Appendix G

WELL INFORMATION, ANALYTICAL RESULTS, AND GET FACILITY REPORTS

Current Extraction and Recharge Well Information

GET D

Extraction Wells

Well #	Design (gpm)	Actual (gpm)
4001	150	100
4017	200	150
4035	200	130
4150	25	3
4155	25	1
4160	25	11
4165	25	2
4170	25	2
4175	25	4
4180	25	11
4185	25	2
4190	25	8
4205	300	10
4210	300	160
4220	250	100
4225	100	37
4230	100	4
4235	50	11
4240	50	2
4245	75	4
4250	1	0
4255	5	1.5
4260	1	0
4320	150	150

Recharge Wells

Well #	Design (gpm)	Actual (gpm)
5020	300	100
5025	300	150
5030	300	150
5035	300	250
5040	300	150
5105	300	100

ARGET

Extraction Wells

Well #	Layer Screened	Design (gpm)	Actual (gpm)
4300	C	300	120
4301	C	220	40
4302	D	35	8
4325	C	260	187
4330	D	310	290
4335	D	215	90
4340	C	65	2
4345	D	400	330
4350	D	310	15
4355	C	400	160
4360	C/D	450	142
4365	D	60	15
4370	C	325	270
4375	C/D	200	163
4380	D/E	105	40
4580	E	300	not avail
4585	E	300	297
4620	E	300	283
1156*	?	?	40

* Wellhead treatment w/ LPGAC

GET B

Extraction Wells

Well #	Design (gpm)	Actual (gpm)
98	5	<1
4011	50	20
4080	100	50
4085	100	50
4095	100	100
4195	100	100
4215	100	50
4303	200	100
4304	5	5
4400	500	275
4405	150	150
4410	500	125
4450	250	125
4455	250	125
4460	500	150
4465	500	400
4475	100	90
4480	200	250
4505	10	10
4510	10	5
4515	10	10
4520	10	4
4525	10	20
4565	60	60
4570	60	60
4575	60	50

GET A

Extraction Wells

Well #	Design (gpm)	Actual (gpm)
4012	40	10-12
4013	12	8-12
4100	50	50
4105	50	10-12
4110	50	10-12
4120	50	50
4125	50	8-12
4130	50	8-12
4430	12	8-12
4500	50	120

GET D Process Performance Data

GET D (4000/4005) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
01/02	251	0.25	99.90	99.9
02/02	ND	ND		
03/02	213	0.25	99.88	
04/02	171	0.25	99.85	
05/02	186	0.25	99.87	
06/02	165	0.25	99.85	
07/02	207	0.25	99.88	
08/02	235	0.25	99.89	
09/02	174	0.25	99.86	
10/02	195	0.25	99.87	
11/02	225	0.25	99.89	
12/02	207	0.25	99.88	
01/03	195	0.25	99.87	
02/03	193	0.25	99.87	
03/03	194	0.25	99.87	
04/03	194	0.25	99.87	
05/03	194	0.25	99.87	
06/03	180	0.25	99.86	
07/03	209	0.25	99.88	
08/03	205	0.25	99.88	
09/03	213	0.25	99.88	
10/03	168	0.25	99.85	
11/03	207	0.25	99.88	

GET D (4000/4005 Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	24.00	0.25	99.0	99.0
10/02	26.00	0.25	99.0	
11/02	32.00	0.25	99.2	
12/02	36.00	0.25	99.3	
01/03	26.00	0.25	99.0	
02/03	23.00	0.25	98.9	
03/03	25.00	0.25	99.0	
04/03	30	0.25	99.17	
05/03	29	0.25	99.14	
06/03	19	0.25	98.68	
07/03	25	0.25	99.00	
08/03	27	0.25	99.07	
09/03	27	0.25	99.07	
10/03	21	0.25	98.81	
11/03	24	0.25	98.96	

GET D (4005/7094 Perchlorate				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	247	1.0	99.59	96.4
10/02	205	91	55.74	
11/02	214	1.0	99.53	
12/02	170	1.0	99.41	
01/03	215	1.0	99.54	
02/03	220	1.0	99.55	
03/03	215	1.0	99.53	
04/03	220	1.0	99.55	
05/03	210	NS		
06/03	220	1.0	99.55	
07/03	210	1.0	99.52	
08/03	223	1.0	99.55	
09/03	220	1.0	99.55	
10/03	218	2.3	98.95	
11/03	210	1.0	99.52	

GET D (4005/7093 Perchlorate				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	215	1.0	99.53	92.1
04/03	220	1.0	99.55	
05/03	210	NS		
06/03	220	1.0	99.55	
07/03	210	1.0	99.52	
08/03	223	63	71.69	
09/03	220	51	76.97	
10/03	218	4.8	97.82	
11/03	210	54	74.13	

ARGET Process Performance Data

ARGET (7065/7069) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	582	5.25	99.10	99.6
10/02	547	5.25	99.04	
11/02	455	5.25	98.85	
12/02	439	5.25	98.80	
01/03	620	5.25	99.15	
02/03	581	0.25	99.96	
03/03	381	0.25	99.93	
04/03	394	0.25	99.94	
05/03	361	0.25	99.93	
06/03	360	0.25	99.93	
07/03	77	0.25	99.68	
08/03	78	0.25	99.68	
09/03	372	0.25	99.93	
10/03	73	0.25	99.66	
11/03	443	0.25	99.94	

ARGET (7065/7069) - Perchlorate				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	21	5.5	73.81	72.9
10/02	23	8.0	65.22	
11/02	21	3.6	82.86	
12/02	21	5.9	71.90	
01/03	23	6.0	73.91	
02/03	19	5.3	72.11	
03/03	20	5.2	74.00	
04/03	20	6.2	69.00	
05/03	20	6.0	70.00	
06/03	20	5.4	73.00	
07/03	19	5.6	70.53	
08/03	21	6.1	70.95	
09/03	21	5.6	73.33	
10/03	20	4.1	79.50	

ARGET (7065/7069) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	24	0.25	98.94	99.0
10/02	25	0.25	98.98	
11/02	25	0.25	99.00	
12/02	26	0.25	99.04	
01/03	28	0.25	99.11	
02/03	28	0.25	99.11	
03/03	23	0.25	98.91	
04/03	26	0.25	99.04	
05/03	23	0.25	98.91	
06/03	22	0.25	98.86	
07/03	26	0.25	99.04	
08/03	28	0.25	99.11	
09/03	24	0.25	98.96	
10/03	27	0.25	99.07	
11/03	27	0.25	99.07	

ARGET (7065/7069) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
12/02	0.00086	0.0005	41.86	19.6
01/03	0.00078	0.00076	2.56	
03/03	0.00063	0.0005	20.63	
04/03	0.00074	0.0005	32.43	
05/03	0.00055	0.0005	9.09	
06/03	0.00053	0.0005	5.66	
07/03	0.00065	0.0005	23.08	
08/03	0.00074	0.0005	32.43	
09/03	0.0011	0.001	9.09	
10/03	ND	ND		

ARGET AS (7068/7069) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	9.7	0.25	97.43	97.39
04/03	9.1	0.25	97.25	
05/03	15	0.25	98.35	
06/03	10	0.25	97.53	
07/03	8.9	0.25	97.18	
08/03	9.2	0.25	97.29	
09/03	9.4	0.25	97.34	
10/03	7.6	0.25	96.71	

ARGET AS (7068/7069) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	7.1	0.25	96.48	96.25
04/03	8.0	0.25	96.88	
06/03	7.2	0.25	96.53	
07/03	4.0	0.25	93.75	
08/03	7.8	0.25	96.79	
09/03	8.2	0.25	96.95	
10/03	6.9	0.25	96.38	

ARGET Process Performance Data

ARGET (7067/7069) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	13	5.25	59.85	84.0
10/02	13	5.25	58.66	
11/02	14	5.25	61.40	
12/02	12	5.25	55.51	
01/03	12	5.25	56.07	
02/03	6.5	0.25	96.15	
03/03	7.9	0.25	96.82	
04/03	7.1	0.25	96.48	
05/03	7.3	0.25	96.55	
06/03	7.1	0.25	96.48	
07/03	6.8	0.25	96.32	
08/03	7.7	0.25	96.73	
09/03	8.9	0.25	97.18	
10/03	6.9	0.25	96.35	
11/03	20	0.25	98.74	

ARGET (7067/7069) - Perchlorate				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	ND	5.5		
10/02	ND	8.0		
11/02	ND	3.6		
12/02	ND	5.9		
01/03	ND	6.0		
02/03	ND	5.3		
03/03	ND	5.2		
04/03	ND	6.2		
05/03	ND	6.0		
06/03	ND	5.4		
07/03	ND	5.6		
08/03	ND	6.1		
09/03	ND	5.6		
10/03	ND	4.1		

ARGET (7067/7069) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	ND	ND		
10/02	ND	ND		
11/02	ND	ND		
12/02	ND	ND		
01/03	ND	ND		
02/03	ND	ND		
03/03	ND	ND		
04/03	ND	ND		
05/03	ND	ND		
06/03	ND	ND		
07/03	ND	ND		
08/03	ND	ND		
09/03	ND	ND		
10/03	ND	ND		
11/03	ND	ND		

ARGET (7067/7069) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
12/02	ND	ND		
01/03	ND	0.00076		
03/03	ND	ND		
04/03	ND	ND		
05/03	ND	ND		
06/03	ND	ND		
07/03	ND	ND		
08/03	ND	ND		
09/03	ND	ND		
10/03	ND	ND		

GET B Process Performance Data

GET B North extraction (7060/7062) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	106	0.25	99.76	99.8
10/02	139	0.25	99.82	
11/02	137	0.25	99.82	
12/02	142	0.25	99.82	
01/03	144	0.25	99.83	
02/03	141	0.25	99.82	
03/03	119	0.25	99.79	
04/03	129	0.25	99.81	
05/03	123	0.25	99.80	
06/03	120	0.25	99.79	
07/03	146	0.25	99.83	
08/03	147	0.25	99.83	
09/03	145	0.25	99.83	
10/03	114	0.25	99.78	
11/03	142	0.25	99.82	

GET B North extraction (7060/7062) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	2.7	0.25	90.74	94.7
10/02	3.6	0.25	93.06	
11/02	2.8	0.25	91.07	
12/02	3.4	0.25	92.65	
01/03	4.3	0.25	94.19	
02/03	3.9	0.25	93.59	
03/03	5.1	0.25	95.10	
04/03	5.8	0.25	95.69	
05/03	5.8	0.25	95.69	
06/03	5.1	0.25	95.10	
07/03	7.4	0.25	96.62	
08/03	8.7	0.25	97.13	
09/03	6.8	0.25	96.32	
10/03	5.2	0.25	95.19	
11/03	11	0.25	97.73	

GET B North extraction (7060/7062) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	41	0.0100	99.98	99.97
10/02	36	0.0075	99.98	
11/02	37	0.0110	99.97	
12/02	38	0.0075	99.98	
01/03	50	0.0087	99.98	
03/03	39	0.0140	99.96	
04/03	55	0.0210	99.96	
05/03	41	0.0170	99.96	
06/03	54	0.0180	99.97	
07/03	52	0.0140	99.97	
08/03	55	0.0049	99.99	
09/03	48	0.0091	99.98	
10/03	49	0.0089	99.98	
11/03	NS	0.012	NA	

GET B South extraction (7063/7062) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	31	0.25	99.18	99.2
10/02	29	0.25	99.13	
11/02	35	0.25	99.29	
12/02	29	0.25	99.14	
01/03	33	0.25	99.25	
02/03	27	0.25	99.09	
03/03	234	0.25	99.89	
04/03	32	0.25	99.22	
05/03	30	0.25	99.17	
06/03	28	0.25	99.10	
07/03	27	0.25	99.07	
08/03	27	0.25	99.08	
09/03	27	0.25	99.09	
10/03	26	0.25	99.05	
11/03	27	0.25	99.06	

GET B South extraction (7063/7062) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	ND	ND	NA	
10/02	ND	ND	NA	
11/02	ND	ND	NA	
12/02	ND	ND	NA	
01/03	ND	ND	NA	
02/03	ND	ND	NA	
03/03	ND	ND	NA	
04/03	ND	ND	NA	
05/03	ND	ND	NA	
06/03	ND	ND	NA	
07/03	ND	ND	NA	
08/03	ND	ND	NA	
09/03	ND	ND	NA	
10/03	ND	ND	NA	
11/03	ND	ND	NA	

GET B South extraction (7063/7062) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
09/02	0.35	0.0100	97.14	88.9
10/02	0.32	0.0075	97.66	
11/02	0.30	0.0110	96.33	
12/02	0.33	0.0075	97.73	
01/03	0.41	0.0087	97.88	
03/03	0.01	0.0140	-7.69	
04/03	0.48	0.0210	95.63	
05/03	0.33	0.0170	94.85	
06/03	0.39	0.0180	95.38	
07/03	0.43	0.0140	96.74	
08/03	0.41	0.0049	98.80	
09/03	0.31	0.0091	97.06	
10/03	0.38	0.0089	97.66	
11/03	NS	0.0120	NA	

GET B Process Performance Data

GET B UV/OX (7060/7063 to 7061) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	353	7.0	98.01	97.4
04/03	161	5.8	96.40	
05/03	153	8.1	94.74	
06/03	148	4.7	96.81	
07/03	169	3.9	97.68	
08/03	174	1.6	99.06	
09/03	172	4.3	97.48	
10/03	141	2.5	98.24	
11/03	168	2.9	98.31	

GET B UV/OX (7060/7063 to 7061) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	5.4	4.4	17.76	62.9
04/03	6.1	2.4	60.33	
05/03	6.1	2.0	66.94	
06/03	5.4	1.0	81.31	
07/03	7.7	2.1	72.55	
08/03	9.0	3.7	58.66	
09/03	7.1	2.1	70.21	
10/03	5.5	1.7	68.81	
11/03	11	3.4	69.78	

GET B UV/OX (7060/7063 to 7061) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	39	0.0190	99.95	99.96
04/03	55	0.0270	99.95	
05/03	41	0.0190	99.95	
06/03	54	0.0220	99.96	
07/03	52	0.0210	99.96	
08/03	55	0.0078	99.99	
09/03	48	0.0140	99.97	
10/03	49	0.0150	99.97	
11/03	NS	NS	NA	

GET B North extraction AS (7061/7062) - Total VOCs				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	8.0	0.25	96.88	95.3
04/03	7.1	0.25	96.45	
05/03	9.3	0.25	97.31	
06/03	6.0	0.25	95.82	
07/03	5.4	0.25	95.38	
08/03	3.4	0.25	92.60	
09/03	5.6	0.25	95.52	
10/03	4.0	0.25	93.72	
11/03	4.4	0.25	94.25	

GET B North extraction AS (7061/7062) - Freon 113				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	4.4	0.25	94.32	88.2
04/03	2.4	0.25	89.58	
05/03	2.0	0.25	87.50	
06/03	1.0	0.25	75.00	
07/03	2.1	0.25	88.10	
08/03	3.7	0.25	93.24	
09/03	2.1	0.25	88.10	
10/03	1.7	0.25	85.29	
11/03	3.4	0.25	92.65	

GET B North extraction AS (7061/7062) - NDMA				
Sample Date	influent	effluent	Percent Removal	Avg % Removal
03/03	0.0190	0.0140	26.32	27.9
04/03	0.0270	0.0210	22.22	
05/03	0.0190	0.0170	10.53	
06/03	0.0220	0.0180	18.18	
07/03	0.0210	0.0140	33.33	
08/03	0.0078	0.0049	37.18	
09/03	0.0140	0.0091	35.00	
10/03	0.0150	0.0089	40.67	
11/03	NS	0.012	NA	

GET A Process Performance Data

GET A (7013/7039) - Total VOCs				
Sample Date	influent	effluent	Percent removal	Avg % Removal
09/02	125	0.25	99.80	99.7
10/02	72	0.25	99.65	
11/02	87	0.25	99.71	
12/02	67	0.25	99.63	
01/03	76	0.25	99.67	
02/03	74	0.25	99.66	
03/03	89	0.25	99.72	
04/03	86	0.25	99.71	
05/03	88	0.25	99.72	
06/03	88	0.25	99.72	
07/03	131	0.25	99.81	
08/03	42	0.25	99.41	
09/03	82	0.25	99.69	
10/03	90	0.25	99.72	
11/03	81	0.25	99.69	

GET A (7013/7039) - NDMA				
Sample Date	influent	effluent	Percent removal	Avg % Removal
09/02	7.7	0.0130	99.83	99.9
10/02	6.7	0.0120	99.82	
11/02	7.4	0.0130	99.82	
12/02	7.0	0.0110	99.84	
01/03	8.8	0.0140	99.84	
03/03	8.7	0.0130	99.85	
04/03	12	0.0120	99.90	
05/03	7.8	0.0140	99.82	
06/03	7.5	0.0120	99.84	
07/03	8.3	0.0130	99.84	
08/03	8.8	0.0110	99.88	
09/03	7.6	0.0110	99.86	
10/03	5.8	0.0052	99.91	

GET A (7013/7039) - Freon 113				
Sample Date	influent	effluent	Percent removal	Avg % Removal
09/02	260	0.25	99.90	99.9
10/02	180	0.25	99.86	
11/02	210	0.25	99.88	
12/02	190	0.25	99.87	
01/03	220	0.25	99.89	
02/03	210	0.25	99.88	
03/03	230	0.25	99.89	
04/03	150	0.25	99.83	
05/03	230	0.25	99.89	
06/03	240	0.25	99.90	
07/03	280	0.25	99.91	
08/03	200	0.25	99.88	
09/03	210	0.25	99.88	
10/03	190	0.25	99.87	
11/03	220	0.25	99.89	

GET A UV/OX (7013/7017) - Total VOCs				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	89	2.9	96.80	96.0
04/03	86	5.8	93.25	
05/03	88	2.9	96.66	
06/03	88	2.9	96.68	
07/03	131	2.5	98.13	
08/03	42	2.4	94.35	
09/03	82	2.6	96.86	
10/03	90	2.2	97.54	
11/03	81	5.1	93.71	

GET A UV/OX (7013/7017) - NDMA				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	8.7	0.015	99.83	99.8
04/03	12	0.017	99.86	
05/03	7.8	0.018	99.77	
06/03	7.5	0.015	99.80	
07/03	8.3	0.015	99.82	
08/03	8.8	0.013	99.85	
09/03	7.6	0.012	99.84	
10/03	5.8	0.007	99.88	

GET A UV/OX (7013/7017) - Freon 113				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	230	230	0.00	4.79
04/03	150	140	6.67	
05/03	230	240	-4.35	
06/03	240	240	0.00	
07/03	280	200	28.57	
08/03	200	190	5.00	
09/03	210	230	-9.52	
10/03	190	210	-10.53	
11/03	220	160	27.27	

GET A AS (7017/7039) - Total VOCs				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	2.9	0.25	91.23	91.5
04/03	5.8	0.25	95.70	
05/03	2.9	0.25	91.50	
06/03	2.9	0.25	91.47	
07/03	2.5	0.25	89.80	
08/03	2.4	0.25	89.58	
09/03	2.6	0.25	90.27	
10/03	2.2	0.25	88.64	
11/03	5.1	0.25	95.11	

GET A AS (7017/7039) - NDMA				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	0.015	0.0130	13.33	18.5
04/03	0.017	0.0120	29.41	
05/03	0.018	0.0140	22.22	
06/03	0.015	0.0120	20.00	
07/03	0.015	0.0130	13.33	
08/03	0.013	0.0110	15.38	
09/03	0.012	0.0110	8.33	
10/03	0.007	0.0052	25.71	

GET A AS (7017/7039) - Freon 113				
Sample Date	influent	effluent	Percent removal	Avg % Removal
03/03	230	0.25	99.89	99.9
04/03	140	0.25	99.82	
05/03	240	0.25	99.90	
06/03	240	0.25	99.90	
07/03	200	0.25	99.88	
08/03	190	0.25	99.87	
09/03	230	0.25	99.89	
10/03	210	0.25	99.88	
11/03	160	0.25	99.84	

2003 Results for 1,4-dioxane

GET	Comments
ARGET	Estimated concentrations of 1,4-dioxane below the 8270C reporting limit (10 µg/l) are consistently observed in treatment influent samples collected downstream (7065) from the SE extraction wells. Two samples (7065) collected in March 2003 and June 2003 reported 1,4-dioxane at 11µg/l. 1,4-dioxane is not observed in samples collected from the American River (7070/7071) or treatment effluent samples (7069) either above the reporting limit (10 µg/l) or as estimated concentrations.
GET A	Concentrations of 1,4-dioxane were reported for two samples collected from the treatment effluent (7039) at concentrations ranging of 2.0 and 2.8 µg/l, using the GCMS-SIM analytical method .
GET B	It appears that 1,4-dioxane was not analyzed in samples collected from GET B.
GET D	It appears that 1,4-dioxane was only analyzed in two samples (4000 and 4005) collected from GET D using the BNAH analytical method, and the results were reported as less than the reporting limit (10 µg/l).

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD CENTRAL VALLEY REGION

RESOLUTION NO. R5-2009-0016

AMENDING WASTE DISCHARGE REQUIREMENTS
ORDER NO. R5-2007-0165
NPDES NO. CA0083861
FOR
AEROJET-GENERAL CORPORATION
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
ARGET, GET E/F, GET H, INTERIM GET H, GET K, INTERIM GET K,
GET L, GET L1, SAILOR BAR PARK WELL, CHETTENHAM WELL,
AND LOW THREAT DISCHARGES
SACRAMENTO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds:

1. On 6 December 2007, the Regional Water Board adopted Waste Discharge Requirements (WDR) Order No. R5-2007-0165, NPDES No. CA0083861, prescribing waste discharge requirements for the Aerojet-General Corporation, Interim Groundwater Extraction and Treatment Systems in Sacramento County. For the purposes of this Resolution, the Aerojet-General Corporation is hereafter referred to as "Discharger." The Discharger owns and operates several groundwater extraction and treatment systems (GETs) designed to cleanup the groundwater pollution emanating from the Discharger's rocket-testing and manufacturing facility in eastern Sacramento County.

2. One of the GETs, GET E/F, utilizes biological reduction to treat for perchlorate, ultraviolet/peroxide to treat for n-nitrosodimethylamine (NMDA) and volatile organics (VOCs) and air stripping to remove VOCs remaining in the flow from the ultraviolet unit. As stand-alone treatment systems, those technologies constitute best available treatment equivalents for removal of perchlorate to less than 4 µg/L, NDMA to around 0.002 µg/L and VOCs to 0.5 µg/L or less. However, after operating the GET E/F facility for the past decade, it has been determined that at times low concentrations of suspended solids from the perchlorate treatment system allow very low concentrations of trichloroethylene (TCE), a volatile organic, to pass through the ultraviolet and air-stripper treatment units. The Discharger has installed a clarifier to reduce the suspended solids concentrations from the perchlorate treatment unit. Even with that modification, there are still infrequent detections of TCE over 0.5 µg/L in the effluent from GET E/F.

3. Effluent Limitations IV.A.1.b of Order No. R5-2007-0165 specifies the best available technology value of 0.5 µg/L for TCE as the monthly average effluent limitation, with 0.7 µg/L being the daily maximum. The Primary Maximum Contaminant Level (MCL) for TCE is 5.0 µg/L and the current California Public Health Goal (one-in-a-million excess cancer risk) established by the California Office of Health Hazard Assessment is 0.8 µg/L, with a revised draft value of 1.7 µg/L out for public comment.

4. The discharge from GET E/F is to Buffalo Creek, an ephemeral stream that would be dry most of the year without the discharges from Aerojet's GET E/F, ARGET and GET J facilities. The mixing of the effluent from the three treatment systems allows a dilution of the GET E/F water by over 50 percent, assuming no other dilution is available from other sources.

5. This order revises the effluent limitation for GET E/F for TCE to 1.5 µg/L for the daily maximum value during regular operations. This value is below both the current MCL and proposed Public Health Goal. When GET E/F is discharging at the effluent limitation and mixing with the flows from ARGET and GET J, the estimated concentration in Buffalo Creek would be approximately 0.9 µg/L. The ARGET and GET J facilities consistently do not detect TCE in their respective effluents. This order revises the daily maximum value to 3.0 µg/L, upon approval of the Executive Officer, for periods when operational changes are being made to address exceedences or potential exceedences of effluent limitations of GET E/F. The beneficial uses of Buffalo Creek are still protected by the proposed change. The other six treatment systems operated by the Discharger and covered by the permit do not have their effluent limitations modified by this Order.

6. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to amend waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

7. Under Water Code section 13389, this action to amend an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

8. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

9. This Order shall amend WDR Order No. R5-2007-0165, NPDES No. CA0083861, pursuant to Section 402 of the CWA (33 U.S.C. section 1342), and amendments thereto, and shall take effect upon the date of hearing, provided EPA has no objections.

IT IS HEREBY ORDERED that Order No. R5-2007-0165 is amended solely to change the GET E/F effluent limitations for trichloroethylene. The Aerojet-General Corporation, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with Amended Order No. R5-2007-0165.

1. Modify the Table on Page 11 of the Waste Discharge Requirements, in Section IV.A.1.b, Effluent Limitations for Discharge Point 002, as described below:

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 002	mgd	8.64	8.64	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.037	0.050	--	--
Trichloroethylene	µg/L	--	1.5, 3.0[2]	--	--
	lbs/day	--	0.11, 0.22[2]	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.028	0.036	--	--
1,4-Dioxane	µg/L	3	6	--	--
	lbs/day	0.23	0.43	--	--
N-nitrosodimethylamine	µg/L	0.002	0.010	--	--
	lbs/day	0.00015	0.00072	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.300	0.43	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.82	1.22	--	--
Acetaldehyde	µg/L	5	5	--	--
	lbs/day	0.38	0.36	--	--
Formaldehyde	µg/L	50	50	--	--
	lbs/day	3.7	3.6		
pH	standard units	--	--	6.5	8.5

1 All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L, except for Trichloroethylene and 1,2-Dichloroethane, which have specific effluent limitations.

2 The daily maximum value is 1.5 µg/L except during times when the Discharger is making operational changes to correct effluent exceedences from GET E/F. During those times, the daily maximum effluent limitation is 3.0 µg/L when approved by the Executive Officer.

I, Pamela C. Creedon, Executive Officer, do hereby certify the following is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 5 February 2009.

Pamela C Creedon

PAMELA C. CREEDON, Executive Officer

California Regional Water Quality Control Board
Central Valley Region

ORDER NO. R5-2007- 0165
NPDES NO. CA0083861

WASTE DISCHARGE REQUIREMENTS
FOR
AEROJET-GENERAL CORPORATION
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
ARGET, GET E/F, GET H, INTERIM GET H, GET K, INTERIM GET K,
GET L, GET L1, SAILOR BAR PARK WELL, CHETTENHAM WELL,
AND LOW THREAT DISCHARGES
SACRAMENTO COUNTY

The following Discharger is authorized to discharge in accordance with the conditions set forth in this Order:

Discharger	Aerojet-General Corporation
Name of Facility	Interim Groundwater Extraction and Treatment Systems ARGET, GET E/F, GET H, Interim GET H, GET J, GET K, Interim GET K, GET L, GET L1, Sailor Bar Park Well, Chettenham and Low-Threat Discharges
Facility Address	Aerojet Road
	Sacramento, CA 95813-6000
	Sacramento County

The Discharger is authorized to discharge from the following discharge points as set forth below:

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
Outfall 001	Treated Groundwater from ARGET, GETE/F, GET J	38°, 38', 01" N	121°, 16', 05" W	Buffalo Creek to American River
Outfall 002*	Treated Groundwater from GET L	38°, 36', 28" N	121°, 18', 35" W	Drainage Ditch to American River
Outfall 002A*	Treated Groundwater from GET L1	38°, 37', 32" N	121°, 18', 15" W	Drainage Ditch to American River
Outfall 003*	Outfall no longer proposed for use	38°, 36', 52" N	121°, 18', 14" W	Drainage Ditch to American River
Outfall 004	Treated Groundwater from Interim GET K and GET K	38°, 36', 05" N	121°, 18', 57" W	Drainage Ditch to American River

Outfall 005*	Treated Groundwater from Chettenham Well and Future GET H	38°, 34', 43" N	121°, 19', 37" W	Boyd Station Channel to American River
Outfall 006	Treated Groundwater from GET H and Interim GET H	38°, 31', 53" N	121°, 19', 36" W	Morrison Creek
Outfall 007	Treated Groundwater from Sailor Bar Well	38°, 37', 59" N	121°, 14', 21" W	Sailor Bar Pond
Outfall 008*	Treated Groundwater from Various GETs	38°, 38', 6" N	121°, 13', 13" W	Drainage Ditch to American River at Natomas Stilling Basin
Outfall 009*	Treated Groundwater from Various GETs			Alder Creek – Tributary to the American River

*Future outfall

This Order was adopted by the Regional Board on:	**6 December 2007**
This Order shall become effective on:	**6 December 2007**
This Order shall expire on:	**1 December 2012**
The U.S. Environmental Protection Agency (U.S. EPA) and the Regional Board have classified this discharge as a major discharge.	
The Discharger shall file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, **not later than 180 days in advance of the Order expiration date** as application for issuance of new waste discharge requirements.	

