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

Prepared For:

ASARCO

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Prepared By:

Hydrometrics, Inc. ®
consulting scientists, engineers and contractors

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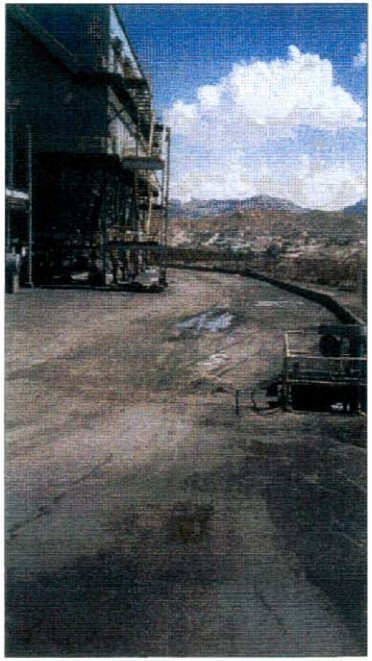
APPENDIX A

PROJECT PHOTOGRAPHS

APPENDIX A

PROJECT PHOTOGRAPHS



INVESTIGATION AREA 1
CONVERTER BAGHOUSE ON LEFT;
MEDFORD SUMP ON RIGHT (LOOKING SOUTH)

MEDFORD SUMP (LOOKING NORTH)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 1** **CONVERTER BAGHOUSE AREA**	FIGURE **A-1**

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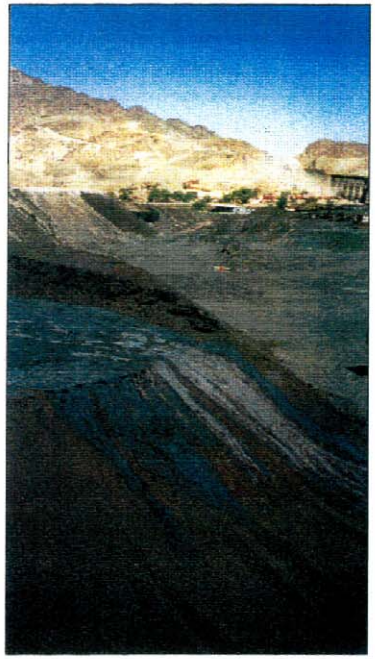
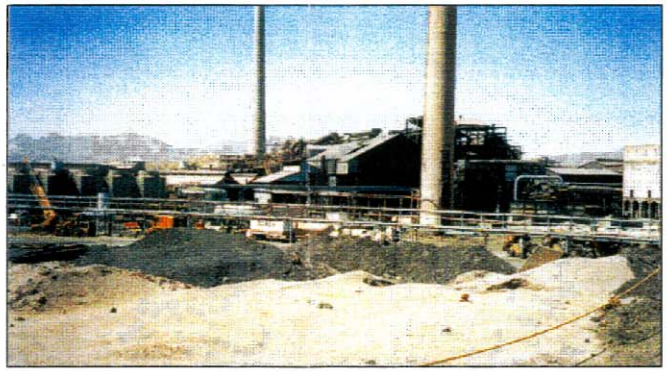


FOREGROUND – FRESH
SLAG POUR AREA
(LOOKING WEST)

PARKER BROTHERS INC.
SLAG CRUSHING OPERATIONS
(LOOKING NORTH)



VIEW ACROSS BONEYARD (LOOKING WEST)

LOADING OPERATIONS FOR
PARKER BROTHERS INC.
CLOSED DEPRESSION IN CENTER
(LOOKING NORTHEAST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 2** **BONEYARD/SLAG STORAGE AREA**	**FIGURE** **A-2**

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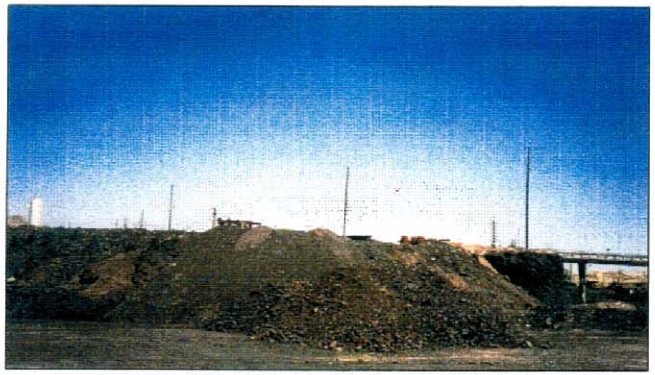
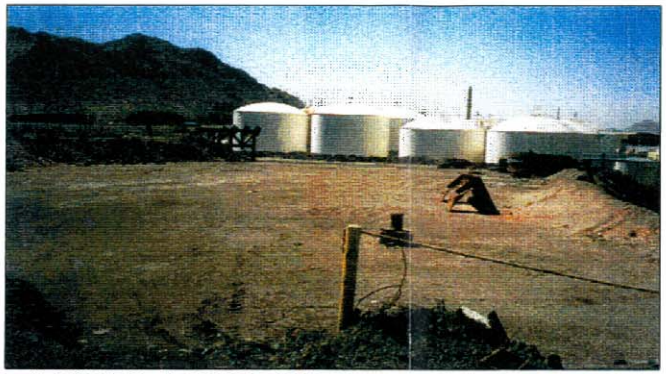
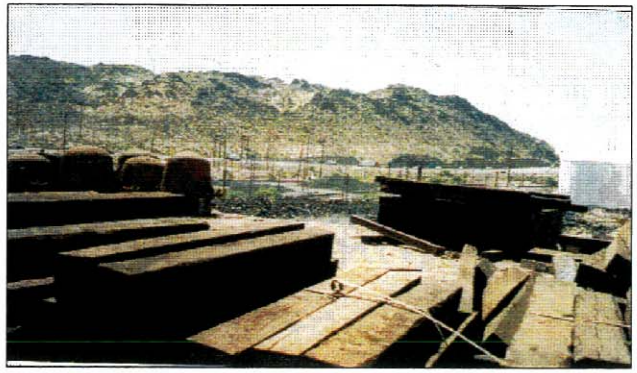


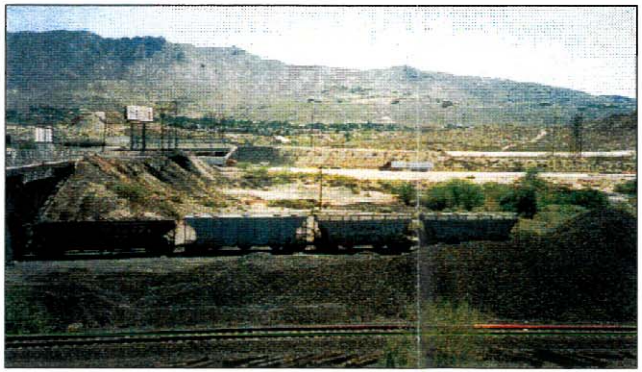
BONEYARD ON TOP OF SLAG (LOOKING NORTH)



BONEYARD LOOKING TOWARD
SULFURIC ACID TANK FARM (LOOKING SOUTH)



TYPES OF MATERIALS CURRENTLY STORED AT BONEYARD
OLD LEAD AND MATTE POTS ON LEFT, RAILROAD TIES
IN FOREGROUND (LOOKING SOUTH)



BONEYARD WITH FRANKLIN MOUNTAINS
IN BACKGROUND (LOOKING EAST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 2** **BONEYARD/SLAG STORAGE AREA**	**FIGURE** **A-3**

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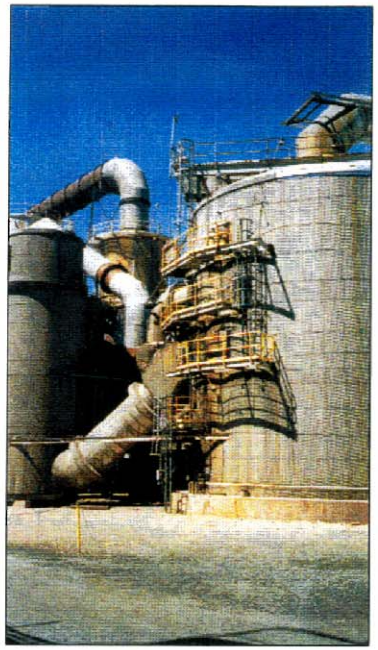
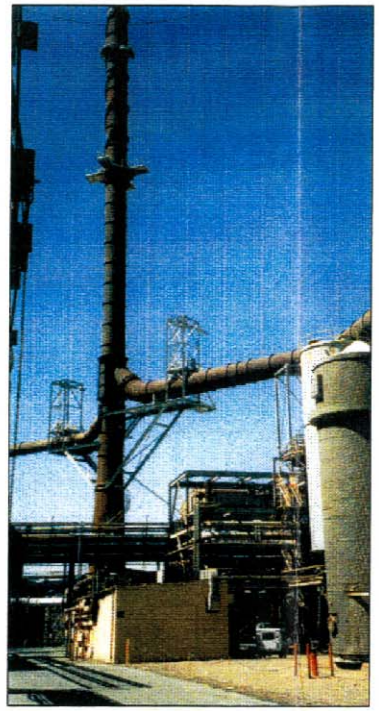
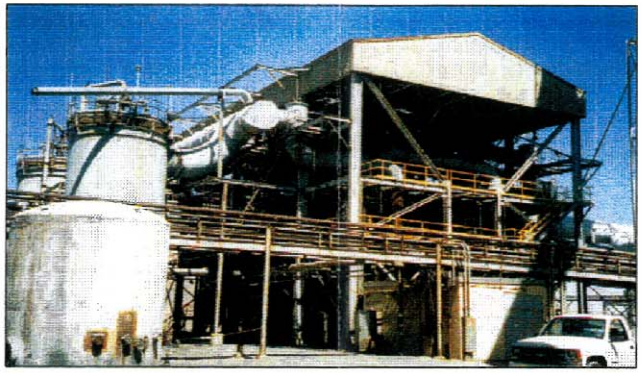


CONVERTER
ACID PLANT NO. 2
(LOOKING SOUTH)



300' ACID PLANT'S STACK
AND FLUES, ACID PLANT NO. 2
HEAT EXCHANGER TO THE RIGHT
(LOOKING SOUTH)



NO.2 ACID PLANT MIST PRECIPITATOR
BUILDING (LOOKING WEST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	INVESTIGATION AREA 3 ACID PLANT NO. 1 AND NO. 2	FIGURE A-4

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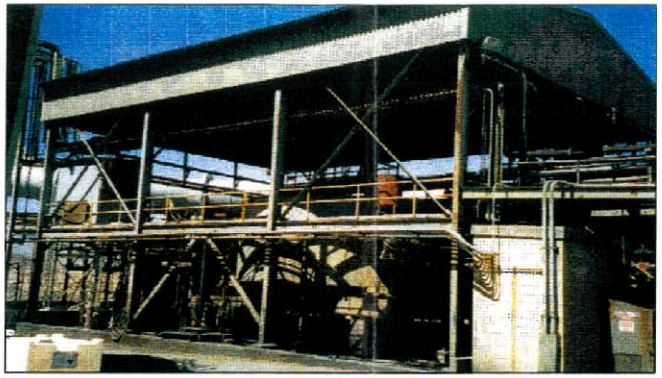

OLD ACID PLANT NO. 2 THICKENER (LOOKING WEST)

CONVERTER AND HEAT EXCHANGERS FOR
ACID PLANT NO. 1 (LOOKING EAST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 3 (con't)** **ACID PLANT NO. 1 AND NO. 2**	FIGURE **A-5**

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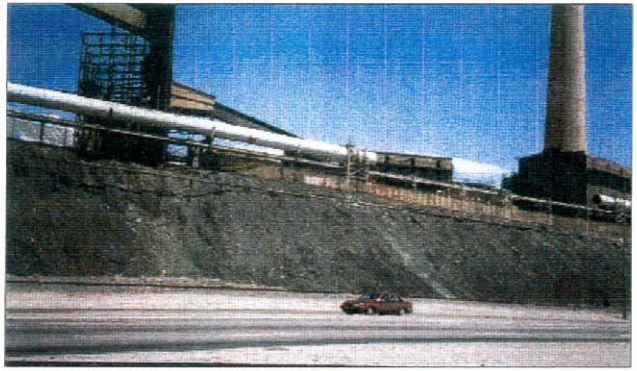
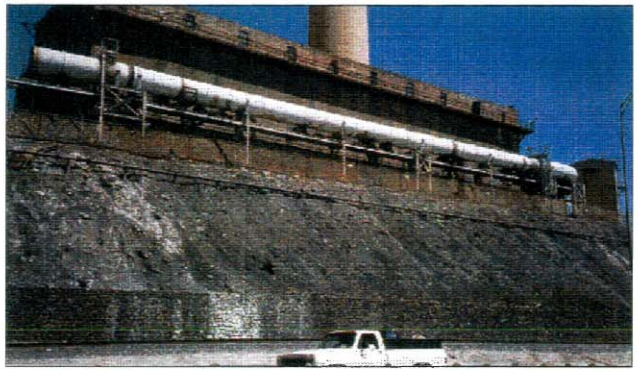
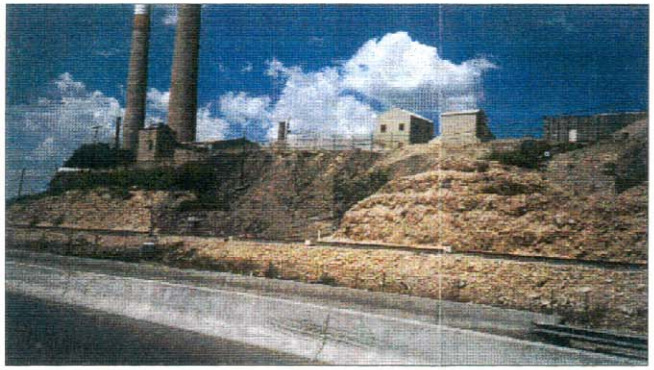


VIEW OF LEAD PLANT AREA



LEAD PLANT SINTER (D & L) BAGHOUSE



SLAG BACK-FILLED ARROYO. POND 1 LOCATED TO RIGHT.

POND 1
HERE

ALL VIEWS LOOKING TOWARDS THE EAST

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	INVESTIGATION AREA 4 FRONT SLOPE AREA	FIGURE A-6

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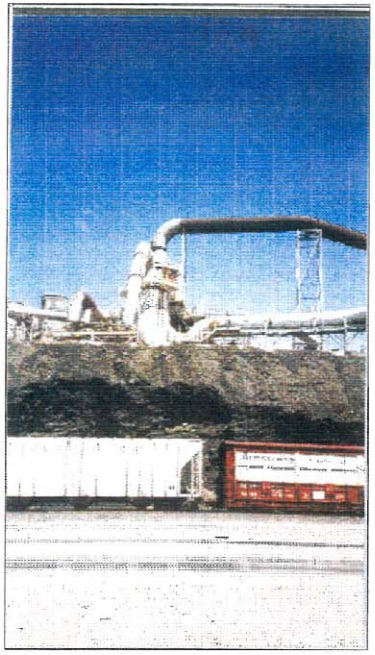
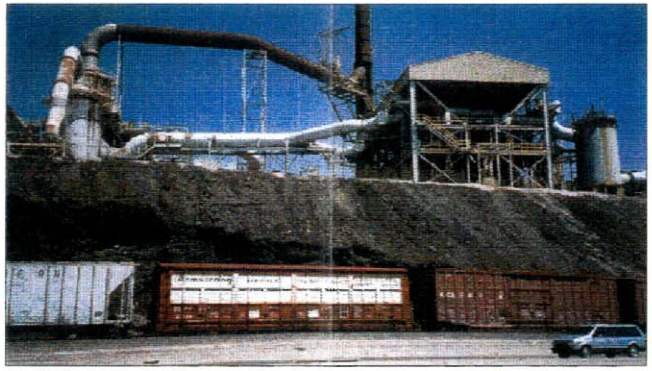
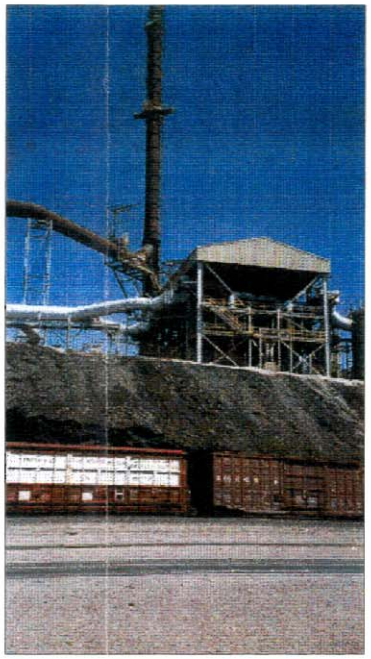


ACID PLANT NO. 2

HISTORIC LEAD PLANT BRICK DEBRIS
BELOW SAMPLE MILL AREA



ACID PLANT NO. 2 WITH ACID PLANT
MIST PRECIPITATOR BUILDING



ACID PLANT MIST PRECIPITATOR BUILDING
WITH ACID PLANT STACK IN BACK

ALL VIEWS LOOKING TOWARDS THE EAST

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 4** **FRONT SLOPE AREA**	FIGURE **A-7**

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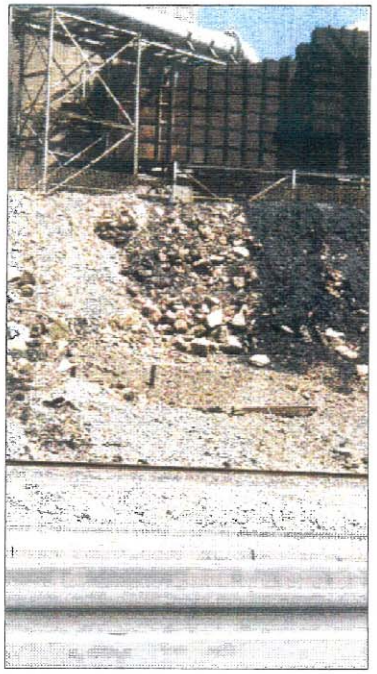
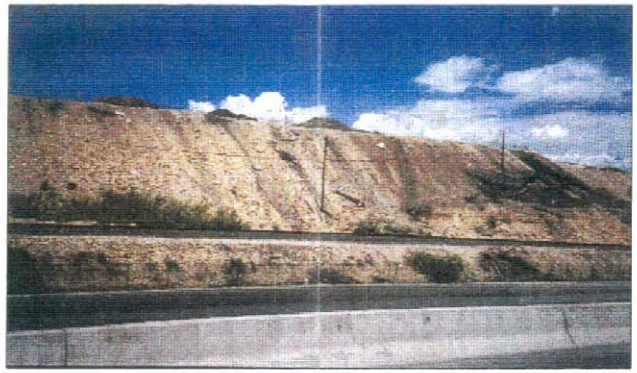
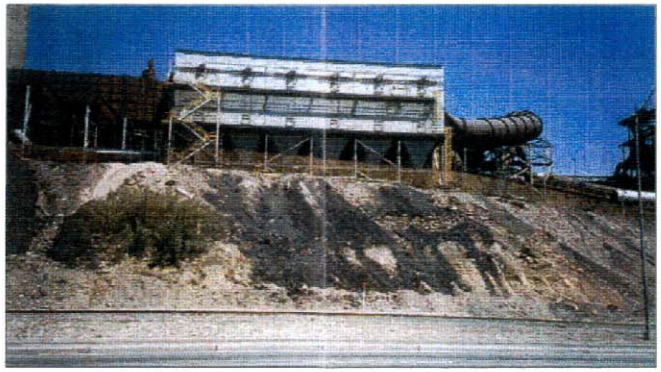


