codes are defined in Table 1, and a summary of the flagged data is in Table 2.
- The flagged database is in Appendix 2.

Samples were analyzed at Asarco Technical Services laboratory in Salt Lake City, Utah.

- Parameters of interest included arsenic, cadmium, chromium, copper, iron, lead, selenium, and zinc.
- Because of the number of parameters and because the purpose of the sampling was an initial screening to determine overall levels of contaminants and to identify hot spots, the analysis was carried out using the fundamental parameters technique rather than a matrix-specific calibration.

Data quality objectives for the project are discussed in detail in Section 9.

A summary of quality control violations follows. It should be noted that not all quality control deficiencies are equally serious, and some may have no practical impact on the usefulness of the data.

- Out of 312 field duplicate measurements, 19 were out of control limits. A total of 108 results were flagged to indicate a possible lack of precision.
- The work plan requires field duplicates to be submitted at a minimum frequency of 1 per day. For 13% of the samples, no field duplicate was submitted on the day of sample collection.

DATA VALIDATION REPORT

1. INTRODUCTION

- This validation applies to the XRF analysis of arsenic and lead for 633 soil samples collected for the El Paso RI project from May through October 1997. The total number of samples included 39 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
  ___ EPA National Functional Guidelines for Inorganic Data Review
  _X_ Project Work Plan: Asarco El Paso Copper Smelter Remedial Investigation Work Plan -- El Paso, Texas (November 1996)
  ___ Other

- Overall level of validation:
  ___ Contract Laboratory Program (CLP)
  _X_ Standard - see Notes
  ___ Visual
  ___ XRF Auto-Validation using in house Auto Val program

  Notes: Both laboratory and field quality control were evaluated for frequency and measured values. Results were flagged for exceedances on field quality control.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.
  _X_ Yes
  ___ No

- All documentation of field procedures was provided as required.
  _X_ Yes
  ___ No

  Notes: With the exception of the collected at the SSIA4 sites at the end of October, field documentation was received after laboratory results. This increased the time required for data management and validation tasks. Ideally, field documentation should be provided to the QA/QC department immediately following field sampling events.

3. FIELD QUALITY CONTROL SAMPLES

- **Field duplicates**

  Field duplicates have been collected at the proper frequency.

  ___Yes

  _X_ No

  Notes: The field duplicate frequency required by the project work plan is 1 in 20 or 1 per sampling day, whichever is more frequent. Overall, the total number of field duplicates met the 1 in 20 frequency. However: the daily frequency was not met.

  - The frequency of 1 per sampling day has not been met. As shown in the following table, for 80 samples, or 13% of the samples, no field duplicates were submitted on the day of sample collection.
  - The frequency of 1 in 20 per sampling day has not been met. As show in the following table, for 3 days, an insufficient number of field duplicates were submitted (indicated by *).

Date of Sampling	Number of Non-QC Samples	Number of Field Duplicates Required	Number of Field Duplicates Submitted	Number of Samples Affected by Lack of QC
5/28	11	1	0	11
5/29	10	1	1	
5/30	10	1	0	10
5/31	9	1	0	9
6/1	9	1	1	
6/2	18	1	1	
6/3	9	1	1	
6/4	12	1	0	12
6/5	7	1	0	7
6/6	11	1	0	11
6/10	7	1	0	7
6/11	16	1	1	
6/12	25	3	2	*
6/13	13	1	1	
6/16	3	1	0	3
6/17	9	1	1	
6/18	9	1	0	9
6/19	6	1	1	
6/30	15	1	2	
7/1	12	1	2	
7/7	1	1	0	1
7/8	55	3	1	*
7/14	38	2	5	
7/15	42	3	3	
7/16	33	1	1	
7/17	41	3	3	
7/18	52	3	2	*
10/27	13	1	1	
10/28	47	3	4	
10/30	51	3	5	
Totals	**594**	**45**	**39**	**80**

- The 39 sample/field duplicate pairs are listed by date in the following table.

Date of Sampling	Field Duplicates Submitted	Duplicates Out of Control Limits	Total Number of Flags
05/29/97	EP-68A/A2	Cu, Pb, Zn	33
06/01/97	EP-72C/C2		
06/02/97	EP-74M/M2		
06/03/97	EP-76B/B2		
06/11/97	EP-83F/F2	Zn	9
06/12/97	EP-70RB/RB2 EP-71RL/RL2		
06/13/97	EP-86M/M2		
06/17/97	EP-88C/C2		
06/19/97	RIBH-1E/E2	Zn	5
06/30/97	RIBH-3A/A2 RIBH-5B/B2		
07/01/97	RIBH-8C/C2 RIBH-10A/A2		
07/08/97	SSIA5-7B/B2	Pb	4
07/14/97	SSIA2-2A/2A2 SSIA5-15A/15A2 SSIA5-15B/15B2 SSIA5-16A/16A2 SSIA5-16B/16B2	 Cr, Zn As, Zn	 10 8
07/15/97	SSIA1-5A/5A2 SSIA3-5A/5A2 SSIA3-10A/10A2		
07/16/97	SSIA8-6A/6A2	Cr	5
07/17/97	SSIA8-14A/14A2 SSENT5-B/B2 SSENT8-A/A2	 Cr	 3
07/18/97	SSIA8-18A/18A2 SSIA8-30A/30A2	 Cr	 3
10/27/97	SSIA4-2A/A2	Cr	5
10/28/97	SSIA4-5A/A2 SSIA4-7A/A2 SSIA4-10A/A2 SSIA4-14A/A2	Cr As, Cu Cr	5 10 5
10/30/97	SSIA4-17A/A2 SSIA4-20A/A2 SSIA4-23A/A2 SSIA4-26A/A2 SSIA4-29A/A2	 Zn	 3

Field duplicate relative percent differences (RPDs) were within the required control limits (RPD of 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± 2 times the PRDL for soil matrix.

___Yes
_X_ No

Notes: The field sample/duplicate pairs which showed exceedances are listed in the following table. Results for samples collected on the same day at the same site have been flagged to indicate a possible lack of reproducibility of sample results due to the combined effects of variations in field sampling techniques, sample preparation, and laboratory analytical procedures.

Out of 312 field duplicate measurements, there were 19 exceedances, resulting the flagging of 108 associated results.

Flagging: J_4/ UJ_4

Sample Date	Sample/ Duplicate	Analyte	Results (ppm)	PRDL (ppm)	Evaluation	Number of Flags
5/29/97	EP-68A/A2	Cu	580/ 37	20	> ±2 times PRDL	11
5/29/97	EP-68A/A2	Pb	140/ 24	10	> ±2 times PRDL	11
5/29/97	EP-68A/A2	Zn	82/ 42	10	> ±2 times PRDL	11
6/11/97	EP-83F/F2	Zn	21/ 49	10	> ±2 times PRDL	9
6/19/97	RIBH-1E/E2	Zn	64/ 140	10	74% RPD	5
7/08/97	SSIA5-7B/B2	Pb	68/ <10	10	> ±2 times PRDL	4
7/14/97	SSIA5-16A/A2	As	27/ 68	20	> ±2 times PRDL	2
7/14/97	SSIA5-16A/A2	Zn	650/ 1000	10	42% RPD	6
7/14/97	SSIA5-15B/B2	Cr	32/ 100	30	> ±2 times PRDL	6
7/14/97	SSIA5-15B/B2	Zn	59/ 27	10	> ±2 times PRDL	4
7/16/97	SSIA8-6A/A2	Cr	<30/ 140	30	> ±2 times PRDL	5
7/17/97	SSENT8-A/A2	Cr	88/ 170	30	> ±2 times PRDL	3
7/18/97	SSIA8-30A/A2	Cr	150/ 70	30	> ±2 times PRDL	3
10/27/97	SSIA4-2A/A2	Cr	100/ 210	30	> ±2 times PRDL	5
10/28/97	SSIA4-5A/A2	Cr	68/ 180	30	> ±2 times PRDL	5
10/28/97	SSIA4-10A/A2	As	840/ 1500	20	56%	5
10/28/97	SSIA4-10A/A2	Cu	5800/ 8800	20	41%	5
10/28/97	SSIA4-14A/A2	Cr	110/ <30	30	> ±2 times PRDL	5
10/30/97	SSIA4-29A/A2	Zn	3000/ 1900	10	45%	3

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**
  - ___ CLP-SOW
  - ___ SW-846
  - ___ Standard Methods for Chemical Analysis of Water and Wastes
  - _X_ XRF Standard Operating Procedures
  - ___ Other

- **Holding times met**

  _X_ Yes - with the exception of laboratory pH, which was requested later
  ___ No

- **Consistency with project requirements**

  Analyses were carried out as requested.
  _X_ Yes
  ___ No

  Project specified methods were used.
  _X_ Yes
  ___ No

5. DETECTION LIMITS

The following table lists the laboratory's reporting level by XRF analysis (using fundamental parameters technique) and compares it to the project detection limit goals (PDLGs).

Parameters	Reporting Level (ppm)	PDLG (ppm)
Arsenic	20	10
Cadmium	10	10
Chromium	30	20
Copper	20	10
Iron	20	20
Lead	10	10
Selenium	10	10
Zinc	10	10

- Reporting detection limits met project required detection limits (PRDLs).

  ___Yes
  _X_ No

  Notes: Note that the reporting level does not meet the PDLG for arsenic, copper, or chromium. This is considered acceptable for analysis using fundamental parameters, since this is a screening technique.

- Instrument detection limits (IDLs) were provided by the laboratory.

  ___Yes
  _X_ No

6. CALIBRATION AND CALIBRATION VERIFICATIONS

- **Instrument calibrations**

  All initial instrument calibrations were performed as specified in the XRF Standard Operating Procedures.

  _X_ Yes
  ___ No

  Notes: Since the XRF fundamental parameters analysis technique used is not matrix specific, the standards chosen were a compromise; it was impossible to find a standard containing every analyte of interest at an appropriate concentration.

- **Calibration verifications**

  The continuing calibration verification (CCV) standards were analyzed at the required frequency.

  _X_ Yes
  ___ No

  The CCV standard percent recovery results were within acceptable limits.

  _X_ Yes -- Source: STD 30651-58
  ___ No

  Notes: Control limits given in the work plan for the CCV recovery are 75% to 125%. No results were flagged for CCV recoveries out of control limits since the fundamental parameters technique is for screening purposes only.

  - Recoveries on the CCV standard were within control limits for iron, lead, and zinc.
  - The true value for cadmium was close to the PDLG (12 ppm true value, with PDLG of 10 ppm). Cadmium results for the CCV ranged from less than 10 to 29 ppm. These results all lie within the ± 2 times the PDLG criteria.
  - For chromium, a total of 13 out of 65 CCV measurements were out of control limits, with between 52 and 74% recovery. The CCVs that were out of control limits were analyzed in 6 different analysis runs; and for each of these runs at least 3 other CCVs were analyzed for which the recovery on chromium was within control limits.

8/15/97	1 out of 5 recoveries low
8/13 /97	2 out of 9 recoveries low
7/1/97	2 out of 5 recoveries low
2/26/98	2 out of 7 recoveries low
3/2/98	3 out of 9 recoveries low
3/2/98	2 out of 7 recoveries low

  - The standard used for the CCV had no certified values for arsenic, copper, or selenium. For these parameters, the measured values were tabulated, and the mean values were calculated.

- For both arsenic and copper, the maximum and minimum values were within CCV control limits of the mean (75 to 125% recovery)..

Analyte	Mean (n=42)
Arsenic	472
Copper	1013
Selenium	15

- For selenium, the mean was 15 ppm. This value was very close to the PDLG of 10 ppm, and more variability is expected in laboratory measurements as low concentrations. The selenium CCV results were considered acceptable: only 3 of 65 CCV results for selenium were greater than the ± 2 times the PDLG criteria.

Results on the CCV standards are summarized in the following table.
Standard 30651-58 was used for the CCV.
(All values are in ppm.)

Analyte (True Value)	n*	Mean (If known, % of true value)	StDev	Recovery Range	Recovery Range in %	# Greater than 125%	# Less than 75%
Arsenic	65	472	55	351-588	74-125%	0	1
Cadmium (12)	65	17.5 or 146%	5	4-29	33-242%	11 or 17%	10 or 15%
Chromium (420)	65	357 or 85%	60	217-471	52-112%	0	5 or 8%
Copper	65	1014	65	760-1267	84-115%	0	0
Iron (180000)	65	150000 or 85%	0	150000	85%	0	0
Lead (8062)	65	7463 or 93%	72	7331-7639	91-95%	0	0
Selenium	65	14.8	9	5-42	33-275%	14 or 22%	12 or 18%
Zinc (27400)	65	28409 or 104%	269	21307-35512	101-107%	0	0

* Number of CCVs analyzed

7. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.
  _X_ Yes
  ___ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ±2 times the PRDL for soil matrix.
  _X_ Yes
  ___ No

8. LABORATORY CONTROL SAMPLES

- The reference material used was of the correct matrix and concentration.

  _X_ Yes -- Source: STDs BRS2704, SO-1

  ___ No

  Notes: As noted in the CCV section above, since the XRF analysis technique used is not matrix specific, the standards chosen were a compromise as it was impossible to find a standard containing every analyte of interest at an appropriate concentration. No results were flagged for LCS recoveries out of control limits since the fundamental parameters technique is for screening purposes only.

- Laboratory control samples (LCSs) were prepared in the same way as the associated samples.

  _X_ Yes

  ___ No

- LCSs were prepared and analyzed at the proper frequency

  _X_ Yes

  ___ No

- LCS recoveries were within acceptable limits.

  _X_ Yes

  ___ No

  Notes: Control limits given in the work plan for the LCS recovery are 75% to 125%.

  - **For standard BRS2704:**
    - Recoveries were within control limits for iron and zinc.
    - There was no true value for selenium.
    - Recoveries were high (112 to 139%) on lead LCSs.
    - Recoveries were high (105 to 155%) on copper LCSs.
    - Recoveries were low (16 to 92%) on 17 out of 20 chromium LCSs.
    - The true value (3.45 ppm) for cadmium was below the PDLG (10 ppm). All cadmium results were reported as less than 10 ppm.
    - The true value for arsenic (23.4 ppm) was close to the reporting detection limit (20 ppm). All arsenic results were reported as less than 20 ppm.

Results for Standard BRS2074 are summarized in the following table. (All values are in ppm.)

Analyte (True Value)	n*	Mean (If known, % of true value)	StDev in ppm	Recovery Range in ppm	Recovery Range in %	*# Greater than 125%*	*# Less than 75%*
Arsenic (23.4)	20	<20	0	all <20	----	----	----

Analyte (True Value)	n*	Mean (If known, % of true value)	StDev in ppm	Recovery Range in ppm	Recovery Range in %	*# Greater than 125%*	*# Less than 75%*
Cadmium (3.45)	20	<10	0	all <10	----	----	----
Chromium (135)	20	103 or 76%	35	21-156	16-116%	0	7 or 35%
Copper (98.6)	20	126 or 128%	13	104-153	105-155%	11 or 55%	0
Iron (44000)	20	44000 or 100%	0.1	43000-45000	98-102%	0	0
Lead (161)	20	200 or 124%	10.3	180-223	112-139%	8 or 40%	*0*
Selenium	20	<10	0	all <10	----	----	----
Zinc (438)	20	505 or 115%	40	476-663	109-151%	1	0

* Number of LCSs analyzed

- **For standard SO-1:**
  - Recoveries were within control limits for iron and zinc.
  - There were no true values for arsenic, cadmium, or selenium.
  - The true value for the lead LCS was 21 ppm. Recoveries were greater than 125% for 5 samples; recoveries were less than 75% for 2 samples. However, for only one of these LCSs (47 ppm) was the recovery out of the 2 times the PDLG limits generally used in evaluating low-level results.
  - Recoveries were high (128 to 156%) on 9 out of 21 copper LCSs.
  - Recoveries were low (35 to 73%) on 11 out of 21 chromium LCSs.

Results for Standard SO-1 are summarized in the following table. (All values are in ppm.)

Analyte (True Value)	n*	Mean (If known, % of true value)	StDev in ppm	Recovery Range in ppm	Recovery Range in %	# Greater than 125%	# Less than 75%
Arsenic	21	<20	0	all <20	----	----	----
Cadmium	21	<10	0	all <10	----	----	----
Chromium (160)	21	118 or 74%	42.5	51-221	32-138%	1	11
Copper (61)	21	76.4 or 125%	16.3	47-111	77-182%	9	0
Iron (60000)	21	61000 or 102%	0.11	60000-63000	100-105%	0	0
Lead (21)	21	19.8 or 94%	7.7	11-47	52-224%	2	5
Selenium	21	<10	0	all <10	----	----	----
Zinc (146)	21	157 or 108%	11.8	134-176	92-121%	0	0

* Number of LCSs analyzed

9. DATA QUALITY OBJECTIVES

- **Project data quality objectives (DQOs) met.**

  _X_ Yes
  ___ No

Accuracy

The target accuracy for this project is for recovery on the CCVs and LCSs to be within acceptable limits. In this case, although recoveries for some of the CCV samples were out of the 75 to 125% recovery window, the results were considered to be adequate, since the fundamental parameters technique is considered to be a screening technique.

Accuracy of the XRF analytical data has been evaluated using mean percent recoveries on the calibration verification standard and on the LCS standard. Note that with the exception of two high recoveries (124 and 146%) and one low recovery (74%), all mean recoveries are within the 75 to 125% limits.

Where the standard used did not have a certified true value for, accuracy could not be evaluated. These cases are shown as "----" in the following table.

Analyte	CCV 30651-58 True value (% recovery)	LCS BRS2704 True value (% recovery)	LCS SO-1 True value (% recovery)
Arsenic	----	----	----
Cadmium	12 ppm (146%)	----	----
Chromium	420 ppm 85%)	135 ppm (76%)	160 ppm (74%)
Copper	----	98.6 ppm (128%)	61 ppm (125%)
Iron	180000 ppm (85%)	44000 ppm (100%)	60000 ppm (102%)
Lead	8062 ppm (93%)	161 ppm (124%)	21 ppm (94%)
Selenium	----	----	----
Zinc	27400 ppm (104%)	438 ppm (115%)	146 ppm (108%)

Precision

The target precision for this project is for all of the laboratory duplicates and all of the field duplicates to be within the control limits of 35% relative percent difference (RPD) or within ± 2 times the PDLG for low concentration samples.

- All of the laboratory duplicates were within control limits.
- Ninety-four percent of the field duplicate measurements (293 out of 312) were within control limits
- Precision as measured by the percentage of field duplicate measurements within control limits for individual parameters is listed in the following table.

Analyte	Precision
Arsenic	95% -- (37 of 39)
Cadmium	100% -- (39 of 39)
Chromium	82% -- (32 of 39)

Analyte	Precision
Copper	95% -- (37 of 39)
Iron	100% -- (39 of 39)
Lead	95% -- (37 of 39)
Selenium	100% -- (39 of 39)
Zinc	79% -- (31 of 39)

Completeness

The target completeness for this project is acceptance of 90% of the sample analyses as "valid," that is, not rejected. Quality control completeness by parameter is summarized in the following table.

Completeness expressed as the percent of results not rejected: 100%
Completeness expressed as the percent of results without EPA flags: %

Completeness by parameter:

Analyte	# Measured Samples	# Measured with no EPA Flags	Completeness as % of Samples with no EPA Flags
Arsenic	633	626	99%
Cadmium	633	633	100%
Chromium	633	601	95%
Copper	633	617	97%
Iron	633	633	100%
Lead	633	618	98%
Selenium	633	633	100%
Zinc	633	595	94%
Totals	**5064**	**4956**	**98%**

DATA VALIDATION REPORT

Prepared by: **Clare Bridge**

Reviewed by: **Mark Walker**

REFERENCES

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___ U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983. (EPA, 1983)

___ U.S. Environmental Protection Agency, 1993. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis . Document Number ILM03.0

_X_ U.S. Environmental Protection Agency, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February 1994.

APPENDIX 1

TABLES

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

CODE		DEFINITION
J	-	The associated numerical value is an estimated quantity because quality control criteria were not met. Subscripts for the "J" qualifier: 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits. 5 - Quality control sample was omitted. (Not an EPA code.)
UJ	-	The material was analyzed for, but was not detected above the associated value. 1 Blank contamination. Indicates possible high bias and/or false positive. 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits. 5 - Quality control sample was omitted. (Not an EPA code.)
R	-	Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	-	Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

Table 2. Summary of Flagged Data
Asarco El Paso RI -- XRF Data, May - October 1997

Site	Sample No	Date	Parameter	Result	Flag	Reason for Flag
EP-68	EP-68A	05/29/97	COPPER (CU)(TOT)	580.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	140.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	82.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68A2	05/29/97	COPPER (CU)(TOT)	37.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	24.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	42.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68B	05/29/97	COPPER (CU)(TOT)	49.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	29.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	35.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68C	05/29/97	COPPER (CU)(TOT)	<20.0	UJ4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	18.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	22.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68D	05/29/97	COPPER (CU)(TOT)	<20.0	UJ4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	33.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	53.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68E	05/29/97	COPPER (CU)(TOT)	<20.0	UJ4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	14.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	37.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68F	05/29/97	COPPER (CU)(TOT)	32.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	24.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	47.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68G	05/29/97	COPPER (CU)(TOT)	22.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	11.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	36.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68H	05/29/97	COPPER (CU)(TOT)	<20.0	UJ4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	<10.0	UJ4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	40.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68I	05/29/97	COPPER (CU)(TOT)	<20.0	UJ4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	<10.0	UJ4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	49.0	J4	Field duplicate difference > ± 2 times PRDL
EP-68	EP-68J	05/29/97	COPPER (CU)(TOT)	54.0	J4	Field duplicate difference > ± 2 times PRDL
			LEAD (PB)(TOT)	34.0	J4	Field duplicate difference > ± 2 times PRDL
			ZINC (ZN)(TOT)	42.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83A	06/11/97	ZINC (ZN)(TOT)	100.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83B	06/11/97	ZINC (ZN)(TOT)	110.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83C	06/11/97	ZINC (ZN)(TOT)	75.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83D	06/11/97	ZINC (ZN)(TOT)	33.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83E	06/11/97	ZINC (ZN)(TOT)	18.0	J4	Field duplicate difference > ± 2 times PRDL

Table 2. Summary of Flagged Data
Asarco El Paso RI -- XRF Data, May - October 1997

Site	Sample No	Date	Parameter	Result	Flag	Reason for Flag
EP-83	EP-83F	06/11/97	ZINC (ZN)(TOT)	21.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83F2	06/11/97	ZINC (ZN)(TOT)	49.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83G	06/11/97	ZINC (ZN)(TOT)	32.0	J4	Field duplicate difference > ± 2 times PRDL
EP-83	EP-83H	06/11/97	ZINC (ZN)(TOT)	110.0	J4	Field duplicate difference > ± 2 times PRDL
RIBH-1	RIBH-1C	06/19/97	ZINC (ZN)(TOT)	83.0	J4	Field duplicate difference RPD 74%
RIBH-1	RIBH-1D	06/19/97	ZINC (ZN)(TOT)	110.0	J4	Field duplicate difference RPD 74%
RIBH-1	RIBH-1E	06/19/97	ZINC (ZN)(TOT)	64.0	J4	Field duplicate difference RPD 74%
RIBH-1	RIBH-1E2	06/19/97	ZINC (ZN)(TOT)	140.0	J4	Field duplicate difference RPD 74%
RIBH-1	RIBH-1F	06/19/97	ZINC (ZN)(TOT)	310.0	J4	Field duplicate difference RPD 74%
SSENT8	SSENT8-A	07/17/97	CHROMIUM (CR)(TOT	88.0	J4	Field duplicate difference > ± 2 times PRDL
SSENT8	SSENT8-A2	07/17/97	CHROMIUM (CR)(TOT	170.0	J4	Field duplicate difference > ± 2 times PRDL
SSENT8	SSENT8-B	07/17/97	CHROMIUM (CR)(TOT	<30.0	UJ4	Field duplicate difference > ± 2 times PRDL
SSIA4-10	SSIA4-10A	10/28/97	ARSENIC (AS)(TOT)	840.0	J4	Field duplicate difference RPD 56%
			COPPER (CU)(TOT)	5800.0	J4	Field duplicate difference RPD 41%
SSIA4-10	SSIA4-10A2	10/28/97	ARSENIC (AS)(TOT)	1500.0	J4	Field duplicate difference RPD 56%
			COPPER (CU)(TOT)	8800.0	J4	Field duplicate difference RPD 41%
SSIA4-10	SSIA4-10B	10/28/97	ARSENIC (AS)(TOT)	880.0	J4	Field duplicate difference RPD 56%
			COPPER (CU)(TOT)	3400.0	J4	Field duplicate difference RPD 41%
SSIA4-10	SSIA4-10C	10/28/97	ARSENIC (AS)(TOT)	380.0	J4	Field duplicate difference RPD 56%
			COPPER (CU)(TOT)	1300.0	J4	Field duplicate difference RPD 41%
SSIA4-10	SSIA4-10D	10/28/97	ARSENIC (AS)(TOT)	400.0	J4	Field duplicate difference RPD 56%
			COPPER (CU)(TOT)	230.0	J4	Field duplicate difference RPD 41%
SSIA4-14	SSIA4-14A	10/28/97	CHROMIUM (CR)(TOT	110.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-14	SSIA4-14A2	10/28/97	CHROMIUM (CR)(TOT	<30.0	UJ4	Field duplicate difference > ± 2 times PRDL
SSIA4-14	SSIA4-14B	10/28/97	CHROMIUM (CR)(TOT	82.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-14	SSIA4-14C	10/28/97	CHROMIUM (CR)(TOT	140.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-14	SSIA4-14D	10/28/97	CHROMIUM (CR)(TOT	170.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-29	SSIA4-29A	10/30/97	ZINC (ZN)(TOT)	3000.0	J4	Field duplicate difference RPD 45%
SSIA4-29	SSIA4-29A2	10/30/97	ZINC (ZN)(TOT)	1900.0	J4	Field duplicate difference RPD 45%
SSIA4-29	SSIA4-29B	10/30/97	ZINC (ZN)(TOT)	270.0	J4	Field duplicate difference RPD 45%

Table 2. Summary of Flagged Data
Asarco El Paso RI -- XRF Data, May - October 1997

Site	Sample No	Date	Parameter	Result	Flag	Reason for Flag
SSIA4-2	SSIA4-2A	10/27/97	CHROMIUM (CR)(TOT	100.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-2	SSIA4-2A2	10/27/97	CHROMIUM (CR)(TOT	210.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-2	SSIA4-2B	10/27/97	CHROMIUM (CR)(TOT	140.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-2	SSIA4-2C	10/27/97	CHROMIUM (CR)(TOT	110.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-2	SSIA4-2D	10/27/97	CHROMIUM (CR)(TOT	170.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-5	SSIA4-5A	10/28/97	CHROMIUM (CR)(TOT	68.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-5	SSIA4-5A2	10/28/97	CHROMIUM (CR)(TOT	180.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-5	SSIA4-5B	10/28/97	CHROMIUM (CR)(TOT	36.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-5	SSIA4-5C	10/28/97	CHROMIUM (CR)(TOT	150.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA4-5	SSIA4-5D	10/28/97	CHROMIUM (CR)(TOT	<30.0	UJ4	Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15A	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	74.0 900.0	J4 J4	Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15A2	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	64.0 760.0	J4 J4	Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15B	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	32.0 59.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15B2	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	100.0 27.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15C	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	150.0 48.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference > ± 2 times PRDL
SSIA5-15	SSIA5-15D	07/14/97	CHROMIUM (CR)(TOT ZINC (ZN)(TOT)	120.0 47.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference > ± 2 times PRDL
SSIA5-16	SSIA5-16A	07/14/97	ARSENIC (AS)(TOT) ZINC (ZN)(TOT)	27.0 650.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference RPD 42%
SSIA5-16	SSIA5-16A2	07/14/97	ARSENIC (AS)(TOT) ZINC (ZN)(TOT)	68.0 1000.0	J4 J4	Field duplicate difference > ± 2 times PRDL Field duplicate difference RPD 42%
SSIA5-16	SSIA5-16B	07/14/97	ZINC (ZN)(TOT)	190.0	J4	Field duplicate difference RPD 42%
SSIA5-16	SSIA5-16B2	07/14/97	ZINC (ZN)(TOT)	140.0	J4	Field duplicate difference RPD 42%
SSIA5-16	SSIA5-16C	07/14/97	ZINC (ZN)(TOT)	48.0	J4	Field duplicate difference RPD 42%
SSIA5-16	SSIA5-16D	07/14/97	ZINC (ZN)(TOT)	81.0	J4	Field duplicate difference RPD 42%
SSIA5-7	SSIA5-7B	07/08/97	LEAD (PB)(TOT)	68.0	J4	Field duplicate difference RPD 42%

Table 2. Summary of Flagged Data
Asarco El Paso RI -- XRF Data, May - October 1997

Site	Sample No	Date	Parameter	Result	Flag	Reason for Flag
SSIA5-7	SSIA5-7B2	07/08/97	LEAD (PB)(TOT)	<10.0	UJ4	Field duplicate difference RPD 42%
SSIA5-7	SSIA5-7C	07/08/97	LEAD (PB)(TOT)	27.0	J4	Field duplicate difference RPD 42%
SSIA5-7	SSIA5-7D	07/08/97	LEAD (PB)(TOT)	27.0	J4	Field duplicate difference RPD 42%
SSIA8-6	SSIA8-6A	07/16/97	CHROMIUM (CR)(TOT	<30.0	UJ4	Field duplicate difference > ± 2 times PRDL
SSIA8-6	SSIA8-6A2	07/16/97	CHROMIUM (CR)(TOT	140.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-6	SSIA8-6B	07/16/97	CHROMIUM (CR)(TOT	94.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-6	SSIA8-6C	07/16/97	CHROMIUM (CR)(TOT	97.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-6	SSIA8-6D	07/16/97	CHROMIUM (CR)(TOT	100.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-30	SSIA8-30A	07/18/97	CHROMIUM (CR)(TOT	70.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-30	SSIA8-30A2	07/18/97	CHROMIUM (CR)(TOT	150.0	J4	Field duplicate difference > ± 2 times PRDL
SSIA8-30	SSIA8-30B	07/18/97	CHROMIUM (CR)(TOT	250.0	J4	Field duplicate difference > ± 2 times PRDL

APPENDIX 2

DATABASE

TABLE OF CONTENTS BY SITE TYPE

TABLE OF CONTENTS BY SITE TYPE

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-67	EP-67	EP-67	EP-67	EP-67	EP-67
SAMPLE DATE	05/28/97	05/28/97	05/28/97	05/28/97	05/28/97	05/28/97
SAMPLE TIME	09:30	09:43	09:55	10:15	10:50	11:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L-971239-1	L-971239-2	L-971239-3	L-971239-4	L-971239-5	L-971239-6
DEPTH	0'	5'	10'	15'	20'	25'
SAMPLE NUMBER	EP-67A	EP-67B	EP-67C	EP-67D	EP-67E	EP-67F
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	1400.0	320.0	340.0	240.0	310.0	350.0
CADMIUM (CD) TOT	470.0	200.0	59.0	82.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	77.0	46.0	100.0	<30.0	<30.0
COPPER (CU) TOT	25000.0	2000.0	210.0	250.0	130.0	210.0
IRON (FE) TOT	30000.0	26000.0	25000.0	22000.0	24000.0	19000.0
LEAD (PB) TOT	9400.0	550.0	25.0	18.0	27.0	<10.0
SELENIUM (SE) TOT	18.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	4800.0	680.0	56.0	82.0	44.0	41.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-67	EP-67	EP-67	EP-67	EP-67
SAMPLE DATE	05/28/97	05/28/97	05/28/97	05/28/97	05/28/97
SAMPLE TIME	11:35	11:45	13:25	14:40	17:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L-971239-7	L-971239-8	L971239-70	L-971239-9	L971239-10
DEPTH	30'	35'	40'	45'	50'
SAMPLE NUMBER	EP-67G	EP-67H	EP-67I	EP-67J	EP-67K
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	170.0	140.0	38.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	13.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	64.0	30.0	120.0	<30.0	<30.0
COPPER (CU) TOT	110.0	91.0	41.0	23.0	24.0
IRON (FE) TOT	18000.0	16000.0	26000.0	25000.0	23000.0
LEAD (PB) TOT	16.0	21.0	<10.0	20.0	11.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	29.0	39.0	58.0	33.0	56.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-68		EP-68		EP-68		EP-68		EP-68		EP-68	
SAMPLE DATE	05/29/97		05/29/97		05/29/97		05/29/97		05/29/97		05/29/97	
SAMPLE TIME	08:40		08:45		09:00		09:10		09:20		09:45	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L971239-11		L971239-12		L971239-13		L971239-14		L971239-15		L971239-16	
REMARKS			DUPLICATE									
DEPTH	0'		0'		5'		10'		15'		20'	
SAMPLE NUMBER	EP-68A		EP-68A2		EP-68B		EP-68C		EP-68D		EP-68E	
-- METALS & MINOR CONSTITUENTS --												
ARSENIC (AS) TOT	<20.0		<20.0		<20.0		<20.0		<20.0		<20.0	
CADMIUM (CD) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0	
CHROMIUM (CR) TOT	<30.0		<30.0		<30.0		130.0		65.0		37.0	
COPPER (CU) TOT	580.0	J4	37.0	J4	49.0	J4	<20.0	UJ4	<20.0	UJ4	<20.0	UJ4
IRON (FE) TOT	17000.0		17000.0		17000.0		16000.0		21000.0		13000.0	
LEAD (PB) TOT	140.0	J4	24.0	J4	29.0	J4	18.0	J4	33.0	J4	14.0	J4
SELENIUM (SE) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	82.0	J4	42.0	J4	35.0	J4	22.0	J4	53.0	J4	37.0	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-68		EP-68		EP-68		EP-68		EP-68		EP-68	
SAMPLE DATE	05/29/97		05/29/97		05/29/97		05/29/97		05/29/97		06/02/97	
SAMPLE TIME	10:00		10:40		11:45		12:10		14:45			
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L971239-17		L971239-18		L971239-19		L971239-20		L971239-21		L971211-1	
TYPE											TCLP	
DEPTH	25'		30'		40'		45'		65'			
SAMPLE NUMBER	EP-68F		EP-68G		EP-68H		EP-68I		EP-68J		EP-68-TCLP	
-- PHYSICAL PARAMETERS --												
PH											9.2	
-- METALS & MINOR CONSTITUENTS --												
ARSENIC (AS) TOT	<20.0		21.0		<20.0		<20.0		<20.0		<.1	
BARIUM (BA) TOT											2.0	
CADMIUM (CD) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<0.05	
CHROMIUM (CR) TOT	61.0		<30.0		85.0		32.0		<30.0		<0.1	
COPPER (CU) TOT	32.0	J4	22.0	J4	<20.0	UJ4	<20.0	UJ4	54.0	J4		
IRON (FE) TOT	25000.0		24000.0		17000.0		30000.0		14000.0			
LEAD (PB) TOT	24.0	J4	11.0	J4	<10.0	UJ4	<10.0	UJ4	34.0	J4	0.84	J4
MERCURY (HG) TOT											<0.0005	
SELENIUM (SE) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<0.1	
SILVER (AG) TOT											<0.05	
ZINC (ZN) TOT	47.0	J4	36.0	J4	40.0	J4	49.0	J4	42.0	J4		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-69	EP-69	EP-69	EP-69	EP-69	EP-69
SAMPLE DATE	05/30/97	05/30/97	05/30/97	05/30/97	05/30/97	05/30/97
SAMPLE TIME	09:00	09:10	09:40	10:45	11:20	12:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-22	L971239-23	L971239-24	L971239-25	L971239-26	L971239-27
DEPTH	0'	5'	15'	20'	25'	30'
SAMPLE NUMBER	EP-69A	EP-69B	EP-69C	EP-69D	EP-69E	EP-69F
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	650.0	28.0	40.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	150.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	86.0	<30.0	<30.0	68.0	<30.0	43.0
COPPER (CU) TOT	9900.0	96.0	34.0	<20.0	<20.0	<20.0
IRON (FE) TOT	37000.0	17000.0	20000.0	20000.0	28000.0	27000.0
LEAD (PB) TOT	6100.0	120.0	53.0	11.0	20.0	26.0
SELENIUM (SE) TOT	16.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	3800.0	100.0	360.0	32.0	57.0	48.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-69		EP-70	EP-70	EP-70	EP-70
SAMPLE DATE	05/31/97		05/30/97	05/30/97	05/30/97	05/30/97
SAMPLE TIME			17:35	17:50	18:10	18:25
LAB	TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971211-2		L971239-28	L971239-29	L971239-30	L971239-31
TYPE	TCLP					
DEPTH			20'	25'	30'	35'
SAMPLE NUMBER	EP-69-TCLP		EP-70A	EP-70B	EP-70C	EP-70D
-- PHYSICAL PARAMETERS --						
PH	9.3					
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<0.1		230.0	130.0	130.0	320.0
BARIUM (BA) TOT	0.89					
CADMIUM (CD) TOT	<0.05		79.0	210.0	20.0	190.0
CHROMIUM (CR) TOT	<0.1		45.0	<30.0	64.0	48.0
COPPER (CU) TOT			32.0	24.0	43.0	66.0
IRON (FE) TOT			12000.0	17000.0	11000.0	22000.0
LEAD (PB) TOT	0.82	J4	28.0	20.0	24.0	20.0
MERCURY (HG) TOT	<0.0005					
SELENIUM (SE) TOT	<0.1		<10.0	<10.0	<10.0	<10.0
SILVER (AG) TOT	<0.05					
ZINC (ZN) TOT			890.0	1400.0	300.0	770.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-70	EP-70	EP-70	EP-70R	EP-70R
SAMPLE DATE	05/31/97	05/31/97	06/01/97	06/12/97	06/12/97
SAMPLE TIME	08:00	08:30		11:45	12:05
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-32	L971239-33	L971211-3	97-1344024	97-1344025
TYPE			TCLP		
DEPTH	40'	45'		9'	15'
SAMPLE NUMBER	EP-70E	EP-70F	EP-70-TCLP	EP-70RA	EP-70RB
-- PHYSICAL PARAMETERS --					
PH			9.0	7.9	9.1
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	390.0	120.0	0.13	36.0	<20.0
BARIUM (BA) TOT			0.35		
CADMIUM (CD) TOT	51.0	70.0	1.1	27.0	<10.0
CHROMIUM (CR) TOT	130.0	87.0	<0.1	110.0	<30.0
COPPER (CU) TOT	27.0	<20.0		230.0	<20.0
IRON (FE) TOT	25000.0	19000.0		20000.0	10000.0
LEAD (PB) TOT	18.0	18.0	0.24 J4	41.0	16.0
MERCURY (HG) TOT			<0.0005		
SELENIUM (SE) TOT	<10.0	<10.0	<0.1	<10.0	<10.0
SILVER (AG) TOT			<0.05		
ZINC (ZN) TOT	1000.0	690.0		470.0	17.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-70R	EP-70R	EP-70R	EP-70R	EP-70R	EP-70R
SAMPLE DATE	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97
SAMPLE TIME	12:05	12:07	12:15	12:20	12:35	12:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344026	97-1344027	97-1344028	97-1344029	97-1344030	97-1344031
REMARKS	DUPLICATE					
DEPTH	15'	20'	25'	30'	35'	40'
SAMPLE NUMBER	EP-70RB2	EP-70RC	EP-70RD	EP-70RE	EP-70RF	EP-70RG
-- PHYSICAL PARAMETERS --						
PH	9.3	9.0	9.4	9.1	8.9	9.2
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	66.0	<30.0	42.0	<30.0	67.0	52.0
COPPER (CU) TOT	<20.0	21.0	<20.0	22.0	13.0	14.0
IRON (FE) TOT	9000.0	16000.0	12000.0	9000.0	23000.0	21000.0
LEAD (PB) TOT	19.0	25.0	22.0	16.0	27.0	20.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	18.0	29.0	<10.0	<10.0	56.0	53.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-70R	EP-70R	EP-70R	EP-70R	EP-70R	EP-70R
SAMPLE DATE	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97
SAMPLE TIME	12:55	13:00	13:10	13:15	13:30	13:35
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344032	97-1344033	97-1344034	97-1344035	97-1344036	97-1344037
DEPTH	45'	50'	55'	60'	65'	70'
SAMPLE NUMBER	EP-70RH	EP-70RI	EP-70RJ	EP-70RK	EP-70RL	EP-70RM
-- PHYSICAL PARAMETERS --						
PH	9.1	9.6	9.7	9.5	9.5	9.4
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	77.0	110.0	<30.0	150.0	<30.0	<30.0
COPPER (CU) TOT	68.0	<20.0	<20.0	<20.0	<20.0	<20.0
IRON (FE) TOT	29000.0	16000.0	17000.0	17000.0	17000.0	17000.0
LEAD (PB) TOT	45.0	12.0	<10.0	16.0	<10.0	<10.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	110.0	53.0	65.0	26.0	55.0	33.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-71	EP-71	EP-71	EP-71	EP-71	EP-71	
SAMPLE DATE	05/31/97	05/31/97	05/31/97	05/31/97	05/31/97	06/01/97	
SAMPLE TIME	11:30	11:40	11:50	12:00	12:45		
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	
LAB NUMBER	L971239-34	L971239-35	L971239-36	L971239-37	L971239-38	L971211-4	
TYPE						TCLP	
DEPTH	0'	5'	10'	15'	25'		
SAMPLE NUMBER	EP-71A	EP-71B	EP-71C	EP-71D	EP-71E	EP-71-TCLP	
-- PHYSICAL PARAMETERS --							
PH						9.1	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<0.1	
BARIUM (BA) TOT						0.26	
CADMIUM (CD) TOT	18.0	<10.0	<10.0	<10.0	<10.0	0.28	
CHROMIUM (CR) TOT	36.0	<30.0	120.0	40.0	<30.0	<0.1	
COPPER (CU) TOT	160.0	<20.0	<20.0	29.0	22.0		
IRON (FE) TOT	10000.0	17000.0	15000.0	14000.0	29000.0		
LEAD (PB) TOT	40.0	20.0	49.0	33.0	59.0	0.17	J4
MERCURY (HG) TOT						<0.0005	
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<0.1	
SILVER (AG) TOT						<0.05	
ZINC (ZN) TOT	720.0	410.0	400.0	570.0	79.0		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-71R	EP-71R	EP-71R	EP-71R	EP-71R	EP-71R
SAMPLE DATE	06/11/97	06/11/97	06/11/97	06/11/97	06/12/97	06/12/97
SAMPLE TIME	16:40	16:50	16:55	17:00	06:45	07:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344001	97-1344002	97-1344003	97-1344046	97-1344047	97-1344038
DEPTH	0'	5'	10'	15'	20'	25'
SAMPLE NUMBER	EP-71RA	EP-71RB	EP-71RC	EP-71RD	EP-71RE	EP-71RF
-- PHYSICAL PARAMETERS --						
PH	6.7	10.0	9.7	9.3	9.6	9.4
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	1300.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	120.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	91.0	51.0	38.0	<30.0	39.0	<30.0
COPPER (CU) TOT	31000.0	340.0	170.0	<20.0	25.0	<20.0
IRON (FE) TOT	45000.0	14000.0	11000.0	18000.0	19000.0	23000.0
LEAD (PB) TOT	7200.0	90.0	54.0	<10.0	20.0	19.0
SELENIUM (SE) TOT	33.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	3900.0	56.0	12.0	31.0	38.0	61.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-71R	EP-71R	EP-71R	EP-71R	EP-71R	EP-71R
SAMPLE DATE	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97	06/12/97
SAMPLE TIME	07:15	07:30	07:35	07:45	07:50	08:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344039	97-1344040	97-1344041	97-1344042	97-1344043	97-1344044
DEPTH	30'	35'	40'	45'	50'	60'
SAMPLE NUMBER	EP-71RG	EP-71RH	EP-71RI	EP-71RJ	EP-71RK	EP-71RL
-- PHYSICAL PARAMETERS --						
PH	9.5	9.3	8.9	9.2	9.6	9.6
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	150.0	<30.0	57.0	200.0	81.0	46.0
COPPER (CU) TOT	25.0	35.0	37.0	21.0	<20.0	<20.0
IRON (FE) TOT	20000.0	19000.0	16000.0	19000.0	18000.0	17000.0
LEAD (PB) TOT	29.0	13.0	11.0	<10.0	13.0	<10.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	63.0	31.0	38.0	50.0	46.0	50.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-71R		EP-72	EP-72	EP-72	EP-72
SAMPLE DATE	06/12/97		05/31/97	05/31/97	06/01/97	06/01/97
SAMPLE TIME	08:10		16:00	16:30	07:25	07:30
LAB	TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344045		L971239-39	L971239-40	L971239-41	L971239-42
REMARKS	DUPLICATE					DUPLICATE
DEPTH	60'		15'	20'	25'	25'
SAMPLE NUMBER	EP-71RL2		EP-72A	EP-72B	EP-72C	EP-72C2
-- PHYSICAL PARAMETERS --						
PH	9.7					
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0		<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0		220.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0		70.0	33.0	67.0	72.0
COPPER (CU) TOT	<20.0		340.0	20.0	<20.0	<20.0
IRON (FE) TOT	17000.0		33000.0	17000.0	13000.0	11000.0
LEAD (PB) TOT	<10.0		530.0	32.0	22.0	24.0
SELENIUM (SE) TOT	<10.0		<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	51.0		1500.0	81.0	19.0	<10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-72	EP-72	EP-72	EP-72		EP-73
SAMPLE DATE	06/01/97	06/01/97	06/01/97	06/02/97		06/01/97
SAMPLE TIME	07:50	08:10	08:35			12:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC		TSC-SLC
LAB NUMBER	L971239-43	L971239-44	L971239-45	L971211-5		L971239-46
TYPE				TCLP		
DEPTH	30'	35'	40'			15'
SAMPLE NUMBER	EP-72D	EP-72E	EP-72F	EP-72-TCLP		EP-73A
-- PHYSICAL PARAMETERS --						
PH				9.4		
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	67.0	54.0	<20.0	<0.1		<20.0
BARIUM (BA) TOT				0.33		
CADMIUM (CD) TOT	25.0	<10.0	<10.0	0.11		<10.0
CHROMIUM (CR) TOT	<30.0	75.0	<30.0	<0.1		50.0
COPPER (CU) TOT	63.0	<20.0	<20.0			31.0
IRON (FE) TOT	19000.0	22000.0	23000.0			28000.0
LEAD (PB) TOT	23.0	38.0	29.0	0.18	J4	160.0
MERCURY (HG) TOT				<0.0005		
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<0.1		<10.0
SILVER (AG) TOT				<0.05		
ZINC (ZN) TOT	74.0	32.0	49.0			350.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-73	EP-73	EP-73	EP-73	EP-73	EP-73
SAMPLE DATE	06/01/97	06/01/97	06/01/97	06/01/97	06/17/97	06/18/97
SAMPLE TIME	13:15	14:00	14:30	15:00	15:45	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-47	L971239-48	L971239-49	L971239-50	97-1402040	L971211-6
TYPE						TCLP
DEPTH	20'	32'	40'	45'	78'	
SAMPLE NUMBER	EP-73B	EP-73C	EP-73D	EP-73E	EP-73F	EP-73-TCLP
-- PHYSICAL PARAMETERS --						
PH					9.0	9.1
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	24.0	<20.0	<20.0	0.16
BARIUM (BA) TOT						1.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	0.092
CHROMIUM (CR) TOT	110.0	<30.0	<30.0	<30.0	43.0	<0.1
COPPER (CU) TOT	400.0	44.0	<20.0	30.0	<20.0	
IRON (FE) TOT	58000.0	9000.0	21000.0	20000.0	11000.0	
LEAD (PB) TOT	2400.0	230.0	31.0	140.0	<10.0	6.1
MERCURY (HG) TOT						<0.0005
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<0.1
SILVER (AG) TOT						<0.05
ZINC (ZN) TOT	5200.0	490.0	33.0	240.0	42.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-74	EP-74	EP-74	EP-74	EP-74	EP-74
SAMPLE DATE	06/02/97	06/02/97	06/02/97	06/02/97	06/02/97	06/02/97
SAMPLE TIME	08:00	08:10	08:20	08:30	09:15	09:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-51	L971239-52	L971239-53	L971239-54	L971239-55	L971239-56
DEPTH	2'	5'	10'	15'	20'	25'
SAMPLE NUMBER	EP-74A	EP-74B	EP-74C	EP-74D	EP-74E	EP-74F
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	140.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	28.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	46.0	130.0	99.0	<30.0	42.0	<30.0
COPPER (CU) TOT	110.0	260.0	55.0	96.0	30.0	<20.0
IRON (FE) TOT	13000.0	22000.0	23000.0	23000.0	24000.0	24000.0
LEAD (PB) TOT	300.0	960.0	100.0	250.0	38.0	19.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	140.0	450.0	110.0	150.0	49.0	57.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-74	EP-74	EP-74	EP-74	EP-74	EP-74
SAMPLE DATE	06/02/97	06/02/97	06/02/97	06/02/97	06/02/97	06/02/97
SAMPLE TIME	09:45	10:00	10:15	10:30	10:45	11:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-57	L971239-58	L971239-59	L971239-60	L971239-61	L971239-62
DEPTH	30'	35'	40'	45'	50'	55'
SAMPLE NUMBER	EP-74G	EP-74H	EP-74I	EP-74J	EP-74K	EP-74L
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	41.0	49.0	40.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	77.0	<30.0	<30.0	<30.0	41.0	63.0
COPPER (CU) TOT	25.0	<20.0	<20.0	31.0	<20.0	<20.0
IRON (FE) TOT	24000.0	23000.0	23000.0	30000.0	29000.0	31000.0
LEAD (PB) TOT	24.0	26.0	22.0	42.0	11.0	<10.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	42.0	48.0	41.0	65.0	66.0	36.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank; parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-74	EP-74	EP-74	EP-74		EP-75
SAMPLE DATE	06/02/97	06/02/97	06/02/97	06/03/97		06/02/97
SAMPLE TIME	11:45	11:50	12:10			16:50
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC		TSC-SLC
LAB NUMBER	L971239-63	L971239-64	L971239-65	L971211-7		L971239-66
REMARKS		DUPLICATE				
TYPE				TCLP		
DEPTH	60'	60'	65'			35'
SAMPLE NUMBER	EP-74M	EP-74M2	EP-74N	EP-74-TCLP		EP-75A
-- PHYSICAL PARAMETERS --						
PH				9.4		
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	46.0	28.0	24.0	<0.1		220.0
BARIUM (BA) TOT				1.5		
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<0.05		<10.0
CHROMIUM (CR) TOT	130.0	120.0	70.0	<0.1		35.0
COPPER (CU) TOT	31.0	35.0	33.0			280.0
IRON (FE) TOT	30000.0	25000.0	31000.0			32000.0
LEAD (PB) TOT	19.0	23.0	16.0	0.4	J4	490.0
MERCURY (HG) TOT				<0.0005		
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<0.1		<10.0
SILVER (AG) TOT				<0.05		
ZINC (ZN) TOT	40.0	27.0	54.0			5400.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-75	EP-75	EP-75	EP-75	EP-75	EP-75
SAMPLE DATE	06/02/97	06/02/97	06/02/97	06/03/97	06/03/97	06/03/97
SAMPLE TIME	17:15	17:30	17:45	07:45	08:10	08:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971239-67	L971239-68	L971239-69	97-1325001	97-1325002	97-1325003
DEPTH	40'	45'	50'	55'	60'	65'
SAMPLE NUMBER	EP-75B	EP-75C	EP-75D	EP-75E	EP-75F	EP-75G
-- PHYSICAL PARAMETERS --						
PH				8.6	8.9	8.8
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	120.0	67.0	45.0	91.0	73.0	36.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	53.0	83.0	43.0	130.0	40.0	<30.0
COPPER (CU) TOT	64.0	<20.0	60.0	450.0	<20.0	22.0
IRON (FE) TOT	29000.0	33000.0	22000.0	31000.0	23000.0	21000.0
LEAD (PB) TOT	120.0	23.0	29.0	760.0	17.0	12.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	1100.0	77.0	280.0	7300.0	50.0	100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-75	EP-75	EP-76	EP-76	EP-76
SAMPLE DATE	06/04/97	06/04/97	06/03/97	06/03/97	06/03/97
SAMPLE TIME			10:45	11:00	11:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971317-1	L971317-2	97-1325004	97-1325005	L971470-1
REMARKS					DUPLICATE
TYPE	TCLP	TCLP			
DEPTH	35'	40'	0'	1.5'	1.5'
SAMPLE NUMBER	EP-75-TCLP	EP-75-TCLP2	EP-76A	EP-76B	EP-76B2
-- PHYSICAL PARAMETERS --					
PH	9.3	9.3	7.8	10.2	10.1
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	0.5	0.5	1800.0	420.0	380.0
BARIUM (BA) TOT	4.1	4.5			
CADMIUM (CD) TOT	0.29	0.29	420.0	<10.0	16.0
CHROMIUM (CR) TOT	<0.1	<0.1	200.0	310.0	380.0
COPPER (CU) TOT			12000.0	4800.0	5000.0
IRON (FE) TOT			120000.0	150000.0	150000.0
LEAD (PB) TOT	30.0	29.0	9500.0	3400.0	3500.0
MERCURY (HG) TOT	<0.0005	<0.0005			
SELENIUM (SE) TOT	<0.1	<0.1	82.0	80.0	83.0
SILVER (AG) TOT	<0.05	<0.05			
ZINC (ZN) TOT			12000.0	110000.0	110000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-76	EP-76	EP-76	EP-76	EP-76
SAMPLE DATE	06/03/97	06/03/97	06/03/97	06/03/97	06/04/97
SAMPLE TIME	13:15	13:30	14:15	14:30	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325006	97-1325007	97-1325008	97-1325009	L971317-3
TYPE					TCLP
DEPTH	45'	50'	55'	60'	
SAMPLE NUMBER	EP-76C	EP-76D	EP-76E	EP-76F	EP-76-TCLP
-- PHYSICAL PARAMETERS --					
PH	8.9	9.7	9.4	9.3	9.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	78.0	29.0	110.0	<20.0	1.1
BARIUM (BA) TOT					7.2
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	0.11
CHROMIUM (CR) TOT	82.0	52.0	<30.0	140.0	<0.1
COPPER (CU) TOT	35.0	<20.0	500.0	25.0	
IRON (FE) TOT	20000.0	18000.0	29000.0	19000.0	
LEAD (PB) TOT	28.0	20.0	650.0	37.0	47.0
MERCURY (HG) TOT					<0.0005
SELENIUM (SE) TOT	14.0	13.0	20.0	<10.0	<0.1
SILVER (AG) TOT					<0.05
ZINC (ZN) TOT	190.0	80.0	6600.0	260.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-77	EP-77	EP-77	EP-77	EP-77	EP-77
SAMPLE DATE	06/04/97	06/04/97	06/04/97	06/04/97	06/04/97	06/04/97
SAMPLE TIME	07:45	08:45	09:00	09:10	09:40	10:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325010	97-1325011	97-1325012	97-1325013	97-1325014	97-1325015
DEPTH	0.5'	20'	25'	30'	35'	40'
SAMPLE NUMBER	EP-77A	EP-77B	EP-77C	EP-77D	EP-77E	EP-77F
-- PHYSICAL PARAMETERS --						
PH	7.9	8.0	8.8	8.7	8.8	9.3
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	200.0	140.0	<20.0	33.0	28.0	73.0
CADMIUM (CD) TOT	11.0	43.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	210.0	84.0	94.0	<30.0	<30.0	78.0
COPPER (CU) TOT	2500.0	350.0	<20.0	<20.0	23.0	32.0
IRON (FE) TOT	100000.0	39000.0	20000.0	18000.0	17000.0	27000.0
LEAD (PB) TOT	2600.0	950.0	90.0	36.0	37.0	22.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	1100.0	850.0	100.0	57.0	57.0	55.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-77	EP-77	EP-78	EP-78	EP-78
SAMPLE DATE	06/04/97	06/04/97	06/04/97	06/04/97	06/04/97
SAMPLE TIME	10:30	10:50	14:45	15:00	15:25
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325016	97-1325017	97-1325018	97-1325019	97-1325020
DEPTH	45'	50'	23'	25'	30'
SAMPLE NUMBER	EP-77G	EP-77H	EP-78A	EP-78B	EP-78C
-- PHYSICAL PARAMETERS --					
PH	9.3	8.8	8.2	8.8	9.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	49.0	20.0	990.0	87.0	82.0
CADMIUM (CD) TOT	<10.0	<10.0	46.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	47.0	78.0	51.0
COPPER (CU) TOT	<20.0	<20.0	700.0	64.0	<20.0
IRON (FE) TOT	26000.0	29000.0	32000.0	11000.0	26000.0
LEAD (PB) TOT	25.0	20.0	530.0	33.0	34.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	52.0	42.0	2300.0	170.0	120.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-78	EP-78	EP-79	EP-79	EP-79
SAMPLE DATE	06/04/97	06/05/97	06/05/97	06/05/97	06/05/97
SAMPLE TIME	15:40		08:30	08:50	09:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325021	L971317-4	97-1325022	97-1325023	97-1325024
TYPE		TCLP			
DEPTH	40'		10'	15'	20'
SAMPLE NUMBER	EP-78D	EP-78-TCLP	EP-79A	EP-79B	EP-79C
-- PHYSICAL PARAMETERS --					
PH	9.6	9.3	9.0	9.0	9.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	50.0	<0.1	<20.0	32.0	28.0
BARIUM (BA) TOT		1.2			
CADMIUM (CD) TOT	<10.0	0.081	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	86.0	<0.1	45.0	60.0	57.0
COPPER (CU) TOT	62.0		<20.0	86.0	120.0
IRON (FE) TOT	15000.0		24000.0	28000.0	34000.0
LEAD (PB) TOT	46.0	0.24	17.0	30.0	110.0
MERCURY (HG) TOT		<0.0005			
SELENIUM (SE) TOT	<10.0	<0.1	<10.0	<10.0	<10.0
SILVER (AG) TOT		<0.05			
ZINC (ZN) TOT	240.0		67.0	180.0	440.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-79	EP-79	EP-79	EP-79	EP-79
SAMPLE DATE	06/05/97	06/05/97	06/05/97	06/05/97	06/06/97
SAMPLE TIME	09:55	11:00	11:15	11:30	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325025	97-1325026	97-1325027	97-1325028	L971317-5
TYPE					TCLP
DEPTH	25'	35'	40'	45	
SAMPLE NUMBER	EP-79D	EP-79E	EP-79F	EP-79G	EP-79-TCLP
-- PHYSICAL PARAMETERS --					
PH	NO MEAS	9.3	9.4	9.3	9.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	210.0	<20.0	<20.0	<20.0	<0.1
BARIUM (BA) TOT					0.82
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<0.05
CHROMIUM (CR) TOT	95.0	59.0	83.0	<30.0	<0.1
COPPER (CU) TOT	300.0	<20.0	<20.0	<20.0	
IRON (FE) TOT	47000.0	16000.0	9000.0	5000.0	
LEAD (PB) TOT	240.0	<10.0	12.0	10.0	<0.1
MERCURY (HG) TOT					<0.0005
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<0.1
SILVER (AG) TOT					<0.05
ZINC (ZN) TOT	1400.0	34.0	20.0	20.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-80	EP-80	EP-80	EP-80	EP-80	EP-80
SAMPLE DATE	06/06/97	06/06/97	06/06/97	06/06/97	06/06/97	06/06/97
SAMPLE TIME	07:45	08:00	08:10	08:15	08:20	08:25
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325029	97-1325030	97-1325031	97-1325032	97-1325033	97-1325034
DEPTH	0'	5'	10'	15'	20'	25'
SAMPLE NUMBER	EP-80A	EP-80B	EP-80C	EP-80D	EP-80E	EP-80F
-- PHYSICAL PARAMETERS --						
PH	8.4	8.5	9.0	9.0	9.1	9.0
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	26.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	41.0	<30.0	<30.0	49.0	79.0	<30.0
COPPER (CU) TOT	160.0	34.0	<20.0	<20.0	34.0	<20.0
IRON (FE) TOT	14000.0	16000.0	18000.0	18000.0	13000.0	14000.0
LEAD (PB) TOT	95.0	46.0	32.0	10.0	23.0	15.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	200.0	79.0	29.0	31.0	36.0	30.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-80	EP-81	EP-81	EP-81	EP-81
SAMPLE DATE	06/07/97	06/06/97	06/06/97	06/06/97	06/06/97
SAMPLE TIME		11:15	11:20	11:25	11:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971317-6	97-1325035	97-1325036	97-1325037	97-1325038
TYPE	TCLP				
DEPTH		5'	10'	15'	20'
SAMPLE NUMBER	EP-80-TCLP	EP-81A	EP-81B	EP-81C	EP-81D
-- PHYSICAL PARAMETERS --					
PH	9.2	8.3	8.5	9.0	8.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	0.15	150.0	<20.0	<20.0	<20.0
BARIUM (BA) TOT	0.62				
CADMIUM (CD) TOT	0.073	15.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<0.1	80.0	38.0	<30.0	<30.0
COPPER (CU) TOT		1100.0	190.0	<20.0	<20.0
IRON (FE) TOT		40000.0	22000.0	18000.0	17000.0
LEAD (PB) TOT	0.71	790.0	140.0	14.0	12.0
MERCURY (HG) TOT	<0.0005				
SELENIUM (SE) TOT	<0.1	<10.0	<10.0	<10.0	<10.0
SILVER (AG) TOT	<0.05				
ZINC (ZN) TOT		2600.0	360.0	46.0	34.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-81	EP-82	EP-82	EP-82	EP-82	EP-82
SAMPLE DATE	06/06/97	06/10/97	06/10/97	06/10/97	06/10/97	06/10/97
SAMPLE TIME	11:35	12:00	12:30	12:55	13:10	13:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1325039	97-1344017	97-1344018	97-1344019	97-1344020	97-1344020
DEPTH	25'	0'	5'	10'	15'	15'
SAMPLE NUMBER	EP-81E	EP-82A	EP-82B	EP-82C	EP-82D	EP-82D
-- PHYSICAL PARAMETERS --						
PH	8.6	9.1	NO MEAS	9.7	9.0	9.0
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	70.0	70.0	<30.0	100.0	100.0
COPPER (CU) TOT	<20.0	200.0	34.0	38.0	<20.0	<20.0
IRON (FE) TOT	18000.0	18000.0	19000.0	12000.0	8000.0	8000.0
LEAD (PB) TOT	11.0	60.0	23.0	<10.0	<10.0	<10.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	29.0	150.0	57.0	22.8	14.0	14.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-82	EP-82	EP-82	EP-83	EP-83
SAMPLE DATE	06/10/97	06/10/97	06/10/97	06/11/97	06/11/97
SAMPLE TIME	13:40	13:50	14:00	08:00	08:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344021	97-1344022	97-1344023	97-1344004	97-1344005
DEPTH	20'	25'	30'	7'	15'
SAMPLE NUMBER	EP-82E	EP-82F	EP-82G	EP-83A	EP-83B
-- PHYSICAL PARAMETERS --					
PH	9.0	9.0	9.4	9.0	9.9
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	<30.0	55.0	70.0
COPPER (CU) TOT	<20.0	<20.0	38.0	70.0	54.0
IRON (FE) TOT	11000.0	12000.0	11000.0	20000.0	28000.0
LEAD (PB) TOT	14.0	15.0	<10.0	20.0	18.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	50.0	24.0	15.0	100.0 J4	110.0 J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-83		EP-83		EP-83		EP-83		EP-83		EP-83	
SAMPLE DATE	06/11/97		06/11/97		06/11/97		06/11/97		06/11/97		06/11/97	
SAMPLE TIME	09:00		09:30		09:50		10:00		10:00		10:10	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	97-1344006		97-1344007		97-1344008		97-1344009		97-1344010		97-1344011	
REMARKS									DUPLICATE			
DEPTH	20'		25'		30'		35'		35'		40'	
SAMPLE NUMBER	EP-83C		EP-83D		EP-83E		EP-83F		EP-83F2		EP-83G	
-- PHYSICAL PARAMETERS --												
PH	9.8		9.9		9.5		9.5		9.6		9.5	
-- METALS & MINOR CONSTITUENTS --												
ARSENIC (AS) TOT	<20.0		<20.0		<20.0		<20.0		<20.0		<20.0	
CADMIUM (CD) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0	
CHROMIUM (CR) TOT	99.0		70.0		90.0		<30.0		48.0		<30.0	
COPPER (CU) TOT	<20.0		23.0		<20.0		<20.0		21.0		<20.0	
IRON (FE) TOT	19000.0		12000.0		8000.0		6000.0		6000.0		12000.0	
LEAD (PB) TOT	21.0		20.0		<10.0		<10.0		<10.0		<10.0	
SELENIUM (SE) TOT	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	75.0	J4	33.0	J4	18.0	J4	21.0	J4	49.0	J4	32.0	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-83		EP-84	EP-84	EP-84	EP-84
SAMPLE DATE	06/11/97		06/11/97	06/11/97	06/11/97	06/11/97
SAMPLE TIME	10:20		13:15	13:25	13:30	13:35
LAB	TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1344012		97-1344013	97-1344014	97-1344015	97-1344016
DEPTH	45'		0'	5'	10'	15'
SAMPLE NUMBER	EP-83H		EP-84A	EP-84B	EP-84C	EP-84D
-- PHYSICAL PARAMETERS --						
PH	8.5		8.9	9.0	8.8	8.6
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0		<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0		14.0	16.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0		47.0	65.0	29.0	48.0
COPPER (CU) TOT	<20.0		490.0	490.0	47.0	33.0
IRON (FE) TOT	27000.0		22000.0	23000.0	24000.0	22000.0
LEAD (PB) TOT	27.0		500.0	500.0	61.0	33.0
SELENIUM (SE) TOT	<10.0		<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	110.0	J4	390.0	380.0	98.0	110.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-85	EP-85	EP-85	EP-85	EP-86
SAMPLE DATE	06/12/97	06/12/97	06/12/97	06/12/97	06/13/97
SAMPLE TIME	16:50	17:00	17:05	17:25	08:50
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402001	97-1402002	97-1402003	97-1402004	97-1402005
DEPTH	5'	10'	15'	20'	0'
SAMPLE NUMBER	EP-85A	EP-85B	EP-85C	EP-85D	EP-86A
-- PHYSICAL PARAMETERS --					
PH	9.3	8.9	9.3	9.4	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	59.0	27.0	22.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	78.0	63.0	<30.0	<30.0
COPPER (CU) TOT	58.0	<20.0	41.0	<20.0	76.0
IRON (FE) TOT	20000.0	15000.0	17000.0	18000.0	19000.0
LEAD (PB) TOT	150.0	15.0	27.0	32.0	87.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	180.0	35.0	26.0	99.0	100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-86	EP-86	EP-86	EP-86	EP-86	EP-86
SAMPLE DATE	06/13/97	06/13/97	06/13/97	06/13/97	06/13/97	06/13/97
SAMPLE TIME	09:00	09:05	09:25	10:00	10:10	10:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402006	97-1402007	97-1402008	97-1402009	97-1402010	97-1402011
DEPTH	5'	10'	15'	20'	25'	30'
SAMPLE NUMBER	EP-86B	EP-86C	EP-86D	EP-86E	EP-86F	EP-86G
-- PHYSICAL PARAMETERS --						
PH	9.3	9.3	9.7	9.8	9.8	9.8
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	<30.0	39.0	30.0	100.0
COPPER (CU) TOT	<20.0	31.0	42.0	30.0	<20.0	<20.0
IRON (FE) TOT	15000.0	21000.0	22000.0	16000.0	13000.0	9000.0
LEAD (PB) TOT	33.0	16.0	48.0	39.0	26.0	25.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	100.0	57.0	85.0	63.0	52.0	42.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-86	EP-86	EP-86	EP-86	EP-86	EP-86
SAMPLE DATE	06/13/97	06/13/97	06/13/97	06/13/97	06/13/97	06/13/97
SAMPLE TIME	10:25	10:27	10:35	10:42	11:00	11:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402012	97-1402013	97-1402014	97-1402015	97-1402016	97-1402017
DEPTH	35'	40'	45'	50'	55'	60'
SAMPLE NUMBER	EP-86H	EP-86I	EP-86J	EP-86K	EP-86L	EP-86M
-- PHYSICAL PARAMETERS --						
PH	9.9	9.8	10.0	9.6	9.6	9.7
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	35.0	<30.0	<30.0	55.0
COPPER (CU) TOT	22.0	30.0	<20.0	<20.0	25.0	<20.0
IRON (FE) TOT	9000.0	12000.0	14000.0	7000.0	18000.0	13000.0
LEAD (PB) TOT	14.0	16.0	17.0	14.0	<10.0	<10.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	33.0	23.0	25.0	19.0	41.0	36.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-86	EP-87	EP-87	EP-87	EP-87
SAMPLE DATE	06/13/97	06/16/97	06/16/97	06/16/97	06/16/97
SAMPLE TIME	11:20	10:50	10:55	11:05	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	
LAB NUMBER	97-1402018	97-1402019	97-1402020	97-1402021	
REMARKS	DUPLICATE				
DEPTH	60'	0'	5'	10'	
SAMPLE NUMBER	EP-86M2	EP-87A	EP-87B	EP-87C	
-- PHYSICAL PARAMETERS --					
PH	9.8	8.9	9.0	8.9	
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	
CHROMIUM (CR) TOT	<30.0	86.0	<30.0	<30.0	
COPPER (CU) TOT	30.0	20.0	41.0	<20.0	
IRON (FE) TOT	15000.0	14000.0	14000.0	12000.0	
LEAD (PB) TOT	<10.0	14.0	54.0	11.0	
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	
ZINC (ZN) TOT	18.0	42.0	68.0	19.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-88	EP-88	EP-88	EP-88	EP-88	EP-88
SAMPLE DATE	06/17/97	06/17/97	06/17/97	06/17/97	06/17/97	06/17/97
SAMPLE TIME	07:15	07:45	08:00	08:00	08:35	09:05
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402022	97-1402023	97-1402024	97-1402025	97-1402026	97-1402027
REMARKS				DUPLICATE		
DEPTH	0'	5'	10'	10'	15'	20'
SAMPLE NUMBER	EP-88A	EP-88B	EP-88C	EP-88C2	EP-88D	EP-88E
-- PHYSICAL PARAMETERS --						
PH	8.3	8.0	9.0	9.0	9.3	9.6
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	550.0	50.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	150.0	120.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	200.0	120.0	59.0	<30.0	55.0	<30.0
COPPER (CU) TOT	5600.0	2200.0	38.0	33.0	<20.0	76.0
IRON (FE) TOT	21000.0	33000.0	24000.0	23000.0	30000.0	18000.0
LEAD (PB) TOT	3600.0	2700.0	35.0	19.0	35.0	58.0
SELENIUM (SE) TOT	23.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	3100.0	3200.0	54.0	61.0	95.0	55.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-88	EP-88	EP-88	EP-89	EP-89
SAMPLE DATE	06/17/97	06/17/97	06/17/97	06/18/97	06/18/97
SAMPLE TIME	09:15	09:35	10:10	09:15	09:25
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402028	97-1402029	97-1402030	97-1402031	97-1402032
DEPTH	25'	30'	35'	0'	5'
SAMPLE NUMBER	EP-88F	EP-88G	EP-88H	EP-89A	EP-89B
-- PHYSICAL PARAMETERS --					
PH	9.7	9.7	9.5	7.8	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	34.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	110.0	<10.0
CHROMIUM (CR) TOT	<30.0	100.0	70.0	<30.0	48.0
COPPER (CU) TOT	36.0	30.0	<20.0	4900.0	25.0
IRON (FE) TOT	28000.0	27000.0	18000.0	27000.0	23000.0
LEAD (PB) TOT	19.0	18.0	<10.0	9600.0	42.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	20.0	<10.0
ZINC (ZN) TOT	49.0	68.0	42.0	4100.0	78.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-89	EP-89	EP-89	EP-89	EP-89	EP-89
SAMPLE DATE	06/18/97	06/18/97	06/18/97	06/18/97	06/18/97	06/18/97
SAMPLE TIME	09:32	09:50	19:15	19:40	19:55	20:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1402033	97-1402034	97-1402035	97-1402036	97-1402037	97-1402038
DEPTH	10'	15'	20'	25'	30'	35'
SAMPLE NUMBER	EP-89C	EP-89D	EP-89E	EP-89F	EP-89G	EP-89H
-- PHYSICAL PARAMETERS --						
PH	NO MEAS	NO MEAS	9.0	8.9	9.6	9.1
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	75.0	54.0	<30.0	91.0	46.0
COPPER (CU) TOT	160.0	<20.0	<20.0	38.0	30.0	33.0
IRON (FE) TOT	32000.0	25000.0	19000.0	20000.0	17000.0	13000.0
LEAD (PB) TOT	180.0	22.0	39.0	92.0	14.0	44.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	200.0	56.0	72.0	180.0	61.0	65.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-89		RIBH-1		RIBH-1		RIBH-1	
SAMPLE DATE	06/18/97		06/19/97		06/19/97		06/19/97	
SAMPLE TIME	20:20		08:15		08:45		09:05	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	97-1402039		L971545-1		L971545-2		L971545-3	
DEPTH	38'		40'		45'		50'	
SAMPLE NUMBER	EP-89I		RIBH-1A		RIBH-1B		RIBH-1C	
-- PHYSICAL PARAMETERS --								
PH	9.6		7.9		NO MEAS		8.5	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	<20.0		4400.0		1400.0		<20.0	
CADMIUM (CD) TOT	<10.0		2100.0		660.0		11.0	
CHROMIUM (CR) TOT	88.0		190.0		170.0		89.0	
COPPER (CU) TOT	<20.0		4000.0		1200.0		<20.0	
IRON (FE) TOT	12000.0		130000.0		41000.0		19000.0	
LEAD (PB) TOT	14.0		11000.0		2200.0		36.0	
SELENIUM (SE) TOT	<10.0		20.0		13.0		<10.0	
ZINC (ZN) TOT	32.0		16000.0		4200.0		83.0	J4

RIBH-1		
06/19/97		
09:15		
TSC-SLC		
L971545-4		
55'		
RIBH-1D		
9.0		
<20.0		
<10.0		
92.0		
26.0		
11000.0		
67.0		
<10.0		
110.0	J4	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-1		RIBH-1		RIBH-1			RIBH-2		RIBH-2	
SAMPLE DATE	06/19/97		06/19/97		06/19/97			06/30/97		06/30/97	
SAMPLE TIME	09:20		09:20		09:45			10:20		10:30	
LAB	TSC-SLC		TSC-SLC		TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L971545-5		L971545-6		L971545-7			L971545-8		L971545-9	
REMARKS			DUPLICATE								
DEPTH	60'		60'		62'			7'		10'	
SAMPLE NUMBER	RIBH-1E		RIBH-1E2		RIBH-1F			RIBH-2A		RIBH-2B	
-- PHYSICAL PARAMETERS --											
PH	9.2		9.3		9.5			NO MEAS		NO MEAS	
-- METALS & MINOR CONSTITUENTS --											
ARSENIC (AS) TOT	23.0		<20.0		<20.0			82.0		<20.0	
CADMIUM (CD) TOT	<10.0		<10.0		<10.0			<10.0		<10.0	
CHROMIUM (CR) TOT	52.0		33.0		51.0			100.0		37.0	
COPPER (CU) TOT	39.0		24.0		130.0			44.0		<20.0	
IRON (FE) TOT	12000.0		12000.0		20000.0			50000.0		14000.0	
LEAD (PB) TOT	20.0		24.0		320.0			39.0		29.0	
SELENIUM (SE) TOT	<10.0		<10.0		<10.0			<10.0		<10.0	
ZINC (ZN) TOT	64.0	J4	140.0	J4	310.0	J4		280.0		35.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-2	RIBH-3	RIBH-3	RIBH-3	RIBH-3
SAMPLE DATE	06/30/97	06/30/97	06/30/97	06/30/97	06/30/97
SAMPLE TIME	10:35	12:25	12:25	12:40	12:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-10	L971545-11	L971545-12	L971545-13	L971545-14
REMARKS			DUPLICATE		
DEPTH	15'	28'	28'	35'	40'
SAMPLE NUMBER	RIBH-2C	RIBH-3A	RIBH-3A2	RIBH-3B	RIBH-3C
-- PHYSICAL PARAMETERS --					
PH	NO MEAS	8.8	8.9	9.2	NO MEAS
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	25.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	<30.0	<30.0	<30.0
COPPER (CU) TOT	31.0	120.0	150.0	33.0	64.0
IRON (FE) TOT	16000.0	33000.0	26000.0	17000.0	24000.0
LEAD (PB) TOT	26.0	800.0	800.0	20.0	44.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	85.0	1200.0	1300.0	75.0	90.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-4	RIBH-4	RIBH-4	RIBH-5	RIBH-5
SAMPLE DATE	06/30/97	06/30/97	06/30/97	06/30/97	06/30/97
SAMPLE TIME	15:00	15:15	15:20	15:50	16:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-15	L971545-16	L971545-17	L971545-18	L971545-19
DEPTH	0'	10'	15'	2'	8'
SAMPLE NUMBER	RIBH-4A	RIBH-4B	RIBH-4C	RIBH-5A	RIBH-5B
-- PHYSICAL PARAMETERS --					
PH	NO MEAS	NO MEAS	9.3	8.8	9.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	280.0	29.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	24.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	120.0	91.0	<30.0	46.0	82.0
COPPER (CU) TOT	2100.0	54.0	23.0	310.0	24.0
IRON (FE) TOT	60000.0	21000.0	17000.0	27000.0	16000.0
LEAD (PB) TOT	970.0	140.0	25.0	210.0	17.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	4700.0	540.0	27.0	1600.0	36.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-5	RIBH-5	RIBH-5	RIBH-5	RIBH-6
SAMPLE DATE	06/30/97	06/30/97	06/30/97	06/30/97	06/30/97
SAMPLE TIME	16:00	16:05	16:10	16:15	16:55
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-20	L971545-21	L971545-22	L971545-23	L971545-24
REMARKS	DUPLICATE				
DEPTH	8'	10'	12'	15'	2'
SAMPLE NUMBER	RIBH-5B2	RIBH-5C	RIBH-5D	RIBH-5E	RIBH-6A
-- PHYSICAL PARAMETERS --					
PH	9.4	9.2	9.3	8.9	9.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	34.0	<20.0	270.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	59.0	32.0	<30.0	48.0	150.0
COPPER (CU) TOT	<20.0	25.0	17.0	<20.0	1800.0
IRON (FE) TOT	17000.0	18000.0	19000.0	18000.0	96000.0
LEAD (PB) TOT	19.0	30.0	22.0	33.0	830.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	15.0
ZINC (ZN) TOT	25.0	42.0	59.0	54.0	6500.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-7	RIBH-7	RIBH-7	RIBH-8	RIBH-8
SAMPLE DATE	07/01/97	07/01/97	07/01/97	07/01/97	07/01/97
SAMPLE TIME	08:00	08:10	08:15	08:40	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-25	L971545-26	L971545-27	L971545-28	L971545-29
DEPTH	0'	5'	10'	0'	5'
SAMPLE NUMBER	RIBH-7A	RIBH-7B	RIBH-7C	RIBH-8A	RIBH-8B
-- PHYSICAL PARAMETERS --					
PH	8.0	8.9	8.3	7.5	9.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	53.0	<20.0	<20.0	120.0	<20.0
CADMIUM (CD) TOT	28.0	<10.0	<10.0	120.0	<10.0
CHROMIUM (CR) TOT	130.0	89.0	74.0	63.0	31.0
COPPER (CU) TOT	1500.0	55.0	31.0	3800.0	22.0
IRON (FE) TOT	21000.0	19000.0	23000.0	22000.0	16000.0
LEAD (PB) TOT	1000.0	19.0	24.0	3300.0	29.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	14.0	<10.0
ZINC (ZN) TOT	780.0	47.0	71.0	3100.0	35.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-8	RIBH-8	RIBH-9	RIBH-9	RIBH-9
SAMPLE DATE	07/01/97	07/01/97	07/01/97	07/01/97	07/01/97
SAMPLE TIME	08:50	08:50	09:10	09:15	09:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-30	L971545-31	L971545-32	L971545-33	L971545-34
REMARKS		DUPLICATE			
DEPTH	10'	10'	0'	5'	10'
SAMPLE NUMBER	RIBH-8C	RIBH-8C2	RIBH-9A	RIBH-9B	RIBH-9C
-- PHYSICAL PARAMETERS --					
PH	9.2	9.1	7.8	8.9	8.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	63.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	46.0	<10.0	<10.0
CHROMIUM (CR) TOT	64.0	32.0	<30.0	80.0	<30.0
COPPER (CU) TOT	27.0	29.0	1600.0	22.0	31.0
IRON (FE) TOT	20000.0	19000.0	23000.0	15000.0	18000.0
LEAD (PB) TOT	17.0	16.0	1100.0	11.0	33.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	48.0	53.0	1500.0	30.0	31.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-10	RIBH-10	RIBH-10	RIBH-10	SSIA1-1
SAMPLE DATE	07/01/97	07/01/97	07/01/97	07/01/97	07/15/97
SAMPLE TIME	09:35	09:35	09:40	09:55	12:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971545-35	L971545-36	L971545-37	L971545-38	97-1680001
REMARKS		DUPLICATE			
DEPTH	0'	0'	5'	10'	0'
SAMPLE NUMBER	RIBH-10A	RIBH-10A2	RIBH-10B	RIBH-10C	SSIA1-1A
-- PHYSICAL PARAMETERS --					
PH	8.2	8.3	NO MEAS	8.8	6.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	46.0	28.0	<20.0	<20.0	3200.0
CADMIUM (CD) TOT	<10.0	20.0	<10.0	<10.0	1900.0
CHROMIUM (CR) TOT	<30.0	<30.0	<30.0	72.0	62.0
COPPER (CU) TOT	760.0	690.0	85.0	<20.0	13000.0
IRON (FE) TOT	18000.0	18000.0	17000.0	17000.0	18000.0
LEAD (PB) TOT	400.0	340.0	40.0	21.0	11000.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	190.0
ZINC (ZN) TOT	360.0	310.0	61.0	25.0	7000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-1	SSIA1-1	SSIA1-1	SSIA1-2	SSIA1-2
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	12:45	12:50	12:53	13:12	13:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680002	L980356-1	L980356-2	97-1680003	97-1680004
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA1-1B	SSIA1-1C	SSIA1-1D	SSIA1-2A	SSIA1-2B
-- PHYSICAL PARAMETERS --					
PH	6.3	7.1	6.9	7.2	6.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	2300.0	4700.0	2600.0	21000.0	22000.0
CADMIUM (CD) TOT	91.0	1700.0	900.0	1100.0	1600.0
CHROMIUM (CR) TOT	330.0	<30.0	<30.0	60.0	110.0
COPPER (CU) TOT	7600.0	12000.0	24000.0	11000.0	28000.0
IRON (FE) TOT	150000.0	38000.0	21000.0	30000.0	46000.0
LEAD (PB) TOT	5000.0	12000.0	20000.0	15.0	5400.0
SELENIUM (SE) TOT	13.0	110.0	220.0	1300.0	200.0
ZINC (ZN) TOT	13000.0	11000.0	7900.0	2600.0	4900.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-2	SSIA1-2	SSIA1-3	SSIA1-3	SSIA1-3
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	13:21	13:29	13:54	13:56	14:06
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-3	L980356-4	97-1680005	97-1680006	L980356-5
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA1-2C	SSIA1-2D	SSIA1-3A	SSIA1-3B	SSIA1-3C
-- PHYSICAL PARAMETERS --					
PH	6.7	7.4	7.8	7.7	7.9
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	15000.0	22000.0	2000.0	4900.0	3400.0
CADMIUM (CD) TOT	1200.0	1300.0	320.0	110.0	110.0
CHROMIUM (CR) TOT	53.0	130.0	<30.0	97.0	<30.0
COPPER (CU) TOT	25000.0	24000.0	4000.0	37000.0	21000.0
IRON (FE) TOT	44000.0	47000.0	12000.0	44000.0	83000.0
LEAD (PB) TOT	8900.0	4000.0	4100.0	5800.0	7300.0
SELENIUM (SE) TOT	230.0	120.0	41.0	36.0	20.0
ZINC (ZN) TOT	4500.0	4400.0	2200.0	7200.0	8700.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-3	SSIA1-4	SSIA1-4	SSIA1-4	SSIA1-4
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	14:10	14:24	14:28	14:33	14:37
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-6	97-1680007	97-1680008	L980356-7	L980356-8
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA1-3D	SSIA1-4A	SSIA1-4B	SSIA1-4C	SSIA1-4D
-- PHYSICAL PARAMETERS --					
PH	8.1	8.1	8.1	8.2	8.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	1900.0	410.0	570.0	370.0	130.0
CADMIUM (CD) TOT	100.0	88.0	160.0	100.0	41.0
CHROMIUM (CR) TOT	160.0	<30.0	110.0	31.0	63.0
COPPER (CU) TOT	13000.0	1800.0	11000.0	7200.0	3100.0
IRON (FE) TOT	64000.0	15000.0	44000.0	36000.0	21000.0
LEAD (PB) TOT	5800.0	690.0	6200.0	3600.0	1400.0
SELENIUM (SE) TOT	22.0	<10.0	25.0	12.0	<10.0
ZINC (ZN) TOT	5900.0	1500.0	7500.0	4700.0	740.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-5	SSIA1-5	SSIA1-5	SSIA1-5	SSIA1-5
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	14:55	14:55	15:01	15:06	15:11
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680009	97-1680010	97-1680011	L980356-9	L980356-10
REMARKS		DUPLICATE			
DEPTH	0'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA1-5A	SSIA1-5A2	SSIA1-5B	SSIA1-5C	SSIA1-5D
-- PHYSICAL PARAMETERS --					
PH	8.1	8.2	8.4	8.4	8.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	1800.0	1600.0	220.0	90.0	<20.0
CADMIUM (CD) TOT	120.0	110.0	20.0	16.0	<10.0
CHROMIUM (CR) TOT	39.0	<30.0	170.0	64.0	98.0
COPPER (CU) TOT	2500.0	2500.0	3500.0	2900.0	310.0
IRON (FE) TOT	18000.0	17000.0	18000.0	19000.0	15000.0
LEAD (PB) TOT	1200.0	1100.0	830.0	670.0	140.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	2300.0	2100.0	550.0	430.0	95.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA2-1	SSIA2-1	SSIA2-2	SSIA2-2	SSIA2-2
SAMPLE DATE	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
SAMPLE TIME	11:37	11:40	13:25	13:25	13:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680012	97-1680013	97-1680014	97-1680015	L980356-11
REMARKS				DUPLICATE	
DEPTH	0'	1.5'	0'	0'	3'
SAMPLE NUMBER	SSIA2-1A	SSIA2-1B	SSIA2-2A	SSIA2-2A2	SSIA2-2C
-- PHYSICAL PARAMETERS --					
PH	7.6	7.6	8.1	8.2	10.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	400.0	1200.0	840.0	950.0	1600.0
CADMIUM (CD) TOT	14.0	56.0	150.0	120.0	450.0
CHROMIUM (CR) TOT	120.0	340.0	230.0	220.0	330.0
COPPER (CU) TOT	7200.0	5400.0	8800.0	8400.0	6300.0
IRON (FE) TOT	130000.0	190000.0	85000.0	83000.0	120000.0
LEAD (PB) TOT	1500.0	180.0	2700.0	2500.0	10000.0
SELENIUM (SE) TOT	12.0	72.0	21.0	23.0	70.0
ZINC (ZN) TOT	10000.0	16000.0	5300.0	5300.0	77000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-1	SSIA3-1	SSIA3-2	SSIA3-2	SSIA3-2
SAMPLE DATE	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
SAMPLE TIME	13:50	13:55	14:30	14:35	14:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680016	97-1680017	97-1680018	97-1680019	L980356-75
DEPTH	0'	1.5'	0'	1.5'	3'
SAMPLE NUMBER	SSIA3-1A	SSIA3-1B	SSIA3-2A	SSIA3-2B	SSIA3-2C
-- PHYSICAL PARAMETERS --					
PH	8.3	8.3	8.4	8.3	8.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	1900.0	650.0	<20.0	35.0	270.0
CADMIUM (CD) TOT	510.0	120.0	25.0	19.0	52.0
CHROMIUM (CR) TOT	240.0	73.0	<30.0	<30.0	150.0
COPPER (CU) TOT	27000.0	4000.0	360.0	430.0	1400.0
IRON (FE) TOT	66000.0	120000.0	15000.0	21000.0	47000.0
LEAD (PB) TOT	7400.0	6900.0	220.0	550.0	1700.0
SELENIUM (SE) TOT	56.0	13.0	<10.0	<10.0	12.0
ZINC (ZN) TOT	7600.0	17000.0	220.0	2000.0	7500.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-3	SSIA3-3	SSIA3-3	SSIA3-3	SSIA3-4
SAMPLE DATE	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
SAMPLE TIME	15:00	15:05	15:15	15:20	15:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680020	97-1680021	L980356-12	L980356-13	97-1680022
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA3-3A	SSIA3-3B	SSIA3-3C	SSIA3-3D	SSIA3-4A
-- PHYSICAL PARAMETERS --					
PH	6.5	8.2	8.3	8.7	7.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	480.0	<20.0	28.0	<20.0	7800.0
CADMIUM (CD) TOT	150.0	<10.0	<10.0	<10.0	1600.0
CHROMIUM (CR) TOT	41.0	100.0	<30.0	<30.0	140.0
COPPER (CU) TOT	3600.0	72.0	110.0	17.0	7400.0
IRON (FE) TOT	15000.0	6000.0	7000.0	7000.0	55000.0
LEAD (PB) TOT	2000.0	37.0	95.0	45.0	7300.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	53.0
ZINC (ZN) TOT	1900.0	100.0	210.0	120.0	9800.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: paramater not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-4	SSIA3-5	SSIA3-5	SSIA3-5
SAMPLE DATE	07/14/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	15:35	08:10	08:10	08:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680023	97-1680024	97-1680025	97-1680026
REMARKS			DUPLICATE	
DEPTH	1.5'	0'	0'	1.5'
SAMPLE NUMBER	SSIA3-4B	SSIA3-5A	SSIA3-5A2	SSIA3-5B
-- PHYSICAL PARAMETERS --				
PH	7.9	8.4	8.6	7.4
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	3000.0	1000.0	950.0	560.0
CADMIUM (CD) TOT	330.0	280.0	250.0	150.0
CHROMIUM (CR) TOT	300.0	240.0	290.0	80.0
COPPER (CU) TOT	4400.0	9000.0	8400.0	3700.0
IRON (FE) TOT	150000.0	92000.0	88000.0	63000.0
LEAD (PB) TOT	5600.0	5200.0	4800.0	3300.0
SELENIUM (SE) TOT	35.0	22.0	14.0	16.0
ZINC (ZN) TOT	16000.0	9200.0	8900.0	7300.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-6	SSIA3-6	SSIA3-6	SSIA3-6	SSIA3-7
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	08:30	08:34	08:37	08:40	08:52
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680027	97-1680028	L980356-14	L980356-15	97-1680029
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA3-6A	SSIA3-6B	SSIA3-6C	SSIA3-6D	SSIA3-7A
-- PHYSICAL PARAMETERS --					
PH	8.4	8.1	8.5	8.4	8.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	2900.0	230.0	1200.0	580.0	820.0
CADMIUM (CD) TOT	790.0	67.0	240.0	130.0	150.0
CHROMIUM (CR) TOT	260.0	60.0	130.0	160.0	120.0
COPPER (CU) TOT	11000.0	1000.0	4400.0	3400.0	1900.0
IRON (FE) TOT	30000.0	16000.0	48000.0	84000.0	12000.0
LEAD (PB) TOT	11000.0	1000.0	4200.0	2900.0	2200.0
SELENIUM (SE) TOT	60.0	<10.0	15.0	<10.0	22.0
ZINC (ZN) TOT	14000.0	1300.0	5800.0	4600.0	2200.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-7	SSIA3-7	SSIA3-7	SSIA3-8	SSIA3-8
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	08:55	09:00	09:03	09:56	10:02
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680030	L980356-16	L980356-17	97-1680031	97-1680032
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA3-7B	SSIA3-7C	SSIA3-7D	SSIA3-8A	SSIA3-8B
-- PHYSICAL PARAMETERS --					
PH	8.1	8.4	8.5	8.2	7.9
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	2700.0	2000.0	1400.0	3200.0	740.0
CADMIUM (CD) TOT	440.0	270.0	180.0	1100.0	170.0
CHROMIUM (CR) TOT	1400.0	1500.0	1400.0	290.0	110.0
COPPER (CU) TOT	3900.0	3600.0	3600.0	20000.0	3300.0
IRON (FE) TOT	45000.0	71000.0	120000.0	60000.0	19000.0
LEAD (PB) TOT	3700.0	3300.0	3300.0	8100.0	1600.0
SELENIUM (SE) TOT	94.0	46.0	44.0	60.0	14.0
ZINC (ZN) TOT	14000.0	13000.0	12000.0	9900.0	1900.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-6	SSIA3-8	SSIA3-9	SSIA3-9	SSIA3-9
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	10:05	10:12	09:17	09:22	09:26
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-18	L980356-19	97-1680033	97-1680034	L980356-20
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA3-8C	SSIA3-8D	SSIA3-9A	SSIA3-9B	SSIA3-9C
-- PHYSICAL PARAMETERS --					
PH	8.3	8.2	8.2	8.4	8.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	64.0	680.0	1900.0	570.0	99.0
CADMIUM (CD) TOT	17.0	100.0	1400.0	340.0	49.0
CHROMIUM (CR) TOT	<30.0	<30.0	53.0	52.0	40.0
COPPER (CU) TOT	380.0	3000.0	8500.0	2700.0	540.0
IRON (FE) TOT	11000.0	21000.0	34000.0	23000.0	18000.0
LEAD (PB) TOT	230.0	1800.0	4500.0	2700.0	550.0
SELENIUM (SE) TOT	<10.0	<10.0	33.0	26.0	<10.0
ZINC (ZN) TOT	290.0	2200.0	5500.0	2600.0	900.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-9	SSIA3-10	SSIA3-10	SSIA3-10	SSIA3-10
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97	07/15/97
SAMPLE TIME	09:35	10:35	10:35	10:39	10:41
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-21	97-1680035	97-1680036	97-1680037	L980356-22
REMARKS			DUPLICATE		
DEPTH	4'	0'	0'	1.5'	3'
SAMPLE NUMBER	SSIA3-9D	SSIA3-10A	SSIA3-10A2	SSIA3-10B	SSIA3-10C
-- PHYSICAL PARAMETERS --					
PH	9.0	10.0	9.3	8.5	8.1
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	2800.0	3300.0	980.0	1400.0
CADMIUM (CD) TOT	<10.0	360.0	410.0	680.0	370.0
CHROMIUM (CR) TOT	68.0	95.0	57.0	<30.0	100.0
COPPER (CU) TOT	130.0	7900.0	8900.0	4700.0	4800.0
IRON (FE) TOT	12000.0	15000.0	16000.0	120000.0	130000.0
LEAD (PB) TOT	140.0	19000.0	22000.0	25000.0	14000.0
SELENIUM (SE) TOT	<10.0	77.0	75.0	46.0	30.0
ZINC (ZN) TOT	160.0	4100.0	4400.0	15000.0	13000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA3-10	SSIA5-1	SSIA5-1	SSIA5-1	SSIA5-1
SAMPLE DATE	07/15/97	07/07/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	10:44	09:55	08:55	08:25	08:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-23	L971637-1	L971637-2	L980374-28	L980374-29
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA3-10D	SSIA5-1A	SSIA5-1B	SSIA5-1C	SSIA5-1D
-- PHYSICAL PARAMETERS --					
PH	8.0	8.2	8.4	9.1	9.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	3500.0	240.0	28.0	<20.0	<20.0
CADMIUM (CD) TOT	550.0	130.0	17.0	<10.0	<10.0
CHROMIUM (CR) TOT	90.0	46.0	<30.0	110.0	99.0
COPPER (CU) TOT	6700.0	6600.0	400.0	<20.0	34.0
IRON (FE) TOT	130000.0	21000.0	19000.0	21000.0	21000.0
LEAD (PB) TOT	20000.0	4200.0	420.0	21.0	58.0
SELENIUM (SE) TOT	31.0	30.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	14000.0	2400.0	200.0	43.0	63.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-2	SSIA5-2	SSIA5-2	SSIA5-2	SSIA5-3
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	09:08	09:12	09:17	09:21	09:35
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-3	L971637-4	L980374-30	L980374-31	L971637-5
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA5-2A	SSIA5-2B	SSIA5-2C	SSIA5-2D	SSIA5-3A
-- PHYSICAL PARAMETERS --					
PH	8.0	9.0	8.4	8.4	7.6
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	71.0	22.0	<20.0	27.0	130.0
CADMIUM (CD) TOT	66.0	<10.0	<10.0	<10.0	110.0
CHROMIUM (CR) TOT	<30.0	82.0	85.0	160.0	170.0
COPPER (CU) TOT	1100.0	42.0	81.0	71.0	7200.0
IRON (FE) TOT	20000.0	19000.0	19000.0	21000.0	25000.0
LEAD (PB) TOT	580.0	44.0	95.0	82.0	2700.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	410.0	28.0	77.0	55.0	2000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-3	SSIA5-3	SSIA5-3	SSIA5-4	SSIA5-4
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	09:37	09:44	09:48	10:04	10:07
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-6	L980374-32	L980374-33	L971637-7	L971637-8
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA5-3B	SSIA5-3C	SSIA5-3D	SSIA5-4A	SSIA5-4B
-- PHYSICAL PARAMETERS --					
PH	8.1	8.2	8.1	7.7	7.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	60.0	37.0	<20.0
CADMIUM (CD) TOT	16.0	<10.0	17.0	41.0	44.0
CHROMIUM (CR) TOT	<30.0	52.0	150.0	30.0	37.0
COPPER (CU) TOT	1200.0	570.0	920.0	1800.0	1600.0
IRON (FE) TOT	19000.0	19000.0	22000.0	21000.0	23000.0
LEAD (PB) TOT	850.0	410.0	590.0	1100.0	1800.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	11.0	12.0
ZINC (ZN) TOT	590.0	300.0	400.0	770.0	1100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-4	,SSIA5-4	SSIA5-5	SSIA5-5	SSIA5-5
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	10:16	10:22	10:36	10:40	10:43
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-34	L980374-35	L971637-9	L971637-10	L980374-36
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA5-4C	SSIA5-4D	SSIA5-5A	SSIA5-5B	SSIA5-5C
-- PHYSICAL PARAMETERS --					
PH	8.9	7.7	8.0	8.4	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	100.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	46.0	<10.0	36.0	<10.0	<10.0
CHROMIUM (CR) TOT	120.0	88.0	30.0	<30.0	63.0
COPPER (CU) TOT	1900.0	76.0	1100.0	130.0	130.0
IRON (FE) TOT	24000.0	28000.0	20000.0	21000.0	22000.0
LEAD (PB) TOT	2200.0	81.0	1200.0	210.0	160.0
SELENIUM (SE) TOT	12.0	<10.0	20.0	<10.0	<10.0
ZINC (ZN) TOT	1300.0	130.0	740.0	130.0	160.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-5	SSIA5-6	SSIA5-6	SSIA5-6	SSIA5-6
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	10:46	10:59	11:05	11:14	11:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-37	L971637-11	L971637-12	L980374-38	L980374-39
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA5-5D	SSIA5-6A	SSIA5-6B	SSIA5-6C	SSIA5-6D
-- PHYSICAL PARAMETERS --					
PH	8.1	8.2	8.2	8.1	8.1
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	14.0	10.0	13.0	15.0
CHROMIUM (CR) TOT	66.0	<30.0	97.0	74.0	71.0
COPPER (CU) TOT	56.0	650.0	310.0	370.0	460.0
IRON (FE) TOT	29000.0	20000.0	21000.0	20000.0	21000.0
LEAD (PB) TOT	63.0	370.0	370.0	430.0	500.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	110.0	280.0	210.0	290.0	290.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-7	SSIA5-7	SSIA5-7	SSIA5-7	SSIA5-7
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	11:32	11:37	11:37	11:43	11:47
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-13	L971637-14	L971637-15	L980374-40	L980374-41
DEPTH	0'	1.5'	1.5'	3'	4'
SAMPLE NUMBER	SSIA5-7A	SSIA5-7B	SSIA5-7B2	SSIA5-7C	SSIA5-7D
-- PHYSICAL PARAMETERS --					
PH	7.9	8.8	NO MEAS	7.7	7.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	110.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	56.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	<30.0	<30.0	<30.0	37.0
COPPER (CU) TOT	3800.0	59.0	24.0	<20.0	30.0
IRON (FE) TOT	24000.0	17000.0	20000.0	19000.0	21000.0
LEAD (PB) TOT	1700.0	68.0 J4	<10.0 UJ4	27.0 J4	27.0 J4
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	1300.0	52.0	52.0	29.0	49.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-8	SSIA5-8	SSIA5-8	SSIA5-8	SSIA5-9
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	12:58	13:02	13:05	13:09	13:18
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-16	L971637-17	L980374-42	L980374-43	L971637-18
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA5-8A	SSIA5-8B	SSIA5-8C	SSIA5-8D	SSIA5-9A
-- PHYSICAL PARAMETERS --					
PH	7.7	8.9	8.5	9.0	7.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	31.0	32.0	20.0	<20.0	90.0
CADMIUM (CD) TOT	42.0	<10.0	<10.0	<10.0	39.0
CHROMIUM (CR) TOT	47.0	<30.0	<30.0	<30.0	<30.0
COPPER (CU) TOT	2800.0	<20.0	<20.0	42.0	2800.0
IRON (FE) TOT	21000.0	16000.0	31000.0	30000.0	23000.0
LEAD (PB) TOT	1200.0	30.0	32.0	25.0	800.0
SELENIUM (SE) TOT	16.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	990.0	28.0	86.0	92.0	850.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-9	SSIA5-9	SSIA5-9	SSIA5-10	SSIA5-10
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	13:23	13:28	13:33	13:43	13:46
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-19	L980374-44	L980374-45	L971637-20	L971637-21
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA5-9B	SSIA5-9C	SSIA5-9D	SSIA5-10A	SSIA5-10B
-- PHYSICAL PARAMETERS --					
PH	8.1	8.4	8.7	7.7	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	130.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	110.0	<10.0
CHROMIUM (CR) TOT	68.0	58.0	52.0	34.0	30.0
COPPER (CU) TOT	260.0	80.0	57.0	3900.0	320.0
IRON (FE) TOT	17000.0	19000.0	19000.0	19000.0	17000.0
LEAD (PB) TOT	110.0	46.0	30.0	2800.0	250.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	12.0	<10.0
ZINC (ZN) TOT	83.0	29.0	33.0	2500.0	200.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-10	SSIA5-10	SSIA5-11	SSIA5-11	SSIA5-11
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	13:49	13:51	14:02	14:11	14:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-46	L980374-47	L971637-22	L971637-23	L980374-48
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA5-10C	SSIA5-10D	SSIA5-11A	SSIA5-11B	SSIA5-11C
-- PHYSICAL PARAMETERS --					
PH	8.8	8.3	8.0	8.1	8.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	22.0	23.0	<10.0
CHROMIUM (CR) TOT	<30.0	33.0	36.0	66.0	130.0
COPPER (CU) TOT	360.0	230.0	1100.0	570.0	330.0
IRON (FE) TOT	18000.0	18000.0	21000.0	19000.0	18000.0
LEAD (PB) TOT	300.0	200.0	740.0	470.0	230.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	270.0	180.0	630.0	360.0	200.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-11	SSIA5-12	SSIA5-12	SSIA5-12	SSIA5-12
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	14:18	14:27	14:32	14:35	14:38
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-49	L971637-24	L971637-25	L980374-50	L980374-51
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA5-11D	SSIA5-12A	SSIA5-12B	SSIA5-12C	SSIA5-12D
-- PHYSICAL PARAMETERS --					
PH	8.3	7.8	7.8	8.2	8.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	21.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	19.0	11.0	<10.0	<10.0
CHROMIUM (CR) TOT	68.0	41.0	100.0	52.0	41.0
COPPER (CU) TOT	33.0	810.0	430.0	<20.0	130.0
IRON (FE) TOT	31000.0	21000.0	20000.0	27000.0	30000.0
LEAD (PB) TOT	31.0	540.0	440.0	38.0	110.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	74.0	440.0	340.0	72.0	120.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-13	SSIA5-13	SSIA5-13	SSIA5-13	SSIA5-14
SAMPLE DATE	07/08/97	07/08/97	07/08/97	07/08/97	07/08/97
SAMPLE TIME	14:47	14:49	14:54	14:56	15:12
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971637-26	L971637-27	L980374-52	L980374-53	L971637-28
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA5-13A	SSIA5-13B	SSIA5-13C	SSIA5-13D	SSIA5-14A
-- PHYSICAL PARAMETERS --					
PH	7.8	8.0	8.3	8.4	8.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	87.0	<20.0	<20.0	<20.0	78.0
CADMIUM (CD) TOT	36.0	<10.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	69.0	<30.0	87.0	<30.0	60.0
COPPER (CU) TOT	2200.0	100.0	190.0	42.0	1300.0
IRON (FE) TOT	17000.0	18000.0	19000.0	21000.0	14000.0
LEAD (PB) TOT	830.0	110.0	160.0	35.0	170.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	850.0	100.0	130.0	61.0	220.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-14		SSIA5-14	SSIA5-14		SSIA5-15		SSIA5-15
SAMPLE DATE	07/08/97		07/08/97	07/08/97		07/14/97		07/14/97
SAMPLE TIME	15:14		15:17	: 0		10:00		10:00
LAB	TSC-SLC		TSC-SLC	TSC-SLC		TSC-SLC		TSC-SLC
LAB NUMBER	L971637-29		L980374-54	L980374-55		97-1680038		97-1680039
REMARKS								DUPLICATE
DEPTH	1.5'		3'	4'		0'		0'
SAMPLE NUMBER	SSIA5-14B		SSIA5-14C	SSIA5-14D		SSIA5-15A		SSIA5-15A2
-- PHYSICAL PARAMETERS --								
PH	8.2		8.7	8.7		7.9		7.9
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	10.0		<20.0	<20.0		86.0		70.0
CADMIUM (CD) TOT	<10.0		<10.0	<10.0		20.0		19.0
CHROMIUM (CR) TOT	<30.0		56.0	190.0		74.0	J4	64.0 J4
COPPER (CU) TOT	120.0		<20.0	<20.0		2800.0		2400.0
IRON (FE) TOT	19000.0		17000.0	18000.0		23000.0		23000.0
LEAD (PB) TOT	130.0		12.0	11.0		420.0		420.0
SELENIUM (SE) TOT	<10.0		<10.0	<10.0		<10.0		<10.0
ZINC (ZN) TOT	54.0		28.0	38.0		900.0		760.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-15		SSIA5-15		SSIA5-15		SSIA5-15		SSIA5-16	
SAMPLE DATE	07/14/97		07/14/97		07/14/97		07/14/97		07/14/97	
SAMPLE TIME	10:10		10:10		10:12		10:16		10:25	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	97-1680040		97-1680041		L980374-1		L980374-2		97-1680042	
REMARKS			DUPLICATE							
DEPTH	1.5'		1.5'		3'		4'		0'	
SAMPLE NUMBER	SSIA5-15B		SSIA5-15B2		SSIA5-15C		SSIA5-15D		SSIA5-16A	
-- PHYSICAL PARAMETERS --										
PH	8.5		8.3		8.4		9.0		7.6	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	<20.0		<20.0		<20.0		<20.0		27.0	J4
CADMIUM (CD) TOT	<10.0		<10.0		<10.0		<10.0		24.0	
CHROMIUM (CR) TOT	32.0	J4	100.0	J4	150.0	J4	120.0	J4	89.0	
COPPER (CU) TOT	39.0		20.0		<20.0		<20.0		1000.0	
IRON (FE) TOT	17000.0		18000.0		20000.0		20000.0		32000.0	
LEAD (PB) TOT	34.0		38.0		13.0		22.0		610.0	
SELENIUM (SE) TOT	<10.0		<10.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	59.0	J4	27.0	J4	48.0	J4	47.0	J4	650.0	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-16		SSIA5-16		SSIA5-16		SSIA5-16		SSIA5-16	
SAMPLE DATE	07/14/97		07/14/97		07/14/97		07/14/97		07/14/97	
SAMPLE TIME	10:25		10:30		10:30		10:33		10:36	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	97-1680043		97-1680044		97-1680045		L980374-3		L980374-4	
REMARKS	DUPLICATE				DUPLICATE					
DEPTH	0'		1.5'		1.5'		3'		4'	
SAMPLE NUMBER	SSIA5-16A2		SSIA5-16B		SSIA5-16B2		SSIA5-16C		SSIA5-16D	
-- PHYSICAL PARAMETERS --										
PH	7.9		8.1		8.1		8.7		8.2	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	68.0	J4	<20.0		<20.0		<20.0		<20.0	
CADMIUM (CD) TOT	40.0		<10.0		<10.0		<10.0		<10.0	
CHROMIUM (CR) TOT	74.0		<30.0		51.0		<30.0		46.0	
COPPER (CU) TOT	1400.0		200.0		140.0		21.0		23.0	
IRON (FE) TOT	33000.0		20000.0		20000.0		20000.0		23000.0	
LEAD (PB) TOT	830.0		150.0		140.0		11.0		18.0	
SELENIUM (SE) TOT	<10.0		<10.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	1000.0	J4	190.0	J4	140.0	J4	48.0	J4	81.0	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-17	SSIA5-17	SSIA5-17	SSIA5-17	SSIA5-18
SAMPLE DATE	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
SAMPLE TIME	10:40	10:45	10:47	10:49	10:55
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680046	97-1680047	L980374-5	L980374-6	97-1680048
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA5-17A	SSIA5-17B	SSIA5-17C	SSIA5-17D	SSIA5-18A
-- PHYSICAL PARAMETERS --					
PH	7.7	8.1	8.1	8.3	8.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	83.0	24.0	24.0	<20.0	26.0
CADMIUM (CD) TOT	85.0	<10.0	<10.0	<10.0	11.0
CHROMIUM (CR) TOT	<30.0	<30.0	80.0	140.0	<30.0
COPPER (CU) TOT	1800.0	150.0	57.0	<20.0	1200.0
IRON (FE) TOT	23000.0	18000.0	17000.0	19000.0	20000.0
LEAD (PB) TOT	1100.0	140.0	63.0	24.0	200.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	1400.0	150.0	90.0	50.0	430.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-18	SSIA5-18	SSIA5-18	SSIA5-19	SSIA5-19
SAMPLE DATE	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
SAMPLE TIME	10:57	10:59	11:01	11:10	11:12
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680049	L980374-7	L980374-8	97-1680050	97-1680051
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA5-18B	SSIA5-18C	SSIA5-18D	SSIA5-19A	SSIA5-19B
-- PHYSICAL PARAMETERS --					
PH	9.3	8.7	9.5	7.7	7.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	160.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	<10.0	150.0	29.0
CHROMIUM (CR) TOT	<30.0	160.0	<30.0	39.0	<30.0
COPPER (CU) TOT	27.0	21.0	<20.0	3400.0	370.0
IRON (FE) TOT	16000.0	17000.0	18000.0	28000.0	15000.0
LEAD (PB) TOT	15.0	32.0	26.0	2400.0	310.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	18.0	<10.0
ZINC (ZN) TOT	28.0	41.0	44.0	3300.0	430.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-19	SSIA5-19		SSIA8-1	SSIA8-1	SSIA8-1
SAMPLE DATE	07/14/97	07/14/97		07/16/97	07/16/97	07/16/97
SAMPLE TIME	11:14	11:16		09:50	09:55	09:58
LAB	TSC-SLC	TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-88	L980374-89		97-1680052	97-1680053	L980374-83
DEPTH	3'	4'		0'	1.5'	3'
SAMPLE NUMBER	SSIA5-19C	SSIA5-19D		SSIA8-1A	SSIA8-1B	SSIA8-1C
-- PHYSICAL PARAMETERS --						
PH	8.1	8.2		8.2	7.9	8.1
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	<20.0		240.0	2100.0	800.0
CADMIUM (CD) TOT	13.0	15.0		33.0	400.0	99.0
CHROMIUM (CR) TOT	68.0	59.0		58.0	120.0	200.0
COPPER (CU) TOT	230.0	270.0		140.0	4300.0	3000.0
IRON (FE) TOT	26000.0	25000.0		17000.0	86000.0	140000.0
LEAD (PB) TOT	860.0	810.0		44.0	1500.0	10000.0
SELENIUM (SE) TOT	<10.0	<10.0		<10.0	26.0	40.0
ZINC (ZN) TOT	1800.0	1500.0		470.0	8100.0	17000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-2	'SSIA8-2	SSIA8-2	SSIA8-2	SSIA8-3
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/16/97	07/16/97
SAMPLE TIME	10:15	10:20	10:23	10:27	11:03
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680054	97-1680055	L980374-84	L980374-85	97-1680056
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA8-2A	SSIA8-2B	SSIA8-2C	SSIA8-2D	SSIA8-3A
-- PHYSICAL PARAMETERS --					
PH	8.5	8.9	8.8	7.9	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	880.0	770.0	2700.0
CADMIUM (CD) TOT	35.0	11.0	38.0	37.0	660.0
CHROMIUM (CR) TOT	58.0	<30.0	290.0	72.0	130.0
COPPER (CU) TOT	440.0	530.0	1600.0	1500.0	1400.0
IRON (FE) TOT	17000.0	18000.0	160000.0	170000.0	34000.0
LEAD (PB) TOT	240.0	500.0	8900.0	10000.0	420.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	66.0
ZINC (ZN) TOT	510.0	340.0	24000.0	28000.0	4600.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-3	SSIA8-3	SSIA8-3	SSIA8-4	SSIA8-4
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/14/97	07/14/97
SAMPLE TIME	11:12	11:14	11:17	11:58	12:02
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680057	L980374-86	L980374-87	L980374-9	L980374-10
DEPTH	1.5'	3'	4'	3'	4'
SAMPLE NUMBER	SSIA8-3B	SSIA8-3C	SSIA8-3D	SSIA8-4C	SSIA8-4D
-- PHYSICAL PARAMETERS --					
PH	8.1	8.1	7.9	6.9	7.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	170.0	1100.0	290.0	6600.0	3100.0
CADMIUM (CD) TOT	150.0	400.0	79.0	1000.0	530.0
CHROMIUM (CR) TOT	56.0	110.0	190.0	79.0	140.0
COPPER (CU) TOT	1100.0	7000.0	3700.0	39000.0	13000.0
IRON (FE) TOT	17000.0	29000.0	18000.0	56000.0	44000.0
LEAD (PB) TOT	1000.0	6800.0	4700.0	71000.0	22000.0
SELENIUM (SE) TOT	<10.0	40.0	<10.0	68.0	23.0
ZINC (ZN) TOT	1800.0	4800.0	2200.0	26000.0	11000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-4	SSIA8-4	SSIA8-5	SSIA8-5	SSIA8-5
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/16/97	07/16/97
SAMPLE TIME	11:50	11:54	11:29	11:33	11:36
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680058	97-1680059	97-1680060	97-1680061	L980374-11
DEPTH	0'	1.5'	0'	1.5'	3'
SAMPLE NUMBER	SSIA8-4A	SSIA8-4B	SSIA8-5A	SSIA8-5B	SSIA8-5C
-- PHYSICAL PARAMETERS --					
PH	8.8	7.7	8.5	8.1	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	3700.0	53.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	980.0	130.0	<10.0	28.0
CHROMIUM (CR) TOT	<30.0	<30.0	110.0	<30.0	150.0
COPPER (CU) TOT	660.0	20000.0	1500.0	170.0	1100.0
IRON (FE) TOT	17000.0	61000.0	18000.0	16000.0	19000.0
LEAD (PB) TOT	120.0	43000.0	180.0	130.0	440.0
SELENIUM (SE) TOT	<10.0	57.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	150.0	21000.0	2300.0	350.0	770.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-5	SSIA8-6	SSIA8-6	SSIA8-6	SSIA8-6
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/16/97	07/16/97
SAMPLE TIME	11:39	12:15	12:35	12:39	12:41
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-12	97-1680062	97-1680063	97-1680064	L980374-13
REMARKS			DUPLICATE		
DEPTH	4'	0'	0'	1.5'	3'
SAMPLE NUMBER	SSIA8-5D	SSIA8-6A	SSIA8-6A2	SSIA8-6B	SSIA8-6C
-- PHYSICAL PARAMETERS --					
PH	8.5	8.7	8.8	9.1	8.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	<20.0	58.0
CADMIUM (CD) TOT	<10.0	23.0	13.0	47.0	130.0
CHROMIUM (CR) TOT	120.0	<30.0 UJ4	140.0 J4	94.0 J4	97.0 J4
COPPER (CU) TOT	170.0	400.0	390.0	520.0	530.0
IRON (FE) TOT	16000.0	15000.0	15000.0	19000.0	20000.0
LEAD (PB) TOT	50.0	690.0	680.0	1000.0	1700.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	250.0	370.0	330.0	470.0	1100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-6		SSIA8-7	SSIA8-7	SSIA8-7	SSIA8-7
SAMPLE DATE	07/16/97		07/16/97	07/16/97	07/16/97	07/16/97
SAMPLE TIME	: 0		13:14	13:18	13:23	13:27
LAB	TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-14		97-1680065	97-1680066	L980374-15	L980374-16
DEPTH	4'		0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA8-6D		SSIA8-7A	SSIA8-7B	SSIA8-7C	SSIA8-7D
-- PHYSICAL PARAMETERS --						
PH	9.3		8.6	8.3	8.3	8.8
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	120.0		51.0	<20.0	31.0	<20.0
CADMIUM (CD) TOT	110.0		96.0	22.0	41.0	<10.0
CHROMIUM (CR) TOT	100.0	J4	59.0	<30.0	200.0	250.0
COPPER (CU) TOT	2600.0		980.0	250.0	380.0	23.0
IRON (FE) TOT	22000.0		20000.0	16000.0	15000.0	25000.0
LEAD (PB) TOT	2400.0		520.0	300.0	500.0	42.0
SELENIUM (SE) TOT	<10.0		<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	1300.0		1100.0	220.0	330.0	54.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-8	SSIA8-8	SSIA8-8	SSIA8-8	SSIA8-9
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/16/97	07/16/97
SAMPLE TIME	13:50	13:54	13:56	13:58	14:42
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680067	97-1680068	L980374-17	L980374-18	97-1680069
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA8-8A	SSIA8-8B	SSIA8-8C	SSIA8-8D	SSIA8-9A
-- PHYSICAL PARAMETERS --					
PH	8.5	8.4	8.4	8.5	8.1
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	39.0	<20.0	<20.0	1000.0
CADMIUM (CD) TOT	96.0	31.0	<10.0	<10.0	310.0
CHROMIUM (CR) TOT	<30.0	44.0	140.0	92.0	120.0
COPPER (CU) TOT	830.0	1500.0	340.0	240.0	22000.0
IRON (FE) TOT	20000.0	21000.0	18000.0	18000.0	54000.0
LEAD (PB) TOT	770.0	1400.0	330.0	920.0	8900.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	35.0
ZINC (ZN) TOT	1200.0	1100.0	260.0	210.0	8000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-9	SSIA8-9	SSIA8-9	SSIA8-10	SSIA8-10
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/17/97	07/17/97
SAMPLE TIME	14:50	14:53	14:56	14:08	14:12
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1680070	L980374-19	L980374-20	L971715-1	L971715-2
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA8-9B	SSIA8-9C	SSIA8-9D	SSIA8-10A	SSIA8-10B
-- PHYSICAL PARAMETERS --					
PH	7.9	7.8	8.0	8.6	7.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	530.0	180.0	<20.0	<20.0	53.0
CADMIUM (CD) TOT	270.0	76.0	19.0	13.0	66.0
CHROMIUM (CR) TOT	<30.0	75.0	<30.0	<30.0	90.0
COPPER (CU) TOT	7300.0	3800.0	840.0	160.0	750.0
IRON (FE) TOT	30000.0	29000.0	21000.0	10000.0	18000.0
LEAD (PB) TOT	11000.0	4600.0	1300.0	68.0	1400.0
SELENIUM (SE) TOT	37.0	12.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	5100.0	1600.0	470.0	130.0	890.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-10	SSIA8-10	SSIA8-11	SSIA8-11	SSIA8-11
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	14:16	14:21	14:38	15:00	15:02
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-56	L980374-71	L971715-3	L971715-4	L980374-57
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA8-10C	SSIA8-10D	SSIA8-11A	SSIA8-11B	SSIA8-11C
-- PHYSICAL PARAMETERS --					
PH	8.5	9.1	8.4	7.5	8.5
PH (PH)				7.5	
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	910.0	62.0	<20.0
ARSENIC (AS) (ppm) TOT				62.0	
CADMIUM (CD) TOT	25.0	28.0	430.0	86.0	<10.0
CHROMIUM (CR) TOT	79.0	<30.0	33.0	31.0	150.0
COPPER (CU) TOT	520.0	220.0	20000.0	2700.0	62.0
IRON (FE) TOT	16000.0	14000.0	24000.0	11000.0	7000.0
LEAD (PB) TOT	810.0	660.0	3200.0	3700.0	36.0
SELENIUM (SE) TOT	<10.0	<10.0	31.0	10.0	<10.0
ZINC (ZN) TOT	620.0	380.0	6300.0	1100.0	25.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-11	SSIA8-12	SSIA8-12	SSIA8-12	SSIA8-12	
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97	07/17/97	
SAMPLE TIME	15:06	15:18	15:20	15:24	15:27	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	
LAB NUMBER	L980374-72	L971715-5	L971715-6	L980374-58	L980374-73	
DEPTH	4'	0'	1.5'	3'	4'	
SAMPLE NUMBER	SSIA8-11D	SSIA8-12A	SSIA8-12B	SSIA8-12C	SSIA8-12D	
-- PHYSICAL PARAMETERS --						
PH	8.4	8.0	7.9	8.2	8.4	
PH (PH)		8.0	7.9			
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	<20.0	150.0	480.0	32.0	<20.0	
ARSENIC (AS) (ppm) TOT		150.0	480.0			
CADMIUM (CD) TOT	<10.0	78.0	78.0	23.0	<10.0	
CHROMIUM (CR) TOT	76.0	36.0	66.0	230.0	200.0	
COPPER (CU) TOT	400.0	5100.0	8300.0	1500.0	31.0	
IRON (FE) TOT	7000.0	17000.0	32000.0	16000.0	19000.0	
LEAD (PB) TOT	230.0	3600.0	4900.0	1100.0	38.0	
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	
ZINC (ZN) TOT	98.0	2300.0	2400.0	760.0	12.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-13	SSIA8-13	SSIA8-13	SSIA8-13	SSIA8-14
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	15:42	15:45	15:54	15:52	16:23
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971715-7	L971715-8	L980374-59	L980374-74	97-1715009
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA8-13A	SSIA8-13B	SSIA8-13C	SSIA8-13D	SSIA8-14A
-- PHYSICAL PARAMETERS --					
PH	8.4	8.0	8.5	8.6	8.7
PH (PH)	8.4	8.0			
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	33.0	<20.0	<20.0	<20.0	<20.0
ARSENIC (AS) (ppm) TOT	33.0	<20.0			
CADMIUM (CD) TOT	<10.0	49.0	<10.0	45.0	<10.0
CHROMIUM (CR) TOT	<30.0	72.0	170.0	120.0	55.0
COPPER (CU) TOT	980.0	8300.0	480.0	130.0	280.0
IRON (FE) TOT	13000.0	26000.0	18000.0	19000.0	13000.0
LEAD (PB) TOT	230.0	3100.0	190.0	98.0	83.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	250.0	2000.0	230.0	180.0	93.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-14	SSIA8-14	SSIA8-14	SSIA8-15	SSIA8-15
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/18/97	07/18/97
SAMPLE TIME	16:23	16:27	16:29	07:45	07:48
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715010	97-1715011	L980374-60	97-1715012	97-1715013
REMARKS	DUPLICATE				
DEPTH	0'	1.5'	3'	0'	1.5'
SAMPLE NUMBER	SSIA8-14A2	SSIA8-14B	SSIA8-14C	SSIA8-15A	SSIA8-15B
-- PHYSICAL PARAMETERS --					
PH	8.9	8.5	8.2	9.0	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	110.0	120.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	25.0	20.0	11.0	14.0
CHROMIUM (CR) TOT	<30.0	350.0	370.0	45.0	31.0
COPPER (CU) TOT	270.0	4900.0	5800.0	1600.0	1900.0
IRON (FE) TOT	14000.0	150000.0	180000.0	13000.0	16000.0
LEAD (PB) TOT	73.0	1200.0	2900.0	160.0	900.0
SELENIUM (SE) TOT	<10.0	23.0	14.0	<10.0	<10.0
ZINC (ZN) TOT	75.0	13000.0	25000.0	370.0	480.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-15	SSIA8-15	SSIA8-16	SSIA8-16	SSIA8-16
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	07:52	08:00	15:55	16:00	16:05
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-61	L980374-75	97-1715014	97-1715015	L980374-62
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA8-15C	SSIA8-15D	SSIA8-16A	SSIA8-16B	SSIA8-16C
-- PHYSICAL PARAMETERS --					
PH	8.7	7.9	8.2	7.9	8.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	83.0	930.0	370.0	1100.0
CADMIUM (CD) TOT	<10.0	92.0	240.0	190.0	120.0
CHROMIUM (CR) TOT	92.0	160.0	120.0	92.0	50.0
COPPER (CU) TOT	210.0	14000.0	22000.0	9500.0	4400.0
IRON (FE) TOT	13000.0	19000.0	31000.0	26000.0	40000.0
LEAD (PB) TOT	100.0	8900.0	4000.0	10000.0	3500.0
SELENIUM (SE) TOT	<10.0	72.0	31.0	27.0	17.0
ZINC (ZN) TOT	200.0	2200.0	5000.0	4000.0	3600.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-16	SSIA8-17	SSIA8-17	SSIA8-17	SSIA8-17
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	16:10	08:35	08:38	08:39	: 0
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-76	97-1715016	97-1715017	L980374-63	L980374-77
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA8-16D	SSIA8-17A	SSIA8-17B	SSIA8-17C	SSIA8-17D
-- PHYSICAL PARAMETERS --					
PH	7.5	8.4	8.4	8.6	8.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	1200.0	98.0	<20.0	27.0	<20.0
CADMIUM (CD) TOT	520.0	29.0	<10.0	<10.0	11.0
CHROMIUM (CR) TOT	<30.0	30.0	59.0	150.0	74.0
COPPER (CU) TOT	3100.0	3700.0	710.0	2100.0	260.0
IRON (FE) TOT	52000.0	15000.0	18000.0	20000.0	13000.0
LEAD (PB) TOT	5000.0	470.0	380.0	520.0	240.0
SELENIUM (SE) TOT	50.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	3900.0	680.0	440.0	730.0	170.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-18	SSIA8-18	SSIA8-18	SSIA8-19	SSIA8-19
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	09:32	09:32	09:36	08:08	08:11
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715018	97-1715019	97-1715020	97-1715021	97-1715022
REMARKS		DUPLICATE			
DEPTH	0'	0'	1.5'	0'	1.5'
SAMPLE NUMBER	SSIA8-18A	SSIA8-18A2	SSIA8-18B	SSIA8-19A	SSIA8-19B
-- PHYSICAL PARAMETERS --					
PH	8.4	8.5	8.0	8.6	8.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	260.0	280.0	<20.0	44.0	<20.0
CADMIUM (CD) TOT	100.0	100.0	99.0	<10.0	<10.0
CHROMIUM (CR) TOT	<30.0	87.0	77.0	76.0	48.0
COPPER (CU) TOT	890.0	800.0	3700.0	1200.0	560.0
IRON (FE) TOT	13000.0	13000.0	21000.0	15000.0	18000.0
LEAD (PB) TOT	300.0	240.0	3600.0	350.0	560.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	790.0	840.0	2600.0	280.0	470.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-19	SSIA8-19	SSIA8-20	SSIA8-20
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	08:16	: 0	09:53	09:56
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-64	L980374-78	97-1715023	97-1715024
DEPTH	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA8-19C	SSIA8-19D	SSIA8-20A	SSIA8-20B
-- PHYSICAL PARAMETERS --				
PH	8.9	7.6	8.3	9.0
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<20.0	<20.0	<20.0	330.0
CADMIUM (CD) TOT	<10.0	220.0	<10.0	89.0
CHROMIUM (CR) TOT	160.0	41.0	64.0	230.0
COPPER (CU) TOT	430.0	11000.0	200.0	10000.0
IRON (FE) TOT	18000.0	31000.0	12000.0	120000.0
LEAD (PB) TOT	290.0	14000.0	95.0	3900.0
SELENIUM (SE) TOT	<10.0	14.0	<10.0	38.0
ZINC (ZN) TOT	410.0	7200.0	130.0	15000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-21	SSIA8-21	SSIA8-21	SSIA8-21	SSIA8-22
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	09:07	09:09	09:15	09:18	16:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715025	97-1715026	L980374-65	L980374-79	97-1715027
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA8-21A	SSIA8-21B	SSIA8-21C	SSIA8-21D	SSIA8-22A
-- PHYSICAL PARAMETERS --					
PH	8.1	8.0	8.6	8.5	7.9
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	460.0	780.0	23.0	<20.0	6600.0
CADMIUM (CD) TOT	300.0	110.0	<10.0	14.0	1400.0
CHROMIUM (CR) TOT	59.0	100.0	<30.0	45.0	110.0
COPPER (CU) TOT	12000.0	19000.0	500.0	310.0	23000.0
IRON (FE) TOT	20000.0	27000.0	9000.0	11000.0	56000.0
LEAD (PB) TOT	1400.0	2900.0	150.0	480.0	8100.0
SELENIUM (SE) TOT	21.0	15.0	<10.0	<10.0	53.0
ZINC (ZN) TOT	5900.0	3200.0	170.0	220.0	7600.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-22	SSIA8-22	SSIA8-22	SSIA8-23	SSIA8-23
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	16:25	16:30	16:35	11:15	11:18
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715028	L980374-66	L980374-80	97-1715029	97-1715030
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA8-22B	SSIA8-22C	SSIA8-22D	SSIA8-23A	SSIA8-23B
-- PHYSICAL PARAMETERS --					
PH	7.3	7.2	7.8	9.2	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	2600.0	1800.0	160.0	140.0	<20.0
CADMIUM (CD) TOT	600.0	260.0	42.0	29.0	21.0
CHROMIUM (CR) TOT	45.0	89.0	<30.0	97.0	65.0
COPPER (CU) TOT	2900.0	610.0	<20.0	820.0	570.0
IRON (FE) TOT	24000.0	22000.0	14000.0	12000.0	15000.0
LEAD (PB) TOT	1500.0	350.0	13.0	590.0	490.0
SELENIUM (SE) TOT	24.0	15.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	2300.0	1600.0	160.0	1500.0	420.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC).
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-23	SSIA8-23	SSIA8-24	SSIA8-24
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	11:22	: 0	10:06	10:12
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-67	L980374-81	97-1715031	97-1715032
DEPTH	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA8-23C	SSIA8-23D	SSIA8-24A	SSIA8-24B
-- PHYSICAL PARAMETERS --				
PH	8.7	9.1	8.6	8.4
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	29.0	<20.0	110.0	44.0
CADMIUM (CD) TOT	<10.0	<10.0	21.0	190.0
CHROMIUM (CR) TOT	30.0	78.0	100.0	88.0
COPPER (CU) TOT	410.0	68.0	2900.0	2000.0
IRON (FE) TOT	14000.0	16000.0	18000.0	30000.0
LEAD (PB) TOT	370.0	50.0	550.0	850.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	19.0
ZINC (ZN) TOT	370.0	64.0	1000.0	2100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-25	SSIA8-25	SSIA8-26	SSIA8-26
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	14:30	14:35	10:29	10:41
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715033	97-1715034	97-1715035	97-1715036
DEPTH	0'	1.5'	0'	1.5'
SAMPLE NUMBER	SSIA8-25A	SSIA8-25B	SSIA8-26A	SSIA8-26B
-- PHYSICAL PARAMETERS --				
PH	8.4	8.1	5.7	6.7
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	4400.0	900.0	2900.0	290.0
CADMIUM (CD) TOT	910.0	120.0	520.0	410.0
CHROMIUM (CR) TOT	170.0	99.0	85.0	120.0
COPPER (CU) TOT	65000.0	9800.0	110000.0	9500.0
IRON (FE) TOT	59000.0	140000.0	110000.0	160000.0
LEAD (PB) TOT	20000.0	3600.0	25000.0	8100.0
SELENIUM (SE) TOT	180.0	31.0	94.0	10.0
ZINC (ZN) TOT	16000.0	19000.0	12000.0	33000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-27	SSIA8-27	SSIA8-27	SSIA8-28	SSIA8-28
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	11:37	11:39	11:44	15:00	15:05
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	97-1715037	97-1715038	L980374-68	97-1715039	97-1715040
DEPTH	0'	1.5'	3'	0'	1.5'
SAMPLE NUMBER	SSIA8-27A	SSIA8-27B	SSIA8-27C	SSIA8-28A	SSIA8-28B
-- PHYSICAL PARAMETERS --					
PH	8.2	8.7	8.9	8.0	7.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	3300.0	240.0	<20.0	4400.0	3300.0
CADMIUM (CD) TOT	380.0	33.0	<10.0	1800.0	1300.0
CHROMIUM (CR) TOT	290.0	31.0	130.0	210.0	100.0
COPPER (CU) TOT	96000.0	8800.0	540.0	22000.0	12000.0
IRON (FE) TOT	70000.0	20000.0	13000.0	33000.0	49000.0
LEAD (PB) TOT	8100.0	790.0	170.0	7300.0	19000.0
SELENIUM (SE) TOT	98.0	<10.0	<10.0	39.0	53.0
ZINC (ZN) TOT	11000.0	1200.0	95.0	6100.0	19000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-28	SSIA8-28	SSIA8-29	SSIA8-29
SAMPLE DATE	07/18/97	07/18/97	07/18/97	07/18/97
SAMPLE TIME	15:15	15:20	10:49	10:54
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-69	L980374-82	97-1715041	97-1715042
DEPTH	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA8-28C	SSIA8-28D	SSIA8-29A	SSIA8-29B
-- PHYSICAL PARAMETERS --				
PH	8.2	8.4	7.8	7.5
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<20.0	<20.0	2900.0	1100.0
CADMIUM (CD) TOT	<10.0	<10.0	470.0	350.0
CHROMIUM (CR) TOT	170.0	89.0	520.0	230.0
COPPER (CU) TOT	38.0	31.0	65000.0	31000.0
IRON (FE) TOT	18000.0	13000.0	130000.0	120000.0
LEAD (PB) TOT	60.0	27.0	9700.0	22000.0
SELENIUM (SE) TOT	<10.0	<10.0	160.0	60.0
ZINC (ZN) TOT	55.0	20.0	16000.0	24000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE		SSIA8-30		SSIA8-30		SSIA8-30		SSIA8-31	SSIA8-31	
SAMPLE DATE		07/18/97		07/18/97		07/18/97		07/18/97	07/18/97	
SAMPLE TIME		14:10		14:10		14:15		13:40	13:45	
LAB		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	TSC-SLC	
LAB NUMBER		97-1715043		97-1715044		97-1715045		97-1715046	97-1715047	
REMARKS				DUPLICATE						
DEPTH		0'		0'		1.5'		0'	1.5'	
SAMPLE NUMBER		SSIA8-30A		SSIA8-30A2		SSIA8-30B		SSIA8-31A	SSIA8-31B	
-- PHYSICAL PARAMETERS --										
PH		5.6		5.4		5.0		9.0	7.8	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS)	TOT	2000.0		2300.0		220.0		48.0	94.0	
CADMIUM (CD)	TOT	840.0		910.0		36.0		<10.0	280.0	
CHROMIUM (CR)	TOT	70.0	J4	150.0	J4	250.0	J4	<30.0	80.0	
COPPER (CU)	TOT	190000.0		180000.0		21000.0		400.0	6500.0	
IRON (FE)	TOT	78000.0		72000.0		210000.0		14000.0	26000.0	
LEAD (PB)	TOT	20000.0		17000.0		8100.0		400.0	9900.0	
SELENIUM (SE)	TOT	73.0		74.0		<10.0		<10.0	40.0	
ZINC (ZN)	TOT	9400.0		11000.0		10000.0		400.0	7300.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-31	SSENT1	SSENT1	SSENT1	SSENT1
SAMPLE DATE	07/18/97	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	13:50	08:40	08:45	08:50	08:55
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-70	L971680-71	L971680-72	L980374-21	L980374-22
DEPTH	3'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA8-31C	SSENT1-A	SSENT1-B	SSENT1-C	SSENT1-D
-- PHYSICAL PARAMETERS --					
PH	8.3	8.0	9.0	8.7	8.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	470.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	44.0	75.0	<10.0	<10.0	<10.0
CHROMIUM (CR) TOT	340.0	69.0	43.0	110.0	96.0
COPPER (CU) TOT	4400.0	9800.0	230.0	69.0	65.0
IRON (FE) TOT	260000.0	56000.0	20000.0	19000.0	23000.0
LEAD (PB) TOT	7100.0	5700.0	300.0	160.0	94.0
SELENIUM (SE) TOT	42.0	15.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	12000.0	5700.0	210.0	70.0	88.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT2	SSENT2	SSENT2	SSENT2	SSENT3
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	08:05	08:10	08:15	08:20	11:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971680-73	L971680-74	L980374-23	L980374-24	L971680-75
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSENT2-A	SSENT2-B	SSENT2-C	SSENT2-D	SSENT3-A
-- PHYSICAL PARAMETERS --					
PH	8.4	9.2	8.7	8.8	8.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	340.0	<20.0	<20.0	<20.0	340.0
CADMIUM (CD) TOT	100.0	<10.0	<10.0	<10.0	99.0
CHROMIUM (CR) TOT	180.0	60.0	<30.0	31.0	130.0
COPPER (CU) TOT	8400.0	400.0	430.0	<20.0	8100.0
IRON (FE) TOT	34000.0	24000.0	23000.0	23000.0	27000.0
LEAD (PB) TOT	3300.0	330.0	430.0	26.0	2800.0
SELENIUM (SE) TOT	15.0	<10.0	<10.0	<10.0	18.0
ZINC (ZN) TOT	3600.0	210.0	250.0	47.0	3000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT3	SSENT4	SSENT4	SSENT5
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	11:05	10:35	10:40	09:35
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971680-76	L971680-77	L971680-78	L971680-79
DEPTH	1.5'	0'	1.5'	0'
SAMPLE NUMBER	SSENT3-B	SSENT4-A	SSENT4-B	SSENT5-A
-- PHYSICAL PARAMETERS --				
PH	8.7	8.0	9.0	7.8
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	34.0	190.0	35.0	750.0
CADMIUM (CD) TOT	<10.0	80.0	<10.0	160.0
CHROMIUM (CR) TOT	110.0	66.0	64.0	200.0
COPPER (CU) TOT	170.0	4000.0	49.0	12000.0
IRON (FE) TOT	23000.0	23000.0	26000.0	31000.0
LEAD (PB) TOT	160.0	1800.0	37.0	5400.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	160.0	1500.0	69.0	3600.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT5	SSENT5	SSENT6	SSENT6	SSENT6
SAMPLE DATE	07/17/97	07/17/97	07/17/97	07/17/97	07/17/97
SAMPLE TIME	09:40	09:40	09:05	09:10	09:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L971680-80	L971680-81	L971680-82	L971680-83	L980374-25
REMARKS		DUPLICATE			
DEPTH	1.5'	1.5'	0'	1.5'	3'
SAMPLE NUMBER	SSENT5-B	SSENT5-B2	SSENT6-A	SSENT6-B	SSENT6-C
-- PHYSICAL PARAMETERS --					
PH	8.9	8.7	8.2	8.6	8.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	380.0	<20.0	<20.0
CADMIUM (CD) TOT	12.0	<10.0	100.0	34.0	<10.0
CHROMIUM (CR) TOT	90.0	<30.0	73.0	47.0	95.0
COPPER (CU) TOT	300.0	300.0	5500.0	1800.0	340.0
IRON (FE) TOT	22000.0	22000.0	26000.0	23000.0	21000.0
LEAD (PB) TOT	280.0	210.0	3800.0	2200.0	610.0
SELENIUM (SE) TOT	<10.0	<10.0	16.0	<10.0	<10.0
ZINC (ZN) TOT	180.0	170.0	2500.0	1500.0	380.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT6	SSENT7	SSENT7	SSENT7
SAMPLE DATE	07/17/97	07/14/97	07/17/97	07/17/97
SAMPLE TIME	09:20	10:17	10:05	10:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980374-26	L980374-27	L971680-84	L971680-85
DEPTH	4'	3'	0'	1.5'
SAMPLE NUMBER	SSENT6-D	SSENT7-C	SSENT7-A	SSENT7-B
-- PHYSICAL PARAMETERS --				
PH	7.5	8.9	7.8	9.1
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<20.0	<20.0	250.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	93.0	<10.0
CHROMIUM (CR) TOT	60.0	110.0	<30.0	100.0
COPPER (CU) TOT	49.0	<20.0	8300.0	33.0
IRON (FE) TOT	24000.0	24000.0	28000.0	18000.0
LEAD (PB) TOT	38.0	25.0	2800.0	30.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	66.0	51.0	2400.0	41.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT8		SSENT8		SSENT8		SSIA4-1	SSIA4-1
SAMPLE DATE	07/17/97		07/17/97		07/17/97		10/27/97	10/27/97
SAMPLE TIME	10:23		10:23		10:27		10:40	14:45
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	TSC-SLC
LAB NUMBER	L971680-86		L971680-87		L971680-88		L972642-1	L972642-2
REMARKS			DUPLICATE					
DEPTH	0'		0'		1.5'		0'	1.5'
SAMPLE NUMBER	SSENT8-A		SSENT8-A2		SSENT8-B		SSIA4-1A	SSIA4-1B
-- PHYSICAL PARAMETERS --								
PH	8.1		7.9		8.0		7.0	7.6
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	520.0		450.0		710.0		3100.0	97.0
CADMIUM (CD) TOT	120.0		120.0		250.0		540.0	66.0
CHROMIUM (CR) TOT	88.0	J4	170.0	J4	<30.0	UJ4	200.0	81.0
COPPER (CU) TOT	5700.0		5800.0		1400.0		31000.0	280.0
IRON (FE) TOT	26000.0		26000.0		20000.0		72000.0	13000.0
LEAD (PB) TOT	3000.0		2800.0		1300.0		11000.0	200.0
SELENIUM (SE) TOT	11.0		11.0		12.0		56.0	<10.0
ZINC (ZN) TOT	2100.0		2000.0		910.0		11000.0	790.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-1		SSIA4-1		SSIA4-2		SSIA4-2		SSIA4-2	
SAMPLE DATE	10/27/97		10/27/97		10/27/97		10/27/97		10/27/97	
SAMPLE TIME	15:05		15:30		15:45		15:45		15:52	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L980356-24		L980356-25		L972642-3		L972642-4		L972642-5	
REMARKS							DUPLICATE			
DEPTH	3'		4'		0'		0'		1.5'	
SAMPLE NUMBER	SSIA4-1C		SSIA4-1D		SSIA4-2A		SSIA4-2A2		SSIA4-2B	
-- PHYSICAL PARAMETERS --										
PH	7.9		8.8		7.5		7.4		7.4	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	40.0		<20.0		4900.0		6200.0		7000.0	
CADMIUM (CD) TOT	42.0		38.0		1000.0		1200.0		1200.0	
CHROMIUM (CR) TOT	150.0		40.0		100.0	J4	210.0	J4	140.0	J4
COPPER (CU) TOT	240.0		110.0		18000.0		17000.0		17000.0	
IRON (FE) TOT	20000.0		10000.0		39000.0		37000.0		35000.0	
LEAD (PB) TOT	390.0		120.0		11000.0		11000.0		12000.0	
SELENIUM (SE) TOT	<10.0		<10.0		74.0		100.0		120.0	
ZINC (ZN) TOT	1300.0		770.0		7300.0		9800.0		8700.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-2		SSIA4-2		SSIA4-3	SSIA4-3	SSIA4-3
SAMPLE DATE	10/27/97		10/27/97		10/27/97	10/27/97	10/27/97
SAMPLE TIME	16:00		16:05		16:15	16:20	16:25
LAB	TSC-SLC		TSC-SLC		TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-26		L980356-27		L972642-6	L972642-7	L980356-28
DEPTH	3'		4'		0'	1.5'	3'
SAMPLE NUMBER	SSIA4-2C		SSIA4-2D		SSIA4-3A	SSIA4-3B	SSIA4-3C
-- PHYSICAL PARAMETERS --							
PH	8.7		9.6		7.2	7.3	7.2
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) TOT	100.0		59.0		4100.0	2900.0	2000.0
CADMIUM (CD) TOT	22.0		15.0		1300.0	1500.0	1300.0
CHROMIUM (CR) TOT	110.0	J4	170.0	J4	76.0	36.0	140.0
COPPER (CU) TOT	110.0		27.0		14000.0	9300.0	3300.0
IRON (FE) TOT	9000.0		7000.0		32000.0	30000.0	29000.0
LEAD (PB) TOT	58.0		27.0		9300.0	8400.0	2900.0
SELENIUM (SE) TOT	<10.0		<10.0		58.0	60.0	33.0
ZINC (ZN) TOT	130.0		30.0		7100.0	5600.0	2800.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-3	SSIA4-4	SSIA4-4	SSIA4-4	SSIA4-4
SAMPLE DATE	10/27/97	10/28/97	10/28/97	10/28/97	10/28/97
SAMPLE TIME	16:30	08:08	08:16	08:21	08:27
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-29	L972642-8	L972642-9	L980356-30	L980356-31
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA4-3D	SSIA4-4A	SSIA4-4B	SSIA4-4C	SSIA4-4D
-- PHYSICAL PARAMETERS --					
PH	7.3	7.7	7.8	7.9	7.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	1200.0	1200.0	1100.0	320.0	600.0
CADMIUM (CD) TOT	37.0	360.0	280.0	69.0	170.0
CHROMIUM (CR) TOT	<30.0	75.0	120.0	96.0	120.0
COPPER (CU) TOT	230.0	16000.0	13000.0	3100.0	9200.0
IRON (FE) TOT	31000.0	38000.0	46000.0	27000.0	41000.0
LEAD (PB) TOT	1800.0	7500.0	7500.0	2900.0	5800.0
SELENIUM (SE) TOT	<10.0	33.0	41.0	<10.0	19.0
ZINC (ZN) TOT	400.0	5600.0	6700.0	1700.0	5100.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-5		SSIA4-5		SSIA4-5		SSIA4-5		SSIA4-5	
SAMPLE DATE	10/28/97		10/28/97		10/28/97		10/28/97		10/28/97	
SAMPLE TIME	08:39		08:39		08:43		08:47		08:50	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972642-10		L972642-11		L972642-12		L980356-32		L980356-33	
REMARKS			DUPLICATE							
DEPTH	0'		0'		1.5'		3'		4'	
SAMPLE NUMBER	SSIA4-5A		SSIA4-5A2		SSIA4-5B		SSIA4-5C		SSIA4-5D	
-- PHYSICAL PARAMETERS --										
PH	7.1		7.0		7.7		7.8		8.5	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	3500.0		3400.0		370.0		650.0		45.0	
CADMIUM (CD) TOT	840.0		870.0		54.0		210.0		<10.0	
CHROMIUM (CR) TOT	68.0	J4	180.0	J4	36.0	J4	150.0	J4	<30.0	UJ4
COPPER (CU) TOT	31000.0		32000.0		2400.0		10000.0		540.0	
IRON (FE) TOT	50000.0		50000.0		24000.0		36000.0		19000.0	
LEAD (PB) TOT	21000.0		23000.0		2600.0		7100.0		430.0	
SELENIUM (SE) TOT	90.0		87.0		<10.0		37.0		<10.0	
ZINC (ZN) TOT	12000.0		13000.0		980.0		4400.0		240.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-6	'SSIA4-6	SSIA4-6	SSIA4-6	SSIA4-7
SAMPLE DATE	10/28/97	10/28/97	10/28/97	10/28/97	10/28/97
SAMPLE TIME	09:05	09:09	09:15	09:19	09:38
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-13	L972642-14	L980356-34	L980356-35	L972642-15
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA4-6A	SSIA4-6B	SSIA4-6C	SSIA4-6D	SSIA4-7A
-- PHYSICAL PARAMETERS --					
PH	7.5	7.7	8.5	8.4	4.6
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	5900.0	610.0	37.0	<20.0	17000.0
CADMIUM (CD) TOT	1300.0	520.0	13.0	<10.0	350.0
CHROMIUM (CR) TOT	120.0	100.0	83.0	150.0	57.0
COPPER (CU) TOT	40000.0	6900.0	200.0	86.0	82000.0
IRON (FE) TOT	50000.0	27000.0	20000.0	18000.0	87000.0
LEAD (PB) TOT	15000.0	4000.0	110.0	38.0	49000.0
SELENIUM (SE) TOT	110.0	16.0	<10.0	<10.0	1600.0
ZINC (ZN) TOT	8700.0	2900.0	110.0	42.0	7900.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-7	SSIA4-7	SSIA4-7	SSIA4-7	SSIA4-8
SAMPLE DATE	10/28/97	10/28/97	10/28/97	10/28/97	10/28/97
SAMPLE TIME	09:38	09:45	09:48	09:52	10:01
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-16	L972642-17	L980356-36	L980356-37	L972642-18
REMARKS	DUPLICATE				
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA4-7A2	SSIA4-7B	SSIA4-7C	SSIA4-7D	SSIA4-8A
-- PHYSICAL PARAMETERS --					
PH	4.4	5.0	5.4	6.5	6.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	18000.0	2200.0	1900.0	1500.0	3300.0
CADMIUM (CD) TOT	360.0	310.0	100.0	430.0	980.0
CHROMIUM (CR) TOT	39.0	210.0	200.0	230.0	180.0
COPPER (CU) TOT	81000.0	68000.0	21000.0	28000.0	25000.0
IRON (FE) TOT	84000.0	40000.0	31000.0	31000.0	50000.0
LEAD (PB) TOT	51000.0	12000.0	7500.0	6800.0	25000.0
SELENIUM (SE) TOT	1800.0	110.0	130.0	88.0	100.0
ZINC (ZN) TOT	8100.0	3600.0	2100.0	3400.0	11000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-8	SSIA4-8	SSIA4-8	SSIA4-9	SSIA4-9
SAMPLE DATE	10/28/97	10/28/97	10/28/97	10/28/97	10/28/97
SAMPLE TIME	10:09	10:11	10:15	12:24	12:28
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-19	L980356-38	L980356-39	L972642-20	L972642-21
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA4-8B	SSIA4-8C	SSIA4-8D	SSIA4-9A	SSIA4-9B
-- PHYSICAL PARAMETERS --					
PH	6.9	8.1	8.2	7.0	6.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	990.0	220.0	200.0	3000.0	1300.0
CADMIUM (CD) TOT	190.0	44.0	30.0	970.0	600.0
CHROMIUM (CR) TOT	75.0	120.0	180.0	74.0	220.0
COPPER (CU) TOT	4200.0	950.0	810.0	12000.0	3900.0
IRON (FE) TOT	27000.0	22000.0	21000.0	43000.0	34000.0
LEAD (PB) TOT	4100.0	960.0	730.0	11000.0	3200.0
SELENIUM (SE) TOT	15.0	12.0	<10.0	30.0	<10.0
ZINC (ZN) TOT	2100.0	570.0	340.0	5400.0	2400.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-9		SSIA4-9		SSIA4-10		SSIA4-10		SSIA4-10	
SAMPLE DATE	10/28/97		10/28/97		10/28/97		10/28/97		10/28/97	
SAMPLE TIME	12:32		12:37		12:48		12:48		12:52	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L980356-40		L980356-41		L972642-22		L972642-23		L972642-24	
REMARKS							DUPLICATE			
DEPTH	3'		4'		0'		0'		1.5'	
SAMPLE NUMBER	SSIA4-9C		SSIA4-9D		SSIA4-10A		SSIA4-10A2		SSIA4-10B	
-- PHYSICAL PARAMETERS --										
PH	7.1		7.9		7.7		7.9		7.8	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	920.0		330.0		840.0	J4	1500.0	J4	880.0	J4
CADMIUM (CD) TOT	300.0		48.0		290.0		380.0		140.0	
CHROMIUM (CR) TOT	230.0		170.0		130.0		130.0		<30.0	
COPPER (CU) TOT	1000.0		460.0		5800.0	J4	8800.0	J4	3400.0	J4
IRON (FE) TOT	23000.0		21000.0		30000.0		34000.0		26000.0	
LEAD (PB) TOT	1100.0		430.0		5100.0		6800.0		2800.0	
SELENIUM (SE) TOT	<10.0		<10.0		24.0		24.0		18.0	
ZINC (ZN) TOT	670.0		270.0		3200.0		4300.0		2000.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-10		SSIA4-10		SSIA4-11		SSIA4-11		SSIA4-11	
SAMPLE DATE	10/28/97		10/28/97		10/28/97		10/28/97		10/28/97	
SAMPLE TIME	12:56		13:02		13:12		13:22		13:27	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L980356-42		L980356-43		L972642-25		L972642-26		L980356-44	
DEPTH	3'		4'		0'		1.5'		3'	
SAMPLE NUMBER	SSIA4-10C		SSIA4-10D		SSIA4-11A		SSIA4-11B		SSIA4-11C	
-- PHYSICAL PARAMETERS --										
PH	8.1		8.1		8.0		7.9		8.6	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	380.0	J4	400.0	J4	1800.0		680.0		95.0	
CADMIUM (CD) TOT	68.0		<10.0		500.0		55.0		<10.0	
CHROMIUM (CR) TOT	82.0		180.0		140.0		61.0		230.0	
COPPER (CU) TOT	1300.0	J4	230.0	J4	9700.0		1000.0		130.0	
IRON (FE) TOT	22000.0		19000.0		36000.0		26000.0		16000.0	
LEAD (PB) TOT	1200.0		190.0		8900.0		1300.0		130.0	
SELENIUM (SE) TOT	<10.0		<10.0		53.0		13.0		<10.0	
ZINC (ZN) TOT	790.0		130.0		4600.0		640.0		70.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-11	SSIA4-12	SSIA4-12	SSIA4-12	SSIA4-12
SAMPLE DATE	10/28/97	10/28/97	10/28/97	10/28/97	10/28/97
SAMPLE TIME	13:32	13:44	13:49	13:55	13:57
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-45	L972642-27	L972642-28	L980356-46	L980356-47
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA4-11D	SSIA4-12A	SSIA4-12B	SSIA4-12C	SSIA4-12D
-- PHYSICAL PARAMETERS --					
PH	8.7	7.2	NO MEAS	9.7	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	35.0	4800.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	<10.0	930.0	18.0	<10.0	<10.0
CHROMIUM (CR) TOT	170.0	130.0	140.0	40.0	100.0
COPPER (CU) TOT	65.0	11000.0	1800.0	3500.0	1100.0
IRON (FE) TOT	16000.0	31000.0	190000.0	260000.0	130000.0
LEAD (PB) TOT	72.0	13000.0	10000.0	2300.0	3200.0
SELENIUM (SE) TOT	<10.0	63.0	<10.0	15.0	<10.0
ZINC (ZN) TOT	51.0	6600.0	20000.0	13000.0	8400.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-13	SSIA4-13	SSIA4-13		SSIA4-14		SSIA4-14	
SAMPLE DATE	10/28/97	10/28/97	10/28/97		10/28/97		10/28/97	
SAMPLE TIME	14:13	14:18	14:23		14:56		14:56	
LAB	TSC-SLC	TSC-SLC	TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972642-29	L972642-30	L980356-48		L972642-31		L972642-32	
REMARKS							DUPLICATE	
DEPTH	0'	1.5'	3'		0'		0'	
SAMPLE NUMBER	SSIA4-13A	SSIA4-13B	SSIA4-13C		SSIA4-14A		SSIA4-14A2	
-- PHYSICAL PARAMETERS --								
PH	7.5	7.4	8.1		7.6		7.7	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	860.0	790.0	78.0		1600.0		1500.0	
CADMIUM (CD) TOT	320.0	320.0	170.0		640.0		670.0	
CHROMIUM (CR) TOT	74.0	120.0	220.0		110.0	J4	<30.0	UJ4
COPPER (CU) TOT	12000.0	14000.0	1200.0		10000.0		9800.0	
IRON (FE) TOT	34000.0	36000.0	22000.0		40000.0		39000.0	
LEAD (PB) TOT	11000.0	12000.0	1000.0		14000.0		15000.0	
SELENIUM (SE) TOT	52.0	70.0	11.0		50.0		62.0	
ZINC (ZN) TOT	5400.0	7400.0	2500.0		6300.0		6700.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-19	SSIA4-19	SSIA4-19	SSIA4-19	SSIA4-20
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	09:35	09:50	09:50	09:56	10:03
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-43	L972642-44	L980356-59	L980356-60	L972642-45
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA4-19A	SSIA4-19B	SSIA4-19C	SSIA4-19D	SSIA4-20A
-- PHYSICAL PARAMETERS --					
PH	8.3	8.5	8.9	8.9	7.8
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	52.0	24.0	<20.0	<20.0	75.0
CADMIUM (CD) TOT	22.0	10.0	<10.0	<10.0	32.0
CHROMIUM (CR) TOT	65.0	<30.0	110.0	130.0	57.0
COPPER (CU) TOT	1200.0	590.0	49.0	320.0	2600.0
IRON (FE) TOT	15000.0	21000.0	25000.0	24000.0	20000.0
LEAD (PB) TOT	560.0	440.0	23.0	230.0	1300.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	350.0	400.0	69.0	220.0	840.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-20	SSIA4-20	SSIA4-20	SSIA4-20	SSIA4-21
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	10:03	10:11	10:17	10:23	10:31
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-46	L972642-47	L980356-61	L980356-62	L972642-48
REMARKS	DUPLICATE				
DEPTH	0'	1.5'	3'	4'	0'
SAMPLE NUMBER	SSIA4-20A2	SSIA4-20B	SSIA4-20C	SSIA4-20D	SSIA4-21A
-- PHYSICAL PARAMETERS --					
PH	7.8	8.2	8.8	8.9	8.3
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	100.0	<20.0	<20.0	<20.0	160.0
CADMIUM (CD) TOT	42.0	16.0	<10.0	<10.0	63.0
CHROMIUM (CR) TOT	33.0	45.0	43.0	<30.0	40.0
COPPER (CU) TOT	2800.0	840.0	<20.0	590.0	3600.0
IRON (FE) TOT	21000.0	27000.0	28000.0	25000.0	28000.0
LEAD (PB) TOT	1400.0	550.0	22.0	460.0	2500.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	900.0	400.0	78.0	320.0	1600.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-21	SSIA4-21	SSIA4-21	SSIA4-22	SSIA4-22
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	10:35	10:39	10:42	10:48	10:54
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-49	L980356-63	L980356-64	L972642-50	L972642-51
DEPTH	1.5'	3'	4'	0'	1.5'
SAMPLE NUMBER	SSIA4-21B	SSIA4-21C	SSIA4-21D	SSIA4-22A	SSIA4-22B
-- PHYSICAL PARAMETERS --					
PH	8.2	8.7	8.8	8.0	8.4
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	210.0	48.0	24.0	140.0	45.0
CADMIUM (CD) TOT	73.0	15.0	11.0	62.0	22.0
CHROMIUM (CR) TOT	86.0	110.0	140.0	75.0	53.0
COPPER (CU) TOT	3200.0	1200.0	580.0	3100.0	1100.0
IRON (FE) TOT	36000.0	27000.0	26000.0	26000.0	23000.0
LEAD (PB) TOT	3200.0	1100.0	560.0	2200.0	1200.0
SELENIUM (SE) TOT	14.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	2700.0	940.0	450.0	1400.0	780.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-22	SSIA4-22	SSIA4-23	SSIA4-23	SSIA4-23
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	10:59	11:06	11:22	11:22	11:28
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-65	L980356-66	L972642-70	L972642-52	L972642-53
REMARKS				DUPLICATE	
DEPTH	3'	4'	0'	0'	1.5'
SAMPLE NUMBER	SSIA4-22C	SSIA4-22D	SSIA4-23A	SSIA4-23A2	SSIA4-23B
-- PHYSICAL PARAMETERS --					
PH	8.7	8.7	7.8	7.8	8.5
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	<20.0	250.0	270.0	<20.0
CADMIUM (CD) TOT	<10.0	<10.0	91.0	97.0	13.0
CHROMIUM (CR) TOT	74.0	87.0	73.0	<30.0	39.0
COPPER (CU) TOT	38.0	220.0	4800.0	5300.0	410.0
IRON (FE) TOT	22000.0	24000.0	24000.0	26000.0	23000.0
LEAD (PB) TOT	21.0	210.0	4600.0	5000.0	370.0
SELENIUM (SE) TOT	<10.0	<10.0	17.0	<10.0	<10.0
ZINC (ZN) TOT	52.0	120.0	2800.0	3200.0	250.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-23	SSIA4-23	SSIA4-24	SSIA4-24	SSIA4-24
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	11:34	11:36	11:45	11:51	12:13
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-67	L980356-68	L972642-54	L972642-55	L980356-69
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA4-23C	SSIA4-23D	SSIA4-24A	SSIA4-24B	SSIA4-24C
-- PHYSICAL PARAMETERS --					
PH	8.7	8.4	8.2	8.8	8.9
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	29.0	120.0	<20.0	22.0
CADMIUM (CD) TOT	<10.0	15.0	38.0	<10.0	<10.0
CHROMIUM (CR) TOT	65.0	<30.0	110.0	110.0	31.0
COPPER (CU) TOT	65.0	650.0	3000.0	220.0	280.0
IRON (FE) TOT	25000.0	25000.0	23000.0	25000.0	25000.0
LEAD (PB) TOT	75.0	520.0	1800.0	260.0	190.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	110.0	440.0	1500.0	230.0	200.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-24	SSIA4-25	SSIA4-25	SSIA4-25	SSIA4-25
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	12:17	12:29	12:33	12:37	12:42
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-70	L972642-56	L972642-57	L980356-71	L980356-72
DEPTH	4'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA4-24D	SSIA4-25A	SSIA4-25B	SSIA4-25C	SSIA4-25D
-- PHYSICAL PARAMETERS --					
PH	9.0	7.5	8.2	9.1	8.2
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	380.0	<20.0	<20.0	120.0
CADMIUM (CD) TOT	<10.0	200.0	<10.0	<10.0	13.0
CHROMIUM (CR) TOT	52.0	83.0	92.0	78.0	38.0
COPPER (CU) TOT	85.0	12000.0	530.0	330.0	540.0
IRON (FE) TOT	25000.0	32000.0	22000.0	30000.0	24000.0
LEAD (PB) TOT	75.0	9400.0	370.0	200.0	620.0
SELENIUM (SE) TOT	<10.0	24.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	99.0	6700.0	280.0	220.0	230.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-26	SSIA4-26	SSIA4-26	SSIA4-26	SSIA4-26
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	12:48	12:48	12:55	13:08	13:12
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-58	L972642-59	L972642-60	L980356-73	L980356-74
REMARKS		DUPLICATE			
DEPTH	0'	0'	1.5'	3'	4'
SAMPLE NUMBER	SSIA4-26A	SSIA4-26A2	SSIA4-26B	SSIA4-26C	SSIA4-26D
-- PHYSICAL PARAMETERS --					
PH	7.7	7.7	8.4	8.3	8.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	320.0	300.0	<20.0	<20.0	<20.0
CADMIUM (CD) TOT	82.0	89.0	<10.0	<10.0	11.0
CHROMIUM (CR) TOT	65.0	50.0	<30.0	44.0	100.0
COPPER (CU) TOT	7500.0	7500.0	140.0	320.0	660.0
IRON (FE) TOT	40000.0	41000.0	28000.0	21000.0	23000.0
LEAD (PB) TOT	3800.0	3600.0	180.0	270.0	550.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	2800.0	2600.0	150.0	250.0	490.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-27	SSIA4-27	SSIA4-28	SSIA4-28
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	13:23	13:30	13:43	13:47
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972642-61	L972642-62	L972642-63	L972642-64
DEPTH	0'	1.5'	0'	1.5'
SAMPLE NUMBER	SSIA4-27A	SSIA4-27B	SSIA4-28A	SSIA4-28B
-- PHYSICAL PARAMETERS --				
PH	7.7	7.9	7.9	8.5
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	370.0	25.0	190.0	<20.0
CADMIUM (CD) TOT	140.0	<10.0	42.0	<10.0
CHROMIUM (CR) TOT	180.0	110.0	110.0	67.0
COPPER (CU) TOT	7600.0	95.0	4100.0	120.0
IRON (FE) TOT	32000.0	12000.0	28000.0	25000.0
LEAD (PB) TOT	5300.0	82.0	1600.0	63.0
SELENIUM (SE) TOT	22.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	3900.0	87.0	1500.0	72.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-29		SSIA4-29		SSIA4-29		SSIA4-30		SSIA4-30	
SAMPLE DATE	10/30/97		10/30/97		10/30/97		10/30/97		10/30/97	
SAMPLE TIME	14:03		14:03		14:12		14:21		14:26	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972642-65		L972642-66		L972642-67		L972642-68		L972642-69	
REMARKS			DUPLICATE							
DEPTH	0'		0'		1.5'		0'		1.5'	
SAMPLE NUMBER	SSIA4-29A		SSIA4-29A2		SSIA4-29B		SSIA4-30A		SSIA4-30B	
-- PHYSICAL PARAMETERS --										
PH	7.6		7.7		8.6		7.9		8.0	
-- METALS & MINOR CONSTITUENTS --										
ARSENIC (AS) TOT	490.0		520.0		<20.0		200.0		250.0	
CADMIUM (CD) TOT	110.0		100.0		<10.0		16.0		83.0	
CHROMIUM (CR) TOT	110.0		160.0		75.0		<30.0		130.0	
COPPER (CU) TOT	6000.0		4900.0		190.0		1200.0		2300.0	
IRON (FE) TOT	39000.0		32000.0		22000.0		17000.0		24000.0	
LEAD (PB) TOT	3900.0		3000.0		330.0		980.0		2700.0	
SELENIUM (SE) TOT	15.0		12.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	3000.0	J4	1900.0	J4	270.0	J4	360.0		2000.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