IT IS HEREBY ORDERED, that Order No.R5-2006-0013 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in Division 7 of the CWC and regulations adopted thereunder, and the provisions of the federal CWA, and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements herein.

I, Pamela C. Creedon, Executive Officer, do hereby certify the following is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 6 December 2007.

Original signed by:_
PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 5, CENTRAL VALLEY REGION

ORDER NO. R5-2007-0165
NPDES NO. CA0083861

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I. FACILITY INFORMATION

The following Discharger is authorized to discharge in accordance with the conditions set forth in this Order:

Discharger	Aerojet-General Corporation
Name of Facility	Interim Groundwater Extraction and Treatment Systems
Facility Address	Aerojet Road Sacramento, CA 95814-6000 Sacramento County
Facility Contact, Title, and Phone	Mr. Chris Fennessy, (916) 355-3341
Mailing Address	P.O. Box 13200 Sacramento, CA 95813-6000
Type of Facility	Groundwater Extraction and Treatment Plants
Facility Design Flows	ARGET – 5.4 million gallons per day (mgd) – Discharge 001,Outfall 001 GET E/F – 8.64 mgd – Discharge 002, Outfall 001 GET H – 6.39 mgd – Interim Discharge (no longer used) 003, Outfall 006, longterm – Discharge 004, Outfall 006 and/or 005 GET J – 7.17 mgd – Discharge 005, Outfall 001 GET K – 0.72 mgd interim – Discharge 006, Outfall 004; 5.76 mgd long-term – Discharge 007, Outfall 004 GET L/L1 – 2.88 mgd – Discharge 008/009, Outfall 002/002A Sailor Bar Pond – 0.36 mgd – Discharge 010, Outfall 007 Chettenham – 0.86 mgd, Discharge 011, Outfall 005

II. FINDINGS

The California Regional Water Quality Control Board, Central Valley Region (hereinafter Regional Water Board), finds:

A. **Background.** The Aerojet-General Corporation (hereafter, Discharger) is currently discharging under Order No. R5-2006-0013 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0083861. The Discharger originally submitted a Report of Waste Discharge, dated 11 April 2005 and supplemental information dated 28 April 2005 and 12 May 2005, and applied for a NPDES permit revision to discharge up to 34.65 mgd of treated groundwater from up to eleven groundwater extraction and treatment systems (GETs), with two of them being temporary.

Since that time, the Discharger submitted a request dated 9 July 2007 to modify the effluent limitation for n-nitrosodimethylamine for GET J, and future treatment systems GET K (longterm), GET L and GET L1. Order No. R5-2006-013 contained an interim effluent limit for NDMA for GET J of 0.010 micrograms per liter (ug/L) to allow an evaluation of the technical and economical issues regarding removal of NDMA. The interim limit expires on 1 January 2008, at which time the limit would lower to 0.002 ug/L. GET K (longterm), GET L and GET L1 were not operational at the time and the GET J analysis could affect the level of treatment for NDMA needed at those GETs. GET L and GET K (longterm) are not yet operational, and GET L1 became operational in September 2007. The Discharger provided sufficient information to allow the effluent limitation for NDMA for GETs J, K, L and L1 to be set at 0.007 ug/L. Further detailed discussion of this issue is found in Attachment F. In addition, in June 2007 the California Office of Health Hazard Assessment revised the Public Health Goal for NDMA from 0.002 ug/L to 0.003 ug/L.

This permit also allows Aerojet to discharge low-threat discharges consisting of such monitor well, extraction well and water supply well development water, purge water and extraction and supply well aquifer test water. Those discharges are subject to similar effluent limitations as established for the GETs.

B. **Facility Descriptions.** The Discharger currently owns and operates six groundwater extraction and treatment systems (hereafter "Facilities") that discharge treated groundwater to surface waters in accordance with an NPDES permit. Five additional facilities are being designed for construction in 2005/6.

a. ARGET (Discharge 001). The American River Study Area (ARSA) treatment system is on the Aerojet site. The facility consists of ultraviolet/peroxide treatment to reduce concentrations of volatile organic compounds (VOCs) and 1,4-dioxane, and air-stripping to remove any remaining VOCs. See Attachment C-1.
b. GET E/F (Discharge 002). The GET E/F facility is also on Aerojet property. It uses biological reduction to remove perchlorate, ultraviolet light to destroy NDMA, and air stripping to remove VOCs from up to 6000 gpm of influent. There is also a sand filter, clarifier and bag filters for solids control. The solids from the clarifier are discharged to the sanitary sewer under a permit. The GET E/F facility has been in operating in its current configuration since 2000. See Attachment C-2.
c. GET H (Discharge 003/004). The interim GET H facility (Discharge 003) discontinued operation in 2006 and all of the GET H extraction wells feed into the long-term GET H system. The long-term GET H system (Discharge 004), completed in 2006, utilizes granular activated carbon (GAC) to remove VOCs and resin adsorption to remove perchlorate from approximately 4450 gpm of extracted groundwater. As VOCs are not currently found in the influent, the Discharger might operate the system without GAC in the vessels until needed. See Attachments C-3 and C-4.
d. GET J (Discharge 005). The GET J system is similar to GET H, but with the addition of ultraviolet treatment for the destruction of NDMA and particulate filtration to help the ultraviolet system. The system is designed to treat 4950 gpm and is found on Pyrites Way in Gold River. See Attachment C-5.
e. GET K (Discharge 006/007). The interim GET K (Discharge 006) uses ion-exchange (resin bed adsorption) to remove perchlorate and GAC to remove VOCs. The long-term GET K system (Discharge 007) will add ultraviolet light and particulate removal for treatment of NDMA from an influent of 4000 gpm. The interim GET K facility is on Zinfandel Drive and the long-term facility will be closer to the river, both in Rancho Cordova. See Attachment C-6 and C-7.
f. GET L/L1 (Discharge 008/009). GET L (Discharge 008) is in Carmichael, near Ancil Hoffman Park and GET L1 (Discharge 009) is northeast of GET L. GET L1 has been completed and GET L will not be operational until 2009. The facilities will initially treat for NDMA using ultraviolet light. If, in the future, if VOCs and/or perchlorate are determined to found to be approaching the extraction wells in the groundwater, VOC and/or perchlorate treatment will be added utilizing the same processes described above. See Attachments C-8 and C-9.
g. Sailor Bar Park (Discharge 010). The Sailor Bar Park system provides for removal of VOCs by GAC on a water supply well for the pond on Sailor Bar Park. The park is on the north side of the American River adjacent to the village of Fair Oaks.

h. Chettenham (Discharge 011). The Discharger has negotiated with California American Water Company (CalAm), owner of the Chettenham Well, to use the Chettenham Well on an interim basis as an extraction point to control a portion of the groundwater pollution and evaluate the effects of pumping the well on the groundwater pollution containment system. Wellhead treatment consisting of ion exchange for perchlorate removal is installed on the well and the discharge is to the Boyd Station Channel. See Attachment C-11.

i. Purge and Aquifer Test Waters. The Discharger develops and purges wells prior to sampling and conducts aquifer tests on extraction/supply wells to determine aquifer characteristics to allow GET systems to be designed. These activities take place over vast areas on and off the Discharger's property. The purge water is generally low in volume (100's – 5000 gallons) and is provided treatment prior to discharge. Treatment is provided on the discharges to remove the pollutants of concern.

Treated groundwater is discharged from Discharges 001, 002 and 005 to Buffalo Creek (tributary to the American River), from Discharge 004 to Morrison Creek (tributary to the Sacramento River), from Discharges 006, 007, 008, 009 and 011 are to drainage channels to the American River, and Discharge 010 is to a pond in Sailor Bar Park (see table on cover page), waters of the United States and part of the Sacramento-San Joaquin Delta (Delta) within the American River and Sacramento River watersheds. Sacramento County requested during development of the previous permit to allow for the potential discharge from some or all of the GETs covered in this permit to Alder Creek, to assist in their reuse of the treated groundwater. The previous permit and this permit include a provision allowing for the discharge to Alder Creek pending completion of an acceptable study of the potential thermal impacts on Alder Creek. Attachment B-1 provides a map describing the locations of the Facilities. Attachments C-1 through C-11 provide wastewater flow schematics of the Facilities.

C. **Legal Authorities.** This Order is issued pursuant to section 402 of the Federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the CWC for discharges that are not subject to regulation under CWA section 402.

D. **Background and Rationale for Requirements**. The Regional Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and through special studies. Attachments A through G,which contain background information and rationale for Order requirements, are hereby incorporated into this Order and, thus, constitute part of the Findings for this Order.

E. **California Environmental Quality Act (CEQA).** This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the CWC. The Department of Toxic Substances Control certified a final Negative Declaration and Initial Study for the American River Study Area project in accordance with CEQA and State CEQA Guidelines. The Board has reviewed the negative declaration and these waste discharge requirements will mitigate or avoid any significant impacts on water quality due to the discharges from the ARGET facility.

F. **Technology-based Effluent Limitations.** The Code of Federal Regulations (CFR) at 40 CFR §122.44(a) requires that permits include applicable technology-based limitations and standards. This Order includes technology-based effluent limitations that protect the beneficial uses of the receiving waters. The Regional Water Board has considered the factors listed in CWC §13241 in establishing these requirements. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet (Attachment F).

G. **Water Quality-based Effluent Limitations.** Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Where numeric water quality objectives have not been established, 40 CFR §122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information, or an indicator parameter.

H. **Water Quality Control Plans.** The Regional Water Board adopted a *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereinafter Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan.

The Basin Plan at page II-2.00 states that the beneficial uses of any specifically identified water body generally applies to its tributary streams. The Basin Plan does not specifically identify beneficial uses for Buffalo Creek and Alder Creek, or Morrison Creek, tributary to the American River and Sacramento River, respectively, but does identify present and potential uses for the American and Sacramento Rivers. These beneficial uses are municipal and domestic supply (MUN); agricultural supply, irrigation and stock watering (AGR); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); warm and cold migration of aquatic organisms (MIGR); warm and cold spawning (SPWN); wildlife habitat (WILD). In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Thus, as discussed in detail in this Fact Sheet, beneficial uses applicable to the American River, Sacramento River, Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond are as follows:

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002 and 005	Buffalo Creek and Alder Creek, Tributary of the American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
003	Morrison Creek, Tributary of the Sacramento River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
004, 006, 007, 008, 009, 011 and 012	American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
010	Sailor Bar Pond, Potentially tributary to American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.

The Basin Plan includes a Wastewater Reuse Policy that encourages the reclamation and reuse of wastewater, including treated groundwater resulting from a cleanup action, where practicable. Those reuse options include municipal and industrial supply, crop irrigation, groundwater recharge, and wetland restoration. At this time, demonstrated cost-effective options that provides for reuse of the treated groundwater have been identified in the Discharger's Reuse Plan, but will likely not be implemented until Spring 2009. The Discharger and Sacramento County have entered into an agreement whereby the water discharged from the GETs is transferred to the County. The County is currently developing a project for reuse of the treated groundwater that is proceeding through the CEQA process.

Until it is feasible for the GET discharges to be reused, discharge to the American River and Sacramento River, and their tributaries, for a limited duration is a reasonable use of the treated groundwater on an interim basis since it implements the goals of cleaning up the aquifer, restoring its beneficial uses, and preventing additional public supply wells from being polluted as other alternatives are considered.

The remediation project has a potential effect on the sustainable yield of the groundwater basin from which the extraction fields takes its water. The Discharger, in accordance with requirements of a previous version of this Order, evaluated the sustainable yield of the aquifer south of the American River in a report dated 12 September 2003. That report stated that there would be an additional drawdown in the eastern part of Sacramento County in the vicinity of OU-3 of up to 30 feet. Implementation of the reuse alternatives contained in the Reuse Plan will help substantially mitigate the impact of the withdrawal of groundwater for remediation purposes. The required evaluations allowed the Regional Board to determine whether there are additional environmental impacts of the Discharger's pumping and will encourage the reuse of treated groundwater consistent with the Wastewater Reuse Policy set forth in the Basin Plan.

The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal* and *Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for inland surface waters.

Requirements of this Order specifically implement the applicable Water Quality Control Plans.

I. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, which was amended on May 4, 1995 and November 9, 1999, and the CTR on May 18, 2000, which was amended on February 13, 2001. These rules include water quality criteria for priority pollutants and are applicable to this discharge.

J. **State Implementation Policy.** On March 2, 2000, State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Boards in their basin plans, with the exception of the provision on alternate test procedures for individual discharges that have been approved by USEPA Regional Administrator. The alternate test procedures provision was effective on May 22, 2000. The SIP became effective on May 18, 2000. The SIP includes procedures for determining the need for and calculating WQBELs and requires dischargers to submit data sufficient to do so.

K. **Compliance Schedules and Interim Requirements.** This permit has interim effluent limits for perchlorate at ARGET and for NDMA at GET J. The interim effluent limitation for perchlorate at ARGET is 11 µg/L until 1 December 2012, or earlier if perchlorate treatment has been added to ARGET. See Attachment F, Sections IV(E)(1) and VII(1)(3).

L. **Antidegradation Policy.** Section 131.12 of 40 CFR requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. As discussed in detail in the Fact Sheet (Attachment F) the permitted discharge is consistent with the antidegradation provision of 40 CFR Section 131.12 and State Water Board Resolution 68-16.

M. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR § 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

N. **Monitoring and Reporting.** Section 122.48 of 40 CFR requires that all NPDES permits specify requirements for recording and reporting monitoring results. Sections 13267 and 13383 of the CWC authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. This Monitoring and Reporting Program is provided in Attachment E.

O. **Standard and Special Provisions.** Standard Provisions, which in accordance with 40 CFR §§122.41and 122.42, apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachment D. The Regional Water Board has also included in this Order special

provisions applicable to the Discharger. A rationale for the special provisions contained in this Order is provided in the attached Fact Sheet (Attachment F).

P. **Notification of Interested Parties.** The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity for a public hearing and to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment F) of this Order.

Q. **Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet (Attachment F) of this Order.

R. This Order contains restrictions on individual pollutants that are no more stringent than required by the federal CWA. Individual pollutant restrictions consist of technology-based restrictions and water quality-based effluent limitations. The technology-based effluent limitations consist of restrictions on VOCs, perchlorate, and NDMA. Water quality-based effluent limitations have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant water quality-based effluent limitations were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR section 131.38. The scientific procedures for calculating the individual water quality-based effluent limitations are based on the CTR-SIP, which was approved by USEPA on May 1, 2001. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the [Clean Water] Act" pursuant to 40 CFR section 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

III. DISCHARGE PROHIBITIONS

A. Discharge of wastewater at a location or in a manner different from that described in the Findings is prohibited.

B. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Standard Provision I.G of Attachment D, Federal Standard Provisions.

C. Neither the discharge nor its treatment shall create a nuisance as defined in Section 13050 of the California Water Code.

D. Discharge of wastewater to Outfall 008 and 009 is prohibited until approved by the Executive Officer. Completion of an adequate assessment of the thermal impacts associated with those discharges at those two outfalls is required before consideration of approval by the Executive Officer.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations – Discharge Points 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012

1. Final Effluent Limitations

a. Discharger Point 001.

i. The discharge of effluent from the ARGET facilities shall maintain compliance with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location M-001, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 001	mgd	5.0	5.4	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.02	0.03	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.016	0.022	--	--
1,4-Dioxane	µg/L	3	6	--	--
	lbs/day	0.125	0.26	--	--
N-nitrosodimethylamine	µg/L	0.002	0.010	--	--
	lbs/day	0.000083	0.00043	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.167	0.26	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.46	0.73	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

b. Discharge Point 002

i. The discharge of effluent from the GET E/F facilities shall maintain compliance with the following effluent limitations at Discharge Point 002, with compliance measured

at Monitoring Location M-002, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 002	mgd	8.64	8.64	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.037	0.050	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.028	0.036	--	--
1,4-Dioxane	µg/L	3	6	--	--
	lbs/day	0.23	0.43	--	--
N-nitrosodimethylamine	µg/L	0.002	0.010	--	--
	lbs/day	0.00015	0.00072	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.300	0.43	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.82	1.22	--	--
Acetaldehyde	µg/L	5	5	--	--
	lbs/day	0.38	0.36	--	--
Formaldehyde	µg/L	50	50	--	--
	lbs/day	3.7	3.6		
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

c. **Discharge Point 003**

i. This Discharge Point is no longer used as all extracted groundwater from Area 1 is sent to the GET H (Discharge 004) facility.

d. **Discharge Point 004**

i. The discharge of effluent from the GET H facilities shall maintain compliance with the following effluent limitations at Discharge Point 004, with compliance measured at Monitoring Location M-004, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 004	mgd	6.39	6.5	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.027	0.038	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.020	0.027	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.21	0.33	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.59	0.92	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

e. **Discharge Point 005**

i. The discharge of effluent from the GET J facilities shall maintain compliance with the following effluent limitations at Discharge Point 005, with compliance measured at Monitoring Location M-005, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 005	mgd	7.17	7.2	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.03	0.042	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.023	0.030	--	--
1,4-Dioxane	µg/L	3	6	--	--
	lbs/day	0.18	0.36	--	--
N-nitrosodimethylamine	µg/L	0.007	0.010	--	--
	lbs/day	0.00042	0.00060	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.24	0.36	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.66	1.02	--	--
pH	standard units	--	--	6.5	8.5

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Chlorform	µg/L	3.0	5.0		
	lbs/day	0.18	0.3		

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

f. **Discharge Point 006**

i. The discharge of effluent from the Interim GET K facilities shall maintain compliance with the following effluent limitations at Discharge Point 006, when measured at Monitoring Location M-006, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 006	mgd	0.58	0.72	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.0024	0.0042	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.0018	0.003	--	--
N-nitrosodimethylamine	µg/L	0.007	0.010	--	--
	lbs/day	0.0000041	0.00006	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.019	0.036	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.053	0.10	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

g. **Discharge Point 007**

i. The discharge of effluent from the GET K facilities shall maintain compliance with the following effluent limitations at Discharge Point 007, with compliance measured at Monitoring Location M-007, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 007	mgd	5.76	5.8	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.024	0.027	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.015	0.020	--	--
N-nitrosodimethylamine	µg/L	0.007	0.010	--	--
	lbs/day	0.00027	0.00039	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.16	0.235	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.43	0.67	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

h. **Discharge Point 008**

i. The discharge of effluent from the GET L facilities shall maintain compliance with the following effluent limitations at Discharge Point 008, with compliance measured at Monitoring Location M-008, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 008	mgd	1.73	1.73	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.0072	0.010	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.00055	0.0072	--	--
N-nitrosodimethylamine	µg/L	0.007	0.010	--	--
	lbs/day	0.00011	0.00014	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.058	0.087	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.16	0.22	--	--

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

i. **Discharge Point 009**

i. The discharge of effluent from the GET L1 facilities shall maintain compliance with the following effluent limitations at Discharge Point 009, with compliance measured at Monitoring Location M-009, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 009	mgd	1.3	1.3	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.0054	0.076	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.004	0.0054	--	--
N-nitrosodimethylamine	µg/L	0.007	0.010	--	--
	lbs/day	0.00007	0.0001	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.043	0.065	--	--
Total Copper	µg/L	11	17	--	--
	lbs/day	0.12	0.18	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

j. **Discharge Point 010**

i. The discharge of effluent from the Sailor Bar Park Well facilities shall maintain compliance with the following effluent limitations at Discharge Point 010, with

compliance measured at Monitoring Location M-010, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 010	mgd	0.18	0.36	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	010	--	--
	lbs/day	0.00076	0.00152	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.00057	0.0015	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.006	0.018	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

k. **Discharge Point 011**

i. The discharge of effluent from the Chettenham Well facilities shall maintain compliance with the following effluent limitations at Discharge Point 011, with compliance measured at Monitoring Location M-011, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 011	mgd	0.86	1.1	--	--
Volatile Organic Contaminants[1]	µg/L	0.5	0.7	--	--
	lbs/day	0.0036	0.0064	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
	lbs/day	0.0027	0.0046	--	--
Perchlorate	µg/L	4	6	--	--
	lbs/day	0.029	0.055	--	--
pH	standard units	--	--	6.5	8.5

[1] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

ii. Survival of aquatic organisms in 96-hour bioassays shall be no less than 70% for any one bioassay and 90% for the median of any three or more consecutive bioassays.

1. **Discharge Point 012 - Purge and Aquifer Test Waters**

   i. The discharge of purge water and aquifer test water from monitor wells, extraction wells, and supply wells shall maintain compliance with the following effluent limitations with compliance measured at Monitoring Point M-012, as described in the attached Monitoring and Reporting Program (Attachment E):

Parameter	Units	Effluent Limitations			
		Total Maximum Discharge[1]	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Per Monitor Well	mgd	0.01	0.01		
Flow – Per Aquifer Test[1]	million gallons	11.5	1.15		
Volatile Organic Contaminants[2]	µg/L	--	5.0	--	--
1,4-Dioxane	µg/L		10		
N-nitrosodimethylamine	µg/L		0.020	--	--
Perchlorate	µg/L		12		
pH	standard units	--	--	6.5	8.5

[1] Based on an aquifer test at 800 gpm for a duration of 4 days.
[2] All volatile organic constituents listed in EPA Methods 8010/8020 or 8260. The concentration of each constituent shall not exceed 0.5 µg/L.

2. **Interim Effluent Limitations**

   a. **Effective immediately and ending on 1 December 2012, or until the treatment system to remove perchlorate at the ARGET facility is constructed, whichever is sooner,** the discharge of treated effluent from the ARGET facility shall maintain compliance with the following effluent limitation for perchlorate at Discharge Point 001, as described in the attached Monitoring and Reporting Program (Attachment E). This interim effluent limitation shall apply in lieu of the corresponding final effluent limitation for perchlorate specified during the time period indicated in this Order.

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
perchlorate	µg/L	11	11	--	--

B. Land Discharge Specifications – Not Applicable
C. Reclamation Specifications – Not Applicable

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Receiving surface water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The discharge shall not cause the following in Alder Creek, Buffalo Creek, Morrison Creek, and the American River:

1. **Bacteria**: The fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.

2. **Dissolved Oxygen**: The monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The DO concentration shall not be reduced below 7.0 mg/L at any time.

3. **Oil and Grease**: Oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the water surface or on objects in the water, or otherwise adversely affect beneficial uses.

4. **Color**: Discoloration that causes nuisance or adversely affects beneficial uses.

5. **pH**: The ambient pH to be depressed below 6.5, nor raised above 8.5, nor changes in normal ambient pH levels to be exceeded by more than 0.5 units. A monthly averaging period may be used for determining compliance with the above 0.5 receiving water pH limitation.

6. **Temperature**: The natural receiving water temperature to increase more than 5°F.

7. **Settleable Matter**: Substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

8. **Radioactivity**:

   a. Radionuclides to be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

   b. Concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations.

9. Toxicity: Toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

10. Biostimulatory Substances: Biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.

11. Floating Material: Floating material in amounts that cause nuisance or adversely affect beneficial uses.

12. Sediment: Suspended sediment load and suspended sediment discharge rate altered in such a manner to cause nuisance or adversely affect beneficial uses.

13. Suspended Sediment: Suspended sediment concentrations that cause nuisance or adversely affect beneficial uses.

14. Taste and Order: Taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses, or impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to domestic or municipal water supplies.

15. Turbidity: Changes in turbidity that cause nuisance or adversely affect beneficial uses. Turbidity attributable to controllable water quality factors to exceed the following:

    a. More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.

    b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.

    c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.

    d. More than 10 percent where natural turbidity is greater than 100 NTUs.

16. Pesticides:

    a. Pesticides in individual or combined concentrations that adversely affect beneficial uses.

    b. Pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.

    c. Total identifiable persistent chlorinated hydrocarbon pesticides in concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.

    d. Concentrations exceeding those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.)

    e. Concentrations exceeding the lowest levels technically and economically achievable.

f. Concentrations exceeding the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.

g. Concentrations of thiobencarb in excess of 1.0 mg/L.

17. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.

B. Groundwater Limitations – Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. **Federal Standard Provisions.** The Discharger shall comply with all Standard Provisions included in Attachment D of this Order.

2. **Regional Water Board Standard Provisions.** The Discharger shall comply with the following provisions:

   a. If the Discharger's wastewater treatment plant is publicly owned or subject to regulation by the California Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to Title 23, California Code of Regulations (CCR), Division 3, Chapter 14.

   b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

      i. Violation of any term or condition contained in this Order;
      ii. Obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;
      iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and
      iv. A material change in the character, location, or volume of discharge.

      The causes for modification include:

      i. **New regulations**. New regulations have been promulgated under Section 405(d) of the Clean Water Act, or the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.

      ii. **Land application plans**. When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.

iii. **Change in sludge use or disposal practice**. Under 40 Code of Federal Regulations (CFR) 122.62(a)(1), a change in the Discharger's sludge use or disposal practice is a cause for modification of the permit. It is cause for revocation and reissuance if the Discharger requests or agrees.

The Regional Water Board may review and revise this Order at any time upon application of any affected person or the Regional Water Board's own motion.

c. If a toxic effluent standard or prohibition (including any scheduled compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the CWA, or amendments thereto, for a toxic pollutant that is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this Order, the Regional Water Board will revise or modify this Order in accordance with such toxic effluent standard or prohibition.

The Discharger shall comply with effluent standards and prohibitions within the time provided in the regulations that establish those standards or prohibitions, even if this Order has not yet been modified.

d. This Order shall be modified, or alternately revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 04(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:

i. Contains different conditions or is otherwise more stringent than any effluent limitation in the Order; or

ii. Controls any pollutant limited in the Order.

The Order, as modified or reissued under this paragraph, shall also contain any other requirements of the CWA then applicable.

e. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.

f. The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal.

g. The Discharger shall ensure compliance with any existing or future pretreatment standard promulgated by USEPA under Section 307 of the CWA, or amendment thereto, for any discharge to the municipal system.

h. The discharge of any radiological, chemical or biological warfare agent or high-level, radiological waste is prohibited.

i. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.

j. Safeguard to electric power failure:

   i. The Discharger shall provide safeguards to assure that, should there be reduction, loss, failure of electric power, the discharge shall comply with the terms and conditions of this Order.

   ii. Upon written request by the Regional Water Board the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past five years on effluent quality and on the capability of the Discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Regional Water Board.

   iii. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or should the Regional Water Board not approve the existing safeguards, the Discharger shall, within ninety days of having been advised in writing by the Regional Water Board that the existing safeguards are inadequate, provide to the Regional Water Board and USEPA a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Regional Water Board, become a condition of this Order.

k. The Discharger, upon written request of the Regional Water Board, shall file with the Regional Water Board a technical report on its preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events.

   The technical report shall:

   i. Identify the possible sources of spills, leaks, untreated waste by-pass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.

   ii. Evaluate the effectiveness of present facilities and procedures and state when they became operational.

iii. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

The Regional Water Board, after review of the technical report, may establish conditions, which it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions shall be incorporated as part of this Order, upon notice to the Discharger.

l. A publicly owned treatment works (POTW) whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the Discharger shall notify the Regional Water Board by **31 January.** A copy of the notification shall be sent to appropriate local elected officials, local permitting agencies and the press. Within 120 days of the notification, the Discharger shall submit a technical report showing how it will prevent flow volumes from exceeding capacity or how it will increase capacity to handle the larger flows. The Regional Water Board may extend the time for submitting the report.

m. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the Discharger, analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by Regional Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Regional Water Board.

i. Unless otherwise specified, all metals shall be reported as Total Metals.

ii. Acute bioassays shall be performed in accordance with guidelines approved by the Regional Water Board and the Department of Fish and Game or in accordance with methods described in USEPA's manual for measuring acute toxicity of effluents (EPA-821-R-02-012 and subsequent amendments).

iii. Short-term chronic bioassays shall be performed in accordance with USEPA guidelines (EPA-821-R-02-013 and subsequent amendments).

n. Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Regional Water Board and USEPA.

o. The Discharger shall conduct analysis on any sample provided by USEPA as part of the Discharge Monitoring Quality Assurance (DMQA) program. The results of any such analysis shall be submitted to USEPA's DMQA manager.

p. The Discharger shall submit technical reports as directed by the Executive Officer. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, Sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, Sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

q. The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal.

r. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.

B. Monitoring and Reporting Program Requirements

The discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

C. Special Provisions

1. Reopener Provisions

a. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Regional Water Board will revise and modify this Order in accordance with such more stringent standards.

b. If after review of effluent monitoring results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective, or the discharge is causing groundwater degradation, this Order may be reopened and effluent limitations added for the subject constituents.

c. The Discharger may request the Executive Officer to reopen the permit to request a reduction in monitoring, if appropriate.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. **Chronic Whole Effluent Toxicity Requirements.** For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct chronic whole effluent toxicity testing, as specified in the Monitoring and Reporting Program (Attachment E). Furthermore, this Provision requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exceeds numeric toxicity trigger levels established in this Provision, the Discharger is required to initiate a Toxicity Reduction Evaluation (TRE), in accordance with an approved TRE workplan, and take actions to mitigate the impact of the discharge and prevent recurrence of the toxicity. A TRE is a site-specific study conducted in a stepwise process to identify source(s) of toxicity and the effective control measures for effluent toxicity. TREs are designed to identify the causative agents of whole effluent toxicity, evaluate the effectiveness of the toxicity control options, and confirm the reduction in effluent toxicity. This Provision includes the requirements for the Discharger to develop and submit a TRE Workplan and also the procedures for accelerated chronic toxicity monitoring and TRE initiation.

