EPA Region 5 Records Ctr.
361511

SOLUTIA. Solutions for a better life.

GROUNDWATER MIGRATION CONTROL SYSTEM

2007 ANNUAL REPORT

SAUGET AREA 2 SITE R

SAUGET, ILLINOIS

Submitted By:

Solutia, Inc.
575 Maryville Centre Drive
St. Louis, MO 63141

June 16, 2008

SOLUTIA. *Solutions for a better life.*

June 13th, 2008

Ms. Leah Evison
U. S. EPA - Region 5
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

RE: Sauget Area 2, Operable Unit # 2

Overnight Mail

Dear Leah:

Attached, please find our 2007 Annual Report, prepared in response to your February 12, 2008, Site R – Comprehensive Comments letter.

We are also sending both Sandra Bron and Lisa Cundiff two additional copies each.

Any questions, please advise.

Sincerely

Steven D. Smith

cc: Sandra Bron – IEPA - 2 hard copies
Lisa Cundiff – CH2M Hill – 2 hard copies

TABLES

TABLE 1
SUMMARY OF SITE R MONITORING
2006 - 2007

Monitoring Conducted by American Bottoms WWTP

Analyte	Location Code	Loc Descr	N.obs	From	To	Minimum Conc	Avg Conc	Maximum Conc	Min MDL	Max MDL	Units
1,1,1-Trichloroethane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.19	25	ug/L
1,1,2,2-Tetrachloroethane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.18	25	ug/L
1,1,2-Trichloroethane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.33	25	ug/L
1,1-Dichloroethane	138A	Site R	42	1/10/2006	12/26/2007	0	13.3	22	0.11	25	ug/L
1,1-Dichloroethene	138A	Site R	41	1/10/2006	12/26/2007	0	2.83	7	0.25	25	ug/L
1,2,4-Trichlorobenzene	138A	Site R	35	1/2/2006	12/3/2007	10	84.1	130	1	20	ug/L
1,2-Dichlorobenzene	138A	Site R	43	1/2/2006	12/26/2007	146	1017	2470	10	9	ug/L
1,2-Dichloroethane	138A	Site R	42	1/10/2006	12/26/2007	0	106	236	0.13	9	ug/L
1,2-Dichloroethene (cis)	138A	Site R	23	11/8/2006	12/26/2007	30	41.9	59	0.16	25	ug/L
1,2-Dichloroethene (trans)	138A	Site R	38	1/10/2006	12/26/2007	0	0.729	3	0.17	3	ug/L
1,2-Dichloropropane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.17	25	ug/L
1,2-Diphenylhydrazine	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	1	20	ug/L
1,3-Dichlorobenzene	138A	Site R	43	1/2/2006	12/26/2007	0	38.7	403	0.13	8	ug/L
1,3-Dichloropropene (cis)	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.18	25	ug/L
1,3-Dichloropropene (total)	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.12	25	ug/L
1,3-Dichloropropene (trans)	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.12	25	ug/L
1,4-Dichlorobenzene	138A	Site R	43	1/2/2006	12/26/2007	0	473	1200	10	9	ug/L
1-Chloro-2-nitrobenzene	138A	Site R	35	1/2/2006	12/3/2007	917	20553	36500	1200	8	ug/L
1-Chloro-3-nitrobenzene	138A	Site R	35	1/2/2006	12/3/2007	144	3194	4650	100	90	ug/L
1-Chloro-4-nitrobenzene	138A	Site R	35	1/2/2006	12/3/2007	142	5351	8400	100	90	ug/L
2,4,5-T	138A	Site R	2	7/25/2006	7/27/2006	15	15.5	16	0.18	0.18	ug/L
2,4,5-Trichlorophenol	138A	Site R	38	1/2/2006	12/19/2007	0	227	831	0.6	8	ug/L
2,4,6-Trichlorophenol	138A	Site R	38	1/2/2006	12/19/2007	0	309	674	22	8	ug/L
2,4-D	138A	Site R	29	1/8/2006	12/3/2007	0	2892	23000	0.048	960	ug/L
2,4-Dichlorophenol	138A	Site R	37	1/10/2006	12/19/2007	197	1919	2950	320	80	ug/L
2,4-Dimethylphenol	138A	Site R	37	1/10/2006	12/19/2007	0	24.7	140	1	5.3	ug/L
2,4-Dinitrophenol	138A	Site R	35	1/2/2006	12/19/2007	0	0	0	0.5	81	ug/L
2,4-Dinitrotoluene	138A	Site R	34	1/2/2006	12/3/2007	0	0	0	10	5	ug/L
2,6-Dinitrotoluene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	10	20	ug/L
2-Butanone	138A	Site R	35	1/10/2006	12/26/2007	0	21.9	124	0.56	20	ug/L
2-Chloroaniline	138A	Site R	31	1/2/2006	12/3/2007	8300	17726	39900	200	400	ug/L
2-Chloroethylvinyl ether	138A	Site R	26	1/10/2006	12/26/2007	0	0	0	0.42	2	ug/L
2-Chloronaphthalene	138A	Site R	1	1/2/2006	1/2/2006	0	0	0	10	10	ug/L
2-Chloronapthalene	138A	Site R	28	1/10/2006	12/3/2007	0	3.18	40	1	5	ug/L
2-Chlorophenol	138A	Site R	38	1/2/2006	12/19/2007	350	1374	2000	10	60	ug/L
2-Methylnaphthalene	138A	Site R	23	1/2/2006	12/3/2007	0	0	0	10	5	ug/L
2-Nitroaniline	138A	Site R	32	1/2/2006	12/3/2007	0	4.69	38	0.7	7	ug/L
2-Nitrophenol	138A	Site R	38	1/2/2006	12/19/2007	0	0	0	1	5	ug/L
3,3-Dichlorobenzidine	138A	Site R	26	1/2/2006	10/2/2007	0	0	0	10	20	ug/L
3-Chloroaniline	138A	Site R	32	1/2/2006	12/3/2007	1000	3064	4650	100	50	ug/L
3-Nitroaniline	138A	Site R	25	1/2/2006	10/2/2007	0	0	0	0.9	9	ug/L
4,6-Dinitro-2-methylphenol	138A	Site R	35	1/2/2006	12/19/2007	0	0	0	0.6	9	ug/L
4-Bromophenyl-phenyl ether	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	1	20	ug/L
4-Chloro-2,6-dinitrophenol	138A	Site R	1	1/2/2006	1/2/2006	0	0	0	8	8	ug/L
4-Chloro-3-methylphenol	138A	Site R	38	1/2/2006	12/19/2007	0	0	0	0.5	9	ug/L
4-Chloroaniline	138A	Site R	32	1/2/2006	12/3/2007	1340	4356	11200	100	50	ug/L
4-Chlorophenol-phenyl ether	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	1	5	ug/L
4-Methyl-2-Pentanone	138A	Site R	41	1/10/2006	12/26/2007	0	148	730	0.65	30	ug/L

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2006 - 2007

Monitoring Conducted by American Bottoms WWTP

Analyte	Location Code	Loc Descr	N.obs	From	To	Minimum Conc	Avg Conc	Maximum Conc	Min MDL	Max MDL	Units
4-Nitroaniline	138A	Site R	32	1/2/2006	12/3/2007	0	8.44	80	1	50	ug/L
4-Nitrophenol (PNP)	138A	Site R	1	1/2/2006	1/2/2006	0	0	0	9	9	ug/L
5-Methyl-2-Hexanone	138A	Site R	6	7/11/2007	12/26/2007	0	4.10	7.3	0.6	50	ug/L
Acenaphthene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.9	9	ug/L
Acenaphthylene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	1	5	ug/L
Acetone	138A	Site R	27	1/10/2006	5/25/2007	0	887	3700	100	200	ug/L
Acetonitrile	138A	Site R	8	5/24/2007	12/26/2007	0	10.1	42	2	61.82	ug/L
Acrolein	138A	Site R	25	1/10/2006	12/26/2007	0	0	0	178.28	6	ug/L
Acrylonitrile	138A	Site R	38	1/10/2006	12/26/2007	0	0	0	1	50	ug/L
Ammonia	138A	Site R	28	1/3/2006	12/26/2007	0	4.67	7.5	0.5	0.7	mg/L
Aniline	138A	Site R	32	1/2/2006	12/3/2007	1660	5056	17200	200	90	ug/L
Anthracene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.6	6	ug/L
Benzene	138A	Site R	42	1/10/2006	12/26/2007	250	1812	4500	10	58	ug/L
Benzidine	138A	Site R	16	1/2/2006	12/3/2007	0	0	0	10	30	ug/L
Benzo(a)anthracene	138A	Site R	35	1/2/2006	12/3/2007	0	0.286	10	1	20	ug/L
Benzo(a)pyrene	138A	Site R	35	1/2/2006	12/3/2007	0	0.343	12	0.5	5	ug/L
Benzo(b)fluoranthene	138A	Site R	31	1/2/2006	12/3/2007	0	0.419	13	0.6	6	ug/L
Benzo(g,h,i)perylene	138A	Site R	28	1/2/2006	12/3/2007	0	0.357	10	1	5	ug/L
Benzo(k)fluoranthene	138A	Site R	33	1/2/2006	12/3/2007	0	0.515	17	0.6	6	ug/L
Biochemical Oxygen Demand	138A	Site R	16	1/4/2006	7/12/2006	106	150	223	2	2	mg/L
bis(2-Chloroethoxy)methane	138A	Site R	32	1/2/2006	10/2/2007	0	0	0	0.8	8	ug/L
bis(2-Chloroethyl)ether	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	1	50	ug/L
bis(2-Chloroisopropyl)ether	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.7	7	ug/L
bis(2-Ethylhexyl)phthalate	138A	Site R	33	1/2/2006	12/3/2007	0	0	0	10	5	ug/L
Bromodichloromethane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.17	25	ug/L
Bromoform	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.22	25	ug/L
Bromomethane	138A	Site R	38	1/10/2006	12/26/2007	0	0	0	0.74	7.39	ug/L
Butylbenzylphthalate	138A	Site R	33	1/2/2006	12/3/2007	0	0	0	10	5	ug/L
Cadmium	138A	Site R	16	5/23/2006	7/29/2006	0	0	0	0.001	0.001	mg/L
Carbazole	138A	Site R	32	2/15/2006	12/3/2007	0	0.625	20	1	10	ug/L
Carbon Disulfide	138A	Site R	38	1/10/2006	12/26/2007	0	0.053	2	0.43	25	ug/L
Carbon tetrachloride	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.15	9.64	ug/L
Chlorobenzene	138A	Site R	42	1/10/2006	12/26/2007	2700	3757	5540	10	900	ug/L
Chloroethane	138A	Site R	42	1/10/2006	12/26/2007	0	2.93	18	0.27	9.07	ug/L
Chloroform	138A	Site R	42	1/10/2006	12/26/2007	0	3.55	21	0.21	25	ug/L
Chloromethane	138A	Site R	38	1/10/2006	12/26/2007	0	0.132	3	0.19	7.15	ug/L
Chrysene	138A	Site R	35	1/2/2006	12/3/2007	0	0.400	14	0.6	6	ug/L
Copper	138A	Site R	16	5/23/2006	7/29/2006	0.012	0.051	0.177	0.003	0.003	mg/L
Cyanide, Total	138A	Site R	23	1/10/2006	10/11/2007	0	0.003	0.032	0.002	0.01	mg/L
Dibenzo(a,h)anthracene	138A	Site R	30	1/2/2006	12/3/2007	0	0.400	12	0.5	5	ug/L
Dibenzofuran	138A	Site R	23	1/2/2006	12/3/2007	0	0	0	1	5	ug/L
Dibromochloromethane	138A	Site R	41	1/10/2006	12/26/2007	0	0	0	0.15	25	ug/L
Diethylphthalate	138A	Site R	32	2/15/2006	12/3/2007	0	0	0	1	10	ug/L
Dimethylphthalate	138A	Site R	32	2/15/2006	12/3/2007	0	0	0	0.7	7	ug/L
Di-n-butylphthalate	138A	Site R	32	1/2/2006	12/3/2007	0	0	0	10	5	ug/L
Di-n-octyl phthalate	138A	Site R	31	1/2/2006	12/3/2007	0	0	0	10	50	ug/L
Dinoseb	138A	Site R	3	7/25/2006	10/24/2006	0	0	0	0.049	0.049	ug/L
Ethyl Benzene	138A	Site R	42	1/10/2006	12/26/2007	48	82.1	137	0.13	25	ug/L

TABLE 1
SUMMARY OF SITE R MONITORING
2006 - 2007

Monitoring Conducted by American Bottoms WWTP

Analyte	Location Code	Loc Descr	N.obs	From	To	Minimum Conc	Avg Conc	Maximum Conc	Min MDL	Max MDL	Units
Fluoranthene	138A	Site R	35	1/2/2006	12/3/2007	0	0.229	8	0.6	6	ug/L
Fluorene	138A	Site R	30	1/2/2006	12/3/2007	0	0	0	1	20	ug/L
Hexachlorobenzene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.6	6	ug/L
Hexachlorobutadiene	138A	Site R	29	2/15/2006	12/3/2007	0	0	0	2	20	ug/L
Hexachlorocyclopentadiene	138A	Site R	19	2/15/2006	12/3/2007	0	0	0	2	20	ug/L
Hexachloroethane	138A	Site R	33	1/2/2006	12/3/2007	0	0	0	0.9	9	ug/L
Hexane	138A	Site R	5	6/19/2006	9/27/2007	1	1.20	2	0.17	0.2	ug/L
Indeno(1,2,3-cd)pyrene	138A	Site R	29	1/2/2006	12/3/2007	0	0.345	10	1	20	ug/L
Isophorone	138A	Site R	32	1/2/2006	10/2/2007	0	0	0	0.8	8	ug/L
m and p-Xylene	138A	Site R	41	1/10/2006	12/26/2007	110	288	620	0.25	30	ug/L
Manganese	138A	Site R	16	5/23/2006	7/29/2006	1.7	1.82	2.4	0.006	0.006	mg/L
Mercury	138A	Site R	25	1/10/2006	11/14/2007	0	0.002	0.06	0.05	0.2	ug/L
Methylene chloride	138A	Site R	33	1/10/2006	12/26/2007	0	4.67	20	0.32	34.26	ug/L
Naphthalene	138A	Site R	30	1/2/2006	12/3/2007	0	0	0	1	5	ug/L
n-Decane	138A	Site R	32	2/15/2006	12/3/2007	0	0	0	0.5	5	ug/L
Nitrobenzene	138A	Site R	35	1/2/2006	12/3/2007	0	24.8	209	0.8	8	ug/L
N-Nitrosodimethylamine	138A	Site R	31	3/1/2006	12/3/2007	0	0	0	0.7	7	ug/L
N-Nitroso-di-n-propylamine	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.7	7	ug/L
N-Nitrosodiphenylamine	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	10	20	ug/L
n-Octadecane	138A	Site R	31	3/1/2006	12/3/2007	0	0	0	0.7	7	ug/L
o-cresol	138A	Site R	37	1/10/2006	12/19/2007	0	0	0	1	5	ug/L
Oil & Grease, Hexane Extraction	138A	Site R	3	2/10/2006	3/22/2006	24	35.0	45	1	1	mg/L
o-Xylene	138A	Site R	41	1/10/2006	12/26/2007	27	58.1	94.5	0.14	50	ug/L
p-Cresol & m-Cresol	138A	Site R	37	1/10/2006	12/19/2007	47	297	530	1	5	ug/L
Pentachlorophenol	138A	Site R	39	1/10/2006	12/19/2007	5.2	46.3	120	0.19	9	ug/L
Phenanthrene	138A	Site R	35	1/2/2006	12/3/2007	0	0	0	0.5	5	ug/L
Phenol	138A	Site R	38	1/2/2006	12/19/2007	31	7580	11600	10	8.2	ug/L
Pyrene	138A	Site R	33	1/2/2006	12/3/2007	0	0.273	9	0.7	7	ug/L
Silvex (2,4,5-TP)	138A	Site R	25	1/8/2006	12/3/2007	0	0.249	3	0.018	0.231	ug/L
Tetrachloroethene	138A	Site R	41	1/10/2006	12/26/2007	0	25.1	58	0.2	25	ug/L
Toluene	138A	Site R	42	1/10/2006	12/26/2007	132	273	900	0.58	25	ug/L
Total Kjeldahl Nitrogen	138A	Site R	7	1/3/2006	1/23/2006	6.2	7.87	9.4	0.2	0.2	mg/L
Trichloroethene	138A	Site R	42	1/10/2006	12/26/2007	0	13.5	60	0.14	25	ug/L
Trichlorofluoromethane	138A	Site R	5	6/19/2006	9/27/2007	0	0	0	0.29	0.29	ug/L
Vinyl chloride	138A	Site R	42	1/10/2006	12/26/2007	0	16.5	29	0.18	8.64	ug/L
Xylene (total)	138A	Site R	42	1/10/2006	12/26/2007	137	343	715	0.3	30	ug/L
Zinc	138A	Site R	16	5/23/2006	7/29/2006	0.05	0.163	0.9	0.02	0.02	mg/L

TABLE 2

GROUNDWATER MIGRATION CONTROL SYSTEM
System Down Time 2006 - 2007

From	To	Duration	Remarks
2/8/2006	2/8/2006	1 hr.	Utility power failure
4/2/2006	4/3/2006	1 day	Requested by POTW
5/24/2006	5/24/2006	5 hrs.	Planned system maintenance.
6/17/2006	6/17/2006	8 hrs.	Utility power failure
7/19/2006	7/19/2006	12 hrs	Utility Power failure
8/14/2006	8/14/2006	10 hrs.	Planned system maintenance.
8/15/2006	8/15/2006	10 hrs.	Planned system maintenance.
8/17/2006	8/17/2006	10 hrs.	Planned system maintenance.
8/18/2006	8/18/2006	10 hrs.	Planned system maintenance.
8/29/2006	8/29/2006	3 hrs.	Pump replacement.
8/30/2006	8/30/2006	3 hrs.	Pump replacement.
9/28/2006	9/28/2006	2 hrs.	Planned system maintenance.
11/30/2006	12/4/2006	4 days	Utility power failure
1/31/2007	1/31/2007	6 hrs	Planned system maintenance.
2/2/2007	2/2/2007	3 hrs.	Planned system maintenance.
2/26/2007	2/26/2007	2 days	Requested by POTW
12/5/2007	12/7/2007	2 days	Requested by POTW

Table 3
Component Failure Table
Period February 1, 2006 through December 31,2007

Item Number	Date	Comments from Field Activity Log
1	6/19/2006	Replaced PZ-1 IN piezometer with a Geokon model 4500 HD serial number 05-6627. Moved PZ-1 IN input to 1:3 on MCU and moved input to second channel on LAB 3 surge board for PZ-1 IN. Moved PZ-1 OUT to an open channel on MCU.
2	7/29/2006	PZ-5U - PZ-5D pair quit reading, PZ-7U - PZ-7D pair quit reading. System shut down when no calculation for the Q could be made. Restarted system remotely by replacing PZ-5 pair with PZ-6 pair in the Q calculation.
	7/31/2006	PZ-5 pair and PZ-7 pair problem found, surge module input channels bad at the MCU enclosure RMU2 and RMU4 respectively. Repaired the PZ-5 pair and PZ-7 pair by moving the input channel wiring on the MCU surge module to unused input channels. Previous channels damaged not allowing signal through.
3	9/1/2006	Replaced EW1 level sensor with a spare 4500S from the office.
4	12/13/2006	Today I changed out PZ- 1 Outside.
5	1/29/2007	Problem with EW1 valve actuator stuck closed. 20 mA signal to actuator is good. Can not get valve actuator to switch into local mode.
	1/29/2007	Problem with EW2 valve actuator not sending 20 mA feedback signal.
	1/31/2007	System shut down for troubleshooting. Bill Oliver with Mead & O' Brian finds EW1 valve is stuck closed and the motor actuator does not have enough torque to open it. The closed limit was adjusted so the EW1 valve does not close completely. EW2 has a defective internal transformer. EW2 actuator needs replacement part to operate fully and will be installed on Friday February 4th. The input voltage was measured at the input breaker panel 790, 801, 801 phase to phase. This looked to be caused by a faulty voltage meter.
	2/2/2007	Bill Oliver replaced transformer in EW-2 actuator box. Also adjusted the closed limit switch since the valve as sticking a little.
6	4/4/2007	System activated pumps EW1 and EW3 on 4-2-07 between 10:00 and 11:00 pm. Problem with PZ-8D elevation reading. System switched to manual on 4-3-07 8:00 am to keep pumps from restarting. Heavy rain filled up quazite box at PZ-8D, the surge module enclosure was half full of water with corrosion damage to the surge circuit board. Replaced the circuit board and PZ-8D readings are correct. System left in manual mode.
	5/17/2007	Piezometer 8U has unstable readings from last few days. The quazite box was half covered with soil and rock. A shovel was used to clear the debris from the quazite lid. The surge module enclosure was half full of water with corrosion damage to the surge circuit board. Replaced the circuit board and PZ-8U readings are correct. System left in manual mode.
7	5/27/2007	System switched to run EW1 and EW3. Then began switching back and forth between EW2 then EW1 & EW3. Q was aroung the 80 GPM point. Problem with EW3 has developed. EW3 cannot pump more than 30 GPM. EW3 has been set to manual only. Control algorithm has been modified to run EW2 with EW1 over 100 GPM.
	5/30/2007	Layne Western replaced the pump and motor at EW3 to fix problem with the low flow. New pump and motor from pole barn were used. After replacement the problem still exist. No flow over 30 GPM. Problem may be in the AC motor drive. Scheduling a technician from Rockwell Automation to look at drive.
	6/11/2007	Dan with Layne Western set up a cross phase motor starter and connected it to the output of the EW3 pump panel disconnect switch. Output of the motor starter was connected to the output of the AC Drive wiring which goes to the well pump.No resolve in the problem. Dan said the pump seems to have the water line plugged. I checked with Mead O'Brian to see if they could look at the plug valve / actuator.
	6/12/2007	Gary Modglin with Mead O"Brian and Dan with Layne on site. Gary found the shaft key not installed between the valve and the actuator. Once the shaft key was replaced the valve was opened and the pump was started and went up to 850 GPM.
8	6/13/2007	PZ-6U has erratic readings lately. The quazite box which houses the surge module can not be located in the area around the well casing. (Landscaping company lot)

Table 3
Component Failure Table
Period February 1, 2006 through December 31,2007

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	6/18/2007	Layne Western pulled EW2 pump to remove sensor that was stuck in the well. They also added an extension to the internal stand pipe in EW2 up to where the sensor could easily be placed into it. EW2 level sensor was calibrated and placed into service. Troubleshooting of PZ-4 IN and PZ-4 OUT continued. PZ-4 IN: Check line resistance, good at 275 ohms. Replaced the surge module at the top of the well. Swapped input channels at RMU1. Sensor signal looks good at the top of the well. Everything changed except sensor. Will install newer surge modules tomorrow.
	6/19/2007	Still troubleshooting PZ-4 IN: Changed surge module again. Changed 4500HD sensor. No resolve. Line checks good with 4-20mA signal and cable line tester at 2010 feet. Troubleshooting PZ-4 OUT: changed input channel on RMU1 surge module. Reading good from PZ-4 OUT.
	6/20/2007	Still troubleshooting PZ-4 IN: Bypassed the surge module. Line checks good. Suspect problem with surge module shorting out on standoff. By late afternoon the signal is not good even if bypassed by the surge module.
	6/21/2007	Still troubleshooting PZ-4 IN: Changed out 4500HD sensor for second time. Calibration zero reading comes through to the MCU OK. Calibrate and drop transducer at final depth reading becomes erratic again to the MCU. Pull the transducer up out of the water and the reading is good again to MCU. Suspect noise problem with overhead lines at the location of PZ-4 IN. Installing the sensor at a higher elevation helps keep the signal to the MCU good. Later reading becomes erratic again. Changed the sweep frequency from 5Khz to 3Khz. This seems to stabilize the reading for now. May need to install a 4-20mA sensor on this well in the future.
10	7/2/2007	Problem with Internet connection. And the river stage bubbler is not sending a 4-20mA signal.
	7/3/2007	American Bottoms Tech Scott Sandusky found a fuse blown in the River stage 4-20mA signal isolator. Replacing the fuse and powering up blew the fuse again. No spares fuses available. Replaced the whole signal isolator. We are waiting for replacement fuses to be shipped to American Bottoms. The satellite system has a problem connecting to the NOC (Network Operations Center) in Germantown, Maryland.which in turn connects to the internet. I am waiting for a responce from the NOC regarding the problems we are experiencing
11	9/7/2007	Internet service switched from satellite to Verizon wireless broadband. Setup FTP server with new IP address at URS office. Setup new router to give access to PC Anywhere for remote control via the internet. Problem found in control software not turning on or regulating EW-2. Additional MCU program lines were found corrupted. Verifying and reloading the problem sections of the program corrected the problem. Added offset to PZ-4IN to bring it back to the correct range.
12	9/10/2007	PZ-8D began giving erroneous readings over the weekend. This caused the pumps to increase pumping to over 700 GPM each at times. PZ-8D surge module enclosure had water in it. Replacing the surge board still gave incorrect readings. Changed sweep freq from 5khz to 3khz and narrowed the time to 400 ms. This stabilized the readings to the correct range. Checked PZ-8U quazite box and found no water in it. Set flow meter at outfall to display the totalized value and the current flow. Current database size was over 290MB and running queries very slow. I cleaned out database by creating a new Field Database of the current system and replaced the SQLDATA4.db file. Old file is backed up in a zip file. SQLDATA4_091070_1300.zip with the date and time in file name.
	9/15/2007	Changed programming to use the PZ-7 pair to calculate flow. Removed PZ-8 pair due to erratic readings of PZ-8D. Change was made by request of Richard Williams
	9/25/2007	Troubleshot PZ-8D due to erroneous readings. No new raw readings now recorded. No raw reading found at the piezometer location. Transducer is defective. Replaced unit with Geokon model 4500HD 3-170KPa (25 PSI). S/N 04-15227. Sensor calibrated and stable Reapplied PZ-8 pair in the flow calculation at 16:30 Continued work on PZ-4IN noise problem. Swapped wire pairs on PZ-4E from orange/white to gray/white. Let read over night.

Table 3
Component Failure Table
Period February 1, 2006 through December 31,2007

13	9/26/2007	Continued work on PZ-4IN noise problem. Swapped leads did not help problem. In fact PZ-4W became unstable. Colin Judd at Geokon suggested reading the mV range just holding meter probes in the air to check for any EMF noise. I measured 200mV to 150mV fluctuating by just holding meter probes in the air under the high voltage lines over the PZ-4 piezometers. Tried another pairs of wires, brown/white with no positive results. Disconnecting all wires except the green/white for PZ-4W, stablizes the readings for PZ-4W. Ordering 4-20mA type signal output sensors.
	10/3/2007	Grounded all wire pairs except PZ-4OUT at the piezometer location. Removed ground connection at the MCU.
	10/24/2007	Installed new Geokon Model 3400 4-20mA piezometer sensor in PZ-4IN. Problem with signal going through the LAB -3 surge module. Signal is unstable and not in correct range. Removing the LAB-3 from the circuit fixes the problem. Will check with Geokon on LAB-3 use with 4-20mA signal. Calibrated sensor and added a new instrument PZ-4test to control programming.
	10/25/2007	Installed a new 4-20mA piezometer sensor Geokon Model 3400 in PZ-4OUT. Calibrated sensor and configured the programming with the old instrument names for both PZ-4IN and PZ-4OUT. Checked calibration of PZ-EW3 extraction well elevation. I manually measured the extraction well elevation twice. The second time the probe became stuck within the well. The pump will have to be pulled to get the probe loose. At present the reel in stored in the pump control enclosure.
14	11/29/2007	River gage decreased to 357.8 at 19:00 on 11-28-07. Reading returned to 381.3 at 8:00 this morning. Must have been a problem with the bubbler. Left message with Richard Harris of AB to verify problem. 12:20 Richard Harris confirmed they are having problems with the bubbler system. They should have it repaired by the end of the day.
15	12/5/2007	PZ-8U quit reading after 1:00 PM. A track hoe cut the line installing gas line.
	12/5/2007	PZ-7U quit reading after 4:00 PM. A track hoe cut the line installing gas line.
	12/6/2007	PZ-8U and PZ-7U damaged wires were found. PZ-7U line spliced together with a 3M 82-A1 splice kit. Additional splice kits on order. PZ-8U is repaired and wrapped with tape ready for splice kit installation. System is still shut down due to American Bottoms request. Gas line is going to cross the PZ-6U line sometime tomorrow 12-7-07
	12/7/2007	PZ-6U line cut by contractor installing gas line. Splice kit installed on PZ-8U and PZ-6U
	12/9/2007	PZ8 pair malfunctioning. Set system to manual and set total flow rate to 920 gpm.
	12/11/2007	Signal from PZ-5U was lost between 1:00 and 2:00 PM. System total Q calc changed to use 7 pair and 8 pair. Gas line trenching hit instrument cable.
16	12/11/2007	PZ-8D began giving high level readings due to surface rain water flooding the stand pipe. Changed the total Q calc to use the 6 and 7 piezo pairs.
	12/12/2007	Changed the total Q calc back to pairs 7 and 8.
	12/13/2007	PZ-5U repaired with 3M splice kit. Setup PZ-5 pair with PZ-8 pair in the total Q calculation.

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Item Number	Date	Comments from Field Activity Log
1	6/19/2006	Replaced PZ-1 IN piezometer with a Geokon model 4500 HD serial number 05-6627. Moved PZ-1 IN input to 1:3 on MCU and moved input to second channel on LAB 3 surge board for PZ-1 IN. Moved PZ-1 OUT to an open channel on MCU.
2	7/29/2006	PZ-5U - PZ-5D pair quit reading, PZ-7U - PZ-7D pair quit reading. System shut down when no calculation for the Q could be made. Restarted system remotely by replacing PZ-5 pair with PZ-6 pair in the Q calculation.
	7/31/2006	PZ-5 pair and PZ-7 pair problem found, surge module input channels bad at the MCU enclosure RMU2 and RMU4 respectively. Repaired the PZ-5 pair and PZ-7 pair by moving the input channel wiring on the MCU surge module to unused input channels. Previous channels damaged not allowing signal through.
3	9/1/2006	Replaced EW1 level sensor with a spare 4500S from the office.
4	12/13/2006	Today I changed out PZ- 1 Outside.
5	1/29/2007	Problem with EW1 valve actuator stuck closed. 20 mA signal to actuator is good. Can not get valve actuator to switch into local mode.
	1/29/2007	Problem with EW2 valve actuator not sending 20 mA feedback signal.
	1/31/2007	System shut down for troubleshooting. Bill Oliver with Mead & O' Brian finds EW1 valve is stuck closed and the motor actuator does not have enough torque to open it. The closed limit was adjusted so the EW1 valve does not close completely. EW2 has a defective internal transformer. EW2 actuator needs replacement part to operate fully and will be installed on Friday February 4th. The input voltage was measured at the input breaker panel 790, 801, 801 phase to phase. This looked to be caused by a faulty voltage meter.
	2/2/2007	Bill Oliver replaced transformer in EW-2 actuator box. Also adjusted the closed limit switch since the valve as sticking a little.
6	4/4/2007	System activated pumps EW1 and EW3 on 4-2-07 between 10:00 and 11:00 pm. Problem with PZ-8D elevation reading. System switched to manual on 4-3-07 8:00 am to keep pumps from restarting. Heavy rain filled up quazite box at PZ-8D, the surge module enclosure was half full of water with corrosion damage to the surge circuit board. Replaced the circuit board and PZ-8D readings are correct. System left in manual mode.
	5/17/2007	Piezometer 8U has unstable readings from last few days. The quazite box was half covered with soil and rock. A shovel was used to clear the debris from the quazite lid. The surge module enclosure was half full of water with corrosion damage to the surge circuit board. Replaced the circuit board and PZ-8U readings are correct. System left in manual mode.
7	5/27/2007	System switched to run EW1 and EW3. Then began switching back and forth between EW2 then EW1 & EW3. Q was aroung the 80 GPM point. Problem with EW3 has developed. EW3 cannot pump more than 30 GPM. EW3 has been set to manual only. Control algorithm has been modified to run EW2 with EW1 over 100 GPM.
	5/30/2007	Layne Western replaced the pump and motor at EW3 to fix problem with the low flow. New pump and motor from pole barn were used. After replacement the problem still exist. No flow over 30 GPM. Problem may be in the AC motor drive. Scheduling a technician from Rockwell Automation to look at drive.
	6/11/2007	Dan with Layne Western set up a cross phase motor starter and connected it to the output of the EW3 pump panel disconnect switch. Output of the motor starter was connected to the output of the AC Drive wiring which goes to the well pump.No resolve in the problem. Dan said the pump seems to have the water line plugged. I checked with Mead O'Brian to see if they could look at the plug valve / actuator.
	6/12/2007	Gary Modglin with Mead O"Brian and Dan with Layne on site. Gary found the shaft key not installed between the valve and the actuator. Once the shaft key was replaced the valve was opened and the pump was started and went up to 850 GPM.
8	6/13/2007	PZ-6U has erratic readings lately. The quazite box which houses the surge module can not be located in the area around the well casing. (Landscaping company lot)

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	12/12/2007	Changed the total Q calc back to pairs 7 and 8.
	12/13/2007	PZ-5U repaired with 3M splice kit. Setup PZ-5 pair with PZ-8 pair in the total Q calculation.

Attachment 1

1.0 Introduction

1.1 Interim Operating Period I

On November 30, 2004, USEPA, responding to Solutia's November 16, 2004 Sauget Area 2 Groundwater Migration Control System Status Report, proposed a 90-day Interim Operating Period starting on December 1, 2004. Surface water level, groundwater level and pumping rate data collected during this period were to be used to determine if the Sauget Area 2 Groundwater Migration Control System could be operated as specified in the Record of Decision (ROD), i.e., zero or negative (inward) gradient across the barrier wall as measured at piezometer pairs located at the northwest and southwest corners of the barrier wall and halfway between the center and northern and center and southern extraction wells (Figures 1 and 2).

Interim Operating Period I began December 1, 2004 and ended February 28, 2005. Groundwater level, surface water level and pumping rate data collected during Interim Operating Period I demonstrated that:

- **Gradients across the barrier wall were positive (outward) on 28 days (31%) during Interim Operating Period I and were associated with low surface water levels; and**
- **On 11 of the 28 days (39.3%) with positive (outward) gradients, the Sauget Area 2 Groundwater Migration Control System was pumping at maximum system capacity, an average of 2166 gpm).**

These observations demonstrated that the Sauget Area 2 Groundwater Migration Control System could not be operated to achieve the ROD requirement for zero or negative gradient across the barrier wall under low river stage conditions even when pumping at maximum system capacity. Consequently, Solutia requested and USEPA approved operation and testing of the Sauget Area 2 Groundwater Migration Control System during a second 90-day Interim Operating Period (IOP II) using groundwater flow into the barrier wall, computed using Darcy's Law, as a performance measure.

1.2 Interim Operating Period II

Interim Operating Period II started August 1, 2005 and finished October 31, 2005, a total of 92 days. Pumping rate, surface water level and groundwater level data collected during Interim Operating Period II demonstrated that:

- **Darcy's Law flow, computed using negative gradients from piezometer pairs PZ-5 U/D, PZ-6 U/D, PZ-7 U/D and PZ-8 U/D, was within + 3.5 percent to - 4.6 percent of actual groundwater flow into the Sauget Area 2 Groundwater Migration Control System estimated using groundwater flow line and flow vector deflections.**

Based on the results of Interim Operating Period II, Solutia determined that additional operational data were needed to optimize and simplify operation of the Sauget Area 2 Groundwater Migration Control System. During a January 12, 2006 meeting, USEPA and Solutia discussed the need for another 90-day Interim Operating Period (IOP III) to evaluate three specific optimization measures:

1) **Running the extraction system with no flow from the center extraction well (EW-2) unless EW-1 and EW-3 were running at full capacity and additional pumping volume was needed to achieve computed flow or if either EW-1 or EW-3 were out of service;**

2) **Using only piezometer pairs PZ-5 U/D and PZ-8 U/D to determine the groundwater gradients used in calculating computed flow into the barrier wall and to calculate these gradients as if PZ-5 D and PZ-8 D were located inside the barrier wall and directly downgradient of PZ-5 U and PZ-8 U, respectively; and**

3) **Using groundwater flow vector deflections to determine if groundwater flow into the barrier wall was perpendicular to the north/south axis of the barrier wall ($Q_{In} = Q_{Out}$), diverging ($Q_{In} > Q_{Out}$) or converging ($Q_{In} < Q_{Out}$).**

In addition, an algorithm that reliably and accurately related computed flow to surface water level was to be developed if sufficient data were generated during Interim Operating Period III.

1.3 Interim Operating Period III

Interim Operating Period III began on February 1, 2006 and continued through May 31, 2006, a period of 120 days. Groundwater level and pumping rate data collected during Interim Operating Period III demonstrated that:

- **Actual flow (Q_A) from the groundwater extraction system could not be controlled within +/- 10 percent of computed flow (Q_C) when computed flow was less than 240 gpm.**

- **Even though groundwater gradients were determined using groundwater level data from piezometer pairs PZ-5 Upgradient/Downgradient and PZ-8 Upgradient/Downgradient, groundwater level contour deflection analysis indicated that computed flow (Q_C) needed to be increased by an average of 4.7 percent to achieve groundwater elevation contours parallel to the north/south alignment of the barrier wall ($Q_{IN} = Q_{OUT}$); and**

- **While computed flow (Q_C) could be calculated using only surface water level in the Mississippi River, the standard error of the estimate of the regression equation was too high to allow it to be used to control flow from the Sauget Area 2 Groundwater Migration Control System.**

An automated flow-control value was installed on extraction well EW-2 on May 24, 2006, which was operated so that actual flow (Q_A) was within +/- 10% of computed flow (Q_C) 97.85 percent of the time between then and May 28, 2006. Subsequently, automated flow control valves were installed on extraction wells EW-1, EW-2 and EW-3 to improve system performance when computed flow (Q_C) was below the operating range of their variable frequency drives.

The July 24, 2006 IOP III Tech Memo indicated that, with USEPA's approval, the groundwater discharge area used to determine computed flow (Q_C) would be increased from 209,522 square feet to 219,370 square feet on September 1, 2006 in order to increase system flow rate by an average of 4.7%.

1.4 USEPA Five-Year Review

On February 12, 2008, USEPA provided Solutia with comprehensive comments "to provide a clear path forward to ensure the remedy implemented at [Sauget Area 2] Site R (GMCS and barrier wall) are meeting the intent of the 2002 Record of Decision (ROD) for Site R." Specifically, USEPA recommended that the Sauget Area 2 Sites Group (SA2SG) undertake mass flux calculations and preparation of a 2007 Annual Report, O&M Plan and Barrier Wall Completion Report. Solutia, the only Sauget Area 2 Potentially Responsible Party who signed the Sauget Area 2 Interim Groundwater Remedy Unilateral

Administrative Order, is submitting this Tech Memo to address the following sections of USEPA's February 12, 2008 "Comprehensive Comments on Sauget Area 2 Interim Groundwater Remedy Submittals, Data, and Path Forward":

Section 1.4.3 - Interim Remedy Performance Evaluation

- **Section 3.a.i** **Mass Flux to Surface Water and Sediments**
- **Section 3.a.ii** **Head Differences across Barrier Wall**
- **Section 3.a.iii** **Groundwater Flow into Open End of Barrier Wall**

Section 1.4.4 - Extra Sections Required for 2007 Annual Report

- **Section 4.b** **GMCS Operating Algorithm Safety Factors**
- **Section 4.d** **Well Deterioration, Well Loss and Well Efficiency**

These sections of USEPA's comments are addressed, respectively, in the following sections of this Tech Memo:

- **Section 2.0** **Mass Flux to Surface Water and Sediments**

  2.1 Groundwater Flow through Barrier Wall
  2.2 Groundwater Flow around Barrier Wall
  2.3 Mass Flux to Sediments and Surface Water

- **Section 3.0** **Head Differences across Barrier Wall**
- **Section 4.0** **Groundwater Flow into Open End of Barrier Wall**
- **Section 5.0** **GMCS Operating Algorithm Safety Factors**

  5.1 Darcy's Law Computed Flow (Dynamic Gradient)
  5.2 Darcy's Law Computed Flow (Dynamic Gradient and Saturated Thickness)

- **Section 6.0** **Well Deterioration, Well Loss and Well Efficiency**

In addition, this Tech Memo proposes another interim operating period (IOP IV) to allow: 1) implementation of changes to the Darcy's Law flow-control algorithm and 2) operation of the Sauget Area 2 Groundwater Migration Control System using this algorithm between now and the time when a Record of Decision is issued for the Sauget Area 2 Sites.

2.0 Mass Flux to Surface Water and Sediments

Section 1.3 of USEPA's February 12, 2008 Comprehensive Comments on Sauget Area 2 Interim Groundwater Remedy Submittals, Data and Path Forward states that:

> **"The mass flux to the river sediments and surface water following construction of the Interim [Groundwater] Remedy *(in comparison to pre-construction)* is *the most important consideration in the* demonstration of containment to verify the performance of the Interim [Groundwater] Remedy."**
>
> **"The mass flux to the river is a function of (1) flux through the 3-feet [thick] barrier wall and (2) the demonstration of parallel to converging groundwater elevation contours on the upgradient side of the wall."**

Groundwater flow through and around the barrier wall are discussed below in Sections 2.1 and 2.2, respectively, and mass flux to the Mississippi River is discussed in Section 2.3.

2.1 Groundwater Flow through Barrier Wall

Groundwater flow through the barrier wall was estimated using Darcy's Law:

$$Q = KIA$$

Where:
- **Q = Groundwater Discharge through Barrier Wall (GPD)**
- **K = Barrier Wall Hydraulic Conductivity (Feet/Day)**
- **I = Groundwater Gradient (Feet/Feet)**
- **A = Groundwater Discharge Area (Square Feet)**

Laboratory testing of slurry-wall backfill quality-control samples indicated that the average hydraulic conductivity of the soil/bentonite backfill used to construct the barrier wall was 1.4E-8 cm/sec. To be conservative, a hydraulic conductivity of 1.4E-7 cm/sec was used in the mass flux determination to allow for differences between in-situ hydraulic conductivity of the barrier wall and the laboratory measurements of hydraulic conductivity. A literature search (Appendix 1) indicates this is a reasonable estimate of in-place hydraulic conductivity of the barrier wall.

Groundwater gradient across the barrier wall was determined using average daily groundwater levels in piezometer pairs PZ - 2 Inside/Outside and PZ - 3 Inside/Outside. These piezometer pairs straddle the north/south alignment of the barrier wall and the inside piezometer is separated from the outside piezometer by a distance of 30 feet. On days with outward gradients (groundwater level in the inside piezometer higher than in the outside piezometer), the groundwater gradient at each piezometer pair was calculated by subtracting the groundwater level in the outside piezometer from the groundwater level in the inside piezometer and dividing the difference by 30 feet, the separation between the inside and outside piezometers. Groundwater gradients in PZ - 2 Inside/Outside were used to determine mass flux through the north half of the barrier wall and gradients in PZ - 3 Inside/Outside were used to determine mass flux through the south half.

Groundwater discharge areas for the north and south halves of the barrier wall were determined using aquifer saturated thickness in PZ - 2 Inside and PZ - 3 Inside, respectively. Aquifer saturated thickness was calculated by subtracting average daily groundwater level elevation from the elevation of the top of bedrock (bottom of the DHU), which was 291 ft. NGVD at PZ - 2 Inside (ground surface elevation of 419 ft NGVD minus depth to bedrock of 128 feet below ground surface) and 293.5 ft. NGVD at PZ - 3 Inside (ground surface elevation of 422 ft NGVD minus depth to bedrock of 128.5 feet below ground surface). Discharge areas for the north and south halves of the barrier wall were determined by multiplying aquifer saturated thickness in PZ - 2 Inside and PZ - 3 Inside, respectively, by 1000 feet, which is half of the 2000 ft. length of the north south alignment of the barrier wall (south wing of barrier wall starts at Station 11+00 and north wing of barrier wall starts at Station 31+00, a difference of 2000 feet). Groundwater flow through the barrier wall is presented in Table 1 and summarized below:

Summary of Darcy's Law Groundwater Flow through the SA2/GMCS Barrier Wall (February 1, 2006 to December 31, 2007)

	Calculated Groundwater Flow through Barrier Wall	
Date	**North Half (Gallons)**	**South Half (Gallons)**
Feb/Mar 06	1,217	727
2Q06	2,170	1,927
3Q06	3,211	2,234
4Q06	2,282	1,307

1Q07	921	789
2Q07	871	343
3Q07	4,190	2,375
4Q07	2,749	1,903
Total	17,611	11,605

These flow data were used to calculate mass flux through the barrier wall, which is discussed in Section 2.3.

2.2 Groundwater Flow around Barrier Wall

Quarterly groundwater flow around the barrier wall was estimated by subtracting Darcy's Law computed flow calculated using site-specific aquifer hydraulic conductivity and dynamic groundwater gradients and aquifer saturated thicknesses (as discussed in Section 5.2) from Darcy's Law computed flow calculated using regional aquifer hydraulic conductivity, dynamic groundwater gradients and static aquifer saturated thickness for each day of the 2007 Annual Report time period. These differences are summarized below and presented in Appendix 2.

Summary of Groundwater Flow Into and Around the SA2/GMCS Barrier Wall (February 1, 2006 to Dec. 31, 2007)

Date	Dynamic Gradient Darcy's Law Computed Flow Into Barrier Wall (Gallons)	Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow Around Barrier Wall (Gallons)	Darcy's Law Computed Flow Around Barrier Wall (Gallons)
Feb/Mar 06	40,788,644	41,838,679	1,050,035
2Q06	69,671,302	72,885,406	3,214,104
3Q06	97,797,928	100,985,898	3,187,970
4Q06	70,584,921	71,671,638	1,086,717
1Q07	31,375,087	32,488,693	1,113,606
2Q07	8,464,073	9,698,600	1,234,527
3Q07	52,174,175	57,602,643	5,428,468
4Q07	66,779,877	71,436,365	4,656,488
Total	437,636,007	458,607,922	20,971,915

Estimates of groundwater flow around the barrier wall were used to calculate TOC and TDS mass flux reductions as described in Section 2.3 below.

2.3 Mass Flux to Sediments and Surface Water

Groundwater mass flux to sediments and surface water in the Mississippi River was determined using 1) groundwater flow through the barrier wall as described in Section 2.1, 2) groundwater flow around the barrier wall as described in Section 2.2, 3) quarterly groundwater flow into the barrier wall (Appendix 2) and 4) groundwater quality data, specifically Total Organic Carbon and Total Dissolved Solids, from quarterly sampling of monitoring wells MW - 1 Shallow, Middle and Deep; MW - 2 Shallow, Middle and Deep; MW - 3 Shallow, Middle and Deep and MW - 4 Shallow, Middle and Deep, which are located downgradient of the barrier wall (Figure 2). Quarterly sampling started in 1Q06 and continued through

4Q07.

To determine quarterly mass flux reduction, mass flux into the barrier wall was divided by the sum of mass flux through and around the barrier wall plus mass flux into the barrier wall:

Mass Flux Reduction = Mass Flux $_{IN}$ / (Mass Flux $_{TA}$ + Mass Flux $_{IN}$)

Where: Mass Flux $_{IN}$ = Quarterly Mass Flux Into Barrier Wall

= Quarterly GW Flow $_{IN}$ x Maximum Quarterly TOC Concentration
Plus
Quarterly GW Flow $_{IN}$ x Maximum Quarterly TDS Concentration

Mass Flux $_{TA}$ = Quarterly Mass Flux Through and Around Barrier Wall

= Quarterly GW Flow $_{TA}$ x Maximum Quarterly TOC Concentration
Plus
Quarterly GW Flow $_{TA}$ x Maximum Quarterly TDS Concentration

GW Flow $_{IN}$ = Quarterly Groundwater Flow Into Barrier Wall (Appendix 2)
GW Flow $_{TA}$ = Quarterly Groundwater Flow Through and Around Barrier Wall (Appendix 2)

The results of these calculations are presented in Table 2 and summarized below:

Reduction of Groundwater Mass Flux to the Mississippi River due to Operation of the SA2/GMCS (Feb. 2006 to Dec. 2007)

		TOC/TDS Mass Flux Reduction		
Date	Total Mass Flux (Kg)	Darcy's Law Mass Flux Into Barrier Wall (Kg)	Darcy's Law Mass Flux Through and Around Barrier Wall (Kg)	Mass Flux Reduction (%)
Feb/Mar 06	353.5	344.6	8.9	97.5
2Q06	610.0	583.1	26.9	95.6
3Q06	880.5	852.7	27.8	96.8
4Q06	586.0	577.1	8.9	98.5
1Q07	287.1	277.2	9.9	96.6
2Q07	85.7	74.8	10.9	87.3
3Q07	495.6	448.8	46.8	90.6
4Q07	553.6	517.5	36.1	93.5
			Maximum	98.5 %
			Average	94.6 %
			Minimum	87.3 %

Significant reductions in groundwater mass discharge to sediments and surface water in the Mississippi River were achieved by operation of the Sauget Area 2 Groundwater Migration Control System during the 2007 Annual Report time period. Over the eight quarters from 1Q06 to 4Q07, TOC/TDS mass flux reduction ranged from 87.3 percent and 98.5 percent and averaged 94.6 percent.

3.0 Head Differences across the Barrier Wall

Head (gradient) differences across the barrier wall are measured in four piezometer pairs that straddle the barrier wall: 1) PZ - 1 Inside/Outside is located on the north wing of the barrier wall, 2) PZ - 2 Inside/Outside is located on the northern half of the north/south alignment of the barrier wall, 3) PZ - 3 Inside/Outside is located on the southern half of the alignment and 4) PZ - 4 Inside/Outside is located on

the south wing (Figure 2). The inside piezometer of each pair is located on the upgradient side of the barrier wall and the outside piezometer on the downgradient side. Negative (inward) gradients across the barrier wall were achieved in these piezometer pairs on 16 days (2.3%) of the 699 day 2007 Annual Report time period (February 1, 2006 to December 31, 2007) as summarized below and tabulated in Table 3:

Days with Groundwater Extraction Producing Negative (Inward) Gradients across the Barrier Wall (Feb 2006 to Dec 2007)

Date	Daily Average Surface Water Level (Ft NGVD)	Daily Average Groundwater Extraction Rate (GPM)
13-Mar-06	384.72	327.30
14-Mar-06	386.30	254.17
15-Mar-06	390.22	33.41
16-Mar-06	387.24	153.93
17-Mar-06	387.99	48.99
20-Mar-06	386.72	159.88
21-Mar-06	387.21	202.53
22-Mar-06	386.83	162.00
01-Apr-06	385.27	300.73
18-May-06	392.84	56.48
19-May-96	392.68	47.78
26-Dec-06	387.18	67.98
06-Jan-07	383.63	81.77
07-Jan-07	383.39	29.70
25-Feb-07	392.80	11.56
17-Dec-07	388.21	279.96

Operation of the Sauget Area 2 Groundwater Migration Control System during Interim Operating Period I (December 1, 2004 to February 28, 2007) demonstrated that inward gradients, i.e. groundwater levels outside the barrier wall higher than groundwater levels inside the barrier wall, could not be achieved under low river stage conditions even when the three extraction wells (EW - 1, 2 and 3) were pumping at their maximum combined capacity, which was an average of 2,166 gpm. Data collected during the 2007 Annual Report time period demonstrated that negative (inward) gradients across the barrier wall could not be achieved over a wide range of surface water levels in the Mississippi River (a minimum of 376.51 Ft. NCVD and a maximum of 422.22 Ft. NGVD) and confirmed the IOP I finding that inward (negative) gradients across the barrier wall were not a good performance measure for the Sauget Area 2 Groundwater Migration Control System.

4.0 Groundwater Flow into Open End of Barrier Wall

When groundwater flow into the Sauget Area 2 Groundwater Migration Control System (Q_{IN}) is equal to flow out (Q_{OUT}), i.e. $Q_{IN} = Q_{OUT}$, groundwater elevation contours at the open-end of the "U"-shaped barrier wall will be parallel to its north/south alignment. If Q_{IN} is greater than Q_{OUT}, groundwater elevation contours will diverge outward as a groundwater mound builds up behind the barrier wall and all of the groundwater inflow is not captured and some groundwater flows around the barrier wall. Conversely, if less groundwater enters the barrier wall than is pumped out ($Q_{IN} < Q_{OUT}$), groundwater elevation contours will converge inward because too much groundwater is extracted and the barrier wall acts as a large-diameter well.

Whether or not groundwater elevation contours were parallel to the north/south alignment of the barrier

wall during the 2007 Annual Report time period, which ran from February 1, 2006 to December 31, 2007, was determined for the north end of the barrier wall using average daily groundwater level elevations measured in piezometers PZ - 5 Upgradient, PZ - 6 Downgradient and the following equation:

Equation 1:	**D_N**	**=**	**(GWL in PZ-6 D - GWL in PZ-1 I) / (GWL in PZ-5U - GWL in PZ-1 I) x 1,067 ft**
Where:	**D_N**	**=**	**Location of the PZ-6D groundwater level elevation on a line between PZ-5 U and PZ-1 I in feet from PZ-1 I**
	1,067 ft	**=**	**Distance between piezometers PZ-5 U and PZ-1 I on a line perpendicular to the north/south alignment of the barrier wall**

If D_N is equal to or less than 843 feet, which is the distance between piezometers PZ - 6 D and PZ - 1 I as measured on a line through PZ - 1 I and perpendicular to the north/south alignment of the barrier wall, the groundwater level contour passing through PZ - 6 D is, respectively, parallel to the north/south alignment of the barrier wall ($Q_{IN} = Q_{OUT}$) or converging ($Q_{IN} < Q_{OUT}$). If D_N is greater than 843 feet, the groundwater elevation contour is diverging and $Q_{IN} > Q_{OUT}$.

Daily average groundwater level data measured piezometers PZ - 8 Upgradient, PZ - 7 Downgradient and PZ - 4 Inside were entered into the following equation to evaluate groundwater elevation contour deflections at the south end of the barrier wall:

Equation 2:	**D_S**	**=**	**(GWL in PZ-7 D - GWL in PZ-4 I) / (GWL in PZ-8U - GWL in PZ-4 I) x 733 ft**
Where:	**D_S**	**=**	**Location of the PZ-7D groundwater level elevation on a line between PZ-8 U and PZ-4 I in feet from PZ-4 I**
	733 ft	**=**	**Distance between piezometers PZ-8 U and PZ-4 I on a line perpendicular to the north/south alignment of the barrier wall**

If D_S is equal to or less than 538 feet, which is the distance between piezometers PZ - 7 D and PZ - 4 I as measured on a line through PZ - 4 I and perpendicular to the north/south alignment of the barrier wall, the groundwater level contour passing through PZ - 7 D is, respectively, parallel to the north/south alignment of the barrier wall ($Q_{IN} = Q_{OUT}$) or converging ($Q_{IN} < Q_{OUT}$). If D_S is greater than 538 feet, the groundwater elevation contour is diverging and $Q_{IN} > Q_{OUT}$.

When computed flows were greater than zero, groundwater elevation contours at the open end of the "U"-shaped barrier wall were parallel to or converging on the north/south alignment of the barrier wall on one day and divergent on 468 days during the 2007 Annual Report time period (Table 4):

Groundwater Flow into Open End of Barrier Wall during 2007 Annual Report Time Period (Feb. 1, 2006 to Dec. 31, 2007)

Number of Days with Parallel ($Q_{IN} = Q_{OUT}$) or Converging ($Q_{IN} < Q_{OUT}$) GW Level Contours	**1**
Number of Days with Diverging ($Q_{IN} > Q_{OUT}$) GW Level Contours	**468**
Number of Days with $Q_C = 0$	**172**
Number of Days with Data Missing	**58**
Total Number of Days	**699**

While the number of days with $Q_{In} = Q_{Out}$ was low, the volume of groundwater captured by the GMCS was high. As indicated in Section 2.2, total groundwater flow captured by the barrier wall during the 2007 Annual Report time period (437,636,007 gallons) was 95.4 percent of the computed flow into the barrier

wall. A total of 20,971,915 gallons of groundwater flowed around the wall, indicating that the GMCS flow control algorithm, which uses Darcy's Law to calculate extraction well pumping rates, is under-predicting the amount of flow needed to achieve parallel flow lines into the open end of the "U"-shaped barrier wall, i.e. $Q_{IN} = Q_{OUT}$.

5.0 GMCS Flow Control Algorithm Safety Factors

5.1 Darcy's Law Computed Flow (Dynamic Gradient)

During the 2007 Annual Report time period (February 1, 2006 to December 31, 2007), computed flow from the Sauget Area 2 Groundwater Migration Control System was calculated using Darcy's Law:

$$Q = KIA$$

Where:

Q	**=**	**Groundwater Discharge**
K	**=**	**Aquifer Hydraulic Conductivity**
I	**=**	**Groundwater Gradient**
A	**=**	**Groundwater Discharge Area**

With diverging groundwater elevation contours ($Q_{IN} > Q_{OUT}$) on 468 of the 699 days (67.0 %) in the 2007 Annual Report time period (Section 4.0), one or more of the inputs into the Darcy's Law computed flow algorithm did not accurately reflect aquifer conditions at the Sauget Area 2 Groundwater Migration Control System. Dynamic groundwater gradients, directly measured in piezometer pairs PZ - 5 Upgradient/Downgradient and PZ - 8 Upgradient/Downgradient (Figure 2), were used to calculate Darcy's Law computed flows and, therefore, it is unlikely that these inputs were the cause of the observed under-pumping. Consequently, aquifer hydraulic conductivity and groundwater discharge area inputs into Darcy's Law computed flow are the most likely causes of the observed under-pumping.

An aquifer hydraulic conductivity value of 285 ft/day, a regional value for the American Bottoms aquifer, was used to calculate Darcy's Law computed flow into the barrier wall during the 2007 Annual Report time period. However, a site-specific pumping test performed by Geraghty and Miller in June 1992 (Appendix 3) indicates that aquifer hydraulic conductivity at Sauget Area 2 Site R, where the Sauget Area 2 Groundwater Migration Control System is located, ranges from a maximum of 425 ft/day to a minimum of 266 ft/day and averages 298 ft/day. Slug tests performed for the Sauget Area 2 Sites Remedial Investigation (Appendix 4) indicate that hydraulic conductivity ranges from a maximum of 252 ft/day to a minimum of 25 ft/day and averages 90 ft/day. These hydraulic conductivity test results are summarized below:

Summary of Aquifer Hydraulic Conductivity for the Middle and Deep Hydrogeologic Units in Sauget Area 2

		Hydraulic Conductivity, Feet per Day			
Aquifer Hydraulic Test	**Hydrogeologic Unit**	**Maximum**		**Average**	**Minimum**
Site R Pumping Test	**Middle Hydrogeologic Unit**	**425**		**282**	**243**
	Deep Hydrogeologic Unit	**243**		**314**	**266**
			Average	**298 Ft/Day**	
SA2/RI Slug Tests	**Middle Hydrogeologic Unit**	**247**		**111**	**67**
	Deep Hydrogeologic Unit	**252**		**68**	**25**
			Average	**90 Ft/Day**	

While the slug tests demonstrate that hydraulic conductivity varies across Sauget Area 2, they clearly

underestimate aquifer hydraulic conductivity at Site R and, therefore, can not be used as inputs into Darcy's Law computed flow (Q_C). However, the average aquifer hydraulic conductivity determined by the site-specific pumping test at Site R demonstrates that the actual hydraulic conductivity (298 ft/day) is higher than the value used to determine Q_C during the 2007 Annual Report time period (285 ft/day). Based on this difference, some of the under-pumping observed during the 2007 Annual Report time period was the result of using a regional aquifer hydraulic conductivity of 285 ft/day to calculate Darcy's Law computed flow (Q_C) instead of the more appropriate local value of 298 ft/day.

Groundwater discharge area was determined by multiplying the actual seepage face length of 2,095.22 feet, which is the distance between the north and south wings at the open end of the "U"-shaped barrier wall, by a static aquifer saturated thickness of 100 feet. However, actual aquifer saturated thickness, as measured in PZ - 5 Downgradient and PZ - 8 Downgradient, averaged 102.88 feet during the 2007 Annual Report time period (Appendix 2). Based on this difference, some of the observed under-pumping was the result of using a static aquifer thickness instead of a dynamic aquifer saturated thickness.

The effect of using site-specific hydraulic conductivity and dynamic aquifer saturated thickness on Darcy's Law computed flow into the Sauget Area 2 Groundwater Migration Control System is discussed in Section 5.2.

5.2 Darcy's Law Computed Flow (Dynamic Gradient and Saturated Thickness)

Given the large number of days with diverging groundwater elevation contours ($Q_{IN} > Q_{OUT}$) during the 2007 Annual Report time period (Section 4.0), calculating Darcy's Law computed flow (Q_C) with regional aquifer hydraulic conductivity, dynamic groundwater gradient and static aquifer saturated thickness clearly underestimates the amount of pumping needed to achieve $Q_{IN} = Q_{OUT}$, i.e. parallel groundwater elevation contours at the open end of the barrier wall.

To determine the effect of site-specific hydraulic conductivity and dynamic aquifer saturated thickness on Darcy's Law computed flow, Q_C for each day of the 2007 Annual Report time period was recalculated using a site-specific hydraulic conductivity value of 298 ft/day, dynamic groundwater gradient and dynamic aquifer saturated thickness. Dynamic groundwater gradients were calculated using daily average groundwater levels in piezometer pairs PZ - 5 Upgradient/Downgradient and PZ - 8 Upgradient/Downgradient and average daily groundwater levels in PZ - 5 Downgradient and PZ - 8 Downgradient were used to determine dynamic daily average aquifer saturated thickness. With these inputs, Darcy's Law computed flows increased by an average of 6.10 percent with a 99% confidence interval of +/- 0.51 percent (Appendix 2).

Rather than trying to establish safety factors that can be applied to Darcy's Law computed flows calculated using regional aquifer hydraulic conductivity, dynamic groundwater gradients and static aquifer saturated thickness, it seems more appropriate to operate the Sauget Area 2 Groundwater Migration Control System using site-specific hydraulic conductivity, dynamic groundwater gradients and dynamic aquifer saturated thickness as inputs into a flow control algorithm based on Darcy's Law. Consequently, this Tech Memo proposes another interim operating period (IOP IV) to allow: 1) implementation of changes to the Darcy's Law flow-control algorithm and 2) operation of the Sauget Area 2 Groundwater

Migration Control System using this algorithm between now and the time a Record of Decision is issued for the Sauget Area 2 Sites remedy.

Specific changes to be implemented during IOP IV include:

- **Optimization Measure 1 - Calculation of Darcy's Law computed flows using a site-specific aquifer hydraulic conductivity of 298 ft/day, dynamic groundwater gradients in PZ - 5 Upgradient/Downgradient and PZ - 8 Upgradient/ Downgradient, and dynamic aquifer saturated thicknesses measured in PZ - 5 Downgradient and PZ - 8 Downgradient.**

  Goal - Increase the flow from the GMCS extraction wells to reduce the number of days with groundwater flow around the barrier wall.

- **Optimization Measure 2 - Evaluation of system performance using groundwater elevation contour deflections at the north and south ends of the barrier wall calculated from groundwater levels measured in PZ - 1 Inside, PZ - 6 Downgradient and PZ - 5 Upgradient and PZ - 4 Inside, PZ - 7 Downgradient and PZ - 8 Upgradient, respectively.**

  Goal - Develop a simple, spreadsheet-based method for evaluating groundwater flow control; and

- **Optimization Measure 3 - Relocation of groundwater level transducers in PZ - 1 Outside, PZ - 2 Inside/Outside, PZ - 3 Inside/Outside, PZ - 4 Outside, PZ - 6 Upgradient and PZ - 7 Upgradient to PZ - 1 Inside, PZ - 4 Inside, PZ - 5 Upgradient/Downgradient, PZ - 6 Downgradient, PZ - 7 Downgradient and PZ - 8 Upgradient/Downgradient.**

  Goal - Provide installed spare transducers in groundwater level measurement piezometers critical to system operation and evaluation in order to prevent recurrence of the 58 days data loss observed during the 2007 Annual Report time period.

6.0 Well Deterioration, Well Loss and Well Efficiency

Extraction well performance can deteriorate over time if well screen open area is reduced as a result of incrustation by mineral precipitates and/or plugging by microbial slimes (biofouling). If an extraction well screen deteriorates over time due to incrustation and/or biofouling, well yield decreases and drawdown increases. Deterioration in Sauget Area 2 Groundwater Migration Control System extraction well performance can be measured by performing periodic specific-capacity pumping tests in each extraction well. Specific capacity, expressed in units of gpm/ft, is calculated by dividing the extraction well pumping rate in gallons per minute by the difference between pumping and non-pumping groundwater levels (drawdown) in the extraction well. If specific capacity decreases over time, extraction well performance is deteriorating. When performance deteriorates to the point that required flows can not be produced, extraction well rehabilitation is appropriate.

Initial step-drawdown specific-capacity tests were performed in extraction wells EW - 1, 2 and 3 between March 21 and April 12, 2005. Step-tests were performed at pumping rates of 140, 280, 420, 560 and 700 gpm in order to determine specific capacities over the operating range of the GMCS extraction wells. When a step test was performed in one extraction well, the other two extraction wells were not operated so that pumping from these wells would not increase drawdown in the step-test well. Step-drawdown data were corrected for river stage fluctuations before they were used to calculate extraction well specific capacity. Barometric pressure corrections were not made for analysis of the step-drawdown data because barometric pressure changes during the tests were small in comparison to drawdown in the pumping wells.

Specific capacity values were calculated by dividing the pumping rate for a given step, Q_n, by the cumulative drawdown, $S_{w(n)}$, measured for the subject step. Extraction well specific-capacities ranged from 27 to 55 gpm/ft and averaged 30 to 41 gpm/ft. Average specific capacity for extraction well EW-2 (30 gpm/ft) was 75 percent of the average specific capacity of extraction wells EW-1 and EW-3 (40 gpm/ft). A lower specific capacity in EW-2 than in EW-1 and EW-3 was most likely due to the fact EW-1 and EW-3 have well screens that are, respectively, 15 and 6 ft longer than the well screen in EW-2 (78 ft and 69 ft versus 63 ft). EW-1 is also equipped with a 30-horsepower pump while EW-1 and 3 have 40-horsepower pumps.

Results of the 2005 specific-capacity step tests are summarized below:

Summary of Step-Drawdown Specific-Capacity Tests Performed in EW - 1, 2 and 3 from March 21 to and April 12, 2005

Extraction Well	Step	Discharge (gpm)		Specific Capacity (gpm/ft)
EW-1	1	140		55
	2	280		42
	3	420		38
	4	560		35
	5	700		33
			Average	41
EW-2	1	140		34
	2	280		32
	3	420		30
	4	560		29
	5	700		27
			Average	30
EW-3	1	140		43
	2	280		39
	3	420		38
	4	560		37
	5	700		37
			Average	39

As mentioned above, these step-drawdown specific-capacity tests can be repeated at periodic intervals in the future to determine if GMCS extraction well performance is deteriorating over time. With a total pumping capacity of 2,100 gpm, extraction well yields would need to decrease by 40 percent before the GMCS could not pump the 1,260 gpm maximum Darcy's Law computed flow for the 2007 Annual Report time period (Appendix 2). For this reason, five years is considered an appropriate time interval for performing step-drawdown specific-capacity tests on the Sauget Area 2 Groundwater Migration Control System extraction wells.