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38	97-1402037	EP-89G	06/18/97	EP-89
38	97-1402038	EP-89H	06/18/97	EP-89
39	97-1402039	EP-89I	06/18/97	EP-89
15	97-1402040	EP-73F	06/17/97	EP-73
46	97-1680001	SSIA1-1A	07/15/97	SSIA1-1
47	97-1680002	SSIA1-1B	07/15/97	SSIA1-1
47	97-1680003	SSIA1-2A	07/15/97	SSIA1-2
47	97-1680004	SSIA1-2B	07/15/97	SSIA1-2
48	97-1680005	SSIA1-3A	07/15/97	SSIA1-3
48	97-1680006	SSIA1-3B	07/15/97	SSIA1-3
49	97-1680007	SSIA1-4A	07/15/97	SSIA1-4
49	97-1680008	SSIA1-4B	07/15/97	SSIA1-4
50	97-1680009	SSIA1-5A	07/15/97	SSIA1-5
50	97-1680010	SSIA1-5A2	07/15/97	SSIA1-5
50	97-1680011	SSIA1-5B	07/15/97	SSIA1-5
51	97-1680012	SSIA2-1A	07/14/97	SSIA2-1
51	97-1680013	SSIA2-1B	07/14/97	SSIA2-1
51	97-1680014	SSIA2-2A	07/14/97	SSIA2-2

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87	SSIA8-16C	L980374-62	07/18/97	SSIA8-16
88	SSIA8-16D	L980374-76	07/18/97	SSIA8-16
88	SSIA8-17A	97-1715016	07/18/97	SSIA8-17
88	SSIA8-17B	97-1715017	07/18/97	SSIA8-17
88	SSIA8-17C	L980374-63	07/18/97	SSIA8-17
88	SSIA8-17D	L980374-77	07/18/97	SSIA8-17
89	SSIA8-18A	97-1715018	07/18/97	SSIA8-18
89	SSIA8-18A2	97-1715019	07/18/97	SSIA8-18
89	SSIA8-18B	97-1715020	07/18/97	SSIA8-18
89	SSIA8-19A	97-1715021	07/18/97	SSIA8-19
89	SSIA8-19B	97-1715022	07/18/97	SSIA8-19
90	SSIA8-19C	L980374-64	07/18/97	SSIA8-19
90	SSIA8-19D	L980374-78	07/18/97	SSIA8-19
75	SSIA8-1A	97-1680052	07/16/97	SSIA8-1
75	SSIA8-1B	97-1680053	07/16/97	SSIA8-1
75	SSIA8-1C	L980374-83	07/16/97	SSIA8-1
90	SSIA8-20A	97-1715023	07/18/97	SSIA8-20
90	SSIA8-20B	97-1715024	07/18/97	SSIA8-20
91	SSIA8-21A	97-1715025	07/18/97	SSIA8-21
91	SSIA8-21B	97-1715026	07/18/97	SSIA8-21
91	SSIA8-21C	L980374-65	07/18/97	SSIA8-21
91	SSIA8-21D	L980374-79	07/18/97	SSIA8-21
91	SSIA8-22A	97-1715027	07/18/97	SSIA8-22
92	SSIA8-22B	97-1715028	07/18/97	SSIA8-22
92	SSIA8-22C	L980374-66	07/18/97	SSIA8-22
92	SSIA8-22D	L980374-80	07/18/97	SSIA8-22
92	SSIA8-23A	97-1715029	07/18/97	SSIA8-23
92	SSIA8-23B	97-1715030	07/18/97	SSIA8-23
93	SSIA8-23C	L980374-67	07/18/97	SSIA8-23
93	SSIA8-23D	L980374-81	07/18/97	SSIA8-23
93	SSIA8-24A	97-1715031	07/18/97	SSIA8-24
93	SSIA8-24B	97-1715032	07/18/97	SSIA8-24
94	SSIA8-25A	97-1715033	07/18/97	SSIA8-25
94	SSIA8-25B	97-1715034	07/18/97	SSIA8-25
94	SSIA8-26A	97-1715035	07/18/97	SSIA8-26
94	SSIA8-26B	97-1715036	07/18/97	SSIA8-26
95	SSIA8-27A	97-1715037	07/18/97	SSIA8-27
95	SSIA8-27B	97-1715038	07/18/97	SSIA8-27
95	SSIA8-27C	L980374-68	07/18/97	SSIA8-27
95	SSIA8-28A	97-1715039	07/18/97	SSIA8-28
95	SSIA8-28B	97-1715040	07/18/97	SSIA8-28
96	SSIA8-28C	L980374-69	07/18/97	SSIA8-28
96	SSIA8-28D	L980374-82	07/18/97	SSIA8-28
96	SSIA8-29A	97-1715041	07/18/97	SSIA8-29
96	SSIA8-29B	97-1715042	07/18/97	SSIA8-29
76	SSIA8-2A	97-1680054	07/16/97	SSIA8-2
76	SSIA8-2B	97-1680055	07/16/97	SSIA8-2
76	SSIA8-2C	L980374-84	07/16/97	SSIA8-2
76	SSIA8-2D	L980374-85	07/16/97	SSIA8-2
97	SSIA8-30A	97-1715043	07/18/97	SSIA8-30
97	SSIA8-30A2	97-1715044	07/18/97	SSIA8-30
97	SSIA8-30B	97-1715045	07/18/97	SSIA8-30
97	SSIA8-31A	97-1715046	07/18/97	SSIA8-31
97	SSIA8-31B	97-1715047	07/18/97	SSIA8-31
98	SSIA8-31C	L980374-70	07/18/97	SSIA8-31
76	SSIA8-3A	97-1680056	07/16/97	SSIA8-3
77	SSIA8-3B	97-1680057	07/16/97	SSIA8-3
77	SSIA8-3C	L980374-86	07/16/97	SSIA8-3
77	SSIA8-3D	L980374-87	07/16/97	SSIA8-3
78	SSIA8-4A	97-1680058	07/16/97	SSIA8-4
78	SSIA8-4B	97-1680059	07/16/97	SSIA8-4
77	SSIA8-4C	L980374-9	07/14/97	SSIA8-4
77	SSIA8-4D	L980374-10	07/14/97	SSIA8-4
78	SSIA8-5A	97-1680060	07/16/97	SSIA8-5
78	SSIA8-5B	97-1680061	07/16/97	SSIA8-5
78	SSIA8-5C	L980374-11	07/16/97	SSIA8-5
79	SSIA8-5D	L980374-12	07/16/97	SSIA8-5
79	SSIA8-6A	97-1680062	07/16/97	SSIA8-6

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79	L980374-13	SSIA8-6C	07/16/97	SSIA8-6
80	L980374-14	SSIA8-6D	07/16/97	SSIA8-6
80	L980374-15	SSIA8-7C	07/16/97	SSIA8-7
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81	L980374-17	SSIA8-8C	07/16/97	SSIA8-8
81	L980374-18	SSIA8-8D	07/16/97	SSIA8-8
82	L980374-19	SSIA8-9C	07/16/97	SSIA8-9
71	L980374-2	SSIA5-15D	07/14/97	SSIA5-15
82	L980374-20	SSIA8-9D	07/16/97	SSIA8-9
98	L980374-21	SSENT1-C	07/17/97	SSENT1
98	L980374-22	SSENT1-D	07/17/97	SSENT1
99	L980374-23	SSENT2-C	07/17/97	SSENT2
99	L980374-24	SSENT2-D	07/17/97	SSENT2
101	L980374-25	SSENT6-C	07/17/97	SSENT6
102	L980374-26	SSENT6-D	07/17/97	SSENT6
102	L980374-27	SSENT7-C	07/14/97	SSENT7
59	L980374-28	SSIA5-1C	07/08/97	SSIA5-1
59	L980374-29	SSIA5-1D	07/08/97	SSIA5-1
72	L980374-3	SSIA5-16C	07/14/97	SSIA5-16
60	L980374-30	SSIA5-2C	07/08/97	SSIA5-2
60	L980374-31	SSIA5-2D	07/08/97	SSIA5-2
61	L980374-32	SSIA5-3C	07/08/97	SSIA5-3
61	L980374-33	SSIA5-3D	07/08/97	SSIA5-3
62	L980374-34	SSIA5-4C	07/08/97	SSIA5-4
62	L980374-35	SSIA5-4D	07/08/97	SSIA5-4
62	L980374-36	SSIA5-5C	07/08/97	SSIA5-5
63	L980374-37	SSIA5-5D	07/08/97	SSIA5-5
63	L980374-38	SSIA5-6C	07/08/97	SSIA5-6
63	L980374-39	SSIA5-6D	07/08/97	SSIA5-6
72	L980374-4	SSIA5-16D	07/14/97	SSIA5-16
64	L980374-40	SSIA5-7C	07/08/97	SSIA5-7
64	L980374-41	SSIA5-7D	07/08/97	SSIA5-7
65	L980374-42	SSIA5-8C	07/08/97	SSIA5-8
65	L980374-43	SSIA5-8D	07/08/97	SSIA5-8
66	L980374-44	SSIA5-9C	07/08/97	SSIA5-9
66	L980374-45	SSIA5-9D	07/08/97	SSIA5-9
67	L980374-46	SSIA5-10C	07/08/97	SSIA5-10
67	L980374-47	SSIA5-10D	07/08/97	SSIA5-10
67	L980374-48	SSIA5-11C	07/08/97	SSIA5-11
68	L980374-49	SSIA5-11D	07/08/97	SSIA5-11
73	L980374-5	SSIA5-17C	07/14/97	SSIA5-17
68	L980374-50	SSIA5-12C	07/08/97	SSIA5-12
68	L980374-51	SSIA5-12D	07/08/97	SSIA5-12
69	L980374-52	SSIA5-13C	07/08/97	SSIA5-13
69	L980374-53	SSIA5-13D	07/08/97	SSIA5-13
70	L980374-54	SSIA5-14C	07/08/97	SSIA5-14
70	L980374-55	SSIA5-14D	07/08/97	SSIA5-14
83	L980374-56	SSIA8-10C	07/17/97	SSIA8-10
83	L980374-57	SSIA8-11C	07/17/97	SSIA8-11
84	L980374-58	SSIA8-12C	07/17/97	SSIA8-12
85	L980374-59	SSIA8-13C	07/17/97	SSIA8-13
73	L980374-6	SSIA5-17D	07/14/97	SSIA5-17
86	L980374-60	SSIA8-14C	07/17/97	SSIA8-14
87	L980374-61	SSIA8-15C	07/18/97	SSIA8-15
87	L980374-62	SSIA8-16C	07/18/97	SSIA8-16
88	L980374-63	SSIA8-17C	07/18/97	SSIA8-17
90	L980374-64	SSIA8-19C	07/18/97	SSIA8-19
91	L980374-65	SSIA8-21C	07/18/97	SSIA8-21
92	L980374-66	SSIA8-22C	07/18/97	SSIA8-22
93	L980374-67	SSIA8-23C	07/18/97	SSIA8-23
95	L980374-68	SSIA8-27C	07/18/97	SSIA8-27
96	L980374-69	SSIA8-28C	07/18/97	SSIA8-28
74	L980374-7	SSIA5-18C	07/14/97	SSIA5-18
98	L980374-70	SSIA8-31C	07/18/97	SSIA8-31
83	L980374-71	SSIA8-10D	07/17/97	SSIA8-10
84	L980374-72	SSIA8-11D	07/17/97	SSIA8-11
84	L980374-73	SSIA8-12D	07/17/97	SSIA8-12
85	L980374-74	SSIA8-13D	07/17/97	SSIA8-13
87	L980374-75	SSIA8-15D	07/18/97	SSIA8-15

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-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-14		SSIA4-14		SSIA4-14		SSIA4-15	SSIA4-15
SAMPLE DATE	10/28/97		10/28/97		10/28/97		10/28/97	10/28/97
SAMPLE TIME	15:02		15:07		15:14		15:30	15:35
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	TSC-SLC
LAB NUMBER	L972642-33		L980356-49		L980356-50		L972642-34	L972642-35
DEPTH	1.5'		3'		4'		0'	1.5'
SAMPLE NUMBER	SSIA4-14B		SSIA4-14C		SSIA4-14D		SSIA4-15A	SSIA4-15B
-- PHYSICAL PARAMETERS --								
PH	8.0		8.9		8.4		7.8	7.9
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	490.0		<20.0		110.0		480.0	440.0
CADMIUM (CD) TOT	190.0		16.0		82.0		300.0	240.0
CHROMIUM (CR) TOT	82.0	J4	140.0	J4	170.0	J4	130.0	71.0
COPPER (CU) TOT	3700.0		200.0		1300.0		4400.0	3800.0
IRON (FE) TOT	33000.0		27000.0		27000.0		27000.0	30000.0
LEAD (PB) TOT	4500.0		280.0		1900.0		6800.0	5300.0
SELENIUM (SE) TOT	16.0		<10.0		<10.0		33.0	21.0
ZINC (ZN) TOT	2400.0		190.0		850.0		3200.0	3000.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-15	SSIA4-15	SSIA4-16	SSIA4-16	SSIA4-16
SAMPLE DATE	10/28/97	10/28/97	10/27/97	10/30/97	10/30/97
SAMPLE TIME	15:39	15:43	15:53	08:00	08:08
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-51	L980356-52	L972642-36	L972642-37	L980356-53
DEPTH	3'	4'	0'	1.5'	3'
SAMPLE NUMBER	SSIA4-15C	SSIA4-15D	SSIA4-16A	SSIA4-16B	SSIA4-16C
-- PHYSICAL PARAMETERS --					
PH	8.8	8.2	8.1	8.2	8.7
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	74.0	520.0	66.0	<20.0
CADMIUM (CD) TOT	13.0	23.0	350.0	30.0	10.0
CHROMIUM (CR) TOT	130.0	200.0	71.0	78.0	91.0
COPPER (CU) TOT	630.0	1300.0	5000.0	640.0	190.0
IRON (FE) TOT	27000.0	24000.0	27000.0	25000.0	22000.0
LEAD (PB) TOT	540.0	930.0	5900.0	710.0	210.0
SELENIUM (SE) TOT	<10.0	<10.0	32.0	<10.0	<10.0
ZINC (ZN) TOT	680.0	470.0	2800.0	380.0	160.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-16	SSIA4-17	SSIA4-17	SSIA4-17	SSIA4-17
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97
SAMPLE TIME	08:15	08:40	08:40	08:44	08:48
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980356-54	L972642-38	L972642-39	L972642-40	L980356-55
REMARKS			DUPLICATE		
DEPTH	4'	0'	0'	1.5'	3'
SAMPLE NUMBER	SSIA4-16D	SSIA4-17A	SSIA4-17A2	SSIA4-17B	SSIA4-17C
-- PHYSICAL PARAMETERS --					
PH	8.8	8.1	8.1	8.4	8.0
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	<20.0	220.0	240.0	160.0	36.0
CADMIUM (CD) TOT	<10.0	76.0	75.0	57.0	12.0
CHROMIUM (CR) TOT	120.0	<30.0	84.0	120.0	130.0
COPPER (CU) TOT	34.0	4600.0	4200.0	1900.0	<20.0
IRON (FE) TOT	25000.0	29000.0	29000.0	29000.0	22000.0
LEAD (PB) TOT	18.0	2500.0	2100.0	1900.0	27.0
SELENIUM (SE) TOT	<10.0	<10.0	11.0	11.0	<10.0
ZINC (ZN) TOT	59.0	1400.0	1300.0	1500.0	53.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-17	SSIA4-18	SSIA4-18	SSIA4-18	SSIA4-18	
SAMPLE DATE	10/30/97	10/30/97	10/30/97	10/30/97	10/30/97	
SAMPLE TIME	08:55	09:07	09:13	09:22	09:27	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	
LAB NUMBER	L980356-56	L972642-41	L972642-42	L980356-57	L980356-58	
DEPTH	4'	0'	1.5'	3'	4'	
SAMPLE NUMBER	SSIA4-17D	SSIA4-18A	SSIA4-18B	SSIA4-18C	SSIA4-18D	
-- PHYSICAL PARAMETERS --						
PH	8.7	8.4	8.4	9.2	9.3	
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	97.0	160.0	150.0	41.0	38.0	
CADMIUM (CD) TOT	23.0	59.0	85.0	<10.0	11.0	
CHROMIUM (CR) TOT	172.0	120.0	130.0	140.0	120.0	
COPPER (CU) TOT	1100.0	2500.0	1700.0	48.0	140.0	
IRON (FE) TOT	27000.0	23000.0	26000.0	24000.0	24000.0	
LEAD (PB) TOT	1000.0	1400.0	1200.0	31.0	100.0	
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0	
ZINC (ZN) TOT	710.0	780.0	1100.0	56.0	96.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank; parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

SECTION 4

REMEDIAL INVESTIGATION
SOILS CONFIRMATION SAMPLES
1997

EL PASO RI SOILS
1997 CONFIRMATION SAMPLES
DATA VALIDATION REPORT

Prepared by
Hydrometrics, Inc.
2727 Airport Road
Helena, MT 59601

April 1998

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GLOSSARY OF TERMS

CCB ..... Continuing Calibration Blank

CCV ..... Continuing Calibration Verification

CLP ..... Contract Laboratory Program

CRDL ..... Contract Required Detection Limit

FAA ..... Flame Atomic Absorption

GFAA ..... Graphite Furnace Atomic Absorption

HGAA ..... Hydride Generation Atomic Absorption

ICB ..... Initial Calibration Blank

ICP ..... Inductively Coupled Plasma

ICV ..... Initial Calibration Verification

IDL ..... Instrument Detection Limit

LCS ..... Laboratory Control Sample

MSA ..... Method of Standard Additions

PB ..... Preparation Blank

PQL ..... Practical Quantitation Limit

PRDL ..... Project Required Detection Limit

QAPP ..... Quality Assurance Project Plan

QC ..... Quality Control

RI ..... Remedial Investigation

RAS ..... Routine Analytical Services

RPD ..... Relative Percent Difference

RSD ..... Relative Standard Deviation

SOW ..... Statement of Work

TDS ..... Total Dissolved Solids

XRF ..... X-ray Fluorescence

SUMMARY

Confirmation samples for the El Paso Copper Smelter Remedial Investigation (RI) for 1997 soil samples have been validated in accordance with the project work plan (El Paso Copper Smelter Remedial Investigation Work Plan, November 1996). Data validation codes and definitions are listed in Appendix 1, Table 1. Appendix 1 also contains Table 2, Summary of Flagged Data, and Table 3, Completeness. In addition to evaluation of the data quality of the 1997 confirmation samples, wet chemistry confirmation data have been compared to analytical results obtained from the XRF instrument (using a fundamental parameters calibration technique). This comparison has been done using relative percent differences, recovery rates, and regression analysis. The information generated by the comparisons is listed in Appendix 2, the results of the comparisons are summarized in Section 12, and the database for the confirmation samples is in Appendix 3.

Summary of Data Quality

Data quality objectives were met for accuracy, precision, and completeness. Data quality information is summarized in Section 13.

Approximately 10% of all measurements were flagged due to the following quality control violation:

- ⇒ One of the two matrix spikes for chromium was out of control limits with a recovery of only 42%. Chromium results for twenty samples analyzed on the same day as this matrix spike were flagged to indicate a possible low bias.
- ⇒ Three of the five LCSs were out of control limits for chromium, resulting in a total of 32 flags to indicate a possible bias.

Summary of the Comparison of Analysis Methods:

The comparison shows that, with the exception of chromium, there is a strong correlation between data produced by the two analysis methods, and the XRF analysis can be used as a cost-effective screening tool to identify parameters and areas of interest. However, the systematic bias evidently introduced in the XRF data by use of the fundamental parameters technique, indicates that to make decisions beyond the screening level, a matrix-specific calibration should be developed for XRF analyses.

No samples were rejected based on the results of the data validation. Overall, the data for the 1997 El Paso RI confirmation samples are deemed acceptable for screening purposes of the project as outlined in the project work plan (Hydrometrics, 1996) provided the flagged data are considered with appropriate caution.

DATA VALIDATION REPORT

1. INTRODUCTION

- This validation applies to inorganic analytes from 64 soil samples analyzed for the El Paso Copper Smelter RI during 1997. The purpose of these confirmation samples is to compare analytical results obtained by the XRF instrument with analytical results obtained from traditional wet chemistry soil analysis techniques.

- Validation procedures used are generally consistent with:
  (Check all that apply)
  - X EPA CLP National Functional Guidelines for Inorganics Data Review
  - X Work Plan (El Paso Copper Smelter Remedial Investigation Work Plan, November 1996)
  - ___ Other

- Overall level of validation:
  - ___ Contract Laboratory Program (CLP)
  - X Standard
  - ___ Visual

  Notes: Following requirements listed in the project work plan, exceedances on laboratory quality control samples resulted in the flagging of associated confirmation sample data as discussed in the appropriate sections of this report.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1995 and/or the project contract.
  - X Yes
  - ___ No

3. LABORATORY PROCEDURES

- **Laboratory procedures followed**
  - X CLP-SOW
  - X SW-846
  - ___ Methods for Chemical Analysis of Water and Wastes
  - ___ XRF Standard Operating Procedures
  - ___ Other

  Notes: The wet chemistry analysis was done by ICP (method 6010) using samples digested with hydrofluoric acid (HF digests). At the beginning of the project, the CLP-RAS digestion was used, but this digestion method gave results that were significantly lower than corresponding XRF values. The HF

digestion is more complete, especially for soils high in silica--such as the El Paso soils.

- **Holding times met**
  _X_ Yes
  ___ No

- **Consistency with project requirements**
  Analyses were carried out as requested.
  _X_ Yes
  ___ No

  Project specified methods were used.
  _X_ Yes
  ___ No
  ___ NA

4. DETECTION LIMITS

All analyses were carried out using the ICP method (EPA-SW-6010).The following table lists the laboratory's reporting level by analytical method and compares it to the project detection limit (PRDL).

Parameters	Reporting Level (ppm)	PDLG (ppm)
Arsenic	10	10
Cadmium	5	10
Chromium	10	20
Copper	10	10
Iron	10	20
Lead	10	10
Selenium	10	10
Zinc	5	10

- Reporting detection limits met project required detection limits (PRDLs).
  _X_ Yes
  ___ No

- Instrument detection limits (IDLs) were provided by the laboratory.
  ___ Yes
  ___ No
  _X_ NA - Not required for project.

5. LABORATORY BLANKS

- **Preparation blanks**

  Preparation blanks were prepared and analyzed at the required frequency.

  _X_ Yes
  ___ No

  All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

  _X_ Yes
  ___ No

6. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

  _X_ Yes
  ___ No

- Matrix spike recoveries were within the required control limits (75-125%).

  ___ Yes
  _X_ No

  Notes: Thirty-five confirmation samples were analyzed in laboratory batch L972604. Two of each type of digestion QC sample were prepared and analyzed with this batch. Recovery was low (42%) on one of the chromium matrix spikes. Chromium results for the twenty samples analyzed on the same day as this matrix spike were flagged to indicate a possible low bias.

  The laboratory noted that the difference in recoveries on the two chromium matrix spikes (42% and 104%) may be a function of sample non-homogeneity.

  Flagging: J_4/UJ_4

7. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

  _X_ Yes
  ___ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix, 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix, within ± 2 times the PRDL for soil matrix.

  _X_ Yes
  ___ No

8. LABORATORY CONTROL SAMPLES

- The reference material used was of the correct matrix and concentration.

  _X_ Yes - See Notes for exception.
  ___ No

  Notes: The LCS material used was NIST-2711. For NIST-2711, the true value for selenium (1.5 ppm) is below the practical quantitation limit for the analysis method.

- Laboratory control samples (LCSs) were prepared in the same way as the associated samples.

  _X_ Yes
  ___ No

- LCSs were prepared and analyzed at the proper frequency.

  _X_ Yes
  ___ No

- LCS recoveries were within the required control limits (80-120%).

  ___ Yes
  _X_ No

  Notes: The 95% confidence limits that are generally used to evaluate recoveries on the LCS for soil matrix was not used in this case. There were two reasons for this. First, the 95% confidence limits for the NIST standard used are very tight. This did not seem appropriate in the screening stage of the project. Second, there was no certified value (and therefore no 95% confidence limits) for chromium. Consequently, all LCSs were evaluated using the 80 to 120% recovery control limits.

  Three chromium LCSs were out of control limits:

Lab Batch #	Analyte	Recovery	Number of Flags
L972383	Chromium	79%	5
L972788	Chromium	74%	7
l972604	Chromium	126%	20

Flagging: J_2/UJ_2

9. DATA COMPARISON (XRF DATA AND WET CHEMISTRY DATA)

XRF results have been compared to the corresponding wet chemistry results (validated in this report) using the following statistical methods:

- relative percent difference
- recovery rates
- regression analysis with 95% confidence bands Miller (1992)

The information generated for these comparisons, as well as an outlier and completeness evaluation, have been compiled in Appendix 2 for all parameters.

Relative Percent Difference:

The data pairs (XRF vs wet chemistry) have been compared using criteria that are typically used for the comparison of laboratory duplicates. The RPD/PRDL duplicate criteria are used here to evaluate the agreement of the XRF confirmation sample data pairs relative to generally accepted control limits; however, no data are qualified as a result of the comparison (summarized in the following table).

- Relative percent difference (RPD) values were calculated for samples with concentrations greater than 5 times the PRDL. A control limit of 35% RPD was used for the comparison.
- If either the XRF or wet chemistry result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the XRF and wet chemistry result should be within ± 2 times the PRDL for soil matrix.
- If both results are under the reporting detection limit, the pair is considered to be within control limits, but is counted as UDL.

Parameter	Type of Comparison	# of Data Pairs (% of total)	% within Control Limits
Arsenic	**RPD**	**36 (56%)**	**72**
	<5xPRDL	**28 (44%)**	**78**
	Combined	**64**	**75**
Cadmium	**RPD**	**31 (48%)**	**84**
	<5xPRDL	**15 (23%)**	**100**
	UDL	**18 (28%)**	**100**
	Combined	**64**	**92**
Chromium	**RPD**	**8 (12%)**	**50**
	<5xPRDL	**56 (88%)**	**71**
	Combined	**64**	**69**
Copper	**RPD**	**51 (80%)**	**59**
	<5xPRDL	**13 (20%)**	**92**
	Combined	**64**	**66**
Iron	**RPD**	**64 (100%)**	**95**
	<5xPRDL	**0**	**NA**
	Combined	**64**	**95**
Lead	**RPD**	**48 (75%)**	**83**
	<5xPRDL	**16 (25%0**	**100**
	Combined	**64**	**88**
Selenium	**RPD**	**10 (16%)**	**60**
	<5xPRDL	**19 (30%)**	**95**
	UDL	**35 (55%)**	**100**
	Combined	**64**	**92**
Zinc	**RPD**	**56 (88%)**	**88**
	<5xPRDL	**8 (12%)**	**88**
	Combined	**64**	**88**

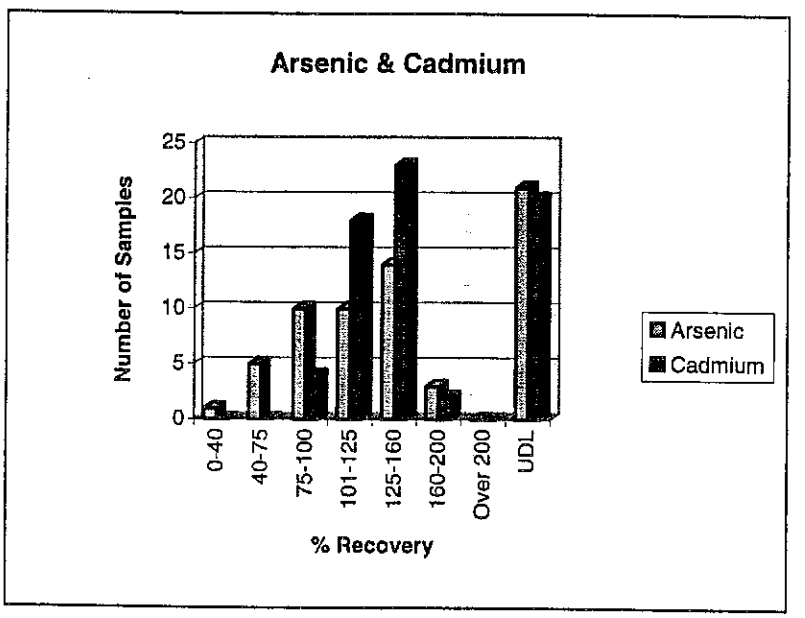
- **Recovery rate:**

Recovery rate (percent) is calculated as (XRF value/HF Digest value) x 100, to indicate whether one analytical method consistently gives higher or lower concentrations than the other by comparing frequencies greater than 100% vs less than 100% recoveries for the two sets of analyses. (Note that when either one or both of the values were below the reporting detection limit, the recovery was not calculated.)

Recovery rates for arsenic:
The XRF concentrations were higher than HF digest results 42%of the time and lower 25% of the time. Thirty-three percent (21 out of 64) of the data pairs had one or both values below the detection limit, so recoveries could not be calculated. Thirty-two percent of the recoveries were between 75 - 125%.

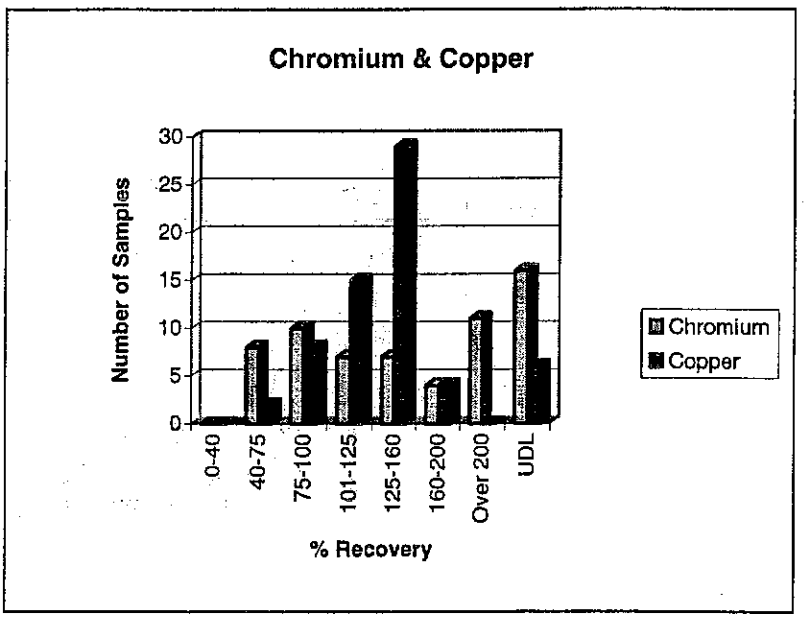
Recovery rates for cadmium:
The XRF results were equal to the HF digest results 2% of the time. XRF concentrations were higher than HF digest results 61% of the time and lower 6% of the time. Twenty of the 64 data pairs (31%) had one or both values below the detection limit, so recoveries could not be calculated.. Thirty-four percent of the recoveries were between 75 - 125%.

The following graph presents the recovery rate distribution for arsenic and cadmium.



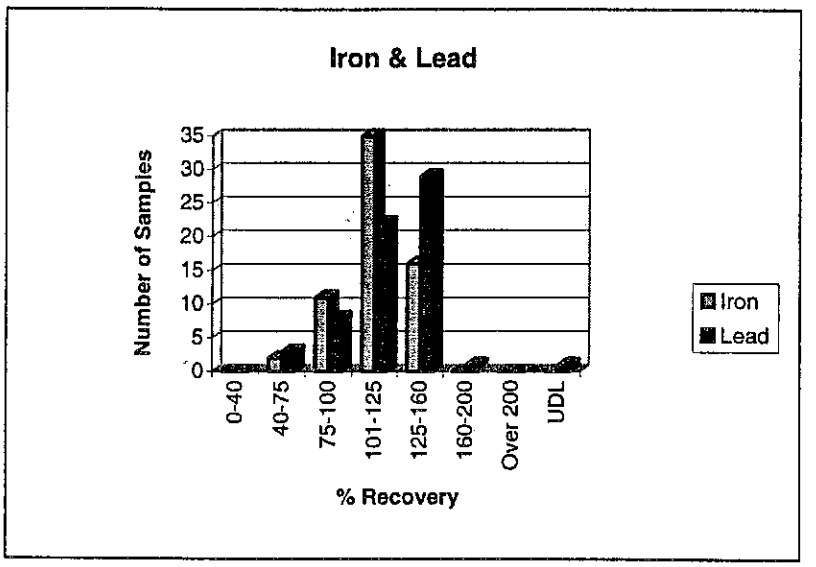
Recovery rates for chromium:
The XRF concentrations were higher than HF digest results 29% of the time and lower 18% of the time. Twenty-five percent (16 out of 64) of the data pairs had one or both values below the detection limit, so recoveries could not be calculated. Twenty-seven percent of the recoveries were between 75 - 125%.

Recovery rates for copper:
The XRF results were equal to the HF digest results 2% of the time. XRF concentrations were higher than HF digest results 75% of the time and lower 16% of the time. Six of the 64 data pairs (9%) had one or both values below the detection limit, so recoveries could not be calculated. Thirty-five percent of the recoveries were between 75 - 125%.



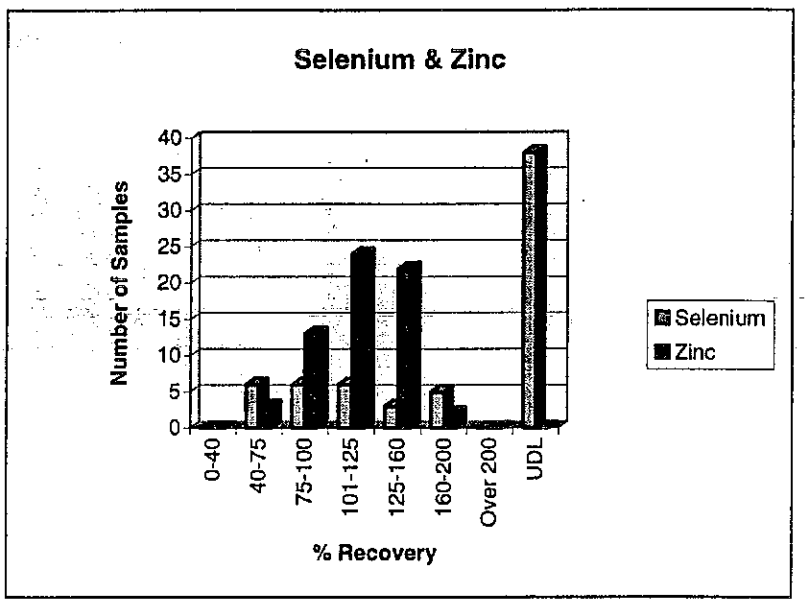
Recovery rates for iron:
The XRF concentrations were higher than HF digest results 81% of the time and lower 19% of the time. Seventy-two percent of the recoveries were between 75 - 125%.

Recovery rates for lead:
The XRF concentrations were higher than HF digest results 81% of the time and lower 17% of the timeOne of the 64 data pairs (2%) had one or both values below the detection limit, so recoveries could not be calculated. Forty-six percent of the recoveries were between 75-125%.



Recovery rates for selenium:
The XRF concentration was equal to the HF digest results 2% of the time. The XRF concentrations were higher than HF digest results 20% of the time and lower 19% of the time. Thirty-eight of the 64 data pairs (59%) had one or both values below the detection limit, so recoveries could not be calculated. Nineteen percent of the recoveries were between 75 - 125%.

Recovery rates for zinc:
The XRF concentrations were higher than HF digest results 75% of the time and lower 25% of the time. Fifty-nine percent of the recoveries were between 75-125%.



	Number of XRF to HF Comparisons (Percent out of 64 total)															
Recovery Range	**Arsenic**		**Cadmium**		**Chromium**		**Copper**		**Iron**		**Lead**		**Selenium**		**Zinc**	
	#	(%)	#	(%)	#	(%)	#	(%)	#	(%)	#	(%)	#	(%)	#	(%)
0-40%	1	(2)	0	---	0	---	0	---	0	---	0	---	0	---	0	---
40-75%	5	(8)	0		8	(12)	2	(3)	2	(3)	3	(5)	6	(9)	3	(5)
75-100%	10	(16)	4	(6)	10	(16)	8	(12)	11	(17)	8	(12)	6	(9)	13	(20)
101-125%	10	(16)	18	(28)	7	(11)	15	(23)	35	(55)	22	(34)	6	(9)	24	(39)
125-160%	14	(22)	23	(36)	7	(11)	29	(45)	16	(25)	29	(45)	3	(5)	22	(34)
160-200%	3	(5)	2	(3)	4	(6)	4	(6)	0	---	1	(2)	5	(8)	2	(3)
Over 200%	0	---	0	---	11	(17)	0	---	0	---	0	---	0	---	0	---
UDL	21	(33)	20	(31)	16	(25)	6	(9)	0	---	1	(2)	38	(59)	0	---
Average % Recovery		**112**		**127**		**142**		**128**		**114**		**120**		**111**		**115**

Shaded area represents "ideal" range.

- **Regression analysis:**
  General considerations involved in the interpretation of the results of regression analysis are as follows:

  - The **R-value** determines the strength of the association between variables. Perfect correlation between variables (i.e. perfect agreement between XRF and wet chemistry concentrations) would be indicated by an R-value of 1.0.

  - The **slope of the regression line** should be near 1 for comparable methods, and may show if a systematic error in calibration plots has occurred during analysis.

  - The **y-intercept** should be near 0 for equivalent methods, and may show if a systematic error has been introduced by background interference, whether it be absorption or fluorescence factors.

  In applying regression analysis to the confirmation samples evaluated in this report, it is important to remember that the XRF analysis was carried out using the fundamental parameters technique rather than a matrix-specific calibration. It is therefore no surprise that the regression results show evidence of systematic error introduced either by interference or by the type of calibration. For the confirmation sample data evaluated in this report:

- With the exception of chromium, all r values were greater than 0.96, showing a strong association between the analysis methods.
- The regression line slope was near 1 for cadmium, copper, selenium, and zinc up to 20,000 ppm. This indicates that for these parameters at similar concentrations, little or no systematic bias has been introduced by the calibration method.
- The regression line slopes for arsenic and lead are greater than 1, and the regression line slopes for chromium and iron are less than 1. This indicates that for these parameters a systematic bias may have been introduced by the calibration method.
- The y-intercept values for all parameters except selenium indicate that a systematic bias may have been introduced by background interference factors

Regression resultsfor each parameter are listed below.

Arsenic Regression Results: R = 0.986

Slope		y - Intercept	
Upper 95%:	**1.59**	**Upper 95%:**	**0.56**
Value:	**1.52**	**Value:**	**-187.11**
Lower 95%:	**1.46**	**Lower 95%:**	**-374.27**

Cadmium Regression Results: R = 0.982

Slope		y - Intercept	
Upper 95%:	**1.19**	**Upper 95%:**	**42.72**
Value:	**1.14**	**Value:**	**18.55**
Lower 95%:	**1.08**	**Lower 95%:**	**1.46**

Chromium Regression Results: R = 0.672

Slope		y - Intercept	
Upper 95%:	**0.82**	**Upper 95%:**	**56.65**
Value:	**0.64**	**Value:**	**37.672**
Lower 95%:	**0.46**	**Lower 95%:**	**18.68**

Copper Regression Results: R = 0.982

Slope		y - Intercept	
Upper 95%:	**1.01**	**Upper 95%:**	**3783**
Value:	**0.96**	**Value:**	**2425**
Lower 95%:	**0.92**	**Lower 95%:**	**1068**

Iron Regression Results: R = 0.966

Slope		y - Intercept	
Upper 95%:	**0.75**	**Upper 95%:**	**13509**
Value:	**0.70**	**Value:**	**10984**
Lower 95%:	**0.658**	**Lower 95%:**	**8459**

Lead Regression Results: R = 0.989

Slope		y - Intercept	
Upper 95%:	**1.32**	**Upper 95%:**	**576.02**
Value:	**1.25**	**Value:**	**-95.12**
Lower 95%:	**1.18**	**Lower 95%:**	**-766.26**

Selenium Regression Results: R = 0.984

Slope		y - Intercept	
Upper 95%:	**1.09**	**Upper 95%:**	**5.94**
Value:	**1.04**	**Value:**	**-4.542**
Lower 95%:	**1.00**	**Lower 95%:**	**-15.03**

ZincRegression Results: R = 0.992

Slope		y - Intercept	
Upper 95%:	**0.90**	**Upper 95%:**	**1273**
Value:	**0.87**	**Value:**	**801**
Lower 95%:	**0.84**	**Lower 95%:**	**328**

Graphs and supporting data for each parameter are contained in Appendix 2.

10. DATA QUALITY OBJECTIVES

- **Project data quality objectives (DQOs) met.**

  X Yes

  ___ No

The target accuracy for this project is evaluation of 90% of laboratory control samples and the matrix spike samples within control limits. Accuracy for laboratory control samples was 92% (37 out of 40 within control limits) and accuracy for matrix spikes was 98% (39 out of 40 within control limits.

Accuracy statements for both the laboratory control sample (LCS) and the matrix spikes were calculated individually for each parameter using the average percent recovery.

Accuracy

Accuracy As Demonstrated By Laboratory Control Sample Analyses (EP SW-6010 - ICP)

Parameter	Average % Recovery	# of LCSs
Arsenic	**96%**	**5**
Cadmium	**90%**	**5**
Chromium	**90%**	**5**
Copper	**100%**	**5**
Iron	**87%**	**5**
Lead	**91%**	**5**
Selenium	**95%**	**2***
Zinc	**93%**	**5**

* For 3 out of 5 LCSs, the true value was below the PQL.

Accuracy As Demonstrated By Laboratory Matrix Spike Analyses (EP SW-6010 - ICP)

Parameter	Average % Recovery	# of Spikes
Arsenic	**104%**	**5**
Cadmium	**93%**	**5**
Chromium	**85%**	**5**
Copper	**86%**	**4***
Iron	**----**	*
Lead	**93%**	**2***
Selenium	**93%**	**5**
Zinc	**92%**	**4**

* Spike recovery not calculated, as sample result was more than 4 times the spike amount added.

Precision

The target precision for this project is evaluation of 90% of laboratory duplicates samples within control limits. Target precision was met with 100% of quality control samples within control limits.

Precision statements below were calculated based on the mean RPD for laboratory duplicate sample values greater than five times the PRDL.

Precision As Demonstrated By Laboratory Duplicate Analyses

Parameter	Average RPD*	# of Dups
Arsenic	2.7%	5
Cadmium	1.3%	5
Chromium	3.0%	5
Copper	3.6%	5
Iron	2.6%	5
Lead	5.3%	5
Selenium	3.5%	4**
Zinc	2.7%	5

* RPDs reported as <1 were counted as 0.5 in calculating the average.
** One sample/duplicate pair was evaluated using PRDL criteria.

Completeness

The target completeness for this project is evaluation of 90% of the sample analyses as "valid," that is, not rejected (Hydrometrics, 1996). This data quality objective was met.

Completeness expressed as the percent of results not rejected: 100%
Completeness expressed as the percent of results without EPA flags: 78%

Completeness - % With No EPA Flags By Parameter

Parameter	# Samples Measured	# Samples Without EPA Flags	% Completeness
Arsenic	64	64	100%
Cadmium	64	64	100%
Chromium	64	32	50%
Copper	64	64	100%
Iron	64	64	100%
Lead	64	64	100%
Selenium	64	57	89%
Zinc	64	64	100%

DATA VALIDATION REPORT

Prepared by: Clare Bridge
Reviewed by: Mark Walker

REFERENCES

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APPENDIX 1

TABLES

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

CODE		DEFINITION
J	-	The associated numerical value is an estimated quantity because quality control criteria were not met. Subscripts for the "J" qualifier: 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits. 5 - Quality control sample was omitted. (Not an EPA code.)
UJ	-	The material was analyzed for, but was not detected above the associated value. Subscripts for the "UJ" qualifier: 1 - Blank contamination. Indicates possible high bias and/or false positive. 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits. 5 - Quality control sample was omitted. (Not an EPA code.)
R	-	Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	-	Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

Table 2. Summary of Flagged Data
El Paso RI 1997 Confirmation Samples

Site	Sample No	Lab No	Date	Parameter	Result	Flag	Bias	Reason for Flag
EP-67	EP-67A	L972604-1	05/28/97	CHROMIUM (CR)(TOT)	78.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	78.0	J4	-58	Spike recovery 42%
EP-67	EP-67B	L972383-2	05/28/97	CHROMIUM (CR)(TOT)	68.0	J2	+21	LCS recovery 79%
EP-67	EP-67C	L972383-3	05/28/97	CHROMIUM (CR)(TOT)	65.0	J2	+21	LCS recovery 79%
EP-70	EP-70E	L972604-12	05/31/97	CHROMIUM (CR)(TOT)	46.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	46.0	J4	-58	Spike recovery 42%
EP-70R	EP-70RJ	L972604-13	06/12/97	CHROMIUM (CR)(TOT)	41.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	41.0	J4	-58	Spike recovery 42%
EP-71R	EP-71RA	L972383-1	06/11/97	CHROMIUM (CR)(TOT)	93.0	J2	+21	LCS recovery 79%
EP-71R	EP-71RE	L972604-14	06/12/97	CHROMIUM (CR)(TOT)	37.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	37.0	J4	-58	Spike recovery 42%
EP-74	EP-74H	L972604-15	06/02/97	CHROMIUM (CR)(TOT)	50.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	50.0	J4	-58	Spike recovery 42%
EP-74	EP-74I	L972604-16	06/02/97	CHROMIUM (CR)(TOT)	73.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	73.0	J4	-58	Spike recovery 42%
EP-74	EP-74K	L972604-17	06/02/97	CHROMIUM (CR)(TOT)	97.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	97.0	J4	-58	Spike recovery 42%
EP-76	EP-76B	L972604-2	06/03/97	CHROMIUM (CR)(TOT)	539.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	539.0	J4	-58	Spike recovery 42%
EP-77	EP-77A	L972604-4	06/04/97	CHROMIUM (CR)(TOT)	69.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	69.0	J4	-58	Spike recovery 42%
EP-77	EP-77B	L972604-5	06/04/97	CHROMIUM (CR)(TOT)	73.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	73.0	J4	-58	Spike recovery 42%
EP-78	EP-78A	L972604-8	06/04/97	CHROMIUM (CR)(TOT)	53.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	53.0	J4	-58	Spike recovery 42%
EP-84	EP-84C	L972604-6	06/11/97	CHROMIUM (CR)(TOT)	52.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	52.0	J4	-58	Spike recovery 42%
EP-84	EP-84D	L972604-7	06/11/97	CHROMIUM (CR)(TOT)	54.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	54.0	J4	-58	Spike recovery 42%
EP-86	EP-86D	L972604-3	06/13/97	CHROMIUM (CR)(TOT)	39.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	39.0	J4	-58	Spike recovery 42%
EP-88	EP-88A	L972604-9	06/17/97	CHROMIUM (CR)(TOT)	67.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	67.0	J4	-58	Spike recovery 42%
EP-89	EP-89A	L972604-10	06/18/97	CHROMIUM (CR)(TOT)	57.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	57.0	J4	-58	Spike recovery 42%
EP-89	EP-89B	L972604-11	06/18/97	CHROMIUM (CR)(TOT)	38.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	38.0	J4	-58	Spike recovery 42%
RIBH-1	RIBH-1A	L972383-4	06/19/97	CHROMIUM (CR)(TOT)	201.0	J2	+21	LCS recovery 79%
RIBH-3	RIBH-3A	L972604-18	06/30/97	CHROMIUM (CR)(TOT)	57.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	57.0	J4	-58	Spike recovery 42%

Table 2. Summary of Flagged Data
El Paso RI 1997 Confirmation Samples

Site	Sample No	Lab No	Date	Parameter	Result	Flag	Bias	Reason for Flag
RIBH-5	RIBH-5A	L972604-19	06/30/97	CHROMIUM (CR)(TOT)	37.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	37.0	J4	-58	Spike recovery 42%
RIBH-10	RIBH-10C	L972604-20	07/01/97	CHROMIUM (CR)(TOT)	25.0	J2	+26	LCS recovery 126%
				CHROMIUM (CR)(TOT)	25.0	J4	-58	Spike recovery 42%
SSIA3-9	SSIA3-9B	L972383-5	07/15/97	CHROMIUM (CR)(TOT)	74.0	J2	+21	LCS recovery 79%
SSIA4-7	SSIA4-7A2	L972788-1	10/28/97	CHROMIUM (CR)(TOT)	68.0	J2	+26	LCS recovery 74%
SSIA4-7	SSIA4-7B	L972788-2	10/28/97	CHROMIUM (CR)(TOT)	184.0	J2	+26	LCS recovery 74%
SSIA4-11	SSIA4-11A	L972788-3	10/28/97	CHROMIUM (CR)(TOT)	69.0	J2	+26	LCS recovery 74%
SSIA4-14	SSIA4-14A2	L972788-4	10/28/97	CHROMIUM (CR)(TOT)	47.0	J2	+26	LCS recovery 74%
SSIA4-22	SSIA4-22B	L972788-5	10/30/97	CHROMIUM (CR)(TOT)	67.0	J2	+26	LCS recovery 74%
SSIA4-27	SSIA4-27A	L972788-7	10/30/97	CHROMIUM (CR)(TOT)	72.0	J2	+26	LCS recovery 74%
SSIA4-27	SSIA4-27B	L972788-6	10/30/97	CHROMIUM (CR)(TOT)	36.0	J2	+26	LCS recovery 74%

APPENDIX 2

REGRESSION STATISTICS

ARSENIC

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: AS

Precision Results: Total Number of Pairs: 36; Total Number of Outliers: 0; Number of Valid Pairs (k): 36; Dixon Q's Test Value: 0.401; 90% t value: 1.645; 95% t value: 1.960; Completeness: 100.0%; Standard Deviation: 0.14; 10% Uncertainty: 5.95; 5% Uncertainty: 7.09; Mean Percentage RPD: 26.7%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 6 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
AS	SSIA8-8C	07/16/97	L980457-17	L980374-17	20.0	<20.0	0.0%	Yes	N/A	|0| < 20
AS	SSIA4-27A	10/30/97	L972788-7	L972642-61	356.0	370.0	3.9%	Yes	No	3.9%
AS	SSIA5-9B	07/08/97	L972604-21	L971637-19	19.0	<20	5.1%	Yes	N/A	|1| < 20
AS	SSIA3-9B	07/15/97	L972383-5	97-1680034	532.0	570.000000	6.9%	Yes	No	6.9%
AS	SSIA8-6D	07/16/97	L980457-15	L980374-14	112.0	120.0	6.9%	Yes	No	6.9%
AS	EP-88A	06/17/97	L972604-9	97-1402022	509.0	550.000000	7.7%	Yes	No	7.7%
AS	SSIA8-7C	07/16/97	L980457-16	L980374-15	35.0	31.0	12.1%	Yes	N/A	|4| < 20
AS	SSIA1-4D	07/15/97	L980457-8	L980356-8	148.0	130.0	12.9%	Yes	No	12.9%
AS	SSIA1-4C	07/15/97	L980457-7	L980356-7	422.0	370.0	13.1%	Yes	No	13.1%
AS	SSENT6-A	07/17/97	L972604-29	L971680-82	439.0	380	14.4%	Yes	No	14.4%
AS	EP-67A	05/28/97	L972604-1	L-971239-1	1210.0	1400	14.6%	Yes	No	14.6%
AS	SSIA1-1D	07/15/97	L980457-2	L980356-2	3020.0	2600.0	14.9%	Yes	No	14.9%
AS	EP-71RA	06/11/97	L972383-1	97-1344001	1117.0	1300.00000	15.1%	Yes	No	15.1%
AS	SSIA3-1A	07/14/97	L972604-24	97-1680016	1607.0	1900.00000	16.7%	Yes	No	16.7%
AS	SSIA1-1C	07/15/97	L980457-1	L980356-1	3970.0	4700.0	16.8%	Yes	No	16.8%
AS	SSIA8-6C	07/16/97	L980457-14	L980374-13	69.0	58.0	17.3%	Yes	N/A	|11| < 20
AS	SSIA8-20B	07/18/97	L972604-33	97-1715024	395.0	330.000000	17.9%	Yes	No	17.9%
AS	SSENT2-A	07/17/97	L972604-28	L971680-73	411.0	340	18.9%	Yes	No	18.9%
AS	SSIA4-14A2	10/28/97	L972788-4	L972642-32	1236.0	1500.0	19.3%	Yes	No	19.3%
AS	SSIA8-30A	07/18/97	L972604-35	97-1715043	2440.0	2000.00000	19.8%	Yes	No	19.8%
AS	EP-77B	06/04/97	L972604-5	97-1325011	114.0	140.000000	20.5%	Yes	No	20.5%
AS	SSIA8-28B	07/18/97	L972604-34	97-1715040	2579.0	3300.00000	24.5%	Yes	No	24.5%
AS	SSIA1-3D	07/15/97	L980457-6	L980356-6	1476.0	1900.0	25.1%	Yes	No	25.1%
AS	SSIA8-4D	07/14/97	L980457-11	L980374-10	2333.0	3100.0	28.2%	Yes	No	28.2%
AS	EP-84C	06/11/97	L972604-6	97-1344015	15.0	<20.000000	28.6%	Yes	N/A	|5| < 20
AS	SSIA5-9A	07/08/97	L972604-23	L971637-18	120.0	90	28.6%	Yes	No	28.6%
AS	RIBH-5A	06/30/97	L972604-19	L971545-18	27.0	<20	29.8%	Yes	N/A	|7| < 20
AS	EP-70E	05/31/97	L972604-12	L971239-32	286.0	390	30.8%	Yes	No	30.8%
AS	SSIA4-7A2	10/28/97	L972788-1	L972642-16	13120.0	18000.0	31.4%	Yes	No	31.4%
AS	SSIA4-27B	10/30/97	L972788-6	L972642-62	18.0	25.0	32.6%	Yes	N/A	|7| < 20
AS	EP-67B	05/28/97	L972383-2	L-971239-2	229.0	320	33.2%	Yes	No	33.2%
AS	SSIA1-3C	07/15/97	L980457-5	L980356-5	2429.0	3400.0	33.3%	Yes	No	33.3%
AS	SSIA4-11A	10/28/97	L972788-3	L972642-25	1271.0	1800.0	34.5%	Yes	No	34.5%
AS	SSENT7-B	07/17/97	L972604-31	L971680-85	14.0	<20	35.3%	Yes	N/A	|6| < 20
AS	SSIA1-2C	07/15/97	L980457-3	L980356-3	10440.0	15000.0	35.8%	No	No	*OUT* 35.8%
AS	EP-76B	06/03/97	L972604-2	97-1325005	608.0	420.000000	36.6%	No	No	*OUT* 36.6%
AS	SSIA8-4C	07/14/97	L980457-10	L980374-9	4479.0	6600.0	38.3%	No	No	*OUT* 38.3%
AS	SSENT7-A	07/17/97	L972604-30	L971680-84	370.0	250	38.7%	No	No	*OUT* 38.7%
AS	EP-78A	06/04/97	L972604-8	97-1325018	663.0	990.000000	39.6%	No	No	*OUT* 39.6%
AS	SSIA4-7B	10/28/97	L972788-2	L972642-17	1425.0	2200.0	42.8%	No	No	*OUT* 42.8%
AS	EP-74K	06/02/97	L972604-17	L971239-61	31.0	49	45.0%	Yes	N/A	|18| < 20
AS	SSIA8-10A	07/17/97	L972604-32	L971715-1	12.0	<20	50.0%	Yes	N/A	|8| < 20
AS	RIBH-1A	06/19/97	L972383-4	L971545-1	2625.0	4400	50.5%	No	No	*OUT* 50.5%
AS	EP-77A	06/04/97	L972604-4	97-1325010	340.0	200.000000	51.9%	No	No	*OUT* 51.9%
AS	SSIA8-7A	07/16/97	L972604-27	97-1680065	87.0	51.000000	52.2%	No	N/A	*OUT* |36| > 20
AS	EP-67C	05/28/97	L972383-3	L-971239-3	189.0	340	57.1%	No	No	*OUT* 57.1%
AS	SSIA1-2D	07/15/97	L980457-4	L980356-4	11960.0	22000.0	59.1%	No	No	*OUT* 59.1%

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

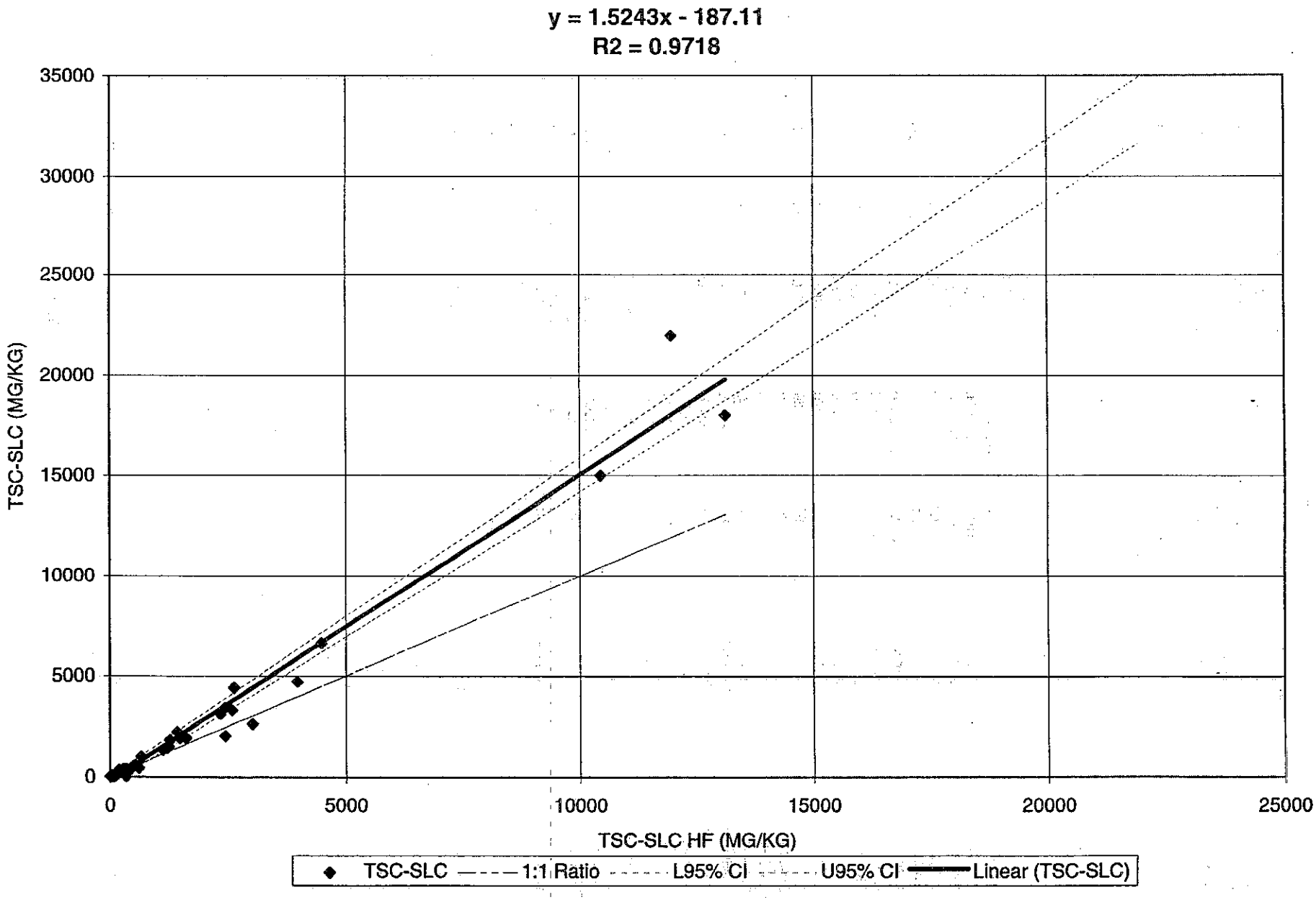
PARAMETER: AS

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
AS	SSIA5-19B	07/14/97	L972604-25	97-1680051	38.0	<20.000000	62.1%	Yes	N/A	|18| < 20
AS	SSIA4-22B	10/30/97	L972788-5	L972642-51	88.0	45.0	64.7%	No	N/A	*OUT* |43| > 20
AS	EP-70RJ	06/12/97	L972604-13	97-1344034	<10.0	<20.000000	66.7%	Yes	N/A	|10| < 20
AS	EP-71RE	06/12/97	L972604-14	97-1344047	<10.0	<20.000000	66.7%	Yes	N/A	|10| < 20
AS	EP-74H	06/02/97	L972604-15	L971239-58	<10.0	<20	66.7%	Yes	N/A	|10| < 20
AS	EP-74I	06/02/97	L972604-16	L971239-59	<10.0	<20	66.7%	Yes	N/A	|10| < 20
AS	EP-84D	06/11/97	L972604-7	97-1344016	<10.0	<20.000000	66.7%	Yes	N/A	|10| < 20
AS	EP-86D	06/13/97	L972604-3	97-1402008	<10.0	<20.000000	66.7%	Yes	N/A	|10| < 20
AS	EP-89B	06/18/97	L972604-11	97-1402032	<10.0	<20.000000	66.7%	Yes	N/A	|10| < 20
AS	RIBH-10C	07/01/97	L972604-20	L971545-38	10.0	<20	66.7%	Yes	N/A	|10| < 20
AS	SSIA5-18D	07/14/97	L980457-9	L980374-8	<10.0	<20.0	66.7%	Yes	N/A	|10| < 20
AS	SSIA8-5C	07/16/97	L980457-12	L980374-11	40.0	<20.0	66.7%	Yes	N/A	|20| < 20
AS	SSIA8-5D	07/16/97	L980457-13	L980374-12	<10.0	<20.0	66.7%	Yes	N/A	|10| < 20
AS	RIBH-3A	06/30/97	L972604-18	L971545-11	63.0	<20	103.6%	No	N/A	*OUT* |43| > 20
AS	SSIA8-6B	07/16/97	L972604-26	97-1680064	80.0	<20.000000	120.0%	No	N/A	*OUT* |60| > 20
AS	SSIA5-3B	07/08/97	L972604-22	L971637-6	86.0	<20	124.5%	No	N/A	*OUT* |66| > 20
AS	EP-89A	06/18/97	L972604-10	97-1402031	337.0	34.000000	163.3%	No	N/A	*OUT* |303| > 20

ARSENIC (AS) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	1210	1400	115.7%	-190	190
EP-67B	5/28/97	229	320	139.7%	-91	91
EP-67C	5/28/97	189	340	179.9%	-151	151
EP-70E	5/31/97	286	390	136.4%	-104	104
EP-74H	6/2/97	<10.0	<20	UDL	-10	10
EP-74I	6/2/97	<10.0	<20	UDL	-10	10
EP-74K	6/2/97	31	49	158.1%	-18	18
EP-76B	6/3/97	608	420	69.1%	188	188
EP-77A	6/4/97	340	200	58.8%	140	140
EP-77B	6/4/97	114	140	122.8%	-26	26
EP-78A	6/4/97	663	990	149.3%	-327	327
EP-71RA	6/11/97	1117	1300	116.4%	-183	183
EP-84C	6/11/97	15	<20.000000	UDL	-5	5
EP-84D	6/11/97	<10.0	<20.000000	UDL	-10	10
EP-70RJ	6/12/97	<10.0	<20.000000	UDL	-10	10
EP-71RE	6/12/97	<10.0	<20.000000	UDL	-10	10
EP-86D	6/13/97	<10.0	<20.000000	UDL	-10	10
EP-88A	6/17/97	509	550	108.1%	-41	41
EP-89A	6/18/97	337	34	10.1%	303	303
EP-89B	6/18/97	<10.0	<20.000000	UDL	-10	10
RIBH-1A	6/19/97	2625	4400	167.6%	-1775	1775
RIBH-3A	6/30/97	63	<20	UDL	43	43
RIBH-5A	6/30/97	27	<20	UDL	7	7
RIBH-10C	7/1/97	10	<20	UDL	-10	10
SSIA5-3B	7/8/97	86	<20	UDL	66	66
SSIA5-9A	7/8/97	120	90	75.0%	30	30
SSIA5-9B	7/8/97	19	<20	UDL	-1	1
SSIA3-1A	7/14/97	1607	1900	118.2%	-293	293
SSIA5-18D	7/14/97	<10.0	<20.0	UDL	-10	10
SSIA5-19B	7/14/97	38	<20.000000	UDL	18	18
SSIA8-4C	7/14/97	4479	6600	147.4%	-2121	2121
SSIA8-4D	7/14/97	2333	3100	132.9%	-767	767
SSIA1-1C	7/15/97	3970	4700	118.4%	-730	730
SSIA1-1D	7/15/97	3020	2600	86.1%	420	420
SSIA1-2C	7/15/97	10440	15000	143.7%	-4560	4560
SSIA1-2D	7/15/97	11960	22000	183.9%	-10040	10040
SSIA1-3C	7/15/97	2429	3400	140.0%	-971	971
SSIA1-3D	7/15/97	1476	1900	128.7%	-424	424
SSIA1-4C	7/15/97	422	370	87.7%	52	52
SSIA1-4D	7/15/97	148	130	87.8%	18	18
SSIA3-9B	7/15/97	532	570	107.1%	-38	38
SSIA8-5C	7/16/97	40	<20.0	UDL	20	20
SSIA8-5D	7/16/97	<10.0	<20.0	UDL	-10	10
SSIA8-6B	7/16/97	80	<20.000000	UDL	60	60
SSIA8-6C	7/16/97	69	58	84.1%	11	11
SSIA8-6D	7/16/97	112	120	107.1%	-8	8
SSIA8-7A	7/16/97	87	51	58.6%	36	36
SSIA8-7C	7/16/97	35	31	88.6%	4	4
SSIA8-8C	7/16/97	20	<20.0	UDL	0	0
SSENT2-A	7/17/97	411	340	82.7%	71	71
SSENT6-A	7/17/97	439	380	86.6%	59	59
SSENT7-A	7/17/97	370	250	67.6%	120	120
SSENT7-B	7/17/97	14	<20	UDL	-6	6
SSIA8-10A	7/17/97	12	<20	UDL	-8	8
SSIA8-20B	7/18/97	395	330	83.5%	65	65
SSIA8-28B	7/18/97	2579	3300	128.0%	-721	721
SSIA8-30A	7/18/97	2440	2000	82.0%	440	440
SSIA4-11A	10/28/97	1271	1800	141.6%	-529	529
SSIA4-14A2	10/28/97	1236	1500	121.4%	-264	264
SSIA4-7A2	10/28/97	13120	18000	137.2%	-4880	4880
SSIA4-7B	10/28/97	1425	2200	154.4%	-775	775
SSIA4-22B	10/30/97	88	45	51.1%	43	43
SSIA4-27A	10/30/97	356	370	103.9%	-14	14
SSIA4-27B	10/30/97	18	25	138.9%	-7	7

ARSENIC (AS) REGRESSION CHART



Regression Statistics	
Multiple R	0.985784495
R Square	0.971771071
Adjusted R Square	0.971315766
Standard Error	680.0200904
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	986971789.4	986971789.4	2134.328444	9.58387E-50
Residual	62	28670494.04	462427.3233		
Total	63	1015642283			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-187.1112191	93.63207412	-1.998366701	0.050067237	-374.2788617	0.056423547
TSC-SLC HF	1.52428627	0.032994072	46.19879267	9.58387E-50	1.458332133	1.590240406

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	1189.984375	1626.765625
Variance	6742657.73	16121306.09
Observations	64	64
Pearson Correlation	0.985784495	
Hypothesized Mean Difference	0	
df	63	
t Stat	-2.299803176	
P(T<=t) one-tail	0.012392169	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.024784337	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	1189.984375	1626.765625
Standard Error	324.5828508	501.8918286
Median	209	170
Mode	10	20
Standard Deviation	2596.662806	4015.134629
Sample Variance	6742657.73	16121306.09
Kurtosis	12.71030476	15.47069886
Skewness	3.517075274	3.865394197
Range	13110	21980
Minimum	10	20
Maximum	13120	22000
Sum	76159	104113
Count	64	64
Confidence Level(95.000%)	636.1697555	983.6884516

CADMIUM

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: CD

Precision Results: Total Number of Pairs: 31; Total Number of Outliers: 0; Number of Valid Pairs (k): 31; Dixon Q's Test Value: 0.401; 90% t value: 1.697; 95% t value: 2.042; Completeness: 100.0%; Standard Deviation: 0.11; 10% Uncertainty: 6.04; 5% Uncertainty: 7.26; Mean Percentage RPD: 25.5%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CD	SSIA5-3B	07/08/97	L972604-22	L971637-6	16.0	16	0.0%	Yes	N/A	|0| < 20
CD	SSIA4-7A2	10/28/97	L972788-1	L972642-16	356.0	360.0	1.1%	Yes	No	1.1%
CD	SSIA1-1D	07/15/97	L980457-2	L980356-2	946.0	900.0	5.0%	Yes	No	5.0%
CD	RIBH-1A	06/19/97	L972383-4	L971545-1	1940.0	2100	7.9%	Yes	No	7.9%
CD	SSIA1-1C	07/15/97	L980457-1	L980356-1	1560.0	1700.0	8.6%	Yes	No	8.6%
CD	SSIA4-22B	10/30/97	L972788-5	L972642-51	24.0	22.0	8.7%	Yes	N/A	|2| < 20
CD	SSIA8-6B	07/16/97	L972604-26	97-1680064	43.0	47.000000	8.9%	Yes	N/A	|4| < 20
CD	EP-70E	05/31/97	L972604-12	L971239-32	46.0	51	10.3%	Yes	N/A	|5| < 20
CD	SSIA8-7C	07/16/97	L980457-16	L980374-15	37.0	41.0	10.3%	Yes	N/A	|4| < 20
CD	EP-77B	06/04/97	L972604-5	97-1325011	38.0	43.000000	12.3%	Yes	N/A	|5| < 20
CD	SSIA8-20B	07/18/97	L972604-33	97-1715024	78.0	89.000000	13.2%	Yes	No	13.2%
CD	SSIA8-30A	07/18/97	L972604-35	97-1715043	980.0	840.000000	15.4%	Yes	No	15.4%
CD	EP-77A	06/04/97	L972604-4	97-1325010	13.0	11.000000	16.7%	Yes	N/A	|2| < 20
CD	EP-71RA	06/11/97	L972383-1	97-1344001	99.0	120.000000	19.2%	Yes	No	19.2%
CD	EP-67C	05/28/97	L972383-3	L-971239-3	48.0	59	20.6%	Yes	N/A	|11| < 20
CD	SSIA1-3D	07/15/97	L980457-6	L980356-6	81.0	100.0	21.0%	Yes	No	21.0%
CD	EP-78A	06/04/97	L972604-8	97-1325018	37.0	46.000000	21.7%	Yes	N/A	|9| < 20
CD	SSIA1-2C	07/15/97	L980457-3	L980356-3	965.0	1200.0	21.7%	Yes	No	21.7%
CD	SSIA1-3C	07/15/97	L980457-5	L980356-5	88.0	110.0	22.2%	Yes	No	22.2%
CD	EP-67B	05/28/97	L972383-2	L-971239-2	159.0	200	22.8%	Yes	No	22.8%
CD	SSIA4-27A	10/30/97	L972788-7	L972642-61	111.0	140.0	23.1%	Yes	No	23.1%
CD	SSIA1-4C	07/15/97	L980457-7	L980356-7	79.0	100.0	23.5%	Yes	No	23.5%
CD	SSIA8-6D	07/16/97	L980457-15	L980374-14	86.0	110.0	24.5%	Yes	No	24.5%
CD	SSIA8-4C	07/14/97	L980457-10	L980374-9	778.0	1000.0	25.0%	Yes	No	25.0%
CD	SSIA8-5D	07/16/97	L980457-13	L980374-12	7.7	<10.0	26.0%	Yes	N/A	UDL
CD	SSIA3-9B	07/15/97	L972383-5	97-1680034	259.0	340.000000	27.0%	Yes	No	27.0%
CD	SSIA8-6C	07/16/97	L980457-14	L980374-13	99.0	130.0	27.1%	Yes	No	27.1%
CD	SSENT6-A	07/17/97	L972604-29	L971680-82	76.0	100	27.3%	Yes	No	27.3%
CD	SSIA4-14A2	10/28/97	L972788-4	L972642-32	498.0	670.0	29.5%	Yes	No	29.5%
CD	SSIA4-11A	10/28/97	L972788-3	L972642-25	368.0	500.0	30.4%	Yes	No	30.4%
CD	EP-88A	06/17/97	L972604-9	97-1402022	110.0	150.000000	30.8%	Yes	No	30.8%
CD	SSENT7-A	07/17/97	L972604-30	L971680-84	68.0	93	31.1%	Yes	No	31.1%
CD	SSENT2-A	07/17/97	L972604-28	L971680-73	72.0	100	32.6%	Yes	No	32.6%
CD	SSIA8-7A	07/16/97	L972604-27	97-1680065	69.0	96.000000	32.7%	Yes	No	32.7%
CD	EP-76B	06/03/97	L972604-2	97-1325005	14.0	<10.000000	33.3%	Yes	N/A	|4| < 20
CD	EP-67A	05/28/97	L972604-1	L-971239-1	334.0	470	33.8%	Yes	No	33.8%
CD	EP-89A	06/18/97	L972604-10	97-1402031	78.0	110.000000	34.0%	Yes	No	34.0%
CD	SSIA8-4D	07/14/97	L980457-11	L980374-10	370.0	530.0	35.6%	No	No	*OUT* 35.6%
CD	SSIA3-1A	07/14/97	L972604-24	97-1680016	349.0	510.000000	37.5%	No	No	*OUT* 37.5%
CD	SSIA4-7B	10/28/97	L972788-2	L972642-17	212.0	310.0	37.5%	No	No	*OUT* 37.5%
CD	SSIA8-5C	07/16/97	L980457-12	L980374-11	19.0	28.0	38.3%	Yes	N/A	|9| < 20
CD	SSIA1-2D	07/15/97	L980457-4	L980356-4	868.0	1300.0	39.9%	No	No	*OUT* 39.9%
CD	SSIA5-9A	07/08/97	L972604-23	L971637-18	26.0	39	40.0%	Yes	N/A	|13| < 20
CD	SSIA1-4D	07/15/97	L980457-8	L980356-8	27.0	41.0	41.2%	Yes	N/A	|14| < 20
CD	SSIA8-28B	07/18/97	L972604-34	97-1715040	793.0	1300.00000	48.4%	No	No	*OUT* 48.4%
CD	SSIA5-19B	07/14/97	L972604-25	97-1680051	17.0	29.000000	52.2%	Yes	N/A	|12| < 20
CD	SSIA8-8C	07/16/97	L980457-17	L980374-17	5.3	<10.0	61.4%	Yes	N/A	UDL

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: CD

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CD	EP-70RJ	06/12/97	L972604-13	97-1344034	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	EP-71RE	06/12/97	L972604-14	97-1344047	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	EP-74H	06/02/97	L972604-15	L971239-58	<5.0	<10	66.7%	Yes	N/A	UDL
CD	EP-74I	06/02/97	L972604-16	L971239-59	<5.0	<10	66.7%	Yes	N/A	UDL
CD	EP-74K	06/02/97	L972604-17	L971239-61	<5.0	<10	66.7%	Yes	N/A	UDL
CD	EP-84C	06/11/97	L972604-6	97-1344015	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	EP-84D	06/11/97	L972604-7	97-1344016	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	EP-86D	06/13/97	L972604-3	97-1402008	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	EP-89B	06/18/97	L972604-11	97-1402032	<5.0	<10.000000	66.7%	Yes	N/A	UDL
CD	RIBH-10C	07/01/97	L972604-20	L971545-38	<5.0	<10	66.7%	Yes	N/A	UDL
CD	RIBH-3A	06/30/97	L972604-18	L971545-11	<5.0	<10	66.7%	Yes	N/A	UDL
CD	RIBH-5A	06/30/97	L972604-19	L971545-18	5.0	<10	66.7%	Yes	N/A	UDL
CD	SSENT7-B	07/17/97	L972604-31	L971680-85	<5.0	<10	66.7%	Yes	N/A	UDL
CD	SSIA4-27B	10/30/97	L972788-6	L972642-62	<5.0	<10.0	66.7%	Yes	N/A	UDL
CD	SSIA5-18D	07/14/97	L980457-9	L980374-8	<5.0	<10.0	66.7%	Yes	N/A	UDL
CD	SSIA5-9B	07/08/97	L972604-21	L971637-19	<5.0	<10	66.7%	Yes	N/A	UDL
CD	SSIA8-10A	07/17/97	L972604-32	L971715-1	<5.0	13	88.9%	Yes	N/A	|8| < 20

CADMIUM (CD) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	334	470	140.7%	-136	136
EP-67B	5/28/97	159	200	125.8%	-41	41
EP-67C	5/28/97	48	59	122.9%	-11	11
EP-70E	5/31/97	46	51	110.9%	-5	5
EP-74H	6/2/97	<5.0	<10	UDL	-5	5
EP-74I	6/2/97	<5.0	<10	UDL	-5	5
EP-74K	6/2/97	<5.0	<10	UDL	-5	5
EP-76B	6/3/97	14	<10.000000	UDL	4	4
EP-77A	6/4/97	13	11	84.6%	2	2
EP-77B	6/4/97	38	43	113.2%	-5	5
EP-78A	6/4/97	37	46	124.3%	-9	9
EP-71RA	6/11/97	99	120	121.2%	-21	21
EP-84C	6/11/97	<5.0	<10.000000	UDL	-5	5
EP-84D	6/11/97	<5.0	<10.000000	UDL	-5	5
EP-70RJ	6/12/97	<5.0	<10.000000	UDL	-5	5
EP-71RE	6/12/97	<5.0	<10.000000	UDL	-5	5
EP-86D	6/13/97	<5.0	<10.000000	UDL	-5	5
EP-88A	6/17/97	110	150	136.4%	-40	40
EP-89A	6/18/97	78	110	141.0%	-32	32
EP-89B	6/18/97	<5.0	<10.000000	UDL	-5	5
RIBH-1A	6/19/97	1940	2100	108.2%	-160	160
RIBH-3A	6/30/97	<5.0	<10	UDL	-5	5
RIBH-5A	6/30/97	5	<10	UDL	-5	5
RIBH-10C	7/1/97	<5.0	<10	UDL	-5	5
SSIA5-3B	7/8/97	16	16	100.0%	0	0
SSIA5-9A	7/8/97	26	39	150.0%	-13	13
SSIA5-9B	7/8/97	<5.0	<10	UDL	-5	5
SSIA3-1A	7/14/97	349	510	146.1%	-161	161
SSIA5-18D	7/14/97	<5.0	<10.0	UDL	-5	5
SSIA5-19B	7/14/97	17	29	170.6%	-12	12
SSIA8-4C	7/14/97	778	1000	128.5%	-222	222
SSIA8-4D	7/14/97	370	530	143.2%	-160	160
SSIA1-1C	7/15/97	1560	1700	109.0%	-140	140
SSIA1-1D	7/15/97	946	900	95.1%	46	46
SSIA1-2C	7/15/97	965	1200	124.4%	-235	235
SSIA1-2D	7/15/97	868	1300	149.8%	-432	432
SSIA1-3C	7/15/97	88	110	125.0%	-22	22
SSIA1-3D	7/15/97	81	100	123.5%	-19	19
SSIA1-4C	7/15/97	79	100	126.6%	-21	21
SSIA1-4D	7/15/97	27	41	151.9%	-14	14
SSIA3-9B	7/15/97	259	340	131.3%	-81	81
SSIA8-5C	7/16/97	19	28	147.4%	-9	9
SSIA8-5D	7/16/97	7.7	<10.0	UDL	-2	2
SSIA8-6B	7/16/97	43	47	109.3%	-4	4
SSIA8-6C	7/16/97	99	130	131.3%	-31	31
SSIA8-6D	7/16/97	86	110	127.9%	-24	24
SSIA8-7A	7/16/97	69	96	139.1%	-27	27
SSIA8-7C	7/16/97	37	41	110.8%	-4	4
SSIA8-8C	7/16/97	5.3	<10.0	UDL	-5	5
SSENT2-A	7/17/97	72	100	138.9%	-28	28
SSENT6-A	7/17/97	76	100	131.6%	-24	24
SSENT7-A	7/17/97	68	93	136.8%	-25	25
SSENT7-B	7/17/97	<5.0	<10	UDL	-5	5
SSIA8-10A	7/17/97	<5.0	13	UDL	-8	8
SSIA8-20B	7/18/97	78	89	114.1%	-11	11
SSIA8-28B	7/18/97	793	1300	163.9%	-507	507
SSIA8-30A	7/18/97	980	840	85.7%	140	140
SSIA4-11A	10/28/97	368	500	135.9%	-132	132
SSIA4-14A2	10/28/97	498	670	134.5%	-172	172
SSIA4-7A2	10/28/97	356	360	101.1%	-4	4
SSIA4-7B	10/28/97	212	310	146.2%	-98	98
SSIA4-22B	10/30/97	24	22	91.7%	2	2
SSIA4-27A	10/30/97	111	140	126.1%	-29	29
SSIA4-27B	10/30/97	<5.0	<10.0	UDL	-5	5

CADMIUM (CD) COMPARISON STATISTICAL SUMMARY

Regression Statistics	
Multiple R	0.981961652
R Square	0.964248686
Adjusted R Square	0.963672052
Standard Error	84.71136299
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	11999746.51	11999746.51	1672.201978	1.45781E-46
Residual	62	444912.9312	7176.015019		
Total	63	12444659.44			

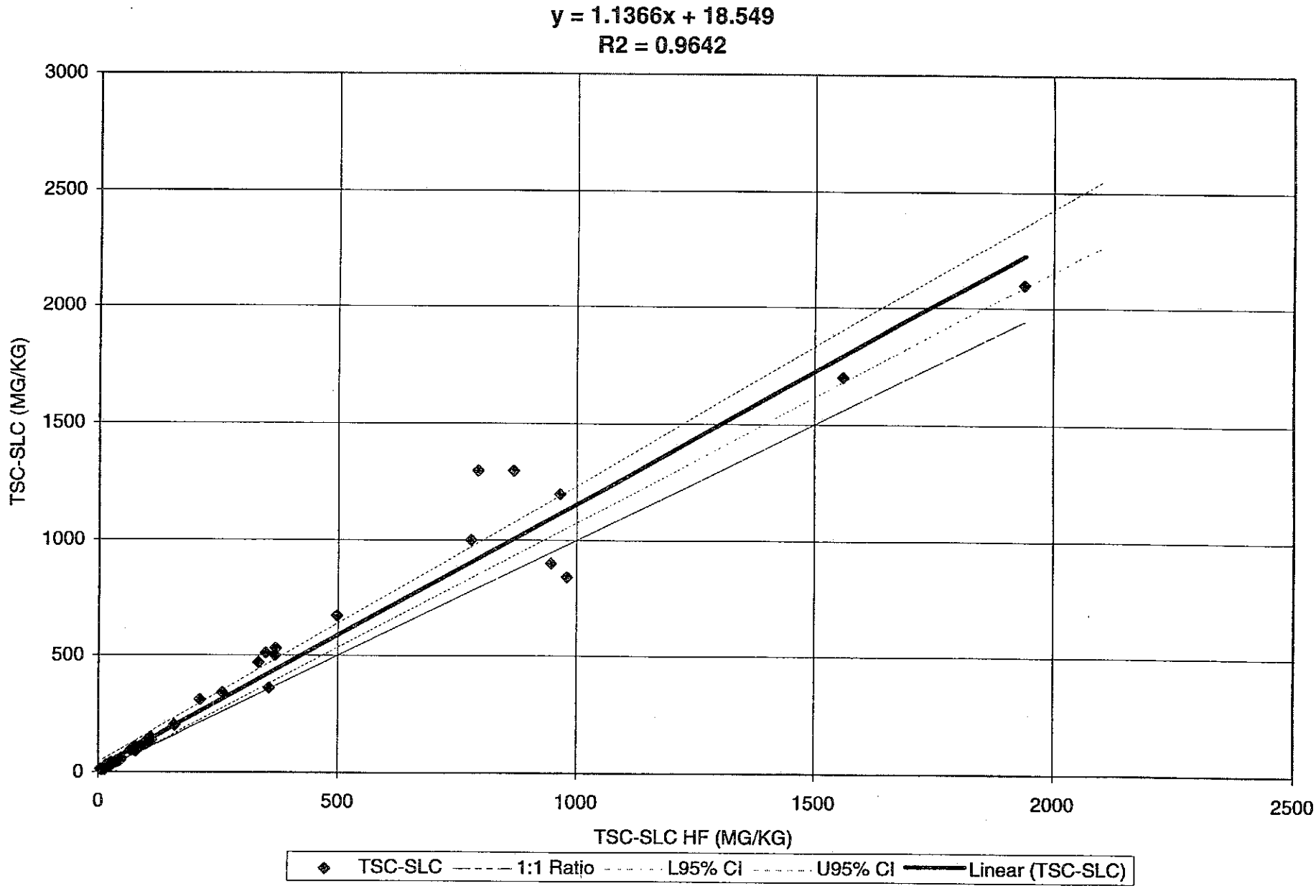
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	18.54905229	12.0894318	1.53431961	0.130038598	-5.617350855	42.71545544
TSC-SLC HF	1.136603682	0.027794873	40.89256629	1.45781E-46	1.081042584	1.19216478

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	209.875	257.09375
Variance	147439.3492	197534.2768
Observations	64	64
Pearson Correlation	0.981961652	
Hypothesized Mean Difference	0	
df	63	
t Stat	-3.813242839	
P(T<=t) one-tail	0.000157286	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.000314572	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	209.875	257.09375
Standard Error	47.99728983	55.55603545
Median	47	55
Mode	5	10
Standard Deviation	383.9783187	444.4482836
Sample Variance	147439.3492	197534.2768
Kurtosis	7.872966634	5.69965429
Skewness	2.708227784	2.405302428
Range	1935	2090
Minimum	5	10
Maximum	1940	2100
Sum	13432	16454
Count	64	64
Confidence Level(95.000%)	94.07282013	108.8876674

CADMIUM (CD) REGRESSION CHART



CHROMIUM

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: CR

Precision Results: Total Number of Pairs: 8; Total Number of Outliers: 0; Number of Valid Pairs (k): 8; Dixon Q's Test Value: 0.479; 90% t value: 1.895; 95% t value: 3.265; Completeness: 100.0%; Standard Deviation: 0.18; 10% Uncertainty: 18.63; 5% Uncertainty: 32.10; Mean Percentage RPD: 32.2%; Validation Detection Limit (VDL): 20.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CR	EP-71RA	06/11/97	L972383-1	97-1344001	93.0	91.000000	2.2%	Yes	N/A	|2| < 40
CR	EP-71RE	06/12/97	L972604-14	97-1344047	37.0	39.000000	5.3%	Yes	N/A	|2| < 40
CR	RIBH-1A	06/19/97	L972383-4	L971545-1	201.0	190	5.6%	Yes	No	5.6%
CR	SSIA1-4D	07/15/97	L980457-8	L980356-8	57.0	63.0	10.0%	Yes	N/A	|6| < 40
CR	EP-84D	06/11/97	L972604-7	97-1344016	54.0	48.000000	11.8%	Yes	N/A	|6| < 40
CR	EP-78A	06/04/97	L972604-8	97-1325018	53.0	47.000000	12.0%	Yes	N/A	|6| < 40
CR	EP-67B	05/28/97	L972383-2	L-971239-2	68.0	77	12.4%	Yes	N/A	|9| < 40
CR	SSIA4-7B	10/28/97	L972788-2	L972642-17	184.0	210.0	13.2%	Yes	No	13.2%
CR	SSIA8-6C	07/16/97	L980457-14	L980374-13	111.0	97.0	13.5%	Yes	N/A	|14| < 40
CR	EP-77B	06/04/97	L972604-5	97-1325011	73.0	84.000000	14.0%	Yes	N/A	|11| < 40
CR	SSIA8-5C	07/16/97	L980457-12	L980374-11	126.0	150.0	17.4%	Yes	No	17.4%
CR	RIBH-5A	06/30/97	L972604-19	L971545-18	37.0	46	21.7%	Yes	N/A	|9| < 40
CR	SSIA1-2C	07/15/97	L980457-3	L980356-3	66.0	53.0	21.8%	Yes	N/A	|13| < 40
CR	SSIA8-6D	07/16/97	L980457-15	L980374-14	125.0	100.0	22.2%	Yes	N/A	|25| < 40
CR	EP-89B	06/18/97	L972604-11	97-1402032	38.0	48.000000	23.3%	Yes	N/A	|10| < 40
CR	SSIA4-22B	10/30/97	L972788-5	L972642-51	67.0	53.0	23.3%	Yes	N/A	|14| < 40
CR	SSIA8-30A	07/18/97	L972604-35	97-1715043	90.0	70.000000	25.0%	Yes	N/A	|20| < 40
CR	EP-86D	06/13/97	L972604-3	97-1402008	39.0	<30.000000	26.1%	Yes	N/A	|9| < 40
CR	SSIA8-20B	07/18/97	L972604-33	97-1715024	176.0	230.000000	26.6%	Yes	No	26.6%
CR	SSENT7-A	07/17/97	L972604-30	L971680-84	40.0	<30	28.6%	Yes	N/A	|10| < 40
CR	SSIA8-5D	07/16/97	L980457-13	L980374-12	89.0	120.0	29.7%	Yes	N/A	|31| < 40
CR	EP-70RJ	06/12/97	L972604-13	97-1344034	41.0	<30.000000	31.0%	Yes	N/A	|11| < 40
CR	SSIA5-19B	07/14/97	L972604-25	97-1680051	41.0	<30.000000	31.0%	Yes	N/A	|11| < 40
CR	SSIA5-9A	07/08/97	L972604-23	L971637-18	41.0	<30	31.0%	Yes	N/A	|11| < 40
CR	SSIA8-4C	07/14/97	L980457-10	L980374-9	108.0	79.0	31.0%	Yes	N/A	|29| < 40
CR	EP-67C	05/28/97	L972383-3	L-971239-3	65.0	46	34.2%	Yes	N/A	|19| < 40
CR	SSIA3-9B	07/15/97	L972383-5	97-1680034	74.0	52.000000	34.9%	Yes	N/A	|22| < 40
CR	SSIA8-4D	07/14/97	L980457-11	L980374-10	207.0	140.0	38.6%	No	No	*OUT* 38.6%
CR	SSIA5-9B	07/08/97	L972604-21	L971637-19	45.0	68	40.7%	Yes	N/A	|23| < 40
CR	SSENT7-B	07/17/97	L972604-31	L971680-85	66.0	100	41.0%	Yes	N/A	|34| < 40
CR	SSIA8-28B	07/18/97	L972604-34	97-1715040	66.0	100.000000	41.0%	Yes	N/A	|34| < 40
CR	SSIA5-3B	07/08/97	L972604-22	L971637-6	46.0	<30	42.1%	Yes	N/A	|16| < 40
CR	SSIA8-6B	07/16/97	L972604-26	97-1680064	61.0	94.000000	42.6%	Yes	N/A	|33| < 40
CR	SSIA1-1D	07/15/97	L980457-2	L980356-2	47.0	<30.0	44.2%	Yes	N/A	|17| < 40
CR	SSIA4-14A2	10/28/97	L972788-4	L972642-32	47.0	<30.0	44.2%	Yes	N/A	|17| < 40
CR	EP-74H	06/02/97	L972604-15	L971239-58	50.0	<30	50.0%	Yes	N/A	|20| < 40
CR	SSIA8-7C	07/16/97	L980457-16	L980374-15	120.0	200.0	50.0%	No	No	*OUT* 50.0%
CR	SSIA3-1A	07/14/97	L972604-24	97-1680016	141.0	240.000000	52.0%	No	No	*OUT* 52.0%
CR	EP-76B	06/03/97	L972604-2	97-1325005	539.0	310.000000	53.9%	No	No	*OUT* 53.9%
CR	SSIA4-7A2	10/28/97	L972788-1	L972642-16	68.0	39.0	54.2%	Yes	N/A	|29| < 40
CR	EP-84C	06/11/97	L972604-6	97-1344015	52.0	29.000000	56.8%	Yes	N/A	|23| < 40
CR	SSIA8-8C	07/16/97	L980457-17	L980374-17	77.0	140.0	58.1%	No	N/A	*OUT* |63| > 40
CR	EP-89A	06/18/97	L972604-10	97-1402031	57.0	<30.000000	62.1%	Yes	N/A	|27| < 40
CR	RIBH-3A	06/30/97	L972604-18	L971545-11	57.0	<30	62.1%	Yes	N/A	|27| < 40
CR	SSIA1-4C	07/15/97	L980457-7	L980356-7	59.0	31.0	62.2%	Yes	N/A	|28| < 40
CR	SSIA8-7A	07/16/97	L972604-27	97-1680065	30.0	59.000000	65.2%	Yes	N/A	|29| < 40
CR	SSIA1-3D	07/15/97	L980457-6	L980356-6	79.0	160.0	67.8%	No	N/A	*OUT* |81| > 40

PARAMETER: CR

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CR	SSIA4-11A	10/28/97	L972788-3	L972642-25	69.0	140.0	67.9%	No	N/A	*OUT* |71| > 40
CR	SSIA1-2D	07/15/97	L980457-4	L980356-4	63.0	130.0	69.4%	No	N/A	*OUT* |67| > 40
CR	SSIA1-1C	07/15/97	L980457-1	L980356-1	65.0	<30.0	73.7%	Yes	N/A	|35| < 40
CR	SSIA1-3C	07/15/97	L980457-5	L980356-5	65.0	<30.0	73.7%	Yes	N/A	|35| < 40
CR	SSENT6-A	07/17/97	L972604-29	L971680-82	31.0	73	80.8%	No	N/A	*OUT* |42| > 40
CR	EP-74K	06/02/97	L972604-17	L971239-61	97.0	41	81.2%	No	N/A	*OUT* |56| > 40
CR	EP-74I	06/02/97	L972604-16	L971239-59	73.0	<30	83.5%	No	N/A	*OUT* |43| > 40
CR	SSENT2-A	07/17/97	L972604-28	L971680-73	74.0	180	83.5%	No	N/A	*OUT* |106| > 40
CR	SSIA4-27A	10/30/97	L972788-7	L972642-61	72.0	180.0	85.7%	No	N/A	*OUT* |108| > 40
CR	SSIA8-10A	07/17/97	L972604-32	L971715-1	12.0	<30	85.7%	Yes	N/A	|18| < 40
CR	SSIA5-18D	07/14/97	L980457-9	L980374-8	76.0	<30.0	86.8%	No	N/A	*OUT* |46| > 40
CR	EP-67A	05/28/97	L972604-1	L-971239-1	78.0	<30	88.9%	No	N/A	*OUT* |48| > 40
CR	EP-70E	05/31/97	L972604-12	L971239-32	46.0	130	95.5%	No	N/A	*OUT* |84| > 40
CR	RIBH-10C	07/01/97	L972604-20	L971545-38	25.0	72	96.9%	No	N/A	*OUT* |47| > 40
CR	EP-88A	06/17/97	L972604-9	97-1402022	67.0	200.000000	99.6%	No	N/A	*OUT* |133| > 40
CR	EP-77A	06/04/97	L972604-4	97-1325010	69.0	210.000000	101.1%	No	N/A	*OUT* |141| > 40
CR	SSIA4-27B	10/30/97	L972788-6	L972642-62	36.0	110.0	101.4%	No	N/A	*OUT* |74| > 40

CHROMIUM (CR) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	78	<30	UDL	48	48
EP-67B	5/28/97	68	77	113.2%	-9	9
EP-67C	5/28/97	65	46	70.8%	19	19
EP-70E	5/31/97	46	130	282.6%	-84	84
EP-74H	6/2/97	50	<30	UDL	20	20
EP-74I	6/2/97	73	<30	UDL	43	43
EP-74K	6/2/97	97	41	42.3%	56	56
EP-76B	6/3/97	539	310	57.5%	229	229
EP-77A	6/4/97	69	210	304.3%	-141	141
EP-77B	6/4/97	73	84	115.1%	-11	11
EP-78A	6/4/97	53	47	88.7%	6	6
EP-71RA	6/11/97	93	91	97.8%	2	2
EP-84C	6/11/97	52	29	55.8%	23	23
EP-84D	6/11/97	54	48	88.9%	6	6
EP-70RJ	6/12/97	41	<30.000000	UDL	11	11
EP-71RE	6/12/97	37	39	105.4%	-2	2
EP-86D	6/13/97	39	<30.000000	UDL	9	9
EP-88A	6/17/97	67	200	298.5%	-133	133
EP-89A	6/18/97	57	<30.000000	UDL	27	27
EP-89B	6/18/97	38	48	126.3%	-10	10
RIBH-1A	6/19/97	201	190	94.5%	11	11
RIBH-3A	6/30/97	57	<30	UDL	27	27
RIBH-5A	6/30/97	37	46	124.3%	-9	9
RIBH-10C	7/1/97	25	72	288.0%	-47	47
SSIA5-3B	7/8/97	46	<30	UDL	16	16
SSIA5-9A	7/8/97	41	<30	UDL	11	11
SSIA5-9B	7/8/97	45	68	151.1%	-23	23
SSIA3-1A	7/14/97	141	240	170.2%	-99	99
SSIA5-18D	7/14/97	76	<30.0	UDL	46	46
SSIA5-19B	7/14/97	41	<30.000000	UDL	11	11
SSIA8-4C	7/14/97	108	79	73.1%	29	29
SSIA8-4D	7/14/97	207	140	67.6%	67	67
SSIA1-1C	7/15/97	65	<30.0	UDL	35	35
SSIA1-1D	7/15/97	47	<30.0	UDL	17	17
SSIA1-2C	7/15/97	66	53	80.3%	13	13
SSIA1-2D	7/15/97	63	130	206.3%	-67	67
SSIA1-3C	7/15/97	65	<30.0	UDL	35	35
SSIA1-3D	7/15/97	79	160	202.5%	-81	81
SSIA1-4C	7/15/97	59	31	52.5%	28	28
SSIA1-4D	7/15/97	57	63	110.5%	-6	6
SSIA3-9B	7/15/97	74	52	70.3%	22	22
SSIA8-5C	7/16/97	126	150	119.0%	-24	24
SSIA8-5D	7/16/97	89	120	134.8%	-31	31
SSIA8-6B	7/16/97	61	94	154.1%	-33	33
SSIA8-6C	7/16/97	111	97	87.4%	14	14
SSIA8-6D	7/16/97	125	100	80.0%	25	25
SSIA8-7A	7/16/97	30	59	196.7%	-29	29
SSIA8-7C	7/16/97	120	200	166.7%	-80	80
SSIA8-8C	7/16/97	77	140	181.8%	-63	63
SSENT2-A	7/17/97	74	180	243.2%	-106	106
SSENT6-A	7/17/97	31	73	235.5%	-42	42
SSENT7-A	7/17/97	40	<30	UDL	10	10
SSENT7-B	7/17/97	66	100	151.5%	-34	34
SSIA8-10A	7/17/97	12	<30	UDL	-18	18
SSIA8-20B	7/18/97	176	230	130.7%	-54	54
SSIA8-28B	7/18/97	66	100	151.5%	-34	34
SSIA8-30A	7/18/97	90	70	77.8%	20	20
SSIA4-11A	10/28/97	69	140	202.9%	-71	71
SSIA4-14A2	10/28/97	47	<30.0	UDL	17	17
SSIA4-7A2	10/28/97	68	39	57.4%	29	29
SSIA4-7B	10/28/97	184	210	114.1%	-26	26
SSIA4-22B	10/30/97	67	53	79.1%	14	14
SSIA4-27A	10/30/97	72	180	250.0%	-108	108
SSIA4-27B	10/30/97	36	110	305.6%	-74	74

Regression Statistics	
Multiple R	0.672151037
R Square	0.451787017
Adjusted R Square	0.442944872
Standard Error	50.05970684
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	128042.0809	128042.0809	51.09473131	1.19143E-09
Residual	62	155370.4034	2505.974249		
Total	63	283412.4844			

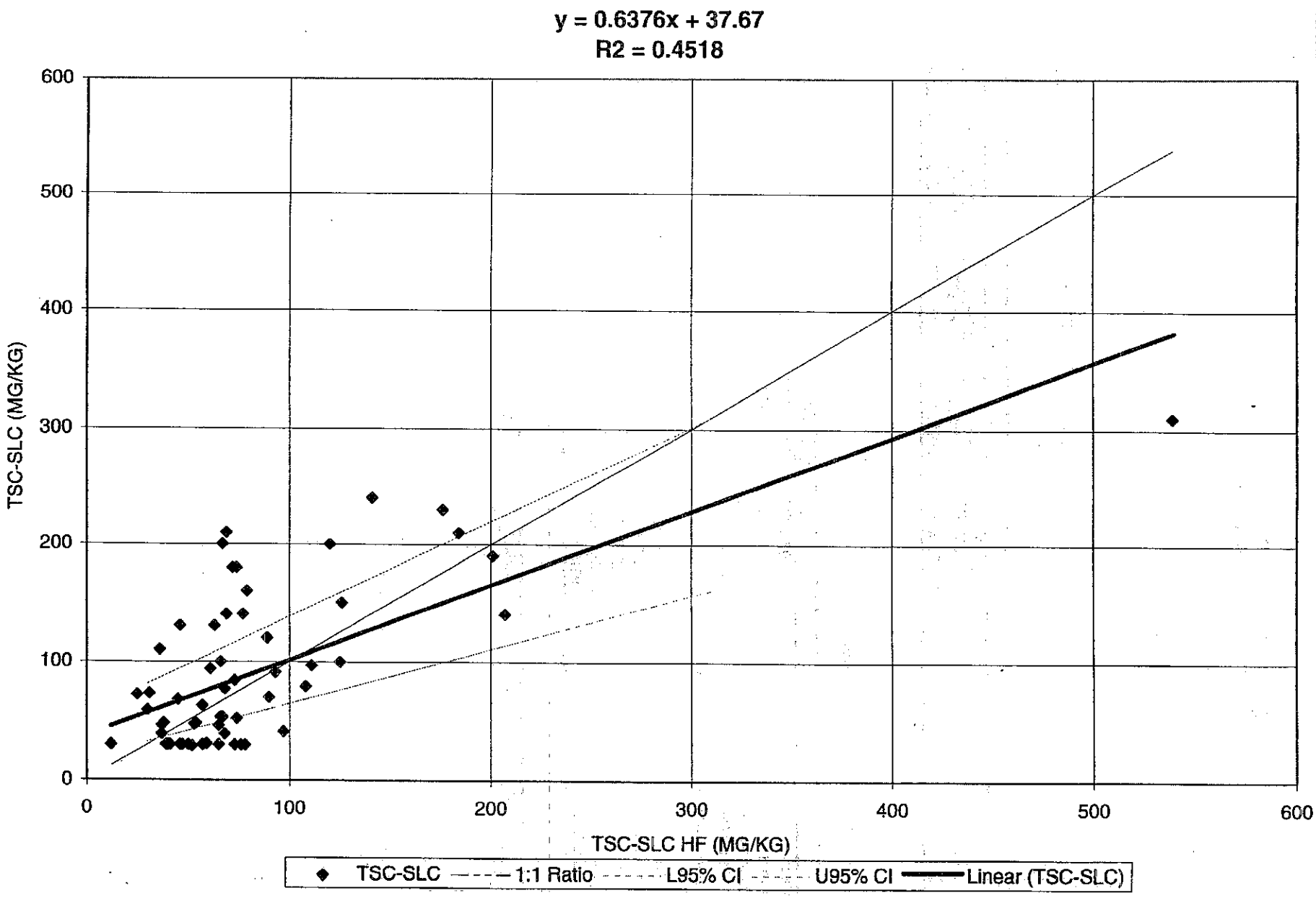
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	37.66959334	9.496878287	3.966523757	0.000191696	18.68562511	56.65356158
TSC-SLC HF	0.637562627	0.089193826	7.14805787	1.19143E-09	0.459266907	0.815858347

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	80.09375	88.734375
Variance	4999.959325	4498.610863
Observations	64	64
Pearson Correlation	0.672151037	
Hypothesized Mean Difference	0	
df	63	
t Stat	-1.236942311	
P(T<=t) one-tail	0.110349797	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.220699595	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	80.09375	88.734375
Standard Error	8.838798813	8.383960564
Median	66	65.5
Mode	65	30
Standard Deviation	70.71039051	67.07168451
Sample Variance	4999.959325	4498.610863
Kurtosis	28.37055315	0.850292393
Skewness	4.692992028	1.216156686
Range	527	281
Minimum	12	29
Maximum	539	310
Sum	5126	5679
Count	64	64
Confidence Level(95.000%)	17.32370169	16.43223642