(i) **Toxicity Reduction Evaluation (TRE) Workplan. Within 90 days of the effective date of this Order,** the Discharger shall submit to the Regional Water Board a TRE Workplan for approval by the Executive Officer. The TRE Workplan shall outline the procedures for identifying the source(s) of, and reducing or eliminating effluent toxicity. The TRE Workplan shall be developed in accordance with EPA guidance and shall contain adequate detail to allow the Discharger to immediately implement a TRE as required in this Provision.

(ii) **Numeric Toxicity Trigger.** The numeric toxicity trigger is **1 TUc**[2] for any test species. The numeric toxicity trigger is not an effluent limitation, it is the toxicity threshold at which the Discharger is required to perform accelerated chronic toxicity monitoring to confirm effluent toxicity, as well as, the threshold to initiate a TRE. The accelerated monitoring specifications are described in subsection (iv), below.

(iii)**Accelerated Monitoring and TRE Initiation.** When the numeric toxicity trigger is exceeded during regular chronic toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall initiate accelerated monitoring to confirm the effluent toxicity as required in the Accelerated Monitoring Specifications outlined in subsection iv, below. Any exceedance of the TRE Trigger during accelerated monitoring requires the Discharger to initiate a TRE in accordance with an approved TRE Work Plan. Notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.

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[1] See Attachment F (Fact Sheet) Section VII.B.2.a. for a list of EPA guidance documents that must be considered in development of the TRE Workplan.

[2] TUc – Chronic toxicity unit. The reciprocal of the effluent concentration that causes no observable effect on the test organism in a chronic toxicity test (TUc=100/NOEC)

(a) In the event the numeric toxicity trigger is exceeded during accelerated monitoring, specific actions the Discharger will take to investigate and identify the cause(s) of toxicity;

(b) In the event the numeric toxicity trigger is exceeded during accelerated monitoring, specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and

(c) A schedule for these actions.

(iv) **Accelerated Monitoring Specifications.** If the TRE Trigger is exceeded during regular chronic toxicity testing, within 14-days of notification by the laboratory of the exceedance, the Discharger shall initiate accelerated monitoring to confirm effluent toxicity. Accelerated monitoring shall consist of three (3) monthly chronic toxicity tests using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:

(a) If the results of three (3) consecutive accelerated monitoring tests do not exceed the TRE Trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. Notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.

(b) If the source(s) of the toxicity is easily identified (i.e. temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until three (3) consecutive accelerated tests do not exceed the TRE Trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.

(c) If the result of any accelerated toxicity test exceeds the TRE Trigger, the Discharger shall cease accelerated monitoring and begin a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of the exceedance of the TRE Trigger during accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Regional Water Board including, at minimum:

1. Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including TRE WET monitoring schedule;
2. Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and
3. A schedule for these actions.

b. **Thermal Impacts Associated with Discharge to Outfall 008 or 009.** The Discharger is not permitted to discharge to Outfall 008 and/or 009 until an adequate thermal impact assessment is completed for Outfall 008 and/or 009 that demonstrates that the discharge will not cause an unacceptable thermal impact on the receiving water. The study must demonstrate that the discharge will meet the Water Quality Objectives for temperature

found in the Basin Plan. Those objectives state "the natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not affect beneficial uses" and "at no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above the natural receiving water temperature".

3. Best Management Practices and Pollution Prevention – Not Applicable

4. Compliance Schedules

a. Final Effluent Limitations for Perchlorate at Discharge 001

i. If the effluent from the GET D system is added to ARGET and the total influent perchlorate concentration into ARGET is greater than 6 µg/L, then by **1 December 2012** the Discharger shall provide treatment equipment at the ARGET facility to remove perchlorate to less than 4 µg/L, the AMEL found in IV(A)(1)(a).

5. Construction, Operation and Maintenance Specifications

a. Operations and Maintenance Plan:

Within 60-days of startup of a GET, the Discharger shall certify in writing to the Regional Water Board that it has developed an Operation and Maintenance Plan (O&M). O&M plans have already developed for GET E/F, ARGET, Interim GET H and GET J under previous versions of the permit. The Discharger shall develop and implement the O&M plan to prevent or minimize the generation and discharge of wastes and pollutants to the waters of the United States and waters of the State. The Discharger shall develop and implement an O&M plan consistent with the following objectives:

i. Operations and Maintenance

1) Maintain in-system production and wastewater treatment technologies to prevent the overflow of any floating matter or bypassing of treatment technologies.

2) Inspect the treatment systems on a routine basis in order to identify and promptly repair any damage.

3) Ensure storage and containment of chemicals or other materials to prevent spillage or release into waters of the United States, or waters of the State.

4) Implement procedures for properly containing, cleaning, and disposing of any spilled material.

ii. Recordkeeping

1) Keep records documenting the frequency of cleaning, inspections, maintenance and repairs.

v. Training

1) Adequately train all relevant facility personnel in spill prevention and how to respond in the event of a spill in order to ensure the proper clean-up and disposal of spilled material.

2) Train staff on the proper operation and cleaning of production and wastewater treatment systems, including training in feeding procedures and proper use of equipment.

The Discharger shall ensure that its operations staff are familiar with the O&M Plan and have been adequately trained in the specific procedures it requires.

b. Solids disposal specifications:

i. Collected screenings, sludges, and other solids, shall be disposed of in a manner approved by the Executive Officer and consistent *with Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.

ii. Any proposed change in solids disposal from a previously approved practice (as described in this Order) shall be reported to this office at least 90 days in advance of the change.

6. Special Provisions for Municipal Facilities (POTWs Only) – Not Applicable

7. Other Special Provisions

a. Prior to making any change in the discharge point, place of use, or purpose of use of the wastewater, the Discharger shall obtain approval of, or clearance from the State Water Resources Control Board (Division of Water Rights).

b. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, address and telephone number of the persons responsible for contact with the Regional Water Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision V.B, Attachment D, and state that the new owner or operator

assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

c. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition or limitation contained in this Order, the Discharger shall notify the Regional Water Board by telephone (916) 464-3291 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within five days, unless the Regional Water Board waives confirmation. The written notification shall include the information required by Federal Standard Provision V.E.1 [40 CFR §122.41(l)(6)(i)].

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in Section IV of this Order will be determined as specified below:

A. Average Monthly Effluent Limitation (AMEL).
If the average of daily discharges over a calendar month exceeds the AMEL for a given parameter, an alleged violation will be flagged and the discharger will be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of non-compliance in a 31-day month). The average of daily discharges over the calendar month that exceeds the AMEL for a parameter will be considered out of compliance for that month only. If only a single sample is taken during the calendar month and the analytical result for that sample exceeds the AMEL, the discharger will be considered out of compliance for that calendar month. For any one calendar month during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar month. For NDMA and 1,4-dioxane, if the approved Practical Quantitation Level (PQL) is greater than the AMEL, then compliance is met if the monthly average is less than the PQL

B. Maximum Daily Effluent Limitation (MDEL).
If a daily discharge exceeds the MDEL for a given parameter, an alleged violation will be flagged and the discharger will be considered out of compliance for that parameter for that 1 day only within the reporting period. For any 1 day during which no sample is taken, no compliance determination can be made for that day. For NDMA and 1,4-dioxane, if the approved Practical Quantitation Level (PQL) is greater than the MDEL, then compliance is met if the daily value is less than the PQL

C. Instantaneous Minimum Effluent Limitation.
If the analytical result of a single grab sample is lower than the instantaneous minimum effluent limitation for a parameter, a violation will be flagged and the discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of non-compliance with the instantaneous minimum effluent limitation).

D. Instantaneous Maximum Effluent Limitation.

If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for a parameter, a violation will be flagged and the discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both exceed the instantaneous maximum effluent limitation would result in two instances of non-compliance with the instantaneous maximum effluent limitation).

E. Maximum 1-Hour Average.

If the analytical result of a samples collected within 1-hour are higher than the maximum 1-hour average effluent limitation for a parameter, a violation will be flagged and the discharger will be considered out of compliance for that parameter.

ATTACHMENT A – DEFINITIONS

Average Monthly Effluent Limitation (AMEL): the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL): the highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Daily Discharge: Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

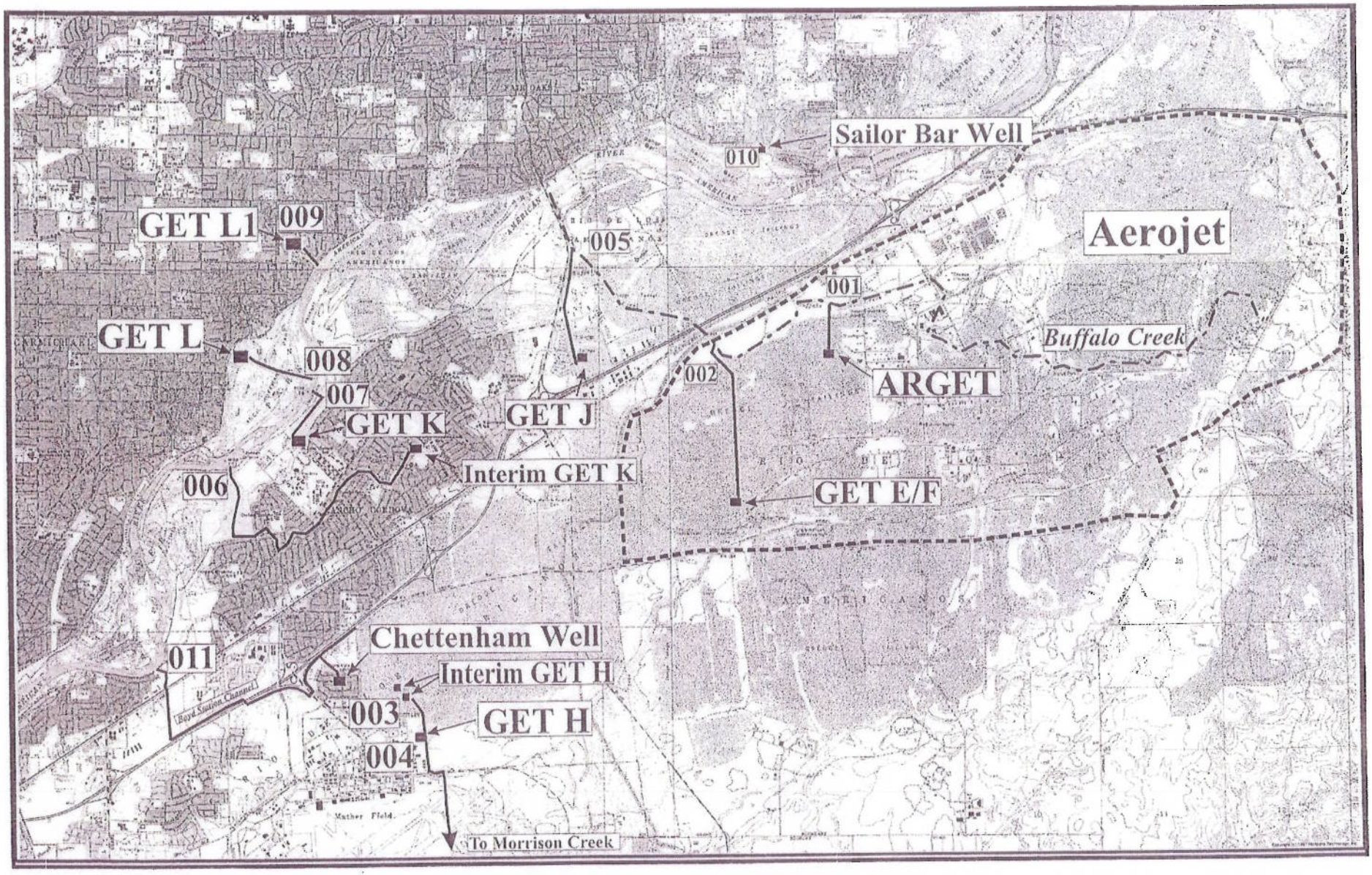
For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

Instantaneous Maximum Effluent Limitation: the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

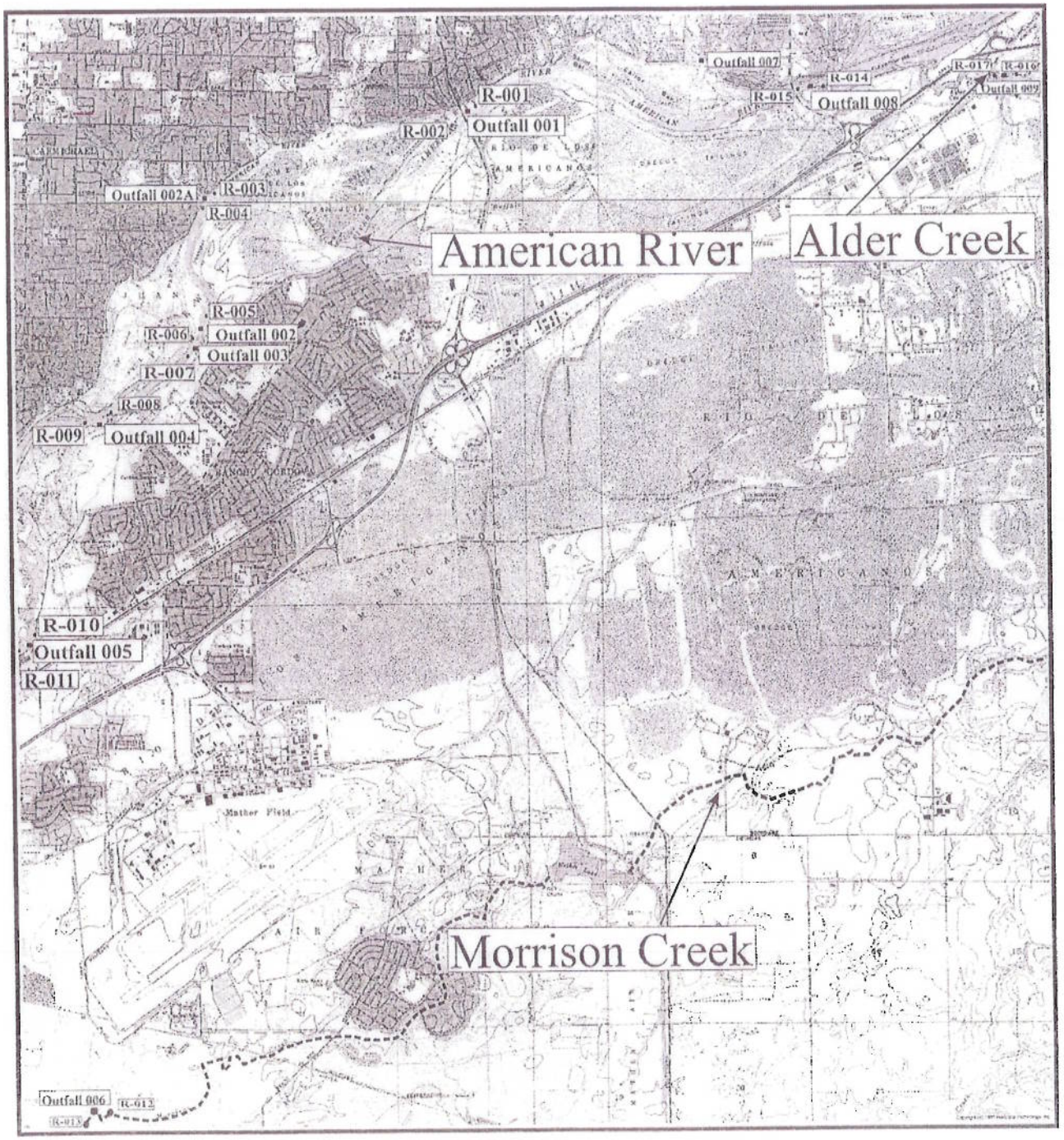
Instantaneous Minimum Effluent Limitation: the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

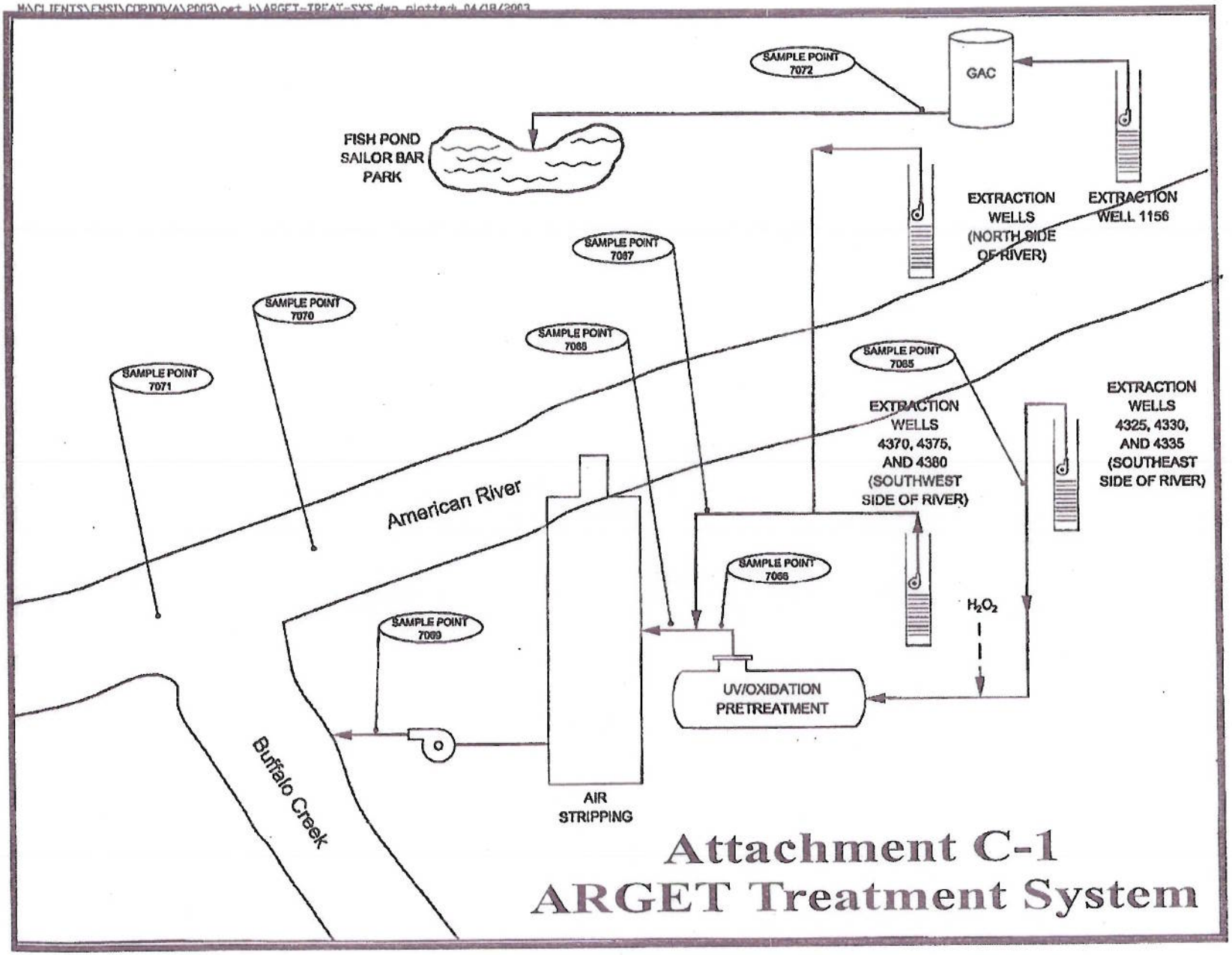
Maximum Daily Effluent Limitation (MDEL): the highest allowable daily discharge of a pollutant.