7.0 Attachments

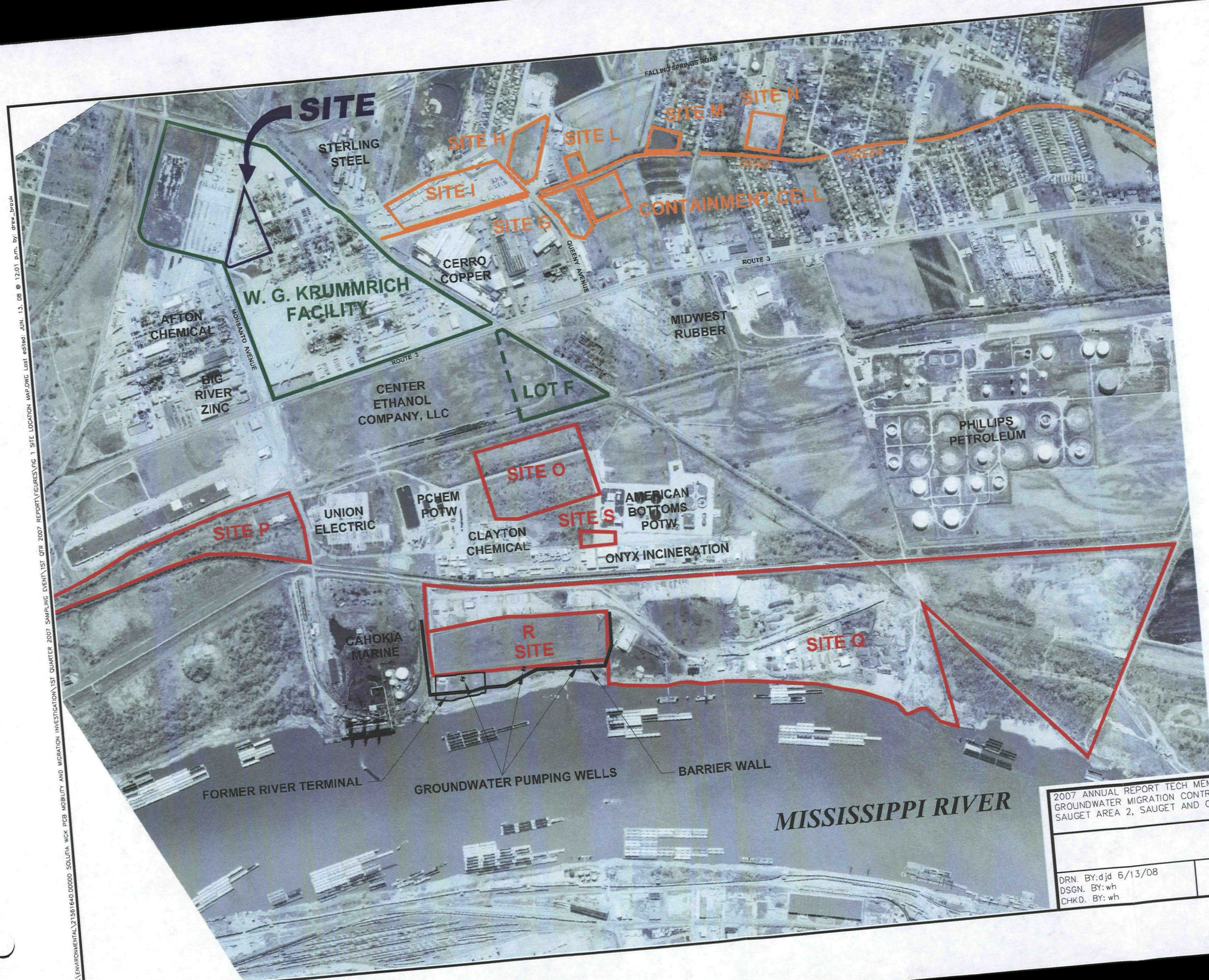
Figure 1 **Site Location Map**
Figure 2 **Well and Piezometer Location Map**

Table 1 **Groundwater Flow through Barrier Wall**
Table 2 **TOC/TDS Mass Flux Reduction**
Table 3 **Head Differences across Barrier Wall**

Table 4 Groundwater Flow into Barrier Wall

Appendix 1 Cut-Off Wall In-Place Permeability Literature
Appendix 2 Dynamic Darcy's Law Computed Flows
Appendix 3 Site R Pumping Test Report
Appendix 4 Sauget Area 2 Slug Tests

Figures



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- W.G. KRUMMRICH FACILITY
- SAUGET AREA #1
- SAUGET AREA #2

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2007 ANNUAL REPORT TECH MEMO
GROUNDWATER MIGRATION CONTROL SYSTEM
SAUGET AREA 2, SAUGET AND CAHOKIA, ILLINOIS

PROJECT NO. 21561391.00000

URS

DRN. BY: djd 6/13/08
DSGN. BY: wh
CHKD. BY: wh

Site Location Map

FIG. NO. 1

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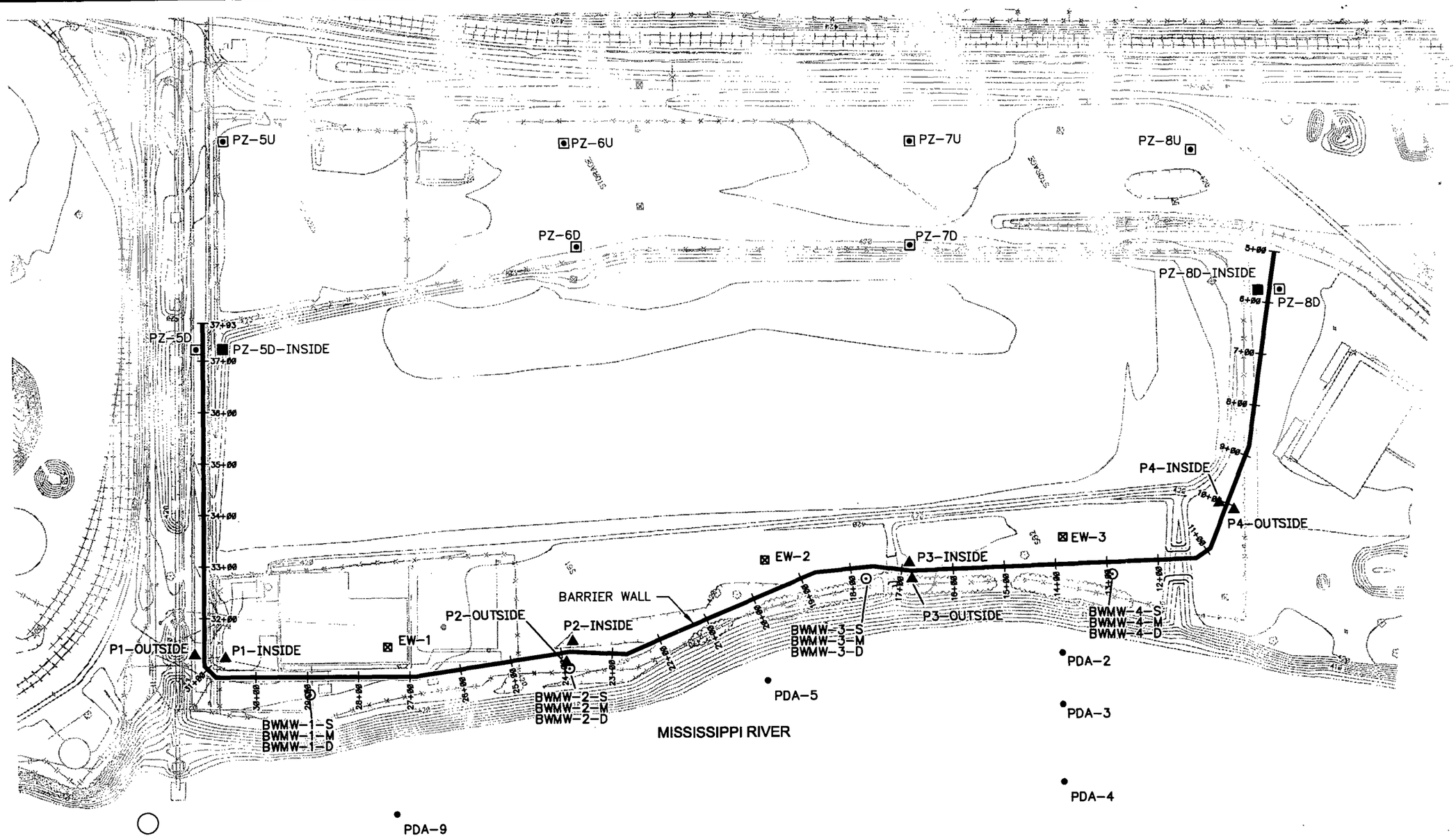

LEGEND

- GROUNDWATER LEVEL PIEZOMETERS
- IMAGE PIEZOMETER (PZ-5D-INSIDE AND PZ-8D-INSIDE)
- EXTRACTION WELLS
- GROUNDWATER LEVEL PIEZOMETERS
- MONITORING WELL CLUSTERS
- SURFACE WATER AND SEDIMENT SAMPLING STATIONS

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2007 ANNUAL REPORT TECH MEMO
GROUNDWATER MIGRATION CONTROL SYSTEM
SAUGET AREA 2, SAUGET AND CAHOKIA, ILLINOIS

PROJECT NO. 21561391.00000

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DRN. BY: djd 6/13/08
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CHKD. BY:

Well and Piezometer Locations

FIG. NO. 2

Tables

Table 1

Table 1
2007 Annual Report Tech Mem0
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
01-Feb-06	381.45	383.50	Yes	92.50	19	9	89.31	Yes	381.78	382.81
02-Feb-06	381.02	383.55	Yes	92.55	23	13	89.36	Yes	381.39	382.86
03-Feb-06	380.94	383.41	Yes	92.41	23	12	89.19	Yes	381.30	382.69
04-Feb-06	381.01	383.40	Yes	92.40	22	12	89.20	Yes	381.39	382.70
05-Feb-06	381.16	383.54	Yes	92.54	22	12	89.34	Yes	381.51	382.84
06-Feb-06	380.96	383.45	Yes	92.45	23	12	89.25	Yes	381.35	382.75
07-Feb-06	380.80	383.53	Yes	92.53	25	15	89.33	Yes	381.19	382.83
08-Feb-06	380.67	383.54	Yes	92.54	26	16	89.35	Yes	381.06	382.85
09-Feb-06	380.67	383.40	Yes	92.40	25	15	89.22	Yes	381.05	382.72
10-Feb-06	380.13	383.26	Yes	92.26	29	18	89.09	Yes	380.53	382.59
11-Feb-06	379.75	383.03	Yes	92.03	30	19	88.82	Yes	380.17	382.32
12-Feb-06	379.35	382.91	Yes	91.91	32	21	88.71	Yes	379.79	382.21
13-Feb-06	379.44	382.91	Yes	91.91	32	20	88.72	Yes	379.89	382.22
14-Feb-06	379.50	382.81	Yes	91.81	30	19	88.64	Yes	379.93	382.14
15-Feb-06	379.32	382.77	Yes	91.77	31	21	88.61	Yes	379.75	382.11
16-Feb-06	379.70	382.73	Yes	91.73	28	17	88.51	Yes	380.08	382.01
17-Feb-06	380.42	382.69	Yes	91.69	21	10	88.45	Yes	380.78	381.95
18-Feb-06	380.52	382.97	Yes	91.97	22	12	88.76	Yes	380.90	382.26
19-Feb-06	378.54	382.80	Yes	91.80	39	27	88.66	Yes	379.05	382.16
20-Feb-06	377.34	382.40	Yes	91.40	46	34	88.25	Yes	377.85	381.75
21-Feb-06	377.35	382.19	Yes	91.19	44	32	88.02	Yes	377.84	381.52
22-Feb-06	377.27	382.01	Yes	91.01	43	31	87.86	Yes	377.77	381.36
23-Feb-06	377.41	381.87	Yes	90.87	40	29	87.68	Yes	377.88	381.18
24-Feb-06	378.36	382.09	Yes	91.09	34	22	87.86	Yes	378.80	381.36
25-Feb-06	379.21	382.12	Yes	91.12	26	16	87.88	Yes	379.59	381.38
26-Feb-06	379.43	382.34	Yes	91.34	26	15	88.11	Yes	379.84	381.61
27-Feb-06	379.06	382.43	Yes	91.43	30	20	88.26	Yes	379.46	381.76
28-Feb-06	378.90	382.28	Yes	91.28	31	20	88.10	Yes	379.31	381.60
01-Mar-06	379.02	382.30	Yes	91.30	30	19	88.10	Yes	379.43	381.60
02-Mar-06	378.93	382.09	Yes	91.09	29	18	87.86	Yes	379.33	381.36
03-Mar-06	379.05	382.15	Yes	91.15	28	17	87.91	Yes	379.45	381.41
04-Mar-06	378.94	382.24	Yes	91.24	30	19	88.05	Yes	379.36	381.55
05-Mar-06	378.66	382.20	Yes	91.20	32	21	88.03	Yes	379.08	381.53
06-Mar-06	378.45	382.01	Yes	91.01	32	21	87.81	Yes	378.84	381.31
07-Mar-06	378.88	382.14	Yes	91.14	29	19	87.92	Yes	379.28	381.42
08-Mar-06	379.42	382.43	Yes	91.43	27	17	88.23	Yes	379.80	381.73
09-Mar-06	379.07	382.49	Yes	91.49	31	20	88.27	Yes	379.47	381.77
10-Mar-06	379.24	382.08	Yes	91.08	26	15	87.83	Yes	379.61	381.33
11-Mar-06	380.44	382.45	Yes	91.45	18	8	88.20	Yes	380.76	381.70

Table 1
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
12-Mar-06	382.25	382.88	Yes	91.88	6	0	88.64	No	382.45	382.14
13-Mar-06	383.24	383.14	No	92.14	0	0	88.88	No	383.45	382.38
14-Mar-06	384.58	383.38	No	92.38	0	0	89.09	No	384.71	382.59
15-Mar-06	388.31	384.11	No	93.11	0	0	89.89	No	388.21	383.39
16-Mar-06	385.73	384.16	No	93.16	0	0	90.04	No	385.87	383.54
17-Mar-06	386.35	384.35	No	93.35	0	0	90.10	No	386.43	383.60
18-Mar-06	386.73	384.77	No	93.77	0	0	90.57	No	386.82	384.07
19-Mar-06	386.31	384.96	No	93.96	0	0	90.82	No	386.46	384.32
20-Mar-06	385.35	384.88	No	93.88	0	0	90.76	No	385.56	384.26
21-Mar-06	385.70	384.72	No	93.72	0	0	90.51	No	385.88	384.01
22-Mar-06	385.41	384.88	No	93.88	0	0	90.68	No	385.63	384.18
23-Mar-06	384.75	385.02	Yes	94.02	3	0	90.81	No	385.02	384.31
24-Mar-06	384.67	385.02	Yes	94.02	3	0	90.81	No	384.93	384.31
25-Mar-06	384.42	385.06	Yes	94.06	6	0	90.82	No	384.71	384.32
26-Mar-06	384.06	384.96	Yes	93.96	8	0	90.70	No	384.38	384.20
27-Mar-06	383.94	385.08	Yes	94.08	11	1	90.88	Yes	384.25	384.38
28-Mar-06	383.84	384.99	Yes	93.99	11	2	90.79	Yes	384.12	384.29
29-Mar-06	383.81	385.09	Yes	94.09	12	3	90.92	Yes	384.12	384.42
30-Mar-06	383.36	385.08	Yes	94.08	16	6	90.93	Yes	383.73	384.43
31-Mar-06	383.94	385.08	Yes	94.08	11	1	90.91	Yes	384.25	384.41
	1Q06 Groundwater Flow Through North Half of Barrier Wall				1,217	727	1Q06 Groundwater Flow Through South Half of Barrier Wall			
01-Apr-06	385.07	383.93	No	92.93	0	0	90.71	No	384.38	384.21
02-Apr-06	385.54	385.07	No	94.07	0	4	91.84	Yes	384.92	385.34
03-Apr-06	385.69	386.05	Yes	95.05	3	12	92.76	Yes	384.97	386.26
04-Apr-06	385.89	387.60	Yes	96.60	16	23	94.20	Yes	385.22	387.70
05-Apr-06	386.27	389.16	Yes	98.16	28	34	95.70	Yes	385.64	389.20
06-Apr-06	386.47	388.66	Yes	97.66	21	27	95.26	Yes	385.87	388.76
07-Apr-06	386.57	390.06	Yes	99.06	34	39	96.56	Yes	385.93	390.06
08-Apr-06	386.62	392.27	Yes	101.27	57	60	98.61	Yes	385.97	392.11
09-Apr-06	386.98	393.50	Yes	102.50	66	68	99.77	Yes	386.39	393.27
10-Apr-06	387.24	393.36	Yes	102.36	62	64	99.66	Yes	386.68	393.16
11-Apr-06	387.46	393.02	Yes	102.02	56	59	99.40	Yes	386.86	392.90
12-Apr-06	387.53	392.93	Yes	101.93	55	58	99.32	Yes	386.92	392.82
13-Apr-06	387.77	392.97	Yes	101.97	52	56	99.38	Yes	387.24	392.88
14-Apr-06	388.03	392.95	Yes	101.95	50	53	99.37	Yes	387.46	392.87
15-Apr-06	388.14	393.00	Yes	102.00	49	53	99.44	Yes	387.56	392.94
16-Apr-06	388.32	393.03	Yes	102.03	48	52	99.47	Yes	387.74	392.97
17-Apr-06	388.38	393.31	Yes	102.31	50	54	99.74	Yes	387.77	393.24
18-Apr-06	388.59	393.45	Yes	102.45	49	53	99.89	Yes	388.08	393.39

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Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
19-Apr-06	388.68	393.68	Yes	102.68	51	54	100.12	Yes	388.13	393.62
20-Apr-06	388.87	393.83	Yes	102.83	50	54	100.27	Yes	388.31	393.77
21-Apr-06	389.01	393.95	Yes	102.95	50	54	100.40	Yes	388.44	393.90
22-Apr-06	389.20	393.86	Yes	102.86	47	51	100.31	Yes	388.65	393.81
23-Apr-06	389.27	393.72	Yes	102.72	45	49	100.21	Yes	388.73	393.71
24-Apr-06	389.42	393.60	Yes	102.60	42	47	100.12	Yes	388.89	393.62
25-Apr-06	389.51	393.59	Yes	102.59	42	46	100.09	Yes	388.97	393.59
26-Apr-06	389.63	393.53	Yes	102.53	40	45	100.07	Yes	389.05	393.57
27-Apr-06	389.69	393.30	Yes	102.30	37	41	99.84	Yes	389.17	393.34
28-Apr-06	389.79	392.71	Yes	101.71	29	35	99.31	Yes	389.21	392.81
29-Apr-06	389.91	392.17	Yes	101.17	23	29	98.79	Yes	389.36	392.29
30-Apr-06	389.91	391.74	Yes	100.74	18	25	98.37	Yes	389.32	391.87
01-May-06	391.31	389.92	No	98.92	0	0	95.83	No	391.50	389.33
02-May-06	391.65	389.95	No	98.95	0	0	95.90	No	391.77	389.40
03-May-06	391.68	390.03	No	99.03	0	0	96.01	No	391.84	389.51
04-May-06	393.48	390.14	No	99.14	0	0	96.10	No	393.52	389.60
05-May-06	396.43	390.40	No	99.40	0	0	96.39	No	396.33	389.89
06-May-06	396.62	390.60	No	99.60	0	0	96.60	No	396.53	390.10
07-May-06	395.90	390.75	No	99.75	0	0	96.76	No	395.87	390.26
08-May-06	394.44	390.80	No	99.80	0	0	96.81	No	394.50	390.31
09-May-06	393.04	390.84	No	99.84	0	0	96.81	No	393.19	390.31
10-May-06	392.52	390.84	No	99.84	0	0	96.83	No	392.69	390.33
11-May-06	393.25	390.91	No	99.91	0	0	96.85	No	393.37	390.35
12-May-06	393.22	391.00	No	100.00	0	0	96.90	No	393.37	390.40
13-May-06	392.81	390.98	No	99.98	0	0	96.90	No	392.97	390.40
14-May-06	393.28	391.02	No	100.02	0	0	96.98	No	393.42	390.48
15-May-06	393.40	391.08	No	100.08	0	0	97.06	No	393.54	390.56
16-May-06	392.71	391.15	No	100.15	0	0	97.13	No	392.89	390.63
17-May-06	391.97	391.20	No	100.20	0	0	97.15	No	392.20	390.65
18-May-06	391.14	390.99	No	99.99	0	0	96.85	No	391.41	390.35
19-May-06	390.98	390.97	No	99.97	0	0	96.85	No	391.27	390.35
20-May-06	390.97	391.03	Yes	100.03	1	0	96.94	No	391.24	390.44
21-May-06	390.97	391.05	Yes	100.05	1	0	97.02	No	391.23	390.52
22-May-06	390.79	391.03	Yes	100.03	2	0	96.95	No	391.08	390.45
23-May-06	390.52	391.04	Yes	100.04	5	0	96.97	No	390.81	390.47
24-May-06	390.45	390.89	Yes	99.89	4	0	96.77	No	390.74	390.27
25-May-06	390.59	390.97	Yes	99.97	4	0	96.85	No	390.88	390.35
26-May-06	390.32	390.82	Yes	99.82	5	0	96.71	No	390.62	390.21
27-May-06	389.83	390.68	Yes	99.68	8	0	96.48	No	390.14	389.98

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Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
28-May-06	389.34	390.51	Yes	99.51	11	1	96.33	Yes	389.71	389.83
29-May-06	388.92	390.40	Yes	99.40	15	5	96.26	Yes	389.28	389.76
30-May-06	388.30	390.13	Yes	99.13	18	8	96.03	Yes	388.66	389.53
31-May-06	387.63	389.90	Yes	98.90	22	12	95.74	Yes	388.02	389.24
01-Jun-06	387.62	389.69	Yes	98.69	20	10	95.54	Yes	388.01	389.04
02-Jun-06	388.81	389.89	Yes	98.89	11	1	95.71	Yes	389.13	389.21
03-Jun-06	390.06	390.53	Yes	99.53	5	0	96.43	No	390.36	389.93
04-Jun-06	389.49	390.59	Yes	99.59	11	1	96.45	Yes	389.82	389.95
05-Jun-06	388.41	389.95	Yes	98.95	15	3	95.62	Yes	388.79	389.12
06-Jun-06	387.90	389.69	Yes	98.69	17	5	95.36	Yes	388.28	388.86
07-Jun-06	387.00	389.45	Yes	98.45	24	12	95.13	Yes	387.41	388.63
08-Jun-06	386.15	389.26	Yes	98.26	30	19	95.09	Yes	386.59	388.59
09-Jun-06	385.19	388.93	Yes	97.93	36	24	94.75	Yes	385.66	388.25
10-Jun-06	384.14	388.52	Yes	97.52	42	30	94.32	Yes	384.63	387.82
11-Jun-06	384.19	388.24	Yes	97.24	39	27	94.02	Yes	384.66	387.52
12-Jun-06	384.84	388.19	Yes	97.19	32	20	93.96	Yes	385.28	387.46
13-Jun-06	385.52	388.38	Yes	97.38	28	16	94.19	Yes	385.95	387.69
14-Jun-06	385.24	388.27	Yes	97.27	29	18	94.07	Yes	385.67	387.57
15-Jun-06	384.75	388.13	Yes	97.13	32	21	93.94	Yes	385.20	387.44
16-Jun-06	384.66	387.99	Yes	96.99	32	21	93.82	Yes	385.10	387.32
17-Jun-06	384.10	388.14	Yes	97.14	39	27	93.97	Yes	384.56	387.47
18-Jun-06	NA	387.67	NC(D)	96.67	NC(D)	27	93.60	Yes	384.14	387.10
19-Jun-06	383.26	387.43	Yes	96.43	40	27	93.35	Yes	383.87	386.85
20-Jun-06	382.35	387.07	Yes	96.07	45	33	92.97	Yes	382.89	386.47
21-Jun-06	382.54	386.88	Yes	95.88	41	29	92.74	Yes	383.06	386.24
22-Jun-06	382.27	386.72	Yes	95.72	42	30	92.60	Yes	382.80	386.10
23-Jun-06	382.09	386.57	Yes	95.57	42	31	92.47	Yes	382.61	385.97
24-Jun-06	382.27	386.46	Yes	95.46	40	28	92.32	Yes	382.75	385.82
25-Jun-06	382.61	386.54	Yes	95.54	37	26	92.41	Yes	383.07	385.91
26-Jun-06	382.73	386.44	Yes	95.44	35	24	92.31	Yes	383.23	385.81
27-Jun-06	382.64	386.34	Yes	95.34	35	23	92.16	Yes	383.10	385.66
28-Jun-06	382.79	386.30	Yes	95.30	33	23	92.20	Yes	383.22	385.70
29-Jun-06	382.56	386.26	Yes	95.26	35	24	92.14	Yes	383.05	385.64
30-Jun-06	382.57	386.22	Yes	95.22	34	23	92.08	Yes	383.06	385.58
	2Q06 Groundwater Flow Through North Half of Barrier Wall				2,170	1,927	2Q06 Groundwater Flow Through South Half of Barrier Wall			
01-Jul-06	382.82	386.23	Yes	95.23	32	21	92.08	Yes	383.26	385.58
02-Jul-06	382.41	386.15	Yes	95.15	35	24	92.05	Yes	382.87	385.55
03-Jul-06	381.26	385.87	Yes	94.87	43	32	91.79	Yes	381.78	385.29
04-Jul-06	380.55	385.59	Yes	94.59	47	35	91.48	Yes	381.08	384.98

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Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
05-Jul-06	380.21	385.38	Yes	94.38	48	36	91.28	Yes	380.74	384.78
06-Jul-06	380.01	385.15	Yes	94.15	48	36	91.05	Yes	380.55	384.55
07-Jul-06	380.35	385.13	Yes	94.13	45	33	91.04	Yes	380.88	384.54
08-Jul-06	380.32	385.07	Yes	94.07	44	33	90.98	Yes	380.84	384.48
09-Jul-06	379.16	384.80	Yes	93.80	52	40	90.72	Yes	379.74	384.22
10-Jul-06	378.03	384.37	Yes	93.37	59	46	90.29	Yes	378.64	383.79
11-Jul-06	377.96	384.16	Yes	93.16	57	45	90.03	Yes	378.51	383.53
12-Jul-06	377.90	383.93	Yes	92.93	55	43	89.80	Yes	378.46	383.30
13-Jul-06	372.13	377.64	Yes	86.64	47	36	83.77	Yes	372.92	377.27
14-Jul-06	379.67	384.01	Yes	93.01	40	29	89.90	Yes	380.16	383.40
15-Jul-06	380.02	384.11	Yes	93.11	38	27	89.99	Yes	380.50	383.49
16-Jul-06	379.66	384.02	Yes	93.02	40	29	89.93	Yes	380.15	383.43
17-Jul-06	380.09	384.10	Yes	93.10	37	26	89.98	Yes	380.55	383.48
18-Jul-06	380.15	384.14	Yes	93.14	37	26	90.01	Yes	380.62	383.51
19-Jul-06	379.84	384.22	Yes	93.22	40	29	90.05	Yes	380.33	383.55
20-Jul-06	379.67	384.66	Yes	93.66	46	36	90.75	Yes	380.20	384.25
21-Jul-06	380.11	383.99	Yes	92.99	36	25	89.92	Yes	380.58	383.42
22-Jul-06	380.21	384.04	Yes	93.04	35	24	89.91	Yes	380.68	383.41
23-Jul-06	379.88	383.98	Yes	92.98	38	27	89.89	Yes	380.36	383.39
24-Jul-06	379.21	383.85	Yes	92.85	43	31	89.73	Yes	379.73	383.23
25-Jul-06	379.07	383.69	Yes	92.69	42	31	89.61	Yes	379.59	383.11
26-Jul-06	378.93	383.67	Yes	92.67	43	32	89.55	Yes	379.45	383.05
27-Jul-06	378.70	383.46	Yes	92.46	44	32	89.37	Yes	379.22	382.87
28-Jul-06	379.03	383.42	Yes	92.42	40	29	89.31	Yes	379.54	382.81
29-Jul-06	379.56	383.81	Yes	92.81	39	27	89.63	Yes	380.05	383.13
30-Jul-06	379.55	384.04	Yes	93.04	41	30	89.98	Yes	380.07	383.48
31-Jul-06	379.04	383.56	Yes	92.56	41	31	89.48	Yes	379.53	382.98
01-Aug-06	378.74	383.31	Yes	92.31	42	31	89.19	Yes	379.23	382.69
02-Aug-06	377.93	383.18	Yes	92.18	48	36	89.08	Yes	378.48	382.58
03-Aug-06	377.28	382.86	Yes	91.86	51	39	88.77	Yes	377.84	382.27
04-Aug-06	377.58	382.76	Yes	91.76	47	35	88.68	Yes	378.15	382.18
05-Aug-06	378.25	382.86	Yes	91.86	42	31	88.76	Yes	378.73	382.26
06-Aug-06	379.40	382.98	Yes	91.98	33	22	88.86	Yes	379.85	382.36
07-Aug-06	379.49	383.05	Yes	92.05	32	22	88.92	Yes	379.97	382.42
08-Aug-06	379.40	383.10	Yes	92.10	34	23	88.96	Yes	379.89	382.46
09-Aug-06	379.44	383.08	Yes	92.08	33	23	88.98	Yes	379.91	382.48
10-Aug-06	379.63	383.10	Yes	92.10	32	21	88.99	Yes	380.09	382.49
11-Aug-06	379.66	383.10	Yes	92.10	31	21	88.99	Yes	380.14	382.49
12-Aug-06	378.95	382.95	Yes	91.95	36	26	88.85	Yes	379.43	382.35

Table 1
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
13-Aug-06	378.57	382.75	Yes	91.75	38	27	88.64	Yes	379.04	382.14
14-Aug-06	378.18	383.60	Yes	92.60	50	37	89.39	Yes	378.71	382.89
15-Aug-06	377.79	383.91	Yes	92.91	56	44	89.82	Yes	378.35	383.32
16-Aug-06	377.81	382.60	Yes	91.60	43	33	88.55	Yes	378.34	382.05
17-Aug-06	377.94	382.62	Yes	91.62	42	30	88.36	Yes	378.45	381.86
18-Aug-06	378.69	382.54	Yes	91.54	35	25	88.50	Yes	379.16	382.00
19-Aug-06	379.36	382.65	Yes	91.65	30	20	88.55	Yes	379.82	382.05
20-Aug-06	379.00	382.67	Yes	91.67	33	23	88.56	Yes	379.49	382.06
21-Aug-06	378.38	382.54	Yes	91.54	38	27	88.45	Yes	378.87	381.95
22-Aug-06	378.17	382.44	Yes	91.44	39	28	88.35	Yes	378.68	381.85
23-Aug-06	377.58	382.33	Yes	91.33	43	32	88.25	Yes	378.13	381.75
24-Aug-06	377.38	382.22	Yes	91.22	44	32	88.15	Yes	377.94	381.65
25-Aug-06	377.38	382.16	Yes	91.16	43	32	88.06	Yes	377.89	381.56
26-Aug-06	377.61	382.07	Yes	91.07	40	29	87.96	Yes	378.10	381.46
27-Aug-06	378.28	382.19	Yes	91.19	35	25	88.08	Yes	378.75	381.58
28-Aug-06	379.89	382.48	Yes	91.48	23	14	88.35	Yes	380.28	381.85
29-Aug-06	381.73	382.99	Yes	91.99	11	2	88.71	Yes	382.02	382.21
30-Aug-06	381.48	383.15	Yes	92.15	15	7	89.08	Yes	381.84	382.58
31-Aug-06	380.95	383.05	Yes	92.05	19	10	88.92	Yes	381.34	382.42
01-Sep-06	381.79	383.22	Yes	92.22	13	4	89.08	Yes	382.13	382.58
02-Sep-06	381.61	383.36	Yes	92.36	16	7	89.24	Yes	382.00	382.74
03-Sep-06	380.53	383.22	Yes	92.22	25	15	89.13	Yes	380.97	382.63
04-Sep-06	380.47	383.18	Yes	92.18	25	15	89.07	Yes	380.89	382.57
05-Sep-06	379.93	383.09	Yes	92.09	29	18	88.98	Yes	380.39	382.48
06-Sep-06	379.18	382.91	Yes	91.91	34	23	88.81	Yes	379.66	382.31
07-Sep-06	378.70	382.68	Yes	91.68	36	26	88.60	Yes	379.17	382.10
08-Sep-06	378.54	382.55	Yes	91.55	36	26	88.46	Yes	379.00	381.96
09-Sep-06	378.76	382.54	Yes	91.54	34	24	88.43	Yes	379.21	381.93
10-Sep-06	378.37	382.41	Yes	91.41	37	26	88.32	Yes	378.88	381.82
11-Sep-06	378.09	382.27	Yes	91.27	38	27	88.15	Yes	378.60	381.65
12-Sep-06	378.88	382.37	Yes	91.37	32	21	88.23	Yes	379.33	381.73
13-Sep-06	379.46	382.47	Yes	91.47	27	17	88.35	Yes	379.91	381.85
14-Sep-06	379.90	382.52	Yes	91.52	24	14	88.38	Yes	380.30	381.88
15-Sep-06	380.46	382.71	Yes	91.71	20	11	88.57	Yes	380.84	382.07
16-Sep-06	380.90	382.94	Yes	91.94	19	9	88.81	Yes	381.27	382.31
17-Sep-06	381.29	383.06	Yes	92.06	16	7	88.94	Yes	381.66	382.44
18-Sep-06	382.11	383.21	Yes	92.21	10	1	89.06	Yes	382.43	382.56
19-Sep-06	381.65	383.24	Yes	92.24	15	5	89.11	Yes	382.00	382.61
20-Sep-06	381.12	383.23	Yes	92.23	19	10	89.13	Yes	381.51	382.63

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Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
21-Sep-06	380.67	383.25	Yes	92.25	24	14	89.15	Yes	381.08	382.65
22-Sep-06	380.92	383.27	Yes	92.27	21	12	89.18	Yes	381.30	382.68
23-Sep-06	381.35	383.32	Yes	92.32	18	9	89.19	Yes	381.72	382.69
24-Sep-06	380.64	383.14	Yes	92.14	23	13	89.04	Yes	381.07	382.54
25-Sep-06	379.34	382.94	Yes	91.94	33	22	88.85	Yes	379.81	382.35
26-Sep-06	380.05	382.95	Yes	91.95	26	17	88.84	Yes	380.46	382.34
27-Sep-06	380.43	383.06	Yes	92.06	24	14	88.98	Yes	380.83	382.48
28-Sep-06	380.39	383.02	Yes	92.02	24	14	88.91	Yes	380.78	382.41
29-Sep-06	380.44	383.08	Yes	92.08	24	14	88.96	Yes	380.86	382.46
30-Sep-06	381.48	383.15	Yes	92.15	15	15	88.92	Yes	380.67	382.42
	3Q06 Groundwater Flow Through North Half of Barrier Wall				3,211	2,234	3Q06 Groundwater Flow Through South Half of Barrier Wall			
01-Oct-06	381.45	383.50	Yes	92.50	19	9	89.31	Yes	381.78	382.81
02-Oct-06	381.02	383.55	Yes	92.55	23	13	89.36	Yes	381.39	382.86
03-Oct-06	380.94	383.41	Yes	92.41	23	12	89.19	Yes	381.30	382.69
04-Oct-06	381.01	383.40	Yes	92.40	22	12	89.20	Yes	381.39	382.70
05-Oct-06	381.16	383.54	Yes	92.54	22	12	89.34	Yes	381.51	382.84
06-Oct-06	380.96	383.45	Yes	92.45	23	12	89.25	Yes	381.35	382.75
07-Oct-06	380.80	383.53	Yes	92.53	25	15	89.33	Yes	381.19	382.83
08-Oct-06	380.67	383.54	Yes	92.54	26	16	89.35	Yes	381.06	382.85
09-Oct-06	380.67	383.40	Yes	92.40	25	15	89.22	Yes	381.05	382.72
10-Oct-06	380.13	383.26	Yes	92.26	29	18	89.09	Yes	380.53	382.59
11-Oct-06	379.75	383.03	Yes	92.03	30	19	88.82	Yes	380.17	382.32
12-Oct-06	379.35	382.91	Yes	91.91	32	21	88.71	Yes	379.79	382.21
13-Oct-06	379.44	382.91	Yes	91.91	32	20	88.72	Yes	379.89	382.22
14-Oct-06	379.50	382.81	Yes	91.81	30	19	88.64	Yes	379.93	382.14
15-Oct-06	379.32	382.77	Yes	91.77	31	21	88.61	Yes	379.75	382.11
16-Oct-06	379.70	382.73	Yes	91.73	28	17	88.51	Yes	380.08	382.01
17-Oct-06	380.42	382.69	Yes	91.69	21	10	88.45	Yes	380.78	381.95
18-Oct-06	380.52	382.97	Yes	91.97	22	12	88.76	Yes	380.90	382.26
19-Oct-06	378.54	382.80	Yes	91.80	39	27	88.66	Yes	379.05	382.16
20-Oct-06	377.34	382.40	Yes	91.40	46	34	88.25	Yes	377.85	381.75
21-Oct-06	377.35	382.19	Yes	91.19	44	32	88.02	Yes	377.84	381.52
22-Oct-06	377.27	382.01	Yes	91.01	43	31	87.86	Yes	377.77	381.36
23-Oct-06	377.41	381.87	Yes	90.87	40	29	87.68	Yes	377.88	381.18
24-Oct-06	378.36	382.09	Yes	91.09	34	22	87.86	Yes	378.80	381.36
25-Oct-06	379.21	382.12	Yes	91.12	26	16	87.88	Yes	379.59	381.38
26-Oct-06	379.43	382.34	Yes	91.34	26	15	88.11	Yes	379.84	381.61
27-Oct-06	379.06	382.43	Yes	91.43	30	20	88.26	Yes	379.46	381.76
28-Oct-06	378.90	382.28	Yes	91.28	31	20	88.10	Yes	379.31	381.60

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	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
29-Oct-06	381.73	382.99	Yes	91.99	11	2	88.71	Yes	382.02	382.21
30-Oct-06	381.48	383.15	Yes	92.15	15	7	89.08	Yes	381.84	382.58
31-Oct-06	380.95	383.05	Yes	92.05	19	10	88.92	Yes	381.34	382.42
01-Nov-06	378.23	382.37	Yes	91.37	37	21	87.65	Yes	378.67	381.15
02-Nov-06	378.21	382.24	Yes	91.24	36	21	87.55	Yes	378.66	381.05
03-Nov-06	378.43	382.31	Yes	91.31	35	20	87.60	Yes	378.84	381.10
04-Nov-06	NA	382.33	NC(D)	91.33	0	22	87.65	Yes	378.65	381.15
05-Nov-06	NA	382.20	NC(D)	91.20	0	25	87.52	Yes	378.15	381.02
06-Nov-06	376.83	382.14	Yes	91.14	48	30	87.49	Yes	377.51	380.99
07-Nov-06	376.69	381.99	Yes	90.99	48	31	87.34	Yes	377.22	380.84
08-Nov-06	376.90	381.90	Yes	90.90	45	29	87.25	Yes	377.39	380.75
09-Nov-06	376.89	381.81	Yes	90.81	44	28	87.08	Yes	377.38	380.58
10-Nov-06	376.83	381.74	Yes	90.74	44	27	87.00	Yes	377.32	380.50
11-Nov-06	377.16	381.63	Yes	90.63	40	24	86.88	Yes	377.62	380.38
12-Nov-06	377.15	381.79	Yes	90.79	42	25	87.09	Yes	377.63	380.59
13-Nov-06	377.08	381.74	Yes	90.74	42	26	87.07	Yes	377.57	380.57
14-Nov-06	377.20	381.80	Yes	90.80	41	25	87.12	Yes	377.67	380.62
15-Nov-06	377.47	381.96	Yes	90.96	40	24	87.24	Yes	377.93	380.74
16-Nov-06	378.41	381.89	Yes	90.89	31	16	87.13	Yes	378.81	380.63
17-Nov-06	378.16	381.86	Yes	90.86	33	17	87.11	Yes	378.60	380.61
18-Nov-06	377.39	381.68	Yes	90.68	39	22	86.94	Yes	377.83	380.44
19-Nov-06	377.06	381.60	Yes	90.60	41	24	86.87	Yes	377.55	380.37
20-Nov-06	376.87	381.56	Yes	90.56	42	26	86.83	Yes	377.36	380.33
21-Nov-06	377.14	381.60	Yes	90.60	40	24	86.88	Yes	377.60	380.38
22-Nov-06	377.14	381.54	Yes	90.54	39	24	86.87	Yes	377.63	380.37
23-Nov-06	377.18	381.57	Yes	90.57	39	23	86.82	Yes	377.65	380.32
24-Nov-06	377.09	381.54	Yes	90.54	40	24	86.84	Yes	377.56	380.34
25-Nov-06	377.02	381.42	Yes	90.42	39	23	86.71	Yes	377.51	380.21
26-Nov-06	377.02	381.38	Yes	90.38	39	23	86.67	Yes	377.50	380.17
27-Nov-06	377.13	381.38	Yes	90.38	38	22	86.64	Yes	377.57	380.14
28-Nov-06	377.27	381.51	Yes	90.51	38	22	86.77	Yes	377.73	380.27
29-Nov-06	377.70	381.61	Yes	90.61	35	19	86.84	Yes	378.15	380.34
30-Nov-06	378.65	381.96	Yes	90.96	30	14	87.13	Yes	379.03	380.63
01-Dec-06	382.08	382.97	Yes	91.97	8	0	88.01	No	382.28	381.51
02-Dec-06	382.73	383.22	Yes	92.22	4	0	88.32	No	382.95	381.82
03-Dec-06	383.26	383.45	Yes	92.45	2	0	88.61	No	383.45	382.11
04-Dec-06	383.04	383.59	Yes	92.59	5	0	88.85	No	383.31	382.35
05-Dec-06	382.60	383.42	Yes	92.42	7	0	88.71	No	382.88	382.21
06-Dec-06	382.20	383.39	Yes	92.39	11	0	88.66	No	382.51	382.16

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Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
07-Dec-06	381.99	383.25	Yes	92.25	12	0	88.47	No	382.29	381.97
08-Dec-06	381.08	383.40	Yes	92.40	21	7	88.71	Yes	381.46	382.21
09-Dec-06	379.98	383.22	Yes	92.22	30	14	88.56	Yes	380.42	382.06
10-Dec-06	379.25	382.98	Yes	91.98	34	18	88.30	Yes	379.70	381.80
11-Dec-06	379.26	382.90	Yes	91.90	33	18	88.22	Yes	379.68	381.72
12-Dec-06	380.30	383.01	Yes	92.01	25	10	88.29	Yes	380.67	381.79
13-Dec-06	381.66	383.32	Yes	92.32	15	1	88.58	Yes	381.97	382.08
14-Dec-06	383.23	383.73	Yes	92.73	5	0	88.99	No	383.47	382.49
15-Dec-06	383.70	383.82	Yes	92.82	1	0	89.05	No	383.93	382.55
16-Dec-06	383.57	384.05	Yes	93.05	4	0	89.31	No	383.84	382.81
17-Dec-06	383.64	384.05	Yes	93.05	4	0	89.31	No	383.88	382.81
18-Dec-06	383.92	384.15	Yes	93.15	2	0	89.33	No	384.14	382.83
19-Dec-06	383.47	384.24	Yes	93.24	7	0	89.44	No	383.76	382.94
20-Dec-06	382.66	384.25	Yes	93.25	15	0	89.50	No	383.00	383.00
21-Dec-06	382.68	384.43	Yes	93.43	16	2	89.70	Yes	383.01	383.20
22-Dec-06	383.42	384.43	Yes	93.43	9	0	89.65	No	383.70	383.15
23-Dec-06	383.73	384.42	Yes	93.42	6	0	89.57	No	384.01	383.07
24-Dec-06	377.39	377.86	Yes	86.86	4	0	83.35	No	377.92	376.85
25-Dec-06	378.01	378.10	Yes	87.10	1	0	83.64	No	378.55	377.14
26-Dec-06	385.54	384.98	No	93.98	0	0	90.20	No	385.77	383.70
27-Dec-06	385.10	385.18	Yes	94.18	1	0	90.44	No	385.37	383.94
28-Dec-06	384.46	385.14	Yes	94.14	6	0	90.35	No	384.74	383.85
29-Dec-06	384.52	385.14	Yes	94.14	6	0	90.39	No	384.82	383.89
30-Dec-06	384.40	385.27	Yes	94.27	8	0	90.56	No	384.70	384.06
31-Dec-06	384.62	385.40	Yes	94.40	7	0	90.68	No	384.90	384.18
	4Q06 Groundwater Flow Through North Half of Barrier Wall				2,282	1,307	4Q06 Groundwater Flow Through South Half of Barrier Wall			
01-Jan-07	385.68	383.51	No	92.51	0	0	90.42	No	385.05	383.92
02-Jan-07	385.49	383.64	No	92.64	0	0	90.55	No	384.65	384.05
03-Jan-07	385.45	383.72	No	92.72	0	0	90.61	No	384.52	384.11
04-Jan-07	385.80	383.90	No	92.90	0	0	90.82	No	385.07	384.32
05-Jan-07	386.27	383.94	No	92.94	0	0	90.93	No	385.84	384.43
06-Jan-07	386.48	383.92	No	92.92	0	0	90.93	No	386.14	384.43
07-Jan-07	386.96	384.27	No	93.27	0	0	91.35	No	386.80	384.85
08-Jan-07	387.37	384.38	No	93.38	0	0	91.55	No	387.41	385.05
09-Jan-07	387.41	384.40	No	93.40	0	0	91.53	No	387.39	385.03
10-Jan-07	387.20	384.60	No	93.60	0	0	91.77	No	386.93	385.27
11-Jan-07	387.12	384.76	No	93.76	0	0	91.90	No	386.73	385.40
12-Jan-07	386.80	384.63	No	93.63	0	0	91.71	No	386.22	385.21
13-Jan-07	387.34	384.80	No	93.80	0	0	91.96	No	387.05	385.46

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	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
14-Jan-07	387.08	384.94	No	93.94	0	0	92.06	No	386.55	385.56
15-Jan-07	387.49	384.92	No	93.92	0	0	92.07	No	387.23	385.57
16-Jan-07	388.21	384.97	No	93.97	0	0	92.14	No	388.38	385.64
17-Jan-07	387.97	385.23	No	94.23	0	0	92.43	No	387.81	385.93
18-Jan-07	387.21	385.30	No	94.30	0	0	92.39	No	386.50	385.89
19-Jan-07	386.55	385.03	No	94.03	0	0	91.92	No	385.53	385.42
20-Jan-07	386.29	384.95	No	93.95	0	1	91.75	Yes	385.14	385.25
21-Jan-07	385.85	384.91	No	93.91	0	7	91.62	Yes	384.40	385.12
22-Jan-07	385.56	384.37	No	93.37	0	8	91.40	Yes	384.03	384.90
23-Jan-07	385.21	384.10	No	93.10	0	13	91.46	Yes	383.50	384.96
24-Jan-07	385.06	383.81	No	92.81	0	12	91.19	Yes	383.37	384.69
25-Jan-07	385.09	383.71	No	92.71	0	11	91.13	Yes	383.46	384.63
26-Jan-07	385.62	384.05	No	93.05	0	6	91.46	Yes	384.29	384.96
27-Jan-07	385.83	384.03	No	93.03	0	2	91.39	Yes	384.63	384.89
28-Jan-07	385.94	384.09	No	93.09	0	1	91.43	Yes	384.82	384.93
29-Jan-07	385.20	384.46	No	93.46	0	11	91.30	Yes	383.54	384.80
30-Jan-07	384.93	384.37	No	93.37	0	7	90.51	Yes	383.21	384.01
31-Jan-07	384.58	384.26	No	93.26	0	17	91.02	Yes	382.67	384.52
01-Feb-07	382.09	385.78	Yes	94.78	35	19	91.11	Yes	382.55	384.61
02-Feb-07	382.00	385.43	Yes	94.43	32	16	90.73	Yes	382.43	384.23
03-Feb-07	381.50	385.28	Yes	94.28	35	19	90.57	Yes	381.97	384.07
04-Feb-07	380.66	385.06	Yes	94.06	41	24	90.36	Yes	381.15	383.86
05-Feb-07	379.40	384.65	Yes	93.65	49	31	89.98	Yes	379.95	383.48
06-Feb-07	379.08	384.62	Yes	93.62	51	34	89.99	Yes	379.65	383.49
07-Feb-07	378.49	384.22	Yes	93.22	53	35	89.48	Yes	379.06	382.98
08-Feb-07	378.10	384.00	Yes	93.00	54	37	89.32	Yes	378.69	382.82
09-Feb-07	378.16	383.91	Yes	92.91	53	35	89.19	Yes	378.74	382.69
10-Feb-07	378.05	383.72	Yes	92.72	52	35	89.03	Yes	378.60	382.53
11-Feb-07	378.08	383.68	Yes	92.68	51	34	89.02	Yes	378.63	382.52
12-Feb-07	377.93	383.57	Yes	92.57	52	34	88.90	Yes	378.49	382.40
13-Feb-07	378.88	383.66	Yes	92.66	44	27	88.94	Yes	379.38	382.44
14-Feb-07	378.63	383.40	Yes	92.40	44	27	88.67	Yes	379.15	382.17
15-Feb-07	378.50	383.34	Yes	92.34	44	27	88.64	Yes	379.02	382.14
16-Feb-07	379.12	383.56	Yes	92.56	41	24	88.87	Yes	379.61	382.37
17-Feb-07	379.82	383.51	Yes	92.51	34	18	88.77	Yes	380.27	382.27
18-Feb-07	380.78	383.76	Yes	92.76	27	11	88.98	Yes	381.19	382.48
19-Feb-07	381.24	384.23	Yes	93.23	28	12	89.49	Yes	381.64	382.99
20-Feb-07	374.32	377.26	Yes	86.26	25	72	89.38	Yes	374.75	382.88
21-Feb-07	380.27	383.89	Yes	92.89	33	17	89.16	Yes	380.72	382.66

Table 1
2007 Annual Report Tech Mem0
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
22-Feb-07	381.17	383.85	Yes	92.85	25	9	89.07	Yes	381.56	382.57
23-Feb-07	382.77	384.36	Yes	93.36	15	0	89.58	No	383.10	383.08
24-Feb-07	384.69	385.10	Yes	94.10	4	0	90.35	No	384.95	383.85
25-Feb-07	390.33	385.70	No	94.70	0	0	90.93	No	390.19	384.43
26-Feb-07	394.18	386.10	No	95.10	0	0	91.40	No	393.79	384.90
27-Feb-07	395.33	386.46	No	95.46	0	0	91.81	No	394.94	385.31
28-Feb-07	395.36	386.97	No	95.97	0	0	92.36	No	395.02	385.86
01-Mar-07	385.68	383.51	No	92.51	0	0	90.42	No	385.05	383.92
02-Mar-07	385.49	383.64	No	92.64	0	0	90.55	No	384.65	384.05
03-Mar-07	385.45	383.72	No	92.72	0	0	90.61	No	384.52	384.11
04-Mar-07	385.80	383.90	No	92.90	0	0	90.82	No	385.07	384.32
05-Mar-07	386.27	383.94	No	92.94	0	0	90.93	No	385.84	384.43
06-Mar-07	386.48	383.92	No	92.92	0	0	90.93	No	386.14	384.43
07-Mar-07	386.96	384.27	No	93.27	0	0	91.35	No	386.80	384.85
08-Mar-07	387.37	384.38	No	93.38	0	0	91.55	No	387.41	385.05
09-Mar-07	387.41	384.40	No	93.40	0	0	91.53	No	387.39	385.03
10-Mar-07	387.20	384.60	No	93.60	0	0	91.77	No	386.93	385.27
11-Mar-07	387.12	384.76	No	93.76	0	0	91.90	No	386.73	385.40
12-Mar-07	386.80	384.63	No	93.63	0	0	91.71	No	386.22	385.21
13-Mar-07	387.34	384.80	No	93.80	0	0	91.96	No	387.05	385.46
14-Mar-07	387.08	384.94	No	93.94	0	0	92.06	No	386.55	385.56
15-Mar-07	387.49	384.92	No	93.92	0	0	92.07	No	387.23	385.57
16-Mar-07	388.21	384.97	No	93.97	0	0	92.14	No	388.38	385.64
17-Mar-07	387.97	385.23	No	94.23	0	0	92.43	No	387.81	385.93
18-Mar-07	387.21	385.30	No	94.30	0	0	92.39	No	386.50	385.89
19-Mar-07	386.55	385.03	No	94.03	0	0	91.92	No	385.53	385.42
20-Mar-07	386.29	384.95	No	93.95	0	1	91.75	Yes	385.14	385.25
21-Mar-07	385.85	384.91	No	93.91	0	7	91.62	Yes	384.40	385.12
22-Mar-07	385.56	384.37	No	93.37	0	8	91.40	Yes	384.03	384.90
23-Mar-07	385.21	384.10	No	93.10	0	13	91.46	Yes	383.50	384.96
24-Mar-07	385.06	383.81	No	92.81	0	12	91.19	Yes	383.37	384.69
25-Mar-07	385.09	383.71	No	92.71	0	11	91.13	Yes	383.46	384.63
26-Mar-07	385.62	384.05	No	93.05	0	6	91.46	Yes	384.29	384.96
27-Mar-07	385.83	384.03	No	93.03	0	2	91.39	Yes	384.63	384.89
28-Mar-07	385.94	384.09	No	93.09	0	1	91.43	Yes	384.82	384.93
29-Mar-07	385.20	384.46	No	93.46	0	11	91.30	Yes	383.54	384.80
30-Mar-07	384.93	384.37	No	93.37	0	7	90.51	Yes	383.21	384.01
31-Mar-07	384.58	384.26	No	93.26	0	17	91.02	Yes	382.67	384.52
	1Q07 Groundwater Flow Through North Half of Barrier Wall				921	789	1Q07 Groundwater Flow Through South Half of Barrier Wall			

Table 1
2007 Annual Report Tech Mem0
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
01-Apr-07	399.47	392.47	No	101.47	0	0	97.95	No	399.26	391.45
02-Apr-07	399.63	392.60	No	101.60	0	0	98.03	No	399.37	391.53
03-Apr-07	399.80	392.56	No	101.56	0	0	97.95	No	399.54	391.45
04-Apr-07	400.50	392.92	No	101.92	0	0	98.41	No	400.22	391.91
05-Apr-07	401.32	393.23	No	102.23	0	0	98.72	No	401.02	392.22
06-Apr-07	401.53	393.49	No	102.49	0	0	98.99	No	401.27	392.49
07-Apr-07	401.26	393.67	No	102.67	0	0	99.17	No	400.98	392.67
08-Apr-07	400.59	393.81	No	102.81	0	0	99.33	No	400.39	392.83
09-Apr-07	400.22	393.93	No	102.93	0	0	99.45	No	400.00	392.95
10-Apr-07	399.72	394.11	No	103.11	0	0	99.62	No	399.58	393.12
11-Apr-07	399.61	394.30	No	103.30	0	0	99.78	No	399.48	393.28
12-Apr-07	399.81	394.17	No	103.17	0	0	99.62	No	399.66	393.12
13-Apr-07	399.95	394.34	No	103.34	0	0	99.83	No	399.78	393.33
14-Apr-07	400.17	394.60	No	103.60	0	0	100.08	No	400.02	393.58
15-Apr-07	401.23	394.67	No	103.67	0	0	100.14	No	401.00	393.64
16-Apr-07	402.35	394.91	No	103.91	0	0	100.40	No	402.06	393.90
17-Apr-07	402.35	395.14	No	104.14	0	0	100.67	No	402.09	394.17
18-Apr-07	401.80	395.26	No	104.26	0	0	100.75	No	401.62	394.25
19-Apr-07	401.31	395.31	No	104.31	0	0	100.78	No	401.10	394.28
20-Apr-07	400.54	395.34	No	104.34	0	0	100.85	No	400.44	394.35
21-Apr-07	399.56	395.40	No	104.40	0	0	100.91	No	399.53	394.41
22-Apr-07	398.76	395.48	No	104.48	0	0	100.89	No	398.80	394.39
23-Apr-07	398.10	395.43	No	104.43	0	0	100.86	No	398.20	394.36
24-Apr-07	397.31	395.43	No	104.43	0	0	100.85	No	397.44	394.35
25-Apr-07	396.45	395.40	No	104.40	0	0	100.79	No	396.65	394.29
26-Apr-07	395.85	395.34	No	104.34	0	0	100.73	No	396.11	394.23
27-Apr-07	396.09	395.19	No	104.19	0	0	100.55	No	396.30	394.05
28-Apr-07	397.86	395.29	No	104.29	0	0	100.69	No	397.96	394.19
29-Apr-07	400.81	395.61	No	104.61	0	0	101.06	No	400.73	394.56
30-Apr-07	402.35	395.95	No	104.95	0	0	101.37	No	402.15	394.87
01-May-07	402.52	396.13	No	105.13	0	0	101.59	No	402.40	395.09
02-May-07	402.45	396.33	No	105.33	0	0	101.79	No	402.32	395.29
03-May-07	402.30	396.48	No	105.48	0	0	101.92	No	402.15	395.42
04-May-07	402.58	396.67	No	105.67	0	0	102.11	No	402.43	395.61
05-May-07	402.58	396.81	No	105.81	0	0	102.25	No	402.47	395.75
06-May-07	401.83	396.88	No	105.88	0	0	102.29	No	401.78	395.79
07-May-07	400.94	396.95	No	105.95	0	0	102.37	No	400.96	395.87
08-May-07	400.56	397.01	No	106.01	0	0	102.40	No	400.63	395.90
09-May-07	403.15	397.26	No	106.26	0	0	102.71	No	403.01	396.21

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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
10-May-07	405.71	397.63	No	106.63	0	0	103.12	No	405.43	396.62
11-May-07	406.66	397.97	No	106.97	0	0	103.45	No	406.34	396.95
12-May-07	406.74	398.18	No	107.18	0	0	103.67	No	406.41	397.17
13-May-07	406.63	398.41	No	107.41	0	0	103.91	No	406.30	397.41
14-May-07	406.39	398.68	No	107.68	0	0	104.11	No	406.10	397.61
15-May-07	406.17	398.89	No	107.89	0	0	104.29	No	405.96	397.79
16-May-07	405.80	398.91	No	107.91	0	0	104.40	No	405.61	397.90
17-May-07	404.96	398.93	No	107.93	0	0	104.42	No	404.84	397.92
18-May-07	403.59	398.95	No	107.95	0	0	104.43	No	403.57	397.93
19-May-07	401.86	398.87	No	107.87	0	0	104.33	No	401.95	397.83
20-May-07	400.47	398.73	No	107.73	0	0	104.15	No	400.65	397.65
21-May-07	398.82	398.48	No	107.48	0	0	103.90	No	399.11	397.40
22-May-07	397.22	398.16	Yes	107.16	10	0	103.55	No	397.59	397.05
23-May-07	396.17	397.85	Yes	106.85	18	1	103.21	Yes	396.60	396.71
24-May-07	395.38	397.60	Yes	106.60	23	6	102.95	Yes	395.83	396.45
25-May-07	394.58	397.33	Yes	106.33	29	11	102.64	Yes	395.06	396.14
26-May-07	394.43	397.22	Yes	106.22	29	12	102.54	Yes	394.90	396.04
27-May-07	394.31	396.98	Yes	105.98	28	11	102.36	Yes	394.75	395.86
28-May-07	395.14	396.93	Yes	105.93	19	2	102.29	Yes	395.55	395.79
29-May-07	396.92	397.20	Yes	106.20	3	0	102.55	No	397.23	396.05
30-May-07	397.45	397.40	No	106.40	0	0	102.76	No	397.76	396.26
31-May-07	396.94	397.43	Yes	106.43	5	0	102.78	No	397.30	396.28
01-Jun-07	396.53	397.42	Yes	106.42	9	0	102.76	No	396.89	396.26
02-Jun-07	397.45	397.53	Yes	106.53	1	0	102.87	No	397.78	396.37
03-Jun-07	398.20	397.74	No	106.74	0	0	103.07	No	398.49	396.57
04-Jun-07	398.67	397.84	No	106.84	0	0	103.19	No	398.96	396.69
05-Jun-07	399.57	397.95	No	106.95	0	0	103.31	No	399.84	396.81
06-Jun-07	398.84	398.03	No	107.03	0	0	103.42	No	399.13	396.92
07-Jun-07	397.14	397.97	Yes	106.97	9	0	103.33	No	397.51	396.83
08-Jun-07	396.20	397.63	Yes	106.63	15	0	102.93	No	396.58	396.43
09-Jun-07	395.61	397.34	Yes	106.34	18	1	102.63	Yes	396.01	396.13
10-Jun-07	395.40	397.28	Yes	106.28	20	3	102.59	Yes	395.83	396.09
11-Jun-07	395.38	397.20	Yes	106.20	19	2	102.46	Yes	395.80	395.96
12-Jun-07	395.75	397.15	Yes	106.15	15	0	102.41	No	396.14	395.91
13-Jun-07	395.64	397.23	Yes	106.23	17	0	102.51	No	396.05	396.01
14-Jun-07	394.51	396.94	Yes	105.94	25	7	102.23	Yes	395.06	395.73
15-Jun-07	393.21	396.44	Yes	105.44	34	15	101.77	Yes	393.80	395.27
16-Jun-07	392.84	396.04	Yes	105.04	33	13	101.33	Yes	393.56	394.83
17-Jun-07	393.26	396.10	Yes	105.10	30	12	101.39	Yes	393.74	394.89

Table 1
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
18-Jun-07	390.33	395.74	NC	104.74	0	20	101.05	Yes	392.56	394.55
19-Jun-07	391.12	395.29	Yes	104.29	43	21	100.54	Yes	391.89	394.04
20-Jun-07	390.75	395.01	Yes	104.01	44	23	100.23	Yes	391.41	393.73
21-Jun-07	390.30	394.60	Yes	103.60	44	26	100.01	Yes	390.88	393.51
22-Jun-07	389.92	394.58	Yes	103.58	48	27	99.85	Yes	390.62	393.35
23-Jun-07	390.03	394.39	Yes	103.39	45	25	99.68	Yes	390.62	393.18
24-Jun-07	392.05	394.86	Yes	103.86	29	10	100.12	Yes	392.62	393.62
25-Jun-07	393.16	395.32	Yes	104.32	22	4	100.55	Yes	393.64	394.05
26-Jun-07	392.59	395.30	Yes	104.30	28	10	100.60	Yes	393.13	394.10
27-Jun-07	391.90	394.93	Yes	103.93	31	13	100.22	Yes	392.38	393.72
28-Jun-07	390.90	394.61	Yes	103.61	38	19	99.92	Yes	391.51	393.42
29-Jun-07	389.93	394.25	Yes	103.25	44	24	99.53	Yes	390.63	393.03
30-Jun-07	389.66	394.18	Yes	103.18	46	26	99.46	Yes	390.36	392.96
	2Q07 Groundwater Flow Through North Half of Barrier Wall				871	343	2Q07 Groundwater Flow Through South Half of Barrier Wall			
01-Jul-07	391.60	394.61	Yes	103.61	31	13	99.87	Yes	392.08	393.37
02-Jul-07	392.47	395.02	Yes	104.02	26	8	100.27	Yes	392.94	393.77
03-Jul-07	392.26	395.14	Yes	104.14	30	12	100.48	Yes	392.74	393.98
04-Jul-07	391.63	394.76	Yes	103.76	32	16	100.23	Yes	392.12	393.73
05-Jul-07	391.49	394.50	Yes	103.50	31	13	99.78	Yes	391.98	393.28
06-Jul-07	391.55	394.51	Yes	103.51	30	12	99.80	Yes	392.10	393.30
07-Jul-07	391.88	394.73	Yes	103.73	29	11	100.04	Yes	392.41	393.54
08-Jul-07	392.06	394.87	Yes	103.87	29	11	100.19	Yes	392.55	393.69
09-Jul-07	391.23	394.61	Yes	103.61	35	15	99.92	Yes	391.88	393.42
10-Jul-07	390.15	394.22	Yes	103.22	42	23	99.53	Yes	390.71	393.03
11-Jul-07	388.42	393.63	Yes	102.63	53	31	98.90	Yes	389.21	392.40
12-Jul-07	387.65	393.19	Yes	102.19	56	34	98.50	Yes	388.52	392.00
13-Jul-07	388.02	393.11	Yes	102.11	51	32	98.39	Yes	388.62	391.89
14-Jul-07	387.45	392.88	Yes	101.88	55	35	98.14	Yes	388.07	391.64
15-Jul-07	386.39	392.50	Yes	101.50	61	37	97.74	Yes	387.42	391.24
16-Jul-07	386.47	392.32	Yes	101.32	59	38	97.54	Yes	387.08	391.04
17-Jul-07	385.98	392.03	Yes	101.03	61	39	97.26	Yes	386.75	390.76
18-Jul-07	385.74	391.80	Yes	100.80	60	38	97.03	Yes	386.57	390.53
19-Jul-07	385.63	391.71	Yes	100.71	61	38	96.88	Yes	386.44	390.38
20-Jul-07	387.61	391.76	Yes	100.76	41	22	96.96	Yes	388.13	390.46
21-Jul-07	388.64	392.50	Yes	101.50	39	12	97.70	Yes	389.97	391.20
22-Jul-07	389.48	392.72	Yes	101.72	33	14	97.95	Yes	390.00	391.45
23-Jul-07	387.37	392.26	Yes	101.26	49	27	97.61	Yes	388.26	391.11
24-Jul-07	386.59	391.84	Yes	100.84	52	32	97.11	Yes	387.24	390.61
25-Jul-07	385.29	391.54	Yes	100.54	62	33	96.84	Yes	386.91	390.34

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Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
26-Jul-07	385.40	391.30	Yes	100.30	59	36	96.55	Yes	386.25	390.05
27-Jul-07	384.84	391.06	Yes	100.06	62	39	96.27	Yes	385.67	389.77
28-Jul-07	384.67	390.56	Yes	99.56	58	39	95.90	Yes	385.30	389.40
29-Jul-07	385.21	390.86	Yes	99.86	56	36	96.05	Yes	385.81	389.55
30-Jul-07	385.22	390.67	Yes	99.67	54	36	96.05	Yes	385.81	389.55
31-Jul-07	385.25	390.73	Yes	99.73	54	34	95.97	Yes	385.90	389.47
01-Aug-07	382.04	387.93	Yes	96.93	57	37	95.16	Yes	384.69	388.66
02-Aug-07	382.62	388.25	Yes	97.25	54	35	95.50	Yes	385.27	389.00
03-Aug-07	384.15	390.13	Yes	99.13	59	38	95.31	Yes	384.78	388.81
04-Aug-07	383.12	389.86	Yes	98.86	66	43	95.08	Yes	384.00	388.58
05-Aug-07	381.56	389.44	Yes	98.44	77	48	94.67	Yes	383.05	388.17
06-Aug-07	381.97	389.15	Yes	98.15	70	48	94.32	Yes	382.68	387.82
07-Aug-07	380.87	388.95	Yes	97.95	78	48	94.09	Yes	382.39	387.59
08-Aug-07	381.00	388.84	Yes	97.84	76	44	94.02	Yes	382.74	387.52
09-Aug-07	383.15	389.03	Yes	98.03	57	37	94.18	Yes	383.76	387.68
10-Aug-07	385.11	389.39	Yes	98.39	42	23	94.55	Yes	385.65	388.05
11-Aug-07	386.14	389.79	Yes	98.79	36	17	94.99	Yes	386.66	388.49
12-Aug-07	387.06	390.11	Yes	99.11	30	13	95.35	Yes	387.52	388.85
13-Aug-07	386.59	390.20	Yes	99.20	35	17	95.43	Yes	387.16	388.93
14-Aug-07	387.23	390.66	Yes	99.66	34	16	95.92	Yes	387.78	389.42
15-Aug-07	385.90	390.43	Yes	99.43	45	26	95.70	Yes	386.44	389.20
16-Aug-07	383.30	388.18	Yes	97.18	47	29	95.46	Yes	385.88	388.96
17-Aug-07	385.03	389.99	Yes	98.99	49	29	95.23	Yes	385.60	388.73
18-Aug-07	384.76	389.94	Yes	98.94	51	32	95.19	Yes	385.33	388.69
19-Aug-07	383.77	389.69	Yes	98.69	58	38	94.96	Yes	384.42	388.46
20-Aug-07	380.60	387.40	Yes	96.40	65	44	94.68	Yes	383.45	388.18
21-Aug-07	382.96	389.27	Yes	98.27	61	39	94.47	Yes	383.81	387.97
22-Aug-07	384.82	389.53	Yes	98.53	46	27	94.80	Yes	385.37	388.30
23-Aug-07	386.52	390.07	Yes	99.07	35	16	95.32	Yes	387.15	388.82
24-Aug-07	388.84	390.55	Yes	99.55	17	1	95.83	Yes	389.27	389.33
25-Aug-07	390.69	390.89	Yes	99.89	2	0	96.16	No	391.08	389.66
26-Aug-07	392.61	391.20	No	100.20	0	0	96.45	No	392.93	389.95
27-Aug-07	394.22	391.50	No	100.50	0	0	96.80	No	394.50	390.30
28-Aug-07	395.79	391.76	No	100.76	0	0	97.11	No	396.00	390.61
29-Aug-07	399.13	392.14	No	101.14	0	0	97.53	No	399.20	391.03
30-Aug-07	400.30	392.52	No	101.52	0	0	97.96	No	400.32	391.46
31-Aug-07	399.82	392.87	No	101.87	0	0	98.31	No	399.87	391.81
01-Sep-07	398.84	393.12	No	102.12	0	0	98.52	No	398.94	392.02
02-Sep-07	397.76	393.32	No	102.32	0	0	98.70	No	397.93	392.20

Table 1
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL (Ft NGVD)	PZ-2 Outside Average Daily GWL (Ft NGVD)	Outward Groundwater Gradient (Yes/No)	Aquifer Saturated Thickness (Feet)	GW Flow Thru North Half of Barrier Wall (GPD)	GW Flow Thru South Half of Barrier Wall (GPD)	Aquifer Saturated Thickness (Feet)	Outward Groundwater Gradient (Yes/No)	PZ-3 Outside Average Daily GWL (Ft NGVD)	PZ-3 Inside Average Daily GWL (Ft NGVD)
03-Sep-07	396.65	393.41	No	102.41	0	0	98.76	No	396.88	392.26
04-Sep-07	395.60	393.62	No	102.62	0	0	98.98	No	395.88	392.48
05-Sep-07	394.51	393.81	No	102.81	0	0	99.21	No	394.86	392.71
06-Sep-07	393.26	393.84	Yes	102.84	6	0	99.22	No	393.65	392.72
07-Sep-07	391.86	393.77	Yes	102.77	19	3	99.09	Yes	392.28	392.59
08-Sep-07	389.26	393.48	Yes	102.48	43	24	98.76	Yes	389.79	392.26
09-Sep-07	388.49	390.82	Yes	99.82	23	25	98.12	Yes	389.07	391.62
10-Sep-07	388.30	392.51	Yes	101.51	42	20	97.90	Yes	389.39	391.40
11-Sep-07	NA	392.78	NC(D)	101.78	NC(D)	22	98.13	Yes	389.31	391.63
12-Sep-07	NA	392.69	NC(D)	101.69	NC(D)	25	98.03	Yes	388.99	391.53
13-Sep-07	NA	392.71	NC(D)	101.71	NC(D)	20	98.04	Yes	389.45	391.54
14-Sep-07	NA	392.64	NC(D)	101.64	NC(D)	22	97.90	Yes	389.16	391.40
15-Sep-07	NA	387.60	NC(D)	96.60	NC(D)	27	97.48	Yes	388.14	390.98
16-Sep-07	NA	391.59	NC(D)	100.59	NC(D)	32	96.89	Yes	387.09	390.39
17-Sep-07	376.04	391.15	Yes	100.15	150	39	96.42	Yes	385.81	389.92
18-Sep-07	381.43	390.90	Yes	99.90	94	43	96.12	Yes	385.08	389.62
19-Sep-07	NA	390.59	NC(D)	99.59	NC(D)	44	95.84	Yes	384.68	389.34
20-Sep-07	357.80	390.39	Yes	99.39	321	43	95.64	Yes	384.61	389.14
21-Sep-07	354.06	390.30	Yes	99.30	356	46	95.56	Yes	384.23	389.06
22-Sep-07	368.47	389.96	Yes	98.96	210	45	95.27	Yes	384.01	388.77
23-Sep-07	366.16	389.84	Yes	98.84	232	45	95.07	Yes	383.74	388.57
24-Sep-07	NA	389.66	NC(D)	98.66	NC(D)	47	94.87	Yes	383.41	388.37
25-Sep-07	NA	389.48	NC(D)	98.48	NC(D)	46	94.74	Yes	383.31	388.24
26-Sep-07	NA	389.34	NC(D)	98.34	NC(D)	44	94.59	Yes	383.43	388.09
27-Sep-07	NA	389.12	NC(D)	98.12	NC(D)	40	94.33	Yes	383.54	387.83
28-Sep-07	NA	389.23	NC(D)	98.23	NC(D)	35	94.44	Yes	384.18	387.94
29-Sep-07	NA	389.15	NC(D)	98.15	NC(D)	37	94.40	Yes	383.96	387.90
30-Sep-07	NA	388.91	NC(D)	97.91	NC(D)	40	94.16	Yes	383.37	387.66
	3Q07 Groundwater Flow Through North Half of Barrier Wall				4,190	2,375	3Q07 Groundwater Flow Through South Half of Barrier Wall			
01-Oct-07	NA	388.74	No	97.74	0	40	93.98	Yes	383.14	387.48
02-Oct-07	NA	388.72	No	97.72	0	41	93.99	Yes	383.03	387.49
03-Oct-07	383.11	388.73	Yes	97.73	54	36	93.96	Yes	383.59	387.46
04-Oct-07	383.46	388.88	Yes	97.88	52	33	94.11	Yes	384.02	387.61
05-Oct-07	383.80	388.86	Yes	97.86	49	30	94.12	Yes	384.37	387.62
06-Oct-07	384.54	388.98	Yes	97.98	43	25	94.25	Yes	385.09	387.75
07-Oct-07	385.36	389.16	Yes	98.16	37	20	94.48	Yes	385.89	387.98
08-Oct-07	385.81	389.34	Yes	98.34	34	17	94.66	Yes	386.32	388.16
09-Oct-07	386.36	389.56	Yes	98.56	31	14	94.85	Yes	386.87	388.35
10-Oct-07	387.16	389.86	Yes	98.86	26	10	95.16	Yes	387.62	388.66

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Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
11-Oct-07	387.45	390.05	Yes	99.05	25	9	95.39	Yes	387.94	388.89
12-Oct-07	387.14	390.15	Yes	99.15	29	11	95.48	Yes	387.78	388.98
13-Oct-07	387.40	390.26	Yes	99.26	28	11	95.56	Yes	387.88	389.06
14-Oct-07	387.67	390.33	Yes	99.33	26	9	95.61	Yes	388.12	389.11
15-Oct-07	388.01	390.44	Yes	99.44	24	7	95.73	Yes	388.47	389.23
16-Oct-07	388.33	390.48	Yes	99.48	21	5	95.76	Yes	388.79	389.26
17-Oct-07	388.53	390.65	Yes	99.65	21	4	95.97	Yes	389.03	389.47
18-Oct-07	389.28	390.75	Yes	99.75	14	0	96.07	No	389.71	389.57
19-Oct-07	391.76	390.95	No	99.95	0	0	96.25	No	392.10	389.75
20-Oct-07	395.38	391.37	No	100.37	0	0	96.79	No	395.58	390.29
21-Oct-07	396.52	391.67	No	100.67	0	0	97.14	No	396.72	390.64
22-Oct-07	395.97	391.89	No	100.89	0	0	97.33	No	396.14	390.83
23-Oct-07	395.20	392.04	No	101.04	0	0	97.53	No	395.42	391.03
24-Oct-07	394.55	392.15	No	101.15	0	0	97.57	No	394.86	391.07
25-Oct-07	393.98	392.31	No	101.31	0	0	97.74	No	394.30	391.24
26-Oct-07	393.59	392.42	No	101.42	0	0	97.82	No	393.92	391.32
27-Oct-07	393.02	392.37	No	101.37	0	0	97.73	No	393.37	391.23
28-Oct-07	392.11	392.37	Yes	101.37	3	0	97.74	No	392.50	391.24
29-Oct-07	391.65	392.44	Yes	101.44	8	0	97.78	No	392.02	391.28
30-Oct-07	391.41	392.45	Yes	101.45	10	0	97.81	No	391.88	391.31
31-Oct-07	391.24	392.42	Yes	101.42	12	0	97.78	No	391.68	391.28
01-Nov-07	390.91	392.26	Yes	101.26	14	0	97.75	No	391.56	391.25
02-Nov-07	390.77	391.74	Yes	100.74	10	1	97.76	Yes	391.15	391.26
03-Nov-07	390.41	391.61	Yes	100.61	12	2	97.46	Yes	390.72	390.96
04-Nov-07	390.00	391.46	Yes	100.46	15	4	97.33	Yes	390.38	390.83
05-Nov-07	389.28	391.11	Yes	100.11	18	7	97.15	Yes	389.96	390.65
06-Nov-07	388.54	390.87	Yes	99.87	23	9	96.79	Yes	389.30	390.29
07-Nov-07	388.08	390.68	Yes	99.68	26	14	96.54	Yes	388.55	390.04
08-Nov-07	386.78	390.20	Yes	99.20	34	17	96.32	Yes	388.07	389.82
09-Nov-07	385.88	389.80	Yes	98.80	38	24	95.80	Yes	386.79	389.30
10-Nov-07	384.54	389.34	Yes	98.34	47	28	95.42	Yes	385.93	388.92
11-Nov-07	384.27	388.93	Yes	97.93	45	36	94.96	Yes	384.63	388.46
12-Nov-07	384.87	389.02	Yes	98.02	40	34	94.52	Yes	384.36	388.02
13-Nov-07	384.61	388.72	Yes	97.72	40	30	94.60	Yes	384.93	388.10
14-Nov-07	384.24	388.62	Yes	97.62	42	30	94.32	Yes	384.65	387.82
15-Nov-07	383.58	388.39	Yes	97.39	46	31	94.15	Yes	384.33	387.65
16-Nov-07	382.99	388.09	Yes	97.09	49	36	94.00	Yes	383.64	387.50
17-Nov-07	382.50	387.77	Yes	96.77	50	38	93.64	Yes	383.06	387.14
18-Nov-07	382.20	387.55	Yes	96.55	51	39	93.29	Yes	382.59	386.79

Table 1
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Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
19-Nov-07	382.03	387.39	Yes	96.39	51	40	93.11	Yes	382.30	386.61
20-Nov-07	381.91	387.19	Yes	96.19	50	40	92.93	Yes	382.12	386.43
21-Nov-07	381.47	386.91	Yes	95.91	52	39	92.75	Yes	381.98	386.25
22-Nov-07	381.43	387.13	Yes	96.13	54	40	92.41	Yes	381.55	385.91
23-Nov-07	381.55	386.76	Yes	95.76	49	43	92.64	Yes	381.49	386.14
24-Nov-07	381.77	386.71	Yes	95.71	47	38	92.34	Yes	381.65	385.84
25-Nov-07	381.73	386.74	Yes	95.74	47	36	92.28	Yes	381.82	385.78
26-Nov-07	381.47	386.42	Yes	95.42	47	36	92.27	Yes	381.79	385.77
27-Nov-07	380.83	386.34	Yes	95.34	52	35	91.96	Yes	381.57	385.46
28-Nov-07	380.79	386.05	Yes	95.05	50	41	91.94	Yes	380.92	385.44
29-Nov-07	380.73	386.01	Yes	95.01	50	38	91.60	Yes	380.86	385.10
30-Nov-07	378.65	381.96	Yes	90.96	30	39	91.58	Yes	380.80	385.08
01-Dec-07	380.62	386.02	Yes	95.02	51	40	91.63	Yes	380.73	385.13
02-Dec-07	380.07	385.69	Yes	94.69	53	42	91.29	Yes	380.19	384.79
03-Dec-07	380.26	385.52	Yes	94.52	49	38	91.08	Yes	380.35	384.58
04-Dec-07	379.94	385.61	Yes	94.61	53	42	91.25	Yes	380.07	384.75
05-Dec-07	379.71	385.87	Yes	94.87	58	46	91.41	Yes	379.82	384.91
06-Dec-07	379.06	387.43	Yes	96.43	80	66	92.94	Yes	379.25	386.44
07-Dec-07	379.25	387.01	Yes	96.01	74	62	92.63	Yes	379.41	386.13
08-Dec-07	380.30	385.31	Yes	94.31	47	36	90.88	Yes	380.37	384.38
09-Dec-07	380.94	385.46	Yes	94.46	42	32	91.04	Yes	380.98	384.54
10-Dec-07	381.17	385.62	Yes	94.62	42	31	91.17	Yes	381.21	384.67
11-Dec-07	380.40	385.78	Yes	94.78	50	40	91.40	Yes	380.50	384.90
12-Dec-07	380.31	385.45	Yes	94.45	48	37	91.04	Yes	380.41	384.54
13-Dec-07	381.11	385.08	Yes	94.08	37	27	90.70	Yes	381.14	384.20
14-Dec-07	382.01	385.36	Yes	94.36	31	22	90.92	Yes	381.98	384.42
15-Dec-07	382.99	385.72	Yes	94.72	26	17	91.37	Yes	382.95	384.87
16-Dec-07	385.47	386.01	Yes	95.01	5	0	91.56	No	385.35	385.06
17-Dec-07	387.18	386.76	No	95.76	0	0	92.34	No	387.02	385.84
18-Dec-07	385.84	386.88	Yes	95.88	10	2	92.52	Yes	385.77	386.02
19-Dec-07	384.88	386.73	Yes	95.73	18	9	92.31	Yes	384.84	385.81
20-Dec-07	384.97	386.81	Yes	95.81	17	9	92.43	Yes	384.97	385.93
21-Dec-07	384.56	386.72	Yes	95.72	20	11	92.28	Yes	384.55	385.78
22-Dec-07	384.18	386.73	Yes	95.73	24	15	92.35	Yes	384.18	385.85
23-Dec-07	384.48	386.52	Yes	95.52	19	10	92.09	Yes	384.45	385.59
24-Dec-07	383.85	386.44	Yes	95.44	24	16	92.03	Yes	383.82	385.53
25-Dec-07	383.32	386.34	Yes	95.34	28	20	91.96	Yes	383.30	385.46
26-Dec-07	383.66	386.34	Yes	95.34	25	17	91.99	Yes	383.61	385.49
27-Dec-07	384.84	386.55	Yes	95.55	16	8	92.15	Yes	384.80	385.65