CHROMIUM (CR) REGRESSION CHART



COPPER

PARAMETER: CU

Precision Results: Total Number of Pairs: 51; Total Number of Outliers: 0; Number of Valid Pairs (k): 51; Dixon Q's Test Value: 0.401; 90% t value: 1.645; 95% t value: 1.960; Completeness: 100.0%; Standard Deviation: 0.14; 10% Uncertainty: 5.39; 5% Uncertainty: 6.42; Mean Percentage RPD: 29.6%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CU	EP-71RE	06/12/97	L972604-14	97-1344047	25.0	25.000000	0.0%	Yes	N/A	|0| < 20
CU	EP-74H	06/02/97	L972604-15	L971239-58	20.0	<20	0.0%	Yes	N/A	|0| < 20
CU	RIBH-5A	06/30/97	L972604-19	L971545-18	311.0	310	0.3%	Yes	No	0.3%
CU	RIBH-3A	06/30/97	L972604-18	L971545-11	114.0	120	5.1%	Yes	No	5.1%
CU	SSIA8-6C	07/16/97	L980457-14	L980374-13	490.0	530.0	7.8%	Yes	No	7.8%
CU	EP-67C	05/28/97	L972383-3	L-971239-3	228.0	210	8.2%	Yes	No	8.2%
CU	EP-76B	06/03/97	L972604-2	97-1325005	5242.0	4800.00000	8.8%	Yes	No	8.8%
CU	RIBH-1A	06/19/97	L972383-4	L971545-1	3660.0	4000	8.9%	Yes	No	8.9%
CU	SSIA8-30A	07/18/97	L972604-35	97-1715043	208400.0	190000	9.2%	Yes	No	9.2%
CU	SSIA4-7A2	10/28/97	L972788-1	L972642-16	73460.0	81000.0	9.8%	Yes	No	9.8%
CU	EP-74K	06/02/97	L972604-17	L971239-61	18.0	<20	10.5%	Yes	N/A	|2| < 20
CU	EP-84D	06/11/97	L972604-7	97-1344016	38.0	33.000000	14.1%	Yes	N/A	|5| < 20
CU	SSIA8-10A	07/17/97	L972604-32	L971715-1	138.0	160	14.8%	Yes	No	14.8%
CU	EP-70E	05/31/97	L972604-12	L971239-32	23.0	27	16.0%	Yes	N/A	|4| < 20
CU	SSIA8-6D	07/16/97	L980457-15	L980374-14	2195.0	2600.0	16.9%	Yes	No	16.9%
CU	SSIA3-9B	07/15/97	L972383-5	97-1680034	2253.0	2700.00000	18.0%	Yes	No	18.0%
CU	EP-70RJ	06/12/97	L972604-13	97-1344034	24.0	<20.000000	18.2%	Yes	N/A	|4| < 20
CU	SSIA8-20B	07/18/97	L972604-33	97-1715024	8231.0	10000	19.4%	Yes	No	19.4%
CU	SSIA8-8C	07/16/97	L980457-17	L980374-17	279.0	340.0	19.7%	Yes	No	19.7%
CU	EP-67B	05/28/97	L972383-2	L-971239-2	1631.0	2000	20.3%	Yes	No	20.3%
CU	EP-78A	06/04/97	L972604-8	97-1325018	570.0	700.000000	20.5%	Yes	No	20.5%
CU	EP-84C	06/11/97	L972604-6	97-1344015	58.0	47.000000	21.0%	Yes	N/A	|11| < 20
CU	EP-89A	06/18/97	L972604-10	97-1402031	3969.0	4900.00000	21.0%	Yes	No	21.0%
CU	SSIA4-22B	10/30/97	L972788-5	L972642-51	891.0	1100.0	21.0%	Yes	No	21.0%
CU	SSIA5-3B	07/08/97	L972604-22	L971637-6	963.0	1200	21.9%	Yes	No	21.9%
CU	EP-74I	06/02/97	L972604-16	L971239-59	16.0	<20	22.2%	Yes	N/A	|4| < 20
CU	RIBH-10C	07/01/97	L972604-20	L971545-38	16.0	<20	22.2%	Yes	N/A	|4| < 20
CU	SSIA5-19B	07/14/97	L972604-25	97-1680051	290.0	370.000000	24.2%	Yes	No	24.2%
CU	SSIA8-7C	07/16/97	L980457-16	L980374-15	294.0	380.0	25.5%	Yes	No	25.5%
CU	SSIA5-9A	07/08/97	L972604-23	L971637-18	2125.0	2800	27.4%	Yes	No	27.4%
CU	EP-89B	06/18/97	L972604-11	97-1402032	33.0	25.000000	27.6%	Yes	N/A	|8| < 20
CU	SSIA8-7A	07/16/97	L972604-27	97-1680065	734.0	980.000000	28.7%	Yes	No	28.7%
CU	SSIA5-18D	07/14/97	L980457-9	L980374-8	27.0	<20.0	29.8%	Yes	N/A	|7| < 20
CU	SSIA8-5C	07/16/97	L980457-12	L980374-11	813.0	1100.0	30.0%	Yes	No	30.0%
CU	SSIA8-6B	07/16/97	L972604-26	97-1680064	381.0	520.000000	30.9%	Yes	No	30.9%
CU	EP-88A	06/17/97	L972604-9	97-1402022	4069.0	5600.00000	31.7%	Yes	No	31.7%
CU	EP-77B	06/04/97	L972604-5	97-1325011	254.0	350.000000	31.8%	Yes	No	31.8%
CU	SSIA1-1D	07/15/97	L980457-2	L980356-2	17350.0	24000.0	32.2%	Yes	No	32.2%
CU	SSENT6-A	07/17/97	L972604-29	L971680-82	3952.0	5500	32.8%	Yes	No	32.8%
CU	SSIA1-4D	07/15/97	L980457-8	L980356-8	2209.0	3100.0	33.6%	Yes	No	33.6%
CU	SSENT2-A	07/17/97	L972604-28	L971680-73	5950.0	8400	34.1%	Yes	No	34.1%
CU	SSIA4-14A2	10/28/97	L972788-4	L972642-32	6875.0	9800.0	35.1%	No	No	*OUT* 35.1%
CU	EP-71RA	06/11/97	L972383-1	97-1344001	21590.0	31000.0000	35.8%	No	No	*OUT* 35.8%
CU	SSENT7-A	07/17/97	L972604-30	L971680-84	5781.0	8300	35.8%	No	No	*OUT* 35.8%
CU	SSIA8-5D	07/16/97	L980457-13	L980374-12	118.0	170.0	36.1%	No	No	*OUT* 36.1%
CU	EP-67A	05/28/97	L972604-1	L-971239-1	17290.0	25000	36.5%	No	No	*OUT* 36.5%
CU	SSI[illegible]	07/15/97	L980457-1	L980356-1	8283.0	[illegible]0.0	36.7%	No	No	*OUT* 36.7%

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: CU

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
CU	EP-77A	06/04/97	L972604-4	97-1325010	1685.0	2500.00000	38.9%	No	No	*OUT* 38.9%
CU	SSIA8-4D	07/14/97	L980457-11	L980374-10	8759.0	13000.0	39.0%	No	No	*OUT* 39.0%
CU	SSIA1-2C	07/15/97	L980457-3	L980356-3	16730.0	25000.0	39.6%	No	No	*OUT* 39.6%
CU	SSIA8-4C	07/14/97	L980457-10	L980374-9	26120.0	39000.0	39.6%	No	No	*OUT* 39.6%
CU	SSIA4-27A	10/30/97	L972788-7	L972642-61	5080.0	7600.0	39.7%	No	No	*OUT* 39.7%
CU	SSIA4-11A	10/28/97	L972788-3	L972642-25	6483.0	9700.0	39.8%	No	No	*OUT* 39.8%
CU	SSIA1-4C	07/15/97	L980457-7	L980356-7	4708.0	7200.0	41.9%	No	No	*OUT* 41.9%
CU	SSIA1-3D	07/15/97	L980457-6	L980356-6	8475.0	13000.0	42.1%	No	No	*OUT* 42.1%
CU	SSIA5-9B	07/08/97	L972604-21	L971637-19	168.0	260	43.0%	No	No	*OUT* 43.0%
CU	SSIA8-28B	07/18/97	L972604-34	97-1715040	7703.0	12000	43.6%	No	No	*OUT* 43.6%
CU	SSIA1-3C	07/15/97	L980457-5	L980356-5	13440.0	21000.0	43.9%	No	No	*OUT* 43.9%
CU	SSENT7-B	07/17/97	L972604-31	L971680-85	54.0	33	48.3%	No	N/A	*OUT* |21| > 20
CU	SSIA3-1A	07/14/97	L972604-24	97-1680016	16460.0	27000.0000	48.5%	No	No	*OUT* 48.5%
CU	EP-86D	06/13/97	L972604-3	97-1402008	25.0	42.000000	50.7%	Yes	N/A	|17| < 20
CU	SSIA4-7B	10/28/97	L972788-2	L972642-17	40210.0	68000.0	51.4%	No	No	*OUT* 51.4%
CU	SSIA1-2D	07/15/97	L980457-4	L980356-4	13710.0	24000.0	54.6%	No	No	*OUT* 54.6%
CU	SSIA4-27B	10/30/97	L972788-6	L972642-62	200.0	95.0	71.2%	No	No	*OUT* 71.2%

COPPER (CU) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	17290	25000	144.6%	-7710	7710
EP-67B	5/28/97	1631	2000	122.6%	-369	369
EP-67C	5/28/97	228	210	92.1%	18	18
EP-70E	5/31/97	23	27	117.4%	-4	4
EP-74H	6/2/97	20	<20	UDL	0	0
EP-74I	6/2/97	16	<20	UDL	-4	4
EP-74K	6/2/97	18	<20	UDL	-2	2
EP-76B	6/3/97	5242	4800	91.6%	442	442
EP-77A	6/4/97	1685	2500	148.4%	-815	815
EP-77B	6/4/97	254	350	137.8%	-96	96
EP-78A	6/4/97	570	700	122.8%	-130	130
EP-71RA	6/11/97	21590	31000	143.6%	-9410	9410
EP-84C	6/11/97	58	47	81.0%	11	11
EP-84D	6/11/97	38	33	86.8%	5	5
EP-70RJ	6/12/97	24	<20.000000	UDL	4	4
EP-71RE	6/12/97	25	25	100.0%	0	0
EP-86D	6/13/97	25	42	168.0%	-17	17
EP-88A	6/17/97	4069	5600	137.6%	-1531	1531
EP-89A	6/18/97	3969	4900	123.5%	-931	931
EP-89B	6/18/97	33	25	75.8%	8	8
RIBH-1A	6/19/97	3660	4000	109.3%	-340	340
RIBH-3A	6/30/97	114	120	105.3%	-6	6
RIBH-5A	6/30/97	311	310	99.7%	1	1
RIBH-10C	7/1/97	16	<20	UDL	-4	4
SSIA5-3B	7/8/97	963	1200	124.6%	-237	237
SSIA5-9A	7/8/97	2125	2800	131.8%	-675	675
SSIA5-9B	7/8/97	168	260	154.8%	-92	92
SSIA3-1A	7/14/97	16460	27000	164.0%	-10540	10540
SSIA5-18D	7/14/97	27	<20.0	UDL	7	7
SSIA5-19B	7/14/97	290	370	127.6%	-80	80
SSIA8-4C	7/14/97	26120	39000	149.3%	-12880	12880
SSIA8-4D	7/14/97	8759	13000	148.4%	-4241	4241
SSIA1-1C	7/15/97	8283	12000	144.9%	-3717	3717
SSIA1-1D	7/15/97	17350	24000	138.3%	-6650	6650
SSIA1-2C	7/15/97	16730	25000	149.4%	-8270	8270
SSIA1-2D	7/15/97	13710	24000	175.1%	-10290	10290
SSIA1-3C	7/15/97	13440	21000	156.3%	-7560	7560
SSIA1-3D	7/15/97	8475	13000	153.4%	-4525	4525
SSIA1-4C	7/15/97	4708	7200	152.9%	-2492	2492
SSIA1-4D	7/15/97	2209	3100	140.3%	-891	891
SSIA3-9B	7/15/97	2253	2700	119.8%	-447	447
SSIA8-5C	7/16/97	813	1100	135.3%	-287	287
SSIA8-5D	7/16/97	118	170	144.1%	-52	52
SSIA8-6B	7/16/97	381	520	136.5%	-139	139
SSIA8-6C	7/16/97	490	530	108.2%	-40	40
SSIA8-6D	7/16/97	2195	2600	118.5%	-405	405
SSIA8-7A	7/16/97	734	980	133.5%	-246	246
SSIA8-7C	7/16/97	294	380	129.3%	-86	86
SSIA8-8C	7/16/97	279	340	121.9%	-61	61
SSENT2-A	7/17/97	5950	8400	141.2%	-2450	2450
SSENT6-A	7/17/97	3952	5500	139.2%	-1548	1548
SSENT7-A	7/17/97	5781	8300	143.6%	-2519	2519
SSENT7-B	7/17/97	54	33	61.1%	21	21
SSIA8-10A	7/17/97	138	160	115.9%	-22	22
SSIA8-20B	7/18/97	8231	10000	121.5%	-1769	1769
SSIA8-28B	7/18/97	7703	12000	155.8%	-4297	4297
SSIA8-30A	7/18/97	208400	190000	91.2%	18400	18400
SSIA4-11A	10/28/97	6483	9700	149.6%	-3217	3217
SSIA4-14A2	10/28/97	6875	9800	142.5%	-2925	2925
SSIA4-7A2	10/28/97	73460	81000	110.3%	-7540	7540
SSIA4-7B	10/28/97	40210	68000	169.1%	-27790	27790
SSIA4-22B	10/30/97	891	1100	123.5%	-209	209
SSIA4-27A	10/30/97	5080	7600	149.6%	-2520	2520
SSIA4-27B	10/30/97	200	95	47.5%	105	105

Regression Statistics	
Multiple R	0.982170187
R Square	0.964658277
Adjusted R Square	0.964088249
Standard Error	5157.97663
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	45023184409	45023184409	1692.300444	1.01971E-46
Residual	62	1649492821	26604722.91		
Total	63	46672677230			

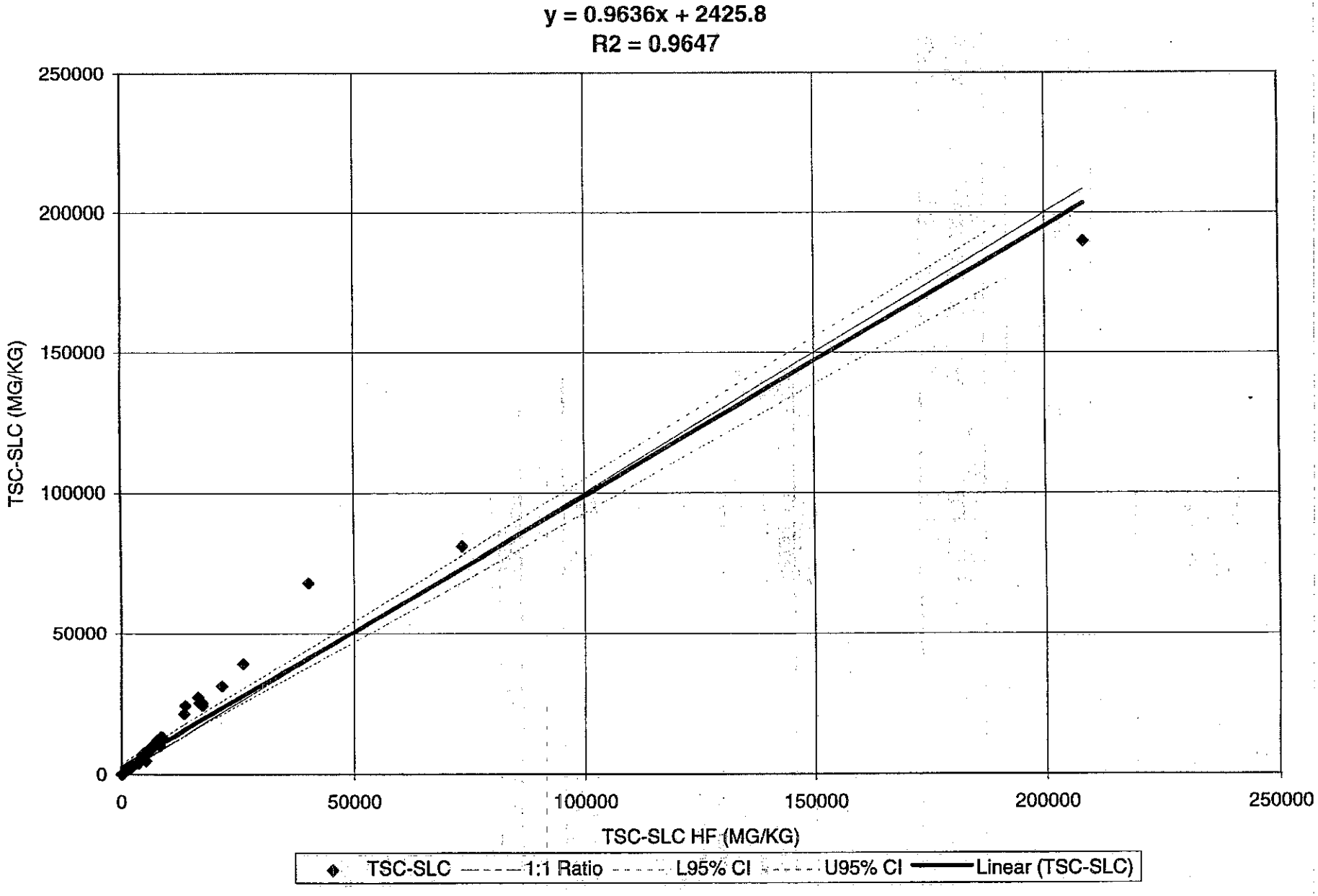
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2425.805772	678.9849427	3.572694503	0.000690409	1068.53571	3783.075835
TSC-SLC HF	0.96356215	0.023422918	41.13757947	1.01971E-46	0.916740456	1.010383844

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	9088.921875	11183.54688
Variance	769726068.6	740836146.5
Observations	64	64
Pearson Correlation	0.982170187	
Hypothesized Mean Difference	0	
df	63	
t Stat	-3.212747996	
P(T<=t) one-tail	0.001036402	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.002072804	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	9088.921875	11183.54688
Standard Error	3467.992189	3402.28817
Median	1658	2250
Mode	16	20
Standard Deviation	27743.93751	27218.30536
Sample Variance	769726068.6	740836146.5
Kurtosis	43.89853003	30.50946093
Skewness	6.290799644	5.070350634
Range	208384	189980
Minimum	16	20
Maximum	208400	190000
Sum	581691	715747
Count	64	64
Confidence Level(95.000%)	6797.129724	6668.352403

COPPER (CU) REGRESSION CHART



IRON

PARAMETER: FE

Precision Results: Total Number of Pairs: 64; Total Number of Outliers: 0; Number of Valid Pairs (k): 64; Dixon Q's Test Value: 0.401; 90% t value: 1.645; 95% t value: 1.960; Completeness: 100.0%; Standard Deviation: 0.11; 10% Uncertainty: 2.97; 5% Uncertainty: 3.54; Mean Percentage RPD: 17.3%; Validation Detection Limit (VDL): 20.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
FE	SSIA1-3D	07/15/97	L980457-6	L980356-6	64050.0	64000.0	0.1%	Yes	No	0.1%
FE	SSIA1-2C	07/15/97	L980457-3	L980356-3	43760.0	44000.0	0.5%	Yes	No	0.5%
FE	RIBH-5A	06/30/97	L972604-19	L971545-18	26810.0	27000	0.7%	Yes	No	0.7%
FE	EP-77A	06/04/97	L972604-4	97-1325010	101300.0	100000	1.3%	Yes	No	1.3%
FE	SSENT7-B	07/17/97	L972604-31	L971680-85	18420.0	18000	2.3%	Yes	No	2.3%
FE	SSIA1-3C	07/15/97	L980457-5	L980356-5	85380.0	83000.0	2.8%	Yes	No	2.8%
FE	EP-89A	06/18/97	L972604-10	97-1402031	26210.0	27000	3.0%	Yes	No	3.0%
FE	EP-78A	06/04/97	L972604-8	97-1325018	30960.0	32000	3.3%	Yes	No	3.3%
FE	SSIA8-6B	07/16/97	L972604-26	97-1680064	18150.0	19000	4.6%	Yes	No	4.6%
FE	SSIA8-4C	07/14/97	L980457-10	L980374-9	53290.0	56000.0	5.0%	Yes	No	5.0%
FE	SSIA3-9B	07/15/97	L972383-5	97-1680034	21800.0	23000	5.4%	Yes	No	5.4%
FE	SSIA4-7A2	10/28/97	L972788-1	L972642-16	89430.0	84000.0	6.3%	Yes	No	6.3%
FE	SSENT2-A	07/17/97	L972604-28	L971680-73	31850.0	34000	6.5%	Yes	No	6.5%
FE	SSIA1-4C	07/15/97	L980457-7	L980356-7	33300.0	36000.0	7.8%	Yes	No	7.8%
FE	EP-84D	06/11/97	L972604-7	97-1344016	20170.0	22000	8.7%	Yes	No	8.7%
FE	SSIA1-1D	07/15/97	L980457-2	L980356-2	23030.0	21000.0	9.2%	Yes	No	9.2%
FE	EP-71RA	06/11/97	L972383-1	97-1344001	49800.0	45000	10.1%	Yes	No	10.1%
FE	SSIA8-7C	07/16/97	L980457-16	L980374-15	13530.0	15000.0	10.3%	Yes	No	10.3%
FE	SSIA8-6C	07/16/97	L980457-14	L980374-13	18030.0	20000.0	10.4%	Yes	No	10.4%
FE	RIBH-1A	06/19/97	L972383-4	L971545-1	144500.0	130000	10.6%	Yes	No	10.6%
FE	SSIA4-14A2	10/28/97	L972788-4	L972642-32	34690.0	39000.0	11.7%	Yes	No	11.7%
FE	SSIA4-27A	10/30/97	L972788-7	L972642-61	27940.0	32000.0	13.5%	Yes	No	13.5%
FE	SSIA8-6D	07/16/97	L980457-15	L980374-14	19220.0	22000.0	13.5%	Yes	No	13.5%
FE	EP-88A	06/17/97	L972604-9	97-1402022	18280.0	21000	13.8%	Yes	No	13.8%
FE	EP-84C	06/11/97	L972604-6	97-1344015	20860.0	24000	14.0%	Yes	No	14.0%
FE	SSIA5-3B	07/08/97	L972604-22	L971637-6	16520.0	19000	14.0%	Yes	No	14.0%
FE	RIBH-3A	06/30/97	L972604-18	L971545-11	28560.0	33000	14.4%	Yes	No	14.4%
FE	SSIA8-28B	07/18/97	L972604-34	97-1715040	42330.0	49000	14.6%	Yes	No	14.6%
FE	SSIA8-4D	07/14/97	L980457-11	L980374-10	37240.0	44000.0	16.6%	Yes	No	16.6%
FE	SSIA5-9A	07/08/97	L972604-23	L971637-18	19350.0	23000	17.2%	Yes	No	17.2%
FE	EP-89B	06/18/97	L972604-11	97-1402032	19300.0	23000	17.5%	Yes	No	17.5%
FE	EP-77B	06/04/97	L972604-5	97-1325011	32640.0	39000	17.8%	Yes	No	17.8%
FE	SSIA5-9B	07/08/97	L972604-21	L971637-19	14220.0	17000	17.8%	Yes	No	17.8%
FE	EP-74K	06/02/97	L972604-17	L971239-61	24150.0	29000	18.3%	Yes	No	18.3%
FE	SSENT7-A	07/17/97	L972604-30	L971680-84	23110.0	28000	19.1%	Yes	No	19.1%
FE	SSIA4-11A	10/28/97	L972788-3	L972642-25	29660.0	36000.0	19.3%	Yes	No	19.3%
FE	SSIA4-27B	10/30/97	L972788-6	L972642-62	9873.0	12000.0	19.4%	Yes	No	19.4%
FE	SSIA8-8C	07/16/97	L980457-17	L980374-17	14770.0	18000.0	19.7%	Yes	No	19.7%
FE	SSENT6-A	07/17/97	L972604-29	L971680-82	21190.0	26000	20.4%	Yes	No	20.4%
FE	SSIA3-1A	07/14/97	L972604-24	97-1680016	53560.0	66000	20.8%	Yes	No	20.8%
FE	SSIA1-4D	07/15/97	L980457-8	L980356-8	16860.0	21000.0	21.9%	Yes	No	21.9%
FE	EP-67A	05/28/97	L972604-1	L-971239-1	24040.0	30000	22.1%	Yes	No	22.1%
FE	SSIA8-20B	07/18/97	L972604-33	97-1715024	149800.0	120000	22.1%	Yes	No	22.1%
FE	EP-71RE	06/12/97	L972604-14	97-1344047	15160.0	19000	22.5%	Yes	No	22.5%
FE	EP-86D	06/13/97	L972604-3	97-1402008	17540.0	22000	22.6%	Yes	No	22.6%
FE	RIBH-10C	07/01/97	L972604-20	L971545-38	13550.0	17000	22.6%	Yes	No	22.6%
FE	SS[illegible]	07/14/97	L980457-9	L980374-8	14290.0	[illegible]0.0	23.0%	Yes	No	23.0%

PARAMETER: FE

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
FE	SSIA4-22B	10/30/97	L972788-5	L972642-51	18240.0	23000.0	23.1%	Yes	No	23.1%
FE	SSIA1-1C	07/15/97	L980457-1	L980356-1	47990.0	38000.0	23.2%	Yes	No	23.2%
FE	EP-74I	06/02/97	L972604-16	L971239-59	18190.0	23000	23.4%	Yes	No	23.4%
FE	EP-67C	05/28/97	L972383-3	L-971239-3	19570.0	25000	24.4%	Yes	No	24.4%
FE	SSIA4-7B	10/28/97	L972788-2	L972642-17	31050.0	40000.0	25.2%	Yes	No	25.2%
FE	EP-74H	06/02/97	L972604-15	L971239-58	17830.0	23000	25.3%	Yes	No	25.3%
FE	EP-67B	05/28/97	L972383-2	L-971239-2	20150.0	26000	25.4%	Yes	No	25.4%
FE	SSIA1-2D	07/15/97	L980457-4	L980356-4	36320.0	47000.0	25.6%	Yes	No	25.6%
FE	EP-70RJ	06/12/97	L972604-13	97-1344034	13120.0	17000	25.8%	Yes	No	25.8%
FE	SSIA8-5D	07/16/97	L980457-13	L980374-12	12140.0	16000.0	27.4%	Yes	No	27.4%
FE	EP-70E	05/31/97	L972604-12	L971239-32	18870.0	25000	27.9%	Yes	No	27.9%
FE	SSIA8-5C	07/16/97	L980457-12	L980374-11	14090.0	19000.0	29.7%	Yes	No	29.7%
FE	SSIA5-19B	07/14/97	L972604-25	97-1680051	10690.0	15000	33.6%	Yes	No	33.6%
FE	SSIA8-7A	07/16/97	L972604-27	97-1680065	14090.0	20000	34.7%	Yes	No	34.7%
FE	SSIA8-10A	07/17/97	L972604-32	L971715-1	6806.0	10000	38.0%	No	No	*OUT* 38.0%
FE	EP-76B	06/03/97	L972604-2	97-1325005	229800.0	150000	42.0%	No	No	*OUT* 42.0%
FE	SSIA8-30A	07/18/97	L972604-35	97-1715043	135200.0	78000	53.7%	No	No	*OUT* 53.7%

IRON (FE) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	24040	30000	124.8%	-5960	5960
EP-67B	5/28/97	20150	26000	129.0%	-5850	5850
EP-67C	5/28/97	19570	25000	127.7%	-5430	5430
EP-70E	5/31/97	18870	25000	132.5%	-6130	6130
EP-74H	6/2/97	17830	23000	129.0%	-5170	5170
EP-74I	6/2/97	18190	23000	126.4%	-4810	4810
EP-74K	6/2/97	24150	29000	120.1%	-4850	4850
EP-76B	6/3/97	229800	150000	65.3%	79800	79800
EP-77A	6/4/97	101300	100000	98.7%	1300	1300
EP-77B	6/4/97	32640	39000	119.5%	-6360	6360
EP-78A	6/4/97	30960	32000	103.4%	-1040	1040
EP-71RA	6/11/97	49800	45000	90.4%	4800	4800
EP-84C	6/11/97	20860	24000	115.1%	-3140	3140
EP-84D	6/11/97	20170	22000	109.1%	-1830	1830
EP-70RJ	6/12/97	13120	17000	129.6%	-3880	3880
EP-71RE	6/12/97	15160	19000	125.3%	-3840	3840
EP-86D	6/13/97	17540	22000	125.4%	-4460	4460
EP-88A	6/17/97	18280	21000	114.9%	-2720	2720
EP-89A	6/18/97	26210	27000	103.0%	-790	790
EP-89B	6/18/97	19300	23000	119.2%	-3700	3700
RIBH-1A	6/19/97	144500	130000	90.0%	14500	14500
RIBH-3A	6/30/97	28560	33000	115.5%	-4440	4440
RIBH-5A	6/30/97	26810	27000	100.7%	-190	190
RIBH-10C	7/1/97	13550	17000	125.5%	-3450	3450
SSIA5-3B	7/8/97	16520	19000	115.0%	-2480	2480
SSIA5-9A	7/8/97	19350	23000	118.9%	-3650	3650
SSIA5-9B	7/8/97	14220	17000	119.5%	-2780	2780
SSIA3-1A	7/14/97	53560	66000	123.2%	-12440	12440
SSIA5-18D	7/14/97	14290	18000	126.0%	-3710	3710
SSIA5-19B	7/14/97	10690	15000	140.3%	-4310	4310
SSIA8-4C	7/14/97	53290	56000	105.1%	-2710	2710
SSIA8-4D	7/14/97	37240	44000	118.2%	-6760	6760
SSIA1-1C	7/15/97	47990	38000	79.2%	9990	9990
SSIA1-1D	7/15/97	23030	21000	91.2%	2030	2030
SSIA1-2C	7/15/97	43760	44000	100.5%	-240	240
SSIA1-2D	7/15/97	36320	47000	129.4%	-10680	10680
SSIA1-3C	7/15/97	85380	83000	97.2%	2380	2380
SSIA1-3D	7/15/97	64050	64000	99.9%	50	50
SSIA1-4C	7/15/97	33300	36000	108.1%	-2700	2700
SSIA1-4D	7/15/97	16860	21000	124.6%	-4140	4140
SSIA3-9B	7/15/97	21800	23000	105.5%	-1200	1200
SSIA8-5C	7/16/97	14090	19000	134.8%	-4910	4910
SSIA8-5D	7/16/97	12140	16000	131.8%	-3860	3860
SSIA8-6B	7/16/97	18150	19000	104.7%	-850	850
SSIA8-6C	7/16/97	18030	20000	110.9%	-1970	1970
SSIA8-6D	7/16/97	19220	22000	114.5%	-2780	2780
SSIA8-7A	7/16/97	14090	20000	141.9%	-5910	5910
SSIA8-7C	7/16/97	13530	15000	110.9%	-1470	1470
SSIA8-8C	7/16/97	14770	18000	121.9%	-3230	3230
SSENT2-A	7/17/97	31850	34000	106.8%	-2150	2150
SSENT6-A	7/17/97	21190	26000	122.7%	-4810	4810
SSENT7-A	7/17/97	23110	28000	121.2%	-4890	4890
SSENT7-B	7/17/97	18420	18000	97.7%	420	420
SSIA8-10A	7/17/97	6806	10000	146.9%	-3194	3194
SSIA8-20B	7/18/97	149800	120000	80.1%	29800	29800
SSIA8-28B	7/18/97	42330	49000	115.8%	-6670	6670
SSIA8-30A	7/18/97	135200	78000	57.7%	57200	57200
SSIA4-11A	10/28/97	29660	36000	121.4%	-6340	6340
SSIA4-14A2	10/28/97	34690	39000	112.4%	-4310	4310
SSIA4-7A2	10/28/97	89430	84000	93.9%	5430	5430
SSIA4-7B	10/28/97	31050	40000	128.8%	-8950	8950
SSIA4-22B	10/30/97	18240	23000	126.1%	-4760	4760
SSIA4-27A	10/30/97	27940	32000	114.5%	-4060	4060
SSIA4-27B	10/30/97	9873	12000	121.5%	-2127	2127

Regression Statistics	
Multiple R	0.966556136
R Square	0.934230764
Adjusted R Square	0.93316997
Standard Error	7379.453267
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	47959145008	47959145008	880.6899868	2.3823E-38
Residual	62	3376292492	54456330.52		
Total	63	51335437500			

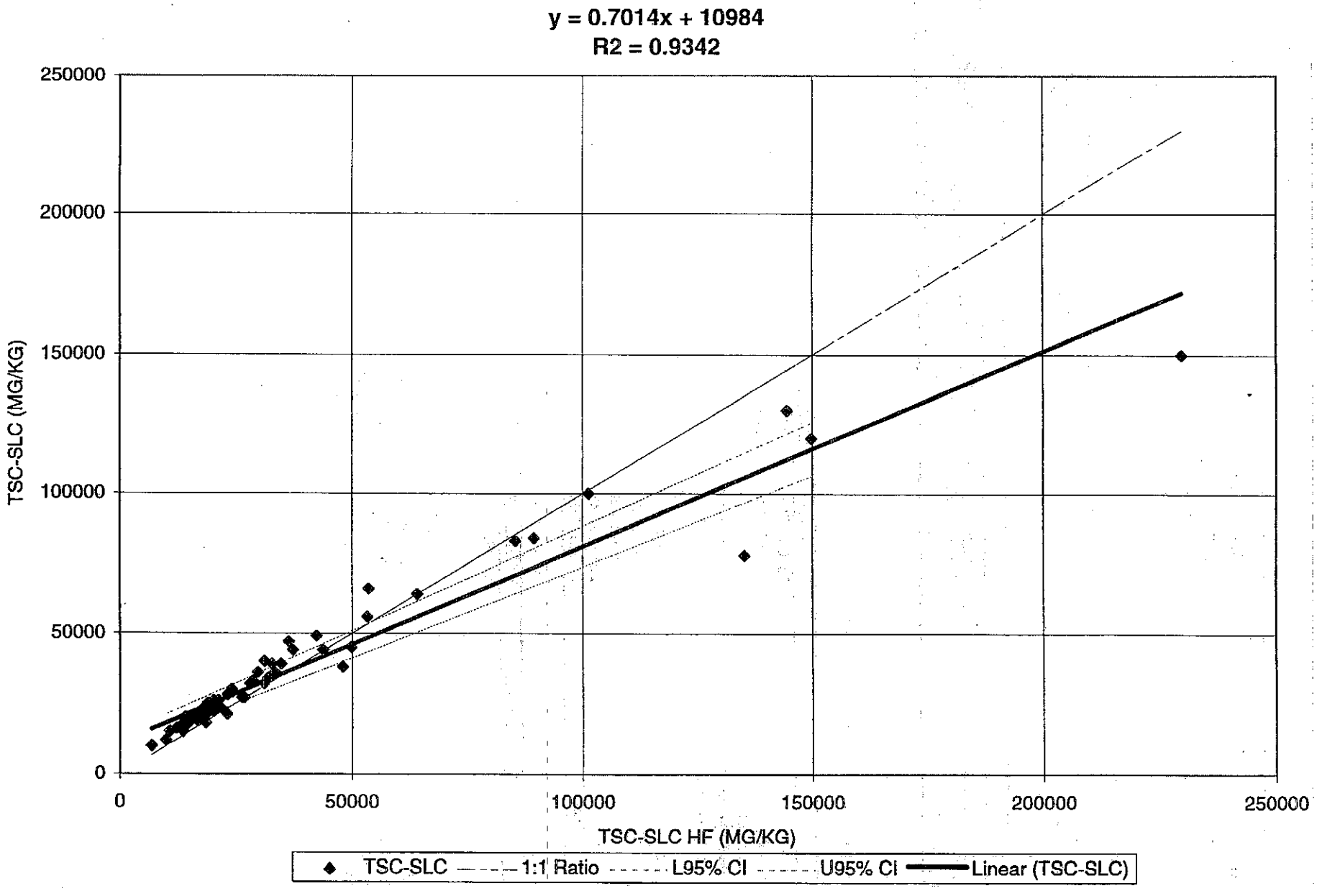
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	10984.32036	1263.15964	8.695908267	2.47597E-12	8459.303003	13509.33771
TSC-SLC HF	0.701442339	0.023636352	29.67642139	2.3823E-38	0.654193997	0.748690681

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	36509.67188	36593.75
Variance	1547201685	814848214.3
Observations	64	64
Pearson Correlation	0.966556136	
Hypothesized Mean Difference	0	
df	63	
t Stat	-0.048605305	
P(T<=t) one-tail	0.480693803	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.961387606	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	36509.67188	36593.75
Standard Error	4916.810586	3568.193289
Median	21495	25500
Mode	14090	23000
Standard Deviation	39334.48468	28545.54631
Sample Variance	1547201685	814848214.3
Kurtosis	10.19806586	5.362428901
Skewness	3.00634412	2.297769234
Range	222994	140000
Minimum	6806	10000
Maximum	229800	150000
Sum	2336619	2342000
Count	64	64
Confidence Level(95.000%)	9636.757397	6993.519981

IRON (FE) REGRESSION CHART



LEAD

PARAMETER: PB

Precision Results: Total Number of Pairs: 48; Total Number of Outliers: 0; Number of Valid Pairs (k): 48; Dixon Q's Test Value: 0.401; 90% t value: 1.645; 95% t value: 1.960; Completeness: 100.0%; Standard Deviation: 0.12; 10% Uncertainty: 4.48; 5% Uncertainty: 5.34; Mean Percentage RPD: 23.6%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
PB	SSIA4-27B	10/30/97	L972788-6	L972642-62	83.0	82.0	1.2%	Yes	No	1.2%
PB	RIBH-3A	06/30/97	L972604-18	L971545-11	776.0	800	3.0%	Yes	No	3.0%
PB	EP-86D	06/13/97	L972604-3	97-1402008	50.0	48.000000	4.1%	Yes	N/A	|2| < 20
PB	RIBH-1A	06/19/97	L972383-4	L971545-1	10530.0	11000	4.4%	Yes	No	4.4%
PB	RIBH-10C	07/01/97	L972604-20	L971545-38	20.0	21	4.9%	Yes	N/A	|1| < 20
PB	SSIA8-7A	07/16/97	L972604-27	97-1680065	553.0	520.000000	6.2%	Yes	No	6.2%
PB	EP-67A	05/28/97	L972604-1	L-971239-1	8750.0	9400	7.2%	Yes	No	7.2%
PB	SSIA1-1D	07/15/97	L980457-2	L980356-2	21530.0	20000.0	7.4%	Yes	No	7.4%
PB	EP-74H	06/02/97	L972604-15	L971239-58	24.0	26	8.0%	Yes	N/A	|2| < 20
PB	EP-71RA	06/11/97	L972383-1	97-1344001	6516.0	7200.00000	10.0%	Yes	No	10.0%
PB	EP-89B	06/18/97	L972604-11	97-1402032	38.0	42.000000	10.0%	Yes	N/A	|4| < 20
PB	SSIA4-7A2	10/28/97	L972788-1	L972642-16	46060.0	51000.0	10.2%	Yes	No	10.2%
PB	SSIA8-30A	07/18/97	L972604-35	97-1715043	22470.0	20000.0000	11.6%	Yes	No	11.6%
PB	RIBH-5A	06/30/97	L972604-19	L971545-18	236.0	210	11.7%	Yes	No	11.7%
PB	SSIA1-1C	07/15/97	L980457-1	L980356-1	10650.0	12000.0	11.9%	Yes	No	11.9%
PB	SSIA8-5D	07/16/97	L980457-13	L980374-12	44.0	50.0	12.8%	Yes	N/A	|6| < 20
PB	SSIA8-6C	07/16/97	L980457-14	L980374-13	1493.0	1700.0	13.0%	Yes	No	13.0%
PB	EP-89A	06/18/97	L972604-10	97-1402031	8417.0	9600.00000	13.1%	Yes	No	13.1%
PB	SSIA8-20B	07/18/97	L972604-33	97-1715024	3421.0	3900.00000	13.1%	Yes	No	13.1%
PB	EP-74I	06/02/97	L972604-16	L971239-59	19.0	22	14.6%	Yes	N/A	|3| < 20
PB	SSIA1-3D	07/15/97	L980457-6	L980356-6	4857.0	5800.0	17.7%	Yes	No	17.7%
PB	SSIA1-4C	07/15/97	L980457-7	L980356-7	3011.0	3600.0	17.8%	Yes	No	17.8%
PB	SSIA8-8C	07/16/97	L980457-17	L980374-17	275.0	330.0	18.2%	Yes	No	18.2%
PB	EP-70E	05/31/97	L972604-12	L971239-32	22.0	18	20.0%	Yes	N/A	|4| < 20
PB	EP-77A	06/04/97	L972604-4	97-1325010	2119.0	2600.00000	20.4%	Yes	No	20.4%
PB	SSIA8-6B	07/16/97	L972604-26	97-1680064	807.0	1000.00000	21.4%	Yes	No	21.4%
PB	SSIA8-6D	07/16/97	L980457-15	L980374-14	1934.0	2400.0	21.5%	Yes	No	21.5%
PB	SSIA3-9B	07/15/97	L972383-5	97-1680034	2167.0	2700.00000	21.9%	Yes	No	21.9%
PB	EP-67C	05/28/97	L972383-3	L-971239-3	20.0	25	22.2%	Yes	N/A	|5| < 20
PB	EP-71RE	06/12/97	L972604-14	97-1344047	25.0	20.000000	22.2%	Yes	N/A	|5| < 20
PB	EP-78A	06/04/97	L972604-8	97-1325018	420.0	530.000000	23.2%	Yes	No	23.2%
PB	SSIA1-3C	07/15/97	L980457-5	L980356-5	5769.0	7300.0	23.4%	Yes	No	23.4%
PB	SSIA8-7C	07/16/97	L980457-16	L980374-15	395.0	500.0	23.5%	Yes	No	23.5%
PB	EP-84D	06/11/97	L972604-7	97-1344016	26.0	33.000000	23.7%	Yes	N/A	|7| < 20
PB	SSIA5-3B	07/08/97	L972604-22	L971637-6	668.0	850	24.0%	Yes	No	24.0%
PB	EP-67B	05/28/97	L972383-2	L-971239-2	429.0	550	24.7%	Yes	No	24.7%
PB	SSENT2-A	07/17/97	L972604-28	L971680-73	2574.0	3300	24.7%	Yes	No	24.7%
PB	EP-88A	06/17/97	L972604-9	97-1402022	2776.0	3600.00000	25.8%	Yes	No	25.8%
PB	SSIA5-9A	07/08/97	L972604-23	L971637-18	617.0	800	25.8%	Yes	No	25.8%
PB	EP-84C	06/11/97	L972604-6	97-1344015	47.0	61.000000	25.9%	Yes	N/A	|14| < 20
PB	SSIA5-18D	07/14/97	L980457-9	L980374-8	20.0	26.0	26.1%	Yes	N/A	|6| < 20
PB	SSIA1-2C	07/15/97	L980457-3	L980356-3	6784.0	8900.0	27.0%	Yes	No	27.0%
PB	SSENT6-A	07/17/97	L972604-29	L971680-82	2884.0	3800	27.4%	Yes	No	27.4%
PB	EP-77B	06/04/97	L972604-5	97-1325011	706.0	950.000000	29.5%	Yes	No	29.5%
PB	SSIA1-4D	07/15/97	L980457-8	L980356-8	1040.0	1400.0	29.5%	Yes	No	29.5%
PB	SSIA8-20A	07/17/97	L972604-32	L971715-1	50.0	68	30.5%	Yes	N/A	|18| < 20
PB	SS[illegible]	10/30/97	L972788-7	L972642-61	3883.0	[illegible]0.0	30.9%	Yes	No	30.9%

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: PB

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
PB	SSIA4-22B	10/30/97	L972788-5	L972642-51	863.0	1200.0	32.7%	Yes	No	32.7%
PB	SSIA8-4D	07/14/97	L980457-11	L980374-10	15790.0	22000.0	32.9%	Yes	No	32.9%
PB	SSIA4-14A2	10/28/97	L972788-4	L972642-32	10720.0	15000.0	33.3%	Yes	No	33.3%
PB	SSIA4-11A	10/28/97	L972788-3	L972642-25	6339.0	8900.0	33.6%	Yes	No	33.6%
PB	SSENT7-A	07/17/97	L972604-30	L971680-84	1973.0	2800	34.7%	Yes	No	34.7%
PB	SSIA8-5C	07/16/97	L980457-12	L980374-11	309.0	440.0	35.0%	Yes	No	35.0%
PB	SSIA1-2D	07/15/97	L980457-4	L980356-4	2807.0	4000.0	35.1%	No	No	*OUT* 35.1%
PB	SSIA5-19B	07/14/97	L972604-25	97-1680051	216.0	310.000000	35.7%	No	No	*OUT* 35.7%
PB	SSIA8-4C	07/14/97	L980457-10	L980374-9	47440.0	71000.0	39.8%	No	No	*OUT* 39.8%
PB	EP-70RJ	06/12/97	L972604-13	97-1344034	15.0	<10.000000	40.0%	Yes	N/A	|5| < 20
PB	SSIA5-9B	07/08/97	L972604-21	L971637-19	73.0	110	40.4%	No	No	*OUT* 40.4%
PB	EP-76B	06/03/97	L972604-2	97-1325005	5189.0	3400.00000	41.7%	No	No	*OUT* 41.7%
PB	SSIA3-1A	07/14/97	L972604-24	97-1680016	4770.0	7400.00000	43.2%	No	No	*OUT* 43.2%
PB	SSENT7-B	07/17/97	L972604-31	L971680-85	47.0	30	44.2%	Yes	N/A	|17| < 20
PB	SSIA4-7B	10/28/97	L972788-2	L972642-17	7546.0	12000.0	45.6%	No	No	*OUT* 45.6%
PB	SSIA8-28B	07/18/97	L972604-34	97-1715040	11670.0	19000.0000	47.8%	No	No	*OUT* 47.8%
PB	EP-74K	06/02/97	L972604-17	L971239-61	19.0	11	53.3%	Yes	N/A	|8| < 20

LEAD (PB) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	8750	9400	107.4%	-650	650
EP-67B	5/28/97	429	550	128.2%	-121	121
EP-67C	5/28/97	20	25	125.0%	-5	5
EP-70E	5/31/97	22	18	81.8%	4	4
EP-74H	6/2/97	24	26	108.3%	-2	2
EP-74I	6/2/97	19	22	115.8%	-3	3
EP-74K	6/2/97	19	11	57.9%	8	8
EP-76B	6/3/97	5189	3400	65.5%	1789	1789
EP-77A	6/4/97	2119	2600	122.7%	-481	481
EP-77B	6/4/97	706	950	134.6%	-244	244
EP-78A	6/4/97	420	530	126.2%	-110	110
EP-71RA	6/11/97	6516	7200	110.5%	-684	684
EP-84C	6/11/97	47	61	129.8%	-14	14
EP-84D	6/11/97	26	33	126.9%	-7	7
EP-70RJ	6/12/97	15	<10.000000	UDL	5	5
EP-71RE	6/12/97	25	20	80.0%	5	5
EP-86D	6/13/97	50	48	96.0%	2	2
EP-88A	6/17/97	2776	3600	129.7%	-824	824
EP-89A	6/18/97	8417	9600	114.1%	-1183	1183
EP-89B	6/18/97	38	42	110.5%	-4	4
RIBH-1A	6/19/97	10530	11000	104.5%	-470	470
RIBH-3A	6/30/97	776	800	103.1%	-24	24
RIBH-5A	6/30/97	236	210	89.0%	26	26
RIBH-10C	7/1/97	20	21	105.0%	-1	1
SSIA5-3B	7/8/97	668	850	127.2%	-182	182
SSIA5-9A	7/8/97	617	800	129.7%	-183	183
SSIA5-9B	7/8/97	73	110	150.7%	-37	37
SSIA3-1A	7/14/97	4770	7400	155.1%	-2630	2630
SSIA5-18D	7/14/97	20	26	130.0%	-6	6
SSIA5-19B	7/14/97	216	310	143.5%	-94	94
SSIA8-4C	7/14/97	47440	71000	149.7%	-23560	23560
SSIA8-4D	7/14/97	15790	22000	139.3%	-6210	6210
SSIA1-1C	7/15/97	10650	12000	112.7%	-1350	1350
SSIA1-1D	7/15/97	21530	20000	92.9%	1530	1530
SSIA1-2C	7/15/97	6784	8900	131.2%	-2116	2116
SSIA1-2D	7/15/97	2807	4000	142.5%	-1193	1193
SSIA1-3C	7/15/97	5769	7300	126.5%	-1531	1531
SSIA1-3D	7/15/97	4857	5800	119.4%	-943	943
SSIA1-4C	7/15/97	3011	3600	119.6%	-589	589
SSIA1-4D	7/15/97	1040	1400	134.6%	-360	360
SSIA3-9B	7/15/97	2167	2700	124.6%	-533	533
SSIA8-5C	7/16/97	309	440	142.4%	-131	131
SSIA8-5D	7/16/97	44	50	113.6%	-6	6
SSIA8-6B	7/16/97	807	1000	123.9%	-193	193
SSIA8-6C	7/16/97	1493	1700	113.9%	-207	207
SSIA8-6D	7/16/97	1934	2400	124.1%	-466	466
SSIA8-7A	7/16/97	553	520	94.0%	33	33
SSIA8-7C	7/16/97	395	500	126.6%	-105	105
SSIA8-8C	7/16/97	275	330	120.0%	-55	55
SSENT2-A	7/17/97	2574	3300	128.2%	-726	726
SSENT6-A	7/17/97	2884	3800	131.8%	-916	916
SSENT7-A	7/17/97	1973	2800	141.9%	-827	827
SSENT7-B	7/17/97	47	30	63.8%	17	17
SSIA8-10A	7/17/97	50	68	136.0%	-18	18
SSIA8-20B	7/18/97	3421	3900	114.0%	-479	479
SSIA8-28B	7/18/97	11670	19000	162.8%	-7330	7330
SSIA8-30A	7/18/97	22470	20000	89.0%	2470	2470
SSIA4-11A	10/28/97	6339	8900	140.4%	-2561	2561
SSIA4-14A2	10/28/97	10720	15000	139.9%	-4280	4280
SSIA4-7A2	10/28/97	46060	51000	110.7%	-4940	4940
SSIA4-7B	10/28/97	7546	12000	159.0%	-4454	4454
SSIA4-22B	10/30/97	863	1200	139.0%	-337	337
SSIA4-27A	10/30/97	3883	5300	136.5%	-1417	1417
SSIA4-27B	10/30/97	83	82	98.8%	1	1

Regression Statistics	
Multiple R	0.979039812
R Square	0.958518953
Adjusted R Square	0.957849904
Standard Error	2378.591889
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	8105551114	8105551114	1432.658503	1.46636E-44
Residual	62	350777361.2	5657699.374		
Total	63	8456328475			

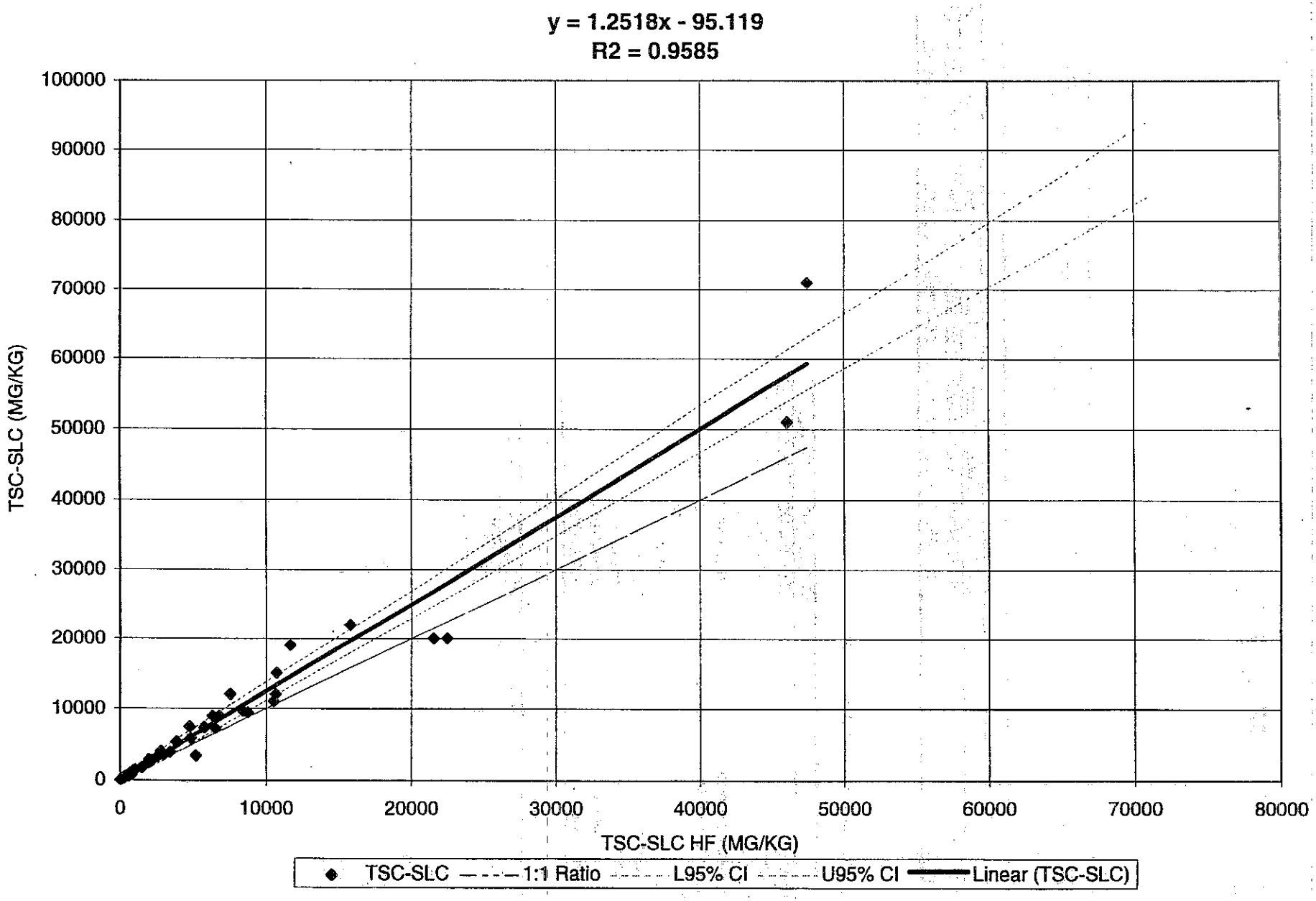
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-95.11907801	335.7414023	-0.28331054	0.77788265	-766.2558374	576.0176814
TSC-SLC HF	1.251795517	0.033072121	37.85047559	1.46636E-44	1.185685362	1.317905673

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	4715.484375	5807.703125
Variance	82106060.57	134227436.1
Observations	64	64
Pearson Correlation	0.979039812	
Hypothesized Mean Difference	0	
df	63	
t Stat	-2.662080695	
P(T<=t) one-tail	0.004921593	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.009843186	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	4715.484375	5807.703125
Standard Error	1132.654933	1448.20706
Median	951.5	1300
Mode	20	26
Standard Deviation	9061.239461	11585.65648
Sample Variance	82106060.57	134227436.1
Kurtosis	13.60434313	18.6135925
Skewness	3.488589078	3.976679744
Range	47425	70990
Minimum	15	10
Maximum	47440	71000
Sum	301791	371693
Count	64	64
Confidence Level(95.000%)	2219.959588	2838.429477

LEAD (PB) REGRESSION CHART



SELENIUM

PARAMETER: SE

Precision Results: Total Number of Pairs: 10; Total Number of Outliers: 0; Number of Valid Pairs (k): 10; Dixon Q's Test Value: 0.409; 90% t value: 1.833; 95% t value: 2.262; Completeness: 100.0%; Standard Deviation: 0.26; 10% Uncertainty: 18.11; 5% Uncertainty: 22.34; Mean Percentage RPD: 33.0%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
SE	EP-67B	05/28/97	L972383-2	L-971239-2	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-67C	05/28/97	L972383-3	L-971239-3	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-70E	05/31/97	L972604-12	L971239-32	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-70RJ	06/12/97	L972604-13	97-1344034	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-71RE	06/12/97	L972604-14	97-1344047	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-74H	06/02/97	L972604-15	L971239-58	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-74I	06/02/97	L972604-16	L971239-59	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-74K	06/02/97	L972604-17	L971239-61	<10.0	<10	0.0%	Yes	N/A	UDL
SE	EP-77A	06/04/97	L972604-4	97-1325010	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-77B	06/04/97	L972604-5	97-1325011	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-78A	06/04/97	L972604-8	97-1325018	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-84D	06/11/97	L972604-7	97-1344016	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-86D	06/13/97	L972604-3	97-1402008	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	EP-89B	06/18/97	L972604-11	97-1402032	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	RIBH-10C	07/01/97	L972604-20	L971545-38	<10.0	<10	0.0%	Yes	N/A	UDL
SE	RIBH-3A	06/30/97	L972604-18	L971545-11	<10.0	<10	0.0%	Yes	N/A	UDL
SE	RIBH-5A	06/30/97	L972604-19	L971545-18	<10.0	<10	0.0%	Yes	N/A	UDL
SE	SSENT2-A	07/17/97	L972604-28	L971680-73	15.0	15	0.0%	Yes	N/A	|0| < 20
SE	SSENT7-A	07/17/97	L972604-30	L971680-84	10.0	<10	0.0%	Yes	N/A	UDL
SE	SSENT7-B	07/17/97	L972604-31	L971680-85	<10.0	<10	0.0%	Yes	N/A	UDL
SE	SSIA1-4D	07/15/97	L980457-8	L980356-8	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA4-22B	10/30/97	L972788-5	L972642-51	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA4-27B	10/30/97	L972788-6	L972642-62	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA5-18D	07/14/97	L980457-9	L980374-8	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA5-19B	07/14/97	L972604-25	97-1680051	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	SSIA5-3B	07/08/97	L972604-22	L971637-6	<10.0	<10	0.0%	Yes	N/A	UDL
SE	SSIA5-9A	07/08/97	L972604-23	L971637-18	<10.0	<10	0.0%	Yes	N/A	UDL
SE	SSIA8-10A	07/17/97	L972604-32	L971715-1	<10.0	<10	0.0%	Yes	N/A	UDL
SE	SSIA8-5C	07/16/97	L980457-12	L980374-11	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA8-5D	07/16/97	L980457-13	L980374-12	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA8-6B	07/16/97	L972604-26	97-1680064	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	SSIA8-6C	07/16/97	L980457-14	L980374-13	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA8-6D	07/16/97	L980457-15	L980374-14	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA8-7A	07/16/97	L972604-27	97-1680065	<10.0	<10.000000	0.0%	Yes	N/A	UDL
SE	SSIA8-7C	07/16/97	L980457-16	L980374-15	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA8-8C	07/16/97	L980457-17	L980374-17	<10.0	<10.0	0.0%	Yes	N/A	UDL
SE	SSIA3-1A	07/14/97	L972604-24	97-1680016	59.0	56.000000	5.2%	Yes	No	5.2%
SE	SSIA8-4C	07/14/97	L980457-10	L980374-9	73.0	68.0	7.1%	Yes	No	7.1%
SE	EP-71RA	06/11/97	L972383-1	97-1344001	36.0	33.000000	8.7%	Yes	N/A	|3| < 20
SE	SSIA1-4C	07/15/97	L980457-7	L980356-7	11.0	12.0	8.7%	Yes	N/A	|1| < 20
SE	EP-88A	06/17/97	L972604-9	97-1402022	21.0	23.000000	9.1%	Yes	N/A	|2| < 20
SE	SSIA4-7A2	10/28/97	L972788-1	L972642-16	1644.0	1800.0	9.1%	Yes	No	9.1%
SE	SSIA8-20B	07/18/97	L972604-33	97-1715024	34.0	38.000000	11.1%	Yes	N/A	|4| < 20
SE	SSIA8-28B	07/18/97	L972604-34	97-1715040	46.0	53.000000	14.1%	Yes	N/A	|7| < 20
SE	SSIA1-2C	07/15/97	L980457-3	L980356-3	197.0	230.0	15.5%	Yes	No	15.5%
SE	SSIA8-30A	07/18/97	L972604-35	97-1715043	91.0	73.000000	22.0%	Yes	No	22.0%
SE	EP-[illegible]	06/03/97	L972604-2	97-1325005	103.0	[illegible]0000	25.1%	Yes	No	25.1%

PARAMETER: SE

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
SE	SSIA8-4D	07/14/97	L980457-11	L980374-10	17.0	23.0	30.0%	Yes	N/A	|6| < 20
SE	SSIA1-2D	07/15/97	L980457-4	L980356-4	82.0	120.0	37.6%	No	No	*OUT* 37.6%
SE	EP-67A	05/28/97	L972604-1	L-971239-1	27.0	18	40.0%	Yes	N/A	|9| < 20
SE	SSIA5-9B	07/08/97	L972604-21	L971637-19	15.0	<10	40.0%	Yes	N/A	|5| < 20
SE	SSIA1-3C	07/15/97	L980457-5	L980356-5	31.0	20.0	43.1%	Yes	N/A	|11| < 20
SE	SSIA4-11A	10/28/97	L972788-3	L972642-25	34.0	53.0	43.7%	Yes	N/A	|19| < 20
SE	RIBH-1A	06/19/97	L972383-4	L971545-1	32.0	20	46.2%	Yes	N/A	|12| < 20
SE	SSENT6-A	07/17/97	L972604-29	L971680-82	<10.0	16	46.2%	Yes	N/A	|6| < 20
SE	SSIA4-14A2	10/28/97	L972788-4	L972642-32	38.0	62.0	48.0%	No	N/A	*OUT* |24| > 20
SE	SSIA1-3D	07/15/97	L980457-6	L980356-6	38.0	22.0	53.3%	Yes	N/A	|16| < 20
SE	SSIA3-9B	07/15/97	L972383-5	97-1680034	15.0	26.000000	53.7%	Yes	N/A	|11| < 20
SE	EP-89A	06/18/97	L972604-10	97-1402031	11.0	20.000000	58.1%	Yes	N/A	|9| < 20
SE	SSIA4-27A	10/30/97	L972788-7	L972642-61	12.0	22.0	58.8%	Yes	N/A	|10| < 20
SE	SSIA4-7B	10/28/97	L972788-2	L972642-17	59.0	110.0	60.4%	No	No	*OUT* 60.4%
SE	SSIA1-1D	07/15/97	L980457-2	L980356-2	453.0	220.0	69.2%	No	No	*OUT* 69.2%
SE	EP-84C	06/11/97	L972604-6	97-1344015	21.0	<10.000000	71.0%	Yes	N/A	|11| < 20
SE	SSIA1-1C	07/15/97	L980457-1	L980356-1	253.0	110.0	78.8%	No	No	*OUT* 78.8%

SELENIUM (SE) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	27	18	66.7%	9	9
EP-67B	5/28/97	<10.0	<10	UDL	0	0
EP-67C	5/28/97	<10.0	<10	UDL	0	0
EP-70E	5/31/97	<10.0	<10	UDL	0	0
EP-74H	6/2/97	<10.0	<10	UDL	0	0
EP-74I	6/2/97	<10.0	<10	UDL	0	0
EP-74K	6/2/97	<10.0	<10	UDL	0	0
EP-76B	6/3/97	103	80	77.7%	23	23
EP-77A	6/4/97	<10.0	<10.000000	UDL	0	0
EP-77B	6/4/97	<10.0	<10.000000	UDL	0	0
EP-78A	6/4/97	<10.0	<10.000000	UDL	0	0
EP-71RA	6/11/97	36	33	91.7%	3	3
EP-84C	6/11/97	21	<10.000000	UDL	11	11
EP-84D	6/11/97	<10.0	<10.000000	UDL	0	0
EP-70RJ	6/12/97	<10.0	<10.000000	UDL	0	0
EP-71RE	6/12/97	<10.0	<10.000000	UDL	0	0
EP-86D	6/13/97	<10.0	<10.000000	UDL	0	0
EP-88A	6/17/97	21	23	109.5%	-2	2
EP-89A	6/18/97	11	20	181.8%	-9	9
EP-89B	6/18/97	<10.0	<10.000000	UDL	0	0
RIBH-1A	6/19/97	32	20	62.5%	12	12
RIBH-3A	6/30/97	<10.0	<10	UDL	0	0
RIBH-5A	6/30/97	<10.0	<10	UDL	0	0
RIBH-10C	7/1/97	<10.0	<10	UDL	0	0
SSIA5-3B	7/8/97	<10.0	<10	UDL	0	0
SSIA5-9A	7/8/97	<10.0	<10	UDL	0	0
SSIA5-9B	7/8/97	15	<10	UDL	5	5
SSIA3-1A	7/14/97	59	56	94.9%	3	3
SSIA5-18D	7/14/97	<10.0	<10.0	UDL	0	0
SSIA5-19B	7/14/97	<10.0	<10.000000	UDL	0	0
SSIA8-4C	7/14/97	73	68	93.2%	5	5
SSIA8-4D	7/14/97	17	23	135.3%	-6	6
SSIA1-1C	7/15/97	253	110	43.5%	143	143
SSIA1-1D	7/15/97	453	220	48.6%	233	233
SSIA1-2C	7/15/97	197	230	116.8%	-33	33
SSIA1-2D	7/15/97	82	120	146.3%	-38	38
SSIA1-3C	7/15/97	31	20	64.5%	11	11
SSIA1-3D	7/15/97	38	22	57.9%	16	16
SSIA1-4C	7/15/97	11	12	109.1%	-1	1
SSIA1-4D	7/15/97	<10.0	<10.0	UDL	0	0
SSIA3-9B	7/15/97	15	26	173.3%	-11	11
SSIA8-5C	7/16/97	<10.0	<10.0	UDL	0	0
SSIA8-5D	7/16/97	<10.0	<10.0	UDL	0	0
SSIA8-6B	7/16/97	<10.0	<10.000000	UDL	0	0
SSIA8-6C	7/16/97	<10.0	<10.0	UDL	0	0
SSIA8-6D	7/16/97	<10.0	<10.0	UDL	0	0
SSIA8-7A	7/16/97	<10.0	<10.000000	UDL	0	0
SSIA8-7C	7/16/97	<10.0	<10.0	UDL	0	0
SSIA8-8C	7/16/97	<10.0	<10.0	UDL	0	0
SSENT2-A	7/17/97	15	15	100.0%	0	0
SSENT6-A	7/17/97	<10.0	16	UDL	-6	6
SSENT7-A	7/17/97	10	<10	UDL	0	0
SSENT7-B	7/17/97	<10.0	<10	UDL	0	0
SSIA8-10A	7/17/97	<10.0	<10	UDL	0	0
SSIA8-20B	7/18/97	34	38	111.8%	-4	4
SSIA8-28B	7/18/97	46	53	115.2%	-7	7
SSIA8-30A	7/18/97	91	73	80.2%	18	18
SSIA4-11A	10/28/97	34	53	155.9%	-19	19
SSIA4-14A2	10/28/97	38	62	163.2%	-24	24
SSIA4-7A2	10/28/97	1644	1800	109.5%	-156	156
SSIA4-7B	10/28/97	59	110	186.4%	-51	51
SSIA4-22B	10/30/97	<10.0	<10.0	UDL	0	0
SSIA4-27A	10/30/97	12	22	183.3%	-10	10
SSIA4-27B	10/30/97	<10.0	<10.0	UDL	0	0

Regression Statistics	
Multiple R	0.984108507
R Square	0.968469554
Adjusted R Square	0.967960998
Standard Error	40.36927119
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3103482.945	3103482.945	1904.353398	2.96049E-48
Residual	62	101040.0395	1629.678056		
Total	63	3204522.984			

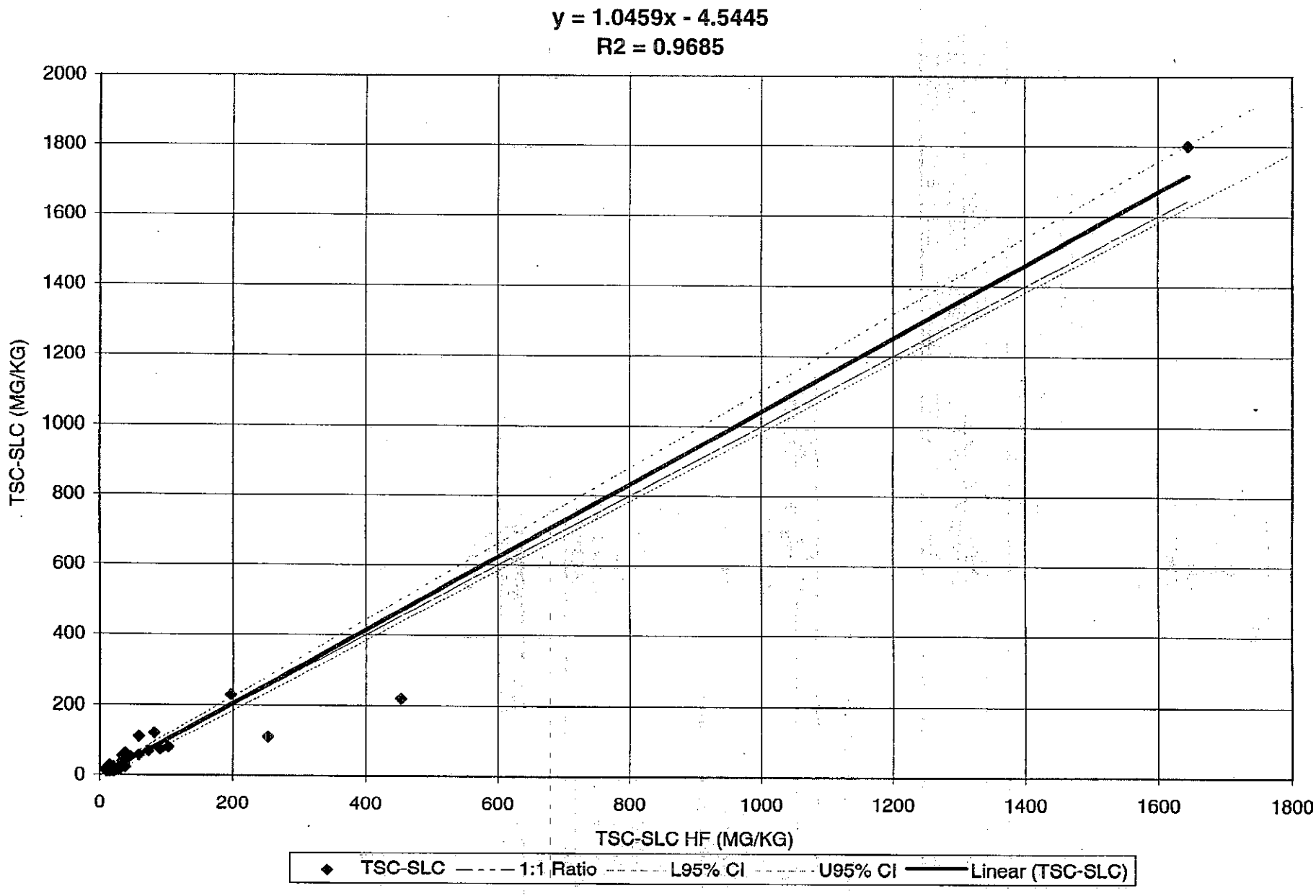
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-4.54446974	5.245844761	-0.866298937	0.389666402	-15.03075242	5.941812942
TSC-SLC HF	1.045936798	0.023967993	43.63889777	2.96049E-48	0.998025516	1.093848081

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	59.8125	58.015625
Variance	45029.58333	50865.4442
Observations	64	64
Pearson Correlation	0.984108507	
Hypothesized Mean Difference	0	
df	63	
t Stat	0.348764885	
P(T<=t) one-tail	0.364214369	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.728428737	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	59.8125	58.015625
Standard Error	26.52521894	28.19171094
Median	10	10
Mode	10	10
Standard Deviation	212.2017515	225.5336875
Sample Variance	45029.58333	50865.4442
Kurtosis	51.30756639	59.00269254
Skewness	6.929388828	7.557213952
Range	1634	1790
Minimum	10	10
Maximum	1644	1800
Sum	3828	3713
Count	64	64
Confidence Level(95.000%)	51.98839681	55.25465628

SELENIUM (SE) REGRESSION CHART



ZINC

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: ZN

Precision Results: Total Number of Pairs: 56; Total Number of Outliers: 0; Number of Valid Pairs (k): 56; Dixon Q's Test Value: 0.401; 90% t value: 1.645; 95% t value: 1.960; Completeness: 100.0%; Standard Deviation: 0.12; 10% Uncertainty: 3.82; 5% Uncertainty: 4.55; Mean Percentage RPD: 21.0%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
ZN	SSIA4-27B	10/30/97	L972788-6	L972642-62	87.0	87.0	0.0%	Yes	No	0.0%
ZN	SSIA1-3D	07/15/97	L980457-6	L980356-6	5799.0	5900.0	1.7%	Yes	No	1.7%
ZN	EP-71RA	06/11/97	L972383-1	97-1344001	3969.0	3900.00000	1.8%	Yes	No	1.8%
ZN	SSIA1-3C	07/15/97	L980457-5	L980356-5	8526.0	8700.0	2.0%	Yes	No	2.0%
ZN	SSIA5-18D	07/14/97	L980457-9	L980374-8	45.0	44.0	2.2%	Yes	N/A	|1| < 20
ZN	SSIA8-8C	07/16/97	L980457-17	L980374-17	254.0	260.0	2.3%	Yes	No	2.3%
ZN	SSIA1-2C	07/15/97	L980457-3	L980356-3	4626.0	4500.0	2.8%	Yes	No	2.8%
ZN	RIBH-1A	06/19/97	L972383-4	L971545-1	16530.0	16000	3.3%	Yes	No	3.3%
ZN	EP-71RE	06/12/97	L972604-14	97-1344047	40.0	38.000000	5.1%	Yes	N/A	|2| < 20
ZN	EP-74H	06/02/97	L972604-15	L971239-58	45.0	48	6.5%	Yes	N/A	|3| < 20
ZN	SSIA1-4C	07/15/97	L980457-7	L980356-7	4381.0	4700.0	7.0%	Yes	No	7.0%
ZN	EP-74I	06/02/97	L972604-16	L971239-59	44.0	41	7.1%	Yes	N/A	|3| < 20
ZN	EP-78A	06/04/97	L972604-8	97-1325018	2111.0	2300.00000	8.6%	Yes	No	8.6%
ZN	SSIA8-10A	07/17/97	L972604-32	L971715-1	119.0	130	8.8%	Yes	No	8.8%
ZN	EP-77A	06/04/97	L972604-4	97-1325010	1005.0	1100.00000	9.0%	Yes	No	9.0%
ZN	SSIA4-7A2	10/28/97	L972788-1	L972642-16	8962.0	8100.0	10.1%	Yes	No	10.1%
ZN	RIBH-3A	06/30/97	L972604-18	L971545-11	1336.0	1200	10.7%	Yes	No	10.7%
ZN	SSIA3-9B	07/15/97	L972383-5	97-1680034	2333.0	2600.00000	10.8%	Yes	No	10.8%
ZN	EP-67C	05/28/97	L972383-3	L-971239-3	50.0	56	11.3%	Yes	N/A	|6| < 20
ZN	SSIA1-4D	07/15/97	L980457-8	L980356-8	655.0	740.0	12.2%	Yes	No	12.2%
ZN	SSIA8-20B	07/18/97	L972604-33	97-1715024	16950.0	15000.0000	12.2%	Yes	No	12.2%
ZN	SSIA5-9B	07/08/97	L972604-21	L971637-19	73.0	83	12.8%	Yes	No	12.8%
ZN	SSENT2-A	07/17/97	L972604-28	L971680-73	3141.0	3600	13.6%	Yes	No	13.6%
ZN	SSIA1-1C	07/15/97	L980457-1	L980356-1	9554.0	11000.0	14.1%	Yes	No	14.1%
ZN	SSIA1-1D	07/15/97	L980457-2	L980356-2	6861.0	7900.0	14.1%	Yes	No	14.1%
ZN	SSIA8-7C	07/16/97	L980457-16	L980374-15	284.0	330.0	15.0%	Yes	No	15.0%
ZN	EP-76B	06/03/97	L972604-2	97-1325005	128100.0	110000	15.2%	Yes	No	15.2%
ZN	SSENT7-B	07/17/97	L972604-31	L971680-85	48.0	41	15.7%	Yes	N/A	|7| < 20
ZN	EP-89B	06/18/97	L972604-11	97-1402032	66.0	78.000000	16.7%	Yes	No	16.7%
ZN	EP-84D	06/11/97	L972604-7	97-1344016	92.0	110.000000	17.8%	Yes	No	17.8%
ZN	EP-89A	06/18/97	L972604-10	97-1402031	3429.0	4100.00000	17.8%	Yes	No	17.8%
ZN	EP-88A	06/17/97	L972604-9	97-1402022	2574.0	3100.00000	18.5%	Yes	No	18.5%
ZN	SSIA8-6C	07/16/97	L980457-14	L980374-13	896.0	1100.0	20.4%	Yes	No	20.4%
ZN	SSIA5-3B	07/08/97	L972604-22	L971637-6	479.0	590	20.8%	Yes	No	20.8%
ZN	SSIA8-5C	07/16/97	L980457-12	L980374-11	620.0	770.0	21.6%	Yes	No	21.6%
ZN	SSIA5-9A	07/08/97	L972604-23	L971637-18	677.0	850	22.7%	Yes	No	22.7%
ZN	SSIA1-2D	07/15/97	L980457-4	L980356-4	3496.0	4400.0	22.9%	Yes	No	22.9%
ZN	SSIA8-6D	07/16/97	L980457-15	L980374-14	1028.0	1300.0	23.4%	Yes	No	23.4%
ZN	EP-74K	06/02/97	L972604-17	L971239-61	52.0	66	23.7%	Yes	No	23.7%
ZN	SSIA4-22B	10/30/97	L972788-5	L972642-51	615.0	780.0	23.7%	Yes	No	23.7%
ZN	EP-77B	06/04/97	L972604-5	97-1325011	657.0	850.000000	25.6%	Yes	No	25.6%
ZN	SSIA4-7B	10/28/97	L972788-2	L972642-17	2775.0	3600.0	25.9%	Yes	No	25.9%
ZN	SSENT6-A	07/17/97	L972604-29	L971680-82	1925.0	2500	26.0%	Yes	No	26.0%
ZN	EP-67A	05/28/97	L972604-1	L-971239-1	3689.0	4800	26.2%	Yes	No	26.2%
ZN	SSIA8-5D	07/16/97	L980457-13	L980374-12	192.0	250.0	26.2%	Yes	No	26.2%
ZN	SSIA4-27A	10/30/97	L972788-7	L972642-61	2991.0	3900.0	26.4%	Yes	No	26.4%
ZN	RIP[illegible]	06/30/97	L972604-19	L971545-18	2104.0	[illegible]600	27.2%	Yes	No	27.2%

OUTLIER AND COMPLETENESS EVALUATION BETWEEN SAMPLE RECEIVED FROM LABS TSC-SLC (HF) AND TSC-SLC
05/01/97 TO 12/31/97

PARAMETER: ZN

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC LAB NO	TSC-SLC LAB NO	TSC-SLC RESULTS	TSC-SLC RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
ZN	RIBH-10C	07/01/97	L972604-20	L971545-38	33.0	25	27.6%	Yes	N/A	|8| < 20
ZN	EP-67B	05/28/97	L972383-2	L-971239-2	505.0	680	29.5%	Yes	No	29.5%
ZN	SSIA8-4D	07/14/97	L980457-11	L980374-10	8094.0	11000.0	30.4%	Yes	No	30.4%
ZN	SSIA4-14A2	10/28/97	L972788-4	L972642-32	4925.0	6700.0	30.5%	Yes	No	30.5%
ZN	SSIA8-4C	07/14/97	L980457-10	L980374-9	18830.0	26000.0	32.0%	Yes	No	32.0%
ZN	SSIA8-6B	07/16/97	L972604-26	97-1680064	337.0	470.000000	33.0%	Yes	No	33.0%
ZN	SSIA4-11A	10/28/97	L972788-3	L972642-25	3294.0	4600.0	33.1%	Yes	No	33.1%
ZN	SSENT7-A	07/17/97	L972604-30	L971680-84	1715.0	2400	33.3%	Yes	No	33.3%
ZN	EP-84C	06/11/97	L972604-6	97-1344015	138.0	98.000000	33.9%	Yes	No	33.9%
ZN	SSIA8-7A	07/16/97	L972604-27	97-1680065	757.0	1100.00000	36.9%	No	No	*OUT* 36.9%
ZN	SSIA8-30A	07/18/97	L972604-35	97-1715043	13800.0	9400.00000	37.9%	No	No	*OUT* 37.9%
ZN	SSIA3-1A	07/14/97	L972604-24	97-1680016	5146.0	7600.00000	38.5%	No	No	*OUT* 38.5%
ZN	SSIA5-19B	07/14/97	L972604-25	97-1680051	281.0	430.000000	41.9%	No	No	*OUT* 41.9%
ZN	EP-70E	05/31/97	L972604-12	L971239-32	651.0	1000	42.3%	No	No	*OUT* 42.3%
ZN	SSIA8-28B	07/18/97	L972604-34	97-1715040	11810.0	19000.0000	46.7%	No	No	*OUT* 46.7%
ZN	EP-86D	06/13/97	L972604-3	97-1402008	145.0	85.000000	52.2%	No	No	*OUT* 52.2%
ZN	EP-70RJ	06/12/97	L972604-13	97-1344034	37.0	65.000000	54.9%	No	N/A	*OUT* |28| > 20

ZINC (ZN) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	TSC-SLC	% Recovery	Difference	Abs of Diff
EP-67A	5/28/97	3689	4800	130.1%	-1111	1111
EP-67B	5/28/97	505	680	134.7%	-175	175
EP-67C	5/28/97	50	56	112.0%	-6	6
EP-70E	5/31/97	651	1000	153.6%	-349	349
EP-74H	6/2/97	45	48	106.7%	-3	3
EP-74I	6/2/97	44	41	93.2%	3	3
EP-74K	6/2/97	52	66	126.9%	-14	14
EP-76B	6/3/97	128100	110000	85.9%	18100	18100
EP-77A	6/4/97	1005	1100	109.5%	-95	95
EP-77B	6/4/97	657	850	129.4%	-193	193
EP-78A	6/4/97	2111	2300	109.0%	-189	189
EP-71RA	6/11/97	3969	3900	98.3%	69	69
EP-84C	6/11/97	138	98	71.0%	40	40
EP-84D	6/11/97	92	110	119.6%	-18	18
EP-70RJ	6/12/97	37	65	175.7%	-28	28
EP-71RE	6/12/97	40	38	95.0%	2	2
EP-86D	6/13/97	145	85	58.6%	60	60
EP-88A	6/17/97	2574	3100	120.4%	-526	526
EP-89A	6/18/97	3429	4100	119.6%	-671	671
EP-89B	6/18/97	66	78	118.2%	-12	12
RIBH-1A	6/19/97	16530	16000	96.8%	530	530
RIBH-3A	6/30/97	1336	1200	89.8%	136	136
RIBH-5A	6/30/97	2104	1600	76.0%	504	504
RIBH-10C	7/1/97	33	25	75.8%	8	8
SSIA5-3B	7/8/97	479	590	123.2%	-111	111
SSIA5-9A	7/8/97	677	850	125.6%	-173	173
SSIA5-9B	7/8/97	73	83	113.7%	-10	10
SSIA3-1A	7/14/97	5146	7600	147.7%	-2454	2454
SSIA5-18D	7/14/97	45	44	97.8%	1	1
SSIA5-19B	7/14/97	281	430	153.0%	-149	149
SSIA8-4C	7/14/97	18830	26000	138.1%	-7170	7170
SSIA8-4D	7/14/97	8094	11000	135.9%	-2906	2906
SSIA1-1C	7/15/97	9554	11000	115.1%	-1446	1446
SSIA1-1D	7/15/97	6861	7900	115.1%	-1039	1039
SSIA1-2C	7/15/97	4626	4500	97.3%	126	126
SSIA1-2D	7/15/97	3496	4400	125.9%	-904	904
SSIA1-3C	7/15/97	8526	8700	102.0%	-174	174
SSIA1-3D	7/15/97	5799	5900	101.7%	-101	101
SSIA1-4C	7/15/97	4381	4700	107.3%	-319	319
SSIA1-4D	7/15/97	655	740	113.0%	-85	85
SSIA3-9B	7/15/97	2333	2600	111.4%	-267	267
SSIA8-5C	7/16/97	620	770	124.2%	-150	150
SSIA8-5D	7/16/97	192	250	130.2%	-58	58
SSIA8-6B	7/16/97	337	470	139.5%	-133	133
SSIA8-6C	7/16/97	896	1100	122.8%	-204	204
SSIA8-6D	7/16/97	1028	1300	126.5%	-272	272
SSIA8-7A	7/16/97	757	1100	145.3%	-343	343
SSIA8-7C	7/16/97	284	330	116.2%	-46	46
SSIA8-8C	7/16/97	254	260	102.4%	-6	6
SSENT2-A	7/17/97	3141	3600	114.6%	-459	459
SSENT6-A	7/17/97	1925	2500	129.9%	-575	575
SSENT7-A	7/17/97	1715	2400	139.9%	-685	685
SSENT7-B	7/17/97	48	41	85.4%	7	7
SSIA8-10A	7/17/97	119	130	109.2%	-11	11
SSIA8-20B	7/18/97	16950	15000	88.5%	1950	1950
SSIA8-28B	7/18/97	11810	19000	160.9%	-7190	7190
SSIA8-30A	7/18/97	13800	9400	68.1%	4400	4400
SSIA4-11A	10/28/97	3294	4600	139.6%	-1306	1306
SSIA4-14A2	10/28/97	4925	6700	136.0%	-1775	1775
SSIA4-7A2	10/28/97	8962	8100	90.4%	862	862
SSIA4-7B	10/28/97	2775	3600	129.7%	-825	825
SSIA4-22B	10/30/97	615	780	126.8%	-165	165
SSIA4-27A	10/30/97	2991	3900	130.4%	-909	909
SSIA4-27B	10/30/97	87	87	100.0%	0	0

Regression Statistics	
Multiple R	0.992080702
R Square	0.984224118
Adjusted R Square	0.983969669
Standard Error	1803.038265
Observations	64

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	12574824777	12574824777	3868.049783	1.39682E-57
Residual	62	201558713	3250946.984		
Total	63	12776383490			

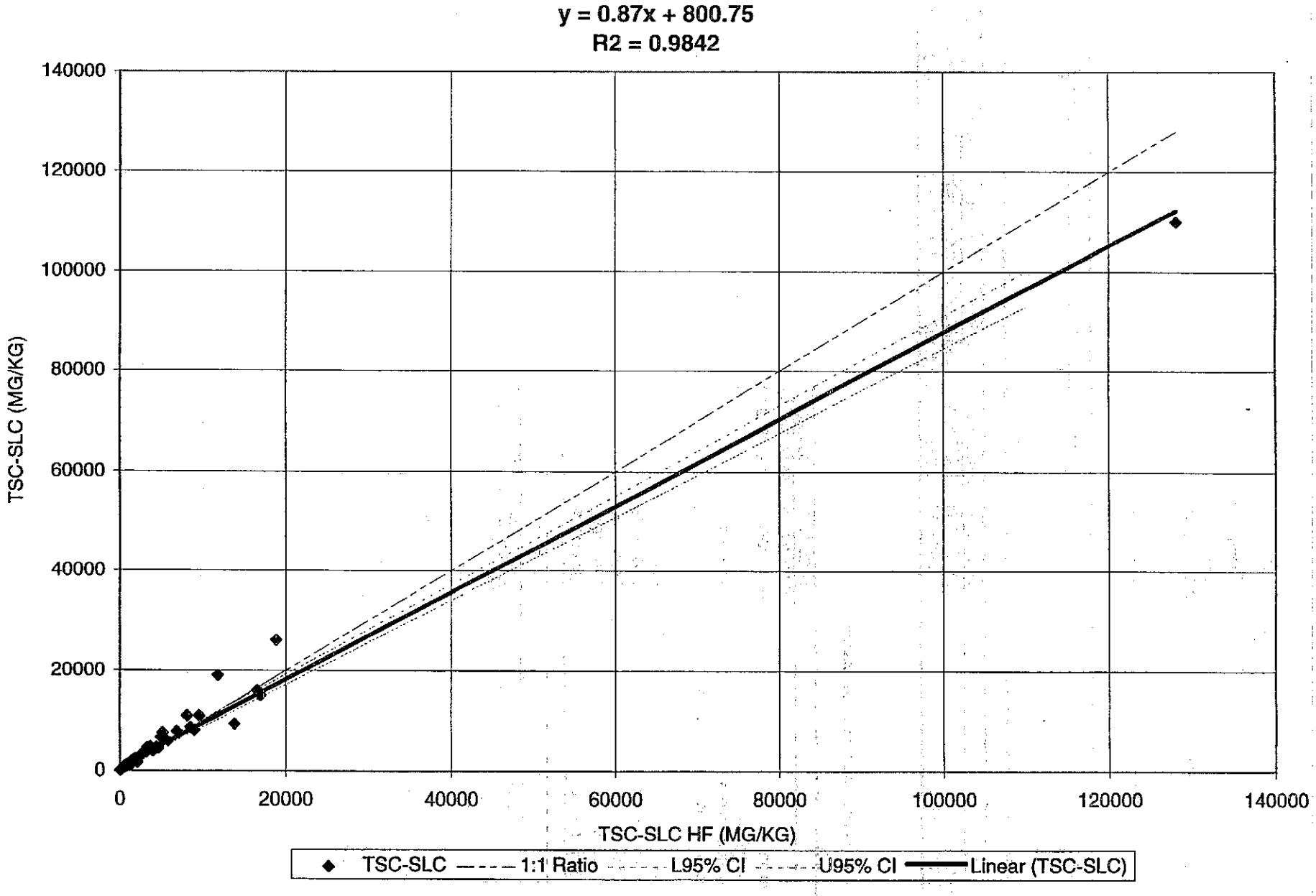
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	800.7523935	236.2940278	3.388796581	0.001224903	328.4078837	1273.096903
TSC-SLC HF	0.869955776	0.013987856	62.19364745	1.39682E-57	0.841994481	0.897917071

t-Test: Paired Two Sample for Means

	TSC-SLC HF	*TSC-SLC*
Mean	5074.734375	5215.546875
Variance	263734558.1	202799737.9
Observations	64	64
Pearson Correlation	0.992080702	
Hypothesized Mean Difference	0	
df	63	
t Stat	-0.4070345	
P(T<=t) one-tail	0.34268115	
t Critical one-tail	1.669402536	
P(T<=t) two-tail	0.6853623	
t Critical two-tail	1.998341759	

Descriptive Statistics	*TSC-SLC HF*	*TSC-SLC*
Mean	5074.734375	5215.546875
Standard Error	2029.988293	1780.097162
Median	1016.5	1150
Mode	45	1100
Standard Deviation	16239.90635	14240.77729
Sample Variance	263734558.1	202799737.9
Kurtosis	54.37750851	48.14317201
Skewness	7.135349252	6.586376504
Range	128067	109975
Minimum	33	25
Maximum	128100	110000
Sum	324783	333795
Count	64	64
Confidence Level(95.000%)	3978.698052	3488.92116

ZINC (ZN) REGRESSION CHART



APPENDIX 3

DATABASE

TABLE OF CONTENTS BY SITE TYPE

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-67		EP-67		EP-67		EP-70	
SAMPLE DATE	05/28/97		05/28/97		05/28/97		05/31/97	
SAMPLE TIME			09:43					
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972604-1		L972383-2		L972383-3		L972604-12	
TYPE	HF		HF		HF		HF	
SAMPLE NUMBER	EP-67A		EP-67B		EP-67C		EP-70E	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	1210.0		229.0		189.0		286.0	
CADMIUM (CD) TOT	334.0		159.0		48.0		46.0	
CHROMIUM (CR) TOT	78.0	J2 J4	68.0	J2	65.0	J2	46.0	J2 J4
COPPER (CU) TOT	17290.0		1631.0		228.0		23.0	
IRON (FE) TOT	24040.0		20150.0		19570.0		18870.0	
LEAD (PB) TOT	8750.0		429.0		20.0		22.0	
SELENIUM (SE) TOT	27.0		<10.0		<10.0		<10.0	
ZINC (ZN) TOT	3689.0		505.0		50.0		651.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-70R	EP-71R	EP-71R	EP-74
SAMPLE DATE	06/12/97	06/11/97	06/12/97	06/02/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-13	L972383-1	L972604-14	L972604-15
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	EP-70RJ	EP-71RA	EP-71RE	EP-74H
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<10.0	1117.0	<10.0	<10.0
CADMIUM (CD) TOT	<5.0	99.0	<5.0	<5.0
CHROMIUM (CR) TOT	41.0 J2 J4	93.0 J2	37.0 J2 J4	50.0 J2 J4
COPPER (CU) TOT	24.0	21590.0	25.0	20.0
IRON (FE) TOT	13120.0	49800.0	15160.0	17830.0
LEAD (PB) TOT	15.0	6516.0	25.0	24.0
SELENIUM (SE) TOT	<10.0	36.0	<10.0	<10.0
ZINC (ZN) TOT	37.0	3969.0	40.0	45.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-74	EP-74	EP-76	EP-77
SAMPLE DATE	06/02/97	06/02/97	06/03/97	06/04/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-16	L972604-17	L972604-2	L972604-4
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	EP-74I	EP-74K	EP-76B	EP-77A
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<10.0	31.0	608.0	340.0
CADMIUM (CD) TOT	<5.0	<5.0	14.0	13.0
CHROMIUM (CR) TOT	73.0 J2 J4	97.0 J2 J4	539.0 J2 J4	69.0 J2 J4
COPPER (CU) TOT	16.0	18.0	5242.0	1685.0
IRON (FE) TOT	18190.0	24150.0	229800.0	101300.0
LEAD (PB) TOT	19.0	19.0	5189.0	2119.0
SELENIUM (SE) TOT	<10.0	<10.0	103.0	<10.0
ZINC (ZN) TOT	44.0	52.0	128100.0	1005.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-77		EP-78		EP-84		EP-84	
SAMPLE DATE	06/04/97		06/04/97		06/11/97		06/11/97	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972604-5		L972604-8		L972604-6		L972604-7	
TYPE	HF		HF		HF		HF	
SAMPLE NUMBER	EP-77B		EP-78A		EP-84C		EP-84D	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) TOT	114.0		663.0		15.0		<10.0	
CADMIUM (CD) TOT	38.0		37.0		<5.0		<5.0	
CHROMIUM (CR) TOT	73.0	J2 J4	53.0	J2 J4	52.0	J2 J4	54.0	J2 J4
COPPER (CU) TOT	254.0		570.0		58.0		38.0	
IRON (FE) TOT	32640.0		30960.0		20860.0		20170.0	
LEAD (PB) TOT	706.0		420.0		47.0		26.0	
SELENIUM (SE) TOT	<10.0		<10.0		21.0		<10.0	
ZINC (ZN) TOT	657.0		2111.0		138.0		92.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	EP-86	EP-88	EP-89	EP-89
SAMPLE DATE	06/13/97	06/17/97	06/18/97	06/18/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-3	L972604-9	L972604-10	L972604-11
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	EP-86D	EP-88A	EP-89A	EP-89B
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	<10.0	509.0	337.0	<10.0
CADMIUM (CD) TOT	<5.0	110.0	78.0	<5.0
CHROMIUM (CR) TOT	39.0 J2 J4	67.0 J2 J4	57.0 J2 J4	38.0 J2 J4
COPPER (CU) TOT	25.0	4069.0	3969.0	33.0
IRON (FE) TOT	17540.0	18280.0	26210.0	19300.0
LEAD (PB) TOT	50.0	2776.0	8417.0	38.0
SELENIUM (SE) TOT	<10.0	21.0	11.0	<10.0
ZINC (ZN) TOT	145.0	2574.0	3429.0	66.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-1			RIBH-3		RIBH-5	
SAMPLE DATE	06/19/97			06/30/97		06/30/97	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L972383-4			L972604-18		L972604-19	
TYPE	HF			HF		HF	
SAMPLE NUMBER	RIBH-1A			RIBH-3A		RIBH-5A	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) TOT	2625.0			63.0		27.0	
CADMIUM (CD) TOT	1940.0			<5.0		5.0	
CHROMIUM (CR) TOT	201.0	J2		57.0	J2 J4	37.0	J2 J4
COPPER (CU) TOT	3660.0			114.0		311.0	
IRON (FE) TOT	144500.0			28560.0		26810.0	
LEAD (PB) TOT	10530.0			776.0		236.0	
SELENIUM (SE) TOT	32.0			<10.0		<10.0	
ZINC (ZN) TOT	16530.0			1336.0		2104.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	RIBH-10		SSENT2	SSENT6
SAMPLE DATE	07/01/97		07/17/97	07/17/97
LAB	TSC-SLC		TSC-SLC	TSC-SLC
LAB NUMBER	L972604-20		L972604-28	L972604-29
TYPE	HF		HF	HF
SAMPLE NUMBER	RIBH-10C		SSENT2-A	SSENT6-A
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	10.0		411.0	439.0
CADMIUM (CD) TOT	<5.0		72.0	76.0
CHROMIUM (CR) TOT	25.0	J2 J4	74.0	31.0
COPPER (CU) TOT	16.0		5950.0	3952.0
IRON (FE) TOT	13550.0		31850.0	21190.0
LEAD (PB) TOT	20.0		2574.0	2884.0
SELENIUM (SE) TOT	<10.0		15.0	<10.0
ZINC (ZN) TOT	33.0		3141.0	1925.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSENT7	SSENT7	SSIA1-1	SSIA1-1
SAMPLE DATE	07/17/97	07/17/97	07/15/97	07/15/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-30	L972604-31	L980457-1	L980457-2
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	SSENT7-A	SSENT7-B	SSIA1-1C	SSIA1-1D
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	370.0	14.0	3970.0	3020.0
CADMIUM (CD) TOT	68.0	<5.0	1560.0	946.0
CHROMIUM (CR) TOT	40.0	66.0	65.0	47.0
COPPER (CU) TOT	5781.0	54.0	8283.0	17350.0
IRON (FE) TOT	23110.0	18420.0	47990.0	23030.0
LEAD (PB) TOT	1973.0	47.0	10650.0	21530.0
SELENIUM (SE) TOT	10.0	<10.0	253.0	453.0
ZINC (ZN) TOT	1715.0	48.0	9554.0	6861.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-2	SSIA1-2	SSIA1-3	SSIA1-3
SAMPLE DATE	07/15/97	07/15/97	07/15/97	07/15/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980457-3	L980457-4	L980457-5	L980457-6
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	SSIA1-2C	SSIA1-2D	SSIA1-3C	SSIA1-3D
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	10440.0	11960.0	2429.0	1476.0
CADMIUM (CD) TOT	965.0	868.0	88.0	81.0
CHROMIUM (CR) TOT	66.0	63.0	65.0	79.0
COPPER (CU) TOT	16730.0	13710.0	13440.0	8475.0
IRON (FE) TOT	43760.0	36320.0	85380.0	64050.0
LEAD (PB) TOT	6784.0	2807.0	5769.0	4857.0
SELENIUM (SE) TOT	197.0	82.0	31.0	38.0
ZINC (ZN) TOT	4626.0	3496.0	8526.0	5799.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA1-4	SSIA1-4	SSIA3-1	SSIA3-9	
SAMPLE DATE	07/15/97	07/15/97	07/14/97	07/15/97	
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	
LAB NUMBER	L980457-7	L980457-8	L972604-24	L972383-5	
TYPE	HF	HF	HF	HF	
SAMPLE NUMBER	SSIA1-4C	SSIA1-4D	SSIA3-1A	SSIA3-9B	
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	422.0	148.0	1607.0	532.0	
CADMIUM (CD) TOT	79.0	27.0	349.0	259.0	
CHROMIUM (CR) TOT	59.0	57.0	141.0	74.0	J2
COPPER (CU) TOT	4708.0	2209.0	16460.0	2253.0	
IRON (FE) TOT	33300.0	16860.0	53560.0	21800.0	
LEAD (PB) TOT	3011.0	1040.0	4770.0	2167.0	
SELENIUM (SE) TOT	11.0	<10.0	59.0	15.0	
ZINC (ZN) TOT	4381.0	655.0	5146.0	2333.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE		SSIA4-7		SSIA4-7		SSIA4-11		SSIA4-14	
SAMPLE DATE		10/28/97		10/28/97		10/28/97		10/28/97	
LAB		TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER		L972788-1		L972788-2		L972788-3		L972788-4	
TYPE		HF		HF		HF		HF	
SAMPLE NUMBER		SSIA4-7A2		SSIA4-7B		SSIA4-11A		SSIA4-14A2	
-- METALS & MINOR CONSTITUENTS --									
ARSENIC (AS)	TOT	13120.0		1425.0		1271.0		1236.0	
CADMIUM (CD)	TOT	356.0		212.0		368.0		498.0	
CHROMIUM (CR)	TOT	68.0	J2	184.0	J2	69.0	J2	47.0	J2
COPPER (CU)	TOT	73460.0		40210.0		6483.0		6875.0	
IRON (FE)	TOT	89430.0		31050.0		29660.0		34690.0	
LEAD (PB)	TOT	46060.0		7546.0		6339.0		10720.0	
SELENIUM (SE)	TOT	1644.0	J2	59.0	J2	34.0	J2	38.0	J2
ZINC (ZN)	TOT	8962.0		2775.0		3294.0		4925.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect, Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA4-22			SSIA4-27		SSIA4-27		SSIA5-3	
SAMPLE DATE	10/30/97			10/30/97		10/30/97		07/08/97	
LAB	TSC-SLC			TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972788-5			L972788-7		L972788-6		L972604-22	
TYPE	HF			HF		HF		HF	
SAMPLE NUMBER	SSIA4-22B			SSIA4-27A		SSIA4-27B		SSIA5-3B	
-- METALS & MINOR CONSTITUENTS --									
ARSENIC (AS) TOT	88.0			356.0		18.0		86.0	
CADMIUM (CD) TOT	24.0			111.0		<5.0		16.0	
CHROMIUM (CR) TOT	67.0	J2		72.0	J2	36.0	J2	46.0	
COPPER (CU) TOT	891.0			5080.0		200.0		963.0	
IRON (FE) TOT	18240.0			27940.0		9873.0		16520.0	
LEAD (PB) TOT	863.0			3883.0		83.0		668.0	
SELENIUM (SE) TOT	<10.0	UJ2		12.0	J2	<10.0	UJ2	<10.0	
ZINC (ZN) TOT	615.0			2991.0		87.0		479.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA5-9	SSIA5-9	SSIA5-18	SSIA5-19
SAMPLE DATE	07/08/97	07/08/97	07/14/97	07/14/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-23	L972604-21	L980457-9	L972604-25
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	SSIA5-9A	SSIA5-9B	SSIA5-18D	SSIA5-19B
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	120.0	19.0	<10.0	38.0
CADMIUM (CD) TOT	26.0	<5.0	<5.0	17.0
CHROMIUM (CR) TOT	41.0	45.0	76.0	41.0
COPPER (CU) TOT	2125.0	168.0	27.0	290.0
IRON (FE) TOT	19350.0	14220.0	14290.0	10690.0
LEAD (PB) TOT	617.0	73.0	20.0	216.0
SELENIUM (SE) TOT	<10.0	15.0	<10.0	<10.0
ZINC (ZN) TOT	677.0	73.0	45.0	281.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-4	SSIA8-4	SSIA8-5	SSIA8-5
SAMPLE DATE	07/14/97	07/14/97	07/16/97	07/16/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980457-10	L980457-11	L980457-12	L980457-13
TYPE	HF	HF	HF	HF
SAMPLE NUMBER	SSIA8-4C	SSIA8-4D	SSIA8-5C	SSIA8-5D
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) TOT	4479.0	2333.0	40.0	<10.0
CADMIUM (CD) TOT	778.0	370.0	19.0	7.7
CHROMIUM (CR) TOT	108.0	207.0	126.0	89.0
COPPER (CU) TOT	26120.0	8759.0	813.0	118.0
IRON (FE) TOT	53290.0	37240.0	14090.0	12140.0
LEAD (PB) TOT	47440.0	15790.0	309.0	44.0
SELENIUM (SE) TOT	73.0	17.0	<10.0	<10.0
ZINC (ZN) TOT	18830.0	8094.0	620.0	192.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-6	SSIA8-6	SSIA8-6	SSIA8-7	SSIA8-7
SAMPLE DATE	07/16/97	07/16/97	07/16/97	07/16/97	07/16/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-26	L980457-14	L980457-15	L972604-27	L980457-16
TYPE	HF	HF	HF	HF	HF
SAMPLE NUMBER	SSIA8-6B	SSIA8-6C	SSIA8-6D	SSIA8-7A	SSIA8-7C
-- METALS & MINOR CONSTITUENTS --					
ARSENIC (AS) TOT	80.0	69.0	112.0	87.0	35.0
CADMIUM (CD) TOT	43.0	99.0	86.0	69.0	37.0
CHROMIUM (CR) TOT	61.0	111.0	125.0	30.0	120.0
COPPER (CU) TOT	381.0	490.0	2195.0	734.0	294.0
IRON (FE) TOT	18150.0	18030.0	19220.0	14090.0	13530.0
LEAD (PB) TOT	807.0	1493.0	1934.0	553.0	395.0
SELENIUM (SE) TOT	<10.0	<10.0	<10.0	<10.0	<10.0
ZINC (ZN) TOT	337.0	896.0	1028.0	757.0	284.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-8	SSIA8-10	SSIA8-20
SAMPLE DATE	07/16/97	07/17/97	07/18/97
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L980457-17	L972604-32	L972604-33
TYPE	HF	HF	HF
SAMPLE NUMBER	SSIA8-8C	SSIA8-10A	SSIA8-20B
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) TOT	20.0	12.0	395.0
CADMIUM (CD) TOT	5.3	<5.0	78.0
CHROMIUM (CR) TOT	77.0	12.0	176.0
COPPER (CU) TOT	279.0	138.0	8231.0
IRON (FE) TOT	14770.0	6806.0	149800.0
LEAD (PB) TOT	275.0	50.0	3421.0
SELENIUM (SE) TOT	<10.0	<10.0	34.0
ZINC (ZN) TOT	254.0	119.0	16950.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SSIA8-28	SSIA8-30
SAMPLE DATE	07/18/97	07/18/97
LAB	TSC-SLC	TSC-SLC
LAB NUMBER	L972604-34	L972604-35
TYPE	HF	HF
SAMPLE NUMBER	SSIA8-28B	SSIA8-30A
-- METALS & MINOR CONSTITUENTS --		
ARSENIC (AS) TOT	2579.0	2440.0
CADMIUM (CD) TOT	793.0	980.0
CHROMIUM (CR) TOT	66.0	90.0
COPPER (CU) TOT	7703.0	208400.0
IRON (FE) TOT	42330.0	135200.0
LEAD (PB) TOT	11670.0	22470.0
SELENIUM (SE) TOT	46.0	91.0
ZINC (ZN) TOT	11810.0	13800.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

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SAMPLE NUMBER ORDER

LAB NUMBER ORDER

SECTION 5

REMEDIAL INVESTIGATION
WATER SAMPLES
FALL 1997

DATA VALIDATION REPORT
ASARCO EL PASO COPPER SMELTER
REMEDIAL INVESTIGATION
WATER SAMPLES
FALL 1997

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March 1998

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LIST OF APPENDICES

GLOSSARY OF TERMS

CCB ..... Continuing Calibration Blank

CCV ..... Continuing Calibration Verification

CLP ..... Contract Laboratory Program

CRDL ..... Contract Required Detection Limit

FAA ..... Flame Atomic Absorption

GFAA ..... Graphite Furnace Atomic Absorption

HGAA ..... Hydride Generation Atomic Absorption

ICB ..... Initial Calibration Blank

ICP ..... Inductively Coupled Plasma

ICV ..... Initial Calibration Verification

IDL ..... Instrument Detection Limit

LCS ..... Laboratory Control Sample

MSA ..... Method of Standard Additions

PB ..... Preparation Blank

PRDL ..... Project Required Detection Limit

QAPP ..... Quality Assurance Project Plan

QC ..... Quality Control

RPD ..... Relative Percent Difference

RSD ..... Relative Standard Deviation

SOW ..... Statement of Work

TDS ..... Total Dissolved Solids

SUMMARY

This report covers groundwater samples collected during the fall of 1997 for the Asarco El Paso Copper Smelter Remediation Investigation. This validation has been carried out according to requirements spelled out in the work plan (Asarco El Paso Copper Smelter Remedial Investigation Work Plan, November 1996), which are consistent with those given in the EPA's National Functional Guidelines for Inorganic Data Review (February 1994). Deviations from prescribed quality control procedures and/or exceedances of quality control samples have been noted, and results have been flagged in the database. Data validation codes are defined in Appendix 1, Table 1. Appendix 1 also includes a summary of flagged data (Table 2). Where there are 3 or more existing data points, a statistical historical comparison has been done. A summary of the historical comparison is in Appendix 1, Table 3. The validated database for this data set is in Appendix 2.

Field Quality Control Violations (discussion of these points will be found in Section 3):

⇒ As in August, the required frequency for field quality control samples was not met for the November sampling.

- Thirteen field duplicates were required, and only three were submitted.
- Thirteen field blanks were required, and one was submitted.

⇒ Detections in the rinsate blank submitted for 11/18/97 resulted in a total of 52 flags.

⇒ The field duplicate submitted on 11/13/97 had an RPD of 54% for TSS, resulting in a total of 5 flags to indicate a possible lack of reproducibility.

⇒ The field duplicate submitted on 11/18/97 had an RPD of 43% for TSS, resulting in a total of 7 flags to indicate a possible lack of reproducibility.

⇒ The field duplicate submitted on 11/13/97 had an RPD of 183% for Nitrate+Nitrite as N, resulting in a total of 5 flags to indicate a possible lack of reproducibility.

Given the failure to meet the required frequency of field quality control samples, it was not possible to evaluate the precision and accuracy of the data as set out in the project work plan. Overall, however, the Asarco El Paso Copper Smelter Remedial Investigation water results for November of 1997 are deemed acceptable for the purposes of the project.

⇒ 3.2 percent of the data were flagged 66 out of 2048 results).

⇒ None of the data were rejected.

DATA VALIDATION REPORT

1. INTRODUCTION

This validation applies to inorganic analytes from 65 groundwater and 13 surface water samples collected during November and December of 1997 for the Asarco El Paso Copper Smelter Remedial Investigation.

The total number of samples included 3 groundwater field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
  - _X_ EPA CLP National Functional Guidelines for Inorganics Data Review
  - _X_ Asarco El Paso Copper Smelter Remedial Investigation Work Plan, El Paso, Texas (November 1996)
  - ___ Other

- Overall level of validation:
  - ___ Contract Laboratory Program (CLP)
  - _X_ Standard
  - ___ Visual

  Notes: The validation consisted of a visual check of lab and field data, a check of laboratory and field quality control samples with flagging for any QC samples that were out of control limits.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.
  - _X_ Yes
  - ___ No

- All documentation of field procedures was provided as required.
  - _X_ Yes
  - ___ No

3. FIELD QUALITY CONTROL SAMPLES

The field quality control samples required by the work plan are 1 field blank (DI) and one field duplicate per day or per 20 samples, whichever is more frequent.

- **Field Blanks**: Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

  DI, trip, rinsate, or any other field blanks have been carried out at the proper frequency.
  - ___ Yes
  - _X_ No

Notes: One rinsate field was submitted with the Fall 1997 samples. The samples for this monitoring event were collected on fourteen different days, so fourteen blanks were required. Although no results were flagged due to the omission of field quality control samples, the lack of field blanks makes it difficult to evaluate the accuracy of low concentration results.

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.

___Yes
_X_No

Notes: When an analyte is detected in a blank, associated results up to 5 times the blank level are flagged to indicate that the results may be biased high due to contamination. Results "associated" with a field blank are generally results for samples collected on the same day as the blank.

The sample that was submitted as a rinsate blank had large amounts of contamination in the portion designated for analysis of dissolved constituents. Arsenic was also detected at 0.014 ppm.

Flagging: UJ_1

- **Field duplicates**

  Field duplicates have been collected at the proper frequency.

  ___Yes
  _X_No

  Notes: Samples were collected on fourteen different days. The project work plan requires at least one field duplicate per day. Field duplicates were submitted on only three of the fourteen sampling days.

Site	Sample Number	Date
EP-51	EPRI-9711-119/ 174	11/06/97
EP-77	EPRI-9711-142/ 178	11/13/97
EP-78	EPRI-9711-143/ 179	11/18//97

Field duplicates were not submitted on the following sampling days:

11/03/97
11/04/97
11/05/97
11/07/97
11/10/97
11/11/97
11/14/97
11/17/97
11/19/97
12/12/97
12/22/97

Field duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix.

___Yes
_X_ No

Notes: The field duplicate submitted for 8/26/97 was out of control limits for total suspended solids (TSS), with an RPD of 40% (sample, 6.5 ppm/ duplicate, 9.8 ppm). Five TSS results were flagged to indicate the possibility of lack of reproducibility due to the combined effects of variations in field sampling techniques, sample preparation, and laboratory analytical procedures.

No results were flagged for the failure to meet the quality control sample frequency required by the project work plan. However, it is difficult to assess the reproducibility of sample results for the nine sampling days for which field duplicates were not submitted to the laboratory.

Flagging: J_4/UJ_4

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**
  - ___ CLP-SOW
  - ___ SW-846
  - _X_ Methods for Chemical Analysis of Water and Wastes
  - ___ XRF Standard Operating Procedures

- **Holding times met**
  - _X_ Yes
  - ___No

- **Consistency with project requirements**

  Analyses were carried out as requested.
  - _X_ Yes
  - ___No

  Project specified methods were used.
  - _X_ Yes
  - ___No

5. DETECTION LIMITS

- Reporting detection limits met project required detection limits (PRDLs).

  Notes: With the exception of sulfate, the laboratory reporting limits for the August samples met the established PRDLs. Sulfate was reported down to 2 ppm, and the PRDL was set at 1 ppm.

- Instrument detection limits (IDLs) were provided by the laboratory.

  X NA

  Notes: IDL verifications are not required for the project.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

  Preparation blanks were prepared and analyzed at the required frequency.

  X Yes
  ___ No

  All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

  X Yes
  ___ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

  X Yes
  ___ No

- Matrix spike recoveries were within the required control limits (75-125%).

  X Yes
  ___ No

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

  X Yes
  ___ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix, 35% or less for soil matrix). For low concentration data, that is if the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within ± the PRDL for water matrix, within ± 2 times the PRDL for soil matrix.

_X_ Yes
___ No

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency
  _X_ Yes
  ___ No

- LCS recoveries were within the required control limits (80-120% for water).
  ___ Yes
  _X_ No

  Notes: For laboratory batch L971969, the LCS was out of control limits for total recoverable iron (recovery was 130%). However, the known iron concentration in the LCS was only 0.100 ppm. A recovery of 130% would mean a concentration that measured 0.030 ppm high. Associated samples in the batch had iron concentrations between 3.2 and 5.9 ppm. At such levels, a difference of 0.030 ppm is negligible. Therefore, no iron results were flagged as a result of this LCS exceedance.

  For laboratory batch L971905, the LCS was out of control limits for dissolved zinc (recovery was 122%). For this batch, all zinc results above the reporting detection limit of 20 ppb were flagged to indicate the possibility of a high bias. This resulted in a total of twelve flags.

  Flagging: J_4

10. INTERPARAMETER RELATIONSHIPS

- The following relationships have been checked:
  _X_ Total Recoverable vs Dissolved metals
  _X_ Lab pH vs field pH.
  _X_ TDS vs SC
  _X_ Lab SC vs field SC
  ___ Arsenic speciation/dissolved arsenic

  Lab pH vs field pH: This relationship was generally in order. For the 71 samples for which both lab and field pH were measured, all had percent differences less than or equal to 16%. In all but five cases, the percent differences were less than or equal to 11%.

  TDS vs SC: The ratio of TDS to SC should lie between 0.55 and 0.75. In natural waters with high sulfate, the ratio may be as high as 0.96. This ratio is intended to be a check on the accuracy of the TDS and SC measurements. (It should be noted that these measurements are less accurate in dilute waters.)

  This relationship was generally in order. With two exceptions, TDS to SC ratios ranging from 0.62 to 0.95. For the samples collected at EP-22 (EPRI-9711-110) and EP-25 (EPRI-9711-113) the ratios were very low. Since the SC values were similar to those measured in August, re-analysis of the TDS was

requested. These re-analysis results were acceptable, but were flagged J3 for exceedance of holding time.

Lab SC vs field SC: For the 71 samples for which both lab and field SC were measured, the field SC measurements were higher for all but nine samples; all but one of these nine were collected on 11/10/97.

The percent differences were distributed as follows:

0 to 9%..... 14
10 to 19..... 29
20 to 29..... 20
30 to 39..... 7
over 39..... 1

11. HISTORICAL COMPARISON

The data for November 1997 were compared with historical results from previous data collected at the same sites. A summary of the comparisons are in Appendix 1, Tables 3. This table includes:

- Any result where the current value differs by more than 3 standard deviations from the comparison period mean.
- Any result that is the highest or lowest value for the comparison period.

Following Table 3 are graphs:

- A follow-up graph on EM-1, where depth to water level, specific conductivity, and TDS all appear to have returned to normal levels since the August monitoring event.
- A graph for bicarbonate alkalinity and for total alkalinity as CaCO3 at EM-5. These 2 parameters both show an upward trend.

12. DATA QUALITY OBJECTIVES

- **Project data quality objectives (DQO's) met.**
  _X_ Yes - for Accuracy and Precision
  _X_ No - for Completeness

Data quality objectives for this project are for the quality control samples to be within control limits. Evaluation of field and laboratory QC samples give a measure of the actual precision and accuracy obtained.

Accuracy

The ability to recover a known amount of an analyte is a measure of accuracy. Accuracy is evaluated by laboratory matrix spikes and laboratory control samples for higher analyte concentrations, and by field blanks for analyte concentrations within five times the PRDL.

All of the laboratory control sample recoveries, and all of the matrix spike recoveries were within control limits, indicating good accuracy for the higher concentration results.

Only one field blank was submitted with the August samples, however, making it difficult to evaluate the accuracy of low level results. This was especially true since the rinsate blank that was submitted on November 18 showed contamination and resulted in the flagging of 52 results for samples collected on that day.

Precision

Duplicate measurements give a measure of reproducibility or precision.

All of the laboratory duplicate measurements and 95% of the field duplicate measurements (63 out of 66) were within control limits. However, the required frequency of field duplicates was not met.

Completeness

One measure of completeness is the percentage of valid results obtained. For the Fall El Paso RI monitoring, 100% of the results were valid.

Completeness is also evaluated by how well the sampling event met the requirements of the project work plan. Completeness is achieved when the number of valid measurements is sufficient to address all important issues about a site. The quality of sample analyses is assessed indirectly through the analysis of associated quality control samples.

- **Field measurements were incomplete.** No field parameters were taken at 4 wells because of hydrocarbon contamination and the possibility of damaging instrument probes.

- **Field quality control samples were not submitted at the required frequency.** The work plan sets the frequency of both field blanks (DI) and field duplicates at one in twenty samples or one per day, whichever is more frequent. As discussed in the field quality control sections, this frequency was not met, making it impossible to evaluate the accuracy and precision of the data to the extent set out in the work plan For a total of thirteen days on which samples were collected,
    - One rinsate blank was submitted, 8 percent of the required number of field blanks.
    - Only three field duplicates were submitted, 23 percent of the required number.

REFERENCES

(References appropriate to this project have been checked)

_X_ Hem, J.D., 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd edition. US Geological Survey Water Supply Paper 2254.

_X_ Hydrometrics, 1996. Asarco El Paso Copper Smelter Remedial Investigation Work Plan, November 1996

___ U.S. Environmental Protection Agency, 1990. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition.

_X_ U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983. (EPA, 1983)

___ U.S. Environmental Protection Agency, 1995. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Document Number ILM04.0

_X_ U.S. Environmental Protection Agency, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February 1994.

DATA VALIDATION REPORT

Prepared by: **Clare Bridge**
Reviewed by: **Linda Tangen**

APPENDIX 1

TABLES and GRAPHS

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

CODE		DEFINITION
J	-	The associated numerical value is an estimated quantity because quality control criteria were not met. Subscripts for the "J" qualifier: 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
UJ	-	The material was analyzed for, but was not detected above the associated value. Subscripts for the "UJ" qualifier: 1 - Blank contamination. Indicates possible high bias and/or false positive. 2 - Calibration range exceeded or significant deviation from known value. Possible bias. 3 - Holding time not met. Indicates low bias. 4 - Other QC outside control limits.
R	-	Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	-	Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

Table 2. Summary of Flagged Data
El Paso RI Waters, Fall 1997 Monitoring
(All values in ppm.)

Site	Sample No	Date	Parameter	Result	Flagging Code	Reason for Flag
EP-21	EPRI-9711-109	11/18/97	CALCIUM (CA) DIS	85.0	UJ1	Rinsate blank
EP-22	EPRI-9711-110	11/18/97	TOTAL DISSOLVED SOLIDS (TDS)	7299	J3	Holding time
			TOTAL SUSPENDED SOLIDS	9.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	9.0	J4	Field duplicate
			ARSENIC (AS)(DIS)	0.044	UJ1	Rinsate blank
EP-24	EPRI-9711-112	11/18/97	TOTAL SUSPENDED SOLIDS	8.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	8.0	J4	Field duplicate
			FLUORIDE (F)	3.1	UJ1	Rinsate blank
EP-25	EPRI-9711-113	11/19/97	TOTAL DISSOLVED SOLIDS (TDS)	3213	J3	Holding time
EP-73	EPRI-9711-138	11/13/97	TOTAL SUSPENDED SOLIDS	12.0	J4	Field duplicate
			NITRATE + NITRITE AS N	23	J4	Field duplicate
EP-75	EPRI-9711-140	11/13/97	TOTAL SUSPENDED SOLIDS	41.0	J4	Field duplicate
			NITRATE + NITRITE AS N	193.0	J4	Field duplicate
EP-77	EPRI-9711-142	11/13/97	TOTAL SUSPENDED SOLIDS	142.0	J4	Field duplicate
			NITRATE + NITRITE AS N	13.0	J4	Field duplicate
EP-77 (Dup)	EPRI-9711-178	11/13/97	TOTAL SUSPENDED SOLIDS	82.0	J4	Field duplicate
			NITRATE + NITRITE AS N	0.59	J4	Field duplicate
EP-78	EPRI-9711-143	11/18/97	SC (UMHOS/CM AT 25 C)	2310.0	UJ1	Rinsate blank
			TDS (MEASURED AT 180 C)	1437.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	5.9	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	5.9	J4	Field duplicate
			CALCIUM (CA) DIS	43.0	UJ1	Rinsate blank
			SODIUM (NA) DIS	380.0	UJ1	Rinsate blank
EP-78 (Dup)	EPRI-9711-179	11/18/97	SC (UMHOS/CM AT 25 C)	2320.0	UJ1	Rinsate blank
			TDS (MEASURED AT 180 C)	1484.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	3.8	J4	Field duplicate
			CALCIUM (CA) DIS	44.0	UJ1	Rinsate blank
			CHLORIDE (CL)	179.0	UJ1	Rinsate blank
EP-79	EPRI-9711-144	11/18/97	CALCIUM (CA) DIS	58.0	UJ1	Rinsate blank
			POTASSIUM (K) DIS	12.0	UJ1	Rinsate blank
			CHLORIDE (CL)	432.0	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.01	UJ1	Rinsate blank
EP-82	EPRI-9711-147	11/18/97	SC (UMHOS/CM AT 25 C)	3250.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	36.0	J4	Field duplicate
			CALCIUM (CA) DIS	91.0	UJ1	Rinsate blank
			SODIUM (NA) DIS	613.0	UJ1	Rinsate blank
			POTASSIUM (K) DIS	17.0	UJ1	Rinsate blank
			CHLORIDE (CL)	361.0	UJ1	Rinsate blank
			FLUORIDE (F)	2.7	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.011	UJ1	Rinsate blank
EP-83	EPRI-9711-148	11/18/97	SC (UMHOS/CM AT 25 C)	3940.0	UJ1	Rinsate blank

Table 2. Summary of Flagged Data
El Paso RI Waters, Fall 1997 Monitoring
(All values in ppm.)

Site	Sample No	Date	Parameter	Result	Flagging Code	Reason for Flag
			CALCIUM (CA) DIS	76.0	UJ1	Rinsate blank
			POTASSIUM (K) DIS	13.0	UJ1	Rinsate blank
			CHLORIDE (CL)	399.0	UJ1	Rinsate blank
			FLUORIDE (F)	2.8	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.005	UJ1	Rinsate blank
EP-84	EPRI-9711-149	11/18/97	SC (UMHOS/CM AT 25 C)	2650.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	31.0	J4	Field duplicate
			SODIUM (NA) DIS	264.0	UJ1	Rinsate blank
			POTASSIUM (K) DIS	13.0	UJ1	Rinsate blank
			CHLORIDE (CL)	326.0	UJ1	Rinsate blank
			FLUORIDE (F)	0.77	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.041	UJ1	Rinsate blank
EP-86	EPRI-9711-151	11/18/97	SC (UMHOS/CM AT 25 C)	2650.0	UJ1	Rinsate blank
			CALCIUM (CA) DIS	42.0	UJ1	Rinsate blank
			SODIUM (NA) DIS	519.0	UJ1	Rinsate blank
			POTASSIUM (K) DIS	10.0	UJ1	Rinsate blank
			CHLORIDE (CL)	291.0	UJ1	Rinsate blank
			FLUORIDE (F)	2.7	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.007	UJ1	Rinsate blank
EP-87	EPRI-9711-152	11/18/97	SC (UMHOS/CM AT 25 C)	560.0	UJ1	Rinsate blank
			TDS (MEASURED AT 180 C)	361.0	UJ1	Rinsate blank
			CALCIUM (CA) DIS	66.0	UJ1	Rinsate blank
			SODIUM (NA) DIS	16.0	UJ1	Rinsate blank
			CHLORIDE (CL)	12.0	UJ1	Rinsate blank
			FLUORIDE (F)	0.59	UJ1	Rinsate blank
			ARSENIC (AS)(DIS)	0.033	UJ1	Rinsate blank
EP-89	EPRI-9711-154	11/13/97	TOTAL SUSPENDED SOLIDS	2.9	J4	Field duplicate
			NITRATE + NITRITE AS N	9.0	J4	Field duplicate
RINSATE	EPRI-9711-180	11/18/97	TDS (MEASURED AT 180 C)	531.0	UJ1	Rinsate blank
			TOTAL SUSPENDED SOLIDS	3.8	J4	Field duplicate

TABLE 3.

SUMMARY OF THE COMPARISON OF SAMPLING PERIOD DATA TO THE DATABASE PERIOD DATA, SHOWING PARAMETERS THAT ARE HIGHEST OR OR LOWEST OR THREE OR MORE STANDARD DEVATIONS FROM THE MEAN OF THE DATABASE PERIOD AND THE RELATIONSHIP TO THESE DATA

DataMan Program

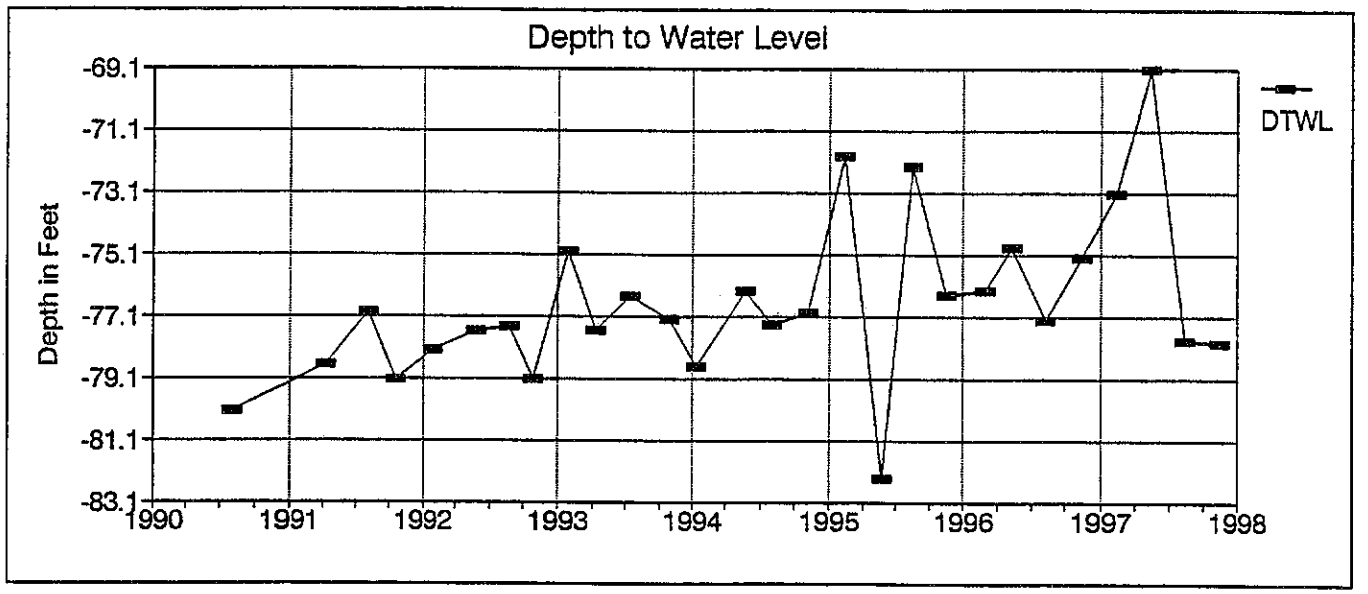
SITE	SAMPLE DATE	RESULT mg/L	PARAMETER	COMPARISON DATABASE PERIOD	N	MIN (mg/L)	MEAN (mg/L)	MAX (mg/L)	STD DEVS FROM MEAN	RELATIONSHIP DATABASE PERIOD
EM-1	11/17/97	6.6	TOTAL SUSPENDED SOLIDS	02/10/97-08/13/97	3	8.500000	31.1667	58.	0.98	LOWEST
EM-2	11/17/97	3960.0	SC (UMHOS/CM AT 25 C)	05/23/90-08/26/97	29	4000.	5193.7931	8850.00000	1.12	LOWEST
		2952.0	TDS (MEASURED AT 180 C)	05/23/90-08/26/97	30	3052.	4112.8667	7503.00000	1.12	LOWEST
		7.5	TOTAL SUSPENDED SOLIDS	02/10/97-08/26/97	3	68.	330.6667	500.000000	1.40	LOWEST
		176.0	CALCIUM (CA) DIS	05/23/90-08/26/97	29	184.000000	318.1379	601.000000	1.21	LOWEST
		11.0	POTASSIUM (K) DIS	05/23/90-08/26/97	29	12.	24.4828	250.0	0.31	LOWEST
		<0.003	LEAD (PB) DIS	05/23/90-08/26/97	29	0.003000		<0.20		LOWEST
EM-4	11/17/97	14110.0	SC (UMHOS/CM AT 25 C) (FLD)	10/30/90-08/11/97	30	11,210.0	10553.2143	12965.	2.02	HIGHEST
EM-5	11/17/97	7.4	TOTAL SUSPENDED SOLIDS	02/10/97-08/26/97	3	12.000000	22.6667	36.	1.25	LOWEST
		174.0	TOTAL ALKALINITY AS CACO3	08/04/90-08/26/97	19	34.	101.5789	162.	1.91	HIGHEST
		212.0	BICARBONATE (HCO3)	05/24/90-08/26/97	29	41.	130.3793	198	1.96	HIGHEST
		<0.05	NITRATE + NITRITE AS N	05/24/90-08/26/97	31	0.050	7.3796	222.	0.18	LOWEST
EM-6	11/17/97	2.2	TOTAL SUSPENDED SOLIDS	02/10/97-08/11/97	3	3.1	7.8333	16.000000	0.79	LOWEST
		6.9	NITRATE + NITRITE AS N	05/24/90-08/11/97	30	7.4	10.3367	41.	0.58	LOWEST
EM-7	11/17/97	8.4	PH	05/24/90-05/17/97	11	7.4	7.7364	8.3	2.65	HIGHEST

NOTES: All quantities in mg/L (Water) or mg/kg (Soil) unless noted. All results LABORATORY unless field (FLD) or calculated (CALC).
N: Number of samples in comparison data set; 50% of data set must be above lab detection limit before mean, median, & SD calculation.
A & R Flags were excluded from Statistics The detection limit was used in calculations.