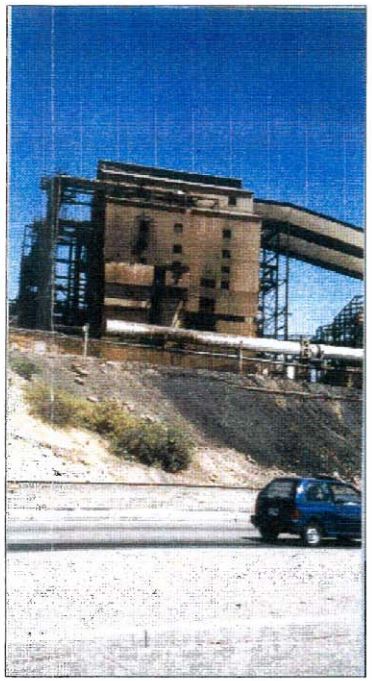
MEDFORD SUMP AREA
NOTE DEBRIS/SLAG ARROYO FILL MATERIAL AT RIGHT



SLAG–DEBRIS FILLED ARROYO
SOUTH TERRACE AREA ARROYO



CONVERTER BUILDING VENTILATION BAGHOUSE



FORMER COPPER ROASTER BUILDING
NOTE START OF SLAG BACKFILLED ARROYO

ALL VIEWS LOOKING TOWARDS THE EAST

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 4 FRONT SLOPE AREA**	FIGURE **A-8**

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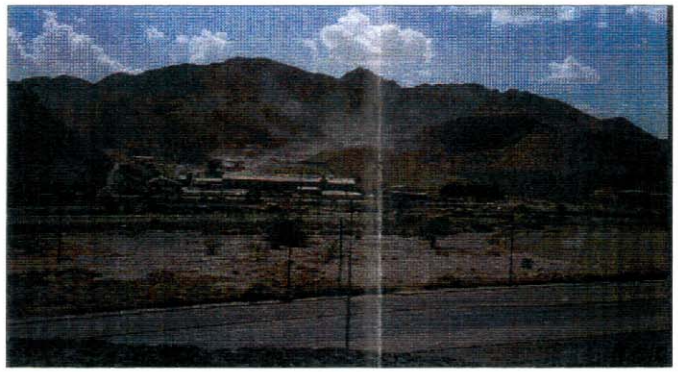

HISTORIC SMELTERTOWN, NO BUILDINGS PRESENTLY EXIST.
BUILDINGS IN BACKGROUND ARE LOCATED ACROSS
THE RIO GRANDE IN MEXICO AND NEW MEXICO.
NOTE ASARCO EMPLOYEE SOFTBALL FIELD ON RIGHT
(LOOKING WEST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 5** **HISTORIC SMELTERTOWN**	FIGURE **A-9**

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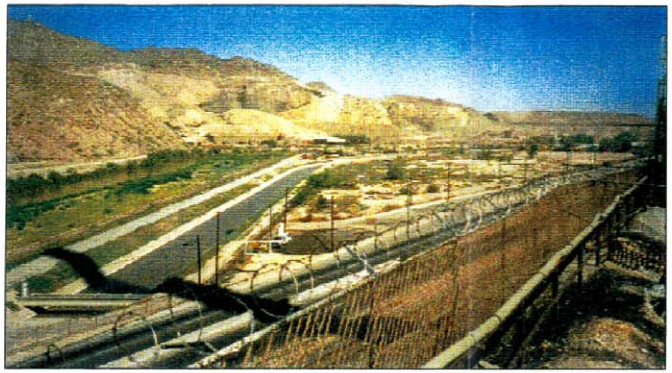
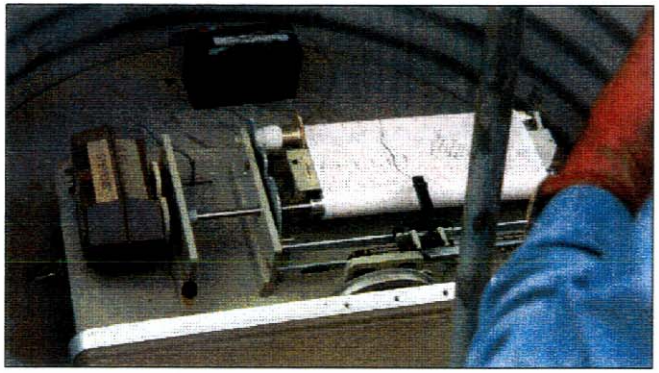
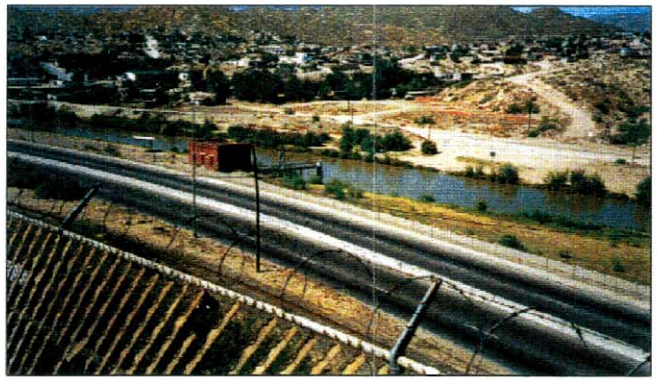
COURCHESNE BRIDGE GAUGING STATION



VIEW OF AMERICAN CANAL (LOOKING NORTH)



AUTOMATIC WATER LEVEL METER – COURCHESNE BRIDGE



RIO GRANDE CENTER WITH PUMP HOUSE GAUGING STATION. MEXICO IN BACKGROUND (LOOKING WEST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	INVESTIGATION AREA 7 SURFACE WATER	FIGURE A-10

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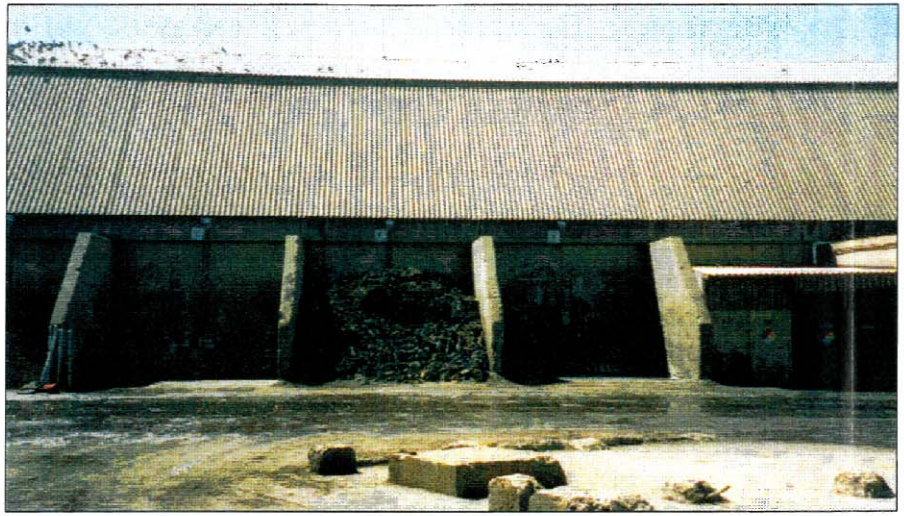
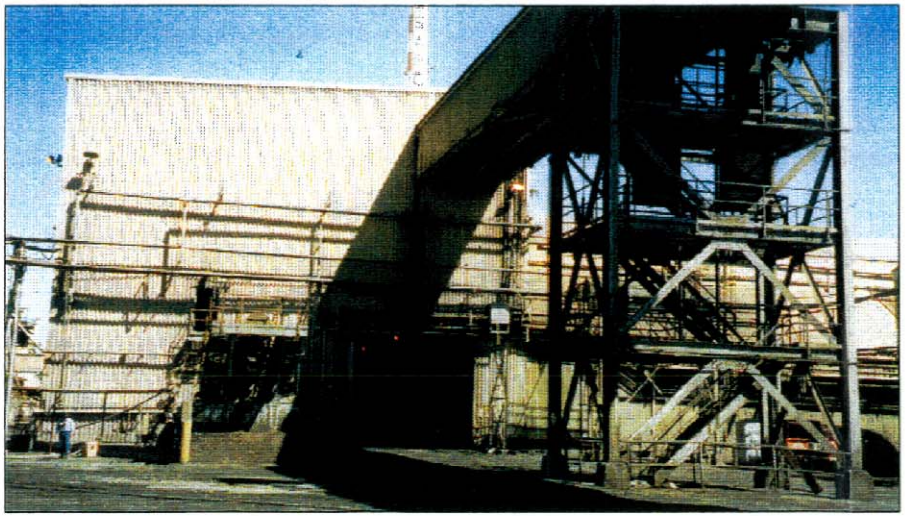
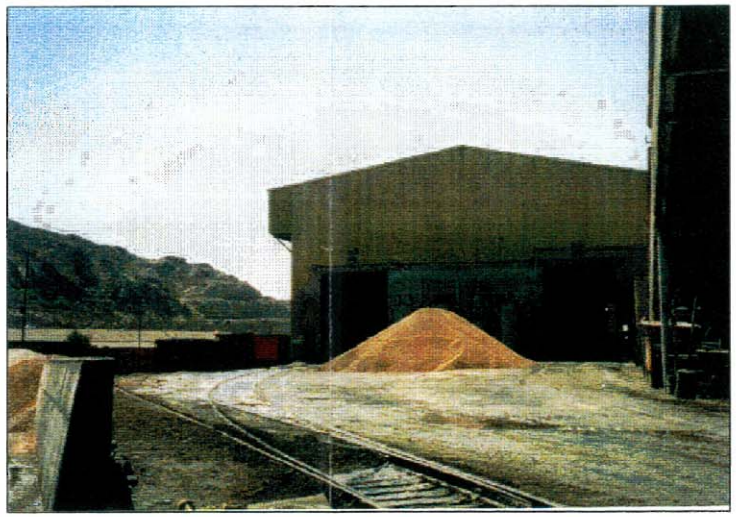


STORAGE BINS ON NORTH SIDE OF BEDDING BUILDING



SOUTH TRUCK ENTRANCE TO BEDDING BUILDING.
NOTE OVERHEAD CONVEYOR BELT HOUSING FROM UNLOADING BUILDING



TRAIN EXITS – NORTH SIDE OF UNLOADING BUILDING
CONVEYOR TO BEDDING BUILDING ON RIGHT

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 8** **BEDDING AND UNLOADING BUILDING**	**FIGURE** **A-11**

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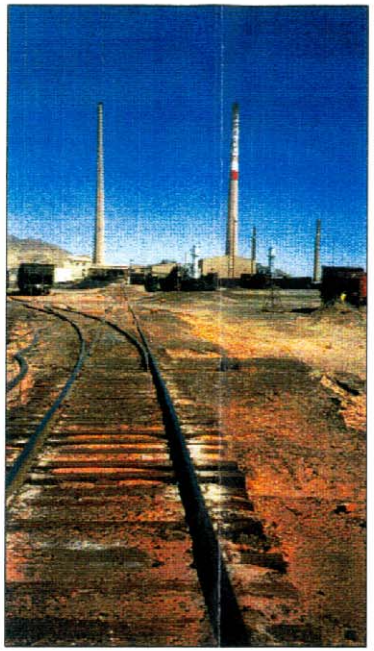
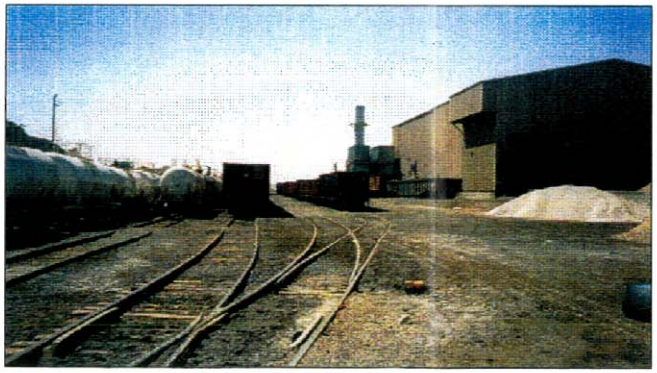
BAGHOUSE (GRAY FACILITY) FOR BEDDING
BUILDING (TAN BUILDINGS) (LOOKING SOUTHWEST)



TRAIN TRACKS LOCATED
SOUTH OF UNLOADING BUILDING
(LOOKING NORTH)



EASTSIDE TRAIN TRACKS
UNLOADING BUILDING TO RIGHT

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 8 (CON'T)** **BEDDING AND UNLOADING BUILDINGS**	FIGURE **A-12**

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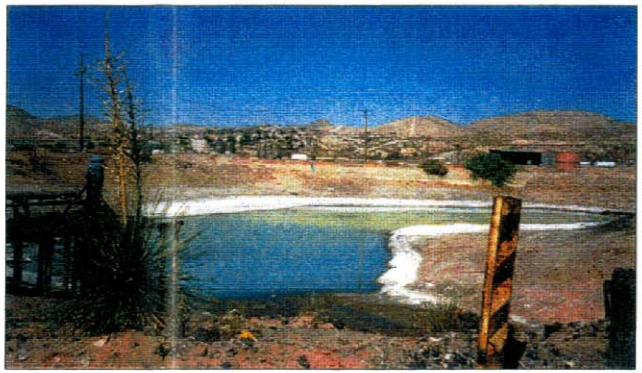
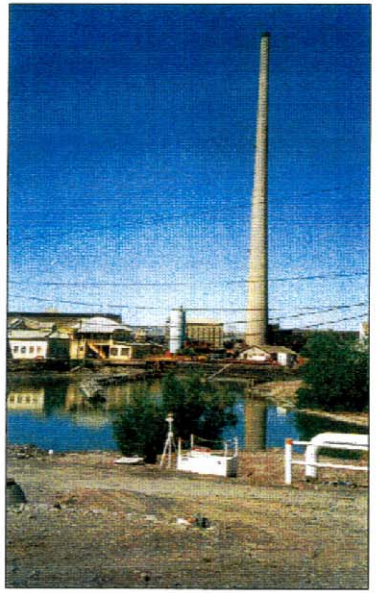
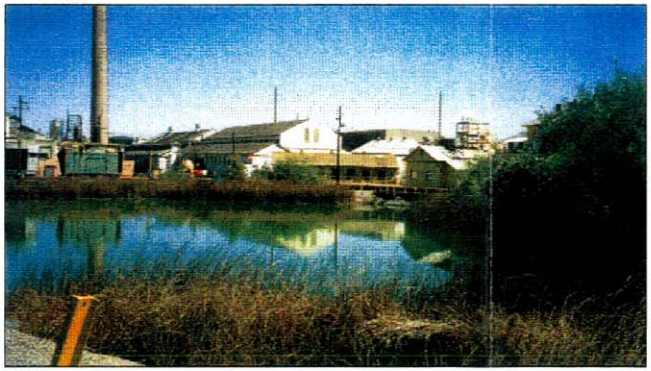


POND 1 (LOOKING WEST)



POND 6 (LOOKING WEST)



POND 5 (LOOKING NORTH)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	**INVESTIGATION AREA 9** **PONDS NO. 1, 5, 6**	FIGURE **A-13**

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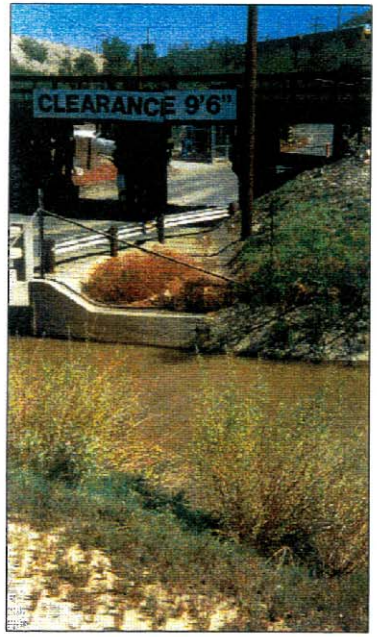
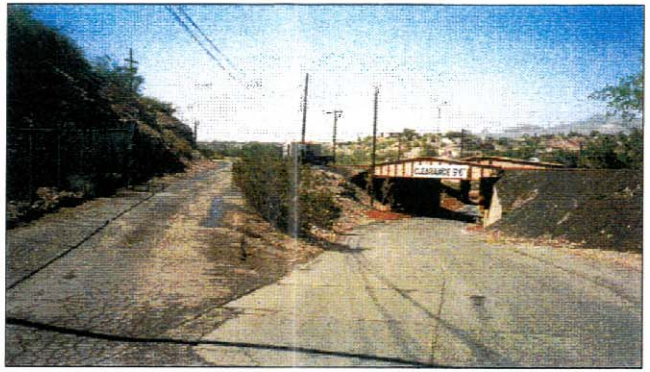
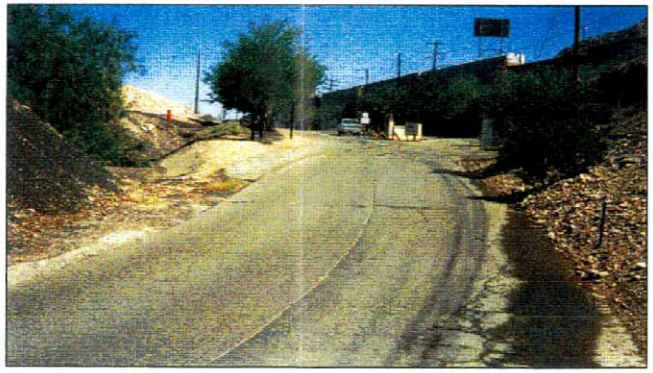


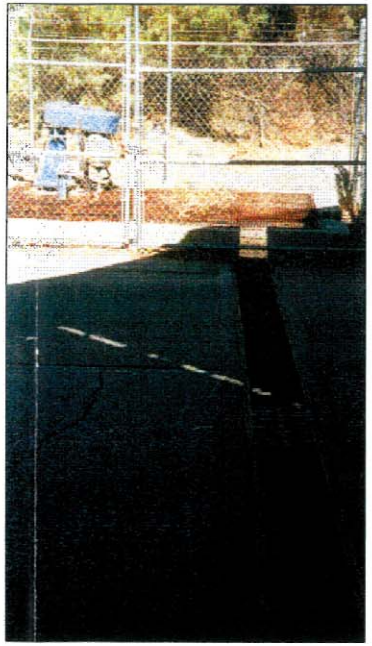
PLANT ENTRANCE OUTFALL
TO AMERICAN CANAL
(LOOKING NORTH)



TRUCK ENTRANCE AND SMALL VEHICLE
ENTRANCE (LOOKING SOUTWEST)



NOTE OUTFALL LEFT SIDE OF PAVEMENT
(LOOKING NORTH).



INTERCEPT TRENCH WITH
SUMP IN BACKGROUND
(LOOKING WEST)

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION REPORT EL PASO, TEXAS	INVESTIGATION AREA 10 PLANT ENTRANCE	FIGURE A-14

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APPENDIX B

BOREHOLE AND WELL DATA

APPENDIX B

BOREHOLE AND WELL DATA

APPENDIX B

BOREHOLE AND WELL DATA

TABLE OF CONTENTS

TABLE B-1 BOREHOLE DATA

TABLE B-2 WELL CONSTRUCTION DETAILS

This appendix contains the individual lithologic logs for each borehole and well diagrams for each well listed in Tables B-1 and B-2.