Table 1
2007 Annual Report Tech Mem0
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Through Barrier Wall

Date	Groundwater Flow Through Northern Half of Barrier Wall					Groundwater Flow Through Southern Half of Barrier Wall				
	PZ-2 Outside Average Daily GWL	PZ-2 Outside Average Daily GWL	Outward Groundwater Gradient	Aquifer Saturated Thickness	GW Flow Thru North Half of Barrier Wall	GW Flow Thru South Half of Barrier Wall	Aquifer Saturated Thickness	Outward Groundwater Gradient	PZ-3 Outside Average Daily GWL	PZ-3 Inside Average Daily GWL
	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Feet)	(GPD)	(GPD)	(Feet)	(Yes/No)	(Ft NGVD)	(Ft NGVD)
28-Dec-07	385.04	386.81	Yes	95.81	17	8	92.42	Yes	385.02	385.92
29-Dec-07	385.20	386.80	Yes	95.80	15	7	92.43	Yes	385.17	385.93
30-Dec-07	384.71	386.86	Yes	95.86	20	12	92.53	Yes	384.68	386.03
31-Dec-07	384.80	386.80	Yes	95.80	19	10	92.45	Yes	384.80	385.95
	4Q07 Groundwater Flow Through North Half of Barrier Wall				2,749	1,903	4Q07 Groundwater Flow Through South Half of Barrier Wall			
	Total Groundwater Flow Through North Half of Barrier Wall				17,610	11,606	Total Groundwater Flow Through South Half of Barrier Wall			

NOTES:

1) Flow Through Barrier Wall Based on Darcy's Law:

Q = KIA Where: Q = Flow Through Barrier Wall in Gallons per Day
K = Hydraulic Conductivity of Barrier Wall (1.4E-8 cm/sec/10 or 1.4E-7 cm/sec (0.000397 ft/day)
I = (PZ- Inside GWL - PZ-Outside GWL)/30 Ft Distance Between Piezometers
A = PZ-2 Aquifer Saturated Thickness x 1000 Ft Length of Northern Half of Barrier Wall
A = PZ-3 Aquifer Saturated Thickness x 1000 Ft Length of Southern Half of Barrier Wall

2) PZ-2 Aquifer Saturated Thickness = PZ-2 Inside GWL Elevation - Bottom of DHU Elevation
3) PZ-3 Aquifer Saturated Thickness = PZ-3 Inside GWL Elevation - Bottom of DHU Elevation
4) PZ-2 Bottom of DHU Elevation = Groundsurface Elevation (419.00 Ft NGVD) - Depth to Bedrock (128 Ft BGS) = 291.00 ft NGVD
5) PZ-3 Inside Aquifer Thickness = Groundsurface Elevation (422.00 Ft NGVD) - Depth to Bedrock (128.5 Ft BGS) = 293.5 Ft NGVD

Table 2

Table 2
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Sauget Area 2 Groundwater Migration Control System
TOC/TDS Mass Flux Reduction

Date	Dynamic Gradient Darcy's Law Computed Flow Into Barrier Wall	Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow Into Barrier Wall	Groundwater Flow Around Barrier Wall	Darcy's Law Computed Flow Through North Half of Barrier Wall	Darcy's Law Computed Flow Through South Half of Barrier Wall	TOC Concentration						TOC Mass Flux	
						MW-2 Shallow	MW-2 Middle	MW-2 Deep	MW-3S Shallow	MW-3S Middle	MW-3S Deep	Mass Flux Through and Around Barrier Wall	Mass Flux Into Barrier Wall
	(Gallons)	(Gallons)	(Gallons)	(Gallons)	(Gallons)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(Kg)	(Kg)
Feb/Mar 06	40,788,644	41,838,679	1,050,035	1,217	727	43	380	240	24	24	62	1.5	60.1
2Q06	69,671,302	72,885,406	3,214,104	2,170	1,927	41	330	360	19	50	32	4.5	97.2
3Q06	97,797,928	100,985,898	3,187,970	3,211	2,234	39	450	310	18	35	38	5.6	170.5
4Q06	70,584,921	71,671,638	1,086,717	2,282	1,307	49	410	370	22	30	44	1.7	112.1
1Q07	31,375,087	32,488,693	1,113,606	921	789	35	410	480	23	47	28	2.1	58.4
2Q07	8,464,073	9,698,600	1,234,527	871	343	32	360	480	19	88	24	2.3	15.7
3Q07	52,174,175	57,602,643	5,428,468	4,190	2,375	26	240	420	18	88	23	8.8	84.9
4Q07	66,779,877	71,436,365	4,656,488	2,749	1,903	21	160	400	15	43	28	7.2	103.5
Total	437,636,007	458,607,922	20,971,915	17,611	11,605								

TDS Concentration						TDS Mass Flux	
MW-2 Shallow	MW-2 Middle	MW-2 Deep	MW-3S Shallow	MW-3S Middle	MW-3S Deep	Mass Flux Around and Through Barrier Wall	Mass Flux Into Barrier Wall
(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(Kg)	(Kg)
1,700	1,600	1,600	1,800	1,300	1,600	7.3	284.5
1,600	1,600	1,800	1,600	1,400	1,500	22.4	486.0
1,600	1,800	1,500	1,500	1,400	1,700	22.3	682.1
1,600	1,700	1,600	1,600	1,300	1,600	7.2	465.0
1,500	1,700	1,800	1,600	1,400	1,300	7.8	218.8
1,600	1,600	1,800	1,500	1,600	1,400	8.6	59.0
1,600	1,600	1,800	1,200	1,600	1,300	37.9	363.9
1,400	1,400	1,600	1,500	1,300	1,400	28.9	414.0

Total Mass Flux Reduction (%)		Total TOC/TDS Mass Flux (Kg)	
1Q06 Mass Flux Reduction	97.5	8.9	344.6
2Q06 Mass Flux Reduction	95.6	26.9	583.1
3Q06 Mass Flux Reduction	96.8	27.8	852.7
4Q06 Mass Flux Reduction	98.5	8.9	577.1
1Q07 Mass Flux Reduction	96.6	9.9	277.2
2Q07 Mass Flux Reduction	87.3	10.9	74.8
3Q07 Mass Flux Reduction	90.6	46.8	448.8
4Q07 Mass Flux Reduction	93.5	36.1	517.5

NOTES:

1) Darcy's Law Computed Flow into Barrier Wall from Appendix 2
2) Darcy's Law Computed Flow Through Barrier Wall (Table 1)
3) Mass Flux = [(Quarterly Groundwater Flow (Gallons) x 3.785 Liters/Gallon) x (Maximum Detected Quarterly Concentration (mg/L)] / (1,000,000,000 mg/Kg)

Table 3

Table 3
2007 Annual Report
Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
01-Feb-06	382.59	428.00	Yes	382.47	381.90	Yes	381.45	383.50	No	381.78	382.81	No	382.42	382.97	No	2	No
02-Feb-06	382.09	456.12	Yes	382.34	381.90	Yes	381.02	383.55	No	381.39	382.86	No	382.26	383.00	No	2	No
03-Feb-06	382.09	478.20	Yes	382.31	381.73	Yes	380.94	383.41	No	381.30	382.69	No	382.17	382.85	No	2	No
04-Feb-06	382.17	482.01	Yes	382.38	381.73	Yes	381.01	383.40	No	381.39	382.70	No	382.26	382.85	No	2	No
05-Feb-06	382.27	446.68	Yes	382.28	381.89	Yes	381.16	383.54	No	381.51	382.84	No	382.31	383.00	No	2	No
06-Feb-06	382.09	463.18	Yes	382.34	381.74	Yes	380.96	383.45	No	381.35	382.75	No	382.25	382.92	No	2	No
07-Feb-06	381.87	449.04	Yes	382.27	381.86	Yes	380.80	383.53	No	381.19	382.83	No	382.18	382.99	No	2	No
08-Feb-06	381.74	464.87	Yes	382.20	381.81	Yes	380.67	383.54	No	381.06	382.85	No	382.09	383.00	No	2	No
09-Feb-06	381.69	532.57	Yes	382.20	381.62	Yes	380.67	383.40	No	381.05	382.72	No	382.09	382.86	No	2	No
10-Feb-06	381.07	613.90	Yes	381.88	381.42	Yes	380.13	383.26	No	380.53	382.59	No	381.81	382.69	No	2	No
11-Feb-06	380.67	652.37	Yes	381.62	381.14	Yes	379.75	383.03	No	380.17	382.32	No	381.55	382.44	No	2	No
12-Feb-06	380.25	655.26	Yes	381.36	381.01	Yes	379.35	382.91	No	379.79	382.21	No	381.27	382.31	No	2	No
13-Feb-06	380.40	652.88	Yes	381.40	381.02	Yes	379.44	382.91	No	379.89	382.22	No	381.30	382.32	No	2	No
14-Feb-06	380.45	660.59	Yes	381.39	380.91	Yes	379.50	382.81	No	379.93	382.14	No	381.30	382.23	No	2	No
15-Feb-06	380.25	662.32	Yes	381.26	380.86	Yes	379.32	382.77	No	379.75	382.11	No	381.17	382.18	No	2	No
16-Feb-06	380.78	664.42	Yes	381.44	380.82	Yes	379.70	382.73	No	380.08	382.01	No	381.32	382.13	No	2	No
17-Feb-06	381.63	585.06	Yes	381.82	380.83	Yes	380.42	382.69	No	380.78	381.95	No	381.66	382.11	No	2	No
18-Feb-06	381.63	536.79	Yes	381.96	381.16	Yes	380.52	382.97	No	380.90	382.26	No	381.84	382.43	No	2	No
19-Feb-06	379.21	681.59	Yes	380.87	380.92	No	378.54	382.80	No	379.05	382.16	No	380.94	382.23	No	1	No
20-Feb-06	378.06	820.65	Yes	380.11	380.36	No	377.34	382.40	No	377.85	381.75	No	380.16	381.75	No	1	No
21-Feb-06	378.09	864.73	Yes	380.04	380.09	No	377.35	382.19	No	377.84	381.52	No	380.04	381.51	No	1	No
22-Feb-06	378.03	897.11	Yes	379.91	379.89	Yes	377.27	382.01	No	377.77	381.36	No	379.91	381.35	No	2	No
23-Feb-06	378.29	872.09	Yes	379.94	379.71	Yes	377.41	381.87	No	377.88	381.18	No	379.88	381.20	No	2	No
24-Feb-06	379.35	782.16	Yes	380.49	380.01	Yes	378.36	382.09	No	378.80	381.36	No	380.39	381.43	No	2	No
25-Feb-06	380.34	706.08	Yes	380.91	380.11	Yes	379.21	382.12	No	379.59	381.38	No	380.76	381.49	No	2	No
26-Feb-06	380.44	644.62	Yes	381.11	380.41	Yes	379.43	382.34	No	379.84	381.61	No	381.02	381.75	No	2	No
27-Feb-06	379.98	683.51	Yes	380.92	381.27	No	379.06	382.43	No	379.46	381.76	No	380.88	381.84	No	1	No
28-Feb-06	379.87	690.20	Yes	380.73	381.67	No	378.90	382.28	No	379.31	381.60	No	380.71	381.67	No	1	No
01-Mar-06	380.01	683.23	Yes	380.84	381.71	No	379.02	382.30	No	379.43	381.60	No	380.79	381.68	No	1	No
02-Mar-06	379.99	687.85	Yes	380.77	381.46	No	378.93	382.09	No	379.33	381.36	No	380.66	381.45	No	1	No
03-Mar-06	380.08	671.03	Yes	380.83	381.54	No	379.05	382.15	No	379.45	381.41	No	380.74	381.52	No	1	No
04-Mar-06	379.92	640.68	Yes	380.79	381.67	No	378.94	382.24	No	379.36	381.55	No	380.74	381.65	No	1	No
05-Mar-06	379.58	702.70	Yes	380.63	381.60	No	378.66	382.20	No	379.08	381.53	No	380.59	381.60	No	1	No
06-Mar-06	379.40	734.15	Yes	380.41	381.34	No	378.45	382.01	No	378.84	381.31	No	380.38	381.37	No	1	No
07-Mar-06	379.90	687.90	Yes	380.65	381.54	No	378.88	382.14	No	379.28	381.42	No	380.61	381.52	No	1	No
08-Mar-06	380.41	631.83	Yes	381.08	381.90	No	379.42	382.43	No	379.80	381.73	No	381.00	381.83	No	1	No
09-Mar-06	380.02	616.52	Yes	380.90	381.98	No	379.07	382.49	No	379.47	381.77	No	380.82	381.86	No	1	No
10-Mar-06	380.33	658.37	Yes	380.91	381.48	No	379.24	382.08	No	379.61	381.33	No	380.75	381.43	No	1	No
11-Mar-06	381.70	526.75	Yes	381.56	381.98	No	380.44	382.45	No	380.76	381.70	No	381.44	381.87	No	1	No
12-Mar-06	383.70	404.16	Yes	382.72	382.54	Yes	382.25	382.88	No	382.45	382.14	Yes	382.45	382.36	Yes	4	No
13-Mar-06	384.72	327.30	Yes	383.35	382.86	Yes	383.24	383.14	Yes	383.45	382.38	Yes	383.04	382.64	Yes	5	Yes
14-Mar-06	386.30	254.17	Yes	384.17	383.16	Yes	384.58	383.38	Yes	384.71	382.59	Yes	383.80	382.91	Yes	5	Yes
15-Mar-06	390.22	33.41	Yes	386.43	384.09	Yes	388.31	384.11	Yes	388.21	383.39	Yes	385.89	383.87	Yes	5	Yes
16-Mar-06	387.24	153.93	Yes	385.24	384.14	Yes	385.73	384.16	Yes	385.87	383.54	Yes	384.99	383.91	Yes	5	Yes
17-Mar-06	387.99	48.99	Yes	385.63	384.33	Yes	386.35	384.35	Yes	386.43	383.60	Yes	385.27	384.03	Yes	5	Yes
18-Mar-06	388.34	0.00	No	385.96	384.82	Yes	386.73	384.77	Yes	386.82	384.07	Yes	385.66	384.53	Yes	4	No
19-Mar-06	387.81	0.00	No	385.87	385.04	Yes	386.31	384.96	Yes	386.46	384.32	Yes	385.60	384.71	Yes	4	No
20-Mar-06	386.72	159.88	Yes	385.41	384.89	Yes	385.35	384.88	Yes	385.56	384.26	Yes	385.20	384.59	Yes	5	Yes
21-Mar-06	387.21	202.53	Yes	385.02	384.64	Yes	385.70	384.72	Yes	385.88	384.01	Yes	385.28	384.36	Yes	5	Yes
22-Mar-06	386.83	162.00	Yes	385.50	384.86	Yes	385.41	384.88	Yes	385.63	384.18	Yes	385.25	384.53	Yes	5	Yes
23-Mar-06	386.06	146.11	Yes	385.16	385.15	Yes	384.75	385.02	No	385.02	384.31	Yes	384.95	384.78	Yes	4	No

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Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
24-Mar-06	386.03	159.43	Yes	385.12	385.34	No	384.67	385.02	No	384.93	384.31	Yes	384.90	384.96	No	2	No
25-Mar-06	385.73	169.48	Yes	384.98	385.31	No	384.42	385.06	No	384.71	384.32	Yes	384.80	384.96	No	2	No
26-Mar-06	385.37	225.63	Yes	384.80	385.30	No	384.06	384.96	No	384.38	384.20	Yes	384.62	384.96	No	2	No
27-Mar-06	385.22	247.60	Yes	384.75	385.20	No	383.94	385.08	No	384.25	384.38	No	384.54	384.85	No	1	No
28-Mar-06	385.14	276.11	Yes	384.63	384.88	No	383.84	384.99	No	384.12	384.29	No	384.42	384.56	No	1	No
29-Mar-06	385.07	268.03	Yes	384.65	385.01	No	383.81	385.09	No	384.12	384.42	No	384.44	384.69	No	1	No
30-Mar-06	384.62	331.30	Yes	384.45	384.94	No	383.36	385.08	No	383.73	384.43	No	384.26	384.65	No	1	No
31-Mar-06	385.32	293.08	Yes	384.72	384.96	No	383.94	385.08	No	384.25	384.41	No	384.49	384.64	No	1	No
01-Apr-06	385.27	300.73	Yes	384.93	384.71	Yes	385.07	383.93	Yes	384.38	384.21	Yes	384.61	384.50	Yes	5	Yes
02-Apr-06	386.42	148.94	Yes	385.52	385.46	Yes	385.54	385.07	Yes	384.92	385.34	No	385.18	385.19	No	3	No
03-Apr-06	387.56	56.25	Yes	385.82	386.01	No	385.69	386.05	No	384.97	386.26	No	385.44	385.66	No	1	No
04-Apr-06	389.36	41.55	Yes	386.02	386.94	No	385.89	387.60	No	385.22	387.70	No	385.70	386.52	No	1	No
05-Apr-06	390.94	0.00	No	386.40	387.94	No	386.27	389.16	No	385.64	389.20	No	386.08	387.50	No	0	No
06-Apr-06	390.32	2.83	NC(A)	386.59	387.82	No	386.47	388.66	No	385.87	388.76	No	386.30	387.44	No	0	No
07-Apr-06	392.01	0.00	No	386.69	388.64	No	386.57	390.06	No	385.93	390.06	No	386.39	388.13	No	0	No
08-Apr-06	394.39	0.00	No	386.73	389.93	No	386.62	392.27	No	385.97	392.11	No	386.51	389.30	No	0	No
09-Apr-06	395.61	2.73	NC(A)	387.12	390.81	No	386.98	393.50	No	386.39	393.27	No	386.98	390.22	No	0	No
10-Apr-06	395.41	0.00	No	387.41	390.90	No	387.24	393.36	No	386.68	393.16	No	387.24	390.39	No	0	No
11-Apr-06	395.02	0.00	No	387.58	390.84	No	387.46	393.02	No	386.86	392.90	No	387.41	390.36	No	0	No
12-Apr-06	394.98	0.00	No	387.68	390.88	No	387.53	392.93	No	386.92	392.82	No	387.50	390.41	No	0	No
13-Apr-06	394.95	2.85	NC(A)	387.98	390.99	No	387.77	392.97	No	387.24	392.88	No	387.78	390.56	No	0	No
14-Apr-06	394.93	0.00	No	388.19	391.13	No	388.03	392.95	No	387.46	392.87	No	388.00	390.70	No	0	No
15-Apr-06	394.97	0.00	No	388.31	391.20	No	388.14	393.00	No	387.56	392.94	No	388.09	390.77	No	0	No
16-Apr-06	395.00	0.00	No	388.47	391.34	No	388.32	393.03	No	387.74	392.97	No	388.27	390.91	No	0	No
17-Apr-06	395.27	0.00	No	388.54	391.50	No	388.38	393.31	No	387.77	393.24	No	388.33	391.04	No	0	No
18-Apr-06	395.41	0.00	No	388.79	391.68	No	388.59	393.45	No	388.08	393.39	No	388.59	391.27	No	0	No
19-Apr-06	395.68	0.00	No	388.87	391.88	No	388.68	393.68	No	388.13	393.62	No	388.67	391.43	No	0	No
20-Apr-06	395.81	0.00	No	389.06	392.03	No	388.87	393.83	No	388.31	393.77	No	388.86	391.60	No	0	No
21-Apr-06	395.94	0.00	No	389.22	392.19	No	389.01	393.95	No	388.44	393.90	No	389.03	391.73	No	0	No
22-Apr-06	395.84	0.00	No	389.36	392.21	No	389.20	393.86	No	388.65	393.81	No	389.16	391.77	No	0	No
23-Apr-06	395.70	0.00	No	389.46	392.19	No	389.27	393.72	No	388.73	393.71	No	389.28	391.75	No	0	No
24-Apr-06	395.57	0.00	No	389.62	392.18	No	389.42	393.60	No	388.89	393.62	No	389.40	391.76	No	0	No
25-Apr-06	395.52	0.00	No	389.71	392.17	No	389.51	393.59	No	388.97	393.59	No	389.49	391.79	No	0	No
26-Apr-06	395.46	0.00	No	389.79	392.18	No	389.63	393.53	No	389.05	393.57	No	389.58	391.85	No	0	No
27-Apr-06	395.17	4.00	NC(A)	389.90	392.09	No	389.69	393.30	No	389.17	393.34	No	389.69	391.74	No	0	No
28-Apr-06	394.53	0.00	No	389.97	391.81	No	389.79	392.71	No	389.21	392.81	No	389.71	391.44	No	0	No
29-Apr-06	393.90	0.00	No	390.09	391.53	No	389.91	392.17	No	389.36	392.29	No	389.81	391.17	No	0	No
30-Apr-06	393.45	0.00	No	390.06	391.29	No	389.91	391.74	No	389.32	391.87	No	389.80	390.87	No	0	No
01-May-06	392.98	0.00	No	391.03	390.08	Yes	391.31	389.92	Yes	391.50	389.33	Yes	390.65	389.76	Yes	4	No
02-May-06	393.35	0.00	No	391.22	390.11	Yes	391.65	389.95	Yes	391.77	389.40	Yes	390.83	389.83	Yes	4	No
03-May-06	393.40	2.69	NC(A)	391.29	390.16	Yes	391.68	390.03	Yes	391.84	389.51	Yes	390.90	389.89	Yes	4	No
04-May-06	395.45	0.00	No	392.30	390.29	Yes	393.48	390.14	Yes	393.52	389.60	Yes	391.86	390.05	Yes	4	No
05-May-06	398.57	0.00	No	394.10	390.56	Yes	396.43	390.40	Yes	396.33	389.89	Yes	393.62	390.47	Yes	4	No
06-May-06	398.69	0.00	No	394.36	390.79	Yes	396.62	390.60	Yes	396.53	390.10	Yes	393.93	390.69	Yes	4	No
07-May-06	397.89	0.00	No	394.06	390.94	Yes	395.90	390.75	Yes	395.87	390.26	Yes	393.66	390.84	Yes	4	No
08-May-06	396.26	0.00	No	393.24	391.00	Yes	394.44	390.80	Yes	394.50	390.31	Yes	392.90	390.81	Yes	4	No
09-May-06	394.75	0.00	No	392.43	391.05	Yes	393.04	390.84	Yes	393.19	390.31	Yes	392.12	390.79	Yes	4	No
10-May-06	394.20	0.00	No	392.11	390.98	Yes	392.52	390.84	Yes	392.69	390.33	Yes	391.78	390.72	Yes	4	No
11-May-06	395.01	0.00	No	392.54	391.10	Yes	393.25	390.91	Yes	393.37	390.35	Yes	392.16	390.83	Yes	4	No
12-May-06	395.01	0.00	No	392.55	391.17	Yes	393.22	391.00	Yes	393.37	390.40	Yes	392.20	390.89	Yes	4	No
13-May-06	394.62	0.00	No	392.29	391.14	Yes	392.81	390.98	Yes	392.97	390.40	Yes	391.96	390.85	Yes	4	No

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				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
14-May-06	395.15	0.00	No	392.59	391.18	Yes	393.28	391.02	Yes	393.42	390.48	Yes	392.23	390.92	Yes	4	No
15-May-06	395.24	0.00	No	392.70	391.25	Yes	393.40	391.08	Yes	393.54	390.56	Yes	392.37	391.00	Yes	4	No
16-May-06	394.42	3.84	NC(Q)	392.32	391.32	Yes	392.71	391.15	Yes	392.89	390.63	Yes	392.00	391.04	Yes	4	No
17-May-06	393.66	4.90	NC(Q)	391.89	391.34	Yes	391.97	391.20	Yes	392.20	390.65	Yes	391.58	391.02	Yes	4	No
18-May-06	392.84	56.48	Yes	391.36	391.18	Yes	391.14	390.99	Yes	391.41	390.35	Yes	391.07	390.85	Yes	5	Yes
19-May-06	392.68	47.78	Yes	391.26	391.17	Yes	390.98	390.97	Yes	391.27	390.35	Yes	390.94	390.81	Yes	5	Yes
20-May-06	392.64	0.00	No	391.15	391.16	No	390.97	391.03	No	391.24	390.44	Yes	390.87	390.77	Yes	2	No
21-May-06	392.61	0.00	No	391.13	391.20	No	390.97	391.05	No	391.23	390.52	Yes	390.87	390.84	Yes	2	No
22-May-06	392.42	0.00	No	391.06	391.15	No	390.79	391.03	No	391.08	390.45	Yes	390.75	390.76	No	1	No
23-May-06	392.09	12.08	Yes	390.88	391.21	No	390.52	391.04	No	390.81	390.47	Yes	390.61	390.76	No	2	No
24-May-06	392.01	86.63	Yes	390.86	391.09	No	390.45	390.89	No	390.74	390.27	Yes	390.60	390.75	No	2	No
25-May-06	392.12	71.46	Yes	390.96	391.21	No	390.59	390.97	No	390.88	390.35	Yes	390.69	390.81	No	2	No
26-May-06	391.83	85.96	Yes	390.76	391.09	No	390.32	390.82	No	390.62	390.21	Yes	390.50	390.66	No	2	No
27-May-06	391.29	117.58	Yes	390.44	390.95	No	389.83	390.68	No	390.14	389.98	Yes	390.21	390.54	No	2	No
28-May-06	390.83	153.32	Yes	390.14	390.69	No	389.34	390.51	No	389.71	389.83	No	389.88	390.33	No	1	No
29-May-06	390.36	194.13	Yes	389.84	390.41	No	388.92	390.40	No	389.28	389.76	No	389.60	390.00	No	1	No
30-May-06	389.70	269.69	Yes	389.44	390.12	No	388.30	390.13	No	388.66	389.53	No	389.20	389.71	No	1	No
31-May-06	388.97	323.39	Yes	388.99	389.77	No	387.63	389.90	No	388.02	389.24	No	388.75	389.44	No	1	No
01-Jun-06	389.00	388.05	Yes	388.93	389.53	No	387.62	389.69	No	388.01	389.04	No	388.71	389.21	No	1	No
02-Jun-06	390.32	263.05	Yes	389.58	389.80	No	388.81	389.89	No	389.13	389.21	No	389.28	389.45	No	1	No
03-Jun-06	391.57	11.77	Yes	390.39	390.62	No	390.06	390.53	No	390.36	389.93	Yes	390.07	390.26	No	2	No
04-Jun-06	390.86	52.20	Yes	390.10	390.77	No	389.49	390.59	No	389.82	389.95	No	389.86	390.36	No	1	No
05-Jun-06	389.73	263.67	Yes	389.41	390.34	No	388.41	389.95	No	388.79	389.12	No	389.21	389.93	No	1	No
06-Jun-06	389.19	309.29	Yes	389.08	390.12	No	387.90	389.69	No	388.28	388.86	No	388.87	389.76	No	1	No
07-Jun-06	388.31	375.93	Yes	388.49	389.68	No	387.00	389.45	No	387.41	388.63	No	388.31	389.30	No	1	No
08-Jun-06	387.41	446.66	Yes	387.95	389.04	No	386.15	389.26	No	386.59	388.59	No	387.76	388.71	No	1	No
09-Jun-06	386.34	553.18	Yes	387.33	388.61	No	385.19	388.93	No	385.66	388.25	No	387.18	388.33	No	1	No
10-Jun-06	385.24	657.05	Yes	386.65	388.08	No	384.14	388.52	No	384.63	387.82	No	386.49	387.86	No	1	No
11-Jun-06	385.33	683.10	Yes	386.55	387.73	No	384.19	388.24	No	384.66	387.52	No	386.36	387.58	No	1	No
12-Jun-06	386.06	622.63	Yes	386.86	387.72	No	384.84	388.19	No	385.28	387.46	No	386.62	387.56	No	1	No
13-Jun-06	386.75	529.68	Yes	387.23	388.01	No	385.52	388.38	No	385.95	387.69	No	386.98	387.80	No	1	No
14-Jun-06	386.42	542.95	Yes	387.04	387.88	No	385.24	388.27	No	385.67	387.57	No	386.81	387.68	No	1	No
15-Jun-06	385.83	574.29	Yes	386.69	387.73	No	384.75	388.13	No	385.20	387.44	No	386.52	387.53	No	1	No
16-Jun-06	385.75	588.54	Yes	386.57	387.57	No	384.66	387.99	No	385.10	387.32	No	386.42	387.38	No	1	No
17-Jun-06	379.42	423.89	Yes	357.99	365.89	No	384.10	388.14	No	384.56	387.47	No	386.10	387.61	No	1	No
18-Jun-06	384.72	648.41	Yes	126.95	163.54	NC(A)	NA	387.67	NC(D)	384.14	387.10	No	385.80	387.14	No	1	No
19-Jun-06	384.45	668.26	Yes	240.81	210.71	NC(A)	383.26	387.43	No	383.87	386.85	No	385.58	386.89	No	1	No
20-Jun-06	383.36	774.12	Yes	384.93	386.15	No	382.35	387.07	No	382.89	386.47	No	385.00	386.49	No	1	No
21-Jun-06	383.62	788.67	Yes	384.94	385.07	No	382.54	386.88	No	383.06	386.24	No	384.99	386.30	No	1	No
22-Jun-06	383.26	783.84	Yes	384.70	384.92	No	382.27	386.72	No	382.80	386.10	No	384.78	386.16	No	1	No
23-Jun-06	383.06	797.34	Yes	384.55	384.76	No	382.09	386.57	No	382.61	385.97	No	384.61	385.98	No	1	No
24-Jun-06	383.18	802.49	Yes	384.57	384.59	No	382.27	386.46	No	382.75	385.82	No	384.61	385.89	No	1	No
25-Jun-06	383.53	739.25	Yes	384.72	384.75	No	382.61	386.54	No	383.07	385.91	No	384.72	385.99	No	1	No
26-Jun-06	383.68	746.45	Yes	384.78	384.66	Yes	382.73	386.44	No	383.23	385.81	No	384.78	385.87	No	2	No
27-Jun-06	383.54	745.33	Yes	384.66	384.52	Yes	382.64	386.34	No	383.10	385.66	No	384.69	385.77	No	2	No
28-Jun-06	383.73	714.90	Yes	384.72	384.53	Yes	382.79	386.30	No	383.22	385.70	No	384.70	385.77	No	2	No
29-Jun-06	383.60	712.22	Yes	384.58	384.50	Yes	382.56	386.26	No	383.05	385.64	No	384.61	385.71	No	2	No
30-Jun-06	383.76	698.72	Yes	384.54	384.44	Yes	382.57	386.22	No	383.06	385.58	No	384.58	385.71	No	2	No
01-Jul-06	384.02	667.38	Yes	384.57	384.50	Yes	382.82	386.23	No	383.26	385.58	No	384.65	385.72	No	2	No
02-Jul-06	383.51	675.38	Yes	384.40	384.41	No	382.41	386.15	No	382.87	385.55	No	384.44	385.66	No	1	No
03-Jul-06	382.21	773.38	Yes	383.67	384.05	No	381.26	385.87	No	381.78	385.29	No	383.84	385.34	No	1	No

Table 3
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Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extraction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
04-Jul-06	381.45	841.45	Yes	383.24	383.67	No	380.55	385.59	No	381.08	384.98	No	383.38	385.02	No	1	No
05-Jul-06	381.07	867.51	Yes	382.97	383.42	No	380.21	385.38	No	380.74	384.78	No	383.10	384.80	No	1	No
06-Jul-06	380.96	897.81	Yes	382.79	383.15	No	380.01	385.15	No	380.55	384.55	No	382.88	384.55	No	1	No
07-Jul-06	381.38	866.43	Yes	382.89	383.17	No	380.35	385.13	No	380.88	384.54	No	383.01	384.55	No	1	No
08-Jul-06	381.27	865.33	Yes	382.86	383.10	No	380.32	385.07	No	380.84	384.48	No	382.95	384.51	No	1	No
09-Jul-06	379.89	953.90	Yes	382.14	382.76	No	379.16	384.80	No	379.74	384.22	No	382.32	384.20	No	1	No
10-Jul-06	378.73	1066.15	Yes	381.48	382.20	No	378.03	384.37	No	378.64	383.79	No	381.61	383.72	No	1	No
11-Jul-06	378.68	1081.18	Yes	381.31	381.90	No	377.96	384.16	No	378.51	383.53	No	381.44	383.47	No	1	No
12-Jul-06	378.61	1107.38	Yes	381.15	381.68	No	377.90	383.93	No	378.46	383.30	No	381.28	383.28	No	1	No
13-Jul-06	379.25	1146.37	Yes	374.97	375.47	No	372.13	377.64	No	372.92	377.27	No	375.16	377.01	No	1	No
14-Jul-06	380.67	945.83	Yes	382.06	381.92	Yes	379.67	384.01	No	380.16	383.40	No	382.07	383.42	No	2	No
15-Jul-06	381.08	867.08	Yes	382.26	382.10	Yes	380.02	384.11	No	380.50	383.49	No	382.28	383.55	No	2	No
16-Jul-06	380.65	896.69	Yes	382.04	382.00	Yes	379.66	384.02	No	380.15	383.43	No	382.10	383.46	No	2	No
17-Jul-06	381.13	835.48	Yes	382.24	382.10	Yes	380.09	384.10	No	380.55	383.48	No	382.26	383.55	No	2	No
18-Jul-06	381.16	801.79	Yes	382.27	382.15	Yes	380.15	384.14	No	380.62	383.51	No	382.30	383.57	No	2	No
19-Jul-06	380.78	703.07	Yes	382.07	382.29	No	379.84	384.22	No	380.33	383.55	No	382.16	383.66	No	1	No
20-Jul-06	380.57	476.69	Yes	381.99	383.17	No	379.67	384.66	No	380.20	384.25	No	382.12	384.59	No	1	No
21-Jul-06	381.06	828.27	Yes	382.18	382.04	Yes	380.11	383.99	No	380.58	383.42	No	382.24	383.47	No	2	No
22-Jul-06	381.07	778.17	Yes	382.23	382.09	Yes	380.21	384.04	No	380.68	383.41	No	382.29	383.50	No	2	No
23-Jul-06	380.66	782.10	Yes	382.03	382.07	No	379.88	383.98	No	380.36	383.39	No	382.13	383.45	No	1	No
24-Jul-06	379.95	828.38	Yes	381.55	381.87	No	379.21	383.85	No	379.73	383.23	No	381.75	383.27	No	1	No
25-Jul-06	379.98	852.75	Yes	381.48	381.71	No	379.07	383.69	No	379.59	383.11	No	381.64	383.12	No	1	No
26-Jul-06	379.84	855.47	Yes	381.38	381.66	No	378.93	383.67	No	379.45	383.05	No	381.51	383.09	No	1	No
27-Jul-06	379.62	876.51	Yes	381.20	381.41	No	378.70	383.46	No	379.22	382.87	No	381.32	382.86	No	1	No
28-Jul-06	380.03	866.23	Yes	381.34	381.37	No	379.03	383.42	No	379.54	382.81	No	381.47	382.83	No	1	No
29-Jul-06	380.57	614.18	Yes	381.62	381.95	No	379.56	383.81	No	380.05	383.13	No	381.75	383.26	No	1	No
30-Jul-06	380.48	575.93	Yes	381.62	382.35	No	379.55	384.04	No	380.07	383.48	No	381.80	383.58	No	1	No
31-Jul-06	379.87	799.02	Yes	381.32	381.64	No	379.04	383.56	No	379.53	382.98	No	381.47	382.99	No	1	No
01-Aug-06	379.50	858.03	Yes	381.11	381.30	No	378.74	383.31	No	379.23	382.69	No	381.26	382.79	No	1	No
02-Aug-06	378.53	863.84	Yes	380.64	381.13	No	377.93	383.18	No	378.48	382.58	No	380.86	382.59	No	1	No
03-Aug-06	377.89	973.30	Yes	380.20	380.73	No	377.28	382.86	No	377.84	382.27	No	380.42	382.25	No	1	No
04-Aug-06	378.26	967.48	Yes	380.28	380.60	No	377.58	382.76	No	378.15	382.18	No	380.49	382.13	No	1	No
05-Aug-06	379.09	897.16	Yes	380.66	380.75	No	378.25	382.86	No	378.73	382.26	No	380.79	382.25	No	1	No
06-Aug-06	380.32	817.18	Yes	381.28	380.96	Yes	379.40	382.98	No	379.85	382.36	No	381.38	382.44	No	2	No
07-Aug-06	380.34	768.40	Yes	381.34	381.08	Yes	379.49	383.05	No	379.97	382.42	No	381.49	382.52	No	2	No
08-Aug-06	380.37	753.88	Yes	381.29	381.12	Yes	379.40	383.10	No	379.89	382.46	No	381.46	382.55	No	2	No
09-Aug-06	380.48	762.12	Yes	381.34	381.16	Yes	379.44	383.08	No	379.91	382.48	No	381.46	382.56	No	2	No
10-Aug-06	380.69	742.13	Yes	381.43	381.18	Yes	379.63	383.10	No	380.09	382.49	No	381.55	382.58	No	2	No
11-Aug-06	380.65	728.51	Yes	381.44	381.19	Yes	379.66	383.10	No	380.14	382.49	No	381.59	382.58	No	2	No
12-Aug-06	379.84	778.59	Yes	381.00	380.98	Yes	378.95	382.95	No	379.43	382.35	No	381.18	382.41	No	2	No
13-Aug-06	379.39	840.55	Yes	380.74	380.74	Yes	378.57	382.75	No	379.04	382.14	No	380.92	382.20	No	2	No
14-Aug-06	378.91	323.15	Yes	380.54	381.95	No	378.18	383.60	No	378.71	382.89	No	380.74	383.07	No	1	No
15-Aug-06	378.46	310.33	Yes	380.32	382.51	No	377.79	383.91	No	378.35	383.32	No	380.54	383.44	No	1	No
16-Aug-06	378.68	909.20	Yes	380.27	380.58	No	377.81	382.60	No	378.34	382.05	No	380.46	382.02	No	1	No
17-Aug-06	378.86	875.79	Yes	380.28	380.83	No	377.94	382.62	No	378.45	381.86	No	380.49	382.02	No	1	No
18-Aug-06	379.71	828.71	Yes	380.68	380.59	Yes	378.69	382.54	No	379.16	382.00	No	380.85	382.12	No	2	No
19-Aug-06	380.42	789.02	Yes	381.09	380.69	Yes	379.36	382.65	No	379.82	382.05	No	381.22	382.11	No	2	No
20-Aug-06	379.96	755.85	Yes	380.89	380.73	Yes	379.00	382.67	No	379.49	382.06	No	381.07	382.13	No	2	No
21-Aug-06	379.18	803.61	Yes	380.49	380.57	No	378.38	382.54	No	378.87	381.95	No	380.71	382.00	No	1	No
22-Aug-06	378.99	823.56	Yes	380.35	380.44	No	378.17	382.44	No	378.68	381.85	No	380.56	381.89	No	1	No
23-Aug-06	378.29	862.25	Yes	380.01	380.30	No	377.58	382.33	No	378.13	381.75	No	380.27	381.78	No	1	No

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Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
24-Aug-06	378.05	888.41	Yes	379.86	380.17	No	377.38	382.22	No	377.94	381.65	No	380.13	381.66	No	1	No
25-Aug-06	378.17	876.99	Yes	379.80	380.13	No	377.38	382.16	No	377.89	381.56	No	380.07	381.56	No	1	No
26-Aug-06	378.53	872.98	Yes	379.89	380.04	No	377.61	382.07	No	378.10	381.46	No	380.12	381.52	No	1	No
27-Aug-06	379.31	787.17	Yes	380.26	380.21	Yes	378.28	382.19	No	378.75	381.58	No	380.45	381.66	No	2	No
28-Aug-06	381.14	670.36	Yes	381.20	380.61	Yes	379.89	382.48	No	380.28	381.85	No	381.28	382.00	No	2	No
29-Aug-06	383.05	473.05	Yes	382.30	381.44	Yes	381.73	382.99	No	382.02	382.21	No	382.26	382.50	No	2	No
30-Aug-06	382.58	434.13	Yes	382.28	381.65	Yes	381.48	383.15	No	381.84	382.58	No	382.35	382.89	No	2	No
31-Aug-06	382.03	542.57	Yes	382.03	381.47	Yes	380.95	383.05	No	381.34	382.42	No	382.15	382.68	No	2	No
01-Sep-06	382.97	479.96	Yes	382.53	381.68	Yes	381.79	383.22	No	382.13	382.58	No	382.55	382.86	No	2	No
02-Sep-06	382.61	452.40	Yes	382.48	381.82	Yes	381.61	383.36	No	382.00	382.74	No	382.58	382.98	No	2	No
03-Sep-06	381.44	527.47	Yes	381.88	381.67	Yes	380.53	383.22	No	380.97	382.63	No	382.06	382.85	No	2	No
04-Sep-06	381.39	553.41	Yes	381.82	381.64	Yes	380.47	383.18	No	380.89	382.57	No	381.99	382.80	No	2	No
05-Sep-06	380.87	597.38	Yes	381.51	381.46	Yes	379.93	383.09	No	380.39	382.48	No	381.70	382.64	No	2	No
06-Sep-06	380.14	644.67	Yes	381.05	381.28	No	379.18	382.91	No	379.66	382.31	No	381.25	382.47	No	1	No
07-Sep-06	379.65	713.90	Yes	380.73	381.02	No	378.70	382.68	No	379.17	382.10	No	380.95	382.23	No	1	No
08-Sep-06	379.46	725.04	Yes	380.57	380.87	No	378.54	382.55	No	379.00	381.96	No	380.78	382.08	No	1	No
09-Sep-06	379.71	699.49	Yes	380.70	380.87	No	378.76	382.54	No	379.21	381.93	No	380.81	382.06	No	1	No
10-Sep-06	379.22	737.41	Yes	380.43	380.71	No	378.37	382.41	No	378.88	381.82	No	380.65	381.95	No	1	No
11-Sep-06	378.97	776.37	Yes	380.23	380.55	No	378.09	382.27	No	378.60	381.65	No	380.46	381.81	No	1	No
12-Sep-06	379.86	707.99	Yes	380.66	380.66	No	378.88	382.37	No	379.33	381.73	No	380.79	381.89	No	1	No
13-Sep-06	380.49	675.77	Yes	381.02	380.77	Yes	379.46	382.47	No	379.91	381.85	No	381.14	382.01	No	2	No
14-Sep-06	381.10	626.17	Yes	381.25	380.85	Yes	379.90	382.52	No	380.30	381.88	No	381.34	382.07	No	2	No
15-Sep-06	381.63	549.22	Yes	381.61	381.13	Yes	380.46	382.71	No	380.84	382.07	No	381.69	382.33	No	2	No
16-Sep-06	382.10	499.08	Yes	381.92	381.39	Yes	380.90	382.94	No	381.27	382.31	No	381.97	382.55	No	2	No
17-Sep-06	382.54	499.78	Yes	382.20	381.51	Yes	381.29	383.06	No	381.66	382.44	No	382.25	382.69	No	2	No
18-Sep-06	383.39	428.24	Yes	382.67	381.71	Yes	382.11	383.21	No	382.43	382.56	No	382.65	382.86	No	2	No
19-Sep-06	382.82	429.02	Yes	382.47	381.75	Yes	381.65	383.24	No	382.00	382.61	No	382.51	382.90	No	2	No
20-Sep-06	382.23	470.20	Yes	382.21	381.72	Yes	381.12	383.23	No	381.51	382.63	No	382.31	382.90	No	2	No
21-Sep-06	381.81	512.41	Yes	381.97	381.72	Yes	380.67	383.25	No	381.08	382.65	No	382.08	382.89	No	2	No
22-Sep-06	382.08	513.39	Yes	382.08	381.74	Yes	380.92	383.27	No	381.30	382.68	No	382.17	382.91	No	2	No
23-Sep-06	382.57	453.45	Yes	382.34	381.81	Yes	381.35	383.32	No	381.72	382.69	No	382.40	382.96	No	2	No
24-Sep-06	381.72	517.37	Yes	381.93	381.60	Yes	380.64	383.14	No	381.07	382.54	No	382.05	382.76	No	2	No
25-Sep-06	380.29	612.48	Yes	381.18	381.34	No	379.34	382.94	No	379.81	382.35	No	381.35	382.53	No	1	No
26-Sep-06	381.21	578.28	Yes	381.51	381.35	Yes	380.05	382.95	No	380.46	382.34	No	381.59	382.54	No	2	No
27-Sep-06	381.50	545.35	Yes	381.76	381.49	Yes	380.43	383.06	No	380.83	382.48	No	381.85	382.67	No	2	No
28-Sep-06	381.48	509.70	Yes	381.71	381.47	Yes	380.39	383.02	No	380.78	382.41	No	381.78	382.63	No	2	No
29-Sep-06	381.53	534.88	Yes	381.78	381.54	Yes	380.44	383.08	No	380.86	382.46	No	381.87	382.71	No	2	No
30-Sep-06	381.45	552.76	Yes	381.65	381.41	Yes	380.25	382.99	No	380.67	382.42	No	381.71	382.59	No	2	No
01-Oct-06	381.06	563.50	Yes	381.47	381.33	Yes	379.98	382.89	No	380.40	382.28	No	381.55	382.49	No	2	No
02-Oct-06	380.15	622.94	Yes	380.99	381.15	No	379.15	382.73	No	379.62	382.16	No	381.14	382.34	No	1	No
03-Oct-06	380.02	644.77	Yes	380.85	381.00	No	379.00	382.62	No	379.45	382.03	No	381.00	382.19	No	1	No
04-Oct-06	379.87	668.50	Yes	380.72	380.88	No	378.88	382.51	No	379.34	381.91	No	380.88	382.09	No	1	No
05-Oct-06	379.78	671.77	Yes	380.65	380.72	No	378.77	382.40	No	379.24	381.80	No	380.80	381.95	No	1	No
06-Oct-06	379.87	677.01	Yes	380.62	380.70	No	378.83	382.32	No	379.28	381.73	No	380.78	381.93	No	1	No
07-Oct-06	380.24	651.75	Yes	380.80	380.76	Yes	379.12	382.37	No	379.57	381.76	No	380.94	382.00	No	2	No
08-Oct-06	380.25	621.28	Yes	380.83	380.84	No	379.20	382.43	No	379.66	381.83	No	380.99	382.05	No	1	No
09-Oct-06	379.72	682.12	Yes	380.53	380.64	No	378.70	382.28	No	379.18	381.70	No	380.71	381.87	No	1	No
10-Oct-06	379.50	685.64	Yes	380.41	380.66	No	378.53	382.32	No	379.02	381.74	No	380.64	381.90	No	1	No
11-Oct-06	408.75	824.35	Yes	373.55	373.92	No	371.57	375.57	No	372.32	375.29	No	373.74	375.15	No	1	No
12-Oct-06	379.55	686.97	Yes	380.40	380.48	No	378.57	382.19	No	379.03	381.58	No	380.55	381.72	No	1	No
13-Oct-06	379.54	676.43	Yes	380.43	380.49	No	378.63	382.20	No	379.10	381.62	No	380.59	381.76	No	1	No

Table 3
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Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
14-Oct-06	379.08	735.19	Yes	380.13	380.30	No	378.21	382.03	No	378.67	381.45	No	380.34	381.57	No	1	No
15-Oct-06	378.92	725.28	Yes	380.10	380.32	No	378.09	382.04	No	378.57	381.47	No	380.27	381.58	No	1	No
16-Oct-06	378.86	648.95	Yes	380.09	380.54	No	378.05	382.21	No	378.53	381.61	No	380.29	381.78	No	1	No
17-Oct-06	379.73	684.52	Yes	380.43	380.42	Yes	378.79	382.07	No	379.21	381.49	No	380.53	381.66	No	2	No
18-Oct-06	379.23	684.15	Yes	380.18	380.26	No	378.37	381.98	No	378.85	381.38	No	380.35	381.53	No	1	No
19-Oct-06	379.36	706.39	Yes	380.21	380.22	No	378.52	381.90	No	378.98	381.33	No	380.42	381.51	No	1	No
20-Oct-06	378.63	724.61	Yes	380.04	380.11	No	377.85	382.14	No	378.34	381.26	No	380.06	381.40	No	1	No
21-Oct-06	379.12	705.83	Yes	380.41	380.13	Yes	378.25	382.46	No	378.69	381.25	No	380.22	381.40	No	2	No
22-Oct-06	379.86	654.57	Yes	380.69	380.13	Yes	378.90	382.45	No	379.31	381.22	No	380.51	381.43	No	2	No
23-Oct-06	379.95	628.33	Yes	380.65	380.33	Yes	378.98	382.57	No	379.41	381.35	No	380.66	381.60	No	2	No
24-Oct-06	380.20	634.66	Yes	380.88	380.28	Yes	379.05	382.54	No	379.48	381.30	No	380.67	381.54	No	2	No
25-Oct-06	380.37	595.60	Yes	381.05	380.45	Yes	379.29	382.69	No	379.72	381.45	No	380.84	381.69	No	2	No
26-Oct-06	380.85	507.74	Yes	381.27	380.77	Yes	379.63	382.93	No	380.02	381.69	No	381.01	381.95	No	2	No
27-Oct-06	381.23	444.92	Yes	381.55	381.06	Yes	380.10	383.10	No	380.49	381.82	No	381.31	382.24	No	2	No
28-Oct-06	380.39	574.77	Yes	381.14	380.66	Yes	379.36	382.81	No	379.78	381.61	No	380.92	381.87	No	2	No
29-Oct-06	379.32	661.68	Yes	380.39	380.37	Yes	378.39	382.60	No	378.87	381.42	No	380.41	381.62	No	2	No
30-Oct-06	378.72	723.44	Yes	380.18	380.16	Yes	377.81	382.43	No	378.26	381.27	No	380.05	381.45	No	2	No
31-Oct-06	379.35	715.25	Yes	380.06	379.92	Yes	378.26	382.26	No	378.67	381.04	No	380.13	381.24	No	2	No
01-Nov-06	379.16	658.81	Yes	380.34	380.06	Yes	378.23	382.37	No	378.67	381.15	No	380.17	381.35	No	2	No
02-Nov-06	379.24	709.25	Yes	380.06	379.92	Yes	378.21	382.24	No	378.66	381.05	No	380.13	381.25	No	2	No
03-Nov-06	379.42	687.40	Yes	380.07	380.03	Yes	378.43	382.31	No	378.84	381.10	No	380.24	381.33	No	2	No
04-Nov-06	379.17	683.23	Yes	380.18	380.01	Yes	NA	382.33	NC(D)	378.65	381.15	No	380.15	381.36	No	2	No
05-Nov-06	378.57	736.80	Yes	380.03	379.87	Yes	NA	382.20	NC(D)	378.15	381.02	No	379.89	381.19	No	2	No
06-Nov-06	377.74	765.80	Yes	379.63	379.81	No	376.83	382.14	No	377.51	380.99	No	379.56	381.14	No	1	No
07-Nov-06	377.50	813.58	Yes	379.34	379.63	No	376.69	381.99	No	377.22	380.84	No	379.33	380.98	No	1	No
08-Nov-06	377.75	827.86	Yes	379.50	379.52	No	376.90	381.90	No	377.39	380.75	No	379.38	380.89	No	1	No
09-Nov-06	377.77	826.54	Yes	379.45	379.42	Yes	376.89	381.81	No	377.38	380.58	No	379.31	380.75	No	2	No
10-Nov-06	377.70	824.80	Yes	379.37	379.35	Yes	376.83	381.74	No	377.32	380.50	No	379.26	380.68	No	2	No
11-Nov-06	378.15	797.15	Yes	379.48	379.20	Yes	377.16	381.63	No	377.62	380.38	No	379.32	380.56	No	2	No
12-Nov-06	378.02	764.65	Yes	379.53	379.42	Yes	377.15	381.79	No	377.63	380.59	No	379.42	380.78	No	2	No
13-Nov-06	377.95	783.34	Yes	379.50	379.38	Yes	377.08	381.74	No	377.57	380.57	No	379.35	380.75	No	2	No
14-Nov-06	378.06	756.93	Yes	379.55	379.44	Yes	377.20	381.80	No	377.67	380.62	No	379.42	380.81	No	2	No
15-Nov-06	378.39	630.89	Yes	379.68	379.67	Yes	377.47	381.96	No	377.93	380.74	No	379.54	380.95	No	2	No
16-Nov-06	379.51	662.06	Yes	380.19	379.57	Yes	378.41	381.89	No	378.81	380.63	No	379.93	380.89	No	2	No
17-Nov-06	379.10	678.24	Yes	379.89	379.53	Yes	378.16	381.86	No	378.60	380.61	No	379.92	380.87	No	2	No
18-Nov-06	378.33	742.61	Yes	379.15	379.31	No	377.39	381.68	No	377.83	380.44	No	379.47	380.68	No	1	No
19-Nov-06	377.97	757.05	Yes	379.00	379.23	No	377.06	381.60	No	377.55	380.37	No	379.28	380.59	No	1	No
20-Nov-06	377.76	770.63	Yes	379.19	379.20	No	376.87	381.56	No	377.36	380.33	No	379.17	380.51	No	1	No
21-Nov-06	378.07	753.20	Yes	379.19	379.26	No	377.14	381.60	No	377.60	380.38	No	379.28	380.57	No	1	No
22-Nov-06	378.06	765.51	Yes	379.34	379.18	Yes	377.14	381.54	No	377.63	380.37	No	379.30	380.56	No	2	No
23-Nov-06	378.12	746.40	Yes	379.40	379.20	Yes	377.18	381.57	No	377.65	380.32	No	379.29	380.55	No	2	No
24-Nov-06	377.99	754.20	Yes	379.37	379.19	Yes	377.09	381.54	No	377.56	380.34	No	379.24	380.55	No	2	No
25-Nov-06	377.97	780.35	Yes	379.33	379.04	Yes	377.02	381.42	No	377.51	380.21	No	379.19	380.43	No	2	No
26-Nov-06	377.96	779.22	Yes	379.29	378.98	Yes	377.02	381.38	No	377.50	380.17	No	379.15	380.38	No	2	No
27-Nov-06	378.09	767.53	Yes	379.36	379.08	Yes	377.13	381.38	No	377.57	380.14	No	379.20	380.47	No	2	No
28-Nov-06	378.26	707.08	Yes	379.43	379.17	Yes	377.27	381.51	No	377.73	380.27	No	379.28	380.52	No	2	No
29-Nov-06	378.74	643.01	Yes	379.68	379.34	Yes	377.70	381.61	No	378.15	380.34	No	379.49	380.65	No	2	No
30-Nov-06	379.99	461.60	Yes	380.23	379.73	Yes	378.65	381.96	No	379.03	380.63	No	379.94	380.95	No	2	No
01-Dec-06	383.75	0.00	No	382.22	380.98	Yes	382.08	382.97	No	382.28	381.51	Yes	381.67	382.02	No	2	No
02-Dec-06	384.20	0.00	No	382.77	381.28	Yes	382.73	383.22	No	382.95	381.82	Yes	382.26	382.35	No	2	No
03-Dec-06	384.78	0.00	No	383.21	381.54	Yes	383.26	383.45	No	383.45	382.11	Yes	382.70	382.65	Yes	3	No

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Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
04-Dec-06	384.42	111.05	Yes	383.25	381.66	Yes	383.04	383.59	No	383.31	382.35	Yes	382.87	382.83	Yes	4	No
05-Dec-06	383.99	249.20	Yes	383.05	381.44	Yes	382.60	383.42	No	382.88	382.21	Yes	382.71	382.64	Yes	4	No
06-Dec-06	383.63	262.38	Yes	382.14	381.39	Yes	382.20	383.39	No	382.51	382.16	Yes	382.52	382.59	No	3	No
07-Dec-06	383.39	299.82	Yes	382.12	381.21	Yes	381.99	383.25	No	382.29	381.97	Yes	382.37	382.41	No	3	No
08-Dec-06	382.29	351.60	Yes	382.29	381.38	Yes	381.08	383.40	No	381.46	382.21	No	382.07	382.59	No	2	No
09-Dec-06	381.06	464.35	Yes	381.61	381.13	Yes	379.98	383.22	No	380.42	382.06	No	381.47	382.37	No	2	No
10-Dec-06	380.33	551.41	Yes	381.19	380.83	Yes	379.25	382.98	No	379.70	381.80	No	381.01	382.09	No	2	No
11-Dec-06	380.39	561.45	Yes	380.98	380.71	Yes	379.26	382.90	No	379.68	381.72	No	380.91	381.99	No	2	No
12-Dec-06	381.62	510.45	Yes	381.69	380.88	Yes	380.30	383.01	No	380.67	381.79	No	381.44	382.12	No	2	No
13-Dec-06	383.07	384.01	Yes	382.99	381.24	Yes	381.66	383.32	No	381.97	382.08	No	382.18	382.48	No	2	No
14-Dec-06	384.79	266.79	Yes	384.34	381.71	Yes	383.23	383.73	No	383.47	382.49	Yes	383.08	382.93	Yes	4	No
15-Dec-06	385.27	202.18	Yes	384.42	381.86	Yes	383.70	383.82	No	383.93	382.55	Yes	383.35	383.05	Yes	4	No
16-Dec-06	385.10	167.11	Yes	384.44	382.14	Yes	383.57	384.05	No	383.84	382.81	Yes	383.46	383.31	Yes	4	No
17-Dec-06	385.20	181.83	Yes	384.51	382.10	Yes	383.64	384.05	No	383.88	382.81	Yes	383.50	383.29	Yes	4	No
18-Dec-06	385.43	142.52	Yes	384.68	382.33	Yes	383.92	384.15	No	384.14	382.83	Yes	383.68	383.53	Yes	4	No
19-Dec-06	384.88	148.91	Yes	384.52	382.55	Yes	383.47	384.24	No	383.76	382.94	Yes	383.60	383.78	No	3	No
20-Dec-06	383.98	240.90	Yes	384.11	382.52	Yes	382.66	384.25	No	383.00	383.00	Yes	383.27	383.75	No	3	No
21-Dec-06	384.09	195.59	Yes	384.11	382.48	Yes	382.68	384.43	No	383.01	383.20	No	383.23	383.68	No	2	No
22-Dec-06	384.88	210.76	Yes	384.54	382.58	Yes	383.42	384.43	No	383.70	383.15	Yes	383.60	383.79	No	3	No
23-Dec-06	385.23	179.39	Yes	384.74	382.72	Yes	383.73	384.42	No	384.01	383.07	Yes	383.78	383.97	No	3	No
24-Dec-06	420.29	276.88	Yes	378.27	376.19	Yes	377.39	377.86	No	377.92	376.85	Yes	377.60	377.70	No	3	No
25-Dec-06	422.22	237.22	Yes	378.99	376.66	Yes	378.01	378.10	No	378.55	377.14	Yes	377.71	377.66	Yes	4	No
26-Dec-06	387.18	67.98	Yes	385.94	383.19	Yes	385.54	384.98	Yes	385.77	383.70	Yes	384.86	384.44	Yes	5	Yes
27-Dec-06	386.56	54.08	Yes	385.79	383.40	Yes	385.10	385.18	No	385.37	383.94	Yes	384.82	384.63	Yes	4	No
28-Dec-06	385.87	109.59	Yes	385.44	383.39	Yes	384.46	385.14	No	384.74	383.85	Yes	384.50	384.63	No	3	No
29-Dec-06	385.96	111.75	Yes	385.49	383.39	Yes	384.52	385.14	No	384.82	383.89	Yes	384.58	384.67	No	3	No
30-Dec-06	385.82	122.11	Yes	385.47	383.57	Yes	384.40	385.27	No	384.70	384.06	Yes	384.58	384.84	No	3	No
31-Dec-06	386.09	122.83	Yes	385.63	383.72	Yes	384.62	385.40	No	384.90	384.18	Yes	384.69	384.96	No	3	No
01-Jan-07	383.75	135.60	Yes	385.68	383.51	Yes	384.78	385.24	No	385.05	383.92	Yes	384.73	384.76	No	3	No
02-Jan-07	384.20	144.45	Yes	385.49	383.64	Yes	384.35	385.33	No	384.65	384.05	Yes	384.60	384.87	No	3	No
03-Jan-07	384.78	180.65	Yes	385.45	383.72	Yes	384.20	385.35	No	384.52	384.11	Yes	384.51	384.98	No	3	No
04-Jan-07	384.42	144.39	Yes	385.80	383.90	Yes	384.76	385.55	No	385.07	384.32	Yes	384.87	385.15	No	3	No
05-Jan-07	383.99	110.58	Yes	386.27	383.94	Yes	385.59	385.66	No	385.84	384.43	Yes	385.28	385.23	Yes	4	No
06-Jan-07	383.63	81.77	Yes	386.48	383.92	Yes	385.90	385.70	Yes	386.14	384.43	Yes	385.44	385.18	Yes	5	Yes
07-Jan-07	383.39	29.70	Yes	386.96	384.27	Yes	386.56	386.06	Yes	386.80	384.85	Yes	385.91	385.50	Yes	5	Yes
08-Jan-07	382.29	2.04	NC(Q)	387.37	384.38	Yes	387.21	386.22	Yes	387.41	385.05	Yes	386.31	385.68	Yes	4	No
09-Jan-07	381.06	3.64	NC(Q)	387.41	384.40	Yes	387.16	386.25	Yes	387.39	385.03	Yes	386.33	385.66	Yes	4	No
10-Jan-07	380.33	6.71	NC(Q)	387.20	384.60	Yes	386.67	386.43	Yes	386.93	385.27	Yes	386.23	385.89	Yes	4	No
11-Jan-07	380.39	8.69	NC(Q)	387.12	384.76	Yes	386.45	386.55	No	386.73	385.40	Yes	386.18	386.00	Yes	3	No
12-Jan-07	381.62	54.73	Yes	386.80	384.63	Yes	385.94	386.40	No	386.22	385.21	Yes	385.90	385.87	Yes	4	No
13-Jan-07	383.07	9.19	NC(Q)	387.34	384.80	Yes	386.79	386.65	Yes	387.05	385.46	Yes	386.36	386.04	Yes	4	No
14-Jan-07	384.79	25.41	NC(Q)	387.08	384.94	Yes	386.27	386.74	No	386.55	385.56	Yes	386.19	386.19	Yes	3	No
15-Jan-07	385.27	7.21	NC(Q)	387.49	384.92	Yes	387.00	386.77	Yes	387.23	385.57	Yes	386.46	386.18	Yes	4	No
16-Jan-07	385.10	0.15	NC(Q)	388.21	384.97	Yes	388.22	386.82	Yes	388.38	385.64	Yes	387.10	386.25	Yes	4	No
17-Jan-07	385.20	0.71	NC(Q)	387.97	385.23	Yes	387.56	387.07	Yes	387.81	385.93	Yes	387.00	386.51	Yes	4	No
18-Jan-07	385.43	50.60	Yes	387.21	385.30	Yes	386.18	387.04	No	386.50	385.89	Yes	386.34	386.54	No	3	No
19-Jan-07	384.88	153.30	Yes	386.55	385.03	Yes	385.18	386.69	No	385.53	385.42	Yes	385.75	386.26	No	3	No
20-Jan-07	383.98	209.23	Yes	386.29	384.95	Yes	384.76	386.58	No	385.14	385.25	No	385.49	386.20	No	2	No
21-Jan-07	384.09	282.87	Yes	385.85	384.91	Yes	383.99	386.43	No	384.40	385.12	No	385.11	386.17	No	2	No
22-Jan-07	384.88	334.67	Yes	385.56	384.37	Yes	383.63	386.16	No	384.03	384.90	No	384.78	385.63	No	2	No
23-Jan-07	385.23	388.81	Yes	385.21	384.10	Yes	383.08	386.15	No	383.50	384.96	No	384.47	385.33	No	2	No

Table 3
2007 Annual Report
Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
24-Jan-07	420.29	427.25	Yes	385.06	383.81	Yes	382.95	385.93	No	383.37	384.69	No	384.27	385.08	No	2	No
25-Jan-07	422.22	422.58	Yes	385.09	383.71	Yes	383.05	385.83	No	383.46	384.63	No	384.27	385.03	No	2	No
26-Jan-07	387.18	378.52	Yes	385.62	384.05	Yes	383.91	386.12	No	384.29	384.96	No	384.78	385.37	No	2	No
27-Jan-07	386.56	353.95	Yes	385.83	384.03	Yes	384.28	386.11	No	384.63	384.89	No	384.94	385.34	No	2	No
28-Jan-07	385.87	324.33	Yes	385.94	384.09	Yes	384.49	386.14	No	384.82	384.93	No	385.06	385.39	No	2	No
29-Jan-07	385.96	361.88	Yes	385.20	384.46	Yes	383.11	386.28	No	383.54	384.80	No	384.45	385.35	No	2	No
30-Jan-07	385.82	447.93	Yes	384.93	384.37	Yes	382.81	385.95	No	383.21	384.01	No	384.08	384.74	No	2	No
31-Jan-07	386.09	371.95	Yes	384.58	384.26	Yes	382.21	386.05	No	382.67	384.52	No	383.86	385.06	No	2	No
01-Feb-07	383.26	478.73	Yes	384.48	383.67	Yes	382.09	385.78	No	382.55	384.61	No	383.74	384.97	No	2	No
02-Feb-07	383.25	538.22	Yes	384.34	383.27	Yes	382.00	385.43	No	382.43	384.23	No	383.56	384.56	No	2	No
03-Feb-07	382.69	562.62	Yes	384.00	383.07	Yes	381.50	385.28	No	381.97	384.07	No	383.29	384.40	No	2	No
04-Feb-07	381.72	623.15	Yes	383.48	382.81	Yes	380.66	385.06	No	381.15	383.86	No	382.81	384.17	No	2	No
05-Feb-07	380.38	736.60	Yes	382.72	382.32	Yes	379.40	384.65	No	379.95	383.48	No	382.09	383.73	No	2	No
06-Feb-07	380.06	778.28	Yes	382.47	382.30	Yes	379.08	384.62	No	379.65	383.49	No	381.88	383.71	No	2	No
07-Feb-07	379.44	825.15	Yes	382.00	381.80	Yes	378.49	384.22	No	379.06	382.98	No	381.38	383.23	No	2	No
08-Feb-07	379.02	885.12	Yes	381.72	381.56	Yes	378.10	384.00	No	378.69	382.82	No	381.11	383.03	No	2	No
09-Feb-07	379.09	875.30	Yes	381.68	381.45	Yes	378.16	383.91	No	378.74	382.69	No	381.02	382.92	No	2	No
10-Feb-07	378.96	909.63	Yes	381.54	381.23	Yes	378.05	383.72	No	378.60	382.53	No	380.91	382.74	No	2	No
11-Feb-07	379.00	902.80	Yes	381.50	381.22	Yes	378.08	383.68	No	378.63	382.52	No	380.86	382.70	No	2	No
12-Feb-07	378.85	911.79	Yes	381.38	381.11	Yes	377.93	383.57	No	378.49	382.40	No	380.74	382.58	No	2	No
13-Feb-07	379.98	795.13	Yes	381.84	381.24	Yes	378.88	383.66	No	379.38	382.44	No	381.13	382.68	No	2	No
14-Feb-07	379.66	852.89	Yes	381.69	380.91	Yes	378.63	383.40	No	379.15	382.17	No	381.00	382.41	No	2	No
15-Feb-07	379.50	869.85	Yes	381.58	380.85	Yes	378.50	383.34	No	379.02	382.14	No	380.91	382.37	No	2	No
16-Feb-07	380.23	791.53	Yes	381.95	381.15	Yes	379.12	383.56	No	379.61	382.37	No	381.26	382.63	No	2	No
17-Feb-07	381.00	746.28	Yes	382.27	381.12	Yes	379.82	383.51	No	380.27	382.27	No	381.53	382.59	No	2	No
18-Feb-07	382.03	621.24	Yes	382.86	381.42	Yes	380.78	383.76	No	381.19	382.48	No	382.10	382.86	No	2	No
19-Feb-07	382.44	496.79	Yes	383.19	382.01	Yes	381.24	384.23	No	381.64	382.99	No	382.45	383.38	No	2	No
20-Feb-07	402.15	675.75	Yes	376.14	375.04	Yes	374.32	377.26	No	374.75	382.88	No	375.72	376.69	No	2	No
21-Feb-07	381.38	622.46	Yes	382.63	381.60	Yes	380.27	383.89	No	380.72	382.66	No	381.95	383.00	No	2	No
22-Feb-07	382.58	570.83	Yes	383.10	381.55	Yes	381.17	383.85	No	381.56	382.57	No	382.31	382.98	No	2	No
23-Feb-07	384.29	428.58	Yes	384.10	382.16	Yes	382.77	384.36	No	383.10	383.08	Yes	383.25	383.53	No	3	No
24-Feb-07	386.39	207.81	Yes	385.34	383.09	Yes	384.69	385.10	No	384.95	383.85	Yes	384.39	384.42	No	3	No
25-Feb-07	392.80	11.56	Yes	388.58	383.75	Yes	390.33	385.70	Yes	390.19	384.43	Yes	387.12	385.17	Yes	5	Yes
26-Feb-07	396.73	0.00	No	391.00	384.18	Yes	394.18	386.10	Yes	393.79	384.90	Yes	389.42	385.75	Yes	4	No
27-Feb-07	397.88	0.00	No	391.97	384.56	Yes	395.33	386.46	Yes	394.94	385.31	Yes	390.43	386.20	Yes	4	No
28-Feb-07	397.80	4.41	NC(Q)	392.36	385.14	Yes	395.36	386.97	Yes	395.02	385.86	Yes	390.91	386.79	Yes	4	No
01-Mar-07	396.85	0.00	No	392.08	385.45	Yes	394.53	387.26	Yes	394.27	386.16	Yes	390.77	387.05	Yes	4	No
02-Mar-07	397.09	0.00	No	392.30	385.58	Yes	394.69	387.41	Yes	394.43	386.24	Yes	390.94	387.13	Yes	4	No
03-Mar-07	399.44	0.00	No	393.62	385.83	Yes	396.84	387.67	Yes	396.45	386.51	Yes	392.13	387.47	Yes	4	No
04-Mar-07	399.78	0.00	No	394.06	386.20	Yes	397.23	388.02	Yes	396.86	386.92	Yes	392.66	387.87	Yes	4	No
05-Mar-07	397.80	0.00	No	393.24	386.48	Yes	395.48	388.27	Yes	395.27	387.17	Yes	392.00	388.10	Yes	4	No
06-Mar-07	395.99	0.00	No	392.45	386.71	Yes	393.85	388.49	Yes	393.77	387.39	Yes	391.28	388.25	Yes	4	No
07-Mar-07	394.23	0.00	No	391.55	386.82	Yes	392.21	388.61	Yes	392.29	387.48	Yes	390.47	388.28	Yes	4	No
08-Mar-07	392.25	0.00	No	390.60	386.93	Yes	390.49	388.70	Yes	390.68	387.58	Yes	389.64	388.31	Yes	4	No
09-Mar-07	390.58	0.00	No	389.65	386.96	Yes	388.93	388.78	Yes	389.21	387.62	Yes	388.79	388.28	Yes	4	No
10-Mar-07	390.34	0.00	No	389.43	386.88	Yes	388.67	388.71	No	388.98	387.52	Yes	388.54	388.18	Yes	3	No
11-Mar-07	389.80	9.13	NC(A)	389.17	386.95	Yes	388.16	388.75	No	388.50	387.59	Yes	388.27	388.21	Yes	3	No
12-Mar-07	390.38	0.95	NC(A)	389.44	387.11	Yes	388.70	388.93	No	388.98	387.78	Yes	388.52	388.37	Yes	3	No
13-Mar-07	392.58	0.00	No	390.58	387.20	Yes	390.63	389.08	Yes	390.80	387.94	Yes	389.49	388.58	Yes	4	No
14-Mar-07	393.38	0.00	No	391.15	387.37	Yes	391.46	389.24	Yes	391.57	388.12	Yes	390.06	388.80	Yes	4	No
15-Mar-07	393.66	0.00	No	391.31	387.40	Yes	391.68	389.25	Yes	391.79	388.11	Yes	390.19	388.81	Yes	4	No