Generated from s:\statout\\rpASEP03.004
Datatst2 v2.0 9/93

Hydrometrics, Inc. 03/11/98

EM-1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Depth in Feet
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-73.1
-75.1
-77.1
-79.1
-81.1
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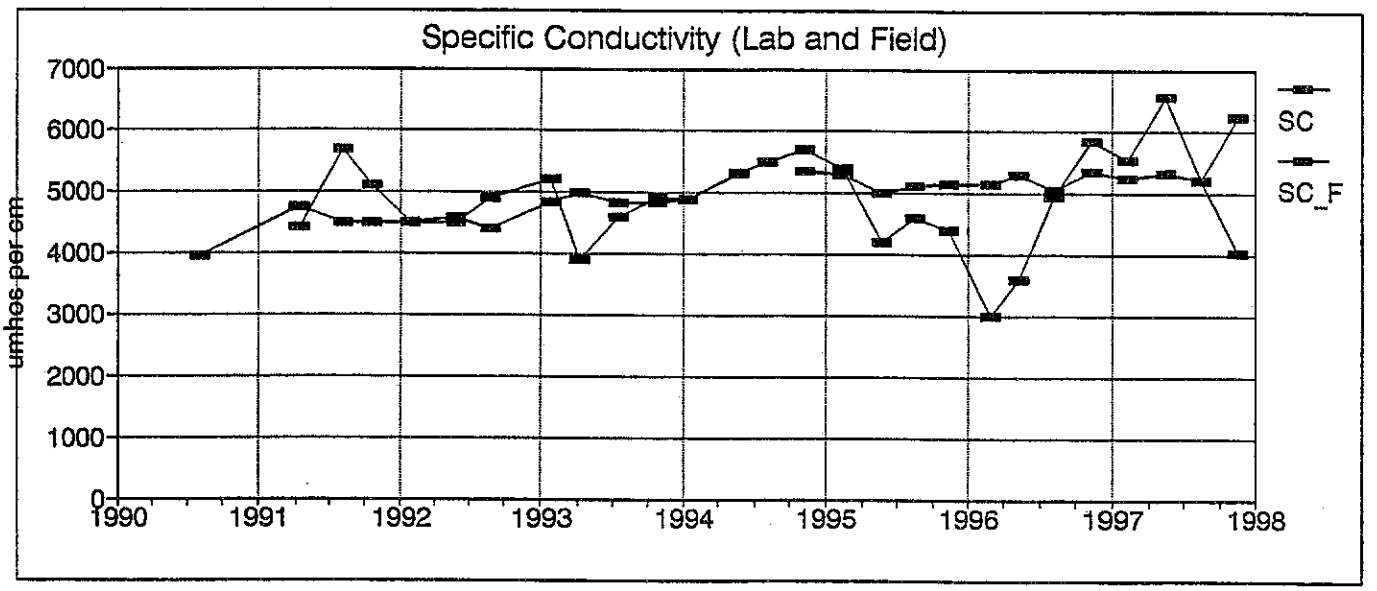
1991
1992
1993
1994
1995
1996
1997
1998
DTWL


Specific Conductivity (Lab and Field)
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6000
5000
4000
3000
2000
1000
0
1990
1991
1992
1993
1994
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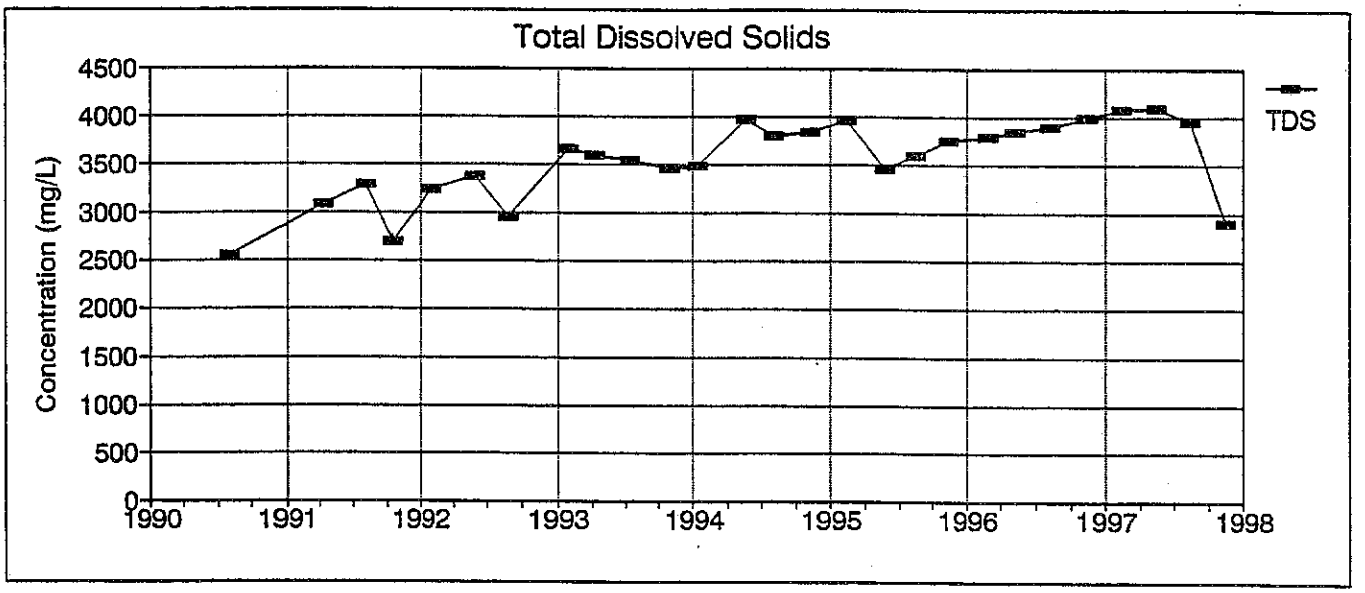
1996
1997
1998
SC
SC_F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Concentration (mg/L)
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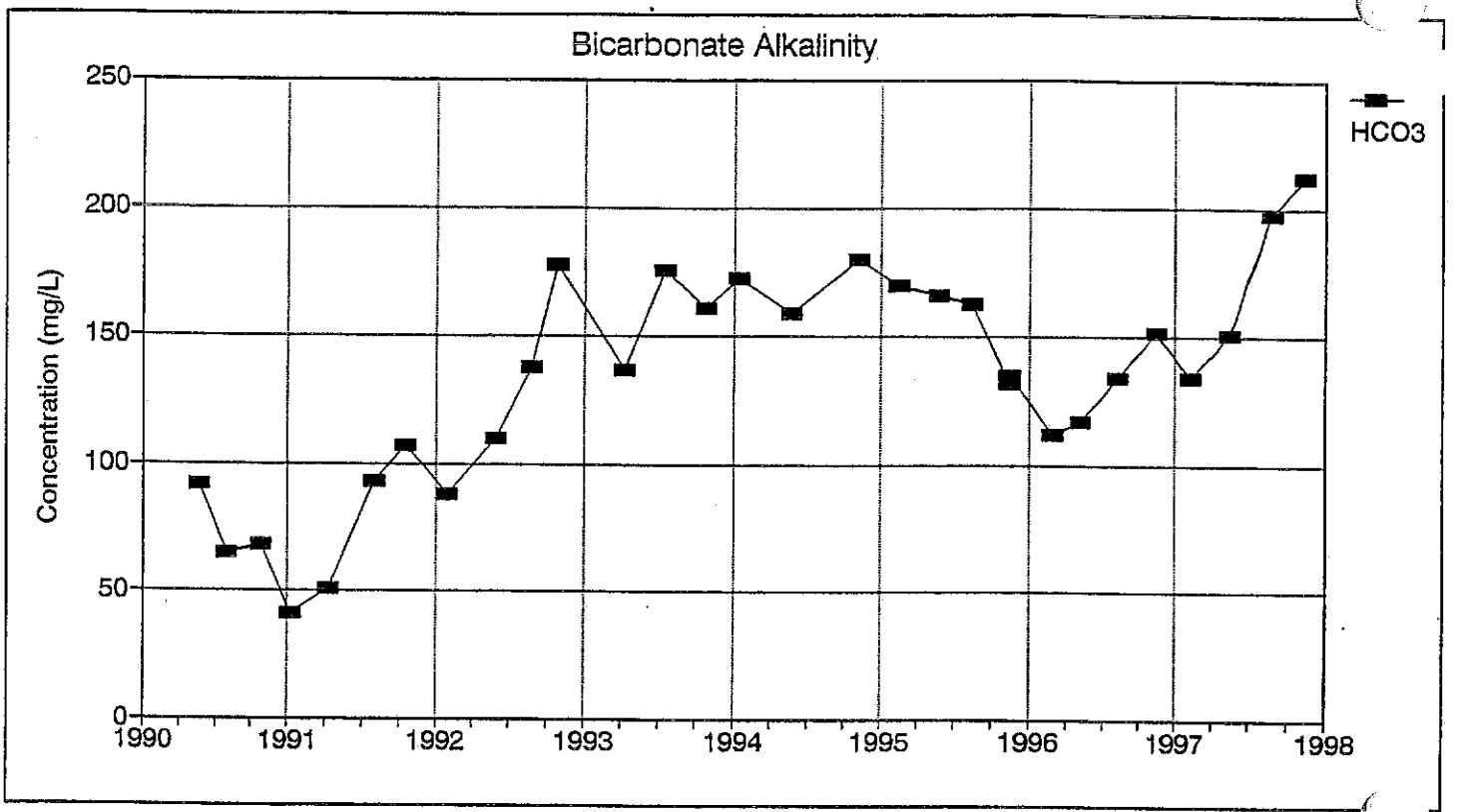
4000
3500
3000
2500
2000
1500
1000
500
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
TDS

EM-5


Bicarbonate Alkalinity
Concentration (mg/L)
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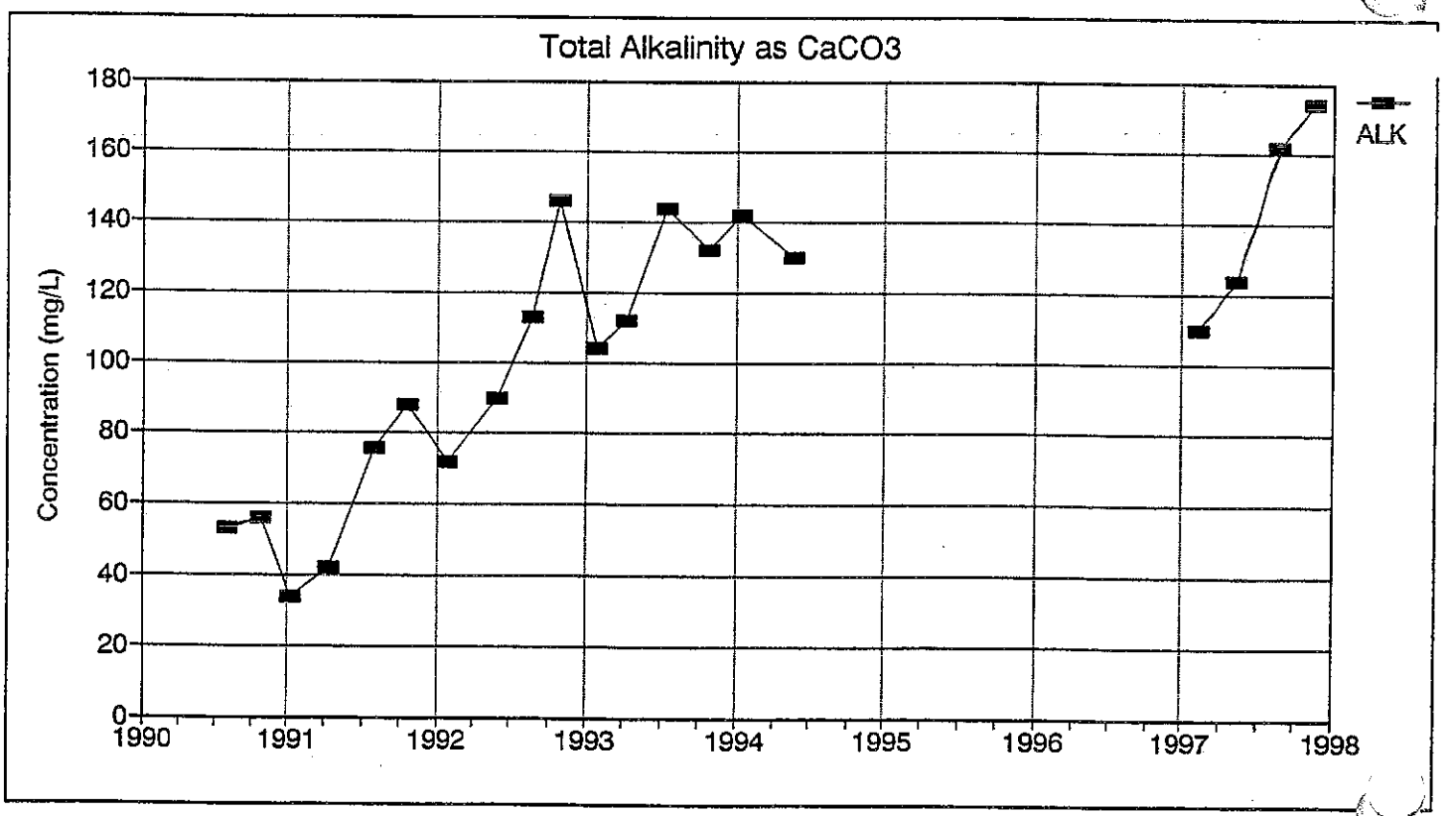
1991
1992
1993
1994
1995
1996
1997
1998
HCO3


Total Alkalinity as CaCO3
Concentration (mg/L)
180
160
140
120
100
80
60
40
20
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
ALK

APPENDIX 2

DATABASE

TABLE OF CONTENTS BY SITE TYPE

TABLE OF CONTENTS BY SITE TYPE

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-1	EM-2	EM-4
SAMPLE DATE	11/17/97	11/17/97	11/17/97
SAMPLE TIME	12:15	11:45	10:50
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972777-6	L972777-5	L972777-4
SAMPLE NUMBER	EPRI-9711-155	EPRI-9711-156	EPRI-9711-158
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	77.95	65.88	63.25
OXYGEN (O) (FLD) DIS	4.96	1.41	2.57
PH (FLD)	7.2	7.0	7.1
PH	8.0	7.7	7.7
SC (UMHOS/CM AT 25 C)	4020.0	3960.0	11300.0
SC (UMHOS/CM AT 25 C) (FLD)	6250.0	5150.0	14110.0
TDS (MEASURED AT 180 C)	2899.0	2952.0	7198.0
TOTAL SUSPENDED SOLIDS	6.6	7.5	7.7
WATER TEMPERATURE (C) (FLD)	21.8	22.7	22.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	173.0	176.0	469.0
MAGNESIUM (MG) DIS	95.0	65.0	211.0
SODIUM (NA) DIS	857.0	704.0	1959.0
POTASSIUM (K) DIS	30.0	11.0	42.0
TOTAL ALKALINITY AS CACO3	148.0	250.0	126.0
BICARBONATE (HCO3)	181.0	305.0	154.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1206.0	1185.0	547.0
CHLORIDE (CL)	564.0	456.0	3423.0
FLUORIDE (F)	0.74	1.3	1.3
-- NUTRIENTS --			
NITRATE + NITRITE AS N	0.073	17.0	0.19
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.007	0.57	<0.005
BARIUM (BA) DIS	<0.1	<0.1	<0.1
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.005	<0.005	<0.005
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
MANGANESE (MN) DIS	0.015	<0.01	<0.01
MERCURY (HG) DIS	<0.0002	<0.0002	<0.0002
SELENIUM (SE) DIS	<0.005	0.11	<0.005
SILVER (AG) DIS	<0.0003	<0.0003	<0.0003
ZINC (ZN) DIS	<0.02	0.023	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EM-5	EM-6	EM-7
SAMPLE DATE	11/17/97	11/17/97	11/17/97
SAMPLE TIME	09:00	09:30	10:20
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972777-1	L972777-2	L972777-3
SAMPLE NUMBER	EPRI-9711-159	EPRI-9711-160	EPRI-9711-161
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	14.62	34.9	8.56
OXYGEN (O) (FLD) DIS	0.79	0.98	1.78
PH (FLD)	7.3	7.15	7.56
PH	7.7	7.6	8.4
SC (UMHOS/CM AT 25 C)	6700.0	4500.0	5700.0
SC (UMHOS/CM AT 25 C) (FLD)	8790.0	5750.0	7070.0
TDS (MEASURED AT 180 C)	5176.0	3372.0	4264.0
TOTAL SUSPENDED SOLIDS	7.4	2.2	54.0
WATER TEMPERATURE (C) (FLD)	25.0	23.7	21.8
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	249.0	124.0	215.0
MAGNESIUM (MG) DIS	60.0	78.0	42.0
SODIUM (NA) DIS	1445.0	902.0	1216.0
POTASSIUM (K) DIS	83.0	14.0	51.0
TOTAL ALKALINITY AS CACO3	174.0	318.0	362.0
BICARBONATE (HCO3)	212.0	388.0	442.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2224.0	1470.0	1864.0
CHLORIDE (CL)	806.0	451.0	714.0
FLUORIDE (F)	6.4	2.0	4.9
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<0.05	6.9	1.5
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	1.7	0.026	1.7
BARIUM (BA) DIS	<0.1	<0.1	<0.1
CADMIUM (CD) DIS	0.069	<0.005	0.021
CHROMIUM (CR) DIS	<0.005	<0.005	0.008
COPPER (CU) DIS	<0.025	0.045	0.067
IRON (FE) DIS	1.8	<0.1	0.35
LEAD (PB) DIS	0.006	<0.003	0.058
MANGANESE (MN) DIS	0.73	<0.01	0.33
MERCURY (HG) DIS	<0.0002	<0.0002	<0.0002
SELENIUM (SE) DIS	0.009	0.11	0.13
SILVER (AG) DIS	<0.0003	<0.0003	<0.0003
ZINC (ZN) DIS	0.31	0.039	0.11

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-4	EP-5	EP-6
SAMPLE DATE	11/04/97	11/04/97	11/04/97
SAMPLE TIME	09:10	09:30	10:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972673-6	L972673-7	L972673-8
SAMPLE NUMBER	EPRI-9711-100	EPRI-9711-101	EPRI-9711-102
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	6.32	5.82	7.8
OXYGEN (O) (FLD) DIS	1.0	2.52	1.03
PH (FLD)	7.46	7.58	7.44
PH	7.8	8.0	7.9
SC (UMHOS/CM AT 25 C)	1656.0	3100.0	7010.0
SC (UMHOS/CM AT 25 C) (FLD)	1906.0	3700.0	7440.0
TDS (MEASURED AT 180 C)	1102.0	2141.0	5909.0
TOTAL SUSPENDED SOLIDS	22.0	186.0	7.5
WATER TEMPERATURE (C) (FLD)	20.2	21.7	23.1
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	56.0	80.0	365.0
MAGNESIUM (MG) DIS	15.0	35.0	118.0
SODIUM (NA) DIS	251.0	623.0	1409.0
POTASSIUM (K) DIS	12.0	11.0	25.0
BICARBONATE (HCO3)	346.0	910.0	425.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	287.0	434.0	2332.0
CHLORIDE (CL)	196.0	343.0	827.0
FLUORIDE (F)	1.4	2.8	1.6
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<0.05	<0.05	17.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.14	0.033	0.031
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.85	<0.1	<0.1
LEAD (PB) DIS	<0.003	0.01	<0.003
SELENIUM (SE) DIS	<0.005	0.033	0.049
ZINC (ZN) DIS	<0.02	0.027	0.024

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-7	EP-12	EP-13
SAMPLE DATE	11/04/97	11/03/97	11/06/97
SAMPLE TIME	11:15	14:25	11:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972673-9	L972673-4	L972701-8
SAMPLE NUMBER	EPRI-9711-103	EPRI-9711-104	EPRI-9711-105
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	7.65	62.41	60.08
OXYGEN (O) (FLD) DIS	1.55	1.44	4.01
PH (FLD)	7.36	6.8	7.11
PH	7.9	7.3	7.8
SC (UMHOS/CM AT 25 C)	2710.0	5840.0	12210.0
SC (UMHOS/CM AT 25 C) (FLD)	2850.0	7490.0	14320.0
TDS (MEASURED AT 180 C)	1974.0	4846.0	10653.0
TOTAL SUSPENDED SOLIDS	15.0	7.9	14.0
WATER TEMPERATURE (C) (FLD)	22.2	24.2	27.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	96.0	370.0	371.0
MAGNESIUM (MG) DIS	32.0	121.0	70.0
SODIUM (NA) DIS	484.0	995.0	3043.0
POTASSIUM (K) DIS	5.9	17.0	91.0
BICARBONATE (HCO3)	390.0	764.0	422.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	687.0	1925.0	5541.0
CHLORIDE (CL)	311.0	539.0	724.0
FLUORIDE (F)	1.8	1.0	1.4
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<0.05	21.0	105.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.084	1.3	46.0
CADMIUM (CD) DIS	<0.005	<0.005	0.8
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	1.2	<0.1	0.15
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	<0.005	6.9	6.7
ZINC (ZN) DIS	<0.02	0.022	0.033

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-14	EP-15	EP-20
SAMPLE DATE	11/05/97	11/06/97	11/03/97
SAMPLE TIME	09:50	12:15	10:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-1	L972701-9	L972673-1
SAMPLE NUMBER	EPRI-9711-106	EPRI-9711-107	EPRI-9711-108
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	59.8	58.55	17.06
OXYGEN (O) (FLD) DIS	0.4	2.37	2.56
PH (FLD)	6.91	7.3	7.05
PH	7.5	7.9	7.3
SC (UMHOS/CM AT 25 C)	4430.0	3060.0	10760.0
SC (UMHOS/CM AT 25 C) (FLD)	5020.0	3180.0	12760.0
TDS (MEASURED AT 180 C)	3686.0	2189.0	10175.0
TOTAL SUSPENDED SOLIDS	3.6	165.0	78.0
WATER TEMPERATURE (C) (FLD)	25.4	24.3	23.5
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	364.0	116.0	520.0
MAGNESIUM (MG) DIS	92.0	42.0	310.0
SODIUM (NA) DIS	623.0	529.0	2253.0
POTASSIUM (K) DIS	53.0	10.0	56.0
BICARBONATE (HCO3)	332.0	290.0	403.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1876.0	974.0	4608.0
CHLORIDE (CL)	347.0	333.0	786.0
FLUORIDE (F)	1.5	0.89	2.4
-- NUTRIENTS --			
NITRATE + NITRITE AS N	19.0	12.0	107.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	1.1	0.013	1.2
CADMIUM (CD) DIS	<0.005	<0.005	0.04
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	0.026
IRON (FE) DIS	0.1	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.36	0.16	0.35
ZINC (ZN) DIS	<0.02	0.021	0.059

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-21	EP-22	EP-23
SAMPLE DATE	11/18/97	11/18/97	11/04/97
SAMPLE TIME	15:00	14:45	14:40
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972784-14	L972784-13	L972673-12
OTHER INFO	Heavy Diesel		
SAMPLE NUMBER	EPRI-9711-109	EPRI-9711-110	EPRI-9711-111
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	28.35	35.8	25.1
OXYGEN (O) (FLD) DIS		1.01	0.73
PH (FLD)	NO MEAS	7.16	7.51
PH	7.8	7.4	7.7
SC (UMHOS/CM AT 25 C)	6260.0	9980.0	6130.0
SC (UMHOS/CM AT 25 C) (FLD)	NO MEAS	12900.0	6810.0
TDS (MEASURED AT 180 C)	3282.0	7299.0	4089.0
TOTAL SUSPENDED SOLIDS	320.0	9.0 J4 UJ1	61.0
WATER TEMPERATURE (C) (FLD)	NO MEAS	23.2	24.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	85.0 UJ1	350.0	181.0
MAGNESIUM (MG) DIS	49.0	164.0	96.0
SODIUM (NA) DIS	1032.0	1942.0	876.0
POTASSIUM (K) DIS	450.0	116.0	76.0
BICARBONATE (HCO3)	1510.0	399.0	322.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1258.0	3341.0	2236.0
CHLORIDE (CL)	826.0	1368.0	541.0
FLUORIDE (F)	5.4	4.2	3.2
-- NUTRIENTS --			
NITRATE + NITRITE AS N	<0.05	158.0	0.16
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.067	0.044 UJ1	4.0
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.39	<0.1	0.46
LEAD (PB) DIS	<0.003	0.006	<0.003
SELENIUM (SE) DIS	0.073	0.11	0.023
ZINC (ZN) DIS	0.031	0.91	0.028

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-24			EP-25		EP-26	
SAMPLE DATE	11/18/97			11/19/97		11/04/97	
SAMPLE TIME	15:45			10:00		13:20	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L972784-15			L972784-18		L972673-10	
OTHER INFO	Heavy Sheen			Heavy Diesel			
SAMPLE NUMBER	EPRI-9711-112			EPRI-9711-113		EPRI-9711-114	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	26.64			46.19		56.7	
OXYGEN (O) (FLD) DIS	NO MEAS			NO MEAS		5.05	
PH (FLD)	NO MEAS			NO MEAS		7.15	
PH	7.7			7.8		7.3	
SC (UMHOS/CM AT 25 C)	5940.0			5470.0		1700.0	
SC (UMHOS/CM AT 25 C) (FLD)	NO MEAS			NO MEAS		1900.0	
TDS (MEASURED AT 180 C)	4168.0			3213.0	J3	1191.0	
TOTAL SUSPENDED SOLIDS	8.0	J4 UJ1		43.0		99.0	
WATER TEMPERATURE (C) (FLD)	NO MEAS			NO MEAS		25.5	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	393.0			74.0		62.0	
MAGNESIUM (MG) DIS	56.0			33.0		13.0	
SODIUM (NA) DIS	1030.0			1136.0		244.0	
POTASSIUM (K) DIS	53.0			59.0		20.0	
BICARBONATE (HCO3)	1037.0			1556.0		44.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	1338.0			304.0		561.0	
CHLORIDE (CL)	1003.0			965.0		163.0	
FLUORIDE (F)	3.1	UJ1		1.7		1.4	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	<0.05			<0.05		3.9	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.071			3.5		0.32	
CADMIUM (CD) DIS	<0.005			<0.005		1.5	
CHROMIUM (CR) DIS	<0.01			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		0.16	
IRON (FE) DIS	<0.1			4.8		<0.1	
LEAD (PB) DIS	<0.003			0.011		0.01	
SELENIUM (SE) DIS	0.079			0.079		0.27	
ZINC (ZN) DIS	<0.02			0.037		4.2	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-29	EP-35	EP-43
SAMPLE DATE	11/03/97	11/03/97	11/03/97
SAMPLE TIME	12:00	14:00	15:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972673-2	L972673-3	L972673-5
SAMPLE NUMBER	EPRI-9711-115	EPRI-9711-116	EPRI-9711-172
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	16.92	17.28	59.63
OXYGEN (O) (FLD) DIS	0.52	1.75	0.52
PH (FLD)	7.09	6.92	7.31
PH	7.9	7.5	7.6
SC (UMHOS/CM AT 25 C)	2960.0	6340.0	4950.0
SC (UMHOS/CM AT 25 C) (FLD)	3610.0	7420.0	5830.0
TDS (MEASURED AT 180 C)	2096.0	5731.0	3361.0
TOTAL SUSPENDED SOLIDS	56.0	73.0	14.0
WATER TEMPERATURE (C) (FLD)	24.6	22.5	23.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	50.0	408.0	118.0
MAGNESIUM (MG) DIS	18.0	165.0	55.0
SODIUM (NA) DIS	576.0	1116.0	974.0
POTASSIUM (K) DIS	24.0	19.0	60.0
BICARBONATE (HCO3)	395.0	493.0	656.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	706.0	2396.0	987.0
CHLORIDE (CL)	305.0	527.0	806.0
FLUORIDE (F)	3.0	1.1	2.6
-- NUTRIENTS --			
NITRATE + NITRITE AS N	6.3	86.0	<0.05
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.48	0.4	0.78
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	1.8	<0.1	1.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.12	6.7	0.053
ZINC (ZN) DIS	0.03	0.022	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-49	EP-51	EP-51	EP-52
SAMPLE DATE	11/19/97	11/06/97	11/06/97	11/06/97
SAMPLE TIME	08:45	15:20	15:30	14:25
LAB	TSC-SLC	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972784-16	L972701-11	L972701-12	L972701-10
REMARKS			DUPLICATE	
OTHER INFO	Heavy Diesel			
SAMPLE NUMBER	EPRI-9711-117	EPRI-9711-118	EPRI-9711-174	EPRI-9711-173
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	64.02	48.8	NO MEAS	45.92
OXYGEN (O) (FLD) DIS	NO MEAS	2.35	NO MEAS	??6.54
PH (FLD)	NO MEAS	6.58	NO MEAS	6.1
PH	3.5	7.3	7.2	7.1
SC (UMHOS/CM AT 25 C)	11740.0	11670.0	11440.0	9750.0
SC (UMHOS/CM AT 25 C) (FLD)	NO MEAS	12140.0	NO MEAS	11000.0
TDS (MEASURED AT 180 C)	17185.0	9116.0	8894.0	8243.0
TOTAL SUSPENDED SOLIDS	465.0	41.0	45.0	57.0
WATER TEMPERATURE (C) (FLD)	NO MEAS	25.3	NO MEAS	26.0
-- MAJOR CONSTITUENTS --				
CALCIUM (CA) DIS	493.0	658.0	645.0	537.0
MAGNESIUM (MG) DIS	303.0	469.0	461.0	211.0
SODIUM (NA) DIS	869.0	1437.0	1409.0	1893.0
POTASSIUM (K) DIS	182.0	47.0	46.0	23.0
BICARBONATE (HCO3)	<1.0	268.0	270.0	571.0
CARBONATE AS CO3	<1.0	<1.0	<1.0	<1.0
SULFATE (SO4)	9515.0	2401.0	2432.0	2953.0
CHLORIDE (CL)	867.0	2609.0	2746.0	1330.0
FLUORIDE (F)	33.0	1.5	1.6	6.3
-- NUTRIENTS --				
NITRATE + NITRITE AS N	<0.2	138.0	134.0	157.0
-- METALS & MINOR CONSTITUENTS --				
ARSENIC (AS) DIS	207.0	0.29	0.28	0.97
CADMIUM (CD) DIS	43.0	0.18	0.21	0.64
CHROMIUM (CR) DIS	0.24	0.031	0.022	0.017
COPPER (CU) DIS	5.1	0.19	0.19	0.53
IRON (FE) DIS	1732.0	2.2	2.2	0.55
LEAD (PB) DIS	0.11	<0.003	<0.003	0.044
SELENIUM (SE) DIS	0.11	0.16	0.19	0.36
ZINC (ZN) DIS	579.0	4.4	5.1	2.6

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-54	EP-55	EP-56
SAMPLE DATE	11/06/97	11/19/97	11/04/97
SAMPLE TIME	16:20	09:30	14:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-13	L972784-17	L972673-11
SAMPLE NUMBER	EPRI-9711-119	EPRI-9711-120	EPRI-9711-121
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	69.05	54.19	48.51
OXYGEN (O) (FLD) DIS	2.51	2.12	0.77
PH (FLD)	6.14	6.25	7.12
PH	6.8	6.9	7.6
SC (UMHOS/CM AT 25 C)	10750.0	10480.0	5520.0
SC (UMHOS/CM AT 25 C) (FLD)	12010.0	12860.0	5930.0
TDS (MEASURED AT 180 C)	9568.0	7450.0	4378.0
TOTAL SUSPENDED SOLIDS	222.0	516.0	565.0
WATER TEMPERATURE (C) (FLD)	16.7	21.2	23.9
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	455.0	521.0	265.0
MAGNESIUM (MG) DIS	307.0	334.0	65.0
SODIUM (NA) DIS	1984.0	1830.0	1080.0
POTASSIUM (K) DIS	375.0	211.0	26.0
BICARBONATE (HCO3)	497.0	1098.0	354.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	5255.0	5186.0	1863.0
CHLORIDE (CL)	791.0	998.0	646.0
FLUORIDE (F)	13.0	24.0	2.4
-- NUTRIENTS --			
NITRATE + NITRITE AS N	0.3	<0.05	2.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	29.0	59.0	2.9
CADMIUM (CD) DIS	4.5	0.043	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	0.57	<0.025	<0.025
IRON (FE) DIS	14.0	130.0	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.071	0.24	0.057
ZINC (ZN) DIS	94.0	82.0	0.022

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-57	EP-58	EP-59
SAMPLE DATE	11/14/97	11/14/97	11/05/97
SAMPLE TIME	11:30	09:40	13:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972756-7	L972756-6	L972701-2
SAMPLE NUMBER	EPRI-9711-122	EPRI-9711-123	EPRI-9711-124
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	9.64	15.1	1320.0
OXYGEN (O) (FLD) DIS	1.72	0.84	0.2
PH (FLD)	7.01	6.54	7.23
PH	7.4	6.9	7.6
SC (UMHOS/CM AT 25 C)	3070.0	11480.0	4660.0
SC (UMHOS/CM AT 25 C) (FLD)	3500.0	14130.0	5340.0
TDS (MEASURED AT 180 C)	2159.0	9286.0	3629.0
TOTAL SUSPENDED SOLIDS	14.0	28.0	6.0
WATER TEMPERATURE (C) (FLD)	23.4	23.5	25.8
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	104.0	487.0	169.0
MAGNESIUM (MG) DIS	79.0	178.0	84.0
SODIUM (NA) DIS	525.0	2396.0	818.0
POTASSIUM (K) DIS	25.0	260.0	95.0
BICARBONATE (HCO3)	1143.0	1274.0	512.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	466.0	4699.0	1555.0
CHLORIDE (CL)	278.0	930.0	421.0
FLUORIDE (F)	1.0	4.7	4.8
-- NUTRIENTS --			
NITRATE + NITRITE AS N	1.5	<0.05	8.8
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.97	4.8	3.8
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.28	0.98	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	<0.005	0.027	0.21
ZINC (ZN) DIS	<0.02	0.024	0.021

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-60	EP-61	EP-62
SAMPLE DATE	11/05/97	11/14/97	11/05/97
SAMPLE TIME	15:25	10:30	14:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-6	L972756-9	L972701-4
SAMPLE NUMBER	EPRI-9711-125	EPRI-9711-126	EPRI-9711-127
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	10.02	12.63	9.55
OXYGEN (O) (FLD) DIS	0.16	1.71	1.16
PH (FLD)	6.99	6.93	7.09
PH	7.5	7.2	7.7
SC (UMHOS/CM AT 25 C)	8560.0	9080.0	5050.0
SC (UMHOS/CM AT 25 C) (FLD)	9660.0	11290.0	5580.0
TDS (MEASURED AT 180 C)	7339.0	7684.0	3897.0
TOTAL SUSPENDED SOLIDS	27.0	38.0	8.2
WATER TEMPERATURE (C) (FLD)	25.8	23.3	24.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	571.0	436.0	216.0
MAGNESIUM (MG) DIS	229.0	182.0	96.0
SODIUM (NA) DIS	1417.0	1962.0	906.0
POTASSIUM (K) DIS	17.0	28.0	64.0
BICARBONATE (HCO3)	290.0	439.0	400.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	3090.0	3446.0	1919.0
CHLORIDE (CL)	1227.0	941.0	497.0
FLUORIDE (F)	1.6	1.7	2.9
-- NUTRIENTS --			
NITRATE + NITRITE AS N	90.0	164.0	7.3
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	<0.005	0.011	1.2
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.8	1.2	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.24	0.38	0.39
ZINC (ZN) DIS	0.021	0.021	0.023

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-63	EP-64	EP-65
SAMPLE DATE	11/05/97	11/05/97	11/14/97
SAMPLE TIME	14:45	13:30	11:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-5	L972701-3	L972756-8
SAMPLE NUMBER	EPRI-9711-128	EPRI-9711-129	EPRI-9711-130
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	93.0	12.05	10.94
OXYGEN (O) (FLD) DIS	0.33	0.19	1.4
PH (FLD)	7.16	7.25	7.02
PH	7.8	7.8	7.6
SC (UMHOS/CM AT 25 C)	8260.0	11000.0	7380.0
SC (UMHOS/CM AT 25 C) (FLD)	9220.0	13050.0	9180.0
TDS (MEASURED AT 180 C)	6381.0	9787.0	6235.0
TOTAL SUSPENDED SOLIDS	32.0	65.0	25.0
WATER TEMPERATURE (C) (FLD)	25.0	25.9	23.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	260.0	482.0	373.0
MAGNESIUM (MG) DIS	152.0	155.0	143.0
SODIUM (NA) DIS	1747.0	2601.0	1480.0
POTASSIUM (K) DIS	35.0	23.0	30.0
BICARBONATE (HCO3)	479.0	389.0	555.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2779.0	4379.0	2699.0
CHLORIDE (CL)	1018.0	916.0	676.0
FLUORIDE (F)	2.3	2.0	1.9
-- NUTRIENTS --			
NITRATE + NITRITE AS N	21.0	114.0	66.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.021	0.048	0.013
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.11	0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.21	0.7	0.29
ZINC (ZN) DIS	0.025	0.03	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-66	EP-67	EP-68
SAMPLE DATE	11/05/97	11/07/97	11/11/97
SAMPLE TIME	16:00	08:50	08:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-7	L972701-14	L972740-9
SAMPLE NUMBER	EPRI-9711-131	EPRI-9711-132	EPRI-9711-133
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	11.85	41.62	62.85
OXYGEN (O) (FLD) DIS	1.3	0.9	6.09
PH (FLD)	6.8	6.84	7.11
PH	7.5	7.4	7.3
SC (UMHOS/CM AT 25 C)	7920.0	4460.0	5440.0
SC (UMHOS/CM AT 25 C) (FLD)	9020.0	5000.0	5590.0
TDS (MEASURED AT 180 C)	7183.0	4028.0	4350.0
TOTAL SUSPENDED SOLIDS	19.0	12.0	38.0
WATER TEMPERATURE (C) (FLD)	27.1	24.5	22.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	618.0	456.0	314.0
MAGNESIUM (MG) DIS	143.0	144.0	132.0
SODIUM (NA) DIS	1502.0	472.0	841.0
POTASSIUM (K) DIS	48.0	15.0	12.0
BICARBONATE (HCO3)	498.0	256.0	223.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	3435.0	2228.0	1725.0
CHLORIDE (CL)	699.0	377.0	751.0
FLUORIDE (F)	3.2	0.79	0.7
-- NUTRIENTS --			
NITRATE + NITRITE AS N	44.0	17.0	24.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	11.0	0.042	<0.005
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	0.15	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.26	0.15	0.32
ZINC (ZN) DIS	0.027	0.038	0.023

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-70	EP-71	EP-72
SAMPLE DATE	11/07/97	11/07/97	11/07/97
SAMPLE TIME	10:15	09:40	11:00
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972701-16	L972701-15	L972701-17
SAMPLE NUMBER	EPRI-9711-135	EPRI-9711-136	EPRI-9711-137
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	62.12	50.38	61.72
OXYGEN (O) (FLD) DIS	0.75	0.54	0.95
PH (FLD)	6.91	6.85	6.86
PH	7.5	7.5	7.4
SC (UMHOS/CM AT 25 C)	6740.0	6470.0	6040.0
SC (UMHOS/CM AT 25 C) (FLD)	7510.0	7180.0	6810.0
TDS (MEASURED AT 180 C)	5436.0	5567.0	5075.0
TOTAL SUSPENDED SOLIDS	6.4	10.0	11.0
WATER TEMPERATURE (C) (FLD)	24.5	24.5	25.2
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	298.0	380.0	347.0
MAGNESIUM (MG) DIS	165.0	185.0	162.0
SODIUM (NA) DIS	1236.0	1091.0	995.0
POTASSIUM (K) DIS	25.0	18.0	22.0
BICARBONATE (HCO3)	300.0	298.0	287.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	2586.0	2564.0	2522.0
CHLORIDE (CL)	624.0	573.0	608.0
FLUORIDE (F)	1.2	0.92	1.4
-- NUTRIENTS --			
NITRATE + NITRITE AS N	62.0	99.0	59.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	1.7	0.19	0.49
CADMIUM (CD) DIS	0.013	<0.005	0.2
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.22	0.32	0.38
ZINC (ZN) DIS	0.18	0.027	0.47

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-73			EP-75			EP-76
SAMPLE DATE	11/13/97			11/13/97			11/11/97
SAMPLE TIME	10:25			09:15			10:30
LAB	TSC-SLC			TSC-SLC			TSC-SLC
LAB NUMBER	L972756-2			L972756-1			L972740-11
SAMPLE NUMBER	EPRI-9711-138			EPRI-9711-140			EPRI-9711-141
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	70.2			55.38			49.97
OXYGEN (O) (FLD) DIS	1.2			1.96			0.16
PH (FLD)	6.91			6.82			7.21
PH	7.4			7.2			7.5
SC (UMHOS/CM AT 25 C)	6520.0			18340.0			4670.0
SC (UMHOS/CM AT 25 C) (FLD)	8610.0			21300.0			5050.0
TDS (MEASURED AT 180 C)	5329.0			18239.0			3497.0
TOTAL SUSPENDED SOLIDS	12.0	J4		41.0	J4		5.6
WATER TEMPERATURE (C) (FLD)	27.9			24.6			22.4
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	265.0			406.0			157.0
MAGNESIUM (MG) DIS	113.0			407.0			88.0
SODIUM (NA) DIS	1087.0			5246.0			891.0
POTASSIUM (K) DIS	382.0			760.0			58.0
BICARBONATE (HCO3)	287.0			742.0			486.0
CARBONATE AS CO3	<1.0			<1.0			<1.0
SULFATE (SO4)	2584.0			10061.0			1498.0
CHLORIDE (CL)	441.0			258.0			479.0
FLUORIDE (F)	2.6			1.5			2.1
-- NUTRIENTS --							
NITRATE + NITRITE AS N	23.0	J4		193.0	J4		4.6
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.033			21.0			0.48
CADMIUM (CD) DIS	<0.005			0.019			<0.005
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01
COPPER (CU) DIS	<0.025			0.051			<0.025
IRON (FE) DIS	<0.1			<0.1			<0.1
LEAD (PB) DIS	<0.003			0.003			0.004
SELENIUM (SE) DIS	1.1			4.0			0.17
ZINC (ZN) DIS	0.033			0.16			0.078

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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-77		EP-77		EP-78		EP-78	
SAMPLE DATE	11/13/97		11/13/97		11/18/97		11/18/97	
SAMPLE TIME	11:15		11:25		09:25		09:30	
LAB	TSC-SLC		TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972756-3		L972756-4		L972784-6		L972784-7	
REMARKS			DUPLICATE				DUPLICATE	
SAMPLE NUMBER	EPRI-9711-142		EPRI-9711-178		EPRI-9711-143		EPRI-9711-179	
-- PHYSICAL PARAMETERS --								
DEPTH TO WATER LEVEL (FEET)	41.2		NO MEAS		31.1		NO MEAS	
OXYGEN (O) (FLD) DIS	1.5		NO MEAS		0.74		NO MEAS	
PH (FLD)	7.02		NO MEAS		7.77		NO MEAS	
PH	7.6		7.6		7.9		7.9	
SC (UMHOS/CM AT 25 C)	5350.0		5360.0		2310.0	UJ1	2320.0	UJ1
SC (UMHOS/CM AT 25 C) (FLD)	6550.0		NO MEAS		2940.0		NO MEAS	
TDS (MEASURED AT 180 C)	3956.0		4057.0		1437.0	UJ1	1484.0	UJ1
TOTAL SUSPENDED SOLIDS	142.0	J4	82.0	J4	5.9	J4 UJ1	3.8	J4
WATER TEMPERATURE (C) (FLD)	24.2		NO MEAS		23.3		NO MEAS	
-- MAJOR CONSTITUENTS --								
CALCIUM (CA) DIS	223.0		226.0		43.0	UJ1	44.0	UJ1
MAGNESIUM (MG) DIS	53.0		55.0		24.0		24.0	
SODIUM (NA) DIS	1030.0		1045.0		380.0	UJ1	381.0	
POTASSIUM (K) DIS	36.0		35.0		46.0		46.0	
BICARBONATE (HCO3)	309.0		310.0		295.0		299.0	
CARBONATE AS CO3	<1.0		<1.0		<1.0		<1.0	
SULFATE (SO4)	1793.0		1793.0		674.0		654.0	
CHLORIDE (CL)	608.0		621.0		179.0		179.0	UJ1
FLUORIDE (F)	2.4		2.2		4.8		4.9	
-- NUTRIENTS --								
NITRATE + NITRITE AS N	13.0	J4	0.59	J4	9.2		8.7	
-- METALS & MINOR CONSTITUENTS --								
ARSENIC (AS) DIS	6.0		5.7		5.6		5.6	
CADMIUM (CD) DIS	0.013		0.012		<0.005		<0.005	
CHROMIUM (CR) DIS	<0.01		<0.01		<0.01		<0.01	
COPPER (CU) DIS	<0.025		<0.025		<0.025		<0.025	
IRON (FE) DIS	<0.1		<0.1		<0.1		<0.1	
LEAD (PB) DIS	0.005		0.005		<0.003		<0.003	
SELENIUM (SE) DIS	0.019		0.024		0.24		0.24	
ZINC (ZN) DIS	0.022		0.022		<0.02		<0.02	

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-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-79			EP-80		EP-81	
SAMPLE DATE	11/18/97			11/17/97		11/17/97	
SAMPLE TIME	08:50			13:15		14:20	
LAB	TSC-SLC			TSC-SLC		TSC-SLC	
LAB NUMBER	L972784-5			L972784-1		L972784-3	
SAMPLE NUMBER	EPRI-9711-144			EPRI-9711-145		EPRI-9711-146	
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	45.2			11.83		18.42	
OXYGEN (O) (FLD) DIS	0.77			2.9		2.88	
PH (FLD)	7.43			7.05		6.9	
PH	8.2			7.9		7.8	
SC (UMHOS/CM AT 25 C)	4900.0			5100.0		2390.0	
SC (UMHOS/CM AT 25 C) (FLD)	6500.0			6840.0		3290.0	
TDS (MEASURED AT 180 C)	3560.0			4029.0		1809.0	
TOTAL SUSPENDED SOLIDS	89.0			127.0		11.0	
WATER TEMPERATURE (C) (FLD)	25.1			25.5		26.1	
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	58.0	UJ1		226.0		150.0	
MAGNESIUM (MG) DIS	71.0			85.0		79.0	
SODIUM (NA) DIS	1153.0			1052.0		311.0	
POTASSIUM (K) DIS	12.0	UJ1		19.0		14.0	
BICARBONATE (HCO3)	454.0			542.0		534.0	
CARBONATE AS CO3	<1.0			<1.0		<1.0	
SULFATE (SO4)	1802.0			2004.0		748.0	
CHLORIDE (CL)	432.0	UJ1		356.0		102.0	
FLUORIDE (F)	3.7			1.3		1.2	
-- NUTRIENTS --							
NITRATE + NITRITE AS N	10.0			5.0		8.2	
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS	0.01	UJ1		0.018		0.19	
CADMIUM (CD) DIS	<0.005			<0.005		<0.005	
CHROMIUM (CR) DIS	0.012			<0.01		<0.01	
COPPER (CU) DIS	<0.025			<0.025		<0.025	
IRON (FE) DIS	<0.1			<0.1		<0.1	
LEAD (PB) DIS	<0.003			<0.003		<0.003	
SELENIUM (SE) DIS	0.19			0.041		0.21	
ZINC (ZN) DIS	<0.02			<0.02		0.025	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-82		EP-83		EP-84	
SAMPLE DATE	11/18/97		11/18/97		11/18/97	
SAMPLE TIME	09:45		11:50		10:50	
LAB	TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972784-8		L972784-11		L972784-9	
SAMPLE NUMBER	EPRI-9711-147		EPRI-9711-148		EPRI-9711-149	
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	16.13		27.52		7.58	
OXYGEN (O) (FLD) DIS	2.15		4.42		1.37	
PH (FLD)	7.03		7.36		7.16	
PH	8.0		8.2		8.1	
SC (UMHOS/CM AT 25 C)	3250.0	UJ1	3940.0	UJ1	2650.0	UJ1
SC (UMHOS/CM AT 25 C) (FLD)	4070.0		4930.0		3260.0	
TDS (MEASURED AT 180 C)	2274.0		2741.0		1979.0	
TOTAL SUSPENDED SOLIDS	36.0	J4	112.0		31.0	J4
WATER TEMPERATURE (C) (FLD)	23.3		22.5		21.4	
-- MAJOR CONSTITUENTS --						
CALCIUM (CA) DIS	91.0	UJ1	76.0	UJ1	201.0	
MAGNESIUM (MG) DIS	48.0		68.0		96.0	
SODIUM (NA) DIS	613.0	UJ1	799.0		264.0	UJ1
POTASSIUM (K) DIS	17.0	UJ1	13.0	UJ1	13.0	UJ1
BICARBONATE (HCO3)	508.0		415.0		284.0	
CARBONATE AS CO3	<1.0		<1.0		<1.0	
SULFATE (SO4)	865.0		1192.0		826.0	
CHLORIDE (CL)	361.0	UJ1	399.0	UJ1	326.0	UJ1
FLUORIDE (F)	2.7	UJ1	2.8	UJ1	0.77	UJ1
-- NUTRIENTS --						
NITRATE + NITRITE AS N	6.4		6.9		7.2	
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) DIS	0.011	UJ1	0.005	UJ1	0.041	UJ1
CADMIUM (CD) DIS	<0.005		<0.005		0.007	
CHROMIUM (CR) DIS	<0.01		<0.01		<0.01	
COPPER (CU) DIS	<0.025		<0.025		<0.025	
IRON (FE) DIS	<0.1		<0.1		<0.1	
LEAD (PB) DIS	<0.003		<0.003		0.01	
SELENIUM (SE) DIS	0.21		0.037		0.031	
ZINC (ZN) DIS	<0.02		<0.02		0.035	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-85	EP-86	EP-87
SAMPLE DATE	11/17/97	11/18/97	11/18/97
SAMPLE TIME	13:50	08:20	11:15
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972784-2	L972784-4	L972784-10
SAMPLE NUMBER	EPRI-9711-150	EPRI-9711-151	EPRI-9711-152
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	13.6	49.27	11.47
OXYGEN (O) (FLD) DIS	0.35	5.56	4.7
PH (FLD)	7.3	7.54	7.49
PH	8.0	8.3	8.2
SC (UMHOS/CM AT 25 C)	2300.0	2650.0 UJ1	560.0 UJ1
SC (UMHOS/CM AT 25 C) (FLD)	2950.0	3240.0	685.0
TDS (MEASURED AT 180 C)	1622.0	1758.0	361.0 UJ1
TOTAL SUSPENDED SOLIDS	1.1	182.0	<1.0
WATER TEMPERATURE (C) (FLD)	23.6	21.6	20.0
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	67.0	42.0 UJ1	66.0 UJ1
MAGNESIUM (MG) DIS	32.0	32.0	24.0
SODIUM (NA) DIS	401.0	519.0 UJ1	16.0 UJ1
POTASSIUM (K) DIS	26.0	10.0 UJ1	<2.0
BICARBONATE (HCO3)	361.0	415.0	289.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	680.0	664.0	39.0
CHLORIDE (CL)	143.0	291.0 UJ1	12.0 UJ1
FLUORIDE (F)	3.8	2.7 UJ1	0.59 UJ1
-- NUTRIENTS --			
NITRATE + NITRITE AS N	5.8	5.9	2.2
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	3.2	0.007 UJ1	0.033 UJ1
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1	<0.1	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
SELENIUM (SE) DIS	0.19	0.038	<0.005
ZINC (ZN) DIS	<0.02	<0.02	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: GROUNDWATER --

SITE CODE	EP-88		EP-89		EP-90	
SAMPLE DATE	11/11/97		11/13/97		12/12/97	
SAMPLE TIME	09:45				10:45	
LAB	TSC-SLC		TSC-SLC		TSC-SLC	
LAB NUMBER	L972740-10		L972756-5		L972978-1	
SAMPLE NUMBER	EPRI-9711-153		EPRI-9711-154		EPRI-9711-139	
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	28.12		15.26		54.64	
OXYGEN (O) (FLD) DIS	0.43		3.98		NO MEAS	
PH (FLD)	7.41		7.12		7.41	
PH	7.9		7.4		8.1	
SC (UMHOS/CM AT 25 C)	5240.0		2770.0		2920.0	
SC (UMHOS/CM AT 25 C) (FLD)	5980.0		3350.0		3700.0	
TDS (MEASURED AT 180 C)	3700.0		1956.0		2138.0	
TOTAL SUSPENDED SOLIDS	72.0		2.9	J4	1058.0	
WATER TEMPERATURE (C) (FLD)	23.5		23.6		22.1	
-- MAJOR CONSTITUENTS --						
CALCIUM (CA) DIS	57.0		157.0		102.0	
MAGNESIUM (MG) DIS	39.0		62.0		49.0	
SODIUM (NA) DIS	1323.0		350.0		588.0	
POTASSIUM (K) DIS	4.9		20.0		11.0	
BICARBONATE (HCO3)	540.0		281.0		398.0	
CARBONATE AS CO3	<1.0		<1.0		<1.0	
SULFATE (SO4)	1787.0		777.0		908.0	
CHLORIDE (CL)	471.0		356.0		281.0	
FLUORIDE (F)	2.2		0.72		0.56	
-- NUTRIENTS --						
NITRATE + NITRITE AS N	1.0		9.0	J4	10.0	
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) DIS	0.017		0.005		0.15	
CADMIUM (CD) DIS	<0.005		<0.005		<0.005	
CHROMIUM (CR) DIS	<0.01		<0.01		<0.01	
COPPER (CU) DIS	<0.025		<0.025		<0.025	
IRON (FE) DIS	<0.1		<0.1		<0.1	
LEAD (PB) DIS	<0.003		<0.003		<0.003	
SELENIUM (SE) DIS	0.029		0.018		0.69	
ZINC (ZN) DIS	0.026		<0.02		0.19	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: QUALITY CONTROL --

SITE CODE	RINSATE	
SAMPLE DATE	11/18/97	
LAB	TSC-SLC	
LAB NUMBER	L972784-12	
SAMPLE NUMBER	EPRI-9711-180	
-- PHYSICAL PARAMETERS --		
PH	8.2	
SC (UMHOS/CM AT 25 C)	879.0	
TDS (MEASURED AT 180 C)	531.0	UJ1
TOTAL SUSPENDED SOLIDS	3.8	J4
-- MAJOR CONSTITUENTS --		
CALCIUM (CA) DIS	30.0	
MAGNESIUM (MG) DIS	2.2	
SODIUM (NA) DIS	135.0	
POTASSIUM (K) DIS	5.8	
BICARBONATE (HCO3)	93.0	
CARBONATE AS CO3	<1.0	
SULFATE (SO4)	201.0	
CHLORIDE (CL)	113.0	
FLUORIDE (F)	0.73	
-- NUTRIENTS --		
NITRATE + NITRITE AS N	<0.05	
-- METALS & MINOR CONSTITUENTS --		
ARSENIC (AS) DIS	0.014	
CADMIUM (CD) DIS	<0.005	
CHROMIUM (CR) DIS	<0.01	
COPPER (CU) DIS	<0.025	
IRON (FE) DIS	<0.1	
LEAD (PB) DIS	<0.003	
SELENIUM (SE) DIS	<0.005	
ZINC (ZN) DIS	<0.02	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	POND 1	POND 5	POND 6
SAMPLE DATE	12/22/97	12/22/97	12/22/97
SAMPLE TIME	09:30	10:00	10:30
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L973027-1	L973027-2	L973027-3
SAMPLE NUMBER	EPRI-9711-182	EPRI-9711-183	EPRI-9711-184
-- PHYSICAL PARAMETERS --			
PH (FLD)	7.58	7.11	7.61
PH	7.5	7.2	7.7
SC (UMHOS/CM AT 25 C)	27200.0	975.0	5330.0
SC (UMHOS/CM AT 25 C) (FLD)	24500.0	1289.0	5870.0
TDS (MEASURED AT 180 C)	25974.0	644.0	3912.0
TOTAL SUSPENDED SOLIDS	6.9	2.8	27.0
WATER TEMPERATURE (C) (FLD)	9.1	21.5	16.4
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	439.0	35.0	175.0
MAGNESIUM (MG) DIS	144.0	3.2	24.0
SODIUM (NA) DIS	7724.0	154.0	1139.0
POTASSIUM (K) DIS	373.0	7.3	30.0
BICARBONATE (HCO3)	176.0	61.0	98.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	16043.0	193.0	1874.0
CHLORIDE (CL)	1002.0	137.0	497.0
FLUORIDE (F)	23.0	1.0	11.0
-- NUTRIENTS --			
NITRATE + NITRITE AS N	20.0	<0.05	0.56
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.14	0.098	3.7
CADMIUM (CD) DIS	16.0	0.054	0.15
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
COPPER (CU) DIS	0.76	0.75	0.96
IRON (FE) DIS	<0.1	0.3	0.37
LEAD (PB) DIS	0.13	0.19	0.14
SELENIUM (SE) DIS	0.74	<0.005	0.12
ZINC (ZN) DIS	137.0	0.6	0.92

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-1	SEP-2	SEP-3
SAMPLE DATE	11/10/97	11/10/97	11/19/97
SAMPLE TIME	14:15	10:40	12:45
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972740-8	L972740-4	L972784-19
SAMPLE NUMBER	EPRI-9711-163	EPRI-9711-164	EPRI-9711-165
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	12.17	6.48	12.44
PH (FLD)	8.04	8.39	7.8
PH	8.0	8.3	7.6
SC (UMHOS/CM AT 25 C)	4660.0	1950.0	5250.0
SC (UMHOS/CM AT 25 C) (FLD)	4680.0	1643.0	6200.0
TDS (MEASURED AT 180 C)	3424.0	1289.0	3954.0
TOTAL SUSPENDED SOLIDS	13.0	25.0	14.0
WATER TEMPERATURE (C) (FLD)	19.4	11.8	21.3
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	196.0	104.0	225.0
MAGNESIUM (MG) DIS	77.0	25.0	94.0
SODIUM (NA) DIS	793.0	277.0	943.0
POTASSIUM (K) DIS	60.0	7.7	53.0
BICARBONATE (HCO3)	381.0	271.0	239.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	1616.0	415.0	1839.0
CHLORIDE (CL)	438.0	248.0	597.0
FLUORIDE (F)	2.3	0.75	2.1
-- NUTRIENTS --			
NITRATE + NITRITE AS N	4.1	2.3	12.0
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.82	0.009	0.81
ARSENIC (AS) TRC	0.8	0.012	1.6
CADMIUM (CD) DIS	<0.005	<0.005	0.008
CADMIUM (CD) TRC	<0.005	<0.005	0.019
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
CHROMIUM (CR) TRC	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
COPPER (CU) TRC	0.032	0.026	0.043
IRON (FE) DIS	<0.1	<0.1	<0.1
IRON (FE) TRC	0.13	0.4	<0.1
LEAD (PB) DIS	<0.003	<0.003	<0.003
LEAD (PB) TRC	0.021	0.01	0.015
SELENIUM (SE) DIS	0.16	<0.005	0.2
SELENIUM (SE) TRC	0.15	<0.005	0.36
ZINC (ZN) DIS	<0.02	<0.02	<0.02
ZINC (ZN) TRC	0.068	0.026	0.041

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-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-4	SEP-7	SEP-9
SAMPLE DATE	11/10/97	11/10/97	11/10/97
SAMPLE TIME	09:30	13:45	13:10
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972740-1	L972740-7	L972740-6
SAMPLE NUMBER	EPRI-9711-166	EPRI-9711-169	EPRI-9711-171
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	6.75	6.96	6.6
PH (FLD)	8.39	8.16	8.14
PH	7.9	8.3	8.3
SC (UMHOS/CM AT 25 C)	1952.0	1924.0	1886.0
SC (UMHOS/CM AT 25 C) (FLD)	1595.0	1796.0	1771.0
TDS (MEASURED AT 180 C)	1289.0	1290.0	1225.0
TOTAL SUSPENDED SOLIDS	31.0	38.0	16.0
WATER TEMPERATURE (C) (FLD)	10.0	16.3	15.7
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	107.0	100.0	99.0
MAGNESIUM (MG) DIS	26.0	24.0	23.0
SODIUM (NA) DIS	275.0	272.0	285.0
POTASSIUM (K) DIS	8.0	12.0	10.0
BICARBONATE (HCO3)	299.0	275.0	254.0
CARBONATE AS CO3	<1.0	<1.0	<1.0
SULFATE (SO4)	424.0	412.0	401.0
CHLORIDE (CL)	249.0	249.0	248.0
FLUORIDE (F)	0.77	0.75	0.77
-- NUTRIENTS --			
NITRATE + NITRITE AS N	1.7	2.7	3.7
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.009	0.009	0.011
ARSENIC (AS) TRC	0.012	0.01	0.011
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CADMIUM (CD) TRC	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
CHROMIUM (CR) TRC	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
COPPER (CU) TRC	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1	<0.1	<0.1
IRON (FE) TRC	0.41	0.36	0.15
LEAD (PB) DIS	<0.003	<0.003	<0.003
LEAD (PB) TRC	0.007	0.005	<0.003
SELENIUM (SE) DIS	<0.005	<0.005	<0.005
SELENIUM (SE) TRC	<0.005	<0.005	<0.005
ZINC (ZN) DIS	<0.02	<0.02	0.025
ZINC (ZN) TRC	0.02	0.024	0.024

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-10	SEP-11	SEP-12
SAMPLE DATE	11/19/97	11/10/97	11/10/97
SAMPLE TIME	15:00	12:40	10:25
LAB	TSC-SLC	TSC-SLC	TSC-SLC
LAB NUMBER	L972784-20	L972740-5	L972740-3
SAMPLE NUMBER	EPRI-9711-181	EPRI-9711-177	EPRI-9711-176
-- PHYSICAL PARAMETERS --			
OXYGEN (O) (FLD) DIS	7.32	6.97	6.64
PH (FLD)	8.38	8.3	8.37
PH	8.5	8.3	8.3
SC (UMHOS/CM AT 25 C)	1970.0	1933.0	1970.0
SC (UMHOS/CM AT 25 C) (FLD)	2180.0	1741.0	1648.0
TDS (MEASURED AT 180 C)	1337.0	1258.0	1323.0
TOTAL SUSPENDED SOLIDS	16.0	23.0	31.0
WATER TEMPERATURE (C) (FLD)	16.0	14.3	11.4
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	103.0	104.0	105.0
MAGNESIUM (MG) DIS	25.0	25.0	26.0
SODIUM (NA) DIS	278.0	272.0	272.0
POTASSIUM (K) DIS	13.0	9.2	11.0
BICARBONATE (HCO3)	278.0	282.0	285.0
CARBONATE AS CO3	12.0	<1.0	<1.0
SULFATE (SO4)	436.0	415.0	427.0
CHLORIDE (CL)	255.0	246.0	254.0
FLUORIDE (F)	0.82	0.74	0.75
-- NUTRIENTS --			
NITRATE + NITRITE AS N	3.0	2.2	2.2
-- METALS & MINOR CONSTITUENTS --			
ARSENIC (AS) DIS	0.007	0.009	0.009
ARSENIC (AS) TRC	0.015	0.01	0.01
CADMIUM (CD) DIS	<0.005	<0.005	<0.005
CADMIUM (CD) TRC	<0.005	<0.005	<0.005
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01
CHROMIUM (CR) TRC	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.025	<0.025	<0.025
COPPER (CU) TRC	<0.025	<0.025	<0.025
IRON (FE) DIS	<0.1	<0.1	<0.1
IRON (FE) TRC	0.25	0.17	0.45
LEAD (PB) DIS	<0.003	<0.003	<0.003
LEAD (PB) TRC	0.013	0.005	0.004
SELENIUM (SE) DIS	<0.005	<0.005	<0.005
SELENIUM (SE) TRC	0.006	<0.005	<0.005
ZINC (ZN) DIS	<0.02	0.021	<0.02
ZINC (ZN) TRC	0.023	<0.02	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

-- SAMPLE TYPE: SURFACE WATER --

SITE CODE	SEP-13
SAMPLE DATE	11/10/97
SAMPLE TIME	10:00
LAB	TSC-SLC
LAB NUMBER	L972740-2
SAMPLE NUMBER	EPRI-9711-175
-- PHYSICAL PARAMETERS --	
OXYGEN (O) (FLD) DIS	6.1
PH (FLD)	8.42
PH	8.3
SC (UMHOS/CM AT 25 C)	1993.0
SC (UMHOS/CM AT 25 C) (FLD)	1613.0
TDS (MEASURED AT 180 C)	1304.0
TOTAL SUSPENDED SOLIDS	38.0
WATER TEMPERATURE (C) (FLD)	10.5
-- MAJOR CONSTITUENTS --	
CALCIUM (CA) DIS	107.0
MAGNESIUM (MG) DIS	27.0
SODIUM (NA) DIS	286.0
POTASSIUM (K) DIS	9.7
BICARBONATE (HCO3)	287.0
CARBONATE AS CO3	<1.0
SULFATE (SO4)	422.0
CHLORIDE (CL)	249.0
FLUORIDE (F)	0.77
-- NUTRIENTS --	
NITRATE + NITRITE AS N	2.1
-- METALS & MINOR CONSTITUENTS --	
ARSENIC (AS) DIS	0.009
ARSENIC (AS) TRC	0.01
CADMIUM (CD) DIS	<0.005
CADMIUM (CD) TRC	<0.005
CHROMIUM (CR) DIS	<0.01
CHROMIUM (CR) TRC	<0.01
COPPER (CU) DIS	<0.025
COPPER (CU) TRC	<0.025
IRON (FE) DIS	<0.1
IRON (FE) TRC	0.58
LEAD (PB) DIS	<0.003
LEAD (PB) TRC	0.003
SELENIUM (SE) DIS	<0.005
SELENIUM (SE) TRC	<0.005
ZINC (ZN) DIS	<0.02
ZINC (ZN) TRC	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3,UJ3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

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MATHCAD FILES FOR CONCENTRATION AND LOADING CALCULATIONS

1 El Paso Groundwater Arsenic Modeling, Estimate of Impacts on Downgradient Surface Water Resources

SOIL PARTITION TABLES

TABLE K-1.
K_d CALCULATION WITH NO BACKGROUND CORRECTION FOR SOIL ARSENIC

Well	Average SWL (ft)	Approximate WL (ft bgs)	Soil Sample Depths (ft bgs)	Soil Arsenic (mg/kg)	Avg Soil Arsenic (mg/kg)	Avg GW Arsenic (mg/l)	K_d (L/kg)
EP-74	52.3	50	50	49	39.8	0.12	331.25
			55	40			
			60	46			
			65	24			
EP-75	56	54	55	91	66.7	17	3.92
			60	73			
			65	36			
EP-76	50.3	48	50	29	53	0.477	111.11
			55	110			
			60	<20			
EP-77	41.2	39	40	73	47.3	5.68	8.33
			45	49			
			50	20			
EP-78	31.6	30	30	82	66	5.85	11.28
			40	50			
						Average:	93.18

Calculation of Arsenic Partition Coefficient (K_d) for El Paso Site

Methodology Notes:

SWL = Static Water Level
WL = Water Level
ft bgs = feet below ground surface

[1] Determine average soil arsenic concentrations for saturated zone soils from well boring lab results
[2] Determine average groundwater arsenic concentrations for wells with detectable saturated zone soil arsenic concentrations
[3] Determine K_d for each well as (soil concentration in mg/kg)/(groundwater concentration in mg/l)
[4] Compare K_{ds} for different areas of the site

TABLE K-2.
K_d CALCULATION BACKGROUND CORRECTION FOR 6 mg/kg SOIL ARSENIC

Well	Average SWL (ft)	Approximate WL (ft bgs)	Soil Sample Depths (ft bgs)	Soil Arsenic (mg/kg)	Corrected Soil Arsenic (mg/kg)	Avg Soil Arsenic (mg/kg)	Avg GW Arsenic (mg/l)	K_d (L/kg)
EP-74	52.3	50	50	49	43	33.8	0.12	281.25
			55	40	34			
			60	46	40			
			65	24	18			
EP-75	56	54	55	91	85	60.7	17	3.57
			60	73	67			
			65	36	30			
EP-76	50.3	48	50	29	23	47	0.477	98.53
			55	110	104			
			60	<20	14			
EP-77	41.2	39	40	73	67	41.3	5.68	7.28
			45	49	43			
			50	20	14			
EP-78	31.6	30	30	82	76	60	5.85	10.26
			40	50	44			

NOTE: Average background soil As concentration of 6 mg/kg from *The Handbook of Trace Elements* (1997).

Average:	80.18
Median:	10.26
Minimum:	3.57

Calculation of Arsenic Partition Coefficient (K_d) for El Paso Site

Methodology Notes:

SWL = Static Water Level
WL = Water Level
ft bgs = feet below ground surface

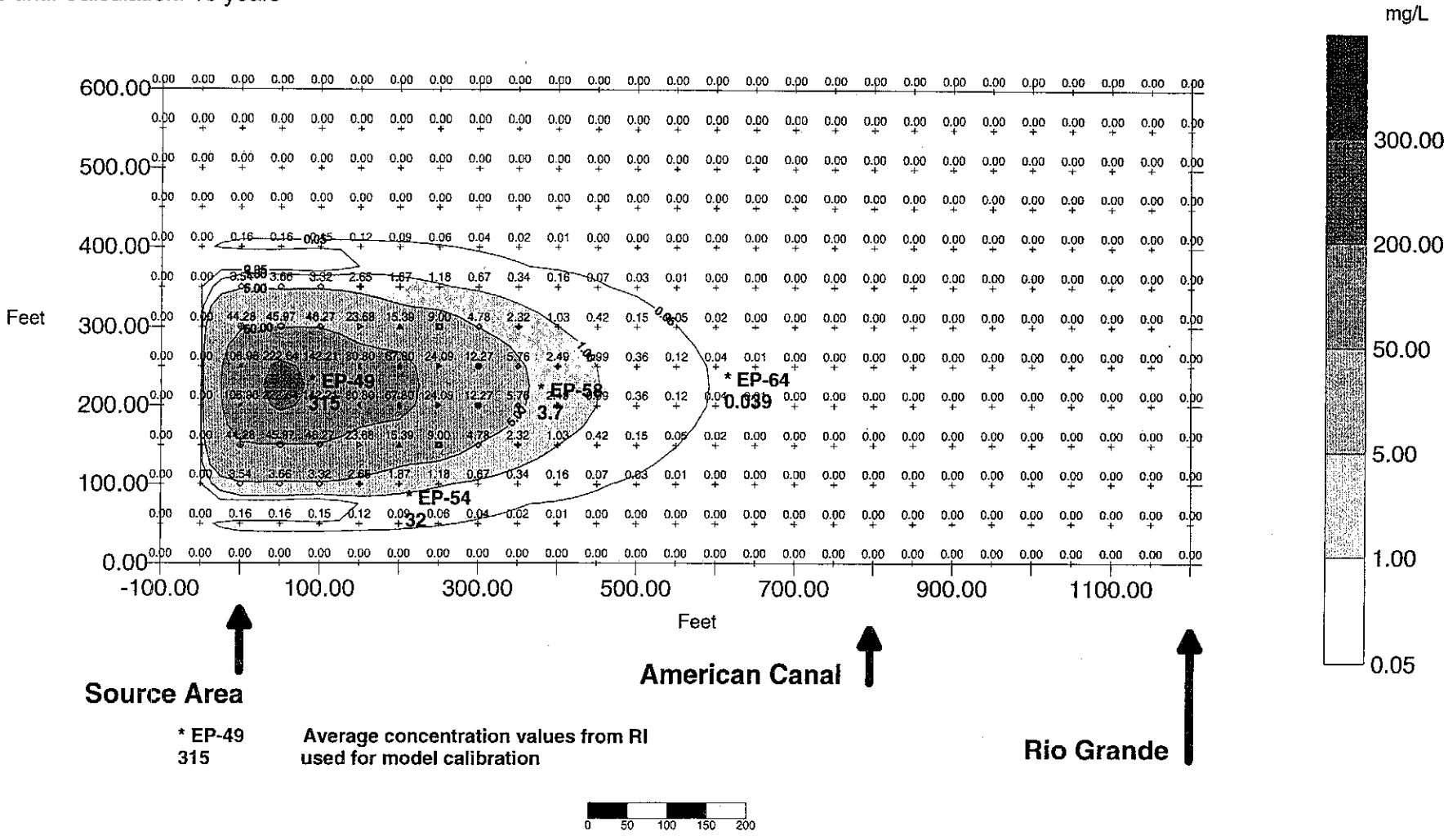
[1] Determine average soil arsenic concentrations for saturated zone soils from well boring lab results
[2] Determine average groundwater arsenic concentrations for wells with detectable saturated zone soil arsenic concentrations
[3] Determine K_d for each well as (soil concentration in mg/kg)/(groundwater concentration in mg/l)
[4] Compare K_{ds} for different areas of the site

MODEL CALIBRATION PLOTS

MODEL CALIBRATION PLOT PLUME #1

EP-RI
Model: 1o
Dispersivity: 250:25
Source: 2 @ 4 lb/day

Retardation Factor: 20
Decay: 0
Time until Calculation: 18 years



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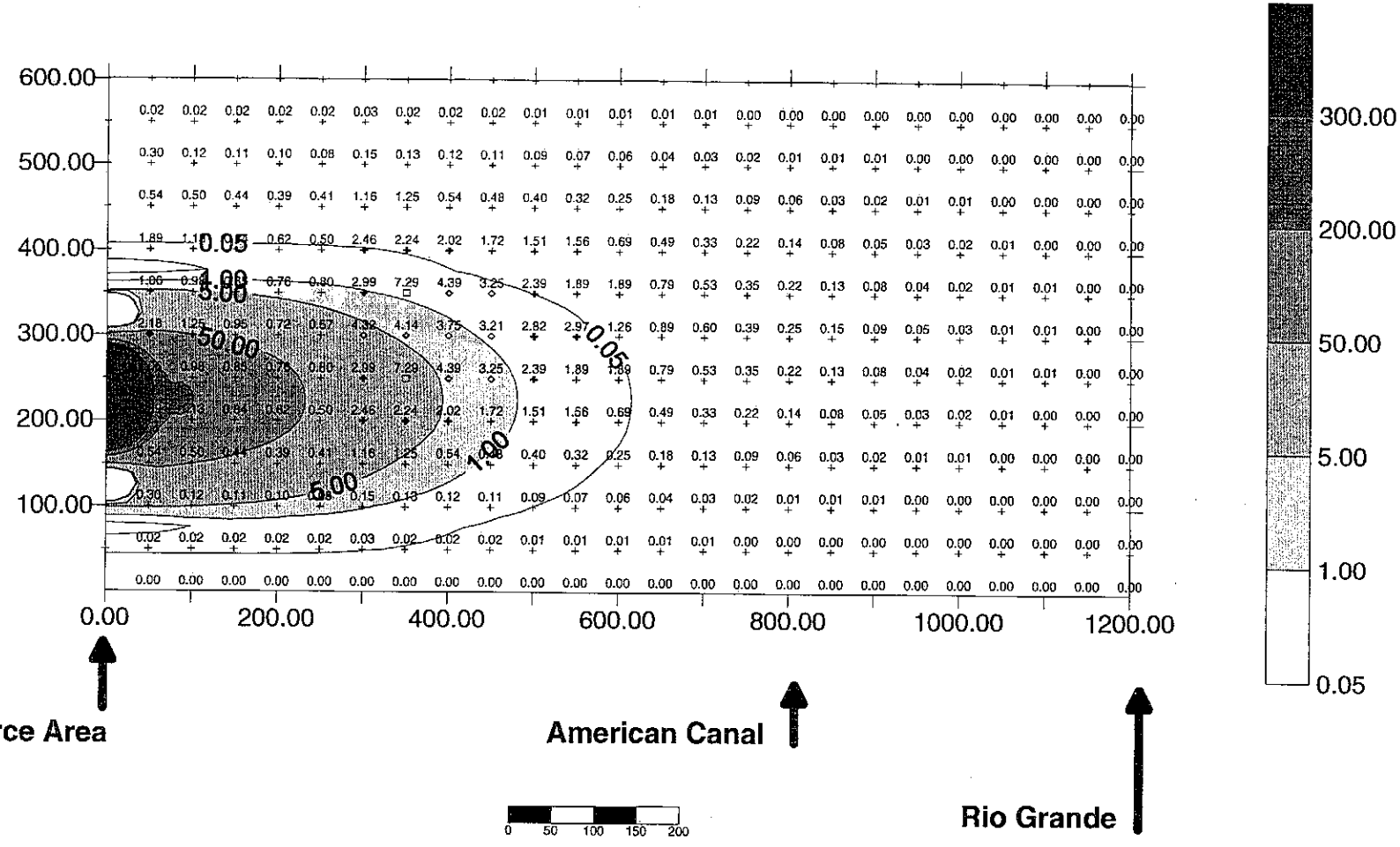
MODEL CALIBRATION PLOT PLUME #1
CHECK PLOT FROM PLUME.EXE

EP-RI
Model 1ox
Dispersivity 250:25
Source: 2 @ 4 lb/day

Retardation Factor: 20
Decay: 0
Time until Calculation: 18 years
(assumes source of As in gw coincident with construction of Acid Plant)

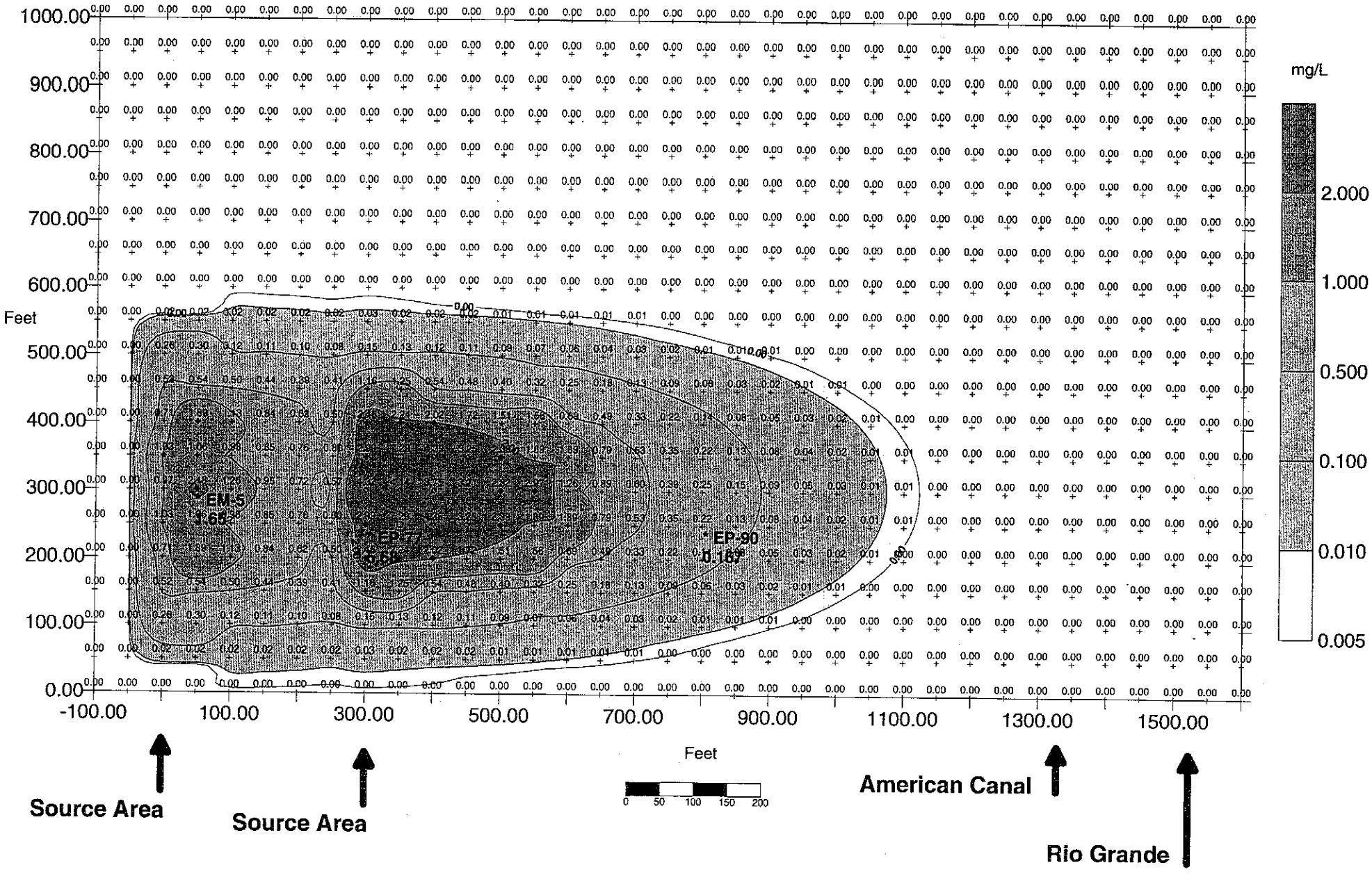


EP-RI
Model: 3d
Dispersivity: 250:25
Source: 3 @ 0.0214 lb/day
Source: 2 @ 0.08 lb/day
Time until calculation: 68 years

MODEL CALIBRATION PLOT PLUME #2

* EP-77
5.68

Average concentration values from RI used for model calibration



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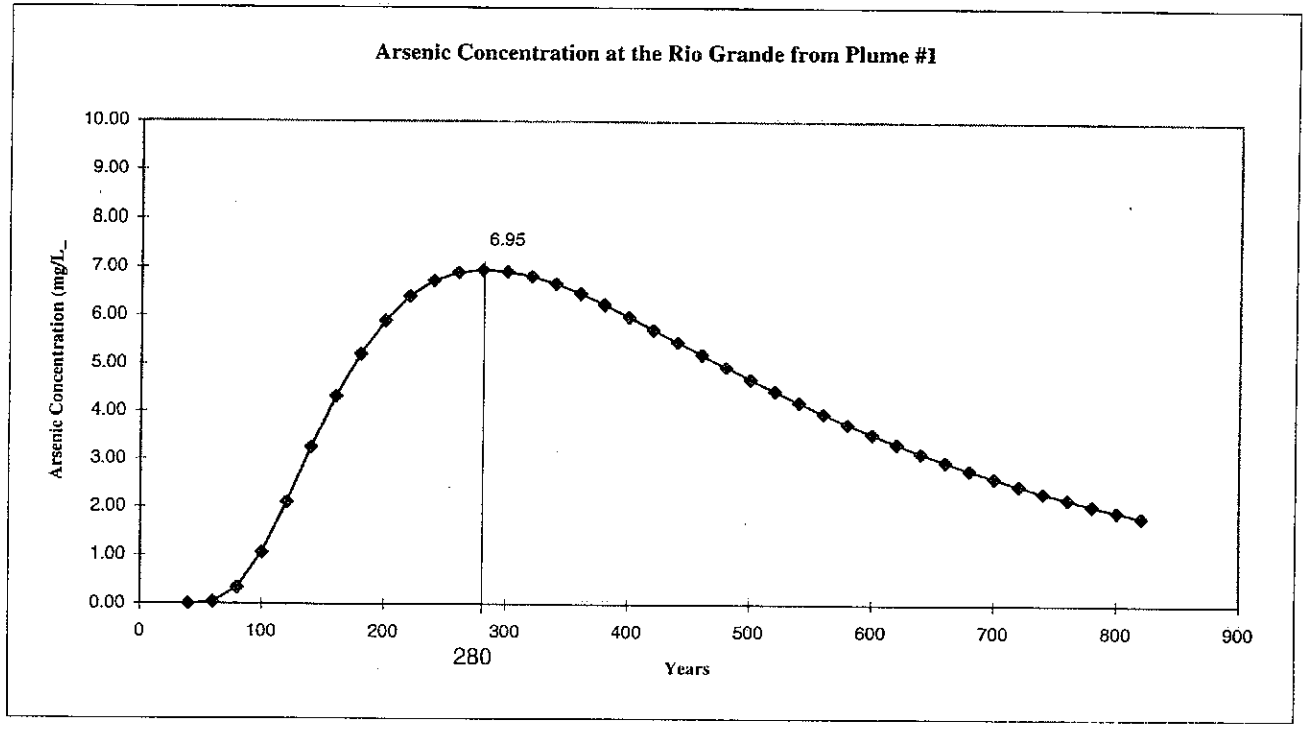
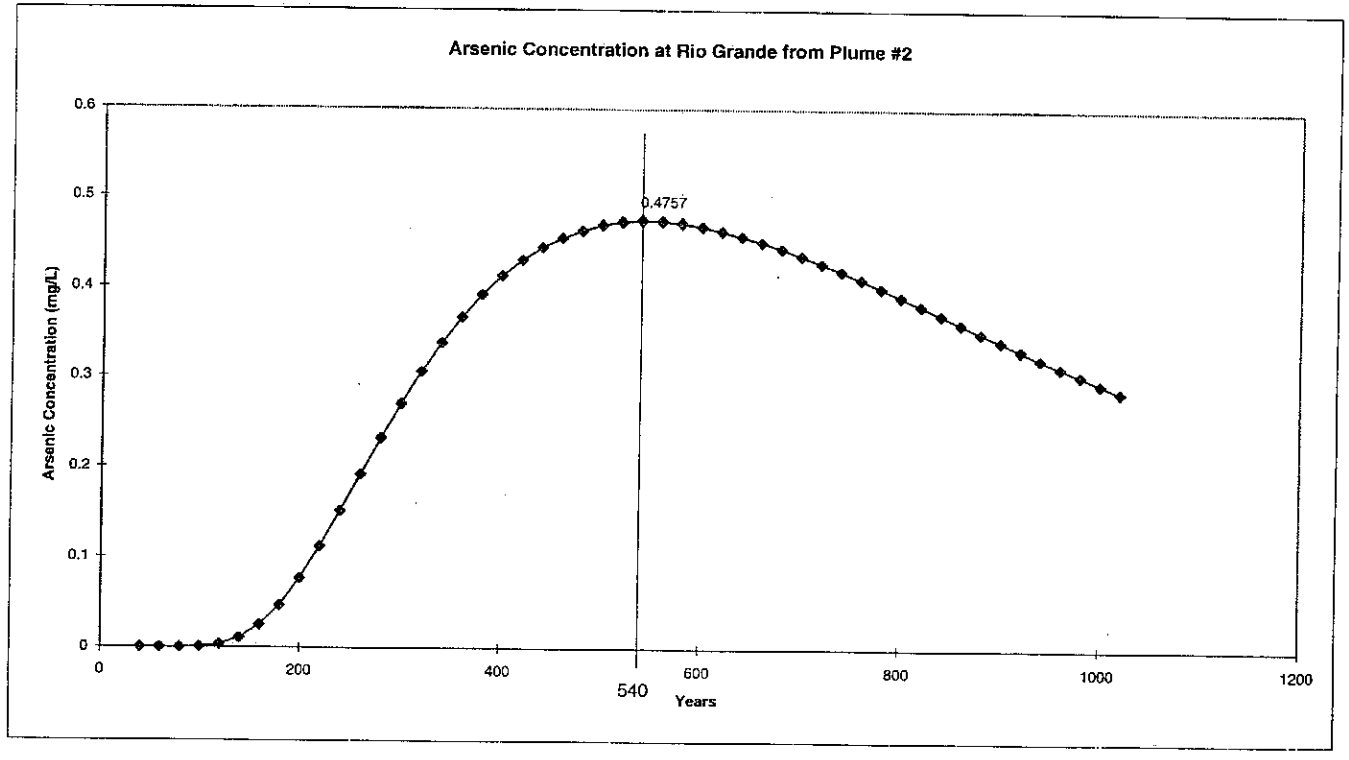
TIME CALCULATION MODEL OUTPUT AT DOWNGRADIENT SURFACE WATER RECEPTORS

time

********** RESULTS **********			
X-COORD [FT]	Y-COORD [FT]	TIME [YR]	CONCENTRATION [MG/L]
1200	201	40	0.00
1200	201	60	0.04
1200	201	80	0.33
1200	201	100	1.06
1200	201	120	2.10
1200	201	140	3.25
1200	201	160	4.31
1200	201	180	5.21
1200	201	200	5.90
1200	201	220	6.39
1200	201	240	6.72
1200	201	260	6.89
1200	201	280	6.95
1200	201	300	6.92
1200	201	320	6.81
1200	201	340	6.65
1200	201	360	6.46
1200	201	380	6.23
1200	201	400	5.99
1200	201	420	5.73
1200	201	440	5.47
1200	201	460	5.21
1200	201	480	4.95
1200	201	500	4.70
1200	201	520	4.45
1200	201	540	4.21
1200	201	560	3.98
1200	201	580	3.76
1200	201	600	3.55
1200	201	620	3.35
1200	201	640	3.16
1200	201	660	2.97
1200	201	680	2.80
1200	201	700	2.64
1200	201	720	2.48
1200	201	740	2.33
1200	201	760	2.19
1200	201	780	2.06
1200	201	800	1.94
1200	201	820	1.82



X-COORD [FT]	Y-COORD [FT]	TIME [YR]	CONCENTRATION [MG/L]
	********** RESULTS **********		
1500	951	40	1.05E-09
1500	951	60	0.000001781
1500	951	80	0.00007727
1500	951	100	0.0007625
1500	951	120	0.003568
1500	951	140	0.01085
1500	951	160	0.02496
1500	951	180	0.04708
1500	951	200	0.07676
1500	951	220	0.1123
1500	951	240	0.1514
1500	951	260	0.192
1500	951	280	0.2322
1500	951	300	0.2707
1500	951	320	0.3064
1500	951	340	0.3388
1500	951	360	0.3676
1500	951	380	0.3925
1500	951	400	0.4138
1500	951	420	0.4315
1500	951	440	0.4458
1500	951	460	0.4569
1500	951	480	0.4652
1500	951	500	0.471
1500	951	520	0.4744
1500	951	540	0.4757
1500	951	560	0.4752
1500	951	580	0.4732
1500	951	600	0.4697
1500	951	620	0.465
1500	951	640	0.4593
1500	951	660	0.4527
1500	951	680	0.4454
1500	951	700	0.4374
1500	951	720	0.4289
1500	951	740	0.4201
1500	951	760	0.4108
1500	951	780	0.4014
1500	951	800	0.3918
1500	951	820	0.382
1500	951	840	0.3722
1500	951	860	0.3623
1500	951	880	0.3525
1500	951	900	0.3427
1500	951	920	0.333
1500	951	940	0.3233
1500	951	960	0.3138
1500	951	980	0.3045
1500	951	1000	0.2953
1500	951	1020	0.2862

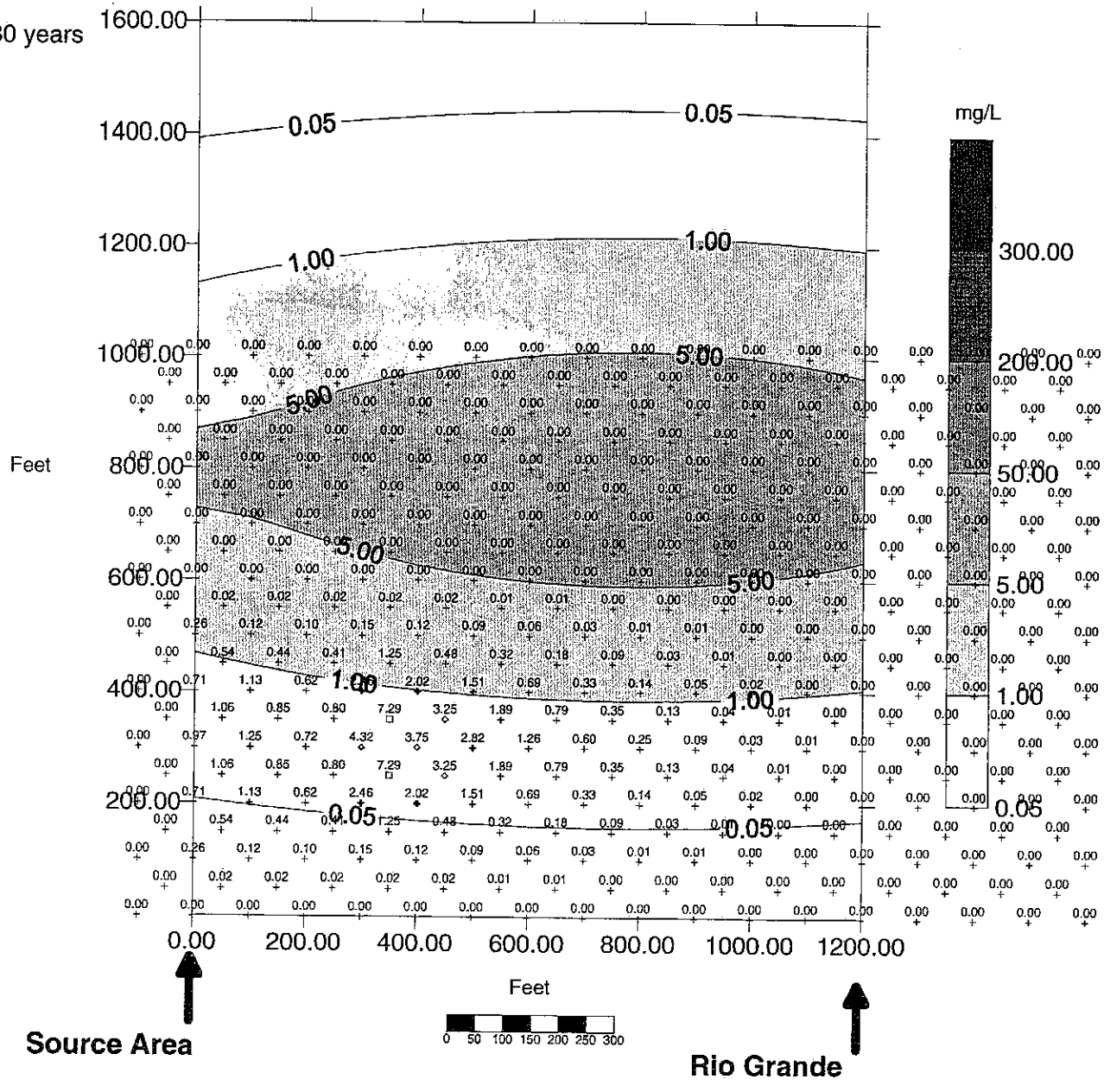


MODEL FUTURE SCENARIO PLOTS

EP-RI
Model: epcal8s3.out
Dispersivity: 250:25
Source: 2 @ 4 lb/day
Source Present: 18 years
Time Until Calculation: 280 years

Future Worst Case Scenario at 280 Years with Source Removal after 18 years

PLUME #1



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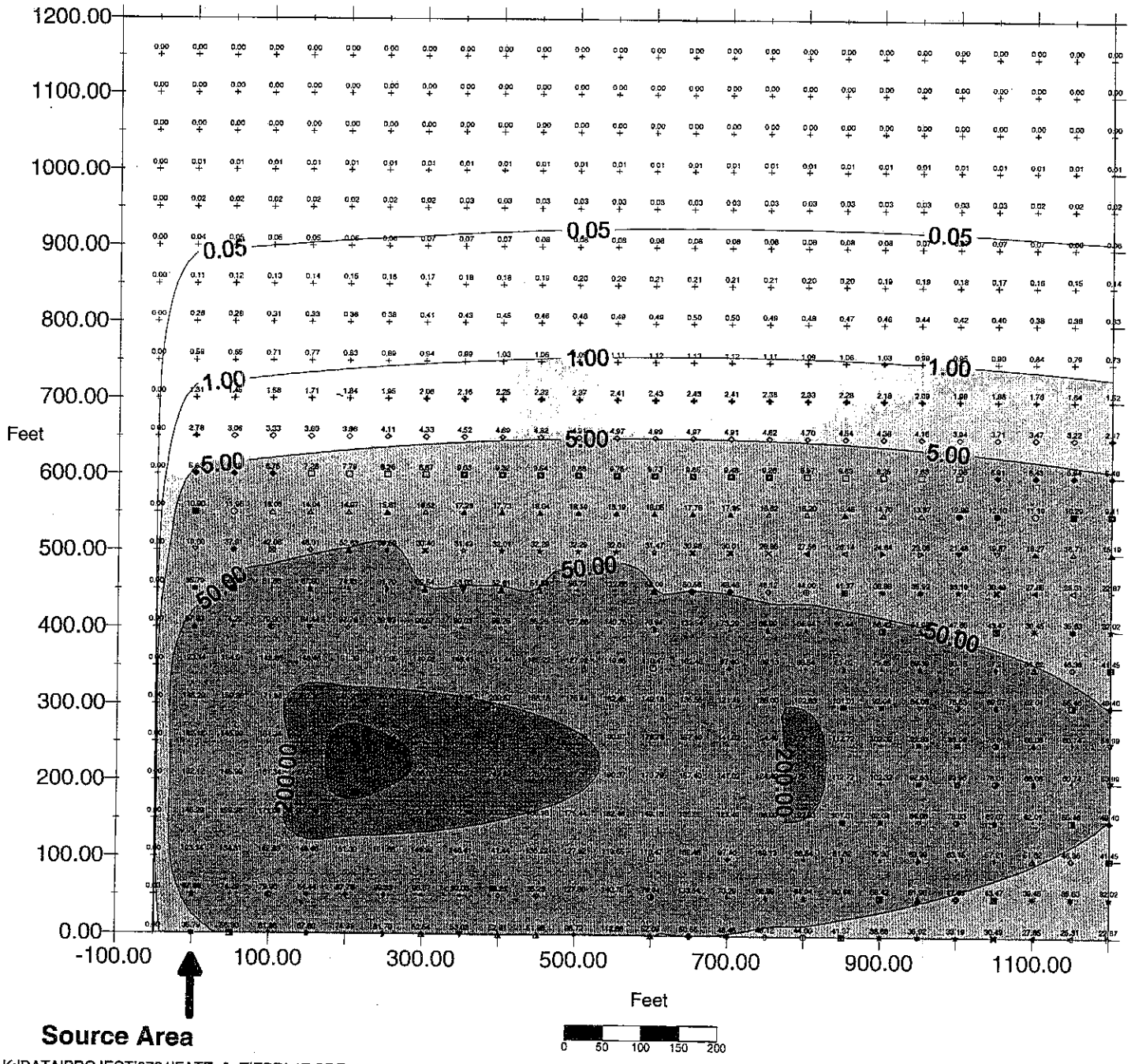
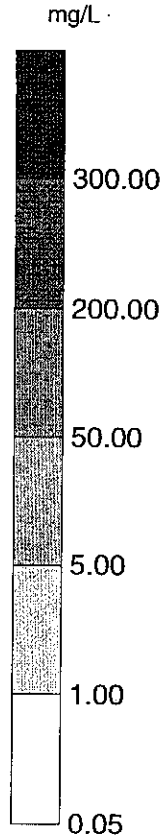
Future Worst Case Scenario without Source Area Removal after 280 Years
Plume #1





EP-RI
Model: 1z
Dispersivity: 250:25
Source: 2 @ 4 lb/day

Retardation Factor: 20
Decay: 0
Time until Calculation: 280 years

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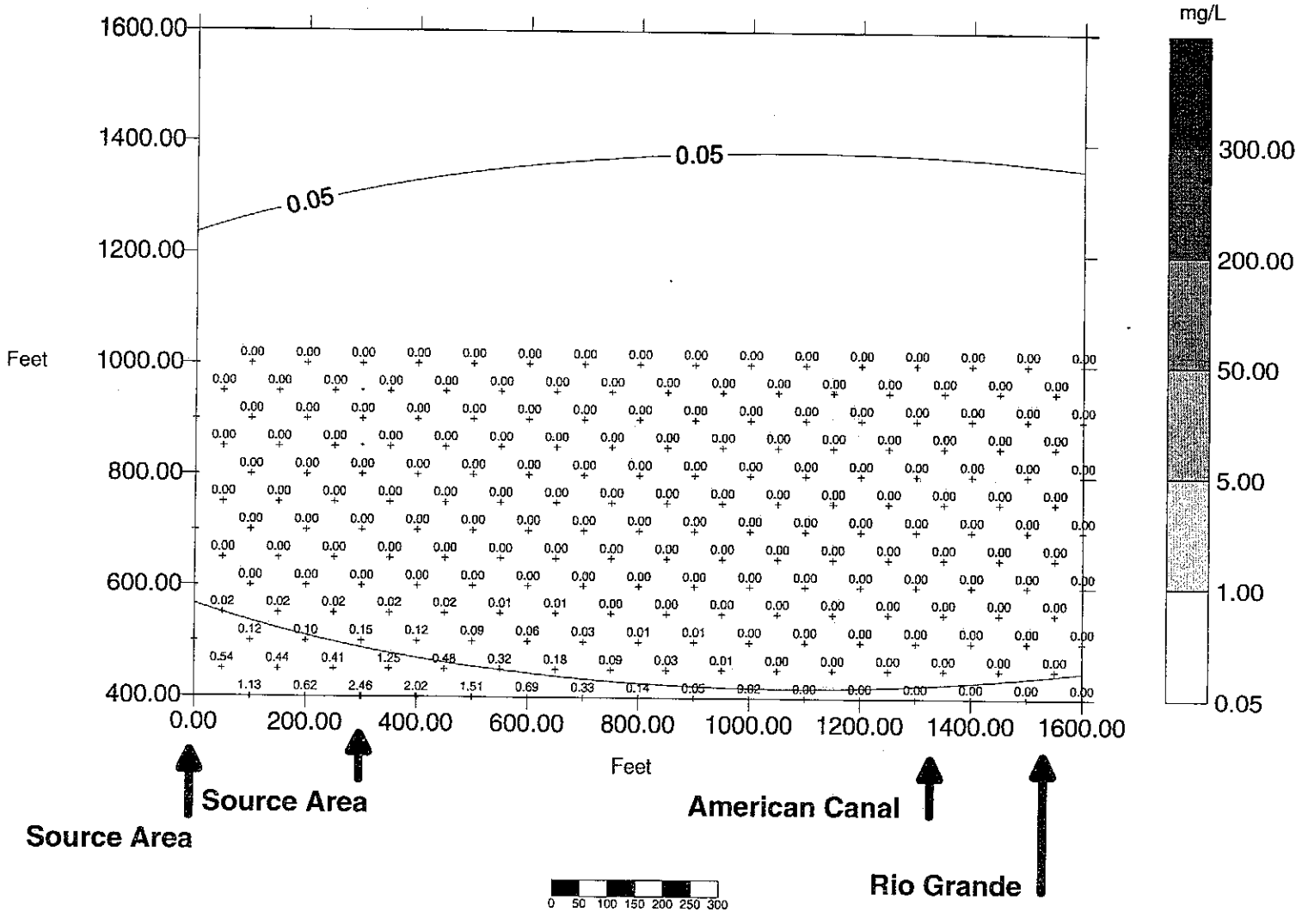
Future Worst Case Scenario a. 0 Years with Source Removal after 68 years

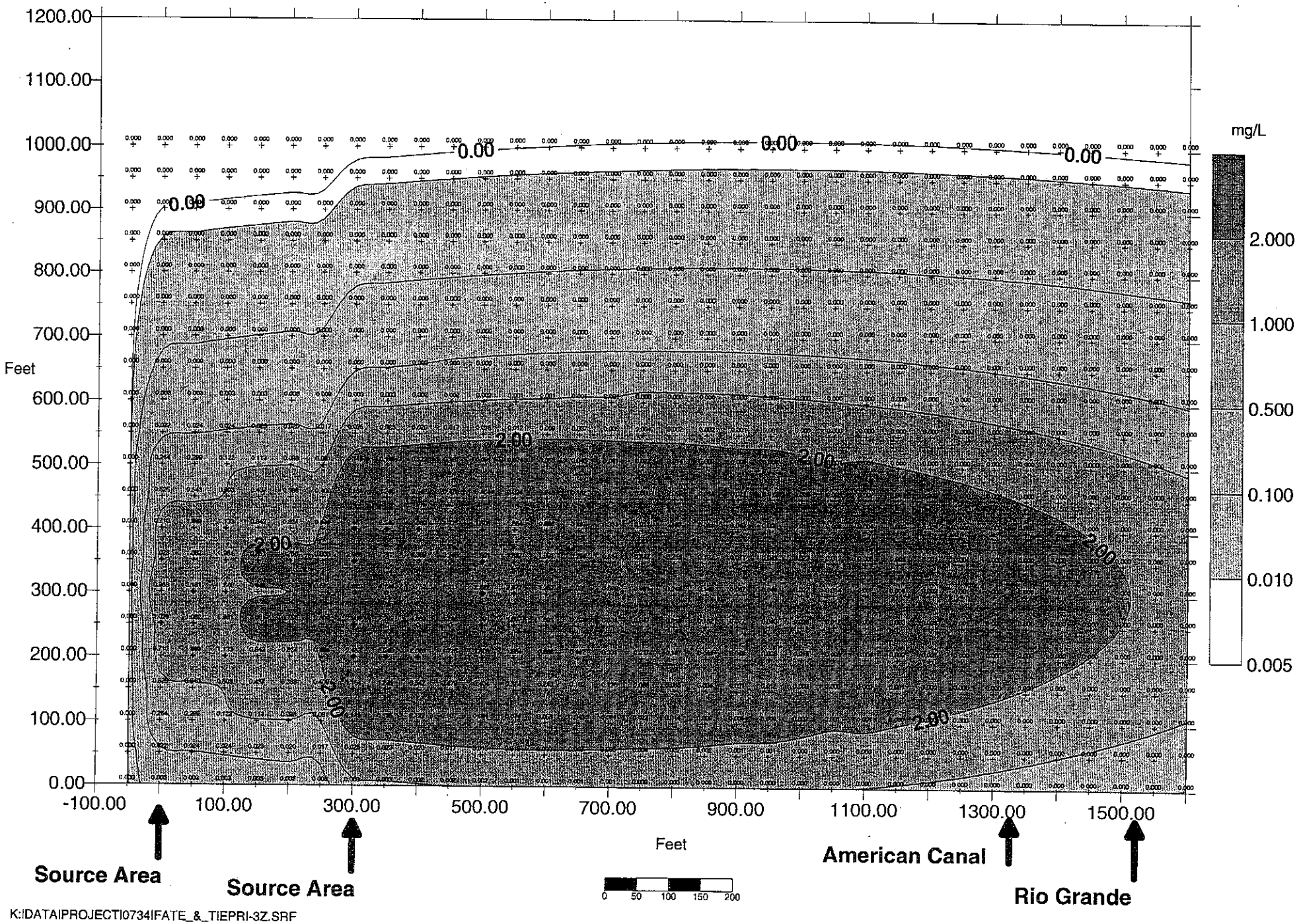
EP-RI
Model: epcal9s1.out
Dispersivity: 250:25
Source: 3 @ 0.0214 lb/day
Source: 2 @ 0.08 lb/day
Source Present: 68 years
Time Until Calculation: 540 years

PLUME #2



EP-RI
Model
Dispe 250:25
Source: 3 @ 0.0214 lb/day
Source: 2 @ 0.08 lb/day
Time until calculation: 540 years

Future Worst Case Scenario without Source Area Removal after 540 Years
Plume #2



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MODEL CALIBRATION OUTPUT FILES

```
*******************************************************
*                                                     *
*        S O L U T E  version 4.06                    *
*                                                     *
*    ANALYTICAL MODELS FOR SOLUTE TRANSPORT           *
*                                                     *
*******************************************************
```

Model: PLUME2D-H

PROJECT..... = epri-plume-1
USER NAME..... = mbrooke
DATE..... = 08-17-1998
DATA FILE..... = c:\solute\0734\plume1\epri-1o.d2d

INPUT DATA:

GROUNDWATER (SEEPAGE) VELOCITY.... = .155 [ft/d]
AQUIFER THICKNESS..... = 15 [ft]
POROSITY..... = .42
LONGITUDINAL DISPERSIVITY..... = 250 [ft]
LATERAL DISPERSIVITY..... = 25 [ft]
RETARDATION FACTOR..... = 20
HALF-LIFE..... = 0 [d]
DECAY CONSTANT..... = 0.0000D+00

NUMBER OF POINT SOURCES..... = 2

SOURCE NO. 1

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 200 [ft]
SOURCE STRENGTH..... = 4 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 6570 [d]

SOURCE NO. 2

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 250 [ft]

SOURCE STRENGTH..... = 4 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 6570 [d]

GRID DATA:

X-COORDINATE OF GRID ORIGIN..... = -100 [ft]
Y-COORDINATE OF GRID ORIGIN..... = 0 [ft]
DISTANCE INCREMENT DELX..... = 50 [ft]
DISTANCE INCREMENT DELY..... = 50 [ft]
NUMBER OF NODES IN X-DIRECTION.... = 27
NUMBER OF NODES IN Y-DIRECTION.... = 13

CONCENTRATION C [mg/l]

ROW\COLUMN	1	2	3	4	5
[ft]	-100.00	-50.00	0.00	50.00	100.00
1	0.00 [ft]	0.0000D+00	0.0000D+00	2.9807D-03	3.1188D-03	2.9256D-03
2	50.00 [ft]	0.0000D+00	0.0000D+00	1.5531D-01	1.6190D-01	1.5024D-01
3	100.00 [ft]	0.0000D+00	0.0000D+00	3.5433D+00	3.6621D+00	3.3165D+00
4	150.00 [ft]	0.0000D+00	0.0000D+00	4.4276D+01	4.5967D+01	4.6269D+01
5	200.00 [ft]	0.0000D+00	0.0000D+00	1.0696D+02	2.2264D+02	1.4221D+02
6	250.00 [ft]	0.0000D+00	0.0000D+00	1.0696D+02	2.2264D+02	1.4221D+02
7	300.00 [ft]	0.0000D+00	0.0000D+00	4.4276D+01	4.5967D+01	4.6269D+01
8	350.00 [ft]	0.0000D+00	0.0000D+00	3.5433D+00	3.6621D+00	3.3165D+00
9	400.00 [ft]	0.0000D+00	0.0000D+00	1.5531D-01	1.6190D-01	1.5024D-01
10	450.00 [ft]	0.0000D+00	0.0000D+00	2.9807D-03	3.1188D-03	2.9256D-03
11	500.00 [ft]	0.0000D+00	0.0000D+00	2.3722D-05	2.4868D-05	2.3458D-05
12	550.00 [ft]	0.0000D+00	0.0000D+00	7.6054D-08	7.9817D-08	7.5539D-08
13	600.00 [ft]	0.0000D+00	0.0000D+00	3.6905D-10	3.8931D-10	3.7421D-10

ROW\COLUMN	6	7	8	9	10
[ft]	150.00	200.00	250.00	300.00	350.00
1	0.00 [ft]	2.4617D-03	1.8597D-03	1.2626D-03	7.7132D-04	4.2450D-04
2	50.00 [ft]	1.2429D-01	9.1873D-02	6.0830D-02	3.6172D-02	1.9365D-02
3	100.00 [ft]	2.6457D+00	1.8720D+00	1.1830D+00	6.7171D-01	3.4425D-01
4	150.00 [ft]	2.3678D+01	1.5392D+01	9.0001D+00	4.7798D+00	2.3169D+00

5	200.00 [ft]	8.0797D+01	6.7803D+01	2.4088D+01	1.2265D+01	5.7567D+00
6	250.00 [ft]	8.0797D+01	6.7803D+01	2.4088D+01	1.2265D+01	5.7567D+00
7	300.00 [ft]	2.3678D+01	1.5392D+01	9.0001D+00	4.7798D+00	2.3169D+00
8	350.00 [ft]	2.6457D+00	1.8720D+00	1.1830D+00	6.7171D-01	3.4425D-01
9	400.00 [ft]	1.2429D-01	9.1873D-02	6.0830D-02	3.6172D-02	1.9365D-02
10	450.00 [ft]	2.4617D-03	1.8597D-03	1.2626D-03	7.7132D-04	4.2450D-04
11	500.00 [ft]	1.9916D-05	1.5224D-05	1.0484D-05	6.5078D-06	3.6660D-06
12	550.00 [ft]	6.4476D-08	4.9646D-08	3.4493D-08	2.1631D-08	3.4870D-08
13	600.00 [ft]	3.2791D-10	2.6211D-10	1.9132D-10	1.2769D-10	7.8036D-11

ROW\COLUMN	11	12	13	14	15
[ft]	400.00	450.00	500.00	550.00	600.00
1	0.00 [ft]	2.1072D-04	9.4456D-05	3.8269D-05	1.4027D-05	4.6545D-06
2	50.00 [ft]	9.3540D-03	4.0841D-03	1.6141D-03	5.7806D-04	1.8776D-04
3	100.00 [ft]	1.5977D-01	6.7303D-02	2.5768D-02	8.9745D-03	2.8447D-03
4	150.00 [ft]	1.0272D+00	4.1674D-01	1.5472D-01	5.2533D-02	1.6305D-02
5	200.00 [ft]	2.4894D+00	9.9058D-01	3.6214D-01	1.2145D-01	3.7319D-02
6	250.00 [ft]	2.4894D+00	9.9058D-01	3.6214D-01	1.2145D-01	3.7319D-02
7	300.00 [ft]	1.0272D+00	4.1674D-01	1.5472D-01	5.2533D-02	1.6305D-02
8	350.00 [ft]	1.5977D-01	6.7303D-02	2.5768D-02	8.9745D-03	2.8447D-03
9	400.00 [ft]	9.3540D-03	4.0841D-03	1.6141D-03	5.7806D-04	1.8776D-04
10	450.00 [ft]	2.1072D-04	9.4456D-05	3.8269D-05	1.4027D-05	4.6545D-06
11	500.00 [ft]	1.8534D-06	8.4640D-07	3.4937D-07	1.3043D-07	4.4074D-08
12	550.00 [ft]	1.8693D-08	9.1543D-09	4.1051D-09	1.6902D-09	6.4095D-10
13	600.00 [ft]	4.3757D-11	2.2559D-11	1.0721D-11	4.7091D-12	1.9177D-12

ROW\COLUMN	16	17	18	19	20
[ft]	650.00	700.00	750.00	800.00	850.00
1	0.00 [ft]	1.4250D-06	3.8938D-07	9.6572D-08	6.1883D-08	1.4098D-08
2	50.00 [ft]	5.5348D-05	1.4813D-05	3.6005D-06	8.3507D-07	1.6909D-07
3	100.00 [ft]	8.2083D-04	2.1562D-04	5.1559D-05	1.1222D-05	2.2227D-06
4	150.00 [ft]	4.6225D-03	1.1964D-03	2.8251D-04	6.0831D-05	1.1938D-05
5	200.00 [ft]	1.0493D-02	2.6973D-03	6.3330D-04	1.3571D-04	2.6524D-05
6	250.00 [ft]	1.0493D-02	2.6973D-03	6.3330D-04	1.3571D-04	2.6524D-05
7	300.00 [ft]	4.6225D-03	1.1964D-03	2.8251D-04	6.0831D-05	1.1938D-05
8	350.00 [ft]	8.2083D-04	2.1562D-04	5.1559D-05	1.1222D-05	2.2227D-06
9	400.00 [ft]	5.5348D-05	1.4813D-05	3.6005D-06	8.3507D-07	1.6909D-07

10	450.00 [ft]	1.4250D-06	3.8938D-07	9.6572D-08	6.1883D-08	1.4098D-08
11	500.00 [ft]	3.9337D-08	1.1937D-08	3.3528D-09	8.7537D-10	2.1348D-10
12	550.00 [ft]	2.2461D-10	7.3008D-11	2.2100D-11	6.2571D-12	1.6644D-12
13	600.00 [ft]	7.2645D-13	2.5689D-13	8.5123D-14	2.6535D-14	7.8132D-15

ROW\COLUMN		21	22	23	24	25
	[ft]	900.00	950.00	1000.00	1050.00	1100.00
1	0.00 [ft]	2.9985D-09	5.9870D-10	1.1288D-10	2.0220D-11	3.4621D-12
2	50.00 [ft]	8.5026D-08	1.6012D-08	2.8344D-09	4.7460D-10	7.5673D-11
3	100.00 [ft]	4.5437D-07	1.8568D-07	3.1497D-08	5.0365D-09	7.6437D-10
4	150.00 [ft]	2.1345D-06	4.5679D-07	1.5040D-07	2.3421D-08	3.4538D-09
5	200.00 [ft]	4.7255D-06	7.6705D-07	1.9260D-07	4.9158D-08	7.1627D-09
6	250.00 [ft]	4.7255D-06	7.6705D-07	1.9260D-07	4.9158D-08	7.1627D-09
7	300.00 [ft]	2.1345D-06	4.5679D-07	1.5040D-07	2.3421D-08	3.4538D-09
8	350.00 [ft]	4.5437D-07	1.8568D-07	3.1497D-08	5.0365D-09	7.6437D-10
9	400.00 [ft]	8.5026D-08	1.6012D-08	2.8344D-09	4.7460D-10	7.5673D-11
10	450.00 [ft]	2.9985D-09	5.9870D-10	1.1288D-10	2.0220D-11	3.4621D-12
11	500.00 [ft]	4.8873D-11	1.0560D-11	2.1650D-12	4.2354D-13	7.9500D-14
12	550.00 [ft]	4.1791D-13	9.9530D-14	2.2594D-14	4.9125D-15	1.0280D-15
13	600.00 [ft]	2.1823D-15	5.8065D-16	1.4780D-16	3.6146D-17	8.5286D-18

ROW\COLUMN		26	27
	[ft]	1150.00	1200.00
1	0.00 [ft]	5.7013D-13	9.0844D-14
2	50.00 [ft]	1.1567D-11	1.7061D-12
3	100.00 [ft]	1.1088D-10	1.5484D-11
4	150.00 [ft]	4.8583D-10	6.5669D-11
5	200.00 [ft]	9.9454D-10	1.3257D-10
6	250.00 [ft]	9.9454D-10	1.3257D-10
7	300.00 [ft]	4.8583D-10	6.5669D-11
8	350.00 [ft]	1.1088D-10	1.5484D-11
9	400.00 [ft]	1.1567D-11	1.7061D-12
10	450.00 [ft]	5.7013D-13	9.0844D-14
11	500.00 [ft]	1.4395D-14	2.5281D-15
12	550.00 [ft]	2.0804D-16	4.0903D-17
13	600.00 [ft]	1.9494D-18	4.3335D-19

INPUT FILE FOR PLUME.EXE: EPCAL-OX.INP

```
0  (US UNITS)
0.155 15 0.42 250 25 20 0.0 0     (V,B,POROS,ALONG,ALAT,RD,LAMBDA,THETA)
0  1  1                          (X0,Y0,T0)
50 50  17                         (DX,DY,DT)
27 13  2                         (NX,NY,NT)
2                                (NUMBER OF SOURCES)
0 200 4 0  18       (XS,YS,STRENGTH, T_START, T_END)
0 250 4 0  18
```

OUTPUT FILE FOR PLUME.EXE: EPCAL-OX.OUT

```
OUTPUT FROM 2D-PLUME GROUNDWATER TRANSPORT MODEL
BASED ON A PAPER BY: WILSON AND MILLER,
IN: ASCE J. HYDRAULICS, V. 104, NO. HY4, APRIL, 1978
PROGRAMMED BY C.H. WAGONER, ICF TECHNOLOGY, 9/92


GROUNDWATER SEEPAGE VELOCITY      .1550    [FT/DAY]
AQUIFER THICKNESS =                15.     [FT]
POROSITY =                        .4200
LONGITUDINAL DISPERSIVITY =       250.0    [FT]
LATERAL DISPERSIVITY =            25.00    [FT]
RETARDATION FACTOR =              20.00
DECAY RATE =                      .0000    [PER DAY]
FLOW ANGLE WRT X-AXIS =           .0000    [DEGREES]


NUMBER OF POINT SOURCES =      2
X-COORD     Y-COORD     STRENGTH    START      END
 [FT]        [FT]       [LB/DAY]   [YR]       [YR]
-------------------------------------------------------
  .000       200.       4.00        .000       18.0
  .000       250.       4.00        .000       18.0

OBSERVATION GRID PARAMETERS:

X-COORDINATE OF GRID ORIGIN =          .0000    [FT]
Y-COORDINATE OF GRID ORIGIN =         1.000     [FT]
FIRST TIME FOR CALCULATIONS =         1.000     [YR]
X-COORDINATE INCREMENT =             50.00     [FT]
Y-COORDINATE INCREMENT =             50.00     [FT]
TIME INCREMENT FOR CALCULATIONS =    17.00     [YR]
NUMBER OF NODES IN X-DIRECTION =        27
NUMBER OF NODES IN Y-DIRECTION =        13
NUMBER OF TIMES TO MAKE CALCULATIONS =   2


*************** RESULTS ***************
X-COORD      Y-COORD      TIME     CONCENTRATION
 [FT]         [FT]        [YR]       [MG/L]
.0000E+00   .1000E+01   .1000E+01   .0000E+00
.0000E+00   .1000E+01   .1800E+02   .6161E-02
.0000E+00   .5100E+02   .1000E+01   .0000E+00
.0000E+00   .5100E+02   .1800E+02   .2881E+00
.0000E+00   .1010E+03   .1000E+01   .9156E-14
.0000E+00   .1010E+03   .1800E+02   .5918E+01
```

.0000E+00	.1510E+03	.1000E+01	.5756E-02
.0000E+00	.1510E+03	.1800E+02	.6189E+02
.0000E+00	.2010E+03	.1000E+01	.1029E+04
.0000E+00	.2010E+03	.1800E+02	.1337E+04
.0000E+00	.2510E+03	.1000E+01	.1029E+04
.0000E+00	.2510E+03	.1800E+02	.1332E+04
.0000E+00	.3010E+03	.1000E+01	.2682E-02
.0000E+00	.3010E+03	.1800E+02	.5685E+02
.0000E+00	.3510E+03	.1000E+01	.2164E-14
.0000E+00	.3510E+03	.1800E+02	.5320E+01
.0000E+00	.4010E+03	.1000E+01	.0000E+00
.0000E+00	.4010E+03	.1800E+02	.2511E+00
.0000E+00	.4510E+03	.1000E+01	.0000E+00
.0000E+00	.4510E+03	.1800E+02	.5187E-02
.0000E+00	.5010E+03	.1000E+01	.0000E+00
.0000E+00	.5010E+03	.1800E+02	.4405E-04
.0000E+00	.5510E+03	.1000E+01	.0000E+00
.0000E+00	.5510E+03	.1800E+02	.1488E-06
.0000E+00	.6010E+03	.1000E+01	.0000E+00
.0000E+00	.6010E+03	.1800E+02	.1965E-09
.5000E+02	.1000E+01	.1000E+01	.0000E+00
.5000E+02	.1000E+01	.1800E+02	.6453E-02
.5000E+02	.5100E+02	.1000E+01	.0000E+00
.5000E+02	.5100E+02	.1800E+02	.3008E+00
.5000E+02	.1010E+03	.1000E+01	.4107E-14
.5000E+02	.1010E+03	.1800E+02	.6127E+01
.5000E+02	.1510E+03	.1000E+01	.2451E-02
.5000E+02	.1510E+03	.1800E+02	.6191E+02
.5000E+02	.2010E+03	.1000E+01	.5475E+02
.5000E+02	.2010E+03	.1800E+02	.3192E+03
.5000E+02	.2510E+03	.1000E+01	.5475E+02
.5000E+02	.2510E+03	.1800E+02	.3149E+03
.5000E+02	.3010E+03	.1000E+01	.1148E-02
.5000E+02	.3010E+03	.1800E+02	.5704E+02
.5000E+02	.3510E+03	.1000E+01	.9710E-15
.5000E+02	.3510E+03	.1800E+02	.5511E+01
.5000E+02	.4010E+03	.1000E+01	.0000E+00
.5000E+02	.4010E+03	.1800E+02	.2622E+00
.5000E+02	.4510E+03	.1000E+01	.0000E+00
.5000E+02	.4510E+03	.1800E+02	.5434E-02
.5000E+02	.5010E+03	.1000E+01	.0000E+00
.5000E+02	.5010E+03	.1800E+02	.4621E-04
.5000E+02	.5510E+03	.1000E+01	.0000E+00
.5000E+02	.5510E+03	.1800E+02	.1563E-06
.5000E+02	.6010E+03	.1000E+01	.0000E+00
.5000E+02	.6010E+03	.1800E+02	.2065E-09
.1000E+03	.1000E+01	.1000E+01	.0000E+00
.1000E+03	.1000E+01	.1800E+02	.6072E-02
.1000E+03	.5100E+02	.1000E+01	.0000E+00
.1000E+03	.5100E+02	.1800E+02	.2804E+00
.1000E+03	.1010E+03	.1000E+01	.3041E-15
.1000E+03	.1010E+03	.1800E+02	.5578E+01
.1000E+03	.1510E+03	.1000E+01	.1601E-03
.1000E+03	.1510E+03	.1800E+02	.5180E+02
.1000E+03	.2010E+03	.1000E+01	.1810E+01
.1000E+03	.2010E+03	.1800E+02	.1871E+03
.1000E+03	.2510E+03	.1000E+01	.1810E+01
.1000E+03	.2510E+03	.1800E+02	.1839E+03
.1000E+03	.3010E+03	.1000E+01	.7580E-04
.1000E+03	.3010E+03	.1800E+02	.4805E+02
.1000E+03	.3510E+03	.1000E+01	.7205E-16
.1000E+03	.3510E+03	.1800E+02	.5025E+01
.1000E+03	.4010E+03	.1000E+01	.0000E+00
.1000E+03	.4010E+03	.1800E+02	.2445E+00
.1000E+03	.4510E+03	.1000E+01	.0000E+00
.1000E+03	.4510E+03	.1800E+02	.5115E-02
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.1000E+03	.5010E+03	.1800E+02	.4370E-04
.1000E+03	.5510E+03	.1000E+01	.0000E+00
.1000E+03	.5510E+03	.1800E+02	.1482E-06
.1000E+03	.6010E+03	.1000E+01	.0000E+00
.1000E+03	.6010E+03	.1800E+02	.1961E-09
.1500E+03	.1000E+01	.1000E+01	.0000E+00
.1500E+03	.1000E+01	.1800E+02	.5136E-02
.1500E+03	.5100E+02	.1000E+01	.0000E+00
.1500E+03	.5100E+02	.1800E+02	.2336E+00

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.1500E+03	.1510E+03	.1800E+02	.3772E+02
.1500E+03	.2010E+03	.1000E+01	.1382E-01
.1500E+03	.2010E+03	.1800E+02	.1144E+03
.1500E+03	.2510E+03	.1000E+01	.1382E-01
.1500E+03	.2510E+03	.1800E+02	.1123E+03
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.1500E+03	.3010E+03	.1800E+02	.3522E+02
.1500E+03	.3510E+03	.1000E+01	.8896E-18
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.1500E+03	.4010E+03	.1800E+02	.2039E+00
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.1500E+03	.4510E+03	.1800E+02	.4328E-02
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.1500E+03	.5510E+03	.1800E+02	.1268E-06
.1500E+03	.6010E+03	.1000E+01	.0000E+00
.1500E+03	.6010E+03	.1800E+02	.1683E-09
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.2000E+03	.1000E+01	.1800E+02	.3907E-02
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.2000E+03	.1510E+03	.1000E+01	.3079E-08
.2000E+03	.1510E+03	.1800E+02	.2461E+02
.2000E+03	.2010E+03	.1000E+01	.2088E-04
.2000E+03	.2010E+03	.1800E+02	.6750E+02
.2000E+03	.2510E+03	.1000E+01	.2088E-04
.2000E+03	.2510E+03	.1800E+02	.6628E+02
.2000E+03	.3010E+03	.1000E+01	.1485E-08
.2000E+03	.3010E+03	.1800E+02	.2310E+02
.2000E+03	.3510E+03	.1000E+01	.1842E-20
.2000E+03	.3510E+03	.1800E+02	.2911E+01
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.2500E+03	.3010E+03	.1800E+02	.1375E+02
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.2500E+03	.3510E+03	.1800E+02	.1874E+01
.2500E+03	.4010E+03	.1000E+01	.0000E+00
.2500E+03	.4010E+03	.1800E+02	.1022E+00
.2500E+03	.4510E+03	.1000E+01	.0000E+00
.2500E+03	.4510E+03	.1800E+02	.2257E-02
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.2500E+03	.5010E+03	.1800E+02	.1985E-04
.2500E+03	.5510E+03	.1000E+01	.0000E+00
.2500E+03	.5510E+03	.1800E+02	.6846E-07
.2500E+03	.6010E+03	.1000E+01	.0000E+00
.2500E+03	.6010E+03	.1800E+02	.9155E-10
.3000E+03	.1000E+01	.1000E+01	.0000E+00
.3000E+03	.1000E+01	.1800E+02	.1652E-02

.3000E+03	.5100E+02	.1000E+01	.0000E+00
.3000E+03	.5100E+02	.1800E+02	.7046E-01
.3000E+03	.1010E+03	.1000E+01	.0000E+00
.3000E+03	.1010E+03	.1800E+02	.1195E+01
.3000E+03	.1510E+03	.1000E+01	.5234E-16
.3000E+03	.1510E+03	.1800E+02	.7910E+01
.3000E+03	.2010E+03	.1000E+01	.3000E-12
.3000E+03	.2010E+03	.1800E+02	.1949E+02
.3000E+03	.2510E+03	.1000E+01	.3000E-12
.3000E+03	.2510E+03	.1800E+02	.1915E+02
.3000E+03	.3010E+03	.1000E+01	.2549E-16
.3000E+03	.3010E+03	.1800E+02	.7472E+01
.3000E+03	.3510E+03	.1000E+01	.0000E+00
.3000E+03	.3510E+03	.1800E+02	.1086E+01
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.3000E+03	.4010E+03	.1800E+02	.6172E-01
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.3000E+03	.4510E+03	.1800E+02	.1394E-02
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.3500E+03	.1000E+01	.1000E+01	.0000E+00
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.3500E+03	.5100E+02	.1000E+01	.0000E+00
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.3500E+03	.1010E+03	.1800E+02	.6251E+00
.3500E+03	.1510E+03	.1000E+01	.4955E-21
.3500E+03	.1510E+03	.1800E+02	.3929E+01
.3500E+03	.2010E+03	.1000E+01	.2723E-17
.3500E+03	.2010E+03	.1800E+02	.9386E+01
.3500E+03	.2510E+03	.1000E+01	.2723E-17
.3500E+03	.2510E+03	.1800E+02	.9228E+01
.3500E+03	.3010E+03	.1000E+01	.2420E-21
.3500E+03	.3010E+03	.1800E+02	.3719E+01
.3500E+03	.3510E+03	.1000E+01	.0000E+00
.3500E+03	.3510E+03	.1800E+02	.5693E+00
.3500E+03	.4010E+03	.1000E+01	.0000E+00
.3500E+03	.4010E+03	.1800E+02	.3361E-01
.350CE+03	.4510E+03	.1000E+01	.0000E+00
.3500E+03	.4510E+03	.1800E+02	.7769E-03
.3500E+03	.5010E+03	.1000E+01	.0000E+00
.3500E+03	.5010E+03	.1800E+02	.7020E-05
.3500E+03	.5510E+03	.1000E+01	.0000E+00
.3500E+03	.5510E+03	.1800E+02	.2462E-07
.3500E+03	.6010E+03	.1000E+01	.0000E+00
.3500E+03	.6010E+03	.1800E+02	.3329E-10
.4000E+03	.1000E+01	.1000E+01	.0000E+00
.4000E+03	.1000E+01	.1800E+02	.4624E-03
.4000E+03	.5100E+02	.1000E+01	.0000E+00
.4000E+03	.5100E+02	.1800E+02	.1882E-01
.4000E+03	.1010E+03	.1000E+01	.0000E+00
.4000E+03	.1010E+03	.1800E+02	.2965E+00
.4000E+03	.1510E+03	.1000E+01	.0000E+00
.4000E+03	.1510E+03	.1800E+02	.1788E+01
.4000E+03	.2010E+03	.1000E+01	.4352E-23
.4000E+03	.2010E+03	.1800E+02	.4176E+01
.4000E+03	.2510E+03	.1000E+01	.4352E-23
.4000E+03	.2510E+03	.1800E+02	.4107E+01
.4000E+03	.3010E+03	.1000E+01	.0000E+00
.4000E+03	.3010E+03	.1800E+02	.1696E+01
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.4000E+03	.6010E+03	.1000E+01	.0000E+00
.4000E+03	.6010E+03	.1800E+02	.1726E-10

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.4500E+03	.2010E+03	.1800E+02	.1711E+01
.4500E+03	.2510E+03	.1000E+01	.0000E+00
.4500E+03	.2510E+03	.1800E+02	.1684E+01
.4500E+03	.3010E+03	.1000E+01	.0000E+00
.4500E+03	.3010E+03	.1800E+02	.7077E+00
.4500E+03	.3510E+03	.1000E+01	.0000E+00
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.4500E+03	.4510E+03	.1000E+01	.0000E+00
.4500E+03	.4510E+03	.1800E+02	.1778E-03
.4500E+03	.5010E+03	.1000E+01	.0000E+00
.4500E+03	.5010E+03	.1800E+02	.1654E-05
.4500E+03	.5510E+03	.1000E+01	.0000E+00
.4500E+03	.5510E+03	.1800E+02	.5913E-08
.4500E+03	.6010E+03	.1000E+01	.0000E+00
.4500E+03	.6010E+03	.1800E+02	.8100E-11
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.1000E+04	.1000E+01	.1800E+02	.5343E-10
.1000E+04	.5100E+02	.1000E+01	.0000E+00
.1000E+04	.5100E+02	.1800E+02	.1830E-08
.1000E+04	.1010E+03	.1000E+01	.0000E+00
.1000E+04	.1010E+03	.1800E+02	.2373E-07
.1000E+04	.1510E+03	.1000E+01	.0000E+00
.1000E+04	.1510E+03	.1800E+02	.1208E-06
.1000E+04	.2010E+03	.1000E+01	.0000E+00
.1000E+04	.2010E+03	.1800E+02	.2601E-06
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.1000E+04	.2510E+03	.1800E+02	.2561E-06
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.1000E+04	.3010E+03	.1800E+02	.1152E-06
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.1000E+04	.3510E+03	.1800E+02	.2182E-07
.1000E+04	.4010E+03	.1000E+01	.0000E+00

.1000E+04	.4010E+03	.1800E+02	.1619E-08
.1000E+04	.4510E+03	.1000E+01	.0000E+00
.1000E+04	.4510E+03	.1800E+02	.4545E-10
.1000E+04	.5010E+03	.1000E+01	.0000E+00
.1000E+04	.5010E+03	.1800E+02	.4781E-12
.1000E+04	.5510E+03	.1000E+01	.0000E+00
.1000E+04	.5510E+03	.1800E+02	.1882E-14
.1000E+04	.6010E+03	.1000E+01	.0000E+00
.1000E+04	.6010E+03	.1800E+02	.2778E-17
.1050E+04	.1000E+01	.1000E+01	.0000E+00
.1050E+04	.1000E+01	.1800E+02	.7489E-11
.1050E+04	.5100E+02	.1000E+01	.0000E+00
.1050E+04	.5100E+02	.1800E+02	.2546E-09
.1050E+04	.1010E+03	.1000E+01	.0000E+00
.1050E+04	.1010E+03	.1800E+02	.3282E-08
.1050E+04	.1510E+03	.1000E+01	.0000E+00
.1050E+04	.1510E+03	.1800E+02	.1664E-07
.1050E+04	.2010E+03	.1000E+01	.0000E+00
.1050E+04	.2010E+03	.1800E+02	.3575E-07
.1050E+04	.2510E+03	.1000E+01	.0000E+00
.1050E+04	.2510E+03	.1800E+02	.3521E-07
.1050E+04	.3010E+03	.1000E+01	.0000E+00
.1050E+04	.3010E+03	.1800E+02	.1586E-07
.1050E+04	.3510E+03	.1000E+01	.0000E+00
.1050E+04	.3510E+03	.1800E+02	.3018E-08
.1050E+04	.4010E+03	.1000E+01	.0000E+00
.1050E+04	.4010E+03	.1800E+02	.2253E-09
.1050E+04	.4510E+03	.1000E+01	.0000E+00
.1050E+04	.4510E+03	.1800E+02	.6372E-11
.1050E+04	.5010E+03	.1000E+01	.0000E+00
.1050E+04	.5010E+03	.1800E+02	.6750E-13
.1050E+04	.5510E+03	.1000E+01	.0000E+00
.1050E+04	.5510E+03	.1800E+02	.2675E-15
.1050E+04	.6010E+03	.1000E+01	.0000E+00
.1050E+04	.6010E+03	.1800E+02	.3970E-18
.1100E+04	.1000E+01	.1000E+01	.0000E+00
.1100E+04	.1000E+01	.1800E+02	.9526E-12
.1100E+04	.5100E+02	.1000E+01	.0000E+00
.1100E+04	.5100E+02	.1800E+02	.3218E-10
.1100E+04	.1010E+03	.1000E+01	.0000E+00
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.1100E+04	.1510E+03	.1800E+02	.2084E-08
.1100E+04	.2010E+03	.1000E+01	.0000E+00
.1100E+04	.2010E+03	.1800E+02	.4470E-08
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.1100E+04	.3510E+03	.1800E+02	.3794E-09
.1100E+04	.4010E+03	.1000E+01	.0000E+00
.1100E+04	.4010E+03	.1800E+02	.2849E-10
.1100E+04	.4510E+03	.1000E+01	.0000E+00
.1100E+04	.4510E+03	.1800E+02	.8108E-12
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.1100E+04	.5010E+03	.1800E+02	.8644E-14
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.1100E+04	.5510E+03	.1800E+02	.3446E-16
.1100E+04	.6010E+03	.1000E+01	.0000E+00
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.1150E+04	.1010E+03	.1000E+01	.0000E+00
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.1150E+04	.1510E+03	.1800E+02	.2372E-09
.1150E+04	.2010E+03	.1000E+01	.0000E+00
.1150E+04	.2010E+03	.1800E+02	.5081E-09
.1150E+04	.2510E+03	.1000E+01	.0000E+00
.1150E+04	.2510E+03	.1800E+02	.5004E-09
.1150E+04	.3010E+03	.1000E+01	.0000E+00
.1150E+04	.3010E+03	.1800E+02	.2262E-09
.1150E+04	.3510E+03	.1000E+01	.0000E+00

.1150E+04	.3510E+03	.1800E+02	.4334E-10
.1150E+04	.4010E+03	.1000E+01	.0000E+00
.1150E+04	.4010E+03	.1800E+02	.3270E-11
.1150E+04	.4510E+03	.1000E+01	.0000E+00
.1150E+04	.4510E+03	.1800E+02	.9362E-13
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.1200E+04	.4510E+03	.1000E+01	.0000E+00
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.1200E+04	.5010E+03	.1000E+01	.0000E+00
.1200E+04	.5010E+03	.1800E+02	.1058E-15
.1200E+04	.5510E+03	.1000E+01	.0000E+00
.1200E+04	.5510E+03	.1800E+02	.4265E-18
.1200E+04	.6010E+03	.1000E+01	.0000E+00
.1200E+04	.6010E+03	.1800E+02	.6428E-21
.1250E+04	.1000E+01	.1000E+01	.0000E+00
.1250E+04	.1000E+01	.1800E+02	.1096E-14
.1250E+04	.5100E+02	.1000E+01	.0000E+00
.1250E+04	.5100E+02	.1800E+02	.3643E-13
.1250E+04	.1010E+03	.1000E+01	.0000E+00
.1250E+04	.1010E+03	.1800E+02	.4609E-12
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.1250E+04	.6010E+03	.1000E+01	.0000E+00
.1250E+04	.6010E+03	.1800E+02	.6204E-22
.1300E+04	.1000E+01	.1000E+01	.0000E+00
.1300E+04	.1000E+01	.1800E+02	.9456E-16
.1300E+04	.5100E+02	.1000E+01	.0000E+00
.1300E+04	.5100E+02	.1800E+02	.3130E-14
.1300E+04	.1010E+03	.1000E+01	.0000E+00
.1300E+04	.1010E+03	.1800E+02	.3946E-13
.1300E+04	.1510E+03	.1000E+01	.0000E+00
.1300E+04	.1510E+03	.1800E+02	.1971E-12
.1300E+04	.2010E+03	.1000E+01	.0000E+00
.1300E+04	.2010E+03	.1800E+02	.4208E-12
.1300E+04	.2510E+03	.1000E+01	.0000E+00
.1300E+04	.2510E+03	.1800E+02	.4144E-12
.1300E+04	.3010E+03	.1000E+01	.0000E+00

.1300E+04	.3010E+03	.1800E+02	.1880E-12
.1300E+04	.3510E+03	.1000E+01	.0000E+00
.1300E+04	.3510E+03	.1800E+02	.3631E-13
.1300E+04	.4010E+03	.1000E+01	.0000E+00
.1300E+04	.4010E+03	.1800E+02	.2773E-14
.1300E+04	.4510E+03	.1000E+01	.0000E+00
.1300E+04	.4510E+03	.1800E+02	.8055E-16
.1300E+04	.5010E+03	.1000E+01	.0000E+00
.1300E+04	.5010E+03	.1800E+02	.8773E-18
.1300E+04	.5510E+03	.1000E+01	.0000E+00
.1300E+04	.5510E+03	.1800E+02	.3570E-20
.1300E+04	.6010E+03	.1000E+01	.0000E+00
.1300E+04	.6010E+03	.1800E+02	.5429E-23