TABLE B-1
BOREHOLE DATA

Borehole Identifier	Depth (feet)	Elevation (feet mean sea level)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)
RIBH-01	63.5	3808.57	06/19/97	06/19/97	Hollow Stem Auger	9
RIBH-02	18	3780.59	06/30/97	06/30/97	Hollow Stem Auger	6
RIBH-03	41	3770.32	06/30/97	06/30/97	Hollow Stem Auger	7
RIBH-04	16	3735.90	06/30/97	06/30/97	Hollow Stem Auger	7
RIBH-05	17	3729.79	06/30/97	06/30/97	Hollow Stem Auger	7
RIBH-06	5	3729.80	06/30/97	06/30/97	Hollow Stem Auger	7
RIBH-07	12	3725.07	07/01/97	07/01/97	Hollow Stem Auger	7
RIBH-08	12	3724.60	07/01/97	07/01/97	Hollow Stem Auger	7
RIBH-09	12	3725.62	07/01/97	07/01/97	Hollow Stem Auger	7
RIBH-10	12	3725.88	07/01/97	07/01/97	Hollow Stem Auger	7
SSENT-01	5	3792.63	07/17/97	07/17/97	Hollow Stem Auger	7
SSENT-02	5	3790.00	07/17/97	07/17/97	Hollow Stem Auger	7
SSENT-03	5	3788.36	07/17/97	07/17/97	Hand Auger	4
SSENT-04	5	3787.64	07/17/97	07/17/97	Hand Auger	4
SSENT-05	5	3791.39	07/17/97	07/17/97	Hand Auger	4
SSENT-06	5	3789.14	07/17/97	07/17/97	Hand Auger	4
SSENT-07	5	3787.45	07/17/97	07/17/97	Hand Auger	4
SSENT-08	5	3786.77	07/17/97	07/17/97	Hand Auger	4
SSIA1-01	5	3784.81	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA1-02	5	3774.04	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA1-03	5	3774.35	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA1-04	5	3774.56	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA1-05	5	3775.50	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA2-01	5	3768.13	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA2-02	4	3804.94	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA3-01	4	3786.39	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA3-02	4	3785.60	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA3-03	5	3785.39	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA3-04	2.5	3786.31	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA3-05	1.5	3786.55	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA3-06	5	3787.21	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA3-07	5	3785.99	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA3-08	5	3786.53	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA3-09	5	3788.94	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA3-10	5	3785.83	07/15/97	07/15/97	Hollow Stem Auger	6
SSIA4-01	5	3728.80	10/27/97	10/27/97	Hollow Stem Auger	6
SSIA4-02	5	3729.30	10/27/97	10/27/97	Hollow Stem Auger	6
SSIA4-03	5	3728.80	10/27/97	10/27/97	Hollow Stem Auger	6
SSIA4-04	5	3729.20	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-05	5	3728.10	10/28/97	10/28/97	Hollow Stem Auger	6

See last page for notes.

TABLE B-1
BOREHOLE DATA

Borehole Identifier	Depth (feet)	Elevation (feet mean sea level)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)
SSIA4-06	5	3725.80	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-07	5	3723.80	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-08	5	3727.10	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-09	5	3726.20	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-10	5	3726.30	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-11	5	3725.60	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-12	5	3726.30	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-13	5	3726.10	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-14	5	3725.90	10/28/97	10/28/97	Hollow Stem Auger	6
SSIA4-15	5	3726.90	10/28/98	10/28/98	Hollow Stem Auger	6
SSIA4-16	5	3726.40	10/28/98	10/30/98	Hollow Stem Auger	6
SSIA4-17	5	3726.30	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-18	5	3726.50	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-19	5	3726.60	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-20	5	3726.40	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-21	5	3725.90	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-22	5	3726.40	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-23	5	3726.20	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-24	5	3725.20	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-25	5	3723.50	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-26	5	3725.80	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-27	2.5	3725.30	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-28	2.5	3726.00	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-29	2.5	3726.20	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA4-30	2.5	3725.80	10/30/97	10/30/97	Hollow Stem Auger	6
SSIA5-01	5	3720.76	07/07/97	07/08/97	Hollow Stem Auger	6
SSIA5-02	5	3722.15	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-03	5	3721.95	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-04	5	3718.60	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-05	5	3717.91	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-06	5	3718.14	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-07	5	3719.36	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-08	5	3720.28	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-09	5	3723.40	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-10	5	3721.37	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-11	5	3718.46	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-12	5	3719.67	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-13	5	3721.84	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-14	4	3724.63	07/08/97	07/08/97	Hollow Stem Auger	6
SSIA5-15	5	3725.48	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA5-16	5	3721.78	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA5-17	5	3725.09	07/14/97	07/14/97	Hollow Stem Auger	6

See last page for notes.

TABLE B-1
BOREHOLE DATA

Borehole Identifier	Depth (feet)	Elevation (feet mean sea level)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)
SSIA5-18	5	3722.53	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA5-19	5	3722.15	07/14/97	07/14/97	Hollow Stem Auger	6
SSIA8-01	3	3775.62	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-02	5	3775.47	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-03	5	3774.87	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-04	5	3775.21	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-05	5	3775.44	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-06	5	3775.96	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-07	5	3776.77	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-08	5	3777.89	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-09	5	3778.18	07/16/97	07/16/97	Hollow Stem Auger	6
SSIA8-10	5	3776.96	07/17/97	07/17/97	Hollow Stem Auger	6
SSIA8-11	5	3776.58	07/17/97	07/17/97	Hollow Stem Auger	6
SSIA8-12	5	3776.48	07/17/97	07/17/97	Hollow Stem Auger	6
SSIA8-13	5	3775.86	07/17/97	07/17/97	Hollow Stem Auger	6
SSIA8-14	4	3777.01	07/17/97	07/17/97	Hollow Stem Auger	6
SSIA8-15	5	3778.84	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-16	5	3777.40	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-17	3	3779.85	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-18	3	3776.98	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-19	5	3780.51	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-20	2	3776.36	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-21	5	3777.82	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-22	5	3774.56	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-23	5	3781.38	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-24	2	3776.77	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-25	1.9	3772.02	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-26	1.5	3776.50	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-27	4	3779.55	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-28	5	3772.02	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-29	5	3777.17	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-30	1.5	3774.82	07/18/97	07/18/97	Hollow Stem Auger	6
SSIA8-31	4	3778.94	07/18/97	07/18/97	Hollow Stem Auger	6

Notes: NA = Not Available

TABLE B-2
WELL CONSTRUCTION DETAILS

Well Identifier	Depth (feet)	Measuring Pt. Elevation (feet MSL)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)	Well Description	Screened Interval (bgs)		Sand Pack Interval (bgs)		Annular Seal Interval (bgs)	
								Top	Bottom	Top	Bottom	Top	Bottom
EM-01	250.0	3784.99	5/8/90	5/10/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	73.5	83.5				
EM-02	82.5	3776.02	5/11/90	5/11/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	60	80	58.85	82.5	53	58.85
EM-03	28.0	3777.85	5/14/90	5/14/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC						
EM-04	115.0	3772.29	05/15/90	05/15/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	95	115	85	115	81	85
EM-05	22.0	3776.5	5/19/90	5/19/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	11	21	8	22	5	8
EM-06	91.0	3770.64	5/19/90	5/20/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	80	90	70	91	64	70
EM-07	15.5	3773.4	5/19/90	5/19/90	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	5	15	4.5	15	2.5	4.5
EM-08	18.0	3769.46	5/21/90	5/21/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC			5	18	0	2
EP-01	30.0	3725.71	2/14/90	2/15/90	HAS & Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	10	30	8	30	0	8
EP-02	6.0		2/16/90	2/16/90	Hollow Stem Auger	6							
EP-03	8.0	3720.95	2/16/90	2/17/90	Hollow Stem Auger	6	4-inch, flush threaded, Sch 40, PVC	4.5	14.5	3	14.5	0	3
EP-04	8.0	3715.96	02/01/90	02/01/90	Hollow Stem Auger	6	2-inch, flush threaded, Sch 40, PVC	3	8	2	8	0	2
EP-05	7.0	3716.92	02/17/90	02/17/90	Hollow Stem Auger	8	2-inch, flush threaded, Sch 40, PVC	2	7	2	7	NA	NA
EP-06	8.0	3716.22	02/18/90	02/18/90	Hollow Stem Auger	6	2-inch, flush threaded, Sch 40, PVC	3	8	2	8	0	2
EP-07	8.0	3722.11	02/18/90	02/18/90	Hollow Stem Auger	6	2-inch, flush threaded, Sch 40, PVC	8	8	2	8	0	2
EP-08	80.0	3774.84	2/19/90	2/20/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	50	70	47	80	45	47
EP-09	80.0	3772.67	2/20/90	2/20/90	Becker 180 Hammer	6	4-inch, flush threaded, Sch 40, PVC	50	70	48	75	46	48
EP-10	85.0	3772.32	2/20/90	2/20/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	52	72	50	78	48	50
EP-11	80.0	3771.02	2/21/90	2/21/90	Becker 180 Hammer	6	4-inch, flush threaded, Sch 40, PVC	49.5	69.5	47	80	45	47
EP-12	80.0	3771.73	02/22/90	02/22/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	52	72	50	75	0	48
EP-13	95.0	3773.23	02/23/90	02/23/90	Air Rotary	6	2-inch, flush threaded, Sch 40, PVC	45	95	52	95	48	52
EP-14	78.0	3774.98	02/23/90	02/24/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	50	70	48	70	46	48
EP-15	78.0	3773.19	02/24/90	02/24/90	Air Rotary	6	2-inch, flush threaded, Sch 40, PVC	52	72	50	78	48	50
EP-16	35.0	3774.65	2/25/90	2/25/90	Becker 180 Hammer	6	4-inch, flush threaded, Sch 40, PVC	15	35	13	35	11	13
EP-17	30.0	3725.9	2/25/90	2/25/90	Driven Casing		4-inch, flush threaded, Sch 40, PVC	15	25	9	30	8	9
EP-18	31.0	3725.28	2/25/90	2/25/90	Air Rotary		4-inch, flush threaded, Sch 40, PVC	10	30	7	30	5	7
EP-19	30.0	3725.63	2/25/90	2/25/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	10	30	9	30	7	9
EP-20	30.0	3724.55	02/26/90	02/26/90	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	10	30	7	30	6	7
EP-21	51.0	3778.62	5/21/90	5/21/90	Air Rotary		4-inch, flush threaded, Sch 40, PVC	31	51	25	51	21	25
EP-22	55.0	3776.23	08/06/90	08/06/90	Air Rotary	6	2-inch, flush threaded, Sch 40, PVC	20	50	16	50	13	16
EP-23	50.0	3775.32	8/7/90	8/7/90	Percussion Hammer		2-inch, flush threaded, Sch 40, PVC	29	49	26	49	24	26
EP-24	58.0	3774.87	8/8/90	8/8/90	Percussion Hammer		2-inch, flush threaded, Sch 40, PVC	25	55	21	58	19	21
EP-25	70.0	3786.72	8/8/90	8/8/90	Percussion Hammer		2-inch, flush threaded, Sch 40, PVC	40	70	36	70	34	36
EP-26	60.0	3770.64	08/09/90	08/09/90	Percussion Hammer	6	2-inch, flush threaded, Sch 40, PVC	30	60	26	60	24	26
EP-27	59.0		8/9/90	8/9/90	Percussion Hammer		2-inch, flush threaded, Sch 40, PVC	29	59	24	59	22	24
EP-28	0.0	3725.77											
EP-29	38.0	3727.25	02/03/91	02/03/91	Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	0	3
EP-30	38.0	3726.34	1/31/91	1/31/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-31	39.0	3726.02	1/30/90	1/30/90	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	6	37	4	6
EP-32	38.5	3725.97	1/31/91	1/31/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-33	37.5	3726.26	1/30/91	1/30/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-34	38.0	3725.93	2/3/91	2/3/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	38	2.5	5

See last page for notes.

TABLE B-2
WELL CONSTRUCTION DETAILS

Well Identifier	Depth (feet)	Measuring Pt. Elevation (feet MSL)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)	Well Description	Screened Interval (bgs)		Sand Pack Interval (bgs)		Annular Seal Interval (bgs)	
								Top	Bottom	Top	Bottom	Top	Bottom
EP-35	37.5	3725.74	2/1/91	2/1/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7.5	37.5	5	37.5	2.5	5
EP-36	38.0	3725.52	2/2/91	2/2/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	38	2.5	5
EP-37	37.5	3725.6	2/2/91	2/2/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	4.5	34.5	3.5	34.5	1.8	3.5
EP-38	38.0	3725.6	2/2/91	2/2/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-39	38.0	3725.95	2/1/91	2/1/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	38	3	5
EP-40	38.0	3725.7	2/1/91	2/1/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-41	38.0	3725.11	1/31/91	1/31/91	Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	8	38	5.5	38	2.5	5.5
EP-42	37.5	3726.15	1/31/91	1/31/91	Schramm Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-43	90.0	3772.17	2/2/91	2/4/91	Schramm Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	58	88	56	90	52	56
EP-44	80.0	3771.74	2/6/91	2/6/91	Rotary Air	8	4-inch, flush threaded, Sch 40, PVC	50	80	45	80	41	45
EP-45	83.0	3771.81	2/4/91	2/4/91	Rotary Air	8	4-inch, flush threaded, Sch 40, PVC	49	79	44	83	40	44
EP-46	80.0	3772.04	2/5/91	2/5/91	Schramm Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	49	79	47	79	44	47
EP-47	80.0	3773.93	2/4/91	2/4/91	Schramm Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	49	79	45	79	42.5	79
EP-48	38.0	3726.11	2/5/91	2/5/91	Rotary Air	8	4-inch, flush threaded, Sch 40, PVC	7	37	5	37	3	5
EP-49	71.0	3785.59	02/07/91	02/09/91	Schramm Air Rotary	6	4-inch Stainless Steel	39	69	35	69	32	35
EP-50	81.0	3772.25	2/11/91	2/11/91	Schramm Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	48	78	45	75	42	45
EP-51	71.0	3774.66	2/11/91	2/12/91	Schraam Air Rotary	6	4-inch, flush threaded, Sch 40, PVC	40	70	36	70	33.5	36
EP-52	71.0	3783.72	2/12/91	2/13/91	Schraam Air Rotary	8	4-inch, flush threaded, Sch 40, PVC	40	70	35.5	70	32.5	35.5
EP-53	81.0	3805.64	2/13/91	2/14/91	Schraam Air Rotary	8	2-inch, flush threaded, Sch 40, PVC	59	79	55	81	52	55
EP-54	80.0	3787.37	02/09/94	02/09/94	Hollow Stem Auger	10	2-inch, flush threaded, Sch 40, PVC	60	80	56	80	0	56
EP-55	62.0	3788.23	02/09/94	02/09/94	Hollow Stem Auger	10	4-inch, flush threaded, Sch 40, PVC			39	59	3.0	35.5
EP-56	58.0	3772.09	02/09/94	02/09/94	Hollow Stem Auger	10	4-inch, flush threaded, Sch 40, PVC	38	58	34	58	3	34
EP-57	30.0	3723.52	1/16/94	1/16/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	10	30	5	30	3	5
EP-58	30.0	3726.67	06/16/94	06/16/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	8	28	5	30	+0.25	3
EP-59	30.0	3728.37	1/17/94	1/17/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	10	20	8	30	3	8
EP-60	30.0	3722.52	1/17/94	1/17/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	7	17	5	30	3	5
EP-61	20.0	3722.95	01/18/94	01/18/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	7	17	5	20	3	5
EP-62	25.0	3720.64	01/18/94	01/25/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	7	17	5	25	3	5
EP-63	20.0	3719.52	01/19/94	01/26/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	7.7	17.7	5	20	3	5
EP-64	20.0	3724.00	01/19/94	01/25/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	5	15	5	20	3	4
EP-65	20.0	3721.39	01/27/94	01/27/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	6.4	16	5	20	3	5
EP-66	20.0	3722.88	01/27/94	01/27/94	Hollow Stem Auger	12	4-inch, flush threaded, Sch 40, PVC	6.4	16.4	5	20	3	5
EP-67	59.0	3761.01	05/28/97	05/28/97	Stratex	8	4-inch, flush threaded, Sch 40, PVC	37.3	57.3	34.2	57.3	9.5	34.2
EP-68	82.0	3783.76	05/29/97	05/29/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	62	82	60	82	2	60
EP-69	65.0	3779.06	05/29/97	05/29/97	Stratex	10		45	55	42	55	10	42
EP-70	55.0	3775.00	05/30/97	05/30/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	40	50	38	50	10	38

See last page for notes.

TABLE B-2
WELL CONSTRUCTION DETAILS

Well Identifier	Depth (feet)	Measuring Pt. Elevation (feet MSL)	Date Started	Date Finished	Drilling Method	Borehole Diameter (inches)	Well Description	Screened Interval (bgs)		Sand Pack Interval (bgs)		Annular Seal Interval (bgs)	
								Top	Bottom	Top	Bottom	Top	Bottom
EP-70R	75.0	3777.67	06/12/97	06/12/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	60	75	61.7	75.0	11	62
EP-71	33.0	3758.11	05/31/97	05/31/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	22	32	20	32	10	20
EP-71R	65.0	3763.19	06/11/97	06/11/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	45	65	43	65	10	43
EP-72	55.0	3773.83	05/31/97	06/01/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	44	54	42	54	10	42
EP-72R	75.0	3776.50	05/31/97	06/01/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	55	75	52	75	8.0	52.1
EP-73	80.0	3787.45	06/01/97	06/01/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	60	80	58	80	8.4	57.8
EP-74	72.0	3775.89	06/02/97	06/02/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	52	72	52	72	10	50
EP-75	71.0	3798.35	06/02/97	06/03/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	61	71	58	71	10	58
EP-76	64.0	3796.56	06/03/97	06/03/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	44	64	40	64	10	41
EP-77	55.0	3777.38	06/04/97	06/04/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	45	55	42	55	4	42
EP-78	45.0	3770.96	06/04/97	06/04/97	Stratex	9	4-inch, flush threaded, Sch 40, PVC	34.42	44.42	31.1	44.8	10	31
EP-79	55.0	3791.94	06/05/97	06/05/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	39	54	36	54	3	36
EP-80	26.5	3724.09	06/06/97	06/06/97	Hollow Stem Auger	9	4-inch, flush threaded, Sch 40, PVC	9	24	8	24	5	8
EP-81	28.0	3731.59	06/06/97	06/06/97	Hollow Stem Auger	9	4-inch, flush threaded, Sch 40, PVC	11	26	9	26	3	9
EP-82	32.0	3771.15	06/10/97	06/10/97	Stratex	9	4-inch, flush threaded, Sch 40, PVC	15	30	13	30	3	13
EP-83	50.0	3801.73	06/11/97	06/11/97	Stratex	9	4-inch, flush threaded, Sch 40, PVC	35	50	32.4	50.0	10.0	32.4
EP-84	20.0	3794.52	06/11/97	06/11/97	Stratex	9	4-inch, flush threaded, Sch 40, PVC	3.5	13.5	2.5	14.0	1.5	2.5
EP-85	25.0	3739.41	06/12/97	06/12/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	10	25	7.5	25.0	3.0	7.9
EP-86	70.0	3817.99	06/13/97	06/13/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	30.5	70.5	27.4	70.5	7.5	27.4
EP-87	12.0	3816.67	06/16/97	06/16/97	Stratex	10.5	4-inch, flush threaded, Sch 40, PVC	3.5	13.5	2.5	13.5	1.0	2.5
EP-88	40.0	3774.54	06/17/97	06/17/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	25	40	22.6	40.0	6.5	22.6
EP-89	40.0	3732.23	06/18/97	06/18/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	20	40	18	40	10	18
EP-90	72.0	3778.08	06/02/97	06/02/97	Stratex	10	4-inch, flush threaded, Sch 40, PVC	52	72	52	72	10	50

Notes: EM-3, EM-8, EP-2 and EP-74 were abandoned. Well EP-90 was drilled over the former EP-74.
EP-69: no well installed.
bgs = feet below ground surface.

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-01

Date Hole Started: 5/8/90 Date Hole Finished: 5/10/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: S of antimony plant, behind security bldg.