Attachment B-1 - Discharge and GET Locations

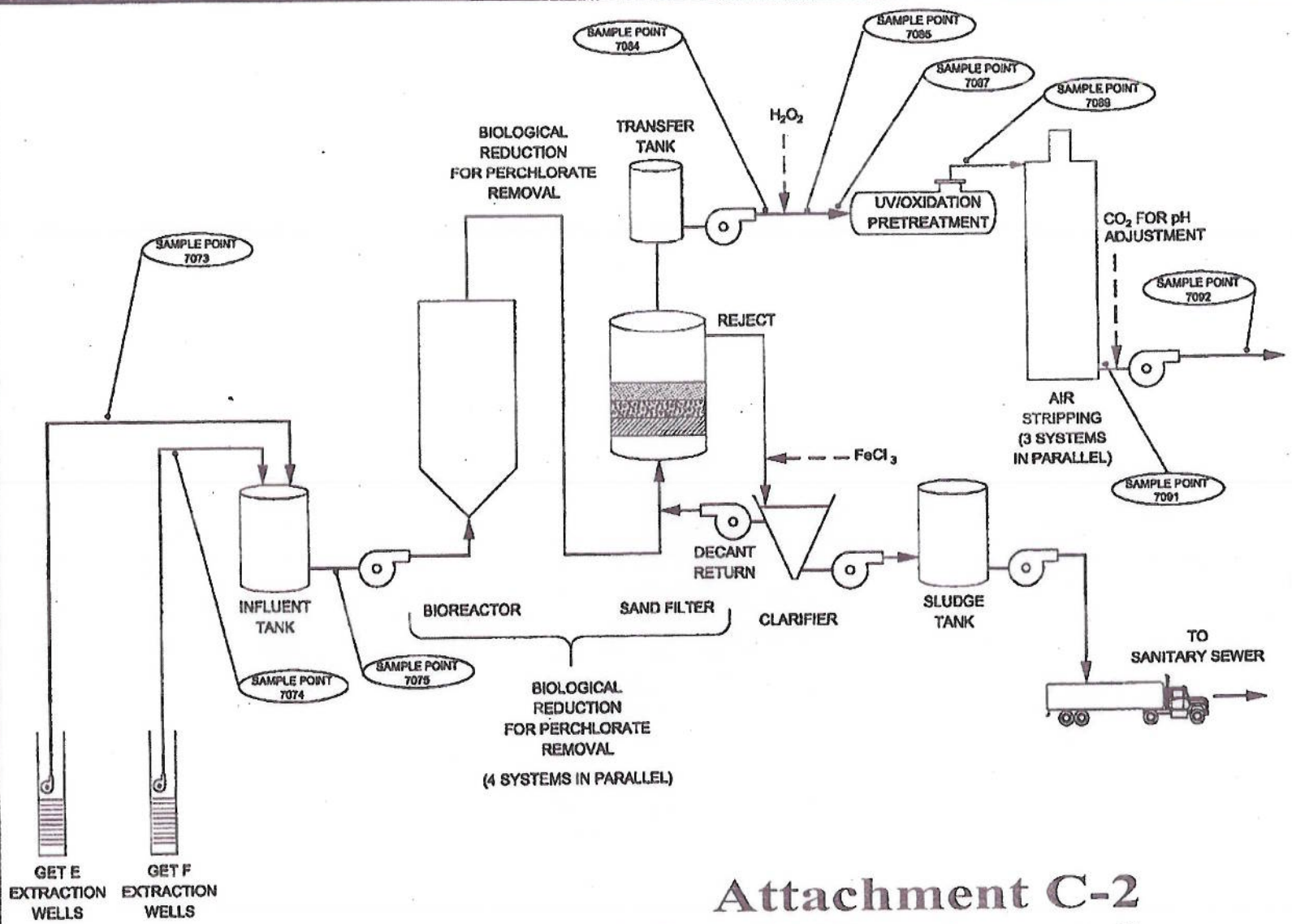


Attachment B-2- Receiving Water Sample Locations

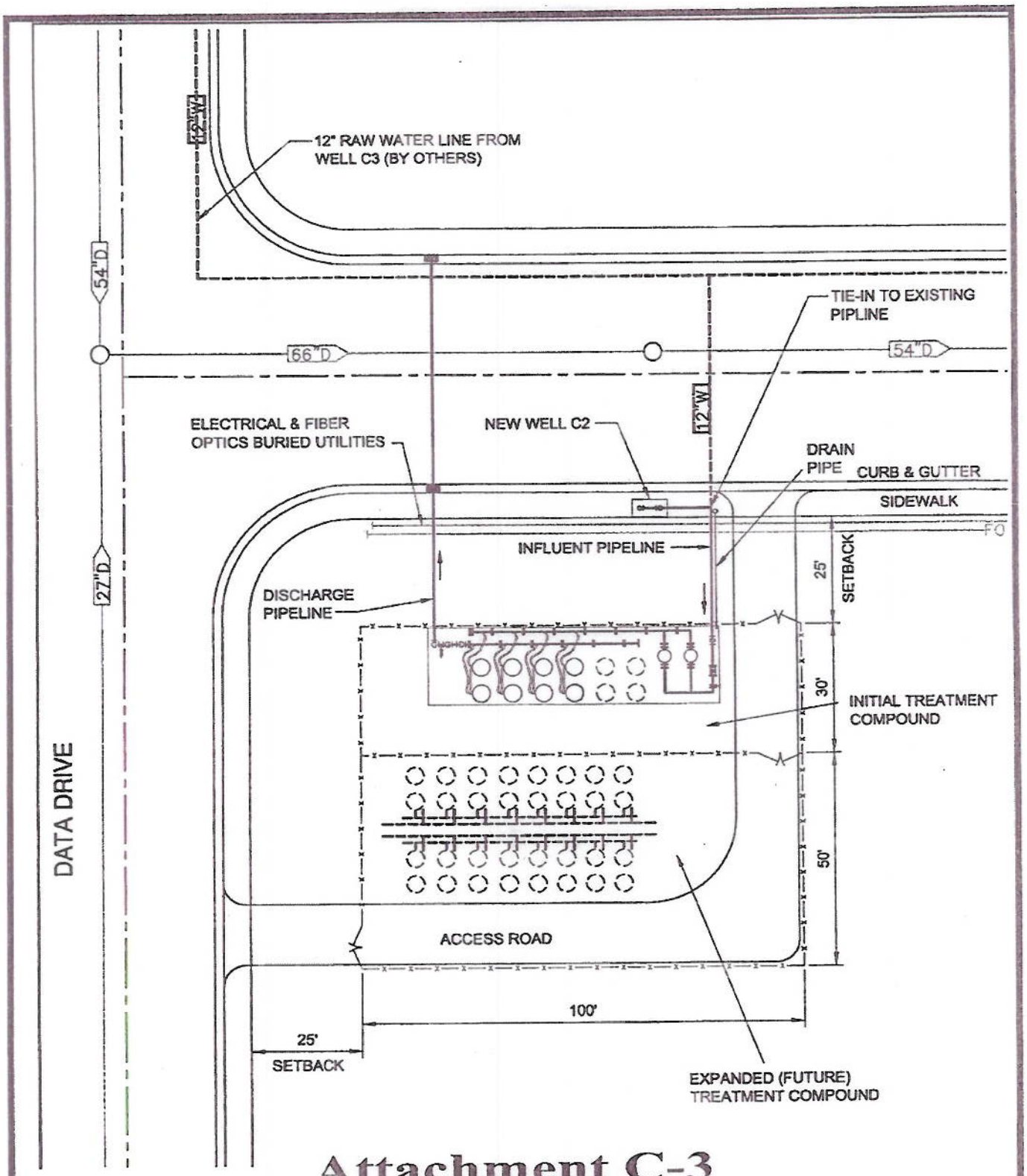




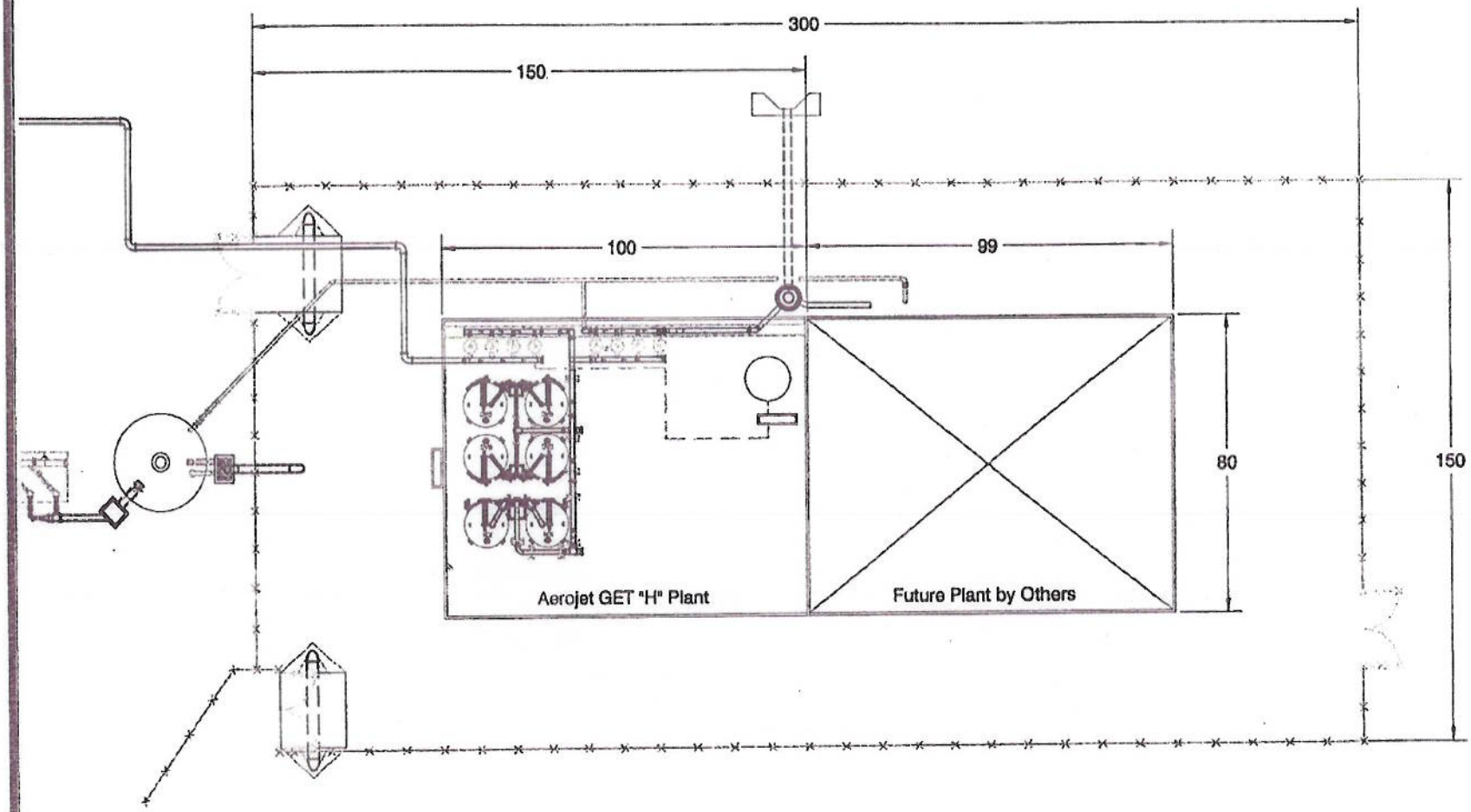
Attachment C-1
ARGET Treatment System



Attachment C-2
GET E/F Treatment System

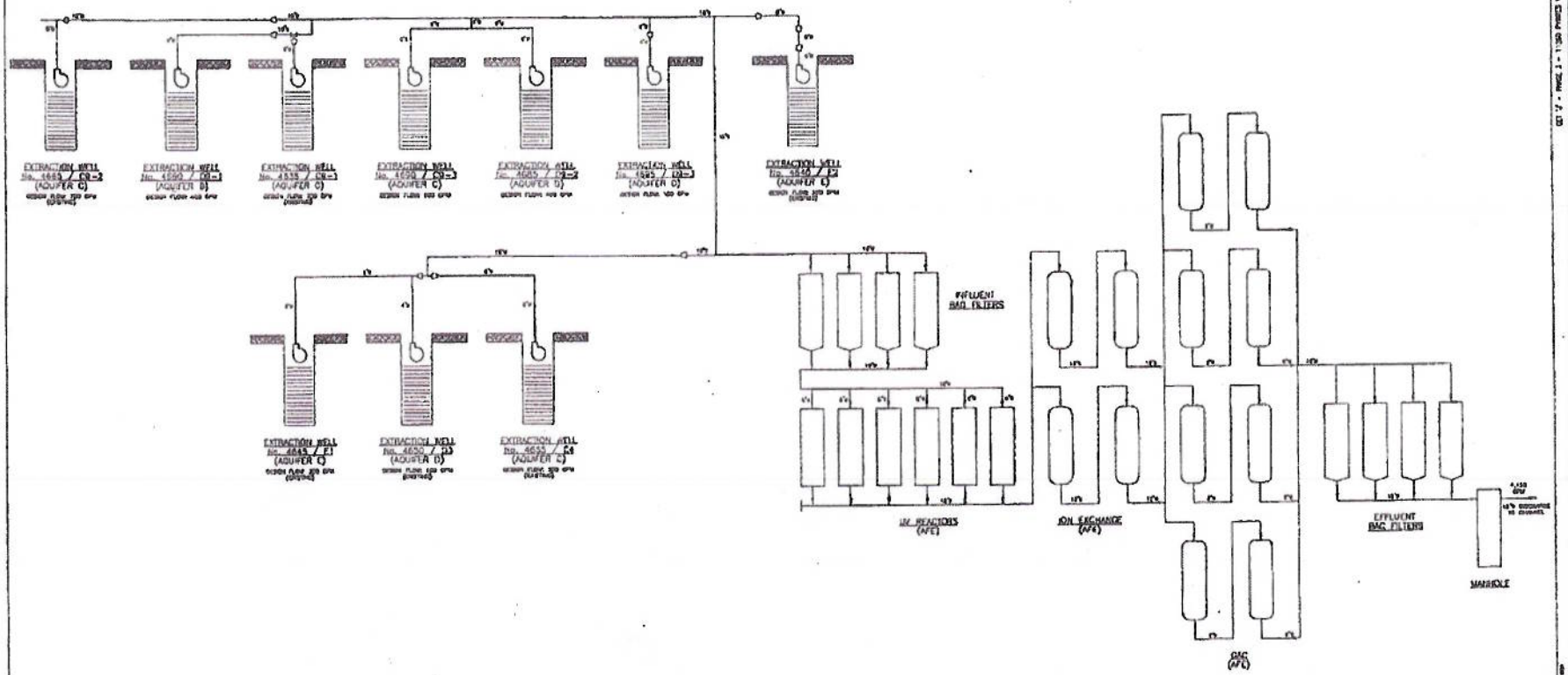


Attachment C-3
Interim GET H Treatment System

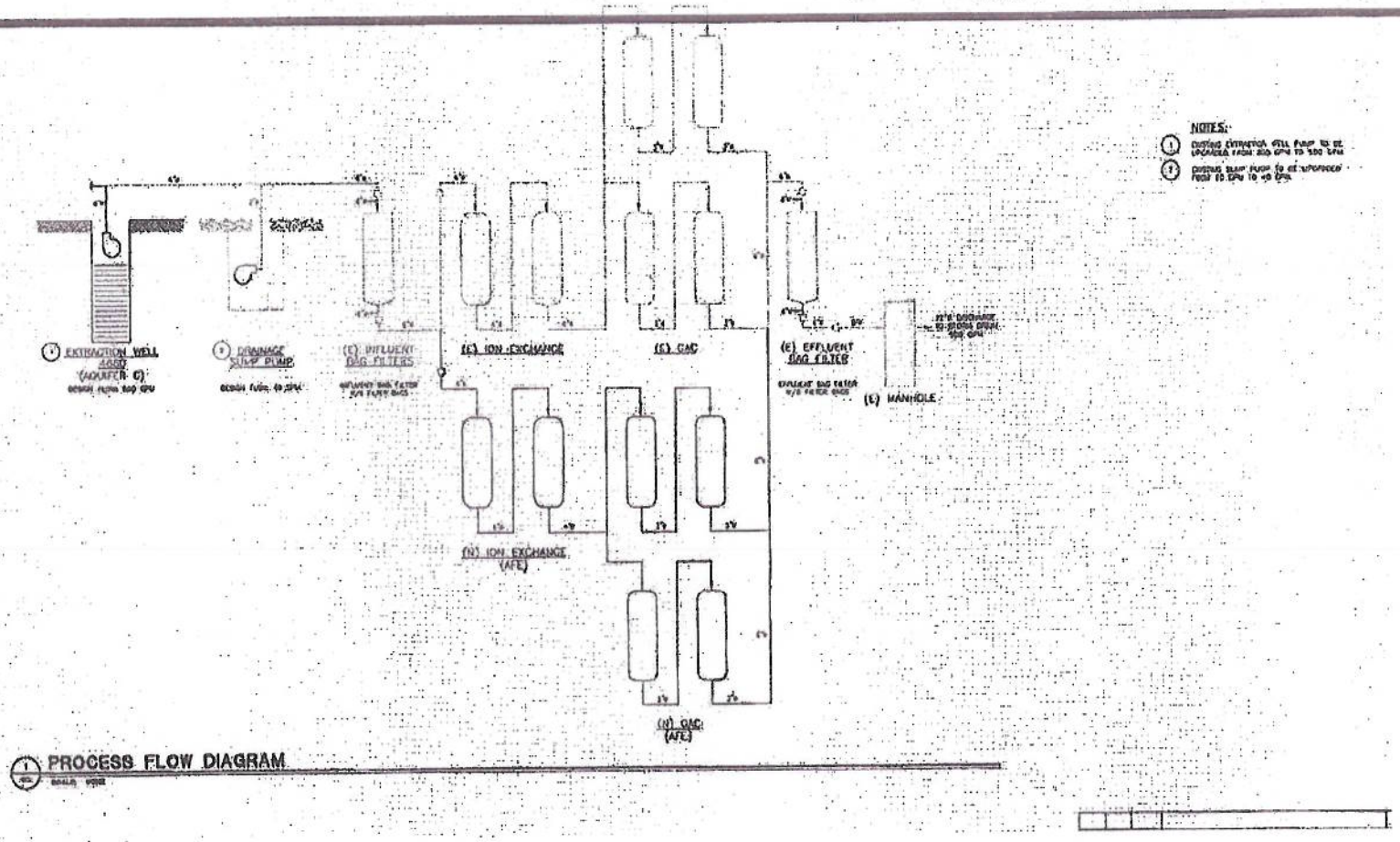


Scale: 1" = 40'

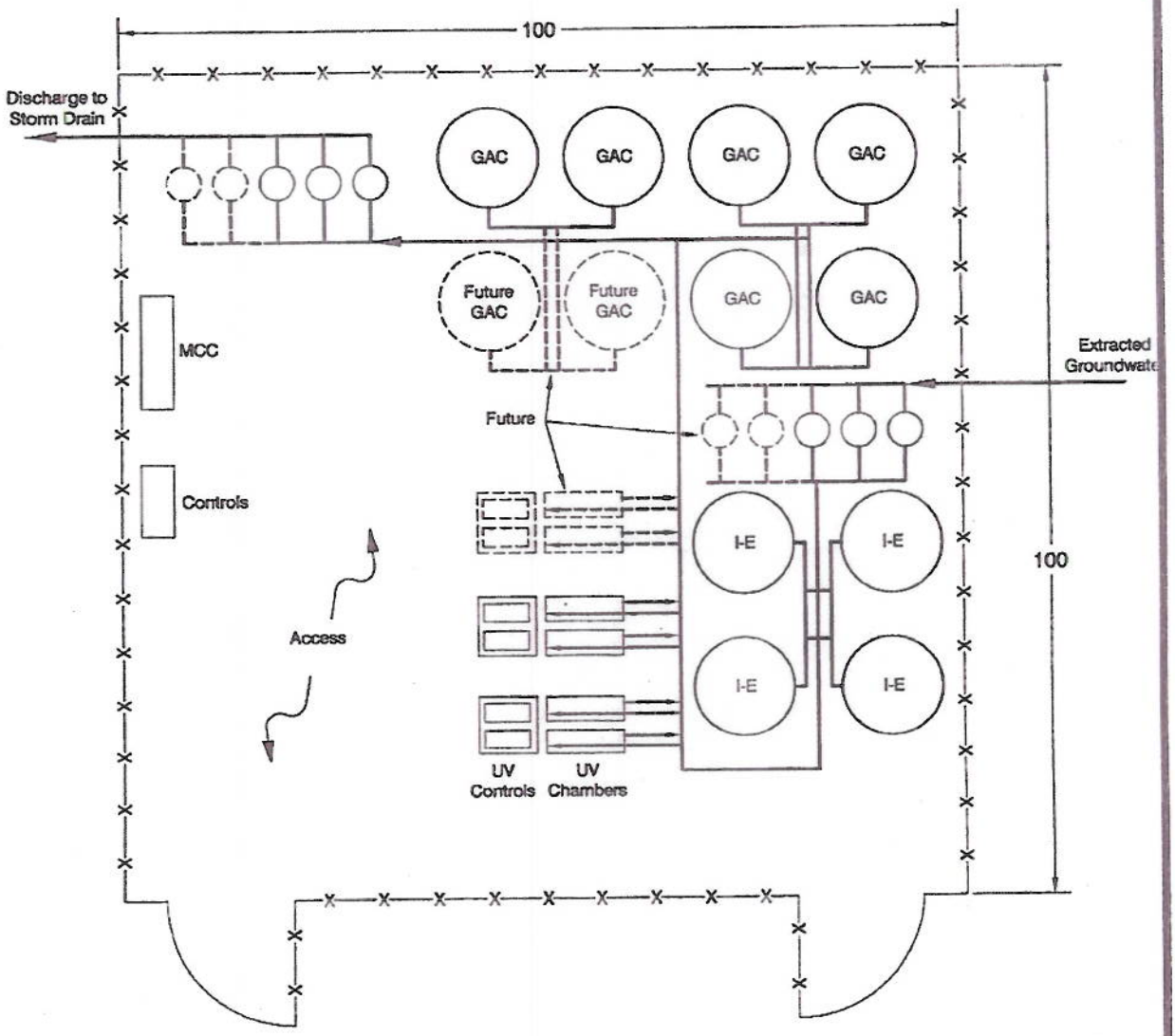
Attachment C-4
GET H Treatment System



Attachment C-5
GET J Treatment System



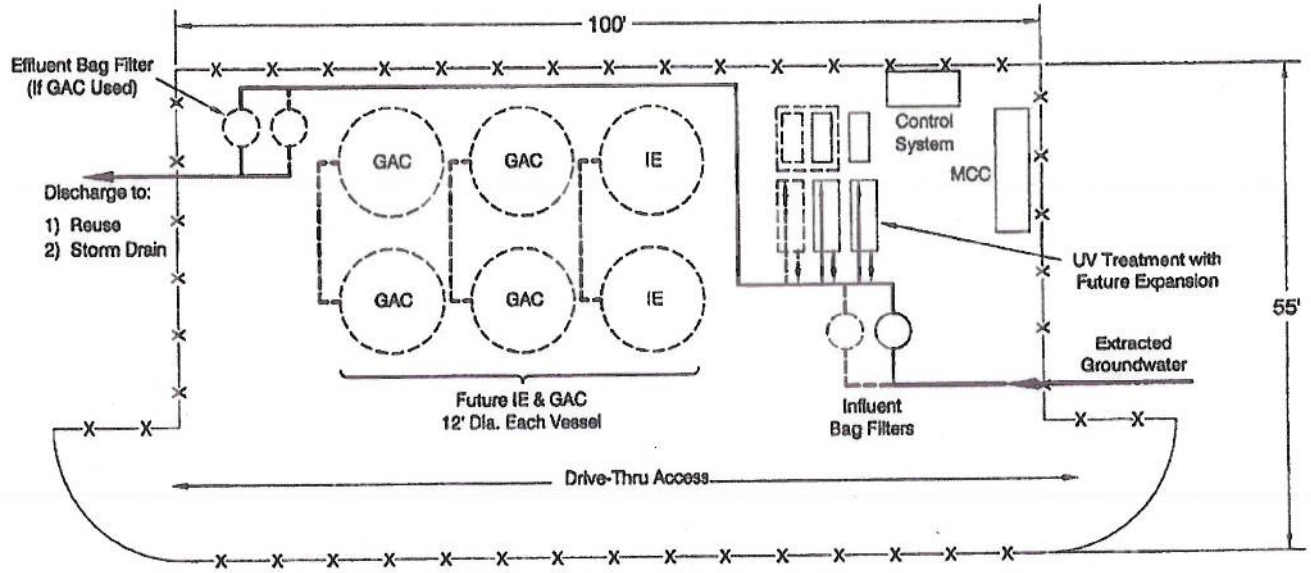
Attachment C-6
Interim GET K Treatment System



Notes: 1. Design capacity is for 3,000 gpm with space to expand to 4,000 gpm if required.

2. Anticipated to be installed outside; however, depending on use permit constraints may require exterior building.

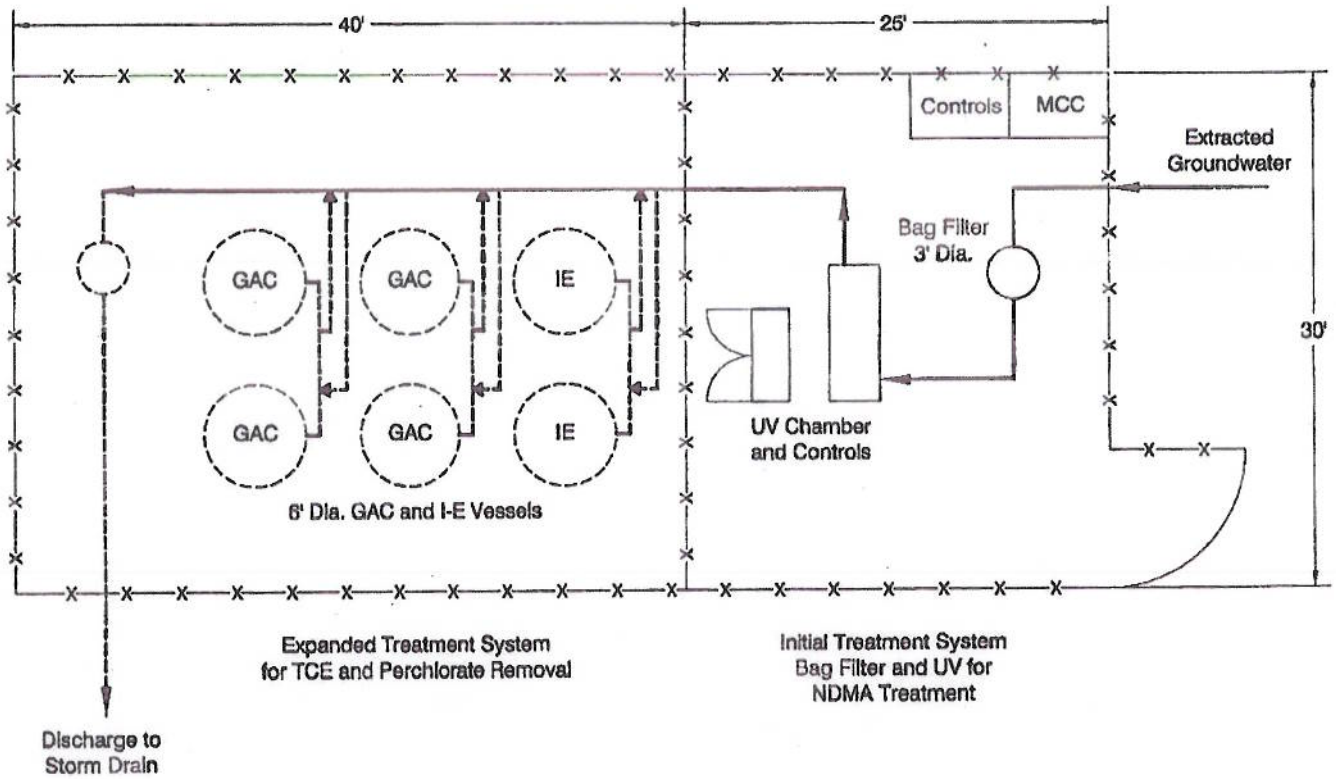
Attachment C-7
GET K Treatment System



Notes:

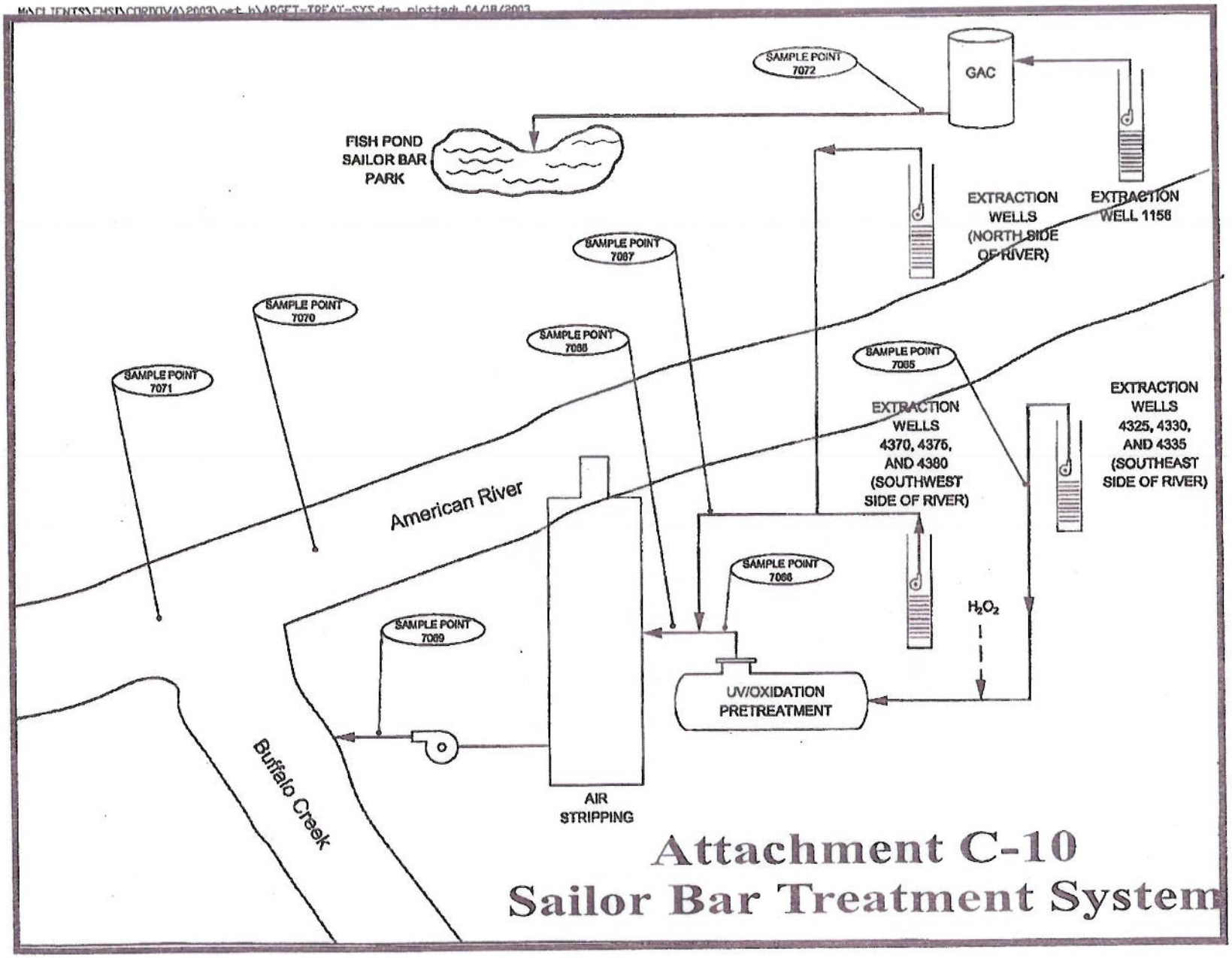
1. Design capacity set for 900 - 1,000 gpm with space to provided for future components to increase to 2,000 gpm.
2. Ion-exchange and GAC treatment not anticipated with initial start up.
3. Anticipated to be installed in fenced area with no building to house.

Attachment C-8
GET L Treatment System

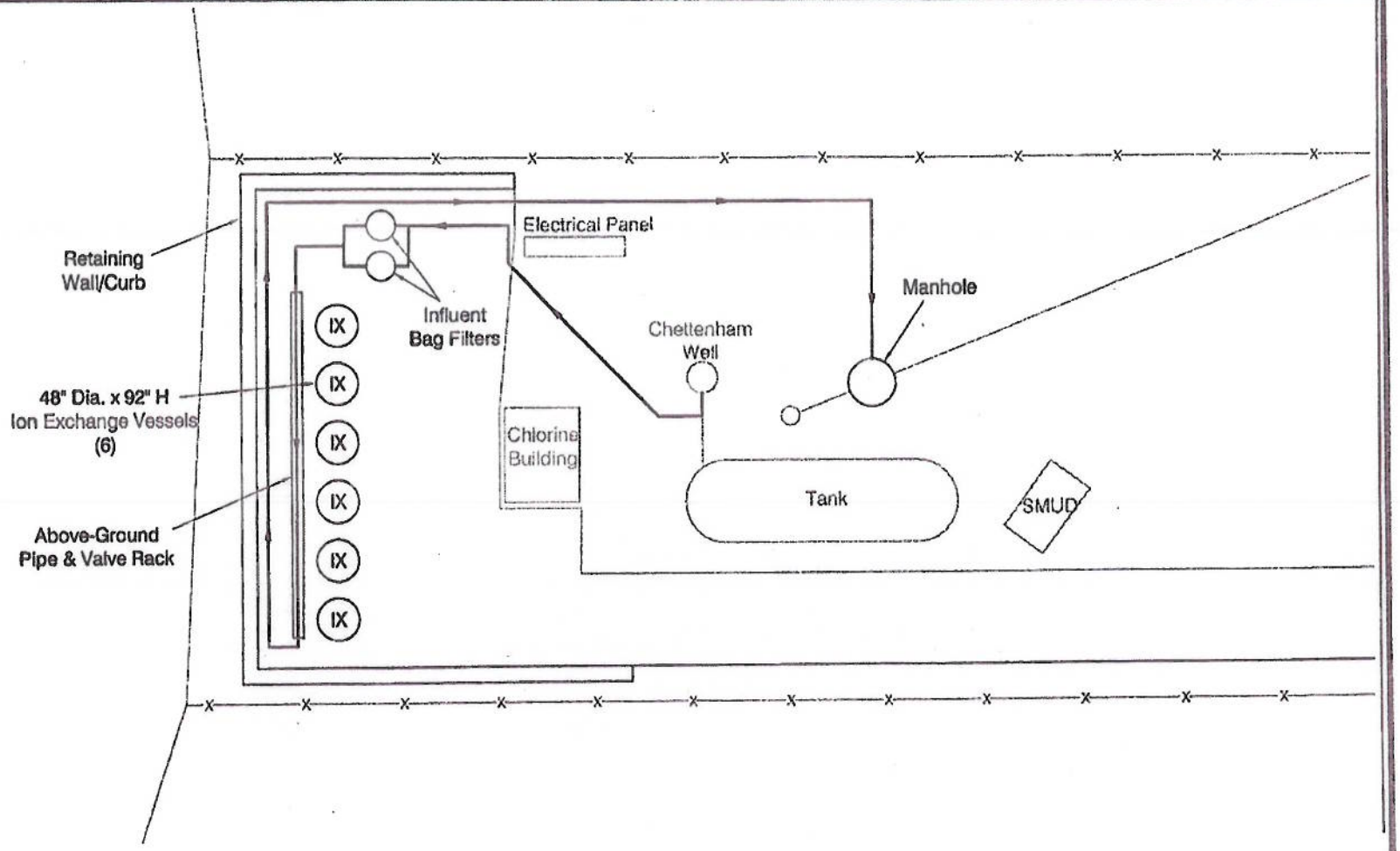


Notes:
1. Design capacity to treat up to 500 gpm.
2. Initial treatment for NDMA with space considerations for the addition of perchlorate and TCE treatment.
3. Anticipated to be installed in fenced area.

Attachment C-9
GET L1 Treatment System



Attachment C-10
Sailor Bar Treatment System



Attachment C-11
Chettenham Treatment System

ATTACHMENT D – FEDERAL STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action, for permit termination, revocation and reissuance, or denial of a permit renewal application [*40 CFR §122.41(a)*].

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not been modified to incorporate the requirement [*40 CFR §122.41(a)(1)*].

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order [*40 CFR §122.41(c)*].

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment [*40 CFR §122.41(d)*].

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order [*40 CFR §122.41(e)*].

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges [*40 CFR §122.41(g)*].

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations [*40 CFR §122.5(c)*].

F. Inspection and Entry

The Discharger shall allow the Regional Water Quality Control Board (RWQCB), State Water Resources Control Board (SWRCB), United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to [*40 CFR §122.41(i)*] [*CWC 13383(c)*]:

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order [*40 CFR §122.41(i)(1)*];

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order [*40 CFR §122.41(i)(2)*];

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order [*40 CFR §122.41(i)(3)*];

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location [*40 CFR §122.41(i)(4)*].

G. Bypass

1. Definitions

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility [*40 CFR §122.41(m)(1)(i)*].

   b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production [*40 CFR §122.41(m)(1)(ii)*].

2. Bypass not exceeding limitations – The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3 and I.G.5 below [*40 CFR §122.41(m)(2)*].

3. Prohibition of bypass – Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless [*40 CFR §122.41(m)(4)(i)*]:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage [*40 CFR §122.41(m)(4)(A)*];

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance [*40 CFR §122.41(m)(4)(B)*]; and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provision – Permit Compliance I.G.5 below [*40 CFR §122.41(m)(4)(C)*].

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above [*40 CFR §122.41(m)(4)(ii)*].

5. Notice

a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass [*40 CFR §122.41(m)(3)(i)*].

b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below [*40 CFR §122.41(m)(3)(ii)*].