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*******************************************************
*                                                     *
*         S O L U T E  version 4.06                   *
*                                                     *
*    ANALYTICAL MODELS FOR SOLUTE TRANSPORT           *
*                                                     *
*******************************************************
```

Model: PLUME2D-H

PROJECT..... = epri-plume-3
USER NAME..... = mbrooke
DATE..... = 08-20-1998
DATA FILE..... = C:\SOLUTE\0734\EPRI-3D.D2D

INPUT DATA:

GROUNDWATER (SEEPAGE) VELOCITY.... = .092 [ft/d]
AQUIFER THICKNESS..... = 20 [ft]
POROSITY..... = .42
LONGITUDINAL DISPERSIVITY..... = 250 [ft]
LATERAL DISPERSIVITY..... = 25 [ft]
RETARDATION FACTOR..... = 20
HALF-LIFE..... = 0 [d]
DECAY CONSTANT..... = 0.0000D+00

NUMBER OF POINT SOURCES..... = 5

SOURCE NO. 1

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 200 [ft]
SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 24820 [d]

SOURCE NO. 2

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 300 [ft]

SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 24820 [d]

SOURCE NO. 3

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 400 [ft]
SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 24820 [d]

SOURCE NO. 4

X-COORDINATE OF THE SOURCE..... = 300 [ft]
Y-COORDINATE OF THE SOURCE..... = 250 [ft]
SOURCE STRENGTH..... = .08 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 24820 [d]

SOURCE NO. 5

X-COORDINATE OF THE SOURCE..... = 300 [ft]
Y-COORDINATE OF THE SOURCE..... = 350 [ft]
SOURCE STRENGTH..... = .08 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 24820 [d]

GRID DATA:

X-COORDINATE OF GRID ORIGIN..... = -100 [ft]
Y-COORDINATE OF GRID ORIGIN..... = 0 [ft]
DISTANCE INCREMENT DELX..... = 50 [ft]
DISTANCE INCREMENT DELY..... = 50 [ft]
NUMBER OF NODES IN X-DIRECTION.... = 35
NUMBER OF NODES IN Y-DIRECTION.... = 21

CONCENTRATION C [mg/l]

ROW\COLUMN	1	2	3	4	5
[ft]	-100.00	-50.00	0.00	50.00	100.00
1	0.00 [ft]	0.0000D+00	0.0000D+00	2.9854D-03	3.2113D-03	3.2728D-03
2	50.00 [ft]	0.0000D+00	0.0000D+00	2.1969D-02	2.3559D-02	2.3796D-02
3	100.00 [ft]	0.0000D+00	0.0000D+00	2.6371D-01	2.9906D-01	1.2186D-01

4	150.00 [ft]	0.0000D+00	0.0000D+00	5.2488D-01	5.4310D-01	5.0252D-01
5	200.00 [ft]	0.0000D+00	0.0000D+00	7.1037D-01	1.8887D+00	1.1329D+00
6	250.00 [ft]	0.0000D+00	0.0000D+00	1.0275D+00	1.0623D+00	9.8094D-01
7	300.00 [ft]	0.0000D+00	0.0000D+00	9.6813D-01	2.1814D+00	1.2482D+00
8	350.00 [ft]	0.0000D+00	0.0000D+00	1.0275D+00	1.0623D+00	9.8094D-01
9	400.00 [ft]	0.0000D+00	0.0000D+00	7.1037D-01	1.8887D+00	1.1329D+00
10	450.00 [ft]	0.0000D+00	0.0000D+00	5.2488D-01	5.4310D-01	5.0252D-01
11	500.00 [ft]	0.0000D+00	0.0000D+00	2.6371D-01	2.9906D-01	1.2186D-01
12	550.00 [ft]	0.0000D+00	0.0000D+00	2.1969D-02	2.3559D-02	2.3796D-02
13	600.00 [ft]	0.0000D+00	0.0000D+00	2.9854D-03	3.2113D-03	3.2728D-03
14	650.00 [ft]	0.0000D+00	0.0000D+00	2.8360D-04	3.0557D-04	3.1296D-04
15	700.00 [ft]	0.0000D+00	0.0000D+00	1.8368D-05	1.9810D-05	2.0348D-05
16	750.00 [ft]	0.0000D+00	0.0000D+00	1.3492D-06	1.4567D-06	1.5010D-06
17	800.00 [ft]	0.0000D+00	0.0000D+00	4.2336D-08	4.5733D-08	4.7202D-08
18	850.00 [ft]	0.0000D+00	0.0000D+00	9.2312D-10	9.9782D-10	1.0318D-09
19	900.00 [ft]	0.0000D+00	0.0000D+00	1.4611D-11	1.5805D-11	1.6380D-11
20	950.00 [ft]	0.0000D+00	0.0000D+00	1.7817D-13	1.9291D-13	2.0048D-13
21	1000.00 [ft]	0.0000D+00	0.0000D+00	1.7920D-15	1.9423D-15	2.0249D-15

ROW\COLUMN	6	7	8	9	10
[ft]	150.00	200.00	250.00	300.00	350.00
1	0.00 [ft]	3.1618D-03	2.8976D-03	2.5214D-03	3.1456D-03	2.7905D-03
2	50.00 [ft]	2.2665D-02	2.0394D-02	1.7373D-02	2.5202D-02	2.2795D-02
3	100.00 [ft]	1.1295D-01	9.8299D-02	8.0745D-02	1.4503D-01	1.3473D-01
4	150.00 [ft]	4.3695D-01	3.8819D-01	4.0903D-01	1.1645D+00	1.2451D+00
5	200.00 [ft]	8.4216D-01	6.2408D-01	4.9610D-01	2.4625D+00	2.2396D+00
6	250.00 [ft]	8.5092D-01	7.5570D-01	8.0043D-01	2.9877D+00	7.2923D+00
7	300.00 [ft]	9.4881D-01	7.1660D-01	5.7182D-01	4.3202D+00	4.1382D+00
8	350.00 [ft]	8.5092D-01	7.5570D-01	8.0043D-01	2.9877D+00	7.2923D+00
9	400.00 [ft]	8.4216D-01	6.2408D-01	4.9610D-01	2.4625D+00	2.2396D+00
10	450.00 [ft]	4.3695D-01	3.8819D-01	4.0903D-01	1.1645D+00	1.2451D+00
11	500.00 [ft]	1.1295D-01	9.8299D-02	8.0745D-02	1.4503D-01	1.3473D-01
12	550.00 [ft]	2.2665D-02	2.0394D-02	1.7373D-02	2.5202D-02	2.2795D-02
13	600.00 [ft]	3.1618D-03	2.8976D-03	2.5214D-03	3.1456D-03	2.7905D-03
14	650.00 [ft]	3.0474D-04	2.8223D-04	2.4871D-04	2.7732D-04	2.4081D-04
15	700.00 [ft]	1.9908D-05	1.8555D-05	1.6480D-05	1.8995D-05	2.3726D-05
16	750.00 [ft]	1.4763D-06	1.3860D-06	1.2423D-06	1.2215D-06	1.0402D-06
17	800.00 [ft]	4.6549D-08	4.3868D-08	3.9511D-08	3.7469D-08	3.1735D-08
18	850.00 [ft]	1.0207D-09	9.6602D-10	8.7495D-10	8.1311D-10	6.8860D-10
19	900.00 [ft]	1.6265D-11	1.5477D-11	1.4114D-11	1.3006D-11	1.1066D-11
20	950.00 [ft]	1.9998D-13	1.9152D-13	1.7611D-13	1.6224D-13	1.3924D-13

21 1000.00 [ft] 2.0306D-15 1.9590D-15 1.8186D-15 1.6845D-15 1.4624D-15

ROW\COLUMN	11	12	13	14	15
[ft]	400.00	450.00	500.00	550.00	600.00
1	0.00 [ft]	2.4057D-03	2.0227D-03	1.6579D-03	1.3227D-03	1.0248D-03
2	50.00 [ft]	2.0134D-02	1.7338D-02	1.4515D-02	1.1776D-02	9.2321D-03
3	100.00 [ft]	1.2200D-01	1.0712D-01	9.0786D-02	7.4009D-02	5.7912D-02
4	150.00 [ft]	5.4247D-01	4.7943D-01	4.0370D-01	3.2395D-01	2.4813D-01
5	200.00 [ft]	2.0196D+00	1.7249D+00	1.5084D+00	1.5635D+00	6.8814D-01
6	250.00 [ft]	4.3890D+00	3.2455D+00	2.3911D+00	1.8872D+00	1.8910D+00
7	300.00 [ft]	3.7520D+00	3.2107D+00	2.8215D+00	2.9719D+00	1.2571D+00
8	350.00 [ft]	4.3890D+00	3.2455D+00	2.3911D+00	1.8872D+00	1.8910D+00
9	400.00 [ft]	2.0196D+00	1.7249D+00	1.5084D+00	1.5635D+00	6.8814D-01
10	450.00 [ft]	5.4247D-01	4.7943D-01	4.0370D-01	3.2395D-01	2.4813D-01
11	500.00 [ft]	1.2200D-01	1.0712D-01	9.0786D-02	7.4009D-02	5.7912D-02
12	550.00 [ft]	2.0134D-02	1.7338D-02	1.4515D-02	1.1776D-02	9.2321D-03
13	600.00 [ft]	2.4057D-03	2.0227D-03	1.6579D-03	1.3227D-03	1.0248D-03
14	650.00 [ft]	2.0309D-04	1.6670D-04	1.3334D-04	1.0396D-04	7.8934D-05
15	700.00 [ft]	1.9777D-05	1.6001D-05	1.2592D-05	9.6510D-06	7.2096D-06
16	750.00 [ft]	8.5538D-07	6.8082D-07	5.2569D-07	3.9460D-07	2.8843D-07
17	800.00 [ft]	2.5906D-08	2.0424D-08	1.5585D-08	1.1536D-08	8.3012D-09
18	850.00 [ft]	5.6159D-10	4.4181D-10	3.3591D-10	2.4734D-10	1.7676D-10
19	900.00 [ft]	9.0682D-12	7.1671D-12	5.4718D-12	4.0427D-12	2.8960D-12
20	950.00 [ft]	1.1519D-13	9.1973D-14	7.0964D-14	5.2993D-14	3.8364D-14
21	1000.00 [ft]	1.2257D-15	9.9268D-16	7.7774D-16	5.9021D-16	4.3446D-16

ROW\COLUMN	16	17	18	19	20
[ft]	650.00	700.00	750.00	800.00	850.00
1	0.00 [ft]	7.6919D-04	5.5797D-04	3.9033D-04	2.7755D-04	1.7779D-04
2	50.00 [ft]	7.0121D-03	5.0972D-03	3.5597D-03	2.3861D-03	1.5343D-03
3	100.00 [ft]	4.3452D-02	3.1248D-02	2.1537D-02	1.4244D-02	9.0209D-03
4	150.00 [ft]	1.8175D-01	1.2752D-01	8.5812D-02	5.5435D-02	3.4397D-02
5	200.00 [ft]	4.8665D-01	3.3113D-01	2.1705D-01	1.3714D-01	8.3506D-02
6	250.00 [ft]	7.9444D-01	5.3432D-01	3.4699D-01	2.1756D-01	1.3164D-01
7	300.00 [ft]	8.8505D-01	5.9938D-01	3.9106D-01	2.4595D-01	1.4914D-01
8	350.00 [ft]	7.9444D-01	5.3432D-01	3.4699D-01	2.1756D-01	1.3164D-01
9	400.00 [ft]	4.8665D-01	3.3113D-01	2.1705D-01	1.3714D-01	8.3506D-02

10	450.00 [ft]	1.8175D-01	1.2752D-01	8.5812D-02	5.5435D-02	3.4397D-02
11	500.00 [ft]	4.3452D-02	3.1248D-02	2.1537D-02	1.4244D-02	9.0209D-03
12	550.00 [ft]	7.0121D-03	5.0972D-03	3.5597D-03	2.3861D-03	1.5343D-03
13	600.00 [ft]	7.6919D-04	5.5797D-04	3.9033D-04	2.7755D-04	1.7779D-04
14	650.00 [ft]	9.4682D-05	6.8353D-05	4.7803D-05	3.2321D-05	2.1089D-05
15	700.00 [ft]	5.2486D-06	3.7205D-06	2.5643D-06	1.7156D-06	1.1120D-06
16	750.00 [ft]	2.0552D-07	1.4281D-07	9.6751D-08	6.3843D-08	4.0979D-08
17	800.00 [ft]	5.8174D-09	3.9760D-09	2.6525D-09	1.7274D-09	1.0978D-09
18	850.00 [ft]	1.2285D-10	8.3209D-11	5.5006D-11	3.5528D-11	2.2434D-11
19	900.00 [ft]	2.0157D-12	1.3658D-12	9.0274D-13	5.8294D-13	3.6823D-13
20	950.00 [ft]	2.6975D-14	1.8455D-14	1.2310D-14	8.0188D-15	5.1096D-15
21	1000.00 [ft]	3.1070D-16	2.1622D-16	1.4667D-16	9.7153D-17	6.2939D-17

ROW\COLUMN	21	22	23	24	25
	[ft] 900.00	950.00	1000.00	1050.00	1100.00
1	0.00 [ft]	1.0959D-04	1.0291D-04	5.9548D-05	3.3063D-05	1.7614D-05
2	50.00 [ft]	9.6484D-04	5.6814D-04	3.2096D-04	1.7391D-04	1.4532D-04
3	100.00 [ft]	5.4788D-03	3.2575D-03	1.8186D-03	9.7438D-04	5.0098D-04
4	150.00 [ft]	2.0526D-02	1.1757D-02	6.4965D-03	3.4335D-03	1.7986D-03
5	200.00 [ft]	4.8995D-02	2.7717D-02	1.5080D-02	7.9099D-03	3.9835D-03
6	250.00 [ft]	7.6853D-02	4.3240D-02	2.3489D-02	1.2256D-02	6.1556D-03
7	300.00 [ft]	8.7164D-02	4.9143D-02	2.6650D-02	1.3928D-02	6.9965D-03
8	350.00 [ft]	7.6853D-02	4.3240D-02	2.3489D-02	1.2256D-02	6.1556D-03
9	400.00 [ft]	4.8995D-02	2.7717D-02	1.5080D-02	7.9099D-03	3.9835D-03
10	450.00 [ft]	2.0526D-02	1.1757D-02	6.4965D-03	3.4335D-03	1.7986D-03
11	500.00 [ft]	5.4788D-03	3.2575D-03	1.8186D-03	9.7438D-04	5.0098D-04
12	550.00 [ft]	9.6484D-04	5.6814D-04	3.2096D-04	1.7391D-04	1.4532D-04
13	600.00 [ft]	1.0959D-04	1.0291D-04	5.9548D-05	3.3063D-05	1.7614D-05
14	650.00 [ft]	1.3260D-05	8.0250D-06	4.6705D-06	2.6126D-06	1.4043D-06
15	700.00 [ft]	6.9720D-07	4.2216D-07	2.4657D-07	1.3880D-07	7.5262D-08
16	750.00 [ft]	2.5547D-08	1.5445D-08	9.0421D-09	5.1206D-09	2.8027D-09
17	800.00 [ft]	6.8016D-10	4.1036D-10	2.4079D-10	1.3724D-10	7.5907D-11
18	850.00 [ft]	1.3848D-11	8.3527D-12	4.9188D-12	2.8253D-12	1.5814D-12
19	900.00 [ft]	2.2772D-13	1.3790D-13	8.1769D-14	4.7452D-14	2.6933D-14
20	950.00 [ft]	3.1889D-15	1.9509D-15	1.1706D-15	6.8902D-16	3.9775D-16
21	1000.00 [ft]	3.9936D-17	2.4849D-17	1.5177D-17	9.1034D-18	5.3645D-18

ROW\COLUMN	26	27	28	29	30

	[ft]	1150.00	1200.00	1250.00	1300.00	1350.00
1	0.00 [ft]	9.0044D-06	4.4182D-06	2.0816D-06	9.4224D-07	4.1002D-07
2	50.00 [ft]	7.3532D-05	3.5699D-05	1.6634D-05	7.4422D-06	3.1989D-06
3	100.00 [ft]	2.4718D-04	1.8729D-04	8.6412D-05	3.8284D-05	1.6293D-05
4	150.00 [ft]	8.7920D-04	4.1285D-04	2.9093D-04	1.2790D-04	5.4029D-05
5	200.00 [ft]	1.9294D-03	9.6873D-04	4.3536D-04	2.8210D-04	1.1863D-04
6	250.00 [ft]	2.9743D-03	1.3821D-03	7.2212D-04	3.1229D-04	1.8084D-04
7	300.00 [ft]	3.3811D-03	1.5712D-03	7.0185D-04	4.8945D-04	2.0546D-04
8	350.00 [ft]	2.9743D-03	1.3821D-03	7.2212D-04	3.1229D-04	1.8084D-04
9	400.00 [ft]	1.9294D-03	9.6873D-04	4.3536D-04	2.8210D-04	1.1863D-04
10	450.00 [ft]	8.7920D-04	4.1285D-04	2.9093D-04	1.2790D-04	5.4029D-05
11	500.00 [ft]	2.4718D-04	1.8729D-04	8.6412D-05	3.8284D-05	1.6293D-05
12	550.00 [ft]	7.3532D-05	3.5699D-05	1.6634D-05	7.4422D-06	3.1989D-06
13	600.00 [ft]	9.0044D-06	4.4182D-06	2.0816D-06	9.4224D-07	4.1002D-07
14	650.00 [ft]	7.2526D-07	3.5997D-07	1.7176D-07	7.8838D-08	3.4833D-08
15	700.00 [ft]	3.9299D-08	1.9762D-08	9.5727D-09	4.4690D-09	2.0121D-09
16	750.00 [ft]	1.4818D-09	7.5667D-10	3.7319D-10	1.7784D-10	8.1926D-11
17	800.00 [ft]	4.0709D-11	2.1160D-11	1.0658D-11	5.2028D-12	2.4622D-12
18	850.00 [ft]	8.6180D-13	4.5696D-13	2.3565D-13	1.1818D-13	5.7635D-14
19	900.00 [ft]	1.4941D-14	8.0956D-15	4.2821D-15	2.2103D-15	1.1132D-15
20	950.00 [ft]	2.2510D-16	1.2484D-16	6.7815D-17	3.6068D-17	1.8777D-17
21	1000.00 [ft]	3.1058D-18	1.7664D-18	9.8662D-19	5.4106D-19	2.9125D-19

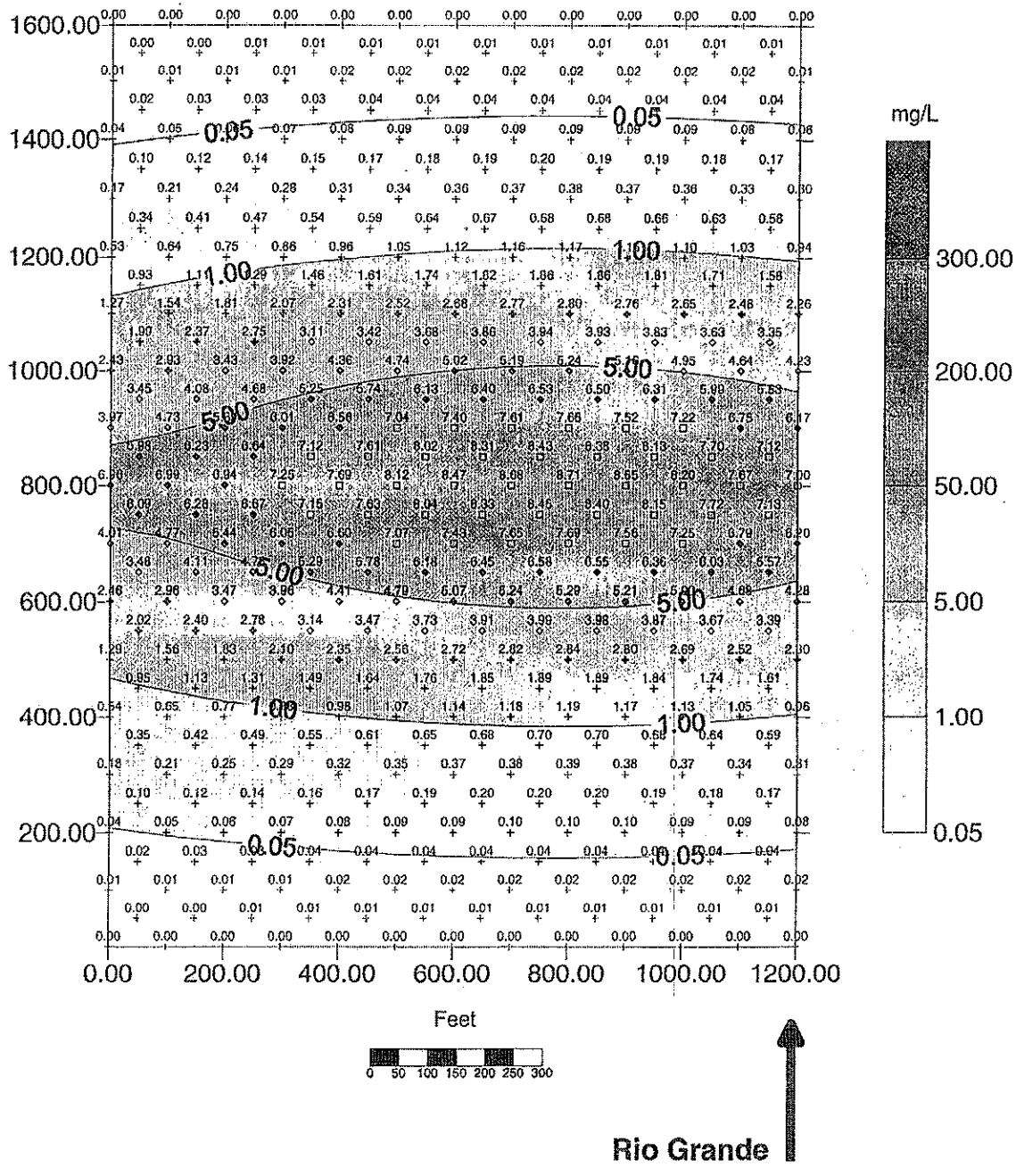
ROW\COLUMN		31	32	33	34	35
	[ft]	1400.00	1450.00	1500.00	1550.00	1600.00
1	0.00 [ft]	1.7167D-07	6.9220D-08	2.6909D-08	1.0098D-08	3.6631D-09
2	50.00 [ft]	1.3219D-06	5.2559D-07	2.0127D-07	7.4321D-08	2.6495D-08
3	100.00 [ft]	6.6645D-06	2.6218D-06	9.9284D-07	3.6226D-07	1.2751D-07
4	150.00 [ft]	2.1937D-05	8.5658D-06	3.2188D-06	1.1650D-06	4.0658D-07
5	200.00 [ft]	4.7956D-05	1.8645D-05	6.9755D-06	2.5133D-06	8.7295D-07
6	250.00 [ft]	7.2992D-05	2.8334D-05	1.0584D-05	3.8070D-06	1.3200D-06
7	300.00 [ft]	8.2918D-05	3.2181D-05	1.2018D-05	4.3220D-06	1.4981D-06
8	350.00 [ft]	7.2992D-05	2.8334D-05	1.0584D-05	3.8070D-06	1.3200D-06
9	400.00 [ft]	4.7956D-05	1.8645D-05	6.9755D-06	2.5133D-06	8.7295D-07
10	450.00 [ft]	2.1937D-05	8.5658D-06	3.2188D-06	1.1650D-06	4.0658D-07
11	500.00 [ft]	6.6645D-06	2.6218D-06	9.9284D-07	3.6226D-07	1.2751D-07
12	550.00 [ft]	1.3219D-06	5.2559D-07	2.0127D-07	7.4321D-08	2.6495D-08
13	600.00 [ft]	1.7167D-07	6.9220D-08	2.6909D-08	1.0098D-08	3.6631D-09
14	650.00 [ft]	1.4827D-08	6.0871D-09	2.4129D-09	9.2465D-10	3.4304D-10
15	700.00 [ft]	8.7441D-10	3.6716D-10	1.4913D-10	5.8670D-11	2.2386D-11

16	750.00 [ft]	3.6514D-11	1.5759D-11	6.5929D-12	2.6770D-12	1.0563D-12
17	800.00 [ft]	1.1303D-12	5.0369D-13	2.1809D-13	9.1848D-14	3.7666D-14
18	850.00 [ft]	2.7346D-14	1.2629D-14	5.6808D-15	2.4911D-15	1.0659D-15
19	900.00 [ft]	5.4710D-16	2.6244D-16	1.2294D-16	5.6269D-17	2.5183D-17
20	950.00 [ft]	9.5678D-18	4.7717D-18	2.3298D-18	1.1141D-18	5.2198D-19
21	1000.00 [ft]	1.5386D-19	7.9761D-20	4.0578D-20	2.0263D-20	9.9352D-21

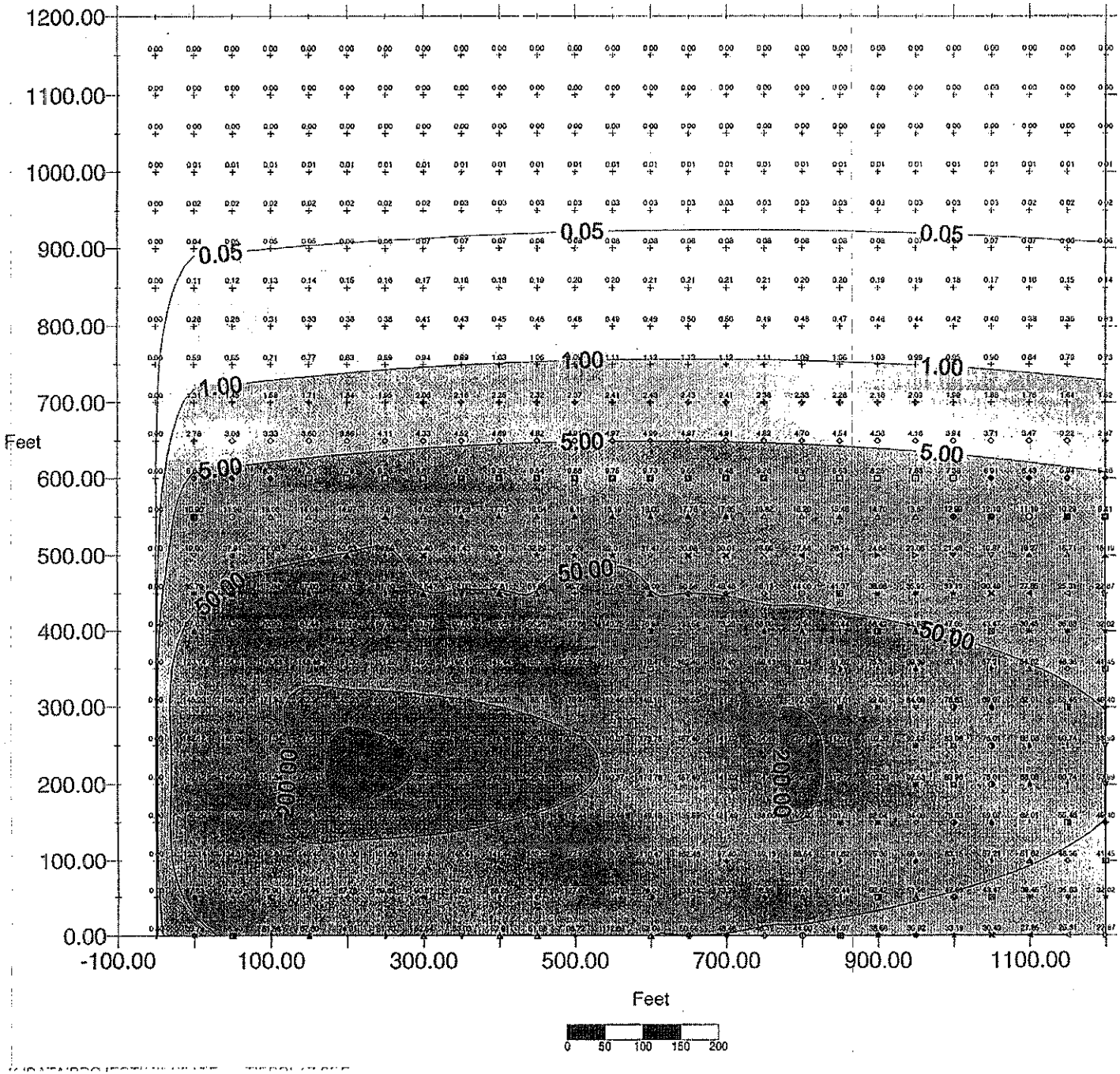
EP-RI
Model: epcal8s3.out
Dispersivity: 250:25
Source: 2 @ 4 lb/day
Source Present: 18 years
Time Until Calculation: 280 years

Future Worst Case Scenario at 280 Years with Source Removal after 18 years

PLUME #1



Future Worst Case Scenario without Source Area Removal after 280 Years
Plume #1



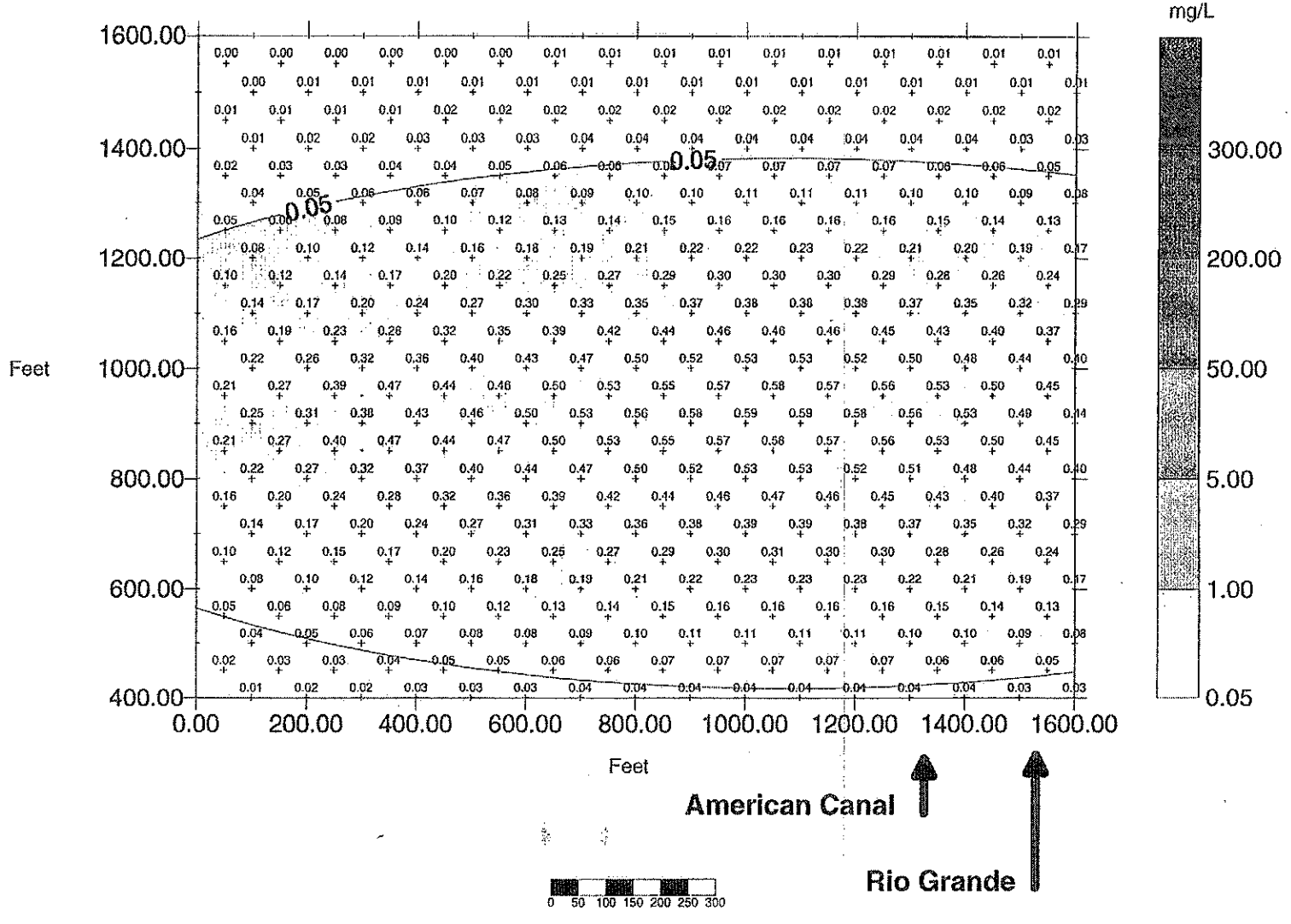
EP-RI
Model: 1z
Dispersivity: 250:25
Source: 2 @ 4 lb/day

Retardation Factor: 20
Decay: 0
Time until Calculation: 280 years

Future Worst Case Scenario at 540 Years with Source Removal after 68 years

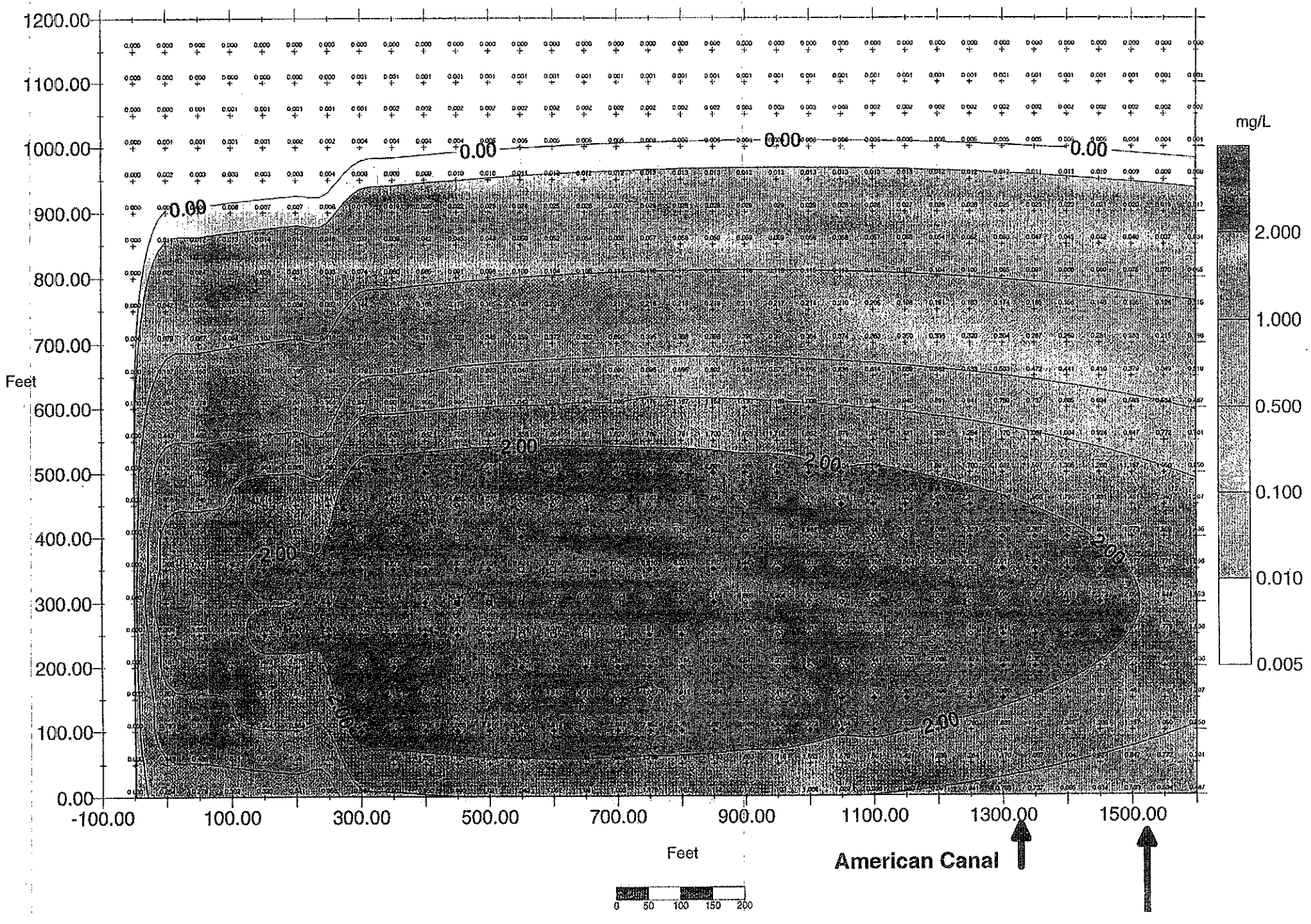
EP-RI
Model: epcal9s1.out
Dispersivity: 250:25
Source: 3 @ 0.0214 lb/day
Source: 2 @ 0.08 lb/day
Source Present: 68 years
Time Until Calculation: 540 years

PLUME #2



EP-RI
Model: 3
Dispersivity 250:25
Source: 3 @ 0.0214 lb/day
Source: 2 @ 0.08 lb/day
Time until calculation: 540 years

Future Worst Case Scenario without Source Area Removal after 540 Years
Plume #2



MODEL FUTURE SCENARIO OUTPUT FILES

INPUT FILE FOR PLUME.EXE: EPCAL8S2.INP

```
0  (US UNITS)
0.155 15 0.42 250 25 20 0.0 0     (V,B,POROS,ALONG,ALAT,RD,LAMBDA,THETA)
0  1  40                        (X0,Y0,T0)
50 50  80                          (DX,DY,DT)
25 27  4                         (NX,NY,NT)
2                                (NUMBER OF SOURCES)
0 0 4 0  18       (XS,YS,STRENGTH, T_START, T_END)
0 0 4 0  18
```

OUTPUT FILE FOR PLUME.EXE: EPCAL8S2.OUT

OUTPUT FROM 2D-PLUME GROUNDWATER TRANSPORT MODEL
BASED ON A PAPER BY: WILSON AND MILLER,
IN: ASCE J. HYDRAULICS, V. 104, NO. HY4, APRIL, 1978
PROGRAMMED BY C.H. WAGONER, ICF TECHNOLOGY, 9/92

GROUNDWATER SEEPAGE VELOCITY	.1550	[FT/DAY]
AQUIFER THICKNESS =	15.	[FT]
POROSITY =	.4200	
LONGITUDINAL DISPERSIVITY =	250.0	[FT]
LATERAL DISPERSIVITY =	25.00	[FT]
RETARDATION FACTOR =	20.00	
DECAY RATE =	.0000	[PER DAY]
FLOW ANGLE WRT X-AXIS =	.0000	[DEGREES]

NUMBER OF POINT SOURCES = 2

X-COORD [FT]	Y-COORD [FT]	STRENGTH [LB/DAY]	START [YR]	END [YR]
.000	.000	4.00	.000	18.0
.000	.000	4.00	.000	18.0

OBSERVATION GRID PARAMETERS:

X-COORDINATE OF GRID ORIGIN =	.0000	[FT]
Y-COORDINATE OF GRID ORIGIN =	1.000	[FT]
FIRST TIME FOR CALCULATIONS =	40.00	[YR]
X-COORDINATE INCREMENT =	50.00	[FT]
Y-COORDINATE INCREMENT =	50.00	[FT]
TIME INCREMENT FOR CALCULATIONS =	80.00	[YR]
NUMBER OF NODES IN X-DIRECTION =	25	
NUMBER OF NODES IN Y-DIRECTION =	27	
NUMBER OF TIMES TO MAKE CALCULATIONS =	4	

********** RESULTS **********

X-COORD [FT]	Y-COORD [FT]	TIME [YR]	CONCENTRATION [MG/L]
.0000E+00	.1000E+01	.4000E+02	.1948E+03
.0000E+00	.1000E+01	.1200E+03	.7903E+02
.0000E+00	.1000E+01	.2000E+03	.4780E+02
.0000E+00	.1000E+01	.2800E+03	.3194E+02
.0000E+00	.5100E+02	.4000E+02	.5611E+02
.0000E+00	.5100E+02	.1200E+03	.1528E+02
.0000E+00	.5100E+02	.2000E+03	.8236E+01
.0000E+00	.5100E+02	.2800E+03	.5211E+01
.0000E+00	.1010E+03	.4000E+02	.2643E+02
.0000E+00	.1010E+03	.1200E+03	.1135E+02
.0000E+00	.1010E+03	.2000E+03	.6230E+01
.0000E+00	.1010E+03	.2800E+03	.3925E+01
.0000E+00	.1510E+03	.4000E+02	.7000E+01
.0000E+00	.1510E+03	.1200E+03	.7758E+01
.0000E+00	.1510E+03	.2000E+03	.4777E+01
.0000E+00	.1510E+03	.2800E+03	.3120E+01
.0000E+00	.2010E+03	.4000E+02	.1113E+01
.0000E+00	.2010E+03	.1200E+03	.4600E+01
.0000E+00	.2010E+03	.2000E+03	.3453E+01
.0000E+00	.2010E+03	.2800E+03	.2422E+01
.0000E+00	.2510E+03	.4000E+02	.1131E+00
.0000E+00	.2510E+03	.1200E+03	.2336E+01
.0000E+00	.2510E+03	.2000E+03	.2307E+01
.0000E+00	.2510E+03	.2800E+03	.1796E+01
.0000E+00	.3010E+03	.4000E+02	.7593E-02
.0000E+00	.3010E+03	.1200E+03	.1012E+01
.0000E+00	.3010E+03	.2000E+03	.1413E+01
.0000E+00	.3010E+03	.2800E+03	.1260E+01
.0000E+00	.3510E+03	.4000E+02	.3387E-03
.0000E+00	.3510E+03	.1200E+03	.3743E+00
.0000E+00	.3510E+03	.2000E+03	.7918E+00
.0000E+00	.3510E+03	.2800E+03	.8331E+00
.0000E+00	.4010E+03	.4000E+02	.1000E-04
.0000E+00	.4010E+03	.1200E+03	.1182E+00
.0000E+00	.4010E+03	.2000E+03	.4049E+00
.0000E+00	.4010E+03	.2800E+03	.5175E+00
.0000E+00	.4510E+03	.4000E+02	.1942E-06
.0000E+00	.4510E+03	.1200E+03	.3187E-01
.0000E+00	.4510E+03	.2000E+03	.1889E+00
.0000E+00	.4510E+03	.2800E+03	.3018E+00
.0000E+00	.5010E+03	.4000E+02	.2471E-08
.0000E+00	.5010E+03	.1200E+03	.7359E-02
.0000E+00	.5010E+03	.2000E+03	.8036E-01
.0000E+00	.5010E+03	.2800E+03	.1650E+00
.0000E+00	.5510E+03	.4000E+02	.2053E-10
.0000E+00	.5510E+03	.1200E+03	.1456E-02
.0000E+00	.5510E+03	.2000E+03	.3117E-01
.0000E+00	.5510E+03	.2800E+03	.8462E-01
.0000E+00	.6010E+03	.4000E+02	.1110E-12
.0000E+00	.6010E+03	.1200E+03	.2474E-03
.0000E+00	.6010E+03	.2000E+03	.1102E-01
.0000E+00	.6010E+03	.2800E+03	.4067E-01
.0000E+00	.6510E+03	.4000E+02	.3901E-15
.0000E+00	.6510E+03	.1200E+03	.3613E-04
.0000E+00	.6510E+03	.2000E+03	.3557E-02
.0000E+00	.6510E+03	.2800E+03	.1831E-01
.0000E+00	.7010E+03	.4000E+02	.8897E-18
.0000E+00	.7010E+03	.1200E+03	.4544E-05
.0000E+00	.7010E+03	.2000E+03	.1047E-02
.0000E+00	.7010E+03	.2800E+03	.7727E-02
.0000E+00	.7510E+03	.4000E+02	.1315E-20
.0000E+00	.7510E+03	.1200E+03	.4926E-06
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.0000E+00	.7510E+03	.2800E+03	.3055E-02
.0000E+00	.8010E+03	.4000E+02	.1258E-23
.0000E+00	.8010E+03	.1200E+03	.4609E-07
.0000E+00	.8010E+03	.2000E+03	.6889E-04
.0000E+00	.8010E+03	.2800E+03	.1132E-02
.0000E+00	.8510E+03	.4000E+02	.7786E-27
.0000E+00	.8510E+03	.1200E+03	.3725E-08
.0000E+00	.8510E+03	.2000E+03	.1541E-04

.0000E+00	.8510E+03	.2800E+03	.3930E-03
.0000E+00	.9010E+03	.4000E+02	.0000E+00
.0000E+00	.9010E+03	.1200E+03	.2603E-09
.0000E+00	.9010E+03	.2000E+03	.3150E-05
.0000E+00	.9010E+03	.2800E+03	.1278E-03
.0000E+00	.9510E+03	.4000E+02	.0000E+00
.0000E+00	.9510E+03	.1200E+03	.1574E-10
.0000E+00	.9510E+03	.2000E+03	.5880E-06
.0000E+00	.9510E+03	.2800E+03	.3898E-04
.0000E+00	.1001E+04	.4000E+02	.0000E+00
.0000E+00	.1001E+04	.1200E+03	.8231E-12
.0000E+00	.1001E+04	.2000E+03	.1003E-06
.0000E+00	.1001E+04	.2800E+03	.1114E-04
.0000E+00	.1051E+04	.4000E+02	.0000E+00
.0000E+00	.1051E+04	.1200E+03	.3726E-13
.0000E+00	.1051E+04	.2000E+03	.1564E-07
.0000E+00	.1051E+04	.2800E+03	.2984E-05
.0000E+00	.1101E+04	.4000E+02	.0000E+00
.0000E+00	.1101E+04	.1200E+03	.1460E-14
.0000E+00	.1101E+04	.2000E+03	.2230E-08
.0000E+00	.1101E+04	.2800E+03	.7492E-06
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.0000E+00	.1201E+04	.2800E+03	.3893E-07
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.0000E+00	.1301E+04	.2000E+03	.3782E-12
.0000E+00	.1301E+04	.2800E+03	.1564E-08
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.5000E+02	.2010E+03	.2000E+03	.3799E+01
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.5000E+02	.3010E+03	.2800E+03	.1388E+01
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.5000E+02	.3510E+03	.1200E+03	.4105E+00
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.5000E+02	.4510E+03	.2800E+03	.3325E+00
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.5000E+02	.5010E+03	.1200E+03	.8071E-02
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.5000E+02	.5510E+03	.4000E+02	.2218E-10
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.5000E+02	.5510E+03	.2800E+03	.9323E-01
.5000E+02	.6010E+03	.4000E+02	.1199E-12
.5000E+02	.6010E+03	.1200E+03	.2713E-03
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.5000E+02	.7010E+03	.4000E+02	.9614E-18
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.5000E+02	.7010E+03	.2800E+03	.8513E-02
.5000E+02	.7510E+03	.4000E+02	.1421E-20
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.5000E+02	.7510E+03	.2000E+03	.3092E-03
.5000E+02	.7510E+03	.2800E+03	.3366E-02
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.1500E+03	.4010E+03	.1200E+03	.1488E+00
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.1500E+03	.4010E+03	.2800E+03	.6790E+00
.1500E+03	.4510E+03	.4000E+02	.2132E-06
.1500E+03	.4510E+03	.1200E+03	.4015E-01
.1500E+03	.4510E+03	.2000E+03	.2449E+00
.1500E+03	.4510E+03	.2800E+03	.3959E+00
.1500E+03	.5010E+03	.4000E+02	.2716E-08
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.1500E+03	.5010E+03	.2800E+03	.2165E+00
.1500E+03	.5510E+03	.4000E+02	.2259E-10
.1500E+03	.5510E+03	.1200E+03	.1834E-02
.1500E+03	.5510E+03	.2000E+03	.4040E-01
.1500E+03	.5510E+03	.2800E+03	.1110E+00
.1500E+03	.6010E+03	.4000E+02	.1223E-12
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.1500E+03	.7010E+03	.4000E+02	.9811E-18
.1500E+03	.7010E+03	.1200E+03	.5725E-05
.1500E+03	.7010E+03	.2000E+03	.1357E-02
.1500E+03	.7010E+03	.2800E+03	.1014E-01
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.1500E+03	.7510E+03	.2800E+03	.4007E-02
.1500E+03	.8010E+03	.4000E+02	.1388E-23
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.1500E+03	.8010E+03	.2000E+03	.8927E-04
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.1500E+03	.8510E+03	.4000E+02	.8596E-27
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.1500E+03	.1051E+04	.2800E+03	.3913E-05
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.2000E+03	.5100E+02	.4000E+02	.5698E+02
.2000E+03	.5100E+02	.1200E+03	.1909E+02
.2000E+03	.5100E+02	.2000E+03	.1027E+02
.2000E+03	.5100E+02	.2800E+03	.6449E+01
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.2000E+03	.1010E+03	.2800E+03	.5387E+01
.2000E+03	.1510E+03	.4000E+02	.6849E+01
.2000E+03	.1510E+03	.1200E+03	.1028E+02
.2000E+03	.1510E+03	.2000E+03	.6607E+01
.2000E+03	.1510E+03	.2800E+03	.4380E+01
.2000E+03	.2010E+03	.4000E+02	.1101E+01
.2000E+03	.2010E+03	.1200E+03	.6090E+01
.2000E+03	.2010E+03	.2000E+03	.4794E+01

.2000E+03	.2010E+03	.2800E+03	.3424E+01
.2000E+03	.2510E+03	.4000E+02	.1135E+00
.2000E+03	.2510E+03	.1200E+03	.3088E+01
.2000E+03	.2510E+03	.2000E+03	.3205E+01
.2000E+03	.2510E+03	.2800E+03	.2544E+01
.2000E+03	.3010E+03	.4000E+02	.7704E-02
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.2000E+03	.3010E+03	.2800E+03	.1787E+01
.2000E+03	.3510E+03	.4000E+02	.3465E-03
.2000E+03	.3510E+03	.1200E+03	.4940E+00
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.2000E+03	.3510E+03	.2800E+03	.1181E+01
.2000E+03	.4010E+03	.4000E+02	.1028E-04
.2000E+03	.4010E+03	.1200E+03	.1559E+00
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.2000E+03	.4510E+03	.1200E+03	.4204E-01
.2000E+03	.4510E+03	.2000E+03	.2623E+00
.2000E+03	.4510E+03	.2800E+03	.4280E+00
.2000E+03	.5010E+03	.4000E+02	.2559E-08
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.2000E+03	.5010E+03	.2800E+03	.2340E+00
.2000E+03	.5510E+03	.4000E+02	.2129E-10
.2000E+03	.5510E+03	.1200E+03	.1921E-02
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.2000E+03	.6010E+03	.4000E+02	.1153E-12
.2000E+03	.6010E+03	.1200E+03	.3264E-03
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.2000E+03	.6010E+03	.2800E+03	.5765E-01
.2000E+03	.6510E+03	.4000E+02	.4059E-15
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.2000E+03	.7010E+03	.4000E+02	.9265E-18
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.2000E+03	.7510E+03	.4000E+02	.1370E-20
.2000E+03	.7510E+03	.1200E+03	.6503E-06
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.2000E+03	.8010E+03	.1200E+03	.6086E-07
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.2000E+03	.8010E+03	.2800E+03	.1604E-02
.2000E+03	.8510E+03	.4000E+02	.8124E-27
.2000E+03	.8510E+03	.1200E+03	.4921E-08
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.2000E+03	.8510E+03	.2800E+03	.5569E-03
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.2000E+03	.9510E+03	.2000E+03	.8159E-06
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.2000E+03	.1051E+04	.2800E+03	.4228E-05
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.2500E+03	.1301E+04	.4000E+02	.0000E+00
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.3000E+03	.1000E+01	.1200E+03	.2150E+02
.3000E+03	.1000E+01	.2000E+03	.1171E+02
.3000E+03	.1000E+01	.2800E+03	.7362E+01
.3000E+03	.5100E+02	.4000E+02	.4161E+02
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.3000E+03	.1010E+03	.4000E+02	.1867E+02
.3000E+03	.1010E+03	.1200E+03	.1573E+02
.3000E+03	.1010E+03	.2000E+03	.9338E+01
.3000E+03	.1010E+03	.2800E+03	.6023E+01
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.3000E+03	.4010E+03	.2000E+03	.6282E+00
.3000E+03	.4010E+03	.2800E+03	.8415E+00
.3000E+03	.4510E+03	.4000E+02	.1547E-06
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.4000E+03	.1101E+04	.4000E+02	.0000E+00
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.4000E+03	.1101E+04	.2800E+03	.1358E-05
.4000E+03	.1151E+04	.4000E+02	.0000E+00
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.4000E+03	.1201E+04	.4000E+02	.0000E+00
.4000E+03	.1201E+04	.1200E+03	.2002E-17
.4000E+03	.1201E+04	.2000E+03	.5780E-10
.4000E+03	.1201E+04	.2800E+03	.7054E-07
.4000E+03	.1251E+04	.4000E+02	.0000E+00
.4000E+03	.1251E+04	.1200E+03	.5090E-19
.4000E+03	.1251E+04	.2000E+03	.6311E-11
.4000E+03	.1251E+04	.2800E+03	.1460E-07
.4000E+03	.1301E+04	.4000E+02	.0000E+00
.4000E+03	.1301E+04	.1200E+03	.1119E-20
.4000E+03	.1301E+04	.2000E+03	.6306E-12
.4000E+03	.1301E+04	.2800E+03	.2834E-08
.4500E+03	.1000E+01	.4000E+02	.2255E+02
.4500E+03	.1000E+01	.1200E+03	.2058E+02
.4500E+03	.1000E+01	.2000E+03	.1235E+02
.4500E+03	.1000E+01	.2800E+03	.7991E+01
.4500E+03	.5100E+02	.4000E+02	.1713E+02
.4500E+03	.5100E+02	.1200E+03	.1905E+02
.4500E+03	.5100E+02	.2000E+03	.1174E+02
.4500E+03	.5100E+02	.2800E+03	.7668E+01
.4500E+03	.1010E+03	.4000E+02	.7697E+01
.4500E+03	.1010E+03	.1200E+03	.1521E+02

.4500E+03	.1010E+03	.2000E+03	.1018E+02
.4500E+03	.1010E+03	.2800E+03	.6846E+01
.4500E+03	.1510E+03	.4000E+02	.2085E+01
.4500E+03	.1510E+03	.1200E+03	.1045E+02
.4500E+03	.1510E+03	.2000E+03	.8098E+01
.4500E+03	.1510E+03	.2800E+03	.5748E+01
.4500E+03	.2010E+03	.4000E+02	.3516E+00
.4500E+03	.2010E+03	.1200E+03	.6166E+01
.4500E+03	.2010E+03	.2000E+03	.5916E+01
.4500E+03	.2010E+03	.2800E+03	.4555E+01
.4500E+03	.2510E+03	.4000E+02	.3805E-01
.4500E+03	.2510E+03	.1200E+03	.3113E+01
.4500E+03	.2510E+03	.2000E+03	.3961E+01
.4500E+03	.2510E+03	.2800E+03	.3405E+01
.4500E+03	.3010E+03	.4000E+02	.2685E-02
.4500E+03	.3010E+03	.1200E+03	.1343E+01
.4500E+03	.3010E+03	.2000E+03	.2426E+01
.4500E+03	.3010E+03	.2800E+03	.2396E+01
.4500E+03	.3510E+03	.4000E+02	.1242E-03
.4500E+03	.3510E+03	.1200E+03	.4950E+00
.4500E+03	.3510E+03	.2000E+03	.1358E+01
.4500E+03	.3510E+03	.2800E+03	.1586E+01
.4500E+03	.4010E+03	.4000E+02	.3758E-05
.4500E+03	.4010E+03	.1200E+03	.1559E+00
.4500E+03	.4010E+03	.2000E+03	.6934E+00
.4500E+03	.4010E+03	.2800E+03	.9851E+00
.4500E+03	.4510E+03	.4000E+02	.7432E-07
.4500E+03	.4510E+03	.1200E+03	.4203E-01
.4500E+03	.4510E+03	.2000E+03	.3231E+00
.4500E+03	.4510E+03	.2800E+03	.5743E+00
.4500E+03	.5010E+03	.4000E+02	.9580E-09
.4500E+03	.5010E+03	.1200E+03	.9701E-02
.4500E+03	.5010E+03	.2000E+03	.1373E+00
.4500E+03	.5010E+03	.2800E+03	.3139E+00
.4500E+03	.5510E+03	.4000E+02	.8036E-11
.4500E+03	.5510E+03	.1200E+03	.1920E-02
.4500E+03	.5510E+03	.2000E+03	.5321E-01
.4500E+03	.5510E+03	.2800E+03	.1609E+00
.4500E+03	.6010E+03	.4000E+02	.4379E-13
.4500E+03	.6010E+03	.1200E+03	.3265E-03
.4500E+03	.6010E+03	.2000E+03	.1881E-01
.4500E+03	.6010E+03	.2800E+03	.7728E-01
.450CE+03	.6510E+03	.4000E+02	.1548E-15
.4500E+03	.6510E+03	.1200E+03	.4773E-04
.4500E+03	.6510E+03	.2000E+03	.6065E-02
.4500E+03	.6510E+03	.2800E+03	.3479E-01
.4500E+03	.7010E+03	.4000E+02	.3548E-18
.4500E+03	.7010E+03	.1200E+03	.6011E-05
.4500E+03	.7010E+03	.2000E+03	.1784E-02
.4500E+03	.7010E+03	.2800E+03	.1467E-01
.4500E+03	.7510E+03	.4000E+02	.5264E-21
.4500E+03	.7510E+03	.1200E+03	.6525E-06
.4500E+03	.7510E+03	.2000E+03	.4790E-03
.4500E+03	.7510E+03	.2800E+03	.5800E-02
.4500E+03	.8010E+03	.4000E+02	.5053E-24
.4500E+03	.8010E+03	.1200E+03	.6115E-07
.4500E+03	.8010E+03	.2000E+03	.1174E-03
.4500E+03	.8010E+03	.2800E+03	.2148E-02
.4500E+03	.8510E+03	.4000E+02	.3136E-27
.4500E+03	.8510E+03	.1200E+03	.4950E-08
.4500E+03	.8510E+03	.2000E+03	.2626E-04
.4500E+03	.8510E+03	.2800E+03	.7456E-03
.4500E+03	.9010E+03	.4000E+02	.0000E+00
.4500E+03	.9010E+03	.1200E+03	.3465E-09
.4500E+03	.9010E+03	.2000E+03	.5367E-05
.4500E+03	.9010E+03	.2800E+03	.2425E-03
.4500E+03	.9510E+03	.4000E+02	.0000E+00
.4500E+03	.9510E+03	.1200E+03	.2097E-10
.4500E+03	.9510E+03	.2000E+03	.1002E-05
.4500E+03	.9510E+03	.2800E+03	.7393E-04
.4500E+03	.1001E+04	.4000E+02	.0000E+00
.4500E+03	.1001E+04	.1200E+03	.1099E-11
.4500E+03	.1001E+04	.2000E+03	.1709E-06
.4500E+03	.1001E+04	.2800E+03	.2113E-04
.4500E+03	.1051E+04	.4000E+02	.0000E+00
.4500E+03	.1051E+04	.1200E+03	.4979E-13

.4500E+03	.1051E+04	.2000E+03	.2666E-07
.4500E+03	.1051E+04	.2800E+03	.5658E-05
.4500E+03	.1101E+04	.4000E+02	.0000E+00
.4500E+03	.1101E+04	.1200E+03	.1953E-14
.4500E+03	.1101E+04	.2000E+03	.3801E-08
.4500E+03	.1101E+04	.2800E+03	.1421E-05
.4500E+03	.1151E+04	.4000E+02	.0000E+00
.4500E+03	.1151E+04	.1200E+03	.6631E-16
.4500E+03	.1151E+04	.2000E+03	.4958E-09
.4500E+03	.1151E+04	.2800E+03	.3344E-06
.4500E+03	.1201E+04	.4000E+02	.0000E+00
.4500E+03	.1201E+04	.1200E+03	.1948E-17
.4500E+03	.1201E+04	.2000E+03	.5916E-10
.4500E+03	.1201E+04	.2800E+03	.7381E-07
.4500E+03	.1251E+04	.4000E+02	.0000E+00
.4500E+03	.1251E+04	.1200E+03	.4953E-19
.4500E+03	.1251E+04	.2000E+03	.6459E-11
.4500E+03	.1251E+04	.2800E+03	.1528E-07
.4500E+03	.1301E+04	.4000E+02	.0000E+00
.4500E+03	.1301E+04	.1200E+03	.1089E-20
.4500E+03	.1301E+04	.2000E+03	.6455E-12
.4500E+03	.1301E+04	.2800E+03	.2965E-08
.5000E+03	.1000E+01	.4000E+02	.1508E+02
.5000E+03	.1000E+01	.1200E+03	.1976E+02
.5000E+03	.1000E+01	.2000E+03	.1245E+02
.5000E+03	.1000E+01	.2800E+03	.8199E+01
.5000E+03	.5100E+02	.4000E+02	.1147E+02
.5000E+03	.5100E+02	.1200E+03	.1829E+02
.5000E+03	.5100E+02	.2000E+03	.1186E+02
.5000E+03	.5100E+02	.2800E+03	.7887E+01
.5000E+03	.1010E+03	.4000E+02	.5182E+01
.5000E+03	.1010E+03	.1200E+03	.1460E+02
.5000E+03	.1010E+03	.2000E+03	.1031E+02
.5000E+03	.1010E+03	.2800E+03	.7074E+01
.5000E+03	.1510E+03	.4000E+02	.1418E+01
.5000E+03	.1510E+03	.1200E+03	.1002E+02
.5000E+03	.1510E+03	.2000E+03	.8219E+01
.5000E+03	.1510E+03	.2800E+03	.5961E+01
.5000E+03	.2010E+03	.4000E+02	.2423E+00
.5000E+03	.2010E+03	.1200E+03	.5906E+01
.5000E+03	.2010E+03	.2000E+03	.6009E+01
.5000E+03	.2010E+03	.2800E+03	.4733E+01
.5000E+03	.2510E+03	.4000E+02	.2653E-01
.5000E+03	.2510E+03	.1200E+03	.2978E+01
.5000E+03	.2510E+03	.2000E+03	.4024E+01
.5000E+03	.2510E+03	.2800E+03	.3541E+01
.5000E+03	.3010E+03	.4000E+02	.1890E-02
.5000E+03	.3010E+03	.1200E+03	.1284E+01
.5000E+03	.3010E+03	.2000E+03	.2464E+01
.5000E+03	.3010E+03	.2800E+03	.2494E+01
.5000E+03	.3510E+03	.4000E+02	.8800E-04
.5000E+03	.3510E+03	.1200E+03	.4729E+00
.5000E+03	.3510E+03	.2000E+03	.1379E+01
.5000E+03	.3510E+03	.2800E+03	.1650E+01
.5000E+03	.4010E+03	.4000E+02	.2677E-05
.5000E+03	.4010E+03	.1200E+03	.1489E+00
.5000E+03	.4010E+03	.2000E+03	.7039E+00
.5000E+03	.4010E+03	.2800E+03	.1025E+01
.5000E+03	.4510E+03	.4000E+02	.5313E-07
.5000E+03	.4510E+03	.1200E+03	.4013E-01
.5000E+03	.4510E+03	.2000E+03	.3279E+00
.5000E+03	.4510E+03	.2800E+03	.5976E+00
.5000E+03	.5010E+03	.4000E+02	.6868E-09
.5000E+03	.5010E+03	.1200E+03	.9262E-02
.5000E+03	.5010E+03	.2000E+03	.1393E+00
.5000E+03	.5010E+03	.2800E+03	.3267E+00
.5000E+03	.5510E+03	.4000E+02	.5774E-11
.5000E+03	.5510E+03	.1200E+03	.1834E-02
.5000E+03	.5510E+03	.2000E+03	.5398E-01
.5000E+03	.5510E+03	.2800E+03	.1674E+00
.5000E+03	.6010E+03	.4000E+02	.3152E-13
.5000E+03	.6010E+03	.1200E+03	.3118E-03
.5000E+03	.6010E+03	.2000E+03	.1908E-01
.5000E+03	.6010E+03	.2800E+03	.8039E-01
.5000E+03	.6510E+03	.4000E+02	.1116E-15
.5000E+03	.6510E+03	.1200E+03	.4560E-04

.5000E+03	.6510E+03	.2000E+03	.6151E-02
.5000E+03	.6510E+03	.2800E+03	.3619E-01
.5000E+03	.7010E+03	.4000E+02	.2560E-18
.5000E+03	.7010E+03	.1200E+03	.5744E-05
.5000E+03	.7010E+03	.2000E+03	.1809E-02
.5000E+03	.7010E+03	.2800E+03	.1526E-01
.5000E+03	.7510E+03	.4000E+02	.3801E-21
.5000E+03	.7510E+03	.1200E+03	.6238E-06
.5000E+03	.7510E+03	.2000E+03	.4857E-03
.5000E+03	.7510E+03	.2800E+03	.6032E-02
.5000E+03	.8010E+03	.4000E+02	.3651E-24
.5000E+03	.8010E+03	.1200E+03	.5847E-07
.5000E+03	.8010E+03	.2000E+03	.1190E-03
.5000E+03	.8010E+03	.2800E+03	.2234E-02
.5000E+03	.8510E+03	.4000E+02	.2267E-27
.5000E+03	.8510E+03	.1200E+03	.4736E-08
.5000E+03	.8510E+03	.2000E+03	.2663E-04
.5000E+03	.8510E+03	.2800E+03	.7754E-03
.5000E+03	.9010E+03	.4000E+02	.0000E+00
.5000E+03	.9010E+03	.1200E+03	.3315E-09
.5000E+03	.9010E+03	.2000E+03	.5442E-05
.5000E+03	.9010E+03	.2800E+03	.2522E-03
.5000E+03	.9510E+03	.4000E+02	.0000E+00
.5000E+03	.9510E+03	.1200E+03	.2008E-10
.5000E+03	.9510E+03	.2000E+03	.1016E-05
.5000E+03	.9510E+03	.2800E+03	.7688E-04
.5000E+03	.1001E+04	.4000E+02	.0000E+00
.5000E+03	.1001E+04	.1200E+03	.1052E-11
.5000E+03	.1001E+04	.2000E+03	.1733E-06
.5000E+03	.1001E+04	.2800E+03	.2197E-04
.5000E+03	.1051E+04	.4000E+02	.0000E+00
.5000E+03	.1051E+04	.1200E+03	.4769E-13
.5000E+03	.1051E+04	.2000E+03	.2703E-07
.5000E+03	.1051E+04	.2800E+03	.5883E-05
.5000E+03	.1101E+04	.4000E+02	.0000E+00
.5000E+03	.1101E+04	.1200E+03	.1871E-14
.5000E+03	.1101E+04	.2000E+03	.3855E-08
.5000E+03	.1101E+04	.2800E+03	.1477E-05
.5000E+03	.1151E+04	.4000E+02	.0000E+00
.5000E+03	.1151E+04	.1200E+03	.6355E-16
.5000E+03	.1151E+04	.2000E+03	.5028E-09
.5000E+03	.1151E+04	.2800E+03	.3477E-06
.5000E+03	.1201E+04	.4000E+02	.0000E+00
.5000E+03	.1201E+04	.1200E+03	.1868E-17
.5000E+03	.1201E+04	.2000E+03	.6000E-10
.5000E+03	.1201E+04	.2800E+03	.7674E-07
.5000E+03	.1251E+04	.4000E+02	.0000E+00
.5000E+03	.1251E+04	.1200E+03	.4749E-19
.5000E+03	.1251E+04	.2000E+03	.6552E-11
.5000E+03	.1251E+04	.2800E+03	.1588E-07
.5000E+03	.1301E+04	.4000E+02	.0000E+00
.5000E+03	.1301E+04	.1200E+03	.1045E-20
.5000E+03	.1301E+04	.2000E+03	.6548E-12
.5000E+03	.1301E+04	.2800E+03	.3083E-08
.5500E+03	.1000E+01	.4000E+02	.9600E+01
.5500E+03	.1000E+01	.1200E+03	.1869E+02
.5500E+03	.1000E+01	.2000E+03	.1248E+02
.5500E+03	.1000E+01	.2800E+03	.8386E+01
.5500E+03	.5100E+02	.4000E+02	.7315E+01
.5500E+03	.5100E+02	.1200E+03	.1730E+02
.5500E+03	.5100E+02	.2000E+03	.1190E+02
.5500E+03	.5100E+02	.2800E+03	.8080E+01
.5500E+03	.1010E+03	.4000E+02	.3327E+01
.5500E+03	.1010E+03	.1200E+03	.1380E+02
.5500E+03	.1010E+03	.2000E+03	.1036E+02
.5500E+03	.1010E+03	.2800E+03	.7273E+01
.5500E+03	.1510E+03	.4000E+02	.9208E+00
.5500E+03	.1510E+03	.1200E+03	.9465E+01
.5500E+03	.1510E+03	.2000E+03	.8271E+01
.5500E+03	.1510E+03	.2800E+03	.6145E+01
.5500E+03	.2010E+03	.4000E+02	.1594E+00
.5500E+03	.2010E+03	.1200E+03	.5570E+01
.5500E+03	.2010E+03	.2000E+03	.6050E+01
.5500E+03	.2010E+03	.2800E+03	.4888E+01
.5500E+03	.2510E+03	.4000E+02	.1767E-01
.5500E+03	.2510E+03	.1200E+03	.2806E+01

.5500E+03	.2510E+03	.2000E+03	.4051E+01
.5500E+03	.2510E+03	.2800E+03	.3661E+01
.5500E+03	.3010E+03	.4000E+02	.1271E-02
.5500E+03	.3010E+03	.1200E+03	.1208E+01
.5500E+03	.3010E+03	.2000E+03	.2480E+01
.5500E+03	.3010E+03	.2800E+03	.2578E+01
.5500E+03	.3510E+03	.4000E+02	.5958E-04
.5500E+03	.3510E+03	.1200E+03	.4448E+00
.5500E+03	.3510E+03	.2000E+03	.1387E+01
.5500E+03	.3510E+03	.2800E+03	.1706E+01
.5500E+03	.4010E+03	.4000E+02	.1822E-05
.5500E+03	.4010E+03	.1200E+03	.1400E+00
.5500E+03	.4010E+03	.2000E+03	.7081E+00
.5500E+03	.4010E+03	.2800E+03	.1060E+01
.5500E+03	.4510E+03	.4000E+02	.3630E-07
.5500E+03	.4510E+03	.1200E+03	.3773E-01
.5500E+03	.4510E+03	.2000E+03	.3297E+00
.5500E+03	.4510E+03	.2800E+03	.6179E+00
.5500E+03	.5010E+03	.4000E+02	.4706E-09
.5500E+03	.5010E+03	.1200E+03	.8708E-02
.5500E+03	.5010E+03	.2000E+03	.1401E+00
.5500E+03	.5010E+03	.2800E+03	.3377E+00
.5500E+03	.5510E+03	.4000E+02	.3965E-11
.5500E+03	.5510E+03	.1200E+03	.1724E-02
.5500E+03	.5510E+03	.2000E+03	.5426E-01
.5500E+03	.5510E+03	.2800E+03	.1730E+00
.5500E+03	.6010E+03	.4000E+02	.2168E-13
.5500E+03	.6010E+03	.1200E+03	.2932E-03
.5500E+03	.6010E+03	.2000E+03	.1918E-01
.5500E+03	.6010E+03	.2800E+03	.8310E-01
.5500E+03	.6510E+03	.4000E+02	.7688E-16
.5500E+03	.6510E+03	.1200E+03	.4290E-04
.5500E+03	.6510E+03	.2000E+03	.6182E-02
.5500E+03	.6510E+03	.2800E+03	.3740E-01
.5500E+03	.7010E+03	.4000E+02	.1765E-18
.5500E+03	.7010E+03	.1200E+03	.5405E-05
.5500E+03	.7010E+03	.2000E+03	.1818E-02
.5500E+03	.7010E+03	.2800E+03	.1577E-01
.5500E+03	.7510E+03	.4000E+02	.2624E-21
.5500E+03	.7510E+03	.1200E+03	.5872E-06
.5500E+03	.7510E+03	.2000E+03	.4881E-03
.5500E+03	.7510E+03	.2800E+03	.6233E-02
.5500E+03	.8010E+03	.4000E+02	.2523E-24
.5500E+03	.8010E+03	.1200E+03	.5507E-07
.5500E+03	.8010E+03	.2000E+03	.1196E-03
.5500E+03	.8010E+03	.2800E+03	.2308E-02
.5500E+03	.8510E+03	.4000E+02	.1568E-27
.5500E+03	.8510E+03	.1200E+03	.4462E-08
.5500E+03	.8510E+03	.2000E+03	.2676E-04
.5500E+03	.8510E+03	.2800E+03	.8011E-03
.5500E+03	.9010E+03	.4000E+02	.0000E+00
.5500E+03	.9010E+03	.1200E+03	.3125E-09
.5500E+03	.9010E+03	.2000E+03	.5469E-05
.5500E+03	.9010E+03	.2800E+03	.2606E-03
.5500E+03	.9510E+03	.4000E+02	.0000E+00
.5500E+03	.9510E+03	.1200E+03	.1893E-10
.5500E+03	.9510E+03	.2000E+03	.1021E-05
.5500E+03	.9510E+03	.2800E+03	.7943E-04
.5500E+03	.1001E+04	.4000E+02	.0000E+00
.5500E+03	.1001E+04	.1200E+03	.9922E-12
.5500E+03	.1001E+04	.2000E+03	.1742E-06
.5500E+03	.1001E+04	.2800E+03	.2269E-04
.5500E+03	.1051E+04	.4000E+02	.0000E+00
.5500E+03	.1051E+04	.1200E+03	.4500E-13
.5500E+03	.1051E+04	.2000E+03	.2717E-07
.5500E+03	.1051E+04	.2800E+03	.6078E-05
.5500E+03	.1101E+04	.4000E+02	.0000E+00
.5500E+03	.1101E+04	.1200E+03	.1766E-14
.5500E+03	.1101E+04	.2000E+03	.3874E-08
.5500E+03	.1101E+04	.2800E+03	.1526E-05
.5500E+03	.1151E+04	.4000E+02	.0000E+00
.5500E+03	.1151E+04	.1200E+03	.5999E-16
.5500E+03	.1151E+04	.2000E+03	.5054E-09
.5500E+03	.1151E+04	.2800E+03	.3592E-06
.5500E+03	.1201E+04	.4000E+02	.0000E+00
.5500E+03	.1201E+04	.1200E+03	.1763E-17

.5500E+03	.1201E+04	.2000E+03	.6031E-10
.5500E+03	.1201E+04	.2800E+03	.7928E-07
.5500E+03	.1251E+04	.4000E+02	.0000E+00
.5500E+03	.1251E+04	.1200E+03	.4485E-19
.5500E+03	.1251E+04	.2000E+03	.6586E-11
.5500E+03	.1251E+04	.2800E+03	.1641E-07
.5500E+03	.1301E+04	.4000E+02	.0000E+00
.5500E+03	.1301E+04	.1200E+03	.9868E-21
.5500E+03	.1301E+04	.2000E+03	.6583E-12
.5500E+03	.1301E+04	.2800E+03	.3185E-08
.6000E+03	.1000E+01	.4000E+02	.5825E+01
.6000E+03	.1000E+01	.1200E+03	.1741E+02
.6000E+03	.1000E+01	.2000E+03	.1241E+02
.6000E+03	.1000E+01	.2800E+03	.8545E+01
.6000E+03	.5100E+02	.4000E+02	.4450E+01
.6000E+03	.5100E+02	.1200E+03	.1611E+02
.6000E+03	.5100E+02	.2000E+03	.1184E+02
.6000E+03	.5100E+02	.2800E+03	.8243E+01
.6000E+03	.1010E+03	.4000E+02	.2039E+01
.6000E+03	.1010E+03	.1200E+03	.1284E+02
.6000E+03	.1010E+03	.2000E+03	.1033E+02
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.6000E+03	.1510E+03	.4000E+02	.5710E+00
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.6000E+03	.1510E+03	.2800E+03	.6299E+01
.6000E+03	.2010E+03	.4000E+02	.1002E+00
.6000E+03	.2010E+03	.1200E+03	.5172E+01
.6000E+03	.2010E+03	.2000E+03	.6038E+01
.6000E+03	.2010E+03	.2800E+03	.5017E+01
.6000E+03	.2510E+03	.4000E+02	.1124E-01
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.6000E+03	.3010E+03	.4000E+02	.8160E-03
.6000E+03	.3010E+03	.1200E+03	.1120E+01
.6000E+03	.3010E+03	.2000E+03	.2475E+01
.6000E+03	.3010E+03	.2800E+03	.2649E+01
.6000E+03	.3510E+03	.4000E+02	.3853E-04
.6000E+03	.3510E+03	.1200E+03	.4120E+00
.6000E+03	.3510E+03	.2000E+03	.1383E+01
.6000E+03	.3510E+03	.2800E+03	.1753E+01
.6000E+03	.4010E+03	.4000E+02	.1185E-05
.6000E+03	.4010E+03	.1200E+03	.1297E+00
.6000E+03	.4010E+03	.2000E+03	.7059E+00
.6000E+03	.4010E+03	.2800E+03	.1089E+01
.6000E+03	.4510E+03	.4000E+02	.2370E-07
.6000E+03	.4510E+03	.1200E+03	.3493E-01
.6000E+03	.4510E+03	.2000E+03	.3286E+00
.6000E+03	.4510E+03	.2800E+03	.6349E+00
.6000E+03	.5010E+03	.4000E+02	.3082E-09
.6000E+03	.5010E+03	.1200E+03	.8062E-02
.6000E+03	.5010E+03	.2000E+03	.1396E+00
.6000E+03	.5010E+03	.2800E+03	.3469E+00
.6000E+03	.5510E+03	.4000E+02	.2603E-11
.6000E+03	.5510E+03	.1200E+03	.1596E-02
.6000E+03	.5510E+03	.2000E+03	.5406E-01
.6000E+03	.5510E+03	.2800E+03	.1777E+00
.6000E+03	.6010E+03	.4000E+02	.1426E-13
.6000E+03	.6010E+03	.1200E+03	.2716E-03
.6000E+03	.6010E+03	.2000E+03	.1910E-01
.6000E+03	.6010E+03	.2800E+03	.8535E-01
.6000E+03	.6510E+03	.4000E+02	.5064E-16
.6000E+03	.6510E+03	.1200E+03	.3974E-04
.6000E+03	.6510E+03	.2000E+03	.6157E-02
.6000E+03	.6510E+03	.2800E+03	.3841E-01
.6000E+03	.7010E+03	.4000E+02	.1164E-18
.6000E+03	.7010E+03	.1200E+03	.5010E-05
.6000E+03	.7010E+03	.2000E+03	.1811E-02
.6000E+03	.7010E+03	.2800E+03	.1620E-01
.6000E+03	.7510E+03	.4000E+02	.1733E-21
.6000E+03	.7510E+03	.1200E+03	.5445E-06
.6000E+03	.7510E+03	.2000E+03	.4861E-03
.6000E+03	.7510E+03	.2800E+03	.6400E-02
.6000E+03	.8010E+03	.4000E+02	.1667E-24
.6000E+03	.8010E+03	.1200E+03	.5109E-07

.6000E+03	.8010E+03	.2000E+03	.1191E-03
.6000E+03	.8010E+03	.2800E+03	.2370E-02
.6000E+03	.8510E+03	.4000E+02	.1037E-27
.6000E+03	.8510E+03	.1200E+03	.4141E-08
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.6000E+03	.9010E+03	.4000E+02	.0000E+00
.6000E+03	.9010E+03	.1200E+03	.2901E-09
.6000E+03	.9010E+03	.2000E+03	.5446E-05
.6000E+03	.9010E+03	.2800E+03	.2675E-03
.6000E+03	.9510E+03	.4000E+02	.0000E+00
.6000E+03	.9510E+03	.1200E+03	.1758E-10
.6000E+03	.9510E+03	.2000E+03	.1017E-05
.6000E+03	.9510E+03	.2800E+03	.8154E-04
.6000E+03	.1001E+04	.4000E+02	.0000E+00
.6000E+03	.1001E+04	.1200E+03	.9218E-12
.6000E+03	.1001E+04	.2000E+03	.1735E-06
.6000E+03	.1001E+04	.2800E+03	.2330E-04
.6000E+03	.1051E+04	.4000E+02	.0000E+00
.6000E+03	.1051E+04	.1200E+03	.4182E-13
.6000E+03	.1051E+04	.2000E+03	.2706E-07
.6000E+03	.1051E+04	.2800E+03	.6239E-05
.6000E+03	.1101E+04	.4000E+02	.0000E+00
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.6000E+03	.1101E+04	.2000E+03	.3859E-08
.6000E+03	.1101E+04	.2800E+03	.1566E-05
.6000E+03	.1151E+04	.4000E+02	.0000E+00
.6000E+03	.1151E+04	.1200E+03	.5579E-16
.6000E+03	.1151E+04	.2000E+03	.5034E-09
.6000E+03	.1151E+04	.2800E+03	.3687E-06
.6000E+03	.1201E+04	.4000E+02	.0000E+00
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.6000E+03	.1201E+04	.2000E+03	.6007E-10
.6000E+03	.1201E+04	.2800E+03	.8138E-07
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.6000E+03	.1251E+04	.1200E+03	.4173E-19
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.6000E+03	.1301E+04	.4000E+02	.0000E+00
.6000E+03	.1301E+04	.1200E+03	.9184E-21
.6000E+03	.1301E+04	.2000E+03	.6558E-12
.6000E+03	.1301E+04	.2800E+03	.3270E-08
.6500E+03	.1000E+01	.4000E+02	.3377E+01
.6500E+03	.1000E+01	.1200E+03	.1597E+02
.6500E+03	.1000E+01	.2000E+03	.1226E+02
.6500E+03	.1000E+01	.2800E+03	.8668E+01
.6500E+03	.5100E+02	.4000E+02	.2587E+01
.6500E+03	.5100E+02	.1200E+03	.1478E+02
.6500E+03	.5100E+02	.2000E+03	.1170E+02
.6500E+03	.5100E+02	.2800E+03	.8370E+01
.6500E+03	.1010E+03	.4000E+02	.1195E+01
.6500E+03	.1010E+03	.1200E+03	.1177E+02
.6500E+03	.1010E+03	.2000E+03	.1021E+02
.6500E+03	.1010E+03	.2800E+03	.7566E+01
.6500E+03	.1510E+03	.4000E+02	.3386E+00
.6500E+03	.1510E+03	.1200E+03	.8056E+01
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.6500E+03	.1510E+03	.2800E+03	.6418E+01
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.6500E+03	.2010E+03	.1200E+03	.4729E+01
.6500E+03	.2010E+03	.2000E+03	.5972E+01
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.6500E+03	.2510E+03	.4000E+02	.6830E-02
.6500E+03	.2510E+03	.1200E+03	.2377E+01
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.6500E+03	.2510E+03	.2800E+03	.3838E+01
.6500E+03	.3010E+03	.4000E+02	.5007E-03
.6500E+03	.3010E+03	.1200E+03	.1022E+01
.6500E+03	.3010E+03	.2000E+03	.2447E+01
.6500E+03	.3010E+03	.2800E+03	.2705E+01
.6500E+03	.3510E+03	.4000E+02	.2381E-04
.6500E+03	.3510E+03	.1200E+03	.3758E+00
.6500E+03	.3510E+03	.2000E+03	.1367E+01
.6500E+03	.3510E+03	.2800E+03	.1790E+01
.6500E+03	.4010E+03	.4000E+02	.7361E-06
.6500E+03	.4010E+03	.1200E+03	.1182E+00

.6500E+03	.4010E+03	.2000E+03	.6975E+00
.6500E+03	.4010E+03	.2800E+03	.1112E+01
.6500E+03	.4510E+03	.4000E+02	.1479E-07
.6500E+03	.4510E+03	.1200E+03	.3184E-01
.6500E+03	.4510E+03	.2000E+03	.3246E+00
.6500E+03	.4510E+03	.2800E+03	.6481E+00
.6500E+03	.5010E+03	.4000E+02	.1929E-09
.6500E+03	.5010E+03	.1200E+03	.7350E-02
.6500E+03	.5010E+03	.2000E+03	.1378E+00
.6500E+03	.5010E+03	.2800E+03	.3542E+00
.6500E+03	.5510E+03	.4000E+02	.1633E-11
.6500E+03	.5510E+03	.1200E+03	.1456E-02
.6500E+03	.5510E+03	.2000E+03	.5337E-01
.6500E+03	.5510E+03	.2800E+03	.1814E+00
.6500E+03	.6010E+03	.4000E+02	.8968E-14
.6500E+03	.6010E+03	.1200E+03	.2477E-03
.6500E+03	.6010E+03	.2000E+03	.1886E-01
.6500E+03	.6010E+03	.2800E+03	.8710E-01
.6500E+03	.6510E+03	.4000E+02	.3189E-16
.6500E+03	.6510E+03	.1200E+03	.3626E-04
.6500E+03	.6510E+03	.2000E+03	.6077E-02
.6500E+03	.6510E+03	.2800E+03	.3919E-01
.6500E+03	.7010E+03	.4000E+02	.7344E-19
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.6500E+03	.7010E+03	.2800E+03	.1653E-01
.6500E+03	.7510E+03	.4000E+02	.1094E-21
.6500E+03	.7510E+03	.1200E+03	.4972E-06
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.6500E+03	.7510E+03	.2800E+03	.6530E-02
.6500E+03	.8010E+03	.4000E+02	.1053E-24
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.6500E+03	.8010E+03	.2800E+03	.2418E-02
.6500E+03	.8510E+03	.4000E+02	.6555E-28
.6500E+03	.8510E+03	.1200E+03	.3785E-08
.6500E+03	.8510E+03	.2000E+03	.2630E-04
.6500E+03	.8510E+03	.2800E+03	.8390E-03
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.6500E+03	.1001E+04	.2800E+03	.2376E-04
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.6500E+03	.1151E+04	.4000E+02	.0000E+00
.6500E+03	.1151E+04	.1200E+03	.5112E-16
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.6500E+03	.1151E+04	.2800E+03	.3761E-06
.6500E+03	.1201E+04	.4000E+02	.0000E+00
.6500E+03	.1201E+04	.1200E+03	.1503E-17
.6500E+03	.1201E+04	.2000E+03	.5930E-10
.6500E+03	.1201E+04	.2800E+03	.8300E-07
.6500E+03	.1251E+04	.4000E+02	.0000E+00
.6500E+03	.1251E+04	.1200E+03	.3825E-19
.6500E+03	.1251E+04	.2000E+03	.6477E-11
.6500E+03	.1251E+04	.2800E+03	.1718E-07
.6500E+03	.1301E+04	.4000E+02	.0000E+00
.6500E+03	.1301E+04	.1200E+03	.8420E-21
.6500E+03	.1301E+04	.2000E+03	.6475E-12
.6500E+03	.1301E+04	.2800E+03	.3335E-08
.7000E+03	.1000E+01	.4000E+02	.1873E+01
.7000E+03	.1000E+01	.1200E+03	.1443E+02

.7000E+03	.1000E+01	.2000E+03	.1200E+02
.7000E+03	.1000E+01	.2800E+03	.8752E+01
.7000E+03	.5100E+02	.4000E+02	.1439E+01
.7000E+03	.5100E+02	.1200E+03	.1334E+02
.7000E+03	.5100E+02	.2000E+03	.1146E+02
.7000E+03	.5100E+02	.2800E+03	.8456E+01
.7000E+03	.1010E+03	.4000E+02	.6701E+00
.7000E+03	.1010E+03	.1200E+03	.1062E+02
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.7000E+03	.1010E+03	.2800E+03	.7653E+01
.7000E+03	.1510E+03	.4000E+02	.1921E+00
.7000E+03	.1510E+03	.1200E+03	.7261E+01
.7000E+03	.1510E+03	.2000E+03	.8001E+01
.7000E+03	.1510E+03	.2800E+03	.6501E+01
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.7000E+03	.2010E+03	.2000E+03	.5855E+01
.7000E+03	.2010E+03	.2800E+03	.5190E+01
.7000E+03	.2510E+03	.4000E+02	.3969E-02
.7000E+03	.2510E+03	.1200E+03	.2138E+01
.7000E+03	.2510E+03	.2000E+03	.3919E+01
.7000E+03	.2510E+03	.2800E+03	.3894E+01
.7000E+03	.3010E+03	.4000E+02	.2936E-03
.7000E+03	.3010E+03	.1200E+03	.9184E+00
.7000E+03	.3010E+03	.2000E+03	.2397E+01
.7000E+03	.3010E+03	.2800E+03	.2745E+01
.7000E+03	.3510E+03	.4000E+02	.1406E-04
.7000E+03	.3510E+03	.1200E+03	.3375E+00
.7000E+03	.3510E+03	.2000E+03	.1339E+01
.7000E+03	.3510E+03	.2800E+03	.1817E+01
.7000E+03	.4010E+03	.4000E+02	.4371E-06
.7000E+03	.4010E+03	.1200E+03	.1061E+00
.7000E+03	.4010E+03	.2000E+03	.6830E+00
.7000E+03	.4010E+03	.2800E+03	.1128E+01
.7000E+03	.4510E+03	.4000E+02	.8819E-08
.7000E+03	.4510E+03	.1200E+03	.2858E-01
.7000E+03	.4510E+03	.2000E+03	.3178E+00
.7000E+03	.4510E+03	.2800E+03	.6575E+00
.7000E+03	.5010E+03	.4000E+02	.1154E-09
.7000E+03	.5010E+03	.1200E+03	.6598E-02
.7000E+03	.5010E+03	.2000E+03	.1349E+00
.7000E+03	.5010E+03	.2800E+03	.3592E+00
.7000E+03	.5510E+03	.4000E+02	.9800E-12
.7000E+03	.5510E+03	.1200E+03	.1307E-02
.7000E+03	.5510E+03	.2000E+03	.5222E-01
.7000E+03	.5510E+03	.2800E+03	.1840E+00
.7000E+03	.6010E+03	.4000E+02	.5391E-14
.7000E+03	.6010E+03	.1200E+03	.2225E-03
.7000E+03	.6010E+03	.2000E+03	.1844E-01
.7000E+03	.6010E+03	.2800E+03	.8833E-01
.7000E+03	.6510E+03	.4000E+02	.1921E-16
.7000E+03	.6510E+03	.1200E+03	.3258E-04
.7000E+03	.6510E+03	.2000E+03	.5944E-02
.7000E+03	.6510E+03	.2800E+03	.3974E-01
.7000E+03	.7010E+03	.4000E+02	.4429E-19
.7000E+03	.7010E+03	.1200E+03	.4111E-05
.7000E+03	.7010E+03	.2000E+03	.1748E-02
.7000E+03	.7010E+03	.2800E+03	.1675E-01
.7000E+03	.7510E+03	.4000E+02	.6604E-22
.7000E+03	.7510E+03	.1200E+03	.4472E-06
.7000E+03	.7510E+03	.2000E+03	.4691E-03
.7000E+03	.7510E+03	.2800E+03	.6619E-02
.7000E+03	.8010E+03	.4000E+02	.6366E-25
.7000E+03	.8010E+03	.1200E+03	.4200E-07
.7000E+03	.8010E+03	.2000E+03	.1149E-03
.7000E+03	.8010E+03	.2800E+03	.2451E-02
.7000E+03	.8510E+03	.4000E+02	.3965E-28
.7000E+03	.8510E+03	.1200E+03	.3407E-08
.7000E+03	.8510E+03	.2000E+03	.2572E-04
.7000E+03	.8510E+03	.2800E+03	.8504E-03
.7000E+03	.9010E+03	.4000E+02	.0000E+00
.7000E+03	.9010E+03	.1200E+03	.2390E-09
.7000E+03	.9010E+03	.2000E+03	.5255E-05
.7000E+03	.9010E+03	.2800E+03	.2765E-03
.7000E+03	.9510E+03	.4000E+02	.0000E+00
.7000E+03	.9510E+03	.1200E+03	.1449E-10

.7000E+03	.9510E+03	.2000E+03	.9812E-06
.7000E+03	.9510E+03	.2800E+03	.8429E-04
.7000E+03	.1001E+04	.4000E+02	.0000E+00
.7000E+03	.1001E+04	.1200E+03	.7606E-12
.7000E+03	.1001E+04	.2000E+03	.1674E-06
.7000E+03	.1001E+04	.2800E+03	.2408E-04
.7000E+03	.1051E+04	.4000E+02	.0000E+00
.7000E+03	.1051E+04	.1200E+03	.3454E-13
.7000E+03	.1051E+04	.2000E+03	.2612E-07
.7000E+03	.1051E+04	.2800E+03	.6449E-05
.7000E+03	.1101E+04	.4000E+02	.0000E+00
.7000E+03	.1101E+04	.1200E+03	.1357E-14
.7000E+03	.1101E+04	.2000E+03	.3725E-08
.7000E+03	.1101E+04	.2800E+03	.1619E-05
.7000E+03	.1151E+04	.4000E+02	.0000E+00
.7000E+03	.1151E+04	.1200E+03	.4613E-16
.7000E+03	.1151E+04	.2000E+03	.4860E-09
.7000E+03	.1151E+04	.2800E+03	.3811E-06
.7000E+03	.1201E+04	.4000E+02	.0000E+00
.7000E+03	.1201E+04	.1200E+03	.1357E-17
.7000E+03	.1201E+04	.2000E+03	.5801E-10
.7000E+03	.1201E+04	.2800E+03	.8411E-07
.7000E+03	.1251E+04	.4000E+02	.0000E+00
.7000E+03	.1251E+04	.1200E+03	.3454E-19
.7000E+03	.1251E+04	.2000E+03	.6337E-11
.7000E+03	.1251E+04	.2800E+03	.1741E-07
.7000E+03	.1301E+04	.4000E+02	.0000E+00
.7000E+03	.1301E+04	.1200E+03	.7605E-21
.7000E+03	.1301E+04	.2000E+03	.6336E-12
.7000E+03	.1301E+04	.2800E+03	.3379E-08
.7500E+03	.1000E+01	.4000E+02	.9953E+00
.7500E+03	.1000E+01	.1200E+03	.1283E+02
.7500E+03	.1000E+01	.2000E+03	.1166E+02
.7500E+03	.1000E+01	.2800E+03	.8791E+01
.7500E+03	.5100E+02	.4000E+02	.7670E+00
.7500E+03	.5100E+02	.1200E+03	.1186E+02
.7500E+03	.5100E+02	.2000E+03	.1113E+02
.7500E+03	.5100E+02	.2800E+03	.8497E+01
.7500E+03	.1010E+03	.4000E+02	.3600E+00
.7500E+03	.1010E+03	.1200E+03	.9433E+01
.7500E+03	.1010E+03	.2000E+03	.9724E+01
.7500E+03	.1010E+03	.2800E+03	.7699E+01
.7500E+03	.1510E+03	.4000E+02	.1044E+00
.7500E+03	.1510E+03	.1200E+03	.6443E+01
.7500E+03	.1510E+03	.2000E+03	.7776E+01
.7500E+03	.1510E+03	.2800E+03	.6547E+01
.7500E+03	.2010E+03	.4000E+02	.1901E-01
.7500E+03	.2010E+03	.1200E+03	.3774E+01
.7500E+03	.2010E+03	.2000E+03	.5690E+01
.7500E+03	.2010E+03	.2800E+03	.5230E+01
.7500E+03	.2510E+03	.4000E+02	.2205E-02
.7500E+03	.2510E+03	.1200E+03	.1893E+01
.7500E+03	.2510E+03	.2000E+03	.3807E+01
.7500E+03	.2510E+03	.2800E+03	.3925E+01
.7500E+03	.3010E+03	.4000E+02	.1646E-03
.7500E+03	.3010E+03	.1200E+03	.8126E+00
.7500E+03	.3010E+03	.2000E+03	.2328E+01
.7500E+03	.3010E+03	.2800E+03	.2767E+01
.7500E+03	.3510E+03	.4000E+02	.7941E-05
.7500E+03	.3510E+03	.1200E+03	.2985E+00
.7500E+03	.3510E+03	.2000E+03	.1300E+01
.7500E+03	.3510E+03	.2800E+03	.1832E+01
.7500E+03	.4010E+03	.4000E+02	.2482E-06
.7500E+03	.4010E+03	.1200E+03	.9384E-01
.7500E+03	.4010E+03	.2000E+03	.6627E+00
.7500E+03	.4010E+03	.2800E+03	.1138E+01
.7500E+03	.4510E+03	.4000E+02	.5028E-08
.7500E+03	.4510E+03	.1200E+03	.2527E-01
.7500E+03	.4510E+03	.2000E+03	.3082E+00
.7500E+03	.4510E+03	.2800E+03	.6628E+00
.7500E+03	.5010E+03	.4000E+02	.6604E-10
.7500E+03	.5010E+03	.1200E+03	.5833E-02
.7500E+03	.5010E+03	.2000E+03	.1308E+00
.7500E+03	.5010E+03	.2800E+03	.3621E+00
.7500E+03	.5510E+03	.4000E+02	.5621E-12
.7500E+03	.5510E+03	.1200E+03	.1156E-02

.7500E+03	.5510E+03	.2000E+03	.5063E-01
.7500E+03	.5510E+03	.2800E+03	.1854E+00
.7500E+03	.6010E+03	.4000E+02	.3099E-14
.7500E+03	.6010E+03	.1200E+03	.1968E-03
.7500E+03	.6010E+03	.2000E+03	.1788E-01
.7500E+03	.6010E+03	.2800E+03	.8900E-01
.7500E+03	.6510E+03	.4000E+02	.1106E-16
.7500E+03	.6510E+03	.1200E+03	.2884E-04
.7500E+03	.6510E+03	.2000E+03	.5761E-02
.7500E+03	.6510E+03	.2800E+03	.4003E-01
.7500E+03	.7010E+03	.4000E+02	.2554E-19
.7500E+03	.7010E+03	.1200E+03	.3639E-05
.7500E+03	.7010E+03	.2000E+03	.1694E-02
.7500E+03	.7010E+03	.2800E+03	.1688E-01
.7500E+03	.7510E+03	.4000E+02	.3813E-22
.7500E+03	.7510E+03	.1200E+03	.3962E-06
.7500E+03	.7510E+03	.2000E+03	.4546E-03
.7500E+03	.7510E+03	.2800E+03	.6667E-02
.7500E+03	.8010E+03	.4000E+02	.3679E-25
.7500E+03	.8010E+03	.1200E+03	.3722E-07
.7500E+03	.8010E+03	.2000E+03	.1114E-03
.7500E+03	.8010E+03	.2800E+03	.2468E-02
.7500E+03	.8510E+03	.4000E+02	.2293E-28
.7500E+03	.8510E+03	.1200E+03	.3022E-08
.7500E+03	.8510E+03	.2000E+03	.2492E-04
.7500E+03	.8510E+03	.2800E+03	.8564E-03
.7500E+03	.9010E+03	.4000E+02	.0000E+00
.7500E+03	.9010E+03	.1200E+03	.2120E-09
.7500E+03	.9010E+03	.2000E+03	.5093E-05
.7500E+03	.9010E+03	.2800E+03	.2785E-03
.7500E+03	.9510E+03	.4000E+02	.0000E+00
.7500E+03	.9510E+03	.1200E+03	.1287E-10
.7500E+03	.9510E+03	.2000E+03	.9509E-06
.7500E+03	.9510E+03	.2800E+03	.8488E-04
.7500E+03	.1001E+04	.4000E+02	.0000E+00
.7500E+03	.1001E+04	.1200E+03	.6755E-12
.7500E+03	.1001E+04	.2000E+03	.1623E-06
.7500E+03	.1001E+04	.2800E+03	.2425E-04
.7500E+03	.1051E+04	.4000E+02	.0000E+00
.7500E+03	.1051E+04	.1200E+03	.3068E-13
.7500E+03	.1051E+04	.2000E+03	.2531E-07
.7500E+03	.1051E+04	.2800E+03	.6493E-05
.7500E+03	.1101E+04	.4000E+02	.0000E+00
.7500E+03	.1101E+04	.1200E+03	.1206E-14
.7500E+03	.1101E+04	.2000E+03	.3611E-08
.7500E+03	.1101E+04	.2800E+03	.1630E-05
.7500E+03	.1151E+04	.4000E+02	.0000E+00
.7500E+03	.1151E+04	.1200E+03	.4102E-16
.7500E+03	.1151E+04	.2000E+03	.4711E-09
.7500E+03	.1151E+04	.2800E+03	.3837E-06
.7500E+03	.1201E+04	.4000E+02	.0000E+00
.7500E+03	.1201E+04	.1200E+03	.1207E-17
.7500E+03	.1201E+04	.2000E+03	.5624E-10
.7500E+03	.1201E+04	.2800E+03	.8469E-07
.7500E+03	.1251E+04	.4000E+02	.0000E+00
.7500E+03	.1251E+04	.1200E+03	.3073E-19
.7500E+03	.1251E+04	.2000E+03	.6144E-11
.7500E+03	.1251E+04	.2800E+03	.1753E-07
.7500E+03	.1301E+04	.4000E+02	.0000E+00
.7500E+03	.1301E+04	.1200E+03	.6768E-21
.7500E+03	.1301E+04	.2000E+03	.6144E-12
.7500E+03	.1301E+04	.2800E+03	.3402E-08
.8000E+03	.1000E+01	.4000E+02	.5073E+00
.8000E+03	.1000E+01	.1200E+03	.1122E+02
.8000E+03	.1000E+01	.2000E+03	.1122E+02
.8000E+03	.1000E+01	.2800E+03	.8782E+01
.8000E+03	.5100E+02	.4000E+02	.3920E+00
.8000E+03	.5100E+02	.1200E+03	.1038E+02
.8000E+03	.5100E+02	.2000E+03	.1072E+02
.8000E+03	.5100E+02	.2800E+03	.8492E+01
.8000E+03	.1010E+03	.4000E+02	.1854E+00
.8000E+03	.1010E+03	.1200E+03	.8248E+01
.8000E+03	.1010E+03	.2000E+03	.9365E+01
.8000E+03	.1010E+03	.2800E+03	.7700E+01
.8000E+03	.1510E+03	.4000E+02	.5430E-01
.8000E+03	.1510E+03	.1200E+03	.5628E+01

.8000E+03	.1510E+03	.2000E+03	.7489E+01
.8000E+03	.1510E+03	.2800E+03	.6553E+01
.8000E+03	.2010E+03	.4000E+02	.9999E-02
.8000E+03	.2010E+03	.1200E+03	.3293E+01
.8000E+03	.2010E+03	.2000E+03	.5479E+01
.8000E+03	.2010E+03	.2800E+03	.5237E+01
.8000E+03	.2510E+03	.4000E+02	.1172E-02
.8000E+03	.2510E+03	.1200E+03	.1650E+01
.8000E+03	.2510E+03	.2000E+03	.3665E+01
.8000E+03	.2510E+03	.2800E+03	.3932E+01
.8000E+03	.3010E+03	.4000E+02	.8824E-04
.8000E+03	.3010E+03	.1200E+03	.7080E+00
.8000E+03	.3010E+03	.2000E+03	.2241E+01
.8000E+03	.3010E+03	.2800E+03	.2773E+01
.8000E+03	.3510E+03	.4000E+02	.4286E-05
.8000E+03	.3510E+03	.1200E+03	.2599E+00
.8000E+03	.3510E+03	.2000E+03	.1251E+01
.8000E+03	.3510E+03	.2800E+03	.1835E+01
.8000E+03	.4010E+03	.4000E+02	.1347E-06
.8000E+03	.4010E+03	.1200E+03	.8169E-01
.8000E+03	.4010E+03	.2000E+03	.6373E+00
.8000E+03	.4010E+03	.2800E+03	.1140E+01
.8000E+03	.4510E+03	.4000E+02	.2740E-08
.8000E+03	.4510E+03	.1200E+03	.2199E-01
.8000E+03	.4510E+03	.2000E+03	.2963E+00
.8000E+03	.4510E+03	.2800E+03	.6639E+00
.8000E+03	.5010E+03	.4000E+02	.3612E-10
.8000E+03	.5010E+03	.1200E+03	.5078E-02
.8000E+03	.5010E+03	.2000E+03	.1257E+00
.8000E+03	.5010E+03	.2800E+03	.3626E+00
.8000E+03	.5510E+03	.4000E+02	.3083E-12
.8000E+03	.5510E+03	.1200E+03	.1006E-02
.8000E+03	.5510E+03	.2000E+03	.4865E-01
.8000E+03	.5510E+03	.2800E+03	.1857E+00
.8000E+03	.6010E+03	.4000E+02	.1703E-14
.8000E+03	.6010E+03	.1200E+03	.1714E-03
.8000E+03	.6010E+03	.2000E+03	.1718E-01
.8000E+03	.6010E+03	.2800E+03	.8910E-01
.8000E+03	.6510E+03	.4000E+02	.6090E-17
.8000E+03	.6510E+03	.1200E+03	.2513E-04
.8000E+03	.6510E+03	.2000E+03	.5534E-02
.8000E+03	.6510E+03	.2800E+03	.4007E-01
.8000E+03	.7010E+03	.4000E+02	.1408E-19
.8000E+03	.7010E+03	.1200E+03	.3174E-05
.8000E+03	.7010E+03	.2000E+03	.1627E-02
.8000E+03	.7010E+03	.2800E+03	.1689E-01
.8000E+03	.7510E+03	.4000E+02	.2105E-22
.8000E+03	.7510E+03	.1200E+03	.3456E-06
.8000E+03	.7510E+03	.2000E+03	.4366E-03
.8000E+03	.7510E+03	.2800E+03	.6673E-02
.8000E+03	.8010E+03	.4000E+02	.2033E-25
.8000E+03	.8010E+03	.1200E+03	.3249E-07
.8000E+03	.8010E+03	.2000E+03	.1070E-03
.8000E+03	.8010E+03	.2800E+03	.2470E-02
.8000E+03	.8510E+03	.4000E+02	.0000E+00
.8000E+03	.8510E+03	.1200E+03	.2639E-08
.8000E+03	.8510E+03	.2000E+03	.2393E-04
.8000E+03	.8510E+03	.2800E+03	.8570E-03
.8000E+03	.9010E+03	.4000E+02	.0000E+00
.8000E+03	.9010E+03	.1200E+03	.1853E-09
.8000E+03	.9010E+03	.2000E+03	.4891E-05
.8000E+03	.9010E+03	.2800E+03	.2786E-03
.8000E+03	.9510E+03	.4000E+02	.0000E+00
.8000E+03	.9510E+03	.1200E+03	.1125E-10
.8000E+03	.9510E+03	.2000E+03	.9132E-06
.8000E+03	.9510E+03	.2800E+03	.8492E-04
.8000E+03	.1001E+04	.4000E+02	.0000E+00
.8000E+03	.1001E+04	.1200E+03	.5909E-12
.8000E+03	.1001E+04	.2000E+03	.1558E-06
.8000E+03	.1001E+04	.2800E+03	.2426E-04
.8000E+03	.1051E+04	.4000E+02	.0000E+00
.8000E+03	.1051E+04	.1200E+03	.2685E-13
.8000E+03	.1051E+04	.2000E+03	.2431E-07
.8000E+03	.1051E+04	.2800E+03	.6496E-05
.8000E+03	.1101E+04	.4000E+02	.0000E+00
.8000E+03	.1101E+04	.1200E+03	.1056E-14

.8000E+03	.1101E+04	.2000E+03	.3469E-08
.8000E+03	.1101E+04	.2800E+03	.1631E-05
.8000E+03	.1151E+04	.4000E+02	.0000E+00
.8000E+03	.1151E+04	.1200E+03	.3593E-16
.8000E+03	.1151E+04	.2000E+03	.4526E-09
.8000E+03	.1151E+04	.2800E+03	.3839E-06
.8000E+03	.1201E+04	.4000E+02	.0000E+00
.8000E+03	.1201E+04	.1200E+03	.1058E-17
.8000E+03	.1201E+04	.2000E+03	.5404E-10
.8000E+03	.1201E+04	.2800E+03	.8473E-07
.8000E+03	.1251E+04	.4000E+02	.0000E+00
.8000E+03	.1251E+04	.1200E+03	.2693E-19
.8000E+03	.1251E+04	.2000E+03	.5904E-11
.8000E+03	.1251E+04	.2800E+03	.1754E-07
.8000E+03	.1301E+04	.4000E+02	.0000E+00
.8000E+03	.1301E+04	.1200E+03	.5933E-21
.8000E+03	.1301E+04	.2000E+03	.5904E-12
.8000E+03	.1301E+04	.2800E+03	.3404E-08
.8500E+03	.1000E+01	.4000E+02	.2481E+00
.8500E+03	.1000E+01	.1200E+03	.9669E+01
.8500E+03	.1000E+01	.2000E+03	.1071E+02
.8500E+03	.1000E+01	.2800E+03	.8725E+01
.8500E+03	.5100E+02	.4000E+02	.1922E+00
.8500E+03	.5100E+02	.1200E+03	.8937E+01
.8500E+03	.5100E+02	.2000E+03	.1023E+02
.8500E+03	.5100E+02	.2800E+03	.8439E+01
.8500E+03	.1010E+03	.4000E+02	.9153E-01
.8500E+03	.1010E+03	.1200E+03	.7098E+01
.8500E+03	.1010E+03	.2000E+03	.8941E+01
.8500E+03	.1010E+03	.2800E+03	.7656E+01
.8500E+03	.1510E+03	.4000E+02	.2707E-01
.8500E+03	.1510E+03	.1200E+03	.4839E+01
.8500E+03	.1510E+03	.2000E+03	.7150E+01
.8500E+03	.1510E+03	.2800E+03	.6519E+01
.8500E+03	.2010E+03	.4000E+02	.5037E-02
.8500E+03	.2010E+03	.1200E+03	.2829E+01
.8500E+03	.2010E+03	.2000E+03	.5230E+01
.8500E+03	.2010E+03	.2800E+03	.5213E+01
.8500E+03	.2510E+03	.4000E+02	.5961E-03
.8500E+03	.2510E+03	.1200E+03	.1417E+01
.8500E+03	.2510E+03	.2000E+03	.3497E+01
.8500E+03	.2510E+03	.2800E+03	.3915E+01
.8500E+03	.3010E+03	.4000E+02	.4524E-04
.8500E+03	.3010E+03	.1200E+03	.6073E+00
.8500E+03	.3010E+03	.2000E+03	.2137E+01
.8500E+03	.3010E+03	.2800E+03	.2760E+01
.8500E+03	.3510E+03	.4000E+02	.2212E-05
.8500E+03	.3510E+03	.1200E+03	.2228E+00
.8500E+03	.3510E+03	.2000E+03	.1192E+01
.8500E+03	.3510E+03	.2800E+03	.1827E+01
.8500E+03	.4010E+03	.4000E+02	.6988E-07
.8500E+03	.4010E+03	.1200E+03	.7002E-01
.8500E+03	.4010E+03	.2000E+03	.6073E+00
.8500E+03	.4010E+03	.2800E+03	.1134E+01
.8500E+03	.4510E+03	.4000E+02	.1428E-08
.8500E+03	.4510E+03	.1200E+03	.1885E-01
.8500E+03	.4510E+03	.2000E+03	.2823E+00
.8500E+03	.4510E+03	.2800E+03	.6607E+00
.8500E+03	.5010E+03	.4000E+02	.1888E-10
.8500E+03	.5010E+03	.1200E+03	.4353E-02
.8500E+03	.5010E+03	.2000E+03	.1197E+00
.8500E+03	.5010E+03	.2800E+03	.3608E+00
.8500E+03	.5510E+03	.4000E+02	.1616E-12
.8500E+03	.5510E+03	.1200E+03	.8631E-03
.8500E+03	.5510E+03	.2000E+03	.4632E-01
.8500E+03	.5510E+03	.2800E+03	.1847E+00
.8500E+03	.6010E+03	.4000E+02	.8952E-15
.8500E+03	.6010E+03	.1200E+03	.1471E-03
.8500E+03	.6010E+03	.2000E+03	.1635E-01
.8500E+03	.6010E+03	.2800E+03	.8863E-01
.8500E+03	.6510E+03	.4000E+02	.3207E-17
.8500E+03	.6510E+03	.1200E+03	.2157E-04
.8500E+03	.6510E+03	.2000E+03	.5267E-02
.8500E+03	.6510E+03	.2800E+03	.3986E-01
.8500E+03	.7010E+03	.4000E+02	.7427E-20
.8500E+03	.7010E+03	.1200E+03	.2725E-05

.8500E+03	.7010E+03	.2000E+03	.1548E-02
.8500E+03	.7010E+03	.2800E+03	.1680E-01
.8500E+03	.7510E+03	.4000E+02	.1112E-22
.8500E+03	.7510E+03	.1200E+03	.2970E-06
.8500E+03	.7510E+03	.2000E+03	.4155E-03
.8500E+03	.7510E+03	.2800E+03	.6635E-02
.8500E+03	.8010E+03	.4000E+02	.1075E-25
.8500E+03	.8010E+03	.1200E+03	.2794E-07
.8500E+03	.8010E+03	.2000E+03	.1018E-03
.8500E+03	.8010E+03	.2800E+03	.2456E-02
.8500E+03	.8510E+03	.4000E+02	.0000E+00
.8500E+03	.8510E+03	.1200E+03	.2271E-08
.8500E+03	.8510E+03	.2000E+03	.2277E-04
.8500E+03	.8510E+03	.2800E+03	.8520E-03
.8500E+03	.9010E+03	.4000E+02	.0000E+00
.8500E+03	.9010E+03	.1200E+03	.1595E-09
.8500E+03	.9010E+03	.2000E+03	.4654E-05
.8500E+03	.9010E+03	.2800E+03	.2770E-03
.8500E+03	.9510E+03	.4000E+02	.0000E+00
.8500E+03	.9510E+03	.1200E+03	.9690E-11
.8500E+03	.9510E+03	.2000E+03	.8691E-06
.8500E+03	.9510E+03	.2800E+03	.8442E-04
.8500E+03	.1001E+04	.4000E+02	.0000E+00
.8500E+03	.1001E+04	.1200E+03	.5092E-12
.8500E+03	.1001E+04	.2000E+03	.1483E-06
.8500E+03	.1001E+04	.2800E+03	.2412E-04
.8500E+03	.1051E+04	.4000E+02	.0000E+00
.8500E+03	.1051E+04	.1200E+03	.2315E-13
.8500E+03	.1051E+04	.2000E+03	.2314E-07
.8500E+03	.1051E+04	.2800E+03	.6458E-05
.8500E+03	.1101E+04	.4000E+02	.0000E+00
.8500E+03	.1101E+04	.1200E+03	.9108E-15
.8500E+03	.1101E+04	.2000E+03	.3302E-08
.8500E+03	.1101E+04	.2800E+03	.1621E-05
.8500E+03	.1151E+04	.4000E+02	.0000E+00
.8500E+03	.1151E+04	.1200E+03	.3100E-16
.8500E+03	.1151E+04	.2000E+03	.4309E-09
.8500E+03	.1151E+04	.2800E+03	.3816E-06
.8500E+03	.1201E+04	.4000E+02	.0000E+00
.8500E+03	.1201E+04	.1200E+03	.9129E-18
.8500E+03	.1201E+04	.2000E+03	.5145E-10
.8500E+03	.1201E+04	.2800E+03	.8422E-07
.8500E+03	.1251E+04	.4000E+02	.0000E+00
.8500E+03	.1251E+04	.1200E+03	.2326E-19
.8500E+03	.1251E+04	.2000E+03	.5622E-11
.8500E+03	.1251E+04	.2800E+03	.1743E-07
.8500E+03	.1301E+04	.4000E+02	.0000E+00
.8500E+03	.1301E+04	.1200E+03	.5124E-21
.8500E+03	.1301E+04	.2000E+03	.5623E-12
.8500E+03	.1301E+04	.2800E+03	.3384E-08
.9000E+03	.1000E+01	.4000E+02	.1165E+00
.9000E+03	.1000E+01	.1200E+03	.8198E+01
.9000E+03	.1000E+01	.2000E+03	.1014E+02
.9000E+03	.1000E+01	.2800E+03	.8619E+01
.9000E+03	.5100E+02	.4000E+02	.9046E-01
.9000E+03	.5100E+02	.1200E+03	.7576E+01
.9000E+03	.5100E+02	.2000E+03	.9682E+01
.9000E+03	.5100E+02	.2800E+03	.8337E+01
.9000E+03	.1010E+03	.4000E+02	.4335E-01
.9000E+03	.1010E+03	.1200E+03	.6013E+01
.9000E+03	.1010E+03	.2000E+03	.8460E+01
.9000E+03	.1010E+03	.2800E+03	.7567E+01
.9000E+03	.1510E+03	.4000E+02	.1293E-01
.9000E+03	.1510E+03	.1200E+03	.4096E+01
.9000E+03	.1510E+03	.2000E+03	.6764E+01
.9000E+03	.1510E+03	.2800E+03	.6446E+01
.9000E+03	.2010E+03	.4000E+02	.2429E-02
.9000E+03	.2010E+03	.1200E+03	.2393E+01
.9000E+03	.2010E+03	.2000E+03	.4946E+01
.9000E+03	.2010E+03	.2800E+03	.5156E+01
.9000E+03	.2510E+03	.4000E+02	.2901E-03
.9000E+03	.2510E+03	.1200E+03	.1197E+01
.9000E+03	.2510E+03	.2000E+03	.3307E+01
.9000E+03	.2510E+03	.2800E+03	.3873E+01
.9000E+03	.3010E+03	.4000E+02	.2218E-04
.9000E+03	.3010E+03	.1200E+03	.5129E+00

.9000E+03	.3010E+03	.2000E+03	.2020E+01
.9000E+03	.3010E+03	.2800E+03	.2731E+01
.9000E+03	.3510E+03	.4000E+02	.1092E-05
.9000E+03	.3510E+03	.1200E+03	.1881E+00
.9000E+03	.3510E+03	.2000E+03	.1127E+01
.9000E+03	.3510E+03	.2800E+03	.1807E+01
.9000E+03	.4010E+03	.4000E+02	.3467E-07
.9000E+03	.4010E+03	.1200E+03	.5911E-01
.9000E+03	.4010E+03	.2000E+03	.5736E+00
.9000E+03	.4010E+03	.2800E+03	.1122E+01
.9000E+03	.4510E+03	.4000E+02	.7115E-09
.9000E+03	.4510E+03	.1200E+03	.1591E-01
.9000E+03	.4510E+03	.2000E+03	.2665E+00
.9000E+03	.4510E+03	.2800E+03	.6534E+00
.9000E+03	.5010E+03	.4000E+02	.9442E-11
.9000E+03	.5010E+03	.1200E+03	.3675E-02
.9000E+03	.5010E+03	.2000E+03	.1130E+00
.9000E+03	.5010E+03	.2800E+03	.3568E+00
.9000E+03	.5510E+03	.4000E+02	.8104E-13
.9000E+03	.5510E+03	.1200E+03	.7289E-03
.9000E+03	.5510E+03	.2000E+03	.4370E-01
.9000E+03	.5510E+03	.2800E+03	.1826E+00
.9000E+03	.6010E+03	.4000E+02	.4499E-15
.9000E+03	.6010E+03	.1200E+03	.1243E-03
.9000E+03	.6010E+03	.2000E+03	.1543E-01
.9000E+03	.6010E+03	.2800E+03	.8761E-01
.9000E+03	.6510E+03	.4000E+02	.1615E-17
.9000E+03	.6510E+03	.1200E+03	.1823E-04
.9000E+03	.6510E+03	.2000E+03	.4968E-02
.9000E+03	.6510E+03	.2800E+03	.3939E-01
.9000E+03	.7010E+03	.4000E+02	.3745E-20
.9000E+03	.7010E+03	.1200E+03	.2305E-05
.9000E+03	.7010E+03	.2000E+03	.1460E-02
.9000E+03	.7010E+03	.2800E+03	.1660E-01
.9000E+03	.7510E+03	.4000E+02	.5614E-23
.9000E+03	.7510E+03	.1200E+03	.2514E-06
.9000E+03	.7510E+03	.2000E+03	.3918E-03
.9000E+03	.7510E+03	.2800E+03	.6556E-02
.9000E+03	.8010E+03	.4000E+02	.5434E-26
.9000E+03	.8010E+03	.1200E+03	.2366E-07
.9000E+03	.8010E+03	.2000E+03	.9600E-04
.9000E+03	.8010E+03	.2800E+03	.2427E-02
.9000E+03	.8510E+03	.4000E+02	.0000E+00
.9000E+03	.8510E+03	.1200E+03	.1924E-08
.9000E+03	.8510E+03	.2000E+03	.2148E-04
.9000E+03	.8510E+03	.2800E+03	.8417E-03
.9000E+03	.9010E+03	.4000E+02	.0000E+00
.9000E+03	.9010E+03	.1200E+03	.1353E-09
.9000E+03	.9010E+03	.2000E+03	.4389E-05
.9000E+03	.9010E+03	.2800E+03	.2737E-03
.9000E+03	.9510E+03	.4000E+02	.0000E+00
.9000E+03	.9510E+03	.1200E+03	.8221E-11
.9000E+03	.9510E+03	.2000E+03	.8197E-06
.9000E+03	.9510E+03	.2800E+03	.8339E-04
.9000E+03	.1001E+04	.4000E+02	.0000E+00
.9000E+03	.1001E+04	.1200E+03	.4323E-12
.9000E+03	.1001E+04	.2000E+03	.1399E-06
.9000E+03	.1001E+04	.2800E+03	.2382E-04
.9000E+03	.1051E+04	.4000E+02	.0000E+00
.9000E+03	.1051E+04	.1200E+03	.1966E-13
.9000E+03	.1051E+04	.2000E+03	.2183E-07
.9000E+03	.1051E+04	.2800E+03	.6378E-05
.9000E+03	.1101E+04	.4000E+02	.0000E+00
.9000E+03	.1101E+04	.1200E+03	.7739E-15
.9000E+03	.1101E+04	.2000E+03	.3115E-08
.9000E+03	.1101E+04	.2800E+03	.1601E-05
.9000E+03	.1151E+04	.4000E+02	.0000E+00
.9000E+03	.1151E+04	.1200E+03	.2635E-16
.9000E+03	.1151E+04	.2000E+03	.4065E-09
.9000E+03	.1151E+04	.2800E+03	.3769E-06
.9000E+03	.1201E+04	.4000E+02	.0000E+00
.9000E+03	.1201E+04	.1200E+03	.7763E-18
.9000E+03	.1201E+04	.2000E+03	.4855E-10
.9000E+03	.1201E+04	.2800E+03	.8318E-07
.9000E+03	.1251E+04	.4000E+02	.0000E+00
.9000E+03	.1251E+04	.1200E+03	.1978E-19

.9000E+03	.1251E+04	.2000E+03	.5305E-11
.9000E+03	.1251E+04	.2800E+03	.1722E-07
.9000E+03	.1301E+04	.4000E+02	.0000E+00
.9000E+03	.1301E+04	.1200E+03	.4360E-21
.9000E+03	.1301E+04	.2000E+03	.5307E-12
.9000E+03	.1301E+04	.2800E+03	.3342E-08
.9500E+03	.1000E+01	.4000E+02	.5251E-01
.9500E+03	.1000E+01	.1200E+03	.6841E+01
.9500E+03	.1000E+01	.2000E+03	.9509E+01
.9500E+03	.1000E+01	.2800E+03	.8464E+01
.9500E+03	.5100E+02	.4000E+02	.4086E-01
.9500E+03	.5100E+02	.1200E+03	.6320E+01
.9500E+03	.5100E+02	.2000E+03	.9080E+01
.9500E+03	.5100E+02	.2800E+03	.8188E+01
.9500E+03	.1010E+03	.4000E+02	.1969E-01
.9500E+03	.1010E+03	.1200E+03	.5014E+01
.9500E+03	.1010E+03	.2000E+03	.7934E+01
.9500E+03	.1010E+03	.2800E+03	.7434E+01
.9500E+03	.1510E+03	.4000E+02	.5922E-02
.9500E+03	.1510E+03	.1200E+03	.3413E+01
.9500E+03	.1510E+03	.2000E+03	.6342E+01
.9500E+03	.1510E+03	.2800E+03	.6335E+01
.9500E+03	.2010E+03	.4000E+02	.1122E-02
.9500E+03	.2010E+03	.1200E+03	.1992E+01
.9500E+03	.2010E+03	.2000E+03	.4636E+01
.9500E+03	.2010E+03	.2800E+03	.5068E+01
.9500E+03	.2510E+03	.4000E+02	.1351E-03
.9500E+03	.2510E+03	.1200E+03	.9961E+00
.9500E+03	.2510E+03	.2000E+03	.3098E+01
.9500E+03	.2510E+03	.2800E+03	.3807E+01
.9500E+03	.3010E+03	.4000E+02	.1041E-04
.9500E+03	.3010E+03	.1200E+03	.4265E+00
.9500E+03	.3010E+03	.2000E+03	.1892E+01
.9500E+03	.3010E+03	.2800E+03	.2685E+01
.9500E+03	.3510E+03	.4000E+02	.5153E-06
.9500E+03	.3510E+03	.1200E+03	.1564E+00
.9500E+03	.3510E+03	.2000E+03	.1055E+01
.9500E+03	.3510E+03	.2800E+03	.1776E+01
.9500E+03	.4010E+03	.4000E+02	.1645E-07
.9500E+03	.4010E+03	.1200E+03	.4913E-01
.9500E+03	.4010E+03	.2000E+03	.5368E+00
.9500E+03	.4010E+03	.2800E+03	.1103E+01
.9500E+03	.4510E+03	.4000E+02	.3390E-09
.9500E+03	.4510E+03	.1200E+03	.1323E-01
.9500E+03	.4510E+03	.2000E+03	.2493E+00
.9500E+03	.4510E+03	.2800E+03	.6421E+00
.9500E+03	.5010E+03	.4000E+02	.4514E-11
.9500E+03	.5010E+03	.1200E+03	.3056E-02
.9500E+03	.5010E+03	.2000E+03	.1057E+00
.9500E+03	.5010E+03	.2800E+03	.3505E+00
.9500E+03	.5510E+03	.4000E+02	.3886E-13
.9500E+03	.5510E+03	.1200E+03	.6062E-03
.9500E+03	.5510E+03	.2000E+03	.4087E-01
.9500E+03	.5510E+03	.2800E+03	.1794E+00
.9500E+03	.6010E+03	.4000E+02	.2162E-15
.9500E+03	.6010E+03	.1200E+03	.1034E-03
.9500E+03	.6010E+03	.2000E+03	.1442E-01
.9500E+03	.6010E+03	.2800E+03	.8604E-01
.9500E+03	.6510E+03	.4000E+02	.7775E-18
.9500E+03	.6510E+03	.1200E+03	.1518E-04
.9500E+03	.6510E+03	.2000E+03	.4644E-02
.9500E+03	.6510E+03	.2800E+03	.3868E-01
.9500E+03	.7010E+03	.4000E+02	.1806E-20
.9500E+03	.7010E+03	.1200E+03	.1920E-05
.9500E+03	.7010E+03	.2000E+03	.1365E-02
.9500E+03	.7010E+03	.2800E+03	.1630E-01
.9500E+03	.7510E+03	.4000E+02	.2711E-23
.9500E+03	.7510E+03	.1200E+03	.2095E-06
.9500E+03	.7510E+03	.2000E+03	.3662E-03
.9500E+03	.7510E+03	.2800E+03	.6436E-02
.9500E+03	.8010E+03	.4000E+02	.2628E-26
.9500E+03	.8010E+03	.1200E+03	.1974E-07
.9500E+03	.8010E+03	.2000E+03	.8972E-04
.9500E+03	.8010E+03	.2800E+03	.2382E-02
.9500E+03	.8510E+03	.4000E+02	.0000E+00
.9500E+03	.8510E+03	.1200E+03	.1606E-08

.9500E+03	.8510E+03	.2000E+03	.2007E-04
.9500E+03	.8510E+03	.2800E+03	.8262E-03
.9500E+03	.9010E+03	.4000E+02	.0000E+00
.9500E+03	.9010E+03	.1200E+03	.1130E-09
.9500E+03	.9010E+03	.2000E+03	.4102E-05
.9500E+03	.9010E+03	.2800E+03	.2686E-03
.9500E+03	.9510E+03	.4000E+02	.0000E+00
.9500E+03	.9510E+03	.1200E+03	.6871E-11
.9500E+03	.9510E+03	.2000E+03	.7661E-06
.9500E+03	.9510E+03	.2800E+03	.8184E-04
.9500E+03	.1001E+04	.4000E+02	.0000E+00
.9500E+03	.1001E+04	.1200E+03	.3615E-12
.9500E+03	.1001E+04	.2000E+03	.1308E-06
.9500E+03	.1001E+04	.2800E+03	.2338E-04
.9500E+03	.1051E+04	.4000E+02	.0000E+00
.9500E+03	.1051E+04	.1200E+03	.1645E-13
.9500E+03	.1051E+04	.2000E+03	.2041E-07
.9500E+03	.1051E+04	.2800E+03	.6259E-05
.9500E+03	.1101E+04	.4000E+02	.0000E+00
.9500E+03	.1101E+04	.1200E+03	.6478E-15
.9500E+03	.1101E+04	.2000E+03	.2912E-08
.9500E+03	.1101E+04	.2800E+03	.1571E-05
.9500E+03	.1151E+04	.4000E+02	.0000E+00
.9500E+03	.1151E+04	.1200E+03	.2207E-16
.9500E+03	.1151E+04	.2000E+03	.3801E-09
.9500E+03	.1151E+04	.2800E+03	.3698E-06
.9500E+03	.1201E+04	.4000E+02	.0000E+00
.9500E+03	.1201E+04	.1200E+03	.6503E-18
.9500E+03	.1201E+04	.2000E+03	.4540E-10
.9500E+03	.1201E+04	.2800E+03	.8163E-07
.9500E+03	.1251E+04	.4000E+02	.0000E+00
.9500E+03	.1251E+04	.1200E+03	.1658E-19
.9500E+03	.1251E+04	.2000E+03	.4962E-11
.9500E+03	.1251E+04	.2800E+03	.1689E-07
.9500E+03	.1301E+04	.4000E+02	.0000E+00
.9500E+03	.1301E+04	.1200E+03	.3655E-21
.9500E+03	.1301E+04	.2000E+03	.4964E-12
.9500E+03	.1301E+04	.2800E+03	.3280E-08
.1000E+04	.1000E+01	.4000E+02	.2272E-01
.1000E+04	.1000E+01	.1200E+03	.5618E+01
.1000E+04	.1000E+01	.2000E+03	.8839E+01
.1000E+04	.1000E+01	.2800E+03	.8263E+01
.1000E+04	.5100E+02	.4000E+02	.1772E-01
.1000E+04	.5100E+02	.1200E+03	.5190E+01
.1000E+04	.5100E+02	.2000E+03	.8440E+01
.1000E+04	.5100E+02	.2800E+03	.7994E+01
.1000E+04	.1010E+03	.4000E+02	.8582E-02
.1000E+04	.1010E+03	.1200E+03	.4116E+01
.1000E+04	.1010E+03	.2000E+03	.7373E+01
.1000E+04	.1010E+03	.2800E+03	.7259E+01
.1000E+04	.1510E+03	.4000E+02	.2599E-02
.1000E+04	.1510E+03	.1200E+03	.2800E+01
.1000E+04	.1510E+03	.2000E+03	.5893E+01
.1000E+04	.1510E+03	.2800E+03	.6187E+01
.1000E+04	.2010E+03	.4000E+02	.4963E-03
.1000E+04	.2010E+03	.1200E+03	.1633E+01
.1000E+04	.2010E+03	.2000E+03	.4307E+01
.1000E+04	.2010E+03	.2800E+03	.4951E+01
.1000E+04	.2510E+03	.4000E+02	.6022E-04
.1000E+04	.2510E+03	.1200E+03	.8160E+00
.1000E+04	.2510E+03	.2000E+03	.2877E+01
.1000E+04	.2510E+03	.2800E+03	.3719E+01
.1000E+04	.3010E+03	.4000E+02	.4671E-05
.1000E+04	.3010E+03	.1200E+03	.3492E+00
.1000E+04	.3010E+03	.2000E+03	.1756E+01
.1000E+04	.3010E+03	.2800E+03	.2622E+01
.1000E+04	.3510E+03	.4000E+02	.2327E-06
.1000E+04	.3510E+03	.1200E+03	.1280E+00
.1000E+04	.3510E+03	.2000E+03	.9785E+00
.1000E+04	.3510E+03	.2800E+03	.1735E+01
.1000E+04	.4010E+03	.4000E+02	.7464E-08
.1000E+04	.4010E+03	.1200E+03	.4021E-01
.1000E+04	.4010E+03	.2000E+03	.4978E+00
.1000E+04	.4010E+03	.2800E+03	.1077E+01
.1000E+04	.4510E+03	.4000E+02	.1545E-09
.1000E+04	.4510E+03	.1200E+03	.1083E-01

.1000E+04	.4510E+03	.2000E+03	.2311E+00
.1000E+04	.4510E+03	.2800E+03	.6269E+00
.1000E+04	.5010E+03	.4000E+02	.2064E-11
.1000E+04	.5010E+03	.1200E+03	.2502E-02
.1000E+04	.5010E+03	.2000E+03	.9794E-01
.1000E+04	.5010E+03	.2800E+03	.3422E+00
.1000E+04	.5510E+03	.4000E+02	.1782E-13
.1000E+04	.5510E+03	.1200E+03	.4965E-03
.1000E+04	.5510E+03	.2000E+03	.3787E-01
.1000E+04	.5510E+03	.2800E+03	.1751E+00
.1000E+04	.6010E+03	.4000E+02	.9936E-16
.1000E+04	.6010E+03	.1200E+03	.8474E-04
.1000E+04	.6010E+03	.2000E+03	.1336E-01
.1000E+04	.6010E+03	.2800E+03	.8396E-01
.1000E+04	.6510E+03	.4000E+02	.3580E-18
.1000E+04	.6510E+03	.1200E+03	.1245E-04
.1000E+04	.6510E+03	.2000E+03	.4302E-02
.1000E+04	.6510E+03	.2800E+03	.3774E-01
.1000E+04	.7010E+03	.4000E+02	.8332E-21
.1000E+04	.7010E+03	.1200E+03	.1576E-05
.1000E+04	.7010E+03	.2000E+03	.1264E-02
.1000E+04	.7010E+03	.2800E+03	.1590E-01
.1000E+04	.7510E+03	.4000E+02	.1252E-23
.1000E+04	.7510E+03	.1200E+03	.1721E-06
.1000E+04	.7510E+03	.2000E+03	.3392E-03
.1000E+04	.7510E+03	.2800E+03	.6278E-02
.1000E+04	.8010E+03	.4000E+02	.1215E-26
.1000E+04	.8010E+03	.1200E+03	.1622E-07
.1000E+04	.8010E+03	.2000E+03	.8309E-04
.1000E+04	.8010E+03	.2800E+03	.2323E-02
.1000E+04	.8510E+03	.4000E+02	.0000E+00
.1000E+04	.8510E+03	.1200E+03	.1321E-08
.1000E+04	.8510E+03	.2000E+03	.1859E-04
.1000E+04	.8510E+03	.2800E+03	.8058E-03
.1000E+04	.9010E+03	.4000E+02	.0000E+00
.1000E+04	.9010E+03	.1200E+03	.9295E-10
.1000E+04	.9010E+03	.2000E+03	.3799E-05
.1000E+04	.9010E+03	.2800E+03	.2619E-03
.1000E+04	.9510E+03	.4000E+02	.0000E+00
.1000E+04	.9510E+03	.1200E+03	.5657E-11
.1000E+04	.9510E+03	.2000E+03	.7096E-06
.1000E+04	.9510E+03	.2800E+03	.7981E-04
.1000E+04	.1001E+04	.4000E+02	.0000E+00
.1000E+04	.1001E+04	.1200E+03	.2978E-12
.1000E+04	.1001E+04	.2000E+03	.1211E-06
.1000E+04	.1001E+04	.2800E+03	.2279E-04
.1000E+04	.1051E+04	.4000E+02	.0000E+00
.1000E+04	.1051E+04	.1200E+03	.1356E-13
.1000E+04	.1051E+04	.2000E+03	.1890E-07
.1000E+04	.1051E+04	.2800E+03	.6103E-05
.1000E+04	.1101E+04	.4000E+02	.0000E+00
.1000E+04	.1101E+04	.1200E+03	.5342E-15
.1000E+04	.1101E+04	.2000E+03	.2698E-08
.1000E+04	.1101E+04	.2800E+03	.1532E-05
.1000E+04	.1151E+04	.4000E+02	.0000E+00
.1000E+04	.1151E+04	.1200E+03	.1821E-16
.1000E+04	.1151E+04	.2000E+03	.3522E-09
.1000E+04	.1151E+04	.2800E+03	.3606E-06
.1000E+04	.1201E+04	.4000E+02	.0000E+00
.1000E+04	.1201E+04	.1200E+03	.5367E-18
.1000E+04	.1201E+04	.2000E+03	.4207E-10
.1000E+04	.1201E+04	.2800E+03	.7959E-07
.1000E+04	.1251E+04	.4000E+02	.0000E+00
.1000E+04	.1251E+04	.1200E+03	.1369E-19
.1000E+04	.1251E+04	.2000E+03	.4599E-11
.1000E+04	.1251E+04	.2800E+03	.1647E-07
.1000E+04	.1301E+04	.4000E+02	.0000E+00
.1000E+04	.1301E+04	.1200E+03	.3019E-21
.1000E+04	.1301E+04	.2000E+03	.4601E-12
.1000E+04	.1301E+04	.2800E+03	.3198E-08
.1050E+04	.1000E+01	.4000E+02	.9440E-02
.1050E+04	.1000E+01	.1200E+03	.4541E+01
.1050E+04	.1000E+01	.2000E+03	.8142E+01
.1050E+04	.1000E+01	.2800E+03	.8017E+01
.1050E+04	.5100E+02	.4000E+02	.7372E-02
.1050E+04	.5100E+02	.1200E+03	.4195E+01

.1050E+04	.5100E+02	.2000E+03	.7774E+01
.1050E+04	.5100E+02	.2800E+03	.7757E+01
.1050E+04	.1010E+03	.4000E+02	.3587E-02
.1050E+04	.1010E+03	.1200E+03	.3325E+01
.1050E+04	.1010E+03	.2000E+03	.6791E+01
.1050E+04	.1010E+03	.2800E+03	.7044E+01
.1050E+04	.1510E+03	.4000E+02	.1093E-02
.1050E+04	.1510E+03	.1200E+03	.2261E+01
.1050E+04	.1510E+03	.2000E+03	.5426E+01
.1050E+04	.1510E+03	.2800E+03	.6005E+01
.1050E+04	.2010E+03	.4000E+02	.2103E-03
.1050E+04	.2010E+03	.1200E+03	.1318E+01
.1050E+04	.2010E+03	.2000E+03	.3964E+01
.1050E+04	.2010E+03	.2800E+03	.4806E+01
.1050E+04	.2510E+03	.4000E+02	.2570E-04
.1050E+04	.2510E+03	.1200E+03	.6581E+00
.1050E+04	.2510E+03	.2000E+03	.2647E+01
.1050E+04	.2510E+03	.2800E+03	.3610E+01
.1050E+04	.3010E+03	.4000E+02	.2006E-05
.1050E+04	.3010E+03	.1200E+03	.2815E+00
.1050E+04	.3010E+03	.2000E+03	.1615E+01
.1050E+04	.3010E+03	.2800E+03	.2545E+01
.1050E+04	.3510E+03	.4000E+02	.1005E-06
.1050E+04	.3510E+03	.1200E+03	.1032E+00
.1050E+04	.3510E+03	.2000E+03	.8996E+00
.1050E+04	.3510E+03	.2800E+03	.1684E+01
.1050E+04	.4010E+03	.4000E+02	.3239E-08
.1050E+04	.4010E+03	.1200E+03	.3241E-01
.1050E+04	.4010E+03	.2000E+03	.4575E+00
.1050E+04	.4010E+03	.2800E+03	.1045E+01
.1050E+04	.4510E+03	.4000E+02	.6730E-10
.1050E+04	.4510E+03	.1200E+03	.8728E-02
.1050E+04	.4510E+03	.2000E+03	.2124E+00
.1050E+04	.4510E+03	.2800E+03	.6082E+00
.1050E+04	.5010E+03	.4000E+02	.9024E-12
.1050E+04	.5010E+03	.1200E+03	.2017E-02
.1050E+04	.5010E+03	.2000E+03	.8995E-01
.1050E+04	.5010E+03	.2800E+03	.3319E+00
.1050E+04	.5510E+03	.4000E+02	.7812E-14
.1050E+04	.5510E+03	.1200E+03	.4005E-03
.1050E+04	.5510E+03	.2000E+03	.3477E-01
.1050E+04	.5510E+03	.2800E+03	.1698E+00
.1050E+04	.6010E+03	.4000E+02	.4367E-16
.1050E+04	.6010E+03	.1200E+03	.6839E-04
.1050E+04	.6010E+03	.2000E+03	.1227E-01
.1050E+04	.6010E+03	.2800E+03	.8141E-01
.1050E+04	.6510E+03	.4000E+02	.1577E-18
.1050E+04	.6510E+03	.1200E+03	.1005E-04
.1050E+04	.6510E+03	.2000E+03	.3949E-02
.1050E+04	.6510E+03	.2800E+03	.3659E-01
.1050E+04	.7010E+03	.4000E+02	.3676E-21
.1050E+04	.7010E+03	.1200E+03	.1273E-05
.1050E+04	.7010E+03	.2000E+03	.1160E-02
.1050E+04	.7010E+03	.2800E+03	.1541E-01
.1050E+04	.7510E+03	.4000E+02	.5532E-24
.1050E+04	.7510E+03	.1200E+03	.1391E-06
.1050E+04	.7510E+03	.2000E+03	.3113E-03
.1050E+04	.7510E+03	.2800E+03	.6085E-02
.1050E+04	.8010E+03	.4000E+02	.5375E-27
.1050E+04	.8010E+03	.1200E+03	.1313E-07
.1050E+04	.8010E+03	.2000E+03	.7626E-04
.1050E+04	.8010E+03	.2800E+03	.2252E-02
.1050E+04	.8510E+03	.4000E+02	.0000E+00
.1050E+04	.8510E+03	.1200E+03	.1070E-08
.1050E+04	.8510E+03	.2000E+03	.1706E-04
.1050E+04	.8510E+03	.2800E+03	.7808E-03
.1050E+04	.9010E+03	.4000E+02	.0000E+00
.1050E+04	.9010E+03	.1200E+03	.7533E-10
.1050E+04	.9010E+03	.2000E+03	.3487E-05
.1050E+04	.9010E+03	.2800E+03	.2538E-03
.1050E+04	.9510E+03	.4000E+02	.0000E+00
.1050E+04	.9510E+03	.1200E+03	.4588E-11
.1050E+04	.9510E+03	.2000E+03	.6513E-06
.1050E+04	.9510E+03	.2800E+03	.7733E-04
.1050E+04	.1001E+04	.4000E+02	.0000E+00
.1050E+04	.1001E+04	.1200E+03	.2416E-12

.1050E+04	.1001E+04	.2000E+03	.1112E-06
.1050E+04	.1001E+04	.2800E+03	.2208E-04
.1050E+04	.1051E+04	.4000E+02	.0000E+00
.1050E+04	.1051E+04	.1200E+03	.1101E-13
.1050E+04	.1051E+04	.2000E+03	.1735E-07
.1050E+04	.1051E+04	.2800E+03	.5913E-05
.1050E+04	.1101E+04	.4000E+02	.0000E+00
.1050E+04	.1101E+04	.1200E+03	.4340E-15
.1050E+04	.1101E+04	.2000E+03	.2477E-08
.1050E+04	.1101E+04	.2800E+03	.1484E-05
.1050E+04	.1151E+04	.4000E+02	.0000E+00
.1050E+04	.1151E+04	.1200E+03	.1480E-16
.1050E+04	.1151E+04	.2000E+03	.3234E-09
.1050E+04	.1151E+04	.2800E+03	.3494E-06
.1050E+04	.1201E+04	.4000E+02	.0000E+00
.1050E+04	.1201E+04	.1200E+03	.4364E-18
.1050E+04	.1201E+04	.2000E+03	.3864E-10
.1050E+04	.1201E+04	.2800E+03	.7711E-07
.1050E+04	.1251E+04	.4000E+02	.0000E+00
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.1050E+04	.1251E+04	.2800E+03	.1596E-07
.1050E+04	.1301E+04	.4000E+02	.0000E+00
.1050E+04	.1301E+04	.1200E+03	.2456E-21
.1050E+04	.1301E+04	.2000E+03	.4227E-12
.1050E+04	.1301E+04	.2800E+03	.3098E-08
.1100E+04	.1000E+01	.4000E+02	.3764E-02
.1100E+04	.1000E+01	.1200E+03	.3613E+01
.1100E+04	.1000E+01	.2000E+03	.7432E+01
.1100E+04	.1000E+01	.2800E+03	.7731E+01
.1100E+04	.5100E+02	.4000E+02	.2944E-02
.1100E+04	.5100E+02	.1200E+03	.3337E+01
.1100E+04	.5100E+02	.2000E+03	.7096E+01
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.1100E+04	.1010E+03	.4000E+02	.1438E-02
.1100E+04	.1010E+03	.1200E+03	.2644E+01
.1100E+04	.1010E+03	.2000E+03	.6197E+01
.1100E+04	.1010E+03	.2800E+03	.6794E+01
.1100E+04	.1510E+03	.4000E+02	.4409E-03
.1100E+04	.1510E+03	.1200E+03	.1797E+01
.1100E+04	.1510E+03	.2000E+03	.4951E+01
.1100E+04	.1510E+03	.2800E+03	.5792E+01
.1100E+04	.2010E+03	.4000E+02	.8535E-04
.1100E+04	.2010E+03	.1200E+03	.1047E+01
.1100E+04	.2010E+03	.2000E+03	.3616E+01
.1100E+04	.2010E+03	.2800E+03	.4635E+01
.1100E+04	.2510E+03	.4000E+02	.1050E-04
.1100E+04	.2510E+03	.1200E+03	.5226E+00
.1100E+04	.2510E+03	.2000E+03	.2413E+01
.1100E+04	.2510E+03	.2800E+03	.3482E+01
.1100E+04	.3010E+03	.4000E+02	.8245E-06
.1100E+04	.3010E+03	.1200E+03	.2235E+00
.1100E+04	.3010E+03	.2000E+03	.1472E+01
.1100E+04	.3010E+03	.2800E+03	.2455E+01
.1100E+04	.3510E+03	.4000E+02	.4153E-07
.1100E+04	.3510E+03	.1200E+03	.8189E-01
.1100E+04	.3510E+03	.2000E+03	.8195E+00
.1100E+04	.3510E+03	.2800E+03	.1624E+01
.1100E+04	.4010E+03	.4000E+02	.1345E-08
.1100E+04	.4010E+03	.1200E+03	.2572E-01
.1100E+04	.4010E+03	.2000E+03	.4166E+00
.1100E+04	.4010E+03	.2800E+03	.1008E+01
.1100E+04	.4510E+03	.4000E+02	.2805E-10
.1100E+04	.4510E+03	.1200E+03	.6928E-02
.1100E+04	.4510E+03	.2000E+03	.1933E+00
.1100E+04	.4510E+03	.2800E+03	.5862E+00
.1100E+04	.5010E+03	.4000E+02	.3774E-12
.1100E+04	.5010E+03	.1200E+03	.1602E-02
.1100E+04	.5010E+03	.2000E+03	.8187E-01
.1100E+04	.5010E+03	.2800E+03	.3198E+00
.1100E+04	.5510E+03	.4000E+02	.3276E-14
.1100E+04	.5510E+03	.1200E+03	.3182E-03
.1100E+04	.5510E+03	.2000E+03	.3164E-01
.1100E+04	.5510E+03	.2800E+03	.1636E+00
.1100E+04	.6010E+03	.4000E+02	.1836E-16
.1100E+04	.6010E+03	.1200E+03	.5436E-04

.1100E+04	.6010E+03	.2000E+03	.1116E-01
.1100E+04	.6010E+03	.2800E+03	.7843E-01
.1100E+04	.6510E+03	.4000E+02	.6641E-19
.1100E+04	.6510E+03	.1200E+03	.7997E-05
.1100E+04	.6510E+03	.2000E+03	.3592E-02
.1100E+04	.6510E+03	.2800E+03	.3525E-01
.1100E+04	.7010E+03	.4000E+02	.1551E-21
.1100E+04	.7010E+03	.1200E+03	.1014E-05
.1100E+04	.7010E+03	.2000E+03	.1055E-02
.1100E+04	.7010E+03	.2800E+03	.1485E-01
.1100E+04	.7510E+03	.4000E+02	.2338E-24
.1100E+04	.7510E+03	.1200E+03	.1108E-06
.1100E+04	.7510E+03	.2000E+03	.2831E-03
.1100E+04	.7510E+03	.2800E+03	.5860E-02
.1100E+04	.8010E+03	.4000E+02	.2274E-27
.1100E+04	.8010E+03	.1200E+03	.1046E-07
.1100E+04	.8010E+03	.2000E+03	.6935E-04
.1100E+04	.8010E+03	.2800E+03	.2168E-02
.1100E+04	.8510E+03	.4000E+02	.0000E+00
.1100E+04	.8510E+03	.1200E+03	.8533E-09
.1100E+04	.8510E+03	.2000E+03	.1552E-04
.1100E+04	.8510E+03	.2800E+03	.7518E-03
.1100E+04	.9010E+03	.4000E+02	.0000E+00
.1100E+04	.9010E+03	.1200E+03	.6014E-10
.1100E+04	.9010E+03	.2000E+03	.3172E-05
.1100E+04	.9010E+03	.2800E+03	.2443E-03
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.1100E+04	.9510E+03	.1200E+03	.3665E-11
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.1100E+04	.9510E+03	.2800E+03	.7444E-04
.1100E+04	.1001E+04	.4000E+02	.0000E+00
.1100E+04	.1001E+04	.1200E+03	.1932E-12
.1100E+04	.1001E+04	.2000E+03	.1011E-06
.1100E+04	.1001E+04	.2800E+03	.2126E-04
.1100E+04	.1051E+04	.4000E+02	.0000E+00
.1100E+04	.1051E+04	.1200E+03	.8807E-14
.1100E+04	.1051E+04	.2000E+03	.1579E-07
.1100E+04	.1051E+04	.2800E+03	.5692E-05
.1100E+04	.1101E+04	.4000E+02	.0000E+00
.1100E+04	.1101E+04	.1200E+03	.3473E-15
.1100E+04	.1101E+04	.2000E+03	.2254E-08
.1100E+04	.1101E+04	.2800E+03	.1429E-05
.1100E+04	.1151E+04	.4000E+02	.0000E+00
.1100E+04	.1151E+04	.1200E+03	.1185E-16
.1100E+04	.1151E+04	.2000E+03	.2943E-09
.1100E+04	.1151E+04	.2800E+03	.3363E-06
.1100E+04	.1201E+04	.4000E+02	.0000E+00
.1100E+04	.1201E+04	.1200E+03	.3496E-18
.1100E+04	.1201E+04	.2000E+03	.3516E-10
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.1100E+04	.1251E+04	.1200E+03	.8921E-20
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.1100E+04	.1251E+04	.2800E+03	.1536E-07
.1100E+04	.1301E+04	.4000E+02	.0000E+00
.1100E+04	.1301E+04	.1200E+03	.1969E-21
.1100E+04	.1301E+04	.2000E+03	.3848E-12
.1100E+04	.1301E+04	.2800E+03	.2982E-08
.1150E+04	.1000E+01	.4000E+02	.1440E-02
.1150E+04	.1000E+01	.1200E+03	.2830E+01
.1150E+04	.1000E+01	.2000E+03	.6722E+01
.1150E+04	.1000E+01	.2800E+03	.7409E+01
.1150E+04	.5100E+02	.4000E+02	.1128E-02
.1150E+04	.5100E+02	.1200E+03	.2613E+01
.1150E+04	.5100E+02	.2000E+03	.6418E+01
.1150E+04	.5100E+02	.2800E+03	.7169E+01
.1150E+04	.1010E+03	.4000E+02	.5529E-03
.1150E+04	.1010E+03	.1200E+03	.2070E+01
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.1150E+04	.2010E+03	.4000E+02	.3318E-04
.1150E+04	.2010E+03	.1200E+03	.8188E+00

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.1150E+04	.2510E+03	.4000E+02	.4105E-05
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.1150E+04	.2510E+03	.2000E+03	.2180E+01
.1150E+04	.2510E+03	.2800E+03	.3337E+01
.1150E+04	.3010E+03	.4000E+02	.3243E-06
.1150E+04	.3010E+03	.1200E+03	.1747E+00
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.1150E+04	.3010E+03	.2800E+03	.2353E+01
.1150E+04	.3510E+03	.4000E+02	.1642E-07
.1150E+04	.3510E+03	.1200E+03	.6400E-01
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.1150E+04	.3510E+03	.2800E+03	.1556E+01
.1150E+04	.4010E+03	.4000E+02	.5340E-09
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.1150E+04	.4010E+03	.2800E+03	.9652E+00
.1150E+04	.4510E+03	.4000E+02	.1118E-10
.1150E+04	.4510E+03	.1200E+03	.5416E-02
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.1150E+04	.5010E+03	.4000E+02	.1509E-12
.1150E+04	.5010E+03	.1200E+03	.1253E-02
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.1150E+04	.5510E+03	.2800E+03	.1566E+00
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.1150E+04	.7010E+03	.4000E+02	.6258E-22
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.1150E+04	.7010E+03	.2800E+03	.1421E-01
.1150E+04	.7510E+03	.4000E+02	.9447E-25
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.1150E+04	.7510E+03	.2800E+03	.5607E-02
.1150E+04	.8010E+03	.4000E+02	.9201E-28
.1150E+04	.8010E+03	.1200E+03	.8217E-08
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.1150E+04	.8010E+03	.2800E+03	.2074E-02
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.1150E+04	.8510E+03	.1200E+03	.6706E-09
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.1150E+04	.9010E+03	.2000E+03	.2859E-05
.1150E+04	.9010E+03	.2800E+03	.2337E-03
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.1150E+04	.9510E+03	.2000E+03	.5340E-06
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.1150E+04	.1101E+04	.2800E+03	.1367E-05
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.1150E+04	.1251E+04	.2800E+03	.1469E-07
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.1200E+04	.1000E+01	.2000E+03	.6025E+01
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.1200E+04	.1510E+03	.2800E+03	.5288E+01
.1200E+04	.2010E+03	.4000E+02	.1236E-04
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.1200E+04	.3510E+03	.2800E+03	.1481E+01
.1200E+04	.4010E+03	.4000E+02	.2029E-09
.1200E+04	.4010E+03	.1200E+03	.1547E-01
.1200E+04	.4010E+03	.2000E+03	.3362E+00
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.1200E+04	.6010E+03	.2800E+03	.7141E-01
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.1200E+04	.9510E+03	.1200E+03	.2236E-11
.1200E+04	.9510E+03	.2000E+03	.4771E-06
.1200E+04	.9510E+03	.2800E+03	.6768E-04
.1200E+04	.1001E+04	.4000E+02	.0000E+00
.1200E+04	.1001E+04	.1200E+03	.1180E-12
.1200E+04	.1001E+04	.2000E+03	.8146E-07
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.1200E+04	.1051E+04	.4000E+02	.0000E+00
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.1200E+04	.1101E+04	.4000E+02	.0000E+00
.1200E+04	.1101E+04	.1200E+03	.2127E-15
.1200E+04	.1101E+04	.2000E+03	.1816E-08
.1200E+04	.1101E+04	.2800E+03	.1299E-05
.1200E+04	.1151E+04	.4000E+02	.0000E+00
.1200E+04	.1151E+04	.1200E+03	.7262E-17
.1200E+04	.1151E+04	.2000E+03	.2372E-09
.1200E+04	.1151E+04	.2800E+03	.3057E-06
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.1200E+04	.1201E+04	.1200E+03	.2145E-18
.1200E+04	.1201E+04	.2000E+03	.2835E-10
.1200E+04	.1201E+04	.2800E+03	.6746E-07
.1200E+04	.1251E+04	.4000E+02	.0000E+00
.1200E+04	.1251E+04	.1200E+03	.5478E-20
.1200E+04	.1251E+04	.2000E+03	.3101E-11
.1200E+04	.1251E+04	.2800E+03	.1396E-07
.1200E+04	.1301E+04	.4000E+02	.0000E+00
.1200E+04	.1301E+04	.1200E+03	.1210E-21
.1200E+04	.1301E+04	.2000E+03	.3105E-12
.1200E+04	.1301E+04	.2800E+03	.2711E-08

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*******************************************************
*                                                     *
*          S O L U T E  version 4.06                  *
*                                                     *
*     ANALYTICAL MODELS FOR SOLUTE TRANSPORT          *
*                                                     *
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```

Model: PLUME2D-H

PROJECT..... = epri-plume-1
USER NAME..... = mbrooke
DATE..... = 08-17-1998
DATA FILE..... = K:\DATA\PROJECT\0734\FATE_&_T\EPRI-1Z.D2D

INPUT DATA:

GROUNDWATER (SEEPAGE) VELOCITY.... = .155 [ft/d]
AQUIFER THICKNESS..... = 15 [ft]
POROSITY..... = .42
LONGITUDINAL DISPERSIVITY..... = 250 [ft]
LATERAL DISPERSIVITY..... = 25 [ft]
RETARDATION FACTOR..... = 20
HALF-LIFE..... = 0 [d]
DECAY CONSTANT..... = 0.0000D+00

NUMBER OF POINT SOURCES..... = 2

SOURCE NO. 1

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 200 [ft]
SOURCE STRENGTH..... = 4 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 102200 [d]

SOURCE NO. 2

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 250 [ft]

SOURCE STRENGTH..... = 4 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 102200 [d]

GRID DATA:

X-COORDINATE OF GRID ORIGIN..... = -100 [ft]
Y-COORDINATE OF GRID ORIGIN..... = 0 [ft]
DISTANCE INCREMENT DELX..... = 50 [ft]
DISTANCE INCREMENT DELY..... = 50 [ft]
NUMBER OF NODES IN X-DIRECTION.... = 27
NUMBER OF NODES IN Y-DIRECTION.... = 49

CONCENTRATION C [mg/l]

ROW\COLUMN	1	2	3	4	5
[ft]	-100.00	-50.00	0.00	50.00	100.00
1	0.00 [ft]	0.0000D+00	0.0000D+00	3.5792D+01	5.6298D+01	6.1856D+01
2	50.00 [ft]	0.0000D+00	0.0000D+00	6.7833D+01	7.4285D+01	7.9896D+01
3	100.00 [ft]	0.0000D+00	0.0000D+00	1.2314D+02	1.3431D+02	1.4283D+02
4	150.00 [ft]	0.0000D+00	0.0000D+00	1.4529D+02	1.5926D+02	1.7193D+02
5	200.00 [ft]	0.0000D+00	0.0000D+00	1.3212D+02	1.4599D+02	1.6134D+02
6	250.00 [ft]	0.0000D+00	0.0000D+00	1.3212D+02	1.4599D+02	1.6134D+02
7	300.00 [ft]	0.0000D+00	0.0000D+00	1.4529D+02	1.5926D+02	1.7193D+02
8	350.00 [ft]	0.0000D+00	0.0000D+00	1.2314D+02	1.3431D+02	1.4283D+02
9	400.00 [ft]	0.0000D+00	0.0000D+00	6.7833D+01	7.4285D+01	7.9896D+01
10	450.00 [ft]	0.0000D+00	0.0000D+00	3.5792D+01	5.6298D+01	6.1856D+01
11	500.00 [ft]	0.0000D+00	0.0000D+00	1.9001D+01	3.7908D+01	4.2077D+01
12	550.00 [ft]	0.0000D+00	0.0000D+00	1.0895D+01	1.1978D+01	1.3035D+01
13	600.00 [ft]	0.0000D+00	0.0000D+00	5.6281D+00	6.1908D+00	6.7463D+00
14	650.00 [ft]	0.0000D+00	0.0000D+00	2.7765D+00	3.0551D+00	3.3324D+00
15	700.00 [ft]	0.0000D+00	0.0000D+00	1.3141D+00	1.4463D+00	1.5787D+00
16	750.00 [ft]	0.0000D+00	0.0000D+00	5.9469D-01	6.5463D-01	7.1493D-01
17	800.00 [ft]	0.0000D+00	0.0000D+00	2.5666D-01	2.8257D-01	3.0872D-01
18	850.00 [ft]	0.0000D+00	0.0000D+00	1.0541D-01	1.1607D-01	1.2685D-01
19	900.00 [ft]	0.0000D+00	0.0000D+00	4.1130D-02	4.5291D-02	4.9510D-02
20	950.00 [ft]	0.0000D+00	0.0000D+00	1.5223D-02	1.6764D-02	1.8330D-02
21	1000.00 [ft]	0.0000D+00	0.0000D+00	5.3387D-03	5.8794D-03	6.4294D-03
22	1050.00 [ft]	0.0000D+00	0.0000D+00	1.7721D-03	1.9517D-03	2.1345D-03
23	1100.00 [ft]	0.0000D+00	0.0000D+00	5.5633D-04	6.1273D-04	6.7021D-04
24	1150.00 [ft]	0.0000D+00	0.0000D+00	1.6508D-04	1.8182D-04	1.9890D-04

25	1200.00 [ft]	0.0000D+00	0.0000D+00	4.6281D-05	5.0976D-05	5.5768D-05
26	1250.00 [ft]	0.0000D+00	0.0000D+00	1.2258D-05	1.3501D-05	1.4772D-05
27	1300.00 [ft]	0.0000D+00	0.0000D+00	3.0673D-06	3.3786D-06	3.6967D-06
28	1350.00 [ft]	0.0000D+00	0.0000D+00	7.2553D-07	7.9919D-07	8.7451D-07
29	1400.00 [ft]	0.0000D+00	0.0000D+00	1.6236D-07	1.7885D-07	1.9572D-07
30	1450.00 [ft]	0.0000D+00	0.0000D+00	3.4416D-08	3.7912D-08	4.1491D-08
31	1500.00 [ft]	0.0000D+00	0.0000D+00	6.9217D-09	7.6249D-09	8.3454D-09
32	1550.00 [ft]	0.0000D+00	0.0000D+00	1.3235D-09	1.4580D-09	1.5959D-09
33	1600.00 [ft]	0.0000D+00	0.0000D+00	2.4118D-10	2.6569D-10	2.9085D-10
34	1650.00 [ft]	0.0000D+00	0.0000D+00	4.2004D-11	4.6276D-11	5.0662D-11
35	1700.00 [ft]	0.0000D+00	0.0000D+00	7.0135D-12	7.7271D-12	8.4606D-12
36	1750.00 [ft]	0.0000D+00	0.0000D+00	1.1266D-12	1.2412D-12	1.3592D-12
37	1800.00 [ft]	0.0000D+00	0.0000D+00	1.7470D-13	1.9249D-13	2.1082D-13
38	1850.00 [ft]	0.0000D+00	0.0000D+00	2.6254D-14	2.8929D-14	3.1688D-14
39	1900.00 [ft]	0.0000D+00	0.0000D+00	3.8380D-15	4.2293D-15	4.6333D-15
40	1950.00 [ft]	0.0000D+00	0.0000D+00	5.4786D-16	6.0375D-16	6.6153D-16
41	2000.00 [ft]	0.0000D+00	0.0000D+00	7.6653D-17	8.4477D-17	9.2577D-17
42	2050.00 [ft]	0.0000D+00	0.0000D+00	1.0550D-17	1.1628D-17	1.2745D-17
43	2100.00 [ft]	0.0000D+00	0.0000D+00	1.4336D-18	1.5801D-18	1.7322D-18
44	2150.00 [ft]	0.0000D+00	0.0000D+00	1.9294D-19	2.1267D-19	2.3318D-19
45	2200.00 [ft]	0.0000D+00	0.0000D+00	2.5801D-20	2.8441D-20	3.1190D-20
46	2250.00 [ft]	0.0000D+00	0.0000D+00	3.4380D-21	3.7901D-21	4.1572D-21
47	2300.00 [ft]	0.0000D+00	0.0000D+00	4.5774D-22	5.0464D-22	5.5363D-22
48	2350.00 [ft]	0.0000D+00	0.0000D+00	6.1041D-23	6.7299D-23	7.3846D-23
49	2400.00 [ft]	0.0000D+00	0.0000D+00	8.1708D-24	9.0091D-24	9.8873D-24

ROW\COLUMN		6	7	8	9	10
	[ft]	150.00	200.00	250.00	300.00	350.00
1	0.00 [ft]	6.7803D+01	7.4314D+01	8.1699D+01	5.2541D+01	5.3030D+01
2	50.00 [ft]	8.4444D+01	8.7779D+01	8.9828D+01	9.0570D+01	9.0029D+01
3	100.00 [ft]	1.4846D+02	1.5130D+02	1.5166D+02	1.4992D+02	1.4641D+02
4	150.00 [ft]	2.5236D+02	2.4523D+02	2.3560D+02	2.2460D+02	2.1286D+02
5	200.00 [ft]	2.4741D+02	3.3905D+02	3.1072D+02	2.8603D+02	2.6397D+02
6	250.00 [ft]	2.4741D+02	3.3905D+02	3.1072D+02	2.8603D+02	2.6397D+02
7	300.00 [ft]	2.5236D+02	2.4523D+02	2.3560D+02	2.2460D+02	2.1286D+02
8	350.00 [ft]	1.4846D+02	1.5130D+02	1.5166D+02	1.4992D+02	1.4641D+02
9	400.00 [ft]	8.4444D+01	8.7779D+01	8.9828D+01	9.0570D+01	9.0029D+01
10	450.00 [ft]	6.7803D+01	7.4314D+01	8.1699D+01	5.2541D+01	5.3030D+01
11	500.00 [ft]	4.6907D+01	5.2629D+01	5.9589D+01	3.0399D+01	3.1427D+01
12	550.00 [ft]	1.4040D+01	1.4971D+01	1.5805D+01	1.6524D+01	1.7276D+01
13	600.00 [ft]	7.2835D+00	7.7910D+00	8.2580D+00	8.6744D+00	9.0315D+00

14	650.00 [ft]	3.6035D+00	3.8630D+00	4.1058D+00	4.3269D+00	4.5218D+00
15	700.00 [ft]	1.7090D+00	1.8350D+00	1.9543D+00	2.0645D+00	2.1634D+00
16	750.00 [ft]	7.7464D-01	8.3274D-01	8.8819D-01	9.3996D-01	9.8705D-01
17	800.00 [ft]	3.3472D-01	3.6015D-01	3.8458D-01	4.0756D-01	4.2867D-01
18	850.00 [ft]	1.3760D-01	1.4816D-01	1.5836D-01	1.6800D-01	1.7693D-01
19	900.00 [ft]	5.3729D-02	5.7885D-02	6.1912D-02	6.5740D-02	6.9302D-02
20	950.00 [ft]	1.9898D-02	2.1447D-02	2.2953D-02	2.4389D-02	2.5731D-02
21	1000.00 [ft]	6.9815D-03	7.5278D-03	8.0599D-03	8.5692D-03	9.0470D-03
22	1050.00 [ft]	2.3183D-03	2.5005D-03	2.6783D-03	2.8489D-03	3.0095D-03
23	1100.00 [ft]	7.2806D-04	7.8547D-04	8.4160D-04	8.9557D-04	9.4648D-04
24	1150.00 [ft]	2.1610D-04	2.3319D-04	2.4993D-04	2.6604D-04	2.8128D-04
25	1200.00 [ft]	6.0600D-05	6.5406D-05	7.0117D-05	7.4661D-05	7.8965D-05
26	1250.00 [ft]	1.6053D-05	1.7330D-05	1.8582D-05	1.9792D-05	2.0939D-05
27	1300.00 [ft]	4.0180D-06	4.3381D-06	4.6526D-06	4.9568D-06	5.2458D-06
28	1350.00 [ft]	9.5061D-07	1.0265D-06	1.1012D-06	1.1734D-06	1.2422D-06
29	1400.00 [ft]	2.1277D-07	2.2980D-07	2.4656D-07	2.6282D-07	2.7831D-07
30	1450.00 [ft]	4.5112D-08	4.8730D-08	5.2297D-08	5.5759D-08	5.9065D-08
31	1500.00 [ft]	9.0749D-09	9.8046D-09	1.0525D-08	1.1225D-08	1.1894D-08
32	1550.00 [ft]	1.7356D-09	1.8756D-09	2.0138D-09	2.1485D-09	2.2774D-09
33	1600.00 [ft]	3.1637D-10	3.4196D-10	3.6727D-10	3.9196D-10	4.1566D-10
34	1650.00 [ft]	5.5118D-11	5.9589D-11	6.4020D-11	6.8349D-11	7.2515D-11
35	1700.00 [ft]	9.2063D-12	9.9558D-12	1.0700D-11	1.1428D-11	1.2131D-11
36	1750.00 [ft]	1.4793D-12	1.6002D-12	1.7204D-12	1.8384D-12	1.9525D-12
37	1800.00 [ft]	2.2950D-13	2.4833D-13	2.6710D-13	2.8555D-13	3.0344D-13
38	1850.00 [ft]	3.4504D-14	3.7348D-14	4.0187D-14	4.2986D-14	4.5708D-14
39	1900.00 [ft]	5.0463D-15	5.4642D-15	5.8822D-15	6.2954D-15	6.6985D-15
40	1950.00 [ft]	7.2069D-16	7.8066D-16	8.4079D-16	9.0038D-16	9.5870D-16
41	2000.00 [ft]	1.0089D-16	1.0932D-16	1.1780D-16	1.2623D-16	1.3450D-16
42	2050.00 [ft]	1.3893D-17	1.5061D-17	1.6237D-17	1.7410D-17	1.8565D-17
43	2100.00 [ft]	1.8887D-18	2.0484D-18	2.2096D-18	2.3707D-18	2.5299D-18
44	2150.00 [ft]	2.5434D-19	2.7595D-19	2.9782D-19	3.1975D-19	3.4149D-19
45	2200.00 [ft]	3.4029D-20	3.6937D-20	3.9887D-20	4.2852D-20	4.5802D-20
46	2250.00 [ft]	4.5371D-21	4.9268D-21	5.3233D-21	5.7229D-21	6.1217D-21
47	2300.00 [ft]	6.0440D-22	6.5661D-22	7.0984D-22	7.6364D-22	8.1751D-22
48	2350.00 [ft]	8.0643D-23	8.7646D-23	9.4804D-23	1.0206D-22	1.0935D-22
49	2400.00 [ft]	1.0801D-23	1.1744D-23	1.2710D-23	1.3691D-23	1.4681D-23

ROW\COLUMN	11	12	13	14	15
[ft]	400.00	450.00	500.00	550.00	600.00

1	0.00 [ft]	5.2812D+01	5.1882D+01	9.6724D+01	1.1268D+02	5.2093D+01
2	50.00 [ft]	8.8249D+01	8.5281D+01	1.2766D+02	1.4075D+02	7.6936D+01

3	100.00 [ft]	1.4144D+02	1.3522D+02	1.2792D+02	1.1965D+02	1.1047D+02
4	150.00 [ft]	2.0067D+02	1.8818D+02	1.7544D+02	1.6246D+02	1.4918D+02
5	200.00 [ft]	2.4383D+02	2.2511D+02	2.0739D+02	1.9037D+02	1.7378D+02
6	250.00 [ft]	2.4383D+02	2.2511D+02	2.0739D+02	1.9037D+02	1.7378D+02
7	300.00 [ft]	2.0067D+02	1.8818D+02	1.7544D+02	1.6246D+02	1.4918D+02
8	350.00 [ft]	1.4144D+02	1.3522D+02	1.2792D+02	1.1965D+02	1.1047D+02
9	400.00 [ft]	8.8249D+01	8.5281D+01	1.2766D+02	1.4075D+02	7.6936D+01
10	450.00 [ft]	5.2812D+01	5.1882D+01	9.6724D+01	1.1268D+02	5.2093D+01
11	500.00 [ft]	3.2009D+01	3.2295D+01	3.2290D+01	3.2008D+01	3.1468D+01
12	550.00 [ft]	1.7731D+01	1.8037D+01	1.8190D+01	1.8191D+01	1.8046D+01
13	600.00 [ft]	9.3218D+00	9.5398D+00	9.6819D+00	9.7463D+00	9.7333D+00
14	650.00 [ft]	4.6863D+00	4.8173D+00	4.9123D+00	4.9695D+00	4.9884D+00
15	700.00 [ft]	2.2490D+00	2.3196D+00	2.3739D+00	2.4107D+00	2.4295D+00
16	750.00 [ft]	1.0285D+00	1.0635D+00	1.0914D+00	1.1117D+00	1.1238D+00
17	800.00 [ft]	4.4749D-01	4.6366D-01	4.7686D-01	4.8683D-01	4.9338D-01
18	850.00 [ft]	1.8496D-01	1.9195D-01	1.9776D-01	2.0227D-01	2.0540D-01
19	900.00 [ft]	7.2532D-02	7.5369D-02	7.7758D-02	7.9652D-02	8.1015D-02
20	950.00 [ft]	2.6956D-02	2.8039D-02	2.8961D-02	2.9703D-02	3.0252D-02
21	1000.00 [ft]	9.4848D-03	9.8745D-03	1.0209D-02	1.0481D-02	1.0686D-02
22	1050.00 [ft]	3.1571D-03	3.2891D-03	3.4031D-03	3.4969D-03	3.5686D-03
23	1100.00 [ft]	9.9344D-04	1.0356D-03	1.0722D-03	1.1026D-03	1.1261D-03
24	1150.00 [ft]	2.9537D-04	3.0807D-04	3.1915D-04	3.2839D-04	3.3561D-04
25	1200.00 [ft]	8.2956D-05	8.6562D-05	8.9719D-05	9.2368D-05	9.4457D-05
26	1250.00 [ft]	2.2006D-05	2.2972D-05	2.3821D-05	2.4537D-05	2.5106D-05
27	1300.00 [ft]	5.5149D-06	5.7593D-06	5.9747D-06	6.1572D-06	6.3034D-06
28	1350.00 [ft]	1.3064D-06	1.3648D-06	1.4165D-06	1.4605D-06	1.4959D-06
29	1400.00 [ft]	2.9279D-07	3.0600D-07	3.1773D-07	3.2775D-07	3.3588D-07
30	1450.00 [ft]	6.2160D-08	6.4993D-08	6.7515D-08	6.9680D-08	7.1450D-08
31	1500.00 [ft]	1.2522D-08	1.3099D-08	1.3614D-08	1.4059D-08	1.4424D-08
32	1550.00 [ft]	2.3988D-09	2.5105D-09	2.6106D-09	2.6975D-09	2.7695D-09
33	1600.00 [ft]	4.3801D-10	4.5865D-10	4.7724D-10	4.9345D-10	5.0699D-10
34	1650.00 [ft]	7.6455D-11	8.0105D-11	8.3406D-11	8.6302D-11	8.8743D-11
35	1700.00 [ft]	1.2797D-11	1.3417D-11	1.3980D-11	1.4477D-11	1.4899D-11
36	1750.00 [ft]	2.0610D-12	2.1623D-12	2.2548D-12	2.3370D-12	2.4076D-12
37	1800.00 [ft]	3.2053D-13	3.3654D-13	3.5124D-13	3.6439D-13	3.7577D-13
38	1850.00 [ft]	4.8316D-14	5.0771D-14	5.3037D-14	5.5078D-14	5.6862D-14
39	1900.00 [ft]	7.0861D-15	7.4526D-15	7.7927D-15	8.1013D-15	8.3735D-15
40	1950.00 [ft]	1.0150D-15	1.0684D-15	1.1183D-15	1.1639D-15	1.2045D-15
41	2000.00 [ft]	1.4252D-16	1.5017D-16	1.5734D-16	1.6395D-16	1.6988D-16
42	2050.00 [ft]	1.9688D-17	2.0765D-17	2.1782D-17	2.2724D-17	2.3577D-17
43	2100.00 [ft]	2.6853D-18	2.8351D-18	2.9772D-18	3.1098D-18	3.2310D-18
44	2150.00 [ft]	3.6280D-19	3.8342D-19	4.0311D-19	4.2159D-19	4.3863D-19
45	2200.00 [ft]	4.8705D-20	5.1527D-20	5.4235D-20	5.6794D-20	5.9172D-20
46	2250.00 [ft]	6.5157D-21	6.9004D-21	7.2715D-21	7.6245D-21	7.9549D-21
47	2300.00 [ft]	8.7092D-22	9.2331D-22	9.7410D-22	1.0227D-21	1.0685D-21

48	2350.00 [ft]	1.1660D-22	1.2374D-22	1.3070D-22	1.3740D-22	1.4376D-22
49	2400.00 [ft]	1.5668D-23	1.6646D-23	1.7602D-23	1.8528D-23	1.9412D-23

ROW\COLUMN		16	17	18	19	20
	[ft]	650.00	700.00	750.00	800.00	850.00
1	0.00 [ft]	5.0564D+01	4.8460D+01	4.6123D+01	4.4004D+01	4.1369D+01
2	50.00 [ft]	1.3354D+02	7.3289D+01	6.8989D+01	6.4941D+01	6.0437D+01
3	100.00 [ft]	1.6246D+02	9.7400D+01	1.6913D+02	8.8539D+01	8.1616D+01
4	150.00 [ft]	1.3555D+02	1.2149D+02	1.8800D+02	1.9263D+02	1.0101D+02
5	200.00 [ft]	1.5740D+02	1.4102D+02	1.2449D+02	2.7917D+02	1.1272D+02
6	250.00 [ft]	1.5740D+02	1.4102D+02	1.2449D+02	2.7917D+02	1.1272D+02
7	300.00 [ft]	1.3555D+02	1.2149D+02	1.8800D+02	1.9263D+02	1.0101D+02
8	350.00 [ft]	1.6246D+02	9.7400D+01	1.6913D+02	8.8539D+01	8.1616D+01
9	400.00 [ft]	1.3354D+02	7.3289D+01	6.8989D+01	6.4941D+01	6.0437D+01
10	450.00 [ft]	5.0564D+01	4.8460D+01	4.6123D+01	4.4004D+01	4.1369D+01
11	500.00 [ft]	3.0983D+01	3.0008D+01	2.8857D+01	2.7558D+01	2.6143D+01
12	550.00 [ft]	1.7762D+01	1.7350D+01	1.6823D+01	1.6196D+01	1.5484D+01
13	600.00 [ft]	9.6450D+00	9.4850D+00	9.2587D+00	8.9723D+00	8.6330D+00
14	650.00 [ft]	4.9691D+00	4.9128D+00	4.8212D+00	4.6971D+00	4.5434D+00
15	700.00 [ft]	2.4301D+00	2.4126D+00	2.3778D+00	2.3266D+00	2.2603D+00
16	750.00 [ft]	1.1277D+00	1.1234D+00	1.1110D+00	1.0909D+00	1.0635D+00
17	800.00 [ft]	4.9639D-01	4.9582D-01	4.9171D-01	4.8419D-01	4.7342D-01
18	850.00 [ft]	2.0708D-01	2.0730D-01	2.0605D-01	2.0337D-01	1.9933D-01
19	900.00 [ft]	8.1820D-02	8.2052D-02	8.1710D-02	8.0804D-02	7.9355D-02
20	950.00 [ft]	3.0595D-02	3.0728D-02	3.0647D-02	3.0356D-02	2.9861D-02
21	1000.00 [ft]	1.0820D-02	1.0880D-02	1.0866D-02	1.0777D-02	1.0617D-02
22	1050.00 [ft]	3.6170D-03	3.6409D-03	3.6401D-03	3.6145D-03	3.5648D-03
23	1100.00 [ft]	1.1423D-03	1.1509D-03	1.1517D-03	1.1447D-03	1.1302D-03
24	1150.00 [ft]	3.4069D-04	3.4352D-04	3.4404D-04	3.4226D-04	3.3821D-04
25	1200.00 [ft]	9.5949D-05	9.6812D-05	9.7032D-05	9.6605D-05	9.5541D-05
26	1250.00 [ft]	2.5517D-05	2.5763D-05	2.5840D-05	2.5745D-05	2.5480D-05
27	1300.00 [ft]	6.4103D-06	6.4762D-06	6.4996D-06	6.4802D-06	6.4184D-06
28	1350.00 [ft]	1.5222D-06	1.5387D-06	1.5453D-06	1.5418D-06	1.5282D-06
29	1400.00 [ft]	3.4197D-07	3.4591D-07	3.4763D-07	3.4708D-07	3.4429D-07
30	1450.00 [ft]	7.2791D-08	7.3678D-08	7.4096D-08	7.4036D-08	7.3502D-08
31	1500.00 [ft]	1.4705D-08	1.4895D-08	1.4991D-08	1.4991D-08	1.4896D-08
32	1550.00 [ft]	2.8254D-09	2.8642D-09	2.8851D-09	2.8878D-09	2.8723D-09
33	1600.00 [ft]	5.1764D-10	5.2520D-10	5.2953D-10	5.3056D-10	5.2827D-10
34	1650.00 [ft]	9.0687D-11	9.2098D-11	9.2953D-11	9.3235D-11	9.2942D-11
35	1700.00 [ft]	1.5240D-11	1.5494D-11	1.5655D-11	1.5721D-11	1.5692D-11
36	1750.00 [ft]	2.4652D-12	2.5090D-12	2.5382D-12	2.5523D-12	2.5511D-12

37	1800.00 [ft]	3.8521D-13	3.9253D-13	3.9762D-13	4.0039D-13	4.0080D-13
38	1850.00 [ft]	5.8360D-14	5.9547D-14	6.0403D-14	6.0915D-14	6.1074D-14
39	1900.00 [ft]	8.6050D-15	8.7921D-15	8.9317D-15	9.0217D-15	9.0606D-15
40	1950.00 [ft]	1.2395D-15	1.2683D-15	1.2904D-15	1.3056D-15	1.3135D-15
41	2000.00 [ft]	1.7506D-16	1.7939D-16	1.8282D-16	1.8529D-16	1.8676D-16
42	2050.00 [ft]	2.4330D-17	2.4972D-17	2.5491D-17	2.5882D-17	2.6137D-17
43	2100.00 [ft]	3.3391D-18	3.4326D-18	3.5100D-18	3.5703D-18	3.6125D-18
44	2150.00 [ft]	4.5399D-19	4.6745D-19	4.7883D-19	4.8796D-19	4.9471D-19
45	2200.00 [ft]	6.1338D-20	6.3261D-20	6.4915D-20	6.6277D-20	6.7329D-20
46	2250.00 [ft]	8.2587D-21	8.5317D-21	8.7703D-21	8.9714D-21	9.1321D-21
47	2300.00 [ft]	1.1110D-21	1.1497D-21	1.1839D-21	1.2134D-21	1.2376D-21
48	2350.00 [ft]	1.4970D-22	1.5516D-22	1.6007D-22	1.6436D-22	1.6798D-22
49	2400.00 [ft]	2.0246D-23	2.1019D-23	2.1722D-23	2.2346D-23	2.2883D-23

ROW\COLUMN	21	22	23	24	25
[ft]	900.00	950.00	1000.00	1050.00	1100.00
1	0.00 [ft]	3.8661D+01	3.5921D+01	3.3186D+01	3.0488D+01	2.7854D+01
2	50.00 [ft]	5.6424D+01	5.1983D+01	4.7652D+01	4.3465D+01	3.9450D+01
3	100.00 [ft]	7.5353D+01	6.9393D+01	6.3145D+01	5.7213D+01	5.1615D+01
4	150.00 [ft]	9.2045D+01	8.4082D+01	7.6629D+01	6.9066D+01	6.2014D+01
5	200.00 [ft]	1.0232D+02	9.2534D+01	8.3965D+01	7.6015D+01	6.8076D+01
6	250.00 [ft]	1.0232D+02	9.2534D+01	8.3965D+01	7.6015D+01	6.8076D+01
7	300.00 [ft]	9.2045D+01	8.4082D+01	7.6629D+01	6.9066D+01	6.2014D+01
8	350.00 [ft]	7.5353D+01	6.9393D+01	6.3145D+01	5.7213D+01	5.1615D+01
9	400.00 [ft]	5.6424D+01	5.1983D+01	4.7652D+01	4.3465D+01	3.9450D+01
10	450.00 [ft]	3.8661D+01	3.5921D+01	3.3186D+01	3.0488D+01	2.7854D+01
11	500.00 [ft]	2.4640D+01	2.3077D+01	2.1479D+01	1.9871D+01	1.8274D+01
12	550.00 [ft]	1.4702D+01	1.3867D+01	1.2995D+01	1.2099D+01	1.1194D+01
13	600.00 [ft]	8.2488D+00	7.8279D+00	7.3785D+00	6.9091D+00	6.4274D+00
14	650.00 [ft]	4.3639D+00	4.1625D+00	3.9433D+00	3.7105D+00	3.4682D+00
15	700.00 [ft]	2.1803D+00	2.0886D+00	1.9870D+00	1.8775D+00	1.7621D+00
16	750.00 [ft]	1.0296D+00	9.8982D-01	9.4502D-01	8.9610D-01	8.4396D-01
17	800.00 [ft]	4.5966D-01	4.4322D-01	4.2442D-01	4.0365D-01	3.8129D-01
18	850.00 [ft]	1.9401D-01	1.8753D-01	1.8003D-01	1.7165D-01	1.6255D-01
19	900.00 [ft]	7.7395D-02	7.4966D-02	7.2119D-02	6.8909D-02	6.5397D-02
20	950.00 [ft]	2.9174D-02	2.8308D-02	2.7281D-02	2.6114D-02	2.4828D-02
21	1000.00 [ft]	1.0387D-02	1.0094D-02	9.7425D-03	9.3402D-03	8.8945D-03
22	1050.00 [ft]	3.4921D-03	3.3978D-03	3.2839D-03	3.1525D-03	3.0062D-03
23	1100.00 [ft]	1.1083D-03	1.0796D-03	1.0445D-03	1.0039D-03	9.5849D-04
24	1150.00 [ft]	3.3198D-04	3.2370D-04	3.1352D-04	3.0165D-04	2.8830D-04
25	1200.00 [ft]	9.3861D-05	9.1600D-05	8.8803D-05	8.5523D-05	8.1821D-05

26	1250.00	[ft]	2.5052D-05	2.4470D-05	2.3743D-05	2.2887D-05	2.1917D-05
27	1300.00	[ft]	6.3156D-06	6.1737D-06	5.9955D-06	5.7846D-06	5.5447D-06
28	1350.00	[ft]	1.5049D-06	1.4723D-06	1.4311D-06	1.3820D-06	1.3259D-06
29	1400.00	[ft]	3.3932D-07	3.3226D-07	3.2324D-07	3.1245D-07	3.0009D-07
30	1450.00	[ft]	7.2503D-08	7.1059D-08	6.9199D-08	6.6958D-08	6.4377D-08
31	1500.00	[ft]	1.4708D-08	1.4429D-08	1.4067D-08	1.3626D-08	1.3116D-08
32	1550.00	[ft]	2.8389D-09	2.7882D-09	2.7212D-09	2.6393D-09	2.5438D-09
33	1600.00	[ft]	5.2271D-10	5.1400D-10	5.0231D-10	4.8784D-10	4.7086D-10
34	1650.00	[ft]	9.2080D-11	9.0665D-11	8.8726D-11	8.6298D-11	8.3425D-11
35	1700.00	[ft]	1.5568D-11	1.5351D-11	1.5045D-11	1.4657D-11	1.4193D-11
36	1750.00	[ft]	2.5346D-12	2.5032D-12	2.4575D-12	2.3983D-12	2.3267D-12
37	1800.00	[ft]	3.9884D-13	3.9457D-13	3.8805D-13	3.7941D-13	3.6880D-13
38	1850.00	[ft]	6.0880D-14	6.0335D-14	5.9451D-14	5.8243D-14	5.6734D-14
39	1900.00	[ft]	9.0479D-15	8.9840D-15	8.8701D-15	8.7083D-15	8.5014D-15
40	1950.00	[ft]	1.3141D-15	1.3075D-15	1.2936D-15	1.2728D-15	1.2454D-15
41	2000.00	[ft]	1.8722D-16	1.8665D-16	1.8507D-16	1.8251D-16	1.7902D-16
42	2050.00	[ft]	2.6253D-17	2.6229D-17	2.6066D-17	2.5767D-17	2.5336D-17
43	2100.00	[ft]	3.6361D-18	3.6407D-18	3.6264D-18	3.5934D-18	3.5423D-18
44	2150.00	[ft]	4.9899D-19	5.0073D-19	4.9993D-19	4.9659D-19	4.9079D-19
45	2200.00	[ft]	6.8055D-20	6.8446D-20	6.8497D-20	6.8209D-20	6.7588D-20
46	2250.00	[ft]	9.2503D-21	9.3244D-21	9.3536D-21	9.3375D-21	9.2766D-21
47	2300.00	[ft]	1.2563D-21	1.2692D-21	1.2762D-21	1.2772D-21	1.2722D-21
48	2350.00	[ft]	1.7088D-22	1.7303D-22	1.7439D-22	1.7496D-22	1.7473D-22
49	2400.00	[ft]	2.3328D-23	2.3674D-23	2.3917D-23	2.4054D-23	2.4084D-23

ROW\COLUMN		26	27
	[ft]	1150.00	1200.00
1	0.00 [ft]	2.5310D+01	2.2874D+01
2	50.00 [ft]	3.5629D+01	3.2019D+01
3	100.00 [ft]	4.6359D+01	4.1454D+01
4	150.00 [ft]	5.5464D+01	4.9405D+01
5	200.00 [ft]	6.0744D+01	5.3995D+01
6	250.00 [ft]	6.0744D+01	5.3995D+01
7	300.00 [ft]	5.5464D+01	4.9405D+01
8	350.00 [ft]	4.6359D+01	4.1454D+01
9	400.00 [ft]	3.5629D+01	3.2019D+01
10	450.00 [ft]	2.5310D+01	2.2874D+01
11	500.00 [ft]	1.6707D+01	1.5185D+01
12	550.00 [ft]	1.0293D+01	9.4067D+00
13	600.00 [ft]	5.9408D+00	5.4563D+00
14	650.00 [ft]	3.2205D+00	2.9710D+00

15	700.00 [ft]	1.6428D+00	1.5215D+00
16	750.00 [ft]	7.8953D-01	7.3369D-01
17	800.00 [ft]	3.5775D-01	3.3342D-01
18	850.00 [ft]	1.5290D-01	1.4286D-01
19	900.00 [ft]	6.1647D-02	5.7723D-02
20	950.00 [ft]	2.3448D-02	2.1997D-02
21	1000.00 [ft]	8.4134D-03	7.9054D-03
22	1050.00 [ft]	2.8475D-03	2.6794D-03
23	1100.00 [ft]	9.0903D-04	8.5643D-04
24	1150.00 [ft]	2.7373D-04	2.5818D-04
25	1200.00 [ft]	7.7766D-05	7.3427D-05
26	1250.00 [ft]	2.0852D-05	1.9708D-05
27	1300.00 [ft]	5.2803D-06	4.9958D-06
28	1350.00 [ft]	1.2640D-06	1.1971D-06
29	1400.00 [ft]	2.8636D-07	2.7152D-07
30	1450.00 [ft]	6.1503D-08	5.8384D-08
31	1500.00 [ft]	1.2546D-08	1.1926D-08
32	1550.00 [ft]	2.4366D-09	2.3194D-09
33	1600.00 [ft]	4.5168D-10	4.3063D-10
34	1650.00 [ft]	8.0158D-11	7.6552D-11
35	1700.00 [ft]	1.3662D-11	1.3072D-11
36	1750.00 [ft]	2.2439D-12	2.1513D-12
37	1800.00 [ft]	3.5641D-13	3.4245D-13
38	1850.00 [ft]	5.4949D-14	5.2918D-14
39	1900.00 [ft]	8.2530D-15	7.9672D-15
40	1950.00 [ft]	1.2120D-15	1.1730D-15
41	2000.00 [ft]	1.7465D-16	1.6947D-16
42	2050.00 [ft]	2.4782D-17	2.4112D-17
43	2100.00 [ft]	3.4739D-18	3.3894D-18
44	2150.00 [ft]	4.8262D-19	4.7220D-19
45	2200.00 [ft]	6.6643D-20	6.5390D-20
46	2250.00 [ft]	9.1719D-21	9.0252D-21
47	2300.00 [ft]	1.2613D-21	1.2446D-21
48	2350.00 [ft]	1.7370D-22	1.7189D-22
49	2400.00 [ft]	2.4007D-23	2.3824D-23

INPUT FILE FOR PLUME.EXE: EPCAL9S1.INP