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				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
16-Mar-07	394.47	0.00	No	391.79	387.55	Yes	392.41	389.38	Yes	392.47	388.26	Yes	390.62	388.98	Yes	4	No
17-Mar-07	396.07	0.00	No	392.71	387.77	Yes	393.89	389.62	Yes	393.87	388.51	Yes	391.50	389.26	Yes	4	No
18-Mar-07	396.88	0.00	No	393.30	388.01	Yes	394.69	389.80	Yes	394.61	388.77	Yes	392.08	389.54	Yes	4	No
19-Mar-07	397.59	0.00	No	393.75	388.22	Yes	395.32	390.03	Yes	395.23	388.97	Yes	392.54	389.77	Yes	4	No
20-Mar-07	398.10	0.00	No	394.14	388.33	Yes	395.82	390.13	Yes	395.70	389.07	Yes	392.94	389.92	Yes	4	No
21-Mar-07	398.42	0.00	No	394.43	388.65	Yes	396.11	390.42	Yes	396.00	389.41	Yes	393.26	390.24	Yes	4	No
22-Mar-07	398.73	0.00	No	394.71	388.76	Yes	396.44	390.56	Yes	396.34	389.52	Yes	393.50	390.38	Yes	4	No
23-Mar-07	399.11	0.00	No	395.00	388.95	Yes	396.81	390.75	Yes	396.67	389.70	Yes	393.81	390.57	Yes	4	No
24-Mar-07	399.56	0.00	No	395.30	389.10	Yes	397.23	390.91	Yes	397.04	389.87	Yes	394.12	390.74	Yes	4	No
25-Mar-07	399.76	0.00	No	395.58	389.35	Yes	397.39	391.14	Yes	397.26	390.09	Yes	394.37	390.96	Yes	4	No
26-Mar-07	400.07	0.00	No	395.80	389.51	Yes	397.69	391.31	Yes	397.53	390.30	Yes	394.62	391.16	Yes	4	No
27-Mar-07	400.40	0.00	No	396.07	389.75	Yes	398.00	391.54	Yes	397.83	390.50	Yes	394.88	391.36	Yes	4	No
28-Mar-07	400.58	0.00	No	396.28	389.89	Yes	398.20	391.69	Yes	398.03	390.66	Yes	395.10	391.55	Yes	4	No
29-Mar-07	400.56	0.00	No	396.37	390.04	Yes	398.19	391.84	Yes	398.07	390.80	Yes	395.18	391.68	Yes	4	No
30-Mar-07	400.60	0.00	No	396.47	390.25	Yes	398.25	392.05	Yes	398.11	391.02	Yes	395.34	391.92	Yes	4	No
31-Mar-07	401.17	0.00	No	396.87	390.57	Yes	398.83	392.34	Yes	398.62	391.33	Yes	395.76	392.19	Yes	4	No
01-Apr-07	401.88	77.27	NC(A)	397.38	390.68	Yes	399.47	392.47	Yes	399.26	391.45	Yes	396.19	392.36	Yes	4	No
02-Apr-07	402.03	117.23	NC(A)	397.50	390.75	Yes	399.63	392.60	Yes	399.37	391.53	Yes	396.38	392.42	Yes	4	No
03-Apr-07	402.21	0.00	No	397.70	390.59	Yes	399.80	392.56	Yes	399.54	391.45	Yes	396.52	392.38	Yes	4	No
04-Apr-07	402.99	0.00	No	398.17	391.11	Yes	400.50	392.92	Yes	400.22	391.91	Yes	396.98	392.84	Yes	4	No
05-Apr-07	403.90	0.00	No	398.80	391.46	Yes	401.32	393.23	Yes	401.02	392.22	Yes	397.60	393.17	Yes	4	No
06-Apr-07	404.06	2.58	NC(A)	399.06	391.73	Yes	401.53	393.49	Yes	401.27	392.49	Yes	397.87	393.43	Yes	4	No
07-Apr-07	403.73	0.00	No	398.96	391.88	Yes	401.26	393.67	Yes	400.98	392.67	Yes	397.80	393.58	Yes	4	No
08-Apr-07	403.02	2.73	NC(A)	398.60	392.06	Yes	400.59	393.81	Yes	400.39	392.83	Yes	397.48	393.70	Yes	4	No
09-Apr-07	402.59	0.00	No	398.41	392.18	Yes	400.22	393.93	Yes	400.00	392.95	Yes	397.30	393.82	Yes	4	No
10-Apr-07	402.11	0.00	No	398.22	392.35	Yes	399.72	394.11	Yes	399.58	393.12	Yes	397.09	393.95	Yes	4	No
11-Apr-07	402.03	0.00	No	398.20	392.53	Yes	399.61	394.30	Yes	399.48	393.28	Yes	397.09	394.09	Yes	4	No
12-Apr-07	402.25	0.00	No	398.26	392.35	Yes	399.81	394.17	Yes	399.66	393.12	Yes	397.12	393.97	Yes	4	No
13-Apr-07	402.39	0.00	No	398.43	392.54	Yes	399.95	394.34	Yes	399.78	393.33	Yes	397.30	394.16	Yes	4	No
14-Apr-07	402.61	0.00	No	398.66	392.82	Yes	400.17	394.60	Yes	400.02	393.58	Yes	397.51	394.38	Yes	4	No
15-Apr-07	403.81	0.00	No	399.30	392.88	Yes	401.23	394.67	Yes	401.00	393.64	Yes	398.12	394.51	Yes	4	No
16-Apr-07	405.02	0.00	No	400.11	393.14	Yes	402.35	394.91	Yes	402.06	393.90	Yes	398.85	394.81	Yes	4	No
17-Apr-07	404.93	0.00	No	400.22	393.37	Yes	402.35	395.14	Yes	402.09	394.17	Yes	398.98	395.04	Yes	4	No
18-Apr-07	404.32	0.00	No	399.92	393.47	Yes	401.80	395.26	Yes	401.62	394.25	Yes	398.72	395.12	Yes	4	No
19-Apr-07	403.74	0.00	No	399.58	393.51	Yes	401.31	395.31	Yes	401.10	394.28	Yes	398.46	395.11	Yes	4	No
20-Apr-07	402.95	0.00	No	399.20	393.57	Yes	400.54	395.34	Yes	400.44	394.35	Yes	398.09	395.14	Yes	4	No
21-Apr-07	401.87	0.00	No	398.64	393.63	Yes	399.56	395.40	Yes	399.53	394.41	Yes	397.56	395.14	Yes	4	No
22-Apr-07	400.99	0.00	No	398.17	393.65	Yes	398.76	395.48	Yes	398.80	394.39	Yes	397.10	395.14	Yes	4	No
23-Apr-07	400.28	0.00	No	397.73	393.60	Yes	398.10	395.43	Yes	398.20	394.36	Yes	396.69	395.02	Yes	4	No
24-Apr-07	399.38	0.00	No	397.24	393.58	Yes	397.31	395.43	Yes	397.44	394.35	Yes	396.25	395.00	Yes	4	No
25-Apr-07	398.43	0.00	No	396.70	393.58	Yes	396.45	395.40	Yes	396.65	394.29	Yes	395.72	394.96	Yes	4	No
26-Apr-07	397.81	0.00	No	396.28	393.47	Yes	395.85	395.34	Yes	396.11	394.23	Yes	395.31	394.83	Yes	4	No
27-Apr-07	398.12	0.00	No	396.36	393.35	Yes	396.09	395.19	Yes	396.30	394.05	Yes	395.38	394.72	Yes	4	No
28-Apr-07	400.16	2.52	NC(A)	397.45	393.41	Yes	397.86	395.29	Yes	397.96	394.19	Yes	396.40	394.87	Yes	4	No
29-Apr-07	403.30	0.00	No	399.38	393.77	Yes	400.81	395.61	Yes	400.73	394.56	Yes	398.25	395.35	Yes	4	No
30-Apr-07	404.88	0.00	No	400.46	394.11	Yes	402.35	395.95	Yes	402.15	394.87	Yes	399.24	395.74	Yes	4	No
01-May-07	405.09	0.00	No	400.67	394.35	Yes	402.52	396.13	Yes	402.40	395.09	Yes	399.51	395.94	Yes	4	No
02-May-07	404.94	0.00	No	400.69	394.51	Yes	402.45	396.33	Yes	402.32	395.29	Yes	399.54	396.09	Yes	4	No
03-May-07	404.72	0.00	No	400.65	394.66	Yes	402.30	396.48	Yes	402.15	395.42	Yes	399.53	396.27	Yes	4	No
04-May-07	405.01	0.00	No	400.87	394.85	Yes	402.58	396.67	Yes	402.43	395.61	Yes	399.77	396.44	Yes	4	No
05-May-07	405.01	0.00	No	400.95	394.99	Yes	402.58	396.81	Yes	402.47	395.75	Yes	399.80	396.59	Yes	4	No

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				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
06-May-07	404.16	0.00	No	400.54	395.03	Yes	401.83	396.88	Yes	401.78	395.79	Yes	399.47	396.62	Yes	4	No
07-May-07	403.18	0.00	No	400.04	395.14	Yes	400.94	396.95	Yes	400.96	395.87	Yes	398.98	396.65	Yes	4	No
08-May-07	402.79	0.00	No	399.83	395.18	Yes	400.56	397.01	Yes	400.63	395.90	Yes	398.78	396.71	Yes	4	No
09-May-07	405.62	0.00	No	401.41	395.42	Yes	403.15	397.26	Yes	403.01	396.21	Yes	400.29	397.04	Yes	4	No
10-May-07	408.28	0.00	No	403.12	395.83	Yes	405.71	397.63	Yes	405.43	396.62	Yes	401.88	397.52	Yes	4	No
11-May-07	409.32	0.00	No	403.83	396.14	Yes	406.66	397.97	Yes	406.34	396.95	Yes	402.54	397.88	Yes	4	No
12-May-07	409.37	0.00	No	403.91	396.40	Yes	406.74	398.18	Yes	406.41	397.17	Yes	402.70	398.10	Yes	4	No
13-May-07	409.22	0.00	No	403.96	396.62	Yes	406.63	398.41	Yes	406.30	397.41	Yes	402.73	398.33	Yes	4	No
14-May-07	408.95	5.36	NC(A)	403.89	396.82	Yes	406.39	398.68	Yes	406.10	397.61	Yes	402.73	398.58	Yes	4	No
15-May-07	408.70	0.00	No	403.86	397.08	Yes	406.17	398.89	Yes	405.96	397.79	Yes	402.72	398.75	Yes	4	No
16-May-07	408.32	2.61	NC(A)	403.69	397.09	Yes	405.80	398.91	Yes	405.61	397.90	Yes	402.53	398.79	Yes	4	No
17-May-07	407.38	0.00	No	403.17	397.10	Yes	404.96	398.93	Yes	404.84	397.92	Yes	402.11	398.77	Yes	4	No
18-May-07	405.88	0.00	No	402.39	397.08	Yes	403.59	398.95	Yes	403.57	397.93	Yes	401.35	398.73	Yes	4	No
19-May-07	404.00	0.00	No	401.31	397.04	Yes	401.86	398.87	Yes	401.95	397.83	Yes	400.33	398.58	Yes	4	No
20-May-07	402.48	0.00	No	400.40	396.89	No	400.47	398.73	No	400.65	397.65	Yes	399.46	398.35	Yes	2	No
21-May-07	400.67	0.00	No	399.30	396.62	No	398.82	398.48	No	399.11	397.40	Yes	398.42	398.05	Yes	2	No
22-May-07	398.94	6.77	NC(Q)	398.21	396.28	No	397.22	398.16	No	397.59	397.05	Yes	397.34	397.66	No	1	No
23-May-07	397.85	15.80	Yes	397.44	395.97	No	396.17	397.85	No	396.60	396.71	Yes	396.59	397.32	No	2	No
24-May-07	396.96	22.33	Yes	396.84	395.72	No	395.38	397.60	No	395.83	396.45	Yes	396.03	396.90	No	2	No
25-May-07	396.10	48.14	Yes	396.27	395.43	No	394.58	397.33	No	395.06	396.14	Yes	395.47	396.56	No	2	No
26-May-07	395.91	44.28	Yes	396.11	395.32	No	394.43	397.22	No	394.90	396.04	Yes	395.30	396.43	No	2	No
27-May-07	395.77	77.71	Yes	395.95	395.08	No	394.31	396.98	No	394.75	395.86	Yes	395.16	395.99	No	2	No
28-May-07	396.91	51.92	Yes	396.41	394.99	No	395.14	396.93	No	395.55	395.79	No	395.58	396.43	No	1	No
29-May-07	398.85	18.71	Yes	397.55	395.25	No	396.92	397.20	No	397.23	396.05	No	396.67	396.64	No	1	No
30-May-07	399.39	0.28	NC(Q)	397.97	395.50	No	397.45	397.40	No	397.76	396.26	No	397.08	396.92	No	0	No
31-May-07	398.81	15.40	Yes	397.71	395.55	No	396.94	397.43	No	397.30	396.28	No	396.85	396.93	No	1	No
01-Jun-07	398.36	14.69	Yes	397.46	395.50	Yes	396.53	397.42	No	396.89	396.26	Yes	396.58	396.90	No	3	No
02-Jun-07	399.39	5.85	NC(Q)	398.02	395.61	Yes	397.45	397.53	No	397.78	396.37	Yes	397.13	397.05	Yes	3	No
03-Jun-07	400.14	0.00	No	398.59	395.83	Yes	398.20	397.74	Yes	398.49	396.57	Yes	397.68	397.31	Yes	4	No
04-Jun-07	400.67	0.00	No	398.87	395.93	Yes	398.67	397.84	Yes	398.96	396.69	Yes	397.96	397.38	Yes	4	No
05-Jun-07	401.61	0.00	No	399.48	396.04	Yes	399.57	397.95	Yes	399.84	396.81	Yes	398.52	397.50	Yes	4	No
06-Jun-07	400.75	0.00	No	399.09	396.12	Yes	398.84	398.03	Yes	399.13	396.92	Yes	398.19	397.56	Yes	4	No
07-Jun-07	398.91	5.70	NC(Q)	398.05	396.06	Yes	397.14	397.97	No	397.51	396.83	Yes	397.17	397.41	No	2	No
08-Jun-07	397.86	15.23	Yes	397.29	395.71	Yes	396.20	397.63	No	396.58	396.43	Yes	396.49	397.04	No	3	No
09-Jun-07	397.25	32.47	Yes	396.86	395.49	Yes	395.61	397.34	No	396.01	396.13	No	396.03	396.79	No	2	No
10-Jun-07	397.04	43.73	Yes	396.66	395.38	Yes	395.40	397.28	No	395.83	396.09	No	395.88	396.70	No	2	No
11-Jun-07	397.15	42.55	Yes	396.62	395.31	Yes	395.38	397.20	No	395.80	395.96	No	395.84	396.12	No	2	No
12-Jun-07	397.64	45.36	Yes	396.83	395.26	Yes	395.75	397.15	No	396.14	395.91	Yes	396.01	390.27	Yes	4	No
13-Jun-07	397.45	28.87	Yes	396.80	395.33	Yes	395.64	397.23	No	396.05	396.01	Yes	395.97	395.26	Yes	4	No
14-Jun-07	396.38	104.65	Yes	396.16	395.05	Yes	394.51	396.94	No	395.06	395.73	No	395.50	395.77	No	2	No
15-Jun-07	395.04	230.40	Yes	395.28	394.41	Yes	393.21	396.44	No	393.80	395.27	No	NA	NA	NC(D)	2	No
16-Jun-07	394.81	293.08	Yes	395.00	393.92	Yes	392.84	396.04	No	393.56	394.83	No	NA	NA	NC(D)	2	No
17-Jun-07	394.98	234.09	Yes	395.10	394.04	Yes	393.26	396.10	No	393.74	394.89	No	NA	NA	NC(D)	2	No
18-Jun-07	393.67	335.89	Yes	394.31	393.63	Yes	390.33	395.74	No	392.56	394.55	No	NA	NA	NC(D)	2	No
19-Jun-07	392.97	399.31	Yes	393.78	393.09	Yes	391.12	395.29	No	391.89	394.04	No	392.84	NA	NC(D)	2	No
20-Jun-07	392.43	442.62	Yes	393.36	392.79	Yes	390.75	395.01	No	391.41	393.73	No	392.49	NA	NC(D)	2	No
21-Jun-07	391.88	478.90	Yes	392.99	392.51	Yes	390.30	394.60	No	390.88	393.51	No	392.12	393.53	No	2	No
22-Jun-07	391.62	479.74	Yes	392.79	392.35	Yes	389.92	394.58	No	390.62	393.35	No	391.93	393.18	No	2	No
23-Jun-07	391.62	499.74	Yes	392.72	392.12	Yes	390.03	394.39	No	390.62	393.18	No	391.83	393.06	No	2	No
24-Jun-07	393.88	270.38	Yes	393.94	392.70	Yes	392.05	394.86	No	392.62	393.62	No	392.95	393.69	No	2	No
25-Jun-07	394.95	114.79	Yes	394.62	393.32	Yes	393.16	395.32	No	393.64	394.05	No	393.79	394.04	No	2	No

Table 3
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Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extraction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
26-Jun-07	394.37	146.15	Yes	394.34	393.29	Yes	392.59	395.30	No	393.13	394.10	No	393.48	394.32	No	2	No
27-Jun-07	393.72	275.44	Yes	393.85	392.84	Yes	391.90	394.93	No	392.38	393.72	No	393.04	393.90	No	2	No
28-Jun-07	NA	377.95	Yes	393.26	392.46	Yes	390.90	394.61	No	391.51	393.42	No	392.50	393.51	No	2	No
29-Jun-07	NA	440.15	Yes	392.62	392.03	Yes	389.93	394.25	No	390.63	393.03	No	391.84	392.37	No	2	No
30-Jun-07	NA	412.40	Yes	392.38	391.98	Yes	389.66	394.18	No	390.36	392.96	No	391.58	392.33	No	2	No
01-Jul-07	NA	211.40	Yes	393.44	392.51	Yes	391.60	394.61	No	392.08	393.37	No	392.57	392.85	No	2	No
02-Jul-07	NA	84.29	Yes	394.03	393.03	Yes	392.47	395.02	No	392.94	393.77	No	393.24	394.16	No	2	No
03-Jul-07	NA	77.16	Yes	393.98	393.22	Yes	392.26	395.14	No	392.74	393.98	No	393.12	394.31	No	2	No
04-Jul-07	NA	194.25	Yes	393.60	392.87	Yes	391.63	394.76	No	392.12	393.73	No	392.70	393.70	No	2	No
05-Jul-07	NA	333.58	Yes	393.43	392.38	Yes	391.49	394.50	No	391.98	393.28	No	392.68	393.17	No	2	No
06-Jul-07	NA	254.30	Yes	393.46	392.41	Yes	391.55	394.51	No	392.10	393.30	No	392.60	393.29	No	2	No
07-Jul-07	NA	183.25	Yes	393.67	392.69	Yes	391.88	394.73	No	392.41	393.54	No	392.75	388.97	Yes	3	No
08-Jul-07	NA	159.09	Yes	393.80	392.86	Yes	392.06	394.87	No	392.55	393.69	No	392.97	391.82	Yes	3	No
09-Jul-07	NA	243.12	Yes	393.35	392.58	Yes	391.23	394.61	No	391.88	393.42	No	392.47	393.63	No	2	No
10-Jul-07	390.92	365.38	Yes	392.58	392.08	Yes	390.15	394.22	No	390.71	393.03	No	391.60	392.96	No	2	No
11-Jul-07	389.67	513.27	Yes	391.54	391.35	Yes	388.42	393.63	No	389.21	392.40	No	390.72	392.32	No	2	No
12-Jul-07	389.02	598.77	Yes	391.02	390.87	Yes	387.65	393.19	No	388.52	392.00	No	390.20	391.82	No	2	No
13-Jul-07	389.13	570.41	Yes	391.03	390.74	Yes	388.02	393.11	No	388.62	391.89	No	390.24	389.88	Yes	3	No
14-Jul-07	388.53	599.44	Yes	390.64	390.53	Yes	387.45	392.88	No	388.07	391.64	No	389.85	389.89	No	2	No
15-Jul-07	387.85	677.06	Yes	390.14	390.08	Yes	386.39	392.50	No	387.42	391.24	No	389.39	390.34	No	2	No
16-Jul-07	387.56	683.41	Yes	389.87	389.88	No	386.47	392.32	No	387.08	391.04	No	389.11	NA	NC(D)	1	No
17-Jul-07	387.34	732.22	Yes	389.61	389.60	Yes	385.98	392.03	No	386.75	390.76	No	388.61	NA	NC(D)	2	No
18-Jul-07	387.13	767.16	Yes	389.42	389.33	Yes	385.74	391.80	No	386.57	390.53	No	388.27	NA	NC(D)	2	No
19-Jul-07	387.13	725.16	Yes	389.27	389.24	Yes	385.63	391.71	No	386.44	390.38	No	388.48	NA	NC(D)	2	No
20-Jul-07	388.88	657.79	Yes	390.26	389.30	Yes	387.61	391.76	No	388.13	390.46	No	389.19	NA	NC(D)	2	No
21-Jul-07	390.66	353.93	Yes	391.43	390.24	Yes	388.64	392.50	No	389.97	391.20	No	390.61	NA	NC(D)	2	No
22-Jul-07	390.57	339.09	Yes	391.52	390.53	Yes	389.48	392.72	No	390.00	391.45	No	390.73	NA	NC(D)	2	No
23-Jul-07	388.73	492.97	Yes	390.45	390.09	Yes	387.37	392.26	No	388.26	391.11	No	389.60	NA	NC(D)	2	No
24-Jul-07	387.73	594.75	Yes	389.71	389.54	Yes	386.59	391.84	No	387.24	390.61	No	388.98	NA	NC(D)	2	No
25-Jul-07	387.38	642.48	Yes	389.45	389.21	Yes	385.29	391.54	No	386.91	390.34	No	388.63	NA	NC(D)	2	No
26-Jul-07	386.65	708.95	Yes	388.98	388.88	Yes	385.40	391.30	No	386.25	390.05	No	388.13	NA	NC(D)	2	No
27-Jul-07	386.10	754.80	Yes	388.57	388.57	Yes	384.84	391.06	No	385.67	389.77	No	387.80	NA	NC(D)	2	No
28-Jul-07	385.79	841.44	Yes	388.25	388.11	Yes	384.67	390.56	No	385.30	389.40	No	387.14	NA	NC(D)	2	No
29-Jul-07	386.43	710.52	Yes	388.53	388.35	Yes	385.21	390.86	No	385.81	389.55	No	387.55	NA	NC(D)	2	No
30-Jul-07	386.49	685.28	Yes	388.48	388.33	Yes	385.22	390.67	No	385.81	389.55	No	387.74	NA	NC(D)	2	No
31-Jul-07	386.49	682.46	Yes	388.51	388.26	Yes	385.25	390.73	No	385.90	389.47	No	387.53	NA	NC(D)	2	No
01-Aug-07	385.69	771.40	Yes	387.50	387.47	Yes	382.04	387.93	No	384.69	388.66	No	387.26	377.14	Yes	3	No
02-Aug-07	385.85	766.01	Yes	388.00	387.73	Yes	382.62	388.25	No	385.27	389.00	No	385.22	366.51	Yes	3	No
03-Aug-07	385.35	778.69	Yes	387.64	387.61	Yes	384.15	390.13	No	384.78	388.81	No	386.96	388.30	No	2	No
04-Aug-07	384.49	832.26	Yes	387.12	387.32	No	383.12	389.86	No	384.00	388.58	No	386.29	388.20	No	1	No
05-Aug-07	383.51	941.67	Yes	386.48	386.82	No	381.56	389.44	No	383.05	388.17	No	385.51	387.15	No	1	No
06-Aug-07	383.15	981.88	Yes	386.16	386.46	No	381.97	389.15	No	382.68	387.82	No	385.47	385.09	Yes	2	No
07-Aug-07	382.84	990.06	Yes	385.91	386.22	No	380.87	388.95	No	382.39	387.59	No	384.69	385.02	No	1	No
08-Aug-07	383.33	950.76	Yes	386.06	386.17	No	381.00	388.84	No	382.74	387.52	No	385.12	386.44	No	1	No
09-Aug-07	384.41	827.92	Yes	386.59	386.41	Yes	383.15	389.03	No	383.76	387.68	No	385.72	384.88	Yes	3	No
10-Aug-07	386.40	647.53	Yes	387.74	386.89	Yes	385.11	389.39	No	385.65	388.05	No	386.42	386.83	No	2	No
11-Aug-07	387.35	513.85	Yes	388.39	387.39	Yes	386.14	389.79	No	386.66	388.49	No	386.80	385.58	Yes	3	No
12-Aug-07	388.13	427.61	Yes	388.97	387.81	Yes	387.06	390.11	No	387.52	388.85	No	386.95	387.33	No	2	No
13-Aug-07	387.72	409.48	Yes	388.80	387.92	Yes	386.59	390.20	No	387.16	388.93	No	387.58	373.40	Yes	3	No
14-Aug-07	388.05	267.19	Yes	389.23	388.50	Yes	387.23	390.66	No	387.78	389.42	No	387.90	376.86	Yes	3	No
15-Aug-07	387.07	388.77	Yes	388.42	388.20	Yes	385.90	390.43	No	386.44	389.20	No	387.55	361.21	Yes	3	No

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Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
16-Aug-07	386.54	424.65	Yes	388.00	387.96	Yes	383.30	388.18	No	385.88	388.96	No	385.13	332.78	Yes	3	No
17-Aug-07	386.30	456.69	Yes	387.80	387.74	Yes	385.03	389.99	No	385.60	388.73	No	387.14	379.36	Yes	3	No
18-Aug-07	385.90	474.93	Yes	387.61	387.64	No	384.76	389.94	No	385.33	388.69	No	386.96	367.49	Yes	2	No
19-Aug-07	384.96	533.30	Yes	387.04	387.37	No	383.77	389.69	No	384.42	388.46	No	384.71	359.96	Yes	2	No
20-Aug-07	383.91	613.43	Yes	386.40	387.05	No	380.60	387.40	No	383.45	388.18	No	383.69	369.04	Yes	2	No
21-Aug-07	384.43	616.86	Yes	386.54	386.84	No	382.96	389.27	No	383.81	387.97	No	385.61	372.24	Yes	2	No
22-Aug-07	386.05	458.60	Yes	387.49	387.28	Yes	384.82	389.53	No	385.37	388.30	No	386.74	377.10	Yes	3	No
23-Aug-07	387.92	298.86	Yes	388.60	387.86	Yes	386.52	390.07	No	387.15	388.82	No	387.53	362.05	Yes	3	No
24-Aug-07	390.01	174.37	Yes	389.95	388.47	Yes	388.84	390.55	No	389.27	389.33	No	388.56	388.90	No	2	No
25-Aug-07	391.84	86.57	Yes	391.17	388.91	Yes	390.69	390.89	No	391.08	389.66	Yes	390.35	389.77	Yes	4	No
26-Aug-07	393.47	1.99	NC(Q)	392.43	389.27	Yes	392.61	391.20	Yes	392.93	389.95	Yes	391.58	390.60	Yes	4	No
27-Aug-07	394.66	0.00	No	393.53	389.58	Yes	394.22	391.50	Yes	394.50	390.30	Yes	392.72	392.49	Yes	4	No
28-Aug-07	395.76	0.00	No	394.62	389.87	Yes	395.79	391.76	Yes	396.00	390.61	Yes	393.79	398.33	No	3	No
29-Aug-07	397.96	0.00	No	396.75	390.27	Yes	399.13	392.14	Yes	399.20	391.03	Yes	395.90	399.02	No	3	No
30-Aug-07	398.67	0.00	No	397.70	390.69	Yes	400.30	392.52	Yes	400.32	391.46	Yes	396.92	399.53	No	3	No
31-Aug-07	398.64	0.00	No	397.65	391.04	Yes	399.82	392.87	Yes	399.87	391.81	Yes	396.90	399.87	No	3	No
01-Sep-07	398.09	0.00	No	397.25	391.31	Yes	398.84	393.12	Yes	398.94	392.02	Yes	396.47	400.08	No	3	No
02-Sep-07	397.31	0.00	No	396.70	391.48	Yes	397.76	393.32	Yes	397.93	392.20	Yes	395.93	400.18	No	3	No
03-Sep-07	396.46	0.00	No	396.09	391.63	Yes	396.65	393.41	Yes	396.88	392.26	Yes	395.32	400.21	No	3	No
04-Sep-07	395.66	0.00	No	395.50	391.78	Yes	395.60	393.62	Yes	395.88	392.48	Yes	394.74	400.30	No	3	No
05-Sep-07	394.98	0.00	No	394.85	391.93	Yes	394.51	393.81	Yes	394.86	392.71	Yes	394.14	400.36	No	3	No
06-Sep-07	394.07	0.00	No	394.08	391.95	Yes	393.26	393.84	No	393.65	392.72	Yes	393.40	400.32	No	2	No
07-Sep-07	392.79	22.55	Yes	393.20	391.86	Yes	391.86	393.77	No	392.28	392.59	No	392.54	397.30	No	2	No
08-Sep-07	390.31	72.29	Yes	391.53	391.56	No	389.26	393.48	No	389.79	392.26	No	390.83	392.36	No	1	No
09-Sep-07	389.64	269.57	Yes	390.94	390.70	Yes	388.49	390.82	No	389.07	391.62	No	389.67	NA	NC(D)	2	No
10-Sep-07	389.90	285.07	Yes	391.06	390.30	Yes	388.30	392.51	No	389.39	391.40	No	389.34	NA	NC(D)	2	No
11-Sep-07	389.82	130.36	Yes	391.01	390.73	Yes	NA	392.78	NC(D)	389.31	391.63	No	390.36	NA	NC(D)	2	No
12-Sep-07	389.51	142.57	Yes	390.72	390.62	Yes	NA	392.69	NC(D)	388.99	391.53	No	390.14	NA	NC(D)	2	No
13-Sep-07	389.96	138.31	Yes	391.03	390.67	Yes	NA	392.71	NC(D)	389.45	391.54	No	390.38	NA	NC(D)	2	No
14-Sep-07	389.67	144.00	Yes	390.79	390.58	Yes	NA	392.64	NC(D)	389.16	391.40	No	390.19	389.87	Yes	3	No
15-Sep-07	388.72	290.85	Yes	390.12	390.03	Yes	NA	387.60	NC(D)	388.14	390.98	No	389.53	384.86	Yes	3	No
16-Sep-07	387.58	511.90	Yes	389.43	389.31	Yes	NA	391.59	NC(D)	387.09	390.39	No	388.87	388.11	Yes	3	No
17-Sep-07	386.27	580.45	Yes	388.55	388.80	No	376.04	391.15	No	385.81	389.92	No	388.01	388.38	No	1	No
18-Sep-07	385.49	587.72	Yes	388.00	388.55	No	381.43	390.90	No	385.08	389.62	No	387.47	388.26	No	1	No
19-Sep-07	385.06	614.45	Yes	387.64	388.18	No	NA	390.59	NC(D)	384.68	389.34	No	387.11	386.53	Yes	2	No
20-Sep-07	385.03	636.18	Yes	387.56	387.97	No	357.80	390.39	No	384.61	389.14	No	386.99	386.53	Yes	2	No
21-Sep-07	384.70	602.74	Yes	387.25	387.93	No	354.06	390.30	No	384.23	389.06	No	386.72	386.59	Yes	2	No
22-Sep-07	384.48	643.11	Yes	387.02	387.60	No	368.47	389.96	No	384.01	388.77	No	386.50	387.22	No	1	No
23-Sep-07	384.18	647.89	Yes	386.80	387.40	No	366.16	389.84	No	383.74	388.57	No	386.28	384.11	Yes	2	No
24-Sep-07	383.83	655.04	Yes	386.56	387.21	No	NA	389.66	NC(D)	383.41	388.37	No	386.01	384.24	Yes	2	No
25-Sep-07	383.78	662.30	Yes	386.42	387.07	No	NA	389.48	NC(D)	383.31	388.24	No	384.52	385.56	No	1	No
26-Sep-07	383.86	676.48	Yes	386.41	386.88	No	NA	389.34	NC(D)	383.43	388.09	No	384.69	NA	NC(D)	1	No
27-Sep-07	384.00	691.21	Yes	386.41	386.64	No	NA	389.12	NC(D)	383.54	387.83	No	385.74	NA	NC(D)	1	No
28-Sep-07	384.68	570.83	Yes	386.75	386.84	No	NA	389.23	NC(D)	384.18	387.94	No	385.86	NA	NC(D)	1	No
29-Sep-07	384.40	578.91	Yes	386.58	386.79	No	NA	389.15	NC(D)	383.96	387.90	No	384.41	NA	NC(D)	1	No
30-Sep-07	383.51	653.15	Yes	386.18	386.50	No	NA	388.91	NC(D)	383.37	387.66	No	382.14	NA	NC(D)	1	No
01-Oct-07	383.51	665.38	Yes	385.98	386.31	No	NA	388.74	NC(D)	383.14	387.48	No	NA	NA	NC(D)	1	No
02-Oct-07	383.36	653.04	Yes	385.89	386.30	No	NA	388.72	NC(D)	383.03	387.49	No	NA	NA	NC(D)	1	No
03-Oct-07	384.09	589.21	Yes	386.15	386.30	No	383.11	388.73	No	383.59	387.46	No	NA	NA	NC(D)	1	No
04-Oct-07	384.51	531.38	Yes	386.39	386.55	No	383.46	388.88	No	384.02	387.61	No	NA	NA	NC(D)	1	No
05-Oct-07	384.95	503.95	Yes	386.61	386.55	Yes	383.80	388.86	No	384.37	387.62	No	NA	NA	NC(D)	2	No

Table 3
2007 Annual Report
Sauget Area 2 Groundwater Migration Control System
Head Differences Across Barrier Wall

Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
06-Oct-07	385.72	452.02	Yes	387.08	386.69	Yes	384.54	388.98	No	385.09	387.75	No	NA	NA	NC(D)	2	No
07-Oct-07	386.47	390.20	Yes	387.55	386.94	Yes	385.36	389.16	No	385.89	387.98	No	NA	NA	NC(D)	2	No
08-Oct-07	386.98	336.00	Yes	387.84	387.15	Yes	385.81	389.34	No	386.32	388.16	No	NA	NA	NC(D)	2	No
09-Oct-07	387.51	275.93	Yes	388.21	387.40	Yes	386.36	389.56	No	386.87	388.35	No	NA	NA	NC(D)	2	No
10-Oct-07	388.34	197.55	Yes	388.73	387.73	Yes	387.16	389.86	No	387.62	388.66	No	NA	NA	NC(D)	2	No
11-Oct-07	388.58	148.68	Yes	388.95	388.01	Yes	387.45	390.05	No	387.94	388.89	No	NA	NA	NC(D)	2	No
12-Oct-07	388.42	163.99	Yes	388.90	388.03	Yes	387.14	390.15	No	387.78	388.98	No	NA	NA	NC(D)	2	No
13-Oct-07	388.51	133.10	Yes	389.00	388.18	Yes	387.40	390.26	No	387.88	389.06	No	NA	NA	NC(D)	2	No
14-Oct-07	388.74	116.13	Yes	389.13	388.31	Yes	387.67	390.33	No	388.12	389.11	No	NA	NA	NC(D)	2	No
15-Oct-07	389.13	106.88	Yes	389.41	388.43	Yes	388.01	390.44	No	388.47	389.23	No	NA	NA	NC(D)	2	No
16-Oct-07	389.61	102.63	Yes	389.66	388.55	Yes	388.33	390.48	No	388.79	389.26	No	NA	NA	NC(D)	2	No
17-Oct-07	389.94	94.38	Yes	389.83	388.76	Yes	388.53	390.65	No	389.03	389.47	No	NA	NA	NC(D)	2	No
18-Oct-07	390.68	83.15	Yes	390.32	388.93	Yes	389.28	390.75	No	389.71	389.57	Yes	NA	NA	NC(D)	3	No
19-Oct-07	393.05	34.73	Yes	391.79	388.98	Yes	391.76	390.95	Yes	392.10	389.75	Yes	NA	NA	NC(D)	4	No
20-Oct-07	396.00	0.00	No	394.05	389.39	Yes	395.38	391.37	Yes	395.58	390.29	Yes	NA	NA	NC(D)	3	No
21-Oct-07	396.74	0.00	No	394.91	389.72	Yes	396.52	391.67	Yes	396.72	390.64	Yes	NA	NA	NC(D)	3	No
22-Oct-07	396.26	0.00	No	394.76	389.94	Yes	395.97	391.89	Yes	396.14	390.83	Yes	NA	NA	NC(D)	3	No
23-Oct-07	395.72	0.00	No	394.44	390.16	Yes	395.20	392.04	Yes	395.42	391.03	Yes	NA	NA	NC(D)	3	No
24-Oct-07	395.18	0.00	No	394.12	390.22	Yes	394.55	392.15	Yes	394.86	391.07	Yes	NA	NA	NC(D)	3	No
25-Oct-07	394.58	0.00	No	393.88	390.34	Yes	393.98	392.31	Yes	394.30	391.24	Yes	393.49	391.92	Yes	4	No
26-Oct-07	394.29	0.00	No	393.64	390.44	Yes	393.59	392.42	Yes	393.92	391.32	Yes	393.35	391.98	Yes	4	No
27-Oct-07	393.73	4.40	NC(Q)	393.28	390.42	Yes	393.02	392.37	Yes	393.37	391.23	Yes	393.03	391.93	Yes	4	No
28-Oct-07	392.93	17.42	Yes	392.78	390.38	Yes	392.11	392.37	No	392.50	391.24	Yes	392.49	391.88	Yes	4	No
29-Oct-07	392.57	20.86	Yes	392.51	390.47	Yes	391.65	392.44	No	392.02	391.28	Yes	392.21	391.92	Yes	4	No
30-Oct-07	392.39	28.64	Yes	392.40	390.57	Yes	391.41	392.45	No	391.88	391.31	Yes	392.10	391.95	Yes	4	No
31-Oct-07	392.19	41.20	Yes	392.30	390.55	Yes	391.24	392.42	No	391.68	391.28	Yes	391.95	391.91	Yes	4	No
01-Nov-07	392.05	28.30	Yes	392.20	390.50	Yes	390.91	392.26	No	391.56	391.25	Yes	391.86	391.87	No	3	No
02-Nov-07	391.73	74.14	Yes	391.95	390.44	Yes	390.77	391.74	No	391.15	391.26	No	391.01	391.06	No	2	No
03-Nov-07	391.33	189.95	Yes	391.65	390.04	Yes	390.41	391.61	No	390.72	390.96	No	390.03	389.99	Yes	3	No
04-Nov-07	391.01	233.47	Yes	391.45	389.90	Yes	390.00	391.46	No	390.38	390.83	No	389.71	389.76	No	2	No
05-Nov-07	390.61	262.99	Yes	391.15	389.72	Yes	389.28	391.11	No	389.96	390.65	No	389.46	389.54	No	2	No
06-Nov-07	389.99	308.03	Yes	390.64	389.32	Yes	388.54	390.87	No	389.30	390.29	No	389.01	389.15	No	2	No
07-Nov-07	389.27	403.06	Yes	390.16	389.02	Yes	388.08	390.68	No	388.55	390.04	No	388.33	388.69	No	2	No
08-Nov-07	388.76	457.98	Yes	389.83	388.80	Yes	386.78	390.20	No	388.07	389.82	No	387.90	388.32	No	2	No
09-Nov-07	387.42	568.85	Yes	388.97	388.23	Yes	385.88	389.80	No	386.79	389.30	No	386.92	387.51	No	2	No
10-Nov-07	386.57	650.35	Yes	388.37	387.77	Yes	384.54	389.34	No	385.93	388.92	No	386.10	386.76	No	2	No
11-Nov-07	385.18	789.67	Yes	387.50	387.24	Yes	384.27	388.93	No	384.63	388.46	No	385.05	386.15	No	2	No
12-Nov-07	385.01	833.77	Yes	387.20	386.74	Yes	384.87	389.02	No	384.36	388.02	No	384.82	385.89	No	2	No
13-Nov-07	385.60	743.44	Yes	387.51	386.88	Yes	384.61	388.72	No	384.93	388.10	No	385.48	386.51	No	2	No
14-Nov-07	384.19	783.83	Yes	387.26	386.58	Yes	384.24	388.62	No	384.65	387.82	No	385.04	385.92	No	2	No
15-Nov-07	384.99	742.61	Yes	386.99	386.44	Yes	383.58	388.39	No	384.33	387.65	No	384.97	386.01	No	2	No
16-Nov-07	384.19	830.53	Yes	386.54	386.23	Yes	382.99	388.09	No	383.64	387.50	No	384.19	385.33	No	2	No
17-Nov-07	383.64	865.68	Yes	386.13	385.85	Yes	382.50	387.77	No	383.06	387.14	No	383.55	384.86	No	2	No
18-Nov-07	383.10	910.90	Yes	385.72	385.46	Yes	382.20	387.55	No	382.59	386.79	No	382.95	384.53	No	2	No
19-Nov-07	382.83	952.15	Yes	385.48	385.26	Yes	382.03	387.39	No	382.30	386.61	No	382.33	383.82	No	2	No
20-Nov-07	382.60	943.23	Yes	385.28	385.08	Yes	381.91	387.19	No	382.12	386.43	No	382.30	383.54	No	2	No
21-Nov-07	382.52	954.43	Yes	385.12	384.85	Yes	381.47	386.91	No	381.98	386.25	No	381.91	383.28	No	2	No
22-Nov-07	382.00	958.35	Yes	384.79	384.49	Yes	381.43	387.13	No	381.55	385.91	No	381.81	383.31	No	2	No
23-Nov-07	381.99	814.04	Yes	384.68	384.80	No	381.55	386.76	No	381.49	386.14	No	382.25	384.05	No	1	No
24-Nov-07	382.16	954.88	Yes	384.72	384.43	Yes	381.77	386.71	No	381.65	385.84	No	381.82	383.29	No	2	No
25-Nov-07	382.35	931.64	Yes	384.76	384.38	Yes	381.73	386.74	No	381.82	385.78	No	382.24	383.38	No	2	No

Table 3
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Head Differences Across Barrier Wall

Date	SWL	Groundwater Extaction Actual Flow Rate	Extraction Wells Operating	PZ-1 Inside/Outside Average Daily GWL			PZ-2 Inside/Outside Average Daily GWL			PZ-3 Inside/Outside Average Daily GWL			PZ-4 Inside/Outside Average Daily GWL			"Yes" Count	Groundwater Extraction Producing Inward Gradient
				Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient	Outside GWL	Inside GWL	Inward Gradient		
	(Ft NGVD)	(GPM)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Yes/No)		(Yes/No)
26-Nov-07	382.34	839.15	Yes	384.66	384.48	Yes	381.47	386.42	No	381.79	385.77	No	382.35	383.80	No	2	No
27-Nov-07	382.11	927.97	Yes	384.48	384.03	Yes	380.83	386.34	No	381.57	385.46	No	381.98	383.40	No	2	No
28-Nov-07	376.51	938.48	Yes	384.09	384.04	Yes	380.79	386.05	No	380.92	385.44	No	381.29	383.06	No	2	No
29-Nov-07	381.49	964.11	Yes	383.98	383.67	Yes	380.73	386.01	No	380.86	385.10	No	380.91	382.29	No	2	No
30-Nov-07	381.33	938.67	Yes	383.87	383.67	Yes	378.65	381.96	No	380.80	385.08	No	381.26	382.58	No	2	No
01-Dec-07	381.17	943.24	Yes	383.81	383.71	Yes	380.62	386.02	No	380.73	385.13	No	380.99	382.48	No	2	No
02-Dec-07	380.66	1005.99	Yes	383.41	383.31	Yes	380.07	385.69	No	380.19	384.79	No	379.99	381.50	No	2	No
03-Dec-07	380.85	980.72	Yes	383.45	383.11	Yes	380.26	385.52	No	380.35	384.58	No	380.43	381.92	No	2	No
04-Dec-07	380.49	981.95	Yes	383.28	383.27	Yes	379.94	385.61	No	380.07	384.75	No	380.44	382.20	No	2	No
05-Dec-07	380.25	636.14	Yes	383.02	383.56	No	379.71	385.87	No	379.82	384.91	No	380.87	383.20	No	1	No
06-Dec-07	379.53	0.00	NC(A)	382.71	385.62	No	379.06	387.43	No	379.25	386.44	No	382.43	386.99	No	0	No
07-Dec-07	379.85	319.24	Yes	382.76	385.15	No	379.25	387.01	No	379.41	386.13	No	381.45	385.63	No	1	No
08-Dec-07	381.01	1003.11	Yes	383.24	382.92	Yes	380.30	385.31	No	380.37	384.38	No	380.18	381.72	No	2	No
09-Dec-07	381.67	855.26	Yes	383.59	383.12	Yes	380.94	385.46	No	380.98	384.54	No	381.25	382.56	No	2	No
10-Dec-07	381.80	732.15	Yes	383.71	383.33	Yes	381.17	385.62	No	381.21	384.67	No	381.66	382.96	No	2	No
11-Dec-07	381.00	682.53	Yes	383.29	383.64	No	380.40	385.78	No	380.50	384.90	No	381.08	382.98	No	1	No
12-Dec-07	380.97	787.27	Yes	383.15	383.22	No	380.31	385.45	No	380.41	384.54	No	380.70	382.25	No	1	No
13-Dec-07	381.88	915.88	Yes	383.58	382.76	Yes	381.11	385.08	No	381.14	384.20	No	381.02	381.93	No	2	No
14-Dec-07	382.81	765.75	Yes	384.10	383.10	Yes	382.01	385.36	No	381.98	384.42	No	381.94	382.52	No	2	No
15-Dec-07	383.80	670.93	Yes	384.75	383.60	Yes	382.99	385.72	No	382.95	384.87	No	382.42	382.87	No	2	No
16-Dec-07	386.67	485.10	Yes	386.18	383.94	Yes	385.47	386.01	No	385.35	385.06	Yes	384.00	383.55	Yes	4	No
17-Dec-07	388.21	279.96	Yes	387.32	384.83	Yes	387.18	386.76	Yes	387.02	385.84	Yes	385.37	384.73	Yes	5	Yes
18-Dec-07	386.76	351.69	Yes	386.70	384.99	Yes	385.84	386.88	No	385.77	386.02	No	384.92	384.75	Yes	3	No
19-Dec-07	385.80	411.23	Yes	386.19	384.79	Yes	384.88	386.73	No	384.84	385.81	No	384.29	384.39	No	2	No
20-Dec-07	385.94	452.87	Yes	386.26	384.86	Yes	384.97	386.81	No	384.97	385.93	No	384.30	384.38	No	2	No
21-Dec-07	385.47	450.79	Yes	386.03	384.76	Yes	384.56	386.72	No	384.55	385.78	No	384.14	384.27	No	2	No
22-Dec-07	385.07	475.24	Yes	385.82	384.78	Yes	384.18	386.73	No	384.18	385.85	No	383.77	384.14	No	2	No
23-Dec-07	385.40	495.72	Yes	385.91	384.52	Yes	384.48	386.52	No	384.45	385.59	No	383.89	383.83	Yes	3	No
24-Dec-07	384.70	531.31	Yes	385.57	384.44	Yes	383.85	386.44	No	383.82	385.53	No	383.55	383.79	No	2	No
25-Dec-07	384.12	563.81	Yes	385.21	384.30	Yes	383.32	386.34	No	383.30	385.46	No	383.18	383.58	No	2	No
26-Dec-07	384.51	553.58	Yes	385.39	384.37	Yes	383.66	386.34	No	383.61	385.49	No	383.20	383.48	No	2	No
27-Dec-07	385.83	448.88	Yes	386.11	384.57	Yes	384.84	386.55	No	384.80	385.65	No	384.10	384.02	Yes	3	No
28-Dec-07	385.97	417.23	Yes	386.30	384.87	Yes	385.04	386.81	No	385.02	385.92	No	384.39	384.37	Yes	3	No
29-Dec-07	386.14	411.48	Yes	386.41	384.85	Yes	385.20	386.80	No	385.17	385.93	No	384.50	384.41	Yes	3	No
30-Dec-07	385.57	434.89	Yes	386.15	384.95	Yes	384.71	386.86	No	384.68	386.03	No	384.29	384.48	No	2	No
31-Dec-07	385.73	441.55	Yes	386.21	384.86	Yes	384.80	386.80	No	384.80	385.95	No	384.33	384.34	No	2	No
										Number of Days with Groundwater Extraction Produced Inward Gradients							16

NOTES:
1) NC(Q) = Not Caculated Because Actual Flow < 10 GPM
2) NC(A) = Not Calculated Because of Anomalous Data
3) NC(D) = Not Calculated Because of Missing Data

Table 4

Table 4
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
01-Feb-06	496	384.68	384.40	381.90	No	384.48	384.12	382.97	No	FALSE
02-Feb-06	529	384.73	384.44	381.90	No	384.54	384.19	383.00	No	FALSE
03-Feb-06	550	384.70	384.36	381.73	No	384.47	384.11	382.85	No	FALSE
04-Feb-06	546	384.73	384.35	381.73	No	384.48	384.11	382.85	No	FALSE
05-Feb-06	510	384.74	384.42	381.89	No	384.54	384.17	383.00	No	FALSE
06-Feb-06	534	384.72	384.38	381.74	No	384.51	384.13	382.92	No	FALSE
07-Feb-06	526	384.78	384.45	381.86	No	384.53	384.17	382.99	No	FALSE
08-Feb-06	579	384.74	384.44	381.81	No	384.56	384.19	383.00	No	FALSE
09-Feb-06	550	384.71	384.39	381.62	No	384.51	384.15	382.86	No	FALSE
10-Feb-06	621	384.72	384.36	381.42	No	384.47	384.11	382.69	No	FALSE
11-Feb-06	658	384.53	384.18	381.14	No	384.37	383.97	382.44	No	FALSE
12-Feb-06	661	384.48	384.09	381.01	No	384.24	383.88	382.31	No	FALSE
13-Feb-06	661	384.44	384.06	381.02	No	384.22	383.85	382.32	No	FALSE
14-Feb-06	664	384.39	384.02	380.91	No	384.16	383.80	382.23	No	FALSE
15-Feb-06	668	384.35	383.99	380.86	No	384.10	383.75	382.18	No	FALSE
16-Feb-06	666	384.33	383.94	380.82	No	384.07	383.71	382.13	No	FALSE
17-Feb-06	577	384.28	383.88	380.83	No	384.01	383.63	382.11	No	FALSE
18-Feb-06	542	384.36	383.99	381.16	No	384.15	383.76	382.43	No	FALSE
19-Feb-06	695	384.32	383.97	380.92	No	384.12	383.76	382.23	No	FALSE
20-Feb-06	830	384.12	383.77	380.36	No	383.89	383.56	381.75	No	FALSE
21-Feb-06	875	384.03	383.65	380.09	No	383.76	383.43	381.51	No	FALSE
22-Feb-06	907	383.93	383.53	379.89	No	383.67	383.32	381.35	No	FALSE
23-Feb-06	877	383.81	383.43	379.71	No	383.54	383.20	381.20	No	FALSE
24-Feb-06	785	383.85	383.49	380.01	No	383.60	383.25	381.43	No	FALSE
25-Feb-06	711	383.83	383.46	380.11	No	383.57	383.21	381.49	No	FALSE
26-Feb-06	648	383.95	383.56	380.41	No	383.68	383.31	381.75	No	FALSE
27-Feb-06	695	384.01	383.64	381.27	No	383.78	383.42	381.84	No	FALSE
28-Feb-06	695	383.92	383.55	381.67	No	383.67	383.32	381.67	No	FALSE
01-Mar-06	689	383.92	383.54	381.71	No	383.65	383.31	381.68	No	FALSE
02-Mar-06	694	383.80	383.40	381.46	No	383.53	383.17	381.45	No	FALSE
03-Mar-06	675	383.78	383.41	381.54	No	383.54	383.17	381.52	No	FALSE
04-Mar-06	646	383.81	383.47	381.67	No	383.56	383.22	381.65	No	FALSE
05-Mar-06	711	383.84	383.45	381.60	No	383.58	383.23	381.60	No	FALSE
06-Mar-06	740	383.74	383.33	381.34	No	383.46	383.11	381.37	No	FALSE
07-Mar-06	693	383.80	383.38	381.54	No	383.52	383.16	381.52	No	FALSE
08-Mar-06	636	383.94	383.71	381.90	No	383.67	383.34	381.83	No	FALSE
09-Mar-06	577	383.93	383.93	381.98	No	383.71	383.37	381.86	No	FALSE
10-Mar-06	661	383.75	383.56	381.48	No	383.47	383.10	381.43	No	FALSE
11-Mar-06	518	383.89	383.76	381.98	No	383.61	383.26	381.87	No	FALSE
12-Mar-06	406	384.13	384.03	382.54	No	383.85	383.49	382.36	No	FALSE
13-Mar-06	327	384.33	384.08	382.86	No	384.05	383.67	382.64	No	FALSE
14-Mar-06	195	384.50	384.10	383.16	Yes	384.20	383.80	382.91	No	FALSE
15-Mar-06	0	384.90	384.48	384.09	NC(Qc = 0)	384.65	384.21	383.87	NC(Qc = 0)	NC(Qc = 0)
16-Mar-06	0	385.01	384.63	384.14	NC(Qc = 0)	384.82	384.38	383.91	NC(Qc = 0)	NC(Qc = 0)
17-Mar-06	0	385.17	384.74	384.33	NC(Qc = 0)	384.91	384.47	384.03	NC(Qc = 0)	NC(Qc = 0)

Table 4
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Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
18-Mar-06	0	385.37	384.96	384.82	NC(Qc = 0)	385.18	384.73	384.53	NC(Qc = 0)	NC(Qc = 0)
19-Mar-06	0	385.51	385.13	385.04	NC(Qc = 0)	385.34	384.91	384.71	NC(Qc = 0)	NC(Qc = 0)
20-Mar-06	17	385.64	385.23	384.89	Yes	385.45	385.00	384.59	No	FALSE
21-Mar-06	31	385.66	385.60	384.64	No	385.42	384.96	384.36	No	FALSE
22-Mar-06	42	385.77	385.38	384.86	Yes	385.51	385.06	384.53	No	FALSE
23-Mar-06	104	385.87	385.47	385.15	Yes	385.61	385.19	384.78	No	FALSE
24-Mar-06	156	385.94	385.52	385.34	Yes	385.68	385.27	384.96	No	FALSE
25-Mar-06	173	385.93	385.56	385.31	Yes	385.72	385.31	384.96	No	FALSE
26-Mar-06	227	385.95	385.56	385.30	Yes	385.75	385.33	384.96	No	FALSE
27-Mar-06	252	386.03	385.62	385.20	Yes	385.78	385.38	384.85	No	FALSE
28-Mar-06	211	385.97	385.56	384.88	Yes	385.72	385.33	384.56	No	FALSE
29-Mar-06	206	386.00	385.62	385.01	Yes	385.77	385.40	384.69	No	FALSE
30-Mar-06	257	386.03	385.65	384.94	Yes	385.82	385.43	384.65	No	FALSE
31-Mar-06	226	386.02	385.65	384.96	Yes	385.80	385.42	383.02	No	FALSE
01-Apr-06	303	386.08	385.66	384.93	Yes	385.81	385.42	384.61	No	FALSE
02-Apr-06	196	386.28	385.96	385.52	Yes	386.02	385.67	385.18	No	FALSE
03-Apr-06	135	386.37	386.02	385.82	Yes	386.11	385.75	385.44	No	FALSE
04-Apr-06	0	386.51	386.13	386.02	NC(Qc = 0)	386.26	385.88	385.70	NC(Qc = 0)	NC(Qc = 0)
05-Apr-06	0	386.75	386.35	386.40	NC(Qc = 0)	386.53	386.12	386.08	NC(Qc = 0)	NC(Qc = 0)
06-Apr-06	0	386.95	386.53	386.59	NC(Qc = 0)	386.73	386.30	386.30	NC(Qc = 0)	NC(Qc = 0)
07-Apr-06	0	387.11	386.65	386.69	NC(Qc = 0)	386.85	386.41	386.39	NC(Qc = 0)	NC(Qc = 0)
08-Apr-06	0	387.28	386.75	386.73	NC(Qc = 0)	387.01	386.51	386.51	NC(Qc = 0)	NC(Qc = 0)
09-Apr-06	0	387.58	387.00	387.12	NC(Qc = 0)	387.34	386.79	386.98	NC(Qc = 0)	NC(Qc = 0)
10-Apr-06	0	387.83	387.23	387.41	NC(Qc = 0)	387.60	387.00	387.24	NC(Qc = 0)	NC(Qc = 0)
11-Apr-06	0	388.00	387.46	387.58	NC(Qc = 0)	387.80	387.20	387.41	NC(Qc = 0)	NC(Qc = 0)
12-Apr-06	0	388.12	387.54	387.68	NC(Qc = 0)	387.90	387.31	387.50	NC(Qc = 0)	NC(Qc = 0)
13-Apr-06	0	388.35	387.75	387.98	NC(Qc = 0)	388.13	387.53	387.78	NC(Qc = 0)	NC(Qc = 0)
14-Apr-06	0	388.57	388.00	388.19	NC(Qc = 0)	388.35	387.75	388.00	NC(Qc = 0)	NC(Qc = 0)
15-Apr-06	0	388.70	388.12	388.31	NC(Qc = 0)	388.48	387.89	388.09	NC(Qc = 0)	NC(Qc = 0)
16-Apr-06	0	388.87	388.30	388.47	NC(Qc = 0)	388.64	388.06	388.27	NC(Qc = 0)	NC(Qc = 0)
17-Apr-06	0	388.97	388.38	388.54	NC(Qc = 0)	388.74	388.15	388.33	NC(Qc = 0)	NC(Qc = 0)
18-Apr-06	0	389.16	388.56	388.79	NC(Qc = 0)	388.92	388.34	388.59	NC(Qc = 0)	NC(Qc = 0)
19-Apr-06	0	389.26	388.66	388.87	NC(Qc = 0)	389.03	388.45	388.67	NC(Qc = 0)	NC(Qc = 0)
20-Apr-06	0	389.43	388.83	389.06	NC(Qc = 0)	389.20	388.61	388.86	NC(Qc = 0)	NC(Qc = 0)
21-Apr-06	0	389.58	388.93	389.22	NC(Qc = 0)	389.35	388.75	389.03	NC(Qc = 0)	NC(Qc = 0)
22-Apr-06	0	389.66	389.15	389.36	NC(Qc = 0)	389.52	388.90	389.16	NC(Qc = 0)	NC(Qc = 0)
23-Apr-06	0	389.82	389.21	389.46	NC(Qc = 0)	389.60	389.01	389.28	NC(Qc = 0)	NC(Qc = 0)
24-Apr-06	0	389.91	389.35	389.62	NC(Qc = 0)	389.74	389.14	389.40	NC(Qc = 0)	NC(Qc = 0)
25-Apr-06	0	390.01	389.45	389.71	NC(Qc = 0)	389.82	389.25	389.49	NC(Qc = 0)	NC(Qc = 0)
26-Apr-06	0	390.16	389.59	389.79	NC(Qc = 0)	389.93	389.37	389.58	NC(Qc = 0)	NC(Qc = 0)
27-Apr-06	0	390.15	389.65	389.90	NC(Qc = 0)	389.99	389.45	389.69	NC(Qc = 0)	NC(Qc = 0)
28-Apr-06	0	390.27	389.74	389.97	NC(Qc = 0)	390.07	389.52	389.71	NC(Qc = 0)	NC(Qc = 0)
29-Apr-06	0	390.33	389.83	390.09	NC(Qc = 0)	390.13	389.63	389.81	NC(Qc = 0)	NC(Qc = 0)
30-Apr-06	0	390.35	389.90	390.06	NC(Qc = 0)	390.15	389.67	389.80	NC(Qc = 0)	NC(Qc = 0)
01-May-06	0	390.31	390.60	390.08	NC(Qc = 0)	390.13	389.68	389.76	NC(Qc = 0)	NC(Qc = 0)

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
02-May-06	0	390.40	390.04	390.11	NC(Qc = 0)	390.19	389.74	389.83	NC(Qc = 0)	NC(Qc = 0)
03-May-06	0	390.45	390.07	390.16	NC(Qc = 0)	390.23	389.81	389.89	NC(Qc = 0)	NC(Qc = 0)
04-May-06	0	390.59	390.16	390.29	NC(Qc = 0)	390.37	389.90	390.05	NC(Qc = 0)	NC(Qc = 0)
05-May-06	0	390.92	390.35	390.56	NC(Qc = 0)	390.69	390.13	390.47	NC(Qc = 0)	NC(Qc = 0)
06-May-06	0	391.06	390.55	390.79	NC(Qc = 0)	390.92	390.31	390.69	NC(Qc = 0)	NC(Qc = 0)
07-May-06	0	391.25	390.67	390.94	NC(Qc = 0)	391.04	390.45	390.84	NC(Qc = 0)	NC(Qc = 0)
08-May-06	0	391.28	390.73	391.00	NC(Qc = 0)	391.09	390.53	390.81	NC(Qc = 0)	NC(Qc = 0)
09-May-06	0	391.27	390.79	391.05	NC(Qc = 0)	391.08	390.58	390.79	NC(Qc = 0)	NC(Qc = 0)
10-May-06	0	391.24	390.85	390.98	NC(Qc = 0)	391.08	390.61	390.72	NC(Qc = 0)	NC(Qc = 0)
11-May-06	0	391.34	391.00	391.10	NC(Qc = 0)	391.13	390.68	390.83	NC(Qc = 0)	NC(Qc = 0)
12-May-06	0	391.37	390.96	391.17	NC(Qc = 0)	391.18	390.72	390.89	NC(Qc = 0)	NC(Qc = 0)
13-May-06	0	391.37	390.95	391.14	NC(Qc = 0)	391.18	390.73	390.85	NC(Qc = 0)	NC(Qc = 0)
14-May-06	0	391.46	391.00	391.18	NC(Qc = 0)	391.25	390.78	390.92	NC(Qc = 0)	NC(Qc = 0)
15-May-06	0	391.51	391.10	391.25	NC(Qc = 0)	391.30	390.87	391.00	NC(Qc = 0)	NC(Qc = 0)
16-May-06	0	391.59	391.13	391.32	NC(Qc = 0)	391.36	390.92	391.04	NC(Qc = 0)	NC(Qc = 0)
17-May-06	0	391.57	391.14	391.34	NC(Qc = 0)	391.34	390.93	391.02	NC(Qc = 0)	NC(Qc = 0)
18-May-06	6	391.51	391.10	391.18	Yes	391.23	390.87	390.85	No	FALSE
19-May-06	2	391.44	391.06	391.17	Yes	391.21	390.85	390.81	No	FALSE
20-May-06	21	391.40	391.03	391.16	Yes	391.16	390.83	390.77	No	FALSE
21-May-06	23	391.44	391.06	391.20	Yes	391.19	390.87	390.84	No	FALSE
22-May-06	30	391.38	391.01	391.15	Yes	391.12	390.83	390.76	No	FALSE
23-May-06	61	391.39	391.03	391.21	Yes	391.12	390.85	390.76	No	FALSE
24-May-06	97	391.46	391.05	391.09	Yes	391.18	390.86	390.75	No	FALSE
25-May-06	62	391.45	391.09	391.21	Yes	391.23	390.92	390.81	No	FALSE
26-May-06	85	391.35	390.97	391.09	Yes	391.12	390.84	390.66	No	FALSE
27-May-06	120	391.25	390.87	390.95	Yes	391.04	390.75	390.54	No	FALSE
28-May-06	122	391.12	390.75	390.69	Yes	390.91	390.62	390.33	No	FALSE
29-May-06	148	391.03	390.66	390.41	Yes	390.78	390.51	390.00	No	FALSE
30-May-06	206	390.93	390.56	390.12	Yes	390.66	390.38	389.71	No	FALSE
31-May-06	242	390.76	390.41	389.77	Yes	390.48	390.22	389.44	No	FALSE
01-Jun-06	389	390.70	390.36	389.53	Yes	390.39	390.11	389.21	No	FALSE
02-Jun-06	258	390.77	390.36	389.80	Yes	390.43	390.14	389.45	No	FALSE
03-Jun-06	131	390.99	390.67	390.62	Yes	390.71	390.44	390.26	No	FALSE
04-Jun-06	164	391.03	390.71	390.77	Yes	390.79	390.52	390.36	No	FALSE
05-Jun-06	265	390.84	390.48	390.34	Yes	390.59	390.29	389.93	No	FALSE
06-Jun-06	315	390.76	390.33	390.12	Yes	390.47	390.15	389.76	No	FALSE
07-Jun-06	382	390.55	390.15	389.68	Yes	390.27	389.98	389.30	No	FALSE
08-Jun-06	450	390.34	389.97	389.04	Yes	390.05	389.80	388.71	No	FALSE
09-Jun-06	563	390.18	389.81	388.61	Yes	389.88	389.62	388.33	No	FALSE
10-Jun-06	666	389.94	389.60	388.08	No	389.64	389.39	387.86	No	FALSE
11-Jun-06	700	389.72	389.50	387.73	No	389.43	389.19	387.58	No	FALSE
12-Jun-06	624	389.65	389.27	387.72	No	389.31	389.07	387.56	No	FALSE
13-Jun-06	535	389.67	389.26	388.01	Yes	389.30	389.08	387.80	No	FALSE
14-Jun-06	550	389.57	389.20	387.88	Yes	389.24	389.01	387.68	No	FALSE
15-Jun-06	582	389.46	389.06	387.73	Yes	389.12	388.90	387.53	No	FALSE

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		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
16-Jun-06	592	389.39	388.97	387.57	Yes	389.04	388.80	387.38	No	FALSE
17-Jun-06	650	389.37	388.95	365.89	No	389.00	388.80	387.61	No	FALSE
18-Jun-06	663	389.19	388.79	163.54	No	388.85	388.65	387.14	No	FALSE
19-Jun-06	682	389.04	388.62	210.71	No	388.69	388.48	386.89	No	FALSE
20-Jun-06	781	388.84	388.43	386.15	No	388.50	388.27	386.49	No	FALSE
21-Jun-06	794	388.71	388.29	385.07	No	388.36	388.11	386.30	No	FALSE
22-Jun-06	788	388.60	388.16	384.92	No	388.22	387.99	386.16	No	FALSE
23-Jun-06	805	388.42	388.00	384.76	No	388.07	387.85	385.98	No	FALSE
24-Jun-06	807	388.36	387.92	384.59	No	387.98	387.74	385.89	No	FALSE
25-Jun-06	732	388.28	387.85	384.75	No	387.92	387.71	385.99	No	FALSE
26-Jun-06	755	388.24	387.80	384.66	No	387.86	387.63	385.87	No	FALSE
27-Jun-06	753	388.10	387.70	384.52	No	387.78	387.54	385.77	No	FALSE
28-Jun-06	565	388.07	387.64	384.53	No	387.73	387.47	385.77	No	FALSE
29-Jun-06	558	387.97	387.57	384.50	No	387.67	387.41	385.71	No	FALSE
30-Jun-06	546	387.94	387.49	384.44	No	387.60	387.36	385.71	No	FALSE
01-Jul-06	671	387.92	387.44	384.50	No	387.55	387.32	385.72	No	FALSE
02-Jul-06	683	387.84	387.40	384.41	No	387.48	387.26	385.66	No	FALSE
03-Jul-06	782	387.69	387.25	384.05	No	387.35	387.12	385.34	No	FALSE
04-Jul-06	851	387.51	387.09	383.67	No	387.18	386.96	385.02	No	FALSE
05-Jul-06	875	387.32	386.91	383.42	No	386.99	386.80	384.80	No	FALSE
06-Jul-06	905	387.17	386.73	383.15	No	386.83	386.64	384.55	No	FALSE
07-Jul-06	873	387.10	386.68	383.17	No	386.76	386.56	384.55	No	FALSE
08-Jul-06	873	387.08	386.64	383.10	No	386.71	386.50	384.51	No	FALSE
09-Jul-06	966	386.90	386.47	382.76	No	386.57	386.35	384.20	No	FALSE
10-Jul-06	1075	386.68	386.23	382.20	No	386.31	386.11	383.72	No	FALSE
11-Jul-06	1092	386.52	386.03	381.90	No	386.12	385.92	383.47	No	FALSE
12-Jul-06	1118	386.33	385.90	381.68	No	385.97	385.76	383.28	No	FALSE
13-Jul-06	1071	380.22	379.73	375.47	No	379.82	379.61	377.01	No	FALSE
14-Jul-06	957	386.24	385.72	381.92	No	385.85	385.62	383.42	No	FALSE
15-Jul-06	874	386.18	385.74	382.10	No	385.84	385.60	383.55	No	FALSE
16-Jul-06	903	386.14	385.65	382.00	No	385.79	385.54	383.46	No	FALSE
17-Jul-06	842	386.10	385.61	382.10	No	385.76	385.52	383.55	No	FALSE
18-Jul-06	808	386.07	385.64	382.15	No	385.71	385.50	383.57	No	FALSE
19-Jul-06	840	386.04	385.70	382.29	No	385.67	385.48	383.66	No	FALSE
20-Jul-06	889	386.13	385.87	383.17	No	385.88	385.72	384.59	No	FALSE
21-Jul-06	830	385.91	385.55	382.04	No	385.64	385.40	383.47	No	FALSE
22-Jul-06	784	385.94	385.51	382.09	No	385.62	385.36	383.50	No	FALSE
23-Jul-06	789	385.84	385.44	382.07	No	385.56	385.32	383.45	No	FALSE
24-Jul-06	836	385.78	385.37	381.87	No	385.45	385.23	383.27	No	FALSE
25-Jul-06	862	385.70	385.29	381.71	No	385.37	385.15	383.12	No	FALSE
26-Jul-06	864	385.65	385.23	381.66	No	385.30	385.09	383.09	No	FALSE
27-Jul-06	884	385.51	385.12	381.41	No	385.20	384.97	382.86	No	FALSE
28-Jul-06	680	385.49	385.05	381.37	No	385.13	384.90	382.83	No	FALSE
29-Jul-06	672	385.50	385.13	381.95	No	385.17	384.91	383.26	No	FALSE
30-Jul-06	398	385.53	385.26	382.35	No	385.28	NA	383.58	NC(D)	NC(D)

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
31-Jul-06	690	385.42	385.03	381.64	No	385.11	384.86	382.99	No	FALSE
01-Aug-06	872	385.33	384.87	381.30	No	384.98	384.77	382.79	No	FALSE
02-Aug-06	913	385.19	384.81	381.13	No	384.88	384.67	382.59	No	FALSE
03-Aug-06	982	385.00	384.61	380.73	No	384.70	384.51	382.25	No	FALSE
04-Aug-06	976	384.97	384.52	380.60	No	384.62	384.40	382.13	No	FALSE
05-Aug-06	901	384.90	384.49	380.75	No	384.59	384.39	382.25	No	FALSE
06-Aug-06	823	384.95	384.51	380.96	No	384.63	384.41	382.44	No	FALSE
07-Aug-06	773	384.97	384.51	381.08	No	384.65	384.40	382.52	No	FALSE
08-Aug-06	763	384.95	384.51	381.12	No	384.65	384.40	382.55	No	FALSE
09-Aug-06	770	384.94	384.52	381.16	No	384.63	384.40	382.56	No	FALSE
10-Aug-06	748	384.98	384.48	381.18	No	384.64	384.40	382.58	No	FALSE
11-Aug-06	735	384.96	384.45	381.19	No	384.63	384.38	382.58	No	FALSE
12-Aug-06	789	384.87	384.39	380.98	No	384.53	384.30	382.41	No	FALSE
13-Aug-06	846	384.77	384.29	380.74	No	384.44	384.20	382.20	No	FALSE
14-Aug-06	924	384.87	384.57	381.95	No	384.53	384.41	383.07	No	FALSE
15-Aug-06	967	384.90	384.70	382.51	No	384.63	384.56	383.44	No	FALSE
16-Aug-06	916	384.60	384.21	380.58	No	384.31	384.10	382.02	No	FALSE
17-Aug-06	884	384.59	384.17	380.83	No	384.23	384.04	382.02	No	FALSE
18-Aug-06	833	384.56	384.13	380.59	No	384.23	384.02	382.12	No	FALSE
19-Aug-06	793	384.57	384.19	380.69	No	384.25	384.02	382.11	No	FALSE
20-Aug-06	763	384.55	384.12	380.73	No	384.22	383.99	382.13	No	FALSE
21-Aug-06	810	384.47	384.04	380.57	No	384.14	383.92	382.00	No	FALSE
22-Aug-06	833	384.40	383.96	380.44	No	384.08	383.85	381.89	No	FALSE
23-Aug-06	870	384.29	383.88	380.30	No	384.02	383.79	381.78	No	FALSE
24-Aug-06	894	384.23	383.83	380.17	No	383.94	383.72	381.66	No	FALSE
25-Aug-06	884	384.13	383.78	380.13	No	383.85	383.66	381.56	No	FALSE
26-Aug-06	878	384.07	383.70	380.04	No	383.80	383.59	381.52	No	FALSE
27-Aug-06	792	384.08	383.72	380.21	No	383.78	383.60	381.66	No	FALSE
28-Aug-06	528	384.25	383.84	380.61	No	383.90	383.70	382.00	No	FALSE
29-Aug-06	410	384.45	384.00	381.44	No	384.12	383.88	382.50	No	FALSE
30-Aug-06	406	384.59	384.14	381.65	No	384.30	384.06	382.89	No	FALSE
31-Aug-06	432	384.62	384.17	381.47	No	384.29	384.05	382.68	No	FALSE
01-Sep-06	482	384.68	384.22	381.68	No	384.39	384.12	382.86	No	FALSE
02-Sep-06	457	384.77	384.32	381.82	No	384.45	384.21	382.98	No	FALSE
03-Sep-06	529	384.73	384.29	381.67	No	384.44	384.20	382.85	No	FALSE
04-Sep-06	583	384.71	384.25	381.64	No	384.43	384.16	382.80	No	FALSE
05-Sep-06	604	384.61	384.19	381.46	No	384.37	384.11	382.64	No	FALSE
06-Sep-06	653	384.52	384.13	381.28	No	384.24	384.01	382.47	No	FALSE
07-Sep-06	721	384.40	383.98	381.02	No	384.13	383.89	382.23	No	FALSE
08-Sep-06	730	384.29	383.90	380.87	No	383.99	383.78	382.08	No	FALSE
09-Sep-06	706	384.20	383.85	380.87	No	383.96	383.73	382.06	No	FALSE
10-Sep-06	745	384.18	383.77	380.71	No	383.92	383.67	381.95	No	FALSE
11-Sep-06	782	384.12	383.70	380.55	No	383.82	383.59	381.81	No	FALSE
12-Sep-06	711	384.10	383.73	380.66	No	383.80	383.60	381.89	No	FALSE
13-Sep-06	679	384.19	383.75	380.77	No	383.86	383.63	382.01	No	FALSE