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Rex T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 250

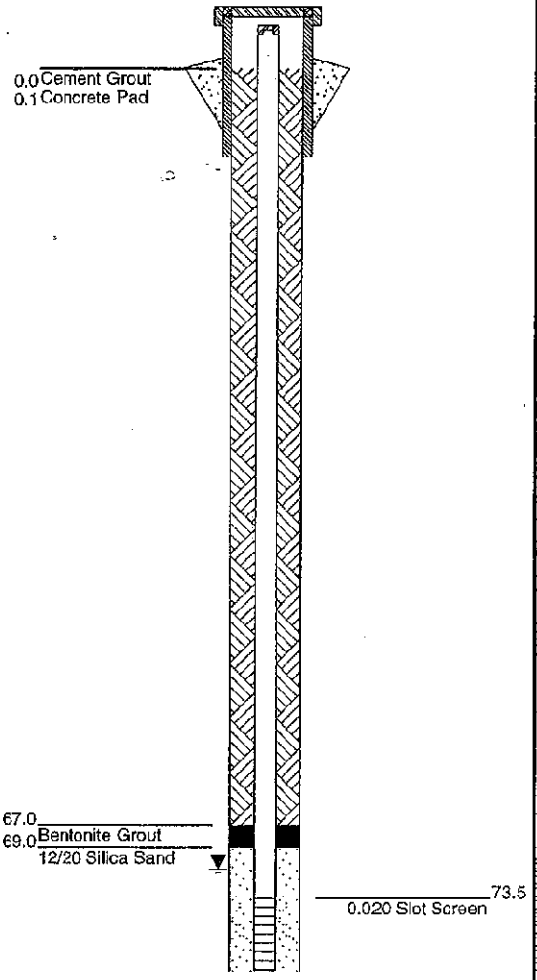
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 85
Surface Casing Used?	Y	8 inch steel	0 - 66 feet
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	73.5 - 83.5 feet
Sand Pack?	Y	10/20 silica sand	
Annular Seal?	Y	Bentonite/Cement Grout	
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 71.98
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.0

Surface Casing Height (ft): 1.2
Riser Height (ft): 1.0
Ground Surface Elevation (ft): 3784.00
MP Elevation (ft): 3784.99

Remarks: Bedrock well. Drilled using percussion hammer bit. Started drilling at 09:50. 52-66 is interpreted as basal conglamorate of the Fort Hancock Formation of strain 78'. This unit drilled hard and stayed open, fragments were angular to well-rounded. Drilled like consolidated material past 52'. Dry at time of development and sampling - very low yield. Hole initially drilled to 250' and backfilled to 85 feet. Samples taken to 140 feet.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 7.0'
SAND -Dry to slightly moist, light orangish-brown, loose, unconsolidated, moderately sorted, highly calcerous, fine to medium silty sand, at least70% quartz, aeolian origin.

7.0 - 15.0'
GRAVELLY SILTY SAND -Slightly damp, light brown, poorly sorted,loose, subangular to subrounded gravel, highly variable composition of gravel up to 1/2" (Alluvium).

15.0 - 26.0'
Medium to Coarse SAND -Dry, light brown to tan, loose, moderately sorted, subangular, sublitharenite composition, very weak reaction to HCl (Alluvium).

26.0 - 29.0'
SANDY GRAVEL -Dry to slightly moist, grey to orange, very coarse. Particle composition is predominantly quartz, but highly variable (Alluvium).

29.0 - 35.0'
GRAVELLY SILTY-CLAY to CLAYEY-SILT-Moist, orangish-brown, tacky, poorly sorted, calcareous (Alluvium).

35.0 - 36.0'
Gravelly Coarse SAND -Dry, light orangish-brown, tacky, poorly sorted, angular fragments (Alluvium).

36.0 - 38.5'
As above, rock fragments of quartz, feldspar, low mafic content.

38.5 - 40.0'
GRAVEL -Dry, grey, unconsolidated gravel, limestone, quartz (Alluvium).

40.0 - 42.0'
GRAVEL -Dry, very light orange, calcareous, silty sand with abundant limestone gravel (Alluvium).

42.0 - 45.0'
SANDY GRAVEL -Dry, light orange, unconsolidated, sandy gravel, abundant limestone (Alluvium).

45.0 - 52.0'
SANDY GRAVEL -Wet, light orangish-brown, unconsolidated, silty, sandy gravel, matrix is calcareous rock fragments mainly quartz arenite, andesite, quartzite (Alluvium).

52.0 - 57.0'
Light tan to light brown, consolidated, medium quartz arenite (Sandstone).

57.0 - 60.0'
SANDY GRAVEL -Orangish-brown, intact, consolidated, poorly sorted sandy gravel, gravelly sand conglamorate (Alluvium).

60.0 - 66.0'
As above with numerous conglamorate fragments (Alluvium).

66.0 - 70.0'
Bluish-grey, well consolidated quartz arenite, fine to coarse with trace limestone (Sandstone).

Continued Next Page

STANDARD 0734W.GPJ HYD-TUC.GDT 10/2/96

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

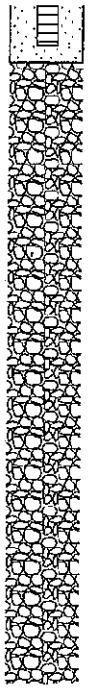
Monitor Well Log

Hole Name: EM-01

Date Hole Started: 5/8/90 Date Hole Finished: 5/10/90

(Continued)

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

70.0 - 85.0'
Bluish-gray to dark brown, intact, laminated, silty (Bedrock).

85.0 - 95.0'
Brown to dark brown, laminated, calcareous, silty (Bedrock).

95.0 - 120.0'
Dark brown to black, laminated, calcareous, silty, 1% calcite (white) crystals (Bedrock).

120.0 - 130.0'
As above, black, silty, calcareous, calcite 0 - 1% as 1/8" white crystals from secondary sources (Bedrock).

130.0 - 140.0'
SANDSTONE -Black, laminated, calcareous, silty, with minor bluish-gray siltstone to very fine calcareous sandstone. Cement plug continues to 250 feet.

STANDARD 0734W.GPJ HYD-TUC.GDT 10/2/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-02

Date Hole Started: 5/11/90 Date Hole Finished: 5/11/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Just south of pond #1

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 82.5

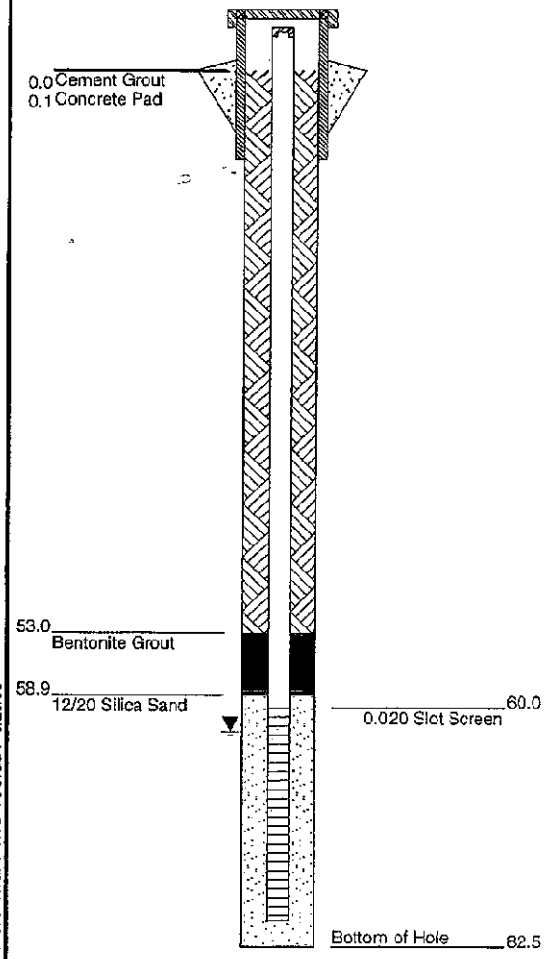
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 80
Surface Casing Used?	Y	8 inch steel	
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	60 - 80 feet
Sand Pack?	Y	10/20 silica sand	58.85 - 82.5 feet
Annular Seal?	Y	Bentonite/Cement Grout	53 - 58.85 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 63.77
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3774.32
MP Elevation (ft): 3776.02

Remarks: Split spoon for EP-TOX metals. Metallic odor at 30' in core sample. Photos #1 & #2 are of core from 35' to 37'. Hardpan calcrete 55 - 68. Standing water level - 65.47'.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 2.0'
SILT -Topsoil, moist, orangish-brown, tacky, clayey silt (Shallow Alluvium).

2.0 - 5.0'
SANDY GRAVEL -Slightly moist, brown, loose to slightly consolidated, calcareous sandy gravel, gravels composed of a wide variety of rock types (Alluvium).

5.0 - 15.0'
SANDY GRAVEL -Dry to slightly moist, light brown, loose, subangular to subrounded, poorly sorted, calcareous, sandy gravels and gravelly sands, layers of sands which are interbedded wit gravels which may actually be aeolian (Alluvium).

15.0 - 20.0'
SANDY GRAVEL -As above, numerous limestone and quartzite fragments in gravels, sands are of 60% quartzite and 20% feldspar composition

20.0 - 22.0'
SAND -Slightly moist, light brown, poorly sorted, angular to subrounded, calcareous (Alluvium).

22.0 - 30.0'
SANDY GRAVEL -Dry, light brown, loose, calcareous sandy gravels interbedded with gravelly sands, abundant felsite/cobbles (Alluvium).

30.0 - 36.0'
CLAY -Light yellowish-brown, loose to slightly tacky, calcareous, gravelly, sandy

36.0 - 42.5'
SANDY GRAVEL -Dry, light brown, loose, calcareous, sandy gravel, andesite rich (Alluvium).

42.5 - 47.0'
CLAYEY SANDY GRAVEL -Dry, light yellowish-brown, semi-consolidated to loose, calcareous (Alluvium).

47.0 - 55.0'
GRAVELLY SAND -Dry to slightly damp, light yellowish-brown, calcarecus (Alluvium).

55.0 - 68.0'
Calcrete hardpan alluvial depositional environment secondary calcium carbonate cement, moist, light yellowish-brown, poorly sorted, subangular, very coarse sand (Alluvium).

68.0 - 82.5'
CLAYEY SANDY GRAVEL -As above, wet, semi-consolidated, calcareous

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EM-03

Date Hole Started: 5/14/90 Date Hole Finished: 5/14/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Near red fire house - east of pond #1

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 28

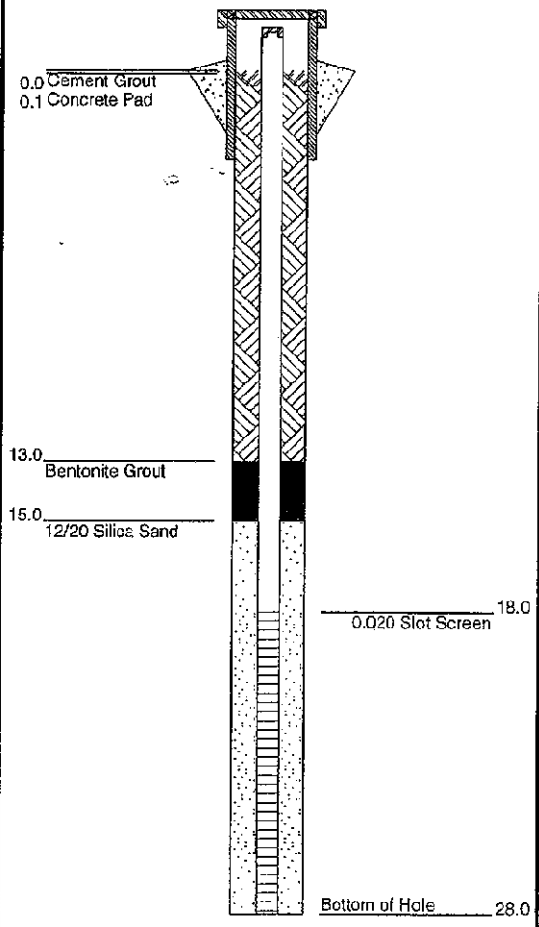
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 28
Surface Casing Used?	Y	8 inch steel	
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	
Sand Pack?	Y	10/20 silica sand	
Annular Seal?	Y	Bentonite/Cement Grout	
Surface Seal?	Y	Bentonite/Cement Grout	
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: Dry
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3777.85

Remarks: Well abandoned. Hole was not drilled due to drilling conditions and the likelyhood of contamination of a lower zone if impermiable hardpan layers were present below.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 1.0'
Slag/Concrete Fill
Dry, light orangish-brown, loose, sandy gravels, concrete, slag
[Fill]

1.0 - 17.0'
Slag
Dry, black, oxidized iron, in places, reacts slightly with HCl, note: at 16' stringer of sand
[Slag Fill]

17.0 - 23.0'
Clayey Gravel
As above, wet, dark grey to black, very loose, clayey gravel, reacts vigorously with HCl
[Slag Fill]

23.0 - 26.0'
Clay
Wet, dark olive-gray to black, tacky, calcareous, gravelly (slag fragments) clay
[Fill]

26.0 - 28.0'
Sandy Gravel
Wet, brown, loose, calcareous sandy gravel
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/93

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-04

Date Hole Started: 5/15/90 Date Hole Finished: 5/15/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 14' east of EP-12

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 115

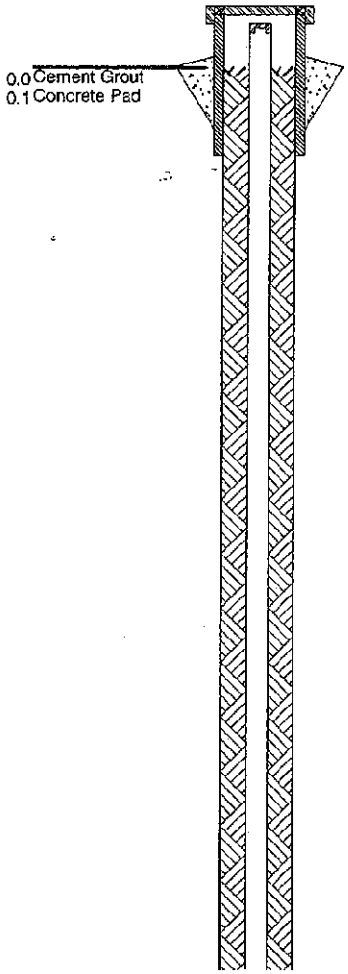
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 115 feet
Surface Casing Used?	Y	8 inch steel	+2 - 2 feet
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	95 - 115 feet
Sand Pack?	Y	12/20 silica sand	85 - 115 feet
Annular Seal?	Y	Bentonite/Cement Grout	81 - 85 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 61.80
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3772.29
MP Elevation (ft): 3774.29

Remarks: Water produced from 95 - 105 feet.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 2.0'
Sandy GRAVEL
dry, light brown, loose, calcareous, poorly sorted, subangular to rounded, sandy cobble gravel
[Alluvium]

2.0 - 17.0'
Poorly Graded Gravelly SAND
dry, light brown, loose,calcareous, subrounded, poorly sorted, gravelly, very coarse sand, variabl composition
[Alluvium]

17.0 - 24.0'
Gravelly very coarse SAND
dry, light brown, very loose, subangular to subrounded, calcareous, gravelly sand, variable composition
[Alluvium]

24.0 - 26.0'
Clayey Sandy GRAVEL
moist, light brown, poorly sorted, calcareous, clayey sandy gravel, variable composition
[Alluvium]

26.0 - 35.0'
gravelly very coarse SAND
dry, light brown, calecareous, poorly sorted, subangular to subrounded, gravelly, very coarse sand
[Alluvium]

35.0 - 38.0'
gravelly very coarse SAND
dry, light brown, calecareous, poorly sorted, subrounded, gravelly, very coarse sand
[Alluvium]

38.0 - 44.0'
Sandy felsite GRAVEL
dry, light yellowish brown, poorly sorted, angular to rounded, calcareous, sandy, felsite gravel
[Alluvium]

44.0 - 54.0'
Clayey gravel-bearing coarse SAND
dry, brown, calcareous, poorly sorted, subrounded, clayey, gravel-bearing, coarse sand to sandy gravel
[Alluvium]

Continued Next Page

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

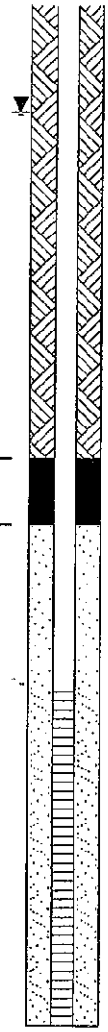
Monitor Well Log

Hole Name: EM-04

Date Hole Started: 5/15/90 Date Hole Finished: 5/15/90

(Continued)

WELL CONSTRUCTION



81.0 Bentonite Grout

85.0 12/20 Silica Sand

95.0 0.020 Slot Screen

Bottom of Hole 115.0

GRAPHICS

GEOLOGICAL DESCRIPTION

54.0 - 55.0'
Clayey gravel-bearing coarse SAND
as above, diesel (?) stained cuttings
[Alluvium]

55.0 - 61.0'
Sandy GRAVEL
dry, light brown, calcareous, loose, poorly sorted, subangular, gravel sands and very coarse sandy gravel - most abundant rock fragments are felsite and andesite
[Alluvium]

61.0 - 70.0'
poorly sorted Sandy GRAVEL
dry, light gray to light brown, calcareous, poorly sorted, sandy gravel - boulders of felsite and adesite - well consolidated
[Alluvium]

70.0 - 84.0'
Clayey Sandy GRAVEL
Wet, orangish brown, clayey, sandy gravel, abundant andesite boulders
[Alluvium]

84.0 - 95.0'
SILTSTONE
orangish brown, intact, slightly consolidated, noncalcareous, cuttings appear to be decomposed bedrock
[Bedrock]

95.0 - 105.0'
SILTSTONE
light orangish brown, consolidated, noncalcareous, clayey, top of bedrock +/- 95'
[Bedrock]

105.0 - 115.0'
SILTSTONE to Mudstone
bluish gray, laminated, noncalcareous
[Bedrock]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-05

Date Hole Started: 5/19/90 Date Hole Finished: 5/19/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Parking lot in front of warehouse.