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation [*40 CFR §122.41(n)(1)*].

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph H.2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review [*40 CFR §122.41(n)(2)*].

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that [*40 CFR §122.41(n)(3)*]:

a. An upset occurred and that the Discharger can identify the cause(s) of the upset [*40 CFR §122.41(n)(3)(i)*];

b. The permitted facility was, at the time, being properly operated [*40 CFR §122.41(n)(3)(i)*];

c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b [*40 CFR §122.41(n)(3)(iii)*]; and

d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above [*40 CFR §122.41(n)(3)(iv)*].

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof [*40 CFR §122.41(n)(4)*].

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition [*40 CFR §122.41(f)*].

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit [*40 CFR §122.41(b)*].

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC [*40 CFR §122.41(l)(3)*] [*40 CFR §122.61*].

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity [*40 CFR §122.41(j)(1)*].

B. Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order [*40 CFR §122.41(j)(4)*] [*40 CFR §122.44(i)(1)(iv)*].

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time [*40 CFR §122.41(j)(2)*].

B. **Records of monitoring information shall include:**

1. The date, exact place, and time of sampling or measurements [*40 CFR §122.41(j)(3)(i)*];
2. The individual(s) who performed the sampling or measurements [*40 CFR §122.41(j)(3)(ii)*];
3. The date(s) analyses were performed [*40 CFR §122.41(j)(3)(iii)*];
4. The individual(s) who performed the analyses [*40 CFR §122.41(j)(3)(iv)*];
5. The analytical techniques or methods used [*40 CFR §122.41(j)(3)(v)*]; and
6. The results of such analyses [*40 CFR §122.41(j)(3)(vi)*].

C. **Claims of confidentiality for the following information will be denied [*40 CFR §122.7(b)*]:**

1. The name and address of any permit applicant or Discharger [*40 CFR §122.7(b)(1)*]; and
2. Permit applications and attachments, permits and effluent data [*40 CFR §122.7(b)(2)*].

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, SWRCB, or USEPA within a reasonable time, any information which the Regional Water Board, SWRCB, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, SWRCB, or USEPA copies of records required to be kept by this Order [*40 CFR §122.41(h)*] [*CWC 13267*].

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, SWRCB, and/or USEPA shall be signed and certified in accordance with paragraph (2.) and (3.) of this provision [*40 CFR §122.41(k)*].

2. All permit applications shall be signed as follows:

   a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures [*40 CFR §122.22(a)(1)*];

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively [*40 CFR §122.22(a)(2)*]; or

   c. For a municipality, State, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA) [*40 CFR §122.22(a)(3)*].

3. All reports required by this Order and other information requested by the Regional Water Board, SWRCB, or USEPA shall be signed by a person described in paragraph (b) of this

provision, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in paragraph (2.) of this provision [*40 CFR §122.22(b)(1)*];

b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (a duly authorized representative may thus be either a named individual or any individual occupying a named position) [*40 CFR §122.22(b)(2)*]; and

c. The written authorization is submitted to the Regional Water Board, SWRCB, or USEPA [*40 CFR §122.22(b)(3)*].

4. If an authorization under paragraph (3.) of this provision is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (3.) of this provision must be submitted to the Regional Water Board, SWRCB or USEPA prior to or together with any reports, information, or applications, to be signed by an authorized representative [40 CFR §122.22(c)].

5. Any person signing a document under paragraph (2.) or (3.) of this provision shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations" [*40 CFR §122.22(d)*].

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in this Order [*40 CFR §122.41(l)(4)*].

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or SWRCB for reporting results of monitoring of sludge use or disposal practices [*40 CFR §122.41(l)(4)(i)*].

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal,

approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board [*40 CFR §122.41(l)(4)(ii)*].

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order [*40 CFR §122.41(l)(4)(iii)*].

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date [*40 CFR §122.41(l)(5)*].

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance [*40 CFR §122.41(l)(6)(i)*].

2. The following shall be included as information that must be reported within 24 hours under this paragraph [*40 CFR §122.41(l)(6)(ii)*]:

   a. Any unanticipated bypass that exceeds any effluent limitation in this Order [*40 CFR §122.41(l)(6)(ii)(A)*].

   b. Any upset that exceeds any effluent limitation in this Order [*40 CFR §122.41(l)(6)(ii)(B)*].

   c. Violation of a maximum daily discharge limitation for any of the pollutants listed in this Order to be reported within 24 hours [*40 CFR §122.41(l)(6)(ii)(C)*].

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours [*40 CFR §122.41(l)(6)(iii)*].

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when [*40 CFR §122.41(l)(1)*]:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b) [*40 CFR §122.41(l)(1)(i)*]; or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in this Order nor to notification requirements under 40 CFR Part 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1) [*40 CFR §122.41(l)(1)(ii)*].

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan [*40 CFR §122.41(l)(1)(iii)*].

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or SWRCB of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements [*40 CFR §122.41(l)(2)]*.

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting E.3, E.4, and E.5 at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E [*40 CFR §122.41(l)(7)*].

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, SWRCB, or USEPA, the Discharger shall promptly submit such facts or information [*40 CFR §122.41(l)(8)*].

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The CWA provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any

requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than one (1) year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than two (2) years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than three (3) years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than six (6) years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the Clean Water Act, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions [*40 CFR §122.41(a)(2)*] [*CWC 13385 and 13387*].

B. Any person may be assessed an administrative penalty by the Regional Water Board for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000 [*40 CFR §122.41(a)(3)*].

C. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both [*40 CFR §122.41(j)(5)*].

D. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Order, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both [*40 CFR §122.41(k)(2)*].

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Non-Municipal Facilities

Existing manufacturing, commercial, mining, and silvicultural dischargers shall notify the Regional Water Board as soon as they know or have reason to believe [*40 CFR §122.42(a)*]:

1. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" [*40 CFR §122.42(a)(1)*]:

    a. 100 micrograms per liter (µg/L) [*40 CFR §122.42(a)(1)(i)*];

    b. 200 µg/L for acrolein and acrylonitrile; 500 µg/L for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol; and 1 milligram per liter (mg/L) for antimony [*40 CFR §122.42(a)(1)(ii)*];

    c. Five (5) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge [*40 CFR §122.42(a)(1)(iii)*]; or

    d. The level established by the Regional Water Board in accordance with 40 CFR §122.44(f) [*40 CFR §122.42(a)(1)(iv)*].

2. That any activity has occurred or will occur that would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" [*40 CFR §122.42(a)(2)*]:

    a. 500 micrograms per liter (µg/L) [*40 CFR §122.42(a)(2)(i)*];

    b. 1 milligram per liter (mg/L) for antimony [*40 CFR §122.42(a)(2)(ii)*];

    c. Ten (10) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge [*40 CFR §122.42(a)(2)(iii)*]; or

    d. The level established by the Regional Water Board in accordance with 40 CFR §122.44(f) [*40 CFR §122.42(a)(2)(iv)*].

B. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following [*40 CFR §122.42(b)*]:

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants [*40 CFR §122.42(b)(1)*]; and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order [*40 CFR §122.42(b)(2)*].

Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW [*40 CFR §122.42(b)(3)*].

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations (CFR) at 40 CFR Section122.48 requires that all NPDES permits specify monitoring and reporting requirements. CWC sections 13267 and 13383 also authorize the Regional Water Quality Control Board (RWQCB) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements that implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of this Regional Water Board.

B. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the Discharger, analyses performed by a noncertified laboratory will be accepted provided the laboratory institutes a Quality Assurance-Quality Control Program. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by Regional Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Regional Water Board.

C. All analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. Laboratories that perform sample analyses shall be identified in all monitoring reports.

D. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

E. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.

F. If the facility is not in operation, or there is no discharge during a required reporting period, the Discharger shall forward a letter to the Regional Water Board indicating that there has been no activity during the required reporting period.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

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Discharge Point Name	Monitoring Location Name	Monitoring Location Description (include Latitude and Longitude when available)
001	M-001	Effluent from ARGET.
002	M-002	Effluent from GET E/F.
003	M-003	Effluent from GET Interim GET H.
004	M-004	Effluent from GET H.
005	M-005	Effluent from GET J.
006	M-006	Effluent from Interim GET K.
007	M-007	Effluent from GET K.
008	M-008	Effluent from GET L.
009	M-009	Effluent from GET L1.
010	M-010	Effluent from Sailor Bar Park Well System.
011	M-011	Effluent from Chettenham Well System.
012	M-012	Effluent from Low-threat System.
	MINFA	Influent to ARGET
	MINFB	Influent to GET E/F
	MINFC	Influent to Interim GET H
	MINFD	Influent to GET H
	MINFE	Influent to GET J
	MINFF	Influent to Interim GET K
	MINFG	Influent to GET K
	MINFH	Influent to GET L
	MINFI	Influent to GET L1
	MINFJ	Influent to Sailor Bar Park Well System
	MINFK	Influent to Chettenham Well System
	R-001 and R-002	R-001 (upstream) and R-002 (downstream) on American River from discharge of Buffalo Creek into American River at Latitude 38°, 38', 01" N, Longitude 121°, 16', 05" W. Outfall 001 is representative of ARGET, GET E/F and GET J discharges (Discharges 001, 002, and 005, respectively.
	R-003 and R-004	R-003 (upstream) and R-004 (downstream) on American River from discharge water from GET L1 (Discharge 009) into American River at Latitude 38°, 37', 32" N, Longitude 121°, 18', 15" W.
	R-005 and R-006	R-005 (upstream) and R-006 (downstream) on American River from discharge water from GET L (Discharge 008) into American River at Latitude 38°, 36', 28" N, Longitude 121°, 18', 35" W.
	R-006 and R-007	R-006 (upstream) and R-007 (downstream) on American River from discharge water from long term GET K (Discharge 007) into American River at Latitude 38°, 36', 36" N, Longitude 121°, 18', 24" W.
	R-008 and R-009	R-008 (upstream) and R-009 (downstream) on American River from discharge water from Interim GET K (Discharge 006) into American River at Latitude 38°, 36', 05" N, Longitude 121°, 18', 57" W.
	R-010 and R-011	R-010 (upstream) and R-011 (downstream) on American River from discharge from Chettenham Well (Discharge 011) into American River via the Boyd Station Channel at Latitude 38°, 34', 43" N, Longitude 121°, 19', 37" W. May receive water from long term GET H (Discharge 004) in the future

Discharge Point Name	Monitoring Location Name	Monitoring Location Description (include Latitude and Longitude when available)
	R-012 and R-013	R-012 (upstream) and R-013 (downstream) on Morrison Creek from discharge of drainage ditch to Morrison Creek at Latitude 38°, 31', 53" N, Longitude 121°, 19', 36" W. Outfall 006 represents discharge from interim GET H (Discharge 003 and long term GET H (Discharge 004).
	R-014 and R-015	R-014 (upstream) and R-015 (downstream) on American River from a potential discharge from various GETs into American River via pipeline at Latitude 38°, 38', 06" N, Longitude 121°, 13', 13" W.
	R-016 and R-017	R-016 (upstream) and R-017 (downstream) on Alder Creek from a potential discharge water from various GETs via pipeline into Alder Creek at American River at Latitude 38°, XX', XX" N, Longitude 121°, XX', XX" W.

III. INFLUENT MONITORING REQUIREMENTS

A. The Discharger shall monitor **MINFA, MINFB, and MINFJ** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
VOCs	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Semi-Volatile Organics	µg/L	Grab	Monthly	[4]
1,4-Dioxane	µg/L	Grab	Monthly	[5]
Total Copper	µg/L	Grab	Monthly	[6]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
5. A test method with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical level shall be reported as trace.
6. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.

B. The Discharger shall monitor **MINFC, MINFD and MINFK** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
VOCs	µg/L	Grab	Monthly	[1]
Perchlorate	µg/L	Grab	Monthly	[2]
Semi-Volatile Organics	µg/L	Grab	Monthly	[3]
Total Copper	µg/L	Grab	Monthly	[4]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
3. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.

C. The Discharger shall monitor MINFE as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
VOCs	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Semi-Volatile Organics	µg/L	Grab	Monthly	[4]
Total Copper	µg/L	Grab	Monthly	[5]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
5. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.

D. The Discharger shall monitor MINFF, MINFG, MINFH and MINFI as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
VOCs	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Total Copper	µg/L	Grab	Monthly	[4]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Locations M-001 through M-012

1. The Discharger shall monitor wastewater discharged at **M-001** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[9]
Volatile Organics	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Semi-Volatile Organics	µg/L	Grab	Monthly	[4]
1,4-Dioxane	µg/L	Grab	Monthly	[5]
Total Copper	µg/L	Grab	Monthly	[6]
Flow[7]	mgd	Measure	Continuous	--
Temperature[7]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[7]	µmhos/cm	Grab	Monthly	--
pH[7]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--
Acute Toxicity	% Survival	Grab	Quarterly	[8]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
5. A test method with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
6. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
7. Field Measurements.
8. Acute toxicity testing shall performed as described in Whole Effluent Toxicity Testing Requirements V.A., below.
9. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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2. The Discharger shall monitor wastewater discharged at **M-002** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[13]
Volatile Organics	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Semi-Volatile Organics	µg/L	Grab	Monthly	[4]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[13]
1,4-Dioxane	µg/L	Grab	Monthly	[5]
Total Copper	µg/L	Grab	Monthly	[6]
Flow[7]	mgd	Measure	Continuous	--
Temperature[7]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[7]	µmhos/cm	Grab	Monthly	--
pH[7]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--
PROWL	µg/L	Grab	Monthly	[8]
Formaldehyde	µg/L	Grab	Monthly	[9]
Glyoxal	µg/L	Grab	Monthly	[10]
Acetaldehyde	µg/L	Grab	Monthly	[11]
Acute Toxicity	% Survival	Grab	Quarterly	[12]

3. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
4. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
5. A test method with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
6. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
7. Field Measurements.
8. PROWL analysis with a practical quanitation level no greater than 10 µg/L. All concentrations between the detection level and practical quanitiation level shall bereported as trace.
9. Formaldehyde analysis with a practical quanitation level no greater than 5 µg/L. All concentrations between the detection level and practical quanitiation level shall bereported as trace.
10. Glyoxal analysis with a practical quanitation level no greater than 5 µg/L. All concentrations between the detection level and practical quanitiation level shall bereported as trace.
11. Acetaldehyde analysis with a practical quanitation level no greater than 1µg/L. All concentrations between the detection level and practical quanitiation level shall bereported as trace.
12. Acute toxicity testing shall performed as described in Whole Effluent Toxicity Testing Requirements V.A., below.
13. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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2. The Discharger shall monitor wastewater discharged at **M-003 and M-004** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[7]
Volatile Organics	µg/L	Grab	Monthly	[1]
Perchlorate	µg/L	Grab	Monthly	[2]
Semi-Volatile Organics	µg/L	Grab	Monthly	[3]
Total Copper	µg/L	Grab	Monthly	[4]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[7]
Flow[5]	mgd	Measure	Continuous	--
Temperature[5]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[5]	µmhos/cm	Grab	Monthly	--
pH[5]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--
Acute Toxicity	% Survival	Grab	Quarterly	[6]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
3. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
5. Field Measurements.
6. Acute toxicity testing shall performed as described in Whole Effluent Toxicity Testing Requirements V.A., below.
7. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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3. The Discharger shall monitor wastewater discharged at **M-005** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[8]
Volatile Organics	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Semi-Volatile Organics	µg/L	Grab	Monthly	[4]
Total Copper	µg/L	Grab	Monthly	[5]
Flow[6]	mgd	Measure	Continuous	--
Temperature[6]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[6]	µmhos/cm	Grab	Monthly	--
pH[6]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--
Acute Toxicity	% Survival	Grab	Quarterly	[7]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.

3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Methods 8270 or 500 Series Method, or an equivalent method approved by the Regional Board with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
5. Tst Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
6. Field Measurements.
7. Acute toxicity testing shall performed as described in Whole Effluent Toxicity Testing Requirements V.A., below.
8. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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4. The Discharger shall monitor wastewater discharged at **M-006, M-007, M-008 and M-009** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[7]
Volatile Organics	µg/L	Grab	Monthly	[1]
N-nitrosodimethylamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Total Copper	µg/L	Grab	Monthly	[4]
Flow[5]	mgd	Measure	Continuous	--
Temperature[5]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[5]	µmhos/cm	Grab	Monthly	--
pH[6]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--
Acute Toxicity	% Survival	Grab	Quarterly	[6]

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
5. Field Measurements.
6. Acute toxicity testing shall performed as described in Whole Effluent Toxicity Testing Requirements V.A., below.
7. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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5. The Discharger shall monitor wastewater discharged at **M-010** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[5]
Volatile Organics	µg/L	Grab	Monthly	[1]
Perchlorate	µg/L	Grab	Monthly	[2]
1,4-Dioxane	µg/L	Grab	Monthly	[3]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[5]
Flow[4]	mgd	Measure	Continuous	--
Temperature[4]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen[	mg/L	Grab	Monthly	--
Electrical Conductivity[4]	µmhos/cm	Grab	Monthly	--
pH[4]	Standard	Grab	Monthly	--

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
3. A test method with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
4. Field Measurements.
5. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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5. The Discharger shall monitor wastewater discharged at **M-011** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[4]
Volatile Organics	µg/L	Grab	Monthly	[1]
Perchlorate	µg/L	Grab	Weekly	[2]
Flow[3]	mgd	Measure	Continuous	--
Temperature[3]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen	mg/L	Grab	Monthly	--
Electrical Conductivity[3]	µmhos/cm	Grab	Monthly	--
pH[3]	Standard	Grab	Monthly	--

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
3. Field Measurements.
4. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

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6. The Discharger shall monitor wastewater discharged at **M-012** as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[4]
Volatile Organics	µg/L	Grab	Once per 10,000 gallons purge water for Well Purge Beginning, middle and end of Aquifer Test	[1]
N-nitrosodimethylamine	µg/L	Grab	Once per well purge Beginning, middle and end of Aquifer Test	[2]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[4]
Perchlorate	µg/L	Grab	Once per well purge Beginning, middle and end of Aquifer Test	[3]
1,4-Dioxane	µg/L	Grab	Once per well purge Beginning, middle and end of Aquifer Test	[3]
Flow[4]	gallons	Measure	Continuous	--
Temperature[4]	°F(°C)	Grab	Once per well purge Beginning, middle and end of Aquifer Test	--
pH[4]	Standard	Grab	Once per well purge Beginning, middle and end of Aquifer Test	--

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
4. Field Measurements.

7. If the discharge is intermittent rather than continuous, then on the first day of each such discharge, the Discharger shall monitor and record data for all of the constituents listed above, after which the frequency of analysis given in the schedule shall apply for the duration of each such intermittent discharge. In no event shall the Discharger be required to monitor and record data more often than twice the frequencies listed in the schedule.

8. If no discharge occurs at a particular discharge point during the monitoring period, then samples need not be collected for that particular discharge. It must be reported under the reporting program that no sampling was conducted at a particular monitoring point due to no discharge.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. **Acute Toxicity Testing.** The Discharger shall conduct acute toxicity testing to determine whether the effluent is contributing acute toxicity to the receiving water. The Discharger shall meet the following acute toxicity testing requirements:

1. *Monitoring Frequency* – the Discharger shall perform quarterly acute toxicity testing, concurrent with effluent sampling for volatile organics and copper.

2. *Sample Types* – Effluent samples shall be grab samples taken at M-001, M-002, M-003, M-004, M-005, M-006, M-007, M-008 and M-009.

3. *Test Species* – Test species shall be larval stage (0 to 14 days old) fathead minnows (Pimephales promelas).

4. *Methods* – The acute bioassay tests samples shall be conducted in accordance with EPA-821-R-02-012, Fifth Edition, or later amendment with Executive Officer approval. Temperature and pH shall be recorded at the time of bioassay sample collection. No pH adjustment may be made unless approved by the Executive Officer.

5. *Test Failure* – If an acute toxicity test does not meet all test acceptability criteria, as specified in the test method, the Discharger must re-sample and re-test as soon as possible, not to exceed 3 business days following notification of test failure.

B. **Chronic Toxicity Testing.** The Discharger shall conduct three species chronic toxicity testing to determine whether the effluent is contributing chronic toxicity to the receiving water. The Discharger shall meet the following chronic toxicity testing requirements:

1. *Monitoring Frequency* – the Discharger shall perform quarterly chronic toxicity testing for the first 4 quarters and annually thereafter.

2. *Sample Types* – Effluent samples shall be grab samples and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at effluent monitoring locations M-001 and M-002. The receiving water control shall be a grab sample obtained from the R-001 sampling location.

3. *Sample Volumes* – Adequate sample volumes shall be collected to provide renewal water to complete the test in the event that the discharge is intermittent.

4. *Test Species* – Chronic toxicity testing measures either lethal or sublethal (e.g. reduced growth, reproduction) effects to experimental test organisms exposed to an effluent compared to that of the control organisms. The Discharger shall conduct chronic toxicity tests with:

   - The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);
   - The fathead minnow, *Pimephales promelas* (larval survival and growth test); and
   - The green alga, *Selenastrum capricornutum* (growth test).

5. *Methods* – The presence of chronic toxicity shall be estimated as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition,* EPA/821-R-02-013, October 2002, or later amendment with Executive Officer approval.

6. *Reference Toxicant* – As required by the SIP, all chronic toxicity tests shall be conducted with concurrent testing with a reference toxicant and shall be reported with the chronic toxicity test results.

7. *Dilutions* – The chronic toxicity testing shall be performed using the 100% effluent, 25% effluent/75% R-001, 10% effluent/90% R-001 and 5%effluent/95% R-001.

8. *Test Failure* – If either the reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002, and its subsequent amendments or revisions, the Discharger must re-sample and re-test as soon as possible, but no later than fourteen (14) days after receiving notification of test failure.

C. **WET Testing Notification Requirements.** The Discharger shall notify the Regional Board within 24-hrs after the receipt of the results of an exceedance of a toxicity trigger during regular or accelerated monitoring.

D. **WET Testing Reporting Requirements.** All toxicity test reports shall include the contracting laboratory's complete report provided to the Discharger and shall be in accordance with the appropriate "Report Preparation and Test Review" sections of the method manuals. At a minimum, whole effluent toxicity monitoring shall be reported as follows:

1. **Chronic WET Reporting.** Regular chronic toxicity monitoring results shall be reported to the Regional Water Board within 30 days following completion of the test, and shall contain, at minimum:
   a. The results expressed in TUc, measured as 100/NOEC, and also measured as 100/LC50 100/EC_{25}, 100/IC_{25}, and 100/IC_{50}, as appropriate.
   b. The statistical methods used to calculate endpoints;
   c. The statistical output page, which includes the calculation of the percent minimum significant difference (PMSD);
   d. The dates of sample collection and initiation of each toxicity test; and
   e. The results compared to the numeric toxicity trigger.

   Additionally, the monthly discharger self-monitoring reports shall contain an updated chronology of chronic toxicity test results expressed in TUc, and organized by test species, type of test (survival, growth or reproduction), and monitoring frequency, i.e., either quarterly, monthly, accelerated, or TRE.

2. **Acute WET Reporting.** Acute toxicity test results shall be submitted with the monthly discharger self-monitoring reports, reported as percent survival.

3. **TRE Reporting.** Reports for Toxicity Reduction Evaluations shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Workplan.

4. **Quality Assurance (QA).** The Discharger must provide the following information for QA purposes:
   a. Results of the applicable reference toxicant data with the statistical output page giving the species, NOEC, LOEC, type of toxicant, dilution water used, concentrations used, PMSD, and dates tested.
   b. The reference toxicant control charts for each endpoint, which include summaries of reference toxicant tests performed by the contracting laboratory.

c. Any information on deviations or problems encountered and how they were dealt with.

VI. LAND DISCHARGE MONITORING REQUIREMENTS – NOT APPLICABLE

VII. RECLAMATION MONITORING REQUIREMENTS – NOT APPLICABLE

VIII. RECEIVING WATER MONITORING REQUIREMENTS

A. Surface Water Monitoring – American River, Morrison Creek and Alder Creek

1. The Discharger shall monitor the American River at R-001, R-002, R-003, R-004, R-005, R-006, R-007, R-008, R-009, R-010, and R-011, R-014, R-015 and Alder Creek at R-016 and R-017 as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[6]
Volatile Organics	µg/L	Grab	Monthly	[1]
N-nitrosodimethlyamine	µg/L	Grab	Monthly	[2]
Perchlorate	µg/L	Grab	Monthly	[3]
Total Copper	µg/L	Grab	Monthly	[4]
Temperature[5]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen[5]	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[5]	µmhos/cm	Grab	Monthly	--
pH[5]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. A test method with a practical quantitation level no greater than 0.005 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
3. A test method with a practical quantitation level no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
4. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
5. Field Measurements.
6. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Stations R-001 and R-016. Attention shall be given to the presence or absence of:

a. Floating or suspended matter
b. Discoloration
c. Bottom deposits
d. Aquatic life
e. Visible films, sheens or coatings
f. Fungi, slimes, or objectionable growths
g. Potential nuisance conditions

Notes on receiving water conditions shall be summarized in the monitoring report.

2. The Discharger shall monitor Morrison Creek R-012 and R-013 as follows:

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method[5]
Volatile Organics	µg/L	Grab	Monthly	[1]
Perchlorate	µg/L	Grab	Monthly	[2]
Total Copper	µg/L	Grab	Monthly	[3]
Temperature[4]	°F(°C)	Grab	Monthly	--
Dissolved Oxygen[4]	mg/L	Grab	Monthly	--
Turbidity	NTU	Grab	Monthly	--
Electrical Conductivity[4]	µmhos/cm	Grab	Monthly	--
pH[4]	Standard	Grab	Monthly	--
Hardness as $CaCO_3$	mg/L	Grab	Quarterly	--
Total Dissolved Solids	mg/L	Grab	Monthly	--

1. Test Method to be EPA Methods 601and 602 or 8010 and 8020 or 8260, or 500 Series, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 0.5 µg/L. All concentrations between the detection level and practical quanitation level shall be reported as trace.
2. Test Method to be EPA Methods 314.0 or 314.1, or an equivalent method approved by the Regional Board. with a Practical Quantitation Level no greater than 4.0 µg/L. All concentrations between the detection limit and practical quanitation level shall be reported as trace.
3. Test Method to be EPA Method 1638/200.8 or an equivalent method approved by the Regional Board with a practical quantitation limit no greater than 3 µg/L. All concentrations between the detection limit and practical quantitation level shall be reported as trace.
4. Field Measurements.
5. Parameters shall be analyzed using the analytical methods described in 40 CFR sections 136.

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Stations R-012 and R-013. Attention shall be given to the presence or absence of:

a. Floating or suspended matter
b. Discoloration
c. Bottom deposits
d. Aquatic life
e. Visible films, sheens or coatings
f. Fungi, slimes, or objectionable growths
g. Potential nuisance conditions

Notes on receiving water conditions shall be summarized in the monitoring report.

3. If no discharge occurs at a particular discharge point during the monitoring period, then receiving water samples associated with that discharge need not be collected for that monitoring period. It must be reported under the reporting program that no sampling was conducted at a particular monitoring point due to no discharge.

B. Groundwater Monitoring – Not Applicable

IX. OTHER MONITORING REQUIREMENTS

A. State Implementation Plan Monitoring

The State Water Resources Control Board (SWRCB) adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP). The SIP states that the Regional Water Boards will require periodic monitoring (at least once prior to issuance and reissuance of a permit) for pollutants for which criteria or objectives apply and for which no effluent limitations have been established.

Accordingly, the Regional Water Board is requiring, as part of this Monitoring and Reporting Program, that the Discharger monitor effluent and analyze the sample for all SIP constituents **one time at least 180 days but no more than 365 days prior to expiration of this Order.** The Discharger must analyze pH and hardness of the effluent at the same time as priority pollutant metals.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

2. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Regional Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the compliance time schedule.

3. The Discharger shall report to the Regional Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986.

4. **Within 24-hours** after the Discharger has received information that its discharge exceeds effluent limitations, the Discharger shall notify the Board, City of Sacramento Department of Utilities, and Carmichael Water District. Arden-Cordova Water Service shall be notified if the discharge that is in violation is to Lake Natoma.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit self-monitoring reports. Until such notification is given,

the Discharger shall submit self-monitoring reports in accordance with the requirements described below.

2. The Discharger shall submit monthly, quarterly, and annual Self Monitoring Reports including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. Monthly reports shall be due on the 15th day of the second month following the end of each calendar month.

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
Continuous	Day after permit effective date	All	Fifteenth day of second calendar month following month of sampling
1 / week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	Fifteenth day of second calendar month following month of sampling
1 / month	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1st day of calendar month through last day of calendar month	Fifteenth day of second calendar month following month of sampling
1 / quarter	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31	May 15 August 15 November 15 February 15
1/year	January 1 following (or on) permit effective date	January 1 through December 31	February 15

4. The Discharger shall report with each sample result the applicable Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

5. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations.

6. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

7. SMRs must be submitted to the Regional Water Board, signed and certified as required by the standard provisions (Attachment D), to the address listed below:

Submit monitoring reports to:
Central Valley Regional Water Quality Control Board 11020 Sun Center Drive #200 Rancho Cordova, CA 95670-6114

C. Discharge Monitoring Reports (DMRs)

1. When requested by U.S. EPA, the Discharger shall complete and submit Discharge Monitoring Reports. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program for Discharger Self Monitoring Reports.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharge shall submit the original DMR and one copy to the address listed below:

   State Water Resources Control Board
   Discharge Monitoring Report Processing Center
   Post Office Box 671
   Sacramento, CA 95812

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self generated or modified cannot be accepted.

D. Other Reports

1. **Annual Solids Disposal Report.** An annual solids disposal report shall be submitted with annual self-monitoring reports. The report shall describe the annual volume of solids, including spent ion exchange resin and granular activated carbon, generated by the Facility and specify the disposal practices.

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ATTACHMENT F – FACT SHEET

As described in Section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

WDID	**5A342000006**
Discharger	Aerojet-General Corporation
Name of Facilities	ARGET, GET E/F, GET H, Interim GET H, GET J, GET K, Interim GET K, GET L, GET L1, Sailor Bar Park Well
Facility Address	Aerojet Road
	Sacramento, CA 95813-6000
	Sacramento County
Facility Contact, Title and Phone	Chris Fennessy, Project Manager, (916) 355-3341
Authorized Person to Sign and Submit Reports	Gerald Swanick, Director Environmental Operations, (916) 355-3558
Mailing Address	P.O. Box 13222, Sacramento, CA 95813-6000
Billing Address	P.O. Box 13222, Sacramento, CA 95813-6000
Type of Facility	Groundwater Extraction and Treatment Facilities
Major or Minor Facility	Major
Threat to Water Quality	2
Complexity	B
Pretreatment Program	Not Applicable
Reclamation Requirements	Not Applicable
Facilities Permitted Flow	34.65 million gallons per day (mgd)
Facilities Design Flow	Not Applicable
Watershed	American and Sacramento Rivers
Receiving Water	Buffalo Creek, Morrison Creek, American River, Alder Creek, Sailor Bar Park Pond
Receiving Water Type	Stream and Pond

A. Aerojet-General Corporation (Aerojet) operates a rocket testing and chemical manufacturing facility on 8500 acres in eastern Sacramento County. In order to address groundwater pollution beneath and beyond the Aerojet property, Aerojet has constructed many groundwater extraction and treatment facilities (GETs). GETs covered under this permit are on both Aerojet-owned property and property leased by Aerojet. Aerojet is responsible for maintaining compliance with this Order and is responsible for the Facilities' operations and discharge to surface waters

B. The Facilities discharge to Buffalo Creek, drainage canals, Alder Creek and Sailor Bar Park Pond, all tributary to the American River, and to Morrison Creek, tributary to the Sacramento

River, waters of the United States. The Facilities are existing facilities regulated by a Regional Water Board Order.

C. The Discharger submitted a Report of Waste Discharge (RWD), dated 11 April 2005, and applied for a National Pollutant Discharge Elimination System (NPDES) permit authorization to discharge up to 32.57 mgd of treated groundwater from the Aerojet GET facilities. Supplemental Information was received on 28 April, 12 May and 15 May 2005. In addition, on 9 July 2007, the Discharger submitted a request to revise the effluent limitation for NDMA for GETs J, K, L and L1. The previous version of the permit had an interim limit for NDMA for GET J, and GETs K, L and L1 had not been completed at the time of issuance of the permit. The interim effluent had an expiration date of 1 January 2008. The Discharger performed an evaluation of the technical and economic ramifications of treating NDMA to concentrations less than 0.010 ug/L. This permit is being revised based on that evaluation supplied by the Discharger and reviewed by staff from the Regional Board, United States Environmental Protection Agency, and Department of Toxic Substances Control.

II. FACILITIES DESCRIPTIONS

The Facilities are found both on and off Aerojet's 8500 acres in eastern Sacramento County, approximately 17 miles east of downtown Sacramento, in and around the City of Rancho Cordova, Sacramento County, as shown in Attachment B.

According to the Discharger's RWD, the Facilities treat extracted groundwater primarily containing volatile organics (VOCs) and/or perchlorate and/or n-nitrosodimethylamine (NDMA). These pollutants originated, for the most part, from historical rocket-testing and chemical manufacturing operations on the Aerojet site.

The groundwater the Facilities extract contains solvents consisting primarily of VOCs, such as trichloroethylene (TCE), chloroform, vinyl chloride (VC), 1,2-dichloroethylene (1,2-DCE), 1,1-dichloroethylene (1,1-DCE), and tetrachloroethylene (PCE), perchlorate, n-nitrosodimethylamine (NDMA), and 1,4-dioxane. Various treatment methods are used to reduce the pollutants down to acceptable levels prior to discharge

A. Description of Wastewater and Biosolids Treatment or Controls

1. VOCs can be easily removed from the extracted groundwater using a variety of treatment processes. Aerojet uses air-stripping, carbon adsorption (GAC), and ultraviolet or ozone oxidation in different combinations to remove the VOCs. At GET facilities that have high concentrations of VOCs Aerojet uses ultraviolet oxidation or oxidation using ozone, along with hydrogen peroxide, to destroy a majority of the VOCs, utilizing air stripping or GAC to remove residual VOCs. For lower concentrations of VOCs, GAC alone is utilized. Spent GAC is trucked to a permitted destruction facility.

2. Perchlorate is removed from the extracted groundwater using either biological reduction or ion-exchange. Biological reduction is performed by growing bacteria on carbon or sand in a fluidized bed reactor. Ethanol is injected into the influent to provide food for the

bacteria. The bacteria will remove oxygen and nitrate prior to destroying the perchlorate. Biosolids are generated as bacteria material is removed from the system. The biosolids are collected on sand filters and the filters periodically backwashed. The backwash water proceeds through a clarifier to remove the solids prior to discharge. The solids collected in the clarifier and trucked to the sanitary sewer and the supernatant off of the clarifier is returned to the treatment process. The ion-exchange process uses a perchlorate-specific ion exchange resin that is disposed of when the resin's capacity for taking up perchlorate is exhausted. The resin is then replaced with fresh resin and the spent resin taken to a permitted disposal facility.

3. Removal of NDMA is accomplished using ultraviolet light oxidation in combination with hydrogen peroxide. This process is highly energy and concentration dependent. The Discharger has demonstrated that 0.007 ug/L is the technical and cost effective effluent level (Best Available/Cost Effective Technology (BACT)) for GETs J, K, L and L1.

4. ARGET Facility. The American River Study Area (ARSA) treatment system is on the Aerojet site. The facility was constructed in 1997 and originally consisted of ultraviolet/peroxide treatment to reduce concentrations of volatile organic compounds (VOCs) and 1,4-dioxane, and air-stripping to remove any remaining VOCs. This facility has been shown to remove VOCs to below detection levels (0.5 µg/L) and 1,4-dioxane to below its detection level (2-10 µg/L). This facility is designed to treat up to 3500 gallons per minute (gpm). Aerojet is modifying the VOC-removal portion of the facility to utilize ozone/hydrogen peroxide to remove the chlorinated ethene VOCs and 1,4-dioxane at a lower cost than the ultraviolet light system. Treatment for removal of low concentrations of perchlorate may be added in the future as the flow from new extraction wells are brought to the facility and the influent concentrations of perchlorate increase.

5. GET E/F Facility. The GET E/F facility is also on Aerojet property. GET E and GET F were originally constructed in the mid-1980's and were subsequently combined into one facility in 2000. The combined facility uses biological reduction to remove perchlorate, ultraviolet light/hydrogen peroxide to destroy NDMA and most of the VOCS, and air stripping to remove the remainder of VOCs from up to 6000 gpm of influent. There is also a sand filter and clarifier for solids control. The solids from the clarifier are discharged to the sanitary sewer under a permit. The treatment process has been shown to be effective in removing VOCs to below detection levels (0.5 µg/L), perchlorate to below 4 µg/L, and NDMA to below detection (0.002 –0.0075 µg/L). Testing of the influent and effluent to the treatment facility for full-scan analysis, including tentatively identified compound analysis, did not indicate additional contaminants of concern.

6. GET H Facilities. The interim GET H facilities are no longer active and have been dismantled. The water from the GET H extraction wells is now treated at the long-term GET H facility on Mather Field. The long-term GET H system utilizes resin adsorption to remove perchlorate to less than 4 µg/L, and granular activated carbon (GAC) to remove VOCs to less than 0.5 µg/L the same treatment methods, but will treat a greater flow of extracted groundwater, approximately 4450 gpm. The long-term GET H system came on-

line in summer 2006 and is in the north-central section of Mather Field. The GET H facilities have shown to be able to consistently meet effluent limitations.

7. GET J Facility. The GET J system is similar to GET H, but with the addition of ultraviolet treatment for the designed destruction of NDMA to less than 0.002 µg/L and particulate filtration to help the ultraviolet system. The system is designed to treat 4950 gpm and is found on Pyrites Way in Gold River. The GET J facility has shown to be capable of consistently meeting effluent limitations, though it has had difficulty meeting the effluent limitation utilizing only ultraviolet light and has incurred a large expense in meeting the limit. As discussed above, and in more detail below, Aerojet performed an evaluation of the ability to technically and effectively remove NDMA down to 0.002 ug/L. The evaluation has led to a revision to the effluent limitation to 0.007 ug/L. This revised effluent limitation is also being applied to the future long-term GET K and GET L treatment systems, and to the recently completed GET L1 system.

8. GET K Facilities. The interim GET K uses ion-exchange (resin bed adsorption) to remove perchlorate and GAC to remove VOCs from an influent of 400gpm. The long-term GET K system, anticipated to be operational in 2008, will add ultraviolet light and particulate removal for treatment of NDMA to the ion-exchange and GAC treatment units, and treat approximately 4000 gpm. The interim GET K facility is on Zinfandel Drive and the long-term facility will be on Coloma Road, both in Rancho Cordova. The interim facility will be decommissioned when the long-term facility becomes operational. The interim GET K facility has consistently met effluent limitations.

9. GET L/L1 Facilities. GET L is currently being designed and constructed and will be in Carmichael, near Ancil Hoffman Park. The facility will initially treat for NDMA using ultraviolet light. If, in the future, VOCs and/or perchlorate are determined to be approaching the extraction wells in the groundwater, VOC and/or perchlorate treatment will be added utilizing the same processes described above. Flow to the plant, anticipated to commence operation in 2008, is 2100 gpm. A satellite treatment system, GET L1, will has been constructed in order to reduce pipeline lengths from extraction wells to GET L. A portion of the extracted flow (9estimated to be 900 gpm) is sent to GET L1 for processing using the same type of treatment as GET L. The total treated flow remains the same.

10. Sailor Bar Park Facility. The Sailor Bar Park system provides for removal of VOCs by GAC on a water supply well that is used to maintain the water elevation in the pond on Sailor Bar Park. The flow through the treatment plant is intermittent and is a maximum of 250 gpm. The park is on the north side of the American River adjacent to the village of Fair Oaks.

11. Chettenham Facility. Aerojet negotiated with California American Water Company (CalAm), owner of the Chettenham Well, to use the Chettenham Well on an interim basis to evaluate plume control by the extraction field with the well pumping, and to evaluate the well as an extraction point to control a portion of the groundwater pollution. Wellhead treatment consisting of ion exchange for perchlorate removal was installed on the well and the discharge is to the Boyd Station Channel. It has been determined that the Chettenham

Well will not be used for control of the plume and a dedicated extraction would be constructed and the extracted groundwater piped to the GET H treatment system. The Chettenham Well currently contains perchlorate, requiring treatment to meet effluent limitations.

12. Groundwater Extraction Well Aquifer Test Water and Well purge and development water. After construction of an extraction well Aerojet will perform an aquifer test on the well for up to 4 days. The purpose of the test is to provide information that will allow design of a GET system for treatment of water generated by an extraction field. The aquifer test water is passed through a portable treatment system designed using the type of treatment systems described above to remove the suspected pollutants. Under the previous permit, Aerojet was able to meet consistently meet effluent limitations with the portable system. Aerojet also develops and purges wells prior to sampling. Treatment is applied as needed to remove the pollutants.

B. Discharge Points and Receiving Waters

1. Treated groundwater is discharged from Discharges 001, 002 and 005 (respectively, ARGET, GET E/F, GET J) to Buffalo Creek (tributary to the American River). Discharges 003 and 004 (Interim GET H and GET H) are to Morrison Creek (tributary to the Sacramento River). Discharges 006 (Interim GET K), 007 (GET K), 008 (GET L), 009 (GET L1) and 011 (Chettentham Well) are to drainage channels to the American River between the Sunrise Boulevard and Watt Avenue over crossings. Discharge 010 (Sailor Bar Park) is to a pond in Sailor Bar Park, with a potential for overflow to the American River. Sacramento County requested during development of the previous permit to allow for the potential discharge from some or all of the GETs covered in this permit to Alder Creek and/or the Natomas Stilling Basin, to assist in their reuse of treated groundwater. The previous permit and this permit included a provision allowing for the discharge to Alder Creek/Natomas Stilling Basin pending completion of an acceptable study of the potential thermal impacts on Alder Creek/American River. In addition, in the future the County may pipe the GET H discharge (004) to the Boyd Station Channel in order to better accommodate reuse projects for the water.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

1. Effluent limitations/Discharge Specifications contained in the existing Order for discharges from Discharge Point 001 and representative monitoring data since July 1998 from the term of the previous Order are as follows:

Parameter (units)	Average Monthly	Maximum Daily	Highest Average Monthly Discharge	Highest Daily Discharge
1,4-dioxane (µg/L)	3	10	<3	<3
Perchlorate (µg/L)	4	8	<4	<4
Copper (µg/L)	11	17	29	29

Parameter (units)	Average Monthly	Maximum Daily	Highest Average Monthly Discharge	Highest Daily Discharge
N-nitrosodimethylamine (µg/L)	0.002	0.005	0.001	0.0023
Trichloroethylene (µg/L)	--	0.5	0.7	1.4
1,2-Dichloroethane (µg/L)	0.38	0.5	0.25	0.45
Lead (µg/L)	15	2.5	1.3	2.7
Acetaldehyde (µg/L)	--	5	5.0	7.0
Formaldehyde (µg/L)	--	50	30	36
Zinc (µg/L)	110	100	21	42

2. The RWD and Aerojet Monitoring describe the discharges as follows:

ARGET

Constituent	Units	Maximum Daily
Flow	mgd	5.4
pH	Standard Units	7.8-8.3
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	15
Sulfate	mg/L	12
Manganese	mg/L	0.02
Aluminum	mg/L	<0.030
Iron	mg/L	<0.040
Zinc	mg/L	0.020
Arsenic	mg/L	<0.002
Lead	mg/L	<0.005
Hardness (as $CaCO_3$)	mg/L	130
Barium	mg/L	0.07
Copper	mg/L	0.027
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	0.007

GET E/F

Constituent	Units	Maximum Daily
Flow	mgd	8.64
pH	Standard Units	7.2-8.2
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	6.6
Sulfate	mg/L	15
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050

Constituent	Units	Maximum Daily
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as $CaCO_3$)	mg/L	110
Barium	mg/L	0.1
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004
Zinc	mg/L	<0.050

GET H/CHETTENHAM WELL

Constituent	Units	Maximum Daily
Flow	mgd	6.39
pH	Standard Units	7.6-7.8
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	4.4
Sulfate	mg/L	3.3
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	<0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as $CaCO_3$)	mg/L	53
Barium	mg/L	0.046
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET J

Constituent	Units	Maximum Daily
Flow	mgd	7.17
pH	Standard Units	6.8-7.6
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	6.6
Sulfate	mg/L	15
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050

Constituent	Units	Maximum Daily
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as $CaCO_3$)	mg/L	160
Barium	mg/L	0.18
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET K

Constituent	Units	Maximum Daily
Flow	mgd	7.17
pH	Standard Units	7.7-7.8
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	4.4
Sulfate	mg/L	3.3
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as $CaCO_3$)	mg/L	110
Barium	mg/L	0.110
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET L/L1

Constituent	Units	Maximum Daily
Flow	mgd	3.0
pH	Standard Units	6.4-9.0
Chlorides	mg/L	6.4
Sulfate	mg/L	7.1
Manganese	mg/L	0.07
Aluminum	mg/L	<0.005
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002

Constituent	Units	Maximum Daily
Lead	mg/L	<0.002
Hardness (as $CaCO_3$)	mg/L	110
Barium	mg/L	0.18
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

D. Compliance Summary

ARGET, GET E/F, GET H, GET J and Sailor Bar Park Well discharges have been in substantial compliance with effluent limitations since the inception of the discharges from those facilities. There have been two detections of TCE in the GET E/F effluent at slightly above the effluent limitation of 0.50 µg/L (maximum 0.8 µg/L). These excursions were not verified by follow-up sampling by Aerojet or Regional Board staff. Other effluent limitation excursions were for exceedances of the daily maximum effluent limit for copper for the ARGET effluent. Twice in the past two years copper has been detected at up to 29 µg/L (limit of 17 µg/L). The effluent limitation does not allow for dilution in the receiving water. The effluent limitation for perchlorate was exceeded twice at the GET E/F facility due to failure of metering system feeding ethanol to the bioreactors. The system was fixed and additional fail-safe measurements were taken to reduce the potential for recurrence. There have been no violations of receiving water limitations for any of the discharges.

E. Planned Changes

As stated above in Sections II(A) and II(B), Aerojet will be eliminating the temporary GET facility Interim GET K (Discharge 007), and replacing it with a larger facilityies at anew location, GET K (Discharge 008), during the life of this permit. In addition, in order to more easily reuse the treated groundwater, Sacramento County may redirect Discharge 004 to the Boyd Station Channel for ultimate discharge to the American River. The County is developing a plan for reuse of the treated groundwater and has developed a CEQA document that has undergone public review. Revision of the permit will be necessary prior to taking Discharge 004 to the Boyd Station Channel. The County may also redirect the discharges from ARGET and/or GET E/F to the Natomas Stilling Basin or Alder Creek. Prior to doing so, a thermal impact study will need to be completed that demonstrates that there are no adverse impacts with discharging to the new location(s). The CEQA document will evaluate the thermal impacts.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the Federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from these facilities to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the CWC for discharges that are not subject to regulation under CWA section 402.

B. California Environmental Quality Act (CEQA)

This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the CWC. The Department of Toxic Substances Control certified a final Negative Declaration and Initial Study for the American River Study Area project in accordance with CEQA and State CEQA Guidelines. The Board has reviewed the negative declaration and these waste discharge requirements will mitigate or avoid any significant impacts on water quality due to the discharges from the ARGET facility.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Regional Water Board adopted a *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereinafter Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan.

   The Basin Plan at page II-2.00 states that the beneficial uses of any specifically identified water body generally applies to its tributary streams. The Basin Plan does not specifically identify beneficial uses for Buffalo Creek, Alder Creek or Sailor Bar Park Pond, but does identify present and potential uses for the American River, to which Buffalo Creek, Alder Creek and potentially Sailor Bar Park Pond are tributary. In addition the Basin Plan does not specifically identify beneficial uses for Morrison Creek, but does identify present and potential uses for the Sacramento River, to which Morrison Creek is tributary. These beneficial uses of the American and Sacramento Rivers are municipal and domestic supply (MUN); agricultural supply, irrigation and stock watering (AGR); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); warm and cold migration of aquatic organisms (MIGR); warm and cold spawning (SPWN); wildlife habitat (WILD). The Sacramento River has an additional designated beneficial use of navigation (NAV). In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Thus, as discussed in detail in this Fact Sheet, beneficial uses applicable to the American River, Buffalo Creek, Alder Creek, Morrison Creek and the Sailor Bar Park Pond are as follows:

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002 and 005	Buffalo Creek and Alder Creek, Tributaries of the American River	Existing: MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
003/004	Morrison Creek, Tributary of the Sacramento River	Existing: MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
004, 006, 007, 008, 009 and 011	American River	Existing: MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
010	Sailor Bar Pond, Potentially tributary to American River	Existing: MUN, AGR, IND, REC-1, REC-2, WARM, COLD, WILD.

The Basin Plan on page II-1.00 states: "*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...* " *and with respect to disposal of wastewaters states that "...disposal of wastewaters is* [not] *a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.*"
The federal Clean Water Act, Section 101(a)(2), states: "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983." Federal Regulations, developed to implement the requirements of the Clean Water Act, create a rebuttable presumption that all waters be designated as fishable and swimable. Federal Regulations, 40 CFR Sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after November 28, 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR Section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

In reviewing whether the existing and/or potential uses of the American and Sacramento River apply to Buffalo Creek, Alder Creek, and Sailor Bar Park Pond, and Morrison Creek, respectively, the Regional Water Board has considered the following facts:

a. **Domestic Supply and Agricultural Supply**

The Regional Water Board is required to apply the beneficial uses of municipal and domestic supply to Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond based on State Water Board Resolution No. 88-63 which was incorporated in the Basin Plan pursuant to Regional Water Board Resolution No. 89-056.

b. **Water Contact and Noncontact Recreation and Esthetic Enjoyment**

The Regional Water Board finds that the discharges flow through residential areas, there is ready public access to the receiving waters, exclusion of the public is unrealistic and contact recreational activities currently exist along Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond and downstream waters. Prior to flowing into the American River, Buffalo Creek, Alder Creek and Morrison Creek flow through areas of general public access, meadows, and residential and commercial areas. Sailor Bar Park Pond is accessible to the public and is used for fishing. The American and Sacramento Rivers offer considerable recreational opportunities.

c. **Preservation and Enhancement of Fish, Wildlife, and Other Aquatic Resources**

Buffalo Creek, Alder Creek and the Sailor Bar Park pond flow to the American River. It is highly unlikely that the overflow from Sailor Bar Park would ever directly reach the American River due to the dredger tailings through which the overflow must traverse. However, there is a potential for the pond to indirectly discharge to the American River via a subsurface pathway. The Basin Plan (Table II-1) designates the American River as being both a cold and warm freshwater habitat; wildlife habitat; warm and cold migration of aquatic organisms; and warm and cold spawning, reproduction, and/or early development of freshwater organisms. The American River supports significant aquatic life, and therefore these beneficial uses apply to it's tributaries. Morrison Creek flows to the Sacramento River. The Basin Plan (Table II-1) designates the Sacramento River below the American the confluence with American River as being both a cold and warm freshwater habitat; wildlife habitat; warm and cold migration of aquatic organisms; and warm spawning, reproduction, and/or early development of freshwater organisms. The Sacramento River supports significant aquatic life, and therefore these beneficial uses apply to it's tributaries

Upon review of the flow conditions, habitat values, and beneficial uses of Buffalo Creek and Alder Creek, and Morrison Creek, and the facts described above, the Regional Water Board finds that the beneficial uses identified in the Basin Plan for the American River and Sacramento River are applicable to Buffalo Creek and Alder Creek, and Morrison Creek, respectively, in the vicinity of the discharges. Given the location of the Sailor Bar Park Pond, the beneficial uses of SPWN and MIGR are not applicable.

2. **Thermal Plan.** The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for inland surface waters.

3. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, which was amended on May 4, 1995 and November 9, 1999, and the CTR on May 18, 2000, which was amended on February 13, 2001. These rules include water quality criteria for priority pollutants and are applicable to this discharge.

4. **State Implementation Policy.** On March 2, 2000, State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Boards in their basin plans, with the exception of the provision on alternate test procedures for individual discharges that have been approved by USEPA Regional Administrator. The alternate test procedures provision was effective on May 22, 2000. The SIP became effective on May 18, 2000. The SIP includes procedures for determining the need for and calculating water quality-based effluent limitations (WQBELs), and requires Dischargers to submit data sufficient to do so.

5. **Compliance Schedules and Interim Requirements.** In accordance with Section 2.1 of the SIP, compliance schedules and interim requirements may only be granted to existing discharges. One of the existing discharges, ARGET (Discharge 001), has a compliance schedule and associated interim requirements.

   The ARGET facility currently has 4 to 6 ug/L perchlorate in the influent to the facility. Concentrations of perchlorate have historically been as high as 8 ug/L in the effluent. The previous effluent limit was 12 ug/L perchlorate as it was determined not to be cost effective to reduce the concentrations from 6 ug/L to 4 ug/L and there was significant dilution available in the American River. The Discharger has proposed adding additional groundwater extraction wells in the future, with treatment at the ARGET facility. Those additional extraction wells currently are treated at the GET D facility, with discharge to land. The influent at the GET D facility contains approximately 200 ug/L perchlorate. Prior to adding those extraction wells the Discharger will add facilities to remove perchlorate at ARGET if the influent is projected to exceed 6 ug/L. Once the treatment facilities are added, the Discharger will be able to meet the same effluent limits established for the other GET facilities. Therefore, interim effluent limits (until December 2012) for perchlorate are established at 11 ug/L for daily maximum and monthly averages. In the interim, mixing of the ARGET effluent with the effluent from GETE/F in Buffalo Creek (<4 ug/L perchlorate) will keep the perchlorate concentration below the WQO for perchlorate of 6 ug/L.

6. **Antidegradation Policy.** The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

7. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and 40 CFR Section122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. The effluent limits are at least as stringent as those in contained in the previous order. There are

new facilities added in this permit, therefore anti-backsliding provisions do not apply to those new facilities.

D. Impaired Water Bodies on CWA 303(d) List

1. The Basin Plan includes a list of Water Quality Limited Segments (WQLSs), which are defined as "*...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.).*" The Basin Plan also states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*" The listing for the western portion Sacramento-San Joaquin Delta waterways includes: diazinon and chlorpyrifos, organo-chlorine Group A pesticides, mercury, and unknown toxicity. The listing for the American River includes mercury and unknown toxicity. There have been no detections of mercury, diazanon, chlorpyrifos, or organo-chlorine Group A pesticides in the effluent from the GETs nor in the plumes of groundwater pollution captured by the GETs. Buffalo Creek, Alder Creek and Morrison Creek are not listed on the 303(d) list.

E. Other Plans, Policies and Regulations – Not Applicable

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.

The federal Clean Water Act (CWA) mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law. (33 U.S.C., Section 1311(b)(1)(C); 40 C.F.R., Section 122.44(d)(1)) NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to Federal Regulations, 40 C.F.R. section 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that "*are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.*" Federal Regulations, 40 CFR, Section 122.44(d)(1)(vi), further provide that "[w]*here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits.*"

The Regional Water Board's Basin Plan, page IV-17.00 contains an implementation policy ("Policy for Application of Water Quality Objectives") that specifies that the Regional Water

Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives*." This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or more of three specified sources, including EPA's published water quality criteria, a proposed state criterion (*i.e.*, water quality objective), or an explicit state policy interpreting its narrative water quality criteria (*i.e.*, the Regional Water Board's "Policy for Application of Water Quality Objectives")(40 C.F.R. 122.44(d)(1) (vi) (A), (B) or (C)). The Basin Plan contains a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*". The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. The beneficial uses include MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, and WILD. The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. When a reasonable potential exists for exceeding a narrative objective, Federal Regulations mandate numerical effluent limitations and the Basin Plan clearly establishes a procedure for translating the narrative objectives into numerical effluent limitations.

A. Discharge Prohibitions

1. As stated in Section I.G of Attachment D, Federal Standard Provisions, this Order prohibits bypass from any portion of the treatment Facility. Federal Regulations, 40 CFR 122.41 (m), define "bypass" as the intentional diversion of waste streams from any portion of a treatment facility. This section of the Federal Regulations, 40 CFR 122.41 (m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Regional Water Board's prohibition of bypasses, the State Water Resources Control Board adopted a presidential decision, Order No. WQO 2002-0015, which cites the Federal Regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation. In the case of United States v. City of Toledo, Ohio (63 F. Supp 2d 834, N.D. Ohio 1999) the Federal Court ruled that "any bypass which occurs because of inadequate plant capacity is unauthorized…to the extent that there are 'feasible alternatives', including the construction or installation of additional treatment capacity".