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Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
14-Sep-06	628	384.17	383.74	380.85	No	383.89	383.64	382.07	No	FALSE
15-Sep-06	553	384.27	383.85	381.13	No	383.95	383.73	382.33	No	FALSE
16-Sep-06	502	384.39	383.97	381.39	No	384.08	383.85	382.55	No	FALSE
17-Sep-06	510	384.46	384.55	381.51	No	384.22	383.97	382.69	No	FALSE
18-Sep-06	429	384.59	384.19	381.71	No	384.29	384.04	382.86	No	FALSE
19-Sep-06	434	384.63	384.24	381.75	No	384.32	384.07	382.90	No	FALSE
20-Sep-06	474	384.64	384.24	381.72	No	384.38	384.10	382.90	No	FALSE
21-Sep-06	515	384.66	384.28	381.72	No	384.38	384.14	382.89	No	FALSE
22-Sep-06	518	384.65	384.34	381.74	No	384.42	384.17	382.91	No	FALSE
23-Sep-06	457	384.70	384.32	381.81	No	384.40	384.17	382.96	No	FALSE
24-Sep-06	524	384.65	384.26	381.60	No	384.33	384.09	382.76	No	FALSE
25-Sep-06	618	384.51	384.14	381.34	No	384.21	383.98	382.53	No	FALSE
26-Sep-06	580	384.44	384.09	381.35	No	384.19	383.95	382.54	No	FALSE
27-Sep-06	552	384.52	384.16	381.49	No	384.22	384.01	382.67	No	FALSE
28-Sep-06	435	384.49	384.11	381.47	No	384.19	383.96	382.63	No	FALSE
29-Sep-06	424	384.51	384.17	381.54	No	384.23	384.01	382.71	No	FALSE
30-Sep-06	436	384.47	384.12	381.41	No	384.17	383.97	382.59	No	FALSE
01-Oct-06	569	384.38	384.03	381.33	No	384.12	383.88	382.49	No	FALSE
02-Oct-06	627	384.28	383.93	381.15	No	384.03	383.81	382.34	No	FALSE
03-Oct-06	650	384.19	383.88	381.00	No	383.93	383.72	382.19	No	FALSE
04-Oct-06	675	384.13	383.79	380.88	No	383.89	383.64	382.09	No	FALSE
05-Oct-06	676	384.09	383.70	380.72	No	383.78	383.57	381.95	No	FALSE
06-Oct-06	683	384.01	383.64	380.70	No	383.76	383.52	381.93	No	FALSE
07-Oct-06	654	384.02	383.62	380.76	No	383.75	383.52	382.00	No	FALSE
08-Oct-06	628	384.02	383.67	380.84	No	383.74	383.53	382.05	No	FALSE
09-Oct-06	693	383.97	383.58	380.64	No	383.69	383.45	381.87	No	FALSE
10-Oct-06	688	383.96	383.59	380.66	No	383.68	383.47	381.90	No	FALSE
11-Oct-06	735	377.50	377.14	373.92	No	377.23	377.03	375.15	No	FALSE
12-Oct-06	689	383.86	383.52	380.48	No	383.59	383.39	381.72	No	FALSE
13-Oct-06	680	383.84	383.50	380.49	No	383.58	383.38	381.76	No	FALSE
14-Oct-06	742	383.78	383.39	380.30	No	383.49	383.27	381.57	No	FALSE
15-Oct-06	732	383.75	383.38	380.32	No	383.47	383.26	381.58	No	FALSE
16-Oct-06	645	383.78	383.54	380.54	No	383.52	383.33	381.78	No	FALSE
17-Oct-06	696	383.74	383.50	380.42	No	383.47	383.25	381.66	No	FALSE
18-Oct-06	691	383.65	383.31	380.26	No	383.36	383.17	381.53	No	FALSE
19-Oct-06	711	383.63	383.23	380.22	No	383.37	383.13	381.51	No	FALSE
20-Oct-06	730	383.54	383.18	380.11	No	383.27	383.07	381.40	No	FALSE
21-Oct-06	710	383.55	383.20	380.13	No	383.25	383.06	381.40	No	FALSE
22-Oct-06	659	383.52	383.15	380.13	No	383.24	383.02	381.43	No	FALSE
23-Oct-06	634	383.58	383.20	380.33	No	383.30	383.08	381.60	No	FALSE
24-Oct-06	638	383.59	383.17	380.28	No	383.29	383.06	381.54	No	FALSE
25-Oct-06	602	383.64	383.25	380.45	No	383.36	383.13	381.69	No	FALSE
26-Oct-06	494	383.76	383.56	380.77	No	383.46	383.25	381.95	No	FALSE
27-Oct-06	289	383.84	383.71	381.06	No	383.58	383.36	382.24	No	FALSE
28-Oct-06	456	383.77	383.46	380.66	No	383.46	383.23	381.87	No	FALSE

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
29-Oct-06	519	383.61	383.23	380.37	No	383.36	383.13	381.62	No	FALSE
30-Oct-06	570	383.52	383.15	380.16	No	383.25	383.03	381.45	No	FALSE
31-Oct-06	561	383.41	382.99	379.92	No	383.14	382.91	381.24	No	FALSE
01-Nov-06	665	383.41	383.04	380.06	No	383.13	382.93	381.35	No	FALSE
02-Nov-06	714	383.40	382.96	379.92	No	383.10	382.87	381.25	No	FALSE
03-Nov-06	692	383.41	382.98	380.03	No	383.13	382.90	381.33	No	FALSE
04-Nov-06	689	383.40	383.01	380.01	No	383.11	382.91	381.36	No	FALSE
05-Nov-06	743	383.34	382.92	379.87	No	383.07	382.84	381.19	No	FALSE
06-Nov-06	774	383.27	382.90	379.81	No	383.02	382.81	381.14	No	FALSE
07-Nov-06	821	383.21	382.82	379.63	No	382.94	382.74	380.98	No	FALSE
08-Nov-06	835	383.16	382.75	379.52	No	382.88	382.68	380.89	No	FALSE
09-Nov-06	833	383.09	382.65	379.42	No	382.81	382.59	380.75	No	FALSE
10-Nov-06	832	383.02	382.59	379.35	No	382.74	382.53	380.68	No	FALSE
11-Nov-06	800	382.92	382.51	379.20	No	382.65	382.44	380.56	No	FALSE
12-Nov-06	772	382.94	382.57	379.42	No	382.70	382.49	380.78	No	FALSE
13-Nov-06	789	382.95	382.54	379.38	No	382.68	382.47	380.75	No	FALSE
14-Nov-06	766	382.94	382.64	379.44	No	382.68	382.49	380.81	No	FALSE
15-Nov-06	636	382.98	382.94	379.67	No	382.70	382.52	380.95	No	FALSE
16-Nov-06	668	382.97	382.86	379.57	No	382.67	382.47	380.89	No	FALSE
17-Nov-06	687	383.01	382.56	379.53	No	382.68	382.46	380.87	No	FALSE
18-Nov-06	751	382.87	382.44	379.31	No	382.59	382.37	380.68	No	FALSE
19-Nov-06	764	382.83	382.42	379.23	No	382.50	382.32	380.59	No	FALSE
20-Nov-06	776	382.76	382.36	379.20	No	382.48	382.28	380.51	No	FALSE
21-Nov-06	760	382.78	382.36	379.26	No	382.48	382.28	380.57	No	FALSE
22-Nov-06	772	382.74	382.31	379.18	No	382.47	382.26	380.56	No	FALSE
23-Nov-06	751	382.75	382.30	379.20	No	382.44	382.24	380.55	No	FALSE
24-Nov-06	763	382.71	382.29	379.19	No	382.43	382.22	380.55	No	FALSE
25-Nov-06	788	382.64	382.20	379.04	No	382.39	382.16	380.43	No	FALSE
26-Nov-06	786	382.62	382.16	378.98	No	382.34	382.13	380.38	No	FALSE
27-Nov-06	775	382.63	382.16	379.08	No	382.34	382.12	380.47	No	FALSE
28-Nov-06	551	382.62	382.23	379.17	No	382.34	382.15	380.52	No	FALSE
29-Nov-06	499	382.62	382.27	379.34	No	382.36	382.18	380.65	No	FALSE
30-Nov-06	350	382.79	382.93	379.73	No	382.48	382.30	380.95	No	FALSE
01-Dec-06	298	383.22	383.54	380.98	No	382.85	382.73	382.02	No	FALSE
02-Dec-06	303	383.42	383.32	381.28	No	383.08	382.92	382.35	No	FALSE
03-Dec-06	235	383.61	383.34	381.54	No	383.29	383.13	382.65	No	FALSE
04-Dec-06	214	383.79	383.46	381.66	No	383.53	383.32	382.83	No	FALSE
05-Dec-06	250	383.84	383.46	381.44	No	383.57	383.33	382.64	No	FALSE
06-Dec-06	265	383.85	383.46	381.39	No	383.55	383.34	382.59	No	FALSE
07-Dec-06	303	383.88	383.41	381.21	No	383.55	383.31	382.41	No	FALSE
08-Dec-06	359	383.97	383.51	381.38	No	383.68	383.44	382.59	No	FALSE
09-Dec-06	470	383.89	383.48	381.13	No	383.63	383.40	382.37	No	FALSE
10-Dec-06	558	383.81	383.39	380.83	No	383.52	383.30	382.09	No	FALSE
11-Dec-06	563	383.73	383.36	380.71	No	383.45	383.26	381.99	No	FALSE
12-Dec-06	512	383.85	383.39	380.88	No	383.52	383.31	382.12	No	FALSE

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
13-Dec-06	385	384.01	383.57	381.24	No	383.64	383.45	382.48	No	FALSE
14-Dec-06	265	384.21	383.78	381.71	No	383.86	383.66	382.93	No	FALSE
15-Dec-06	201	384.26	383.80	381.86	No	383.93	383.70	383.05	No	FALSE
16-Dec-06	169	384.40	383.95	382.14	No	384.07	383.84	383.31	No	FALSE
17-Dec-06	193	384.45	383.97	382.10	No	384.12	383.88	383.29	No	FALSE
18-Dec-06	165	384.55	384.05	382.33	Yes	384.21	383.96	383.53	No	FALSE
19-Dec-06	152	384.62	384.19	382.55	No	384.31	384.07	383.78	No	FALSE
20-Dec-06	249	384.69	384.25	382.52	No	384.40	384.15	383.75	No	FALSE
21-Dec-06	179	384.72	384.97	382.48	No	384.44	384.21	383.68	No	FALSE
22-Dec-06	212	384.81	384.45	382.58	No	384.48	384.26	383.79	No	FALSE
23-Dec-06	193	384.85	384.42	382.72	No	384.55	384.30	383.97	No	FALSE
24-Dec-06	167	378.53	378.09	376.19	No	378.21	377.97	377.70	No	FALSE
25-Dec-06	114	378.62	378.17	376.66	Yes	378.33	378.08	377.66	No	FALSE
26-Dec-06	69	385.21	384.73	383.19	Yes	384.89	384.64	384.44	No	FALSE
27-Dec-06	79	385.34	384.89	383.40	Yes	385.02	384.78	384.63	No	FALSE
28-Dec-06	108	385.40	384.93	383.39	Yes	385.08	384.84	384.63	No	FALSE
29-Dec-06	79	385.39	384.94	383.39	Yes	385.12	384.86	384.67	No	FALSE
30-Dec-06	93	385.50	385.05	383.57	Yes	385.22	384.98	384.84	No	FALSE
31-Dec-06	92	385.61	385.56	383.72	No	385.32	385.08	384.96	No	FALSE
01-Jan-07	138	385.58	385.14	383.51	Yes	385.27	385.02	384.76	No	FALSE
02-Jan-07	147	385.63	385.18	383.64	Yes	385.35	385.09	384.87	No	FALSE
03-Jan-07	180	385.70	385.25	383.72	Yes	385.40	385.16	384.98	No	FALSE
04-Jan-07	148	385.80	385.52	383.90	No	385.52	385.28	385.15	No	FALSE
05-Jan-07	111	385.89	385.59	383.94	No	385.61	385.35	385.23	No	FALSE
06-Jan-07	80	385.94	385.47	383.92	Yes	385.62	385.37	385.18	No	FALSE
07-Jan-07	26	386.13	385.64	384.27	Yes	385.82	385.56	385.50	No	FALSE
08-Jan-07	0	386.23	385.79	384.38	NC(Qc = 0)	385.91	385.67	385.68	NC(Qc = 0)	NC(Qc = 0)
09-Jan-07	0	386.28	385.81	384.40	NC(Qc = 0)	385.97	385.72	385.66	NC(Qc = 0)	NC(Qc = 0)
10-Jan-07	0	386.41	385.96	384.60	NC(Qc = 0)	386.11	385.86	385.89	NC(Qc = 0)	NC(Qc = 0)
11-Jan-07	0	386.51	386.07	384.76	NC(Qc = 0)	386.20	385.97	386.00	NC(Qc = 0)	NC(Qc = 0)
12-Jan-07	10	386.50	386.25	384.63	No	386.20	385.96	385.87	No	FALSE
13-Jan-07	11	386.61	387.13	384.80	No	386.31	386.07	386.04	No	FALSE
14-Jan-07	17	386.72	386.83	384.94	No	386.41	386.18	386.19	No	FALSE
15-Jan-07	0	386.74	386.81	384.92	NC(Qc = 0)	386.43	386.21	386.18	No	FALSE
16-Jan-07	0	386.84	386.46	384.97	NC(Qc = 0)	386.52	386.27	386.25	NC(Qc = 0)	NC(Qc = 0)
17-Jan-07	0	387.00	386.59	385.23	NC(Qc = 0)	386.70	386.44	386.51	NC(Qc = 0)	NC(Qc = 0)
18-Jan-07	45	387.01	386.66	385.30	No	386.74	386.51	386.54	NC(Qc = 0)	NC(Qc = 0)
19-Jan-07	158	386.91	386.53	385.03	No	386.63	386.41	386.26	No	FALSE
20-Jan-07	213	386.90	386.52	384.95	No	386.62	386.40	386.20	No	FALSE
21-Jan-07	286	386.88	386.55	384.91	No	386.61	386.39	386.17	No	FALSE
22-Jan-07	339	386.74	386.30	384.37	No	386.41	386.19	385.63	No	FALSE
23-Jan-07	395	386.63	386.23	384.10	No	386.32	386.14	385.33	No	FALSE
24-Jan-07	431	386.49	386.09	383.81	No	386.20	385.99	385.08	No	FALSE
25-Jan-07	424	386.45	386.02	383.71	No	386.10	385.92	385.03	No	FALSE
26-Jan-07	383	386.61	386.20	384.05	No	386.29	386.10	385.37	No	FALSE

Table 4
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
27-Jan-07	356	386.62	386.17	384.03	No	386.28	386.09	385.34	No	FALSE
28-Jan-07	254	386.63	386.15	384.09	No	386.29	386.09	385.39	No	FALSE
29-Jan-07	316	386.68	386.24	384.46	No	386.31	386.15	385.35	No	FALSE
30-Jan-07	346	386.52	386.02	384.37	Yes	386.03	385.86	384.74	No	FALSE
31-Jan-07	389	386.50	386.07	384.26	No	386.09	385.95	385.06	No	FALSE
01-Feb-07	529	386.40	386.00	383.67	No	386.05	385.93	384.97	No	FALSE
02-Feb-07	543	386.22	385.79	383.27	No	385.86	385.71	384.56	No	FALSE
03-Feb-07	571	386.12	385.65	383.07	No	385.72	385.59	384.40	No	FALSE
04-Feb-07	632	385.98	385.46	382.81	No	385.56	385.45	384.17	No	FALSE
05-Feb-07	744	385.75	385.29	382.32	No	385.38	385.25	383.73	No	FALSE
06-Feb-07	787	385.67	385.28	382.30	No	385.33	385.22	383.71	No	FALSE
07-Feb-07	834	385.39	384.99	381.80	No	385.04	384.95	383.23	No	FALSE
08-Feb-07	894	385.27	384.87	381.56	No	384.91	384.82	383.03	No	FALSE
09-Feb-07	886	385.15	384.76	381.45	No	384.79	384.71	382.92	No	FALSE
10-Feb-07	916	385.05	384.62	381.23	No	384.65	384.58	382.74	No	FALSE
11-Feb-07	909	384.97	384.53	381.22	No	384.58	384.52	382.70	No	FALSE
12-Feb-07	919	384.87	384.46	381.11	No	384.49	384.43	382.58	No	FALSE
13-Feb-07	791	384.85	385.31	381.24	No	384.46	384.40	382.68	No	FALSE
14-Feb-07	864	384.69	384.42	380.91	No	384.35	384.23	382.41	No	FALSE
15-Feb-07	879	384.64	384.25	380.85	No	384.29	384.17	382.37	No	FALSE
16-Feb-07	792	384.71	384.30	381.15	No	384.35	384.25	382.63	No	FALSE
17-Feb-07	751	384.68	384.22	381.12	No	384.32	384.19	382.59	No	FALSE
18-Feb-07	621	384.75	384.27	381.42	No	384.38	384.25	382.86	No	FALSE
19-Feb-07	418	384.96	384.77	382.01	No	384.63	384.50	383.38	No	FALSE
20-Feb-07	580	378.39	378.65	375.04	No	378.02	377.89	376.69	No	FALSE
21-Feb-07	628	384.84	384.99	381.60	No	384.48	384.33	383.00	No	FALSE
22-Feb-07	572	384.79	384.45	381.55	No	384.43	384.26	382.98	No	FALSE
23-Feb-07	429	385.07	384.57	382.16	No	384.69	384.52	383.53	No	FALSE
24-Feb-07	92	385.46	385.65	383.09	No	385.09	384.96	384.42	No	FALSE
25-Feb-07	0	385.90	385.97	383.75	NC(Qc = 0)	385.48	385.30	385.17	NC(Qc = 0)	NC(Qc = 0)
26-Feb-07	0	386.36	385.75	384.18	NC(Qc = 0)	385.94	385.62	385.75	NC(Qc = 0)	NC(Qc = 0)
27-Feb-07	0	386.74	386.02	384.56	NC(Qc = 0)	386.34	385.93	386.20	NC(Qc = 0)	NC(Qc = 0)
28-Feb-07	0	387.18	386.41	385.14	NC(Qc = 0)	386.81	386.34	386.79	NC(Qc = 0)	NC(Qc = 0)
01-Mar-07	0	387.47	386.74	385.45	NC(Qc = 0)	380.07	386.62	387.05	NC(Qc = 0)	NC(Qc = 0)
02-Mar-07	0	387.66	386.87	385.58	NC(Qc = 0)	387.29	386.80	387.13	NC(Qc = 0)	NC(Qc = 0)
03-Mar-07	0	388.00	387.12	385.83	NC(Qc = 0)	387.60	387.05	387.47	NC(Qc = 0)	NC(Qc = 0)
04-Mar-07	0	388.32	387.40	386.20	NC(Qc = 0)	387.95	387.35	387.87	NC(Qc = 0)	NC(Qc = 0)
05-Mar-07	0	388.50	387.64	386.48	NC(Qc = 0)	388.15	387.58	388.10	NC(Qc = 0)	NC(Qc = 0)
06-Mar-07	0	388.64	387.85	386.71	NC(Qc = 0)	388.32	387.79	388.25	NC(Qc = 0)	NC(Qc = 0)
07-Mar-07	0	388.72	387.98	386.82	NC(Qc = 0)	388.39	387.93	388.28	NC(Qc = 0)	NC(Qc = 0)
08-Mar-07	0	388.77	388.10	386.93	NC(Qc = 0)	388.44	388.03	388.31	NC(Qc = 0)	NC(Qc = 0)
09-Mar-07	0	388.71	388.18	386.96	NC(Qc = 0)	388.43	388.11	388.28	NC(Qc = 0)	NC(Qc = 0)
10-Mar-07	0	388.68	388.17	386.88	NC(Qc = 0)	388.37	388.09	388.18	NC(Qc = 0)	NC(Qc = 0)
11-Mar-07	5	388.70	388.18	386.95	Yes	388.41	388.14	388.21	No	FALSE
12-Mar-07	0	388.82	388.31	387.11	NC(Qc = 0)	388.50	388.26	388.37	NC(Qc = 0)	NC(Qc = 0)

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		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
13-Mar-07	0	388.98	388.50	387.20	NC(Qc = 0)	388.62	388.40	388.58	NC(Qc = 0)	NC(Qc = 0)
14-Mar-07	0	389.19	388.64	387.37	NC(Qc = 0)	388.79	388.54	388.80	NC(Qc = 0)	NC(Qc = 0)
15-Mar-07	0	389.24	389.30	387.40	NC(Qc = 0)	388.89	388.60	388.81	NC(Qc = 0)	NC(Qc = 0)
16-Mar-07	0	389.37	388.84	387.55	NC(Qc = 0)	389.04	388.73	388.98	NC(Qc = 0)	NC(Qc = 0)
17-Mar-07	0	389.63	389.02	387.77	NC(Qc = 0)	389.26	388.91	389.26	NC(Qc = 0)	NC(Qc = 0)
18-Mar-07	0	389.81	389.19	388.01	NC(Qc = 0)	389.48	389.11	389.54	NC(Qc = 0)	NC(Qc = 0)
19-Mar-07	0	390.03	389.38	388.22	NC(Qc = 0)	389.71	389.29	389.77	NC(Qc = 0)	NC(Qc = 0)
20-Mar-07	0	390.23	389.49	388.33	NC(Qc = 0)	389.87	389.44	389.92	NC(Qc = 0)	NC(Qc = 0)
21-Mar-07	0	390.44	389.73	388.65	NC(Qc = 0)	390.10	389.66	390.24	NC(Qc = 0)	NC(Qc = 0)
22-Mar-07	0	390.63	389.86	388.76	NC(Qc = 0)	390.31	389.83	390.38	NC(Qc = 0)	NC(Qc = 0)
23-Mar-07	0	390.80	390.05	388.95	NC(Qc = 0)	390.50	390.01	390.57	NC(Qc = 0)	NC(Qc = 0)
24-Mar-07	0	390.99	390.21	389.10	NC(Qc = 0)	390.68	390.17	390.74	NC(Qc = 0)	NC(Qc = 0)
25-Mar-07	0	391.20	390.42	389.35	NC(Qc = 0)	390.87	390.37	390.96	NC(Qc = 0)	NC(Qc = 0)
26-Mar-07	0	391.37	390.55	389.51	NC(Qc = 0)	391.08	390.55	391.16	NC(Qc = 0)	NC(Qc = 0)
27-Mar-07	0	391.58	390.79	389.75	NC(Qc = 0)	391.25	390.74	391.36	NC(Qc = 0)	NC(Qc = 0)
28-Mar-07	0	391.74	390.95	389.89	NC(Qc = 0)	391.45	390.91	391.55	NC(Qc = 0)	NC(Qc = 0)
29-Mar-07	0	391.88	391.11	390.04	NC(Qc = 0)	391.60	391.07	391.68	NC(Qc = 0)	NC(Qc = 0)
30-Mar-07	0	392.13	391.25	390.25	NC(Qc = 0)	391.81	391.26	391.92	NC(Qc = 0)	NC(Qc = 0)
31-Mar-07	0	392.34	391.71	390.57	NC(Qc = 0)	392.03	391.51	392.19	NC(Qc = 0)	NC(Qc = 0)
01-Apr-07	0	392.54	391.83	390.68	NC(Qc = 0)	392.23	391.67	392.36	NC(Qc = 0)	NC(Qc = 0)
02-Apr-07	0	392.66	391.88	390.75	NC(Qc = 0)	392.37	391.80	392.42	NC(Qc = 0)	NC(Qc = 0)
03-Apr-07	0	392.78	392.13	390.59	NC(Qc = 0)	392.48	391.89	392.38	NC(Qc = 0)	NC(Qc = 0)
04-Apr-07	0	392.99	392.19	391.11	NC(Qc = 0)	392.74	392.13	392.84	NC(Qc = 0)	NC(Qc = 0)
05-Apr-07	0	393.29	392.42	391.46	NC(Qc = 0)	393.02	392.39	393.17	NC(Qc = 0)	NC(Qc = 0)
06-Apr-07	0	393.54	392.65	391.73	NC(Qc = 0)	393.25	392.62	393.43	NC(Qc = 0)	NC(Qc = 0)
07-Apr-07	0	393.70	392.82	391.88	NC(Qc = 0)	393.43	392.81	393.58	NC(Qc = 0)	NC(Qc = 0)
08-Apr-07	0	393.79	393.01	392.06	NC(Qc = 0)	393.55	392.96	393.70	NC(Qc = 0)	NC(Qc = 0)
09-Apr-07	0	393.88	393.11	392.18	NC(Qc = 0)	393.68	393.11	393.82	NC(Qc = 0)	NC(Qc = 0)
10-Apr-07	0	394.03	393.29	392.35	NC(Qc = 0)	393.79	393.27	393.95	NC(Qc = 0)	NC(Qc = 0)
11-Apr-07	0	394.22	393.77	392.53	NC(Qc = 0)	393.93	393.45	394.09	NC(Qc = 0)	NC(Qc = 0)
12-Apr-07	0	394.15	393.45	392.35	NC(Qc = 0)	393.92	393.40	393.97	NC(Qc = 0)	NC(Qc = 0)
13-Apr-07	0	394.30	393.60	392.54	NC(Qc = 0)	394.05	393.52	394.16	NC(Qc = 0)	NC(Qc = 0)
14-Apr-07	0	394.52	394.21	392.82	NC(Qc = 0)	394.23	393.75	394.38	NC(Qc = 0)	NC(Qc = 0)
15-Apr-07	0	394.67	393.92	392.88	NC(Qc = 0)	394.38	393.86	394.51	NC(Qc = 0)	NC(Qc = 0)
16-Apr-07	0	394.95	394.08	393.14	NC(Qc = 0)	394.63	394.05	394.81	NC(Qc = 0)	NC(Qc = 0)
17-Apr-07	0	395.15	394.27	393.37	NC(Qc = 0)	394.84	394.26	395.04	NC(Qc = 0)	NC(Qc = 0)
18-Apr-07	0	395.25	394.43	393.47	NC(Qc = 0)	394.95	394.39	395.12	NC(Qc = 0)	NC(Qc = 0)
19-Apr-07	0	395.25	394.51	393.51	NC(Qc = 0)	394.98	394.47	395.11	NC(Qc = 0)	NC(Qc = 0)
20-Apr-07	0	395.32	394.57	393.57	NC(Qc = 0)	395.00	394.54	395.14	NC(Qc = 0)	NC(Qc = 0)
21-Apr-07	0	395.33	394.65	393.63	NC(Qc = 0)	395.02	394.61	395.14	NC(Qc = 0)	NC(Qc = 0)
22-Apr-07	0	395.28	394.69	393.65	NC(Qc = 0)	395.02	394.66	395.14	NC(Qc = 0)	NC(Qc = 0)
23-Apr-07	0	395.20	394.68	393.60	NC(Qc = 0)	394.97	394.64	395.02	NC(Qc = 0)	NC(Qc = 0)
24-Apr-07	0	395.23	394.68	393.58	NC(Qc = 0)	394.94	394.65	395.00	NC(Qc = 0)	NC(Qc = 0)
25-Apr-07	0	395.20	394.69	393.58	NC(Qc = 0)	394.88	394.66	394.96	NC(Qc = 0)	NC(Qc = 0)
26-Apr-07	0	395.10	394.65	393.47	NC(Qc = 0)	394.79	394.60	394.83	NC(Qc = 0)	NC(Qc = 0)

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		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
27-Apr-07	0	395.01	394.53	393.35	NC(Qc = 0)	394.68	394.49	394.72	NC(Qc = 0)	NC(Qc = 0)
28-Apr-07	0	395.11	394.59	393.41	NC(Qc = 0)	394.80	394.55	394.87	NC(Qc = 0)	NC(Qc = 0)
29-Apr-07	0	395.56	394.82	393.77	NC(Qc = 0)	395.22	394.83	395.35	NC(Qc = 0)	NC(Qc = 0)
30-Apr-07	0	395.90	395.13	394.11	NC(Qc = 0)	395.55	395.09	395.74	NC(Qc = 0)	NC(Qc = 0)
01-May-07	0	396.08	395.45	394.35	NC(Qc = 0)	395.73	395.27	395.94	NC(Qc = 0)	NC(Qc = 0)
02-May-07	0	396.27	395.84	394.51	NC(Qc = 0)	NA	395.45	396.09	NC(Qc = 0)	NC(Qc = 0)
03-May-07	0	396.40	395.83	394.66	NC(Qc = 0)	NA	395.62	396.27	NC(Qc = 0)	NC(Qc = 0)
04-May-07	0	396.59	397.16	394.85	NC(Qc = 0)	396.29	395.81	396.44	NC(Qc = 0)	NC(Qc = 0)
05-May-07	0	396.75	396.05	394.99	NC(Qc = 0)	396.41	395.95	396.59	NC(Qc = 0)	NC(Qc = 0)
06-May-07	0	396.77	396.11	395.03	NC(Qc = 0)	396.46	396.04	396.62	NC(Qc = 0)	NC(Qc = 0)
07-May-07	0	396.81	396.24	395.14	NC(Qc = 0)	396.51	396.14	396.65	NC(Qc = 0)	NC(Qc = 0)
08-May-07	0	396.88	396.31	395.18	NC(Qc = 0)	396.55	396.21	396.71	NC(Qc = 0)	NC(Qc = 0)
09-May-07	0	397.14	396.51	395.42	NC(Qc = 0)	396.86	396.43	397.04	NC(Qc = 0)	NC(Qc = 0)
10-May-07	0	397.60	396.81	395.83	NC(Qc = 0)	397.29	396.74	397.52	NC(Qc = 0)	NC(Qc = 0)
11-May-07	0	397.95	397.09	396.14	NC(Qc = 0)	397.62	397.03	397.88	NC(Qc = 0)	NC(Qc = 0)
12-May-07	0	398.16	397.34	396.40	NC(Qc = 0)	397.86	397.26	398.10	NC(Qc = 0)	NC(Qc = 0)
13-May-07	0	398.40	397.55	396.62	NC(Qc = 0)	398.50	397.48	398.33	NC(Qc = 0)	NC(Qc = 0)
14-May-07	0	398.58	397.76	396.82	NC(Qc = 0)	398.87	397.74	398.58	NC(Qc = 0)	NC(Qc = 0)
15-May-07	0	398.73	398.00	397.08	NC(Qc = 0)	400.10	397.94	398.75	NC(Qc = 0)	NC(Qc = 0)
16-May-07	0	398.81	398.06	397.09	NC(Qc = 0)	404.08	398.02	398.79	NC(Qc = 0)	NC(Qc = 0)
17-May-07	0	398.78	398.09	397.10	NC(Qc = 0)	404.84	398.06	398.77	NC(Qc = 0)	NC(Qc = 0)
18-May-07	0	398.74	398.14	397.08	NC(Qc = 0)	398.48	398.11	398.73	NC(Qc = 0)	NC(Qc = 0)
19-May-07	0	398.61	398.08	397.04	NC(Qc = 0)	398.38	398.07	398.58	NC(Qc = 0)	NC(Qc = 0)
20-May-07	0	398.47	397.98	396.89	NC(Qc = 0)	398.20	397.95	398.35	NC(Qc = 0)	NC(Qc = 0)
21-May-07	0	398.17	397.78	396.62	NC(Qc = 0)	397.91	397.75	398.05	NC(Qc = 0)	NC(Qc = 0)
22-May-07	0	397.85	397.51	396.28	NC(Qc = 0)	397.61	397.48	397.66	NC(Qc = 0)	NC(Qc = 0)
23-May-07	2	397.54	397.24	395.97	No	397.30	397.22	397.32	Yes	FALSE
24-May-07	16	397.29	397.06	395.72	No	397.07	397.01	396.90	No	FALSE
25-May-07	124	397.07	396.84	395.43	No	396.84	396.79	396.56	No	FALSE
26-May-07	121	396.94	396.70	395.32	No	396.69	396.68	396.43	No	FALSE
27-May-07	106	396.80	396.55	395.08	No	396.56	396.54	395.99	No	FALSE
28-May-07	31	396.79	396.49	394.99	No	396.47	396.45	396.43	No	FALSE
29-May-07	0	396.98	396.58	395.25	NC(Qc = 0)	396.66	396.58	396.64	NC(Qc = 0)	NC(Qc = 0)
30-May-07	0	397.11	396.79	395.50	NC(Qc = 0)	396.79	396.71	396.92	NC(Qc = 0)	NC(Qc = 0)
31-May-07	0	397.13	398.82	395.55	NC(Qc = 0)	396.84	396.76	396.93	NC(Qc = 0)	NC(Qc = 0)
01-Jun-07	0	397.22	396.86	395.50	NC(Qc = 0)	396.89	396.81	396.90	NC(Qc = 0)	NC(Qc = 0)
02-Jun-07	0	397.32	396.98	395.61	NC(Qc = 0)	396.99	396.91	397.05	NC(Qc = 0)	NC(Qc = 0)
03-Jun-07	0	397.49	397.17	395.83	NC(Qc = 0)	397.20	397.10	397.31	NC(Qc = 0)	NC(Qc = 0)
04-Jun-07	0	397.60	397.23	395.93	NC(Qc = 0)	397.27	397.15	397.38	NC(Qc = 0)	NC(Qc = 0)
05-Jun-07	0	397.73	397.31	396.04	NC(Qc = 0)	397.42	397.24	397.50	NC(Qc = 0)	NC(Qc = 0)
06-Jun-07	0	397.81	397.38	396.12	NC(Qc = 0)	397.48	397.33	397.56	NC(Qc = 0)	NC(Qc = 0)
07-Jun-07	0	397.68	397.32	396.06	NC(Qc = 0)	397.35	397.29	397.41	NC(Qc = 0)	NC(Qc = 0)
08-Jun-07	13	397.32	396.99	395.71	No	397.04	396.99	397.04	Yes	FALSE
09-Jun-07	16	397.14	396.80	395.49	No	396.84	396.80	396.79	No	FALSE
10-Jun-07	36	397.09	396.77	395.38	No	396.77	396.73	396.70	No	FALSE

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		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
11-Jun-07	45	397.00	396.64	395.31	Yes	396.71	396.65	396.12	No	FALSE
12-Jun-07	19	396.99	396.58	395.26	Yes	396.66	396.60	390.27	No	FALSE
13-Jun-07	25	396.98	396.63	395.33	Yes	396.68	396.63	395.26	No	FALSE
14-Jun-07	105	396.83	396.54	395.05	No	396.53	396.49	395.77	No	FALSE
15-Jun-07	239	396.51	396.21	394.41	No	396.21	396.19	NA	NC(D)	NC(D)
16-Jun-07	294	396.29	395.91	393.92	No	395.99	395.92	NA	NC(D)	NC(D)
17-Jun-07	238	396.24	395.90	394.04	No	395.92	395.87	NA	NC(D)	NC(D)
18-Jun-07	341	396.00	395.70	393.63	No	395.71	395.67	NA	NC(D)	NC(D)
19-Jun-07	421	395.74	395.43	393.09	No	395.39	395.36	NA	NC(D)	NC(D)
20-Jun-07	448	395.48	395.16	392.79	No	395.15	395.12	NA	NC(D)	NC(D)
21-Jun-07	483	395.25	394.94	392.51	No	394.94	394.92	393.53	No	FALSE
22-Jun-07	487	395.09	394.79	392.35	No	394.77	394.77	393.18	No	FALSE
23-Jun-07	499	394.97	394.62	392.12	No	394.63	394.61	393.06	No	FALSE
24-Jun-07	264	395.15	394.77	392.70	No	394.79	394.75	393.69	No	FALSE
25-Jun-07	116	395.32	394.96	393.32	No	394.99	394.93	394.04	No	FALSE
26-Jun-07	151	395.31	394.96	393.29	No	394.95	394.94	394.32	No	FALSE
27-Jun-07	190	395.17	394.76	392.84	No	394.79	394.75	393.90	No	FALSE
28-Jun-07	342	394.99	394.70	392.46	No	394.64	394.61	393.51	No	FALSE
29-Jun-07	370	394.77	394.44	392.03	No	394.43	394.39	392.37	No	FALSE
30-Jun-07	337	394.65	394.36	391.98	No	394.29	394.30	392.33	No	FALSE
01-Jul-07	205	394.81	394.45	392.51	No	394.44	394.42	392.85	No	FALSE
02-Jul-07	86	394.98	394.62	393.03	No	394.65	394.61	394.16	No	FALSE
03-Jul-07	71	395.04	394.75	393.22	No	394.73	394.73	394.31	No	FALSE
04-Jul-07	170	394.98	394.66	392.87	No	394.64	394.66	393.70	No	FALSE
05-Jul-07	353	394.83	394.53	392.38	No	394.46	NA	393.17	NC(D)	NC(D)
06-Jul-07	253	394.73	394.40	392.41	No	394.39	NA	393.29	NC(D)	NC(D)
07-Jul-07	183	394.82	394.50	392.69	No	394.51	NA	388.97	NC(D)	NC(D)
08-Jul-07	162	394.90	394.58	392.86	No	394.57	NA	391.82	NC(D)	NC(D)
09-Jul-07	221	394.79	394.47	392.58	No	394.45	NA	393.63	NC(D)	NC(D)
10-Jul-07	370	394.59	394.25	392.08	No	394.22	394.19	392.96	No	FALSE
11-Jul-07	521	394.22	393.93	391.35	No	393.90	393.89	392.32	No	FALSE
12-Jul-07	604	393.96	393.62	390.87	No	393.63	393.63	391.82	No	FALSE
13-Jul-07	576	393.82	393.48	390.74	No	393.48	393.49	389.88	No	FALSE
14-Jul-07	634	393.68	393.34	390.53	No	393.31	393.32	389.89	No	FALSE
15-Jul-07	692	393.42	393.07	390.08	No	393.05	393.07	390.34	No	FALSE
16-Jul-07	692	393.20	392.91	389.88	No	392.84	392.88	NA	NC(D)	NC(D)
17-Jul-07	740	393.07	392.68	389.60	No	392.64	392.67	NA	NC(D)	NC(D)
18-Jul-07	772	392.91	392.49	389.33	No	392.47	392.49	NA	NC(D)	NC(D)
19-Jul-07	651	392.69	392.32	389.24	No	392.31	392.34	NA	NC(D)	NC(D)
20-Jul-07	654	392.78	392.30	389.30	No	392.33	392.30	NA	NC(D)	NC(D)
21-Jul-07	352	392.97	392.54	390.24	No	392.57	392.55	NA	NC(D)	NC(D)
22-Jul-07	341	393.13	392.69	390.53	No	392.72	392.67	NA	NC(D)	NC(D)
23-Jul-07	500	392.93	392.53	390.09	No	392.54	392.53	NA	NC(D)	NC(D)
24-Jul-07	603	392.64	392.27	389.54	No	392.25	392.26	NA	NC(D)	NC(D)
25-Jul-07	647	392.48	392.10	389.21	No	392.09	392.09	NA	NC(D)	NC(D)

Table 4
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Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
26-Jul-07	717	392.32	391.89	388.88	No	391.91	391.92	NA	NC(D)	NC(D)
27-Jul-07	741	392.13	391.73	388.57	No	391.70	391.72	NA	NC(D)	NC(D)
28-Jul-07	649	391.88	391.56	388.11	No	391.50	391.51	NA	NC(D)	NC(D)
29-Jul-07	557	391.84	391.52	388.35	No	391.44	391.47	NA	NC(D)	NC(D)
30-Jul-07	530	391.72	391.42	388.33	No	391.35	391.39	NA	NC(D)	NC(D)
31-Jul-07	554	391.68	391.32	388.26	No	391.23	391.24	NA	NC(D)	NC(D)
01-Aug-07	775	391.11	390.68	387.47	No	390.65	390.67	377.14	No	FALSE
02-Aug-07	772	391.47	390.97	387.73	No	390.98	390.99	366.51	No	FALSE
03-Aug-07	786	391.30	390.84	387.61	No	390.84	390.85	388.30	No	FALSE
04-Aug-07	841	391.09	390.66	387.32	No	390.66	390.68	388.20	No	FALSE
05-Aug-07	953	390.88	390.43	386.82	No	390.43	390.44	387.15	No	FALSE
06-Aug-07	988	390.67	390.18	386.46	No	390.19	390.21	385.09	No	FALSE
07-Aug-07	998	390.46	390.01	386.22	No	389.99	390.02	385.02	No	FALSE
08-Aug-07	955	390.33	389.87	386.17	No	389.85	389.88	386.44	No	FALSE
09-Aug-07	837	390.30	389.87	386.41	No	389.84	389.87	384.88	No	FALSE
10-Aug-07	647	390.43	389.95	386.89	No	389.98	389.97	386.83	No	FALSE
11-Aug-07	513	390.56	390.12	387.39	No	390.15	390.13	385.58	No	FALSE
12-Aug-07	430	390.78	390.30	387.81	No	390.34	390.30	387.33	No	FALSE
13-Aug-07	347	390.78	390.34	387.92	No	390.40	390.37	373.40	No	FALSE
14-Aug-07	271	390.98	390.60	388.50	No	390.59	390.62	376.86	No	FALSE
15-Aug-07	392	390.89	390.51	388.20	No	390.54	390.53	361.21	No	FALSE
16-Aug-07	429	390.72	390.41	387.96	No	390.39	390.40	332.78	No	FALSE
17-Aug-07	460	390.63	390.27	387.74	No	390.26	390.26	379.36	No	FALSE
18-Aug-07	479	390.57	390.20	387.64	No	390.20	390.20	367.49	No	FALSE
19-Aug-07	538	390.41	390.05	387.37	No	390.04	390.08	359.96	No	FALSE
20-Aug-07	621	390.24	389.89	387.05	No	389.87	389.92	369.04	No	FALSE
21-Aug-07	615	390.15	389.75	386.84	No	389.75	389.79	372.24	No	FALSE
22-Aug-07	458	390.19	389.85	387.28	No	389.86	389.88	377.10	No	FALSE
23-Aug-07	292	390.44	390.06	387.86	No	390.05	390.09	362.05	No	FALSE
24-Aug-07	110	390.74	390.38	388.47	No	390.39	390.39	388.90	No	FALSE
25-Aug-07	55	391.04	390.63	388.91	No	390.71	390.65	389.77	No	FALSE
26-Aug-07	21	391.35	390.83	389.27	Yes	391.01	390.89	390.60	No	FALSE
27-Aug-07	0	391.61	391.10	389.58	NC(Qc = 0)	391.34	391.14	392.49	NC(Qc = 0)	NC(Qc = 0)
28-Aug-07	0	391.92	391.33	389.87	NC(Qc = 0)	391.67	391.38	398.33	NC(Qc = 0)	NC(Qc = 0)
29-Aug-07	0	392.38	391.64	390.27	NC(Qc = 0)	392.14	391.72	399.02	NC(Qc = 0)	NC(Qc = 0)
30-Aug-07	0	392.80	392.00	390.69	NC(Qc = 0)	392.60	392.08	399.53	NC(Qc = 0)	NC(Qc = 0)
31-Aug-07	0	393.15	392.32	391.04	NC(Qc = 0)	392.94	392.40	399.87	NC(Qc = 0)	NC(Qc = 0)
01-Sep-07	0	393.40	392.56	391.31	NC(Qc = 0)	393.17	392.63	400.08	NC(Qc = 0)	NC(Qc = 0)
02-Sep-07	0	393.54	392.77	391.48	NC(Qc = 0)	393.28	392.82	400.18	NC(Qc = 0)	NC(Qc = 0)
03-Sep-07	0	393.64	392.87	391.63	NC(Qc = 0)	393.39	392.95	400.21	NC(Qc = 0)	NC(Qc = 0)
04-Sep-07	0	393.70	393.05	391.78	NC(Qc = 0)	393.43	393.08	400.30	NC(Qc = 0)	NC(Qc = 0)
05-Sep-07	0	393.73	393.20	391.93	NC(Qc = 0)	393.46	393.22	400.36	NC(Qc = 0)	NC(Qc = 0)
06-Sep-07	0	393.67	393.26	391.95	NC(Qc = 0)	393.43	393.27	400.32	NC(Qc = 0)	NC(Qc = 0)
07-Sep-07	44	393.60	393.22	391.86	Yes	393.35	393.22	397.30	Yes	TRUE
08-Sep-07	111	393.29	393.01	391.56	No	393.05	393.03	392.36	No	FALSE

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
09-Sep-07	153	392.95	392.65	390.70	No	392.69	392.67	NA	NC(D)	NC(D)
10-Sep-07	138	392.80	392.45	390.30	No	392.53	392.49	NA	NC(D)	NC(D)
11-Sep-07	131	392.78	392.48	390.73	No	392.52	392.51	NA	NC(D)	NC(D)
12-Sep-07	143	392.67	392.39	390.62	No	392.41	392.43	NA	NC(D)	NC(D)
13-Sep-07	129	392.66	392.42	390.67	No	392.39	392.42	NA	NC(D)	NC(D)
14-Sep-07	145	392.59	392.35	390.58	No	392.29	392.34	389.87	No	FALSE
15-Sep-07	172	392.36	392.09	390.03	No	392.10	392.12	384.86	No	FALSE
16-Sep-07	210	392.13	391.84	389.31	No	391.83	391.83	388.11	No	FALSE
17-Sep-07	257	391.86	391.53	388.80	No	391.54	391.55	388.38	No	FALSE
18-Sep-07	263	391.59	391.30	388.55	No	391.29	391.32	388.26	No	FALSE
19-Sep-07	296	391.41	391.09	388.18	No	391.05	391.09	386.53	No	FALSE
20-Sep-07	287	391.23	390.91	387.97	No	390.85	390.91	386.53	No	FALSE
21-Sep-07	283	391.05	390.76	387.93	No	390.69	390.78	386.59	No	FALSE
22-Sep-07	281	390.82	390.55	387.60	No	390.46	390.55	387.22	No	FALSE
23-Sep-07	306	390.71	390.39	387.40	No	390.31	390.38	384.11	No	FALSE
24-Sep-07	312	390.55	390.21	387.21	No	390.13	390.22	384.24	No	FALSE
25-Sep-07	315	390.41	390.06	387.07	No	389.97	390.07	385.56	No	FALSE
26-Sep-07	682	390.27	389.91	386.88	No	389.86	389.93	NA	NC(D)	NC(D)
27-Sep-07	695	390.13	389.74	386.64	No	389.67	389.74	NA	NC(D)	NC(D)
28-Sep-07	472	390.00	389.67	386.84	No	389.64	389.69	NA	NC(D)	NC(D)
29-Sep-07	480	389.91	389.59	386.79	No	389.57	389.61	NA	NC(D)	NC(D)
30-Sep-07	542	389.85	389.44	386.50	No	389.42	389.48	NA	NC(D)	NC(D)
01-Oct-07	668	389.70	389.33	386.31	No	389.27	389.34	NA	NC(D)	NC(D)
02-Oct-07	659	389.63	389.25	386.30	No	389.22	389.28	NA	NC(D)	NC(D)
03-Oct-07	541	389.55	389.19	386.30	No	389.16	389.22	NA	NC(D)	NC(D)
04-Oct-07	536	389.57	389.24	386.55	No	389.21	389.26	NA	NC(D)	NC(D)
05-Oct-07	508	389.54	389.21	386.55	No	389.18	389.23	NA	NC(D)	NC(D)
06-Oct-07	454	389.65	389.26	386.69	No	389.23	389.27	NA	NC(D)	NC(D)
07-Oct-07	393	389.75	389.33	386.94	No	389.35	389.35	NA	NC(D)	NC(D)
08-Oct-07	237	389.83	389.41	387.15	No	389.44	389.44	NA	NC(D)	NC(D)
09-Oct-07	278	389.93	389.51	387.40	No	389.55	389.54	NA	NC(D)	NC(D)
10-Oct-07	196	390.07	389.64	387.73	No	389.70	389.71	NA	NC(D)	NC(D)
11-Oct-07	149	390.20	389.83	388.01	No	389.87	389.86	NA	NC(D)	NC(D)
12-Oct-07	166	390.22	389.88	388.03	No	389.94	389.93	NA	NC(D)	NC(D)
13-Oct-07	132	390.24	389.92	388.18	No	389.98	389.99	NA	NC(D)	NC(D)
14-Oct-07	102	390.38	389.97	388.31	No	390.03	390.05	NA	NC(D)	NC(D)
15-Oct-07	78	390.48	390.05	388.43	No	390.12	390.14	NA	NC(D)	NC(D)
16-Oct-07	79	390.53	390.15	388.55	No	390.23	390.20	NA	NC(D)	NC(D)
17-Oct-07	88	390.64	390.29	388.76	No	390.37	390.34	NA	NC(D)	NC(D)
18-Oct-07	87	390.82	390.43	388.93	No	390.47	390.46	NA	NC(D)	NC(D)
19-Oct-07	28	390.95	390.50	388.98	Yes	390.63	390.55	NA	NC(D)	NC(D)
20-Oct-07	0	391.29	390.78	389.39	NC(Qc = 0)	391.02	390.84	NA	NC(Qc = 0)	NC(Qc = 0)
21-Oct-07	0	391.66	391.02	389.72	NC(Qc = 0)	391.38	391.10	NA	NC(Qc = 0)	NC(Qc = 0)
22-Oct-07	0	391.81	391.22	389.94	NC(Qc = 0)	391.59	391.30	NA	NC(Qc = 0)	NC(Qc = 0)
23-Oct-07	0	392.01	391.41	390.16	NC(Qc = 0)	391.79	391.49	NA	NC(Qc = 0)	NC(Qc = 0)

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Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
24-Oct-07	0	392.10	391.51	390.22	NC(Qc = 0)	391.87	391.58	391.79	NC(Qc = 0)	NC(Qc = 0)
25-Oct-07	0	392.23	391.62	390.34	NC(Qc = 0)	391.96	391.70	391.92	NC(Qc = 0)	NC(Qc = 0)
26-Oct-07	0	392.30	391.72	390.44	NC(Qc = 0)	392.02	391.80	391.98	NC(Qc = 0)	NC(Qc = 0)
27-Oct-07	0	392.24	391.74	390.42	NC(Qc = 0)	392.02	391.81	391.93	NC(Qc = 0)	NC(Qc = 0)
28-Oct-07	6	392.26	391.77	390.38	Yes	391.98	391.82	391.88	No	FALSE
29-Oct-07	12	392.27	391.83	390.47	Yes	392.03	391.88	391.92	No	FALSE
30-Oct-07	24	392.33	391.87	390.57	Yes	392.07	391.94	391.95	No	FALSE
31-Oct-07	38	392.34	391.89	390.55	Yes	392.07	391.94	391.91	No	FALSE
01-Nov-07	0	392.25	391.86	390.50	NC(Qc = 0)	392.00	391.93	391.87	NC(Qc = 0)	NC(Qc = 0)
02-Nov-07	23	392.31	392.11	390.44	No	392.11	392.21	391.06	No	FALSE
03-Nov-07	193	392.21	392.19	390.04	No	392.12	392.41	389.99	No	FALSE
04-Nov-07	237	392.17	392.14	389.90	No	392.07	392.37	389.76	No	FALSE
05-Nov-07	266	392.03	392.02	389.72	No	391.96	392.26	389.54	No	FALSE
06-Nov-07	312	391.78	391.77	389.32	No	391.70	391.99	389.15	No	FALSE
07-Nov-07	398	391.67	391.57	389.02	No	391.54	391.65	388.69	No	FALSE
08-Nov-07	465	391.57	391.37	388.80	No	391.43	391.22	388.32	No	FALSE
09-Nov-07	575	391.26	391.10	388.23	No	391.15	390.93	387.51	No	FALSE
10-Nov-07	659	390.99	390.86	387.77	No	390.90	390.69	386.76	No	FALSE
11-Nov-07	801	390.78	390.59	387.24	No	390.62	390.43	386.15	No	FALSE
12-Nov-07	839	390.53	390.30	386.74	No	390.33	390.13	385.89	No	FALSE
13-Nov-07	748	390.43	390.22	386.88	No	390.24	390.07	386.51	No	FALSE
14-Nov-07	789	390.28	390.03	386.58	No	390.06	389.88	385.92	No	FALSE
15-Nov-07	751	390.02	389.89	386.44	No	389.89	389.72	386.01	No	FALSE
16-Nov-07	842	389.95	389.73	386.23	No	389.74	389.58	385.33	No	FALSE
17-Nov-07	874	389.68	389.49	385.85	No	389.50	389.34	384.86	No	FALSE
18-Nov-07	921	389.46	389.25	385.46	No	389.26	389.10	384.53	No	FALSE
19-Nov-07	957	389.34	389.08	385.26	No	389.10	388.94	383.82	No	FALSE
20-Nov-07	952	389.14	388.91	385.08	No	388.93	388.78	383.54	No	FALSE
21-Nov-07	965	389.01	388.75	384.85	No	388.76	388.62	383.28	No	FALSE
22-Nov-07	967	388.74	388.49	384.49	No	388.52	388.37	383.31	No	FALSE
23-Nov-07	971	388.68	388.46	384.80	No	388.46	388.35	384.05	No	FALSE
24-Nov-07	963	388.55	388.31	384.43	No	388.32	388.18	383.29	No	FALSE
25-Nov-07	940	388.48	388.24	384.38	No	388.25	388.10	383.38	No	FALSE
26-Nov-07	874	388.40	388.19	384.48	No	388.16	388.03	383.80	No	FALSE
27-Nov-07	936	388.24	387.95	384.03	No	387.98	387.82	383.40	No	FALSE
28-Nov-07	747	388.11	387.88	384.04	No	387.89	387.76	383.06	No	FALSE
29-Nov-07	762	387.93	387.67	383.67	No	387.69	387.54	382.29	No	FALSE
30-Nov-07	744	387.82	387.60	383.67	No	387.62	387.45	382.58	No	FALSE
01-Dec-07	952	387.80	387.57	383.71	No	387.59	387.44	382.48	No	FALSE
02-Dec-07	1016	387.61	387.36	383.31	No	387.38	387.23	381.50	No	FALSE
03-Dec-07	988	387.48	387.20	383.11	No	387.25	387.08	381.92	No	FALSE
04-Dec-07	990	387.45	387.21	383.27	No	387.24	387.10	382.20	No	FALSE
05-Dec-07	1033	387.39	387.18	383.56	No	387.10	387.05	383.20	No	FALSE
06-Dec-07	1194	387.60	387.69	385.62	No	387.50	387.55	386.99	No	FALSE
07-Dec-07	1175	387.51	387.60	385.15	No	387.38	387.47	385.63	No	FALSE

Table 4
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Groundwater Flow into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)
08-Dec-07	1008	387.08	386.94	382.92	No	386.95	386.81	381.72	No	FALSE
09-Dec-07	689	387.09	386.92	383.12	No	387.03	386.79	382.56	No	FALSE
10-Dec-07	881	387.09	386.90	383.33	No	386.92	386.79	382.96	No	FALSE
11-Dec-07	810	387.14	386.98	383.64	No	387.02	386.84	382.98	No	FALSE
12-Dec-07	636	NA	386.77	383.22	NC(D)	386.85	386.66	382.25	No	NC(D)
13-Dec-07	876	386.87	386.62	382.76	No	386.69	386.51	381.93	No	FALSE
14-Dec-07	767	386.94	386.64	383.10	No	386.71	386.55	382.52	No	FALSE
15-Dec-07	677	387.14	386.88	383.60	No	386.92	386.76	382.87	No	FALSE
16-Dec-07	480	387.24	386.94	383.94	No	387.01	386.81	383.55	No	FALSE
17-Dec-07	281	387.60	387.30	384.83	No	387.40	387.19	384.73	No	FALSE
18-Dec-07	354	387.73	387.47	384.99	No	387.58	387.37	384.75	No	FALSE
19-Dec-07	420	387.69	387.42	384.79	No	387.54	387.33	384.39	No	FALSE
20-Dec-07	378	387.80	387.81	384.86	No	387.78	387.42	384.38	No	FALSE
21-Dec-07	455	387.73	387.74	384.76	No	387.62	387.39	384.27	No	FALSE
22-Dec-07	411	387.75	387.65	384.78	No	387.66	387.41	384.14	No	FALSE
23-Dec-07	497	387.67	387.51	384.52	No	387.52	387.27	383.83	No	FALSE
24-Dec-07	537	387.65	387.35	384.44	No	387.44	387.23	383.79	No	FALSE
25-Dec-07	569	387.55	387.30	384.30	No	387.37	387.17	383.58	No	FALSE
26-Dec-07	555	387.54	387.31	384.37	No	387.38	387.19	383.48	No	FALSE
27-Dec-07	450	387.65	387.35	384.57	No	387.44	387.23	384.02	No	FALSE
28-Dec-07	335	387.78	387.51	384.87	No	387.60	387.39	384.37	No	FALSE
29-Dec-07	325	387.77	387.51	384.85	No	387.62	387.40	384.41	No	FALSE
30-Dec-07	348	387.83	387.60	384.95	No	387.69	387.48	384.48	No	FALSE
31-Dec-07	352	387.83	387.58	384.86	No	387.66	387.45	384.34	No	FALSE
					66	Number of Days with Parallel Flow Lines			3	1
					460	Number of Days with Diverging Flow Lines			467	468
					172	Number of Days with NC(Qc = 0)			172	172
					1	Number of Days with NC(D)			57	58
					699	Total Number of Days			699	699

NOTES:

1) Groundwater Elevation Contour Deflections at North End of Barrier Wall Calculated Using the Following Equations:

Equation 1: D_N = (GWL in PZ-6 D - GWL in PZ-1 I) / (GWL in PZ-5U - GWL in PZ-1 I) x 1,067 ft

Where: D_N = Location of PZ-6D groundwater level elevation on a line between PZ-5 U and PZ-1 I in feet from PZ-1I
1067 Ft = Distance Between Piezometers PZ-5 U and PZ-1 I on a Line Perpendicular to North/South Alignment of Barrier Wall

$D_N \leq 843$ Feet Groundwater level contour passing through PZ-6D is parallel to or converging on N/S alignment of barrier wall
$D_N > 843$ Feet Groundwater level contour passing through PZ-6D is diverging on N/S alignment of barrier wall
843 Ft = Distance Between Piezometers PZ-6 D and PZ-1 I on a Line Perpendicular to North/South Alignment of Barrier Wall

2) Groundwater Elevation Deflections at South End of Barrier Wall Calculated Using the Following Equations:

s Equation 2: D_S = (GWL in PZ-7 D - GWL in PZ-4 I) / (GWL in PZ-8U - GWL in PZ-4 I) x 733 ft

Table 4
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Sauget Area 2 Groundwater Migration Control System
Groundwater Flow Into Open End of Barrier Wall

Date	Dynamic Gradient Darcy's Law Computed Flow	Groundwater Flow Into North End of Barrier Wall				Groundwater Flow Into SouthEnd of Barrier Wall				Flow Into Barrier Wall Equal to Flow Out of Barrier Wall
		PZ-5U Average Daily GWL	PZ-6D Average Daily GWL	PZ-1I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	PZ-8U Average Daily GWL	PZ-7D Average Daily GWL	PZ-4I Average Daily GWL	Groundwater Level Contour Parallel to North/South Alignment of Barrier Wall	
	(GPM)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Yes/No)	(True/False)

Where: D_S = Location of PZ-7D Groundwater Level Elevation on a Line Between PZ-8 U and PZ-4 I in Feet from PZ-1I
733 Ft = Distance Between Piezometers PZ-8 U and PZ-4 I on a Line Perpendicular to North/South Alignment of Barrier Wall

$D_S \leq 843$ Feet Groundwater level contour passing through PZ-6D is parallel to or converging on N/S alignment of barrier wall
$D_S > 843$ Feet Groundwater level contour passing through PZ-6D is diverging on N/S alignment of barrier wall
538 Ft = Distance Between Piezometers PZ-7 D and PZ-4 I on a Line Perpendicular to North/South Alignment of Barrier Wall

3) NC(QC = 0) = Not Calculated because Computed Flow was Zero

4) NC(D) = Not Calculated because of Missing Data

Appendices

Appendix 1

The Karlsruhe Cut-off Wall Testing Unit (KTU) for Monitoring In-Situ Permeability

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ABSTRACT: The paper presents a testing unit for monitoring the hydraulic permeability of cut-off walls. The testing unit was developed, constructed and applied in initial tests in practice at the Institute of Soil and Rock Mechanics in Karlsruhe and different building sites. It can be implemented under conditions generally prevailing at cut-off walls with one and two phase methods and enables the permeability of cut-off walls to be measured by means of percolation at predetermined depths over any length within certain limits, both immediately after completion (and hardening) or at any time afterwards. All elements of the KTU are described as well as the formula for evaluating hydraulic permeability values. Further, the installation in a cut-off wall underneath a flood water dike is presented with first measurement results.

1 INTRODUCTION

It is a known fact that it is a complex undertaking to prove that cut-off walls are sufficiently im-permeable. A number of factors play a role here, which make the tests and evaluations involved either more or less difficult or even unreliable - depending on the cut-off material, method of construction, geology of the site etc.:

- The cut-off material may behave differently in the panel compared to laboratory test specimens, so that the latter may not necessarily be representative.
- The overall permeability of the cut-off wall is generally greater than the permeability of the individual wall panels or even the cut-off material itself, because, for example, the joints and other imperfections in the panels have a negative influence.
- On site, the wall acts together with a 'sealing base layer' (which has either been built on purpose or exists in the form of a natural sealing layer), the sealing effect or permeability of which influences the whole behaviour of the encapsulation in a manner difficult to estimate in advance.

These conditions are taken into account, when building actually takes place, by means of a quality assurance system with a graduated programme of tests and controls, ranging from measurements on specimens in the laboratory and quality controls of different kinds during construction to a pumping test on the finished object (Ratnam et al. 2001).

Unfortunately from time to time it is discovered that - despite all efforts of those involved during the planning and construction phase - the observations made at the "moment of truth", i.e. at the end of any construction work, are not as favourable as expected, or indeed are completely unsatisfactory.

Past experience has shown that a method for measuring in-situ permeability of cut-off wall panels would be useful, in as much as it would avoid the necessity of testing bore holes (which are undesirable for various reasons, and from a testing point of view technically unreliable). With this in mind, a testing unit was developed, constructed and applied in initial tests in practice at the Institute of Soil and Rock Mechanics in Karlsruhe, Germany, which can be implemented under conditions generally prevailing at cut-off walls with one and two phase methods. It enables the permeability of cut-off walls to be measured by means of percolation at predetermined depths (over any length within certain limits) immediately after completion (and hardening) or at any time afterwards.

The following is a report on this testing unit and the first results obtained under building site conditions. The unit was designed with a view to attend to two requirements: obtain essential information about the quality of cut-off wall panels under specific applications, since it should be adaptable to specific site conditions and be economical to acquire.

2 DESIGN AND APPLICATION

The basic intention, on which the design is based, is to insert a permanent testing control unit of a preselectable length, which has been prepared in a workshop and can then be let down to any depth in newly constructed cut-off panels on site, in the open panel. The unit should be mainly made up of components easily available on the market and should require as few special parts as possible and be simple to use on site.

In figure 1 a unit according to this conception is shown. The KTU presented has a testing length of 1.80 m; however, by linking several elements together the length can easily be extended.

A connecting hose exists between the body of KTU and a plastic chamber with tube connections. The hose located inside the cut-off wall protects the pipe for the water supply and the tubes for the installation phase. The pipe for the water supply leads to the water reservoir, which feeds the system during the permeability test.

The thin plastic tubes for the installation phase form the connections, which are required when installing the unit in preparation for the actual permeability test. By means of suitable parts inserted in the testing tube they serve to prevent the initially fluid cut-off wall material with its greater density from draining into the testing unit, in which there is only hydrostatic counterpressure from the water inside. Any drainage of this kind would lead to accelerated consolidation and compression as with a filter cake around the testing unit and would, of course, distort the measuring results.

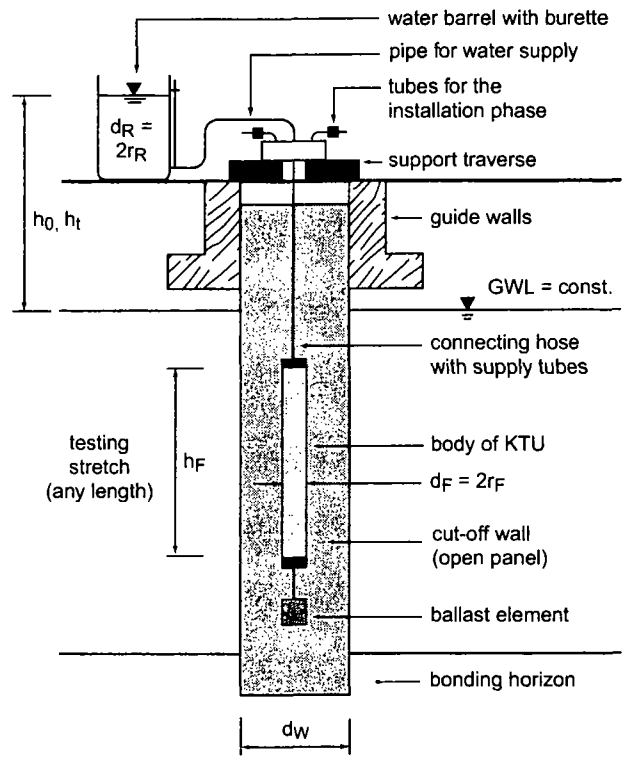

Figure 2. Sketch of the KTU after installation and prepared for operation.

Further, at the lower end of the KTU an iron ballast element is attached to equalize the resulting uplift depending on the density of the cut-off wall material and the volume of the KTU. The iron weight makes it possible to suspend the body of the KTU vertically in the open panel. A sketch of the testing unit after it has been installed and prepared for operation is shown in figure 2.

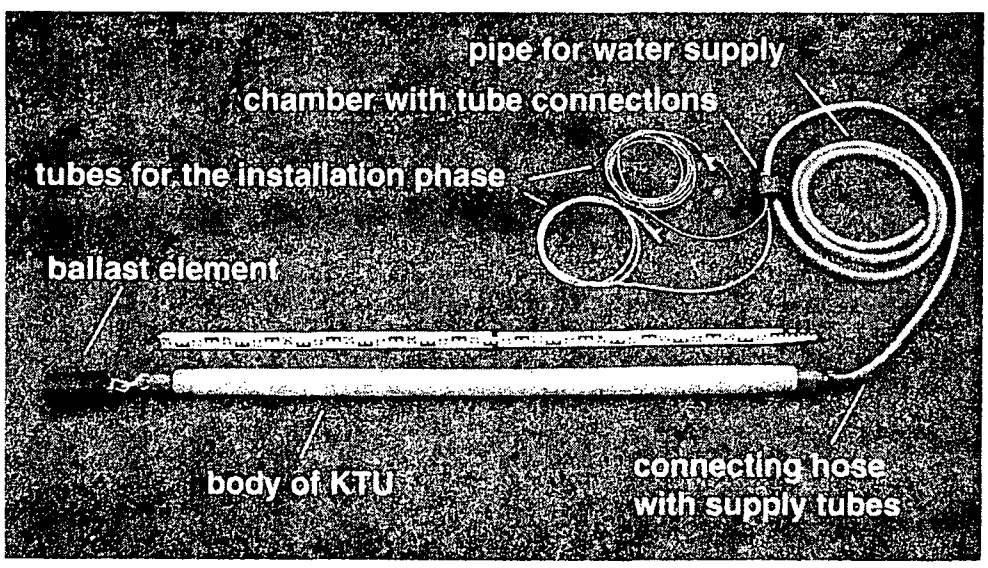

Figure 1. Complete testing unit, 2 m in length in this case, with all the components.

3 EVALUATION OF TEST RESULTS

When the testing unit, which has been completely preconstructed in the workshop, has been inserted into the cut-off wall element to be tested and the hardening process of the cut-off wall material has been completed, the aid device (special packer technique) to prevent the formation of filter cakes is released. After the unit has been connected to the water supply, the apparatus is ready for use.

The system dimensions, which are essential for the evaluation, are given in figure 2. Since generally longer testing stretches of at least a few meters in length will be selected, it is sufficient to interpret the flow out of the testing unit through the wall area to be tested as a horizontal two-dimensional problem and thus to ignore the three-dimensional upward and downward discharges (cf. Brauns & Charles de Oliveira 1987).

In this way, one is on the safe side regarding the evaluation of the permeability of the wall, and the related equation to determine the permeability of the wall from two readings of the water level in the water reservoir at different times is:

$$k_{\text{cut-off wall}} = \frac{r_R^2 \cdot \ln\frac{h_0}{h_t} \cdot \ln\frac{2 \cdot d_w}{\pi \cdot r_F}}{2 \cdot h_F \cdot (t_t - t_0)} \qquad (1)$$

where r_F and h_F are radius and length of testing stretch; h_0 are h_t are the water heads above ground water at the beginning and the end of the period of observation (see figure 2); $(t_t - t_0)$ is the duration of the period of observation; d_w is the thickness of the cut-off wall.

The testing unit is designed on the basis of filter pipes with a 2" diameter. A water barrel with a burette can be used for the water reservoir.

Suitable measuring periods are, of course, determined by the selected length of the test stretch and the actual permeability of the tested area of wall on the one hand, and on the other, by the chosen size of the water supply and the accuracy of the reading of the water level, i.e. the volume of water consumed. It could be useful to switch between the water barrel and the burette by means of a three-way valve, so that in addition to carrying out a longer infiltration test using the water in the barrel, also a short term reading is made possible by operating the burette.

When planning the application of the testing unit, the question arises as to the quantity of the water supply, taking into account the geometrical system requirements and the expected permeability of the wall. The equation for the fall velocity of the water level (v_s) in the water supply with diameter ($2r_R$) to be selected is given as an orientation aid:

$$v_s = -\frac{d_h}{d_t} = \frac{h_0}{r_R^2} \cdot a \cdot e^{-a\frac{t}{r_R^2}} \quad \text{with} \quad a = \frac{2 \cdot k \cdot h_F}{\ln\frac{2 \cdot d_W}{\pi \cdot r_F}} \qquad (2)$$

The fall velocity at the beginning of the test serves mainly as an orientation aid, i.e. at $t = 0$ and $h = h_0$. For this condition the last factor in the equation equals 1 and the initial fall velocity becomes

$$v_{s0} = -\frac{h_0}{r_R^2} \cdot \frac{2 \cdot d_W}{\pi \cdot r_F} \qquad (3)$$

(This equation of course applies basically for each condition h during the test, when the momentary h is used as h_0).

4 APPLICATION INSIDE A CUT-OFF WALL UNDERNEATH A FLOOD WATER DIKE

For the first time the KTU was installed in a cut-off wall for the encapsulation of a quantity of hazardous waste (cf. Brauns et al. 2000). The successful operation of the KTU encouraged the authors to put the KTU in a cut-off wall below a flood water dike close to a large river (see figure 3).

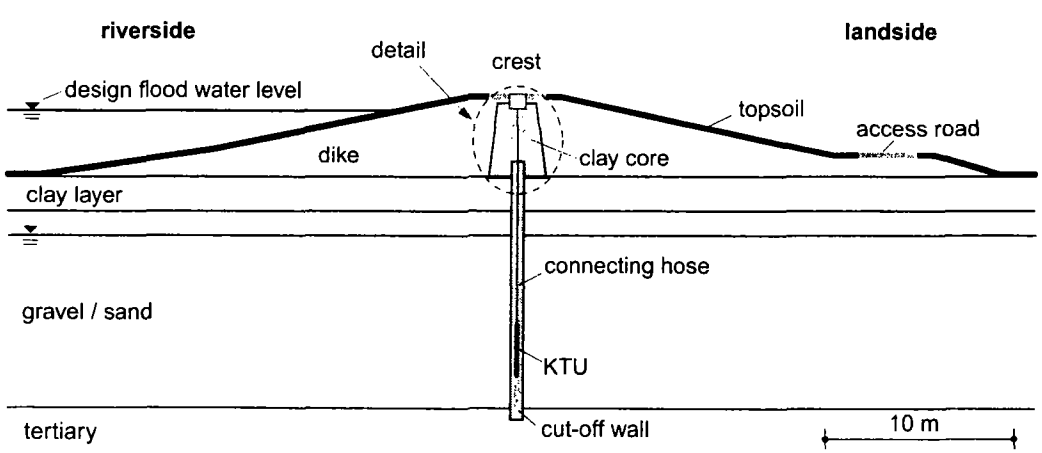

Figure 3. Cross section of the dike with subsoil and cut-off wall (detail: cf. figure 5).

In addition to the initial application a method had to be developed to lead the connecting hose with the supply tubes through the body of the dike, in particular through the clay core which has to act as a seal. When doing this there is also an opportunity to determine the permeability of the cut-off wall beyond the ground water table with regard to the behaviour depending on whether it is loaded under flood water conditions. In particular, the influence of the desiccation process of the cut-off wall material with regard to the hydraulic permeability can be investigated.

The cross section of the dike is presented in figure 3. The dike with the clay core and an access road located on the landside is based on a clay layer with a thickness of about 2.0 m deposited by fluvial processes, overlying a gravel and sand layer at least 10 m thick. Underneath a tertiary layer with a low hydraulic permeability adjoins this.

With this picture in mind it is obvious that the installation process has to be separated into different steps. The first step consists of hanging the KTU into the fresh slurry of the cut-off wall (cf. figure 4). After the hardening process of the fresh slurry, work takes place to build the body of the dike in several layers. In order to protect the connecting hose is led inside a plastic pipe through the clay core up to the crest of the dike (cf. figure 5). The pipe ends in a manhole consisting of concrete elements at the top of the dike.

Figure 4. KTU just before installation into the fresh slurry of the cut-off wall.

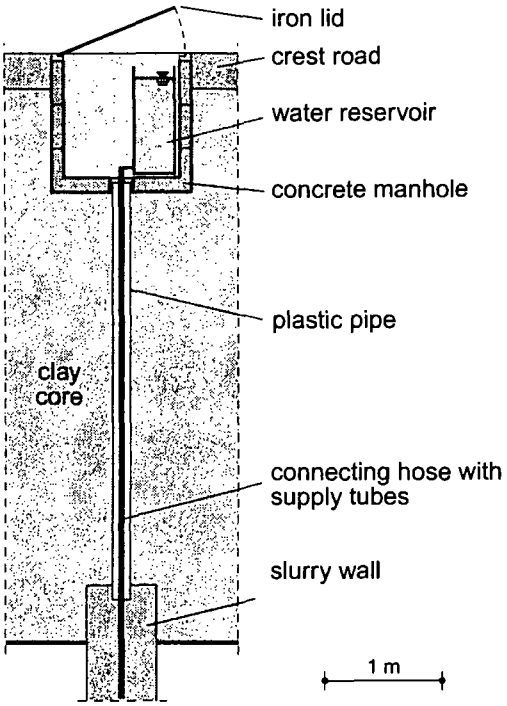

Figure 5. Cross section of the dike with cut-off wall, clay core and manhole for test equipment (cf. figure 3, detail).

The water reservoir and the supply tubes are placed inside the manhole, which can be covered with an iron lid (cf. figure 6). As a result of this construction all the measurement elements are well protected on the one hand, whilst on the other hand, everything is easily accessible, so that long time measurements can be carried out as well.

Figure 6. Manhole, located in the crest of the dike, with water barrel and supply tubes.

Since the installation process of the KTU on this site, two measurements have been carried out with two different KTUs. One KTU is located below the ground water table, and one above it. The evaluated hydraulic permeability values are presented in figure 7 in accordance with equation (1). The first reading was taken after 3 months, the second after one year. The hydraulic permeability values of both units are satisfactory, since the values are less than required according to the quality assurance system. Also the process of decreasing permeability is as expected. Further readings, which will be taken in coming years, will show the behaviour of the hydraulic permeability depending on the position related to the ground water level.