```
0  (US UNITS)
0.092 20 0.42 250 25 20 0.0 0     (V,B,POROS,ALONG,ALAT,RD,LAMBDA,THETA)
0  1  540                        (X0,Y0,T0)
50 50  100                        (DX,DY,DT)
33 33  1                         (NX,NY,NT)
5                                (NUMBER OF SOURCES)
0 800 .0214 0  68       (XS,YS,STRENGTH, T_START, T_END)
0 900 .0214 0  68
0 1000 .0214 0  68
300 850 .08 0  68
300 950 .08 0  68
```

OUTPUT FILE FOR PLUME.EXE: EPCAL9S1.OUT

```
OUTPUT FROM 2D-PLUME GROUNDWATER TRANSPORT MODEL
BASED ON A PAPER BY: WILSON AND MILLER,
IN: ASCE J. HYDRAULICS, V. 104, NO. HY4, APRIL, 1978
PROGRAMMED BY C.H. WAGONER, ICF TECHNOLOGY, 9/92


GROUNDWATER SEEPAGE VELOCITY      .9200E-01[FT/DAY]
AQUIFER THICKNESS =                 20.    [FT]
POROSITY =                         .4200
LONGITUDINAL DISPERSIVITY =        250.0    [FT]
LATERAL DISPERSIVITY =             25.00    [FT]
RETARDATION FACTOR =               20.00
DECAY RATE =                       .0000    [PER DAY]
FLOW ANGLE WRT X-AXIS =            .0000    [DEGREES]


NUMBER OF POINT SOURCES =      5
X-COORD     Y-COORD     STRENGTH   START      END
 [FT]       [FT]       [LB/DAY]   [YR]       [YR]
-------------------------------------------------------
  .000       800.       .214E-01   .000       68.0
  .000       900.       .214E-01   .000       68.0
  .000       .100E+04   .214E-01   .000       68.0
 300.        850.       .800E-01   .000       68.0
 300.        950.       .800E-01   .000       68.0

OBSERVATION GRID PARAMETERS:

X-COORDINATE OF GRID ORIGIN =          .0000    [FT]
Y-COORDINATE OF GRID ORIGIN =         1.000     [FT]
FIRST TIME FOR CALCULATIONS =         540.0     [YR]
X-COORDINATE INCREMENT =              50.00     [FT]
Y-COORDINATE INCREMENT =              50.00     [FT]
TIME INCREMENT FOR CALCULATIONS =     100.0     [YR]
NUMBER OF NODES IN X-DIRECTION =         33
NUMBER OF NODES IN Y-DIRECTION =         33
NUMBER OF TIMES TO MAKE CALCULATIONS =    1