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 22

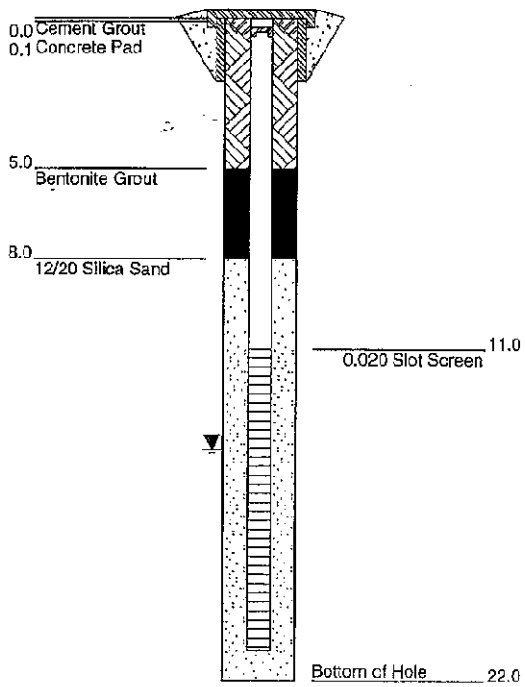
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 22 feet
Surface Casing Used?	Y	6 inch steel	
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	11 - 21 feet
Sand Pack?	Y	12/20 Silica Sand	8 - 22 feet
Annular Seal?	Y	Bentonite/Cement Grout	5 - 8 feet
Surface Seal?	Y	Concrete	0 - 2 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 14.36
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 0

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3776.25
MP Elevation (ft): 3776.5

Remarks: Water level 14.43' in open hole - bgs. Clay layer is believed to be restricting downward movement of ground water.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 3.0'
Slag
predominantly gravel size slag with minor amounts of dirt fill
[Slag Fill]

3.0 - 17.0'
Slag
dry, black, unconsolidated
[Slag Fill]

17.0 - 20.0'
Slag
dry, black, unconsolidated, wet
[Slag Fill]

20.0 - 22.0'
Clay
dark gray to black, tacky, calcareous, origin unknown

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-06

Date Hole Started: 5/19/90 Date Hole Finished: 5/20/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Parking lot in front of warehouse, 14' south of EM-5

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 91

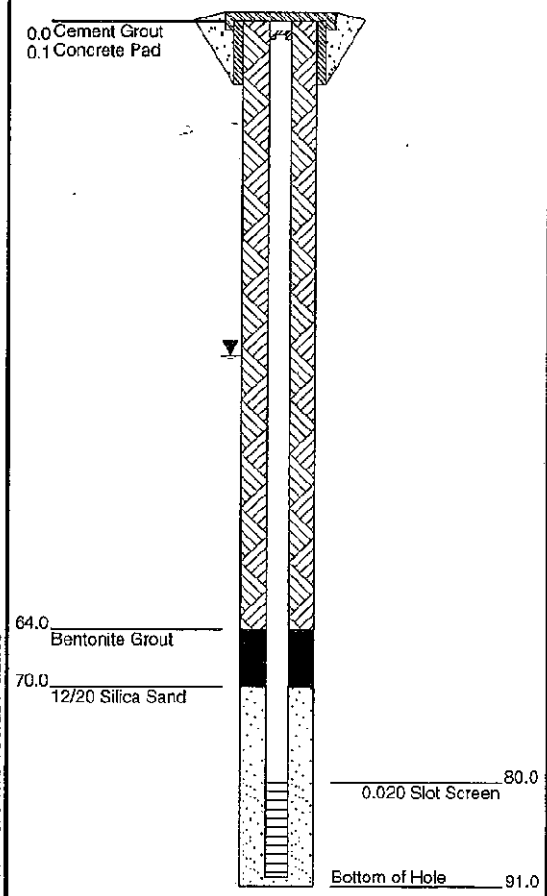
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 91 feet
Surface Casing Used?	Y	6 inch steel	0 - 38.5 feet
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	80 - 90 feet
Sand Pack?	Y	12/20 Silica Sand	70 - 91 feet
Annular Seal?	Y	Bentonite/Cement Grout	64 - 70 feet
Surface Seal?	Y	Concrete	
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 35.28
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 0

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3776.22
MP Elevation (ft): 3770.64

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 22.0'
SLAG -dry, black with reddish-brown oxidation stains, cuttings are 1/2" (wet at 20')
[Slag Fill]

22.0 - 35.0'
CLAY -possible alluvial origin - old pond lining? dark to light gray, tacky, calcareous, gravel is present but less that 5%

35.0 - 38.0'
GRAVELLY SAND -dry, light brown, loose, unconsolidated, calcareous fines, poorly sorted, angular to subrounded grains, valable composition but andesite approx. 30% of rock fragments has appearance of grus
[Alluvium]

38.0 - 40.0'
BOULDERS -dry, medium gray, andesite boulders, calcareous matrix
[Alluvium]

40.0 - 48.0'
GRAVELLY SAND -slightly moist, intact, light orangish-brown, calcareous, poorly sorted, gravel is subrounded, variable composition
[Alluvium]

48.0 - 65.0'
GRAVELLY SAND with CLAY -wet, light orangish-brown, calcareous matrix, poorly sorted, subangular, clayey, gravelly, very coarse sand, increase in iron stained quartz sandstone rock fragments with depth
[Alluvium]

65.0 - 70.0'
SANDSTONE -light pink to white, with red spots scattered throughout, medium to very coarse, poorly sorted, subangular, calcareous, dirty (approx. 5 - 10% clay), moderately hard quartz sublitharenite

70.0 - 88.0'
SANDSTONE -light gray to light pinkish-gray, poorly sorted, subangular to subrounded, calcareous, coarse quartz sublitharenite with areas of wacke, siltstone stringers of olive green, also may be present - abundant white quartz arenite cuttings, moderately sorted, subangular, slightly calcareous

88.0 - 91.0'
SANDSTONE -bluish-green, bluish-gray and olive green, poorly sorted, interbedded siltstone and silty very fine sandstone, non-calcareous

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HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EM-07

Date Hole Started: 5/19/90 Date Hole Finished: 5/19/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Parking lot between engineering building and lab

Recorded By: AJH
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 12-inch
Total Depth Drilled (ft): 15.5

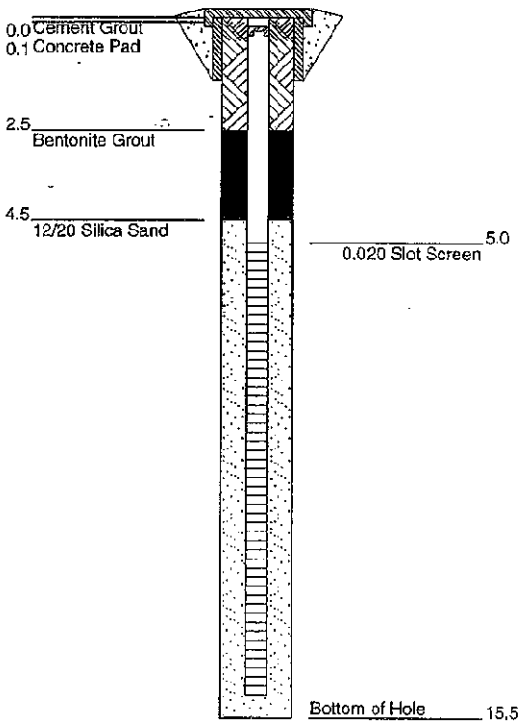
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 15 feet
Surface Casing Used?	N		
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	5 - 15 feet
Sand Pack?	Y	12/20 Silica Sand	4.5 - 15 feet
Annular Seal?	Y	Bentonite Grout	2.5 - 4.5 feet
Surface Seal?	Y	Concrete	0 - 2.5 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 8.5
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3773.41

Remarks: Drilled with 12" auger. One sample for EP-toxicity metals at 5'.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 7.5'
Fill
dry, light brown, calcareous, silty, gravelly sand
[Fill]

7.5 - 10.5'
Clayey Sand
dark gray, clayey sand, wet at 9'
[Alluvium]

10.5 - 10.8'
Clay
wet, dark gray to black, slightly silty, calcareous
[Alluvium]

10.8 - 15.5'
Sand
dark gray to black, calcareous, silty, clayey, top of alluvium
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EM-08

Date Hole Started: 5/21/90 Date Hole Finished: 5/21/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 15' due east of pond #6

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 18

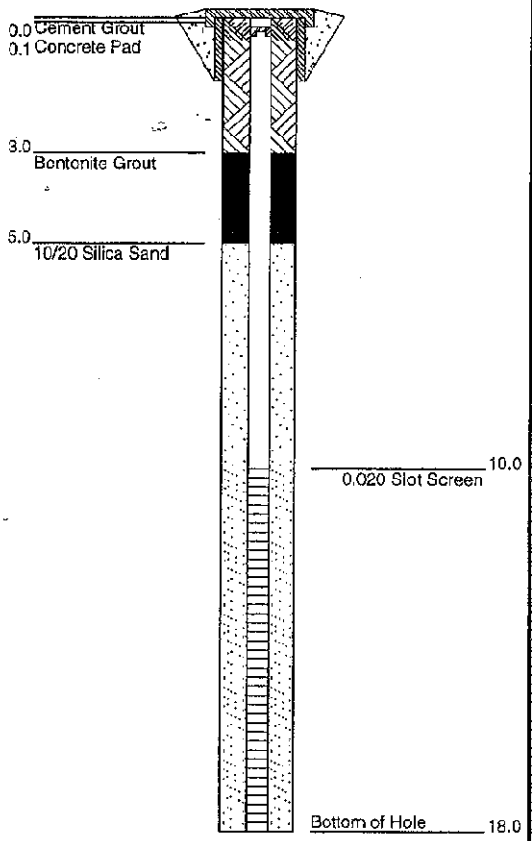
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	
Surface Casing Used?	N		
Screen/Perforations?	N		
Sand Pack?	N		5 - 18 feet
Annular Seal?	Y	Bentonite plug	0 - 2 feet
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: Dry
Date: 5/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft): 3769.21
MP Elevation (ft): 3769.46

Remarks: Well abandoned. Very loose strata - caves in while drilling. Drove in 8" steel casing while drilling.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 3.0'
Fill
dry, grayish-brown, silty, clayey sand, calcareous
[Fill]

3.0 - 7.0'
Clayey Sand
light brown, silty, clayey sand, calcareous
[Alluvium]

7.0 - 13.0'
Clayey Sand
as above, wet
[Alluvium]

13.0 - 14.0'
Sandy Clay
wet, calcareous, gray to brownish gray, sandy clay
[Alluvium]

14.0 - 17.0'
Clay
moist, dark greenish-gray, silt and gravel bearing, calcareous
[Alluvium]

17.0 - 18.0'
Clay
as above, light brown
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-01

Date Hole Started: 2/14/90 Date Hole Finished: 2/15/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 35' downstream of Canal Tunnel

Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger & Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 30

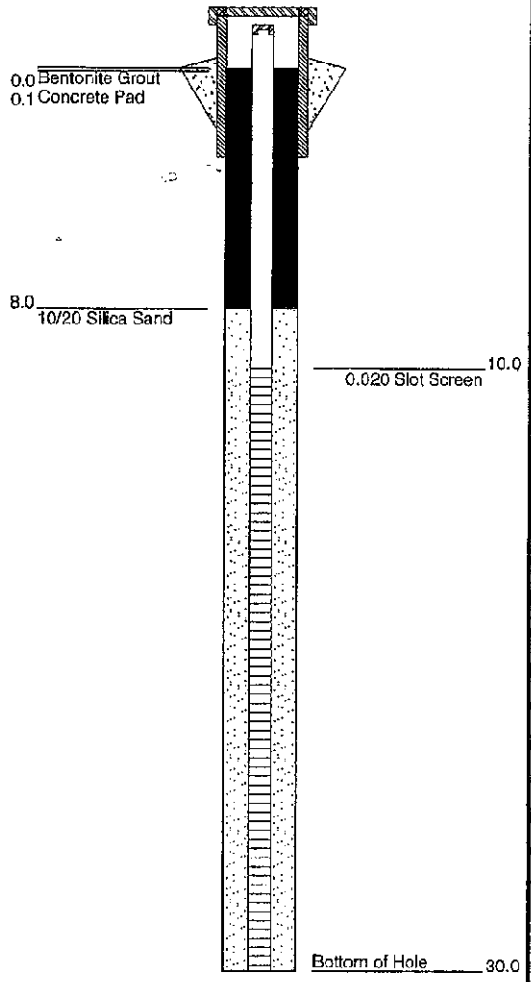
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 30 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	10 - 30 feet
Sand Pack?	Y	12/20 Silica Sand	8 - 30 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 8 feet
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 19
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft): 3724.21
MP Elevation (ft): 3725.71

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 8.0'
Silty Sand
some gravel to 1". Gravel angular to subangular, sand coarse to medium grained; light tan
[Fill]

8.0 - 12.0'
Gravelly Sand
well graded sand with some gravel to 1"; light brown
[Alluvium]

12.0 - 16.0'
Andesite Boulder
very hard andesite chips

16.0 - 27.0'
Sandy Gravel
tan in color, some cobbles to 6"; smoother drilling 27 - 30 feet
[Alluvium]

Sheet 1 of 1

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-02

Date Hole Started: 2/16/90 Date Hole Finished: 2/16/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 200' downstream of canal tunnel along rail road tracks
Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 6

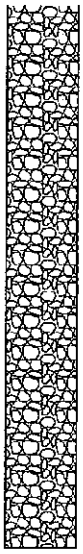
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	N		
Surface Casing Used?	N		
Screen/Perforations?	N		
Sand Pack?	N		
Annular Seal?	N		
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks: Auger refusal at 6', abandoned hole.

WELL CONSTRUCTION



Backfill 0.0

Bottom of Hole 6.0

GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 6.0'
Gravel
cobbles and sand; cobbles to 3"; auger refusal at 6'
[Fill]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/28/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-03

Date Hole Started: 2/16/90 Date Hole Finished: 2/17/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 6' north of east canal tunnel

Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 15

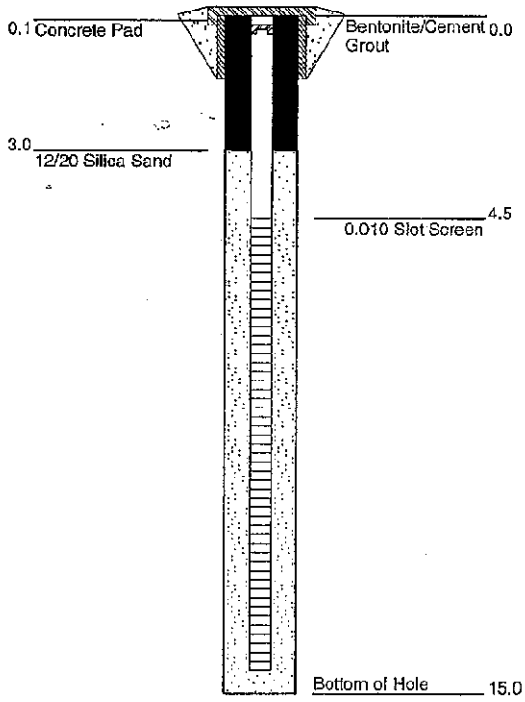
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 28 feet
Surface Casing Used?	Y	8 inch steel	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	4.5 - 14.5 feet
Sand Pack?	Y	12/20 Silica Sand	3 - 14.5 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 3 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 4 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 10.00
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3719.45
MP Elevation (ft): 3720.95

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 6.5'
GRAVELLY SAND -predominantly coarse to medium grained sand and silt, light brown to tan; some gravel to 2"; fine grained sands with some clay at 3 - 6.5 feet
[Alluvium]

6.5 - 8.0'
SANDY GRAVEL -gravels and coarse to medium grained sand
[Alluvium]

8.0 - 10.0'
SILTY SAND -medium to coarse grained sands with some silt
[Alluvium]

10.0 - 11.5'
SAND -fine grained sand, brown, moist to wet, slight odor
[Alluvium]

11.5 - 15.0'
SANDY GRAVEL -gravel cobbles and coarse-grained sand; more sand and softer drilling 13.5 to 14.5; large cobbles at 15' - auger refusal
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-04

Date Hole Started: 2/1/90 Date Hole Finished: 2/1/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 30' form Rio Grande and 50' down from canal tunnel

Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 8

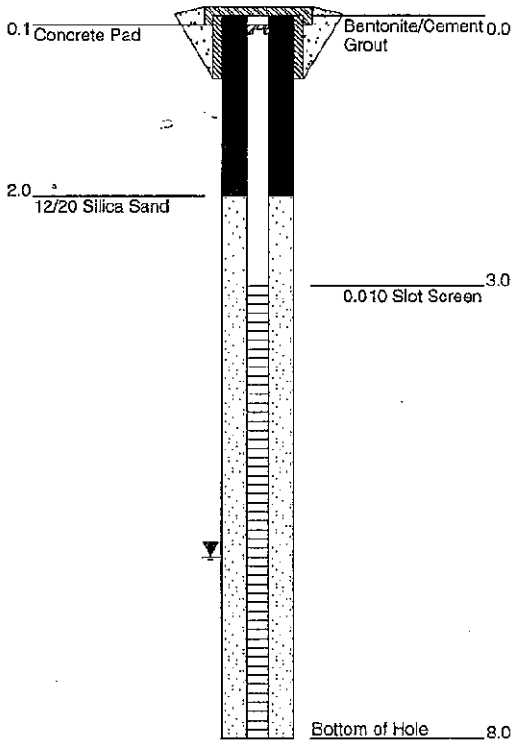
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 8 feet
Surface Casing Used?	Y	8 inch steel	0 - 4 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	3 - 8 feet
Sand Pack?	Y	12/20 Silica Sand	2 - 8 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 5.75
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3716.21
MP Elevation (ft): 3715.96

Remarks: First water encountered just below clay layer (4' deep).

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 3.5'
Sandy Silt
light tan in color
[Alluvium]

3.5 - 4.0'
Sandy Clay
layer of medium-brown clay, medium plasticity with some fine-grained sand
[Alluvium]

4.0 - 8.0'
Sand
poorly graded fine to medium grained sand, light brown
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-05

Date Hole Started: 2/17/90 Date Hole Finished: 2/17/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 30' from Rio Grande and 250' down form canal tunnel.

Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 7

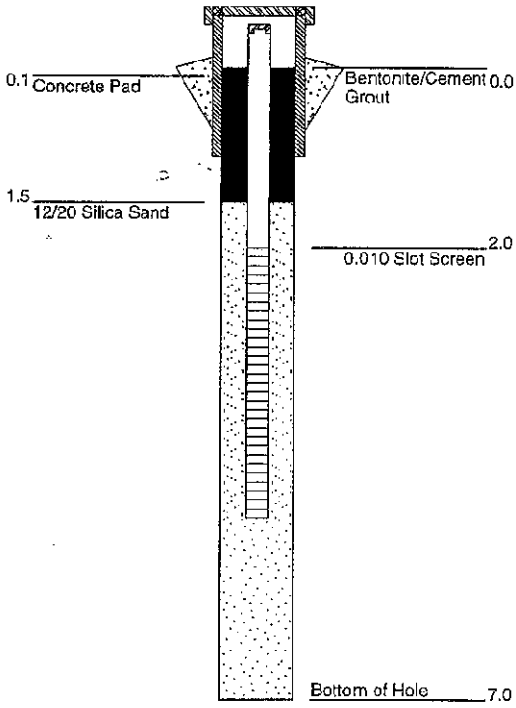
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 7 feet
Surface Casing Used?	Y	8 inch steel	0 - 4 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	2 - 7 feet
Sand Pack?	Y	12/20 Silica Sand	1.5 - 7 feet
Annular Seal?	Y	Bentonite/Cement Grout	
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 6.31
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3714.67
MP Elevation (ft): 3716.92

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 4.0'
Gravel and Sand
gravel and sand with some cobbles to 1'
[Fill]

4.0 - 4.5'
Silty Clay
medium plasticity clay and silt, brown
[Alluvium]

4.5 - 7.0'
Gravelly Sand
predominantly medium to fine-grained sand with gravel to 1/2"; large cobble at 7', auger refusal
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-06

Date Hole Started: 2/18/90 Date Hole Finished: 2/18/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: approximately 30 feet from Rio Grande and 600 feet down from canal tunnel
Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 8

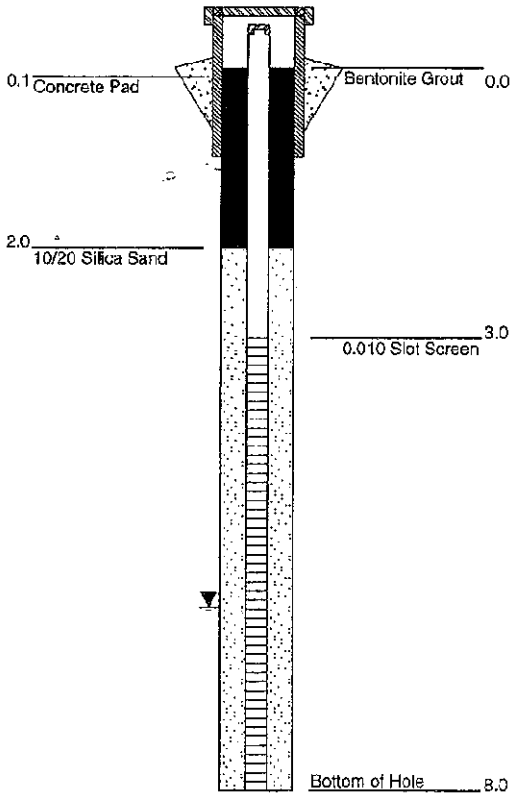
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 8 feet
Surface Casing Used?	Y	8 inch steel	+2 - 2 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	3 - 8 feet
Sand Pack?	Y	12/20 silica sand	2 - 8 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
Surface Seal?	Y	Bentonite/Cement Grout	NA
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 7.48
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3714.72
MP Elevation (ft): 3716.22

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 3.0'
Gravel and Sand
Gravel and Sand
[Fill]

3.0 - 7.0'
Sand
Poorly graded fine to medium grained sand, predominantly medium grained
[Sand]

7.0 - 8.0'
Gravelly Sand
Gravels to 5 inches with coarse to medium grained sand
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/20/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-07

Date Hole Started: 2/18/90 Date Hole Finished: 2/18/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 50' from Rio Grande opposite of plant entrance.