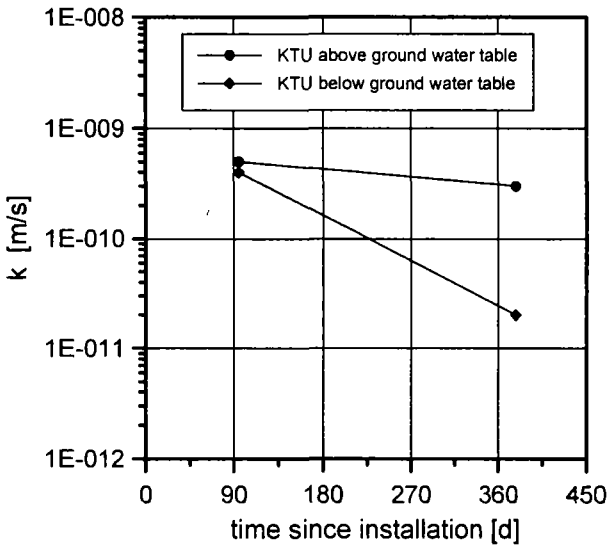

Figure 7. Example of a measuring result, evaluated as a wall permeability coefficient from a one phase cut-off wall.

5 CONCLUDING REMARKS

In this article, a testing technique for the determination of the permeability of individual cut-off wall panels in situ is described. Furthermore, the installation of the unit inside a cut-off wall underneath a flood water dike and some successful measurements are presented.

The unit is designed for practical use and for this reason is composed mainly of commonly available parts, in addition to a few specially made elements. It is intended that the unit be assembled ready for use in a workshop so that it only needs to be suspended in the newly made open cut-off wall on site. The length of the test stretch can be more or less selected as required and prefabricated (in meter steps). Special measures are necessary to prevent the formation of filter cakes around the testing unit cover during the period of installation in the cut-off wall material, which has not yet hardened. It was seen that it is possible to solve this problem.

The testing unit remains in the cut-off wall to be monitored and is thus completely constructed out of non-degradable and otherwise durable materials. As a result, once a KTU has been installed, it is available for reuse at the testing site for a long period of time.

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Appendix 2

Appendix 2
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Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
01-Feb-06	382.59	384.68	384.29	0.00097	102.90	384.48	383.87	0.00223	94.37	0.00160	98.63	496	713,860	511	736,230	15.53	3.13
02-Feb-06	382.09	384.73	384.33	0.00100	102.94	384.54	383.88	0.00241	94.38	0.00170	98.66	529	761,052	545	785,099	16.70	3.16
03-Feb-06	382.09	384.70	384.27	0.00108	102.88	384.47	383.80	0.00246	94.30	0.00177	98.59	550	792,581	567	817,033	16.98	3.09
04-Feb-06	382.17	384.73	384.27	0.00115	102.88	384.48	383.83	0.00238	94.33	0.00176	98.60	546	786,858	563	811,268	16.95	3.10
05-Feb-06	382.27	384.74	384.34	0.00100	102.95	384.54	383.91	0.00229	94.41	0.00164	98.68	510	733,786	526	757,150	16.23	3.18
06-Feb-06	382.09	384.72	384.28	0.00108	102.89	384.51	383.86	0.00237	94.36	0.00172	98.63	534	768,995	551	793,052	16.71	3.13
07-Feb-06	381.87	384.78	384.34	0.00109	102.95	384.53	383.90	0.00231	94.40	0.00170	98.68	526	758,159	543	782,251	16.73	3.18
08-Feb-06	381.74	384.74	384.28	0.00115	102.89	384.56	383.85	0.00259	94.35	0.00187	98.62	579	834,341	597	860,361	18.07	3.12
09-Feb-06	381.69	384.71	384.29	0.00104	102.90	384.51	383.83	0.00250	94.33	0.00177	98.61	550	791,643	567	816,273	17.10	3.11
10-Feb-06	381.07	384.72	384.19	0.00133	102.80	384.47	383.74	0.00268	94.24	0.00200	98.52	621	894,652	640	921,596	18.71	3.01
11-Feb-06	380.67	384.53	384.04	0.00121	102.65	384.37	383.54	0.00303	94.04	0.00212	98.35	658	946,959	676	973,800	18.64	2.83
12-Feb-06	380.25	384.48	383.94	0.00134	102.55	384.24	383.45	0.00292	93.95	0.00213	98.25	661	951,131	679	977,093	18.03	2.73
13-Feb-06	380.40	384.44	383.92	0.00130	102.53	384.22	383.41	0.00296	93.91	0.00213	98.22	661	951,451	679	977,144	17.84	2.70
14-Feb-06	380.45	384.39	383.86	0.00132	102.47	384.16	383.35	0.00296	93.85	0.00214	98.16	664	956,091	681	981,316	17.52	2.64
15-Feb-06	380.25	384.35	383.79	0.00139	102.40	384.10	383.30	0.00292	93.80	0.00215	98.10	668	962,232	685	987,023	17.22	2.58
16-Feb-06	380.78	384.33	383.79	0.00133	102.40	384.07	383.27	0.00297	93.77	0.00215	98.08	666	959,522	683	984,069	17.05	2.56
17-Feb-06	381.63	384.28	383.79	0.00122	102.40	384.01	383.33	0.00250	93.83	0.00186	98.12	577	831,085	592	852,626	14.96	2.59
18-Feb-06	381.63	384.36	383.94	0.00104	102.55	384.15	383.48	0.00245	93.98	0.00175	98.27	542	780,353	557	801,793	14.89	2.75
19-Feb-06	379.21	384.32	383.75	0.00142	102.36	384.12	383.29	0.00306	93.79	0.00224	98.07	695	1,000,328	712	1,025,781	17.68	2.54
20-Feb-06	378.06	384.12	383.43	0.00170	102.04	383.89	382.90	0.00365	93.40	0.00267	97.72	830	1,194,751	848	1,220,781	18.08	2.18
21-Feb-06	378.09	384.03	383.29	0.00182	101.90	383.76	382.72	0.00382	93.22	0.00282	97.56	875	1,259,597	892	1,284,952	17.61	2.01
22-Feb-06	378.03	383.93	383.17	0.00190	101.78	383.67	382.59	0.00395	93.09	0.00292	97.43	907	1,305,564	924	1,330,098	17.04	1.88
23-Feb-06	378.29	383.81	383.09	0.00179	101.70	383.54	382.49	0.00386	92.99	0.00283	97.34	877	1,263,600	893	1,286,131	15.65	1.78
24-Feb-06	379.35	383.85	383.22	0.00159	101.83	383.60	382.65	0.00347	93.15	0.00253	97.49	785	1,130,761	800	1,152,648	15.20	1.94
25-Feb-06	380.34	383.83	383.25	0.00144	101.86	383.57	382.71	0.00314	93.21	0.00229	97.54	711	1,023,422	725	1,043,730	14.10	1.98
26-Feb-06	380.44	383.95	383.39	0.00138	102.00	383.68	382.92	0.00279	93.42	0.00209	97.71	648	932,800	662	952,993	14.02	2.16
27-Feb-06	379.98	384.01	383.44	0.00141	102.05	383.78	382.95	0.00307	93.45	0.00224	97.75	695	1,000,167	710	1,022,243	15.33	2.21
28-Feb-06	379.87	383.92	383.36	0.00139	101.97	383.67	382.83	0.00309	93.33	0.00224	97.65	695	1,001,021	710	1,022,093	14.63	2.11
01-Mar-06	380.01	383.92	383.36	0.00142	101.97	383.65	382.83	0.00302	93.33	0.00222	97.65	689	991,524	703	1,012,366	14.47	2.10
02-Mar-06	379.99	383.80	383.24	0.00141	101.85	383.53	382.70	0.00307	93.20	0.00224	97.52	694	999,714	708	1,019,409	13.68	1.97
03-Mar-06	380.08	383.78	383.22	0.00140	101.83	383.54	382.74	0.00295	93.24	0.00218	97.53	675	971,741	688	990,997	13.37	1.98
04-Mar-06	379.92	383.81	383.27	0.00135	101.88	383.56	382.79	0.00282	93.29	0.00208	97.58	646	930,293	659	949,218	13.14	2.03
05-Mar-06	379.58	383.84	383.25	0.00146	101.86	383.58	382.73	0.00313	93.23	0.00229	97.55	711	1,023,704	725	1,044,146	14.20	2.00
06-Mar-06	379.40	383.74	383.13	0.00151	101.74	383.46	382.58	0.00327	93.08	0.00239	97.41	740	1,066,289	754	1,086,032	13.71	1.85
07-Mar-06	379.90	383.80	383.22	0.00144	101.83	383.52	382.70	0.00303	93.20	0.00224	97.51	693	998,347	707	1,017,904	13.58	1.96
08-Mar-06	380.41	383.94	383.41	0.00132	102.02	383.67	382.92	0.00278	93.42	0.00205	97.72	636	915,601	650	935,523	13.83	2.18
09-Mar-06	380.02	383.93	383.40	0.00133	102.01	383.71	383.06	0.00239	93.56	0.00186	97.78	577	830,346	590	848,972	12.93	2.24
10-Mar-06	380.33	383.75	383.22	0.00133	101.83	383.47	382.67	0.00293	93.17	0.00213	97.50	661	952,358	674	970,883	12.86	1.95
11-Mar-06	381.70	383.89	383.46	0.00106	102.07	383.61	382.99	0.00228	93.49	0.00167	97.78	518	745,288	529	761,987	11.60	2.24
12-Mar-06	383.70	384.13	383.80	0.00083	102.41	383.85	383.37	0.00179	93.87	0.00131	98.14	406	584,545	417	599,825	10.61	2.61
13-Mar-06	384.72	384.33	384.06	0.00065	102.67	384.05	383.66	0.00146	94.16	0.00105	98.41	327	471,067	337	484,746	9.50	2.90
14-Mar-06	386.30	384.50	384.33	0.00042	102.94	384.20	383.97	0.00083	94.47	0.00063	98.70	195	281,014	201	290,022	6.26	3.21
15-Mar-06	390.22	384.90	385.01	(0.00029)	103.62	384.65	384.82	(0.00065)	95.32	(0.00047)	99.47	0	0	0	0	0	0
16-Mar-06	387.24	385.01	385.02	(0.00002)	103.63	384.82	384.85	(0.00012)	95.35	(0.00007)	99.49	0	0	0	0	0	0
17-Mar-06	387.99	385.17	385.20	(0.00009)	103.81	384.91	384.98	(0.00025)	95.48	(0.00017)	99.65	0	0	0	0	0	0
18-Mar-06	388.34	385.37	385.45	(0.00021)	104.06	385.18	385.27	(0.00033)	95.77	(0.00027)	99.92	0	0	0	0	0	0
19-Mar-06	387.81	385.51	385.60	(0.00021)	104.21	385.34	385.42	(0.00028)	95.92	(0.00025)	100.06	0	0	0	0	0	0
20-Mar-06	386.72	385.64	385.62	0.00005	104.23	385.45	385.43	0.00006	95.93	0.00005	100.08	17	23,880	17	24,989	0.77	4.65
21-Mar-06	387.21	385.66	385.64	0.00006	104.25	385.42	385.38	0.00014	95.88	0.00010	100.06	31	45,142	33	47,230	1.45	4.63
22-Mar-06	386.83	385.77	385.71	0.00016	104.32	385.51	385.48	0.00011	95.98	0.00013	100.15	42	60,038	44	62,869	1.97	4.72
23-Mar-06	386.06	385.87	385.79	0.00019	104.40	385.61	385.48	0.00049	95.98	0.00034	100.19	104	150,346	109	157,502	4.97	4.76
24-Mar-06	386.03	385.94	385.86	0.00021	104.47	385.68	385.46	0.00080	95.96	0.00050	100.22	156	225,108	164	235,884	7.48	4.79
25-Mar-06	385.73	385.93	385.80	0.00032	104.41	385.72	385.51	0.00079	96.01	0.00056	100.21	173	248,629	181	260,509	8.25	4.78
26-Mar-06	385.37	385.95	385.81	0.00036	104.42	385.75	385.45	0.00110	95.95	0.00073	100.18	227	327,336	238	342,890	10.80	4.75
27-Mar-06	385.22	386.03	385.85	0.00045	104.46	385.78	385.46	0.00118	95.96	0.00081	100.21	252	363,302	264	380,676	12.07	4.78
28-Mar-06	385.14	385.97	385.77	0.00049	104.38	385.72	385.36	0.00087	95.86	0.00068	100.12	211	304,161	221	318,422	9.90	4.69
29-Mar-06	385.07	386.00	385.83	0.00044	104.44	385.77	385.42	0.00089	95.92	0.00066	100.18	206	296,291	216	310,350	9.76	4.75
30-Mar-06	384.62	386.03	385.79	0.00060	104.40	385.82	385.39	0.00105	95.89	0.00083	100.14	257	370,364	269	387,819	12.12	4.71
31-Mar-06	385.32	386.02	385.81	0.00052	104.42	385.80	385.42	0.00094	95.92	0.00073	100.17	226	325,457	237	340,884	10.71	4.74
											1Q06 Total Gallons		40,788,644		41,838,679		
01-Apr-06	385.27	386.08	385.82	0.00064	104.43	385.81	385.46	0.00131	95.96	0.00098	100.19	303	435,789	317	456,552	14.42	4.76
02-Apr-06	386.42	386.28	386.12	0.00038	104.73	386.02	385.78	0.00088	96.28	0.00063	100.51	196	282,350	206	296,724	9.98	5.09
03-Apr-06	387.56	386.37	386.29	0.00021	104.90	386.11	385.93	0.00066	96.43	0.00044	100.66	135	194,329	142	204,538	7.09	5.25
04-Apr-06	389.36	386.51	386.56	(0.00014)	105.17	386.26	386.26	(0.00001)	96.76	(0.00008)	100.97	0	0	0	0	0	0
05-Apr-06	390.94	386.75	386.92	(0.00041)	105.53	386.53	386.76	(0.00086)	97.26	(0.00063)	101.39	0	0	0	0	0	0
06-Apr-06	390.32	386.95	387.07	(0.00029)	105.68	386.73	386.94	(0.00079)	97.44	(0.00054)	101.56	0	0	0	0	0	0

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
07-Apr-06	392.01	387.11	387.33	(0.00053)	105.94	386.85	387.19	(0.00125)	97.69	(0.00089)	101.81	0	0	0	0	0	0
08-Apr-06	394.39	387.28	387.68	(0.00099)	106.29	387.01	387.64	(0.00230)	98.14	(0.00165)	102.22	0	0	0	0	0	0
09-Apr-06	395.61	387.58	388.10	(0.00131)	106.71	387.34	388.20	(0.00317)	98.70	(0.00224)	102.71	0	0	0	0	0	0
10-Apr-06	395.41	387.83	388.38	(0.00137)	106.99	387.60	388.52	(0.00340)	99.02	(0.00239)	103.01	0	0	0	0	0	0
11-Apr-06	395.02	388.00	388.54	(0.00133)	107.15	387.80	388.71	(0.00335)	99.21	(0.00234)	103.18	0	0	0	0	0	0
12-Apr-06	394.98	388.12	388.64	(0.00129)	107.25	387.90	388.80	(0.00331)	99.30	(0.00230)	103.28	0	0	0	0	0	0
13-Apr-06	394.95	388.35	388.87	(0.00130)	107.48	388.13	389.03	(0.00329)	99.53	(0.00230)	103.50	0	0	0	0	0	0
14-Apr-06	394.93	388.57	389.08	(0.00127)	107.69	388.35	389.23	(0.00324)	99.73	(0.00226)	103.71	0	0	0	0	0	0
15-Apr-06	394.97	388.70	389.21	(0.00125)	107.82	388.48	389.35	(0.00321)	99.85	(0.00223)	103.83	0	0	0	0	0	0
16-Apr-06	395.00	388.87	389.39	(0.00130)	108.00	388.64	389.50	(0.00316)	100.00	(0.00223)	104.00	0	0	0	0	0	0
17-Apr-06	395.27	388.97	389.48	(0.00125)	108.09	388.74	389.59	(0.00312)	100.09	(0.00219)	104.09	0	0	0	0	0	0
18-Apr-06	395.41	389.16	389.65	(0.00122)	108.26	388.92	389.84	(0.00340)	100.34	(0.00231)	104.30	0	0	0	0	0	0
19-Apr-06	395.68	389.26	389.77	(0.00127)	108.38	389.03	389.93	(0.00331)	100.43	(0.00229)	104.41	0	0	0	0	0	0
20-Apr-06	395.81	389.43	389.96	(0.00132)	108.57	389.20	390.11	(0.00336)	100.61	(0.00234)	104.59	0	0	0	0	0	0
21-Apr-06	395.94	389.58	390.09	(0.00126)	108.70	389.35	390.25	(0.00328)	100.75	(0.00227)	104.72	0	0	0	0	0	0
22-Apr-06	395.84	389.66	390.23	(0.00142)	108.84	389.52	390.37	(0.00315)	100.87	(0.00228)	104.86	0	0	0	0	0	0
23-Apr-06	395.70	389.82	390.26	(0.00109)	108.87	389.60	390.47	(0.00320)	100.97	(0.00214)	104.92	0	0	0	0	0	0
24-Apr-06	395.57	389.91	390.35	(0.00110)	108.96	389.74	390.54	(0.00295)	101.04	(0.00202)	105.00	0	0	0	0	0	0
25-Apr-06	395.52	390.01	390.45	(0.00108)	109.06	389.82	390.61	(0.00289)	101.11	(0.00199)	105.08	0	0	0	0	0	0
26-Apr-06	395.46	390.16	390.56	(0.00099)	109.17	389.93	390.69	(0.00280)	101.19	(0.00190)	105.18	0	0	0	0	0	0
27-Apr-06	395.17	390.15	390.63	(0.00119)	109.24	389.99	390.68	(0.00254)	101.18	(0.00186)	105.21	0	0	0	0	0	0
28-Apr-06	394.53	390.27	390.59	(0.00078)	109.20	390.07	390.62	(0.00137)	101.12	(0.00107)	105.16	0	0	0	0	0	0
29-Apr-06	393.90	390.33	390.63	(0.00075)	109.24	390.13	390.62	(0.00122)	101.12	(0.00098)	105.18	0	0	0	0	0	0
30-Apr-06	393.45	390.35	390.61	(0.00063)	109.22	390.15	390.50	(0.00089)	101.00	(0.00076)	105.11	0	0	0	0	0	0
01-May-06	392.98	390.31	390.51	(0.00049)	109.12	390.13	390.73	(0.00220)	101.23	(0.00134)	105.17	0	0	0	0	0	0
02-May-06	393.35	390.40	390.60	(0.00049)	109.21	390.19	390.53	(0.00124)	101.03	(0.00086)	105.12	0	0	0	0	0	0
03-May-06	393.40	390.45	390.69	(0.00059)	109.30	390.23	390.62	(0.00141)	101.12	(0.00100)	105.21	0	0	0	0	0	0
04-May-06	395.45	390.59	390.90	(0.00079)	109.51	390.37	390.96	(0.00214)	101.46	(0.00147)	105.48	0	0	0	0	0	0
05-May-06	398.57	390.92	391.43	(0.00126)	110.04	390.69	391.80	(0.00411)	102.30	(0.00268)	106.17	0	0	0	0	0	0
06-May-06	398.69	391.06	391.70	(0.00161)	110.31	390.92	392.14	(0.00445)	102.64	(0.00303)	106.47	0	0	0	0	0	0
07-May-06	397.89	391.25	391.77	(0.00129)	110.38	391.04	392.16	(0.00411)	102.66	(0.00270)	106.52	0	0	0	0	0	0
08-May-06	396.26	391.28	391.71	(0.00107)	110.32	391.09	391.91	(0.00301)	102.41	(0.00204)	106.36	0	0	0	0	0	0
09-May-06	394.75	391.27	391.56	(0.00074)	110.17	391.08	391.61	(0.00195)	102.11	(0.00135)	106.14	0	0	0	0	0	0
10-May-06	394.20	391.24	391.52	(0.00069)	110.13	391.08	391.53	(0.00165)	102.03	(0.00117)	106.08	0	0	0	0	0	0
11-May-06	395.01	391.34	391.58	(0.00061)	110.19	391.13	391.63	(0.00187)	102.13	(0.00124)	106.16	0	0	0	0	0	0
12-May-06	395.01	391.37	391.62	(0.00061)	110.23	391.18	391.69	(0.00189)	102.19	(0.00125)	106.21	0	0	0	0	0	0
13-May-06	394.62	391.37	391.59	(0.00054)	110.20	391.18	391.57	(0.00142)	102.07	(0.00098)	106.13	0	0	0	0	0	0
14-May-06	395.15	391.46	391.69	(0.00058)	110.30	391.25	391.70	(0.00164)	102.20	(0.00111)	106.25	0	0	0	0	0	0
15-May-06	395.24	391.51	391.74	(0.00057)	110.35	391.30	391.79	(0.00182)	102.29	(0.00120)	106.32	0	0	0	0	0	0
16-May-06	394.42	391.59	391.77	(0.00045)	110.38	391.36	391.70	(0.00126)	102.20	(0.00085)	106.29	0	0	0	0	0	0
17-May-06	393.66	391.57	391.66	(0.00023)	110.27	391.34	391.54	(0.00072)	102.04	(0.00047)	106.15	0	0	0	0	0	0
18-May-06	392.84	391.51	391.50	0.00004	110.11	391.23	391.26	(0.00010)	101.76	0.00002	105.93	6	9,259	7	10,256	0.69	10.77
19-May-06	392.68	391.44	391.46	(0.00006)	110.07	391.21	391.20	0.00001	101.70	0.00001	105.89	2	2,395	2	2,651	0.18	10.72
20-May-06	392.64	391.40	391.42	(0.00006)	110.03	391.16	391.13	0.00013	101.63	0.00007	105.83	21	29,764	23	32,935	2.20	10.66
21-May-06	392.61	391.44	391.47	(0.00007)	110.08	391.19	391.14	0.00015	101.64	0.00007	105.86	23	33,185	26	36,732	2.46	10.69
22-May-06	392.42	391.38	391.37	0.00003	109.98	391.12	391.07	0.00017	101.57	0.00010	105.78	30	43,661	34	48,289	3.21	10.60
23-May-06	392.09	391.39	391.35	0.00009	109.96	391.12	391.04	0.00031	101.54	0.00020	105.75	61	88,098	68	97,414	6.47	10.57
24-May-06	392.01	391.46	391.38	0.00019	109.99	391.18	391.06	0.00043	101.56	0.00031	105.77	97	139,641	107	154,442	10.28	10.60
25-May-06	392.12	391.45	391.44	0.00003	110.05	391.23	391.12	0.00037	101.62	0.00020	105.84	62	88,920	68	98,401	6.58	10.66
26-May-06	391.83	391.35	391.31	0.00011	109.92	391.12	391.01	0.00043	101.51	0.00027	105.71	85	121,817	94	134,649	8.91	10.53
27-May-06	391.29	391.25	391.19	0.00014	109.80	391.04	390.87	0.00063	101.37	0.00039	105.58	120	173,125	133	191,129	12.50	10.40
28-May-06	390.83	391.12	391.03	0.00024	109.64	390.91	390.69	0.00055	101.19	0.00039	105.41	122	176,386	135	194,417	12.52	10.22
29-May-06	390.36	391.03	390.91	0.00029	109.52	390.78	390.51	0.00067	101.01	0.00048	105.27	148	213,191	163	234,655	14.91	10.07
30-May-06	389.70	390.93	390.76	0.00043	109.37	390.66	390.30	0.00090	100.80	0.00066	105.09	206	296,573	226	325,875	20.35	9.88
31-May-06	388.97	390.76	390.57	0.00047	109.18	390.48	390.04	0.00109	100.54	0.00078	104.86	242	348,605	265	382,222	23.35	9.64
01-Jun-06	389.00	390.70	390.43	0.00068	109.04	390.39	389.89	0.00183	100.39	0.00125	104.72	389	560,339	426	613,534	36.94	9.49
02-Jun-06	390.32	390.77	390.58	0.00047	109.19	390.43	390.10	0.00119	100.60	0.00083	104.90	258	371,917	283	407,922	25.00	9.68
03-Jun-06	391.57	390.99	390.93	0.00016	109.54	390.71	390.52	0.00069	101.02	0.00042	105.28	131	189,228	145	208,300	13.24	10.08
04-Jun-06	390.86	391.03	390.93	0.00025	109.54	390.79	390.57	0.00081	101.07	0.00053	105.30	164	235,499	180	259,304	16.53	10.11
05-Jun-06	389.73	390.84	390.67	0.00043	109.28	390.59	390.24	0.00128	100.74	0.00085	105.01	265	381,172	291	418,523	25.94	9.80
06-Jun-06	389.19	390.76	390.52	0.00059	109.13	390.47	390.07	0.00144	100.57	0.00101	104.85	315	453,324	345	497,007	30.33	9.64
07-Jun-06	388.31	390.55	390.27	0.00070	108.88	390.27	389.79	0.00176	100.29	0.00123	104.59	382	549,563	417	600,992	35.71	9.36
08-Jun-06	387.41	390.34	389.99	0.00086	108.60	390.05	389.49	0.00205	99.99	0.00145	104.30	450	648,602	491	707,336	40.79	9.06
09-Jun-06	386.34	390.18	389.74	0.00111	108.35	389.88	389.19	0.00253	99.69	0.00182	104.02	563	811,126	613	882,193	49.35	8.76
10-Jun-06	385.24	389.94	389.43	0.00128	108.04	389.64	388.82	0.00301	99.32	0.00215	103.68	666	958,574	722	1,039,152	55.96	8.41
11-Jun-06	385.33	389.72	389.25	0.00117	107.86	389.43	388.51	0.00335	99.01	0.00226	103.44	700	1,008,617	758	1,090,890	57.13	8.16

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
12-Jun-06	386.06	389.65	389.17	0.00119	107.78	389.31	388.54	0.00283	99.04	0.00201	103.41	624	898,650	675	971,705	50.73	8.13
13-Jun-06	386.75	389.67	389.24	0.00105	107.85	389.30	388.65	0.00241	99.15	0.00173	103.50	535	770,674	579	834,045	44.01	8.22
14-Jun-06	386.42	389.57	389.13	0.00109	107.74	389.24	388.58	0.00245	99.08	0.00177	103.41	550	792,269	595	856,639	44.70	8.12
15-Jun-06	385.83	389.46	389.01	0.00112	107.62	389.12	388.41	0.00263	98.91	0.00188	103.27	582	837,630	628	904,445	46.40	7.98
16-Jun-06	385.75	389.39	388.91	0.00121	107.52	389.04	388.33	0.00261	98.83	0.00191	103.17	592	852,627	639	919,821	46.66	7.88
17-Jun-06	379.42	389.37	388.83	0.00133	107.44	389.00	388.22	0.00286	98.72	0.00210	103.08	650	935,826	700	1,008,661	50.58	7.78
18-Jun-06	384.72	389.19	388.66	0.00132	107.27	388.85	388.05	0.00296	98.55	0.00214	102.91	663	954,712	713	1,027,312	50.42	7.60
19-Jun-06	384.45	389.04	388.49	0.00138	107.10	388.69	387.87	0.00302	98.37	0.00220	102.73	682	982,738	733	1,055,660	50.64	7.42
20-Jun-06	383.36	388.84	388.19	0.00160	106.80	388.50	387.57	0.00343	98.07	0.00252	102.44	781	1,124,875	837	1,204,833	55.53	7.11
21-Jun-06	383.62	388.71	388.06	0.00162	106.67	388.36	387.40	0.00351	97.90	0.00256	102.29	794	1,144,054	850	1,223,608	55.25	6.95
22-Jun-06	383.26	388.60	387.94	0.00164	106.55	388.22	387.28	0.00344	97.78	0.00254	102.16	788	1,135,040	842	1,212,503	53.79	6.82
23-Jun-06	383.06	388.42	387.75	0.00167	106.36	388.07	387.11	0.00351	97.61	0.00259	101.99	805	1,158,637	858	1,235,548	53.41	6.64
24-Jun-06	383.18	388.36	387.67	0.00172	106.28	387.98	387.03	0.00348	97.53	0.00260	101.90	807	1,162,785	860	1,238,975	52.91	6.55
25-Jun-06	383.53	388.28	387.69	0.00148	106.30	387.92	387.04	0.00324	97.54	0.00236	101.92	732	1,053,408	780	1,122,602	48.05	6.57
26-Jun-06	383.68	388.24	387.58	0.00165	106.19	387.86	386.99	0.00322	97.49	0.00243	101.84	755	1,086,601	804	1,157,055	48.93	6.48
27-Jun-06	383.54	388.10	387.50	0.00151	106.11	387.78	386.87	0.00335	97.37	0.00243	101.74	753	1,084,310	801	1,153,493	48.04	6.38
28-Jun-06	383.73	388.07	387.44	0.00155	106.05	387.73	386.89	0.00209	97.39	0.00182	101.72	565	813,412	601	865,147	35.93	6.36
29-Jun-06	383.60	387.97	387.39	0.00145	106.00	387.67	386.80	0.00215	97.30	0.00180	101.65	558	803,921	593	854,456	35.09	6.29
30-Jun-06	383.76	387.94	387.38	0.00139	105.99	387.60	386.75	0.00213	97.25	0.00176	101.62	546	785,866	580	835,035	34.14	6.26
											2Q06 Total Gallons		69,671,302		72,885,406		
01-Jul-06	384.02	387.92	387.37	0.00135	105.98	387.55	386.74	0.00297	97.24	0.00216	101.61	671	966,345	713	1,026,734	41.94	6.25
02-Jul-06	383.51	387.84	387.26	0.00143	105.87	387.48	386.67	0.00297	97.17	0.00220	101.52	683	982,891	725	1,043,393	42.02	6.16
03-Jul-06	382.21	387.69	387.04	0.00163	105.65	387.35	386.43	0.00341	96.93	0.00252	101.29	782	1,125,530	828	1,192,018	46.17	5.91
04-Jul-06	381.45	387.51	386.81	0.00175	105.42	387.18	386.17	0.00374	96.67	0.00274	101.04	851	1,225,593	899	1,294,844	48.09	5.65
05-Jul-06	381.07	387.32	386.61	0.00176	105.22	386.99	385.94	0.00388	96.44	0.00282	100.83	875	1,259,855	922	1,328,218	47.47	5.43
06-Jul-06	380.96	387.17	386.43	0.00183	105.04	386.83	385.74	0.00400	96.24	0.00292	100.64	905	1,302,955	952	1,371,118	47.34	5.23
07-Jul-06	381.38	387.10	386.39	0.00175	105.00	386.76	385.70	0.00388	96.20	0.00281	100.60	873	1,256,725	918	1,321,956	45.30	5.19
08-Jul-06	381.27	387.08	386.36	0.00179	104.97	386.71	385.67	0.00384	96.17	0.00281	100.57	873	1,256,979	918	1,321,776	45.00	5.16
09-Jul-06	379.89	386.90	386.09	0.00201	104.70	386.57	385.42	0.00421	95.92	0.00311	100.31	966	1,390,564	1013	1,458,506	47.18	4.89
10-Jul-06	378.73	386.68	385.77	0.00227	104.38	386.31	385.04	0.00467	95.54	0.00347	99.96	1075	1,548,419	1124	1,618,401	48.60	4.52
11-Jul-06	378.68	386.52	385.60	0.00230	104.21	386.12	384.83	0.00474	95.33	0.00352	99.77	1092	1,571,785	1139	1,639,680	47.15	4.32
12-Jul-06	378.61	386.33	385.39	0.00234	104.00	385.97	384.64	0.00487	95.14	0.00361	99.57	1118	1,610,345	1164	1,676,604	46.01	4.11
13-Jul-06	379.25	380.22	379.33	0.00221	97.94	379.82	378.54	0.00470	89.04	0.00345	93.49	1071	1,542,078	1047	1,507,487	-24.02	-2.24
14-Jul-06	380.67	386.24	385.44	0.00201	104.05	385.85	384.72	0.00416	95.22	0.00308	99.63	957	1,377,674	997	1,435,238	39.98	4.18
15-Jul-06	381.08	386.18	385.47	0.00176	104.08	385.84	384.78	0.00388	95.28	0.00282	99.68	874	1,258,930	911	1,312,161	36.97	4.23
16-Jul-06	380.65	386.14	385.38	0.00189	103.99	385.79	384.72	0.00393	95.22	0.00291	99.61	903	1,300,291	940	1,354,240	37.46	4.15
17-Jul-06	381.13	386.10	385.39	0.00178	104.00	385.76	384.76	0.00365	95.26	0.00271	99.63	842	1,212,011	877	1,262,604	35.13	4.17
18-Jul-06	381.16	386.07	385.36	0.00176	103.97	385.71	384.77	0.00345	95.27	0.00261	99.62	808	1,164,175	842	1,212,665	33.67	4.17
19-Jul-06	380.78	386.04	385.33	0.00176	103.94	385.67	384.68	0.00366	95.18	0.00271	99.56	840	1,209,998	875	1,259,626	34.46	4.10
20-Jul-06	380.57	386.13	385.44	0.00170	104.05	385.88	384.78	0.00403	95.28	0.00287	99.67	889	1,280,399	927	1,334,341	37.46	4.21
21-Jul-06	381.06	385.91	385.29	0.00153	103.90	385.64	384.60	0.00383	95.10	0.00268	99.50	830	1,195,558	864	1,243,878	33.56	4.04
22-Jul-06	381.07	385.94	385.30	0.00160	103.91	385.62	384.67	0.00346	95.17	0.00253	99.54	784	1,129,192	816	1,175,262	31.99	4.08
23-Jul-06	380.66	385.84	385.23	0.00153	103.84	385.56	384.59	0.00356	95.09	0.00254	99.46	789	1,135,930	820	1,181,368	31.55	4.00
24-Jul-06	379.95	385.78	385.07	0.00175	103.68	385.45	384.46	0.00364	94.96	0.00269	99.32	836	1,203,366	868	1,249,701	32.18	3.85
25-Jul-06	379.98	385.70	385.00	0.00173	103.61	385.37	384.33	0.00382	94.83	0.00278	99.22	862	1,240,827	894	1,287,292	32.27	3.74
26-Jul-06	379.84	385.65	384.92	0.00181	103.53	385.30	384.28	0.00376	94.78	0.00278	99.16	864	1,243,809	896	1,289,565	31.78	3.68
27-Jul-06	379.62	385.51	384.82	0.00172	103.43	385.20	384.12	0.00398	94.62	0.00285	99.02	884	1,273,518	916	1,318,619	31.32	3.54
28-Jul-06	380.03	385.49	384.76	0.00182	103.37	385.13	384.10	0.00257	94.60	0.00219	98.98	680	979,613	704	1,013,890	23.80	3.50
29-Jul-06	380.57	385.50	384.78	0.00180	103.39	385.17	384.15	0.00253	94.65	0.00217	99.02	672	967,233	695	1,001,434	23.75	3.54
30-Jul-06	380.48	385.53	NA	NC(D)	NC(D)	385.28	384.25	0.00257	94.75	0.00128	94.75	398	573,662	395	568,332	-3.70	-0.93
31-Jul-06	379.87	385.42	384.67	0.00187	103.28	385.11	384.08	0.00257	94.58	0.00222	98.93	690	992,966	713	1,027,147	23.74	3.44
01-Aug-06	379.50	385.33	384.59	0.00184	103.20	384.98	383.96	0.00377	94.46	0.00281	98.83	872	1,254,989	901	1,296,832	29.06	3.33
02-Aug-06	378.53	385.19	384.44	0.00187	103.05	384.88	383.79	0.00402	94.29	0.00294	98.67	913	1,314,245	942	1,355,892	28.92	3.17
03-Aug-06	377.89	385.00	384.22	0.00196	102.83	384.70	383.51	0.00437	94.01	0.00317	98.42	982	1,413,754	1010	1,454,876	28.56	2.91
04-Aug-06	378.26	384.97	384.15	0.00204	102.76	384.62	383.46	0.00425	93.96	0.00315	98.36	976	1,404,893	1003	1,444,922	27.80	2.85
05-Aug-06	379.09	384.90	384.18	0.00181	102.79	384.59	383.50	0.00401	94.00	0.00291	98.40	901	1,297,852	927	1,335,288	26.00	2.88
06-Aug-06	380.32	384.95	384.26	0.00172	102.87	384.63	383.66	0.00359	94.16	0.00265	98.51	823	1,184,659	847	1,220,268	24.73	3.01
07-Aug-06	380.34	384.97	384.33	0.00160	102.94	384.65	383.73	0.00339	94.23	0.00249	98.58	773	1,113,334	797	1,147,594	23.79	3.08
08-Aug-06	380.37	384.95	384.33	0.00155	102.94	384.65	383.73	0.00337	94.23	0.00246	98.58	763	1,099,043	787	1,132,907	23.52	3.08
09-Aug-06	380.48	384.94	384.29	0.00161	102.90	384.63	383.72	0.00335	94.22	0.00248	98.56	770	1,108,706	793	1,142,575	23.52	3.05
10-Aug-06	380.69	384.98	384.34	0.00159	102.95	384.64	383.76	0.00323	94.26	0.00241	98.60	748	1,076,587	771	1,109,986	23.19	3.10
11-Aug-06	380.65	384.96	384.34	0.00155	102.95	384.63	383.76	0.00319	94.26	0.00237	98.61	735	1,058,906	758	1,091,764	22.82	3.10
12-Aug-06	379.84	384.87	384.19	0.00168	102.80	384.53	383.61	0.00340	94.11	0.00254	98.45	789	1,135,746	812	1,169,185	23.22	2.94
13-Aug-06	379.39	384.77	384.05	0.00178	102.66	384.44	383.45	0.00367	93.95	0.00273	98.30	846	1,217,948	869	1,251,915	23.59	2.79
14-Aug-06	378.91	384.87	384.19	0.00171	102.80	384.53	383.37	0.00425	93.87	0.00298	98.33	924	1,330,026	950	1,367,527	26.04	2.82
15-Aug-06	378.46	384.90	384.14	0.00190	102.75	384.63	383.45	0.00433	93.95	0.00312	98.35	967	1,392,822	995	1,432,331	27.44	2.84

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
16-Aug-06	378.68	384.60	383.86	0.00184	102.47	384.31	383.20	0.00407	93.70	0.00295	98.09	916	1,319,175	940	1,352,974	23.47	2.56
17-Aug-06	378.86	384.59	383.83	0.00187	102.44	384.23	383.19	0.00383	93.69	0.00285	98.07	884	1,272,971	906	1,305,317	22.46	2.54
18-Aug-06	379.71	384.56	383.83	0.00180	102.44	384.23	383.26	0.00357	93.76	0.00269	98.10	833	1,199,535	854	1,230,454	21.47	2.58
19-Aug-06	380.42	384.57	383.95	0.00156	102.56	384.25	383.29	0.00355	93.79	0.00256	98.17	793	1,141,838	814	1,172,088	21.01	2.65
20-Aug-06	379.96	384.55	383.92	0.00157	102.53	384.22	383.30	0.00335	93.80	0.00246	98.17	763	1,098,531	783	1,127,605	20.19	2.65
21-Aug-06	379.18	384.47	383.78	0.00172	102.39	384.14	383.19	0.00351	93.69	0.00261	98.04	810	1,166,648	831	1,195,949	20.35	2.51
22-Aug-06	378.99	384.40	383.68	0.00178	102.29	384.08	383.10	0.00359	93.60	0.00268	97.95	833	1,198,900	853	1,227,849	20.10	2.41
23-Aug-06	378.29	384.29	383.57	0.00178	102.18	384.02	382.98	0.00384	93.48	0.00281	97.83	870	1,253,507	890	1,282,253	19.96	2.29
24-Aug-06	378.05	384.23	383.49	0.00183	102.10	383.94	382.87	0.00394	93.37	0.00288	97.74	894	1,287,881	914	1,316,154	19.63	2.20
25-Aug-06	378.17	384.13	383.38	0.00186	101.99	383.85	382.80	0.00383	93.30	0.00285	97.64	884	1,272,730	902	1,299,433	18.54	2.10
26-Aug-06	378.53	384.07	383.33	0.00185	101.94	383.80	382.76	0.00381	93.26	0.00283	97.60	878	1,264,468	896	1,290,395	18.00	2.05
27-Aug-06	379.31	384.08	383.44	0.00159	102.05	383.78	382.83	0.00352	93.33	0.00255	97.69	792	1,140,340	809	1,164,819	17.00	2.15
28-Aug-06	381.14	384.25	383.67	0.00145	102.28	383.90	383.11	0.00196	93.61	0.00170	97.95	528	760,867	541	779,240	12.76	2.41
29-Aug-06	383.05	384.45	384.00	0.00110	102.61	384.12	383.50	0.00154	94.00	0.00132	98.31	410	590,268	421	606,746	11.44	2.79
30-Aug-06	382.58	384.59	384.13	0.00113	102.74	384.30	383.70	0.00148	94.20	0.00131	98.47	406	584,481	418	601,796	12.02	2.96
31-Aug-06	382.03	384.62	384.13	0.00122	102.74	384.29	383.66	0.00157	94.16	0.00139	98.45	432	622,674	445	640,996	12.72	2.94
01-Sep-06	382.97	384.68	384.25	0.00106	102.86	384.39	383.83	0.00205	94.33	0.00155	98.60	482	693,981	497	715,449	14.91	3.09
02-Sep-06	382.61	384.77	384.38	0.00096	102.99	384.45	383.91	0.00199	94.41	0.00147	98.70	457	658,417	472	679,482	14.63	3.20
03-Sep-06	381.44	384.73	384.22	0.00126	102.83	384.44	383.85	0.00215	94.35	0.00171	98.59	529	762,272	546	785,803	16.34	3.09
04-Sep-06	381.39	384.71	384.18	0.00132	102.79	384.43	383.77	0.00244	94.27	0.00188	98.53	583	839,760	601	865,142	17.63	3.02
05-Sep-06	380.87	384.61	384.13	0.00118	102.74	384.37	383.63	0.00272	94.13	0.00195	98.44	604	870,093	622	895,574	17.69	2.93
06-Sep-06	380.14	384.52	383.97	0.00138	102.58	384.24	383.47	0.00283	93.97	0.00211	98.28	653	940,548	671	966,500	18.02	2.76
07-Sep-06	379.65	384.40	383.80	0.00150	102.41	384.13	383.27	0.00315	93.77	0.00232	98.09	721	1,037,521	739	1,064,106	18.46	2.56
08-Sep-06	379.46	384.29	383.68	0.00152	102.29	383.99	383.12	0.00319	93.62	0.00235	97.95	730	1,051,730	748	1,077,210	17.69	2.42
09-Sep-06	379.71	384.20	383.66	0.00134	102.27	383.96	383.08	0.00321	93.58	0.00228	97.93	706	1,016,263	723	1,040,609	16.91	2.40
10-Sep-06	379.22	384.18	383.56	0.00152	102.17	383.92	383.02	0.00328	93.52	0.00240	97.85	745	1,072,961	762	1,097,764	17.22	2.31
11-Sep-06	378.97	384.12	383.47	0.00162	102.08	383.82	382.88	0.00342	93.38	0.00252	97.73	782	1,126,768	800	1,151,435	17.13	2.19
12-Sep-06	379.86	384.10	383.51	0.00145	102.12	383.80	382.95	0.00313	93.45	0.00229	97.79	711	1,023,805	727	1,046,808	15.97	2.25
13-Sep-06	380.49	384.19	383.57	0.00155	102.18	383.86	383.09	0.00283	93.59	0.00219	97.89	679	978,268	695	1,001,261	15.97	2.35
14-Sep-06	381.10	384.17	383.64	0.00133	102.25	383.89	383.15	0.00272	93.65	0.00203	97.95	628	905,026	644	926,883	15.18	2.42
15-Sep-06	381.63	384.27	383.80	0.00118	102.41	383.95	383.30	0.00239	93.80	0.00178	98.11	553	796,419	567	816,985	14.28	2.58
16-Sep-06	382.10	384.39	383.97	0.00105	102.58	384.08	383.49	0.00219	93.99	0.00162	98.28	502	723,141	516	743,151	13.90	2.77
17-Sep-06	382.54	384.46	384.07	0.00097	102.68	384.22	383.59	0.00232	94.09	0.00164	98.39	510	733,933	524	755,017	14.64	2.87
18-Sep-06	383.39	384.59	384.23	0.00089	102.84	384.29	383.78	0.00188	94.28	0.00138	98.56	429	618,367	443	637,266	13.12	3.06
19-Sep-06	382.82	384.63	384.24	0.00096	102.85	384.32	383.82	0.00184	94.32	0.00140	98.59	434	624,428	447	643,681	13.37	3.08
20-Sep-06	382.23	384.64	384.23	0.00103	102.84	384.38	383.83	0.00203	94.33	0.00153	98.58	474	682,237	488	703,239	14.58	3.08
21-Sep-06	381.81	384.66	384.23	0.00108	102.84	384.38	383.77	0.00224	94.27	0.00166	98.56	515	741,365	531	763,981	15.71	3.05
22-Sep-06	382.08	384.65	384.25	0.00101	102.86	384.42	383.79	0.00233	94.29	0.00167	98.57	518	746,282	534	769,171	15.90	3.07
23-Sep-06	382.57	384.70	384.32	0.00096	102.93	384.40	383.86	0.00198	94.36	0.00147	98.64	457	657,381	471	678,053	14.36	3.14
24-Sep-06	381.72	384.65	384.20	0.00111	102.81	384.33	383.72	0.00227	94.22	0.00169	98.51	524	754,920	540	777,621	15.76	3.01
25-Sep-06	380.29	384.51	383.98	0.00132	102.59	384.21	383.49	0.00267	93.99	0.00199	98.29	618	890,385	635	915,052	17.13	2.77
26-Sep-06	381.21	384.44	384.00	0.00109	102.61	384.19	383.47	0.00265	93.97	0.00187	98.29	580	835,254	596	858,425	16.09	2.77
27-Sep-06	381.50	384.52	384.06	0.00112	102.67	384.22	383.56	0.00243	94.06	0.00178	98.37	552	794,766	568	817,447	15.75	2.85
28-Sep-06	381.48	384.49	384.01	0.00117	102.62	384.19	383.53	0.00164	94.03	0.00140	98.33	435	626,841	448	644,479	12.25	2.81
29-Sep-06	381.53	384.51	384.04	0.00116	102.65	384.23	383.60	0.00157	94.10	0.00137	98.38	424	609,943	436	627,428	12.14	2.87
30-Sep-06	381.45	384.47	384.01	0.00114	102.62	384.17	383.50	0.00166	94.00	0.00140	98.31	436	627,314	448	644,847	12.18	2.79
											3Q06 Total Gallons		97,797,928		100,985,898		
01-Oct-06	381.06	384.38	383.93	0.00112	102.54	384.12	383.43	0.00255	93.93	0.00184	98.24	569	819,961	585	842,234	15.47	2.72
02-Oct-06	380.15	384.28	383.79	0.00123	102.40	384.03	383.27	0.00281	93.77	0.00202	98.08	627	902,767	643	925,836	16.02	2.56
03-Oct-06	380.02	384.19	383.66	0.00131	102.27	383.93	383.15	0.00288	93.65	0.00210	97.96	650	936,087	666	958,818	15.79	2.43
04-Oct-06	379.87	384.13	383.62	0.00128	102.23	383.89	383.05	0.00307	93.55	0.00218	97.89	675	971,795	691	994,700	15.91	2.36
05-Oct-06	379.78	384.09	383.50	0.00147	102.11	383.78	382.99	0.00289	93.49	0.00218	97.80	676	973,455	691	995,435	15.26	2.26
06-Oct-06	379.87	384.01	383.48	0.00132	102.09	383.76	382.92	0.00308	93.42	0.00220	97.75	683	983,228	698	1,004,990	15.11	2.21
07-Oct-06	380.24	384.02	383.47	0.00135	102.08	383.75	382.97	0.00287	93.47	0.00211	97.77	654	941,472	668	962,511	14.61	2.23
08-Oct-06	380.25	384.02	383.49	0.00133	102.10	383.74	383.00	0.00272	93.50	0.00202	97.80	628	903,989	642	924,413	14.18	2.26
09-Oct-06	379.72	383.97	383.39	0.00142	102.00	383.69	382.87	0.00304	93.37	0.00223	97.68	693	997,752	708	1,019,111	14.83	2.14
10-Oct-06	379.50	383.96	383.37	0.00146	101.98	383.68	382.87	0.00298	93.37	0.00222	97.68	688	990,057	702	1,011,181	14.67	2.13
11-Oct-06	408.75	377.50	376.89	0.00152	95.50	377.23	376.36	0.00322	86.86	0.00237	91.18	735	1,058,240	701	1,008,887	-34.27	-4.66
12-Oct-06	379.55	383.86	383.32	0.00134	101.93	383.59	382.75	0.00311	93.25	0.00222	97.59	689	991,761	703	1,011,995	14.05	2.04
13-Oct-06	379.54	383.84	383.29	0.00138	101.90	383.58	382.77	0.00300	93.27	0.00219	97.58	680	978,763	694	998,651	13.81	2.03
14-Oct-06	379.08	383.78	383.13	0.00163	101.74	383.49	382.63	0.00316	93.13	0.00239	97.44	742	1,068,388	756	1,088,483	13.96	1.88
15-Oct-06	378.92	383.75	383.13	0.00154	101.74	383.47	382.61	0.00317	93.11	0.00236	97.42	732	1,053,432	745	1,073,104	13.66	1.87
16-Oct-06	378.86	383.78	383.17	0.00152	101.78	383.52	382.81	0.00264	93.31	0.00208	97.54	645	928,691	658	947,199	12.85	1.99
17-Oct-06	379.73	383.74	383.16	0.00144	101.77	383.47	382.64	0.00304	93.14	0.00224	97.46	696	1,001,990	709	1,021,037	13.23	1.90
18-Oct-06	379.23	383.65	383.07	0.00145	101.68	383.36	382.55	0.00300	93.05	0.00223	97.36	691	995,409	704	1,013,365	12.47	1.80
19-Oct-06	379.36	383.63	383.05	0.00143	101.66	383.37	382.52	0.00315	93.02	0.00229	97.34	711	1,023,733	724	1,041,950	12.65	1.78

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
20-Oct-06	378.63	383.54	382.93	0.00152	101.54	383.27	382.40	0.00318	92.90	0.00235	97.22	730	1,051,056	742	1,068,474	12.10	1.66
21-Oct-06	379.12	383.55	382.98	0.00144	101.59	383.25	382.40	0.00314	92.90	0.00229	97.24	710	1,022,848	722	1,040,008	11.92	1.68
22-Oct-06	379.86	383.52	382.97	0.00137	101.58	383.24	382.46	0.00288	92.96	0.00212	97.27	659	948,496	670	964,686	11.24	1.71
23-Oct-06	379.95	383.58	383.02	0.00137	101.63	383.30	382.56	0.00271	93.06	0.00204	97.35	634	912,474	645	928,768	11.32	1.79
24-Oct-06	380.20	383.59	383.07	0.00130	101.68	383.29	382.52	0.00282	93.02	0.00206	97.35	638	919,292	650	935,771	11.44	1.79
25-Oct-06	380.37	383.64	383.14	0.00123	101.75	383.36	382.63	0.00265	93.13	0.00194	97.44	602	867,027	613	883,404	11.37	1.89
26-Oct-06	380.85	383.76	383.26	0.00124	101.87	383.46	382.93	0.00194	93.43	0.00159	97.65	494	711,337	504	726,307	10.40	2.10
27-Oct-06	381.23	383.84	383.44	0.00101	102.05	383.58	383.35	0.00085	93.85	0.00093	97.95	289	415,793	296	425,831	6.97	2.41
28-Oct-06	380.39	383.77	383.26	0.00125	101.87	383.46	382.78	0.00169	93.28	0.00147	97.58	456	656,470	465	669,796	9.25	2.03
29-Oct-06	379.32	383.61	383.07	0.00133	101.68	383.36	382.55	0.00202	93.05	0.00167	97.37	519	747,672	529	761,179	9.38	1.81
30-Oct-06	378.72	383.52	382.92	0.00151	101.53	383.25	382.38	0.00217	92.88	0.00184	97.20	570	820,588	579	834,015	9.32	1.64
31-Oct-06	379.35	383.41	382.83	0.00144	101.44	383.14	382.26	0.00217	92.76	0.00181	97.10	561	807,394	569	819,747	8.58	1.53
01-Nov-06	379.16	383.41	382.88	0.00131	101.49	383.13	382.32	0.00298	92.82	0.00214	97.16	665	957,297	675	972,515	10.57	1.59
02-Nov-06	379.24	383.40	382.80	0.00148	101.41	383.10	382.25	0.00312	92.75	0.00230	97.08	714	1,028,575	725	1,044,130	10.80	1.51
03-Nov-06	379.42	383.41	382.84	0.00140	101.45	383.13	382.29	0.00305	92.79	0.00223	97.12	692	995,820	702	1,011,294	10.75	1.55
04-Nov-06	379.17	383.40	382.81	0.00146	101.42	383.11	382.30	0.00298	92.80	0.00222	97.11	689	991,908	699	1,007,197	10.62	1.54
05-Nov-06	378.57	383.34	382.73	0.00154	101.34	383.07	382.18	0.00325	92.68	0.00240	97.01	743	1,070,275	754	1,085,611	10.65	1.43
06-Nov-06	377.74	383.27	382.64	0.00157	101.25	383.02	382.09	0.00342	92.59	0.00250	96.92	774	1,114,520	784	1,129,448	10.37	1.34
07-Nov-06	377.50	383.21	382.53	0.00169	101.14	382.94	381.96	0.00361	92.46	0.00265	96.80	821	1,182,676	831	1,197,032	9.97	1.21
08-Nov-06	377.75	383.16	382.47	0.00171	101.08	382.88	381.88	0.00367	92.38	0.00269	96.73	835	1,201,966	844	1,215,708	9.54	1.14
09-Nov-06	377.77	383.09	382.41	0.00169	101.02	382.81	381.81	0.00368	92.31	0.00269	96.66	833	1,200,204	842	1,213,066	8.93	1.07
10-Nov-06	377.70	383.02	382.33	0.00170	100.94	382.74	381.75	0.00366	92.25	0.00268	96.59	832	1,198,192	840	1,210,164	8.31	1.00
11-Nov-06	378.15	382.92	382.28	0.00160	100.89	382.65	381.68	0.00356	92.18	0.00258	96.53	800	1,152,123	808	1,162,914	7.49	0.94
12-Nov-06	378.02	382.94	382.31	0.00156	100.92	382.70	381.77	0.00342	92.27	0.00249	96.60	772	1,111,621	780	1,122,771	7.74	1.00
13-Nov-06	377.95	382.95	382.30	0.00161	100.91	382.68	381.73	0.00348	92.23	0.00254	96.57	789	1,135,843	796	1,146,932	7.70	0.98
14-Nov-06	378.06	382.94	382.31	0.00159	100.92	382.68	381.77	0.00335	92.27	0.00247	96.59	766	1,103,503	774	1,114,523	7.65	1.00
15-Nov-06	378.39	382.98	382.34	0.00161	100.95	382.70	382.02	0.00249	92.52	0.00205	96.73	636	915,866	643	926,354	7.28	1.15
16-Nov-06	379.51	382.97	382.39	0.00143	101.00	382.67	381.88	0.00288	92.38	0.00215	96.69	668	961,580	675	972,197	7.37	1.10
17-Nov-06	379.10	383.01	382.40	0.00151	101.01	382.68	381.88	0.00292	92.38	0.00221	96.70	687	988,872	694	999,836	7.61	1.11
18-Nov-06	378.33	382.87	382.25	0.00154	100.86	382.59	381.69	0.00330	92.19	0.00242	96.53	751	1,081,334	758	1,091,393	6.99	0.93
19-Nov-06	377.97	382.83	382.20	0.00155	100.81	382.50	381.58	0.00337	92.08	0.00246	96.45	764	1,099,506	770	1,108,829	6.47	0.85
20-Nov-06	377.76	382.76	382.13	0.00156	100.74	382.48	381.55	0.00344	92.05	0.00250	96.39	776	1,116,995	782	1,125,831	6.14	0.79
21-Nov-06	378.07	382.78	382.15	0.00156	100.76	382.48	381.57	0.00334	92.07	0.00245	96.41	760	1,094,164	766	1,103,048	6.17	0.81
22-Nov-06	378.06	382.74	382.10	0.00159	100.71	382.47	381.55	0.00338	92.05	0.00249	96.38	772	1,111,039	778	1,119,693	6.01	0.78
23-Nov-06	378.12	382.75	382.13	0.00155	100.74	382.44	381.55	0.00329	92.05	0.00242	96.39	751	1,081,364	757	1,089,895	5.92	0.79
24-Nov-06	377.99	382.71	382.08	0.00155	100.69	382.43	381.51	0.00337	92.01	0.00246	96.35	763	1,098,369	768	1,106,580	5.70	0.75
25-Nov-06	377.97	382.64	382.00	0.00161	100.61	382.39	381.45	0.00347	91.95	0.00254	96.28	788	1,134,676	793	1,142,255	5.26	0.67
26-Nov-06	377.96	382.62	381.98	0.00158	100.59	382.34	381.39	0.00349	91.89	0.00253	96.24	786	1,131,857	791	1,139,028	4.98	0.63
27-Nov-06	378.09	382.63	382.00	0.00158	100.61	382.34	381.41	0.00341	91.91	0.00250	96.26	775	1,115,335	780	1,122,587	5.04	0.65
28-Nov-06	378.26	382.62	382.05	0.00141	100.66	382.34	381.48	0.00214	91.98	0.00177	96.32	551	792,810	554	798,461	3.92	0.71
29-Nov-06	378.74	382.62	382.14	0.00120	100.75	382.36	381.55	0.00202	92.05	0.00161	96.40	499	718,275	503	724,012	3.98	0.80
30-Nov-06	379.99	382.79	382.31	0.00121	100.92	382.48	382.06	0.00104	92.56	0.00113	96.74	350	503,464	354	509,253	4.02	1.15
01-Dec-06	383.75	383.22	382.89	0.00081	101.50	382.85	382.55	0.00111	93.05	0.00096	97.28	298	429,035	303	436,384	5.10	1.71
02-Dec-06	384.20	383.42	383.18	0.00060	101.79	383.08	382.71	0.00135	93.21	0.00098	97.50	303	435,998	309	444,487	5.89	1.95
03-Dec-06	384.78	383.61	383.43	0.00045	102.04	383.29	383.00	0.00107	93.50	0.00076	97.77	235	339,023	241	346,591	5.26	2.23
04-Dec-06	384.42	383.79	383.62	0.00042	102.23	383.53	383.27	0.00096	93.77	0.00069	98.00	214	308,362	219	315,987	5.29	2.47
05-Dec-06	383.99	383.84	383.62	0.00054	102.23	383.57	383.28	0.00107	93.78	0.00081	98.01	250	359,966	256	368,877	6.19	2.48
06-Dec-06	383.63	383.85	383.62	0.00057	102.23	383.55	383.24	0.00114	93.74	0.00085	97.98	265	381,601	272	390,965	6.50	2.45
07-Dec-06	383.39	383.88	383.62	0.00065	102.23	383.55	383.20	0.00130	93.70	0.00098	97.96	303	436,967	311	447,582	7.37	2.43
08-Dec-06	382.29	383.97	383.67	0.00076	102.28	383.68	383.26	0.00155	93.76	0.00116	98.02	359	516,351	368	529,204	8.93	2.49
09-Dec-06	381.06	383.89	383.51	0.00095	102.12	383.63	383.07	0.00207	93.57	0.00151	97.84	470	676,176	480	691,761	10.82	2.30
10-Dec-06	380.33	383.81	383.35	0.00114	101.96	383.52	382.85	0.00245	93.35	0.00180	97.65	558	803,270	570	820,189	11.75	2.11
11-Dec-06	380.39	383.73	383.26	0.00115	101.87	383.45	382.77	0.00248	93.27	0.00182	97.57	563	810,827	574	827,240	11.40	2.02
12-Dec-06	381.62	383.85	383.42	0.00105	102.03	383.52	382.91	0.00225	93.41	0.00165	97.72	512	736,584	523	752,635	11.15	2.18
13-Dec-06	383.07	384.01	383.66	0.00085	102.27	383.64	383.20	0.00163	93.70	0.00124	97.99	385	553,827	394	567,429	9.45	2.46
14-Dec-06	384.79	384.21	383.99	0.00055	102.60	383.86	383.55	0.00116	94.05	0.00085	98.32	265	381,781	273	392,500	7.44	2.81
15-Dec-06	385.27	384.26	384.11	0.00039	102.72	383.93	383.68	0.00091	94.18	0.00065	98.45	201	290,138	207	298,667	5.92	2.94
16-Dec-06	385.10	384.40	384.26	0.00035	102.87	384.07	383.86	0.00075	94.36	0.00055	98.61	169	243,921	175	251,513	5.27	3.11
17-Dec-06	385.20	384.45	384.29	0.00041	102.90	384.12	383.89	0.00084	94.39	0.00062	98.65	193	277,984	199	286,730	6.07	3.15
18-Dec-06	385.43	384.55	384.42	0.00030	103.03	384.21	384.00	0.00076	94.50	0.00053	98.77	165	238,304	171	246,105	5.42	3.27
19-Dec-06	384.88	384.62	384.49	0.00033	103.10	384.31	384.14	0.00065	94.64	0.00049	98.87	152	218,212	157	225,582	5.12	3.38
20-Dec-06	383.98	384.69	384.48	0.00052	103.09	384.40	384.11	0.00109	94.61	0.00080	98.85	249	359,140	258	371,204	8.38	3.36
21-Dec-06	384.09	384.72	384.51	0.00053	103.12	384.44	384.27	0.00062	94.77	0.00058	98.95	179	258,097	185	267,024	6.20	3.46
22-Dec-06	384.88	384.81	384.64	0.00042	103.25	384.48	384.23	0.00095	94.73	0.00068	98.99	212	305,867	220	316,577	7.44	3.50
23-Dec-06	385.23	384.85	384.73	0.00029	103.34	384.55	384.30	0.00095	94.80	0.00062	99.07	193	277,838	200	287,808	6.92	3.59
24-Dec-06	420.29	378.53	378.36	0.00041	96.97	378.21	378.03	0.00067	88.53	0.00054	92.75	167	241,057	162	233,785	-5.05	-3.02

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
25-Dec-06	422.22	378.62	378.56	0.00014	97.17	378.33	378.17	0.00060	88.67	0.00037	92.92	114	164,783	111	160,101	-3.25	-2.84
26-Dec-06	387.18	385.21	385.16	0.00013	103.77	384.89	384.81	0.00031	95.31	0.00022	99.54	69	99,309	72	103,360	2.81	4.08
27-Dec-06	386.56	385.34	385.23	0.00027	103.84	385.02	384.95	0.00024	95.45	0.00025	99.65	79	113,710	82	118,478	3.31	4.19
28-Dec-06	385.87	385.40	385.28	0.00030	103.89	385.08	384.92	0.00039	95.42	0.00035	99.66	108	155,490	113	162,025	4.54	4.20
29-Dec-06	385.96	385.39	385.35	0.00008	103.96	385.12	384.95	0.00043	95.45	0.00025	99.71	79	113,193	82	118,007	3.34	4.25
30-Dec-06	385.82	385.50	385.42	0.00019	104.03	385.22	385.06	0.00041	95.56	0.00030	99.79	93	133,563	97	139,367	4.03	4.35
31-Dec-06	386.09	385.61	385.51	0.00026	104.12	385.32	385.18	0.00034	95.68	0.00030	99.90	92	133,100	97	139,030	4.12	4.46
											4Q06 Total Gallons		70,584,921		71,671,638		
01-Jan-07	383.75	385.58	385.49	0.00022	104.10	385.27	385.08	0.00067	95.58	0.00044	99.84	138	198,112	144	206,822	6.05	4.40
02-Jan-07	384.20	385.63	385.52	0.00026	104.13	385.35	385.16	0.00069	95.66	0.00047	99.90	147	211,940	154	221,376	6.55	4.45
03-Jan-07	384.78	385.70	385.58	0.00029	104.19	385.40	385.16	0.00088	95.66	0.00058	99.93	180	259,685	188	271,334	8.09	4.49
04-Jan-07	384.42	385.80	385.71	0.00023	104.32	385.52	385.33	0.00073	95.83	0.00048	100.07	148	213,085	155	222,965	6.86	4.64
05-Jan-07	383.99	385.89	385.85	0.00010	104.46	385.61	385.44	0.00061	95.94	0.00036	100.20	111	159,297	116	166,900	5.28	4.77
06-Jan-07	383.63	385.94	385.89	0.00012	104.50	385.62	385.51	0.00039	96.01	0.00026	100.26	80	114,774	84	120,317	3.85	4.83
07-Jan-07	383.39	386.13	386.09	0.00010	104.70	385.82	385.80	0.00007	96.30	0.00008	100.50	26	37,858	28	39,782	1.34	5.08
08-Jan-07	382.29	386.23	386.29	(0.00016)	104.90	385.91	385.96	(0.00017)	96.46	(0.00017)	100.68	0	0	0	0	0	0
09-Jan-07	381.06	386.28	386.33	(0.00013)	104.94	385.97	386.03	(0.00023)	96.53	(0.00018)	100.74	0	0	0	0	0	0
10-Jan-07	380.33	386.41	386.42	(0.00003)	105.03	386.11	386.15	(0.00011)	96.65	(0.00007)	100.84	0	0	0	0	0	0
11-Jan-07	380.39	386.51	386.51	(0.00001)	105.12	386.20	386.21	(0.00003)	96.71	(0.00002)	100.91	0	0	0	0	0	0
12-Jan-07	381.62	386.50	386.47	0.00007	105.08	386.20	386.25	(0.00020)	96.75	0.00003	100.92	10	15,046	11	15,876	0.58	5.52
13-Jan-07	383.07	386.61	386.58	0.00007	105.19	386.31	386.48	(0.00064)	96.98	0.00003	101.09	11	15,278	11	16,148	0.60	5.70
14-Jan-07	384.79	386.72	386.67	0.00011	105.28	386.41	386.62	(0.00077)	97.12	0.00006	101.20	17	24,768	18	26,208	1.00	5.82
15-Jan-07	385.27	386.74	386.76	(0.00005)	105.37	386.43	386.61	(0.00066)	97.11	(0.00035)	101.24	0	0	0	0	0	0
16-Jan-07	385.10	386.84	386.92	(0.00019)	105.53	386.52	386.68	(0.00061)	97.18	(0.00040)	101.36	0	0	0	0	0	0
17-Jan-07	385.20	387.00	387.06	(0.00016)	105.67	386.70	386.85	(0.00056)	97.35	(0.00036)	101.51	0	0	0	0	0	0
18-Jan-07	385.43	387.01	386.97	0.00008	105.58	386.74	386.68	0.00021	97.18	0.00015	101.38	45	65,498	48	69,433	2.73	6.01
19-Jan-07	384.88	386.91	386.80	0.00026	105.41	386.63	386.42	0.00076	96.92	0.00051	101.17	158	227,214	167	240,354	9.12	5.78
20-Jan-07	383.98	386.90	386.74	0.00040	105.35	386.62	386.36	0.00098	96.86	0.00069	101.10	213	307,264	226	324,825	12.20	5.72
21-Jan-07	384.09	386.88	386.68	0.00050	105.29	386.61	386.24	0.00134	96.74	0.00092	101.02	286	411,371	302	434,502	16.06	5.62
22-Jan-07	384.88	386.74	386.48	0.00065	105.09	386.41	386.00	0.00153	96.50	0.00109	100.79	339	487,941	357	514,237	18.26	5.39
23-Jan-07	385.23	386.63	386.31	0.00079	104.92	386.32	385.85	0.00176	96.35	0.00127	100.64	395	568,323	415	598,021	20.62	5.23
24-Jan-07	420.29	386.49	386.15	0.00084	104.76	386.20	385.67	0.00195	96.17	0.00139	100.46	431	620,970	453	652,314	21.77	5.05
25-Jan-07	422.22	386.45	386.11	0.00083	104.72	386.10	385.58	0.00190	96.08	0.00137	100.40	424	610,435	445	640,857	21.13	4.98
26-Jan-07	387.18	386.61	386.31	0.00075	104.92	386.29	385.82	0.00172	96.32	0.00123	100.62	383	551,538	403	580,281	19.96	5.21
27-Jan-07	386.56	386.62	386.33	0.00073	104.94	386.28	385.85	0.00156	96.35	0.00115	100.65	356	512,154	374	538,976	18.63	5.24
28-Jan-07	385.87	386.63	386.36	0.00068	104.97	386.29	385.91	0.00096	96.41	0.00082	100.69	254	366,197	268	385,534	13.43	5.28
29-Jan-07	385.96	386.68	386.36	0.00080	104.97	386.31	385.81	0.00124	96.31	0.00102	100.64	316	455,316	333	479,130	16.54	5.23
30-Jan-07	385.82	386.52	386.19	0.00083	104.80	386.03	385.47	0.00140	95.97	0.00112	100.38	346	498,603	363	523,349	17.18	4.96
31-Jan-07	386.09	386.50	386.11	0.00098	104.72	386.09	385.47	0.00153	95.97	0.00125	100.34	389	559,481	408	587,018	19.12	4.92
01-Feb-07	383.26	386.40	385.98	0.00104	104.59	386.05	385.40	0.00237	95.90	0.00171	100.25	529	761,879	555	798,598	25.50	4.82
02-Feb-07	383.25	386.22	385.80	0.00104	104.41	385.86	385.19	0.00245	95.69	0.00175	100.05	543	781,390	568	817,436	25.03	4.61
03-Feb-07	382.69	386.12	385.64	0.00120	104.25	385.72	385.05	0.00248	95.55	0.00184	99.90	571	822,390	597	859,025	25.44	4.45
04-Feb-07	381.72	385.98	385.41	0.00142	104.02	385.56	384.84	0.00266	95.34	0.00204	99.68	632	909,880	659	948,351	26.72	4.23
05-Feb-07	380.38	385.75	385.13	0.00154	103.74	385.38	384.50	0.00326	95.00	0.00240	99.37	744	1,070,839	773	1,112,639	29.03	3.90
06-Feb-07	380.06	385.67	385.02	0.00161	103.63	385.33	384.38	0.00346	94.88	0.00254	99.26	787	1,132,653	816	1,175,522	29.77	3.78
07-Feb-07	379.44	385.39	384.71	0.00170	103.32	385.04	384.04	0.00368	94.54	0.00269	98.93	834	1,201,472	863	1,242,792	28.69	3.44
08-Feb-07	379.02	385.27	384.54	0.00181	103.15	384.91	383.83	0.00396	94.33	0.00288	98.74	894	1,287,830	923	1,329,632	29.03	3.25
09-Feb-07	379.09	385.15	384.44	0.00175	103.05	384.79	383.71	0.00396	94.21	0.00286	98.63	886	1,275,421	913	1,315,344	27.72	3.13
10-Feb-07	378.96	385.05	384.31	0.00184	102.92	384.65	383.54	0.00407	94.04	0.00295	98.48	916	1,319,396	944	1,358,661	27.27	2.98
11-Feb-07	379.00	384.97	384.21	0.00189	102.82	384.58	383.50	0.00397	94.00	0.00293	98.41	909	1,308,954	935	1,346,926	26.37	2.90
12-Feb-07	378.85	384.87	384.12	0.00187	102.73	384.49	383.39	0.00405	93.89	0.00296	98.31	919	1,322,658	944	1,359,620	25.67	2.79
13-Feb-07	379.98	384.85	384.15	0.00175	102.76	384.46	383.55	0.00335	94.05	0.00255	98.40	791	1,138,818	814	1,171,759	22.88	2.89
14-Feb-07	379.66	384.69	383.99	0.00175	102.60	384.35	383.31	0.00382	93.81	0.00279	98.20	864	1,244,762	888	1,278,151	23.19	2.68
15-Feb-07	379.50	384.64	383.92	0.00180	102.53	384.29	383.24	0.00387	93.74	0.00283	98.13	879	1,265,331	902	1,298,356	22.93	2.61
16-Feb-07	380.23	384.71	384.05	0.00166	102.66	384.35	383.41	0.00345	93.91	0.00255	98.28	792	1,141,138	814	1,172,719	21.93	2.77
17-Feb-07	381.00	384.68	384.06	0.00153	102.67	384.32	383.41	0.00332	93.91	0.00242	98.29	751	1,081,977	772	1,112,027	20.87	2.78
18-Feb-07	382.03	384.75	384.24	0.00127	102.85	384.38	383.63	0.00273	94.13	0.00200	98.49	621	894,015	639	920,701	18.53	2.98
19-Feb-07	382.44	384.96	384.49	0.00117	103.10	384.63	384.21	0.00153	94.71	0.00135	98.91	418	602,432	433	623,031	14.31	3.42
20-Feb-07	402.15	378.39	377.90	0.00121	96.51	378.02	377.33	0.00253	87.83	0.00187	92.17	580	834,505	559	804,257	-21.01	-3.62
21-Feb-07	381.38	384.84	384.33	0.00128	102.94	384.48	383.73	0.00277	94.23	0.00203	98.58	628	904,863	648	932,704	19.33	3.08
22-Feb-07	382.58	384.79	384.33	0.00113	102.94	384.43	383.73	0.00256	94.23	0.00185	98.59	572	824,329	590	849,734	17.64	3.08
23-Feb-07	384.29	385.07	384.72	0.00088	103.33	384.69	384.18	0.00188	94.68	0.00138	99.01	429	617,562	444	639,310	15.10	3.52
24-Feb-07	386.39	385.46	385.23	0.00059	103.84	385.09	385.47	(0.00139)	95.97	0.00030	99.90	92	131,942	96	137,827	4.09	4.46
25-Feb-07	392.80	385.90	385.98	(0.00020)	104.59	385.48	385.77	(0.00105)	96.27	(0.00062)	100.43	0	0	0	0	0	0
26-Feb-07	396.73	386.36	386.75	(0.00097)	105.36	385.94	386.75	(0.00297)	97.25	(0.00197)	101.30	0	0	0	0	0	0
27-Feb-07	397.88	386.74	387.32	(0.00145)	105.93	386.34	387.44	(0.00403)	97.94	(0.00274)	101.93	0	0	0	0	0	0