**********  RESULTS  **********
X-COORD      Y-COORD      TIME     CONCENTRATION
 [FT]         [FT]        [YR]        [MG/L]
.0000E+00   .1000E+01   .5400E+03   .3228E-04
.0000E+00   .5100E+02   .5400E+03   .8180E-04
```

.0000E+00	.1010E+03	.5400E+03	.1962E-03
.0000E+00	.1510E+03	.5400E+03	.4456E-03
.0000E+00	.2010E+03	.5400E+03	.9580E-03
.0000E+00	.2510E+03	.5400E+03	.1950E-02
.0000E+00	.3010E+03	.5400E+03	.3761E-02
.0000E+00	.3510E+03	.5400E+03	.6870E-02
.0000E+00	.4010E+03	.5400E+03	.1190E-01
.0000E+00	.4510E+03	.5400E+03	.1953E-01
.0000E+00	.5010E+03	.5400E+03	.3045E-01
.0000E+00	.5510E+03	.5400E+03	.4511E-01
.0000E+00	.6010E+03	.5400E+03	.6365E-01
.0000E+00	.6510E+03	.5400E+03	.8585E-01
.0000E+00	.7010E+03	.5400E+03	.1115E+00
.0000E+00	.7510E+03	.5400E+03	.1425E+00
.0000E+00	.8010E+03	.5400E+03	.3426E+00
.0000E+00	.8510E+03	.5400E+03	.1884E+00
.0000E+00	.9010E+03	.5400E+03	.3655E+00
.0000E+00	.9510E+03	.5400E+03	.1879E+00
.0000E+00	.1001E+04	.5400E+03	.3417E+00
.0000E+00	.1051E+04	.5400E+03	.1410E+00
.0000E+00	.1101E+04	.5400E+03	.1104E+00
.0000E+00	.1151E+04	.5400E+03	.8489E-01
.0000E+00	.1201E+04	.5400E+03	.6284E-01
.0000E+00	.1251E+04	.5400E+03	.4445E-01
.0000E+00	.1301E+04	.5400E+03	.2994E-01
.0000E+00	.1351E+04	.5400E+03	.1917E-01
.0000E+00	.1401E+04	.5400E+03	.1165E-01
.0000E+00	.1451E+04	.5400E+03	.6713E-02
.0000E+00	.1501E+04	.5400E+03	.3667E-02
.0000E+00	.1551E+04	.5400E+03	.1898E-02
.0000E+00	.1601E+04	.5400E+03	.9301E-03
.5000E+02	.1000E+01	.5400E+03	.3609E-04
.5000E+02	.5100E+02	.5400E+03	.9149E-04
.5000E+02	.1010E+03	.5400E+03	.2195E-03
.5000E+02	.1510E+03	.5400E+03	.4988E-03
.5000E+02	.2010E+03	.5400E+03	.1073E-02
.5000E+02	.2510E+03	.5400E+03	.2185E-02
.5000E+02	.3010E+03	.5400E+03	.4215E-02
.5000E+02	.3510E+03	.5400E+03	.7702E-02
.5000E+02	.4010E+03	.5400E+03	.1334E-01
.5000E+02	.4510E+03	.5400E+03	.2192E-01
.5000E+02	.5010E+03	.5400E+03	.3417E-01
.5000E+02	.5510E+03	.5400E+03	.5065E-01
.5000E+02	.6010E+03	.5400E+03	.7149E-01
.5000E+02	.6510E+03	.5400E+03	.9647E-01
.5000E+02	.7010E+03	.5400E+03	.1254E+00
.5000E+02	.7510E+03	.5400E+03	.1601E+00
.5000E+02	.8010E+03	.5400E+03	.2116E+00
.5000E+02	.8510E+03	.5400E+03	.2139E+00
.5000E+02	.9010E+03	.5400E+03	.2389E+00
.5000E+02	.9510E+03	.5400E+03	.2133E+00
.5000E+02	.1001E+04	.5400E+03	.2105E+00
.5000E+02	.1051E+04	.5400E+03	.1585E+00
.5000E+02	.1101E+04	.5400E+03	.1241E+00
.5000E+02	.1151E+04	.5400E+03	.9539E-01
.5000E+02	.1201E+04	.5400E+03	.7058E-01
.5000E+02	.1251E+04	.5400E+03	.4990E-01
.5000E+02	.1301E+04	.5400E+03	.3360E-01
.5000E+02	.1351E+04	.5400E+03	.2151E-01
.5000E+02	.1401E+04	.5400E+03	.1306E-01
.5000E+02	.1451E+04	.5400E+03	.7526E-02
.5000E+02	.1501E+04	.5400E+03	.4110E-02
.5000E+02	.1551E+04	.5400E+03	.2126E-02
.5000E+02	.1601E+04	.5400E+03	.1042E-02
.1000E+03	.1000E+01	.5400E+03	.4012E-04
.1000E+03	.5100E+02	.5400E+03	.1018E-03
.1000E+03	.1010E+03	.5400E+03	.2443E-03
.1000E+03	.1510E+03	.5400E+03	.5553E-03
.1000E+03	.2010E+03	.5400E+03	.1195E-02
.1000E+03	.2510E+03	.5400E+03	.2434E-02
.1000E+03	.3010E+03	.5400E+03	.4698E-02
.1000E+03	.3510E+03	.5400E+03	.8589E-02
.1000E+03	.4010E+03	.5400E+03	.1488E-01
.1000E+03	.4510E+03	.5400E+03	.2445E-01
.1000E+03	.5010E+03	.5400E+03	.3814E-01
.1000E+03	.5510E+03	.5400E+03	.5655E-01

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.1000E+03	.8510E+03	.5400E+03	.2415E+00
.1000E+03	.9010E+03	.5400E+03	.2541E+00
.1000E+03	.9510E+03	.5400E+03	.2408E+00
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.9500E+03	.1201E+04	.5400E+03	.2216E+00
.9500E+03	.1251E+04	.5400E+03	.1569E+00
.9500E+03	.1301E+04	.5400E+03	.1055E+00
.9500E+03	.1351E+04	.5400E+03	.6722E-01
.9500E+03	.1401E+04	.5400E+03	.4060E-01
.9500E+03	.1451E+04	.5400E+03	.2324E-01
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.9500E+03	.1601E+04	.5400E+03	.3146E-02
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.1000E+04	.5510E+03	.5400E+03	.1612E+00
.1000E+04	.6010E+03	.5400E+03	.2271E+00
.1000E+04	.6510E+03	.5400E+03	.3036E+00
.1000E+04	.7010E+03	.5400E+03	.3854E+00
.1000E+04	.7510E+03	.5400E+03	.4644E+00
.1000E+04	.8010E+03	.5400E+03	.5308E+00
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.1050E+04	.5510E+03	.5400E+03	.1622E+00
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.1050E+04	.7010E+03	.5400E+03	.3877E+00
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.1300E+04	.7010E+03	.5400E+03	.3687E+00
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.1400E+04	.4010E+03	.5400E+03	.3764E-01
.1400E+04	.4510E+03	.5400E+03	.6235E-01
.1400E+04	.5010E+03	.5400E+03	.9788E-01
.1400E+04	.5510E+03	.5400E+03	.1456E+00
.1400E+04	.6010E+03	.5400E+03	.2053E+00
.1400E+04	.6510E+03	.5400E+03	.2745E+00
.1400E+04	.7010E+03	.5400E+03	.3480E+00
.1400E+04	.7510E+03	.5400E+03	.4185E+00
.1400E+04	.8010E+03	.5400E+03	.4773E+00
.1400E+04	.8510E+03	.5400E+03	.5162E+00
.1400E+04	.9010E+03	.5400E+03	.5295E+00
.1400E+04	.9510E+03	.5400E+03	.5151E+00
.1400E+04	.1001E+04	.5400E+03	.4752E+00
.1400E+04	.1051E+04	.5400E+03	.4158E+00
.1400E+04	.1101E+04	.5400E+03	.3451E+00
.1400E+04	.1151E+04	.5400E+03	.2716E+00
.1400E+04	.1201E+04	.5400E+03	.2027E+00
.1400E+04	.1251E+04	.5400E+03	.1435E+00
.1400E+04	.1301E+04	.5400E+03	.9623E-01
.1400E+04	.1351E+04	.5400E+03	.6117E-01
.1400E+04	.1401E+04	.5400E+03	.3684E-01
.1400E+04	.1451E+04	.5400E+03	.2102E-01
.1400E+04	.1501E+04	.5400E+03	.1136E-01
.1400E+04	.1551E+04	.5400E+03	.5811E-02
.1400E+04	.1601E+04	.5400E+03	.2815E-02
.1450E+04	.1000E+01	.5400E+03	.8943E-04
.1450E+04	.5100E+02	.5400E+03	.2294E-03
.1450E+04	.1010E+03	.5400E+03	.5571E-03
.1450E+04	.1510E+03	.5400E+03	.1281E-02
.1450E+04	.2010E+03	.5400E+03	.2788E-02
.1450E+04	.2510E+03	.5400E+03	.5744E-02
.1450E+04	.3010E+03	.5400E+03	.1121E-01
.1450E+04	.3510E+03	.5400E+03	.2070E-01
.1450E+04	.4010E+03	.5400E+03	.3622E-01
.1450E+04	.4510E+03	.5400E+03	.6003E-01
.1450E+04	.5010E+03	.5400E+03	.9425E-01
.1450E+04	.5510E+03	.5400E+03	.1402E+00
.1450E+04	.6010E+03	.5400E+03	.1978E+00
.1450E+04	.6510E+03	.5400E+03	.2645E+00
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.1450E+04	.8010E+03	.5400E+03	.4599E+00
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.1450E+04	.1001E+04	.5400E+03	.4580E+00
.1450E+04	.1051E+04	.5400E+03	.4007E+00
.1450E+04	.1101E+04	.5400E+03	.3325E+00
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.1450E+04	.1551E+04	.5400E+03	.5586E-02
.1450E+04	.1601E+04	.5400E+03	.2705E-02

.1500E+04	.1000E+01	.5400E+03	.8535E-04
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.1500E+04	.1010E+03	.5400E+03	.5321E-03
.1500E+04	.1510E+03	.5400E+03	.1224E-02
.1500E+04	.2010E+03	.5400E+03	.2664E-02
.1500E+04	.2510E+03	.5400E+03	.5492E-02
.1500E+04	.3010E+03	.5400E+03	.1072E-01
.1500E+04	.3510E+03	.5400E+03	.1981E-01
.1500E+04	.4010E+03	.5400E+03	.3467E-01
.1500E+04	.4510E+03	.5400E+03	.5747E-01
.1500E+04	.5010E+03	.5400E+03	.9027E-01
.1500E+04	.5510E+03	.5400E+03	.1343E+00
.1500E+04	.6010E+03	.5400E+03	.1895E+00
.1500E+04	.6510E+03	.5400E+03	.2535E+00
.1500E+04	.7010E+03	.5400E+03	.3214E+00
.1500E+04	.7510E+03	.5400E+03	.3865E+00
.1500E+04	.8010E+03	.5400E+03	.4408E+00
.1500E+04	.8510E+03	.5400E+03	.4767E+00
.1500E+04	.9010E+03	.5400E+03	.4890E+00
.1500E+04	.9510E+03	.5400E+03	.4757E+00
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.1500E+04	.1201E+04	.5400E+03	.1871E+00
.1500E+04	.1251E+04	.5400E+03	.1324E+00
.1500E+04	.1301E+04	.5400E+03	.8874E-01
.1500E+04	.1351E+04	.5400E+03	.5638E-01
.1500E+04	.1401E+04	.5400E+03	.3394E-01
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.1500E+04	.1551E+04	.5400E+03	.5341E-02
.1500E+04	.1601E+04	.5400E+03	.2586E-02
.1550E+04	.1000E+01	.5400E+03	.8101E-04
.1550E+04	.5100E+02	.5400E+03	.2080E-03
.1550E+04	.1010E+03	.5400E+03	.5054E-03
.1550E+04	.1510E+03	.5400E+03	.1163E-02
.1550E+04	.2010E+03	.5400E+03	.2533E-02
.1550E+04	.2510E+03	.5400E+03	.5222E-02
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.1550E+04	.3510E+03	.5400E+03	.1885E-01
.1550E+04	.4010E+03	.5400E+03	.3300E-01
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.1550E+04	.5510E+03	.5400E+03	.1280E+00
.1550E+04	.6010E+03	.5400E+03	.1806E+00
.1550E+04	.6510E+03	.5400E+03	.2416E+00
.1550E+04	.7010E+03	.5400E+03	.3063E+00
.1550E+04	.7510E+03	.5400E+03	.3684E+00
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.1550E+04	.1001E+04	.5400E+03	.4184E+00
.1550E+04	.1051E+04	.5400E+03	.3661E+00
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.1550E+04	.1201E+04	.5400E+03	.1783E+00
.1550E+04	.1251E+04	.5400E+03	.1261E+00
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.1550E+04	.1601E+04	.5400E+03	.2458E-02
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.1600E+04	.1010E+03	.5400E+03	.4774E-03
.1600E+04	.1510E+03	.5400E+03	.1099E-02
.1600E+04	.2010E+03	.5400E+03	.2394E-02
.1600E+04	.2510E+03	.5400E+03	.4938E-02
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.1600E+04	.3510E+03	.5400E+03	.1783E-01
.1600E+04	.4010E+03	.5400E+03	.3123E-01
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.1600E+04	.5010E+03	.5400E+03	.8143E-01
.1600E+04	.5510E+03	.5400E+03	.1213E+00
.1600E+04	.6010E+03	.5400E+03	.1711E+00
.1600E+04	.6510E+03	.5400E+03	.2289E+00
.1600E+04	.7010E+03	.5400E+03	.2904E+00
.1600E+04	.7510E+03	.5400E+03	.3492E+00
.1600E+04	.8010E+03	.5400E+03	.3983E+00
.1600E+04	.8510E+03	.5400E+03	.4308E+00
.1600E+04	.9010E+03	.5400E+03	.4419E+00
.1600E+04	.9510E+03	.5400E+03	.4299E+00
.1600E+04	.1001E+04	.5400E+03	.3966E+00
.1600E+04	.1051E+04	.5400E+03	.3470E+00
.1600E+04	.1101E+04	.5400E+03	.2879E+00
.1600E+04	.1151E+04	.5400E+03	.2265E+00
.1600E+04	.1201E+04	.5400E+03	.1690E+00
.1600E+04	.1251E+04	.5400E+03	.1195E+00
.1600E+04	.1301E+04	.5400E+03	.8005E-01
.1600E+04	.1351E+04	.5400E+03	.5083E-01
.1600E+04	.1401E+04	.5400E+03	.3057E-01
.1600E+04	.1451E+04	.5400E+03	.1742E-01
.1600E+04	.1501E+04	.5400E+03	.9399E-02
.1600E+04	.1551E+04	.5400E+03	.4802E-02
.1600E+04	.1601E+04	.5400E+03	.2323E-02

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*******************************************************
*                                                     *
*        S O L U T E  version 4.06                    *
*                                                     *
*    ANALYTICAL MODELS FOR SOLUTE TRANSPORT           *
*                                                     *
*******************************************************
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Model: PLUME2D-H

PROJECT..... = epri-plume-3
USER NAME..... = mbrooke
DATE..... = 08-20-1998
DATA FILE..... = K:\DATA\PROJECT\0734\FATE_&_T\EPRI-3Z.D2D

INPUT DATA:

GROUNDWATER (SEEPAGE) VELOCITY.... = .092 [ft/d]
AQUIFER THICKNESS..... = 20 [ft]
POROSITY..... = .42
LONGITUDINAL DISPERSIVITY..... = 250 [ft]
LATERAL DISPERSIVITY..... = 25 [ft]
RETARDATION FACTOR..... = 20
HALF-LIFE..... = 0 [d]
DECAY CONSTANT..... = 0.0000D+00

NUMBER OF POINT SOURCES..... = 5

SOURCE NO. 1

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 200 [ft]
SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 197100 [d]

SOURCE NO. 2

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 300 [ft]

SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 197100 [d]

SOURCE NO. 3

X-COORDINATE OF THE SOURCE..... = 0 [ft]
Y-COORDINATE OF THE SOURCE..... = 400 [ft]
SOURCE STRENGTH..... = .0214 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 197100 [d]

SOURCE NO. 4

X-COORDINATE OF THE SOURCE..... = 300 [ft]
Y-COORDINATE OF THE SOURCE..... = 250 [ft]
SOURCE STRENGTH..... = .08 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 197100 [d]

SOURCE NO. 5

X-COORDINATE OF THE SOURCE..... = 300 [ft]
Y-COORDINATE OF THE SOURCE..... = 350 [ft]
SOURCE STRENGTH..... = .08 [lb/d]
ELAPSED TIME TILL CALCULATION.. = 197100 [d]

GRID DATA:

X-COORDINATE OF GRID ORIGIN..... = -100 [ft]
Y-COORDINATE OF GRID ORIGIN..... = 0 [ft]
DISTANCE INCREMENT DELX..... = 50 [ft]
DISTANCE INCREMENT DELY..... = 50 [ft]
NUMBER OF NODES IN X-DIRECTION.... = 35
NUMBER OF NODES IN Y-DIRECTION.... = 25

CONCENTRATION C [mg/l]

ROW\COLUMN	1	2	3	4	5
	[ft] -100.00	-50.00	0.00	50.00	100.00
1	0.00 [ft]	0.0000D+00	0.0000D+00	2.5362D-01	2.7847D-01	3.0182D-01
2	50.00 [ft]	0.0000D+00	0.0000D+00	4.4320D-01	4.8573D-01	5.2363D-01
3	100.00 [ft]	0.0000D+00	0.0000D+00	7.9264D-01	8.6538D-01	9.2290D-01

4	150.00	[ft]	0.0000D+00	0.0000D+00	8.5818D-01	9.4452D-01	1.0312D+00
5	200.00	[ft]	0.0000D+00	0.0000D+00	1.1814D+00	1.2951D+00	1.3989D+00
6	250.00	[ft]	0.0000D+00	0.0000D+00	1.2081D+00	1.3320D+00	1.4617D+00
7	300.00	[ft]	0.0000D+00	0.0000D+00	1.5580D+00	1.7039D+00	1.8276D+00
8	350.00	[ft]	0.0000D+00	0.0000D+00	1.2081D+00	1.3320D+00	1.4617D+00
9	400.00	[ft]	0.0000D+00	0.0000D+00	1.1814D+00	1.2951D+00	1.3989D+00
10	450.00	[ft]	0.0000D+00	0.0000D+00	8.5818D-01	9.4452D-01	1.0312D+00
11	500.00	[ft]	0.0000D+00	0.0000D+00	7.9264D-01	8.6538D-01	9.2290D-01
12	550.00	[ft]	0.0000D+00	0.0000D+00	4.4320D-01	4.8573D-01	5.2363D-01
13	600.00	[ft]	0.0000D+00	0.0000D+00	2.5362D-01	2.7847D-01	3.0182D-01
14	650.00	[ft]	0.0000D+00	0.0000D+00	1.3659D-01	1.5005D-01	1.6288D-01
15	700.00	[ft]	0.0000D+00	0.0000D+00	7.8795D-02	8.6673D-02	9.4450D-02
16	750.00	[ft]	0.0000D+00	0.0000D+00	4.2041D-02	4.6265D-02	5.0482D-02
17	800.00	[ft]	0.0000D+00	0.0000D+00	2.1797D-02	2.3994D-02	2.6205D-02
18	850.00	[ft]	0.0000D+00	0.0000D+00	1.0936D-02	1.2041D-02	1.3159D-02
19	900.00	[ft]	0.0000D+00	0.0000D+00	5.2935D-03	5.8293D-03	6.3739D-03
20	950.00	[ft]	0.0000D+00	0.0000D+00	2.4659D-03	2.7159D-03	2.9707D-03
21	1000.00	[ft]	0.0000D+00	0.0000D+00	1.1032D-03	1.2152D-03	1.3296D-03
22	1050.00	[ft]	0.0000D+00	0.0000D+00	4.7319D-04	5.2126D-04	5.7049D-04
23	1100.00	[ft]	0.0000D+00	0.0000D+00	1.9430D-04	2.1406D-04	2.3432D-04
24	1150.00	[ft]	0.0000D+00	0.0000D+00	7.6284D-05	8.4043D-05	9.2013D-05
25	1200.00	[ft]	0.0000D+00	0.0000D+00	2.8603D-05	3.1514D-05	3.4507D-05

ROW\COLUMN		6	7	8	9	10
	[ft]	150.00	200.00	250.00	300.00	350.00
1	0.00	[ft]	3.2298D-01	3.4136D-01	3.5647D-01	8.4664D-01	9.0133D-01
2	50.00	[ft]	5.5560D-01	5.8078D-01	5.9870D-01	1.4950D+00	1.5849D+00
3	100.00	[ft]	9.6389D-01	9.8907D-01	1.0002D+00	2.5385D+00	2.6748D+00
4	150.00	[ft]	1.6137D+00	1.5838D+00	1.5411D+00	4.2375D+00	4.4324D+00
5	200.00	[ft]	1.4918D+00	1.5753D+00	2.0954D+00	4.8339D+00	5.0198D+00
6	250.00	[ft]	2.5898D+00	2.5012D+00	2.3953D+00	6.0305D+00	6.2772D+00
7	300.00	[ft]	1.9279D+00	2.0081D+00	2.5168D+00	5.7295D+00	5.9590D+00
8	350.00	[ft]	2.5898D+00	2.5012D+00	2.3953D+00	6.0305D+00	6.2772D+00
9	400.00	[ft]	1.4918D+00	1.5753D+00	2.0954D+00	4.8339D+00	5.0198D+00
10	450.00	[ft]	1.6137D+00	1.5838D+00	1.5411D+00	4.2375D+00	4.4324D+00
11	500.00	[ft]	9.6389D-01	9.8907D-01	1.0002D+00	2.5385D+00	2.6748D+00
12	550.00	[ft]	5.5560D-01	5.8078D-01	5.9870D-01	1.4950D+00	1.5849D+00
13	600.00	[ft]	3.2298D-01	3.4136D-01	3.5647D-01	8.4664D-01	9.0133D-01
14	650.00	[ft]	1.7471D-01	1.8518D-01	1.9395D-01	4.7950D-01	5.1184D-01
15	700.00	[ft]	1.0197D-01	1.0909D-01	1.1565D-01	2.7121D-01	2.9131D-01
16	750.00	[ft]	5.4618D-02	5.8599D-02	6.2351D-02	1.4388D-01	1.5484D-01

17	800.00 [ft]	2.8394D-02	3.0527D-02	3.2567D-02	7.3871D-02	7.9597D-02
18	850.00 [ft]	1.4275D-02	1.5370D-02	1.6429D-02	3.6600D-02	3.9471D-02
19	900.00 [ft]	6.9200D-03	7.4597D-03	7.9850D-03	1.7458D-02	1.8839D-02
20	950.00 [ft]	3.2273D-03	3.4821D-03	3.7315D-03	8.0018D-03	8.6380D-03
21	1000.00 [ft]	1.4452D-03	1.5604D-03	1.6736D-03	3.5182D-03	3.7987D-03
22	1050.00 [ft]	6.2032D-04	6.7015D-04	7.1930D-04	1.4817D-03	1.6000D-03
23	1100.00 [ft]	2.5487D-04	2.7546D-04	2.9584D-04	5.9703D-04	6.4472D-04
24	1150.00 [ft]	1.0011D-04	1.0824D-04	1.1630D-04	2.2991D-04	2.4826D-04
25	1200.00 [ft]	3.7552D-05	4.0614D-05	4.3656D-05	8.4534D-05	9.1272D-05

ROW\COLUMN	11	12	13	14	15
[ft]	400.00	450.00	500.00	550.00	600.00
1	0.00 [ft]	9.4960D-01	9.9004D-01	1.0213D+00	1.0422D+00	1.0517D+00
2	50.00 [ft]	1.6620D+00	1.7526D+00	1.8038D+00	1.8378D+00	1.8537D+00
3	100.00 [ft]	2.7852D+00	2.8662D+00	2.9156D+00	2.9323D+00	2.9163D+00
4	150.00 [ft]	4.5663D+00	4.6635D+00	4.6758D+00	4.6340D+00	4.5460D+00
5	200.00 [ft]	5.2126D+00	7.2635D+00	7.0296D+00	6.7516D+00	6.4498D+00
6	250.00 [ft]	6.4917D+00	6.6730D+00	6.8277D+00	8.6241D+00	8.0794D+00
7	300.00 [ft]	6.2272D+00	1.0247D+01	9.7384D+00	9.1859D+00	8.6297D+00
8	350.00 [ft]	6.4917D+00	6.6730D+00	6.8277D+00	8.6241D+00	8.0794D+00
9	400.00 [ft]	5.2126D+00	7.2635D+00	7.0296D+00	6.7516D+00	6.4498D+00
10	450.00 [ft]	4.5663D+00	4.6635D+00	4.6758D+00	4.6340D+00	4.5460D+00
11	500.00 [ft]	2.7852D+00	2.8662D+00	2.9156D+00	2.9323D+00	2.9163D+00
12	550.00 [ft]	1.6620D+00	1.7526D+00	1.8038D+00	1.8378D+00	1.8537D+00
13	600.00 [ft]	9.4960D-01	9.9004D-01	1.0213D+00	1.0422D+00	1.0517D+00
14	650.00 [ft]	5.4125D-01	5.9548D-01	6.2270D-01	6.4608D-01	6.6522D-01
15	700.00 [ft]	3.1052D-01	3.2848D-01	3.4489D-01	3.5947D-01	3.7197D-01
16	750.00 [ft]	1.6542D-01	1.7546D-01	1.8478D-01	1.9324D-01	2.0070D-01
17	800.00 [ft]	8.5174D-02	9.0516D-02	9.5540D-02	1.0016D-01	1.0431D-01
18	850.00 [ft]	4.2285D-02	4.5000D-02	4.7575D-02	4.9970D-02	5.2147D-02
19	900.00 [ft]	2.0198D-02	2.1517D-02	2.2776D-02	2.3956D-02	2.5038D-02
20	950.00 [ft]	9.2664D-03	9.8785D-03	1.0466D-02	1.1019D-02	1.1531D-02
21	1000.00 [ft]	4.0766D-03	4.3481D-03	4.6094D-03	4.8569D-03	5.0868D-03
22	1050.00 [ft]	1.7175D-03	1.8325D-03	1.9435D-03	2.0489D-03	2.1473D-03
23	1100.00 [ft]	6.9211D-04	7.3861D-04	7.8358D-04	8.2642D-04	8.6649D-04
24	1150.00 [ft]	2.6652D-04	2.8445D-04	3.0182D-04	3.1840D-04	3.3394D-04
25	1200.00 [ft]	9.7979D-05	1.0457D-04	1.1097D-04	1.1708D-04	1.2282D-04

ROW\COLUMN	16	17	18	19	20
[ft]	650.00	700.00	750.00	800.00	850.00
1	0.00 [ft]	1.0909D+00	1.0854D+00	1.1746D+00	1.1672D+00	1.1522D+00
2	50.00 [ft]	1.8508D+00	1.8292D+00	1.7888D+00	1.7910D+00	1.7295D+00
3	100.00 [ft]	2.9104D+00	2.8419D+00	2.8520D+00	2.7506D+00	2.6907D+00
4	150.00 [ft]	4.4188D+00	4.2580D+00	4.0674D+00	3.9113D+00	3.6845D+00
5	200.00 [ft]	6.1744D+00	5.8546D+00	5.5245D+00	5.1837D+00	4.8942D+00
6	250.00 [ft]	7.5708D+00	7.0839D+00	6.6097D+00	6.2031D+00	5.7523D+00
7	300.00 [ft]	8.0846D+00	7.5539D+00	7.0361D+00	6.5276D+00	6.1496D+00
8	350.00 [ft]	7.5708D+00	7.0839D+00	6.6097D+00	6.2031D+00	5.7523D+00
9	400.00 [ft]	6.1744D+00	5.8546D+00	5.5245D+00	5.1837D+00	4.8942D+00
10	450.00 [ft]	4.4188D+00	4.2580D+00	4.0674D+00	3.9113D+00	3.6845D+00
11	500.00 [ft]	2.9104D+00	2.8419D+00	2.8520D+00	2.7506D+00	2.6907D+00
12	550.00 [ft]	1.8508D+00	1.8292D+00	1.7888D+00	1.7910D+00	1.7295D+00
13	600.00 [ft]	1.0909D+00	1.0854D+00	1.1746D+00	1.1672D+00	1.1522D+00
14	650.00 [ft]	6.7977D-01	6.8985D-01	6.9523D-01	6.9592D-01	6.9205D-01
15	700.00 [ft]	3.8219D-01	3.8998D-01	3.9523D-01	3.9791D-01	3.9800D-01
16	750.00 [ft]	2.0702D-01	2.1211D-01	2.1590D-01	2.1832D-01	2.1937D-01
17	800.00 [ft]	1.0792D-01	1.1092D-01	1.1327D-01	1.1494D-01	1.1590D-01
18	850.00 [ft]	5.4071D-02	5.5709D-02	5.7037D-02	5.8032D-02	5.8680D-02
19	900.00 [ft]	2.6006D-02	2.6844D-02	2.7538D-02	2.8077D-02	2.8453D-02
20	950.00 [ft]	1.1992D-02	1.2396D-02	1.2736D-02	1.3006D-02	1.3203D-02
21	1000.00 [ft]	5.2955D-03	5.4798D-03	5.6367D-03	5.7638D-03	5.8589D-03
22	1050.00 [ft]	2.2371D-03	2.3168D-03	2.3853D-03	2.4415D-03	2.4844D-03
23	1100.00 [ft]	9.0320D-04	9.3598D-04	9.6432D-04	9.8777D-04	1.0059D-03
24	1150.00 [ft]	3.4823D-04	3.6103D-04	3.7215D-04	3.8141D-04	3.8867D-04
25	1200.00 [ft]	1.2811D-04	1.3286D-04	1.3700D-04	1.4047D-04	1.4321D-04

ROW\COLUMN	21	22	23	24	25
[ft]	900.00	950.00	1000.00	1050.00	1100.00
1	0.00 [ft]	1.1301D+00	1.1015D+00	1.0676D+00	1.0288D+00	9.8598D-01
2	50.00 [ft]	1.6525D+00	1.7183D+00	1.6517D+00	1.5789D+00	1.5013D+00
3	100.00 [ft]	2.5661D+00	2.4258D+00	2.2717D+00	2.1042D+00	2.1541D+00
4	150.00 [ft]	3.5070D+00	3.4160D+00	3.1895D+00	2.9539D+00	2.7093D+00
5	200.00 [ft]	4.5472D+00	4.2776D+00	3.9321D+00	3.5770D+00	3.4410D+00
6	250.00 [ft]	5.4433D+00	5.0304D+00	4.6177D+00	4.2036D+00	3.7848D+00
7	300.00 [ft]	5.6832D+00	5.3084D+00	4.8702D+00	4.4330D+00	3.9941D+00
8	350.00 [ft]	5.4433D+00	5.0304D+00	4.6177D+00	4.2036D+00	3.7848D+00
9	400.00 [ft]	4.5472D+00	4.2776D+00	3.9321D+00	3.5770D+00	3.4410D+00
10	450.00 [ft]	3.5070D+00	3.4160D+00	3.1895D+00	2.9539D+00	2.7093D+00

11	500.00 [ft]	2.5661D+00	2.4258D+00	2.2717D+00	2.1042D+00	2.1541D+00
12	550.00 [ft]	1.6525D+00	1.7183D+00	1.6517D+00	1.5789D+00	1.5013D+00
13	600.00 [ft]	1.1301D+00	1.1015D+00	1.0676D+00	1.0288D+00	9.8598D-01
14	650.00 [ft]	6.8382D-01	6.7151D-01	6.5543D-01	6.3598D-01	6.1357D-01
15	700.00 [ft]	3.9557D-01	3.9071D-01	3.8356D-01	3.7429D-01	3.6310D-01
16	750.00 [ft]	2.1903D-01	2.1735D-01	2.1436D-01	2.1015D-01	2.0481D-01
17	800.00 [ft]	1.1615D-01	1.1568D-01	1.1452D-01	1.1269D-01	1.1023D-01
18	850.00 [ft]	5.8973D-02	5.8909D-02	5.8492D-02	5.7733D-02	5.6649D-02
19	900.00 [ft]	2.8660D-02	2.8696D-02	2.8561D-02	2.8260D-02	2.7799D-02
20	950.00 [ft]	1.3323D-02	1.3365D-02	1.3328D-02	1.3214D-02	1.3024D-02
21	1000.00 [ft]	5.9206D-03	5.9480D-03	5.9407D-03	5.8991D-03	5.8240D-03
22	1050.00 [ft]	2.5134D-03	2.5280D-03	2.5280D-03	2.5135D-03	2.4847D-03
23	1100.00 [ft]	1.0186D-03	1.0254D-03	1.0264D-03	1.0216D-03	1.0110D-03
24	1150.00 [ft]	3.9381D-04	3.9674D-04	3.9744D-04	3.9588D-04	3.9210D-04
25	1200.00 [ft]	1.4518D-04	1.4634D-04	1.4668D-04	1.4620D-04	1.4490D-04

ROW\COLUMN	26	27	28	29	30
[ft]	1150.00	1200.00	1250.00	1300.00	1350.00
1	0.00 [ft]	9.3988D-01	8.9123D-01	8.4077D-01	7.8916D-01	7.3704D-01
2	50.00 [ft]	1.4207D+00	1.3379D+00	1.2540D+00	1.1699D+00	1.0865D+00
3	100.00 [ft]	2.0227D+00	1.8906D+00	1.7601D+00	1.6318D+00	1.5065D+00
4	150.00 [ft]	2.6916D+00	2.4993D+00	2.3113D+00	2.1301D+00	1.9560D+00
5	200.00 [ft]	3.1233D+00	3.0683D+00	2.8234D+00	2.5889D+00	2.3668D+00
6	250.00 [ft]	3.5937D+00	3.2263D+00	3.1903D+00	2.9165D+00	2.6582D+00
7	300.00 [ft]	3.5502D+00	3.6299D+00	3.3248D+00	3.0351D+00	2.7639D+00
8	350.00 [ft]	3.5937D+00	3.2263D+00	3.1903D+00	2.9165D+00	2.6582D+00
9	400.00 [ft]	3.1233D+00	3.0683D+00	2.8234D+00	2.5889D+00	2.3668D+00
10	450.00 [ft]	2.6916D+00	2.4993D+00	2.3113D+00	2.1301D+00	1.9560D+00
11	500.00 [ft]	2.0227D+00	1.8906D+00	1.7601D+00	1.6318D+00	1.5065D+00
12	550.00 [ft]	1.4207D+00	1.3379D+00	1.2540D+00	1.1699D+00	1.0865D+00
13	600.00 [ft]	9.3988D-01	8.9123D-01	8.4077D-01	7.8916D-01	7.3704D-01
14	650.00 [ft]	5.8861D-01	5.6157D-01	5.3287D-01	5.0295D-01	4.7222D-01
15	700.00 [ft]	3.5023D-01	3.3589D-01	3.2035D-01	3.0385D-01	2.8664D-01
16	750.00 [ft]	1.9843D-01	1.9116D-01	1.8311D-01	1.7441D-01	1.6521D-01
17	800.00 [ft]	1.0720D-01	1.0366D-01	9.9653D-02	9.5263D-02	9.0556D-02
18	850.00 [ft]	5.5262D-02	5.3597D-02	5.1684D-02	4.9557D-02	4.7250D-02
19	900.00 [ft]	2.7186D-02	2.6434D-02	2.5555D-02	2.4565D-02	2.3481D-02
20	950.00 [ft]	1.2763D-02	1.2436D-02	1.2048D-02	1.1605D-02	1.1116D-02
21	1000.00 [ft]	5.7169D-03	5.5797D-03	5.4149D-03	5.2253D-03	5.0139D-03
22	1050.00 [ft]	2.4424D-03	2.3871D-03	2.3198D-03	2.2418D-03	2.1543D-03
23	1100.00 [ft]	9.9481D-04	9.7338D-04	9.4706D-04	9.1628D-04	8.8155D-04

24	1150.00 [ft]	3.8617D-04	3.7819D-04	3.6831D-04	3.5668D-04	3.4350D-04
25	1200.00 [ft]	1.4280D-04	1.3996D-04	1.3640D-04	1.3220D-04	1.2741D-04

ROW\COLUMN		31	32	33	34	35
	[ft]	1400.00	1450.00	1500.00	1550.00	1600.00
1	0.00 [ft]	6.8499D-01	6.3353D-01	5.8312D-01	5.3416D-01	4.8699D-01
2	50.00 [ft]	1.0043D+00	9.2425D-01	8.4671D-01	7.7221D-01	7.0112D-01
3	100.00 [ft]	1.3852D+00	1.2684D+00	1.1566D+00	1.0503D+00	9.4984D-01
4	150.00 [ft]	1.7896D+00	1.6312D+00	1.4813D+00	1.3400D+00	1.2074D+00
5	200.00 [ft]	2.1567D+00	1.9586D+00	1.7726D+00	1.5986D+00	1.4364D+00
6	250.00 [ft]	2.4158D+00	2.1887D+00	1.9766D+00	1.7790D+00	1.5957D+00
7	300.00 [ft]	2.5096D+00	2.2718D+00	2.0501D+00	1.8439D+00	1.6529D+00
8	350.00 [ft]	2.4158D+00	2.1887D+00	1.9766D+00	1.7790D+00	1.5957D+00
9	400.00 [ft]	2.1567D+00	1.9586D+00	1.7726D+00	1.5986D+00	1.4364D+00
10	450.00 [ft]	1.7896D+00	1.6312D+00	1.4813D+00	1.3400D+00	1.2074D+00
11	500.00 [ft]	1.3852D+00	1.2684D+00	1.1566D+00	1.0503D+00	9.4984D-01
12	550.00 [ft]	1.0043D+00	9.2425D-01	8.4671D-01	7.7221D-01	7.0112D-01
13	600.00 [ft]	6.8499D-01	6.3353D-01	5.8312D-01	5.3416D-01	4.8699D-01
14	650.00 [ft]	4.4108D-01	4.0989D-01	3.7899D-01	3.4865D-01	3.1915D-01
15	700.00 [ft]	2.6895D-01	2.5103D-01	2.3307D-01	2.1527D-01	1.9780D-01
16	750.00 [ft]	1.5564D-01	1.4583D-01	1.3590D-01	1.2597D-01	1.1615D-01
17	800.00 [ft]	8.5604D-02	8.0478D-02	7.5246D-02	6.9973D-02	6.4720D-02
18	850.00 [ft]	4.4798D-02	4.2238D-02	3.9604D-02	3.6932D-02	3.4252D-02
19	900.00 [ft]	2.2318D-02	2.1095D-02	1.9828D-02	1.8535D-02	1.7231D-02
20	950.00 [ft]	1.0588D-02	1.0029D-02	9.4463D-03	8.8483D-03	8.2426D-03
21	1000.00 [ft]	4.7841D-03	4.5393D-03	4.2832D-03	4.0191D-03	3.7505D-03
22	1050.00 [ft]	2.0585D-03	1.9561D-03	1.8485D-03	1.7371D-03	1.6234D-03
23	1100.00 [ft]	8.4340D-04	8.0242D-04	7.5920D-04	7.1434D-04	6.6842D-04
24	1150.00 [ft]	3.2896D-04	3.1329D-04	2.9673D-04	2.7948D-04	2.6179D-04
25	1200.00 [ft]	1.2212D-04	1.1640D-04	1.1034D-04	1.0402D-04	9.7523D-05

MATHCAD FILES FOR CONCENTRATION AND LOADING CALCULATIONS

El Paso Groundwater Arsenic Modeling
Estimate of Impacts on Downgradient Surface Water Resources

The concentration of arsenic in downgradient surface water resources (i.e. the Rio Grande) is estimated using loading relationships as follows:

Receptor Load = Upgradient Surface Water Load + Groundwater Load

where the Receptor is the Rio Grande, the Upgradient Surface Water Load is the loading upgradient of potential groundwater impacts, and the Groundwater Load is the loading from groundwater to the receptor downgradient of a presumed source area. Each load is calculated as a concentration multiplied by a flux (flow). Two scenarios are considered: source removal after a specified period of time (Scenario 1), and no source removal (Scenario 2).

Loading calculations are performed for two areas:

(1) **Source Area 1** -- Acid Mist Precipitator/Acid Plant
(2) **Source Area 2** -- Ponds 5 and 6 Arroyo

NOTE: arsenic is the only constituent modeled because it is the most widespread and has the most occurrences above primary drinking water standards.

Source Area 1 -- Acid Mist Precipitator/Acid Plant Source Area (Arsenic)

Scenario 1: Source Removal After 18 Years

River Data

$Criv := 0.006 \cdot \frac{mg}{liter}$ — Concentration of dissolved arsenic at Rio Grande sampling site SEP-10 during low flow (February 1998)

$Qriv := 0.09 \cdot \frac{m^3}{sec}$ — Typical low flow in Rio Grande, (Lower 5th percentile for daily mean flow data from January 1995 through May 1998)

Groundwater Data

$Cgw := 3.1 \cdot \frac{mg}{liter}$ — Weighted average concentration of dissolved arsenic in groundwater across plume front at Rio Grande 280 years after source input

$Qgw := 1132 \cdot \frac{ft^3}{day}$ — Groundwater flux at Rio Grande assuming plume width of 1270 ft, saturated thickness of 11 ft, hydraulic gradient of 0.0045, hydraulic conductivity of 18 ft/day

Rearranging the loading equation to solve for the resultant concentration in the Rio Grande yields the following:

$$Cmix := \frac{(Cgw \cdot Qgw) + (Criv \cdot Qriv)}{(Qgw + Qriv)}$$

$Cmix = 0.019 \cdot \frac{mg}{liter}$ — Estimated worst-case arsenic concentration in Rio Grande due to acid mist precipitator arsenic plume, assuming source removal

Source Area 1 -- Acid Mist Precipitator/Acid Plant Source Area (Arsenic)

Scenario 2: No Source Removal

River Data

$Criv := 0.006 \cdot \frac{mg}{liter}$ Concentration of dissolved arsenic at Rio Grande sampling site SEP-10 during low flow (February 1998)

$Qriv := 0.09 \cdot \frac{m^3}{sec}$ Typical low flow in Rio Grande (Lower 5th percentile for daily mean flow data from January 1995 through May 1998)

Groundwater Data

$Cgw := 18.4 \cdot \frac{mg}{liter}$ Weighted average concentration of dissolved arsenic in groundwater across plume front at Rio Grande after 280 years (NOTE: with no source removal, this concentration will continue to increase until steady state is reached)

$Qgw := 1212 \cdot \frac{ft^3}{day}$ Groundwater flux at Rio Grande assuming plume width of 1360 ft, saturated thickness of 11 ft, hydraulic gradient of 0.0045, hydraulic conductivity of 18 ft/day

Rearranging the loading equation to solve for the resultant concentration in the Rio Grande yields the following:

$$Cmix := \frac{(Cgw \cdot Qgw) + (Criv \cdot Qriv)}{(Qgw + Qriv)}$$

$Cmix = 0.087 \cdot \frac{mg}{liter}$ Estimated arsenic concentration in Rio Grande due to acid mist precipitator arsenic plume after 280 years, assuming no source removal

Source Area 2 -- Ponds 5 and 6 Arroyo (Arsenic)

Scenario 1: Source Removal After 68 Years

River Data

$Criv := 0.006 \cdot \frac{mg}{liter}$ Concentration of dissolved arsenic at Rio Grande sampling site SEP-11 during low flow (February 1998)

$Qriv := 0.09 \cdot \frac{m^3}{sec}$ Typical low flow in Rio Grande (Lower 5th percentile for daily mean flow data from January 1995 through May 1998)

Groundwater Data

$$Cgw := 0.48 \cdot \frac{mg}{liter}$$

Weighted average concentration of dissolved arsenic in groundwater across plume front at Rio Grande 540 years after source input

$$Qgw := 375 \cdot \frac{ft^3}{day}$$

Groundwater flux at Rio Grande assuming plume width of 910 ft, saturated thickness of 3 ft, hydraulic gradient of 0.0125, hydraulic conductivity of 11 ft/day

Rearranging the loading equation to solve for the resultant concentration in the Rio Grande yields the following:

$$Cmix := \frac{(Cgw \cdot Qgw) + (Criv \cdot Qriv)}{(Qgw + Qriv)}$$

$$Cmix = 6.6464 \cdot 10^{-3} \cdot \frac{mg}{liter}$$

Estimated arsenic concentration in Rio Grande due to Ponds 5 and 6 arsenic plume after 540 years, assuming source removal

Area 2 -- Ponds 5 and 6 Arroyo (Arsenic)

Scenario 2: No Source Removal

River Data

$$Criv := 0.006 \cdot \frac{mg}{liter}$$

Concentration of dissolved arsenic at Rio Grande sampling site SEP-11 during low flow (February 1998)

$$Qriv := 0.09 \cdot \frac{m^3}{sec}$$

Typical low flow in Rio Grande (Lower 5th percentile for daily mean flow data from January 1995 through May 1998)

Groundwater Data

$$Cgw := 0.711 \cdot \frac{mg}{liter}$$

Weighted average concentration of dissolved arsenic in groundwater across plume front at Rio Grande after 540 years (NOTE: with no source removal, this concentration will continue to increase until steady state is reached)

$$Qgw := 578 \cdot \frac{ft^3}{day}$$

Groundwater flux at Rio Grande assuming plume width of 1400 ft, saturated thickness of 3 ft, hydraulic gradient of 0.0125, hydraulic conductivity of 11 ft/day

Rearranging the loading equation to solve for the resultant concentration in the Rio Grande yields the following:

$$Cmix := \frac{(Cgw \cdot Qgw) + (Criv \cdot Qriv)}{(Qgw + Qriv)}$$

$$Cmix = 7.4808 \cdot 10^{-3} \cdot \frac{mg}{liter}$$

Estimated arsenic concentration in Rio Grande due to Ponds 5 and 6 arsenic plume after 540 years, assuming no source removal

APPENDIX L

BASELINE RISK ASSESSMENT

APPENDIX L

BASELINE RISK ASSESSMENT

APPENDIX L
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1.0 INTRODUCTION

1.1 OBJECTIVES

The objectives of this assessment are to: 1) identify mechanisms of present and future potential exposure to contaminants released to the environment by the Asarco El Paso Copper Smelter, and 2) to provide preliminary, media-specific cleanup levels that are protective of potentially adverse effects to human health and the environment. This risk assessment is completed in general accordance with TNRCC Risk Reduction Standards and EPA guidelines (EPA, 1989). More specifically, this assessment completes the risk assessment-related requirements presented in the Remedial Investigation Work Plan (Hydrometrics, Inc., 1996). These include Section 5.3.3, Potential Human and Environmental Receptors, and Section 5.3.4, Determination of Critical Values.

1.2 ORGANIZATION

Consistent with TNRCC and EPA guidelines, this assessment consists of the following sections:

- **Data Evaluation** – Identification of the data and the parameters to be evaluated.
- **Exposure Assessment** – Identification of the exposure pathways, the human and ecological receptors, and the quantification of any exposure.
- **Toxicity Assessment** – Description of constituent hazards upon exposure, regulatory standards, and quantitative estimates of toxicity.
- **Determination of Critical Values** – Presentation of preliminary media-specific cleanup objectives.
- **Uncertainty Assessment** – Summary of uncertainty and variability of various assessment components.

This assessment serves as a supplement to the site characterization presented in Sections 2.0 and 3.0 of this report. This appendix supports the Constituents of Potential Concern and Exposure Assessment sections of the risk assessment. A summary of the risk assessment approach and conclusions is presented in Section 4.1.1 of the Remedial Investigation Report, Risk Evaluation and Preliminary Corrective Action Goals.

All of the supporting data, calculations and more detailed supporting information are provided in attachments to this appendix.

2.0 DATA EVALUATION

This section provides a brief summary of data considerations specifically relevant to this risk assessment. A comprehensive site characterization is provided in Sections 2.0 and 3.0 of this report.

2.1 DATA USED FOR THIS ASSESSMENT

Data used in this assessment were obtained in accordance with the Remedial Investigation Work Plan (Hydrometrics, Inc., 1996). Measurement data of particular relevance to this risk assessment include potentially toxic total recoverable metal concentrations measured during a single sampling event for soils and measured quarterly in groundwater and surface water sampling during one year. Total recoverable metals analyzed were:

- Arsenic
- Cadmium
- Chromium
- Copper
- Iron
- Lead
- Selenium
- Zinc

No air measurements were planned under the Remedial Investigation Work Plan. Asarco routinely monitors air concentrations of lead, cadmium and arsenic using low volume filters at various stations surrounding the site. This monitoring program demonstrates compliance with ambient air quality requirements. However, where these stations are not proximal to areas of potential concern to this risk assessment (i.e., historic Smeltertown), models are used to conservatively estimate reasonable maximum air concentrations.

2.2 DATA QUALITY

All metals data were validated in accordance with EPA procedures (EPA, 1994). None of the measurements intended for use in the risk assessment were qualified as "rejected." Some measurements were qualified as "estimated," placing uncertainty over constituent concentrations in some cases. However, the qualified data are expected to have a negligible effect on the risk assessment because the statistical use of the data diminishes the bias on any one measurement, and the measurement errors associated with estimated values are much

smaller than the errors inherent in estimating exposure and toxicity. Therefore, all data generated under the Remedial Investigation Work Plan for the above metals were used in this risk assessment.

2.3 DATA REDUCTION

All total recoverable metals parameters are equally evaluated in this assessment. The brief nature of this assessment and the relatively short list of parameters did not warrant a separate screening analysis to derive a shorter list of constituents of potential concern.

2.4 INVESTIGATION AREAS

Data collection was organized in distinct Investigation Areas of potential concern, such as groundwater, surface water, acid plant area soils, slag pile area soil, and others. This risk assessment evaluates each Investigation Area separately.

3.0 EXPOSURE ASSESSMENT

For a toxic effect to occur, a chemical must contact an individual or organism in the surrounding environment. This section of the risk assessment evaluates exposure using the following steps:

- Characterization of Exposure Setting
- Identification of Exposure Pathways
- Quantification of Exposure

3.1 CHARACTERIZATION OF EXPOSURE SETTING

A description of environmental setting and land use is presented in Remedial Investigation Work Plan, Section 2.0 (Hydrometrics, Inc., 1996) and in Section 1.0 of this Report. A brief summary of relevant factors affecting exposure is as follows:

- The site has been used by several smelters and refineries since 1887.
- Surface soils and process pond sediments are known to contain elevated metals concentrations, as presented in Section 2.0.
- Land use proximal to the site is mixed industrial, commercial and residential.
- No appreciable terrestrial life or modest quality terrestrial habitat is located within the project site.
- The Rio Grande borders the site to the west and south. TNRCC-designated water uses are drinking water use and aquatic life protection. Flow is dam-controlled, with higher flows being released during the summer months (April to September).
- The American Canal, which also borders the site to the west and south, is a concrete-lined channel that receives flow from the Rio Grande during the summer months (April to September). This water is ultimately used for irrigation and as a supply to a domestic water supply system.

- The climate is hot and dry, with precipitation usually received in intense short bursts.
- Northwesterly winds predominate in the winter months (November to May), while southeasterly winds predominate in the summer months (June to October).
- Soils in the plant area are a mix of colluvial and fluvial sediments, with areas of extensive fill by slag and other materials.
- Depth to groundwater ranges from 60 feet in upgradient areas to 10 feet along the Rio Grande floodplain. The aquifer is composed primarily of inter-bedded and mixed sand, gravel, and boulders. Groundwater flow is from east to west.

3.2 IDENTIFICATION OF EXPOSURE PATHWAYS

From the summary points, a conceptual model of contaminant fate and transport is provided as Figure L-1, Exposure Pathway Flow Chart. A complete exposure pathway requires all of the following:

- Source of contamination
- Transport mechanism for chemical release and migration from the source
- Contact with a receptor
- Mechanism for chemical intake into the body.

Each complete and incomplete pathway is described, based on the affected media identified in the Exposure Pathway Flow Chart (Figure L-1).

3.2.1 Air

Total recoverable metals adsorb to soil particles and can be dispersed into the air as wind-blown dust. The dust may be inhaled, or it may be deposited on surfaces from which it may be subsequently transferred to hands and incidentally ingested through inadvertent hand-to-mouth activity.

On-site Workers. Much of the site is presently unpaved, and a dust control program is implemented at the plant. Most importantly, an OSHA-mandated health and safety program is in place for all employees at the site. Compliance with this program serves as a remedial control, precluding adverse health effects. Comparison with TNRCC default media-specific cleanup levels in Section 5.0 of this appendix further demonstrates that the OSHA program provides biomonitoring for those parameters having the greatest potential for adversely affecting human health (i.e., arsenic, cadmium and lead).

Off-site Workers. No dust control occurs in the historic Smeltertown area. A commercial office for the International Boundary Water Commission (IBWC) is located directly to the north of Smeltertown, which may receive wind blown dust. To evaluate potential risk via this pathway, air concentrations at the IBWC must be estimated using a dispersion model. This assessment also serves as a conservative estimate of potential exposure to other more distant commercial and industrial properties.

Off-site Residents. A small residential community is located on the north side of the slag area. These residents may also be exposed to contaminants via air, although existing low-volume monitoring results collected nearby (Executive Center) indicate present compliance with health-based standards for lead, cadmium and arsenic. Historically, atmospheric emissions may have impacted surface soils in this area; hence, this residential area is further evaluated under Surface Soil (next).

3.2.2 Surface Soil

Surface soil is defined in TNRCC guidance as the top two feet of soil. Surface soils may be impacted through direct release to surface soil, wind dispersion and atmospheric deposition, and stormwater flow. Once soil is impacted, intake may occur through incidental ingestion of soil.

On-site Workers. Elevated metals concentrations predominate throughout the investigation areas. As indicated for the air pathway, Asarco's biomonitoring program effectively manages potential adverse human health impacts. Regardless, a comparison of soil

concentrations to TNRCC default industrial soil concentrations provided in Section 5.0 of this appendix demonstrates that the biomonitoring program addresses the appropriate parameters.

Off-site Workers. The IBWC office is the only business sufficiently close to known areas of impacted soil to present a potential concern. The property is paved, precluding ingestion of soil directly. Windblown dusts and fugitive air emissions may settle in the buildings and provide a source of incidental soil ingestion. This exposure potential is therefore evaluated concurrently with the air pathway previously described.

Off-site Residents. Despite present assurances provided by the low volume air monitoring station at Executive Center, historic emissions may have deposited contaminants in the small residential area located directly north of the slag pile.

3.2.3 Surface Water

Surface waters of concern include the Rio Grande and the American Canal. Surface waters may potentially be impacted by wind deposition of soils, stormwater discharge and/or recharge by groundwater. Data from this investigation indicates that the American Canal would not receive substantial groundwater flow. Asarco has made improvements to become a zero-discharge facility, meaning that they either recycle or evaporate excess process water.

There is no direct contact of surface water by people on a regular basis. Access to the Rio Grande is controlled as an International Boundary. The American Canal is fenced to prevent trespass and for safety.

On-site and Off-site Workers and Off-site Residents. The American Canal conveys water to a water treatment plant, which provides water to businesses and residents of El Paso. This water is provided during the summer months when flow is increased in the Rio Grande. It is therefore important that present and future impacts to surface waters are controlled to support existing and future use as a drinking water resource. Existing concentrations are compared with regulatory criteria in Section 5.0 of this appendix. Furthermore, future potential impacts

to surface water quality are quantified using groundwater fate-and-transport models and compared with regulatory criteria.

Off-site Aquatic Life. Aquatic life in the Rio Grande may be exposed to metals; therefore, aquatic life standards also apply specifically to the Rio Grande.

3.2.4 Groundwater

Groundwater is likely impacted from leaching of surface soils. An additional potential source includes water loss and/or leaching of metals from process pond sediments. Despite elevated concentrations, no existing or reasonably anticipated future exposure to groundwater occurs. The site borders the Rio Grande, precluding impacts to any downgradient groundwater users, and Asarco obtains city water as a source of drinking water. Completion of the ConTop copper smelting process in 1993 confirms continued investment and long-term future use of the site for smelting.

A Water and Monitoring Well Survey, dated June 16, 1998, was completed to ensure that there were no wells potentially affected by the groundwater. No downgradient drinking water wells were identified (Attachment L-1, Water and Monitor Well Survey).

Since there is no existing or future potential exposure to groundwater as a drinking water source, the primary concern is recharge of contaminated groundwater to surface water at loads which may cause a significant impact.

3.3 QUANTIFICATION OF EXPOSURE

Two exposure pathways are quantified for this assessment; groundwater loads to surface water, and air and surface soil exposure to off-site workers.

3.3.1 Future Potential Loads to Surface Water Bodies and Resulting Surface Water Concentrations

A fate-and-transport model is presented in Appendix K and is summarized in Section 2.5 of this report. Quantitative results of this investigation are as follows:

Future Potential Arsenic Loads to the Rio Grande

	Rio Grande Results		
	Arsenic Concentration (mg/L)[2]	Arsenic Load (kg/day)[3]	Modeled Load from Groundwater (kg/day)
Source Area 1[1]			
Current	0.006	0.047	---
With Source Removal	0.019	0.146	0.099
With No Source Removal	0.087	0.678	0.631
Source Area 2[1]			
Current	0.006	0.047	---
With Source Removal	0.0066	0.052	0.005
With No Source Removal	0.0075	0.058	0.012

(1) Area 1 = Acid Plant Mist Precipitator Source; Area 2 = Ponds 5 & 6 Source

(2) From current data or groundwater modeling results. Model results for 280 years (Area 1) or 540 years (Area 2) from present.

(3) Calculated using model results and presumed low-flow conditions:

- 0.09 m^3/sec river flow;
- 1132 ft^3/day groundwater flux, 3.1 mg/L groundwater arsenic for Area 1 with source removal;
- 1212 ft^3/day groundwater flux, 18.4 mg/L groundwater arsenic for Area 1 with no source removal;
- 375 ft^3/day groundwater flux, 0.48 mg/L groundwater arsenic for Area 2 with source removal;
- 578 ft^3/day groundwater flux, 0.711 mg/L groundwater arsenic for Area 2 with no source removal.

mg/l = Milligrams per liter

kg = Kilograms

3.3.2 Off-Site Worker (IBWC) Exposure to Inhalation of Airborne Dust and to Incidental Ingestion of Dust Deposited in the Building

Default TNRCC exposure models, modified for applicability to this specific exposure scenario, were used to quantify exposure for all metals except lead, which is evaluated separately below. Site-specific adjustments include:

- Volatilization Removed. The metals under investigation are not volatile; therefore, this component of the exposure calculation could be eliminated. This simplification of the model does not affect final soil cleanup levels.

- Inhalation Rate Adjusted. The TNRCC default inhalation rate for a worker is 20 cubic meters per day. However, this condition evaluates office work only, which would be more consistent with the inhalation rate ascribed to residential settings of 15 m^3/day. This adjustment results in higher soil cleanup levels.

- Particulate Emission Factor. The particulate emission factor was recalculated for this site-specific application. This model is presented in Attachment L-2. The site-specific particulate emission factor is greater than the TNRCC default parameter, primarily as a result of the lack of a vegetative cover. This adjustment results in lower soil cleanup levels.

The equation and input parameters are presented in Table L-2. Because the result of this assessment is the derivation of media-specific cleanup levels, as opposed to estimates of risk, model results are deferred to the presentation of media-specific cleanup levels in Section 5.0 of this appendix.

3.3.3 Off-site Worker (IBWC) LEAD Exposure to Inhalation of Airborne Dust and to Incidental Ingestion of Dust Deposited in the Building

To support this assessment, we have chosen to use a relatively simple model (Bowers, et al., 1994; see Attachment L-3) as a screening tool to evaluate lead exposure in adults. This model allows for consideration of lead exposure via both incidental ingestion and inhalation.

Lead exposure is evaluated differently from other parameters in that it is based on blood lead levels, as explained in Attachment L-4. This difference requires that a separate exposure model be used specifically to evaluate lead in terms of modifications to blood lead levels. While the EPA has developed the Integrated Exposure Biokinetic Model for lead in children, no model has been developed by the EPA for evaluating lead exposure in adults. However, others have developed such models.

For this application, the model required one modification: the need to account for multiple sources of dust in the IBWC office. Dust is derived from: 1) historic Smeltertown during time periods when the wind blows northward; 2) from other regional sources; and 3) from the IBWC site. To reflect these multiple contributions, it is assumed for screening levels analysis purposes that 50% of the dust at the IBWC office is derived from historic Smeltertown.

Of note, the concentration of lead in the air, estimated by multiplying the PEF by the upper confidence limit lead concentration in soil, is less than the background air concentration reported by Bowers (1994). This result occurs even though our site-specific PEF exceeds TNRCC's default PEF factor. Lead predominates in urban environments from multiple sources, including existing and/or historic automobile emissions. Because air concentrations are low, the inhalation pathway does not significantly affect the resultant soil cleanup level concentration. The potential for incidental ingestion of windblown dust is estimated through our modeling results to be a more important potential pathway. This potential pathway could be further verified through the collection of dust wipe samples in the IBWC offices.

Any modeling effort must contain certain assumptions, shedding uncertainty on the resulting value. Where concern for the health of individuals exists, it is advisable to measure actual blood lead levels rather than rely on models.

The model and the input parameters are presented in Table L-3. Model results are deferred to the presentation of media-specific cleanup levels in Section 5.0 of this appendix.

4.0 TOXICITY ASSESSMENT

This section presents background information on the toxic properties of the metals of concern. A fundamental principal of toxicology is that that dose determines the toxic properties (or perhaps nutritional benefit) of a chemical. The toxic properties of a chemical can change, depending on the dose received. Accordingly, toxicity factors (cancer slope factors for carcinogens and chronic reference doses for systemic toxins) have been developed by the EPA to support quantitative risk assessment. These toxicity factors are intended to be protective of the most sensitive adverse effect known, and provide margins of safety against the unknown.

This assessment applies the most current toxicity factors developed by the EPA in deriving the media-specific cleanup levels presented in Section 5.0 of this appendix. Due to the supporting nature of the toxicity summaries, they are provided for each metal of concern as Attachment L-4, Toxicity Profiles. A summary of the toxicity factors is provided in the table below.

SUMMARY OF TOXICITY FACTORS

	Carcinogenic Slope Factor (mg/kg/day)[1]		Chronic Reference Dose (mg/kg/day)	
Parameter	Oral	Inhalation	Oral	Inhalation[1]
Arsenic	1.5	15	0.0003	0.0003
Cadmium	---	6.1	0.001[2]	0.0005
Chromium	---	41	1	1
Copper	---	---	0.005[2]	0.005
Iron	---	---	0.037	0.037
Lead	---	---	NA	NA
Selenium	---	---	0.005	0.005
Zinc	---	---	0.3	0.3

NA = Not Available from EPA, based on blood lead levels.

--- = Not Applicable, parameters not known to be carcinogenic.

(1) For many elements, no inhalation RfDs have been established by the EPA. To support this assessment, inhalation RfDs have been assumed to be identical to the oral RfDs in the absence of additional information.

(2) Reference doses for these chemicals are derived using the Maximum Contaminant Level or the Maximum Contaminant Level Goal, and assuming 2 liters/day water ingestion and a 70 Kg person.

5.0 DETERMINATION OF CRITICAL VALUES

This section of the risk assessment presents preliminary, media-specific cleanup levels protective of human health and the environment. This information is presented in a series of tables that compare Reasonable Maximum Exposure (RME) concentrations for surface soil, surface water and groundwater with appropriate "Comparison Values" (Tables L-4 through L-8). The Comparison Values consist of regulatory standards and risk-based concentrations protective of human health and the environment. These risk-based values are determined using the information presented in the Exposure Assessment and Toxicity Assessment sections. Essentially, the tables allow for the identification of parameter concentrations by media, which present potential health threats and support the establishment of preliminary cleanup level objectives. A conclusion to this section provides recommendations for preliminary cleanup level objectives and additional data collection.

5.1 DETERMINATION OF REASONABLE MAXIMUM EXPOSURE CONCENTRATIONS AND BACKGROUND CONCENTRATIONS

Consistent with EPA guidance, RME concentrations are used as a conservative, health-protective basis for evaluating potential risk (EPA, 1989). This value depends on the amount and nature of the data collected. Where there were relatively large data sets, with lognormal distributions, such as surface soil and groundwater investigation areas, the upper confidence limit approach recommended by EPA (1992) for lognormal distributions was used. In some cases, this approach produced values exceeding the maximum value measured in an Investigation Area, in which case the maximum value was reported.

In some cases, there was insufficient data to support statistical data summary, such as background monitoring points and seasonal surface water concentrations. Since background monitoring points were used as comparison values, selecting the maximum observed background concentration permits a consistent basis for comparison to reasonable maximum on-site or downgradient values.

5.2 ON-FACILITY SURFACE SOILS

Surface soil concentrations and comparison values are presented in Table L-4.

On-site Concentrations. The Remedial Investigation extensively evaluated surface soil concentrations in six on-facility remedial investigation areas. Consistent with EPA guidance (EPA, 1989), RME concentrations are used as a conservative, health-protective basis for evaluating potential risk.

Comparison Values. Comparison values for surface soils include background concentrations and health-based standards. Background concentrations are based on surface soil (upper two feet) concentrations at Monitor Wells EP-86 and EP-87. Well EP-84 was originally intended to serve as a background measurement, but concentrations of copper, lead and zinc in this area are elevated relative to the other background sites such that it was excluded for use in estimating local background soil concentrations. The USGS (1984) background values provide a basis for comparing on-site background concentrations with estimates of background concentrations nationally.

The TNRCC published Industrial Use Standard for the Soil/Air Ingestion SAI-Ind pathway. SAI-Ind values were used as comparison values. Published values were not provided for cadmium or zinc; therefore, these values were calculated using TNRCC's Equation 6 in the Risk Reduction Rules. In the absence of any controls or site-specific conditions, these soil values are considered to be protective of worker health.

Interpretation. On-facility concentrations for all metals exceeded both measured background concentrations for the site and background concentrations for the United States. However, on-facility concentrations do not exceed SAI-Ind values except for arsenic (all Investigation Areas), lead (all Investigation Areas), and cadmium (Investigation Areas 1 and 3 only). Asarco provides employee biomonitoring for arsenic, lead and cadmium in accordance with OSHA requirements, and is in compliance with this biomonitoring program. This institutional control precludes the need for further remedial action at the site to protect on-facility worker health.

5.3 SMELTERTOWN SURFACE SOILS

Smeltertown surface soil concentrations and comparison values are presented in Table L-5. Surface soils for this Investigation Area are addressed with a separate table, due to the different exposure pathways and comparison values that apply.

On-site Concentrations. The approach used to calculate the RME concentrations is identical for on-facility surface soils.

Comparison Values. For this area, health-based comparison values include TNRCC's published Soil/Air and Ingestion Standard for Residential Use (SAI-Res) and a site-specific Soil/Air and Ingestion Standard for Industrial Use (SAI-Ind) as described in Sections 3.3.2 and 3.3.3 of this appendix.

Interpretation. Surface soil concentrations for all metals in Smeltertown are far lower than for on-facility investigation areas; however, they do exceed background concentrations. Smeltertown surface soil concentrations only exceed the SAI-Res standards for arsenic and lead, although the SAI-Res standard for arsenic is far below background concentrations for the site and for the United States. This comparison indicates a potential health risk associated with future use of the site for residential purposes in the absence of some remedial action.

Similarly, the Smeltertown surface soil concentrations exceed the default TNRCC SAI-Ind standards for arsenic and lead presented in Table L-4. The arsenic standard is in the range of background soil concentrations; however, this comparison indicates that some mitigation may be necessary to support unrestricted future use of the former Smeltertown area for commercial or industrial purposes.

Smeltertown surface soil concentrations do not exceed the site-specific SAI-Ind standard except for arsenic, which has a standard roughly equal to background soil concentrations. This comparison indicates little to no health risk to existing employees at the IBWC business

complex, or to employees of businesses that may occupy the surrounding area in the future. Rather than rely on these modeling efforts, urinary arsenic biomonitoring of IBWC employees during the winter months, when winds predominate from the north, could be conducted to confirm or refute excess exposure.

5.4 SURFACE WATER

Surface water flows and concentrations vary seasonally. For this reason, two comparison tables are provided. Table L-6 presents low-flow concentrations corresponding to the November and February sampling events, and Table L-7 presents high-flow conditions corresponding to the May and August sampling events.

Downgradient Concentrations. Downgradient concentrations are summarized separately for the American Canal (SEP-1, SEP-3 and SEP-7) and the Rio Grande (SEP-2, SEP-10, SEP-11, SEP-12 and SEP-13). Due to the small data sets (6 results per parameter for the American Canal and 10 results per parameter for the Rio Grande), maximum values are presented as the RME.

Comparison Values. Background concentrations are represented by SEP-9. Consistent with TNRCC risk reduction rules (§335.563(g)), the Maximum Contaminant Level (MCL) is provided as the health-based standard for protection of human health. MCLs were developed by the EPA in accordance with the federal Safe Drinking Water Act, which regulates public water supply systems. MCLs apply to water in the American Canal during high flow, when water in the canal is used as a source of drinking water for El Paso. MCLs are also criteria that apply to the Rio Grande, since Texas Surface Water Quality Standards designate drinking water as a beneficial use for this section of the Rio Grande. Fresh water chronic standards (FW-Chronic) provide for the long-term (chronic) protection of aquatic life and, therefore, apply only to the Rio Grande. Fresh Water chronic standards were developed by the EPA in accordance with the federal Clean Water Act, and have since been adopted by the TNRCC. Consistent with Texas Surface Water Quality Standards, a hardness value of 250 mg/l was used to calculate hardness-dependent standards.

Interpretation – Low-Flow. During low-flow conditions in the American Canal, downgradient concentrations exceed background for arsenic, cadmium, copper, lead, selenium, and zinc. During these low-flow conditions the American Canal is not known to be in contact with groundwater, because the groundwater elevation is below the elevation of the bottom of the canal. The source of metals during this low-flow period is uncertain, but possible sources include windblown dust, storm water releases, or accumulated sediments in the canal. Because water in the canal is not used for drinking water during low-flow, MCLs do not apply.

During low-flow in the Rio Grande, lead is the only parameter that appreciably exceeds background concentrations. The data indicate a general trend in lead concentrations, beginning with a higher concentration at SEP-10, and concentrations decreasing with downgradient monitoring stations. Potential sources of lead in the Rio Grande are unknown, but may include groundwater recharge, impacted surface soils or storm water discharge from the U.S. or Mexican border. There is limited data with which to make conclusive statements at this time, and the February data for lead were qualified as estimated, indicating uncertainty in the data. Regardless, none of the lead measurements exceeded the MCL or fresh water chronic standard for lead, indicating the existence of no immediate health threat.

Interpretation – High Flow. In comparison with the low-flow event, parameter concentrations are generally lower in both the American Canal and the Rio Grande during high flow. Iron is an exception, with higher concentrations observed during high flow in upgradient and downgradient locations. Slightly elevated lead and zinc concentrations are also observed in upgradient and downgradient Rio Grande locations.

During high flow in the American Canal, arsenic, iron, lead and zinc concentrations exceed background levels. Similarly, iron, lead and zinc concentrations in the Rio Grande exceed background levels. Potential reasons for these results include groundwater recharge, stormwater inputs and windblown dispersion of impacted surface soils. Additionally, these findings may be an artifact resulting from limited background data to support the determination of a statistically significant difference in concentrations. None of the metals

identified at levels exceeding background are present at concentrations exceeding MCLs or freshwater chronic criteria.

5.5 GROUNDWATER

The groundwater comparison table is provided as Table L-8.

On-site Concentrations. The groundwater investigation area contains numerous monitoring wells, representing a broad range of conditions throughout the site. Statistically summarizing concentrations and presenting a single value to represent the RME condition was complicated because the data distributions varied substantially from normal or lognormal. For this reason, several statistical methods were used to present worst-case conditions, as presented in Table L-8.

Comparison Values. Background concentrations were based on wells EP-86, EP-87 and EP-89. Despite the fact that groundwater is not used as a drinking water source, MCLs are listed to provide human health-based comparison values. The primary concern with groundwater is the potential for groundwater to impact surface water resources. For this reason, freshwater chronic criteria are provided as a basis for evaluating potential effects to surface water aquatic life.

Interpretation. Except for chromium, all RME metals concentrations exceed background concentrations. RME groundwater concentrations also exceed MCLs, except for chromium, copper and lead. For these three parameters, only the maximum observed concentration exceeds the MCL. Similarly, RME groundwater concentrations exceed freshwater chronic criteria, except for chromium and lead, which do not exceed criteria even for the maximum observed value. These comparisons provide a basis for identifying future potential metals of concern. Since groundwater is not used as a source of drinking water, and since surface water concentrations are not presently impacted to levels exceeding criteria, there are no present or imminent impacts. The principal concern is for future potential impacts.

The potential for groundwater recharge to impact surface water was evaluated (Appendix K, Groundwater Modeling Data). The initial model results indicate that loads of arsenic, and perhaps other metals, may increase slowly over time. Model results for arsenic indicate that worst case future concentrations in the Rio Grande may increase in 280 years to 0.02 to 0.09 mg/l, depending on whether the source of arsenic is effectively eliminated. There is considerable uncertainty associated with this modelling effort; however, results indicate that source removal would prevent future concentrations from exceeding the MCLs.

5.6 SUMMARY

The following conclusions are made from this assessment:

- No imminent health threats as a result of environmental contamination from the Asarco El Paso Smelter site are identified. Potential worker risks from exposure to soil are appropriately managed, there is no exposure to groundwater, and metals concentrations in surface water are below health-based levels of concern (MCLs and Fresh Water Chronic Criteria).
- Cleanup Objectives should focus on prevention of future impacts to the American Canal and the Rio Grande, consistent with the requirement of Texas Surface Water Quality Standards. MCLs are the applicable standard for the American Canal, while both MCLs and Fresh Water Chronic Criteria are applicable to the Rio Grande. Non-degradation and related load limitations (TMDLs) would also apply.
- Additional data collection is recommended in order to more completely address the following issues:
  - Soil samples should be collected in the residential area to the north of the slag pile.
  - Possible sources of metals identified in the American Canal should be further evaluated.

6.0 UNCERTAINTY ASSESSMENT

In accordance with EPA guidance (1989) and TNRCC requirements (§335.553(b)(2)), this section of the report identifies uncertainties and variability associated with this assessment. Uncertainty refers to factors for which there is little or no information, while variability refers to factors having inherent variability, but which are estimated using a single value (such as body weight).

All of the procedures, models and related assumptions used in this risk assessment are routinely used in risk assessments today. While uncertainty in the derivation of health protective standards exists, adherence to EPA and TNRCC guidelines provides results comparable to those used at other sites and allows for a consistent basis for decision making.

Because of the numerous assumptions required to complete a risk assessment, the EPA confides that quantitative risks are considered to be upper bound limits of actual risk, and that actual risk may be as low as zero. One of the most frequent criticisms of EPA risk assessment methodology is the compounding effect of using RME estimates for multiple exposure factors. Reasonable maximum exposures are intended to provide clean-up standards that are not exceeded by more than five to ten percent of the population. However, when multiple RME factors are used in a calculation (such as ingestion rate, exposure frequency and exposure duration for the soil ingestion pathway in this risk assessment), the resulting risk estimates are actually protective of more than 99 percent of the population. The default procedure for calculating risk, therefore, results in risk estimates that virtually no one in the surrounding population would be expected to experience. Actual RME risks more likely lie between the RME and average risk estimates.

The following list identifies areas of uncertainty specific to this assessment that could be improved upon with additional data collection:

- Air Dispersion Modeling. The determination of a Particulate Emission Factor is likely to be highly conservative (larger than actual). Since workers presently exist in the

area, biomonitoring of the workers would provide much more conclusive estimates of actual exposure under current conditions.

- Soil Ingestion Rates. Estimates of exposure to chemicals in soil are strongly dependent on soil ingestion rates. The actual incidental soil ingestion rate is unknown, and there is considerable variability between individuals. Where exposure is a concern to presently exposed individuals, biomonitoring can provide an improved measure of actual exposure.

- Arsenic Toxicity. Present TNRCC default soil cleanup levels are equal to or less than background soil concentrations. There is considerable debate over the toxicity factor used for arsenic. The debate is further complicated by the fact that arsenic skin cancers are highly treatable. Congress has mandated that the EPA re-evaluate arsenic toxicity and the MCL, and this work is ongoing. As is the case for all toxicity factors developed by the EPA, they are set at a level that likely overestimates toxicity in order to provide a margin of safety.

- Blood Lead Modeling. The Bowers (1994) model used in this assessment provides a simple screening tool for evaluating exposure in adults. There is considerable variability between individuals in the amount of lead exposure actually received, due to differences in physical and behavioral (such as hand-to-mouth activity) characteristics. Where possible, actual blood lead measurements would provide a more definitive estimate of actual exposure.

- Groundwater Modeling. Numerous assumptions are inherent in any groundwater modeling effort, and considerable resources can be expended in such efforts without gaining appreciable confidence in the final result. Groundwater modeling approach was simple and conservative. While care must be used in drawing detailed conclusions, model results do indicate that groundwater concentrations may slowly rise with time (on the scale of hundreds of years), and that source removal would reduce future groundwater concentrations. Our present understanding of the groundwater flow and groundwater/surface water interaction does not explain the occurrence of metals in surface water, supporting the need for additional data collection.

7.0 REFERENCES

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TABLES

TABLE L-1. GLOSSARY OF RISK ASSESSMENT TERMINOLOGY

TERM	DEFINITION
Cancer Slope Factor (CSF)	A plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime. The slope factor is used to estimate an upper-bound probability of an individual developing cancer over a lifetime as a result of exposure to a particular level of a potential carcinogen (ELCR).
Chronic Reference Dose (RfD)	An estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a maximum daily exposure level for the human population, including sensitive sub-populations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. Chronic RfDs are specifically developed to be protective for long-term exposure to a compound (as a Superfund program guideline, seven years to lifetime).
Constituents of Potential Concern (COC)	Chemicals that are potentially site-related and whose data are of sufficient quality for use in the quantitative risk assessment.
Dose	A quantity of chemical exposure occurring at one time.
Excess Lifetime Cancer Risk (ELCR)	Upper-bound estimate of the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen; calculated as the product of the CSF and exposure dose.
Exposure	Contact of an organism with a chemical or physical agent. Exposure is quantified as the amount of the agent available at the exchange boundaries of the organism and available for absorption.

GLOSSARY OF RISK ASSESSMENT TERMINOLOGY, continued

TERM	DEFINITION
Exposure Pathway	The course a chemical or physical agent takes from a source to an exposed organism. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs for the source, a transport/exposure medium (e.g., air) or media (in cases of inter-media transfer) must also be included.
Exposure Point	A location of potential contact between an organism and a chemical or physical agent.
Exposure Route	The way a chemical or physical agent comes in contact with an organism (i.e., by ingestion, inhalation, dermal contact).
Hazard Index (HI)	The sum of more than one hazard quotient for multiple substances and/or multiple exposure pathways. Separate His are calculated to assess non-carcinogenic effects in chronic, subchronic, and shorter duration exposures.
Hazard Quotient (HQ)	The ratio of a single substance exposure level over a specified time period (e.g., chronic) to a reference dose for that substance derived from a similar exposure period.
Integrated Risk Information System (IRIS)	An EPA database containing verified RfDs and CSFs and up-to-date health risk and EPA regulatory information for numerous chemicals. IRIS is EPS's preferred source for toxicity information.
Lowest-Observed-Adverse-Effects-Level (LOAEL)	In dose-response experiments, the lowest exposure level at which there are statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control group.

GLOSSARY OF RISK ASSESSMENT TERMINOLOGY, continued

TERM	DEFINITION
No-Observed-Adverse-Effects-Level (NOAEL)	In dose-response experiments, an exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control. Some effects may be produced at this level, but they are not considered to be adverse, nor precursors to specific adverse effects. In an experiment with more than one NOAEL, the regulatory focus is primarily on the highest one, leading to the common usage of the term NOAEL to mean the highest exposure level without adverse effect.
No-Observed-Effect-Level (NOEL)	In dose-response experiments, an exposure level at which there are no statistically or biologically significant increases in the frequency or severity of any effect between the exposed population and its appropriate control.
Particulate Emission Factor (PEF)	Relates the chemical constituent concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from the surface soil.
Qualitative Evaluation	A descriptive assessment of potential risks and hazards associated with exposure.
Quantitative Evaluation	A numerical estimate of potential risks and hazards associated with exposure.
Reasonable Maximum Exposure Point Concentration	The lesser of the calculated 95 percent UCL concentration and the maximum detected concentration for a specific COC.
Receptor	Individual or population potentially exposed to constituents at an exposure point. An integral component of the exposure pathway.

GLOSSARY OF RISK ASSESSMENT TERMINOLOGY, continued

TERM	DEFINITION
Toxicity Value	A numerical expression of a constituent's dose-response relationship that is used in risk assessments. The most common are RfDs and CSFs.
Upper Confidence Level (UCL)	The percent likelihood that the arithmetic mean concentration for a chemical constituent lies below the target concentration. A high level of confidence (95 percent) is used to compensate for the uncertainty involved in representing site conditions with a finite number of samples.
Weight-of-Evidence Classification	An EPA classification system for characterizing the extent to which the available data indicate that an agent is human carcinogen. Recently, EPA has developed weight-of-evidence classification systems for some other kinds of toxic effects, such as developmental effects.

TABLE L-2. OFF-SITE WORKER (IBWC) EXPOSURE MODEL

TNRCC EQUATION 5

MSC for Worker Ingestion of Soils and Inhalation of Particulates; Carcinogens

$$MSC = \frac{TR \times BW \times AT_c \times 365 days/yr}{EF \times ED \times \left[\left(SF_o \times 10^{-6} Kg/mg \times IR_{soil}\right) + \left(SF_i \times IR_{air} \times (1/PEF)\right)\right]}$$

TNRCC Equation 6

MSC for Worker Ingestion of Soils and Inhalation of Particulates; Systemics

$$MSC = \frac{THI \times BW \times AT_s \times 365 days/yr}{EF \times ED \times \left[\left((1/RFD_o) \times 10^{-6} Kg/mg \times IR_{soil}\right) + \left((1/RfD_o) \times IR_{air} \times (1/PEF)\right)\right]}$$

Where:

Parameters	Definitions (Units)	Values
MSC	Medium Specific Concentration (mg/Kg)	calculated
TR	Target excess individual lifetime cancer risk (unitless)	10^{-6} Class A, B carcinogens; 10^{-5} for Class C carcinogens
THI	Target hazard index (unitless)	1
SF_o	Oral cancer slope factor ((mg/Kg-day)$^{-1}$)	chemical-specific (Section 4.0)
SF_I	Inhalation cancer slope factor ((mg/Kg-day)$^{-1}$)	chemical-specific (Section 4.0)
RfD_o	Oral chronic reference dose (mg/Kg-day)	chemical-specific (Section 4.0)
RFD_I	Inhalation chronic reference dose (mg/Kg-day)	chemical-specific (Section 4.0)
BW	Adult body weight (Kg)	70 Kg
AT_c	Averaging time for carcinogens (yr)	70 yr
AT_s	Averaging time for systemic toxicants (yr)	30 yr res.; 25 yr worker
EF	Exposure frequency (days/yr)	350 res.; 250 worker
ED	Exposure duration (yr)	30 yr res.; 25 yr worker
IR_w	Daily water ingestion rate (liter/day)	2 l/day res.; 1 l/day worker
IR_{soil}	Workday soil ingestion rate (mg/day)	50 mg/day
IR_{air}	Daily indoor inhalation rate	15m^3/day residential 20 m^3/8 hr day worker
PEF	Particulate emission factor	2.54 x 10^9 m^3/Kg (site specific)

TABLE L-3. OFF-SITE WORKER (IBWC) LEAD EXPOSURE MODEL

Adult Blood Lead Model (Bowers, et.al., 1994)

$$PbB = 3.1 + (BSF)\left[\left(I_{s/d} \times A_{s/d} \times t \times \left(C_{s/d} - C_{bkgd/s}\right)\right) + \left(V_a \times A_a \times T \times \left(C_a - C_{bkgd/a}\right)\right)\right]$$

Rearranging the equation to solve for the concentration in soil/dust ($C_{s/d}$), and adding a factor to account for the percent of dust at the site that is derived from the adjacent field (historic Smeltertown), yields:

$$C_s = \frac{\left((PbB - 3.1)(1/BSF) - \left(V_a \times A_a \times t \times \left(C_a - C_{bkgd/a}\right)\right)\right)}{I_{s/d} \times A_{s/d} \times t \times S_{s/d}} + C_{bkgd/d}$$

Where:

Parameters	Definitions (Units)	Values
BSF	Biokinetic Slope Factor	0.375 ug/dL per ug/day
$I_{s/d}$	Soil/dust ingestion	0.02 g/day
$A_{s/d}$	Soil/dust absorption	0.08
t	Fraction of waking hours spent on site	0.33
$C_{s/d}$	Concentration soil /dust (RME Smeltertown)	1,884 mg/kg
$C_{bkgd/d}$	Background concentration of soil and dust (site-specific)	87 mg/kg
V_a	Ventilation rate during waking hours	15 m^3/day
A_a	Percent lung deposition and absorption	0.32
C_a	Air concentration (PEF x $C_{s/d}$)	4.785 x 10^{-6} ug/m^3
$C_{bkgd/a}$	Background concentration air	0.20 ug/m^3
$S_{s/d}$	Fraction Soil/Dust derived from the contaminated area	0.5

ug = micrograms
dL = liters per day

TABLE L-4. SURFACE SOIL CONCENTRATION SUMMARY
Units in mg/kg

Parameters	On-site UCL/Max. Concentration [1]						Comparison Values		
	Area 1	Area 2	Area 3	Area 4	Area 8	Entrance	Back-ground [2]	USGS [3]	SAI-Ind [4]
Arsenic	22,000	1,800	7,800	5,961	3,397	750	10	5.2	3.27 [5]
Cadmium	1,900	420	1,600	799	516	250	5	N/A	1,020
Chromium (Total)	330	340	432	122	112	139	86	37	5,110
Copper	36,419	12,000	20,000	50,265	57,303	12,000	76	17	75,622 [6]
Iron	74,981	179,222	75,951	190,000	81,319	30,198	19,000	18,000	- - - [7]
Lead	11,000	9,500	25,000	31,960	16,518	5,700	87	16	1,000
Selenium	1,300	82	73	49	28.8	11.44	5	0.26	10,200
Zinc	13,000	110,000	16,000	13,737	13,763	5,700	100	44	613,200 [6]

(1) Upper Confidence Limit (UCL) of the mean for a lognormal distribution (EPA, 1992), except maximum measured value used where UCL exceeds maximum value. One-half the detection limit used for nondetected values. Calculations provided in Attachment L-5.

(2) Based on maximum surface soil concentration at background wells EP-86 and EP-87.

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

(4) SAI-Ind = Soil/Air and Ingestion Standard for Industrial Use. Maximum Concentration in Industrial Soil Considering Cross-media Contamination of Air and the Human Ingestion and Inhalation Pathways (mg/kg). From TNRCC Administrative Code, Chapter 335.

(5) Based on slope factor of 1.75, rather than 1.5 currently used by the EPA.

(6) Calculated using TNRCC MSC Equation 6, and an RfD of 0.037 mg/kg/day for copper and 0.3 mg/kg/day for zinc from IRIS.

(7) EPA has not established an RfD to support quantitative risk assessment.

(8) N/A = Not available

TABLE L-5. SMELTERTOWN SURFACE SOIL CONCENTRATION SUMMARY

Parameters	Smeltertown (A5) UCL/Max. Concentration [1]	Comparison Values			
		Background	USGS	SAI-Res [2]	SAI-Ind [3]
Arsenic	64	10	5.2	0.366	7.6
Cadmium	52.3	5	N/A	137	4,090
Chromium	50.7	86	37	391	1,150
Copper	4,741	76	17	10,154	151,000
Iron	20,826	19,000	18,000	- - - [4]	- - - [4]
Lead	1,884	87	16	500	11,804 [5]
Selenium	7.78	5	0.26	1,370	20,400
Zinc	1,344	100	44	- - - [6]	- - - [6]

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

(2) SAI-Res = Soil/Air and Ingestion Standard for Residential Use. Maximum Concentration in Residential Soil Considering Cross-media Contamination of Air and the Human Ingestion and Inhalation Pathways (mg/kg). From TNRCC Administrative Code, Chapter 335, except for copper which was calculated.

(3) Calculated using TNRCC Equation 5 (carcinogens) or Equation 6 (systemics), using toxicity factors provided in Enclosure 4, and modified to account for the site-specific factors.

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

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

(6) Value exceeds that of pure zinc (i.e., greater than 1,000,000 mg/kg) using TNRCC MSC Equation 4 and an RfD of 0.3 mg/kg/day from IRIS.

(7) Based on carcinogenicity of Chromium (VI).

TABLE L-6. TOTAL RECOVERABLE SURFACE WATER CONCENTRATIONS (mg/l) SUMMARY - LOW FLOW

Parameter	Downgradient Concentrations						Comparison Values		
	American Canal [1]			Rio Grande [2]					
	Min.	Mean	Max.	Min.	Mean	Max.	Upgradient [3] Max.	MCL	FW- Chronic [4]
Arsenic	0.010	0.585	1.6	0.008	0.01	0.015	0.011	0.05	0.190
Cadmium	<0.005	0.006	0.019	<0.005	<0.005	<0.005	<0.005	0.005	0.0023
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1 [5]	0.438 [5]
Copper	<0.025	0.021	0.043	<0.025	0.01	0.026	<0.025	1.3 [6]	0.028
Iron	<0.01	0.207	0.6	0.17	0.972	1.6	0.6	0.3	None
Lead	<0.003	0.008	0.021	<0.003	0.006	0.013	<0.003	0.015	10.2
Selenium	<0.005	0.123	0.36	<0.005	<0.005	0.006	<0.005	0.05	0.005
Zinc	<0.010	0.032	0.068	<0.010	0.019	0.029	0.031	5.0 [6]	0.230

Low-Flow = November and February sampling events

< = not detected at the indicated detection limit.

(1) MCL criteria apply. Total metals for sample locations SEP-1, SEP-3 and SEP-7. Calculations provided in Attachment L-5.

(2) MCL and Fresh Water-Acute Criteria apply. Total metals for sample locations SEP-2, SEP-4, SEP-10, SEP-11, SEP-12 and SEP-13. Calculations provided in Attachment L-1.

(3) Total metals for SEP-9.

(4) Fresh Water Chronic Criteria using a hardness of 250 mg/l for hardness-dependent parameters.

(5) Trivalent form.

(6) Secondary MCL, unenforceable federal guideline regarding taste (copper and zinc) and staining of laundry (copper only).

TABLE L-7. TOTAL RECOVERABLE SURFACE WATER CONCENTRATIONS (mg/l) SUMMARY - HIGH FLOW

Parameter	Downgradient Concentrations						Comparison Values		
	American Canal [1]			Rio Grande [2]					
	Min.	Mean	Max.	Min.	Mean	Max.	Upgradient [3] Max.	MCL	FW- Chronic [4]
Arsenic	0.005	0.008	0.013	<0.005	0.004	0.006	0.006	0.05	0.190
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.0023
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1 [5]	0.438 [5]
Copper	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	1.3 [6]	0.028
Iron	2.0	3.33	4.7	1.6	3.58	5.9	3.2	0.3	None
Lead	<0.005	0.005	0.008	<0.003	0.006	0.014	0.004	0.015	10.2
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05	0.005
Zinc	0.022	0.031	0.044	0.026	0.032	0.042	0.037	5.0 [6]	0.230

High Flow = May and August sampling events

< = not detected at the indicated detection limit.

(1) Total metals for sample locations SEP-1, SEP-3 and SEP-7. Calculations provided in Attachment L-5. MCL comparison values apply.

(2) Total metals for sample locations SEP-2, SEP-4, SEP-10, SEP-11, SEP-12 and SEP-13. Calculations provided in Attachment L-5. MCL and Fresh Water-Acute comparison values apply.

(3) Total metals for SEP-9, maximum value.

(4) Fresh Water Chronic Criteria using a hardness of 250 mg/l for hardness-dependent parameters.

(5) Trivalent form.

(6) Secondary MCL, unenforceable federal guideline regarding taste (copper and zinc) and staining of laundry (copper only).

TABLE L-8. GROUNDWATER CONCENTRATIONS (mg/l) SUMMARY

Parameter	On Site [1]					Comparison Values		
	AVERAGE	LN UCL [2]	95th Percentile [3]	UCL [4]	Max.	MCL	FW Chronic [5]	Back-ground [6]
Arsenic	8.5	28.2	48.5	13.5	464	0.05	0.190	0.054
Cadmium	0.69	0.100	1.04	1.3	43	0.005	0.0023	<0.005
Chromium	0.007	0.0064	0.01	0.009	0.24	0.1 [7]	0.438 [8]	0.016
Copper	0.077	0.032	0.12	0.14	5.6	1.3 [9]	0.027	0.033
Iron	27.5	1.52	4.18	55.8	2381	0.3 [10]	None	0.100
Lead	0.004	0.003	0.01	0.006	0.110	0.015 [9]	10.2	0.006
Selenium	0.49	0.862	2.06	0.64	7	0.05	0.005	0.043
Zinc	19.0	1.51	17.6	38.4	1900	5.0 [10]	0.230	0.030

< = not detected at the indicated detection limit.

(1) Dissolved metals concentrations based on 4 monitoring events (Fall '97, Winter '97, Spring '98 and Summer '98). One-half the detection limit used for nondetected values. Calculations provided in Attachment L-5.

(2) Upper Confidence Limit (UCL) of the mean for a lognormal distribution (EPA, 1992), except maximum measured value used where UCL exceeds maximum value. One-half the detection limit used for nondetected values. Calculations provided in Attachment L-5.

(3) Based on a ranked order, (i.e., distribution free).

(4) Upper Confidence Interval of a normal distribution.

(5) Fresh Water Chronic Criteria using a hardness of 250 mg/l for hardness-dependent parameters.

(6) Based on the maximum dissolved concentration observed in wells EP-86, EP-87 and EP-89.

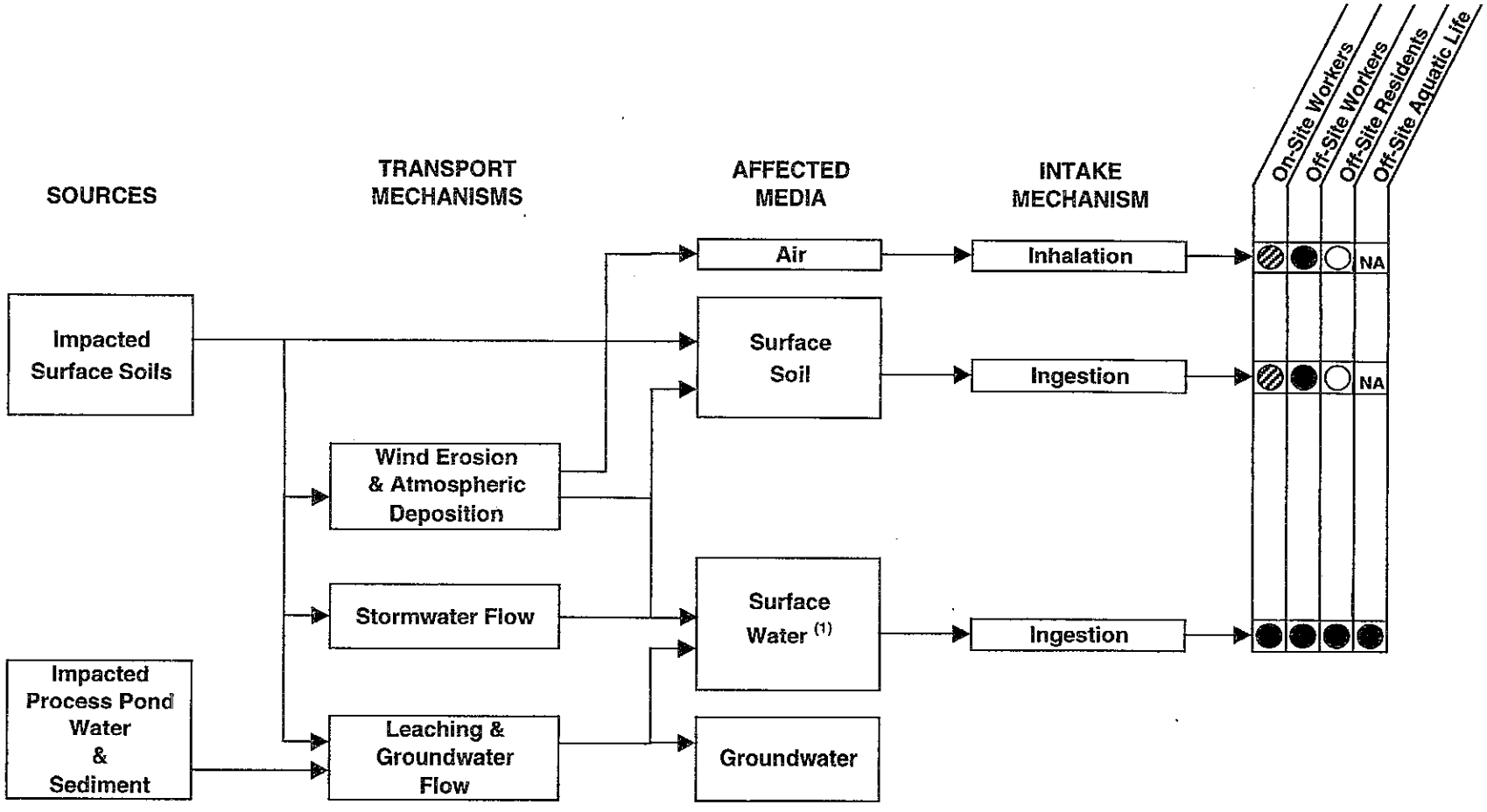
(7) Total Chromium.

(8) Trivalent form.

(9) Lead and Copper Rule.

(10) Secondary MCL, unenforceable federal guideline regarding taste (copper and zinc) and staining of laundry (copper only).

FIGURES



Notes:

- ● Potential exposure pathway, evaluated quantitatively
- ▨ Potential exposure pathway, controls or remedial system in-place, evaluated quantitatively
- ○ Potential exposure pathway, insufficient data to support quantitative analysis, evaluated qualitatively

NA Not an exposure pathway, not evaluated

(1) The American Canal and the Rio Grande

Figure L-1
EXPOSURE PATHWAY FLOW CHART

H:\FILES\128\0734\RIREPORT\FIGURES\Pathway\FigL-1\TUC\8/28/98\065

APPENDIX L

Attachment L-1

Water and Monitor Well Survey, AIC, July 1998

AIC
AGENCY INFORMATION CONSULTANTS
an ERIIS Company
800 Brazos Street, Suite 740
Austin, TX 78701
Tel (800) 945-9509; (512) 478-8991
Fax (512) 478-5215

WATER AND MONITOR WELL SURVEY

SUBJECT PROPERTY:

Asarco Inc.
2301 W. Paisano
El Paso, Texas

Client Project #0734-503.100
AIC #02-0051089

Submitted
July 8, 1998

Research Protocol

Agency Information Consultants (AIC) reviews records at the Texas Water Development Board (TWDB) and the Texas Natural Resource Conservation Commission (TNRCC) to obtain information concerning water and monitor wells within the requested Area of Review (AOR). Due to the TNRCC file system, the research for monitor wells is separate from water wells, but AIC compiles the results in one report. As documentation, AIC locates identified wells on a color copy of a USGS 7.5 Minute Topographic Map and provides copies of Drillers' Logs.

AIC cannot guarantee the accuracy of the information provided by state agencies. This report is intended to provide the user with a "working approximation" of reported well locations. Following are the specific research procedures utilized to produce the results in this report.

- Identify all Located Wells within the AOR according to the TWDB files, county highway maps and topographic maps.
- Identify all Plotted Wells within the AOR according to the TWDB county highway maps.
- Identify all Partially Numbered Wells within the AOR according to the TNRCC files containing records submitted by the well driller.
- Identify all Unnumbered Wells within the AOR according to the TNRCC files containing records submitted by the well driller.
- Identify Monitor Wells within the AOR according to the TNRCC DIM files containing records submitted by the well driller. AIC also searches for Monitor Well records misfiled with the Partially Numbered Wells.

As part of the standard Water & Monitor Well Survey Protocol, AIC does not review Plugged & Abandoned or Unplotted Well files. These files can be reviewed upon special request by the client.

Description of Terms

Located Water Well: Well locations that have been field checked by a TWDB or USGS staff member, spotted on a USGS 7.5' topographical or county highway map, assigned an unique identification number, and filed at the TWDB.

Plotted Water Well: Approximate well locations spotted on county highway maps by the TWDB staff members according to information submitted on the Driller's Log. The state assigned unique identification numbers to these wells, but in high density areas, a single identification number may represent multiple well locations. The TWDB eliminated this plotting activity in June 1986.

Partially Numbered Water Well: Well locations established to within a 2.5 minute topographic quadrangle by the TNRCC according to maps submitted with the Driller's Log. The TNRCC assigned a State ID Number corresponding to this generalized location. This procedure for records processing has been in effect since June 1986.

WATER AND MONITOR WELL SURVEY

Unnumbered Water Well: Well locations are not assigned by either the TWDB or the TNRCC. The Driller's Log and any corresponding maps are filed by county at the TNRCC. This procedure for records processing has been in effect since June 1991.

DIM Files: Monitor well records are contained in the De-watering, Injection, and Monitor (DIM) files at the TNRCC. The Driller's Log and any corresponding maps are filed by county..

Thank you for your order.

If you have any questions or comments regarding this report, please call AIC at (800)945-9509 or locally at (512)478-8991.

WATER AND MONITOR WELL SURVEY

REPORT SUMMARY

Submitted July 8, 1998

Subject Property: Asarco Inc.
2301 W. Paisano
El Paso, Texas

Client Project #0734-503.100 **AIC #02-0051089**

Area of Review: 1/2 Mile Radius

WELL TYPE	TOTAL NUMBER FOUND
Located Water Wells	3
Plotted Water Wells	1
Partially Numbered Water Wells	1*
Unnumbered Water Wells	0
Monitor Wells	10
TOTAL NUMBER FOUND	25

***NOTE:** When well drillers do not submit a locational map or when maps are misplaced in state files, AIC may not be able to determine the exact well location. When the exact location of a well can not be determined, it is still included in the above totals. Any available records are labeled "LU" for Location Unknown and are included in the Records Section of the report.

WATER AND MONITOR WELL SURVEY
REPORT DETAIL

Submitted July 8, 1998

Subject Property: Asarco Inc.
2301 W. Paisano
El Paso, Texas

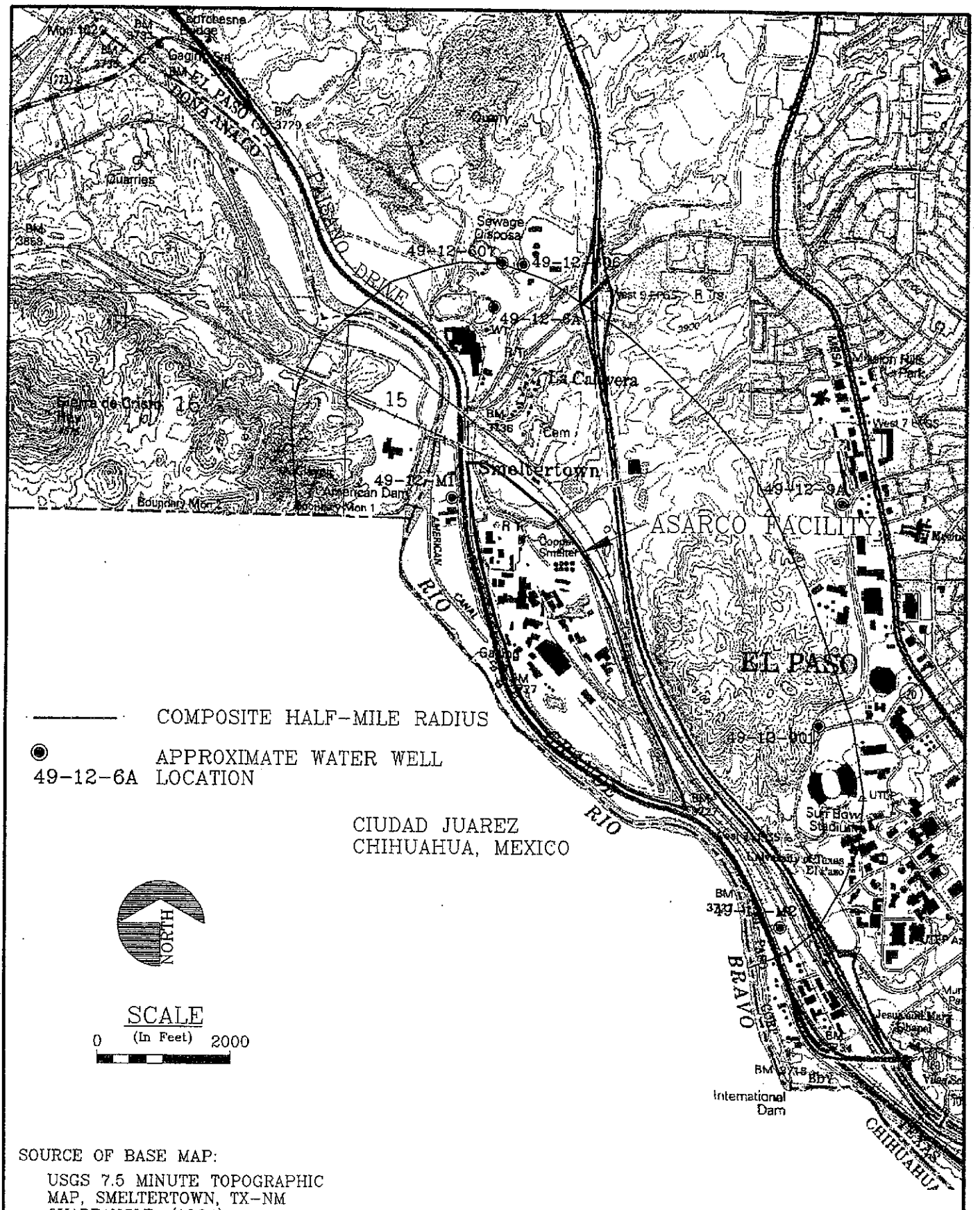
Client Project #0734-503.100 **AIC #02-0051089**

Area of Review: 1/2 Mile Radius

Wells are listed in this table by state identification number. On the map, wells are referenced by only the final digits of these numbers.

( ) AIC assigned unique number for Partial and Unnumbered wells
[ ] Total Plotted wells at a single location
M# AIC assigned unique number for Monitor wells
[NR] No Records or Driller's Log available

LOCATED	PLOTTED	PARTIAL	UNNUMBERED	MONITOR
49-12-606	49-12-6A			[4] M1
607				[6] M2
901				



SOURCE OF BASE MAP:

USGS 7.5 MINUTE TOPOGRAPHIC MAP, SMELTERTOWN, TX-NM QUADRANGLE, (1994)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	WATER WELL INVENTORY MAP	FIGURE L-1-1

UPDATE TIME: 9:00
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TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer _____ Field No. UV 253 U-59 State Well No. 49-12-606

Owner's Well No. _____ County El Paso

1. Location: ___ l/h, ___ l/4 Sec. _____, Block _____ Survey _____
51 47 39N 106 31 32.1
2. Owner: Southwestern Portland Cement Co. Address: _____
Tenant: Powell Constr. Co. Address: _____
Driller: Sw Ptl'd Cem. Co. Address: _____
3. Elevation of _____ LSD is 3800 ft. above msl, determined by Topo
4. Drilled: _____ 19 1951; Dug, Cable Tool, Rotary, _____
5. Depth: Rept. 140 ft. Meas. _____ ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed Sub
7. Pump: Mfgr. Berkley Type Turbine (3")
No. Stages _____, Bowls Diam. ___ in., Setting _____ ft.
Column Diam. 4 in., Length Tailpipe _____ ft.
8. Motor: Fuel Elec. Make & Model _____ HP. 7½
9. Yield: Flow ___ gpm, Pump 40 gpm, Meas., (Rept.), Est. _____
10. Performance Test: Date _____ Length of Test _____ Made by _____
Static Level ___ ft. Pumping Level ___ ft. Drawdown ___ ft.
Production _____ gpm Specific Capacity _____ gpm/ft.
11. Water Level: 48.99 ft. rept. (Meas) 11/21 1951 above (below) top of casing which is <1' ft. above (below) surface.
_____ ft. rept. meas. _____ 19__ above below which is ___ ft. above below surface.
_____ ft. rept. meas. _____ 19__ above below which is ___ ft. above below surface.
_____ ft. rept. meas. _____ 19__ above below which is ___ ft. above below surface.
12. Use: (Dom.), Stock, Public Supply, (Ind.), Irr., Waterflooding, Observation, Not Used, _____
13. (Quality) (Remarks on taste, odor, color, etc.) _____
Temp. ___ °F, Date sampled for analysis 6/25/53 Laboratory _____
Temp. ___ °F, Date sampled for analysis _____ Laboratory _____
Temp. ___ °F, Date sampled for analysis _____ Laboratory _____
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test, _____
15. Record by: TWDB Date 3/3 1971
Source of Data USGS well sched (JW Hood 6/25/53)
16. Remarks:
Well drilled entirely in hard rock - some beds of sand - probably Cretaceous since surface rock is K
(15' ø shaft - about 100' east of other well) - 49-12-607
Both wells 49-12-606 & 607 used only for drinking water at present.
Pumping and other
no access to measure WL 4/1/75 RR

Wells used in cement manufacturing process

CASING & BLANK PIPE

Cemented From ___ ft. to ___ ft.

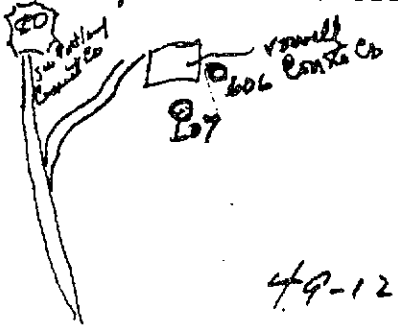
Diam. (in.)	Type	Setting, ft. from	to
6	Steel		

WELL SCREEN

Screen Openings

Diam. (in.)	Type	Setting, ft. from	to

(Sketch)



TWDBE-WD-2

49-12-606 ✓

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer________________ Field No. U-60 State Well No. 49-12-607

Owner's Well No. __________ County El Paso

1. Location: ___1/4, ___1/4 Sec.____, Block______ Survey__________
314739N 1063125.1
2. Owner: Southwest Portland Cement Company Address:
Tenant: Vowell Constr Co Address:
Driller: Address:
3. Elevation of LSD is 3800± ft. above msl, determined by TOPO
4. Drilled: ______ 1951, Dug, Cable Tool, Rotary,
5. Depth: Rept. 240 ft. Meas.______ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed Sub
7. Pump: Mfgr. Berkeley Type [illegible]
No. Stages____, Bowls Diam.____in., Setting______ft.
Column Diam.______in., Length Tailpipe______ft.
8. Motor: Fuel Elec Make & Model HP.
9. Yield: Flow____gpm, Pump____gpm, Meas., Rept., Est.
10. Performance Test: Date______ Length of Test____ Made by
Static Level___ft. Pumping Level___ft. Drawdown____ft.
Production______gpm Specific Capacity______gpm/ft.
11. Water Level: 45.88 ft. rept. meas. 11/21 1955 above below top of csg which is ___ ft. above below surface.
_____ ft. rept. meas. ___ 19__ above below ______ which is ___ ft. above below surface.
_____ ft. rept. meas. ___ 19__ above below ______ which is ___ ft. above below surface.
_____ ft. rept. meas. ___ 19__ above below ______ which is ___ ft. above below surface.
12. Use: Dom. Stock, Public Supply, Ind. Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
Temp.___°F, Date sampled for analysis______ Laboratory______
Temp.___°F, Date sampled for analysis______ Laboratory______
Temp.___°F, Date sampled for analysis______ Laboratory______
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: TWDB Date 3/3 1975
Source of Data USGS well sched (RESmith 11/21/55)
16. Remarks:
Both wells (49-12-606 & 607) used only for drinking water at present. 205' pump shaft on this well. About 100' west of other well (U-59 - 49-12-606)

4/4/75
Pumping, all no access to measure WL

CASING & BLANK PIPE

Cemented From ______ ft. to ______ ft.

Diam. (in.)	Type	Setting, ft. from	to
8			240

WELL SCREEN

Screen Openings

Diam. (in.)	Type	Setting, ft. from	to

See sketch on 606

TWDBE-WD-2 (Sketch) 49-12-607 ✓

RECEIVED

APR 29 1981

CR/TDWR

TEXAS DEPARTMENT OF WATER RESOURCES

WELL SCHEDULE

Aquifer(s)_____ Project No._____ State Well No. 49-12-901

_____ Field No./Owner's Well No._____ County El Paso

1. Location: ___ ¼, ___ ¼, Section ___, Block ___, Survey _____, Lat. 31°46'37" N, Long. 106°30'27"

2. Owner: Univ. Texas El Paso (Geophysics) Address:_____

Tenant (other):_____ Address:_____

Driller: Binkley Address:_____

3. Land Surface Elevation: 3970 ft. above msl determined by Smeltertown 7½' map

4. Drilled: June 1979; Dug, Cable Tool, Rotary, Air, _____

5. Depth: Rept._____ ft. Meas. 394 ft.

6. Borehole Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed

7. Pump: Mfr._____ Type None

No. Stages_____, Bowls Diam.____in., Setting_____ft.

Column Diam._____in., Length Tailpipe_____ft.

8. Motor: Mfr._____ Fuel_____ HP._____

9. Yield: Flow_____gpm, Pump_____gpm, Meas., Rept., Est._____ Date___

10. Performance Test: Date_____ Length of Test_____ Made by_____

Static Level____ft. Pumping Level____ft. Drawdown_____ft.

Production_____gpm Specific Capacity_____gpm/ft.

11. Quality: (Remarks on taste, odor, color, etc.)_____

Analyses

Date_____ Laboratory_____ TDS____ Sp Cond_____

Date_____ Laboratory_____ TDS____ Sp Cond_____

12. Other data available (as circled): Pumping Test, Power & Yield Test, Drillers Log, Formation Samples, Geophysical Log(s) Cuttings & core data at UTEP (type) T-log

CASING, BLANK PIPE & WELL SCREEN
Cemented From____ft. to____ft.

Diam. (In.)	Type	Setting (feet) from	to
1½	steel		
No Perf. or Screen			

13. Water Level(s): _____ft. rept. meas._____ 19___ above below _____ which is____ft. above below Land Surface

_____ ft. rept. meas._____ 19___ above below _____ which is____ft. above below Land Surface

14. Use: Dom., Stock, Public Supply, Ind., Irr., (Observation) Other (Test Hole, Oil Test, etc.) Heat flow

15. Recorded by: J. Mikels (USGS) Source of data: T-log & field Date: 7/13/80

16. Remarks: Sealed at bottom & filled with water.

17. Location or Sketch:

TDWR-0308

W/L Obs. Well ___ W/Q Obs. Well ___

State Well No. 49-12-901

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

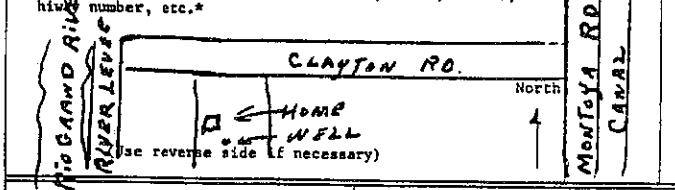
For TWDB use only
Well No. 49-12-6A
Located on map
Received:

1) OWNER:
Person having well drilled RODRIGO (Name) MERCADO Address 420 CLAYTON RD. (Street or RFD) EL PASO (City) TEX. (State)

Landowner RODRIGO (Name) MERCADO Address 420 CLAYTON RD (Street or RFD) EL PASO (City) TEX. (State)

2) LOCATION OF WELL:
County EL PASO, Approx ½ miles in S (N.E., S.W., etc.) direction from EL PASO City Limits (Town)

Locate by sketch map showing landmarks, roads, creeks, highway number, etc.*



(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor _____ League _____
Block _____ Survey _____
Abstract No. _____
(NW¼ NE¼ SW¼ SE¼) of Section _____

3) TYPE OF WORK (Check):
(New Well) Deepening
Reconditioning Plugging

4) PROPOSED USE (Check):
(Domestic) Industrial Municipal
(Irrigation) Test Well Other

5) TYPE OF WELL (Check):
Rotary Driven Dug
Cable (Jetted) Bored

6) WELL LOG:
Diameter of hole 4 in. Depth drilled 68 ft. Depth of completed well 68 ft. Date drilled 11-3-75
All measurements made from 1 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	2	Top Soil
2	5	SAND — BROWN
5	35	SAND — BLACK
35	38	ROCKS + SAND
38	55	SAND — BLACK · COARSE
55	63	SCATTERED GRAVEL + SAND
63	68	GOOD GRAVEL

(Use reverse side if necessary)

9) Casing:
Type: Old (New) (Steel) Plastic Other
Cemented from NONE GALV. ft. to _____ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage

10) SCREEN:
Type NONE
Perforated (Slotted)

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot Size
	SLOTTED FROM 64' TO 68'		3/16

7) COMPLETION (Check):
Straight wall Gravel packed Other OPEN BOTTOM IN GRAVEL
Under reamed Open Hole

8) WATER LEVEL:
Static level 5 ft. below land surface Date 11-3-75
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., _____ ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes (No) If yes, by whom?
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? GOOD depth of strata _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME E.T. MORALES (Type or Print) Water Well Drillers Registration No. 1640

ADDRESS PO. Box 52 (Street or RFD) CANUTILLO, (City) TEX. (State)

(Signed) E. T. Morales (Water Well Driller) E.T. MORALES & SONS (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDB6-WD-8

Send original copy by certified mail to: **Texas Water Commission, P.O. Box 13087, Austin, Texas 78711** 71 KU

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas
WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER SAM OSBORN (Name) ADDRESS P.O.BOX 1388 (Street or RFD) LAS CRUCES, (City) NM (State) 88001 (Zip)

2) LOCATION OF WELL:
County EL PASO , 4 miles in N (NE, SW, etc.) direction from EL PASO (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. Lot 1 Block No. 4 Township _____ Abstract No. _____ Survey Name Mayfair Sub Div
Distance and direction from two intersecting section or survey lines _____
☐ SEE ATTACHED MAP D:d not send a map.

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Monitor ☒ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Drive ☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started Aug 21 1989 Completed Aug 25 1989

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
12-1/4	Surface	160

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 120 ft. to 160 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	7	Sand, Gravel & Clay
7	19	Sand
19	35	Sandy Red Clay
35	70	Sand & Gravel
70	80	Light Red Clay
80	130	Sand & Small Gravel
130	138	Red Clay
138	160	Sand

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
6	New	Steel	0	140	.280
6	New	S.S. H.S.Screen.020	140	160	Std.

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 0 ft. to 26 ft. No. of Sacks Used 14
_____ ft. to _____ ft. No. of Sacks Used _____
Method used Poured
Cemented by Larry Johnson

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OCT 5 1989
TEXAS WATER COMMISSION

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

14) WELL TESTS:
Type Test: ☐ Pump ☐ Baller ☒ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

11) WATER LEVEL:
Static level 19 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

15) WATER QUALITY:
Did the drilling penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME LARJON DRILLING COMPANY (Type or print) WELL DRILLER'S LICENSE NO. 2971W

ADDRESS 5210 Stern Drive (Street or RFD) Las Cruces (City) NM (State) 88001 (Zip)

(Signed) Larry Johnson (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. 49-12-6 Located on map _____

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087 — Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas
WELL REPORT MW #3

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER International Boundary Water Commission (Name) — ADDRESS 2616 W. Paisano (Street or RFD) El Paso (City) Texas (State) (Zip)

2) ADDRESS OF WELL: County El Paso — 2616 W. Paisano (Street or RFD) — El Paso (City) — Texas (State) (Zip) — GRID # LONG 106° 31'-25" LAT 31° 47'-10"

SMELTER TOWN 31406 G5-TF-024

3) TYPE OF WORK (Check):
☐ New Well ☐ Deepening
☒ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) See Attached Map

6) WELL LOG:
Date Drilling:
Started 8-26 19 94
Completed 8-26 19 94

DIAMETER OF HOLE

Dia.. (in.)	From (ft.)	To (ft.)
10 3/4"	Surface	23

7) DRILLING METHOD (Check): ☐ Driven
☐ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☒ Other H/S AUGER

From (ft.)	To (ft.)	Description and color of formation material
0	5	FILL
5	10	SILTY SAND, LT. BROWN
10	15	SILTY SAND, LT BROWN, GRAY
15	23	SILTY CLAYEY SAND PROD LT. BROWN

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall
☐ Underreamed ☒ Gravel Packed ☐ Other
If Gravel Packed give interval ... from 11 ft. to 23 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	CASING	0	13	SCH40
4	N	SCREEN	13	23	SCH40

RECEIVED JAN 3 1997

(Use reverse side if necessary)

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 0 ft. to 9 ft. No. of sacks used 6
ft. to ft. No. of sacks used
Method used TRIMMIE ← TRIMMIE
Cemented by JOHN MILLER ← JOHN MILLER
Distance to septic system field lines or other concentrated contamination ft.
Method of verification of above distance

13) TYPE PUMP: N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed (Rule 338.44(2)(A))
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

14) WELL TESTS:
Type Test: ☐ Pump ☒ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

11) WATER LEVEL
Static Level 9 ft. below land surface Date 8-26-94
Artesian flow gpm Date

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata 15
Was a chemical analysis made? ☒ Yes ☐ No

12) PACKERS: Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Viva Environmental, Inc. (Type or print) — WELL DRILLER'S LICENSE NO. 4768 M

ADDRESS 7201 Stiles (Street or RFD) — El Paso (City) — Texas (State) — 79915 (Zip)

Signed (Licensed Well Driller) — (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 11-1-94)

TNRCC COPY

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087 — Please use black ink.

ATTENTION OWNER: *Confidentiality & Privilege Notice on Reverse Side*

State of Texas
WELL REPORT MW #5

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER International Boundary Water Commission (Name) — ADDRESS 2616 W. Paisano (Street or RFD) El Paso (City) Texas (State) (Zip)

2) ADDRESS OF WELL: County El Paso — 2616 W. Paisano (Street or RFD) — El Paso (City) — Texas (State) (Zip) — GRID # LONG # 31-25" 106. LAT # 31° 47'-10"

3) TYPE OF WORK (Check): ☐ New Well ☐ Deepening ☒ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) See Attached MAP

6) WELL LOG:

Date Drilling: Started 8-29 19 94 Completed 8-29 19 94

DIAMETER OF HOLE

Dia.. (in.)	From (ft.)	To (ft.)
10 3/4"	Surface	18

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Other H/S AUGER

From (ft.)	To (ft.)	Description and color of formation material
0	18	SILTY CLAYEY, LT. BROWN

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other
If Gravel Packed give interval ... from 11 ft. to 18 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting	Gage Screen
4	N	CASING	0	13	SCH 40	
4	N	SCREEN	13	18		SCH 40

RECEIVED JAN 3 1997

(Use reverse side if necessary)

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 0 ft. to 9 ft. No. of sacks used 4
ft. to ft. No. of sacks used
Method used TREMMIE
Cemented by JOHN MILLER
Distance to septic system field lines or other concentrated contamination ft.
Method of verification of above distance

13) TYPE PUMP: N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

14) WELL TESTS:
Type Test: ☐ Pump ☒ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed (Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL
Static Level 11 ft. below land surface Date 8-29-94
Artesian flow gpm Date

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata 15 -
Was a chemical analysis made? ☒ Yes ☐ No

12) PACKERS: Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Viva Environmental, Inc. (Type or print) — WELL DRILLER'S LICENSE NO. 4768 M

ADDRESS 7201 Stiles (Street or RFD) El Paso (City) Texas (State) 79915 (Zip)

(Signed) (Licensed Well Driller) — (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 11-1-94)

TNRCC COPY

Send original copy by certified return receipt requested mail to: TNRCC, MC 177, P.O. Box 13087, Austin, TX 78711-3087

ATTENTION OWNER: *Confidentiality Privilege Notice on on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
MC 177
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

-1A

1) OWNER American Dam I.B.W.C. (Name) ADDRESS 2616 W. Paisano, El Paso, TX 79922 (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County El Paso same as above (Street, RFD or other) (City) (State) (Zip) GRID # 49-12-9

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling:
Started 02/04 19 97
Completed 02/04 19 97

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
10¼	Surface	23'

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Other 10¼ H.S. Auger

N

From (ft.)	To (ft.)	Description and color of formation material
0	10'	Poorly-graded sand, coarse grains, Brn, moist, w/fine gravel
10	12'	Clayey- sand, fine grains, Brn, soft moist, w/med to coarse gravel Note: Solvent odor @ 9'
12'	17'	Poorly- graded sand, coarse grains, gray, wet
17'	23'	Clay, Brn, firm, highly plastic very tough

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other
If Gravel Packed give interval from 5.5" ft. to 23' ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4"	N	PVC Blank	0'	5.5	40
4"	N	0.010 PVC Screen	5.5	22	40

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 1.5 ft. to 3.5 ft. No. of sacks used 1
3.5 ft. to 5.5 ft. No. of sacks used 3/Bent
Method used Poured
Cemented by Reynaldo Torres - S.B.L.
Distance to septic system field lines or other concentrated contamination ____ ft.
Method of verification of above distance N/A

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13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other N/A
Depth to pump bowls, cylinder, jet, etc., ____ ft.

14) WELL TESTS: N/A
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
Static level 11.5 ft. below land surface Date 02/04/97
Artesian flow ____ gpm. Date ____

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☒ Yes ☐ No

12) PACKERS: Type Depth
N/A

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME SunBelt Laboratories, INc. (Type or print) WELL DRILLER'S LICENSE NO. 3252M

ADDRESS 1410 Gail Borden C-5, El Paso, TX 79935 (Street or RFD) (City) (State) (Zip)

(Signed) (Licensed Well Driller)

(Signed) Reynaldo Torres (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified return receipt requested mail to: TNRCC, MC 177, P.O. Box 13087, Austin, TX 78711-3087

ATTENTION OWNER: *Confidentiality Privilege Notice on on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
MC 177
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

4A

1) OWNER American Dam I.B.W.C. (Name) ADDRESS 2616 W. Paisano, El Paso, TX 79922 (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County El El Paso same as above (Street, RFD or other) (City) (State) (Zip) GRID # 49-12-9

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling: Started 02/04 19 97 Completed 02/04 1997

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
10¼	Surface	21'

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Other 10¼ H.S. Auger

N

From (ft.)	To (ft.)	Description and color of formation material
0'	6'	Silty-Sand, Fine Grains, Brn w/fine, Coarse gravel, moist.
6'	8'	Clayey-Sand, Fine Grains, Soft Brn Moist, w/ Fine-Coarse Gravel.
8'	21'	Poorly-Graded Sand MED-Coarse Grains, Brn Moist-Wet, w/Fine Coarse Gravel, Cobbles.

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other
If Gravel Packed give interval ... from 3' ft. to 21' ft.

CASINGS, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4"	N	P.V.C. Blank	0	5	40
4"	N	0.010 P.V.C. Screen	5	20	40

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 1' ft. to 3' ft. No. of sacks used 3/Bent
ft. to ft. No. of sacks used
Method used Poured
Cemented by Reynaldo Torres - S.B.L.
Distance to septic system field lines or other concentrated contamination ft.
Method of verification of above distance

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13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other N/A
Depth to pump bowls, cylinder, jet, etc., N/A

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

14) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

11) WATER LEVEL:
Static level 8.5 ft. below land surface Date 02/04/97
Artesian flow gpm. Date

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? ☐ Yes ☐ No

12) PACKERS: Type Depth
N/A

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Sunbelt Laboratories, Inc. (Type or print) WELL DRILLER'S LICENSE NO. 3252M

ADDRESS 1410 Gail Borden #5, El Paso, TX 79935 (Street or RFD) (City) (State) (Zip)

(Signed) (Licensed Well Driller)

(Signed) Reynaldo (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711 — Please use black ink.

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

State of Texas WELL REPORT

AEH91-018-00 MW-1

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Thunderbird c/o ERM-Southwest, Inc. (Name) ADDRESS 2000 Paisano, (Street or RFD) El Paso, (City) TX (State) (Zip)

2) LOCATION OF WELL:
County El Paso , _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial ☒ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 4/15 1991 Completed 4/15/ 1991

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
3-1/8	Surface	27

D.P.M.

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 11 ft. to 18 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	15	SAND, Silty, Brown, Dry, Gravels, Cobbles & Boulders - with some bricks
15	28	COBBLES, Gravels with some Silt, Dry (Hydrocarbon Odor) - Limestone at 20' - wet at 24'

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	N	Plastic Riser	0	13	Sch.40
2	N	Plastic Screen 0.010	13	28	Sch. 4

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 2 ft. to 10 ft. No. of Sacks Used 3
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

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TEXAS WATER COMMISSION

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., N/A ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

11) WATER LEVEL:
Static level 19' ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type Depth

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) WELL DRILLER'S LICENSE NO. 2914M

ADDRESS 7002 Commerce (Street or RFD) El Paso, (City) TX (State) 79915 (Zip)

(Signed) Manuel Nuñez (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. 49-12-9 Located on map

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

AEH91-018-00

State of Texas
WELL REPORT - MW-2

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Thunderbird c/o ERM Southwest, Inc. (Name) ADDRESS 2000 Paisano, (Street or RFD) El Paso, (City) TX (State) (Zip)

2) LOCATION OF WELL:
County El Paso , _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial ☒ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 4/16 19 91 Completed 4/16 19 91

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
3-1/8	Surface	24.5

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from 7 ft. to 15 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	12	SAND, Silty, Brown, Dry, Gravels & Cobbles - With some bricks
12	24	COBBLES, Gravels, Silty, Dry (Hydrocarbon Odor) - wet at 21'

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	N	Plastic Riser	0	9	Sch.40
2	N	Plastic Screen 0.010	9	24	Sch.40

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 2 ft. to 6.5 ft. No. of Sacks Used 3
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other N/A
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

11) WATER LEVEL:
Static level 19 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

12) PACKERS: N/A Type Depth

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I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) WELL DRILLER'S LICENSE NO. 2914M

ADDRESS 7002 Commerce (Street or RFD) El Paso, (City) TX (State) 79915 (Zip)

(Signed) Manuel Duenez (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. LI

For TWC use only: Well No. 49-12-9 Located on map _____

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711 — Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas
WELL REPORT-MW-3

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

AEH91-018-00

1) OWNER Thunderbird c/o ERM Southwest, Inc. (Name) ADDRESS 2000 Paisano, (Street or RFD) El Paso, (City) TX (State) (Zip)

2) LOCATION OF WELL:
County El Paso _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial ☒ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 4/22 1991 Completed 4/22 1991

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
3-1/8	Surface	26.0

7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	17	SAND, Silty, Brown, Dry, Gravel & Cobbles & Some Boulders
17	26	Limestone

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	N	Plastic Riser	0	10	Sch.40
2	N	Plastic Screen 0.010	10	25	Sch.40

(Use reverse side if necessary)

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 2 ft. to 7 ft. No. of Sacks Used 3
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:
Static level 17 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other N/A
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

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TEXAS WATER COMMISSION

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) WELL DRILLER'S LICENSE NO. 2914M

ADDRESS 7002 Commerce (Street or RFD) El Paso, (City) TX (State) 79915 (Zip)

(Signed) Manuel Bueno (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. LI

For TWC use only: Well No. 49-12-9 Located on map _____

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

AEH91-018-00

State of Texas
WELL REPORT MW-4

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 7871:

Thunderbird

1) OWNER c/o ERM Southwest, Inc. (Name) ADDRESS 2000 Paisano (Street or RFD) El Paso, (City) TX (State) (Zip)

2) LOCATION OF WELL:
County El Paso _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
XX SEE ATTACHED MAP

3) TYPE OF WORK (Check):
XX New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial XX Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored XX Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 4/22 19 91 Completed 4/22 19 91

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
3-1/8	Surface	24

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
XX Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 7 ft. to 10 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	16	SAND; Silty, Brown, Bricks Gravels & Boulders
16	24	Limestone

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
2	N	Plastic Riser	0	9	Sch.40
2	N	Plastic Screen 0.010	9	24	Sch.40

(Use reverse side if necessary)

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TEXAS WATER COMMISSION

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 2 ft. to 3 ft. No. of Sacks Used 3
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
XX Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:
Static level 16 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., N/A

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
XX Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) WELL DRILLER'S LICENSE NO. 2914M

ADDRESS 7002 Commerce (Street or RFD) El Paso, (City) TX (State) 79915 (Zip)

(Signed) Manuel Duenez (Licensed Well Driller)

(Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. LI

For TWC use only: Well No. 49-12-9 Located on map _____

Send original copy by certified mail to: **Texas Water Commission, P.O. Box 13087, Austin, Texas 78711** *Please use print.*

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

AEH91-018-00

State of Texas
WELL REPORT MW-5

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Thunderbird ERM South West, Inc. (Name) ADDRESS 2000 Paisano (Street or RFD) El Paso, (City) TX (State) (Zip)

2) LOCATION OF WELL:
County El Paso , _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial ☒ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 4/23 19 91 Completed 4/23 19 91

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
3-1/8	Surface	25

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	18	SAND, Silty, Brown, Gravelly, Cobbles & some Boulders
18	25	Limestone

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	N	Plastic Riser	0	10	Sch.40
2	N	Plastic Screen 0.010	10	25	Sch.40

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 2 ft. to 8 ft. No. of Sacks Used 3
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.44(4)]

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TEXAS WATER COMMISSION

11) WATER LEVEL:
Static level 18 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other N/A
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) WELL DRILLER'S LICENSE NO. 2914M

ADDRESS 7002 Commerce (Street or RFD) El Paso, (City) TX (State) 79915 (Zip)

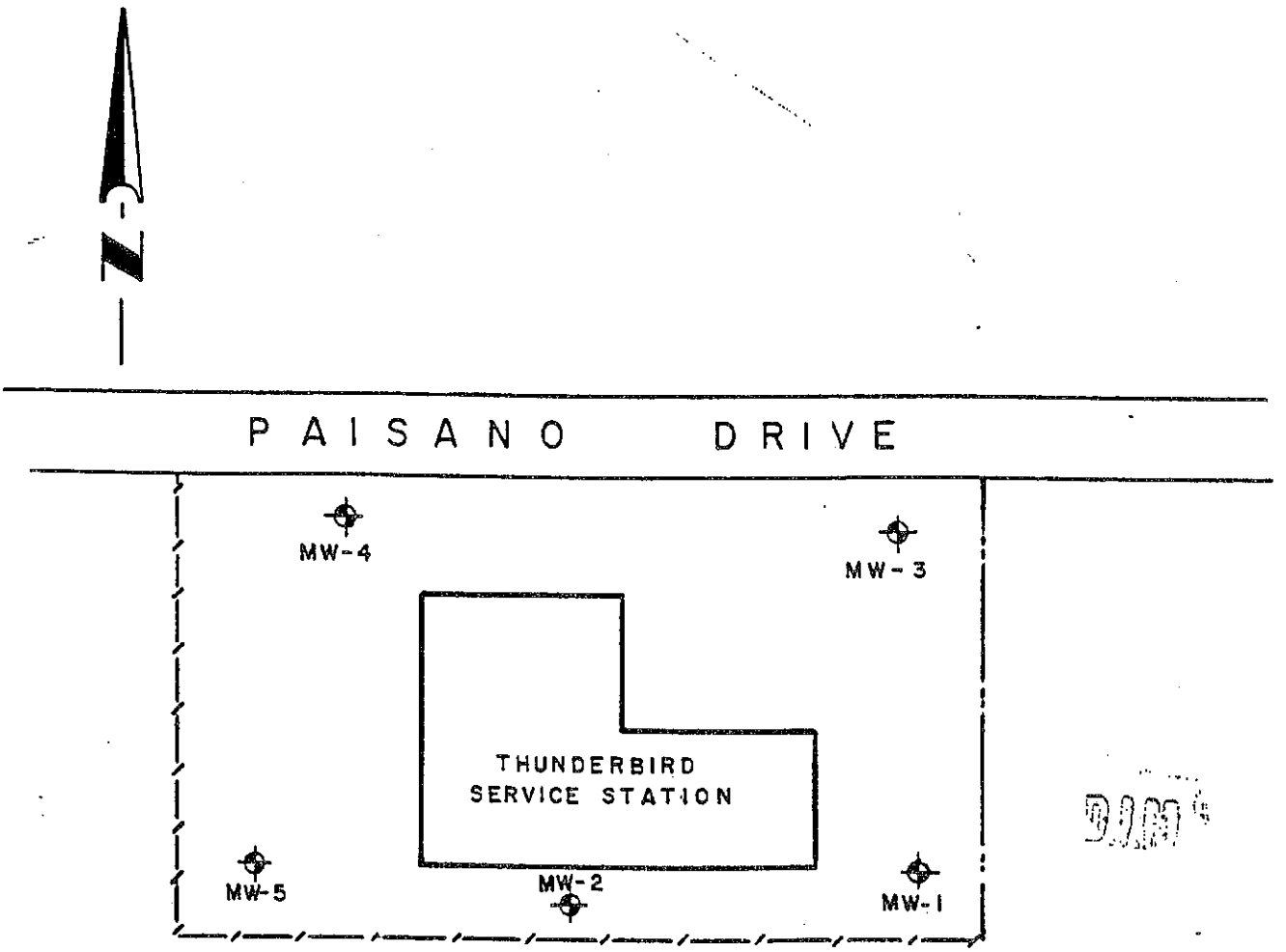
(Signed) Manuel Nuñez (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. LI

For TWC use only: Well No. 49-12-9 Located on map _____

AEH91-018-00

THUNDERBIRD SERVICE STATION
2000 PAISANO DR.
EL PASO, TEXAS.



LEGEND

MW-1 — MONITOR WELL NUMBER AND LOCATION.

SITE PLAN

NOT TO SCALE

Raba-Kistner Consultants, Inc

PLATE 1

Send original copy by certified mail to: **Texas Water Commission, P.O. Box 13087, Austin, Texas 78711**

D.I.M.

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

AEH91-018-02

State of Texas
WELL REPORT MW-6

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) **OWNER** Thunderbird (ERM-Southwest) (Name) **ADDRESS** 2000 Paisano, (Street or RFD) El Paso, (City) Texas (State) (Zip)

2) **LOCATION OF WELL:**
County El Paso _____ miles in _____ (NE, SW, etc.) direction from _____ (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **LEGAL DESCRIPTION:**

Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

☒ **SEE ATTACHED MAP**

3) **TYPE OF WORK (Check):**
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE (Check):**
☐ Domestic ☐ Industrial ☒ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) **DRILLING METHOD (Check):**
☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) **WELL LOG:**
Date Drilling: Started 11/6 19 91 Completed 11/6 19 91

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
6-1/4	Surface	25.5

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 3 ft. to 25 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	18.0	SAND, Silty, Brown, Gravelly, Dense - with cobbles and boulders
18.0	25.5	LIMESTONE

(Use reverse side if necessary)

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	Plastic Riser	0	5	Sch.40
4	N	Plastic Screen 0.010	5	25	Sch.40

9) **CEMENTING DATA** [Rule 287.44(1)]
* Cemented from _____ ft. to _____ ft. No. of Sacks Used _____
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
* Cemented by Bentonite Pellets 1-3'; Concrete 0-1'

10) **SURFACE COMPLETION**
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

13) **TYPE PUMP:**
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., N/A ft.

RECEIVED
NOV 29 1991
TEXAS WATER WELL DRILLERS BOARD

14) **WELL TESTS:**
Type Test: ☐ Pump ☐ Baller ☐ Jetted ☐ Estimated
Yield: _____ gpm with N/A ft. drawdown after _____ hrs.

11) **WATER LEVEL:**
Static level 19 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

15) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

12) **PACKERS:** N/A Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

ANY NAME RABA-KISTNER CONSULTANTS (SW), INC. (Type or print) **WELL DRILLER'S LICENSE NO.** 2914M

ADDRESS 7002 Commerce, (Street or RFD) El Paso, (City) Texas (State) 79915 (Zip)

(Signed) Manuel Duenez (Licensed Well Driller)

(Signed) A.W. Howell (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. _____ Located on map _____

State of Texas

REPORT OF
UNDESIRABLE WATER OR CONSTITUENTS

AEH91-018-02 MW-6

To be completed by Well Driller. (Type or print.)

1. Well Driller: Manuel Duenez

   Company Name: RABA-KISTNER CONSULTANTS (SW), INC.

   Address: 7002 Commerce, (Street or RFD) El Paso, (City) TX 79915 (State)

2. Landowner or Person Having Well Drilled: Thunderbird (ERM-Southwest)

   Address: 2000 Paisano, (Street or RFD) El Paso, (City) Texas (State)

3. Location of Well: County El Paso ☒ See attached map

   League _____ Abstract No. _____

   NW¼, NE¼, SW¼, SE¼, of Section _____ Block _____

   Survey _____

   _____ miles in _____ (NE, SW, etc.) direction.

   from _____ (Town)

4. Reason why Report was submitted:

   ☐ Naturally-occurring, poor-quality groundwater encountered;

   ☒ Hydrocarbon contamination encountered (includes gasoline, diesel, etc.);

   ☐ Hazardous material/hazardous waste contamination encountered;

   ☐ Other; describe _____

   _____

   _____

RECEIVED
NOV 29 1991
TEXAS WATER WELL DRILLERS BOARD

5. Date Well Drilled: 11/6/91 Type Well: Monitor

6. Has a Water Well Report form relating to this well been forwarded to the Texas Water Commission?

   ☒ Yes ☐ No Date 11/18/91

7. I do hereby certify that in drilling, deepening, or otherwise altering the above described well, undesirable water or constituents has been encountered and the landowner or person having the well drilled has been informed by certified mail that such well must be completed or plugged in such a manner as to avoid injury or pollution.

   Date 11/18/91

   Reg. No. 2914M (Signed) _____ (Well Driller)

Send *White Copy* by Certified Mail to: TEXAS WATER COMMISSION, P.O. Box 13087, Austin, Texas 78711
Send *Yellow Copy* by Certified Mail to: LANDOWNER or PERSON HAVING WELL DRILLED
Pink Copy to be retained by: WELL DRILLER

WWD-015 (Rev. 07-20-90)

APPENDIX L

Attachment L-2

Derivation of Particulate Emission Factor (PEF) for Investigation Area 5 (Smeltertown)

Attachment L-2

Derivation of Particulate Emission Factor (PEF) for Investigation Area 5 (Smeltertown)

A site-specific Particulate Emission Factor (PEF) has been derived for the Historic Smeltertown area (Investigation Area 5) at the Asarco El Paso Copper Smelter. The PEF is basically a factor that allows correlation of concentration of contaminants in soil to concentration of dust particles in air. Calculation of the PEF is necessary in order to estimate risks from inhalation of fugitive dusts. The PEF for Investigation Area 5 was calculated using recent U.S. Environmental Protection Agency (EPA) and Texas Natural Resource Conservation Commission (TNRCC) guidance, with equation parameters appropriate for the site characteristics.

The PEF is calculated using the following equation from EPA (1996):

$$PEF(m^3/kg) = Q/C \times \frac{3600}{0.036 \times (1-V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x)}$$

where Q/C = inverse of mean concentration in air at center of source area (g/m^2-sec/kg/m^3);
V = fraction of vegetative cover (unitless);
U_m = mean annual wind speed (m/sec);
U_t = equivalent threshold value of windspeed at 7 m altitude (m/sec);
F(x) = function dependent on ratio of U_t/U_m (Cowherd et al., 1985).

Each of the above parameters has a default value suggested by EPA and a default value suggested by TNRCC (see Table L-2-1, PEF Calculation Spreadsheet). In cases where sufficient data are available, site-specific parameter values may be calculated to estimate a more reasonable PEF for the site in question. The site-specific approach was adopted for Investigation Area 5 at the El Paso site. Table L-2-1 compares the EPA (EPA, 1996) and TNRCC (Grant, 1998) default values with the values used for the El Paso site, and describes the source of data for each of the site-specific values. In summary, the PEF values calculated using default and site-specific values compare as follows:

EPA Default PEF:	1.32×10^9 m^3/kg
TNRCC Default PEF:	9.28×10^8 m^3/kg
Investigation Area 5 (Smeltertown) PEF:	2.54×10^9 m^3/kg

REFERENCES

Cowherd et al., 1985. Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites, EPA/600/8-85/002, Office of Heasth and Environmental Assessment/Office of Research and Development, February 1985.

EPA, 1996. Soil Screening Guidance: User's Guide, Second Edition, EPA/540/R-96/018, Office of Emergency and Remedial Response, July 1996.

Grant, 1998. Personal communication (fax) from Roberta L. Grant, Ph. D. (TNRCC Toxicology and Risk Assessment Section), Copy of Texas Register (23 TexReg 5142) dated May 15, 1998, Figure 1: 30 TAC §350.59(a)(1).

TABLE L-2-1.
PEF CALCULATION FOR
INVESTIGATION AREA 5 (SMELTERTOWN)

PEF Equation (EPA, Soil Screening Guidance User's Guide, July 1996, EPA/540/R-96/018)

$$PEF\ (m^3/kg) = Q/C \times \frac{3600}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$$

where Q/C = inverse of mean concentration at center of source area (g/m^2-sec/kg/m^3)
V = fraction of vegetative cover (unitless)
U_m = mean annual wind speed (m/sec)
U_t = equivalent threshold value at 7 meter altitude (m/sec)
F(x) = function dependent on ratio of U_t/U_m, from Cowherd et al. (Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites) (1985)

Variable	EPA Default	TNRCC Tier 1 Default	Investigation Area 5 (Smeltertown) Value	Investigation Area 5 (Smeltertown) Value Derivation
Q/C*	90.80	79.25 40.76	**46.48**	TNRCC Tier 2,3 Equation (30 TAC §350.59(a)(1)): **Q/C = -9.3087 ln(x) + 69.989** where x = area of source (12.5 acres determined from site map with planimeter)
V	0.5	0.5	**0**	Negligible vegetative cover
Um	4.69	4.8	**3.93**	National Climatic Data Center Database -- El Paso Airport Long-Term Annual Average (8.8 mi/hr = 3.93 m/sec)
Ut	11.32	11.32	**11.32**	No site-specific data; therefore use default
F(x)	0.194	0.224	**0.0437**	**$x = 0.886 \times (U_t/U_m)$; $F(x) = 0.18(8x^3 + 12x) \exp(-x^2)$** (from Cowherd et al., 1985) **x =** 2.55 **F(x) =** 0.0437
Calculated PEF (m^3/kg)	**1.32E+09**	**9.28E+08**	**2.54E+09**	

**NOTE*: EPA default value for a 0.5 acre site; TNRCC values for 0.5 acre site (79.25) and 30 acre site (40.76); 0.5 acre TNRCC default value used for sample calculation.

APPENDIX L

Attachment L-3

Assessing the Relationship Between Environmental Lead Concentrations and Adult Blood Lead Levels

Assessing the Relationship Between Environmental Lead Concentrations and Adult Blood Lead Levels

Teresa S. Bowers,[1,3] Barbara D. Beck,[1] and Hala S. Karam[2]

Received November 13, 1992; revised October 18, 1993

This paper presents a model for predicting blood lead levels in adults who are exposed to elevated environmental levels of lead. The model assumes a baseline blood lead level based on average blood lead levels for adults described in two recent U.S. studies. The baseline blood lead level in adults arises primarily from exposure to lead in diet. Media-specific ingestion and absorption parameters are assessed for the adult population, and a biokinetic slope factor that relates uptake of lead into the body to blood lead levels is estimated. These parameters are applied to predict blood lead levels for adults exposed to a hypothetical site with elevated lead levels in soil, dust and air. Blood lead levels ranging from approximately 3–57 μg/dl are predicted, depending on the exposure scenarios and assumptions.

KEY WORDS: Blood lead; adult; exposure; model.

1. INTRODUCTION

In recent years, there has been significant interest in the potential human health risks resulting from exposures to lead in soil and dust. This concern is most often focused on young children because, given the same concentration of lead in soil and dust, children's exposures will be higher than those of adults. This is because of children's high hand-to-mouth behavior, and the amount of time they spend playing outside, coming into contact with and ingesting more lead-contaminated dirt. In addition, children absorb more lead ingested from soil and dust than adults absorb, and children are more sensitive to the toxic effects of lead.

However, adults may be exposed to high levels of lead in soil and dust in situations where there are no exposures to children. These situations include adults working on a daily basis in occupations that involve lead exposures, or adults involved in construction or remediation activities at lead-contaminated sites. In these situations adults may be at risk for elevated blood lead levels due to soil and dust exposures. For such situations it would be useful to have an adult lead exposure model to assess risk. It should also be noted that the United States Occupational Safety and Health Administration (OSHA) regulates lead in air in the working environment, but not lead in soil or dust,[1] further emphasizing the potential use of an adult lead exposure model.

An adult lead exposure model should relate lead concentrations in various media (air, water, soil, and dust) to blood lead levels. Several such models exist for assessing childhood exposures to lead, including the LEAD Model.[2] However, models designed to predict blood lead levels in children cannot be easily used for adults because of significant differences between children and adults in the pharmacokinetic parameters that control the distribution of lead in the body.

Models relating adult blood lead levels to some types of environmental exposures have been developed by O'Flaherty,[3] Carrington and Bolger,[4] and Chamberlain and Heard.[5] O'Flaherty predicted adult blood lead levels from exposure to air, water, and diet using a so-

[1] Gradient Corporation, 44 Brattle Street, Cambridge, Massachusetts 02138.

[2] The Cadmus Group, Inc., 135 Beaver Street, Waltham, Massachusetts 02154.

[3] To whom all correspondence should be addressed.

distribution would be considered acceptable for children, it would also be acceptable for adults.

In this paper, we provide estimates of blood lead levels for a group of adults with current occupational exposure at a hypothetical site that includes soil contamination and indoor dust contamination in a warehouse. Calculated percentages of workers with blood lead levels exceeding 10 μg/dl (the CDC screening criterion for children), 30 μg/dl (the OSHA nonmandatory criterion for adults intending to have children), and 40 μg/dl (OSHA permissible standards) are presented.

2. BASELINE ADULT BLOOD LEAD LEVELS

An estimate of baseline blood lead levels for adults without previous excessive occupational exposures can be obtained from the results of two recent epidemiological studies in Butte, Montana[13] and Midvale, Utah.[14] (Results from the soon-to-be released NHANES III study will provide a more comprehensive assessment of adult blood lead levels and could be used as input into the model.) These studies reported measured blood lead levels for 48 and 43 adults, respectively, with geometric mean blood lead levels of 3.1 μg/dl and 2.2 μg/dl, respectively. The measured range of blood lead levels in adults was from 0.5–12.0 μg/dl at Butte, and from nondetectable to 8.0 μg/dl at Midvale. These ranges can be described by geometric standard deviations (GSD) of 1.94 and 1.77, respectively. Because these levels are relatively low, we assume the adults in the studies had no significant previous occupational exposures to lead. The highest blood lead level of 12 μg/dl is much lower than the permissible adult levels under OSHA standards of 40 μg/dl. Adult blood lead calculations presented below use the higher geometric mean blood lead value from Butte, 3.1 μg/dl, as an average or baseline adult blood lead level in 1991 representative of adult exposures to average lead concentrations arising largely from lead in diet. It should be noted that use of a community-based baseline blood lead for the risk assessment model is, in fact, conservative, and likely to overestimate the actual value. The overestimate occurs because the proposed baseline for these individuals already incorporates some exposures from soil, dust, air, and water.

3. EXPOSURE MODELS

Multiple pathway exposure assessments depend on: (1) an evaluation of the concentration of the chemical of concern in each environmental medium; (2) a quantification of the variables affecting each potential exposure route, such as inhalation, ingestion, or dermal contact; and (3) an understanding of how daily exposure from each pathway is combined to represent a total exposure to the chemical from all sources and pathways. McKone and Daniels[15] have proposed a detailed multiple pathway exposure model that depends on each of these components, and that can be used for a variety of chemicals of concern. This model, and others like it, form the basis for the type of model presented here.

In the case of lead, total exposure is reflected in an individual's blood lead level, a variable that can be measured. A multiple pathway exposure model is used here to calculate adult blood lead levels that arise from environmental lead sources. The basic equation of the model is similar to that used in the U.S. EPA LEAD Model for children, but makes use of a biokinetic slope factor to relate total uptake of lead in adults to blood lead, rather than the multiple compartment distribution model for children used by the LEAD Model. (In theory, other modeling approaches such as structural equation modeling[16] could be developed for specific sites.) The following equation is used:

$$\mathrm{PbB} = \mathrm{PbB}_{\mathrm{baseline}} + (\mathrm{BSF})(\mathrm{Uptake}_{\mathrm{air}} + \mathrm{Uptake}_{\mathrm{water}} + \mathrm{Uptake}_{\mathrm{soil/dust}}) \quad (1)$$

where PbB stands for blood lead, $\mathrm{PbB}_{\mathrm{baseline}}$ refers to a baseline blood lead level which largely depends on dietary intake of lead, and BSF is the biokinetic slope factor that relates blood lead levels in μg/dl to daily absorbed amounts of lead in μg/day. The other source-specific uptakes (in μg/day) are defined by

$$\mathrm{Uptake}_{\mathrm{air}} = (A_a)(V_a)(C_a) \quad (2)$$

$$\mathrm{Uptake}_{\mathrm{water}} = (A_w)(I_w)(C_w) \quad (3)$$

$$\mathrm{Uptake}_{\mathrm{soil/dust}} = (A_{s/d})(I_{s/d})[(t_0)(C_s) + (t_1)(C_d)] \quad (4)$$

where A_a, A_w, and $A_{s/d}$ represent the absorption fractions for lead taken into the body from air, water, and soil/dust, respectively, V_a is the ventilation rate in m^3/day, I_w is the ingestion rate of water in l/day, $I_{s/d}$ is the ingestion rate of soil and dust in g/day, and C_a, C_w, C_s, and C_d are the concentrations of lead in air (μg/m^3), water (μg/l or ppb), and soil and dust (μg/g or ppm). The parameters t_0 and t_1 refer to time-activity patterns that represent the relative proportions of soil and dust ingested, and sum to 1.

Concentration parameters are site-specific, while ingestion rates, absorption, and time-activity patterns may be similar for many sites. The calculated blood lead level is a geometric mean value representing an individual with average (or median) intake patterns. The expected

describing the contribution of water lead to blood lead can be derived from Eqs. (1) and (3) where

$$PbB_{water} = (BSF)(A_w)(I_w)(C_w) \quad (5)$$

Rearrangement of this expression yields

$$PbB_{water}/C_w = 0.06 = (BSF)(A_w)(I_w) \quad (6)$$

Substituting $A_w = 0.08$ and $I_w = 2$ l/day and solving for BSF yields a value for BSF of 0.375 μg/dl blood lead per μg/day lead uptake. A BSF value for children can be derived from the output of EPA's LEAD Model by dividing predicted blood lead levels by total uptake. The average value derived in this manner is about 0.3 μg/dl per μg/day, and compares favorably with the adult value used in this study.

5. ASSESSING POTENTIAL ADULT BLOOD LEAD LEVELS: A HYPOTHETICAL SITE

Calculations are presented here for a hypothetical site consisting of an industrial manufacturing warehouse with substantial interior dust lead contamination, elevated air lead concentrations, and surrounding acreage containing waste dumps of lead-containing material that has contaminated the soil. Table II summarizes hypothetical geometric mean concentration levels for soil, dust, and air that are used for the following calculations. The background level of lead in soil and dust used in the following calculations is approximately the natural level of lead in soil in many parts of the United States. The background level of lead in air is taken from the LEAD Model default value for the average concentration of lead in air.

Two exposure scenarios are considered: the outdoor worker, who spends all of his working time outdoors on the site, and the warehouse worker, who spends all of his working time inside the warehouse. A geometric mean blood lead level is calculated from the following relationship:

$$PbB = 3.1 + (BSF)[(I_{sM})(A_{sM})(t_s)(C_{sM} - C_{bgM}) + (V_a)(A_a)(t_{s2})(C_a - C_{bga})] \quad (7)$$

where t_s and t_{s2} represent time-activity patterns corresponding to the fraction of waking hours spent on site (for assessment of onsite percent of soil and dust ingestion), and the fraction of total hours spent on site (for assessment of onsite percent of ventilated air), respectively. (Soil and dust ingestion occurs only during working hours, assumed to be 16 hr/day, while air inhalation occurs 24 hr/day.) We assume that the workers spend 8 hr/day, 5 days/weeks, 50 weeks/year onsite. Values of t_s and t_{s2} are therefore 0.34 and 0.23, respectively. Background concentrations of lead in soil/dust and air are subtracted from the site concentrations because time spent onsite replaces exposure that would otherwise be to background lead levels. No elevated exposures to lead in water are considered for this hypothetical site.

Solving Eq. (7) with the values of the parameters given in Tables I and II yields a geometric mean blood lead for the outdoor worker of 3.4 μg/dl and for the warehouse worker of 6.8 μg/dl.

We describe the hypothetical industrial manufacturing warehouse as a dusty place with significant particulate matter in the air due to the nature of the work. We therefore assume that the working adult in such an environment may ingest more soil and dust than they might otherwise in, for example, a residential environment. An alternate calculation of the warehouse worker blood lead level can be made by assuming that during the time the adult is in the warehouse his soil and dust ingestion rate increases to 0.1 g/day, or 5 times the value used in the previous calculation. This higher assumed ingestion rate results in a geometric mean blood lead level for the warehouse worker of 19.8 μg/dl.

A range of blood lead levels consistent with these exposure conditions can be estimated by applying an appropriate blood lead GSD value to the calculated geometric mean blood lead. Observed GSDs for adults at Butte and Midvale were 1.94 and 1.77, respectively. EPA's Draft Lead Guidance Manual suggests that the range of blood lead levels for a population with a narrow range of exposure conditions, such as a group of children all living in one house, may be described by a GSD of approximately 1.35. More accurate estimates of the blood lead GSD in adults will be available from the NHANES III study. For a potential maximum adult blood lead for workers exposed to this site, we assess the 95th percentile

Table II. Lead Concentration Levels for the Hypothetical Site

Symbol	Description	Value (geometric mean)
C_s	Soil concentration	1450 ppm
C_d	Dust concentration in warehouse	16,000 ppm
C_a	Air concentration in warehouse	1.0 μg/m³
C_{bgM}	Background concentration of soil and dust	100 ppm

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APPENDIX L

Attachment L-4

Toxicity Profiles

Arsenic (As)

Arsenic is a gray, very brittle, crystalline semimetal, located in group VB of the periodic table. Arsenic is found in its native form, as a sulfide, oxide, or in various arsenides and arsenates. Oxidation states include +3, +5, and –3. The most common arsenic-bearing mineral is arsenopyrite (FeAsS), which decomposes on heating to ferrous sulfide and volatile (gaseous) arsenic. Elemental arsenic is not toxic, but most arsenic compounds are toxic, and As(III) is much more toxic than As(V). The average crustal abundance of arsenic is 1.8 mg/kg (Weast, 1987), and the average background soil concentration in the conterminous U.S. is 5.2 mg/kg (USGS, 1994).

Environmental Fate

The environmental chemistry of arsenic is complex. The behavior of arsenic in water and soils depends on pH and redox conditions, sorption and precipitation reactions, concentration of other parameters (sulfides, phosphorus minerals, iron), and salinity. Major forms of arsenic include the oxyanions of pentavalent and trivalent arsenic, and organoarsenic compounds (methylarsines). The fate and transport of arsenic are intimately linked to the oxidation state of the element. Sorption of arsenic decreases with increasing pH, and As(V) forms are generally less mobile than As(III) forms. Adsorption of arsenic tends to be most significant in aerobic, acidic, dilute waters, and the amount of arsenic in solution generally increases as conditions become more reducing, as pH increases, and as the ionic strength of the water increases (Callahan et al., 1979).

Groundwater fate of arsenic in many circumstances is probably controlled to a significant extent by coprecipitation/adsorption with iron oxyhydroxides (Callahan et al., 1979). Methylarsine compounds can be generated by biological action in reducing environments. Arsenic can undergo a wide variety of biogeochemical transformations once introduced to a system, making it a challenge to predict mobility and behavior in complex settings.

Toxicology and Regulatory Criteria for Human Health

Trivalent arsenic compounds can be corrosive to the skin with prolonged contact. Acute and chronic exposure to inorganic arsenic via ingestion and inhalation can result in a variety of toxic effects, especially to moist tissues such as the eyes and respiratory system. Arsenic is classified by the EPA as a group A carcinogen, meaning that sufficient evidence of carcinogenicity in exposed humans exists (IRIS, 1992). Cancers have been mostly observed in the lung (from inhalation exposures) and skin (from oral ingestion exposures). The skin cancers are largely treatable.

An inhalation unit risk of 4.3 (mg/m^3) has been developed by EPA based on the occurrence of lung cancer in humans. An inhalation slope factor of 15 $(mg/kg\text{-}day)^{-1}$ was calculated from this unit risk by assuming inhalation of 20 m^3/day by a 70-kg individual and an absorption rate of 30 percent. For oral exposures, a unit risk of 5×10^{-5} (mg/l) has been proposed by the EPA Risk Assessment Forum based on the occurrence of skin cancer in humans. An oral cancer slope factor of 1.75 $(mg/kg\text{-}day)^{-1}$ was initially calculated from this

unit risk, assuming ingestion of 2 l/day by a 70-kg individual (IRIS, 1992), but was subsequently revised to 1.5 $(mg/kg\text{-}day)^{-1}$. For non-carcinogenic effects the oral reference dose has been established as 0.003 mg/kg-day for both subchronic and chronic exposures (IRIS, 1992).