B. Technology-Based Effluent Limitations

1. Scope and Authority

a. As specified in 40 CFR Section122.44(a)(1), permits are required to include technology based effluent limitations

2. Applicable Technology-Based Effluent Limitations

a. **Volatile Organic Compounds (VOCs).** The effluent limits for VOCs are based on Best Available Technology utilizing either air stripping or carbon adsorption which have been demonstrated to readily reduce VOCs to below 0.5 µg/L. The 0.5 µg/L effluent limitation is below the Water Quality Based Effluent Limits (WQBEL) calculated below for VOCs of concern, with the exception of 1,2-Dichloroethane. The WQBEL will be used for 1,2-Dichloroethane. Carbon adsorption and ultraviolet light are not entirely effective on the removal of chloroform at low concentrations. GET J has low concentrations of chloroform (1 µg/L) and relying on removal to 0.5 µg/L by carbon, increases the cost of operating GET J by over $500,000 per year. The effluent limit for chloroform for GET J is set at 3 µg/L which will meet the WQBEL for chloroform of 1.1 µg/L in Buffalo Creek. The proposed effluent limitations are consistent with those found in the existing Order.

b. **Perchlorate**. The monthly average effluent limitation for perchlorate is established at 4 µg/L, a value that the Discharger, utilizing commercially available technology at GET E/F, Interim GET H, GET and Interim GET K, has shown to be capable of technically and economically meeting on a consistent basis. As discussed below in Section IV.C.3, the water quality based effluent limitation is 6 ug/L. Therefore, systems for perchlorate removal are not added until the perchlorate concentration in the influent is 6 ug/L or greater. Once the treatment system is added, the effluent limitation would be 4 ug/L. This is possibility is only applicable to ARGET at this time.

c. **Flow.** This Order contains a maximum daily and long term average effluent limitations of 5.4 mgd for ARGET, 8.64 mgd for GET E/F, 6.39 mgd for GET H/Chettentham, 7.17 mgd for GET J, 0.72/5.76 mgd for interim GETK/longterm GET K, 3.1 mgd, 1.56 for GET L/L1, and 0.36 mgd for Sailor Bar Park Well based on the maximum daily effluent flows reported in Aerojet's RWD. In accordance with 40 CFR Section 122.45, this Order includes mass effluent limitations based on the long term average effluent flows listed above and reported in the Discharger's RWD.

d. **NDMA**. Under the pervious permit, the Discharger performed a study on the technical and economic implications of treating NDMA at GET J to 0.002 ug/L, the effluent limitation found in the previous version of the permit. An interim effluent limit of 0.01 ug/L was established and the studies undertaken. The studies showed that there is a significant reduction in treatment efficiency below a concentration of 0.01 ug/L, and even less efficiency below 0.007 ug/L. It was estimated that there would be approximately $50 million in increased costs (30-year net present worth) to reduce the effluent from 0.010 ug/l to 0.002 ug/L, assuming power cost per kilowatt/hour remained constant. The Discharger's study concluded that treating to 0.007 ug/L was both technically achievable and cost-effective for GET J and future GETs using the low-watt UV technology to remove NDMA from groundwater. Using an effluent limitation of 0.007 ug/L for GET J and the available dilution in Buffalo Creek provided by flows from GET E/F and ARGET, the WQBEL of 0.003 µg/L will be met in

Buffalo Creek. Future discharges at Discharge Points 007, 008, and 009 discharge directly to the American River with a minimum dilution of 50:1. A technology-based effluent limitation of 0.007 ug/l will meet the WQBEL in the American River.

3. Final Technology-Based Effluent Limitations

Table F-1 summarizes the final technology-based effluent limitations established in this Order.

Table F-1
Summary of Technology-based Effluent Limitations
Discharge Points 001, 002 004, 005, 006, 007, 008, 009, 010, 011

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
ARGET Flow	mgd	5.4	--	5.4	--	--
GET E/F Flow	mgd	8.64		8.64		
GET H/Chettenham Flow	mgd	6.39		6.39		
GET J Flow	mgd	7.17		7.17		
Interim GET K Flow	mgd	0.58		0.72		
Long-term GET K Flow	mgd	5.76		5.76		
GET L/L1 Flow	mgd	3.03		3.03		
Sailor Bar Park Well Flow	mgd	0.36		0.36		
VOCs[1]	ug/L	0.5		0.75		
Perchlorate[2]	ug/L	4.0		6.0		
N-nitrosodimethylamine	ug/L	0.002		0.005		
N-nitrosodimethylamine –Discharges 005, 007, 008, and 009	ug/L	0.007		0.010		
chloroform – GET J	ug/L	3.0		5.0		

1 1,2-dichloroethane has a WQBELs listed below that are more stringent than the 0.5 µg/L listed on this table.
2 In the existing permit ARGET has an effluent limitation of 10 µg/L for a monthly average and 18 µg/L for a daily maximum. The current ARGET influent is between 4 and 6 µg/L. As planned new extraction wells are added and their extracted groundwater sent to the ARGET facility, treatment for removal of perchlorate will be added and the effluent limitations will be the same as those for the other treatment facilities.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in 40 CFR Section122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an excursion above any state water quality

standard. The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

a. **Beneficial Uses.** The Basin Plan at page II-2.00 states that the beneficial uses of any specifically identified water body generally applies to its tributary streams. The Basin Plan does not specifically identify beneficial uses for Buffalo Creek and Alder Creek, or Morrison Creek, tributary to the American River and Sacramento River, respectively, but does identify present and potential uses for the American and Sacramento Rivers. These beneficial uses are municipal and domestic supply (MUN); agricultural supply, irrigation and stock watering (AGR); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); warm and cold migration of aquatic organisms (MIGR); warm and cold spawning (SPWN); wildlife habitat (WILD). In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Thus, as discussed in detail in this Fact Sheet, beneficial uses applicable to the American River, Sacramento River, Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond are as follows:

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002 and 005	Buffalo Creek and Alder Creek, Tributary of the American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
003	Morrison Creek, Tributary of the Sacramento River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
004, 006, 007, 008, 009, 011 and 012	American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
010	Sailor Bar Pond, Potentially tributary to American River	Existing: MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.

b. **Dilution Credits/Mixing Zones.** The Regional Board finds that based on the available information that three of the receiving waters, Buffalo Creek, Morrison Creek and Alder Creek, and on the Discharger's application, that these three creeks, absent the discharges, are ephemeral streams, or at times the flow upstream of the discharges is significantly less than that of the discharge. The ephemeral an/or low flow nature of the creeks means that the designated beneficial uses must be protected, but that no credit for receiving water dilution is available. However, there is dilution available on

Buffalo Creek at Discharge Point 005 due to the flow from upstream Discahrges 01 and 002. As the discharge, at times, maintains the aquatic habitat, constituents may not be discharged that may cause harm to aquatic life. At other times, natural flows within the creeks help support the aquatic life. Dry conditions occur primarily in the summer months, but dry conditions may also occur throughout the year, particularly in low rainfall years. The lack of dilution results in more stringent effluent limitations to protect contact recreational uses, drinking water standards, agricultural water quality goals and aquatic life. Therefore, the Regional Water Board has evaluated the need for water quality-based effluent limitations for pollutants without benefit of dilution in this Order. These water quality-based effluent limitations are based on the application of water quality criteria or objectives at the points of discharge.

c. **Hardness.** The minimum effluent hardness, maximum receiving water pH limitation, and measured effluent temperature were used to develop hardness, pH, and/or temperature dependent WQBELs. These worst-case values have been chosen to protect the beneficial uses of the receiving water and are summarized below:

Hardness:	130 mg/L
pH:	8.5 standard units
Temperature:	21 °C

3. **Determining the Need for WQBELs**

a. Reasonable potential (RP) was determined by calculating the projected maximum effluent concentration (MEC) for each constituent and comparing it to applicable water quality criteria; if a criterion was exceeded, the discharge was determined to have reasonable potential to exceed a water quality objective for that constituent. The projected MEC is determined by multiplying the observed MEC by a factor that accounts for statistical variation. The multiplying factor is determined (for 99% confidence level and 99% probability basis) using the number of results available and the coefficient of variation (standard deviation divided by the mean) of the sample results. In accordance with the SIP, non-detect results were counted as one-half the detection level when calculating the mean. For all constituents for which the source of the applicable water quality standard is the CTR or NTR, the multiplying factor is 1. Reasonable potential evaluation was based on the methods used in the SIP and the U.S. EPA Technical Support Document for Water Quality-Based Toxics Control [EPA/505/2-90-001].

b. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs the Regional Water Board finds that the discharge does have a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for copper. Effluent limitations for copper are included in this Order.

d. The reasonable potential analysis for detected constituents is summarized below in Table F-2.

Table F-2.
RPA Summary for Detected Constituents
Discharges 001-012

Parameter	Units	MEC[1]	99th MEC[1]	WQO/ WQC[2]	Source	RP[3]
Perchlorate	µg/L	4	4	6	California Primary MCL	Y
NDMA	µg/L	0.005	0.005	0.003	CTR HH	Y
Copper	µg/L	27	27	12/18	CTR CCC/CMC	Y
Mercury	µg/L	0.001	0.001	0.05	CTR HH	N
Nickel	µg/L	13	13	65/590	CTR CCC/CMC	N
Zinc	µg/L	42	42	150	CTR CCC/CMC	N
Barium	µg/L	90	124	1000	California Primary MCL	N
Iron	µg/L	55	75	300	California Secondary MCL	N
Manganese	µg/L	<5	23	50	California Secondary MCL	N
Chloride	mg/L	13	39	106	Water Quality for Agriculture	N
Nitrate	mg/L	0.8	4	10	California Primary MCL	N
Sulfate	mg/L	12	60	250	California Secondary MCL	N
Electrical Conductivity	umhos/cm	210	230	700	Water Quality for Agriculture	N
Total Dissolved Solids	mg/L	220	260	450	Water Quality for Agriculture	N

1. MEC: maximum effluent concentration. 99th MEC: maximum predicted effluent concentration using 99th percentile multiplier, note that multiplier is equal to "1" when applying CTR criteria.
2. WQO: water quality objective. WQC: water quality criteria.
3. Reasonable potential.
4. Indeterminate, inadequate information to establish limitations. See discussion below.
5. Reasonable potential found due to use of salt at the facility

d. **Copper.** Copper is known to cause adverse impacts on aquatic species, particularly fish. The Basin Plan's chemical constituents water quality objective has a copper limit for the American River of 0.01 mg/L. Furthermore, the same water quality objective prohibits chemical constituents in concentrations that adversely affect beneficial uses. Applying a hardness of 130 mg/L (worst case effluent hardness) the allowable continuous concentration is 0.011 mg/L and the allowable instantaneous concentration is 0.017 mg/L.

e. **pH.** The Basin Plan includes numeric water quality objectives that the pH "…not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses." The receiving water is designated as having both COLD and WARM beneficial uses. An effluent limitation for pH is included in this Order, and is based on the Basin Plan objectives for pH.

f. **1,2-Dichloroethane.** 1,2-Dichloroethane has not been detected in the effluent of the GET facilities (PQL of 0.5 ug/L) but has been detected in the groundwater contaminant

plumes. The estimated incremental $1x10^{-6}$ excess cancer risk value established by the Office of Environmental Health Hazard Assessment for the State of California for this volatile organic is 0.38 ug/L. As there is little to no dilution in Buffalo Creek and Morrison Creek, the monthly average effluent limitation is established at the risk value.

g. **Perchlorate**. Perchlorate has been determined to have a potential adverse impact on the thyroid. The California Department of Public Health has adopted a Maximum Contaminant Level for perchlorate of 6 ug/L and the California Department of Health Hazard Assessment has adopted the same value as the Public Health Goal. Concentrations below 6 ug/L would pose a *de minimus* risk to human health.

h. **NDMA**. NDMA is believed to be a human carcinogen at very low concentrations. The estimated incremental $1x10^{-6}$ excess cancer risk value (Public Health Goal) established by the Office of Environmental Health Hazard Assessment for the State of California for this pollutant is 0.003 ug/L. Baring any dilution within the receiving water, this value is used as the effluent limitation. However, when the previous version of the permit was adopted, the Public Health Goal was 0.002 ug/L and the effluent limits for the GETs were established at that value.

4. **WQBEL Calculations**

a. The Discharger conducted monitoring for priority and non-priority pollutants. The analytical results of one comprehensive sampling event were submitted to the Regional Water Board. The results of this sampling event were used in developing the requirements of this Order. Effluent limitations are included in this Order to protect the beneficial uses of the receiving stream and to ensure that the discharge complies with the Basin Plan objective that toxic substances not be discharged in toxic amounts.

b. **Calculations for Effluent Limitations.** In calculating maximum effluent limitations, the effluent concentration allowances were set equal to the criteria/standards/objectives.

$$ECA_{acute} = CMC \qquad ECA_{chronic} = CCC$$

$$ECA_{HH} = HH$$

where: ECA_{acute} = effluent concentration allowance for acute (one-hour average) toxicity criterion
$ECA_{chronic}$ = effluent concentration allowance for chronic (four-day average) toxicity criterion
ECA_{HH} = effluent concentration allowance for human health, agriculture, or other long-term criterion/objective
CMC = criteria maximum concentration (one-hour average)
CCC = criteria continuous concentration (four-day average, unless otherwise noted)
HH = human health, agriculture, or other long-term criterion/objective

Acute and chronic toxicity ECAs were then converted to equivalent long-term averages (LTA) using statistical multipliers and the lowest is used. Additional statistical multipliers were then used to calculate the maximum daily effluent limitation (MDEL) and the average monthly effluent limitation (AMEL). The statistical multipliers were calculated using data shown in Table 1.

Human health ECAs are set equal to the AMEL and a statistical multiplier is used to calculate the MDEL.

$$MDEL = mult_{MDEL}\left[\min\left(\overbrace{M_A ECA_{acute}}^{LTA_{acut}}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}}\right)\right]$$

$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}}\right) AMEL_{HH}$$

where: $mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL
$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL
M_A = statistical multiplier converting CMC to LTA
M_C = statistical multiplier converting CCC to LTA

c. **Mass-based Effluent Limitations.** In accordance with 40 CFR 122.45(b)(2), mass-based limitations are calculated by multiplying the concentration limitation by the long-term average flow and the appropriate unit conversion factors. Mass based limits are found in Tables IV(A)(1) through IV(A)(12).

Mass-based effluent limitations, or mass emission rates (MERs), for WQBELs applicable to Discharge 001-011 are calculated as follows:

$$MER = 8.34\left(\frac{lb - L}{mg - gal}\right) \times AMEL - or - MDEL \times flow(mgd)$$

d. **Final WQBELs. Table F-3 summarizes the final WQBELs contained in this Order.**

Table F-3
Discharge Points 001-011

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
perchlorate	ug/L	6				
NDMA – Discharge 002	ug/L	0.003		0.010		
Total Copper	ug/L	11	--	17	--	--
pH	standard units	--	--	--	6.5	8.5

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
1,2-DCA	ug/L	0.38	--	0.50	--	--

5. Whole Effluent Toxicity (WET)

The Basin Plan specifies a narrative objective for toxicity, requiring that "All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life." Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Water Board. The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al. 1992).

In addition to the Basin Plan requirements, Section 4 of the SIP states that a chronic toxicity effluent limitation is required in permits for all discharges that will cause, have the reasonable potential to cause, or contribute to chronic toxicity in receiving waters.

Numeric water quality criteria, or Basin Plan numeric objectives currently are not available for many of the aquaculture drugs and chemicals used by aquaculture facilities. Therefore, the Regional Water Board uses the narrative water quality objective for toxicity from the Basin Plan as a basis for determining "reasonable potential" for discharges of these drugs and chemicals. USEPA's *Technical Support Document Water Quality-based Toxics Control* (TSD) specifies two toxicity measurement techniques that can be employed in effluent characterization; the first is Whole Effluent Toxicity (WET) testing, and the second is chemical-specific toxicity analyses. Whole effluent toxicity (WET) requirements protect the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach allows for protection of the narrative "no toxics in toxic amounts" criterion while implementing numeric criteria for toxicity. There are two types of WET tests: acute and chronic. An acute toxicity test is conducted over a short time period and generally measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth. For fish hatcheries WET testing is used most appropriately when the toxic constituents in an effluent are not completely known; whereas chemical-specific analysis is more appropriately used when an effluent contains only one, or very few, well-known constituents.

D. Final Effluent Limitations

1. 40 CFR Section122.45 states that:

   "…All pollutants limited in permits shall have limitations…expressed in terms of mass except…[f]or pH, temperature, radiation, or other pollutants which cannot appropriately be expressed by mass…Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations."

2. Tables F-4 and F-5summarizes the final technology-based and water quality-based effluent limits established in this Order.

Table F-4
Summary of Final Effluent Limitations
Discharge Points 001 through 011

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 001	mgd	5.0	5.4	--	--
Flow – Discharge 002	mgd	7.92	8.64		
Flow – Discharge 003	mgd	6.39	6.5		
Flow – Discharge 004	mgd	6.39	6.5		
Flow – Discharge 005	mgd	7.17	7.2		
Flow – Discharge 006	mgd	0.58	0.72		
Flow – Discharge 007	mgd	5.76	5.76		
Flow – Discharge 008	mgd	1.73	1.73		
Flow – Discharge 009	mgd	1.3	1.3		
Flow – Discharge 010	mgd	0.18	0.36		
Flow – Discharge 011	mgd	0.86	1.1		
Volatile Organic Contaminants	ug/L	0.5	0.7	--	--
1,2-Dichloroethane	ug/L	0.38	0.5	--	--
1,4-Dioxane	ug/L	3	6		
N-nitrosodimethylamine – Discharge 002	ug/L	0.002	0.010	--	--
N-nirosodiemthylamine - Discharges 005, 007, 008 and 009	ug/L	0.007	0.010		
Perchlorate	ug/L	4	6		
Total Copper	ug/L	17	11	--	--
Acetaldehyde	ug/L	5	--	--	--
Formaldehyde	ug/L	50	--		
pH	standard units	--	--	6.5	8.5

Table F-5
Summary of Final Effluent Limitations
Discharge Point 012

Parameter	Units	Effluent Limitations			
		Total Maximum Discharge[1]	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Per Well Purge/Development Water	mgd	0.01	0.01		
Flow – Per Aquifer Test	mgd	4.6	1.15		
Volatile Organic Contaminants	ug/L	--	5.0	--	--
1,4-Dioxane	ug/L		10		
N-nitrosodimethylamine	ug/L		0.020	--	--
Perchlorate	ug/L		12		
pH	standard units	--	--	6.5	8.5

E. Interim Effluent Limitations

1. See Section IV(A)(2)(a) and IV(A)(6)(2).

Table F-6
Summary of Interim Effluent Limitations
Discharge Points 001

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Discharge 001 - Perchlorate	ug/L	11	11		

F. Land Discharge Specifications – Not Applicable

G. Reclamation Specifications – Not Applicable

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

A. Surface Water

1. The Clean Water Act, Section 303(a-c), required states to adopt numeric criteria where they are necessary to protect designated uses. The Regional Water Board adopted numeric criteria in the Basin Plan. The Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality control (40 CFR 131.20). State Water Board Resolution No. 68-16, the Antidegradation Policy, does not allow changes in water quality less than that prescribed in Water Quality Control Plans (Basin Plans). The Basin

Plan states that; "The numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses." This Order contains Receiving Water Limitations based on the Basin Plan numerical and narrative water quality objectives for Biostimulatory Substances, Chemical Constituents, Color, Dissolved Oxygen, Floating Material, Oil and Grease, pH, Pesticides, Radioactivity, Salinity, Sediment, Settleable Material, Suspended Material, Tastes and Odors, Temperature, Toxicity and Turbidity.

2. Numeric Basin Plan objectives for bacteria, dissolved oxygen, pH, temperature, and turbidity are applicable to this discharge and have been incorporated as Receiving Surface Water Limitations. Rational for these numeric receiving surface water limitations are as follows:

   a. **Bacteria.** The Basin Plan includes a water quality objective that "*[I]n water designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.*" Numeric Receiving Water Limitations for bacteria are included in this Order and are based on the Basin Plan objective.

   b. **Dissolved Oxygen.** The Basin Plan includes a water quality objective that "*[F]or water bodies outside of the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (DO) concentrations shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not fall below the following minimum levels at any time – Waters designated WARM – 5.0 mg/L, Waters designated COLD – 7.0 mg/L, and Waters designated SPAWN – 7.0 mg/L.* The American River is designated as having WARM, COLD, and SPAWN designated uses. Numeric Receiving Water Limitations for dissolved oxygen are included in this Order and are based on the Basin Plan objective.

   c. **pH.** The Basin Plan includes water quality objectives that the pH "…not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses." The American River is designated as having both COLD and WARM beneficial uses. The change in pH of 0.5 (standard pH units) is not included as necessary to protect aquatic life in U.S. EPA's Ambient Criteria for the Protection of Freshwater Aquatic Life as long as pH does not fall below 6.5 or exceed 8.5 units. Therefore, an averaging period of 30 days has been applied to the Basin Plan receiving water objective for changes in pH. Numeric Receiving Water Limitations for pH are included in this Order and are based on the Basin Plan objectives for pH.

   d. **Temperature.** The Basin Plan includes water quality objectives that prohibit the temperature ". . . of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water." The American River is designated having both

COLD and WARM beneficial uses. Receiving Water Limitations for temperatures are included in this Order and are based on the Basin Plan objectives for temperature.

e. **Turbidity.** The Basin Plan includes a water quality objective that "[I]*ncreases in turbidity attributable to controllable water quality factors shall not exceed the following limits:*

- *Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.*
- *Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.*
- *Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.*
- *Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent."*

A numeric Receiving Surface Water Limitation for turbidity is included in this Order and is based on the Basin Plan objective for turbidity.

B. Groundwater – Not Applicable

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Section 122.48 of 40 CFR requires all NPDES permits to specify recording and reporting of monitoring results. Sections 13267 and 13383 of the CWC authorize the Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program, Attachment E of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for this facility

A. Influent Monitoring

The Order establishes influent monitoring requirements to allow the Discharger to monitor the treatment efficiency of the treatment systems and make sure that influent concentrations are within the design parameters of the treatment systems. As such, monitoring is required for volatile organics, semi-volatile organics, perchlorate, 1,4-Dioxane, n-nitrosodimethylamine, and copper.

B. Effluent Monitoring

Pursuant to the requirements of 40 CFR 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. The Monitoring and Reporting Requirements include effluent monitoring requirements in Attachment E, Section IV.

C. Whole Effluent Toxicity Testing

1. **Acute Toxicity.** Quarterly 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity (Effluent Limitations IV.A.1.e.).

2. **Chronic Toxicity**. Quarterly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective.

D. Receiving Water Monitoring

1. **Surface Water.** Receiving water monitoring is required to demonstrate compliance with the Receiving Water Limitations.

2. **Groundwater – Not Applicable**

   Groundwater monitoring associated with the treatment facilities is not required. Extensive groundwater monitoring is conducted by the Discharger to meet compliance associated with groundwater cleanup requirements established by the Regional Water Board and USEPA under other programs.

F. Other Monitoring Requirements

1. **Solids Disposal Monitoring**

   This Order requires an annual solids disposal report describing the annual volume of solids generated by the Facilities and specifying the disposal practices. Solids disposal reporting is required to evaluate compliance with Construction, Operation, and Maintenance Specifications, Section VI.C.5.a, of this Order.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

1. **Federal Standard Provisions.** In accordance with 40 CFR section 122.41and 122.42, the Federal Standard Provisions provided in Attachment D of this Order apply to this discharge.

2. **Regional Water Board Standard Provisions.** In addition to the Federal Standard Provisions (Attachment D), the Discharger must comply with the Regional Water Board Standard Provisions provided in Standard Provisions VI.A.2.

   40 CFR Section 122.41(a)(1) and (b) through (n) establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR Section 123.25(a)(12) allows the State to omit or modify conditions to impose more stringent requirements. In accordance with

Section 123.35, this Order omits federal conditions that address enforcement authority specified in 40CFR Sections 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent . In lieu of these conditions, this Order incorporates by reference CWC Section13387(e) .

B. Special Provisions

1. Reopener Provisions

a. **Special Provisions VI.C.1.a.** Conditions that necessitate a major modification of a permit are described in 40 CFR section 122.62, which include the following:

i. When standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision. Therefore, if more stringent applicable water quality standards are promulgated or approved pursuant to section 303 of the Federal Water Pollution Control Act or amendments thereto, the Regional Water Board will revise and modify this Order in accordance with such more stringent standards.

ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.

b. **Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a chronic toxicity limitation based on that objective.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. **Chronic Whole Effluent Toxicity Requirements (Special Provisions VI.C.2.a.).** The Basin Plan contains a narrative toxicity objective that states, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." (Basin Plan at III-8.00.) Based on quarterly whole effluent chronic toxicity testing performed by the Discharger from March 2, 2001 through October 15, 2004, the discharge has reasonable potential to cause or contribute to an to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

Special Provisions VI.C.2.a. requires the Discharger to develop a Toxicity Reduction Evaluation (TRE) work plan in accordance with EPA guidance. In addition, the provision establishes a numeric toxicity trigger, requirements for accelerated monitoring to confirm effluent toxicity, and a protocol for requiring the Discharger to initiate a TRE.

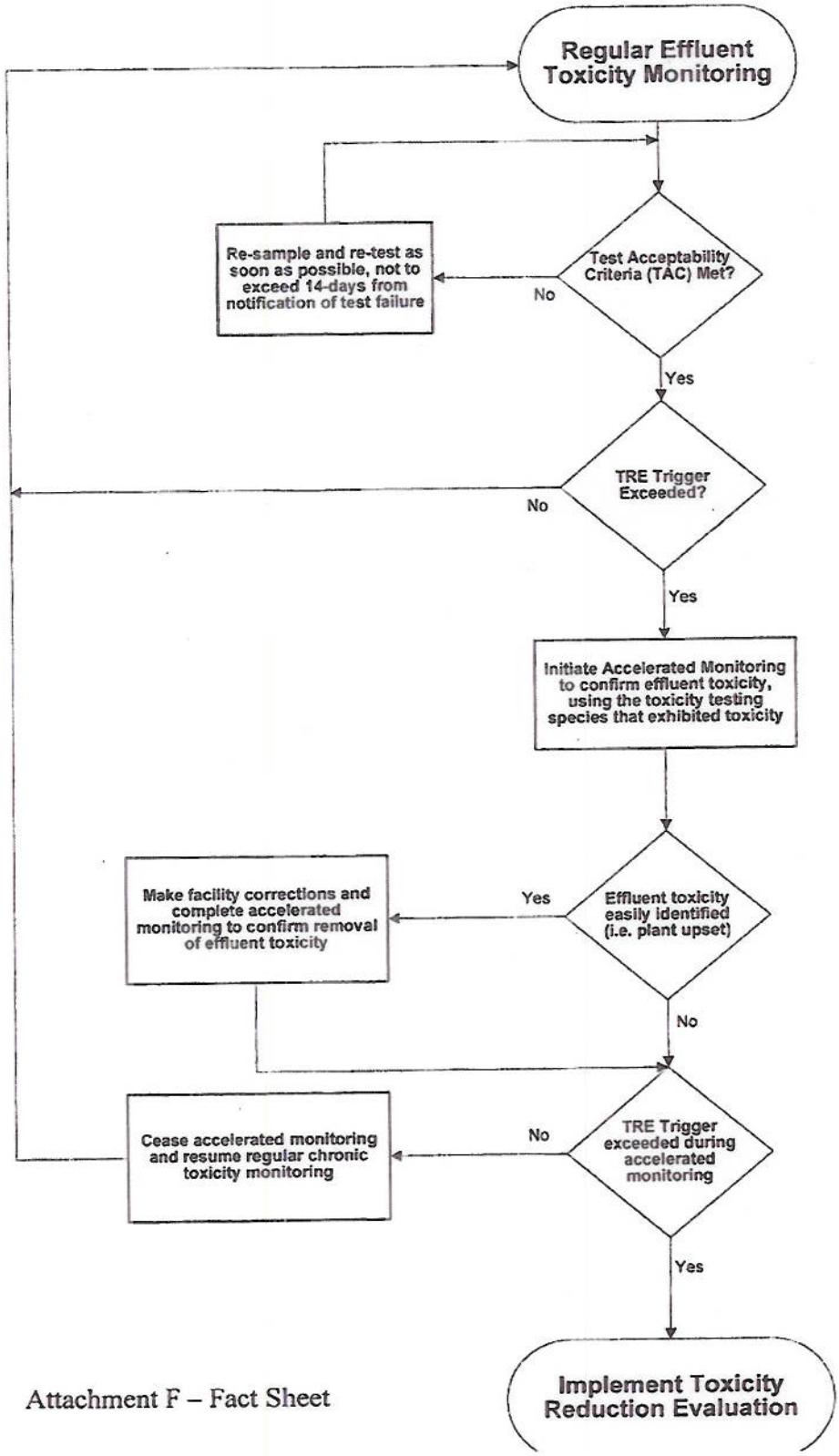
TRE Trigger. A numeric TRE Trigger of > 1 TUc (where TUc = 100/NOEC) is applied in the provision, because this Order does not allow any dilution for the chronic condition. Therefore, a TRE is triggered when the effluent exhibits toxicity at 100% effluent.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the TRE Trigger to confirm effluent toxicity prior to requiring implementation of a TRE.

TRE Guidance. The Discharger is required to prepare the TRE work plan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, *(EPA/833B-99/002), August 1999.*
- Generalized Methodology for Conducting Industrial TREs, *(EPA/600/2-88/070), April 1989.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, *Second Edition, EPA 600/6-91/005F, February 1991.*
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, *EPA 600/6-91/005F, May 1992.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting acute and Chronic Toxicity, *Second Edition, EPA 600/R-92/080, September 1993.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, *Second Edition, EPA 600/R-92/081, September 1993.*
- Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, *Fifth Edition, EPA-821-R-02-012, October 2002.*
- Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, *Fourth Edition, EPA-821-R-02-013, October 2002.*
- Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991

Figure F-15
WET Accelerated Monitoring Flow Chart



3. Best Management Practices and Pollution Prevention – Not Applicable

4. Compliance Schedules

a. **ARGET Perchlorate Effluent Limitation.** Effective immediately and ending on 1 January 2012, or until the treatment system to remove perchlorate at the ARGET facility is constructed, whichever is sooner, the discharge of treated effluent from the ARGET facility shall maintain compliance with 8.0 µg/l as the effluent limitation for perchlorate at Discharge Point 001. Mixing with the GET E/F effluent will keep the perchlorate concentration below the Water Quality Objective of 6 µg/L in Buffalo Creek. No additional extraction wells containing perchlorate will be added to the ARGET system until perchlorate treatment is added at ARGET.