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
28-Feb-07	397.80	387.18	387.79	(0.00151)	106.40	386.81	388.05	(0.00456)	98.55	(0.00303)	102.47	0	0	0	0	0	0
01-Mar-07	396.85	387.47	388.07	(0.00150)	106.68	380.07	388.31	(0.03030)	98.81	(0.01590)	102.75	0	0	0	0	0	0
02-Mar-07	397.09	387.66	388.30	(0.00159)	106.91	387.29	388.52	(0.00451)	99.02	(0.00305)	102.97	0	0	0	0	0	0
03-Mar-07	399.44	388.00	388.78	(0.00193)	107.39	387.60	389.08	(0.00546)	99.58	(0.00370)	103.48	0	0	0	0	0	0
04-Mar-07	399.78	388.32	389.13	(0.00200)	107.74	387.95	389.55	(0.00590)	100.05	(0.00395)	103.89	0	0	0	0	0	0
05-Mar-07	397.80	388.50	389.25	(0.00187)	107.86	388.15	389.55	(0.00515)	100.05	(0.00351)	103.96	0	0	0	0	0	0
06-Mar-07	395.99	388.64	389.23	(0.00148)	107.84	388.32	389.46	(0.00421)	99.96	(0.00284)	103.90	0	0	0	0	0	0
07-Mar-07	394.23	388.72	389.18	(0.00114)	107.79	388.39	389.27	(0.00326)	99.77	(0.00220)	103.78	0	0	0	0	0	0
08-Mar-07	392.25	388.77	389.05	(0.00069)	107.66	388.44	389.02	(0.00215)	99.52	(0.00142)	103.59	0	0	0	0	0	0
09-Mar-07	390.58	388.71	388.90	(0.00048)	107.51	388.43	388.71	(0.00103)	99.21	(0.00076)	103.36	0	0	0	0	0	0
10-Mar-07	390.34	388.68	388.82	(0.00034)	107.43	388.37	388.52	(0.00055)	99.02	(0.00044)	103.22	0	0	0	0	0	0
11-Mar-07	389.80	388.70	388.75	(0.00012)	107.36	388.41	388.40	0.00003	98.90	0.00001	103.13	5	6,500	5	7,009	0.35	7.84
12-Mar-07	390.38	388.82	388.90	(0.00018)	107.51	388.50	388.54	(0.00017)	99.04	(0.00018)	103.28	0	0	0	0	0	0
13-Mar-07	392.58	388.98	389.14	(0.00040)	107.75	388.62	388.91	(0.00105)	99.41	(0.00073)	103.58	0	0	0	0	0	0
14-Mar-07	393.38	389.19	389.41	(0.00056)	108.02	388.79	389.38	(0.00215)	99.88	(0.00135)	103.95	0	0	0	0	0	0
15-Mar-07	393.66	389.24	389.49	(0.00064)	108.10	388.89	389.44	(0.00199)	99.94	(0.00131)	104.02	0	0	0	0	0	0
16-Mar-07	394.47	389.37	389.70	(0.00080)	108.31	389.04	389.65	(0.00226)	100.15	(0.00153)	104.23	0	0	0	0	0	0
17-Mar-07	396.07	389.63	390.01	(0.00094)	108.62	389.26	390.08	(0.00299)	100.58	(0.00196)	104.60	0	0	0	0	0	0
18-Mar-07	396.88	389.81	390.28	(0.00118)	108.89	389.48	390.45	(0.00359)	100.95	(0.00238)	104.92	0	0	0	0	0	0
19-Mar-07	397.59	390.03	390.53	(0.00124)	109.14	389.71	390.77	(0.00390)	101.27	(0.00257)	105.21	0	0	0	0	0	0
20-Mar-07	398.10	390.23	390.74	(0.00126)	109.35	389.87	391.06	(0.00439)	101.56	(0.00282)	105.45	0	0	0	0	0	0
21-Mar-07	398.42	390.44	391.04	(0.00150)	109.65	390.10	391.38	(0.00470)	101.88	(0.00310)	105.76	0	0	0	0	0	0
22-Mar-07	398.73	390.63	391.22	(0.00146)	109.83	390.31	391.57	(0.00465)	102.07	(0.00306)	105.95	0	0	0	0	0	0
23-Mar-07	399.11	390.80	391.44	(0.00158)	110.05	390.50	391.81	(0.00481)	102.31	(0.00320)	106.18	0	0	0	0	0	0
24-Mar-07	399.56	390.99	391.62	(0.00157)	110.23	390.68	392.04	(0.00500)	102.54	(0.00328)	106.38	0	0	0	0	0	0
25-Mar-07	399.76	391.20	391.83	(0.00157)	110.44	390.87	392.29	(0.00522)	102.79	(0.00340)	106.61	0	0	0	0	0	0
26-Mar-07	400.07	391.37	392.04	(0.00164)	110.65	391.08	392.48	(0.00515)	102.98	(0.00340)	106.81	0	0	0	0	0	0
27-Mar-07	400.40	391.58	392.29	(0.00177)	110.90	391.25	392.75	(0.00549)	103.25	(0.00363)	107.07	0	0	0	0	0	0
28-Mar-07	400.58	391.74	392.45	(0.00175)	111.06	391.45	392.94	(0.00371)	103.44	(0.00273)	107.25	0	0	0	0	0	0
29-Mar-07	400.56	391.88	392.59	(0.00179)	111.20	391.60	393.08	(0.00367)	103.58	(0.00273)	107.39	0	0	0	0	0	0
30-Mar-07	400.60	392.13	392.74	(0.00153)	111.35	391.81	393.24	(0.00354)	103.74	(0.00254)	107.54	0	0	0	0	0	0
31-Mar-07	401.17	392.34	393.06	(0.00180)	111.67	392.03	393.57	-0.00384	104.07	(0.00282)	107.87	0	0	0	0	0	0
											1Q07 Total Gallons		31,375,087		32,488,693		
01-Apr-07	401.88	392.54	393.27	(0.00180)	111.88	392.23	393.87	(0.00604)	104.37	(0.00392)	108.13	0	0	0	0	0	0
02-Apr-07	402.03	392.66	393.40	(0.00185)	112.01	392.37	394.04	(0.00617)	104.54	(0.00401)	108.28	0	0	0	0	0	0
03-Apr-07	402.21	392.78	393.55	(0.00193)	112.16	392.48	413.83	(0.07849)	124.33	(0.04021)	118.25	0	0	0	0	0	0
04-Apr-07	402.99	392.99	393.80	(0.00202)	112.41	392.74	403.78	(0.04059)	114.28	(0.02130)	113.34	0	0	0	0	0	0
05-Apr-07	403.90	393.29	394.18	(0.00222)	112.79	393.02	394.90	(0.00690)	105.40	(0.00456)	109.09	0	0	0	0	0	0
06-Apr-07	404.06	393.54	394.41	(0.00217)	113.02	393.25	395.19	(0.00713)	105.69	(0.00465)	109.35	0	0	0	0	0	0
07-Apr-07	403.73	393.70	394.57	(0.00217)	113.18	393.43	395.26	(0.00674)	105.76	(0.00446)	109.47	0	0	0	0	0	0
08-Apr-07	403.02	393.79	394.62	(0.00205)	113.23	393.55	395.24	(0.00619)	105.74	(0.00412)	109.48	0	0	0	0	0	0
09-Apr-07	402.59	393.88	394.67	(0.00197)	113.28	393.68	395.19	(0.00556)	105.69	(0.00376)	109.49	0	0	0	0	0	0
10-Apr-07	402.11	394.03	394.74	(0.00177)	113.35	393.79	395.24	(0.00530)	105.74	(0.00353)	109.54	0	0	0	0	0	0
11-Apr-07	402.03	394.22	394.82	(0.00149)	113.43	393.93	395.49	(0.00574)	105.99	(0.00362)	109.71	0	0	0	0	0	0
12-Apr-07	402.25	394.15	394.77	(0.00154)	113.38	393.92	395.32	(0.00514)	105.82	(0.00334)	109.60	0	0	0	0	0	0
13-Apr-07	402.39	394.30	394.94	(0.00159)	113.55	394.05	395.47	(0.00523)	105.97	(0.00341)	109.76	0	0	0	0	0	0
14-Apr-07	402.61	394.52	395.15	(0.00159)	113.76	394.23	395.96	(0.00636)	106.46	(0.00397)	110.11	0	0	0	0	0	0
15-Apr-07	403.81	394.67	395.36	(0.00174)	113.97	394.38	396.01	(0.00598)	106.51	(0.00386)	110.24	0	0	0	0	0	0
16-Apr-07	405.02	394.95	395.72	(0.00191)	114.33	394.63	396.43	(0.00662)	106.93	(0.00426)	110.63	0	0	0	0	0	0
17-Apr-07	404.93	395.15	395.95	(0.00198)	114.56	394.84	396.62	(0.00654)	107.12	(0.00426)	110.84	0	0	0	0	0	0
18-Apr-07	404.32	395.25	395.94	(0.00170)	114.55	394.95	396.63	(0.00619)	107.13	(0.00395)	110.84	0	0	0	0	0	0
19-Apr-07	403.74	395.25	395.93	(0.00168)	114.54	394.98	396.51	(0.00561)	107.01	(0.00364)	110.77	0	0	0	0	0	0
20-Apr-07	402.95	395.32	395.93	(0.00151)	114.54	395.00	396.41	(0.00516)	106.91	(0.00334)	110.72	0	0	0	0	0	0
21-Apr-07	401.87	395.33	395.82	(0.00122)	114.43	395.02	396.22	(0.00441)	106.72	(0.00282)	110.58	0	0	0	0	0	0
22-Apr-07	400.99	395.28	395.73	(0.00112)	114.34	395.02	396.04	(0.00374)	106.54	(0.00243)	110.44	0	0	0	0	0	0
23-Apr-07	400.28	395.20	395.56	(0.00089)	114.17	394.97	395.81	(0.00311)	106.31	(0.00200)	110.24	0	0	0	0	0	0
24-Apr-07	399.38	395.23	395.50	(0.00065)	114.11	394.94	395.63	(0.00253)	106.13	(0.00159)	110.12	0	0	0	0	0	0
25-Apr-07	398.43	395.20	395.38	(0.00045)	113.99	394.88	395.40	(0.00190)	105.90	(0.00117)	109.95	0	0	0	0	0	0
26-Apr-07	397.81	395.10	395.20	(0.00026)	113.81	394.79	395.17	(0.00140)	105.67	(0.00083)	109.74	0	0	0	0	0	0
27-Apr-07	398.12	395.01	395.15	(0.00035)	113.76	394.68	395.11	(0.00159)	105.61	(0.00097)	109.69	0	0	0	0	0	0
28-Apr-07	400.16	395.11	395.43	(0.00079)	114.04	394.80	395.54	(0.00183)	106.04	(0.00131)	110.04	0	0	0	0	0	0
29-Apr-07	403.30	395.56	396.07	(0.00128)	114.68	395.22	396.51	(0.00321)	107.01	(0.00225)	110.85	0	0	0	0	0	0
30-Apr-07	404.88	395.90	396.56	(0.00166)	115.17	395.55	397.14	(0.00395)	107.64	(0.00280)	111.41	0	0	0	0	0	0
01-May-07	405.09	396.08	396.77	(0.00172)	115.38	395.73	397.59	(0.00682)	108.09	(0.00427)	111.73	0	0	0	0	0	0
02-May-07	404.94	396.27	396.98	(0.00175)	115.59	NA	397.86	NC(D)	108.36	(0.00088)	111.97	0	0	0	0	0	0
03-May-07	404.72	396.40	397.07	(0.00166)	115.68	NA	397.58	NC(D)	108.08	(0.00083)	111.88	0	0	0	0	0	0

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
04-May-07	405.01	396.59	397.26	(0.00168)	115.87	396.29	398.45	(0.00794)	108.95	(0.00481)	112.41	0	0	0	0	0	0
05-May-07	405.01	396.75	397.40	(0.00163)	116.01	396.41	397.98	(0.00580)	108.48	(0.00371)	112.25	0	0	0	0	0	0
06-May-07	404.16	396.77	397.34	(0.00143)	115.95	396.46	397.92	(0.00538)	108.42	(0.00340)	112.19	0	0	0	0	0	0
07-May-07	403.18	396.81	397.32	(0.00126)	115.93	396.51	397.80	(0.00475)	108.30	(0.00301)	112.11	0	0	0	0	0	0
08-May-07	402.79	396.88	397.33	(0.00113)	115.94	396.55	397.73	(0.00435)	108.23	(0.00274)	112.09	0	0	0	0	0	0
09-May-07	405.62	397.14	397.80	(0.00162)	116.41	396.86	398.44	(0.00582)	108.94	(0.00372)	112.68	0	0	0	0	0	0
10-May-07	408.28	397.60	398.45	(0.00213)	117.06	397.29	399.53	(0.00823)	110.03	(0.00518)	113.55	0	0	0	0	0	0
11-May-07	409.32	397.95	398.90	(0.00236)	117.51	397.62	399.80	(0.00804)	110.30	(0.00520)	113.91	0	0	0	0	0	0
12-May-07	409.37	398.16	399.10	(0.00234)	117.71	397.86	400.07	(0.00814)	110.57	(0.00524)	114.14	0	0	0	0	0	0
13-May-07	409.22	398.40	399.26	(0.00214)	117.87	398.50	400.22	(0.00634)	110.72	(0.00424)	114.30	0	0	0	0	0	0
14-May-07	408.95	398.58	399.42	(0.00209)	118.03	398.87	400.37	(0.00553)	110.87	(0.00381)	114.45	0	0	0	0	0	0
15-May-07	408.70	398.73	399.56	(0.00206)	118.17	400.10	400.53	(0.00159)	111.03	(0.00183)	114.60	0	0	0	0	0	0
16-May-07	408.32	398.81	399.59	(0.00196)	118.20	404.08	400.47	NC(A)	110.97	(0.00098)	114.59	0	0	0	0	0	0
17-May-07	407.38	398.78	399.50	(0.00180)	118.11	404.84	400.32	NC(A)	110.82	(0.00090)	114.47	0	0	0	0	0	0
18-May-07	405.88	398.74	399.34	(0.00148)	117.95	398.48	400.04	(0.00574)	110.54	(0.00074)	114.24	0	0	0	0	0	0
19-May-07	404.00	398.61	399.08	(0.00116)	117.69	398.38	399.58	(0.00441)	110.08	(0.00221)	113.88	0	0	0	0	0	0
20-May-07	402.48	398.47	398.77	(0.00075)	117.38	398.20	399.12	(0.00341)	109.62	(0.00170)	113.50	0	0	0	0	0	0
21-May-07	400.67	398.17	398.36	(0.00049)	116.97	397.91	398.55	(0.00233)	109.05	(0.00116)	113.01	0	0	0	0	0	0
22-May-07	398.94	397.85	397.92	(0.00019)	116.53	397.61	397.93	(0.00120)	108.43	(0.00069)	112.48	0	0	0	0	0	0
23-May-07	397.85	397.54	397.54	0.00001	116.15	397.30	397.43	(0.00050)	107.93	0.00001	112.04	2	3,241	3	3,797	0.39	17.15
24-May-07	396.96	397.29	397.25	0.00010	115.86	397.07	397.07	0.00000	107.57	0.00005	111.71	16	23,258	19	27,168	2.72	16.81
25-May-07	396.10	397.07	396.95	0.00029	115.56	396.84	396.70	0.00051	107.20	0.00040	111.38	124	179,199	145	208,700	20.49	16.46
26-May-07	395.91	396.94	396.84	0.00025	115.45	396.69	396.54	0.00053	107.04	0.00039	111.24	121	173,572	140	201,896	19.67	16.32
27-May-07	395.77	396.80	396.68	0.00028	115.29	396.56	396.45	0.00040	106.95	0.00034	111.12	106	152,595	123	177,300	17.16	16.19
28-May-07	396.91	396.79	396.71	0.00018	115.32	396.47	396.47	0.00002	106.97	0.00010	111.14	31	44,987	36	52,281	5.07	16.21
29-May-07	398.85	396.98	397.02	(0.00009)	115.63	396.66	396.99	(0.00081)	107.49	(0.00045)	111.56	0	0	0	0	0	0
30-May-07	399.39	397.11	397.23	(0.00029)	115.84	396.79	397.29	(0.00123)	107.79	(0.00076)	111.81	0	0	0	0	0	0
31-May-07	398.81	397.13	397.21	(0.00020)	115.82	396.84	397.12	(0.00069)	107.62	(0.00045)	111.72	0	0	0	0	0	0
01-Jun-07	398.36	397.22	397.25	(0.00009)	115.86	396.89	396.91	(0.00008)	107.41	(0.00008)	111.64	0	0	0	0	0	0
02-Jun-07	399.39	397.32	397.38	(0.00015)	115.99	396.99	397.28	(0.00104)	107.78	(0.00059)	111.88	0	0	0	0	0	0
03-Jun-07	400.14	397.49	397.62	(0.00032)	116.23	397.20	397.67	(0.00173)	108.17	(0.00103)	112.20	0	0	0	0	0	0
04-Jun-07	400.67	397.60	397.78	(0.00043)	116.39	397.27	397.83	(0.00204)	108.33	(0.00123)	112.36	0	0	0	0	0	0
05-Jun-07	401.61	397.73	398.00	(0.00067)	116.61	397.42	398.13	(0.00264)	108.63	(0.00165)	112.62	0	0	0	0	0	0
06-Jun-07	400.75	397.81	398.01	(0.00048)	116.62	397.48	398.07	(0.00218)	108.57	(0.00133)	112.60	0	0	0	0	0	0
07-Jun-07	398.91	397.68	397.72	(0.00012)	116.33	397.35	397.63	(0.00102)	108.13	(0.00057)	112.23	0	0	0	0	0	0
08-Jun-07	397.86	397.32	397.29	0.00009	115.90	397.04	397.14	(0.00037)	107.64	0.00004	111.77	13	19,082	15	22,300	2.23	16.86
09-Jun-07	397.25	397.14	397.07	0.00018	115.68	396.84	396.86	(0.00008)	107.36	0.00005	111.52	16	22,588	18	26,339	2.61	16.61
10-Jun-07	397.04	397.09	397.00	0.00023	115.61	396.77	396.77	0.00000	107.27	0.00012	111.44	36	52,082	42	60,687	5.98	16.52
11-Jun-07	397.15	397.00	396.89	0.00028	115.50	396.71	396.71	0.00002	107.21	0.00015	111.35	45	65,457	53	76,212	7.47	16.43
12-Jun-07	397.64	396.99	396.87	0.00030	115.48	396.66	396.71	(0.00019)	107.21	0.00006	111.35	19	26,659	22	31,038	3.04	16.43
13-Jun-07	397.45	396.98	396.92	0.00016	115.53	396.68	396.73	(0.00021)	107.23	0.00008	111.38	25	35,648	29	41,516	4.08	16.46
14-Jun-07	396.38	396.83	396.69	0.00033	115.30	396.53	396.44	0.00035	106.94	0.00034	111.12	105	151,027	122	175,479	16.98	16.19
15-Jun-07	395.04	396.51	396.28	0.00058	114.89	396.21	395.95	0.00096	106.45	0.00077	110.67	239	343,788	276	397,813	37.52	15.71
16-Jun-07	394.81	396.29	395.97	0.00081	114.58	395.99	395.70	0.00108	106.20	0.00095	110.39	294	423,229	339	488,503	45.33	15.42
17-Jun-07	394.98	396.24	395.96	0.00068	114.57	395.92	395.69	0.00085	106.19	0.00077	110.38	238	342,183	274	394,942	36.64	15.42
18-Jun-07	393.67	396.00	395.69	0.00077	114.30	395.71	395.32	0.00143	105.82	0.00110	110.06	341	491,508	393	565,614	51.46	15.08
19-Jun-07	392.97	395.74	395.31	0.00107	113.92	395.39	394.94	0.00165	105.44	0.00136	109.68	421	606,301	483	695,336	61.83	14.68
20-Jun-07	392.43	395.48	395.06	0.00105	113.67	395.15	394.66	0.00184	105.16	0.00144	109.41	448	644,798	512	737,675	64.50	14.40
21-Jun-07	391.88	395.25	394.82	0.00108	113.43	394.94	394.39	0.00203	104.89	0.00156	109.16	483	695,411	551	793,717	68.27	14.14
22-Jun-07	391.62	395.09	394.66	0.00107	113.27	394.77	394.20	0.00207	104.70	0.00157	108.99	487	701,539	555	799,456	68.00	13.96
23-Jun-07	391.62	394.97	394.50	0.00116	113.11	394.63	394.07	0.00206	104.57	0.00161	108.84	499	718,356	568	817,535	68.87	13.81
24-Jun-07	393.88	395.15	394.86	0.00072	113.47	394.79	394.52	0.00099	105.02	0.00085	109.25	264	380,270	302	434,376	37.57	14.23
25-Jun-07	394.95	395.32	395.16	0.00041	113.77	394.99	394.90	0.00034	105.40	0.00037	109.58	116	166,577	133	190,866	16.87	14.58
26-Jun-07	394.37	395.31	395.10	0.00052	113.71	394.95	394.83	0.00045	105.33	0.00049	109.52	151	217,014	173	248,514	21.88	14.52
27-Jun-07	393.72	395.17	394.86	0.00077	113.47	394.79	394.67	0.00045	105.17	0.00061	109.32	190	273,595	217	312,725	27.17	14.30
28-Jun-07	NA	394.99	394.64	0.00087	113.25	394.64	394.11	0.00133	104.61	0.00110	108.93	342	492,492	390	560,946	47.54	13.90
29-Jun-07	NA	394.77	394.34	0.00107	112.95	394.43	393.90	0.00131	104.40	0.00119	108.67	370	532,209	420	604,750	50.38	13.63
30-Jun-07	NA	394.65	394.19	0.00114	112.80	394.29	393.87	0.00103	104.37	0.00109	108.58	337	485,408	383	551,118	45.63	13.54
											2Q07 Total Gallons		8,464,073		9,698,600		
01-Jul-07	NA	394.81	394.49	0.00078	113.10	394.44	394.29	0.00055	104.79	0.00066	108.95	205	295,168	234	336,245	28.53	13.92
02-Jul-07	NA	394.98	394.77	0.00053	113.38	394.65	394.64	0.00003	105.14	0.00028	109.26	86	123,406	98	140,986	12.21	14.24
03-Jul-07	NA	395.04	394.86	0.00043	113.47	394.73	394.72	0.00003	105.22	0.00023	109.35	71	102,453	81	117,138	10.20	14.33
04-Jul-07	NA	394.98	394.70	0.00070	113.31	394.64	394.54	0.00040	105.04	0.00055	109.17	170	245,085	194	279,769	24.09	14.15
05-Jul-07	NA	394.83	394.50	0.00081	113.11	394.46	394.06	0.00146	104.56	0.00114	108.84	353	507,679	401	577,743	48.66	13.80
06-Jul-07	NA	394.73	394.50	0.00057	113.11	394.39	394.11	0.00106	104.61	0.00081	108.86	253	363,821	288	414,116	34.93	13.82
07-Jul-07	NA	394.82	394.65	0.00044	113.26	394.51	394.31	0.00075	104.81	0.00059	109.03	183	264,170	209	301,168	25.69	14.01

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
08-Jul-07	NA	394.90	394.71	0.00047	113.32	394.57	394.41	0.00057	104.91	0.00052	109.12	162	232,597	184	265,378	22.76	14.09
09-Jul-07	NA	394.79	394.50	0.00073	113.11	394.45	394.26	0.00070	104.76	0.00071	108.93	221	318,499	252	362,780	30.75	13.90
10-Jul-07	390.92	394.59	394.19	0.00099	112.80	394.22	393.84	0.00140	104.34	0.00119	108.57	370	532,482	420	604,492	50.01	13.52
11-Jul-07	389.67	394.22	393.73	0.00122	112.34	393.90	393.31	0.00214	103.81	0.00168	108.08	521	750,719	589	848,348	67.80	13.00
12-Jul-07	389.02	393.96	393.39	0.00141	112.00	393.63	392.96	0.00249	103.46	0.00195	107.73	604	870,155	681	980,177	76.40	12.64
13-Jul-07	389.13	393.82	393.30	0.00129	111.91	393.48	392.83	0.00242	103.33	0.00186	107.62	576	828,834	648	932,653	72.10	12.53
14-Jul-07	388.53	393.68	393.09	0.00147	111.70	393.31	392.60	0.00262	103.10	0.00204	107.40	634	913,123	712	1,025,405	77.97	12.30
15-Jul-07	387.85	393.42	392.78	0.00158	111.39	393.05	392.26	0.00289	102.76	0.00223	107.08	692	997,076	775	1,116,337	82.82	11.96
16-Jul-07	387.56	393.20	392.60	0.00149	111.21	392.84	392.03	0.00297	102.53	0.00223	106.87	692	996,216	773	1,113,211	81.25	11.74
17-Jul-07	387.34	393.07	392.39	0.00168	111.00	392.64	391.80	0.00309	102.30	0.00239	106.65	740	1,065,533	825	1,188,203	85.19	11.51
18-Jul-07	387.13	392.91	392.18	0.00180	110.79	392.47	391.61	0.00317	102.11	0.00249	106.45	772	1,111,392	859	1,237,046	87.26	11.31
19-Jul-07	387.13	392.69	392.05	0.00160	110.66	392.31	391.61	0.00260	102.11	0.00210	106.38	651	937,952	725	1,043,317	73.17	11.23
20-Jul-07	388.88	392.78	392.21	0.00140	110.82	392.33	391.57	0.00282	102.07	0.00211	106.45	654	941,525	728	1,047,920	73.89	11.30
21-Jul-07	390.66	392.97	392.63	0.00084	111.24	392.57	392.18	0.00143	102.68	0.00113	106.96	352	506,786	394	566,797	41.67	11.84
22-Jul-07	390.57	393.13	392.75	0.00095	111.36	392.72	392.38	0.00125	102.88	0.00110	107.12	341	491,427	382	550,406	40.96	12.00
23-Jul-07	388.73	392.93	392.46	0.00117	111.07	392.54	391.98	0.00205	102.48	0.00161	106.78	500	720,108	558	803,978	58.24	11.65
24-Jul-07	387.73	392.64	392.09	0.00137	110.70	392.25	391.56	0.00252	102.06	0.00194	106.38	603	867,627	670	965,094	67.69	11.23
25-Jul-07	387.38	392.48	391.90	0.00143	110.51	392.09	391.34	0.00273	101.84	0.00208	106.18	647	931,031	718	1,033,635	71.25	11.02
26-Jul-07	386.65	392.32	391.67	0.00162	110.28	391.91	391.09	0.00300	101.59	0.00231	105.94	717	1,031,762	794	1,142,871	77.16	10.77
27-Jul-07	386.10	392.13	391.44	0.00171	110.05	391.70	390.87	0.00306	101.37	0.00239	105.71	741	1,066,400	819	1,178,679	77.97	10.53
28-Jul-07	385.79	391.88	391.23	0.00163	109.84	391.50	390.47	0.00256	100.97	0.00209	105.40	649	934,938	716	1,030,420	66.31	10.21
29-Jul-07	386.43	391.84	391.26	0.00145	109.87	391.44	390.58	0.00214	101.08	0.00179	105.48	557	801,375	614	883,821	57.25	10.29
30-Jul-07	386.49	391.72	391.18	0.00135	109.79	391.35	390.52	0.00207	101.02	0.00171	105.40	530	763,665	584	841,643	54.15	10.21
31-Jul-07	386.49	391.68	391.09	0.00146	109.70	391.23	390.39	0.00211	100.89	0.00178	105.29	554	797,209	610	877,694	55.89	10.10
01-Aug-07	385.69	391.11	390.41	0.00173	109.02	390.65	389.76	0.00327	100.26	0.00250	104.64	775	1,116,389	848	1,221,512	73.00	9.42
02-Aug-07	385.85	391.47	390.74	0.00182	109.35	390.98	390.12	0.00316	100.62	0.00249	104.99	772	1,111,795	848	1,220,459	75.46	9.77
03-Aug-07	385.35	391.30	390.60	0.00175	109.21	390.84	389.93	0.00332	100.43	0.00254	104.82	786	1,132,419	862	1,241,140	75.50	9.60
04-Aug-07	384.49	391.09	390.34	0.00186	108.95	390.66	389.69	0.00356	100.19	0.00271	104.57	841	1,210,324	919	1,323,367	78.50	9.34
05-Aug-07	383.51	390.88	390.04	0.00209	108.65	390.43	389.33	0.00405	99.83	0.00307	104.24	953	1,372,808	1039	1,496,242	85.72	8.99
06-Aug-07	383.15	390.67	389.78	0.00221	108.39	390.19	389.06	0.00416	99.56	0.00319	103.97	988	1,423,034	1074	1,547,086	86.15	8.72
07-Aug-07	382.84	390.46	389.58	0.00220	108.19	389.99	388.84	0.00424	99.34	0.00322	103.76	998	1,437,462	1083	1,559,569	84.80	8.49
08-Aug-07	383.33	390.33	389.51	0.00205	108.12	389.85	388.73	0.00410	99.23	0.00308	103.68	955	1,374,959	1035	1,490,511	80.24	8.40
09-Aug-07	384.41	390.30	389.55	0.00187	108.16	389.84	388.88	0.00352	99.38	0.00270	103.77	837	1,205,365	908	1,307,853	71.17	8.50
10-Aug-07	386.40	390.43	389.83	0.00148	108.44	389.98	389.25	0.00269	99.75	0.00209	104.09	647	931,537	704	1,013,909	57.20	8.84
11-Aug-07	387.35	390.56	390.06	0.00124	108.67	390.15	389.58	0.00207	100.08	0.00166	104.38	513	739,410	560	806,968	46.93	9.14
12-Aug-07	388.13	390.78	390.31	0.00116	108.92	390.34	389.90	0.00162	100.40	0.00139	104.66	430	619,366	471	677,815	40.59	9.44
13-Aug-07	387.72	390.78	390.33	0.00111	108.94	390.40	390.09	0.00113	100.59	0.00112	104.77	347	500,390	381	548,151	33.17	9.54
14-Aug-07	388.05	390.98	390.58	0.00100	109.19	390.59	390.39	0.00075	100.89	0.00087	105.04	271	389,752	297	428,062	26.60	9.83
15-Aug-07	387.07	390.89	390.39	0.00124	109.00	390.54	390.19	0.00129	100.69	0.00126	104.85	392	564,924	430	619,315	37.77	9.63
16-Aug-07	386.54	390.72	390.22	0.00124	108.83	390.39	389.98	0.00153	100.48	0.00138	104.65	429	618,042	470	676,302	40.46	9.43
17-Aug-07	386.30	390.63	390.08	0.00137	108.69	390.26	389.82	0.00160	100.32	0.00148	104.50	460	663,055	503	724,522	42.68	9.27
18-Aug-07	385.90	390.57	389.99	0.00142	108.60	390.20	389.75	0.00167	100.25	0.00154	104.43	479	689,229	523	752,566	43.98	9.19
19-Aug-07	384.96	390.41	389.80	0.00152	108.41	390.04	389.51	0.00195	100.01	0.00173	104.21	538	774,047	586	843,390	48.15	8.96
20-Aug-07	383.91	390.24	389.56	0.00167	108.17	389.87	389.24	0.00234	99.74	0.00200	103.96	621	894,860	675	972,696	54.05	8.70
21-Aug-07	384.43	390.15	389.47	0.00169	108.08	389.75	389.13	0.00227	99.63	0.00198	103.86	615	885,815	668	961,926	52.86	8.59
22-Aug-07	386.05	390.19	389.66	0.00131	108.27	389.86	389.41	0.00165	99.91	0.00148	104.09	458	660,114	499	718,465	40.52	8.84
23-Aug-07	387.92	390.44	390.01	0.00108	108.62	390.05	389.83	0.00081	100.33	0.00094	104.48	292	420,767	319	459,651	27.00	9.24
24-Aug-07	390.01	390.74	390.46	0.00071	109.07	390.39	390.97	(0.00211)	101.47	0.00035	105.27	110	158,562	121	174,529	11.09	10.07
25-Aug-07	391.84	391.04	390.90	0.00035	109.51	390.71	390.78	(0.00026)	101.28	0.00018	105.39	55	78,702	60	86,731	5.58	10.20
26-Aug-07	393.47	391.35	391.29	0.00013	109.90	391.01	391.48	(0.00172)	101.98	0.00007	105.94	21	30,092	23	33,334	2.25	10.77
27-Aug-07	394.66	391.61	391.73	(0.00029)	110.34	391.34	392.13	(0.00289)	102.63	(0.00159)	106.48	0	0	0	0	0	0
28-Aug-07	395.76	391.92	392.15	(0.00058)	110.76	391.67	392.79	(0.00279)	103.29	(0.00169)	107.03	0	0	0	0	0	0
29-Aug-07	397.96	392.38	392.88	(0.00123)	111.49	392.14	393.89	(0.00435)	104.39	(0.00279)	107.94	0	0	0	0	0	0
30-Aug-07	398.67	392.80	393.45	(0.00162)	112.06	392.60	394.73	(0.00529)	105.23	(0.00345)	108.65	0	0	0	0	0	0
31-Aug-07	398.64	393.15	393.79	(0.00160)	112.40	392.94	395.04	(0.00522)	105.54	(0.00341)	108.97	0	0	0	0	0	0
01-Sep-07	398.09	393.40	393.96	(0.00139)	112.57	393.17	395.03	(0.00685)	105.53	(0.00412)	109.05	0	0	0	0	0	0
02-Sep-07	397.31	393.54	393.99	(0.00110)	112.60	393.28	394.92	(0.00604)	105.42	(0.00357)	109.01	0	0	0	0	0	0
03-Sep-07	396.46	393.64	393.97	(0.00083)	112.58	393.39	394.73	(0.00493)	105.23	(0.00288)	108.91	0	0	0	0	0	0
04-Sep-07	395.66	393.70	393.91	(0.00051)	112.52	393.43	394.54	(0.00409)	105.04	(0.00230)	108.78	0	0	0	0	0	0
05-Sep-07	394.98	393.73	393.86	(0.00033)	112.47	393.46	394.40	(0.00345)	104.90	(0.00189)	108.69	0	0	0	0	0	0
06-Sep-07	394.07	393.67	393.71	(0.00008)	112.32	393.43	394.06	(0.00232)	104.56	(0.00120)	108.44	0	0	0	0	0	0
07-Sep-07	392.79	393.60	393.49	0.00028	112.10	393.35	393.79	(0.00161)	104.29	0.00014	108.19	44	63,425	50	71,751	5.78	13.13
08-Sep-07	390.31	393.29	393.01	0.00072	111.62	393.05	393.91	(0.00315)	104.41	0.00036	108.01	111	160,414	126	181,168	14.41	12.94
09-Sep-07	389.64	392.95	392.55	0.00099	111.16	392.69	394.99	(0.00847)	105.49	0.00049	108.33	153	220,367	173	249,604	20.30	13.27
10-Sep-07	389.90	392.80	392.45	0.00089	111.06	392.53	392.62	(0.00033)	103.12	0.00044	107.09	138	198,608	154	222,386	16.51	11.97
11-Sep-07	389.82	392.78	392.44	0.00085	111.05	392.52	392.67	(0.00057)	103.17	0.00042	107.11	131	188,886	147	211,544	15.74	12.00

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
12-Sep-07	389.51	392.67	392.30	0.00092	110.91	392.41	393.60	(0.00437)	104.10	0.00046	107.51	143	205,552	160	231,063	17.72	12.41
13-Sep-07	389.96	392.66	392.33	0.00083	110.94	392.39	395.21	(0.01035)	105.71	0.00042	108.32	129	186,229	146	210,926	17.15	13.26
14-Sep-07	389.67	392.59	392.22	0.00093	110.83	392.29	394.94	(0.00975)	105.44	0.00047	108.14	145	208,561	164	235,815	18.93	13.07
15-Sep-07	388.72	392.36	391.92	0.00111	110.53	392.10	396.10	(0.01470)	106.60	0.00055	108.56	172	247,681	195	281,150	23.24	13.51
16-Sep-07	387.58	392.13	391.59	0.00136	110.20	391.83	393.66	(0.00676)	104.16	0.00068	107.18	210	303,004	236	339,576	25.40	12.07
17-Sep-07	386.27	391.86	391.19	0.00166	109.80	391.54	392.31	(0.00285)	102.81	0.00083	106.31	257	370,595	286	411,939	28.71	11.16
18-Sep-07	385.49	391.59	390.91	0.00169	109.52	391.29	391.43	(0.00052)	101.93	0.00085	105.72	263	378,003	290	417,865	27.68	10.55
19-Sep-07	385.06	391.41	390.65	0.00191	109.26	391.05	390.90	0.00054	101.40	0.00095	105.33	296	426,150	326	469,339	29.99	10.13
20-Sep-07	385.03	391.23	390.48	0.00185	109.09	390.85	391.25	(0.00148)	101.75	0.00093	105.42	287	413,650	317	455,969	29.39	10.23
21-Sep-07	384.70	391.05	390.31	0.00182	108.92	390.69	392.50	(0.00664)	103.00	0.00091	105.96	283	406,937	313	450,864	30.50	10.79
22-Sep-07	384.48	390.82	390.09	0.00181	108.70	390.46	395.90	(0.02003)	106.40	0.00091	107.55	281	404,623	316	455,038	35.01	12.46
23-Sep-07	384.18	390.71	389.92	0.00197	108.53	390.31	397.97	(0.02817)	108.47	0.00099	108.50	306	440,733	347	500,014	41.17	13.45
24-Sep-07	383.83	390.55	389.74	0.00201	108.35	390.13	399.33	(0.03381)	109.83	0.00101	109.09	312	449,761	356	513,005	43.92	14.06
25-Sep-07	383.78	390.41	389.59	0.00203	108.20	389.97	390.84	(0.00318)	101.34	0.00102	104.77	315	454,159	346	497,523	30.11	9.55
26-Sep-07	383.86	390.27	389.48	0.00195	108.09	389.86	389.20	0.00245	99.70	0.00220	103.89	682	982,665	741	1,067,502	58.91	8.63
27-Sep-07	384.00	390.13	389.32	0.00201	107.93	389.67	389.00	0.00247	99.50	0.00224	103.72	695	1,000,316	753	1,084,828	58.69	8.45
28-Sep-07	384.68	390.00	389.33	0.00166	107.94	389.64	389.09	0.00138	99.59	0.00152	103.77	472	679,155	512	736,872	40.08	8.50
29-Sep-07	384.40	389.91	389.24	0.00167	107.85	389.57	388.99	0.00143	99.49	0.00155	103.67	480	690,960	520	749,009	40.31	8.40
30-Sep-07	383.51	389.85	389.08	0.00191	107.69	389.42	388.78	0.00158	99.28	0.00175	103.48	542	780,311	586	844,326	44.46	8.20
											3Q07 Total Gallons		52,174,175		57,602,643		
01-Oct-07	383.51	389.70	388.94	0.00190	107.55	389.27	388.61	0.00241	99.11	0.00216	103.33	668	962,558	722	1,039,969	53.76	8.04
02-Oct-07	383.36	389.63	388.87	0.00189	107.48	389.22	388.58	0.00235	99.08	0.00212	103.28	659	948,964	712	1,024,808	52.67	7.99
03-Oct-07	384.09	389.55	388.86	0.00171	107.47	389.16	388.68	0.00178	99.18	0.00175	103.32	541	779,701	585	842,357	43.51	8.04
04-Oct-07	384.51	389.57	388.94	0.00157	107.55	389.21	388.69	0.00189	99.19	0.00173	103.37	536	772,379	580	834,834	43.37	8.09
05-Oct-07	384.95	389.54	388.94	0.00149	107.55	389.18	388.70	0.00179	99.20	0.00164	103.38	508	731,986	549	791,215	41.13	8.09
06-Oct-07	385.72	389.65	389.05	0.00147	107.66	389.23	388.84	0.00146	99.34	0.00146	103.50	454	654,166	492	707,944	37.35	8.22
07-Oct-07	386.47	389.75	389.21	0.00135	107.82	389.35	389.03	0.00118	99.53	0.00127	103.67	393	566,077	426	613,642	33.03	8.40
08-Oct-07	386.98	389.83	389.33	0.00123	107.94	389.44	389.36	0.00030	99.86	0.00076	103.90	237	341,254	257	370,746	20.48	8.64
09-Oct-07	387.51	389.93	389.48	0.00114	108.09	389.55	389.37	0.00065	99.87	0.00090	103.98	278	400,475	302	435,402	24.25	8.72
10-Oct-07	388.34	390.07	389.69	0.00095	108.30	389.70	389.61	0.00032	100.11	0.00063	104.21	196	281,582	213	306,812	17.52	8.96
11-Oct-07	388.58	390.20	389.85	0.00087	108.46	389.87	389.84	0.00009	100.34	0.00048	104.40	149	215,209	163	234,927	13.69	9.16
12-Oct-07	388.42	390.22	389.90	0.00081	108.51	389.94	389.87	0.00027	100.37	0.00054	104.44	166	239,043	181	261,039	15.27	9.20
13-Oct-07	388.51	390.24	389.97	0.00068	108.58	389.98	389.93	0.00017	100.43	0.00042	104.51	132	189,592	144	207,172	12.21	9.27
14-Oct-07	388.74	390.38	390.08	0.00076	108.69	390.03	390.06	(0.00010)	100.56	0.00033	104.62	102	147,335	112	161,177	9.61	9.39
15-Oct-07	389.13	390.48	390.19	0.00072	108.80	390.12	390.18	(0.00021)	100.68	0.00025	104.74	78	112,981	86	123,733	7.47	9.52
16-Oct-07	389.61	390.53	390.27	0.00066	108.88	390.23	390.27	(0.00015)	100.77	0.00026	104.82	79	113,935	87	124,877	7.60	9.60
17-Oct-07	389.94	390.64	390.42	0.00057	109.03	390.37	390.66	(0.00106)	101.16	0.00028	105.09	88	126,850	97	139,392	8.71	9.89
18-Oct-07	390.68	390.82	390.60	0.00056	109.21	390.47	390.93	(0.00169)	101.43	0.00028	105.32	87	125,229	96	137,906	8.80	10.12
19-Oct-07	393.05	390.95	390.87	0.00018	109.48	390.63	391.06	(0.00160)	101.56	0.00009	105.52	28	40,972	31	45,207	2.94	10.34
20-Oct-07	396.00	391.29	391.51	(0.00053)	110.12	391.02	392.06	(0.00382)	102.56	(0.00218)	106.34	0	0	0	0	0	0
21-Oct-07	396.74	391.66	391.95	(0.00073)	110.56	391.38	392.71	(0.00488)	103.21	(0.00281)	106.88	0	0	0	0	0	0
22-Oct-07	396.26	391.81	392.15	(0.00084)	110.76	391.59	392.91	(0.00485)	103.41	(0.00285)	107.08	0	0	0	0	0	0
23-Oct-07	395.72	392.01	392.28	(0.00066)	110.89	391.79	393.02	(0.00451)	103.52	(0.00259)	107.20	0	0	0	0	0	0
24-Oct-07	395.18	392.10	392.30	(0.00050)	110.91	391.87	392.94	(0.00396)	103.44	(0.00223)	107.18	0	0	0	0	0	0
25-Oct-07	394.58	392.23	392.36	(0.00032)	110.97	391.96	392.94	(0.00358)	103.44	(0.00195)	107.20	0	0	0	0	0	0
26-Oct-07	394.29	392.30	392.40	(0.00024)	111.01	392.02	392.93	(0.00334)	103.43	(0.00179)	107.22	0	0	0	0	0	0
27-Oct-07	393.73	392.24	392.33	(0.00022)	110.94	392.02	392.75	(0.00270)	103.25	(0.00146)	107.10	0	0	0	0	0	0
28-Oct-07	392.93	392.26	392.25	0.00004	110.86	391.98	392.55	(0.00141)	103.05	0.00002	106.95	6	9,259	7	10,355	0.76	11.83
29-Oct-07	392.57	392.27	392.24	0.00007	110.85	392.03	392.45	(0.00104)	102.95	0.00004	106.90	12	16,586	13	18,538	1.36	11.77
30-Oct-07	392.39	392.33	392.27	0.00015	110.88	392.07	392.42	(0.00087)	102.92	0.00008	106.90	24	34,490	27	38,550	2.82	11.77
31-Oct-07	392.19	392.34	392.24	0.00025	110.85	392.07	392.35	(0.00072)	102.85	0.00012	106.85	38	55,092	43	61,552	4.49	11.73
01-Nov-07	392.05	392.25	392.19	0.00016	110.80	392.00	392.31	(0.00114)	102.81	(0.00049)	106.81	0	0	0	0	0	0
02-Nov-07	391.73	392.31	392.17	0.00036	110.78	392.11	392.16	(0.00021)	102.66	0.00007	106.72	23	33,222	26	37,072	2.67	11.59
03-Nov-07	391.33	392.21	392.01	0.00050	110.62	392.12	391.92	0.00075	102.42	0.00062	106.52	193	278,170	215	309,818	21.98	11.38
04-Nov-07	391.01	392.17	391.94	0.00058	110.55	392.07	391.81	0.00096	102.31	0.00077	106.43	237	341,891	264	380,463	26.79	11.28
05-Nov-07	390.61	392.03	391.80	0.00059	110.41	391.96	391.65	0.00113	102.15	0.00086	106.28	266	383,504	296	426,180	29.64	11.13
06-Nov-07	389.99	391.78	391.53	0.00063	110.14	391.70	391.32	0.00139	101.82	0.00101	105.98	312	449,191	346	497,756	33.73	10.81
07-Nov-07	389.27	391.67	391.31	0.00089	109.92	391.54	391.08	0.00168	101.58	0.00128	105.75	398	573,727	441	634,401	42.13	10.58
08-Nov-07	388.76	391.57	391.17	0.00100	109.78	391.43	390.89	0.00200	101.39	0.00150	105.58	465	668,904	513	738,470	48.31	10.40
09-Nov-07	387.42	391.26	390.80	0.00115	109.41	391.15	390.45	0.00256	100.95	0.00186	105.18	575	828,596	633	911,274	57.42	9.98
10-Nov-07	386.57	390.99	390.48	0.00128	109.09	390.90	390.09	0.00297	100.59	0.00212	104.84	659	948,894	722	1,040,197	63.40	9.62
11-Nov-07	385.18	390.78	390.12	0.00164	108.73	390.62	389.66	0.00352	100.16	0.00258	104.45	801	1,153,282	875	1,259,535	73.79	9.21
12-Nov-07	385.01	390.53	389.84	0.00172	108.45	390.33	389.33	0.00369	99.83	0.00271	104.14	839	1,208,396	914	1,315,786	74.58	8.89
13-Nov-07	385.60	390.43	389.82	0.00151	108.43	390.24	389.34	0.00332	99.84	0.00241	104.13	748	1,077,700	815	1,173,435	66.48	8.88
14-Nov-07	384.19	390.28	389.61	0.00168	108.22	390.06	389.13	0.00341	99.63	0.00255	103.93	789	1,136,863	858	1,235,379	68.41	8.67
15-Nov-07	384.99	390.02	389.45	0.00141	108.06	389.89	388.96	0.00343	99.46	0.00242	103.76	751	1,081,951	815	1,173,824	63.80	8.49

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)
16-Nov-07	384.19	389.95	389.24	0.00178	107.85	389.74	388.75	0.00366	99.25	0.00272	103.55	842	1,212,796	912	1,313,116	69.67	8.27
17-Nov-07	383.64	389.68	388.98	0.00174	107.59	389.50	388.44	0.00390	98.94	0.00282	103.26	874	1,258,285	943	1,358,593	69.66	7.97
18-Nov-07	383.10	389.46	388.72	0.00185	107.33	389.26	388.15	0.00409	98.65	0.00297	102.99	921	1,326,169	992	1,428,136	70.81	7.69
19-Nov-07	382.83	389.34	388.52	0.00202	107.13	389.10	387.97	0.00415	98.47	0.00309	102.80	957	1,378,158	1029	1,481,381	71.68	7.49
20-Nov-07	382.60	389.14	388.36	0.00196	106.97	388.93	387.79	0.00418	98.29	0.00307	102.63	952	1,371,000	1022	1,471,212	69.59	7.31
21-Nov-07	382.52	389.01	388.18	0.00204	106.79	388.76	387.63	0.00418	98.13	0.00311	102.46	965	1,389,207	1034	1,488,318	68.83	7.13
22-Nov-07	382.00	388.74	387.93	0.00201	106.54	388.52	387.37	0.00423	97.87	0.00312	102.20	967	1,392,485	1033	1,488,101	66.40	6.87
23-Nov-07	381.99	388.68	387.88	0.00200	106.49	388.46	387.30	0.00427	97.80	0.00313	102.14	971	1,398,371	1037	1,493,510	66.07	6.80
24-Nov-07	382.16	388.55	387.74	0.00203	106.35	388.32	387.19	0.00417	97.69	0.00310	102.02	963	1,386,640	1027	1,479,145	64.24	6.67
25-Nov-07	382.35	388.48	387.68	0.00198	106.29	388.25	387.14	0.00408	97.64	0.00303	101.97	940	1,353,635	1002	1,443,218	62.21	6.62
26-Nov-07	382.34	388.40	387.60	0.00199	106.21	388.16	387.17	0.00365	97.67	0.00282	101.94	874	1,258,865	932	1,341,845	57.62	6.59
27-Nov-07	382.11	388.24	387.41	0.00204	106.02	387.98	386.89	0.00399	97.39	0.00302	101.71	936	1,347,560	995	1,433,087	59.39	6.35
28-Nov-07	376.51	388.11	387.29	0.00205	105.90	387.89	386.78	0.00277	97.28	0.00241	101.59	747	1,075,213	793	1,142,131	46.47	6.22
29-Nov-07	381.49	387.93	387.08	0.00211	105.69	387.69	386.57	0.00280	97.07	0.00246	101.38	762	1,096,740	807	1,162,585	45.73	6.00
30-Nov-07	381.33	387.82	387.00	0.00206	105.61	387.62	386.52	0.00274	97.02	0.00240	101.31	744	1,071,509	788	1,135,074	44.14	5.93
01-Dec-07	381.17	387.80	386.97	0.00207	105.58	387.59	386.48	0.00407	96.98	0.00307	101.28	952	1,371,126	1008	1,452,050	56.20	5.90
02-Dec-07	380.66	387.61	386.73	0.00219	105.34	387.38	386.19	0.00436	96.69	0.00327	101.02	1016	1,462,415	1073	1,544,646	57.10	5.62
03-Dec-07	380.85	387.48	386.63	0.00212	105.24	387.25	386.09	0.00425	96.59	0.00319	100.92	988	1,422,948	1043	1,501,472	54.53	5.52
04-Dec-07	380.49	387.45	386.59	0.00213	105.20	387.24	386.08	0.00426	96.58	0.00319	100.89	990	1,426,058	1045	1,504,386	54.39	5.49
05-Dec-07	380.25	387.39	386.51	0.00217	105.12	387.10	385.88	0.00449	96.38	0.00333	100.75	1033	1,487,778	1088	1,567,306	55.23	5.35
06-Dec-07	379.53	387.60	386.74	0.00215	105.35	387.50	385.99	0.00555	96.49	0.00385	100.92	1194	1,720,023	1260	1,815,033	65.98	5.52
07-Dec-07	379.85	387.51	386.61	0.00224	105.22	387.38	385.93	0.00534	96.43	0.00379	100.82	1175	1,692,014	1239	1,783,738	63.70	5.42
08-Dec-07	381.01	387.08	386.26	0.00205	104.87	386.95	385.74	0.00445	96.24	0.00325	100.55	1008	1,451,793	1060	1,526,418	51.82	5.14
09-Dec-07	381.67	387.09	386.32	0.00191	104.93	387.03	386.34	0.00254	96.84	0.00222	100.89	689	992,795	727	1,047,289	37.84	5.49
10-Dec-07	381.80	387.09	386.35	0.00183	104.96	386.92	385.87	0.00385	96.37	0.00284	100.66	881	1,268,522	927	1,335,197	46.30	5.26
11-Dec-07	381.00	387.14	386.30	0.00208	104.91	387.02	386.16	0.00314	96.66	0.00261	100.79	810	1,166,068	853	1,228,858	43.60	5.38
12-Dec-07	380.97	NA	386.14	NC(D)	104.75	386.85	385.74	0.00410	96.24	0.00205	100.49	636	915,145	668	961,624	32.28	5.08
13-Dec-07	381.88	386.87	386.11	0.00190	104.72	386.69	385.67	0.00375	96.17	0.00282	100.45	876	1,260,935	920	1,324,349	44.04	5.03
14-Dec-07	382.81	386.94	386.26	0.00169	104.87	386.71	385.82	0.00325	96.32	0.00247	100.60	767	1,104,645	807	1,161,912	39.77	5.18
15-Dec-07	383.80	387.14	386.53	0.00150	105.14	386.92	386.15	0.00286	96.65	0.00218	100.89	677	975,509	715	1,029,116	37.23	5.50
16-Dec-07	386.67	387.24	386.81	0.00108	105.42	387.01	386.46	0.00202	96.96	0.00155	101.19	480	691,296	508	731,430	27.87	5.81
17-Dec-07	388.21	387.60	387.30	0.00075	105.91	387.40	387.11	0.00106	97.61	0.00090	101.76	281	404,098	299	429,956	17.96	6.40
18-Dec-07	386.76	387.73	387.38	0.00089	105.99	387.58	387.20	0.00139	97.70	0.00114	101.84	354	510,159	377	543,252	22.98	6.49
19-Dec-07	385.80	387.69	387.28	0.00102	105.89	387.54	387.09	0.00169	97.59	0.00135	101.74	420	604,759	447	643,326	26.78	6.38
20-Dec-07	385.94	387.80	387.37	0.00106	105.98	387.78	387.40	0.00138	97.90	0.00122	101.94	378	544,368	403	580,265	24.93	6.59
21-Dec-07	385.47	387.73	387.32	0.00102	105.93	387.62	387.10	0.00191	97.60	0.00147	101.76	455	655,069	484	697,026	29.14	6.40
22-Dec-07	385.07	387.75	387.31	0.00109	105.92	387.66	387.23	0.00156	97.73	0.00132	101.83	411	591,551	437	629,825	26.58	6.47
23-Dec-07	385.40	387.67	387.22	0.00112	105.83	387.52	386.95	0.00209	97.45	0.00160	101.64	497	715,597	528	760,508	31.19	6.28
24-Dec-07	384.70	387.65	387.14	0.00127	105.75	387.44	386.85	0.00220	97.35	0.00173	101.55	537	773,451	570	821,259	33.20	6.18
25-Dec-07	384.12	387.55	387.03	0.00130	105.64	387.37	386.73	0.00237	97.23	0.00183	101.43	569	819,165	603	868,816	34.48	6.06
26-Dec-07	384.51	387.54	387.06	0.00120	105.67	387.38	386.74	0.00238	97.24	0.00179	101.45	555	798,774	588	847,345	33.73	6.08
27-Dec-07	385.83	387.65	387.22	0.00107	105.83	387.44	386.94	0.00183	97.44	0.00145	101.63	450	648,059	478	688,691	28.22	6.27
28-Dec-07	385.97	387.78	387.38	0.00100	105.99	387.60	387.13	0.00116	97.63	0.00108	101.81	335	482,631	357	513,771	21.63	6.45
29-Dec-07	386.14	387.77	387.40	0.00091	106.01	387.62	387.14	0.00119	97.64	0.00105	101.83	325	468,510	346	498,833	21.06	6.47
30-Dec-07	385.57	387.83	387.42	0.00101	106.03	387.69	387.19	0.00123	97.69	0.00112	101.86	348	501,149	371	533,769	22.65	6.51
31-Dec-07	385.73	387.83	387.41	0.00103	106.02	387.66	387.16	0.00124	97.66	0.00113	101.84	352	506,825	375	539,705	22.83	6.49
											3Q07 Total Gallons		66,779,877		71,436,365		
									Maximum	0.00385	118.25	1194		1260		87.26	17.15
									Average	0.00064	102.88	521		547		26.15	6.10
									Minimum	-0.04021	91.18	0		0		-34.27	-4.66

Number of Days with Qc = 0	172	172
Number of Days with Qc > 0	527	527

alpha	0.05	0.05
Std. Dev.	21.00	4.22
Sample No.	699	699
95% CL	1.94	0.39

alpha	0.01	0.01
Std. Dev.	21.00	4.22
Sample No.	699	699
99% CL	2.55	0.51

NOTES:

1) Darcy's Law Used to Determine Computed Flow: Q = KIA

Q = Groundwater Flow (GPD)
K = Hydraulic Conducitivity (Feet/Day)
I = Groundwater Gradient (Ft/Ft)
A = Groundwater Discharge Area (Square Feet)

2) Dynamic Gradient Darcy's Law Computed Flow Calculated Using Regional Aquifer Hydraulic Conductivity (285 ft/day), Dynamic GW Gradient and 100 Ft. Saturated Thickness
3) Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow Calculated Using Site-Specific Hydraulic Conductivity of 298 ft/day, Average GW Gradient in PZ-5 U/D and PZ-8 U/D and Average Saturated Thickness in PZ-5 D and PZ-8 D.
4) Actual Distance Between PZ-5 U/D is 407.04 feet; Image Well Distance of 402 feet Used to Calculate GW Gradient
5) Actual Distance Between PZ-8 U/D is 320.56 feet; Image Well Distance of 272 feet Used to Calculate GW Gradient
6) Seepage Face Length is 2,095.22 feet
7) PZ-5D Daily Average Saturated Thickness = Average Daily GWL - Bottom Elevation of DHU (281.39 Ft. NGVD)

Appendix 2
2007 Annual Report Tech Memo
Sauget Area 2 Groundwater Migration Control System
Darcy's Law Flow Computed with Dynamic Gradient and Saturated Thickness

Date	SWL	PZ-5U Average GWL	PZ-5D Average GWL	PZ-5 U/D Groundwater Gradient	PZ-5D Saturated Thickness	PZ-8U Average GWL	PZ-8D Average GWL	PZ-8 U/D Groundwater Gradient	PZ-8D Saturated Thickness	Average Groundwater Gradient	Average Saturated Thickness	Dynamic Gradient Darcy's Law Computed Flow		Dynamic Gradient and Saturated Thickness Darcy's Law Computed Flow		Darcy's Law Computed Flow Increase/Decrease	
	(Ft NGVD)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet/Feet)	(Ft NGVD)	(Ft NGVD)	(Feet/Feet)	(Feet)	(Feet/Feet)	(Feet)	(GPM)	(GPD)	(GPM)	(GPD)	(GPM)	(Percent)

8) PZ-8D Daily Average Saturated Thickness = Average Daily GWL - Bottom Elevation of DHU (289.50 Ft. NGVD)
9) NC(D) = Not Calculated because of Missing Data

Appendix 3

RI/FS Support Sampling Plan

Sauget Area 2 Sites

Sauget, Illinois

Volume 1

Support Sampling Plan

May 25, 2001

Submitted To:

U.S. Environmental Protection Agency

Submitted By:

Sauget Area 2 Sites Group

Appendix 3

Groundwater Flow Conditions

(Geraghty & Miller, 1994)

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2. Water-Level Elevations in the Intermediate Zone on June 3, 1992, Monsanto Company, Sauget, Illinois.

3. Water-Level Elevations in the Deep Zone on June 3, 1992, Monsanto Company, Sauget, Illinois.

4. Mississippi River Stage at the St. Louis Station from June 15 through 19, 1992.

5. Drawdown in the Intermediate and Deep Aquifers after 550 Minutes of Pumping on June 17, 1992, Monsanto Company, Sauget, Illinois.

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4. Estimates of Aquifer Characteristics Obtained Through Interpretation of Observation Well Drawdown Data From the June 1992 Aquifer Test, Sauget Site R, Monsanto Company, Sauget, Illinois.

5. Estimate of Average Daily Ground-Water Discharge to Mississippi River, Sauget Site R, Monsanto Company, Sauget, Illinois.

flow meets the regional westward flow) which is generally between Site R and the levee. Its exact location depends on the magnitude of the regional westward flow and river stage. At the stagnation point, water from the shallow zone flows downward into the intermediate zone. Water which flows south from the mound eventually turns to the west under the influence of the regional flow patterns.

Both the easterly and southerly flow from the mound are included in the model. The easterly flow is included in the intermediate zone estimate of groundwater discharge to the river. Wells screened in the intermediate zone adjacent to the river encounter this flow. Shallow wells along the river in the southern portion of Site R and in the Expanded Study Area encounter the southern flow.

Figures 2 and 3 show that groundwater flow in the intermediate and deep zones on June 3, 1992 was toward the river. Water-level data from well clusters screened in the intermediate and deep zones (GM-27B and GM-27C, P-8 and GM-56C, and GM-28B and GM-28C) indicates that there is an upward gradient from the deep zone to the intermediate zone (Table 1). This is to be expected because these wells are adjacent to the Mississippi River, which is a major groundwater discharge boundary. Groundwater flows from the lower portion of the aquifer up toward the river.

During periods of high river stage, when the river rises higher than the water table, gradients in the intermediate and deep zones are reversed. Flow in all three zones is toward the east, but eventually reaches a stagnation point where the eastward gradient equals the westward regional gradient. This "riverbank storage effect" can last from several days to a few weeks. The response of all three zones to varying river stages was demonstrated in hydrographs provided in the RI Work Plan (Geraghty & Miller 1990).

Analytical data from the well cluster located adjacent to the flood control levee (GM-62A, GM-62B, and GM-62C) indicate that there has been little, if any, transport of constituents from Site R to the east. The concentrations of total VOCs and total SVOCs are less than 150 ug/L

test were conducted. The site-specific aquifer coefficients determined from this testing include transmissivity, hydraulic conductivity, and storage coefficient.

2.1 FIELD TESTING

Prior to testing, two 6,000-gallon Calgon carbon adsorption units were delivered to the site, set up in series, and filled with 40,000 pounds of activated carbon to treat the discharge water on site. Piping was then installed from the well to the carbon units and from the carbon unit discharge line to a line which was connected to the American Bottoms treatment facility. The American Bottoms facility issued a permit for this discharge before testing was initiated.

A step-drawdown test was conducted to evaluate the optimum pumping rate for the constant-rate aquifer test. Based on this test, a flow rate of 350 gallons per minute (gpm) was selected for the constant-rate test. A network of 22 wells was monitored on a regular basis using three different types of monitoring equipment. Pressure transducers were used to monitor water-level changes in 16 monitoring wells, automatic Steven's water-level recorders were used on three wells, and manual measurements were collected in three wells. Table 2 provides a summary of the method used to monitor each well. The water-level measurements collected during the test are provided in Attachment A.

During the test, water samples were collected from the carbon unit influent, lead vessel effluent, and final effluent after 6, 24, and 48 hours, for laboratory analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and herbicides. The final effluent sample collected 24 hours into the test was also analyzed for cyanide, ammonia, metals, and pesticides. Analysis was performed by Savannah Laboratories, Savannah, Georgia. Field analyses of the phenol in lead vessel effluent were conducted to monitor for breakthrough.

At approximately 12 hours into the test, the river stage began to rise as a result of a storm event that had occurred upriver several days earlier (Figure 4). Water levels within the wells

Unconfined aquifer conditions were analyzed using the non-equilibrium method of Neuman or the methods of Theis and Cooper-Jacob with Jacob's correction for reduction in saturated thickness. The applicability of the semi-confined (leaky) solution of aquifer conditions was analyzed using the non-equilibrium method of Hantush, with storage in the overlying unpumped aquifer zone.

Except for the Jacob distance-drawdown solution, all of the methods were applied with the support of AQTESOLV, a Geraghty & Miller Modeling Group aquifer test analysis software package. Data utilized by the Jacob distance-drawdown solution were plotted on semilog paper.

AQTESOLV is an interactive, menu driven program that provides graphical curve matching techniques for quick and efficient analysis of aquifer test data. The option was utilized in which the analyst interactively matches type curves to the time-drawdown data directly on the computer screen. Data relevant to the configuration of the aquifer test are presented in Table 3.

2.2.1 Theis Method

If an unconfined aquifer does not exhibit a delayed water-table response, then the Theis Method for unsteady flow in confined aquifers can be applied once the drawdown data are corrected as follows:

$$S' = S - \frac{S^2}{2m}$$

where S' = equivalent confined aquifer drawdown

S = observed drawdown under unconfined conditions

m = aquifer thickness (pretesting)

2.2.4 Jacob (Distance-Drawdown) Method

Simultaneous drawdown measurements in several observation wells, each at a different distance from the pumped well, were plotted on semilog paper to show the straight line distance-drawdown relationship. This distance-drawdown graph was used to calculate the aquifer transmissivity and storativity. Distance-drawdown graphs were plotted for data from groups of intermediate and deep zone wells to determine the aquifer characteristics for those zones.

2.3 INTERPRETATION OF RESULTS

2.3.1 Water-Table Zone

Observation wells screened in the poorly sorted, fine grained material of this zone recorded maximum drawdown ranging from 0.08 to 0.15 ft. This small drawdown was not sufficient to establish drawdown behavior from natural fluctuations in water-level elevations. Thus, the aquifer characteristics of the water-table zone were not estimated through the analysis of aquifer test data.

2.3.2 Intermediate Zone

Time-drawdown measurements in the intermediate zone wells exhibited the characteristic shape of the Theis type-curve (Figures 7 through 11). The decline in measured drawdown beginning about 800 minutes after the start of pumping indicates the recovery in water-levels induced by aquifer recharge from the river. Table 4 presents trasmissivity values for all observation wells that produced a sufficient drawdown response; values ranged from about 22,000 to 38,200 square feet per day (ft^2/day). Values of storativity calculated with the Theis method range from .004 to .013 (Table 4). Estimates of transmissivity obtained with the Theis solution were closely reproduced with the Cooper-Jacob (semilog) method for Well B-24C (Figure 12) and the Neuman method for Well B-26B (Figure 13).

for individual time-drawdown plots. Values of transmissivity with the Jacob method ranged from 17,154 ft^2/day to 22,055 ft^2/day. The distance-drawdown results for the intermediate and deep zone wells were lower than individual well estimates. However, the groundwater flow model was calibrated with transmissivity values based on the higher estimates obtained from individual well plots. Thus, simulated remedial pumping rates will produce conservative estimates of capture zones since they are based on values in the higher range of transmissivity estimates.

3.0 GROUNDWATER DISCHARGE CALCULATIONS

As one of the first steps of the risk assessment, a list of chemicals of concern (COC) was selected for the groundwater at Site R. In order to complete the evaluation of risks associated with exposure to river water affected by the ground water, predicted concentrations of the COCs in the river were calculated. Geraghty & Miller used the groundwater model described in Appendix H and the concentrations of the COCs in the wells to complete these calculations.

Several steps were involved in the process. First, because the rate of groundwater discharge to the river changes with varying river stage, data were obtained from the U.S. Army Corps of Engineers (COE) which show the daily percent frequency of occurrence for every river stage on record in 1-ft increments, i.e., the percent of days in a given period that each river stage occurred. The data included the 130-year period from January 1861 to December 1991.

Using these data, a range of river stages was selected for the discharge calculations. The lower limit of this range was 374 ft above mean sea level (msl), the lowest river stage on record. The upper limit of the range was 410 ft above msl. Groundwater level data and the model indicate that the hydraulic gradient in the aquifer reverses above this level, so there would be no discharge to the river. These river stages and their frequency of occurrence are shown in columns 1 and 2 of Table 5.

The model was used to predict the groundwater discharge to the river at each river stage in the range A separate calculation was done for each of the three hydrogeologic zones (Columns

Table 1. Water-Level Elevations in Monitoring Wells at Sauget Site R, June 3, 1992, Monsanto Company, Sauget, Illinois.

Well No.	Measuring Point Elevation (1)	Depth to Water (2)	Water Level Elevation (1)
Shallow Wells			
B-21A	428.53	29.93	398.60
B-22A	428.16	28.79	399.37
B-24A	422.49	22.17	400.32
B-25A	428.47	30.95	397.52
B-26A	423.71	26.37	397.34
B-28A	423.04	25.25	397.79
B-29A	429.03	31.97	397.06
B-31B	421.68	28.45	393.23
P-6	421.78	24.92	396.86
P-7	421.82	22.96	398.86
P-14	424.36	24.93	399.43
GM-62A	425.75	31.99	393.76
GM-65A	424.11	32.66	391.45
GM-66A	422.73	27.79	394.94
Intermediate Wells			
GM-27B	426.04	36.63	389.41
GM-28B	423.88	34.15	389.73
B-21B	428.37	36.12	392.25
B-22B	428.16	37.55	390.61
B-23B	428.17	33.97	394.20
B-24B	422.26	31.70	390.56
B-24C	422.52	32.02	390.50
B-25B	427.35	34.84	392.51
B-26B	423.62	33.29	390.33
B-27B	425.83	34.26	391.57
B-28B	423.08	32.55	390.53
B-29B	429.06	36.69	392.37
B-30B	430.52	38.02	392.50
B-31C	421.88	28.70	393.18
P-1	423.11	33.18	389.93
P-2	423.15	33.26	389.89
P-3	423.43	33.27	390.16
P-4	421.82	31.70	390.12
P-5	422.12	32.31	389.81
P-8	421.79	32.02	389.77
P-9	423.14	33.38	389.76
P-10	423.43	33.19	390.24
P-11	422.30	32.68	389.62
P-12	423.75	34.45	389.30
P-13	424.32	34.90	389.42
GM-62B	426.16	32.42	393.74
GM-66B	423.20	34.05	389.15
TW-1	423.14	32.47	390.67
Deep Wells			
GM-27C	426.76	36.60	390.16
GM-28C	423.78	33.98	389.80
GM-55C	422.88	32.32	390.56
GM-56C	422.16	31.16	391.00
GM-57C	424.02	34.06	389.96
GM-62C	427.03	33.30	393.73
GM-66C	423.46	34.37	389.09
Bedrock Wells			
GM-106	424.82	29.73	395.09
B-102	423.84	31.74	392.10

(1) Elevation in feet above mean sea level.
(2) Depth to water in feet below measuring point.
The water-level for Well B-21A may be representative of a water level in the 2-ft section of blank casing at the bottom of the well, and not representative of the water table zone. This water level was not used in the groundwater model.

Table 3. Data Used to Define the Configuration of the June 1992 Aquifer Test, Sauget, Illinois.

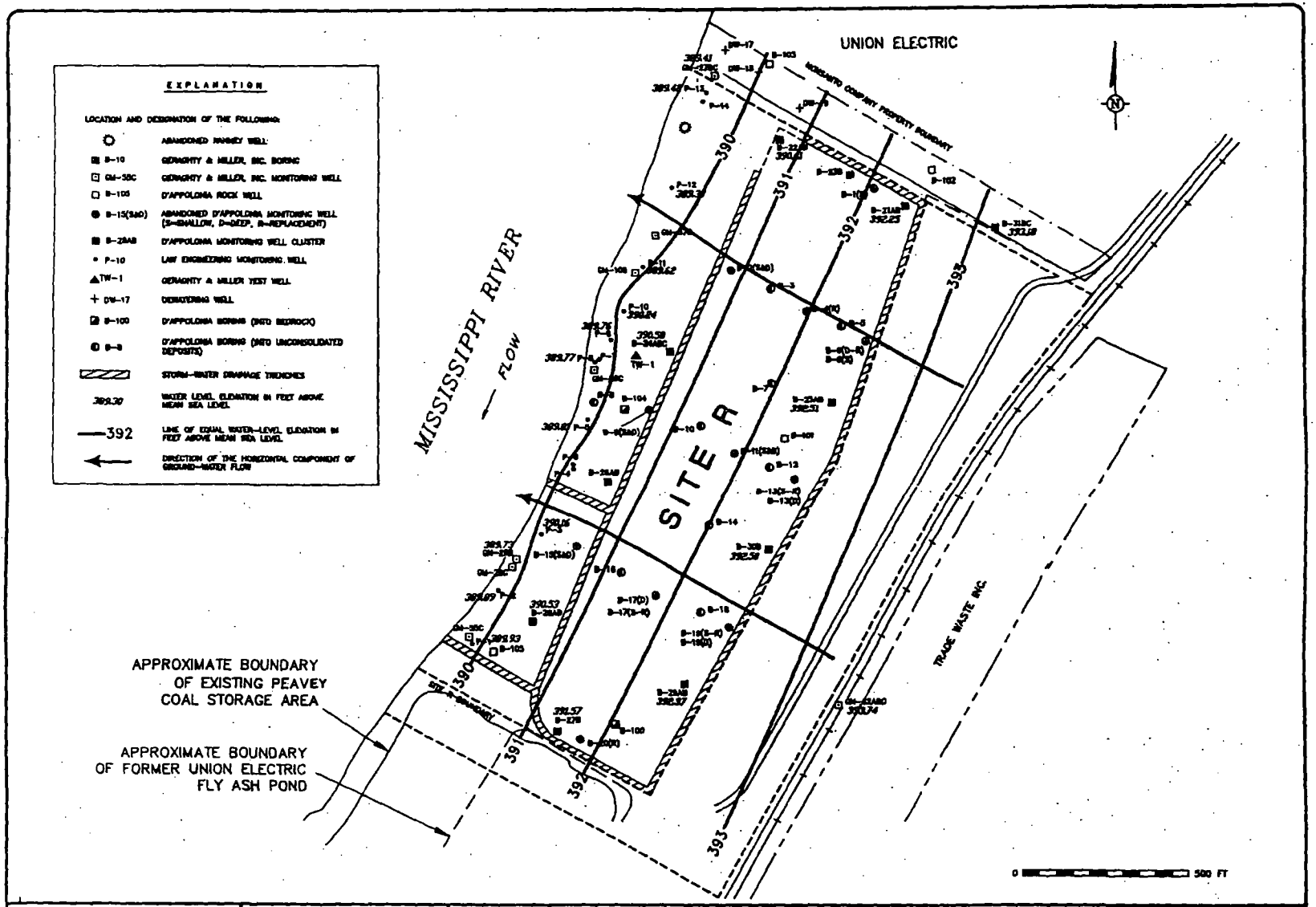
Well Number	Distance From Pumped Well to Observation Well	Maximum Drawdown	Saturated Thickness	Well Depth	Depth From Static Water Level to Top of Screen	Depth From Static Water Level to Bottom of Screen
Water-Table Zone						
B-24A	118	.08	90	27.5	0	2.6
B-25A	625	.07	90	35.2	0	1.7
B-26A	355	.15	90	33.2	0	3.8
P-7	102	.05	90	33	2.7	7.7
Intermediate Zone						
B-24C	118	.98	90	69	22.9	32.9
P-10	143	.97	90	54	11.4	16.4
P-9	104	.99	90	50	7.7	12.7
B-25B	625	.33	90	49.5	0.8	10.8
P-5	272	.36	90	54.5	13.3	18.3
B-26B	433	.46	90	49.8	2.4	12.4
GM-28B	772	.22	90	93	34.4	54.4
P-8	112	–	90	53.5	12.5	17.5
TW-1*	0	34.8	90	108	41.5	73.5
Deep Zone						
GM-57C	368	.77	90	116	60	80
GM-28C	772	.21	90	107	51	71
GM-56C	150	1.21	90	111	58.1	78.1

* Pumping Rate = 350 gpm; screened interval is from the lower intermediate zone to the upper deep zone.
– Not reported due to problems with pressure transducer.