The Maximum Contaminant Level (MCL) established by the government for total arsenic in drinking water is 0.05 mg/l. The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission for total arsenic is 0.366 mg/kg. The SAI-RES value for arsenic determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for residential purposes. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission for total arsenic is 3.27 mg/kg. The SAI-IND value for arsenic determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites.

Toxicology and Regulatory Criteria for Aquatic Life

Various species of freshwater fish and plants have an acute toxicity to Arsenic (III) and (V) at concentrations ranging from 0.812 mg/l to 97 mg/l. Low to moderate bioconcentration factors and the short half-life of arsenic in fish tissue suggest that arsenic residues should not be a problem to predators of aquatic life (IRIS, 1991). The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life and based on measurement of the reduced form of arsenic (As(III)) is 0.19 mg/l. Freshwater organisms should not be adversely effected if the four-day average concentration of As (III) does not exceed 0.19 mg/l (IRIS, 1991).

Cadmium (Cd)

Cadmium is a soft, bluish-white transition metal (group IIB of the periodic table). Cadmium most often is found in association with zinc ores; the only cadmium mineral occurring in appreciable amounts is sphalerite (CdS). The average natural abundance of cadmium is approximately 0.2 parts per million (ppm) (Weast, 1987). Cadmium is used extensively in electroplating, pigments, and as a PVC stabilizer (Hem, 1989). Meat, fish, and fruits contain anywhere from 1 to 50 micrograms per kilogram (µg/kg) cadmium, while grains contain 10 to 150 µg/kg (Klassen et al., 1986).

Environmental Fate

Cadmium shares some chemical similarities with zinc, a member of the same group on the periodic table. Most cadmium compounds are fairly soluble. Some insoluble or sparingly soluble forms include $CdCO_3$, CdS (0.13 mg/100 ml water), and Cd $(OH)_2$ (0.26 mg/100 ml water) (Weast, 1987). As with most metals, the solubility of cadmium decreases as solution pH increases until very high pH values are reached. Cadmium forms many stable inorganic and organic complexes; $Cd(C1)_2^0$ predominates in seawater, and $Cd(OH)^+$ in freshwater. Although sorption, coprecipitation, and isomorphic substitution in carbonate minerals may reduce aqueous concentrations of cadmium, the effect of adsorption on cadmium is less pronounced than many of the other metals (Callahan et al., 1979). The only stable oxidation state of cadmium in environmental systems is +2.

Toxicology and Regulatory Criteria For Human Health

Cadmium is poorly absorbed by the skin or upon ingestion, but is well absorbed upon inhalation. Once absorbed, cadmium is retained in the kidneys and liver and may result in kidney damage. Cadmium is also a respiratory tract irritant, and chronic exposures can cause chronic obstructive pulmonary disease and emphysema.

EPA has classified cadmium as a probable human carcinogen (Group B1) via the inhalation route. A cancer risk of 10^{-6} at an airborne cadmium concentration of 0.6 mg/m^3 has been reported. The carcinogenic slope factor is 6.1 $(mg/kg\text{-}day)^{-1}$ assuming inhalation of 20 m^3/day for a 70 kg individual. EPA (IRIS, 1991) has developed oral reference doses for cadmium in water and food. An oral reference dose water 5×10^{-4} mg/kg-day has been established based on observed renal damage in humans. EPA (IRIS, 1991) also derived an oral RfD for cadmium in food of 1×10^{-3} mg/kg-day. An uncertainty factor of 10 was used to derive both values (IRIS, 1991). EPA has not developed an inhalation RfD for cadmium.

The MCL established by the government for cadmium is 0.005 mg/l. The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission for cadmium is 137 mg/kg. The SAI-RES value for cadmium determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable

for residential purposes. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission for cadmium is 1,020 mg/kg. The SAI-IND value for cadmium determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites.

Toxicology and Regulatory Criteria for Aquatic Life

Callahan et. al. (1979) reports that due to the chemical similarity of cadmium to zinc, cadmium exposure may disrupt normal metabolic functions supported by zinc. As the hardness of water increases, the toxic effects of cadmium decrease. The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life is $e^{(0.7852(\ln(\text{hardness}))-3.49}$. For example, at a hardness of 250 mg/l, the water quality criteria would be 2.3 µg/l (IRIS, 1991).

Chromium (Cr)

Chromium is a steel-gray, lustrous, hard metal belonging to VIB group of the periodic table. The most common ore of chromium is chromite ($FeCrO_4$). Oxidation states include +3 and +6. Chromium has several uses including manufacturing stainless steel and hardening steel. The refractory industry has used chromium to form bricks and shapes since it has a high melting point, moderate thermal expansion and is a stable crystalline structure (Weast, 1987). Common foods contain anywhere from 0.05 mg/kg (apple) to 0.2 mg/kg (wheat grain) cadmium (Pais, 1997). Background soil concentrations in the conterminous U.S. average 86 mg/kg (USGS, 1994).

Environmental Fate

Chromium has two possible aqueous ionic states, +3 (the most stable, common form) and +6. Hexavalent chromium, a strong oxidizer of organic matter in aquatic systems is considered to be the highly toxic form. Hexavalent chromium in the anionic form is soluble and, therefore, very mobile in an aquatic environment (Callahan et. al., 1979). Trivalent chromium will, instead, hydrolyze and precipitate into the sediments. Water conditions determine which form of chromium will be more prevalent in aquatic systems. If the water conditions consist of Fe(II), dissolved sulfides and certain organic compounds with sulfhydryl groups, trivalent chromium will be more prevalent. If the water conditions consist of large excesses of MnO_2 or O_2, hexavalent chromium will be more prevalent (Callahan et. al., 1979).

Both forms of chromium also display different characteristics in soils. As soil pH increases, trivalent chromium is more readily adsorbed into the soil whereas hexavalent chromium's ability to be adsorbed into soil decreases. Neither form is readily adsorbed by inorganic surfaces.

Toxicology and Regulatory Criteria for Human Health

Trivalent chromium is found in biological tissues and is essential in trace concentrations for carbohydrate metabolism. Trivalent chromium is not known to be converted to the hexavalent form in biological tissues. The hexavalent form readily crosses cell membranes and is reduced intracellularly to trivalent chromium. The harmful effects of chromium have been attributed to the hexavalent form, however, the mechanism by which toxic effects are manifest are not fully known. Adverse effects from short-term high-level exposure can consist of ulcers of the skin and irritation of the nasal mucous membrane and gastrointestinal tract. Adverse effects in the kidney and liver could also result. Lung cancer has been associated with long-term exposure at elevated levels of chromium in workers.

EPA has classified hexavalent chromium as a known human carcinogen (Group A) due to increased incidence of lung cancer associated with occupational inhalation exposure. The carcinogenic slope factor is 41 $(mg/kg\text{-}day)^{-1}$ assuming inhalation of 20 m^3/day for a 70 kg individual. Ingested hexavalent chromium is not considered carcinogenic. EPA (IRIS, 1991) has developed an oral reference dose for chronic exposure to hexavalent chromium of

5×10^{-3} mg/kg-day. This value was established based on an uncertainty factor of 500 and is limited to soluble salts of hexavalent chromium.

The MCL established by the EPA for total chromium is 0.1 mg/l (which is also equal to the Maximum Contaminant Level Goal (MCLG)). The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission for total chromium is 391 mg/kg. The SAI-RES value for total chromium determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for residential purposes. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission for total chromium is 5,110 mg/kg. The SAI-IND value for total chromium determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites.

Toxicology and Regulatory Criteria for Aquatic Life

Acute toxicity values for hexavalent chromium are available for 27 freshwater genera and range from 0.023 mg/l for a cladoceran to 1,870 mg/l for stonefly. Reduced growth in chinook salmon was observed at 0.016 mg/l. The bioconcentration factor for rainbow trout was less than 3 (IRIS, 1991). As the hardness of water increases for trivalent chromium, the toxic effects of trivalent chromium decrease. The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life for trivalent chromium is $e^{(0.8190(\ln(\text{hardness})) + 1.561)}$ and for hexavalent chromium is 0.011. At a hardness of 250 mg/l, the water quality criteria for trivalent chromium would be 438 mg/l (IRIS, 1991).

Copper (Cu)

Copper is a ductile, reddish transition metal, located in group IB of the periodic table. Of all the elements, copper is second only to pure silver in electical conductivity. Copper is occasionally found in the elemental form, but also has many widespread mineral forms. Copper sulfides, oxides, and carbonates are all important ores; chalcopyrite ($CuFeS_2$) is the most abundant of these. Copper is a necessary nutrient, and humans generally consume 2-5 mg/day through the diet (Gough et al., 1979). The natural abundance of copper in rocks and minerals is about 55 mg/kg (Weast, 1987). Background soils concentrations in the conterminous U.S. average 76 mg/kg (USGS, 1994). Copper sulfate is used as an algicide in water, and copper metal is extensively mined, smelted, and used in industry, plumbing, and electical circuits.

Environmental Fate

Copper has two possible aqueous ionic states, +1 and +2, although the +2 form is much more prevalent. Most copper in aquatic systems is complexed by organic or inorganic ligands, with copper showing a particular preference for organics. Complexed copper is often more readily adsorbed to particle surfaces than free copper ions, and copper complexes show a strong affinity for iron and manganese oxides, as well as organic surfaces. Adsorption of copper is also pH dependent, with the percent adsorbed increasing as pH increases. Sorption processes generally are effective scavengers of copper in unpolluted environments; where excess soluble organic material is present, however, the effectiveness of sorption may be decreased and copper may tend to remain solubilized (Callahan et al., 1979). Copper is strongly bioaccumulated by organisms.

Toxicology and Regulatory Criteria for Human Health

Copper is a necessary micronutrient for humans, and potential toxic effects only occur at relatively high exposure levels (Callahan et al., 1979). Long-term exposure to copper dust can irritate the nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea. If water with high levels of copper is ingested, vomiting, diarrhea, stomach cramps, and nausea may occur (EPA, 1992). However, due to inadequate toxicity data, no confirmed toxicity criteria for use in risk assessment have been developed by the EPA for copper.

The MCLG (not to be confused with the maximum contaminant level (MCL)) set by the EPA for copper is 1.3 mg/l which is based on potential adverse effects (gastrointestinal) reported in human studies (IRIS, 1991). EPA cites an oral RfD of 3.7×10^{-2} mg/kg-day based on this MCLG. However, neither an MCL nor a water quality criterion for the protection of human health has been established for copper. Copper does have a Secondary Maximum Contaminant Level (SMCL) of 1.3 mg/l which is a non-enforceable drinking water requirement solely based on the aesthetic (e.g., taste and odor) qualities of the water (IRIS, 1991).

Copper, a Group D (not classifiable) compound, is not considered carcinogenic by the EPA due to inadequate toxicological data in humans and inadequate evidence of carcinogenicity in animals (IRIS, 1991).

The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission, which determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for residential purposes, is not applicable to copper due to inadequate toxicity data. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission, which determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites, is not applicable to copper due to inadequate toxicity data.

Toxicology and Regulatory Criteria for Aquatic Life

Ionic forms of copper present in water can be toxic to aquatic life at low concentrations. Only a fraction of the total copper present in most ambient waters is typically bioavailable and thereby toxic. The aqueous toxicity of copper is dependent upon a variety of physical and chemical factors influencing copper ion activity, including water hardness, pH, suspended particulate matter, and dissolved colloidal materials. As the hardness of water increases, the toxic effects of copper decrease. The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life is $e^{(0.8545(\ln(\text{hardness})) - 1.386)}$ for chronic exposures. For example, at a harness of 250 mg/l, the water quality criteria would be 0.028 mg/l (IRIS, 1991).

Iron (Fe)

Iron, when pure, is lustrous, silvery and soft in appearance. It is located in Group VIII of the periodic table. Oxidation states include +2 and +3. Common forms of iron are hematite (Fe_2O_3), magnetite (Fe_3O_4), and siderite ($FeCO_3$). Iron is an abundant element in the universe (Weast, 1987). It is the fourth most abundant element by weight in the earth's crust. Average iron soil concentration in the conterminous U.S. is 19,000 mg/kg (USGS 1994). Iron is essential to the human body. Muscles contain 180 mg/kg of iron and blood contains 447 mg/dl$^{3\ (deciliters)}$ of iron. Iron is also essential for plant growth and iron-deficient soils affect the ability of many plants to grow. Iron is typically not used commercially in its pure form but, instead, is alloyed with carbon or other metals to make different steels.

Environmental Fate

Iron has two primary aqueous ionic states, +2 and +3. The ferrous form of iron (Fe^{2+}) is soluble in oxygen deprived aquatic environments and, therefore, is fairly mobile. If aerobic conditions exist, ferrous iron will quickly precipitate and become insoluble thus limiting its mobility. The other primary form of iron, ferric iron (Fe^{3+}) is considered insoluble. Iron mainly exists as a precipitate of oxides and hydroxides in the soil. However, iron in aerobic soil conditions reduces from Fe(III) to Fe(II), thereby increasing its solubility in soils. The amount of iron in soil is affected by the pH of the soil. Acidic soils increase the solubility of iron.

Toxicology and Regulatory Criteria for Human Health

Iron is a necessary micronutrient for humans and plants. It can, however, be potentially toxic in relatively high exposure levels. If large amounts of iron supplements are ingested, gastrointestinal problems, metabolic acidosis and cardiovascular collapse could result.

Iron, a Group D 9 (not classifiable) compound, is not considered carcinogenic by the EPA due to inadequate toxicological data in humans and inadequate evidence of carcinogenicity in animals (IRIS, 1991).

The MCL established by the government for iron in drinking water is 0.3.mg/l. The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission which determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg) acceptable for residential purposes, is not applicable to iron due to inadequate toxicity data. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission which determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites, is not applicable to iron due to inadequate toxicity data.

Toxicology and Regulatory Criteria for Aquatic Life

Ferrous iron present in anaerobic water can be toxic to aquatic life because it remains soluble under those conditions. In aerobic aquatic conditions, ionic forms of iron do not pose a risk to aquatic life. There is currently no Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life.

Lead, element number 82 in group IVB of the periodic table, is a soft metal, a poor conductor, and highly resistant to corrosion. The most common lead ore is galena (PbS). The widespread presence of lead is due in part to its natural occurrence (12.5 ppm average abundance), as well as its common use in man-made products (Weast, 1987). Average soil concentrations in the conterminous U.S is 87 mg/kg (USGS, 1994). It can be detected in almost all media of the environment, despite the fact that it has no known biological role. Anthropogenic sources of lead include electroplating, metallurgy, electronic equipment, paints, dyes, plumbing, and gasoline. Lead is well-known as a cumulative poison, but the principle source of exposure of the general population to lead is in food. The average daily intake from food is approximately 150 µg/day for adults, 0.75 to 120 µg/day for infants and small children, and 10 µg/day from water.

Environmental Fate

Sorption processes are the dominant mechanism controlling the distribution of lead in the environment. Most lead is retained strongly in soil and very little is transported into surface water or groundwater. Sorption mechanisms vary depending on the geological setting, pH, Eh, availability of ligands, organic content of the soil, dissolved and particulate iron concentration, salinity, and initial lead concentration (Callahan et al., 1979). The adsorption of lead to soils and oxides is highly pH dependent. Above pH 7, essentially all of the lead is in the solid phase (Callahan et al., 1979). Iron oxides can sorb as much as 0.28 moles of lead per mole iron at a pH of 6. Adsorption to clay surfaces and incorporation into cationic lattice sites in crystalline sediments are other important sorption processes. Lead is also strongly complexed by organic materials. Humic acids in solution and other organic complexing agents can maintain lead ions in a bound form at a pH as low as 3. Atmospheric rainout and fallout of airborne lead (introduced primarily by combustion processes) is an important component in the environmental cycling of lead.

Toxicology and Regulatory Criteria for Human Health

Absorption of lead to which an individual is exposed is highly variable. In the diet the percentage of lead absorbed will vary depending on the person's age and nutritional factors, with children having greater absorption than adults. Lead absorption in the lungs depends on the volume of air respired and the size of the particle to which the lead is adsorbed. Once absorbed into the body over 90 percent of the lead resides in the red blood cells. Therefore, blood lead levels are a good indicator of recent exposure to lead in the environment. Moderate to high levels of exposure to inorganic lead and some of its compounds can cause lead poisoning. This exposure can be difficult to diagnose, but may include symptoms of decreased physical fitness, fatigue, sleep disturbances, headaches, aching bones and muscle, digestive symptoms, abdominal pains, and decreased appetite. These symptoms are reversible and complete recovery is possible. Of greatest concern regarding chronic exposure to lead is the effect on the central nervous system, particularly in children. Nerve damage may occur, with symptoms such as "wrist-drop".

There is not a value associated with the reference dose for oral exposures, however, a blood-lead "level of concern" of 10 µg/dL has been established by the Center for Disease Control (CDC). To evaluate risks associated with exposure to lead, the EPA developed the Integrated Exposure Uptake Biokinetic Model for Lead in Children (EPA, 1994). This model estimates blood lead concentrations based on environmental exposure to lead. Other models have been developed to estimate exposure to adults. The simplest to use is the Bowers Model (Bowers, et. al., 1994). A more complex, physiologically-based model was developed by O'Flaherty (1993). Lead is classified as a group B2 carcinogen indicating that it is a probable human carcinogen based on sufficient evidence from animal studies and insufficient evidence from humans (IRIS, 1990).

The MCL for lead is 0.015 mg/l. The Soil/Air and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission for lead is 500 mg/kg. The SAI-RES value for lead determines the maximum concentration in residential soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for residential purposes. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission for lead is 1,000 mg/kg. The SAI-IND value for lead determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites.

Toxicology and Regulatory Criteria for Aquatic Life

The toxicity of lead in freshwater has been shown to be dependent on water hardness. Increasing toxicity is associated with decreasing C_aCO_3 concentrations. At a hardness of 50 mg/l, the acute sensitivity of 10 species of fish range from 0.142 mg/l for an amphipod to 235.9 mg/l for a midge. Chronic toxicity values range from 0.012 to 0.0128 mg/l for the cladoceran. Four species of freshwater algae are effected by lead concentrations greater than 0.50 mg/l. Spinal deformities have been observed in rainbow trout at 0.013 to 0.027 mg/l (28 mg/l C_aCO_3). Available bioconcentrations factors range from 42 to 1,700 (IRIS, 1991). The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life is $e^{(1.273(\ln(\text{hardness})) - 4.705)}$. At a hardness of 250 mg/l, the water quality criteria would be 0.010 mg/l (IRIS, 1991).

Selenium is a silvery metallic allotrope or red amorphous powder (less stable) located in group VIA of the periodic table. Oxidation states include +4, +6 and –2. Selenium is considered an essential trace element and practically non-toxic (Weast, 1987). Selenium's most common forms are as trace minerals in certain ores or as a by–product in electrorefining copper (Pais, 1997). Selenium is used in photocopying, by the glass industry to decolorize glass and as an additive to stainless steel (Weast, 1987).

Environmental Fate

Selenium's ability to sorb or co-precipitate with hydrous iron oxides allows it to be mobile in aerobic waters. Selenium is considered a non-metal residing mainly in igneous rocks; therefore, most of the selenium found in natural waters is attributed to the weathering of seleniferous rock. Elemental selenium is the most stable form of selenium, however, in aerobic conditions, selenite (+4) and selenate (+6) are more stable. Each form of selenium affects its movement, toxicity and deficiency in the environment. Selenate is very stable in alkaline pH environments where it is very soluble and readily available to plants. Selenite is less soluble than selenate and, therefore, its mobility in an aquatic environment is limited. Elemental selenium is insoluble in water making it relatively immobile in an aquatic environment. Selenide (-2) is considered highly toxic but it rapidly decomposes to form elemental selenium and, therefore, does not affect the overall fate of selenium in the aquatic environment (Callahan et al., 1979).

Toxicology and Regulatory Criteria for Human Health

Selenium is a necessary micronutirent for humans, and potential toxic effects only occur at relatively high exposure levels (Callahan et al., 1979). Several selenium compounds are well absorbed from the gastrointestinal tract of humans. The degree of absorption can be affected by the physical state of the compound (e.g., solid or solution), the chemical form of selenium (e.g., organic, inorganic) and the dosing regimen. It appears, however, that the degree of selenium absorption (i.e., percent of administered dose) in humans is independent of the exposure level (ATSDR, 1991). EPA (IRIS, 1991) derived an oral RfD for selenium to be 5 x 10^{-3} mg/kg-day using an uncertainty factor of 3.

Selenium, a Group D (not classifiable) compound, is not considered carcinogenic by the EPA due to inadequate toxicological data in humans and inadequate evidence of carcinogenicity in animals (IRIS, 1991).

The MCLG (not be confused with the Maximum Contaminant Level (MCL)) set by the EPA for selenium is 0.05 mg/l which is based on a no-effect human level obtained from a human study in China (IRIS, 1991). The MCL for selenium is equal to the MCLG, 0.05 mg/l. The Soil/Iar and Ingestion Standard for Residential Use (SAI-RES) established by the Texas Natural Resource Conservation Commission for selenium is 1,370 mg/kg. The SAI-RES value for selenium determines the maximum concentration in residential soil, considering

cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for residential purposes. The Soil/Air and Ingestion Standard for Industrial Use (SAI-IND) established by the Texas Natural Resource Conservation Commission for selenium is 1,020 mg/kg. The SAI-IND value for selenium determines the maximum concentration in industrial soil, considering cross-media contamination of air and the human ingestion and inhalation pathways (mg/kg), acceptable for industrial sites.

Toxicology and Regulatory Criteria for Aquatic Life

Callhan et. al. (1979) reports that selenium is beneficial to aquatic life at low concentrations but is toxic at high concentrations. Still, there is very little quantitative data on the effects selenium has on aquatic life. The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life is 0.005 mg/l.

Zinc (Zn)

Zinc is a bluish-white, lustrous transition metal belonging to group IIB of the periodic table, along with cadmium and mercury. Zinc is one of the most important trace nutrients in living organisms, with over 25 zinc-containing enzymes identified. Ores of zinc include sulfide, carbonate, silicate, and iron-manganese-zinc oxide forms, and zinc occurs naturally at an average concentration of 70 ppm (Weast, 1987). The average concentration in the conterminous U.S. is 100 mg/kg (USGS, 1994). Zinc is used in metallurgy, and is commonly used to galvanize materials to prevent corrosion. Zinc oxides are employed in a wide range of products and applications, including paints, rubber, cosmetics, soaps, textiles, and plastics.

Environmental Fate

Zinc compounds are very soluble in water, more so than compounds of copper or nickel, and zinc is mobile in aquatic systems, particularly at low (<6) and high (>11) pH values. The stable aqueous oxidation state of zinc is +2. In reducing environments, zinc sulfide precipitates may form (ZnS solubility in cold water is 0.065 mg/100 ml). In most cases adsorption and/or coprecipitation are the mechanisms that probably limit zinc concentrations in natural waters. Zinc adsorbs readily to iron oxyhydroxides, and the affinity of zinc for these surfaces increases as pH increases. In organic-rich waters, complexation of zinc with humic acids and other organic ligands can occur at pH values as low as 3 (Callahan et al., 1979).

Toxicology and Regulatory Criteria for Human Health

Similar to copper, zinc is a necessary micronutrient for humans. Potential toxic effects appear to occur only at relatively high exposure levels. The major effects of eating food or drinking water that contains too much zinc are digestive problems (EPA, 1992). A chronic oral RfD for zinc has been established at 0.3 mg/kg-day based on anemia in humans exposed to therapeutic doses of 2.14 mg/kg-day. No inhalation RfD is available for zinc. Neither MCLG nor MCL have been established for zinc. Zinc does have a Secondary Maximum Contaminant Level (SMCL) of 5.0 mg/l, which is a non-enforceable drinking water requirement solely based on the aesthetic (e.g., taste and odor) qualities of the water (IRIS, 1991).

Zinc, a Group D (not classifiable) compound, is not considered carcinogenic by the EPA due to inadequate toxicological data in humans and inadequate evidence of carcinogenicity in animals (IRIS, 1991).

The Texas Natural Resource Conservation Commission has not established a Soil/Air and Ingestion Standard for Residential Use (SAI-RES) or a Soil/Air and Ingestion Standard for Industrial Use (SAI-IND).

Toxicology and Regulatory Criteria for Aquatic Life

Ionic forms of zinc present in water can be toxic to aquatic life at low concentrations, and toxicity is dependent upon a variety of physical and chemical factors which influence the ion activity, including water hardness, pH, suspended particulate matter, and dissolved colloidal materials. As the hardness of water increases, the toxic effects of zinc decrease. The Freshwater Chronic Criteria established by the Texas Surface Water Quality Standards for the protection of aquatic life is $e^{(0.8473\ (\ln(\text{hardness}))\ +0.7614)}$ for chronic exposures. For example, at a hardness of 250 mg/l, the water quality criteria would be 0.230 mg/l (IRIS, 1991).

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APPENDIX L

Attachment L-5

Criteria Table Calculations and Data

SSIA1																				
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA1-1	7/15/97	SSIA1-1A	0 ft.	6.8	3200	1900	62	13000	18000	11000	190	7000	1.916923	8.070906	7.549609	4.127134	9.472705	9.798127	9.305651	5.247024	8.853665
SSIA1-1	7/15/97	SSIA1-1B	1.5 ft.	6.3	2300	91	330	7600	150000	5000	13	13000	1.84055	7.740664	4.51086	5.799093	8.935904	11.91839	8.517193	2.564949	9.472705
SSIA1-2	7/15/97	SSIA1-2A	0 ft.	7.2	21000	1100	60	11000	30000	15	1300	2600	1.974081	9.952278	7.003065	4.094345	9.305651	10.30895	2.70805	7.17012	7.863267
SSIA1-2	7/15/97	SSIA1-2B	1.5 ft.	6.7	22000	1600	110	28000	46000	5400	200	4900	1.902108	9.998798	7.377759	4.70048	10.23996	10.7364	8.594154	5.298317	8.49699
SSIA1-3	7/15/97	SSIA1-3A	0 ft.	7.8	2000	320	15	4000	12000	4100	41	2200	2.054124	7.600902	5.768321	2.70805	8.29405	9.392662	8.318742	3.713572	7.696213
SSIA1-3	7/15/97	SSIA1-3B	1.5 ft.	7.7	4900	110	97	37000	44000	5800	36	7200	2.04122	8.49699	4.70048	4.574711	10.51867	10.69194	8.665613	3.583519	8.881836
SSIA1-4	7/15/97	SSIA1-4A	0 ft.	8.1	410	88	15	1800	15000	690	5	1500	2.091864	6.016157	4.477337	2.70805	7.495542	9.615805	6.536692	1.609438	7.31322
SSIA1-4	7/15/97	SSIA1-4B	1.5 ft.	8.1	570	160	110	11000	44000	6200	25	7500	2.091864	6.345636	5.075174	4.70048	9.305651	10.69194	8.732305	3.218876	8.922658
SSIA1-5	7/15/97	SSIA1-5A	0 ft.	8.1	1800	120	39	2500	18000	1200	5	2300	2.091864	7.495542	4.787492	3.663562	7.824046	9.798127	7.090077	1.609438	7.740664
SSIA1-5	7/15/97	SSIA1-5B	1.5 ft.	8.4	220	20	170	3500	18000	830	5	550	2.128232	5.393628	2.995732	5.135798	8.160518	9.798127	6.721426	1.609438	6.309918
			n=	10	10	10	10	10	10	10	10	10									
			standard deviation=	0.720802	8374.999	708.3641	93.81874	11708.8	40996.61	3411.902	399.8202	3828.058	0.098435	1.533732	1.476639	0.990273	1.004856	0.757022	1.93509	1.869207	0.945117
			average=	7.52	5840	550.9	100.8	11940	39500	4023.5	182	4875	2.013283	7.71115	5.424583	4.22117	8.95527	10.27505	7.51899	3.562469	8.155114
			UCL=	7.98	64,764	5,216	397	36,419	74,981	351,946	4,798	13,970									
			skewness=	-0.54838	1.663124	1.247198	1.807657	1.454638	2.587165	0.708058	2.968787	1.013368									
			H=	1.800	4.286	4.154	3.856	3.113	2.629	5.240	5.082	2.993									

SSIA2																					
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc		pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA2-1	7/14/97	SSIA2-1A	0 ft.	7.6	400	14	120	7200	130000	1500	12	10000		2.028148	5.991465	2.639057	4.787492	8.881836	11.77529	7.31322	2.484907	9.21034
EP-76	6/3/97	EP-76A	0 ft.	7.8	1800	420	200	12000	120000	9500	82	12000		2.054124	7.495542	5.298317	5.298317	9.392662	11.69525	9.159047	4.406719	9.392662
EP-76	6/3/97	EP-76B	1.5 ft.	10.2	420	5	310	4800	150000	3400	80	110000		2.322388	6.040255	5.736572	5.736572	8.476371	11.91839	8.131531	4.382027	11.60824
RIBH-4	6/30/97	RIBH-4A	0 ft.	0	280	24	120	2100	60000	970	5	4700			5.63479	4.787492	4.787492	7.649693	11.0021	6.877296	1.609438	8.455318
RIBH-5	6/30/97	RIBH-5A	2 ft.	8.8	10	5	46	310	27000	210	5	1600		2.174752	2.302585	3.828641	3.828641	5.736572	10.20359	5.347108	1.609438	7.377759
RIBH-6	6/30/97	RIBH-6A	2 ft.	9.7	270	5	150	1800	96000	830	15	6500		2.272126	5.598422	5.010635	5.010635	7.495542	11.4721	6.721426	2.70805	8.779557
SSIA2-1	7/14/97	SSIA2-1B	1.5 ft.	7.6	1200	56	340	5400	190000	180	72	16000		2.028148	7.090077	4.025352	5.828946	8.594154	12.15478	5.192957	4.276666	9.680344
SSIA2-2	7/14/97	SSIA2-2A	0 ft.	8.1	840	150	230	8800	85000	2700	21	5300		2.091864	6.733402	5.010635	5.438079	9.082507	11.35041	7.901007	3.044522	8.575462
			n=	8	8	8	8	8	8	8	8	8										
		standard deviation=		3.174339	593.6991	144.0500285	100.5229	3935.191	51616.03	3083.210004	34.86709	36344.2641		0.120162	1.593515	0.992509	0.644648	1.180491	0.614877	1.356998	1.177441	1.223324
			average=	7.48	653	84.9	190	5301	107250	2411	36.5	20763		2.138793	5.860817	4.542088	5.089522	8.163667	11.44649	7.080449	3.065221	9.13496
			UCL=	9.31	27,370	567	382	41,598	179,222	29,413	251	130,055										
			skewness=	-2.28559	1.165199	2.279980545	0.288426	0.469076	0.033061	2.129807477	0.58582	2.74093594										
			H=	1.878	5.125	3.480	2.664	3.979	1.983	4.461	3.971	4.093										

SSIA3																				
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA3-10	7/15/97	SSIA3-10A	0 ft.	10	2800	360	95	7900	15000	19000	77	4100	2.302585	7.937375	5.886104	4.553877	8.974618	9.615805	9.852194	4.343805	8.318742
SSIA3-10	7/15/97	SSIA3-10B	1.5 ft.	8.5	980	680	15	4700	120000	25000	46	15000	2.140066	6.887553	6.522093	2.70805	8.455318	11.69525	10.12663	3.828641	9.615805
SSIA3-2	7/14/97	SSIA3-2A	0 ft.	8.4	10	25	15	360	15000	220	5	220	2.128232	2.302585	3.218876	2.70805	5.886104	9.615805	5.393628	1.609438	5.393628
SSIA3-2	7/14/97	SSIA3-2B	1.5 ft.	8.3	35	19	15	430	21000	550	5	2000	2.116256	3.555348	2.944439	2.70805	6.063785	9.952278	6.309918	1.609438	7.600902
SSIA3-3	7/14/97	SSIA3-3A	0 ft.	6.5	480	150	41	3600	15000	2000	5	1900	1.871802	6.173786	5.010635	3.713572	8.188689	9.615805	7.600902	1.609438	7.549609
SSIA3-3	7/14/97	SSIA3-3B	1.5 ft.	8.2	10	5	100	72	6000	37	5	100	2.104134	2.302585	1.609438	4.60517	4.276666	8.699515	3.610918	1.609438	4.60517
SSIA3-4	7/14/97	SSIA3-4A	0 ft.	7.3	7800	1600	140	7400	55000	7300	53	9800	1.987874	8.961879	7.377759	4.941642	8.909235	10.91509	8.89563	3.970292	9.190138
SSIA3-4	7/14/97	SSIA3-4B	1.5 ft.	7.9	3000	330	300	4400	150000	5600	35	16000	2.066863	8.006368	5.799093	5.703782	8.38936	11.91839	8.630522	3.555348	9.680344
SSIA3-5	7/15/97	SSIA3-5A	0 ft.	8.4	1000	280	240	9000	92000	5200	22	9200	2.128232	6.907755	5.63479	5.480639	9.10498	11.42954	8.556414	3.091042	9.126959
SSIA3-5	7/15/97	SSIA3-5B	1.5 ft.	7.4	560	150	80	3700	63000	3300	16	7300	2.00148	6.327937	5.010635	4.382027	8.216088	11.05089	8.101678	2.772589	8.89563
SSIA3-6	7/15/97	SSIA3-6A	0 ft.	8.4	2900	790	260	11000	30000	11000	60	14000	2.128232	7.972466	6.672033	5.560682	9.305651	10.30895	9.305651	4.094345	9.546813
SSIA3-6	7/15/97	SSIA3-6B	1.5 ft.	8.1	230	67	60	1000	16000	1000	5	1300	2.091864	5.438079	4.204693	4.094345	6.907755	9.680344	6.907755	1.609438	7.17012
SSIA3-7	7/15/97	SSIA3-7A	0 ft.	8.2	820	150	120	1900	12000	2200	22	2200	2.104134	6.709304	5.010635	4.787492	7.549609	9.392662	7.696213	3.091042	7.696213
SSIA3-7	7/15/97	SSIA3-7B	1.5 ft.	8.1	2700	440	1400	3900	45000	3700	94	14000	2.091864	7.901007	6.086775	7.244228	8.268732	10.71442	8.216088	4.543295	9.546813
SSIA3-8	7/15/97	SSIA3-8A	0 ft.	8.2	3200	1100	290	20000	60000	8100	60	9900	2.104134	8.070906	7.003065	5.669881	9.903488	11.0021	8.999619	4.094345	9.20029
SSIA3-8	7/15/97	SSIA3-8B	1.5 ft.	7.9	740	170	110	3300	19000	1600	14	1900	2.066863	6.60665	5.135798	4.70048	8.101678	9.852194	7.377759	2.639057	7.549609
SSIA3-9	7/15/97	SSIA3-9A	0 ft.	8.2	1900	1400	53	8500	34000	4500	33	5500	2.104134	7.549609	7.244228	3.970292	9.047821	10.43412	8.411833	3.496508	8.612503
SSIA3-9	7/15/97	SSIA3-9B	1.5 ft.	8.4	570	340	52	2700	23000	2700	26	2600	2.128232	6.345636	5.828946	3.951244	7.901007	10.04325	7.901007	3.258097	7.863267
			n=	18	18	18	18	18	18	18	18	18									
		standard deviation=		0.684277	1913.006	481.3579	316.7249	4901.327	40381.23	6684.94	27.16213	5508.541	0.084667	1.934253	1.551457	1.18237	1.402033	0.874852	1.588598	1.047727	1.429783
			average=	8.13	1652	448	188	5215	43944	5723	32	6501	2.09261	6.442046	5.344446	4.526861	7.969477	10.3298	7.88302	3.045866	8.175697
			UCL=	8.43	29,689	2,656	432	23,713	75,951	37,739	73	31,491									
			skewness=	0.264235	2.090198	1.3768	3.651942	1.708942	1.541601	1.962047	0.859241	0.52224									
			H=	1.724	4.233	3.552	2.938	3.298	2.476	3.617	2.728	3.344									

SSIA4 Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA4-1	10/27/97	SSIA4-1A	0 ft.	7	3100	540	200	31000	72000	11000	56	11000	1.94591	8.039157	6.291569	5.298317	10.34174	11.18442	9.305651	4.025352	9.305651
SSIA4-1	10/27/97	SSIA4-1B	1.5 ft.	7.6	97	66	81	280	13000	200	5	790	2.028148	4.574711	4.189655	4.394449	5.63479	9.472705	5.298317	1.609438	6.672033
SSIA4-10	10/28/97	SSIA4-10A	0 ft.	7.7	840	290	130	5800	30000	5100	24	3200	2.04122	6.733402	5.669881	4.867534	8.665613	10.30895	8.536996	3.178054	8.070906
SSIA4-10	10/28/97	SSIA4-10B	1.5 ft.	7.8	880	140	15	3400	26000	2800	18	2000	2.054124	6.779922	4.941642	2.70805	8.131531	10.16585	7.937375	2.890372	7.600902
SSIA4-11	10/28/97	SSIA4-11A	0 ft.	8	1800	500	140	9700	36000	8900	53	4600	2.079442	7.495542	6.214608	4.941642	9.179881	10.49127	9.093807	3.970292	8.433812
SSIA4-11	10/28/97	SSIA4-11B	1.5 ft.	7.9	680	55	61	1000	26000	1300	13	640	2.066863	6.522093	4.007333	4.110874	6.907755	10.16585	7.17012	2.564949	6.461468
SSIA4-12	10/28/97	SSIA4-12A	0 ft.	7.2	4800	930	130	11000	31000	13000	63	6600	1.974081	8.476371	6.835185	4.867534	9.305651	10.34174	9.472705	4.143135	8.794825
SSIA4-12	10/28/97	SSIA4-12B	1.5 ft.		10	18	140	1800	190000	10000	5	20000		2.302585	2.890372	4.941642	7.495542	12.15478	9.21034	1.609438	9.903488
SSIA4-13	10/28/97	SSIA4-13A	0 ft.	7.5	860	320	74	12000	34000	11000	52	5400	2.014903	6.756932	5.768321	4.304065	9.392662	10.43412	9.305651	3.951244	8.594154
SSIA4-13	10/28/97	SSIA4-13B	1.5 ft.	7.4	790	320	120	14000	36000	12000	70	7400	2.00148	6.672033	5.768321	4.787492	9.546813	10.49127	9.392662	4.248495	8.909235
SSIA4-14	10/28/97	SSIA4-14A	0 ft.	7.6	1600	640	110	10000	40000	14000	50	6300	2.028148	7.377759	6.461468	4.70048	9.21034	10.59663	9.546813	3.912023	8.748305
SSIA4-14	10/28/97	SSIA4-14B	1.5 ft.	8	490	190	82	3700	33000	4500	16	2400	2.079442	6.194405	5.247024	4.406719	8.216088	10.40426	8.411833	2.772589	7.783224
SSIA4-15	10/28/97	SSIA4-15A	0 ft.	7.8	480	300	130	4400	27000	6800	33	3200	2.054124	6.173786	5.703782	4.867534	8.38936	10.20359	8.824678	3.496508	8.070906
SSIA4-15	10/28/97	SSIA4-15B	1.5 ft.	7.9	440	240	71	3800	30000	5300	21	3000	2.066863	6.086775	5.480639	4.26268	8.242756	10.30895	8.575462	3.044522	8.006368
SSIA4-16	10/27/97	SSIA4-16A	0 ft.	8.1	520	350	71	5000	27000	5900	32	2800	2.091864	6.253829	5.857933	4.26268	8.517193	10.20359	8.682708	3.465736	7.937375
SSIA4-16	10/30/97	SSIA4-16B	1.5 ft.	8.2	66	30	78	640	25000	710	5	380	2.104134	4.189655	3.401197	4.356709	6.461468	10.12663	6.565265	1.609438	5.940171
SSIA4-17	10/30/97	SSIA4-17A	0 ft.	8.1	220	76	15	4600	29000	2500	5	1400	2.091864	5.393628	4.330733	2.70805	8.433812	10.27505	7.824046	1.609438	7.244228
SSIA4-17	10/30/97	SSIA4-17B	1.5 ft.	8.4	160	57	120	1900	29000	1900	11	1500	2.128232	5.075174	4.043051	4.787492	7.549609	10.27505	7.549609	2.397895	7.31322
SSIA4-18	10/30/97	SSIA4-18A	0 ft.	8.4	160	59	120	2500	23000	1400	5	780	2.128232	5.075174	4.077537	4.787492	7.824046	10.04325	7.244228	1.609438	6.659294
SSIA4-18	10/30/97	SSIA4-18B	1.5 ft.	8.4	150	85	130	1700	26000	1200	5	1100	2.128232	5.010635	4.442651	4.867534	7.436384	10.16585	7.090077	1.609438	7.003065
SSIA4-19	10/30/97	SSIA4-19A	0 ft.	8.3	52	22	65	1200	15000	560	5	350	2.116256	3.951244	3.091042	4.174387	7.090077	9.615805	6.327937	1.609438	5.857933
SSIA4-19	10/30/97	SSIA4-19B	1.5 ft.	8.5	24	10	15	590	21000	440	5	400	2.140066	3.178054	2.302585	2.70805	6.380123	9.952278	6.086775	1.609438	5.991465
SSIA4-2	10/27/97	SSIA4-2A	0 ft.	7.5	4900	1000	100	18000	39000	11000	74	7300	2.014903	8.49699	6.907755	4.60517	9.798127	10.57132	9.305651	4.304065	8.89563
SSIA4-2	10/27/97	SSIA4-2B	1.5 ft.	7.4	7000	1200	140	17000	35000	12000	120	8700	2.00148	8.853665	7.090077	4.941642	9.740969	10.4631	9.392662	4.787492	9.071078
SSIA4-20	10/30/97	SSIA4-20A	0 ft.	7.8	75	32	57	2600	20000	1300	5	840	2.054124	4.317488	3.465736	4.043051	7.863267	9.903488	7.17012	1.609438	6.733402
SSIA4-20	10/30/97	SSIA4-20B	1.5 ft.	8.2	10	16	45	840	27000	550	5	400	2.104134	2.302585	2.772589	3.806662	6.733402	10.20359	6.309918	1.609438	5.991465
SSIA4-21	10/30/97	SSIA4-21A	0 ft.	8.3	160	63	40	3600	28000	2500	5	1600	2.116256	5.075174	4.143135	3.688879	8.188689	10.23996	7.824046	1.609438	7.377759
SSIA4-21	10/30/97	SSIA4-21B	1.5 ft.	8.2	210	73	86	3200	36000	3200	14	2700	2.104134	5.347108	4.290459	4.454347	8.070906	10.49127	8.070906	2.639057	7.901007
SSIA4-22	10/30/97	SSIA4-22A	0 ft.	8	140	62	75	3100	26000	2200	5	1400	2.079442	4.941642	4.127134	4.317488	8.039157	10.16585	7.696213	1.609438	7.244228
SSIA4-22	10/30/97	SSIA4-22B	1.5 ft.	8.4	45	22	53	1100	23000	1200	5	780	2.128232	3.806662	3.091042	3.970292	7.003065	10.04325	7.090077	1.609438	6.659294
SSIA4-23	10/30/97	SSIA4-23A	0 ft.	7.8	250	91	73	4800	24000	4600	17	2800	2.054124	5.521461	4.51086	4.290459	8.476371	10.08581	8.433812	2.833213	7.937375
SSIA4-23	10/30/97	SSIA4-23B	1.5 ft.	8.5	10	13	39	410	23000	370	5	250	2.140066	2.302585	2.564949	3.663562	6.016157	10.04325	5.913503	1.609438	5.521461
SSIA4-24	10/30/97	SSIA4-24A	0 ft.	8.2	120	38	110	3000	23000	1800	5	1500	2.104134	4.787492	3.637586	4.70048	8.006368	10.04325	7.495542	1.609438	7.31322
SSIA4-24	10/30/97	SSIA4-24B	1.5 ft.	8.8	10	5	110	220	25000	260	5	230	2.174752	2.302585	1.609438	4.70048	5.393628	10.12663	5.560682	1.609438	5.438079
SSIA4-25	10/30/97	SSIA4-25A	0 ft.	7.5	380	200	83	12000	32000	9400	24	6700	2.014903	5.940171	5.298317	4.418841	9.392662	10.37349	9.148465	3.178054	8.809863
SSIA4-25	10/30/97	SSIA4-25B	1.5 ft.	8.2	10	5	92	530	22000	370	5	280	2.104134	2.302585	1.609438	4.521789	6.272877	9.998798	5.913503	1.609438	5.63479
SSIA4-26	10/30/97	SSIA4-26A	0 ft.	7.7	320	82	65	7500	40000	3800	5	2800	2.04122	5.768321	4.406719	4.174387	8.922658	10.59663	8.242756	1.609438	7.937375
SSIA4-26	10/30/97	SSIA4-26B	1.5 ft.	8.4	10	5	15	140	28000	180	5	150	2.128232	2.302585	1.609438	2.70805	4.941642	10.23996	5.192957	1.609438	5.010635
SSIA4-27	10/30/97	SSIA4-27A	0 ft.	7.7	370	140	180	7600	32000	5300	22	3900	2.04122	5.913503	4.941642	5.192957	8.935904	10.37349	8.575462	3.091042	8.268732
SSIA4-27	10/30/97	SSIA4-27B	1.5 ft.	7.9	25	5	110	95	12000	82	5	87	2.066863	3.218876	1.609438	4.70048	4.553877	9.392662	4.406719	1.609438	4.465908
SSIA4-28	10/30/97	SSIA4-28A	0 ft.	7.9	190	42	110	4100	28000	1600	5	1500	2.066863	5.247024	3.73767	4.70048	8.318742	10.23996	7.377759	1.609438	7.31322
SSIA4-28	10/30/97	SSIA4-28B	1.5 ft.	8.5	10	5	67	120	25000	63	5	72	2.140066	2.302585	1.609438	4.204693	4.787492	10.12663	4.143135	1.609438	4.276666
SSIA4-29	10/30/97	SSIA4-29A	0 ft.	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	2.028148	2.028148	2.028148	2.028148	2.028148	2.028148	2.028148	2.028148	2.028148
SSIA4-29	10/30/97	SSIA4-29B	1.5 ft.	8.6	10	5	75	190	22000	330	5	270	2.151762	2.302585	1.609438	4.317488	5.247024	9.998798	5.799093	1.609438	5.598422
SSIA4-3	10/27/97	SSIA4-3A	0 ft.	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	1.974081	1.974081	1.974081	1.974081	1.974081	1.974081	1.974081	1.974081	1.974081
SSIA4-3	10/27/97	SSIA4-3B	1.5 ft.	7.3	2900	1500	36	9300	30000	8400	60	5600	1.987874	7.972466	7.31322	3.583519	9.13777	10.30895	9.035987	4.094345	8.630522
SSIA4-30	10/30/97	SSIA4-30A	0 ft.	7.9	200	16	15	1200	17000	980	5	360	2.066863	5.298317	2.772589	2.70805	7.090077	9.740969	6.887553	1.609438	5.886104
SSIA4-30	10/30/97	SSIA4-30B	1.5 ft.	8	250	83	130	2300	24000	2700	5	2000	2.079442	5.521461	4.418841	4.867534	7.740664	10.08581	7.901007	1.609438	7.600902
SSIA4-4	10/28/97	SSIA4-4A	0 ft.	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	2.04122	2.04122	2.04122	2.04122	2.04122	2.04122	2.04122	2.04122	2.04122
SSIA4-4	10/28/97	SSIA4-4B	1.5 ft.	7.8	1100	280	120	13000	46000	7500	41	6700	2.054124	7.003065	5.63479	4.787492	9.472705	10.7364	8.922658	3.713572	8.809863
SSIA4-5	10/28/97	SSIA4-5A	0 ft.	7.1	3500	840	68	31000	50000	21000	90	12000	1.960095	8.160518	6.733402	4.219508	10.34174	10.81978	9.952278	4.49981	9.392662
SSIA4-5	10/28/97	SSIA4-5B	1.5 ft.	7.7	370	54	36	2400	24000	2600	5	980	2.04122	5.913503	3.988984	3.583519	7.783224	10.08581	7.863267	1.609438	6.887553
SSIA4-6	10/28/97	SSIA4-6A	0 ft.	7.5	5900	1300	120	40000	50000	15000	110	8700	2.014903	8.682708	7.17012	4.787492	10.59663	10.81978	9.615805	4.70048	9.071078
SSIA4-6	10/28/97	SSIA4-6B	1.5 ft.	7.7	610	520	100	6900	27000	4000	16	2900	2.04122	6.413459	6.253829	4.60517	8.839277	10.20359	8.29405	2.772589	7.972466
SSIA4-7	10/28/97	SSIA4-7A	0 ft.	4.6	17000	350	57	82000	87000	49000	1600	7900	1.526056	9.740969	5.857933	4.043051	11.31447	11.37366	10.79958	7.377759	8.974618
SSIA4-7	10/28/97	SSIA4-7B	1.5 ft.	5	2200	310	210	68000	40000	12000	110	3600	1.609438	7.696213	5.736572	5.347108	11.12726	10.59663	9.392662	4.70048	8.188689

SSIA4																					
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc		pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA4-8	10/28/97	SSIA4-8A	0 ft.	6.4	3300	980	180	25000	50000	25000	100	11000		1.856298	8.101678	6.887553	5.192957	10.12663	10.81978	10.12663	4.60517	9.305651
SSIA4-8	10/28/97	SSIA4-8B	1.5 ft.	6.9	990	190	75	4200	27000	4100	15	2100		1.931521	6.897705	5.247024	4.317488	8.34284	10.20359	8.318742	2.70805	7.649693
SSIA4-9	10/28/97	SSIA4-9A	0 ft.	7	3000	970	74	12000	43000	11000	30	5400		1.94591	8.006368	6.877296	4.304065	9.392662	10.66896	9.305651	3.401197	8.594154
SSIA4-9	10/28/97	SSIA4-9B	1.5 ft.	6.5	1300	600	220	3900	34000	3200	5	2400		1.871802	7.17012	6.39693	5.393628	8.268732	10.43412	8.070906	1.609438	7.783224
			n=	59	60	60	60	60	60	60	60	60										
			standard deviation=	0.746443	2591.005	369.4688	50.80608	14975.68	25042.73	7884.81	205.5907	3812.23		0.110831	2.097146	1.728912	0.828241	2.037021	1.872201	1.944177	1.25999	1.770666
			average=	7.72	1252	273	88	8690	32300	5819	52	3353		2.03771	5.504809	4.483189	4.233619	7.811273	9.90074	7.617438	2.682764	7.224871
			UCL=	7.91	5961	799	122	50265	258656	31960	49	13737										
			skewness=	-2.14748	4.307244	1.720768	0.501596	3.382788	4.500665	3.239985	7.481098	1.968995										
			H=	1.685	3.623	3.137	2.124	3.541	3.323	3.417	2.568	3.190										

SSIA5																				
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA5-1	7/7/97	SSIA5-1A	0 ft.	8.2	240	130	46	6600	21000	4200	30	2400	2.104134	5.480639	4.867534	3.828641	8.794825	9.952278	8.34284	3.401197	7.783224
SSIA5-1	7/8/97	SSIA5-1B	1.5 ft.	8.4	28	17	15	400	19000	420	5	200	2.128232	3.332205	2.833213	2.70805	5.991465	9.852194	6.040255	1.609438	5.298317
EP-80	6/6/97	EP-80A	0 ft.	8.4	26	5	41	160	14000	95	5	200	2.128232	3.258097	3.713572	3.713572	5.075174	9.546813	4.553877	1.609438	5.298317
EP-80	6/6/97	EP-80B	5 ft.	8.5	10	5	15	34	16000	46	5	79	2.140066	2.302585	2.70805	2.70805	3.526361	9.680344	3.828641	1.609438	4.369448
RIBH-7	7/1/97	RIBH-7A	0 ft.	8	53	28	130	1500	21000	1000	5	780	2.079442	3.970292	4.867534	4.867534	7.31322	9.952278	6.907755	1.609438	6.659294
RIBH-8	7/1/97	RIBH-8A	0 ft.	7.5	120	120	63	3800	22000	3300	14	3100	2.014903	4.787492	4.143135	4.143135	8.242756	9.998798	8.101678	2.639057	8.039157
RIBH-9	7/1/97	RIBH-9A	0 ft.	7.8	63	46	15	1600	23000	1100	5	1500	2.054124	4.143135	2.70805	2.70805	7.377759	10.04325	7.003065	1.609438	7.31322
RIBH-10	7/1/97	RIBH-10A	0 ft.	8.2	46	5	15	760	18000	400	5	360	2.104134	3.828641	2.70805	2.70805	6.633318	9.798127	5.991465	1.609438	5.886104
SSIA5-10	7/8/97	SSIA5-10A	0 ft.	7.7	130	110	34	3900	19000	2800	12	2500	2.04122	4.867534	4.70048	3.526361	8.268732	9.852194	7.937375	2.484907	7.824046
SSIA5-10	7/8/97	SSIA5-10B	1.5 ft.	8.4	10	5	30	320	17000	250	5	200	2.128232	2.302585	1.609438	3.401197	5.768321	9.740969	5.521461	1.609438	5.298317
SSIA5-11	7/8/97	SSIA5-11A	0 ft.	8	10	22	36	1100	21000	740	5	630	2.079442	2.302585	3.091042	3.583519	7.003065	9.952278	6.60665	1.609438	6.44572
SSIA5-11	7/8/97	SSIA5-11B	1.5 ft.	8.1	10	23	66	570	19000	470	5	360	2.091864	2.302585	3.135494	4.189655	6.345636	9.852194	6.152733	1.609438	5.886104
SSIA5-12	7/8/97	SSIA5-12A	0 ft.	7.8	21	19	41	810	21000	540	5	440	2.054124	3.044522	2.944439	3.713572	6.697034	9.952278	6.291569	1.609438	6.086775
SSIA5-12	7/8/97	SSIA5-12B	1.5 ft.	7.8	10	11	100	430	20000	440	5	340	2.054124	2.302585	2.397895	4.60517	6.063785	9.903488	6.086775	1.609438	5.828946
SSIA5-13	7/8/97	SSIA5-13A	0 ft.	7.8	87	36	69	2200	17000	830	5	850	2.054124	4.465908	3.583519	4.234107	7.696213	9.740969	6.721426	1.609438	6.745236
SSIA5-13	7/8/97	SSIA5-13B	1.5 ft.	8	10	5	15	100	18000	110	5	100	2.079442	2.302585	1.609438	2.70805	4.60517	9.798127	4.70048	1.609438	4.60517
SSIA5-14	7/8/97	SSIA5-14A	0 ft.	8	78	5	60	1300	14000	170	5	220	2.079442	4.356709	1.609438	4.094345	7.17012	9.546813	5.135798	1.609438	5.393628
SSIA5-14	7/8/97	SSIA5-14B	1.5 ft.	8.2	10	5	15	120	19000	130	5	54	2.104134	2.302585	1.609438	2.70805	4.787492	9.852194	4.867534	1.609438	3.988984
SSIA5-15	7/14/97	SSIA5-15A	0 ft.	7.9	86	20	74	2800	23000	420	5	900	2.066863	4.454347	2.995732	4.304065	7.937375	10.04325	6.040255	1.609438	6.802395
SSIA5-15	7/14/97	SSIA5-15B	1.5 ft.	8.5	10	5	32	39	17000	34	5	59	2.140066	2.302585	1.609438	3.465736	3.663562	9.740969	3.526361	1.609438	4.077537
SSIA5-16	7/14/97	SSIA5-16A	0 ft.	7.6	27	24	89	1000	32000	610	5	650	2.028148	3.295837	3.178054	4.488636	6.907755	10.37349	6.413459	1.609438	6.476972
SSIA5-16	7/14/97	SSIA5-16B	1.5 ft.	8.1	10	5	15	200	20000	150	5	190	2.091864	2.302585	1.609438	2.70805	5.298317	9.903488	5.010635	1.609438	5.247024
SSIA5-17	7/14/97	SSIA5-17A	0 ft.	7.7	83	85	15	1800	23000	1100	5	1400	2.04122	4.418841	4.442651	2.70805	7.495542	10.04325	7.003065	1.609438	7.244228
SSIA5-17	7/14/97	SSIA5-17B	1.5 ft.	8.1	24	5	15	150	18000	140	5	150	2.091864	3.178054	1.609438	2.70805	5.010635	9.798127	4.941642	1.609438	5.010635
SSIA5-18	7/14/97	SSIA5-18A	0 ft.	8.5	26	11	15	1200	20000	200	5	430	2.140066	3.258097	2.397895	2.70805	7.090077	9.903488	5.298317	1.609438	6.063785
SSIA5-18	7/14/97	SSIA5-18B	1.5 ft.	9.3	10	5	15	27	16000	15	5	28	2.230014	2.302585	1.609438	2.70805	3.295837	9.680344	2.70805	1.609438	3.332205
SSIA5-19	7/14/97	SSIA5-19A	0 ft.	7.7	160	150	39	3400	28000	2400	18	3300	2.04122	5.075174	5.010635	3.663562	8.131531	10.23996	7.783224	2.890372	8.101678
SSIA5-19	7/14/97	SSIA5-19B	1.5 ft.	7.8	10	29	15	370	15000	310	5	430	2.054124	2.302585	3.367296	2.70805	5.913503	9.615805	5.736572	1.609438	6.063785
SSIA5-2	7/8/97	SSIA5-2A	0 ft.	8	71	66	15	1100	20000	580	5	410	2.079442	4.26268	4.189655	2.70805	7.003065	9.903488	6.363028	1.609438	6.016157
SSIA5-2	7/8/97	SSIA5-2B	1.5 ft.	9	22	5	82	42	19000	44	5	28	2.197225	3.091042	1.609438	4.406719	3.73767	9.852194	3.78419	1.609438	3.332205
SSIA5-3	7/8/97	SSIA5-3A	0 ft.	7.6	130	110	170	7200	25000	2700	5	2000	2.028148	4.867534	4.70048	5.135798	8.881836	10.12663	7.901007	1.609438	7.600902
SSIA5-3	7/8/97	SSIA5-3B	1.5 ft.	8.1	10	16	15	1200	19000	850	5	590	2.091864	2.302585	2.772589	2.70805	7.090077	9.852194	6.745236	1.609438	6.380123
SSIA5-4	7/8/97	SSIA5-4A	0 ft.	7.7	37	41	30	1800	21000	1100	11	770	2.04122	3.610918	3.713572	3.401197	7.495542	9.952278	7.003065	2.397895	6.646391
SSIA5-4	7/8/97	SSIA5-4B	1.5 ft.	7.7	10	44	37	1600	23000	1800	12	1100	2.04122	2.302585	3.78419	3.610918	7.377759	10.04325	7.495542	2.484907	7.003065
SSIA5-5	7/8/97	SSIA5-5A	0 ft.	8	10	36	30	1100	20000	1200	20	740	2.079442	2.302585	3.583519	3.401197	7.003065	9.903488	7.090077	2.995732	6.60665
SSIA5-5	7/8/97	SSIA5-5B	1.5 ft.	8.4	10	5	15	130	21000	210	5	130	2.128232	2.302585	1.609438	2.70805	4.867534	9.952278	5.347108	1.609438	4.867534
SSIA5-6	7/8/97	SSIA5-6A	0 ft.	8.2	10	14	15	650	20000	370	5	280	2.104134	2.302585	2.639057	2.70805	6.476972	9.903488	5.913503	1.609438	5.63479
SSIA5-6	7/8/97	SSIA5-6B	1.5 ft.	8.2	10	10	97	310	21000	370	5	210	2.104134	2.302585	2.302585	4.574711	5.736572	9.952278	5.913503	1.609438	5.347108
SSIA5-7	7/8/97	SSIA5-7A	0 ft.	7.9	110	56	15	3800	24000	1700	5	1300	2.066863	4.70048	4.025352	2.70805	8.242756	10.08581	7.438384	1.609438	7.17012
SSIA5-7	7/8/97	SSIA5-7B	1.5 ft.	8.8	10	5	15	59	17000	68	5	52	2.174752	2.302585	1.609438	2.70805	4.077537	9.740969	4.219508	1.609438	3.951244
SSIA5-7	7/8/97	SSIA5-7B2	1.5 ft.		10	5	15	24	20000	5	5	52		2.302585	1.609438	2.70805	3.178054	9.903488	1.609438	1.609438	3.951244
SSIA5-8	7/8/97	SSIA5-8A	0 ft.	7.7	31	42	47	2800	21000	1200	16	990	2.04122	3.433987	3.73767	3.850148	7.937375	9.952278	7.090077	2.772589	6.897705
SSIA5-8	7/8/97	SSIA5-8B	1.5 ft.	8.9	32	5	15	10	16000	30	5	28	2.186051	3.465736	1.609438	2.70805	2.302585	9.680344	3.401197	1.609438	3.332205
SSIA5-9	7/8/97	SSIA5-9A	0 ft.	7.4	90	39	15	2800	23000	800	5	850	2.00148	4.49981	3.663562	2.70805	7.937375	10.04325	6.684612	1.609438	6.745236
SSIA5-9	7/8/97	SSIA5-9B	1.5 ft.	8.1	10	5	68	260	17000	110	5	83	2.091864	2.302585	1.609438	4.219508	5.560682	9.740969	4.70048	1.609438	4.418841
			n=	44	45	45	45	45	45	45	45	45									
			standard deviation=	0.408026	50.54873	38.05797	35.03991	1658.81	3417.572	955.1231	5.140746	815.7993	0.049508	1.02237	1.114139	0.751422	1.663439	0.165107	1.500833	0.463762	1.318336
			average=	8.08	44.9	32.0	40.6	1368	19956	790	7.07	699	2.088585	3.271098	2.920859	3.40649	6.289134	9.887698	5.86562	1.813686	5.846039
			UCL=	8.19	64.0	52.3	50.7	4741	20826	1884	7.78	1344									
			skewness=	0.935666	1.899768	1.743213	1.778657	1.922383	1.03352	1.927	2.897841	1.819796									
			H=	1.654	2.367	2.472	2.095	3.156	1.713	2.428	1.868	2.457									

SSIA8																					
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA8-1	7/16/97	SSIA8-1A	0 ft.	8.2	240	33	58	140	17000	44	5	470	2.104134	5.480639	3.496508	4.060443	4.941642	9.740969	3.78419	1.609438	6.152733
SSIA8-1	7/16/97	SSIA8-1B	1.5 ft.	7.9	2100	400	120	4300	86000	1500	26	8100	2.066863	7.649693	5.991465	4.787492	8.36637	11.3621	7.31322	3.258097	8.999619
EP-71	5/31/97	EP-71A	0 ft.		10	18	36	160	10000	40	5	720		2.302585	3.583519	3.583519	5.075174	9.21034	3.688879	1.609438	6.579251
EP-71	5/31/97	EP-71B	5 ft.		10	5	15	10	17000	20	5	410		2.302585	2.70805	2.70805	2.302585	9.740969	2.995732	1.609438	6.016157
EP-71R	6/11/97	EP-71RA	0 ft.	6.7	1300	120	91	31000	45000	7200	33	3900	1.902108	7.17012	4.51086	4.51086	10.34174	10.71442	8.881836	3.496508	8.268732
EP-71R	6/11/97	EP-71RB	5 ft.	10	10	5	51	340	14000	90	5	56	2.302585	2.302585	3.931826	3.931826	5.828946	9.546813	4.49981	1.609438	4.025352
SSIA8-10	7/17/97	SSIA8-10A	0 ft.	8.6	10	13	15	160	10000	68	5	130	2.151762	2.302585	2.564949	2.70805	5.075174	9.21034	4.219508	1.609438	4.867534
SSIA8-10	7/17/97	SSIA8-10B	1.5 ft.	7.8	53	66	90	750	18000	1400	5	890	2.054124	3.970292	4.189655	4.49981	6.620073	9.798127	7.244228	1.609438	6.791221
SSIA8-11	7/17/97	SSIA8-11A	0 ft.	8.4	910	430	33	20000	24000	3200	31	6300	2.128232	6.813445	6.063785	3.496508	9.903488	10.08581	8.070906	3.433987	8.748305
SSIA8-11	7/17/97	SSIA8-11B	1.5 ft.	7.5	62	86	31	2700	11000	3700	10	1100	2.014903	4.127134	4.454347	3.433987	7.901007	9.305651	8.216088	2.302585	7.003065
SSIA8-12	7/17/97	SSIA8-12A	0 ft.	8	150	78	36	5100	17000	3600	5	2300	2.079442	5.010635	4.356709	3.583519	8.536996	9.740969	8.188689	1.609438	7.740664
SSIA8-12	7/17/97	SSIA8-12B	1.5 ft.	7.9	480	78	66	8300	32000	4900	5	2400	2.066863	6.173786	4.356709	4.189655	9.024011	10.37349	8.49699	1.609438	7.783224
SSIA8-13	7/17/97	SSIA8-13A	0 ft.	8.4	33	5	15	980	13000	230	5	250	2.128232	3.496508	1.609438	2.70805	6.887553	9.472705	5.438079	1.609438	5.521461
SSIA8-13	7/17/97	SSIA8-13B	1.5 ft.	8	10	49	72	8300	26000	3100	5	2000	2.079442	2.302585	3.89182	4.276666	9.024011	10.16585	8.039157	1.609438	7.600902
SSIA8-14	7/17/97	SSIA8-14A	0 ft.	8.7	10	5	55	280	13000	83	5	93	2.163323	2.302585	1.609438	4.007333	5.63479	9.472705	4.418841	1.609438	4.532599
SSIA8-14	7/17/97	SSIA8-14B	1.5 ft.	8.5	110	25	350	4900	150000	1200	23	13000	2.140066	4.70048	3.218876	5.857933	8.49699	11.91839	7.090077	3.135494	9.472705
SSIA8-15	7/18/97	SSIA8-15A	0 ft.	9	10	11	45	1600	13000	160	5	370	2.197225	2.302585	2.397895	3.806662	7.377759	9.472705	5.075174	1.609438	5.913503
SSIA8-15	7/18/97	SSIA8-15B	1.5 ft.	8.4	10	14	31	1900	16000	900	5	480	2.128232	2.302585	2.639057	3.433987	7.549609	9.680344	6.802395	1.609438	6.173786
SSIA8-16	7/18/97	SSIA8-16A	0 ft.	8.2	930	240	120	22000	31000	4000	31	5000	2.104134	6.835185	5.480639	4.787492	9.998798	10.34174	8.29405	3.433987	8.517193
SSIA8-16	7/18/97	SSIA8-16B	1.5 ft.	7.9	370	190	92	9500	26000	10000	27	4000	2.066863	5.913503	5.247024	4.521789	9.159047	10.16585	9.21034	3.295837	8.29405
SSIA8-17	7/18/97	SSIA8-17A	0 ft.	8.4	98	29	30	3700	15000	470	5	680	2.128232	4.584967	3.367296	3.401197	8.216088	9.615805	6.152733	1.609438	6.522093
SSIA8-17	7/18/97	SSIA8-17B	1.5 ft.	8.4	10	5	59	710	18000	380	5	440	2.128232	2.302585	1.609438	4.077537	6.565265	9.798127	5.940171	1.609438	6.086775
SSIA8-18	7/18/97	SSIA8-18A	0 ft.	8.4	260	100	15	890	13000	300	5	790	2.128232	5.560682	4.60517	2.70805	6.791221	9.472705	5.703782	1.609438	6.672033
SSIA8-18	7/18/97	SSIA8-18B	1.5 ft.	8	10	99	77	3700	21000	3600	5	2600	2.079442	2.302585	4.59512	4.343805	8.216088	9.952278	8.188689	1.609438	7.863267
SSIA8-19	7/18/97	SSIA8-19A	0 ft.	8.6	44	5	76	1200	15000	350	5	280	2.151762	3.78419	1.609438	4.330733	7.090077	9.615805	5.857933	1.609438	5.63479
SSIA8-19	7/18/97	SSIA8-19B	1.5 ft.	8.3	10	5	48	560	18000	560	5	470	2.116256	2.302585	1.609438	3.871201	6.327937	9.798127	6.327937	1.609438	6.152733
SSIA8-2	7/16/97	SSIA8-2A	0 ft.	8.5	10	35	58	440	17000	240	5	510	2.140066	2.302585	3.555348	4.060443	6.086775	9.740969	5.480639	1.609438	6.234411
SSIA8-2	7/16/97	SSIA8-2B	1.5 ft.	8.9	10	11	15	530	18000	500	5	340	2.186051	2.302585	2.397895	2.70805	6.272877	9.798127	6.214608	1.609438	5.828946
SSIA8-20	7/18/97	SSIA8-20A	0 ft.	8.3	10	5	64	200	12000	95	5	130	2.116256	2.302585	1.609438	4.158883	5.298317	9.392662	4.553877	1.609438	4.867534
SSIA8-20	7/18/97	SSIA8-20B	1.5 ft.	9	330	89	230	10000	120000	3900	38	15000	2.197225	5.799093	4.488636	5.438079	9.21034	11.69525	8.268732	3.637586	9.615805
SSIA8-21	7/18/97	SSIA8-21A	0 ft.	8.1	460	300	59	12000	20000	1400	21	5900	2.091864	6.131226	5.703782	4.077537	9.392662	9.903488	7.244228	3.044522	8.682708
SSIA8-21	7/18/97	SSIA8-21B	1.5 ft.	8	780	110	100	19000	27000	2900	15	3200	2.079442	6.659294	4.70048	4.60517	9.852194	10.20359	7.972466	2.70805	8.070906
SSIA8-22	7/18/97	SSIA8-22A	0 ft.	7.9	6600	1400	110	23000	56000	8100	53	7600	2.066863	8.794825	7.244228	4.70048	10.04325	10.93311	8.999619	3.970292	8.935904
SSIA8-22	7/18/97	SSIA8-22B	1.5 ft.	7.3	2600	600	45	2900	24000	1500	24	2300	1.987874	7.863267	6.39693	3.806662	7.972466	10.08581	7.31322	3.178054	7.740664
SSIA8-23	7/18/97	SSIA8-23A	0 ft.	9.2	140	29	97	820	12000	590	5	1500	2.219203	4.941642	3.367296	4.574711	6.709304	9.392662	6.380123	1.609438	7.31322
SSIA8-23	7/18/97	SSIA8-23B	1.5 ft.	8.4	10	21	65	570	15000	490	5	420	2.128232	2.302585	3.044522	4.174387	6.345636	9.615805	6.194405	1.609438	6.040255
SSIA8-24	7/18/97	SSIA8-24A	0 ft.	8.6	110	21	100	2900	18000	550	5	1000	2.151762	4.70048	3.044522	4.60517	7.972466	9.798127	6.309918	1.609438	6.907755
SSIA8-24	7/18/97	SSIA8-24B	1.5 ft.	8.4	44	190	88	2000	30000	850	19	2100	2.128232	3.78419	5.247024	4.477337	7.600902	10.30895	6.745236	2.944439	7.649693
SSIA8-25	7/18/97	SSIA8-25A	0 ft.	8.4	4400	910	170	65000	59000	20000	180	16000	2.128232	8.38936	6.813445	5.135798	11.08214	10.98529	9.903488	5.192957	9.680344
SSIA8-25	7/18/97	SSIA8-25B	1.5 ft.	8.1	900	120	99	9800	140000	3600	31	19000	2.091864	6.802395	4.787492	4.59512	9.190138	11.8494	8.188689	3.433987	9.852194
SSIA8-26	7/18/97	SSIA8-26A	0 ft.	5.7	2900	520	85	110000	110000	25000	94	12000	1.740466	7.972466	6.253829	4.442651	11.60824	11.60824	10.12663	4.543295	9.392662
SSIA8-26	7/18/97	SSIA8-26B	1.5 ft.	6.7	290	410	120	9500	160000	8100	10	33000	1.902108	5.669881	6.016157	4.787492	9.159047	11.98293	8.999619	2.302585	10.40426
SSIA8-27	7/18/97	SSIA8-27A	0 ft.	8.2	3300	380	290	96000	70000	8100	98	11000	2.104134	8.101678	5.940171	5.669881	11.4721	11.15625	8.999619	4.584967	9.305651
SSIA8-27	7/18/97	SSIA8-27B	1.5 ft.	8.7	240	33	31	8800	20000	790	5	1200	2.163323	5.480639	3.496508	3.433987	9.082507	9.903488	6.672033	1.609438	7.090077
SSIA8-28	7/18/97	SSIA8-28A	0 ft.	8	4400	1800	210	22000	33000	7300	39	6100	2.079442	8.38936	7.495542	5.347108	9.998798	10.40426	8.89563	3.663562	8.716044
SSIA8-28	7/18/97	SSIA8-28B	1.5 ft.	7.5	3300	1300	100	12000	49000	19000	53	19000	2.014903	8.101678	7.17012	4.60517	9.392662	10.79958	9.852194	3.970292	9.852194
SSIA8-29	7/18/97	SSIA8-29A	0 ft.	7.8	2900	470	520	65000	130000	9700	160	16000	2.054124	7.972466	6.152733	6.253829	11.08214	11.77529	9.179881	5.075174	9.680344
SSIA8-29	7/18/97	SSIA8-29B	1.5 ft.	7.5	1100	350	230	31000	120000	22000	60	24000	2.014903	7.003065	5.857933	5.438079	10.34174	11.69525	9.998798	4.094345	10.08581
SSIA8-3	7/16/97	SSIA8-3A	0 ft.	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	2.128232	2.128232	2.128232	2.128232	2.128232	2.128232	2.128232	2.128232	2.128232
SSIA8-3	7/16/97	SSIA8-3B	1.5 ft.	8.1	170	150	56	1100	17000	1000	5	1800	2.091864	5.135798	5.010635	4.025352	7.003065	9.740969	6.907755	1.609438	7.495542
SSIA8-30	7/18/97	SSIA8-30A	0 ft.	5.6	2000	840	70	190000	78000	20000	73	9400	1.722767	7.600902	6.733402	4.248495	12.15478	11.26446	9.903488	4.290459	9.148465
SSIA8-30	7/18/97	SSIA8-30B	1.5 ft.	5	220	36	250	21000	210000	8100	5	10000	1.609438	5.393628	3.583519	5.521461	9.952278	12.25486	8.999619	1.609438	9.21034
SSIA8-31	7/18/97	SSIA8-31A	0 ft.	9	48	5	15	400	14000	400	5	400	2.197225	3.871201	1.609438	2.70805	5.991465	9.546813	5.991465	1.609438	5.991465
SSIA8-31	7/18/97	SSIA8-31B	1.5 ft.	7.8	94	280	80	6500	26000	9900	40	7300	2.054124	4.543295	5.63479	4.382027	8.779557	10.16585	9.20029	3.688879	8.89563
SSIA8-4	7/16/97	SSIA8-4A	0 ft.	8.8	10	5	15	660	17000	120	5	150	2.174752	2.302585	1.609438	2.70805	6.49224	9.740969	4.787492	1.609438	5.010635
SSIA8-4	7/16/97	SSIA8-4B	1.5 ft.	7.7	3700	980	15	20000	61000	43000	57	21000	2.04122	8.216088	6.887553	2.70805	9.903488	11.01863	10.66896	4.043051	9.952278

SSIA8 Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSIA8-5	7/16/97	SSIA8-5A	0 ft.	8.5	53	130	110	1500	18000	180	5	2300	2.140066	3.970292	4.867534	4.70048	7.31322	9.798127	5.192957	1.609438	7.740664
SSIA8-5	7/16/97	SSIA8-5B	1.5 ft.	8.1	10	5	15	170	16000	130	5	350	2.091864	2.302585	1.609438	2.70805	5.135798	9.680344	4.867534	1.609438	5.857933
SSIA8-6	7/16/97	SSIA8-6A	0 ft.	8.7	10	23	15	400	15000	690	5	370	2.163323	2.302585	3.135494	2.70805	5.991465	9.615805	6.536692	1.609438	5.913503
SSIA8-6	7/16/97	SSIA8-6B	1.5 ft.	9.1	10	47	94	520	19000	1000	5	470	2.208274	2.302585	3.850148	4.543295	6.253829	9.852194	6.907755	1.609438	6.152733
SSIA8-7	7/16/97	SSIA8-7A	0 ft.	8.6	51	96	59	980	20000	520	5	1100	2.151762	3.931826	4.564348	4.077537	6.887553	9.903488	6.253829	1.609438	7.003065
SSIA8-7	7/16/97	SSIA8-7B	1.5 ft.	8.3	10	22	15	250	16000	300	5	220	2.116256	2.302585	3.091042	2.70805	5.521461	9.680344	5.703782	1.609438	5.393628
SSIA8-8	7/16/97	SSIA8-8A	0 ft.	8.5	10	96	15	830	20000	770	5	1200	2.140066	2.302585	4.564348	2.70805	6.721426	9.903488	6.646391	1.609438	7.090077
SSIA8-8	7/16/97	SSIA8-8B	1.5 ft.	8.4	39	31	44	1500	21000	1400	5	1100	2.128232	3.663562	3.433987	3.78419	7.31322	9.952278	7.244228	1.609438	7.003065
SSIA8-9	7/16/97	SSIA8-9A	0 ft.	8.1	1000	310	120	22000	54000	8900	35	8000	2.091864	6.907755	5.736572	4.787492	9.998798	10.89674	9.093807	3.555348	8.987197
SSIA8-9	7/16/97	SSIA8-9B	1.5 ft.	7.9	530	270	15	7300	30000	11000	37	5100	2.066863	6.272877	5.598422	2.70805	8.89563	10.30895	9.305651	3.610918	8.536996
			n=	64	66	66	66	66	66	66	66	66									
			standard deviation=	0.808094	1359.9	360.3407	88.07404	30355.79	43288.89	7587.144	34.03259	6893.278	0.111435	2.179361	1.673401	0.923339	2.083717	1.27065	1.91771	1.092764	1.721704
			average=	8.13	758	220	85.2	13815	39409	4594	23.0	4921	2.089304	4.754818	4.214104	4.039169	7.861464	10.09476	7.075349	2.442063	7.384736
			UCL=	8.32	3397	516	112	57303	81319	16518	28.8	13763									
			skewness=	-1.7141	2.331208	2.605533	2.698405	4.034762	2.125692	2.870339	2.932308	1.985999									
			H=	1.684	3.703	3.045	2.202	3.574	2.564	3.355	2.374	3.104									

SSENT Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
SSENT1	7/17/97	SSENT1-A	0 ft.	8	470	75	69	9800	56000	5700	15	5700	2.079442	6.152733	4.317488	4.234107	9.190138	10.93311	6.648221	2.70805	8.648221
SSENT1	7/17/97	SSENT1-B	1.5 ft.	9	10	5	43	230	20000	300	5	210	2.197225	2.302585	1.609438	3.7612	5.438079	9.903488	5.703782	1.609438	5.347108
SSENT2	7/17/97	SSENT2-A	0 ft.	8.4	340	100	180	8400	34000	3300	15	3600	2.128232	5.828946	4.60517	5.192957	9.035987	10.43412	8.101678	2.70805	8.188689
SSENT2	7/17/97	SSENT2-B	1.5 ft.	9.2	10	5	60	400	24000	330	5	210	2.219203	2.302585	1.609438	4.094345	5.991465	10.08581	5.799093	1.609438	5.347108
SSENT3	7/17/97	SSENT3-A	0 ft.	8	340	99	130	8100	27000	2800	18	3000	2.079442	5.828946	4.59512	4.867534	8.999619	10.20359	7.937375	2.890372	8.006368
SSENT3	7/17/97	SSENT3-B	1.5 ft.	8.7	34	5	110	170	23000	160	5	160	2.163323	3.526361	1.609438	4.70048	5.135798	10.04325	5.075174	1.609438	5.075174
SSENT4	7/17/97	SSENT4-A	0 ft.	8	190	80	66	4000	23000	1800	5	1500	2.079442	5.247024	4.382027	4.189655	8.29405	10.04325	7.495542	1.609438	7.31322
SSENT4	7/17/97	SSENT4-B	1.5 ft.	9	35	5	64	49	26000	37	5	69	2.197225	3.555348	1.609438	4.158883	3.89182	10.16585	3.610918	1.609438	4.234107
SSENT5	7/17/97	SSENT5-A	0 ft.	7.8	750	160	200	12000	31000	5400	5	3600	2.054124	6.620073	5.075174	5.298317	9.392662	10.34174	8.594154	1.609438	8.188689
SSENT5	7/17/97	SSENT5-B	1.5 ft.	8.9	10	12	90	300	22000	280	5	180	2.186051	2.302585	2.484907	4.49981	5.703782	9.998798	5.63479	1.609438	5.192957
SSENT6	7/17/97	SSENT6-A	0 ft.	8.2	380	100	73	5500	26000	3800	16	2500	2.104134	5.940171	4.60517	4.290459	8.612503	10.16585	8.242756	2.772589	7.824046
SSENT6	7/17/97	SSENT6-B	1.5 ft.	8.6	10	34	47	1800	23000	2200	5	1500	2.151762	2.302585	3.526361	3.850148	7.495542	10.04325	7.696213	1.609438	7.31322
SSENT7	7/17/97	SSENT7-A	0 ft.	7.8	250	93	15	8300	28000	2800	5	2400	2.054124	5.521461	4.532599	2.70805	9.024011	10.23996	7.937375	1.609438	7.783224
SSENT7	7/17/97	SSENT7-B	1.5 ft.	9.1	10	5	100	33	18000	30	5	41	2.208274	2.302585	1.609438	4.60517	3.496508	9.798127	3.401197	1.609438	3.713572
SSENT8	7/17/97	SSENT8-A	0 ft.	8.1	520	120	88	5700	26000	3000	11	2100	2.091864	6.253829	4.787492	4.477337	8.648221	10.16585	8.006368	2.397895	7.649693
SSENT8	7/17/97	SSENT8-B	1.5 ft.	8	710	250	15	1400	20000	1300	12	910	2.079442	6.565265	5.521461	2.70805	7.244228	9.903488	7.17012	2.484907	6.813445
			n=	16	16	16	16	16	16	16	16	16									
			standard deviation=	0.497326	258.2226	69.29695	51.63187	4128.129	8829.638	1874.238	4.979541	1661.813	0.058715	1.783995	1.48924	0.730136	1.996637	0.264409	1.715258	0.536095	1.583032
			average=	8.43	254	71.8	84.4	4136	26688	2077	8.56	1730	2.129582	4.534568	3.53001	4.227281	7.224651	10.15435	6.815922	2.003515	6.664927
			UCL=	8.65	3004	404	139	101835	30198	22913	11.44	12531									
			skewness=	0.275946	0.681585	1.095465	0.947091	0.525256	2.670929	0.594137	0.856803	0.895028									
			H=	1.704	4.085	3.543	2.327	4.487	1.849	3.957	2.095	3.714									

EP Sites not Associated with SSIA																				
Site	Date	Samp#	Depth	pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc		pH	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Selenium	Zinc
EP-67	5/28/97	EP-67A	0 ft.		1400	470	15	25000	30000	9400	18	4800			7.244228	6.152733	2.70805	10.12663	10.30895	9.148465	2.890372	8.476371
EP-68	5/29/97	EP-68A	0 ft.		10	5	15	580	17000	140	5	82			2.302585	1.609438	2.70805	6.363028	9.740969	4.941642	1.609438	4.406719
EP-69	5/30/97	EP-69A	0 ft.		650	150	86	9900	37000	6100	16	3800			6.476972	5.010635	4.454347	9.20029	10.51867	8.716044	2.772589	8.242756
EP-74	6/2/97	EP-74A	2 ft.		10	5	46	110	13000	300	5	140			2.302585	1.609438	3.828641	4.70048	9.472705	5.703782	1.609438	4.941642
EP-77	6/4/97	EP-77A	0.5 ft.	7.9	200	11	210	2500	100000	2600	5	1100		2.066863	5.298317	2.397895	5.347108	7.824046	11.51293	7.863267	1.609438	7.003065
EP-82	6/10/97	EP-82A	0 ft.	9.1	10	5	70	200	18000	60	5	150		2.208274	2.302585	1.609438	4.248495	5.298317	9.798127	4.094345	1.609438	5.010635
EP-84	6/11/97	EP-84A	0 ft.	8.9	10	14	47	490	22000	500	5	390		2.186051	2.302585	2.639057	3.850148	6.194405	9.998798	6.214608	1.609438	5.966147
EP-86	6/13/97	EP-86A	0 ft.	8.4	10	5	15	76	19000	87	5	100		2.128232	2.302585	1.609438	2.70805	4.330733	9.852194	4.465908	1.609438	4.60517
EP-87	6/16/97	EP-87A	0 ft.	8.9	10	5	86	20	14000	14	5	42		2.186051	2.302585	1.609438	4.454347	2.995732	9.546813	2.639057	1.609438	3.73767
EP-88	6/17/97	EP-88A	0 ft.	8.3	550	150	200	5600	21000	3600	23	3100		2.116256	6.309918	5.010635	5.298317	8.630522	9.952278	8.188689	3.135494	8.039157
EP-89	6/18/97	EP-89A	0 ft.	7.8	34	110	15	4900	27000	9600	20	4100		2.054124	3.526361	4.70048	2.70805	8.49699	10.20359	9.169518	2.995732	8.318742
			n=	7	11	11	11	11	11	11	11	11										
		standard deviation=		0.512231	443.325	141.3558	70.78533	7507.525	24635.16	3773.359	7.37317	1910.657		0.060776	2.025658	1.760518	1.021996	2.27729	0.568826	2.27433	0.680886	1.808841
			average=	8.47	263	84.5	73.2	4489	28909	2946	10.2	1619		2.135122	3.87921	3.087148	3.846691	6.741925	10.08237	6.467757	2.096387	6.249825
			UCL=	8.85	10795	1361	212	751463	42343	624576	17.4	73590										
			skewness=	-0.15434	2.022104	2.361833	1.302281	2.40308	2.842311	1.063272	0.839571	0.730221										
			H=	1.748	5.239	4.633	3.053	5.825	2.276	5.966	2.444	5.805										

SITE COD	AMP DAT	SAMP #	LAB #	REMARK	TYPE NA	(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
High flows																					
SEP-9	08/15/97	EPRI-9708-171	L971969-12		Surface W	0.006		0.0025	U	0.005	U	0.0125	U	3.2		0.004		0.0025	U	0.034	
SEP-9	05/19/98	EPRI-9805-166	L981031-21		Surface W	0.006		0.0025	U	0.005	U	0.0125	U	1.7		0.004		0.0025	U	0.037	
					Max=	0.006		0.0025		0.005		0.0125		3.2		0.004		0.0025		0.037	
Low flows																					
SEP-9	11/10/97	EPRI-9711-171	L972740-6		Surface W	0.011		0.0025	U	0.005	U	0.0125	U	0.15		0.0015	U	0.0025	U	0.024	
SEP-9	02/13/98	EPRI-9802-166	L980371-9		Surface W	0.01		0.0025	U	0.005	U	0.0125	U	0.6		0.0015	U,UJ	0.0025	U	0.031	J2
					Max=	0.011		0.0025		0.005		0.0125		0.6		0.0015		0.0025		0.031	

High flow			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
SEP-9	08/15/97	EPRI-9708-171	0.006		0.0025	U	0.005	U	0.0125	U	3.2		0.004		0.0025	U	0.034	
SEP-9	05/19/98	EPRI-9805-166	0.006		0.0025	U	0.005	U	0.0125	U	1.7		0.004		0.0025	U	0.037	
SEP-10	08/15/97	EPRI-9708-175	0.005		0.0025	U	0.005	U	0.0125	U	5.9		0.007		0.0025	U	0.04	
SEP-10	05/19/98	EPRI-9805-167	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.1		0.004		0.0025	U	0.027	
SEP-11	08/15/97	EPRI-9708-176	0.005		0.0025	U	0.005	U	0.0125	U	5		0.006		0.0025	U	0.037	
SEP-11	05/19/98	EPRI-9805-168	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.2		0.003		0.0025	U	0.028	
SEP-2	08/15/97	EPRI-9708-164	0.005		0.0025	U	0.005	U	0.0125	U	3.9		0.006		0.0025	U	0.033	
SEP-2	05/19/98	EPRI-9805-162	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.1		0.003		0.0025	U	0.028	
SEP-12	08/15/97	EPRI-9708-177	0.005		0.0025	U	0.005	U	0.0125	U	5.2		0.009		0.0025	U	0.036	
SEP-12	05/19/98	EPRI-9805-169	0.005		0.0025	U	0.005	U	0.0125	U	2.1		0.005		0.0025	U	0.027	
SEP-13	08/15/97	EPRI-9708-178	0.005		0.0025	U	0.005	U	0.0125	U	5.4		0.006		0.0025	U	0.026	
SEP-13	05/19/98	EPRI-9805-170	0.005		0.0025	U	0.005	U	0.0125	U	1.6		0.014		0.0025	U	0.03	
SEP-4	08/15/97	EPRI-9708-166	0.005		0.0025	U	0.005	U	0.0125	U	5.6		0.008		0.0025	U	0.035	
SEP-4	05/19/98	EPRI-9805-164	0.006		0.0025	U	0.005	U	0.0125	U	1.8		0.005		0.0025	U	0.042	

Low flow			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
SEP-9	11/10/97	EPRI-9711-171	0.0025	U	0.005	U	0.0125	U	0.15		0.0015	U	0.0025	U	0.024			
SEP-9	02/13/98	EPRI-9802-166	0.0025	U	0.005	U	0.0125	U	0.6		0.0015	U,U	0.0025	U	0.031	J2		
SEP-10	11/19/97	EPRI-9711-181	0.015		0.0025	U	0.005	U	0.0125	U	0.25		0.013		0.006		0.023	
SEP-10	02/13/98	EPRI-9802-167	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.029	J2
SEP-11	11/10/97	EPRI-9711-177	0.01		0.0025	U	0.005	U	0.0125	U	0.17		0.005		0.0025	U	0.01	U
SEP-11	02/13/98	EPRI-9802-168	0.008		0.0025	U	0.005	U	0.0125	U	1.4		0.011	J4	0.0025	U	0.025	J2
SEP-2	11/10/97	EPRI-9711-164	0.012		0.0025	U	0.005	U	0.026		0.4		0.01		0.0025	U	0.026	
SEP-2	02/13/98	EPRI-9802-162	0.009		0.0025	U	0.005	U	0.0125	U	1.6		0.004	J4	0.0025	U	0.022	J2
SEP-12	11/10/97	EPRI-9711-176	0.01		0.0025	U	0.005	U	0.0125	U	0.45		0.004		0.0025	U	0.01	U
SEP-12	02/13/98	EPRI-9802-169	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.027	J2
SEP-13	11/10/97	EPRI-9711-175	0.01		0.0025	U	0.005	U	0.0125	U	0.58		0.003		0.0025	U	0.01	U
SEP-13	02/13/98	EPRI-9802-170	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.01	U
SEP-4	11/10/97	EPRI-9711-166	0.012		0.0025	U	0.005	U	0.0125	U	0.41		0.007		0.0025	U	0.02	
SEP-4	02/13/98	EPRI-9802-164	0.01		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.01	U
			***								***							

SITE COD	AMP DAT	SAMP #	(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
SEP-10	08/15/97	EPRI-9708-175	0.005		0.0025	U	0.005	U	0.0125	U	5.9		0.007		0.0025	U	0.04	
SEP-10	05/19/98	EPRI-9805-167	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.1		0.004		0.0025	U	0.027	
SEP-11	08/15/97	EPRI-9708-176	0.005		0.0025	U	0.005	U	0.0125	U	5		0.006		0.0025	U	0.037	
SEP-11	05/19/98	EPRI-9805-168	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.2		0.003		0.0025	U	0.028	
SEP-2	08/15/97	EPRI-9708-164	0.005		0.0025	U	0.005	U	0.0125	U	3.9		0.006		0.0025	U	0.033	
SEP-2	05/19/98	EPRI-9805-162	0.0025	U	0.0025	U	0.005	U	0.0125	U	2.1		0.003		0.0025	U	0.028	
SEP-12	08/15/97	EPRI-9708-177	0.005		0.0025	U	0.005	U	0.0125	U	5.2		0.009		0.0025	U	0.036	
SEP-12	05/19/98	EPRI-9805-169	0.005		0.0025	U	0.005	U	0.0125	U	2.1		0.005		0.0025	U	0.027	
SEP-13	08/15/97	EPRI-9708-178	0.005		0.0025	U	0.005	U	0.0125	U	5.4		0.006		0.0025	U	0.026	
SEP-13	05/19/98	EPRI-9805-170	0.005		0.0025	U	0.005	U	0.0125	U	1.6		0.014		0.0025	U	0.03	
SEP-4	08/15/97	EPRI-9708-166	0.005		0.0025	U	0.005	U	0.0125	U	5.6		0.008		0.0025	U	0.035	
SEP-4	05/19/98	EPRI-9805-164	0.006		0.0025	U	0.005	U	0.0125	U	1.8		0.005		0.0025	U	0.042	
			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
	High flow	MIN:	0.0025		0.0025		0.005		0.0125		1.6		0.003		0.0025		0.026	
		MEAN:	0.00446		0.00250		0.00500		0.01250		3.57500		0.00633		0.00250		0.03242	
		MAX:	0.006		0.0025		0.005		0.0125		5.9		0.014		0.0025		0.042	
SEP-10	11/19/97	EPRI-9711-181	0.015		0.0025	U	0.005	U	0.0125	U	0.25		0.013		0.006		0.023	
SEP-10	02/13/98	EPRI-9802-167	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.029	J2
SEP-11	11/10/97	EPRI-9711-177	0.01		0.0025	U	0.005	U	0.0125	U	0.17		0.005		0.0025	U	0.01	U
SEP-11	02/13/98	EPRI-9802-168	0.008		0.0025	U	0.005	U	0.0125	U	1.4		0.011	J4	0.0025	U	0.025	J2
SEP-2	11/10/97	EPRI-9711-164	0.012		0.0025	U	0.005	U	0.026		0.4		0.01		0.0025	U	0.026	
SEP-2	02/13/98	EPRI-9802-162	0.009		0.0025	U	0.005	U	0.0125	U	1.6		0.004	J4	0.0025	U	0.022	J2
SEP-12	11/10/97	EPRI-9711-176	0.01		0.0025	U	0.005	U	0.0125	U	0.45		0.004		0.0025	U	0.01	U
SEP-12	02/13/98	EPRI-9802-169	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.027	J2
SEP-13	11/10/97	EPRI-9711-175	0.01		0.0025	U	0.005	U	0.0125	U	0.58		0.003		0.0025	U	0.01	U
SEP-13	02/13/98	EPRI-9802-170	0.008		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.01	U
SEP-4	11/10/97	EPRI-9711-166	0.012		0.0025	U	0.005	U	0.0125	U	0.41		0.007		0.0025	U	0.02	
SEP-4	02/13/98	EPRI-9802-164	0.01		0.0025	U	0.005	U	0.0125	U	1.6		0.0015	U,U	0.0025	U	0.01	U
			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
	Low flow	MIN:	0.008		0.0025		0.005		0.0125		0.17		0.0015		0.0025		0.01	
		MEAN:	0.01000		0.00250		0.00500		0.01363		0.97167		0.00525		0.00279		0.01850	
		MAX:	0.015		0.0025		0.005		0.026		1.6		0.013		0.006		0.029	

SITE	DATE	SAMP #	(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
SEP-7	08/18/97	EPRI-9708-169	0.006		0.0025	U	0.005	U	0.0125	U	4.7		0.005		0.0025	U	0.035	
SEP-7	05/20/98	EPRI-9805-183	0.013		0.0025	U	0.005	U	0.0125	U	2.2		0.002	U	0.0025	U	0.022	
SEP-1	08/15/97	EPRI-9708-163	0.005		0.0025	U	0.005	U	0.0125	U	4.4		0.008		0.0025	U	0.044	
SEP-1	05/20/98	EPRI-9805-184	0.008		0.0025	U	0.005	U	0.0125	U	2		0.002	U	0.0025	U	0.024	
SEP-3	08/18/97	EPRI-9708-165	0.005		0.0025	U	0.005	U	0.0125	U	4.4		0.006		0.0025	U	0.034	
SEP-3	05/20/98	EPRI-9805-185	0.008		0.0025	U	0.005	U	0.0125	U	2.3		0.004		0.0025	U	0.027	
High flows--seasonal variation between May and August																		
No apparent downgradient degradation.																		
			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
SEP-7	11/10/97	EPRI-9711-169	0.01		0.0025	U	0.005	U	0.0125	U	0.36		0.005		0.0025	U	0.024	
SEP-7	02/13/98	EPRI-9802-165	0.02		0.0025	U	0.005	U	0.0125	U	0.6		0.0015	U,UJ4	0.0025	U	0.024	J2
SEP-1	11/10/97	EPRI-9711-163	0.8		0.0025	U	0.005	U	0.032		0.13		0.021		0.15		0.068	
SEP-1	02/13/98	EPRI-9802-161	0.58		0.0025	U	0.005	U	0.0125	U	0.05	U	0.0015	U,UJ4	0.11		0.01	U
SEP-3	11/19/97	EPRI-9711-165	1.6		0.019		0.005	U	0.043		0.05	U	0.015		0.36		0.041	
SEP-3	02/13/98	EPRI-9802-163	0.5		0.008		0.005	U	0.0125	U	0.05	U	0.006	J4	0.11		0.025	J2
			***		***				***				***		***		***	
Low flows--concentration increases downgradient for parameters marked with ***.																		
Increases are more marked in November than in February--except for zinc.																		

SITE CO	AMP DAT	SAMP #	(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
High flow																		
SEP-1	08/15/97	EPRI-9708-163	0.005		0.0025	U	0.005	U	0.0125	U	4.4		0.008		0.0025	U	0.044	
SEP-1	05/20/98	EPRI-9805-184	0.008		0.0025	U	0.005	U	0.0125	U	2		0.002	U	0.0025	U	0.024	
SEP-3	08/18/97	EPRI-9708-165	0.005		0.0025	U	0.005	U	0.0125	U	4.4		0.006		0.0025	U	0.034	
SEP-3	05/20/98	EPRI-9805-185	0.008		0.0025	U	0.005	U	0.0125	U	2.3		0.004		0.0025	U	0.027	
SEP-7	08/18/97	EPRI-9708-169	0.006		0.0025	U	0.005	U	0.0125	U	4.7		0.005		0.0025	U	0.035	
SEP-7	05/20/98	EPRI-9805-183	0.013		0.0025	U	0.005	U	0.0125	U	2.2		0.002	U	0.0025	U	0.022	
			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
	High flow	MIN:	0.005		0.0025		0.005		0.0125		2		0.002		0.0025		0.022	
		MEAN:	0.008		0.003		0.005		0.013		3.333		0.005		0.003		0.031	
		MAX:	0.013		0.0025		0.005		0.0125		4.7		0.008		0.0025		0.044	
Low flow																		
SEP-1	11/10/97	EPRI-9711-163	0.8		0.0025	U	0.005	U	0.032		0.13		0.021		0.15		0.068	
SEP-1	02/13/98	EPRI-9802-161	0.58		0.0025	U	0.005	U	0.0125	U	0.05	U	0.0015	U,UJ4	0.11		0.01	U
SEP-3	11/19/97	EPRI-9711-165	1.6		0.019		0.005	U	0.043		0.05	U	0.015		0.36		0.041	
SEP-3	02/13/98	EPRI-9802-163	0.5		0.008		0.005	U	0.0125	U	0.05	U	0.006	J4	0.11		0.025	J2
SEP-7	11/10/97	EPRI-9711-169	0.01		0.0025	U	0.005	U	0.0125	U	0.36		0.005		0.0025	U	0.024	
SEP-7	02/13/98	EPRI-9802-165	0.02		0.0025	U	0.005	U	0.0125	U	0.6		0.0015	U,UJ4	0.0025	U	0.024	J2
			(AS) TRC		(CD) TRC		(CR) TRC		(CU) TRC		(FE) TRC		(PB) TRC		(SE) TRC		(ZN) TRC	
	Low flow	MIN:	0.01		0.0025		0.005		0.0125		0.05		0.0015		0.0025		0.01	
		MEAN:	0.585		0.006		0.005		0.021		0.207		0.008		0.123		0.032	
		MAX:	1.6		0.019		0.005		0.043		0.6		0.021		0.36		0.068	

Background Groundwater Quality									
SITE	**DATE**	**(AS) DIS**	**(CD) DIS**	**(CR) DIS**	**(CU) DIS**	**(FE) DIS**	**(PB) DIS**	**(SE) DIS**	**(ZN) DIS**
EP-86	08/13/97	0.011	0.0025	0.005	0.0125	0.05	0.0015	0.043	0.01
EP-86	11/18/97	0.007	0.0025	0.005	0.0125	0.05	0.0015	0.038	0.01
EP-86	02/06/98	0.0025	0.0025	0.005	0.0125	0.1	0.0015	0.029	0.01
EP-86	05/14/98	0.008	0.0025	0.005	0.0125	0.05	0.0015	0.041	0.02
EP-87	09/15/97	0.054	0.0025	0.016	0.033	0.05	0.006	0.0025	0.03
EP-87	11/18/97	0.033	0.0025	0.005	0.0125	0.05	0.0015	0.0025	0.01
EP-89	08/12/97	0.01	0.0025	0.005	0.0125	0.05	0.0015	0.029	0.02
EP-89	11/13/97	0.005	0.0025	0.005	0.0125	0.05	0.0015	0.018	0.01
EP-89	02/11/98	0.0025	0.0025	0.005	0.0125	0.05	0.0015	0.013	0.01
EP-89	05/13/98	0.006	0.0025	0.005	0.0125	0.05	0.0015	0.026	0.01
average		0.0139	0.0025	0.0061	0.01455	0.055	0.00195	0.0242	0.014
maximum		0.054	0.0025	0.016	0.033	0.1	0.006	0.043	0.030

DATA FILE GENERATED ON THURSDAY, 08/06/98 AT 14:07:05 BY CBRIDGE
DATE SELECTION RANGE: / / TO 08/06/98
THE A AND R FLAGS HAVE BEEN INCLUDED.
ALL QA/QC SAMPLES HAVE BEEN EXCLUDED.
RESULTS LESS THAN DETECTION LIMIT HAVE BEEN REPLACED BY 1/2 THE DETECTION LIMIT.

THIS SPREADSHEET IS FOR STATISTICS for Groundwater
Includes data from all wells except for 'background wells' -- EP-86, EP-87, and EP-89.

Untransformaed data

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EM-1	08/13/97	EPRI-9708-155	0.011	0.0025	0.005	0.0125	0.05	0.0015	0.017	0.029
EM-1	11/17/97	EPRI-9711-155	0.007	0.0025	0.0025	0.0125	0.05	0.0015	0.0025	0.01
EM-1	02/19/98	EPRI-9802-155	0.056	0.0025	0.005	0.0125	0.05	0.0015	0.0025	0.01
EM-1	05/18/98	EPRI-9805-155	0.0025	0.0025	0.005	0.0125	0.05	0.0015	0.0025	0.02
EM-2	08/26/97	EPRI-9708-156	0.84	0.0025	0.005	0.0125	0.05	0.0015	0.16	0.025
EM-2	11/17/97	EPRI-9711-156	0.57	0.0025	0.0025	0.0125	0.05	0.0015	0.11	0.023
EM-2	02/17/98	EPRI-9802-156	0.55	0.0025	0.005	0.0125	0.05	0.0015	0.12	0.01
EM-2	05/18/98	EPRI-9805-156	0.58	0.0025	0.005	0.0125	0.05	0.0015	0.13	0.01
EM-4	08/26/97	EPRI-9708-158	0.009	0.0025	0.005	0.0125	0.05	0.0015	0.011	0.031
EM-4	11/17/97	EPRI-9711-158	0.0025	0.0025	0.0025	0.0125	0.05	0.0015	0.0025	0.01
EM-4	02/17/98	EPRI-9802-157	0.009	0.008	0.005	0.0125	0.05	0.0015	0.0025	0.01
EM-4	05/18/98	EPRI-9805-157	0.019	0.0025	0.005	0.071	0.05	0.0015	0.0025	0.032
EM-5	08/26/97	EPRI-9708-159	1.6	0.08	0.005	0.046	0.55	0.01	0.027	0.31
EM-5	11/17/97	EPRI-9711-159	1.7	0.069	0.0025	0.0125	1.8	0.006	0.009	0.31
EM-5	02/17/98	EPRI-9802-158	1.6	0.066	0.005	0.03	2.4	0.009	0.012	0.38
EM-5	05/18/98	EPRI-9805-158	1.7	0.017	0.005	0.025	1.3	0.005	0.013	0.17
EM-6	08/11/97	EPRI-9708-160	0.03	0.0025	0.005	0.0125	0.05	0.0015	0.11	0.03
EM-6	11/17/97	EPRI-9711-160	0.026	0.0025	0.0025	0.045	0.05	0.0015	0.11	0.039
EM-6	02/17/98	EPRI-9802-159	0.028	0.006	0.005	0.043	0.05	0.0015	0.1	0.045
EM-6	05/18/98	EPRI-9805-159	0.025	0.0025	0.005	0.045	0.05	0.0015	0.099	0.052
EM-7	11/17/97	EPRI-9711-161	1.7	0.021	0.008	0.067	0.35	0.058	0.13	0.11
EM-7	02/19/98	EPRI-9802-160	2.1	0.009	0.005	0.055	0.34	0.03	0.055	0.078
EM-7	05/07/98	EPRI-9805-160	1.8	0.018	0.005	0.073	0.2	0.039	0.055	0.11
EP-12	11/03/97	EPRI-9711-104	1.3	0.0025	0.005	0.0125	0.05	0.0015	6.9	0.022
EP-12	02/03/98	EPRI-9802-104	1.2	0.0025	0.005	0.0125	0.15	0.0015	1.7	0.01
EP-12	05/20/98	EPRI-9805-104	1	0.0025	0.005	0.031	0.05	0.002	0.57	0.031
EP-13	08/07/97	EPRI-9708-105	49	0.82	0.005	0.0125	0.05	0.008	7	0.052
EP-13	11/06/97	EPRI-9711-105	46	0.8	0.005	0.0125	0.15	0.0015	6.7	0.033
EP-13	02/17/98	EPRI-9802-105	48	0.68	0.005	0.027	0.05	0.0015	6.1	0.025
EP-13	05/07/98	EPRI-9805-105	36	0.71	0.005	0.025	0.05	0.0015	5.7	0.059
EP-14	11/05/97	EPRI-9711-106	1.1	0.0025	0.005	0.0125	0.1	0.0015	0.36	0.01
EP-14	02/17/98	EPRI-9802-106	1.3	0.0025	0.005	0.0125	0.17	0.004	0.3	0.01
EP-14	05/07/98	EPRI-9805-106	1.4	0.0025	0.005	0.0125	0.15	0.004	0.23	0.046
EP-15	08/07/97	EPRI-9708-107	0.076	0.0025	0.005	0.0125	0.05	0.0015	0.17	0.022
EP-15	11/06/97	EPRI-9711-107	0.013	0.0025	0.005	0.0125	0.05	0.0015	0.16	0.021
EP-15	02/17/98	EPRI-9802-107	0.031	0.016	0.005	0.0125	0.05	0.0015	0.16	0.01
EP-15	05/07/98	EPRI-9805-107	0.007	0.0025	0.005	0.0125	0.05	0.0015	0.2	0.031
EP-20	08/07/97	EPRI-9708-108	1.2	0.036	0.005	0.0125	0.05	0.0015	0.38	0.057
EP-20	11/03/97	EPRI-9711-108	1.2	0.04	0.005	0.026	0.05	0.0015	0.35	0.059
EP-20	02/03/98	EPRI-9802-108	0.96	0.048	0.005	0.036	0.11	0.0015	0.37	0.063
EP-20	05/06/98	EPRI-9805-108	0.85	0.042	0.005	0.03	0.05	0.0015	0.34	0.098
EP-21	11/18/97	EPRI-9711-109	0.067	0.0025	0.005	0.0125	0.39	0.0015	0.073	0.031
EP-21	02/18/98	EPRI-9802-109	0.062	0.0025	0.005	0.0125	0.17	0.0015	0.095	0.038
EP-21	05/21/98	EPRI-9805-109	0.052	0.0025	0.005	0.0125	0.34	0.002	0.018	0.028

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-22	08/15/97	EPRI-9708-110	0.035	0.006	0.005	0.031	0.05	0.016	0.32	0.64
EP-22	11/18/97	EPRI-9711-110	0.044	0.0025	0.005	0.0125	0.05	0.006	0.11	0.91
EP-22	02/18/98	EPRI-9802-110	0.035	0.005	0.005	0.035	0.05	0.018	0.59	2.1
EP-22	06/10/98	EPRI-9806-201	0.096	0.044	0.019	0.034	0.11	0.044	0.54	5.9
EP-23	08/11/97	EPRI-9708-111	2.5	0.0025	0.005	0.0125	0.65	0.0015	0.027	0.027
EP-23	11/04/97	EPRI-9711-111	4	0.0025	0.005	0.0125	0.46	0.0015	0.023	0.028
EP-23	02/04/98	EPRI-9802-111	1.5	0.0025	0.005	0.0125	0.25	0.0015	0.019	0.01
EP-23	05/11/98	EPRI-9805-111	4.2	0.0025	0.005	0.0125	0.63	0.0015	0.011	0.045
EP-24	08/15/97	EPRI-9708-112	0.47	0.0025	0.005	0.0125	4.4	0.0015	0.014	0.035
EP-24	11/18/97	EPRI-9711-112	0.071	0.0025	0.005	0.0125	0.05	0.0015	0.079	0.01
EP-24	02/18/98	EPRI-9802-112	0.031	0.0025	0.005	0.0125	0.2	0.0015	0.0025	0.01
EP-24	05/21/98	EPRI-9805-112	0.38	0.0025	0.005	0.12	0.81	0.002	0.0025	0.33
EP-25	08/15/97	EPRI-9708-113	3	0.0025	0.005	0.0125	2.6	0.0015	0.17	0.021
EP-25	11/19/97	EPRI-9711-113	3.5	0.0025	0.005	0.0125	4.8	0.011	0.079	0.037
EP-25	02/18/98	EPRI-9802-113	3.1	0.0025	0.005	0.0125	4	0.0015	0.044	0.01
EP-25	05/21/98	EPRI-9805-113	2.6	0.0025	0.005	0.028	5.8	0.002	0.083	0.039
EP-26	08/11/97	EPRI-9708-114	0.32	0.62	0.005	0.21	0.12	0.036	0.079	1.9
EP-26	11/04/97	EPRI-9711-114	0.32	1.5	0.005	0.16	0.05	0.01	0.27	4.2
EP-26	02/04/98	EPRI-9802-114	0.58	0.18	0.005	0.042	0.05	0.01	0.05	0.56
EP-26	05/07/98	EPRI-9805-114	0.45	0.18	0.005	0.025	0.05	0.007	0.059	0.57
EP-29	08/07/97	EPRI-9708-115	0.31	0.0025	0.005	0.0125	0.05	0.0015	0.2	0.022
EP-29	11/03/97	EPRI-9711-115	0.48	0.0025	0.005	0.0125	1.8	0.0015	0.12	0.03
EP-29	02/03/98	EPRI-9802-115	0.29	0.0025	0.005	0.0125	0.11	0.0015	0.19	0.01
EP-29	05/06/98	EPRI-9805-115	0.21	0.0025	0.005	0.0125	0.05	0.0015	0.16	0.024
EP-35	08/07/97	EPRI-9708-116	0.4	0.0025	0.005	0.0125	0.05	0.0015	1.4	0.026
EP-35	11/03/97	EPRI-9711-116	0.4	0.0025	0.005	0.0125	0.05	0.0015	6.7	0.022
EP-35	02/03/98	EPRI-9802-116	0.37	0.0025	0.005	0.0125	0.1	0.0015	4.1	0.021
EP-35	05/06/98	EPRI-9805-116	0.62	0.0025	0.005	0.0125	0.05	0.0015	2.5	0.049
EP-4	08/06/97	EPRI-9708-100	0.16	0.0025	0.005	0.0125	1.1	0.0015	0.0025	0.01
EP-4	11/04/97	EPRI-9711-100	0.14	0.0025	0.005	0.0125	0.85	0.0015	0.0025	0.01
EP-4	02/04/98	EPRI-9802-100	0.068	0.0025	0.005	0.0125	0.91	0.0015	0.005	0.01
EP-4	05/05/98	EPRI-9805-100	0.085	0.0025	0.005	0.0125	1.3	0.0015	0.0025	0.029
EP-43	11/03/97	EPRI-9711-172	0.78	0.0025	0.005	0.0125	1.1	0.0015	0.053	0.01
EP-43	02/03/98	EPRI-9802-175	1.2	0.0025	0.005	0.0125	0.17	0.0015	0.15	0.01
EP-43	05/20/98	EPRI-9805-175	0.72	0.0025	0.005	0.0125	1.6	0.002	0.52	0.01
EP-49	11/19/97	EPRI-9711-117	207	43	0.24	5.1	1732	0.11	0.11	579
EP-49	02/19/98	EPRI-9802-117	464	43	0.047	0.089	2381	0.014	0.14	1900
EP-49	05/21/98	EPRI-9805-117	274	43	0.1	0.044	1609	0.002	0.19	1138
EP-5	08/06/97	EPRI-9708-101	0.047	0.0025	0.016	0.0125	0.31	0.0015	0.0025	0.01
EP-5	11/04/97	EPRI-9711-101	0.033	0.0025	0.005	0.0125	0.05	0.01	0.033	0.027
EP-5	02/04/98	EPRI-9802-101	0.059	0.0025	0.005	0.0125	0.21	0.0015	0.005	0.021
EP-5	05/05/98	EPRI-9805-101	0.05	0.0025	0.005	0.0125	0.21	0.003	0.0025	0.057
EP-51	08/26/97	EPRI-9708-118	0.033	0.034	0.029	0.076	1.4	0.0015	0.22	0.53
EP-51	11/06/97	EPRI-9711-118	0.29	0.18	0.031	0.19	2.2	0.0015	0.16	4.4
EP-51	02/12/98	EPRI-9802-118	10	3.9	0.005	5.6	1.8	0.0015	0.17	61
EP-51	05/11/98	EPRI-9805-118	0.26	0.15	0.005	0.44	0.54	0.0015	0.13	2.2
EP-52	11/06/97	EPRI-9711-173	0.97	0.64	0.017	0.53	0.55	0.044	0.36	2.6
EP-52	02/12/98	EPRI-9802-176	1.6	0.71	0.005	0.45	0.55	0.043	0.3	3.6
EP-53	08/11/97	EPRI-9708-172	51	1.3	0.005	0.0125	0.05	0.0015	0.76	3.6
EP-53	02/04/98	EPRI-9802-178	63	1.4	0.005	0.032	0.05	0.0015	1.7	4.3
EP-53	06/10/98	EPRI-9806-200	63	1.3	0.005	0.0125	0.05	0.0015	1.4	4.2
EP-54	08/26/97	EPRI-9708-119	22	5.7	0.005	0.18	13	0.0015	0.075	113
EP-54	11/06/97	EPRI-9711-119	29	4.5	0.005	0.57	14	0.0015	0.071	94
EP-54	02/12/98	EPRI-9802-119	27	2	0.005	0.21	2.3	0.0015	0.065	41
EP-54	05/11/98	EPRI-9805-119	50	1.5	0.005	0.12	3.4	0.011	0.082	32

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-55	08/15/97	EPRI-9708-120	62	0.13	0.005	0.0125	229	0.02	0.28	200
EP-55	11/19/97	EPRI-9711-120	59	0.043	0.005	0.0125	130	0.0015	0.24	82
EP-55	02/12/98	EPRI-9802-120	57	0.042	0.005	0.0125	99	0.0015	0.19	71
EP-55	05/20/98	EPRI-9805-120	56	0.013	0.005	0.0125	84	0.002	0.18	43
EP-56	08/26/97	EPRI-9708-121	1.9	0.004	0.005	0.0125	0.05	0.003	0.048	0.026
EP-56	11/04/97	EPRI-9711-121	2.9	0.0025	0.005	0.0125	0.05	0.0015	0.057	0.022
EP-56	02/04/98	EPRI-9802-121	2.2	0.0025	0.005	0.027	0.05	0.0015	0.048	0.025
EP-56	05/07/98	EPRI-9805-121	1.9	0.0025	0.005	0.025	0.05	0.003	0.058	0.039
EP-57	08/16/97	EPRI-9708-122	1.1	0.0025	0.005	0.0125	0.6	0.0015	0.03	0.027
EP-57	11/14/97	EPRI-9711-122	0.97	0.0025	0.005	0.0125	0.28	0.0015	0.0025	0.01
EP-57	02/18/98	EPRI-9802-122	0.98	0.0025	0.005	0.0125	0.05	0.0015	0.0025	0.022
EP-57	05/18/98	EPRI-9805-122	0.79	0.0025	0.005	0.0125	0.05	0.0015	0.0025	0.01
EP-58	08/16/97	EPRI-9708-123	1.4	0.0025	0.005	0.0125	2.7	0.0015	0.16	0.022
EP-58	11/14/97	EPRI-9711-123	4.8	0.0025	0.005	0.0125	0.98	0.0015	0.027	0.024
EP-58	02/18/98	EPRI-9802-123	4.2	0.0025	0.005	0.0125	0.9	0.0015	0.027	0.01
EP-58	05/18/98	EPRI-9805-123	4.5	0.0025	0.011	0.0125	0.9	0.0015	0.034	0.023
EP-59	08/09/97	EPRI-9708-124	3.6	0.0025	0.005	0.0125	0.05	0.0015	0.18	0.023
EP-59	11/05/97	EPRI-9711-124	3.8	0.0025	0.005	0.0125	0.05	0.0015	0.21	0.021
EP-59	02/05/98	EPRI-9802-124	3.4	0.0025	0.005	0.0125	0.1	0.0015	0.23	0.01
EP-59	05/08/98	EPRI-9805-124	3.1	0.005	0.005	0.0125	0.05	0.0015	0.29	0.043
EP-6	08/06/97	EPRI-9708-102	0.032	0.0025	0.005	0.0125	0.05	0.0015	0.033	0.021
EP-6	11/04/97	EPRI-9711-102	0.031	0.0025	0.005	0.0125	0.05	0.0015	0.049	0.024
EP-6	02/04/98	EPRI-9802-102	0.023	0.0025	0.005	0.0125	0.05	0.0015	0.009	0.01
EP-6	05/05/98	EPRI-9805-102	0.021	0.0025	0.005	0.0125	0.05	0.0015	0.01	0.044
EP-60	08/08/97	EPRI-9708-125	0.007	0.0025	0.011	0.0125	0.38	0.0015	0.24	0.026
EP-60	11/05/97	EPRI-9711-125	0.0025	0.0025	0.005	0.0125	0.8	0.0015	0.24	0.021
EP-60	02/05/98	EPRI-9802-125	0.009	0.0025	0.005	0.034	0.4	0.0015	0.26	0.027
EP-60	05/08/98	EPRI-9805-125	0.008	0.0025	0.005	0.0125	0.05	0.0015	0.24	0.052
EP-61	08/16/97	EPRI-9708-126	0.0025	0.0025	0.005	0.0125	1.4	0.0015	0.42	0.021
EP-61	11/14/97	EPRI-9711-126	0.011	0.0025	0.005	0.0125	1.2	0.0015	0.38	0.021
EP-61	02/18/98	EPRI-9802-126	0.025	0.0025	0.005	0.0125	0.35	0.0015	0.36	0.01
EP-61	05/18/98	EPRI-9805-126	0.008	0.0025	0.005	0.0125	0.18	0.0015	0.31	0.022
EP-62	08/09/97	EPRI-9708-127	1.1	0.0025	0.005	0.0125	0.05	0.0015	0.36	0.023
EP-62	11/05/97	EPRI-9711-127	1.2	0.0025	0.005	0.0125	0.05	0.0015	0.39	0.023
EP-62	02/05/98	EPRI-9802-127	0.84	0.0025	0.005	0.026	0.1	0.0015	0.39	0.023
EP-62	05/08/98	EPRI-9805-127	0.96	0.0025	0.005	0.0125	0.05	0.0015	0.38	0.039
EP-63	08/09/97	EPRI-9708-128	0.019	0.0025	0.005	0.0125	0.05	0.0015	0.23	0.022
EP-63	11/05/97	EPRI-9711-128	0.021	0.0025	0.005	0.0125	0.11	0.0015	0.21	0.025
EP-63	02/05/98	EPRI-9802-128	0.02	0.0025	0.005	0.029	0.2	0.0015	0.2	0.03
EP-63	05/08/98	EPRI-9805-128	0.022	0.0025	0.005	0.0125	0.05	0.0015	0.22	0.052
EP-64	08/09/97	EPRI-9708-129	0.025	0.0025	0.005	0.0125	0.05	0.0015	0.5	0.023
EP-64	11/05/97	EPRI-9711-129	0.048	0.0025	0.005	0.0125	0.1	0.0015	0.7	0.03
EP-64	02/05/98	EPRI-9802-129	0.043	0.0025	0.005	0.049	0.1	0.0015	0.65	0.024
EP-64	05/08/98	EPRI-9805-129	0.041	0.0025	0.005	0.0125	0.05	0.0015	0.61	0.053
EP-65	08/16/97	EPRI-9708-130	0.0025	0.0025	0.005	0.0125	0.05	0.0015	0.33	0.01
EP-65	11/14/97	EPRI-9711-130	0.013	0.0025	0.005	0.0125	0.05	0.0015	0.29	0.01
EP-65	02/18/98	EPRI-9802-130	0.009	0.0025	0.005	0.0125	0.05	0.0015	0.2	0.01
EP-65	05/18/98	EPRI-9805-130	0.007	0.0025	0.005	0.0125	0.05	0.0015	0.16	0.01
EP-66	08/08/97	EPRI-9708-131	13	0.0025	0.011	0.0125	0.05	0.0015	0.26	0.046
EP-66	11/05/97	EPRI-9711-131	11	0.0025	0.005	0.0125	0.15	0.0015	0.26	0.027
EP-66	02/05/98	EPRI-9802-131	9.7	0.0025	0.005	0.032	0.1	0.0015	0.26	0.024
EP-66	05/08/98	EPRI-9805-131	10	0.0025	0.005	0.0125	0.05	0.0015	0.25	0.059
EP-67	08/12/97	EPRI-9708-132	0.015	0.0025	0.005	0.0125	0.05	0.0015	0.14	0.022
EP-67	11/07/97	EPRI-9711-132	0.042	0.0025	0.005	0.0125	0.05	0.0015	0.15	0.038
EP-67	02/11/98	EPRI-9802-132	0.015	0.0025	0.005	0.0125	0.05	0.0015	0.13	0.02

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-67	05/12/98	EPRI-9805-132	0.015	0.0025	0.005	0.0125	0.05	0.0015	0.14	0.028
EP-68	08/14/97	EPRI-9708-133	0.0025	0.0025	0.005	0.0125	0.05	0.0015	0.33	0.024
EP-68	11/11/97	EPRI-9711-133	0.0025	0.0025	0.005	0.0125	0.05	0.0015	0.32	0.023
EP-68	02/11/98	EPRI-9802-133	0.0025	0.0025	0.016	0.0125	0.05	0.0015	0.28	0.01
EP-68	05/13/98	EPRI-9805-133	0.009	0.0025	0.012	0.0125	0.05	0.0015	0.33	0.02
EP-7	08/06/97	EPRI-9708-103	0.064	0.0025	0.005	0.0125	1	0.0015	0.0025	0.01
EP-7	11/04/97	EPRI-9711-103	0.084	0.0025	0.005	0.0125	1.2	0.0015	0.0025	0.01
EP-7	02/04/98	EPRI-9802-103	0.076	0.0025	0.005	0.0125	1.7	0.0015	0.0025	0.01
EP-7	05/05/98	EPRI-9805-103	0.056	0.0025	0.005	0.0125	1.5	0.0015	0.0025	0.028
EP-70	11/07/97	EPRI-9711-135	1.7	0.013	0.005	0.0125	0.05	0.0015	0.22	0.18
EP-70	02/11/98	EPRI-9802-135	1.4	0.014	0.005	0.0125	0.05	0.0015	0.22	0.2
EP-70	05/12/98	EPRI-9805-135	1.2	0.012	0.005	0.0125	0.05	0.0015	0.21	0.19
EP-70R	08/26/97	EPRI-9708-135	2	0.01	0.005	0.0125	0.05	0.0015	0.24	0.15
EP-71	11/07/97	EPRI-9711-136	0.19	0.0025	0.005	0.0125	0.05	0.0015	0.32	0.027
EP-71	02/11/98	EPRI-9802-136	0.14	0.0025	0.005	0.025	0.05	0.012	0.26	0.027
EP-71	05/12/98	EPRI-9805-136	0.13	0.0025	0.005	0.0125	0.05	0.0015	0.27	0.023
EP-71R	08/12/97	EPRI-9708-136	0.16	0.0025	0.005	0.0125	0.05	0.0015	0.28	0.01
EP-72	08/12/97	EPRI-9708-137	0.48	0.21	0.005	0.0125	0.05	0.0015	0.51	0.45
EP-72	11/07/97	EPRI-9711-137	0.49	0.2	0.005	0.0125	0.05	0.0015	0.38	0.47
EP-72	02/11/98	EPRI-9802-137	0.5	0.21	0.005	0.0125	0.05	0.0015	0.36	0.53
EP-72	05/13/98	EPRI-9805-137	0.5	0.22	0.005	0.0125	0.05	0.0015	0.39	0.54
EP-73	08/12/97	EPRI-9708-138	0.031	0.0025	0.005	0.0125	0.05	0.0015	1.1	0.03
EP-73	11/13/97	EPRI-9711-138	0.033	0.0025	0.005	0.0125	0.05	0.0015	1.1	0.033
EP-73	02/12/98	EPRI-9802-138	0.023	0.0025	0.005	0.0125	0.05	0.004	1.2	0.022
EP-73	05/11/98	EPRI-9805-138	0.11	0.01	0.005	0.0125	0.05	0.0015	1.3	0.15
EP-74	08/13/97	EPRI-9708-139	0.12	0.0025	0.005	0.0125	0.05	0.0015	0.44	0.02
EP-75	08/12/97	EPRI-9708-140	12	0.036	0.005	0.054	0.05	0.003	5.3	0.15
EP-75	11/13/97	EPRI-9711-140	21	0.019	0.005	0.051	0.05	0.003	4	0.16
EP-75	02/06/98	EPRI-9802-140	18	0.022	0.005	0.086	0.3	0.0015	4.49	0.14
EP-75	05/11/98	EPRI-9805-140	17	0.041	0.005	0.1	0.05	0.005	5.1	0.15
EP-76	08/12/97	EPRI-9708-141	0.48	0.0025	0.005	0.0125	0.05	0.007	0.14	0.16
EP-76	11/11/97	EPRI-9711-141	0.48	0.0025	0.005	0.0125	0.05	0.004	0.17	0.078
EP-76	02/06/98	EPRI-9802-141	0.54	0.0025	0.005	0.0125	0.1	0.005	0.13	0.07
EP-76	05/11/98	EPRI-9805-141	0.41	0.0025	0.005	0.0125	0.05	0.0015	0.14	0.085
EP-77	08/12/97	EPRI-9708-142	5.6	0.012	0.005	0.0125	0.05	0.006	0.034	0.025
EP-77	11/13/97	EPRI-9711-142	6	0.013	0.005	0.0125	0.05	0.005	0.019	0.022
EP-77	02/12/98	EPRI-9802-142	5.7	0.015	0.005	0.0125	0.05	0.005	0.007	0.024
EP-77	05/13/98	EPRI-9805-142	5.4	0.016	0.005	0.0125	0.05	0.005	0.018	0.031
EP-78	08/13/97	EPRI-9708-143	6.3	0.0025	0.005	0.0125	0.05	0.0015	0.35	0.023
EP-78	11/18/97	EPRI-9711-143	5.6	0.0025	0.005	0.0125	0.05	0.0015	0.24	0.01
EP-78	02/06/98	EPRI-9802-143	5.9	0.0025	0.005	0.0125	0.1	0.0015	0.22	0.01
EP-78	05/14/98	EPRI-9805-143	5.6	0.0025	0.005	0.0125	0.05	0.0015	0.21	0.01
EP-79	08/13/97	EPRI-9708-144	0.011	0.0025	0.012	0.0125	0.05	0.0015	0.17	0.01
EP-79	11/18/97	EPRI-9711-144	0.01	0.0025	0.012	0.0125	0.05	0.0015	0.19	0.01
EP-79	02/06/98	EPRI-9802-144	0.007	0.0025	0.01	0.0125	0.1	0.0015	0.18	0.01
EP-79	05/14/98	EPRI-9805-144	0.008	0.0025	0.011	0.0125	0.05	0.0015	0.17	0.01
EP-80	08/13/97	EPRI-9708-145	0.019	0.0025	0.005	0.0125	0.05	0.0015	0.017	0.01
EP-80	11/17/97	EPRI-9711-145	0.018	0.0025	0.005	0.0125	0.05	0.0015	0.041	0.01
EP-80	02/05/98	EPRI-9802-145	0.018	0.0025	0.005	0.0125	0.1	0.0015	0.039	0.01
EP-80	05/13/98	EPRI-9805-145	0.02	0.0025	0.005	0.0125	0.05	0.0015	0.039	0.023
EP-81	08/13/97	EPRI-9708-146	0.21	0.0025	0.005	0.0125	0.05	0.0015	0.22	0.01
EP-81	11/17/97	EPRI-9711-146	0.19	0.0025	0.005	0.0125	0.05	0.0015	0.21	0.025
EP-81	02/05/98	EPRI-9802-146	0.32	0.0025	0.005	0.0125	0.1	0.0015	0.21	0.025
EP-81	05/14/98	EPRI-9805-149	0.24	0.0025	0.005	0.0125	0.05	0.0015	0.21	0.021
EP-82	08/13/97	EPRI-9708-147	0.016	0.0025	0.005	0.0125	0.05	0.0015	0.27	0.01

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-82	11/18/97	EPRI-9711-147	0.011	0.0025	0.005	0.0125	0.05	0.0015	0.21	0.01
EP-82	02/11/98	EPRI-9802-147	0.006	0.0025	0.005	0.0125	0.05	0.0015	0.17	0.024
EP-82	05/14/98	EPRI-9805-147	0.01	0.0025	0.005	0.0125	0.05	0.0015	0.18	0.022
EP-83	08/13/97	EPRI-9708-148	0.01	0.0025	0.005	0.0125	0.05	0.0015	0.053	0.021
EP-83	11/18/97	EPRI-9711-148	0.005	0.0025	0.005	0.0125	0.05	0.0015	0.037	0.01
EP-83	02/06/98	EPRI-9802-148	0.006	0.0025	0.005	0.0125	0.1	0.0015	0.044	0.01
EP-83	05/13/98	EPRI-9805-148	0.01	0.0025	0.005	0.0125	0.05	0.0015	0.054	0.01
EP-84	08/13/97	EPRI-9708-149	0.1	0.007	0.005	0.026	0.05	0.009	0.036	0.042
EP-84	11/18/97	EPRI-9711-149	0.041	0.007	0.005	0.0125	0.05	0.01	0.031	0.035
EP-84	02/06/98	EPRI-9802-149	0.035	0.007	0.005	0.037	0.1	0.018	0.024	0.048
EP-84	05/13/98	EPRI-9805-146	0.034	0.006	0.005	0.0125	0.05	0.006	0.029	0.052
EP-85	08/13/97	EPRI-9708-150	3.1	0.0025	0.005	0.0125	0.05	0.0015	0.22	0.01
EP-85	11/17/97	EPRI-9711-150	3.2	0.0025	0.005	0.0125	0.05	0.0015	0.19	0.01
EP-85	02/05/98	EPRI-9802-150	2.9	0.0025	0.005	0.0125	0.1	0.0015	0.15	0.01
EP-85	05/14/98	EPRI-9805-150	2.8	0.0025	0.005	0.0125	0.05	0.0015	0.16	0.025
EP-88	08/12/97	EPRI-9708-153	0.02	0.0025	0.005	0.0125	0.05	0.0015	0.094	0.025
EP-88	11/11/97	EPRI-9711-153	0.017	0.0025	0.005	0.0125	0.05	0.0015	0.029	0.026
EP-88	02/12/98	EPRI-9802-153	0.017	0.0025	0.005	0.0125	0.05	0.0015	0.011	0.031
EP-88	05/11/98	EPRI-9805-153	0.032	0.0025	0.005	0.0125	0.05	0.0015	0.029	0.027
EP-9	05/07/98	EPRI-9805-178	0.39	0.0025	0.005	0.0125	0.05	0.0015	0.17	0.022
EP-90	12/12/97	EPRI-9711-139	0.15	0.0025	0.005	0.0125	0.05	0.0015	0.69	0.19
EP-90	02/17/98	EPRI-9802-139	0.18	0.0025	0.005	0.0125	0.05	0.0015	0.75	0.01
EP-90	05/13/98	EPRI-9805-139	0.17	0.0025	0.005	0.0125	0.05	0.0015	0.86	0.027
Transformed Data										
EM-1	08/13/97	EPRI-9708-155	-4.50986	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.074542	-3.540459
EM-1	11/17/97	EPRI-9711-155	-4.961845	-5.991465	-5.991465	-4.382027	-2.995732	-6.50229	-5.991465	-4.60517
EM-1	02/19/98	EPRI-9802-155	-2.882404	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-5.991465	-4.60517
EM-1	05/18/98	EPRI-9805-155	-5.991465	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-5.991465	-3.912023
EM-2	08/26/97	EPRI-9708-156	-0.174353	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-3.688879
EM-2	11/17/97	EPRI-9711-156	-0.562119	-5.991465	-5.991465	-4.382027	-2.995732	-6.50229	-2.207275	-3.772261
EM-2	02/17/98	EPRI-9802-156	-0.597837	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.120264	-4.60517
EM-2	05/18/98	EPRI-9805-156	-0.544727	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.040221	-4.60517
EM-4	08/26/97	EPRI-9708-158	-4.710531	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.50986	-3.473768
EM-4	11/17/97	EPRI-9711-158	-5.991465	-5.991465	-5.991465	-4.382027	-2.995732	-6.50229	-5.991465	-4.60517
EM-4	02/17/98	EPRI-9802-157	-4.710531	-4.828314	-5.298317	-4.382027	-2.995732	-6.50229	-5.991465	-4.60517
EM-4	05/18/98	EPRI-9805-157	-3.963316	-5.991465	-5.298317	-2.645075	-2.995732	-6.50229	-5.991465	-3.442019
EM-5	08/26/97	EPRI-9708-159	0.470004	-2.525729	-5.298317	-3.079114	-0.597837	-4.60517	-3.611918	-1.171183
EM-5	11/17/97	EPRI-9711-159	0.530628	-2.673649	-5.991465	-4.382027	0.587787	-5.115996	-4.710531	-1.171183
EM-5	02/17/98	EPRI-9802-158	0.470004	-2.718101	-5.298317	-3.506558	0.875469	-4.710531	-4.422849	-0.967584
EM-5	05/18/98	EPRI-9805-158	0.530628	-4.074542	-5.298317	-3.688879	0.262364	-5.298317	-4.342806	-1.771957
EM-6	08/11/97	EPRI-9708-160	-3.506558	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.207275	-3.506558
EM-6	11/17/97	EPRI-9711-160	-3.649659	-5.991465	-5.991465	-3.101093	-2.995732	-6.50229	-2.207275	-3.244194
EM-6	02/17/98	EPRI-9802-159	-3.575551	-5.115996	-5.298317	-3.146555	-2.995732	-6.50229	-2.302585	-3.101093
EM-6	05/18/98	EPRI-9805-159	-3.688879	-5.991465	-5.298317	-3.101093	-2.995732	-6.50229	-2.312635	-2.956512
EM-7	11/17/97	EPRI-9711-161	0.530628	-3.863233	-4.828314	-2.703063	-1.049822	-2.847312	-2.040221	-2.207275
EM-7	02/19/98	EPRI-9802-160	0.741937	-4.710531	-5.298317	-2.900422	-1.07881	-3.506558	-2.900422	-2.551046
EM-7	05/07/98	EPRI-9805-160	0.587787	-4.017384	-5.298317	-2.617296	-1.609438	-3.244194	-2.900422	-2.207275
EP-12	11/03/97	EPRI-9711-104	0.262364	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	1.931521	-3.816713
EP-12	02/03/98	EPRI-9802-104	0.182322	-5.991465	-5.298317	-4.382027	-1.89712	-6.50229	0.530628	-4.60517
EP-12	05/20/98	EPRI-9805-104	0	-5.991465	-5.298317	-3.473768	-2.995732	-6.214608	-0.562119	-3.473768
EP-13	08/07/97	EPRI-9708-105	3.89182	-0.198451	-5.298317	-4.382027	-2.995732	-4.828314	1.94591	-2.956512
EP-13	11/06/97	EPRI-9711-105	3.828641	-0.223144	-5.298317	-4.382027	-1.89712	-6.50229	1.902108	-3.411248
EP-13	02/17/98	EPRI-9802-105	3.871201	-0.385662	-5.298317	-3.611918	-2.995732	-6.50229	1.808289	-3.688879

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-13	05/07/98	EPRI-9805-105	3.583519	-0.34249	-5.298317	-3.688879	-2.995732	-6.50229	1.740466	-2.830218
EP-14	11/05/97	EPRI-9711-106	0.09531	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-1.021651	-4.60517
EP-14	02/17/98	EPRI-9802-106	0.262364	-5.991465	-5.298317	-4.382027	-1.771957	-5.521461	-1.203973	-4.60517
EP-14	05/07/98	EPRI-9805-106	0.336472	-5.991465	-5.298317	-4.382027	-1.89712	-5.521461	-1.469676	-3.079114
EP-15	08/07/97	EPRI-9708-107	-2.577022	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.771957	-3.816713
EP-15	11/06/97	EPRI-9711-107	-4.342806	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-3.863233
EP-15	02/17/98	EPRI-9802-107	-3.473768	-4.135167	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-4.60517
EP-15	05/07/98	EPRI-9805-107	-4.961845	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.609438	-3.473768
EP-20	08/07/97	EPRI-9708-108	0.182322	-3.324236	-5.298317	-4.382027	-2.995732	-6.50229	-0.967584	-2.864704
EP-20	11/03/97	EPRI-9711-108	0.182322	-3.218876	-5.298317	-3.649659	-2.995732	-6.50229	-1.049822	-2.830218
EP-20	02/03/98	EPRI-9802-108	-0.040822	-3.036554	-5.298317	-3.324236	-2.207275	-6.50229	-0.994252	-2.764621
EP-20	05/06/98	EPRI-9805-108	-0.162519	-3.170086	-5.298317	-3.506558	-2.995732	-6.50229	-1.07881	-2.322788
EP-21	11/18/97	EPRI-9711-109	-2.703063	-5.991465	-5.298317	-4.382027	-0.941609	-6.50229	-2.617296	-3.473768
EP-21	02/18/98	EPRI-9802-109	-2.780621	-5.991465	-5.298317	-4.382027	-1.771957	-6.50229	-2.353878	-3.270169
EP-21	05/21/98	EPRI-9805-109	-2.956512	-5.991465	-5.298317	-4.382027	-1.07881	-6.214608	-4.017384	-3.575551
EP-22	08/15/97	EPRI-9708-110	-3.352407	-5.115996	-5.298317	-3.473768	-2.995732	-4.135167	-1.139434	-0.446287
EP-22	11/18/97	EPRI-9711-110	-3.123566	-5.991465	-5.298317	-4.382027	-2.995732	-5.115996	-2.207275	-0.094311
EP-22	02/18/98	EPRI-9802-110	-3.352407	-5.298317	-5.298317	-3.352407	-2.995732	-4.017384	-0.527633	0.741937
EP-22	06/10/98	EPRI-9806-201	-2.343407	-3.123566	-3.963316	-3.381395	-2.207275	-3.123566	-0.616186	1.774952
EP-23	08/11/97	EPRI-9708-111	0.916291	-5.991465	-5.298317	-4.382027	-0.430783	-6.50229	-3.611918	-3.611918
EP-23	11/04/97	EPRI-9711-111	1.386294	-5.991465	-5.298317	-4.382027	-0.776529	-6.50229	-3.772261	-3.575551
EP-23	02/04/98	EPRI-9802-111	0.405465	-5.991465	-5.298317	-4.382027	-1.386294	-6.50229	-3.963316	-4.60517
EP-23	05/11/98	EPRI-9805-111	1.435085	-5.991465	-5.298317	-4.382027	-0.462035	-6.50229	-4.50986	-3.101093
EP-24	08/15/97	EPRI-9708-112	-0.755023	-5.991465	-5.298317	-4.382027	1.481605	-6.50229	-4.268698	-3.352407
EP-24	11/18/97	EPRI-9711-112	-2.645075	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.538307	-4.60517
EP-24	02/18/98	EPRI-9802-112	-3.473768	-5.991465	-5.298317	-4.382027	-1.609438	-6.50229	-5.991465	-4.60517
EP-24	05/21/98	EPRI-9805-112	-0.967584	-5.991465	-5.298317	-2.120264	-0.210721	-6.214608	-5.991465	-1.108663
EP-25	08/15/97	EPRI-9708-113	1.098612	-5.991465	-5.298317	-4.382027	0.955511	-6.50229	-1.771957	-3.863233
EP-25	11/19/97	EPRI-9711-113	1.252763	-5.991465	-5.298317	-4.382027	1.568616	-4.50986	-2.538307	-3.296837
EP-25	02/18/98	EPRI-9802-113	1.131402	-5.991465	-5.298317	-4.382027	1.386294	-6.50229	-3.123566	-4.60517
EP-25	05/21/98	EPRI-9805-113	0.955511	-5.991465	-5.298317	-3.575551	1.757858	-6.214608	-2.488915	-3.244194
EP-26	08/11/97	EPRI-9708-114	-1.139434	-0.478036	-5.298317	-1.560648	-2.120264	-3.324236	-2.538307	0.641854
EP-26	11/04/97	EPRI-9711-114	-1.139434	0.405465	-5.298317	-1.832581	-2.995732	-4.60517	-1.309333	1.435085
EP-26	02/04/98	EPRI-9802-114	-0.544727	-1.714798	-5.298317	-3.170086	-2.995732	-4.60517	-2.995732	-0.579818
EP-26	05/07/98	EPRI-9805-114	-0.798508	-1.714798	-5.298317	-3.688879	-2.995732	-4.961845	-2.830218	-0.562119
EP-29	08/07/97	EPRI-9708-115	-1.171183	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.609438	-3.816713
EP-29	11/03/97	EPRI-9711-115	-0.733969	-5.991465	-5.298317	-4.382027	0.587787	-6.50229	-2.120264	-3.506558
EP-29	02/03/98	EPRI-9802-115	-1.237874	-5.991465	-5.298317	-4.382027	-2.207275	-6.50229	-1.660731	-4.60517
EP-29	05/06/98	EPRI-9805-115	-1.560648	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-3.729701
EP-35	08/07/97	EPRI-9708-116	-0.916291	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	0.336472	-3.649659
EP-35	11/03/97	EPRI-9711-116	-0.916291	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	1.902108	-3.816713
EP-35	02/03/98	EPRI-9802-116	-0.994252	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	1.410987	-3.863233
EP-35	05/06/98	EPRI-9805-116	-0.478036	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	0.916291	-3.015935
EP-4	08/06/97	EPRI-9708-100	-1.832581	-5.991465	-5.298317	-4.382027	0.09531	-6.50229	-5.991465	-4.60517
EP-4	11/04/97	EPRI-9711-100	-1.966113	-5.991465	-5.298317	-4.382027	-0.162519	-6.50229	-5.991465	-4.60517
EP-4	02/04/98	EPRI-9802-100	-2.688248	-5.991465	-5.298317	-4.382027	-0.094311	-6.50229	-5.298317	-4.60517
EP-4	05/05/98	EPRI-9805-100	-2.465104	-5.991465	-5.298317	-4.382027	0.262364	-6.50229	-5.991465	-3.540459
EP-43	11/03/97	EPRI-9711-172	-0.248461	-5.991465	-5.298317	-4.382027	0.09531	-6.50229	-2.937463	-4.60517
EP-43	02/03/98	EPRI-9802-175	0.182322	-5.991465	-5.298317	-4.382027	-1.771957	-6.50229	-1.89712	-4.60517
EP-43	05/20/98	EPRI-9805-175	-0.328504	-5.991465	-5.298317	-4.382027	0.470004	-6.214608	-0.653926	-4.60517
EP-49	11/19/97	EPRI-9711-117	5.332719	3.7612	-1.427116	1.629241	7.457032	-2.207275	-2.207275	6.361302
EP-49	02/19/98	EPRI-9802-117	6.139885	3.7612	-3.057608	-2.419119	7.775276	-4.268698	-1.966113	7.549609
EP-49	05/21/98	EPRI-9805-117	5.613128	3.7612	-2.302585	-3.123566	7.383368	-6.214608	-1.660731	7.037028
EP-5	08/06/97	EPRI-9708-101	-3.057608	-5.991465	-4.135167	-4.382027	-1.171183	-6.50229	-5.991465	-4.60517
EP-5	11/04/97	EPRI-9711-101	-3.411248	-5.991465	-5.298317	-4.382027	-2.995732	-4.60517	-3.411248	-3.611918

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-5	02/04/98	EPRI-9802-101	-2.830218	-5.991465	-5.298317	-4.382027	-1.560648	-6.50229	-5.298317	-3.863233
EP-5	05/05/98	EPRI-9805-101	-2.995732	-5.991465	-5.298317	-4.382027	-1.560648	-5.809143	-5.991465	-2.864704
EP-51	08/26/97	EPRI-9708-118	-3.411248	-3.381395	-3.540459	-2.577022	0.336472	-6.50229	-1.514128	-0.634878
EP-51	11/06/97	EPRI-9711-118	-1.237874	-1.714798	-3.473768	-1.660731	0.788457	-6.50229	-1.832581	1.481605
EP-51	02/12/98	EPRI-9802-118	2.302585	1.360977	-5.298317	1.722767	0.587787	-6.50229	-1.771957	4.110874
EP-51	05/11/98	EPRI-9805-118	-1.347074	-1.89712	-5.298317	-0.820981	-0.616186	-6.50229	-2.040221	0.788457
EP-52	11/06/97	EPRI-9711-173	-0.030459	-0.446287	-4.074542	-0.634878	-0.597837	-3.123566	-1.021651	0.955511
EP-52	02/12/98	EPRI-9802-176	0.470004	-0.34249	-5.298317	-0.798508	-0.597837	-3.146555	-1.203973	1.280934
EP-53	08/11/97	EPRI-9708-172	3.931826	0.262364	-5.298317	-4.382027	-2.995732	-6.50229	-0.274437	1.280934
EP-53	02/04/98	EPRI-9802-178	4.143135	0.336472	-5.298317	-3.442019	-2.995732	-6.50229	0.530628	1.458615
EP-53	06/10/98	EPRI-9806-200	4.143135	0.262364	-5.298317	-4.382027	-2.995732	-6.50229	0.336472	1.435085
EP-54	08/26/97	EPRI-9708-119	3.091042	1.740466	-5.298317	-1.714798	2.564949	-6.50229	-2.590267	4.727388
EP-54	11/06/97	EPRI-9711-119	3.367296	1.504077	-5.298317	-0.562119	2.639057	-6.50229	-2.645075	4.543295
EP-54	02/12/98	EPRI-9802-119	3.295837	0.693147	-5.298317	-1.560648	0.832909	-6.50229	-2.733368	3.713572
EP-54	05/11/98	EPRI-9805-119	3.912023	0.405465	-5.298317	-2.120264	1.223775	-4.50986	-2.501036	3.465736
EP-55	08/15/97	EPRI-9708-120	4.127134	-2.040221	-5.298317	-4.382027	5.433722	-3.912023	-1.272966	5.298317
EP-55	11/19/97	EPRI-9711-120	4.077537	-3.146555	-5.298317	-4.382027	4.867534	-6.50229	-1.427116	4.406719
EP-55	02/12/98	EPRI-9802-120	4.043051	-3.170086	-5.298317	-4.382027	4.59512	-6.50229	-1.660731	4.26268
EP-55	05/20/98	EPRI-9805-120	4.025352	-4.342806	-5.298317	-4.382027	4.430817	-6.214608	-1.714798	3.7612
EP-56	08/26/97	EPRI-9708-121	0.641854	-5.521461	-5.298317	-4.382027	-2.995732	-5.809143	-3.036554	-3.649659
EP-56	11/04/97	EPRI-9711-121	1.064711	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.864704	-3.816713
EP-56	02/04/98	EPRI-9802-121	0.788457	-5.991465	-5.298317	-3.611918	-2.995732	-6.50229	-3.036554	-3.688879
EP-56	05/07/98	EPRI-9805-121	0.641854	-5.991465	-5.298317	-3.688879	-2.995732	-5.809143	-2.847312	-3.244194
EP-57	08/16/97	EPRI-9708-122	0.09531	-5.991465	-5.298317	-4.382027	-0.510826	-6.50229	-3.506558	-3.611918
EP-57	11/14/97	EPRI-9711-122	-0.030459	-5.991465	-5.298317	-4.382027	-1.272966	-6.50229	-5.991465	-4.60517
EP-57	02/18/98	EPRI-9802-122	-0.020203	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-5.991465	-3.816713
EP-57	05/18/98	EPRI-9805-122	-0.235722	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-5.991465	-4.60517
EP-58	08/16/97	EPRI-9708-123	0.336472	-5.991465	-5.298317	-4.382027	0.993252	-6.50229	-1.832581	-3.816713
EP-58	11/14/97	EPRI-9711-123	1.568616	-5.991465	-5.298317	-4.382027	-0.020203	-6.50229	-3.611918	-3.729701
EP-58	02/18/98	EPRI-9802-123	1.435085	-5.991465	-5.298317	-4.382027	-0.105361	-6.50229	-3.611918	-4.60517
EP-58	05/18/98	EPRI-9805-123	1.504077	-5.991465	-4.50986	-4.382027	-0.105361	-6.50229	-3.381395	-3.772261
EP-59	08/09/97	EPRI-9708-124	1.280934	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.714798	-3.772261
EP-59	11/05/97	EPRI-9711-124	1.335001	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-3.863233
EP-59	02/05/98	EPRI-9802-124	1.223775	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-1.469676	-4.60517
EP-59	05/08/98	EPRI-9805-124	1.131402	-5.298317	-5.298317	-4.382027	-2.995732	-6.50229	-1.237874	-3.146555
EP-6	08/06/97	EPRI-9708-102	-3.442019	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.411248	-3.863233
EP-6	11/04/97	EPRI-9711-102	-3.473768	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.015935	-3.729701
EP-6	02/04/98	EPRI-9802-102	-3.772261	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.710531	-4.60517
EP-6	05/05/98	EPRI-9805-102	-3.863233	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.60517	-3.123566
EP-60	08/08/97	EPRI-9708-125	-4.961845	-5.991465	-4.50986	-4.382027	-0.967584	-6.50229	-1.427116	-3.649659
EP-60	11/05/97	EPRI-9711-125	-5.991465	-5.991465	-5.298317	-4.382027	-0.223144	-6.50229	-1.427116	-3.863233
EP-60	02/05/98	EPRI-9802-125	-4.710531	-5.991465	-5.298317	-3.381395	-0.916291	-6.50229	-1.347074	-3.611918
EP-60	05/08/98	EPRI-9805-125	-4.828314	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.427116	-2.956512
EP-61	08/16/97	EPRI-9708-126	-5.991465	-5.991465	-5.298317	-4.382027	0.336472	-6.50229	-0.867501	-3.863233
EP-61	11/14/97	EPRI-9711-126	-4.50986	-5.991465	-5.298317	-4.382027	0.182322	-6.50229	-0.967584	-3.863233
EP-61	02/18/98	EPRI-9802-126	-3.688879	-5.991465	-5.298317	-4.382027	-1.049822	-6.50229	-1.021651	-4.60517
EP-61	05/18/98	EPRI-9805-126	-4.828314	-5.991465	-5.298317	-4.382027	-1.714798	-6.50229	-1.171183	-3.816713
EP-62	08/09/97	EPRI-9708-127	0.09531	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.021651	-3.772261
EP-62	11/05/97	EPRI-9711-127	0.182322	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.941609	-3.772261
EP-62	02/05/98	EPRI-9802-127	-0.174353	-5.991465	-5.298317	-3.649659	-2.302585	-6.50229	-0.941609	-3.772261
EP-62	05/08/98	EPRI-9805-127	-0.040822	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.967584	-3.244194
EP-63	08/09/97	EPRI-9708-128	-3.963316	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.469676	-3.816713
EP-63	11/05/97	EPRI-9711-128	-3.863233	-5.991465	-5.298317	-4.382027	-2.207275	-6.50229	-1.560648	-3.688879
EP-63	02/05/98	EPRI-9802-128	-3.912023	-5.991465	-5.298317	-3.540459	-1.609438	-6.50229	-1.609438	-3.506558
EP-63	05/08/98	EPRI-9805-128	-3.816713	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.514128	-2.956512

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-64	08/09/97	EPRI-9708-129	-3.688879	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.693147	-3.772261
EP-64	11/05/97	EPRI-9711-129	-3.036554	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-0.356675	-3.506558
EP-64	02/05/98	EPRI-9802-129	-3.146555	-5.991465	-5.298317	-3.015935	-2.302585	-6.50229	-0.430783	-3.729701
EP-64	05/08/98	EPRI-9805-129	-3.194183	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.494296	-2.937463
EP-65	08/16/97	EPRI-9708-130	-5.991465	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.108663	-4.60517
EP-65	11/14/97	EPRI-9711-130	-4.342806	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.237874	-4.60517
EP-65	02/18/98	EPRI-9802-130	-4.710531	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.609438	-4.60517
EP-65	05/18/98	EPRI-9805-130	-4.961845	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-4.60517
EP-66	08/08/97	EPRI-9708-131	2.564949	-5.991465	-4.50986	-4.382027	-2.995732	-6.50229	-1.347074	-3.079114
EP-66	11/05/97	EPRI-9711-131	2.397895	-5.991465	-5.298317	-4.382027	-1.89712	-6.50229	-1.347074	-3.611918
EP-66	02/05/98	EPRI-9802-131	2.272126	-5.991465	-5.298317	-3.442019	-2.302585	-6.50229	-1.347074	-3.729701
EP-66	05/08/98	EPRI-9805-131	2.302585	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.386294	-2.830218
EP-67	08/12/97	EPRI-9708-132	-4.199705	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.966113	-3.816713
EP-67	11/07/97	EPRI-9711-132	-3.170086	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.89712	-3.270169
EP-67	02/11/98	EPRI-9802-132	-4.199705	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.040221	-3.912023
EP-67	05/12/98	EPRI-9805-132	-4.199705	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.966113	-3.575551
EP-68	08/14/97	EPRI-9708-133	-5.991465	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.108663	-3.729701
EP-68	11/11/97	EPRI-9711-133	-5.991465	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.139434	-3.772261
EP-68	02/11/98	EPRI-9802-133	-5.991465	-5.991465	-4.135167	-4.382027	-2.995732	-6.50229	-1.272966	-4.60517
EP-68	05/13/98	EPRI-9805-133	-4.710531	-5.991465	-4.422849	-4.382027	-2.995732	-6.50229	-1.108663	-3.912023
EP-7	08/06/97	EPRI-9708-103	-2.748872	-5.991465	-5.298317	-4.382027	0	-6.50229	-5.991465	-4.60517
EP-7	11/04/97	EPRI-9711-103	-2.476938	-5.991465	-5.298317	-4.382027	0.182322	-6.50229	-5.991465	-4.60517
EP-7	02/04/98	EPRI-9802-103	-2.577022	-5.991465	-5.298317	-4.382027	0.530628	-6.50229	-5.991465	-4.60517
EP-7	05/05/98	EPRI-9805-103	-2.882404	-5.991465	-5.298317	-4.382027	0.405465	-6.50229	-5.991465	-3.575551
EP-70	11/07/97	EPRI-9711-135	0.530628	-4.342806	-5.298317	-4.382027	-2.995732	-6.50229	-1.514128	-1.714798
EP-70	02/11/98	EPRI-9802-135	0.336472	-4.268698	-5.298317	-4.382027	-2.995732	-6.50229	-1.514128	-1.609438
EP-70	05/12/98	EPRI-9805-135	0.182322	-4.422849	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-1.660731
EP-70R	08/26/97	EPRI-9708-135	0.693147	-4.60517	-5.298317	-4.382027	-2.995732	-6.50229	-1.427116	-1.89712
EP-71	11/07/97	EPRI-9711-136	-1.660731	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.139434	-3.611918
EP-71	02/11/98	EPRI-9802-136	-1.966113	-5.991465	-5.298317	-3.688879	-2.995732	-4.422849	-1.347074	-3.611918
EP-71	05/12/98	EPRI-9805-136	-2.040221	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.309333	-3.772261
EP-71R	08/12/97	EPRI-9708-136	-1.832581	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.272966	-4.60517
EP-72	08/12/97	EPRI-9708-137	-0.733969	-1.560648	-5.298317	-4.382027	-2.995732	-6.50229	-0.673345	-0.798508
EP-72	11/07/97	EPRI-9711-137	-0.71335	-1.609438	-5.298317	-4.382027	-2.995732	-6.50229	-0.967584	-0.755023
EP-72	02/11/98	EPRI-9802-137	-0.693147	-1.560648	-5.298317	-4.382027	-2.995732	-6.50229	-1.021651	-0.634878
EP-72	05/13/98	EPRI-9805-137	-0.693147	-1.514128	-5.298317	-4.382027	-2.995732	-6.50229	-0.941609	-0.616186
EP-73	08/12/97	EPRI-9708-138	-3.473768	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	0.09531	-3.506558
EP-73	11/13/97	EPRI-9711-138	-3.411248	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	0.09531	-3.411248
EP-73	02/12/98	EPRI-9802-138	-3.772261	-5.991465	-5.298317	-4.382027	-2.995732	-5.521461	0.182322	-3.816713
EP-73	05/11/98	EPRI-9805-138	-2.207275	-4.60517	-5.298317	-4.382027	-2.995732	-6.50229	0.262364	-1.89712
EP-74	08/13/97	EPRI-9708-139	-2.120264	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.820981	-3.912023
EP-75	08/12/97	EPRI-9708-140	2.484907	-3.324236	-5.298317	-2.918771	-2.995732	-5.809143	1.667707	-1.89712
EP-75	11/13/97	EPRI-9711-140	3.044522	-3.963316	-5.298317	-2.97593	-2.995732	-5.809143	1.386294	-1.832581
EP-75	02/06/98	EPRI-9802-140	2.890372	-3.816713	-5.298317	-2.453408	-1.203973	-6.50229	1.501853	-1.966113
EP-75	05/11/98	EPRI-9805-140	2.833213	-3.194183	-5.298317	-2.302585	-2.995732	-5.298317	1.629241	-1.89712
EP-76	08/12/97	EPRI-9708-141	-0.733969	-5.991465	-5.298317	-4.382027	-2.995732	-4.961845	-1.966113	-1.832581
EP-76	11/11/97	EPRI-9711-141	-0.733969	-5.991465	-5.298317	-4.382027	-2.995732	-5.521461	-1.771957	-2.551046
EP-76	02/06/98	EPRI-9802-141	-0.616186	-5.991465	-5.298317	-4.382027	-2.302585	-5.298317	-2.040221	-2.65926
EP-76	05/11/98	EPRI-9805-141	-0.891598	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.966113	-2.465104
EP-77	08/12/97	EPRI-9708-142	1.722767	-4.422849	-5.298317	-4.382027	-2.995732	-5.115996	-3.381395	-3.688879
EP-77	11/13/97	EPRI-9711-142	1.791759	-4.342806	-5.298317	-4.382027	-2.995732	-5.298317	-3.963316	-3.816713
EP-77	02/12/98	EPRI-9802-142	1.740466	-4.199705	-5.298317	-4.382027	-2.995732	-5.298317	-4.961845	-3.729701
EP-77	05/13/98	EPRI-9805-142	1.686399	-4.135167	-5.298317	-4.382027	-2.995732	-5.298317	-4.017384	-3.473768
EP-78	08/13/97	EPRI-9708-143	1.84055	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.049822	-3.772261
EP-78	11/18/97	EPRI-9711-143	1.722767	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.427116	-4.60517

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
EP-78	02/06/98	EPRI-9802-143	1.774952	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-1.514128	-4.60517
EP-78	05/14/98	EPRI-9805-143	1.722767	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-4.60517
EP-79	08/13/97	EPRI-9708-144	-4.50986	-5.991465	-4.422849	-4.382027	-2.995732	-6.50229	-1.771957	-4.60517
EP-79	11/18/97	EPRI-9711-144	-4.60517	-5.991465	-4.422849	-4.382027	-2.995732	-6.50229	-1.660731	-4.60517
EP-79	02/06/98	EPRI-9802-144	-4.961845	-5.991465	-4.60517	-4.382027	-2.302585	-6.50229	-1.714798	-4.60517
EP-79	05/14/98	EPRI-9805-144	-4.828314	-5.991465	-4.50986	-4.382027	-2.995732	-6.50229	-1.771957	-4.60517
EP-80	08/13/97	EPRI-9708-145	-3.963316	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.074542	-4.60517
EP-80	11/17/97	EPRI-9711-145	-4.017384	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.194183	-4.60517
EP-80	02/05/98	EPRI-9802-145	-4.017384	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-3.244194	-4.60517
EP-80	05/13/98	EPRI-9805-145	-3.912023	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.244194	-3.772261
EP-81	08/13/97	EPRI-9708-146	-1.560648	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.514128	-4.60517
EP-81	11/17/97	EPRI-9711-146	-1.660731	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-3.688879
EP-81	02/05/98	EPRI-9802-146	-1.139434	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-1.560648	-3.688879
EP-81	05/14/98	EPRI-9805-149	-1.427116	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-3.863233
EP-82	08/13/97	EPRI-9708-147	-4.135167	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.309333	-4.60517
EP-82	11/18/97	EPRI-9711-147	-4.50986	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.560648	-4.60517
EP-82	02/11/98	EPRI-9802-147	-5.115996	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.771957	-3.729701
EP-82	05/14/98	EPRI-9805-147	-4.60517	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.714798	-3.816713
EP-83	08/13/97	EPRI-9708-148	-4.60517	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.937463	-3.863233
EP-83	11/18/97	EPRI-9711-148	-5.298317	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.296837	-4.60517
EP-83	02/06/98	EPRI-9802-148	-5.115996	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-3.123566	-4.60517
EP-83	05/13/98	EPRI-9805-148	-4.60517	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.918771	-4.60517
EP-84	08/13/97	EPRI-9708-149	-2.302585	-4.961845	-5.298317	-3.649659	-2.995732	-4.710531	-3.324236	-3.170086
EP-84	11/18/97	EPRI-9711-149	-3.194183	-4.961845	-5.298317	-4.382027	-2.995732	-4.60517	-3.473768	-3.352407
EP-84	02/06/98	EPRI-9802-149	-3.352407	-4.961845	-5.298317	-3.296837	-2.302585	-4.017384	-3.729701	-3.036554
EP-84	05/13/98	EPRI-9805-146	-3.381395	-5.115996	-5.298317	-4.382027	-2.995732	-5.115996	-3.540459	-2.956512
EP-85	08/13/97	EPRI-9708-150	1.131402	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.514128	-4.60517
EP-85	11/17/97	EPRI-9711-150	1.163151	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.660731	-4.60517
EP-85	02/05/98	EPRI-9802-150	1.064711	-5.991465	-5.298317	-4.382027	-2.302585	-6.50229	-1.89712	-4.60517
EP-85	05/14/98	EPRI-9805-150	1.029619	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.832581	-3.688879
EP-88	08/12/97	EPRI-9708-153	-3.912023	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-2.36446	-3.688879
EP-88	11/11/97	EPRI-9711-153	-4.074542	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.540459	-3.649659
EP-88	02/12/98	EPRI-9802-153	-4.074542	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-4.50986	-3.473768
EP-88	05/11/98	EPRI-9805-153	-3.442019	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-3.540459	-3.611918
EP-9	05/07/98	EPRI-9805-178	-0.941609	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-1.771957	-3.816713
EP-90	12/12/97	EPRI-9711-139	-1.89712	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.371064	-1.660731
EP-90	02/17/98	EPRI-9802-139	-1.714798	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.287682	-4.60517
EP-90	05/13/98	EPRI-9805-139	-1.771957	-5.991465	-5.298317	-4.382027	-2.995732	-6.50229	-0.150823	-3.611918
		n	232	232	232	232	232	232	232	232
		trans. Stdev.	2.753312	2.084125	0.452819	0.925865	1.945855	0.834879	1.812718	2.325374
		trans. Ave.	-1.22941	-4.937694	-5.207573	-3.9913	-1.888618	-6.132825	-2.160891	-2.859653
		H value	4.3	3.4	1.8	1.75	3.23	1.6	3.1	3.7
		ln UCL	28.21679	0.100291	0.0064	0.031553	1.519055	0.003358	0.862271	1.507004
		skew	0.284728	2.214744	4.923683	3.333386	2.526864	2.461628	-0.36972	2.333478
		ave	8.475483	0.690009	0.0072	0.076851	27.46763	0.004237	0.486616	18.99299
		std deve	39.24823	4.889365	0.017041	0.498177	219.8934	0.010253	1.217094	150.589

SITE	DATE	SAMP #	(AS) DIS	(CD) DIS	(CR) DIS	(CU) DIS	(FE) DIS	(PB) DIS	(SE) DIS	(ZN) DIS
		95% Conf.	5.050374	0.629152	0.002193	0.064104	28.29539	0.001319	0.156613	19.37745
		UCL	13.52586	1.319161	0.009393	0.140956	55.76302	0.005556	0.643229	38.37044
		max	464	43	0.24	5.6	2381	0.11	7	1900
		min	0.0025	0.0025	0.0025	0.0125	0.05	0.0015	0.0025	0.01
		95th percentile	48.45	1.04	0.01	0.12	4.18	0.01	2.06	17.64

APPENDIX M

BACKUP DETAIL FOR COST ESTIMATES

CORRECTIVE ACTION MEASURES

APPENDIX M

BACKUP DETAIL FOR COST ESTIMATES

CORRECTIVE ACTION MEASURES

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BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES

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TABLE M-1. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 1

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #1 -- Medford Sump							
Air Monitoring/Dust Control							
Dust Control	4	WEEK	$0	$0	$2,000	$8,000	$8,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Demolition/Debris Clean-up							
Remove Existing Asphalt Pavement	323	SY	$0	$0	$6	$1,938	$1,938
Remove Existing Concrete Pavement	0	SY	$0	$0	$10	$0	$0
Structure Demolition							
Existing Medford Sump	21	CY	$0	$0	$250	$5,185	$5,185
Other	0	CY		$0		$0	$0
Crush Concrete Slabs/Walls/floors	21	CY	$0	$0	$10	$207	$207
Load and Haul to On-Site Repository	48	CY	$0	$0	$3.50	$167	$167
Load and Haul to Staging Area	0	CY	$0	$0	$3.50	$0	$0
Excavation							
Excavate Soils-Category I	1,615	CY	$0	$0	$3	$4,844	$4,844
Load and Haul to On-Site Repository	1,615	CY	$0	$0	$3.50	$5,651	$5,651
Post-Corrective Action Measures Soil Sampling	1	LS	$250	$250	$2,000	$2,000	$2,250
Compacted Backfill							
Provide backfill - on-site source	1,426	CY	$0	$0	$3.00	$4,279	$4,279
Provide backfill - imported	0	CY	$15	$0	$0.00	$0	$0
Place and compact backfill	1,426	CY	$0	$0	$3.00	$4,279	$4,279
Replace Structures							
Replace Medford Sump	(A)	CY	$200		$300		$0
Fine Grade for paving	323	SY	$0	$0	$3.00	$969	$969
Subgrade Preparation	323	SY	$0	$0	$1.50	$484	$484
Compacted subgrade base course	108	CY	$18	$1,938	$4.50	$484	$2,422
60 mil HDPE (flexible-FML)	323	SY	$3.25	$1,049	$3.75	$1,211	$2,260
Geotextile	323	SY	$1.75	$565	$1.50	$484	$1,049
Crushed Limestone Aggregate	54	CY	$20	$1,076	$5.00	$269	$1,345
Replace Asphalt Pavement	27	CY	$57	$1,534	$13.00	$350	$1,884
Replace Concrete Pavement	0	CY	$75	$0	$30.00	$0	$0
Engineering Controls for system leaks							
Engineering Controls for system leaks	1	LS	$0	$0	$4,500	$4,500	$4,500
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$8,412**		**$60,301**	**$68,713**
Mobilization	1	LS			3%		$2,061
Texas State Sales Tax	1	LS			8.25%		$694
Scope Contingency	1	LS			25%		$17,178
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$6,871
Subtotal Construction							**$95,518**
Other Misc. Costs							
Bond and Insurance					3%		$2,866
Compliance Testing/Lab Analysis					10%		$9,552
Total Other Costs							$12,417
Engineering Design/Oversight							
Design					15%		$14,328
Construction Management					20%		$19,104
Administration/Meetings					10%		$9,552
Total Engineering							$42,983
Subtotal Corrective Action Measures @ Investigation Area #1							**$150,918**
Monitoring and O&M							
Site Inspections (once per year)	1	LS		Annual Present worth cost (i=0.05, n=15)	$500	$500	$5,190
Annual O&M				Annual Present worth cost (i=0.05, n=15)	$239	$239	$2,479
Total Monitoring and O&M							$7,668
TOTAL CAPITAL OUTLAY							**$158,587**

(A) By Others---Storm Water Control/Water Reuse Project

TABLE M-2. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 2

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #2 -- North Plant/Slag/Boneyard							
Air Monitoring/Dust Control							
Dust Control	8	WEEK	$0	$0	$2,000	$16,000	$16,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Demolition/Debris Clean-up							
Debris Clean-up	3.06	ACRE	$0	$0	$5,000	$15,324	$15,324
Load and Haul to On-Site Repository	31	CY	$0	$0	$4	$107	$107
Load and Haul to Staging Area	0	CY	$0	$0	$4	$0	$0
Excavation							
Closed Depression	2,799	CY					
Boneyard Surface	6,875	CY					
Sediment Stockpile	2,361	CY					
Excavate Soils-Category I	12,035	CY	$0	$0	$3.00	$36,104	$36,104
Load and Haul to On-Site Repository	12,035	CY	$0	$0	$3.50	$42,122	$42,122
Post-Corrective Action Measure Soil Sampling	3.06	ACRE	$250	$766	$2,000	$6,129	$6,896
Cover Soil site graded area							
Provide cover soil/topsoil - imported	0	CY	$15	$0	$0.00	$0	$0
Spread	0	CY	$0	$0	$1.00	$0	$0
Place and grade excavated soil/fill	0	CY	$0	$0	$2.00	$0	$0
Stabilize Surface							
Site Grading	3.06	ACRE	$0	$0	$2,000	$6,129	$6,129
Culverts under RR tracks	1	LS	$0	$0	$5,000	$5,000	$5,000
Surface Water Drainage Improvements	2,640	CY	$0	$0	$6.00	$15,840	$15,840
Seed, Fertilize & Mulch	3.06	ACRE	$500	$1,532	$500	$1,532	$3,065
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$4,299**		**$159,288**	**$163,587**
Mobilization	1	LS			3%		$4,908
Texas State Sales Tax	1	LS			8.25%		$355
Scope Contingency	1	LS			25%		$40,897
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$16,359
Subtotal Construction							**$226,104**
Other Misc. Costs							
Bond and Insurance					3%		$6,783
Compliance Testing/Lab Analysis					10%		$22,610
Total Other Costs							$29,394
Engineering Design/Oversight							
Design					15%		$33,916
Construction Management					20%		$45,221
Administration/Meetings					10%		$22,610
Total Engineering							$101,747
Subtotal Corrective Action Measures @ Investigation Area #2							**$357,244**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$500	$500	$5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$565	$565	$5,867
Total Monitoring and O&M							$11,057
TOTAL CAPITAL OUTLAY							**$368,301**

TABLE M-3. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 3

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #3 -- Acid Plants							
Air Monitoring/Dust Control							
Dust Control	6	WEEK	$0	$0	$2,000	$12,000	$12,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Demolition/Debris Clean-up							
Remove Existing Asphalt Pavement	3,733	SY	$0	$0	$6	$22,400	$22,400
Remove Existing Concrete Pavement			$0	$0	$10	$0	$0
Structure Demolition							
Modify Existing Sump	13	CY	$0	$0	$250	$3,333	$3,333
Remove Existing Concrete Sill Wall	11	CY	$0	$0	$100	$1,111	$1,111
Crush Concrete Slabs/Walls/floors	42	CY	$0	$0	$10	$417	$417
Load and Haul to On-Site Repository	353	CY	$0	$0	$3.50	$1,235	$1,235
Excavation							
Excavate Soils-Category I	1,867	CY	$0	$0	$3.00	$5,600	$5,600
Load and Haul to On-Site Repository	1,867	CY	$0	$0	$3.50	$6,533	$6,533
Post-Corrective Action Measures Soil Sampling	0	LS	$250	$0	$2,000	$0	$0
Replace Structures							
Modify Existing Acid Plant #2 Sump	13	CY	$200	$2,667	$300	$4,000	$6,667
Cap Secondary containment area floors							
Site Grading	0.77	ACRES	$0.00	$0	$2,000	$1,543	$1,543
Fine Grade for paving	3,733	SY	$0.00	$0	$3.00	$11,200	$11,200
Subgrade Preparation	3,733	SY	$0.00	$0	$1.50	$5,600	$5,600
Compacted subgrade base course	1,244	CY	$18	$22,400	$5	$5,600	$28,000
Geotextile	3,733	SY	$1.75	$6,533	$1.50	$5,600	$12,133
60 mil HDPE (flexible-FML)	3,733	SY	$3.25	$12,133	$3.75	$14,000	$26,133
Crushed Limestone Aggregate	622	CY	$20.00	$12,444	$5.00	$3,111	$15,556
Asphalt Pavement	311	CY	$57	$17,733	$13	$4,044	$21,778
Secondary Containment Walls/sides							
Concrete sill wall	104	CY	$200	$20,741	$300	$31,111	$51,852
Floor Crack Sealant	80	SY	$14	$1,120	$1.00	$80	$1,200
FML -60 mil (Acid Mist Precip Bldg floor)	80	SY	$3	$260	$3.75	$300	$560
Engineering Controls for system leaks							
Engineering Controls for system leaks	1	LS	$0	$0	$4,500	$4,500	$4,500
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$98,032**		**$158,319**	**$256,351**
Mobilization	1	LS			3%		$7,691
Texas State Sales Tax	1	LS			8.25%		$8,088
Scope Contingency	1	LS			25%		$64,088
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$25,635
Subtotal Construction							**$361,852**
Other Misc. Costs							
Bond and Insurance					3%		$10,856
Compliance Testing/Lab Analysis					10%		$36,185
Total Other Costs							$47,041
Engineering Design/Oversight							
Design					15%		$54,278
Construction Management					20%		$72,370
Administration/Meetings					10%		$36,185
Total Engineering							$162,834
Subtotal Corrective Action Measures @ Investigation Area #3							**$571,727**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$500	$500	$5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$905	$905	$9,390
Total Monitoring and O&M							$14,580
TOTAL CAPITAL OUTLAY							**$586,306**

TABLE M-4. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 4

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #4 -- Front Slope							
Air Monitoring/Dust Control							
Dust Control	8	WEEK	$0	$0	$2,000	$16,000	$16,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Demolition/Debris Clean-up							
Debris Clean-up	4.87	ACRE	$0	$0	$5,000	$24,352	$24,352
Load and Haul to On-Site Repository	49	CY	$0	$0	$4	$170	$170
Excavation							
Acid Plants	7,774	CY					
Medford Sump	15,548	CY					
Lead Baghouse	4,664	CY					
Sample Mill	8,037	CY					
South Staging	4,126	CY					
Excavate Soils-Category I	40,149	CY	$0	$0	$3	$120,448	$120,448
Load and Haul to On-Site Repository	40,149	CY	$0	$0	$4	$140,523	$140,523
Post-Corrective Action Measures Soil Sampling	4.87	ACRE	$250	$1,218	$2,000	$9,741	$10,958
Compacted Backfill							
Provide backfill - on-site source	40,149	CY	$0	$0	$3	$120,448	$120,448
Spread	40,149	CY	$0	$0	$1	$40,149	$40,149
Place and compact backfill	40,149	CY	$0	$0	$3	$120,448	$120,448
Stabilize Surface							
Site Grading	4.87	ACRE	$0	$0	$2,000	$9,741	$9,741
Fine Grade for paving	12,594	SY	$0	$0	$3	$37,781	$37,781
Subgrade Preparation	23,573	SY	$0	$0	$2	$35,359	$35,359
Asphalt Pavement	700	CY	$57	$39,880	$13	$9,095	$48,976
Gravel Surfacing	1,220	CY	$18	$21,958	$5	$5,490	$27,448
Utility Issues							
Utility Relocations	15	EA	$1,000	$15,000	$1,000	$15,000	$30,000
Drainage Control Features							
Sump @ US 85	1	LS	$3,000	$3,000	$3,000	$3,000	$6,000
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$83,056**		**$722,746**	**$805,802**
Mobilization	1	LS			3%		$24,174
Texas State Sales Tax	1	LS			8.25%		$6,852
Scope Contingency	1	LS			25%		$201,450
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$80,580
Subtotal Construction							**$1,118,859**
Other Misc. Costs							
Bond and Insurance					3%		$33,566
Compliance Testing/Lab Analysis					10%		$111,886
Total Other Costs							$145,452
Engineering Design/Oversight							
Design					10%		$111,886
Construction Management					15%		$167,829
Administration/Meetings					5%		$55,943
Total Engineering							$335,658
Subtotal Corrective Action Measures @ Investigation Area #4							**$1,599,968**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$500	$500	$5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$2,797	$2,797	$29,033
Total Monitoring and O&M							$34,223
TOTAL CAPITAL OUTLAY							**$1,634,191**

TABLE M-5. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 5

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #5 -- Historic Smelter Town							
Deep Till							
Air Monitoring/Dust Control							
Dust Control	4	WEEK	$0	$0	$2,000	$8,000	$8,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Excavation							
Excavate Soils-Category I	2,222	CY	$0	$0	$3.00	$6,667	$6,667
Load and Haul to Onsite Stockpile	2,222	CY	$0	$0	$3.50	$7,778	$7,778
Post-Corrective Action Measures Soil Sampling	9.08	ACRE	$250	$2,271	$2,000	$18,167	$20,438
Deep Tillage							
Deep Tillage (24") --Modified Baker Plow	9.08	ACRE	$0	$0	$850	$7,721	$7,721
Lime Application (1/4" minus @ 4 tons/acre)	9.08	ACRE	$60	$545	$40	$363	$908
Rip Stoney Soil (D-8)	9.08	ACRE	$0	$0	$80	$727	$727
Roll Rocks	9.08	ACRE	$0	$0	$25	$227	$227
Level for Planting	9.08	ACRE	$0	$0	$80	$727	$727
Mobilization (Helena to El Paso of Modified Plow)	1	LS	$0	$0	$5,000	$5,000	$5,000
Replace Structures							
Remove and Reset Existing Fence	500	LF	$1	$500	$15	$7,500	$8,000
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$ 5,316**		**$ 77,876**	**$ 83,192**
Mobilization	1	LS			3%		$2,496
Texas State Sales Tax	1	LS			8.25%		$439
Scope Contingency	1	LS			25%		$20,798
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$8,319
Subtotal Construction							**$115,243**
Other Misc. Costs							
Bond and Insurance					3%		$3,457
Compliance Testing/Lab Analysis					10%		$11,524
Total Other Costs							$14,982
Engineering Design/Oversight							
Design					15%		$17,287
Construction Management					20%		$23,049
Administration/Meetings					10%		$11,524
Total Engineering							$51,860
Subtotal Corrective Action Measures @ Investigation Area #5							**$182,085**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$500	$500	$5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$288	$288	$2,990
Total Monitoring and O&M							$8,180
TOTAL CAPITAL OUTLAY							**$190,265**

TABLE M-6. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 8

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #8 -- Bedding and Unloading Facility							
Air Monitoring/Dust Control							
Dust Control	8	WEEK	$0	$0	$2,000	$16,000	$16,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Structure Demolition							
Remove Existing Asphalt Pavement	2,568	SY	$0	$0	$6	$15,406	$15,406
Remove Existing Concrete Pavement	0	SY	$0	$0	$10	$0	$0
Structure Demolition							
Existing Control Structures	10	CY	$0	$0	$250	$2,500	$2,500
Other	10	CY	$0	$0	$250	$2,500	$2,500
Crush Concrete Slabs/Walls/floors	20	CY	$0	$0	$10	$200	$200
Load Demo material and Haul to On-Site Repository	234	CY	$0	$0	$4	$819	$819
Remove Railroad Tracks and Reinstall	12,600	LF	$5	$63,000	$33	$409,500	$472,500
Remove & Replace Elevated Railroad Tracks	2,000	LF	$7	$14,000	$33	$66,000	$80,000
Excavation							
Excavate Soils for RR pad installation	4,667	CY	$0	$0	$3.00	$14,000	$14,000
Grade under asphalt cap area	4,667	CY	$0	$0	$2.00	$9,333	$9,333
Compacted Backfill							
Provide backfill - on-site source	0	CY	$0	$0	$3	$0	$0
Provide backfill - imported	0	CY	$10	$0	$0	$0	$0
Place and compact backfill	0	CY	$0	$0	$3	$0	$0
Area Cap							
Site Grading	7.07	ACRE	$0.00	$0	$2,000	$14,147	$14,147
Compacted Subgrade (road mix)	7,679	CY	$15.00	$115,181	$10	$76,787	$191,968
Subgrade Preparation	23,036	SY	$0.00	$0	$1.50	$34,554	$34,554
60 mil HDPE (flexible-FML)	23,036	SY	$3.25	$74,867	$3.75	$86,385	$161,253
Geotextile	23,036	SY	$1.75	$40,313	$1.50	$34,554	$74,867
Crushed Limestone Aggregate	3,839	CY	$20.00	$76,787	$5.00	$19,197	$95,984
Subgrade Preparation	23,036	SY	$0.00	$0	$1.50	$34,554	$34,554
Fine Grade for paving	23,036	SY	$0.00	$0	$3.00	$69,108	$69,108
Asphalt Pavement	1,920	CY	$57	$109,422	$13	$24,956	$134,377
Concrete ballast under RR tracks	4,667	CY	$75	$350,000	$30	$140,000	$490,000
Rubber Block Pavement	0	CY	$0	$0	$0	$0	$0
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Enlarge Sump	10	CY	$200	$2,000	$300	$3,000	$5,000
Drainage improvements/grading	650	CY	$0	$0	$6	$3,900	$3,900
Surface Water Control Structures	1	LS	$3,000	$3,000	$3,000	$3,000	$6,000
Subtotal Base Construction				**$ 850,570**		**$ 1,095,401**	**$ 1,945,971**
Mobilization	1	LS			3%		$58,379
Texas State Sales Tax	1	LS			8.25%	$	70,172
Scope Contingency	1	LS			25%	$	486,493
Health and Safety Premium (Modified Level D protection)	1	LS			10%	$	194,597
Subtotal Construction							**$ 2,755,612**
Other Misc. Costs							
Bond and Insurance					3%	$	82,668
Compliance Testing/Lab Analysis					5%	$	137,781
Total Other Costs						$	220,449
Engineering Design/Oversight							
Design					7.5%	$	206,671
Construction Management					10.0%	$	275,561
Administration/Meetings					2.5%	$	68,890
Total Engineering						$	551,122
Subtotal Corrective Action Measures @ Investigation Area #8							**$ 3,527,184**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)	$ 500	$ 500	$	5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)	$ 6,889	$ 6,889	$	71,506
Total Monitoring and O&M						$	76,696
TOTAL CAPITAL OUTLAY							**$ 3,603,879**

TABLE M-7. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 9

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #9 -- Ponds 1, 5 and 6 (On-Site Repository)							
Air Monitoring/Dust Control							
Dust Control	13	WEEK	$0	$0	$2,000	$26,000	$26,000
Air Monitoring Stations	1	LS	$2,000	$2,000	$10,000	$10,000	$12,000
Structure Demolition							
Remove structures and piping in Pond 1	1	LS	$500	$500	$4,500	$4,500	$5,000
Remove structures and piping in Pond 5	1	LS	$500	$500	$4,500	$4,500	$5,000
Remove structures and piping in Pond 6	1	LS	$500	$500	$4,500	$4,500	$5,000
Excavate Sediments							
Pond 1	6,889	CY					
Pond 5	5,597	CY					
Pond 6	8,403	CY					
Excavate Soils-Category 1	20,889	CY	$0	$0	$3	$62,667	$62,667
Haul to Drying Area	20,889	CY	$0	$0	$4	$73,111	$73,111
Prepare Sediment Air dry pad	1	ACRE					
Air Dry Sediments	20,889	CY	$0	$0	$4	$73,111	$73,111
Load and Haul to On-Site Repository	20,889	CY					
Volume Placed in On-Site Repository							
Excavated soils	76,554	CY					
Demolition Debris	714	CY					
Total Volume Placed in On-Site Repository	77,268	CY	$0	$0	$3	$231,804	$231,804
On-Site Repository (includes all 3 sites)							
Excavate to Subgrade Elevations	12,352	CY	$0	$0	$0	$0	$0
Place Excavated Material in Stockpile	12,352	CY	$0	$0	$0	$0	$0
Bottom Preparation	0	0					
Site Grading	4	ACRE	$0	$0	$0	$0	$0
Prep Subgrade (compact w/ sheep's foot roller)	18,528	SY	$0	$0	$0	$0	$0
Bottom Liner							
Geotextile	18,528	SY	$1.75	$32,423	$1.75	$32,423	$64,846
Geonet	18,528	SY	$3.00	$55,583	$3.00	$55,583	$111,165
60 mil HDPE (flexible-FML)	18,528	SY	$3.25	$60,214	$3.25	$60,214	$120,429
Geotextile	18,528	CY	$20.00	$370,550	$20.00	$370,550	$741,100
Leachate collection piping	1,250	LF	$4.00	$5,000	$4.00	$5,000	$10,000
Leachate collection sump	1	LS	$2,000	$2,000	$2,000	$2,000	$4,000
Cap							
Place Asphalt Pavement	1,544	CY	$57	$88,006	$57	$88,006	$176,011
Fine Grade for paving	18,528	SY	$0	$0	$0	$0	$0
Subgrade Preparation	18,528	SY	$0	$0	$0	$0	$0
Base Course	3,088	CY	$18	$55,583	$18	$55,583	$111,165
Geotextile	18,528	SY	$1.75	$32,423	$1.75	$32,423	$64,846
Drain aggregate/crushed slag	6,176	CY	$0	$0	$3	$18,528	$18,528
Geotextile	18,528	SY	$1.75	$32,423	$1.75	$32,423	$64,846
60 mil HDPE (flexible-FML)	18,528	SY	$3.25	$60,214	$3.25	$60,214	$120,429
Geotextile	18,528	SY	$1.75	$32,423	$1.75	$32,423	$64,846
Cap Lateral Drainage collection piping	1,250	LF	$4	$5,000	$4.00	$5,000	$10,000
Cap Lateral Drainage sump	1	LS	$2,000	$2,000	$2,000	$2,000	$4,000
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Connect Sumps to plant surface water system	3	EA	$3,000	$9,000	$3,000	$9,000	$18,000
Subtotal Base Construction				$846,342		$1,356,562	$2,202,904
Mobilization	1	LS			3%		$66,087
Texas State Sales Tax	1	LS			8.25%		$ 69,823
Scope Contingency	1	LS			25%		$ 550,726
Health and Safety Premium (Modified Level D protection) (10%)	1	LS			10%		$ 220,290
Subtotal Construction							$ 3,109,831
Other Misc. Costs							
Bond and Insurance (3%)					1.5%		$ 46,647
Compliance Testing/Lab Analysis					5%		$ 155,492
Total Other Costs							$ 202,139
Engineering Design/Oversight							
Design					5%		$ 155,492
Construction Management					10%		$ 310,983
Administration/Meetings					1.5%		$ 46,647
Total Engineering							$ 513,122
Subtotal Corrective Action Measures @ Investigation Area #9							$ 3,825,092
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$ 500	$ 500	$ 5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$ 7,775	$ 7,775	$ 80,697
Total Monitoring and O&M							$ 85,887
TOTAL CAPITAL OUTLAY							$ 3,910,979

TABLE M-8. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 10

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #10 -- Plant Entrance							
Air Monitoring/Dust Control							
Dust Control	2	WEEK	$0	$0	$2,000	$4,000	$4,000
Air Monitoring Stations	1	LS	$1,000	$1,000	$1,000	$1,000	$2,000
Storm Water Improvements							
Remove Existing Asphalt Pavement	(A)	LS					$0
Site Grading	(A)	LS					$0
Subgrade prep and base course	(A)	LS					$0
Remove and install new cattleguard	(A)	LS					$0
Remove and install new sump	(A)	LS					$0
Remove Railroad Tracks and Reinstall	(A)	LS					$0
Excavate Designated Soils for road construction	(A)	LS					$0
Replace Asphalt Pavement	(A)	LS					$0
Site Improvements/Grading							
Site Grading for Drainage improvements	2,500	SY	$0.00	$0	$3.00	$7,500	$7,500
Remove and Reset Existing Fence	100	LF	$1.00	$100	$7.00	$700	$800
Aggregate Surfacing	417	CY	$18	$7,500	$4.50	$1,875	$9,375
Landscape improvements	0.52	ACRE	$2,000	$1,033	$5,000	$2,583	$3,616
Drainage Control Features							
Temporary Construction Erosion & Sediment Controls	1	LS	$0	$0	$5,000	$5,000	$5,000
Subtotal Base Construction				**$ 9,633**		**$ 22,658**	**$ 32,291**
Mobilization	1	LS			3%		$969
Texas State Sales Tax	1	LS			8.25%		$795
Scope Contingency	1	LS			25%		$8,073
Health and Safety Premium (Modified Level D protection)	1	LS			10%		$3,229
Subtotal Construction							**$45,356**
Other Misc. Costs							
Bond and Insurance					3%		$1,361
Compliance Testing/Lab Analysis					10%		$4,536
Total Other Costs							$5,896
Engineering Design/Oversight							
Design					15%		$6,803
Construction Management					20%		$9,071
Administration/Meetings					10%		$4,536
Total Engineering							$20,410
Subtotal Corrective Action Measures @ Investigation Area #10							**$71,662**
Monitoring and O&M							
Site Inspections (once per year)	1	LS	Annual Present worth cost (i=0.05, n=15)		$500	$500	$5,190
Annual O&M			Annual Present worth cost (i=0.05, n=15)		$113	$113	$1,177
Total Monitoring and O&M							$6,367
TOTAL CAPITAL OUTLAY							**$ 78,029**

(A) By Others---Storm Water Control/Water Reuse Project

TABLE M-9. BACKUP DETAIL FOR COST ESTIMATES
CORRECTIVE ACTION MEASURES
INVESTIGATION AREA 6 AND 7

TASK DESCRIPTION	NO UNITS	UNIT	MATERIAL UNIT COST	MATERIAL COST	LABOR AND EQUIPMENT UNIT COST	LABOR AND EQUIPMENT COST	SUBTOTAL COST
Investigation Area #6 -- Groundwater Issues							
Investigation Area #7 -- Surface Water Issues							
Long-Term Monitoring-Annual							
Groundwater/Surface Water Monitoring							
Sampling, Monitoring, Maps, Data QA/QC	1	LS	$3,000	$3,000	$137,000	$137,000	$140,000
Analytical Lab Expenses	1	LS	$0	$0	$70,000	$70,000	$70,000
Base Annual Long-Term Monitoring				$3,000		$207,000	$210,000
Mobilization	1	LS			1%		$2,100
Texas State Sales Tax	1	LS			8.25%		$248
Scope Contingency	1	LS			10%		$21,000
Other Misc. Costs							
Bond/Insurance					1%		$2,100
Engineering Administrative Expenses							
Administration/Meetings					6.93%		$14,553
Annual Long Term Monitoring Expenses (IA#6 & #7)							**$ 250,000**
Monitoring and O&M							
Annual O&M			Annual Present worth cost (i=0.05, n=15)	$ 250,000	$ 250,000		$ 2,594,915
Total Monitoring and O&M							$ 2,594,915
TOTAL CAPITAL OUTLAY							**$ 2,594,915**