Recorded By: MRW
Drilling Company: Raba-Kistner
Driller: Manny
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 8

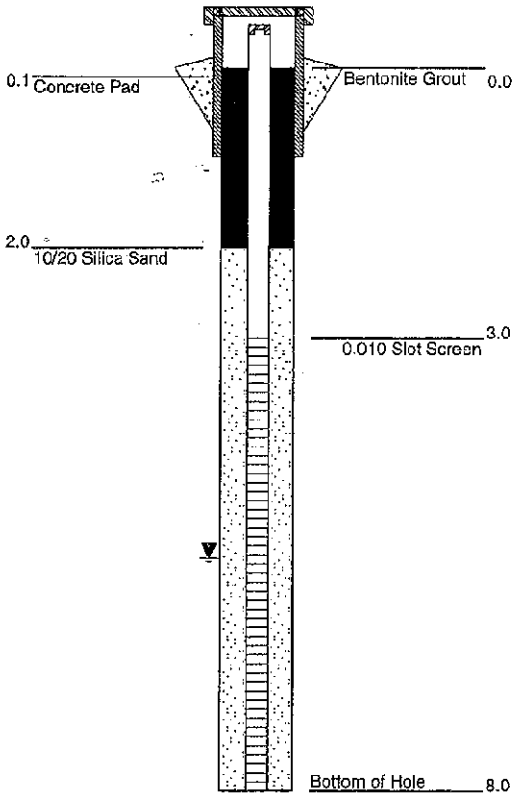
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 8 feet
Surface Casing Used?	Y	8 inch steel	+2 - 2 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	8 - 8 feet
Sand Pack?	Y	12/20 Silica Sand	2 - 8 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 2 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 6.94
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3720.60
MP Elevation (ft): 3722.1

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 3.5'
SAND -fine grained to medium grained sand, brown
[Alluvium]

3.5 - 4.5'
SILTY CLAY -medium plasticity clay with silt, brown to dark brown
[Alluvium]

4.5 - 8.0'
SAND -fine to medium grained sand, predominately fine grained sand, tan
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-08

Date Hole Started: 2/19/90 Date Hole Finished: 2/20/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Adjacent to north diesel tank

Recorded By: MRW
Drilling Company: Layne Western
Driller:
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 80

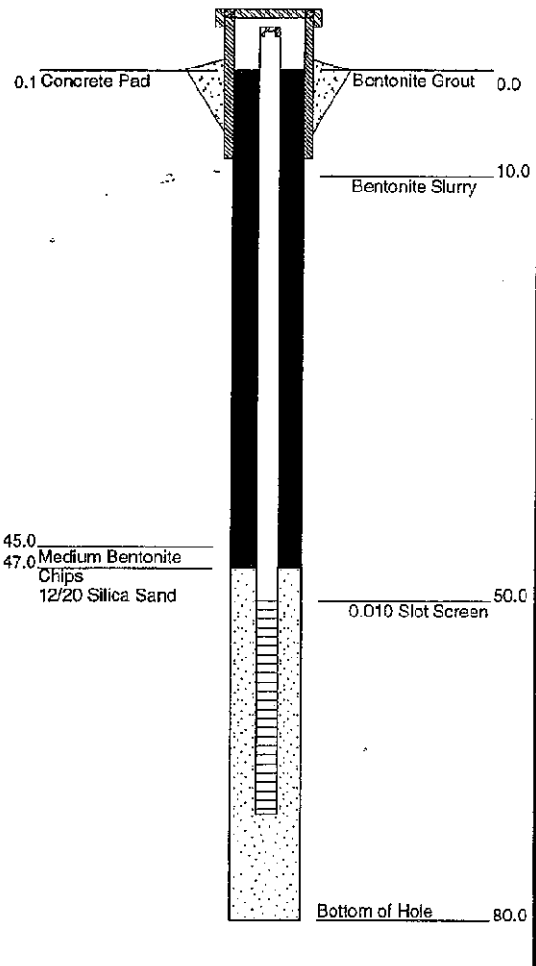
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 70 feet
Surface Casing Used?	Y	8 inch steel	+2.5 - 2.5 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	50 - 70 feet
Sand Pack?	Y	12/20 Silica Sand	47 - 80 feet
Annular Seal?	Y	Bentonite Chips	45 - 47 feet
Surface Seal?	Y	Bentonite/Cement Grout	10 - 45 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 76
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3774.84

Remarks: Drilled hole with 5 3/4" bit to 80' on 2/19/90. Enlarged hole on 2/20/90 with 8" bit, hole caved to about 55' before well screen could be installed. Re-drilled hole with 8" bit and installed well.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 12.0'
SLAG FILL -very hard slag, black angular fragments, possibly poured in place.

12.0 - 20.0'
SAND -coarse-grained sand with gravel to 1/2", poorly graded

20.0 - 26.0'
SILTY SAND -coarse-grained sand and gravel to 1/2", approx. 20% silt, light brown

26.0 - 28.0'
SANDY SILT -predominantly silt withsome low plasticity clay and fine-grained sand; light brown, slight odor

28.0 - 38.0'
SANDY GRAVEL -predominantly gravel and cobbles with some coarse-grained sands, very little fines; occasional lens with some silt; poorly graded, well rounded to subangular

38.0 - 40.0'
ANDESITE -cobble or boulder?

40.0 - 76.0'
SILTY GRAVEL -silty sandy gravel, well-rounded to subangular, to 3"; tan, hard gray shale stringer at aprox. 52'; slight odor at 65'; more silt between 65 - 70'

76.0 - 76.5'
SILTY CLAY -clay stringer at 76'; medium plasticity

76.5 - 80.0'
ANDESITE BOULDER -hard andesite chips

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-09

Date Hole Started: 2/20/90 Date Hole Finished: 2/20/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 40' north of lunch house

Recorded By: MRW
Drilling Company: Becker Drilling
Driller: Ken
Drilling Method: Becker 180 Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 80

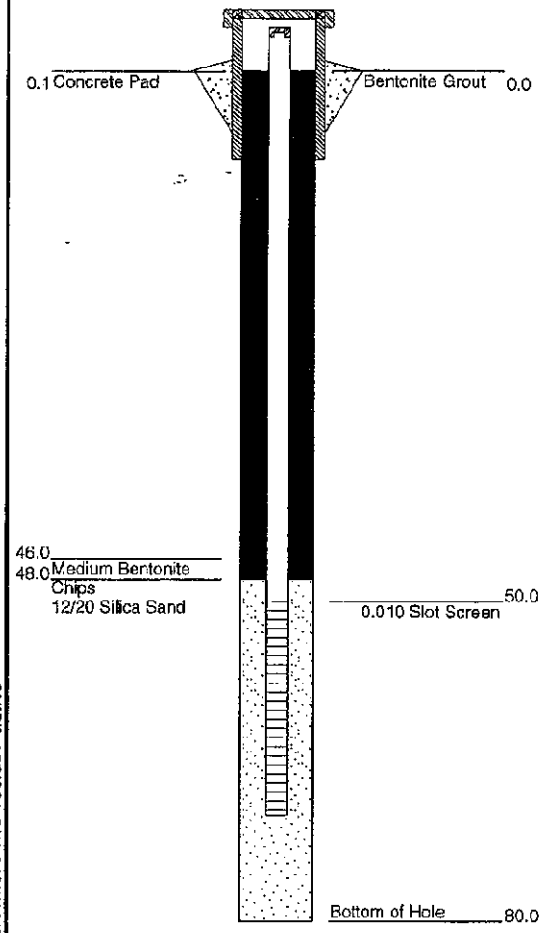
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 70 feet
Surface Casing Used?	Y	8 inch steel	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	50 - 70 feet
Sand Pack?	Y	12/20 Silica Sand	48 - 75 feet
Annular Seal?	Y	Bentonite Chips	46 - 48 feet
Surface Seal?	Y	Cement Grout	0 - 46 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP:
Date:
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3772.67

Remarks: First hole with Becker drill rig - hammers drive shoe through soil, no drill bit, cuttings blown to surface with air. Hydraulic hose split on rig at 1430. Rig casing stuck at 62'. Eventually pulled out and drilled 5 7/8" pilot hole with Layne Western rotary rig to 80'.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 12.0'
SLAG -very hard slag, black angular fragments, possibly poured in place; some sand and gravel mixed in with slag

12.0 - 18.0'
GRAVELLY SAND -fine to medium grained sand with some gravel to 1"; moist, brown

18.0 - 37.0'
SLAG -very hard slag as above, very hard at 26'

37.0 - 60.0'
SILTY GRAVEL -gravel and cobbles with some coarse-grained sand and silt, light tan; more silt at 50 - 55'

60.0 - 63.0'
ANDESITE BOULDER

63.0 - 67.0'
SILTY SAND -brown, fine

67.0 - 73.0'
SAND -brown, well graded

73.0 - 76.0'
ANDESITE BOULDER -rock chips, gray

76.0 - 80.0'
SAND -with some gravel

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-10

Date Hole Started: 2/20/90 Date Hole Finished: 2/20/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 50' east of building

Recorded By: RC (AES)
Drilling Company: Layne Christensen Co.
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 85

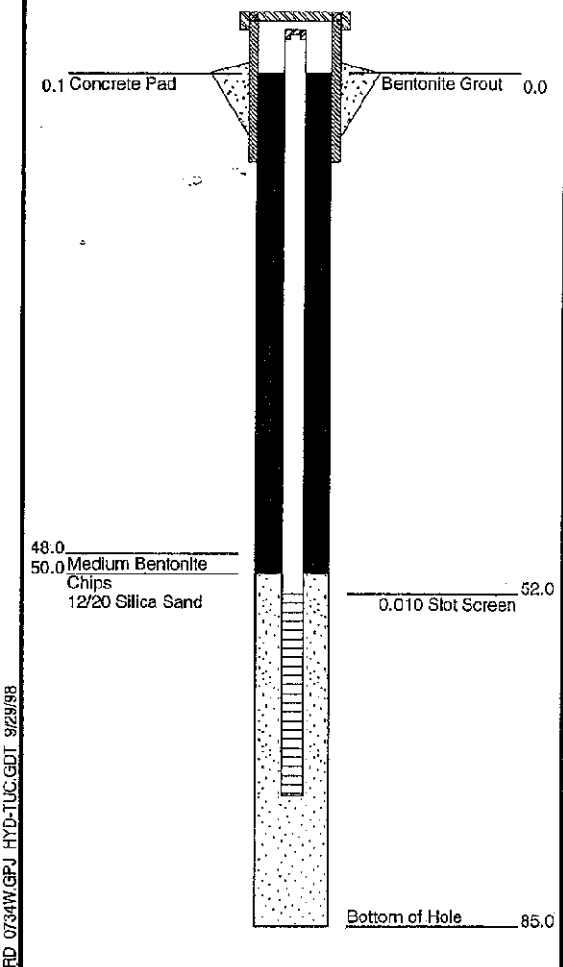
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 72 feet
Surface Casing Used?	Y	8 inch steel	+2.5 - 1.5 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	52 - 72 feet
Sand Pack?	Y	12/20 Silica Sand	50 - 78 feet
Annular Seal?	Y	Bentonite Chips	48 - 50 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 48 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP:
Date:
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3772.32
MP Elevation (ft): 3772.32

Remarks: Hole drilled with 5 7/8" bit and opened with a 7 5/8" bit to 70 of 78'.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 5.0'
SMELTER DEBRIS -with some pavement
[Smelter Debris]

5.0 - 18.0'
SAND -brown, silty, mostly fine but well graded; some small gravel
[Alluvium]

18.0 - 22.0'
GRAVEL -graded from coarse down to sand

22.0 - 28.0'
SLAG

28.0 - 38.0'
GRAVEL -with sand and some brown silt at 35'; gravel gets coarser, but is well rounded; sand content reduced

38.0 - 40.0'
BOULDER -hard layer, black chips

40.0 - 45.0'
GRAVEL -coarse, well rounded, some sand and silt

45.0 - 49.0'
SILT -tan, sandy with some gravel

49.0 - 55.0'
CLAY -light tan, sandy with some gravel

55.0 - 63.0'
GRAVEL -with light tan clay and sand

63.0 - 73.0'
GRAVEL -with sand and silt

73.0 - 83.0'
SAND -with gravel and silt; shows of water at 78'

83.0 - 85.0'
SILT -tan with some sand and gravel

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-11

Date Hole Started: 2/21/90 Date Hole Finished: 2/21/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 60' south of EP-10 and 150' south of lunch house.

Recorded By: MRW
Drilling Company: Becker Drilling
Driller: Ken
Drilling Method: Becker 180 Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 80

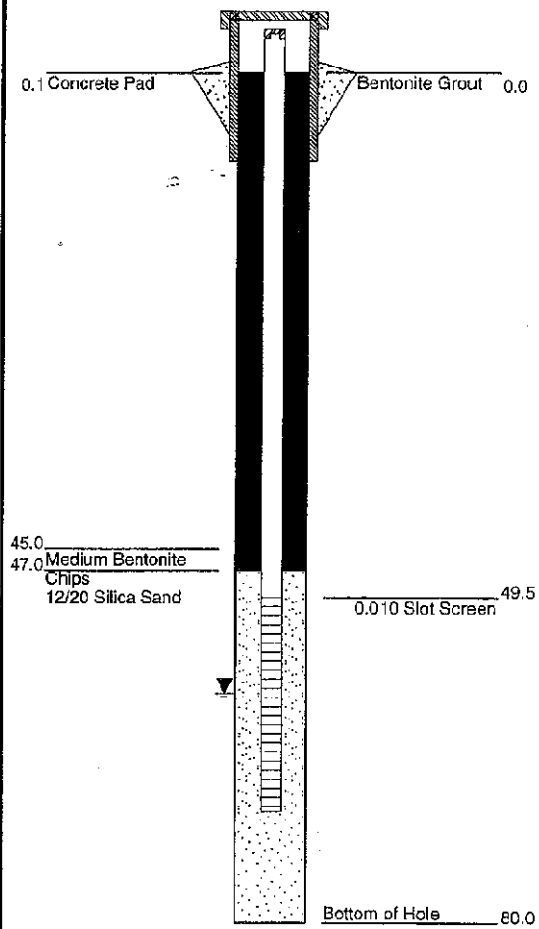
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 69.5 feet
Surface Casing Used?	Y	8 inch steel	+2.5 - 1.5 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	49.5 - 69.5 feet
Sand Pack?	Y	12/20 Silica Sand	47 - 80 feet
Annular Seal?	Y	Bentonite Chips	45 - 47 feet
Surface Seal?	Y	Cement Grout	0 - 45 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 60
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3771.02
MP Elevation (ft): 3771.02

Remarks: Becker drill could not drill past 62'. Brought Layne Western Air Rotary rig in to drill 5 7/8" pilot hole from 62 - 80'. All rigs were decontaminated prior to entering hole.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 8.0'
SANDY GRAVEL -gravel and cobbles to 6", well rounded with sand and silt; brown to gray

8.0 - 18.0'
SANDY CLAY -low plasticity clay, light brown with silt, sand and some gravel to 1/2"

18.0 - 29.0'
SILTY GRAVEL -predominantly well rounded gravel with silt and some sand

29.0 - 36.0'
SLAG -very hard slag, black, angular fragments

36.0 - 38.5'
SILTY SAND -fine to medium grained sand and silt with some gravel to 1/2"; moist

38.5 - 39.5'
CLAY -high plasticity clay, dark brown, moist

39.5 - 53.0'
SILTY GRAVEL -gravel to 5", well rounded to angular with silt and some sand; tan

53.0 - 64.0'
GRAVEL -poorly graded gravel and cobbles with very little sand; hard at 57 - 60; strong diesel odor at 60'

64.0 - 78.0'
GRAVELLY SILT -predominantly silt with some clay and gravel to 1/2"; little or no sand

78.0 - 80.0'
SANDY GRAVEL -predominantly gravel to 1/2"; well rounded to subangular with some coarse-grained sand

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-12

Date Hole Started: 2/22/90 Date Hole Finished: 2/22/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 200 feet SE of lunchroom.

Recorded By: RC (AES)
Drilling Company: Layne Christensen Co.
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 80

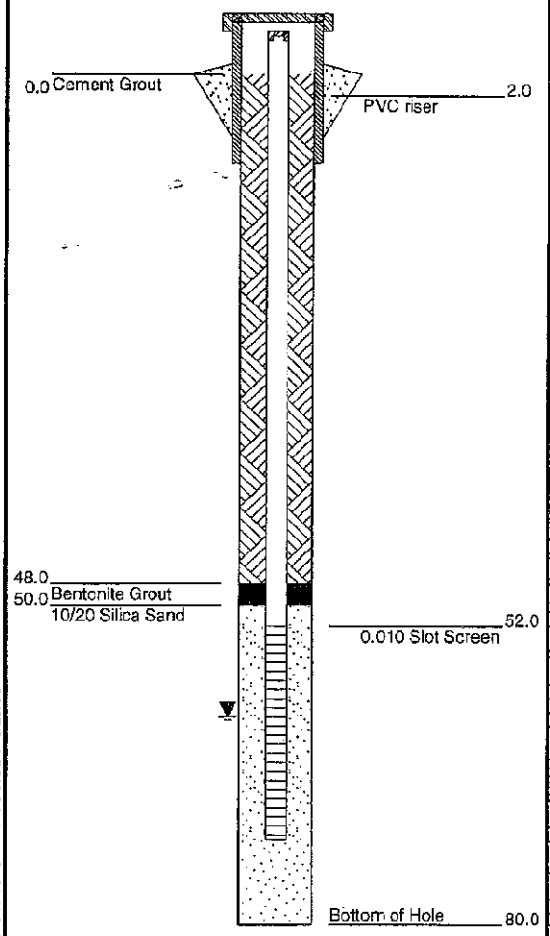
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 72 feet
Surface Casing Used?	Y	8 inch steel	+2 - 2 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	52 - 72 feet
Sand Pack?	Y	12/20 Silica Sand	50 - 75 feet
Annular Seal?	Y	Bentonite/Cement Grout	0 - 48 feet
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 62.0
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 1.5

Surface Casing Height (ft): 2.0
Riser Height (ft): 1.5
Ground Surface Elevation (ft): 3771.73
MP Elevation (ft): 3773.23

Remarks: Drilled 0 - 80 feet with air rotary rig (5 - 7/8" Tricone Bit). Completed hole with Becker hammer rig because hole caved behind air rotary rig.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 2.0'
[RUBBLE]

2.0 - 7.0'
Silty SAND -Brown medium to fine
[Alluvium]

7.0 - 14.0'
Silty SAND -Tan, Fine
[Alluvium]

14.0 - 17.0'
Silty SAND -Brown, medium to fine , some gravel
[Alluvium]

17.0 - 26.0'
Sandy GRAVEL -some silt, well-graded
[Alluvium]

26.0 - 34.0'
Silty SAND -light brown, very fine with little gravel
[Alluvium]

34.0 - 36.0'
Sandy GRAVEL -tan, some silt
[Alluvium]

36.0 - 40.0'
GRAVEL -coarse well rounded
[Alluvium]

40.0 - 60.0'
Sandy GRAVEL
[Alluvium]

60.0 - 67.0'
Gravelly SAND -Tan, with rock chips, hard at 60 feet
[Alluvium]

67.0 - 80.0'
Sandy GRAVEL -tan, fine, with coarse gravel
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-13

Date Hole Started: 2/23/90 Date Hole Finished: 2/23/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 500 feet NW (upgradient) of lunchroom

Recorded By: RC (AES)
Drilling Company: Layne Christensen Co.
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 95

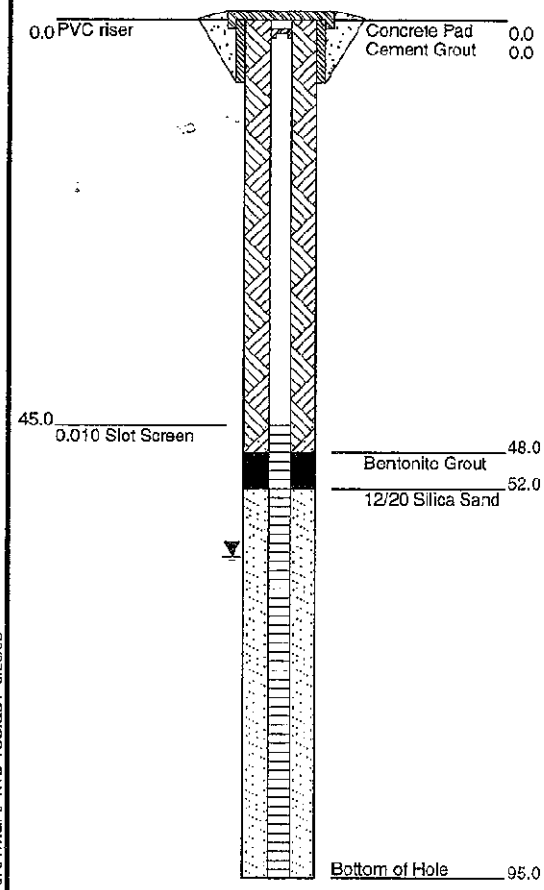
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 95 feet
Surface Casing Used?	Y	Manhole	0 - .25 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	45 - 95 feet
Sand Pack?	Y	12/20 silica sand	52 - 95 feet
Annular Seal?	Y	Bentonite Chips	48 - 52 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 48 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 59.25
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3776.47
MP Elevation (ft): 3776.22

Remarks: Drilled with 5 - 7/8" tricone bit 0 - 17 feet. Drilled with 6" downhole hammer bit 17 - 95 feet. Slag stripped carbide tips from the tricone bit. After one hour water level recovered to ~90 feet. Eventually, recovered to 60 feet.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 2.0'
FILL -Pavement and Rubble

2.0 - 26.0'
Slag Fill -black, hard.