Table 5. Estimate of Average Daily Ground-Water Discharge to Mississippi River, Sauget Site R, Monsanto Company, Sauget, Illinois

1 River-Stage Elevation (ft above MSL)	2 Frequency of Occurence (% of days)	3 Q Shallow	4 Q x % Shallow	5 Q Intermediate	6 Q x % Intermediate	7 Q Deep	8 Q x % Deep	9 Total Q x %
374	0.2	0.00024	0.00000048	0.6496	0.0012992	0.6228	0.0012456	0.00254528
375	0.5	0.00037	0.00000185	0.634	0.00317	0.608	0.00304	0.00621185
376	1.5	0.0005	0.0000075	0.6184	0.009276	0.5932	0.008898	0.0181815
377	2.2	0.00063	0.00001386	0.6028	0.0132616	0.5784	0.0127248	0.02600026
378	2.3	0.00076	0.00001748	0.5872	0.0135056	0.5636	0.0129628	0.02648588
379	3	0.00089	0.0000267	0.5716	0.017148	0.5488	0.016464	0.0336387
380	3.8	0.00102	0.00003876	0.556	0.021128	0.534	0.020292	0.04145876
381	3.9	0.00109	0.00004251	0.5406	0.0210834	0.5194	0.0202566	0.04138251
382	4.6	0.00116	0.00005336	0.5252	0.0241592	0.5048	0.0232208	0.04743336
383	4.2	0.00124	0.00005208	0.5098	0.0214116	0.4902	0.0205884	0.04205208
384	4.9	0.00131	0.00006419	0.4944	0.0242256	0.4756	0.0233044	0.04759419
385	4.9	0.00138	0.00006762	0.479	0.023471	0.461	0.022589	0.04612762
386	5.5	0.00142	0.0000781	0.4638	0.025509	0.4462	0.024541	0.0501281
387	4.5	0.00145	0.00006525	0.4486	0.020187	0.4314	0.019413	0.03966525
388	4.4	0.00149	0.00006556	0.4334	0.0190696	0.4166	0.0183304	0.03746556
389	4.1	0.00152	0.00006232	0.4182	0.0171462	0.4018	0.0164738	0.03368232
390	4.1	0.00156	0.00006396	0.403	0.016523	0.387	0.015867	0.03245396
391	3.5	0.00158	0.0000553	0.3878	0.013573	0.3724	0.013034	0.0266623
392	3.5	0.00159	0.00005565	0.3726	0.013041	0.3578	0.012523	0.02561965
393	3.5	0.00161	0.00005635	0.3574	0.012509	0.3432	0.012012	0.02457735
394	3.6	0.00162	0.00005832	0.3422	0.0123192	0.3286	0.0118296	0.02420712
395	2.7	0.00164	0.00004428	0.327	0.008829	0.314	0.008478	0.01735128
396	2.9	0.00164	0.00004756	0.3116	0.0090364	0.2992	0.0086768	0.01776076
397	2.5	0.00164	0.000041	0.2962	0.007405	0.2844	0.00711	0.014556
398	2.2	0.00164	0.00003608	0.2808	0.0061776	0.2696	0.0059312	0.01214488
399	2.1	0.00164	0.00003444	0.2654	0.0055734	0.2548	0.0053508	0.01095864
400	1.8	0.00164	0.00002952	0.25	0.0045	0.24	0.00432	0.00884952
401	1.8	0.00163	0.00002934	0.235	0.00423	0.2256	0.0040608	0.00832014
402	1.3	0.00161	0.00002093	0.22	0.00286	0.2112	0.0027456	0.00562653
403	1.4	0.0016	0.0000224	0.205	0.00287	0.1968	0.0027552	0.0056476
404	1.1	0.00158	0.00001738	0.19	0.00209	0.1824	0.0020064	0.00411378
405	1.2	0.00157	0.00001884	0.175	0.0021	0.168	0.002016	0.00413484
406	0.9	0.00154	0.00001386	0.1602	0.0014418	0.1537	0.0013833	0.00283896
407	0.9	0.00152	0.00001368	0.1454	0.0013086	0.1394	0.0012546	0.00257688
408	1.1	0.00149	0.00001639	0.1306	0.0014366	0.1251	0.0013761	0.00282909
409	0.9	0.00147	0.00001323	0.1158	0.0010422	0.1108	0.0009972	0.00205263
410	0.8	0.00144	0.00001152	0.101	0.000808	0.0965	0.000772	0.00159152
Weighted Average Daily Discharge	98.3		0.00135768 (Shallow)		0.4047248 (Intermediate)		0.3888442 (Deep)	0.79492665 (Total)

) - Rate of ground-water discharge to river (million gallons per day).



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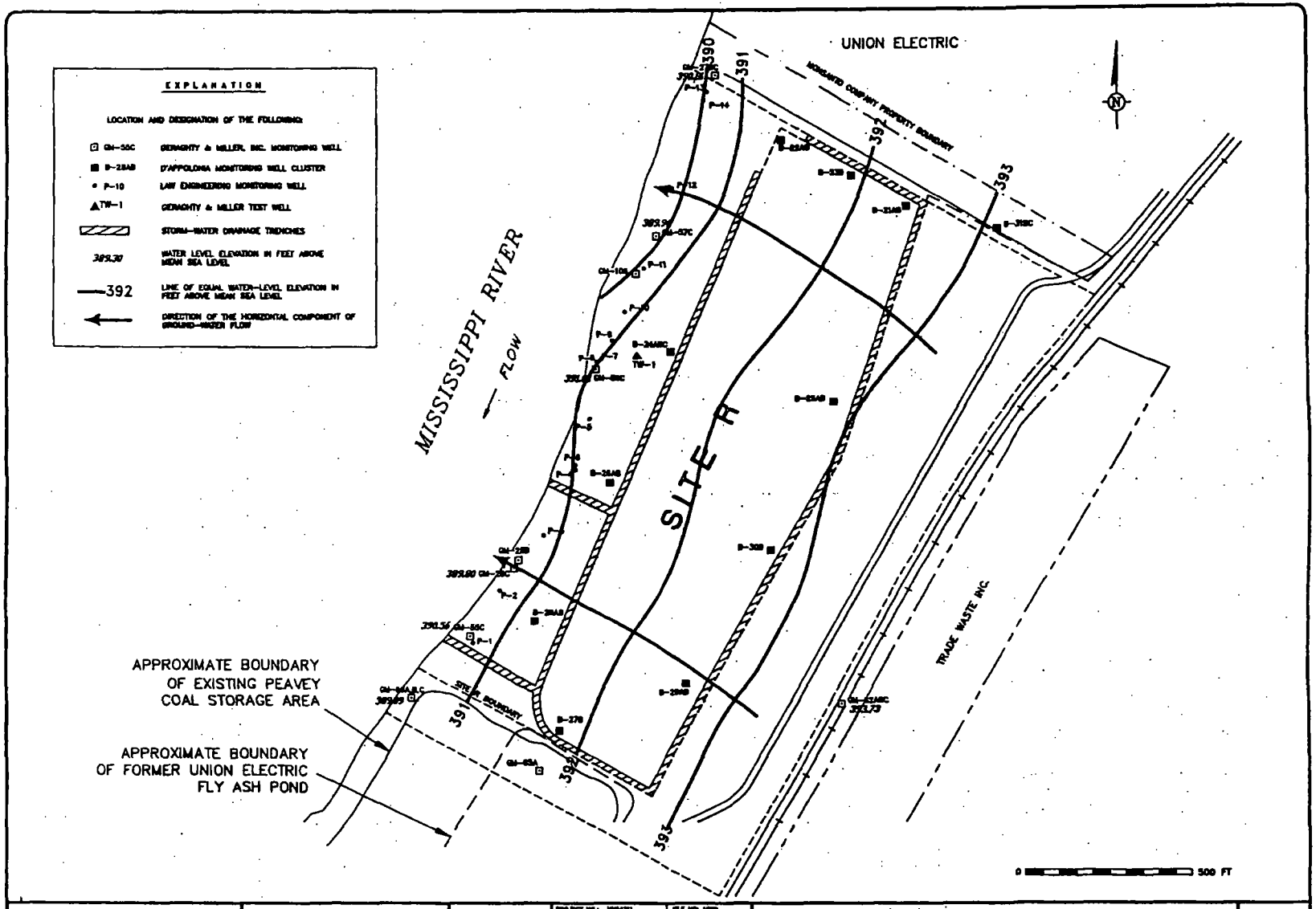
WATER-LEVEL ELEVATIONS IN THE INTERMEDIATE ZONE ON JUNE 3, 1992

MONSANTO COMPANY
SAUGET, ILLINOIS

FIGURE 2



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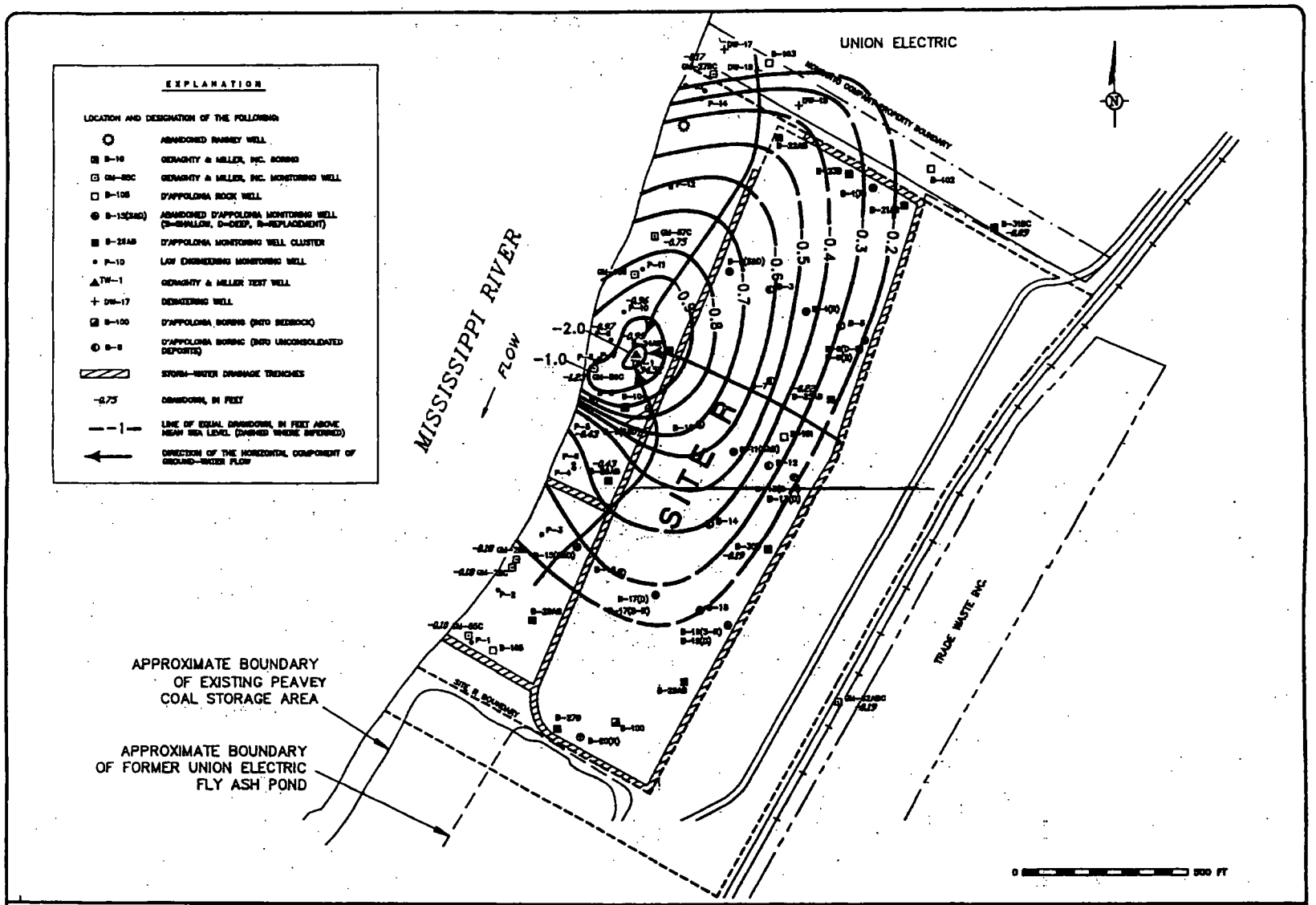
WATER-LEVEL ELEVATIONS IN THE DEEP ZONE ON JUNE 3, 1992

MONSANTO COMPANY
SAUGET, ILLINOIS

FIGURE 3



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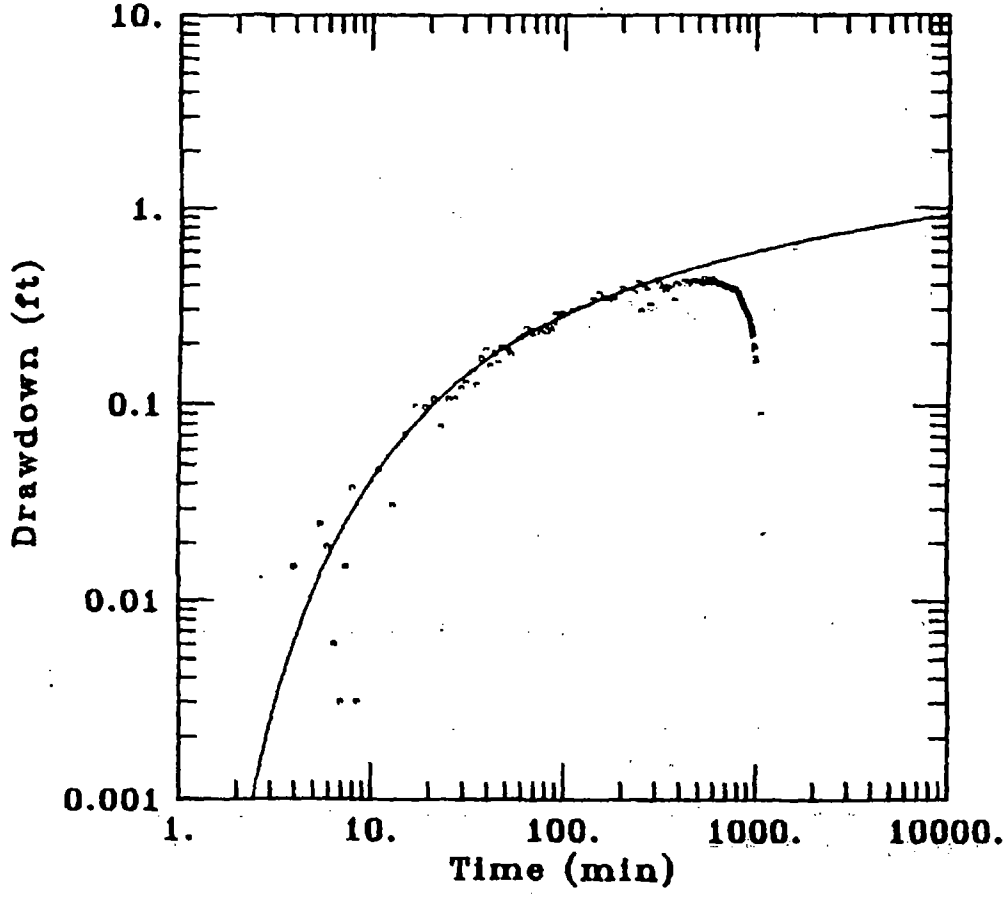
DRAWDOWN IN THE INTERMEDIATE AND DEEP AQUIFERS AFTER 550 MINUTES OF PUMPING ON JUNE 17, 1992

MONSANTO COMPANY
SAUGET, ILLINOIS

FIGURE 5

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

P-5



DATA SET:
P-5.AQT
07/08/92

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Theis

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
P-5

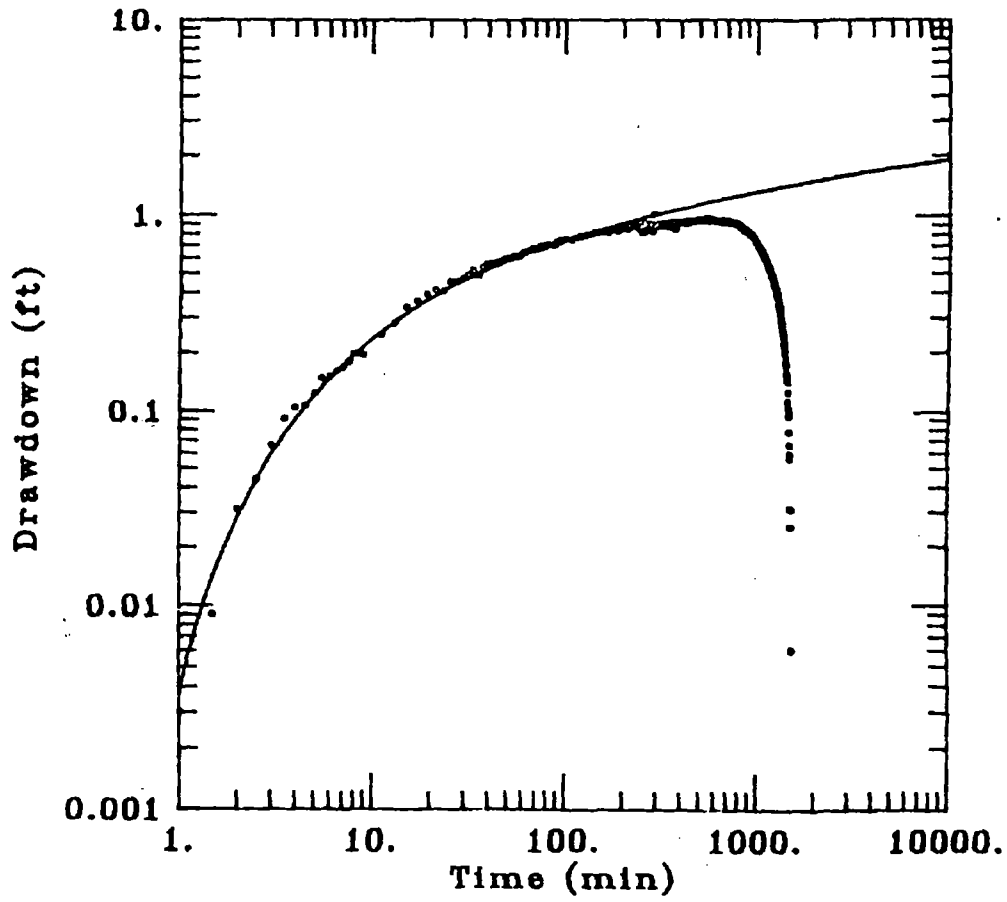
ESTIMATED PARAMETERS:
T = 26.55 ft^2/min
S = 0.01176

TEST DATA:
Q = 16.8 ft^3/min
r = 272. ft
b = 90. ft

Figure 7

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

P-10



DATA SET:
p-10.aqt
07/01/92

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Theis

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
P-10

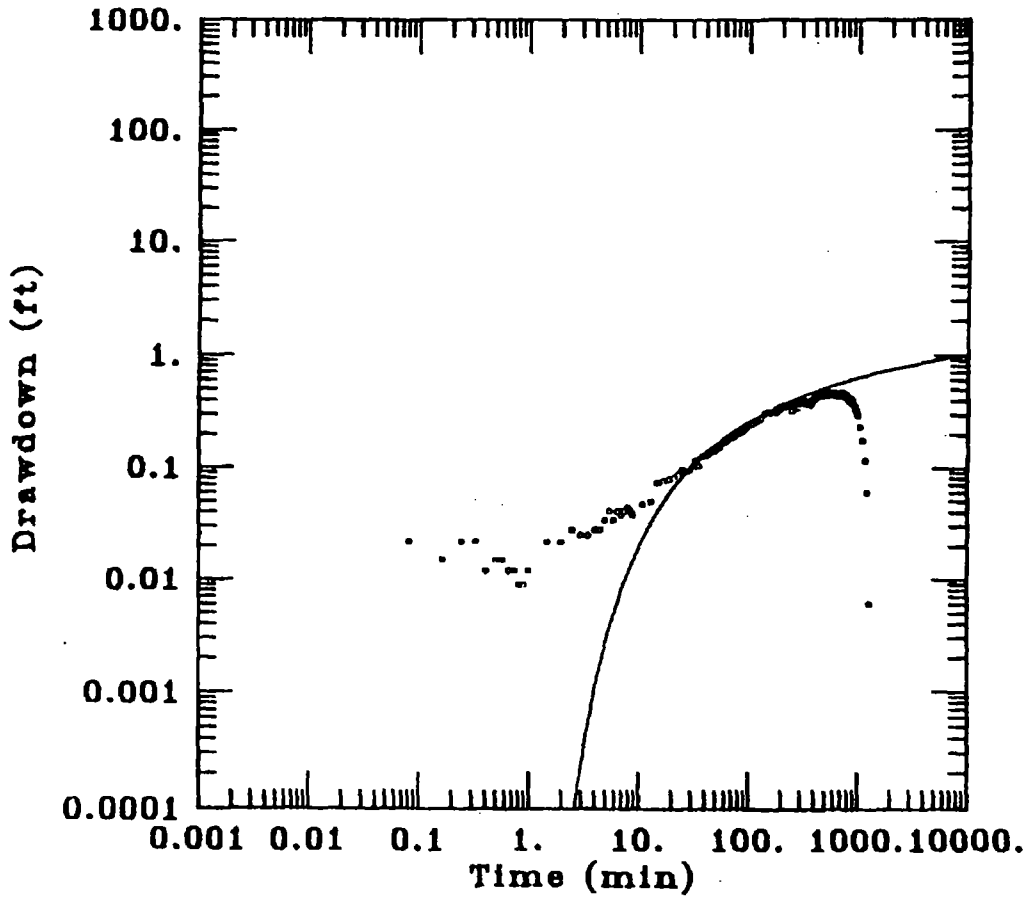
ESTIMATED PARAMETERS:
T = 15.19 ft^2/min
S = 0.008326

TEST DATA:
Q = 46.8 ft^3/min
r = 143. ft
b = 90. ft

Figure 9

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

B-26B



DATA SET:
B-26B.AQT
07/08/92

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Theis

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
B-26B

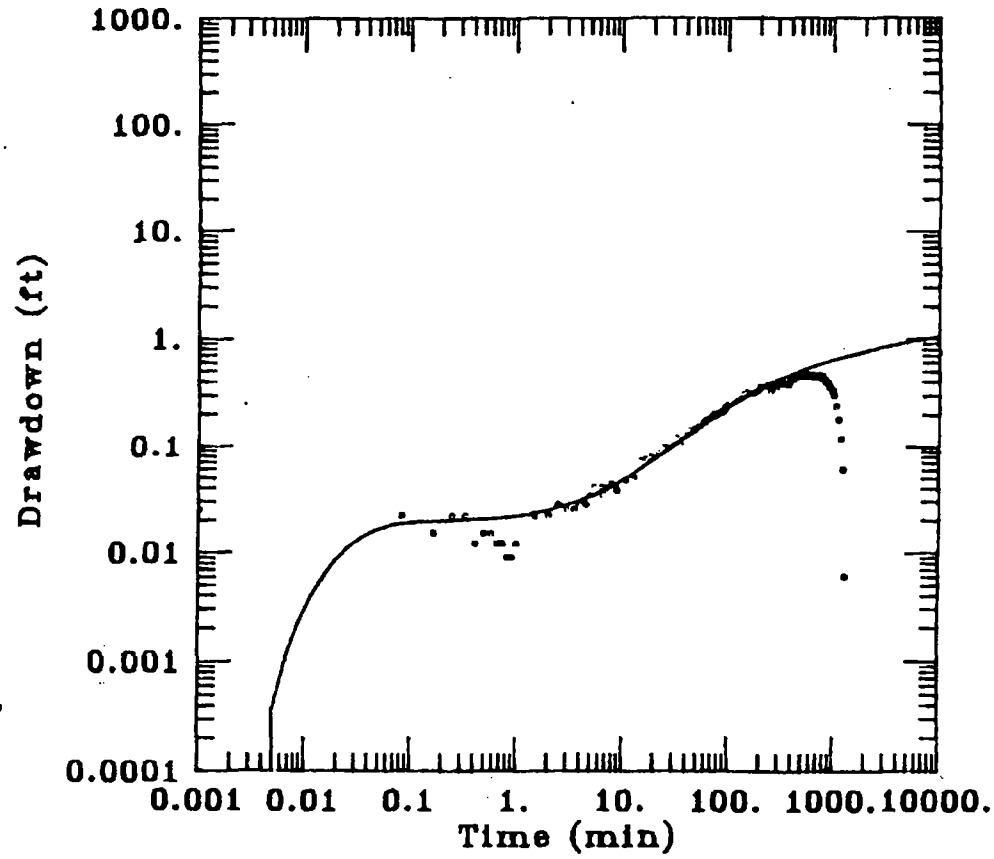
ESTIMATED PARAMETERS:
T = 22.22 ft^2/min
S = 0.006535

TEST DATA:
Q = 46.8 ft^3/min
r = 433. ft
rc = 0.5 ft
rw = 0.5 ft
b = 90. ft

Figure 11

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

B-26B



DATA SET:
b-26b.aqt
07/01/92

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Neuman

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
B-26B

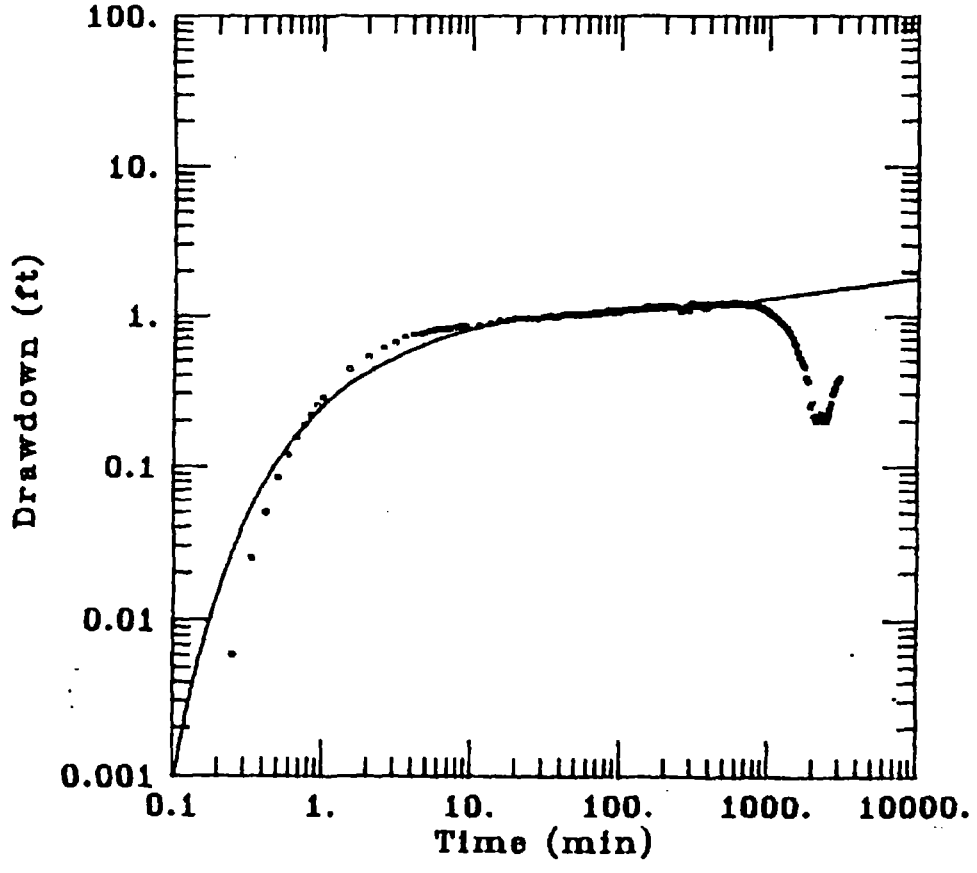
ESTIMATED PARAMETERS:
T = 20.3 ft^2/min
S = 6.8199E-06
Sy = 0.007037
β = 0.8

TEST DATA:
Q = 46.8 ft^3/min
r = 433. ft
rc = 0.5 ft
rw = 0.5 ft
b = 99. ft
TEST WELL:
t.o.s. = 41.5 ft
b.o.s. = 73.5 ft
OBS. WELL:
t.o.s. = 2.4 ft
b.o.s. = 12.4 ft

Figure 13

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

GM-56C



DATA SET:
GM-56C.AQT
06/29/92

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Neuman

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
GM-56C

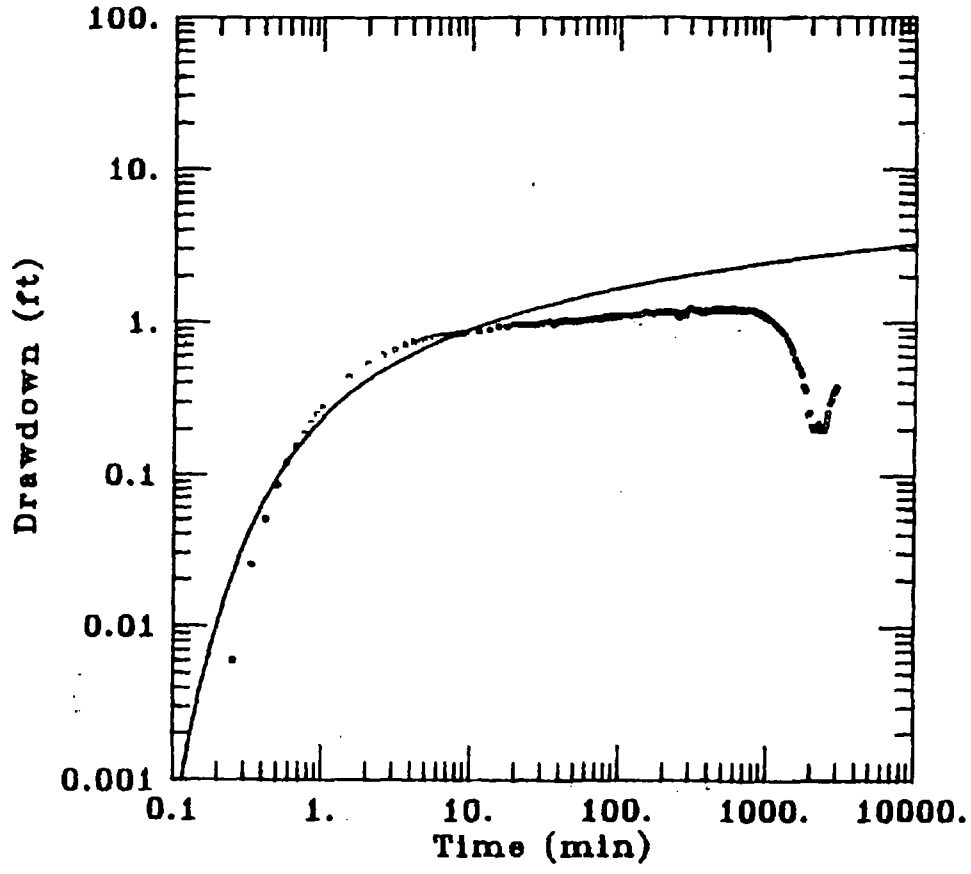
ESTIMATED PARAMETERS:
T = 16.64 ft^2/min
S = 0.001341
Sy = 0.01647
β = 0.03

TEST DATA:
Q = 46.8 ft^3/min
r = 150.5 ft
rc = 0.5 ft
rw = 0.5 ft
b = 90. ft
TEST WELL:
t.o.s. = 41.5 ft
b.o.s. = 73.5 ft
OBS. WELL:
t.o.s. = 58.1 ft
b.o.s. = 78.1 ft

Figure 15

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

GM-56C



DATA SET:
gm-56c.aqt
06/25/92

AQUIFER TYPE:
Leaky

SOLUTION METHOD:
Hantush

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
GM-56C

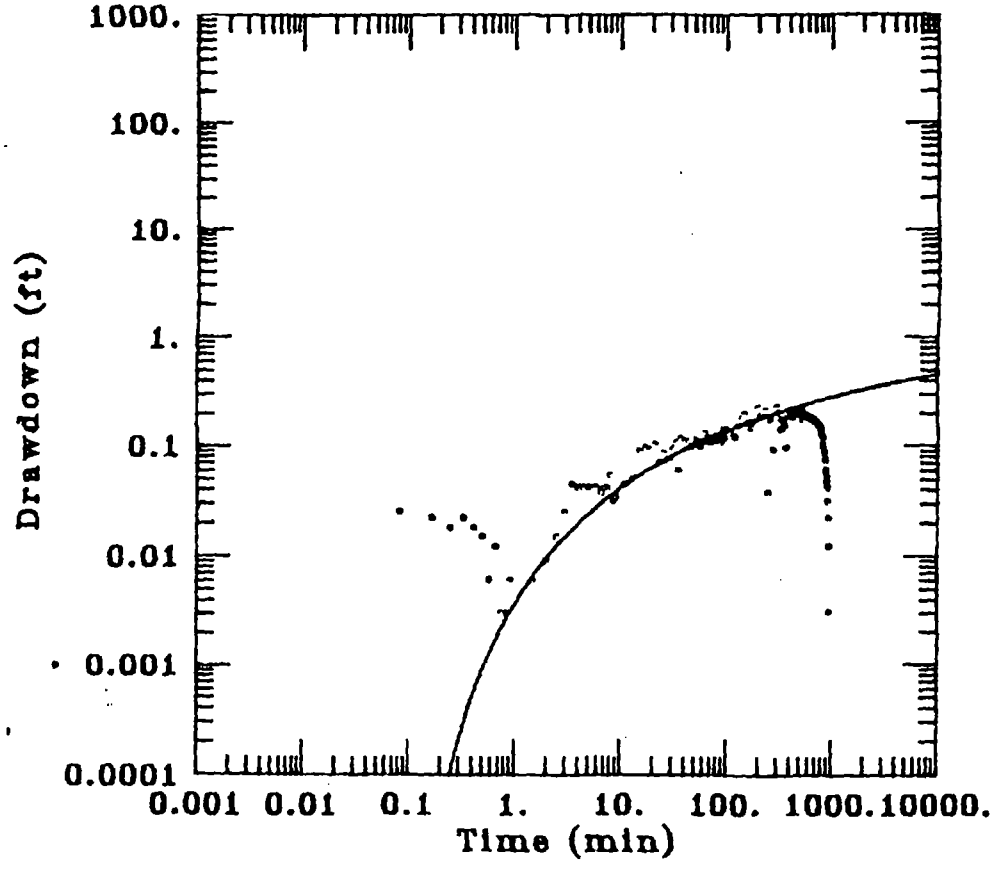
ESTIMATED PARAMETERS:
T = 10.82 ft^2/min
S = 0.001283
β = 0.0001

TEST DATA:
Q = 46.8 ft^3/min
r = 135. ft
rc = 0.5 ft
rw = 0.5 ft
b = 90. ft
TEST WELL:
t.o.s. = 41.5 ft
b.o.s. = 73.5 ft
OBS. WELL:
t.o.s. = 58.1 ft
b.o.s. = 78.1 ft

Figure 17

GERAGHTY & MILLER	Client: MONSANTO
Project No.: NY64207	Location: SAUGET, ILLINOIS

GM-28C



DATA SET:
gm-28c.aqt
07/01/92

AQUIFER TYPE:
Leaky

SOLUTION METHOD:
Hantush

TEST DATE:
JUNE 17, 1992

TEST WELL:
TW-1

OBS. WELL:
GM-28C

ESTIMATED PARAMETERS:
T = 21.64 ft^2/min
S = 0.0001029
β = 2.

TEST DATA:
Q = 46.8 ft^3/min
r = 772. ft
rc = 0.5 ft
rw = 0.5 ft
b = 90. ft
TEST WELL:
t.o.s. = 41.5 ft
b.o.s. = 73.5 ft
OBS. WELL:
t.o.s. = 51. ft
b.o.s. = 71. ft

Figure 19

Appendix 4

Appendix 4 2007 Annual Report Tech Memo Sauget Area 2 Groundwater Migration Control System Sauget Area 2 Remedial Investigation Slug Tests					
Piezometer	Slug Test	Middle Hydrogeologic Unit Hydraulic Conductivity		Deep Hydrogeologic Unit Hydraulic Conductivity	
		Feet/Minute	Feet/Day	Feet/Minute	Feet/Day
PZ-1	Rising Head	0.07298	105	0.07772	112
	Falling Head	0.05243	75	0.01828	26
PZ-2	Rising Head	0.06778	98	0.01734	25
	Falling Head	0.06778	98	0.01734	25
PZ-3	Rising Head	0.05078	73	0.02085	30
	Falling Head	0.04632	67	0.02085	30
PZ-4	Rising Head	0.08446	122	0.03629	52
	Falling Head	0.08446	122	0.03579	52
PZ-5	Rising Head	0.06867	99	0.02239	32
	Falling Head	0.06582	95	0.02239	32
PZ-6	Rising Head	0.06631	95	0.0262	38
	Falling Head	0.1274	183	0.0262	38
PZ-7	Rising Head	0.07423	107	0.06377	92
	Falling Head	0.07423	107	0.04878	70
PZ-8	Rising Head	0.0636	92	0.1748	252
	Falling Head	0.1713	247	0.1748	252
PZ-9	Rising Head	ND	NC	0.02859	41
	Falling Head	ND	NC	0.0218	31
	Maximum		247		252
	Average		111		68
	Minimum		67		25

Attachment 2

AMERICAN BOTTOMS
REGIONAL WASTEWATER TREATMENT FACILITY

1 AMERICAN BOTTOMS ROAD
SAUGET, ILLINOIS 62201-1075

(618) 337-1710
FAX (618) 337-8919

July 6, 2007

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7004 1350 0003 1739 7842

Mr. Richard S. Williams
Project Manager, Sauget Sites Project
Solutia Inc.
500 Monsanto Avenue
Sauget, IL 62206-1198

Re: Modification to Discharge Permit No: 06C-138
For premise at: #5 Riverview Avenue
Sauget, Illinois 62201

Dear Mr. Williams:

Your American Bottoms Regional Wastewater Discharge Permit issued on August 15, 2006 for the premise identified above is hereby modified. Pursuant to the findings of the December 2005 USEPA Pretreatment Audit, applicable prohibitive discharge standards are being set forth in the permit rather than being incorporated by reference to the Pretreatment Ordinance provision that sets forth the prohibitive discharge standards. Additional method detection limit language has been added to Part 1.J of the permit and the monitoring frequency for mercury, cyanide, and pH have been reduced from quarterly to semi-annually.

This modification does not affect any monitoring or analysis of your discharge that may be necessary to comply with other requirements of your permit and does not in any way relieve you of your obligations to achieve the discharge limitation as provided in the permit.

This modification is effective July 9, 2007.

If you have any questions related to this permit modification, please call me at 337-1710.

Sincerely,

Jerry G. Richardson II
Pretreatment Coordinator

enclosure

VILLAGE OF SAUGET

AMERICAN BOTTOMS REGIONAL

WASTEWATER TREATMENT FACILITY

WASTEWATER DISCHARGE PERMIT

for

SOLUTIA, INC. - Site R

UAO Remediation Wastewater
V-W-02-C-716

PERMIT NO. 06C-138

VILLAGE OF SAUGET
AMERICAN BOTTOMS REGIONAL WASTEWATER TREATMENT FACILITY

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Effective July 9, 2007

July 6, 2007

Solutia, Inc. - W.G. Krummrich Plant
Site R - UAO # V-W-02-C-716

500 Monsanto Avenue
Sauget, Illinois 62206-1198

UAO Remediation Wastewater Discharge Permit No. 06C-138

Dear Sirs:

In accordance with all the terms and conditions of Ordinance 632, as amended, of the Village of Sauget; the 1977 Regional Agreement as amended; Section 46 of the Illinois Environmental Protection Act of 1970 (Ill. Rev. Stat. 1987. Ch. 1111/2, Sec. 1046) as amended; and Ill. Rev. Stat. 1987, Ch 24, Sec. 11-141-7; permission is hereby granted to Solutia Inc., as owner and operator, to discharge UAO Remediation Wastewater into sewer lines tributary to the American Bottoms Regional Wastewater Treatment Plant in accordance with and subject to the provisions of attached American Bottoms Regional Wastewater Discharge Permit No. 06C-138 ("Permit").

This Permit modification is in accordance with the Village of Sauget Ordinance 632 Part 4, Section 4.10.

Nothing herein shall be construed as a permit or as permission for the permittee to violate the provisions of any sewer use ordinance in effect within the jurisdiction of any unit of local government in which the permittee's facility is located.

VILLAGE OF SAUGET

By: _____
Executive Director

PART 1 - GENERAL CONDITIONS OF PERMIT

A. General - This Wastewater Discharge Permit shall be expressly subject to all provisions of Ordinance 632 of the Village of Sauget, including any further amendments thereto (hereinafter "the Ordinance") and all other applicable regulations, user charges, and fees established by the Village of Sauget. In consideration of the granting of this Permit, the permittee shall comply with all provisions of the Ordinance, Permit conditions, and the Implementation procedures including, but not limited to the specific requirements of these General Condition Articles. Any Permit noncompliance constitutes a violation of the Ordinance, and is grounds for enforcement action.

B. Definition of UAO Remediation Wastewater: "UAO Remediation Wastewater" means any wastewater, including leachate and groundwater, discharged to the POTW pursuant to the Administrative Order for Remedial Design and Interim Remedial Action ("UAO") (Docket No. V-W-02-C-716) and accompanying Record of Decision issued by the United States Environmental Protection Agency, Region 5, on September 30, 2002, under the authority of Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act, commonly known as Superfund ("CERCLA"), (42 U.S.C. § 9606(a)).

C. Prohibitive Discharge Standards

1. General Prohibitions: It shall be unlawful for any User to contribute or cause to be contributed, directly or indirectly, any Pollutant or Wastewater which will Interfere with the operation or performance of the POTW or will Pass Through the POTW.

   These general prohibitions and the specific prohibitions in Part 1.B.2 of this Part apply to each User introducing pollutants into the POTW whether or not the User is subject to National Categorical Pretreatment Standards or any other National, state or local Pretreatment Standards or Requirements.

2. Specific Prohibitions: In addition to Part 1.B.1, the following pollutants may not be introduced into the POTW:

   a. Any liquids, solids or gases which by reason of

their nature and quantity are, or may be, sufficient either alone or by interaction with other substances to cause a fire or explosion or be injurious or hazardous in any other way to the POTW or to the operation of the POTW, including but not limited to, any Wastewater with a closed-cup flash point of less than 60° C (140° F) using the test methods specified in 40 CFR 261.21.

b. Solid or viscous substances in amounts which will cause obstruction to the Flow in the POTW resulting in Interference with the operation of the Wastewater treatment facilities, including, but not limited to: grease, garbage with particles greater than one-half inch (1/2") in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, tar, asphalt residues from refining or processing of fuel or lubricating oil, mud or glass grinding or polishing wastes, or tumbling and de-burring stones.

c.

1. For Users discharging to the P-Chem Plant: Any Wastewater which will cause corrosive structural damage to the Public Sewage Collection System, but in no case any Wastewater with a pH less than 6.0 or higher than pH 10.0, unless the Public Sewage Collection System is specifically designed to accommodate such Discharge.

2. For Users not discharging to the P-Chem Plant: Any Wastewater having a pH less than pH 6.0 or higher than pH 10.0 or which will cause corrosive structure damage to the Public Sewage Collection System.

d. Any Pollutants, noxious or malodorous liquids, gases, or solids, which either singly or by interaction with other Wastewater, result in the presence of toxic vapors, gases, or fumes within the POTW in a quantity that, may cause acute worker health and safety problems, are sufficient to create a public nuisance or hazard to life, or are sufficient to prevent entry into sewers for their maintenance and repair.

e. Any Wastewater having a temperature at the point of Discharge to the POTW which will inhibit biological activity in the POTW Treatment Plant resulting in Interference but in no case shall Wastewater be introduced to the POTW which exceeds 40° C (104° F) at the introduction into the POTW Treatment Plant.

f. Any Wastewater containing concentrations of fat, oil, grease (FOG), including but not limited to petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin, or trichlorotrifluoroethane extractable material which is sufficient to cause Interference or Pass Through.

g. Any Pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW.

h. Any trucked or hauled Pollutants, except at Discharge points designated by the POTW pursuant to Section 3.10 of Ordinance 632.

D. Prohibition of Improper Dilution - Improper dilution shall be prohibited pursuant to Section 3.6 of the Ordinance.

E. Duration - This Permit is issued effective August 15, 2006, and shall expire on August 1, 2009.

F. Non-transferability of Discharge Permit: A Discharge Permit issued for the discharge of the UAO Remediation Wastewater shall only be transferable to another person upon the prior written approval of such transfer by the POTW. Any change in the person to whom such Discharge Permit has been issued without the prior written approval of the POTW shall render the Discharge Permit null and void.

G. Change in Conditions - Pursuant to Section 4.7 of the Ordinance, in the event the type, quality, character or volume of Pollutants in a Discharge, including the listed or characteristic hazardous wastes for which the permittee has submitted initial notification under Section 4.13.5 of the Ordinance, is expected to substantially change as reasonably determined by the permittee or POTW, the permittee or his assignee (see paragraph E. above) shall give sixty (60) days

advance notice in writing to the POTW and shall make a new application to the POTW and the Sewer System Owner prior to said change. No permittee shall substantially change the type, quality, character or volume of its Wastewater beyond that allowed by this Permit without prior approval of the Sewer System Owner and the POTW.

H. Access - Pursuant to Section 4.15 of the Ordinance, persons or occupants of premises in which a Discharge source or treatment system is located or in which records are kept shall allow the POTW or its representative ready access upon presentation of credentials at reasonable times to all parts of said premises for the purposes of inspection, sampling, examination and photocopying of records required to be kept by the Ordinance and this Permit, and in the performance of any of their duties. The POTW shall have the right to set up on the permittee's property such devices as are necessary to conduct sampling, monitoring and metering operations.

I. Retention of Records - Pursuant to Section 4.15 of the Ordinance, the permittee shall maintain records of all information resulting from any monitoring activities required by this Ordinance and shall include:

1. The date, exact place, method and time of sampling and the names of the Person or Persons taking the samples;

2. The dates analyses were performed;

3. Who performed the analyses;

4. The analytical techniques/methods used; and

5. The results of such analyses.

The permittee shall maintain for inspection by the POTW, IEPA or USEPA such records for a minimum of three (3) years. This period of retention shall be extended during the course of any unresolved litigation regarding the Discharge of Pollutants by the permittee or operation of the POTW Pretreatment program or when requested by the Regional Administrator of USEPA or the Director of IEPA.

J. Analytical Methods - All measurements, sampling, tests, and analyses to which reference is made in this Permit shall be determined and performed in accordance with the procedures

established by the United States Environmental Protection Agency (hereafter "U.S. EPA") pursuant to Section 304(g) of the Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedures approved by the U.S. EPA. Sampling shall be performed in accordance with the techniques approved by the U.S. EPA. Where 40 CFR Part 136 does not include sampling or analytical techniques for the Pollutants in question, or where the U.S. EPA determines that the Part 136 sampling and analytical techniques are inappropriate for the Pollutant in question, sampling and analyses shall be performed using validated analytical methods or any other sampling and analytical procedures, including procedures suggested by the POTW or other parties, approved by the U.S. EPA.

Method detection limits (MDLs) shall be determined in accordance with Method 136 for analytical measurements required by the permit. For each analytical measurement, the reporting limit, defined as the method detection limit adjusted for dilution or adjustments in sample volume, shall be reported for each analysis for each parameter. All results above the reporting limit must be reported as numerical values. Practical quantitation limits, limits of quantitation, alternate definitions of the term reporting limit and other forms of reporting thresholds are not acceptable.

A reporting limit at or below the applicable effluent limitation in Part 4 for each parameter must be achieved for any reported non-detectable concentration. If the reporting limit for any parameter is above the applicable effluent limitation and the concentration is reported as non-detectable, the analysis is inadequate to determine compliance and may not be used to satisfy the monitoring requirements of Part 4.

Where the effluent limitation in this permit is expressed in mass units, the reporting limit must be converted to mass units using the reporting limit concentration and the applicable flow measurement at the time of sampling.

Where compliance with a mass effluent limitation is determined as the sum of the masses measured concurrently at more than one sampling location, the sum of the reporting limits for each of the samples, expressed as mass, must not exceed the applicable mass limitation.

Where a laboratory result is obtained with a reporting limit greater than the effluent limitation and that reporting limit cannot be corrected, either by conducting a timely reanalysis of the sample or by correcting a reporting error, prior to submittal of the results to the POTW, the analysis is inadequate to determine compliance and may not be used to satisfy the monitoring requirements of Part 4. The SIU must report this analytical failure in the next required monitoring report to the POTW with a plan of corrective action to prevent the future recurrence of a reporting limit greater than the effluent limitation.

K. Pretreatment Facilities - The permittee shall provide necessary Wastewater Pretreatment as required to comply with the Ordinance and shall achieve compliance with all applicable Pretreatment Requirements and Standards within the time limitations as specified by appropriate statutes, regulations, and the Ordinance. Any facilities required to pretreat Wastewater to a level acceptable to the POTW shall be provided, properly operated and maintained at the permittee's expense. Such Pretreatment facilities shall be under the control and direction of an IEPA certified Wastewater Treatment Operator.

L. Permit Modifications - The terms and conditions of this Permit may be modified by the POTW during the term of the Permit for good cause including, but not limited to, the following: to incorporate any new or revised Federal, State, or local Pretreatment Standards or Requirements; to address significant alterations or additions to the permittee's operation, processes, or Wastewater volume or character since the time of Wastewater Discharge Permit issuance; a change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized Discharge; misrepresentation or failure to fully disclose all relevant facts in the Wastewater Discharge Permit application or in any required reporting; revision of or a grant of variance from Categorical Pretreatment Standards pursuant to 40 CFR 403.13; to correct typographical errors in the Wastewater Discharge Permit; or to reflect a transfer of the facility ownership and/or operation to a new owner/operator (as provided in paragraph F. above). The permittee shall be informed of any proposed changes in its Permit at least 30 days prior to the effective date of any modification, and

shall have all rights of appeal as provided in Section 4.12 of the Ordinance.

M. Civil and Criminal Penalties - Pursuant to Part 6 of the Ordinance, any permittee who is found to have violated an Order of the POTW or who has failed to comply with any provision of the Ordinance, and the orders, rules, and regulations and Wastewater Discharge Permits issued thereunder, may be fined by appropriate suit at law in an amount not less than one hundred dollars ($100) nor more than one thousand dollars ($1000) per day for each violation. In addition to the penalties provided herein, the POTW may recover reasonable attorney's fees, court costs, court reporter fees and other expenses of litigation by appropriate suit at law against the Person found to have violated this Ordinance or the orders, rules, regulations and Permits issued thereunder.

Any Person who knowingly makes any false statements, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to the Ordinance or Wastewater Discharge Permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under the Ordinance, shall in addition be guilty of a misdemeanor and upon conviction, be punished by a fine of $500 to $1,000, for each offense.

N. Additional Information - The permittee shall furnish any additional information as may be reasonably requested by the Village of Sauget from time to time.

O. Resampling - Pursuant to Section 4.13.3.7 of the Ordinance, if sampling performed by the permittee indicates a violation, the permittee shall notify the POTW within 24 hours of becoming aware of the violation. The permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the POTW within 30 days after becoming aware of the violation, except the permittee is not required to resample if:

1. The POTW performs sampling at the permittee's location at a frequency of at least once per month, or

2. The POTW performs sampling at the permittee's location between the time when the permittee performs its initial sampling and the time when the permittee receives the results of this sampling.

3. The POTW may waive the resampling requirements if the SIU performs compliance self-monitoring at a frequency of at least once per month.

Resampling is only required for those parameters for which the violation has been identified.

P. Notifications - The following verbal and written notifications are required:

1. Pursuant to Section 4.13.3.7 of the Ordinance, if sampling performed by the permittee indicates a violation of any requirements of the Ordinance or this Permit, the permittee shall notify the POTW within 24 hours of becoming aware of the violation. Such notification may be made orally by telephone. Voice mail may not be used to comply with the notification requirement.

Q. Report Submittal - All reports and/or notifications required by this Permit shall be submitted to:

Pretreatment Coordinator
American Bottoms Regional Wastewater
Treatment Facility
#1 American Bottoms Road
Sauget, Illinois 62201
Telephone:(618) 337-1710
Facsimile: (618) 337-8919

R. Revocation of Permit Pursuant to Section 5.3 of the Ordinance, this Permit may be revoked by the POTW for violations as identified in Section 5.3.1 of the Ordinance, and in accordance with the procedures set forth in Section 5.3.2 of the Ordinance.

S. Other Ordinances: The Significant Industrial User to which this permit is issued is subject to the following Ordinance(s) of the Village of Sauget:

1. Ordinance No. 536, as amended, which establishes user charges for the American Bottoms Regional Wastewater Treatment Facility.

2. Ordinance No. 380, as amended, which establishes user charges for the Village of Sauget Physical-Chemical Wastewater Treatment Plant.

PART 2 - GENERAL AND SPECIFIC REPORTING REQUIREMENTS

A. General - The General Pretreatment Regulations of 40 CFR 403.12 and the Ordinance set forth basic reporting requirements that apply to the permittee.

B. Specific - The specific reporting requirements of this Permit include the following reporting requirements:

1. Monitoring Reports - Monitoring results obtained shall be summarized and reported on a monthly basis. Except as otherwise provided in Part 6 of the Permit, the report is due on or before 45 days after the end of the month in which the sampling was performed. The report shall indicate the nature and concentration of all pollutants in the wastewater discharges which are regulated by the standards set forth in this Permit and include measured or estimated maximum and average daily flows. These reports will satisfy the requirement for the Periodic Compliance Report, provided they contain all the information and certifications required pursuant to Section 4.13.3 of the Ordinance.

2. Compliance Deadline Report - Pursuant to Section 4.13.2 of the Ordinance, within ninety (90) days following the date for final compliance with any applicable Pretreatment Standards, or in the case of a New Source, within ninety (90) days following commencement of the Discharge of Wastewater into the POTW, any permittee subject to any Pretreatment Standards shall submit a report on compliance with any applicable Pretreatment Standards in a form prescribed and furnished by the POTW. This report shall contain information as described in Section 4.13.2.2 of the Ordinance.

PART 3 - GENERAL SAMPLING AND TESTING REQUIREMENTS

A. The permittee is responsible for compliance sampling. The monitoring facilities designated by this Permit are shown on Figure 1.

B. Compliance monitoring results and frequencies may be reviewed periodically by the Village of Sauget and appropriate adjustments made to frequencies and parameters in a modified or revised Wastewater Discharge Permit.

C. All handling and preservation of collected samples and laboratory analyses shall be performed in accordance with procedures contained in 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this Permit. Composite sampling, where called for, shall be performed over a twenty-four (24) hour period by flow or time proportionate methods.

The test procedures for all samples shall conform to one of the USEPA approved test methods which provides the most sensitive detection limits for the pollutant under investigation listed in the current issue of the Code of Federal Regulations, and the most recent addendum published by the Federal Register. The testing for priority organic pollutants shall be conducted utilizing gas chromatograph/mass spectrometer (GC/MS) methods and procedures. Other test procedures may be approved by the USEPA, pursuant to Section 4.15.2 of the Ordinance.

If more than one method for analysis of a substance is approved for use, a method having a detection limit lower than the permit limit shall be used. If the detection limit of all methods is higher than the permit limit, the method having the lowest detection limit shall be used and a report of less than detection limit shall constitute compliance. However should EPA approve a method with a lower detection limit during the term of this permit, the permittee shall use the newly approved method.

D. The appropriate flow measurement devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the

accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

E. For each measurement or sample taken pursuant to the requirements of this Permit, the permittee shall maintain and submit records which include:

1. The date, location, and type of sample collected;
2. The dates analyses were performed;
3. The analytical techniques/methods used;
4. The results of such analyses; and
5. The average daily and maximum daily flows.

F. In the event of a sampling failure, including, but not limited to, failure of sampling equipment, or sample damage, contamination, or breakage, sampling shall be repeated as soon as possible at all applicable required monitoring locations for those parameters for which the analysis of the original sample(s) was intended.

G. The 30 day resampling requirement of Part 1.O. of this Permit shall apply to all monitoring locations identified in this Permit. Where a violation of a plant mass limitation has occurred, all sites which contribute to the calculation of the plant mass shall be resampled concurrently. Only those parameters for which the violation has been identified are required to be analyzed as part of the resampling.

H. Where agreed upon in advance by both parties, the POTW may perform monitoring and testing for a parameter(s) regulated by this permit and such POTW monitoring shall satisfy the self-monitoring requirement for the subject parameter(s).

PART 4 - EFFLUENT LIMITATIONS, SAMPLING AND TESTING REQUIREMENTS

A. Local Limits: The Village of Sauget reserves the right in the Ordinance to establish limitations or requirements on discharges to the wastewater disposal system if deemed necessary to comply with the objectives presented in Section 1.4 of the Ordinance.

Any Discharge to the Regional System from Site R shall not exceed either an ammonia nitrogen concentration of 50 mg/l in a 24-hour composite sample or 75 mg/l in a Grab sample or

an ammonia nitrogen daily maximum mass of 50 lb/day. For purposes of this local limit, a discharger who complies with either of the ammonia nitrogen concentration limits or the daily maximum mass limit shall be deemed to be in compliance. The ammonia nitrogen mass in a discharge shall be determined by multiplying the daily flow volume times the 24-hour composite sample concentration times the appropriate conversion factor or, if a 24-hour composite sample is not available, times the Grab sample concentration, for the same day.

B. State Limits: These limits are stated in 35 Ill. Adm. Code Part 307. This Part 307 places restrictions on the types, concentrations, and quantities of contaminants which can be discharged into sewer systems in the State.

Limitations:

Parameters	Monthly Avg (mg/L)	Daily Composite (mg/L)	Grab Sample (mg/L)
Mercury	0.0005	0.001	0.0025
Cyanide(total)	--	--	10.0
pH	--	--	6.0-10.0

Any sample tested shall not release more than 2 mg/l of cyanide when tested at a pH of 4.5 and at a temperature of 66°C (150°F) for a period of 30 minutes.

Subject to the averaging rule of Ill Adm. Code 304.104, the monthly average for mercury shall be the numerical average of all daily composites for mercury taken during a calendar month. A monthly average must be based on at least three daily composites.

C. National Categorical Pretreatment Standards (NCPS): Not Applicable

D. Monitoring Schedule

1. The requirements of the monitoring schedule are effective as of the effective date of this Permit.

2. Monitoring locations are shown in the attached diagram, entitled "Figure 1", which is incorporated into and made a part of this Permit.

3. Monitoring frequencies:

Parameter (units)	Monitoring Location	Monitoring Frequency	Sample Type
Ammonia nitrogen (mg/L)	A	See 4. below	Composite
Mercury (mg/L)	A	1/6-months	See 5. below
Cyanide (mg/L)	A	1/6-months	See 8. below
pH (S.U.)	A	1/6-months	Grab
Flow	A	Daily	Meter
Parameters per part 4.D.9. below	A	Monthly	See 5. & 7. below

4. Compliance with the ammonia nitrogen local limit will be determined by testing performed by the POTW. Permittee self-monitoring for ammonia nitrogen is not required.

5. Daily composite samples for parameters other than volatile organics and cyanide shall be obtained from the composite sampler at monitoring location A.

6. A sampling day is a 24-hour period with the sample date designated as the date beginning the 24-hr period.

7. Grab samples for volatile organics shall consist of a minimum of (2) two grab samples taken within a 24-hour period with at least 8 hours between the minimum two samples. If more than 2 grabs are taken, the collection of these samples should be representative of the 24-hour period. The individual 40ml VOA grabs shall be equally composited in the laboratory into one sample for analysis.

8. Grab samples for cyanide shall consist of a single grab sample collected during the sampling day.

9. Site Specific Monitoring Parameters

Volatiles	Sample Type
Benzene	Grab
Chlorobenzene	Grab
Chloroethane	Grab
Chloroform	Grab
1,1-dichloroethane	Grab
1,2-dichloroethane	Grab
1,1-dichloroethylene	Grab
Ethylbenzene	Grab
Methylene chloride	Grab
Methyl ethyl Ketone	Grab
Tetrachloroethylene	Grab
Toluene	Grab
1,2-trans-dichloroethylene	Grab
Trichloroethylene	Grab
Vinyl chloride	Grab
Xylenes	Grab
4-methyl-2-pentanone	Grab
1,2-dichlorobenzene	Grab
1,3-dichlorobenzene	Grab
1,4-dichlorobenzene	Grab

Herbicides	Sample Type
2,4-D	Comp

Base/Neutral	Sample type
Aniline	Comp
Nitrobenzene	Comp
1,2,4-trichlorobenzene	Comp
2-chloroaniline	Comp
4-chloroaniline	Comp
2-Nitroaniline	Comp
2-Nitrochlorobenzene	Comp
3-Chloroaniline	Comp
3-Nitrochlorobenzene	Comp
4-Nitroaniline	Comp
4-Nitrochlorobenzene	Comp

Acid Compounds	
2-chlorophenol	Comp
2,4-dichlorophenol	Comp
2-nitrophenol	Comp
4-nitrophenol	Comp
Pentachlorophenol	Comp
Phenol	Comp
2,4,5-trichlorophenol	Comp
2,4,6-trichlorophenol	Comp
o-Cresol	Comp
m & p-cresol	Comp

10. In the event of brief discharges, the monitoring requirements in Part 4.D.3 above may be waived, provided that Site R provides prior notification and the Pretreatment Coordinator provides written authorization prior to discharge.

PART 5 - COMPLIANCE SCHEDULE

A. General:
Authority Citation: Section 4.13 Village of Sauget Pre-treatment Ordinance No. 632, as amended.
Permit No. 06C-138
Owner: Solutia, Inc.
Operator: Solutia, Inc.
Facility Name: Site R Remediation Site
Authorized Discharge: UAO Remediation Wastewater, as defined in Section 4.17.1 of Ordinance 632, as amended.

B. Final Compliance Date: Not applicable

PART 6 - SPECIAL CONDITIONS

A. Cost of Service: The Ordinance provides that the cost of the Pretreatment Program, including special sampling analysis, Monitoring, etc. be recovered from the customer causing the incurrence of the cost.

B. Applicability: Pursuant to Section 4.17.2 of the Ordinance, the discharge of UAO Remediation Wastewater is subject to the provisions of this Ordinance applicable to a discharge of wastewater. A discharger of UAO Remediation Wastewater is subject to all rate ordinances adopted by the Village of Sauget that are applicable to Industrial Users and Significant Industrial Users.

C. Unlawful Discharges of Remediation Wastewater: It shall be unlawful for any person to cause or allow the discharge of UAO Remediation Wastewater to the POTW unless such person is in possession of a current and valid Wastewater Discharge Permit issued expressly for the purpose of discharging the UAO Remediation Wastewater.

D. Additional Permit Terms and Conditions: In addition to the provisions of Section 4.6 of the Ordinance, this Permit for the discharge of UAO Remediation Wastewater is subject to the following terms and conditions:

1. When and as directed by the POTW, Solutia shall control the commencement, reduction or resumption of the discharge of the UAO Remediation Wastewater, including but not limited to, limitations on flow rate, flow volume and mass loadings of specific contaminants.

2. When directed by the POTW, Solutia shall immediately cease the discharge of UAO Remediation Wastewater or adjust the flow rate to protect against threats to the integrity of the POTW treatment processes, worker safety or the environment.

3. The POTW reserves the right to modify this Permit to include additional limitations on the concentration or mass of specific or categorical chemical compounds in the UAO Remediation Wastewater discharge, including the prohibition of

the discharge of any hazardous air pollutants within the meaning of the Clean Air Act that may cause or contribute to a violation of the POTW's Clean Air Act Permit. Any such modification shall be made pursuant to the notice procedures of Section 4.10 of the Ordinance.

4. Solutia shall maintain, keep in proper working order, and periodically test the shutdown systems for the UAO Remediation Wastewater discharge.

5. Solutia shall maintain and keep in proper working order secure discharge control valve(s), pump electrical supply disconnect switch or similar device for the use of the POTW to halt the discharge when required pursuant to the provisions of Section 6.D.2 above and the Ordinance for cessation or reduction of the UAO Remediation Wastewater discharge, which equipment may be required to be located on property owned or otherwise controlled by the Village.

6. The POTW reserves the right to add powdered activated carbon (PAC) in order to protect against threats to the integrity of the POTW treatment processes, worker safety or the environment. The decision of whether to add PAC shall be within the sole discretion of the Executive Director, using best professional judgment and in consideration of acceptable ambient and operational conditions.

E. Indemnification: Solutia shall defend, indemnify and hold harmless the Village, the Village Board and the Association from and against any and all legal, equitable or other claims, losses, liabilities, damages (including, but not limited to, damage caused to POTW treatment equipment), civil penalties, injunctive relief, injuries to persons, injuries to real property, injuries to personal property, costs, and expenses, (including, but not limited to, reasonable attorneys', accountants' and consultants' fees, costs and expenses), whether foreseeable or unforeseeable, as a direct or indirect result of, the discharge of the UAO Remediation Wastewater to the POTW or the treatment of the UAO Remediation Wastewater by the POTW. This indemnification shall not cover claims, losses, liabilities, damages, civil penalties, injunctive relief, injuries to persons, injuries

to real property, injuries to personal property, and expenses arising directly or indirectly from: (i) the Village's, Village Board's, and/or the Association's liability, if any, for Sauget Areas 1 and 2 under CERCLA, or (ii) the negligent operation of the POTW, including, but not limited to, any negligent handling or treatment of the UAO Remediation Wastewater.

F. Waiver of Claims: By accepting and discharging UAO Remediation Wastewater under this Permit, Solutia hereby agrees to waive any claims against the Village, the Village Board and Association by the permittee for any liability incurred by the permittee under the UAO due to any shutdown or reduction in flow of the discharge ordered by the POTW.

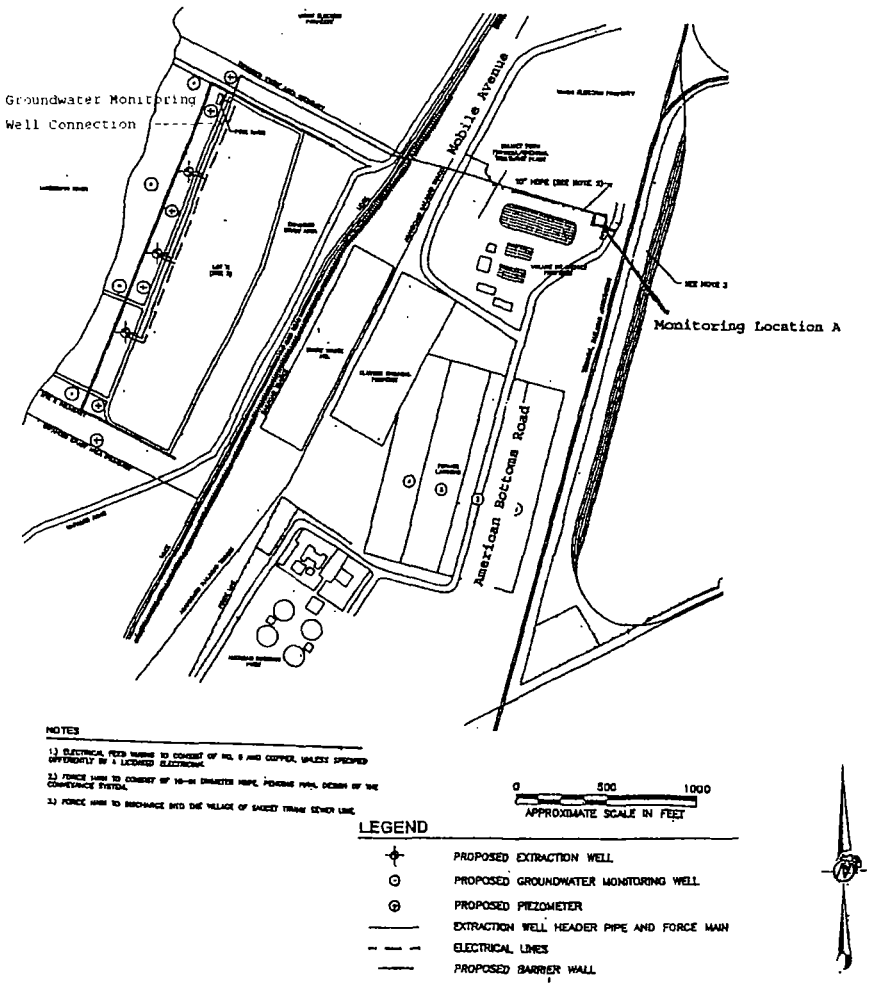
G. Waiver of Affirmative Defenses: By accepting and discharging UAO Remediation Wastewater under this Permit, Solutia hereby agrees to waive the affirmative defenses set forth in Section 3.2.3 of the Ordinance, for any alleged violation relating to the discharge of UAO Remediation Wastewater.

H. Monitoring Wells Groundwater Discharges: Only discharges of groundwater originating from groundwater monitoring wells located in the Sauget Area 1 or 2 Superfund Sites are authorized under the terms of this permit.

Solutia shall request in writing approval to discharge and receive approval from American Bottoms prior to discharge of any such monitoring well groundwater. Solutia's written request for discharge approval shall include the proposed volume of monitoring groundwater. At the time of submission of the written request for discharge approval, Solutia shall also provide a grab sample of the proposed discharge taken from the tank(s) in which the proposed discharge is stored. American Bottoms will inform Solutia whether its request for approval to discharge is approved or denied. If the proposed discharge is approved, American Bottoms will provide to Solutia the applicable discharge conditions, including the allowed date(s) of discharge and maximum flow rate for the discharge, at the time of its approval.

The authorized discharge location for the monitoring well groundwater shall be by pumping into the Site R force main prior to monitoring location A on Figure 1.

FIGURE 1 - MONITORING LOCATION



AMERICAN BOTTOMS REGIONAL TREATMENT PLANT
INDUSTRIAL WASTEWATER DISCHARGE PERMIT

FACT SHEET - MODIFICATION

MODIFICATION FOR MONITORING REDUCTION IDENTIFIED IN SECTION 5, INCLUSION OF PROHIBITIVE LANGUAGE AND INCLUSION OF MDL LANGUAGE IDENTIFIED IN SECTION 6

Date July 6, 2007

Section 1 Description of the Permittee

Facility Name: Site R- UAO Remediation Wastewater
Wastewater # V-W-02-C-716
Facility Site Address: #5 Riverview Ave., Sauget, IL 62201
Facility Mailing Address: 500 Monsanto Ave., Sauget, IL 62206

Total Number of Monitoring connections: 1

Monitoring Location	Regulated Process	Unregulated Process	Dilution	Locally Regulated
Loc. A	No	No	No	Yes

Brief description of the facility processes: **The Site R discharge consists of "UAO Remediation Wastewater" as that term is defined in Section 4.17 of Ordinance 632, as amended. Solutia has implemented a Groundwater Mitigation Control System (GMCS) for the Site R discharge. Three extraction wells are onsite to recover impacted groundwater for treatment by American Bottoms. A subsurface barrier wall has been constructed to prevent the discharge of impacted groundwater to the Mississippi River.**

Brief description of process wastewater being discharged: **The facilities discharge consists of untreated groundwater.**

Collection System: **The collection system that Site R discharges to is not corrosion resistant and is constructed of HDPE and ductile iron.**

Categorical Industry: Yes ____ No x

If Yes, 40 CFR _____ Subpart(s) _____

SIC Code(s): N/A

Section 2 Type and Quantity of Discharge - NO MODIFICATIONS TO THIS SECTION

Section 3 Rationale for Permit Limits - NO MODIFICATIONS TO THIS SECTION

Section 4 Special Conditions - NO MODIFICATIONS TO THIS SECTION

Section 5 Monitoring Requirements

Monitoring Location: **138 A - Fenceline**

Monitoring Frequencies:

Parameter	Frequency
Flow-fenceline	**Daily**
Hg	**Semi-Annually**
CN	**Semi-Annually**
pH	**Semi-Annually**
Volatiles	**Monthly**
Semi-volatile - Acids	**Monthly**
Semi-volatile - Base/Neutral	**Monthly**
Herbicides	**Monthly**

Flow monitoring is required daily. Based on 3 years of monitoring data showing no violations and no reasonable potential to exceed permit limits, the monitoring frequencies for mercury, cyanide, and pH will decrease from quarterly to semi-annually. The reasonable potential analysis performed for this permit is set forth in Attachment A.

The analysis method for 1,2dichlorobenzene, 1,3 dichlorobenzene, and 1,4 dichlorobenzene have been modified from a EPA 625 to EPA 624. The collection method for these parameters has been modified from composite to grab in Part 4.D of the permit.

Section 6 Other Modifications

Pursuant to the findings of the December 2005 USEPA Pretreatment Audit, applicable prohibitive discharge standards are being set forth in the permit rather than being incorporated by reference to the Pretreatment Ordinance provision that sets forth the prohibitive discharge standards.

Additional method detection limit (MDL) language in Part 1.I of the permit has been included.

Attachment A

REASONABLE POTENTIAL ANALYSIS

FOR

SITE R TO EXCEED PERMIT LIMITS

PARAMETER	LIMIT TYPE	LIMIT VALUE (A)	OBSERVED EFFLUENT MAXIMUM (B)	NUMBER OF EFFLUENT DATA	COEFFI-CIENT OF VARIANCE	REASONABLE POTENTIAL MULTIPLIER (C)*	MAXIMUM EFFLUENT AT REASONABLE POTENTIAL (D)=(C)*(B)	REASONABLE POTENTIAL TO EXCEED LIMIT (D)>(A)?
HG - 5/1/04-4/30/07 (3yrs)	MA mg/L	0.0005	0.0001	44	6.630	1.3	0.0001	No
CN - 3/1/04-2/28/07 (3yrs)	GRAB mg/L	10	0.0320	48	4.68	1.2	0.038	No
PH - 3/1/04-2/28/07 (3yrs)	GRAB SU	10	8.7000	68	0.070	1.1	9.570	No

* (C): RP MULTIPLIER "FLOOR" IS 1.1, PER IEPA MZ DOCUMENT