26.0 - 27.0'
GRAVEL
[Alluvium]

27.0 - 34.0'
Gravelly SAND -light brown
[Alluvium]

34.0 - 48.0'
Sandy GRAVEL -coarser after 40 feet
[Alluvium]

48.0 - 54.0'
Rock Chips -gray, angular
[Alluvium]

54.0 - 58.0'
GRAVELLY SAND with SILT -tan with some silt
[Alluvium]

58.0 - 74.0'
Silty SAND -tan, some gravel
[Alluvium]

74.0 - 95.0'
Rock Chips -gray, angular
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-14

Date Hole Started: 2/23/90 Date Hole Finished: 2/24/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 50 feet NE of lunchroom

Recorded By: RC (AES)
Drilling Company: Layne Christensen Co.
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 78

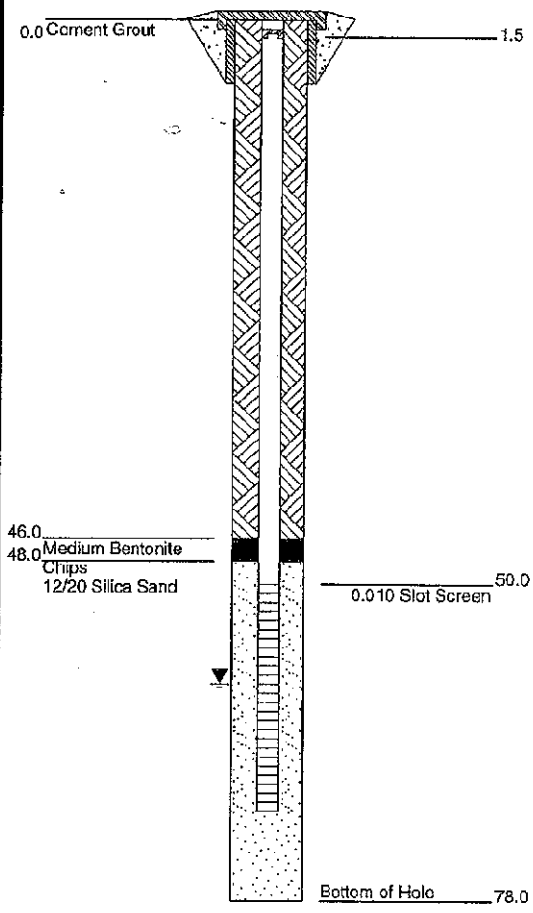
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	.25 - 70 feet
Surface Casing Used?	Y	Manhole	0 - .25 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	50 - 70 feet
Sand Pack?	Y	12/20 silica sand	48 - 70 feet
Annular Seal?	Y	Bentonite Chips	46 - 48 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 46 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 58.58
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3775.23
MP Elevation (ft): 3774.98

Remarks: Drilled 0 - 50 feet with 5 - 7/8" tricone bit on 2/23/90. Bentonite above 40 feet. Drilled 50 - 78 feet with 5 7/8" tricone bit on 2/24/90. Hole caved behind bit. Well was worked over with casing hammer rig and well installed on 2/24/90.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 2.0'
PAVEMENT/RUBBLE
[Fill]

2.0 - 13.0'
SLAG black
[Slag Fill]

13.0 - 28.0'
SAND with Gravel - sand, dark brown with gravel
[Alluvium]

28.0 - 34.0'
SANDY GRAVEL
[Alluvium]

34.0 - 45.0'
Gravelly SAND -light brown
[Alluvium]

45.0 - 50.0'
Gravelly SAND -light brown. some gravel
[Alluvium]

50.0 - 59.0'
Gravelly SAND -light brown. boulders at 53 to 54 feet.
[Alluvium]

59.0 - 64.0'
Silty SAND -tan, some gravel, gravel layer at 62 to 63 feet.
[Alluvium]

64.0 - 67.0'
Sandy SILT -light brown, some gravel
[Alluvium]

67.0 - 78.0'
Gravelly SAND -tan, coarse, some silt. hard layer at 73 to 74 feet
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-15

Date Hole Started: 2/24/90 Date Hole Finished: 2/24/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Upgradient - between bedding, building and trestle.

Recorded By: HC (AES)
Drilling Company: Layne Christensen Co.
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 78

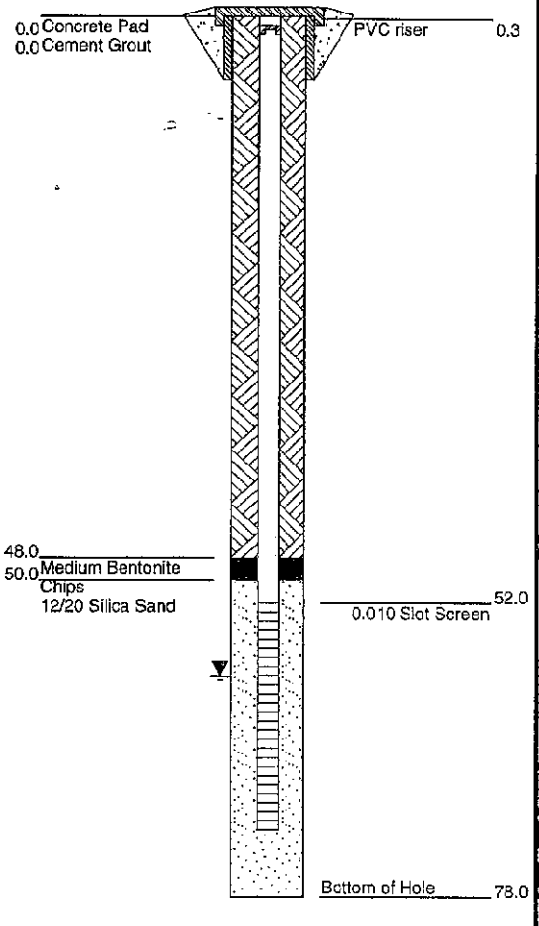
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0.25 - 72 feet
Surface Casing Used?	Y	Manhole	0 - .25 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	52 - 72 feet
Sand Pack?	Y	12/20 silica sand	50 - 78 feet
Annular Seal?	Y	Bentonite Chips	48 - 50 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 48 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 58.22
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3773.44
MP Elevation (ft): 3773.19

Remarks: drilled 0 - 12 feet with 5 - 7/8" hammer bit, drilled 12 - 78 feet with 5 - 7/8" tricone bit.

WELL CONSTRUCTION



GEOLOGICAL DESCRIPTION

GRAPHICS

0.0 - 1.0'
PAVEMENT
[Road Pavement]

1.0 - 12.0'
SAND -brown, fine, some rounded gravel, very loose (Alluvium).

12.0 - 21.0'
Sandy SILT -light brown, little gravel (Alluvium).

21.0 - 24.0'
Silty SAND -light brown, silty, with little gravel (Alluvium).

24.0 - 26.0'
Silty Sand -light brown with little gravel (Alluvium).

26.0 - 28.0'
CLAY -light brown (Alluvium).

28.0 - 33.0'
Sandy GRAVEL

33.0 - 38.0'
Sandy SILT -tan to light brown, little gravel (Alluvium).

38.0 - 42.0'
Sandy SILT -tan, some sand (Alluvium).

42.0 - 46.0'
Sandy SILT -tan with some coarse sand (Alluvium).

46.0 - 48.0'
Rock Chips -gray (Alluvium).

48.0 - 57.0'
Silty SAND -light brown, coarse (Alluvium).

57.0 - 62.0'
Sandy CLAY -light brown (Alluvium).

62.0 - 66.0'
Silty SAND -tan, some gravel (Alluvium).

66.0 - 67.0'
Rock Chips -gray (Alluvium).

67.0 - 70.0'
Sandy Silty CLAY -tan (Alluvium).

70.0 - 78.0'
Rock chips -gray (Alluvium).

STANDARD 0734W.CPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-16

Date Hole Started: 2/25/90 Date Hole Finished: 2/25/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Near trench excavation below lunch house.

Recorded By: MRW
Drilling Company: Becker Drilling
Driller: Ken & Glen
Drilling Method: Becker 180 Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 35

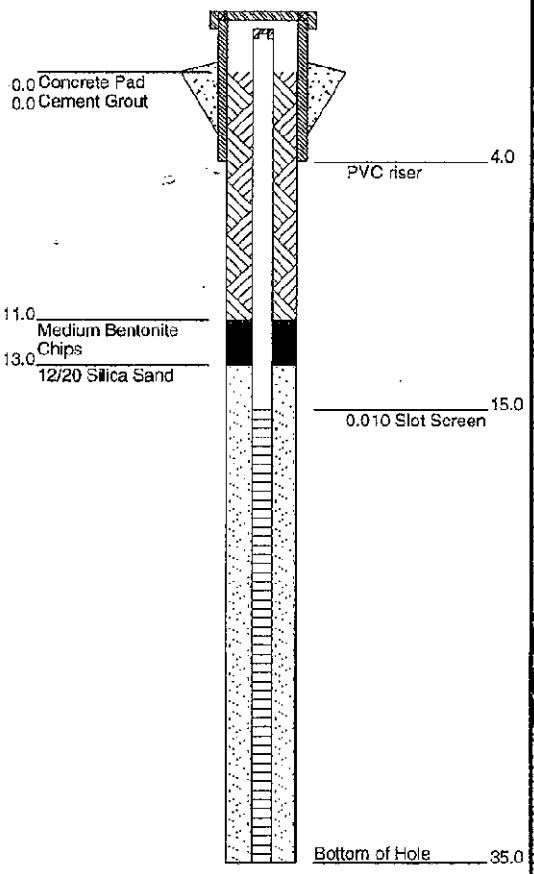
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 35 feet
Surface Casing Used?	Y	8 inch steel	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	15 - 35 feet
Sand Pack?	Y	12/20 silica sand	13 - 35 feet
Annular Seal?	Y	Bentonite Chips	11 - 13 feet
Surface Seal?	Y	Cement Grout	0 - 11 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 23
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

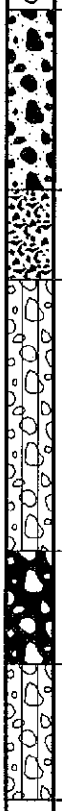
Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3774.65

Remarks: Drilled to 35' and waited one hour. Water level at approximately 35'. Let hole sit overnight and water level at 23'.

WELL CONSTRUCTION



GRAPHICS



GEOLOGICAL DESCRIPTION

0.0 - 8.0'
SANDY GRAVEL -fill material, coarse to medium grained, sandy with rounded to subangular gravel to 3"

8.0 - 12.0'
SLAG FILL -loose slag fill, broken chips to 5", black, hard

12.0 - 24.0'
SILTY GRAVEL -fill material, predominantly silts and gravel to 3" with some coarse grained sand; harder at 20 - 24; moist to wet at 23'

24.0 - 29.0'
ANDESITE COBBLES -hard cobbles at 24 - 26' loose gravel and silt at 26 - 27'; hard cobble at 27 - 29'

29.0 - 35.0'
SILTY GRAVEL -tan silt with gravel and cobbles

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-17

Date Hole Started: 2/25/90 Date Hole Finished: 2/25/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 10' north of EP-1

Recorded By: AJH
Drilling Company: Layne Christensen Co.
Driller: Art
Drilling Method: Driven Casing
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 30

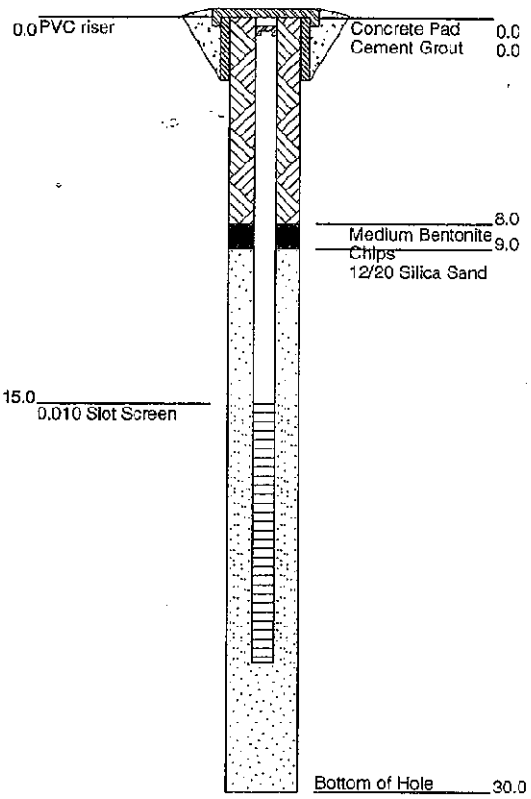
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 25 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	15 - 25 feet
Sand Pack?	Y	12/20 silica sand	9 - 30 feet
Annular Seal?	Y	Bentonite Chips	8 - 9 feet
Surface Seal?	Y	Cement Grout	0 - 8 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 17
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3725.9

Remarks: Samples collected through air rotary rig, Ingersol Rand TH60. Pulled out at 20'. Drilled-bored using AP1000, 250/750 Air. AP1000 rig pulled off hole at 20.5' due to bank instability and hole problems. Andesite causing extremely slow penetration.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 7.0'
FILL -dry to slightly moist, brown at 5'; loose, calcareous, clay, coarse sand

7.0 - 17.0'
SANDY GRAVEL -moist orangish-brown calcareous matrix, clay, slightly moist to wet at 17', light orange to brown

17.0 - 21.0'
ANDESITE BOULDERS -dry (water on top), medium gray to white porphry, quartz feldspars; sand at 18 - 19'

21.0 - 27.0'
SANDY GRAVEL -light orange to orange-brown; calcareous

27.0 - 30.0'
CLAYEY SAND -orangish-brown, calcareous, clay, conglamoritic, medium to very fine sand [Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-18

Date Hole Started: 2/25/90 Date Hole Finished: 2/25/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 740' south of canal tunnel.

Recorded By: Brad Wilson
Drilling Company: Layne
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 31

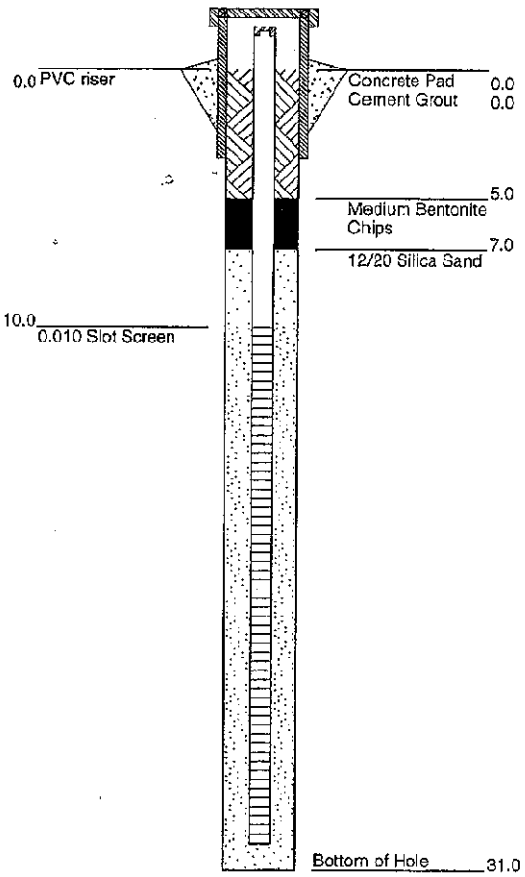
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 30 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	10 - 30 feet
Sand Pack?	Y	12/20 silica sand	7 - 30 feet
Annular Seal?	Y	Bentonite Chips	5 - 7 feet
Surface Seal?	Y	Cement Grout	0 - 5 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP:
Date:
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3725.28

Remarks: 22 - 24 feet: drilled through boulder. Bottom of boring at 31 feet.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 10.0'
GRAVEL -gravel pack for railroad tracks cosisting of various rock fragments, some sand

10.0 - 18.0'
SANDY GRAVEL -rock fragment with some sand and silt

18.0 - 30.0'
SANDY GRAVEL -various rock fragments

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-19

Date Hole Started: 2/25/90 Date Hole Finished: 2/25/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 280' south of canal tunnel.

Recorded By: AJH
Drilling Company: Layne
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 8-inch
Total Depth Drilled (ft): 30

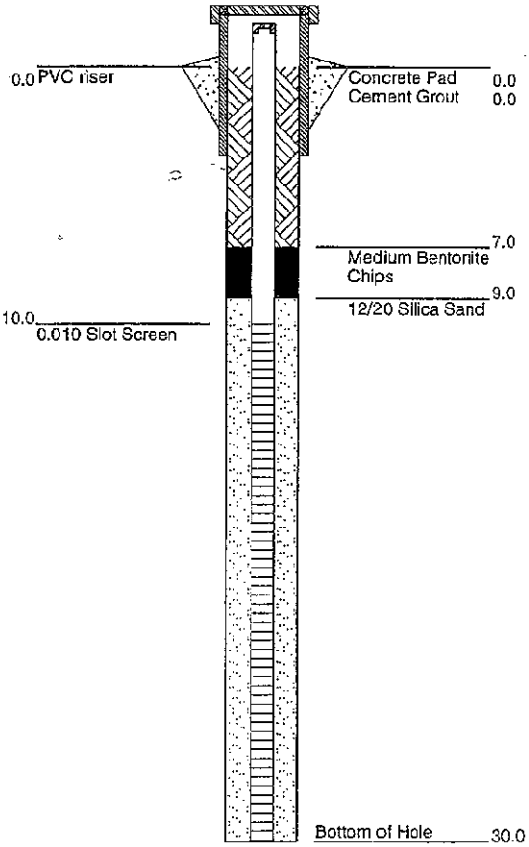
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 30 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	10 - 30 feet
Sand Pack?	Y	12/20 silica sand	9 - 30 feet
Annular Seal?	Y	Bentonite Chips	7 - 9 feet
Surface Seal?	Y	Cement Grout	0 - 7 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 10
Date: 2/90
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3725.63

Remarks: Drilled with Ingersol Rand TH60 rotary rig. SWL 23.4 at 14:21 Kolor Kut paste shows no sign of oil. Location 2 yards west of rr track. Water not detected initially during drilling with 5 1/8" bit. When rig went into hole with 7 7/8" bit, water at approx. 10 - 15 feet.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 6.0'
FILL -light brown, dry clayey sand

6.0 - 15.0'
SANDY GRAVEL -light orange, dry, coarse, calcareous
[Alluvium]

15.0 - 17.0'
ANDESITE BOULDER -dry, medium dark gray, andesite porphyry, sandy gravel

17.0 - 27.0'
SANDY GRAVEL -orangish-brown to medium gray, calcareous matrix (fines), coarse to very coarse sandy gravel

27.0 - 30.0'
CLAYEY SAND -yellow, non-calcareous matrix, clayey, conglamorate, sand; highly variable lithologies: quartz, igneous, rock fragments; clay sized particles react slightly with HCL, coarse fragments don't react
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
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Tucson, Arizona

Monitor Well Log

Hole Name: EP-20

Date Hole Started: 2/26/90 Date Hole Finished: 2/26/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approximately 1370' south of canal tunnel

Recorded By: AJH
Drilling Company: Layne
Driller: Gary
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 30

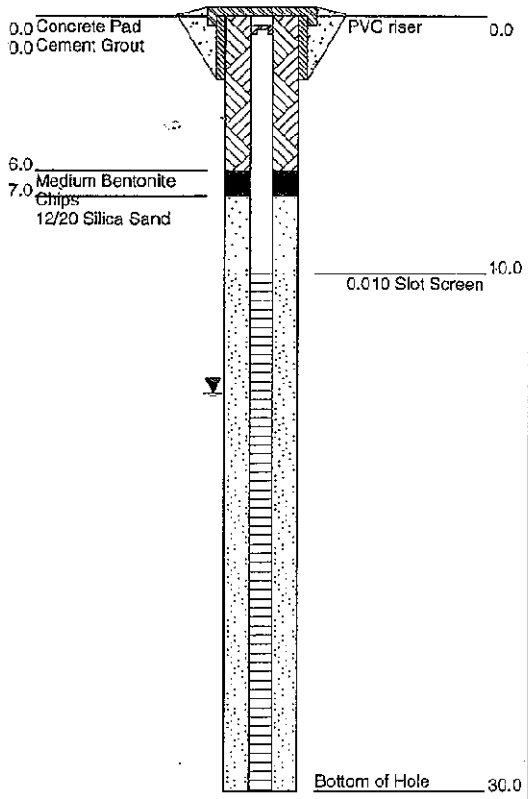
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 30 feet
Surface Casing Used?	Y	Manhole	0 - .25 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	10 - 30 feet
Sand Pack?	Y	10/20 silica sand	7 - 30 feet
Annular Seal?	Y	Bentonite Chips	6 - 7 feet
Surface Seal?	Y	Bentonite/Cement Grout	0 - 6 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 14.39
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3724.8
MP Elevation (ft): 3724.55

Remarks: Located in what appears to be an old arroyo channel, hole SPUD in fill material at 1230. High variable composition of rock fragments

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 7.0'
FILL -poorly sorted, angular to subrounded, calcareous gravel bearing less than 5% coarse sand

7.0 - 10.0'
SANDY GRAVEL -dry, light brown-orange, poorly sorted, calcareous, cuttings clay bearing, fine-coarse sandy gravel

10.0 - 16.0'
SANDY GRAVEL -dry (moist at 14'), yellowish-gray, matrix slightly calcareous, clayey, silty, very coarse sandy gravel
[Alluvium]

16.0 - 17.0'
SILTY SAND -yellowish-gray mostly non-calcareous, silty, very fine sand
[Alluvium]

17.0 - 30.0'
SILTY SAND -medium yellow-gray, fine to medium silty sand, 5% gravel fragments
[Alluvium]

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-21

Date Hole Started: 5/21/90 Date Hole Finished: 5/21/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 18' north of 18,000 gallon diesel

Recorded By: AJH
Drilling Company: Earl & Sons
Driller: Mark T.
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 51

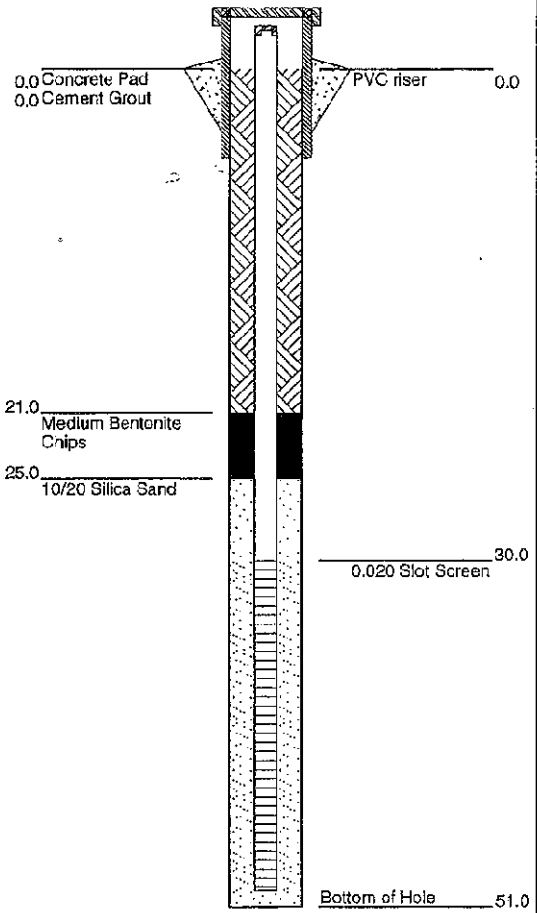
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4-inch, flush threaded, Sch 40, PVC	0 - 51 feet
Surface Casing Used?	Y	12 inch manhole	0 - 36 feet
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	31 - 51 feet
Sand Pack?	Y	10/20 silica sand	25 - 51 feet
Annular Seal?	Y	Bentonite Chips	21 - 25 feet
Surface Seal?	Y	Cement Grout	0 - 21 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 27.80
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3778.62

Remarks:

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 5.0'
SLAG -black with red oxidized areas, dry

5.0 - 7.0'
FILL -moist brownsh-gray, poorly sorted, gravelly sand, calcareous

7.0 - 9.0'
SAND -orangish-brown, slightly moist, moderately sorted, clay bearing, medium sand

9.0 - 15.0'
GRAVELLY SAND -slightly moist, light orangish-brown, slightly calcareous, poorly sorted, subrounded to subangular gravelly sand

15.0 - 28.0'
GRAVELLY SAND -dry, variable colors, calcareous matrix, sand, cobble gravel, subrounded, bimodal grain size distribution divided between medium quartz sand and gravels of highly variable composition

28.0 - 39.0'
GRAVEL -slightly moist, light brown, calcarecus, poorly sorted, angular, sandy andesite gravel - diesel odor

39.0 - 50.0'
SANDY GRAVEL -dark gray, wet, diesel odor, poorly sorted, clayey sandy gravel

50.0 - 51.0'
CLAY to MUDSTONE -moist, reddish-brown, may be top of bedrock - gravel fragments from up hole fell into borehole upon caving

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-22

Date Hole Started: 8/6/90 Date Hole Finished: 8/6/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: NW of above ground storage tank

Recorded By: MRW
Drilling Company: Layne Western
Driller: Art Rodriguez
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Soil Samples
Target Aquifer: NA
Hole Diameter (in): 6-inch
Total Depth Drilled (ft): 55

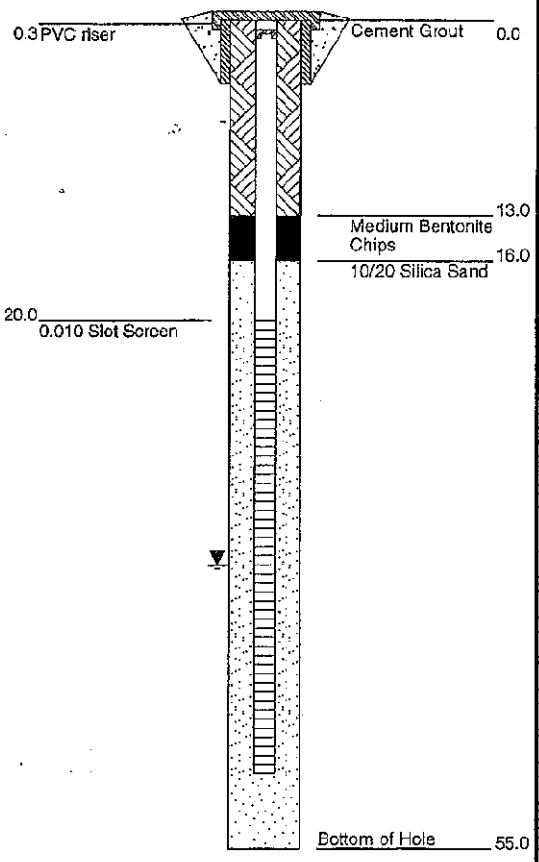
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 50 feet
Surface Casing Used?	Y	Manhole	0 - .5 feet
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	20 - 50 feet
Sand Pack?	Y	10/20 silica sand	16 - 50 feet
Annular Seal?	Y	Bentonite Chips	13 - 16 feet
Surface Seal?	Y	Concrete	0 - 13 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 36.04
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.25

Surface Casing Height (ft): 0
Riser Height (ft): -0.25
Ground Surface Elevation (ft): 3776.48
MP Elevation (ft): 3776.23

Remarks: Drilled open hole with 5 7/8" air rotary on Becker percussion hammer rig. Hole caved from 50 - 55 feet after drill stem was removed. Very little or no water encountered; however, EP-21 (approximately 150 - feet downgradient) has water at 33.5 - feet. Well completion includes 2' X 2" concrete pad with a locking water tight manhole and expansion plug.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 12.0'
SLAG-black angular fragments of hard slag

12.0 - 20.0'
SAND-coarse to medium grained sand

20.0 - 37.0'
GRAVELLY SAND-predominantly fine to coarse grained sand with well-rounded gravel to 1" diameter

37.0 - 52.0'
SILTY GRAVEL-predominantly gravel to 2", well rounded to subangular with tan silt; more silt at 45 - 52'

52.0 - 55.0'
CLAY-low plasticity clay or mudstone; brown to brown-green color

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-23

Date Hole Started: 8/7/90 Date Hole Finished: 8/7/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: 50' south of NE stack

Recorded By: MRW
Drilling Company: Layne Western
Driller: Art Rodriguez
Drilling Method: Percussion Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 50

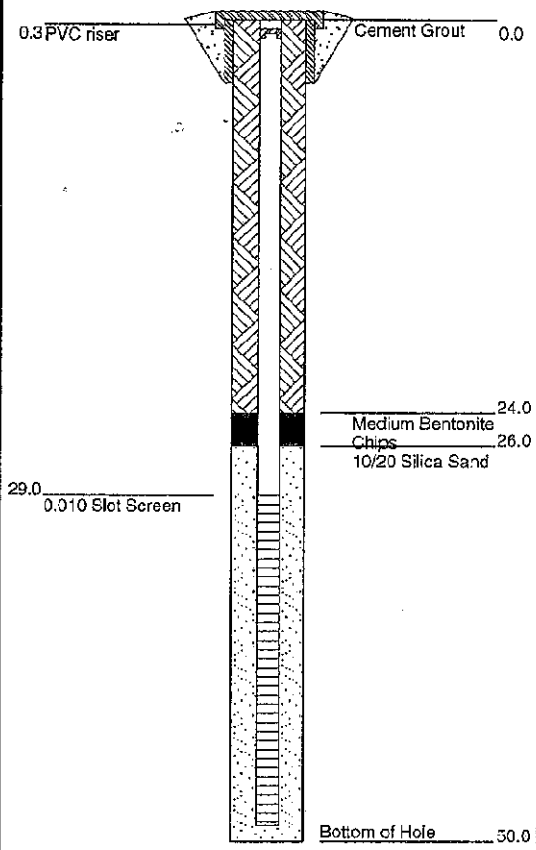
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 49 feet
Surface Casing Used?	N		
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	29 - 49 feet
Sand Pack?	Y	10/20 silica sand	26 - 49 feet
Annular Seal?	Y	Bentonite Chips	24 - 26 feet
Surface Seal?	Y	Cement Grout	0 - 24 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 24.37
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3775.32

Remarks: Let hole sit 1hr @ 50'. No water but approx. 0.2' of diesel-like hydrocarbons in hole. Well completion includes a 2' X 2' concrete pad with a locking water tight manhole and expansion plug. After well completion water level at approx. 30.5' with no phase separated hydrocarbons present.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 1.0'
[Slag Fill]

1.0 - 16.0'
SANDY GRAVEL -poorly graded medium to coarse sand and well-rounded gravel to 2"

16.0 - 30.0'
ANDESITE COBBLES & BOULDERS -up to 12" intermixed with sand and gravels

30.0 - 42.0'
GRAVELLY SAND -medium to coarse grained sand with gravel, angular to subangular to 2"; hydrocarbon stained @ approx. 40 - 41'

42.0 - 43.0'
MUDSTONE -cemented clay, yellow-orange color, low plasticity

43.0 - 50.0'
SANDSTONE -fine-grained sandstone, stained at 44 - 45', clean 45 - 49'

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-24

Date Hole Started: 8/8/90 Date Hole Finished: 8/8/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Near NE corner of anode building

Recorded By: MRW
Drilling Company: Layne
Driller: Art Rodriguez
Drilling Method: Percussion Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 58

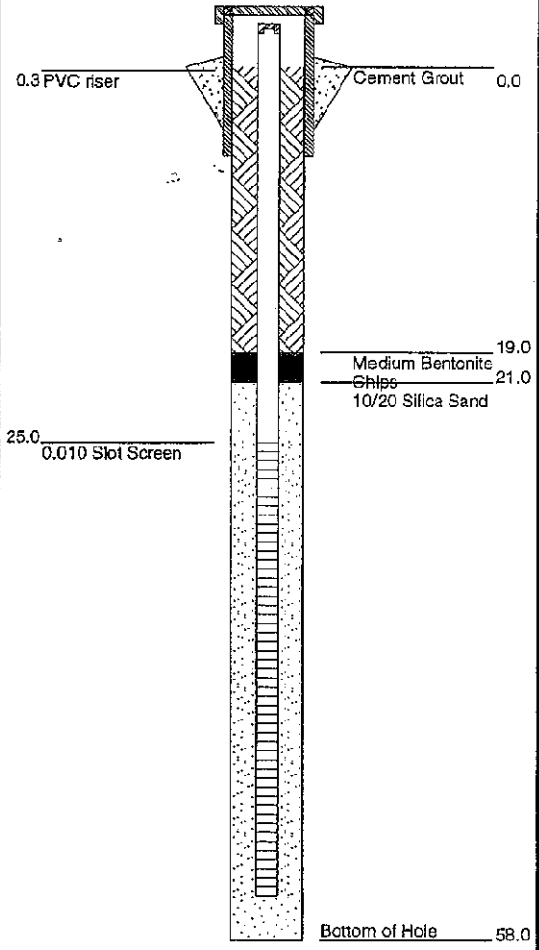
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 55 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	25 - 55 feet
Sand Pack?	Y	10/20 silica sand	21 - 58 feet
Annular Seal?	Y	Bentonite Chips	19 - 21 feet
Surface Seal?	Y	Cement Grout	0 - 19 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 34.56
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3774.87

Remarks: Waited 15 minutees at 50'; hole dry. Drilled to 58', still dry in sandstone. Well completion includes a 2' X 2' concrete pad with a locking water-tight manhole and expansion plug.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 0.5'
ASPHALT PAVEMENT

0.5 - 12.0'
SANDY GRAVEL -well rounded to subrounded gravel to 5" with medium to coarse-grained sand

12.0 - 25.0'
ANDESITE COBBLES -cobbles and boulders to 12" intermixed with sands, silts and gravels

25.0 - 43.0'
GRAVELLY SAND -medium to coarse grained sand with some gravel to 1/2"; angular to subangular

43.0 - 45.0'
SILTY CLAY -low plasticity clay, brown to light brown with silt; some coarse grained sand and gravel to 1/2", intermixed at 45 - 48'

45.0 - 56.0'
SILTY GRAVEL -poorly graded gravel and cobbles to 5", angular to subangular with silty sand (medium to coarse grained)

56.0 - 58.0'
SANDSTONE -fine grained sandstone, highly cemented

STANDARD 0734W.GPJ HYD-TUC.GDT 9/29/98

HYDROMETRICS INC.
Consulting Scientists and Engineers
Tucson, Arizona

Monitor Well Log

Hole Name: EP-25

Date Hole Started: 8/8/90 Date Hole Finished: 8/8/90

Client: ASARCO, Inc.
Project: Asarco El Paso Agreed Order RI
County: El Paso State: Texas
Property Owner: ASARCO, Inc. Property
Legal Description: Asarco Plant
Descriptive Location: Approx. 50 yards NE of "ASARCO" stack

Recorded By: MRW
Drilling Company: Layne
Driller: Art Rodriguez
Drilling Method: Percussion Hammer
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: NA
Hole Diameter (in):
Total Depth Drilled (ft): 70

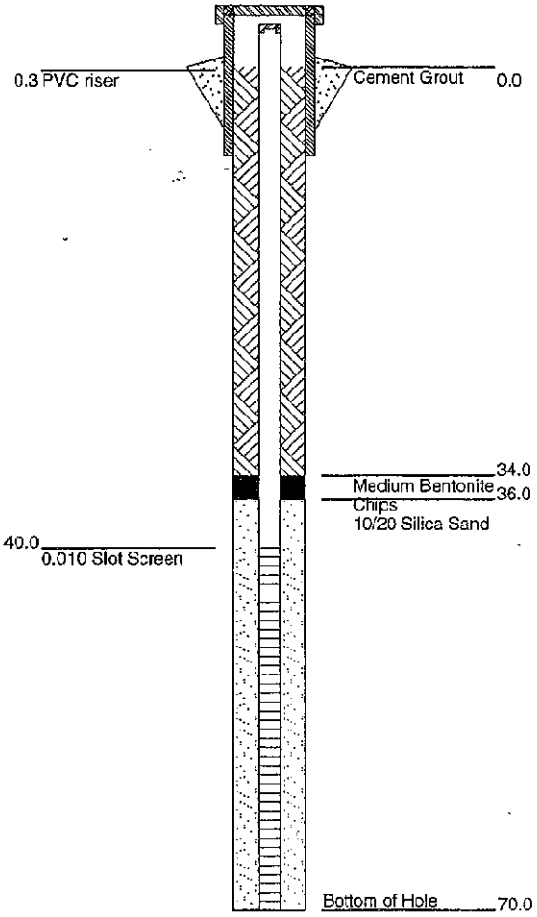
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	0 - 70 feet
Surface Casing Used?	Y	Manhole	
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	40 - 70 feet
Sand Pack?	Y	10/20 silica sand	36 - 70 feet
Annular Seal?	Y	Bentonite Chips	34 - 36 feet
Surface Seal?	Y	Cement Grout	0 - 34 feet
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 47.88
Date: 5/98
MP Description: Top of PVC
MP Height Above or Below Ground (ft):

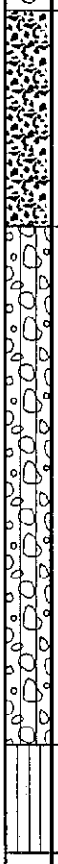
Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft): 3786.72

Remarks: Hydrocarbon stained soils at 60' - 60.5'. Very little water after waiting 15 minutes. Let hole sit overnight from 7pm to 7am; moist at bottom of hole but no water (casing may be sealing off water). Well completion includes a 2' X 2' concrete pad with a water tight locking manhole and expansion plug.

WELL CONSTRUCTION



GRAPHICS



GEOLOGICAL DESCRIPTION

0.0 - 18.0'
SLAG -very hard angular black slag

18.0 - 61.0'
SILTY GRAVEL -primarily well-rounded to angular gravel to 3" with some fine to coarse-grained sand and tan silt; occasional andesite cobbles to 6" at 30 - 40'; black stained soil at 60 - 60.5'

61.0 - 70.0'
CLAYEY SILT -medium plasticity clay and silt with some sand and gravel to 1"; moist to wet

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