5. Construction, Operation, and Maintenance Specifications

a. **Provisions VI.C.5.a,b.** Solid waste disposal provisions in this Order are based on the requirements of CCR Title 27 and prevention of unauthorized discharge of solid wastes into waters of the United States or waters of the State. Other construction, operation, and maintenance specifications are to prevent other unauthorized discharges to waters of the United States or waters of the State.

6. Special Provisions for Municipal Facilities (POTWs Only) – Not Applicable

7. Other Special Provisions

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, Central Valley Region (Regional Water Board) is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit for the Aerojet-General Corporation Groundwater Extraction and Treatment Systems. As a step in the WDR adoption process, the Regional Water Board staff has developed tentative WDRs. The Regional Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments should be submitted either in person

or by mail to the Executive Office at the Regional Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on November 2, 2007.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date:	**6/7 December 2007**
Time:	8:30 am
Location:	Regional Water Quality Control Board 11020 Sun Center Dr #200 Rancho Cordova, CA

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is http://www.waterboa rds.ca.gov/centralvalley/ where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The RWD, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Regional Water Board by calling (916) 464-3291.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Alexander MacDonald at (916) 464-4625.

SR10106188

FACILITY REPORT

GET D SYSTEM

FACILITY REPORT
GET D SYSTEM

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FACILITY REPORT
GET D SYSTEM

Aerojet has prepared this facility report in accordance with provisions contained in Exhibit VI of the Partial Consent Decree.

SUBPARAGRAPH E(1)(a)

Figures 1 through 7 are asbuilt schematic drawings of the GET D facility showing process units, piping, flow direction, influent, effluent, and intermediate monitoring stations. The hydraulic capacity and the expected normal range for flow rates of GET D pumps are presented below:

PUMP NUMBER	HYDRAULIC CAPACITY (GPM)[1]	EXPECTED NORMAL RANGE FLOW RATE (GPM)[2]
Well Pump 4001	250	100-150
Well Pump 4017	400	150-175
Well Pump 4035	400	100-150
Well Pump 4150	25	3-10
Well Pump 4155	25	3-10
Well Pump 4160	25	3-10
Well Pump 4165	25	3-10
Well Pump 4170	25	3-10
Well Pump 4175	25	3-10
Well Pump 4180	25	3-10
Well Pump 4185	25	3-10
Well Pump 4190	25	3-10
Well Pump 4205	25	3-10
Well Pump 4210	400	250-300
Well Pump 4220	350	225-275

[1] Hydraulic capacity indicates the maximum capacity of the pump, not what the well will produce.

[2] Expected normal flow rate is a range because it is principally a function of the level of the groundwater tables and the period of time following well development/redevelopment.

Normal operating parameters for the four system components of the GET D facility are as follows:

SYSTEM COMPONENT	PARAMETER	NORMAL OPERATING RANGE[5]
Extraction Wells (24)	Cumulative Flow Rate (gpm)	850-1,050
Treatment Plant	Air Flow Rate (cfm) Liquid Flow Rate (gpm)	850-9,000 850-1,050
Carbon Dioxide Injection System	CO_2 Flow Rate (cf/hr)	120-140
Recharge Wells (6)	Liquid Flow Rate (gpm)	850-1,050

B. Startup/Shutdown

Startup procedures for the facility are defined in the following steps:

1. Observe the instrumentation control panel to ensure that no alarms have been activated.
2. Turn the alarm switch to "DISABLE", then "ENABLE".
3. Turn the System Control Switch from "OFF" to "ON".
4. Plant will automatically startup in the following sequential mode as governed by the programmable controllers:
   - Blowers
   - Influent Pumps 1A and 2A
   - Transfer Pumps 1B and 2B
   - Effluent Pump 3
   - CO_2 system
   - Surge tank level controller sends signal to all extraction wells for startup
   - Treated effluent 30 minute initial pond discharge

[5] Normal operating values are expressed in ranges because operating conditions vary requiring adjustment of system parameters.

ID NUMBER	DESCRIPTION
4017	Extraction Well
4035	Extraction Well
4150	Extraction Well
4155	Extraction Well
4160	Extraction Well
4165	Extraction Well
4170	Extraction Well
4175	Extraction Well
4180	Extraction Well
4185	Extraction Well
4190	Extraction Well
4205	Extraction Well
4210	Extraction Well
4220	Extraction Well
4225	Extraction Well
4230	Extraction Well
4235	Extraction Well
4240	Extraction Well
4245	Extraction Well
4250	Extraction Well
4255	Extraction Well
4260	Extraction Well
4320	Extraction Well
5020	Recharge Well
5025	Recharge Well
5030	Recharge Well
5035	Recharge Well
5040	Recharge Well
5105	Recharge Well

SUBPARAGRAPH E(1)(c)

From the initial step draw down tests and observed recharge rates, the design extraction and recharge rates for the GET D facility are estimated as follows:

WELL NUMBER	DESIGN CAPACITY (GPM)[3]
Extraction Well 4001	150
Extraction Well 4017	200
Extraction Well 4035	200
Extraction Well 4150	25
Extraction Well 4155	25
Extraction Well 4160	25
Extraction Well 4165	25
Extraction Well 4170	25
Extraction Well 4175	25
Extraction Well 4180	25
Extraction Well 4185	25
Extraction Well 4190	25
Extraction Well 4195	25
Extraction Well 4205	300
Extraction Well 4210	300
Extraction Well 4220	250
Extraction Well 4225	100
Extraction Well 4230	100
Extraction Well 4235	50
Extraction Well 4240	50
Extraction Well 4245	75
Extraction Well 4250	1
Extraction Well 4255	5
Extraction Well 4260	1
Extraction Well 4320	150

[3] Design capacity is an engineering estimate calculated to determine size requirements of well and treatment plant components.

WELL NUMBER	DESIGN CAPACITY (GPM)
Recharge Well 5020	300
Recharge Well 5025	300
Recharge Well 5030	300
Recharge Well 5035	300
Recharge Well 5040	300
Recharge Well 5105	300

SUBPARAGRAPH E(1)(d)

The GET D facility is designed to remove the following chemicals:

cis/trans-1,2-Dichloroethylene	Tetrachloroethylene	1,1-Dichloroethylene
1,1,2-Trichloro-1,2,2-Trifloroethane	Trichloroethylene	1,1-Dichloroethane
Chloroform	1,1,1-Trichloroethane	

The treatment process employed to removed these chemicals is described in the following paragraphs.

The GET D facility consists of 24 extraction wells, a surge tank, two air stripping units (a unit comprises two stripping towers in series), a carbon dioxide injection system, an emission control unit, a filtration system and an effluent water recharge system consisting of six recharge wells. Groundwater from the extraction wells is conveyed by a piping system to a 20,000-gallon surge tank designed to control flow fluctuations. Water is then pumped from the surge tank to the stripping units by a piping system which divides and delivers the flow in equal quantities to each of the two treatment units.

The treatment process, as shown diagrammatically in Figure 4, begins with water being divided equally between the two units as it is pumped from the surge tank to the top of the first of the two stripping towers. The water is distributed so that it flows evenly over and down through the packing material within the tower in a manner to provide maximum water surface area exposure to the counter currently flowing air, thus causing the volatile dissolved chemicals to leave the water and enter the air. Water is collected in a

sump at the base of the first tower and pumped to the top of the second tower by a 20-horsepower centrifugal pump. The process in the second tower is identical to the process in the first tower. During continuous operation, treated effluent collected at the base of the second tower is pumped into the recharge well conveyance piping system by a 50-horsepower centrifugal pump. The treated effluent passes through a filtration system for removal of suspended solids and is then injected with CO_2 to counteract pH increase caused by loss of CO_2 during the air stripping. Effluent is then conveyed to the GET D recharge well system to recharge the aquifer and assist in maintaining hydraulic control in the area. During any start-up operation, treated effluent is automatically pumped into the GET D pond basin for a period of 30 minutes to purge suspended solids delivered from the deep extraction wells as a result of startup from a stagnant state. This operation is conducted in order to protect the effluent filtration system and recharge well field.

Each air stripping tower is 22 feet high and five feet in diameter and is constructed of reinforced fiberglass. Each tower contains approximately 2000 cubic feet of 3.5 inch aluminum pall ring packing material which provides a large surface area for mass transfer to occur. Air flows through the towers countercurrent to the water. An air flow of approximately 4,500 cubic feet per minute is forced into the base of the second tower in each unit by a 10-horsepower motor driving a centrifugal fan. The air is forced up through the packing material to the top of the second tower and conveyed through sheetmetal ducting to the base of the first tower. After air passes through the first tower, it is discharged to air at the plant through an 18-foot tall vertical stack.

GET D is equipped with an air emission control unit. The system consists of two activated carbon beds, a steam generated system and a solvent recovery system. The unit is not operating and is not anticipated to be used under present and foreseeable conditions, given the relatively low level of chemicals in groundwater.

SUBPARAGRAPH E(1)(e)

A list of identified substances analyzed for but not specially intended to be removed by the GET D facility is given below:

Arsenic	Calcium	Fluoride	Nickel	Perchlorate	Sulfate
Bicarbonate	Chloride	Lead	Nitrate	Potassium	Sulfide
Bis (2-Ethylhexyl) Phthalate	Copper	Magnesium	Oil & Grease	Sodium	Zinc

None of these substances have been found in concentrations which exceed primary or secondary State of California Drinking Water Standards under Title 22 of the California Code of Regulations.

SUBPARAGRAPH E(1)(f)

Design and operational treatment capabilities of the facility at full scale operation are as follows:

PARAMETER	DESIGN CAPABILITY	OPERATIONAL TREATMENT CAPABILITY
Liquid Flow, gpm	1,400	1,050
CO_2 Flow, cf/hr	500	120
Air Flow, cfm	9,000	9,000

CHEMICAL	OPERATIONAL TREATMENT CAPABILITY MAX. INFLUENT (PPB) TO YIELD EFFLUENT OF <1 PPB
1,1,2-Trichloro-1,2,2-Trifloroethane	525
Trichloroethylene	450
cis/trans-1,2-Dichloroethylene	500
Tetrachloroethylene	475

CHEMICAL	OPERATIONAL TREATMENT CAPABILITY MAX. INFLUENT (PPB) TO YIELD EFFLUENT OF <1 PPB
1,1-Dichloroethylene	500
1,1-Dichloroethane	375
Chloroform	300
1,1,1-Trichloroethane	475

SUBPARAGRAPH E(1)(g)

Based on data collected between June and July 1990, average emission of chemicals in Subparagraph E(1)(d) from the GET D facility to the ambient air are presented below:

SUBSTANCE	AVERAGE EMISSION RATE (LB/DAY)[4]
cis/trans-1,2-Dichloroethylene	.47
1,1,2-Trichloro-1,2,2-Trifloroethane	0.96
Trichloroethylene	2.95
Tetrachloroethylene	0.60
1,1-Dichloroethylene	0.11
1,1-Dichloroethane	0.02
Chloroform	0.02
1,1,1-Trichloroethane	0.07

Emission rates of the chemicals listed in Subparagraph E(1)(e) have not been established because they are not volatile and should not enter the air steam.

SUBPARAGRAPH E(1)(h)

I. GET D OPERATING PLAN

The operating objective of the GET D facility is to remove compounds listed in Subparagraph E(1)(d) from extracted groundwater and then reintroduce treated effluent to ground through a

[4] The average emission rate is calculated from water quality data.

recharge well system. This plan outlines facility operation and maintenance procedures intended to maximize operating time and minimize down time while complying with discharge limits set forth in the Partial Consent Decree. The plan defines normal operating parameters, and serves as a guide for diagnosing and correcting problems that may arise with system components at the GET D facility. In addition to this plan, a library of manufacturers' manuals is maintained; these manuals contain detailed information on all system components.

II. OVERALL SYSTEM

A. System Components

The GET D facility is shown in Figure 1 and employs four major system components in the treatment of groundwater.

The four system components are as follows:

1. 24 Extraction Wells
2. Treatment Plant
3. Carbon Dioxide Injection System
4. 6 Recharge Wells

2. Air Emission Control

The facility is equipped with a vapor phase carbon absorption air emission control ssytem which has been maintained in a operational standby mode since installation in 1993.

Normal operating parameters for the four system components of the GET D facility are as follows:

SYSTEM COMPONENT	PARAMETER	NORMAL OPERATING RANGE[5]
Extraction Wells (24)	Cumulative Flow Rate (gpm)	850-1,050
Treatment Plant	Air Flow Rate (cfm) Liquid Flow Rate (gpm)	850-9,000 850-1,050
Carbon Dioxide Injection System	CO_2 Flow Rate (cf/hr)	120-140
Recharge Wells (6)	Liquid Flow Rate (gpm)	850-1,050

B. Startup/Shutdown

Startup procedures for the facility are defined in the following steps:

1. Observe the instrumentation control panel to ensure that no alarms have been activated.
2. Turn the alarm switch to "DISABLE", then "ENABLE".
3. Turn the System Control Switch from "OFF" to "ON".
4. Plant will automatically startup in the following sequential mode as governed by the programmable controllers:
   - Blowers
   - Influent Pumps 1A and 2A
   - Transfer Pumps 1B and 2B
   - Effluent Pump 3
   - CO_2 system
   - Surge tank level controller sends signal to all extraction wells for startup
   - Treated effluent 30 minute initial pond discharge

[5] Normal operating values are expressed in ranges because operating conditions vary requiring adjustment of system parameters.

- Filtration and recharge well disposal after 30 minute pond discharge

Shutdown of the facility is accomplished by turning the System Control Switch from "ON" to "OFF". The high water level controller in th esurge tank will automatically shutdown the extraction wells.

C. Maintenance

Efficient plant operation requires scheduled preventive maintenance and a capability to respond quickly to unscheduled equipment failure. General maintenance procedures are briefly highlighted in this plan. Additional maintenance information, if required, can be found in the manufacturer's operation and maintenance manuals. Maintenance of the GET D facility is performed by Environmental Operations (EO) personnel, facilities personnel and maintenance contractors. Maintenance considerations include routine site maintenance, utilities maintenance, preventive maintenance and routine inspections. Pipelines, valves, pumps and other mechanical equipment require routine maintenance for proper performance including cleaning and painting to protect against corrosion. Plant maintenance and frequency at which this required maintenance must be performed is the responsibility of Aerojet Facility Services. More detailed descriptions of maintenance procedures of the system components are given in the following sections of this report.

III. EXTRACTION WELLS

The 24 extraction wells which convey groundwater to GET D are located as shown in Figure 1.

A. Well Components

The extraction wells at GET D are of two types. Twenty of the wells (shallow) are equipped with submersible pumps and are of similar construction. The major components of the extraction wells include the well, check valve, flowmeter, manual flow control valve and control panel. Details of these wells are presented in Figure 7 and a functional description is presented in Table 1.

The remaining five wells (deep) have vertical turbine pumps. The major components of these extraction wells include the well, air release valve, flowmeter, check valve butterfly valve and control panel. Details of these wells are presented in Figure 2 and a functional description is presented in Table 1.

B. Normal Operation

During normal operation, the pump flow rates are within the expected normal range listed in Subparagraph E(1)(a). All GET D extraction well pump motors (except 4017) are equipped with low water level shut-off probes. The low water level shut-off probe prevents pump operation when the water level in the well casing is too low to provide proper pump submergence. With the "Hand-Off-Auto" switch, located in the control panel of each well, in the "Auto" position, the well pump will shut off when the water drops to the low level probe. The probe can be bypassed by turning this switch to the "Hand" position. However, pumps should never be operated for extended periods of time in the "Hand" position because water levels in the well may become too low and damage the pump. With the exception of 4017, 4035 and 4220, all GET D extraction wells are equipped with a high water level probe which initiates pump operation when the water level recovers to the height at which the high-level

probe is submerged. Extraction Wells 4017 and 4320 possess neither a high or low water probe.

C. Startup/Shutdown

Startup of the well pumps is performed in the following steps:

1. Set position of flow control valve to approximately 25% open to eliminate dead heading of pump and the possibility of damage to pump discharge head or head works.
2. Check all circuit breakers in the pedestal control panel noting the state of any electrical protection devices. If any protection device indicates a faulty condition exists, locate the problem and correct before proceeding to start pump.
3. Set the "Hand-Off-Auto" switch to the "Auto" position. The pump will not activate immediately due to a pump backspin time delay interlock relay.
4. Adjust the flow control valve position to achieve the desired flow rate. It is usually necessary to continue to readjust the flow control valve position to achieve the desired flow rate until the pumping level begins to stabilize.
5. Adjust the oiler on the deep well turbine pump to a drip rate of approximately one drip every ten seconds.

Shutdown of the extraction well is performed by simply turning the "Hand-Off-Auto" switch to the "Off" position and closing the valve.

D. Maintenance

GET D extractioin well pumps require a minimum of maintenance. Maintenance routine includes: a check of pressure, flow rate, cumulative gallons, inspection of the well piping and casing for leaks, and monitoring of any abnormal noise or vibration.

IV. TREATMENT PLANT

A. Treatment Plant Components

The major components of the GET D treatment plant include the surge tank, two stripping units, a process control unit, influent, intermediate and effluent pumps, process control valves, two air blowers and piping. Details of the striping plant are presented in Figures 3 and 4 and a functional description is presented in Table 2.

B. Normal Operation

During normal operation, the liquid flow rate through the treatment plant is between 850 and 1,050 gallons per minute and the air flow rate is 9,000 cubic feet per minute. The treatment plant is designed to remove volatile organic compounds listed in Subparagraph E(1)(d).

Flow from the surge tank into the treatment facility is dependent on the surge tank water level. A tank-mounted level controller responds to fluctuations in tank level by manipulating the pneumatic positioners on the influent control valves for Towers 1A and 2A. This results in maintaining control over surge tank water level and plant influent flow rate.

Water is collected at the base of Towers 1A and 2A in a sump and pumped to Towers 1B and 2B, respectively. Treated effluent is then pumped from the tower sumps into the recharge field pipeline through a pneumatic flow control valve mounted on the discharge of the effluent pump. The water level in each tower sump is monitored by a differential pressure (dp) cell and maintained by a pneumatic flow control valve on the pump discharge pipe.

During any startup operation, treated effluent is automatically pumped into the GET D pond basin for a period of 30 minutes. This is accomplished by the programmable controller automatically closing the effluent pump flow control valve and opening the flow control valve on the 6-inch pond discharge pipeline. After 30 minutes, the process is reversed and treated effluent is pumped into the effluent pipeline, through the filters, and to the recharge well field.

A forced draft air blower provides the air flow for each of the stripping units. The ducting for each blower is equipped with an air pressure sensor which detects changes in pressure due to air flow produced by the blower. The air pressure sensors, interlocked to the influent pumps to the plant, will prevent the pumps from operating unless the blowers are in operation.

A blower forces approximately 4,500 cubic feet per minute of air through each treatment unit. The air is first forced up the second tower (1B and 2B) over the packing material and is then conveyed to the base of the first tower (1A and 2A). After the air passes through the first tower, it then is exhausted to the atmosphere. The pH of the treated effluent is adjusted before it enters the effluent pipeline and recharge wells. This is required to stop the precipitation of calcium carbonate which will clog the recharge wells. The pH is adjusted by injecting CO_2 into the effluent header. The CO_2 injection system consists of a 12,000 pound CO_2 tank, pressure regulator, and control valve. The pH is monitored at the effluent header and a single loop electronic controller maintains the pH at a predetermined set point.

C. Startup/Shutdown

Startup procedures for the treatment plant are defined in the following steps:

1. Observe the instrumentation control panel to ensure that no alarms ahve been activated.

2. Turn the alarm switch to "DISABLE", then "ENABLE".

3. Turn the System Control Switch from "OFF" to "ON".

4. The treatment plant will automatically startup in the following sequential mode as governed by the progammable controllers:

   - Blowers
   - Influent Pumps 1A and 2A
   - Transfer Pumps 1B and 2B
   - Effluent Pump 3
   - CO_2 system
   - Treated effluent 30 minute initial pond discharge
   - Filtration and recharge well disposal after initial 30 minute pond discharge

Shutdown of the facility is accomplished by turning the System Control Switch from "ON" to "OFF".

D. Malfunctions

Malfunctions usually associated with the treatment plant involve electrical or pneumatic failure. Electrical failure due to power outages or electrical fluctuations can cause the process control unit to jam, circuit breakers to trip and can damage fuses and interlock relays. Pneumatic failure due to air compressor failure or ruptured pneumatic lines will prevent valves from operating. In either case, failure results in treatment plant shutdown.

E. Maintenance

Routine maintenance of the GET D treatment plant includes:

1. Check compressor oil.
2. Lubricate pump bearings.
3. Check flow rate and cumulative flow.
4. Check pneumatic lines and inspect valves.
5. Check process control unit for alarm signals.
6. Check pressure difference on filter vessel.
7. Check for abnormal noise and vibration.

V. CARBON DIOXIDE INJECTION SYSTEM

A. Carbon Dioxide Injection System Components

The CO_2 injection system consists of a 12,000-pound CO_2 tank, pressure regulator and flow control valve. A functional description of the CO_2 injection system is presented in Table 2.

B. Normal Operation

During normal operation, CO_2 is injected into the effluent pipeline directly downstream of effluent pump 3 to control pH. pH control of the stripping tower effluent is required to prevent precipitation of calcium carbonate which will clog the recharge wells, reducing water infiltration rates and increasing the frequency of well redevelopment.

CO_2 injection rate is adjusted by manually opening or closing the flow control valve until the desired pH is attained.

C. Startup/Shutdown

Startup the CO_2 injection system is performed after water is detected in the effluent pipe. Once water is detected in the effluent pipe, the operator can adjust CO_2 flow until desired pH is attained. Shutdown of the CO_2 injection system is accomplished by closing the isolation valve downstream of the CO_2 flow control valve.

D. Malfunctions

Malfunctions associated with the CO_2 injection system are usually due to failure of the CO_2 flow meter or pH monitor.

E. Maintenance

Routine maintenance of the CO_2 injection system at GET D includes:

1. Inspect tank pressure and CO_2 inventory
2. Check CO_2 flow rate and pH. (Adjust CO_2 flow if pH is not within acceptable range.)

VI. RECHARGE WELL SYSTEM

The six recharge wells which restore treated water to the aquifer and assist in maintenance of hydraulic control in the area are located as shown in Figure 1.

A. Well Components

The major components of the recharge well system include a filtration system, conveyance pipeline and six recharge wells which include welded steel headworks, air release valve, flow control valve and flow meter. Figure 5 details a typical recharge well; functional descriptions of each component are presented in Table 1.

B. Normal Operation

During normal operation, the recharge wells are capable of receiving effluent at flow rates within the expected normal range listed in Subparagraph E(1)(a). GET D treated effluent, is pumped (via Effluent Pump 3) through a filtration system to remove particulate matter larger than 5 microns and then is pumped through a 10-inch diameter pipeline to six identical recharge wells. The recharge wells strategically replace treated water into the regional aquifer. Recharge wells normally operate under a vacuum but can be pressurized up to 25 psi.

C. Startup/Shutdown

Startup or recharge wells is performed in the following steps:

1. Prepare recharge wells for treated water by partially opening the 4-inch globe valve, fully opening the 4-inch isolation valve, and opening the air-release valve.
2. Direct treated water through the plant filter system prior to conveying to recharge field.
3. Maintain pH of 6.8 by adjusting CO_2 flow.
4. Adjust individual recharge wells to desired flow rates.

D. Malfunctions

During normal operation, recharge wells become clogged over time with particulate matter, thus reducing recharge of treated water into the regional aquifer.

E. Maintenance

GET D recharge wells require minimum maintenance. Maintenance routine includes:

1. Check flow rate, cumulative gallons, water level and pressure daily.

2. Inspect well piping and casing for leaks.
3. In the event of clogging, the well will become pressurized at which time flow should be monitored and adjusted weekly. If water level in the well increases too rapidly or a pressure of more than 25 psi is exceeded, the recharge well should be shut down.
4. Redevelopment of the well when required due to injection pressure.

VII. EMISSION CONTROL UNIT

The emission control system has been maintained in an operational standby mode sine installation in 1983. Detailed operation and maintenance of the unit is contained in the Baron Blakeslee Model 6.12 sp manufacturer's manual. In the event of startup of the unit at GET D, appropriate operating criteria will be developed for its use.

VIII. GET OUTAGES OPERATING PLAN

The purpose of the GET Outages Operating Plan is to describe required planned activities that will cause suspension of the operation of all or part of a GET system(s). Also detailed in this plan are examples of unplanned activities that will cause GET system(s) outages that are beyond the control of the operator.

Inherent in the operation of any treatment facility are periods when all or part of the treatment facility will be unavailable due to one or all of the following events:

- routine prevention maintenance
- identified maintenance
- annual inspection
- instrument calibration

- hydrologic testing
- well rehabilitation
- catastrophic equipment failures
- new construction

In the following subsections, an explanation of these events is provided.

A. Preventive Maintenance

Aerojet Facility Maintenance Department operates a program of preventive maintenance. After the completion of construction activities, a physical inventory is performed to identify the equipment and systems that require routine preventive maintenance. During the inventory, a maintenance number is assigned to each piece of equipment. These maintenance numbers are entered into the computerized database with a corresponding schedule for daily, weekly, monthly, quarterly, or yearly maintenance. Depending on the schedule entered for the equipment, the computer routinely generates Maintenance Work Orders (MWOs). These MWOs are then assigned to maintenance crews depending on the type of work required (i.e., lubrication, mechanical, electrical, boiler, sheetmetal or HVAC). The foreman of the maintenance crew then coordinates with Environmental Operations (EO). If equipment shutdown is required, the equipment is secured by EO personnel, the required work is performed, and the equipment is placed back online. These types of tasks usually require minimal downtime.

B. Identified Maintenance

The Maintenance Work Request (MWR) system is employed in conjunction with the preventive maintenance program. This program gives the facility operating personnel the option to place MWRs for problems that become evident during routine operations or

preventive maintenance that requires immediate attention. The MWR system is intended to facilitate rapid response to situations which, if left unattended, would lead to catastrophic equipment failure and result in extended periods of GET system outages.

C. Annual Inspections

As required by state and local codes, there are several types of equipment (e.g., boiler and compressors) that require annual inspections. These required inspections necessitate the shutdown of the equipment for a few hours to as much as 24 hours, resulting in the inability to continue to operate the GET facility.

D. Instrument Calibration

The existing GET facilities use sophisticated electronic equipment to operate and monitor the treatment process. These instruments require periodic calibration that is currently performed on a quarterly basis. The facilities must shut down for a period of up to two (2) days to perform this work.

E. Hydrologic Testing

To determine accurately what modifications should be performed on the existing extraction or recharge systems to assure system effectiveness, or to verify if the completed modification is producing the required zones of capture or other hydrologic effects, it is necessary to routinely suspend pumping or recharge in selected wells. These shutdowns are required to allow the system to obtain hydrologic equilibrium conditions for hydrologic measurements. The lengths of these shutdowns are variable and will normally continue until there is enough data to predict accurate aquifer characteristics. The normal testing period will usually require between 5 to 14 days.

F. Well Rehabilitation

During normal operation of the GET facilities, the capacity of the production wells or recharge wells to produce or accept water will decline. This decline depends on the volume and rate of water produced or recharged and aquifer characteristics. When the specific capacity has declined sufficiently, as indicated by either the extraction well not producing the desired hydraulic control, or the recharge well not accepting the volume of water necessary to maintain hydraulic control, the wells must be rehabilitated. The rehabilitation of an extraction well usually lasts 5 to 7 days depending on the cause of the reduced hydraulic capacity. This outage generally affects only a portion of the hydrologic control at a GET facility.

G. Equipment Failure

An equipment failure is defined as failure or malfunction of any GET facility or related support equipment which causes an unplanned shutdown of part or all of a GET facility. To minimize the occurrence of unscheduled outages, Aerojet has developed certain contingency plans. These contingency plans include:

- continuous and on-call maintenance capabilities provided by in-plant facility services,
- time and material contracts with specialty contractors to provide support for maintenance capabilities that are not provided by Aerojet facility services, (i.e., water well equipment and well rehabilitation),
- a maintenance store to provide replacement parts and equipment, and
- open purchase order accounts at numerous local supply houses for parts and equipment not normally stocked at the maintenance store.

H. New Construction (Existing GET Facilities)

During the long-term operation of a GET system, head and water quality data are routinely collected and evaluated to determine effectiveness of the system. As a result of this evaluation, Aerojet may identify a need to modify the system(s) to enhance effectiveness. These modifications usually consist of the addition of extraction and recharge wells and modification to GET treatment facilities with subsequent system shutdown during the construction of these modifications. The period of time required for system shutdowns varies from a few hours to several months depending upon the nature of the construction work.

SUBPARAGRAPH E(1)(i)

No modifications planned at this time.

TABLE 1

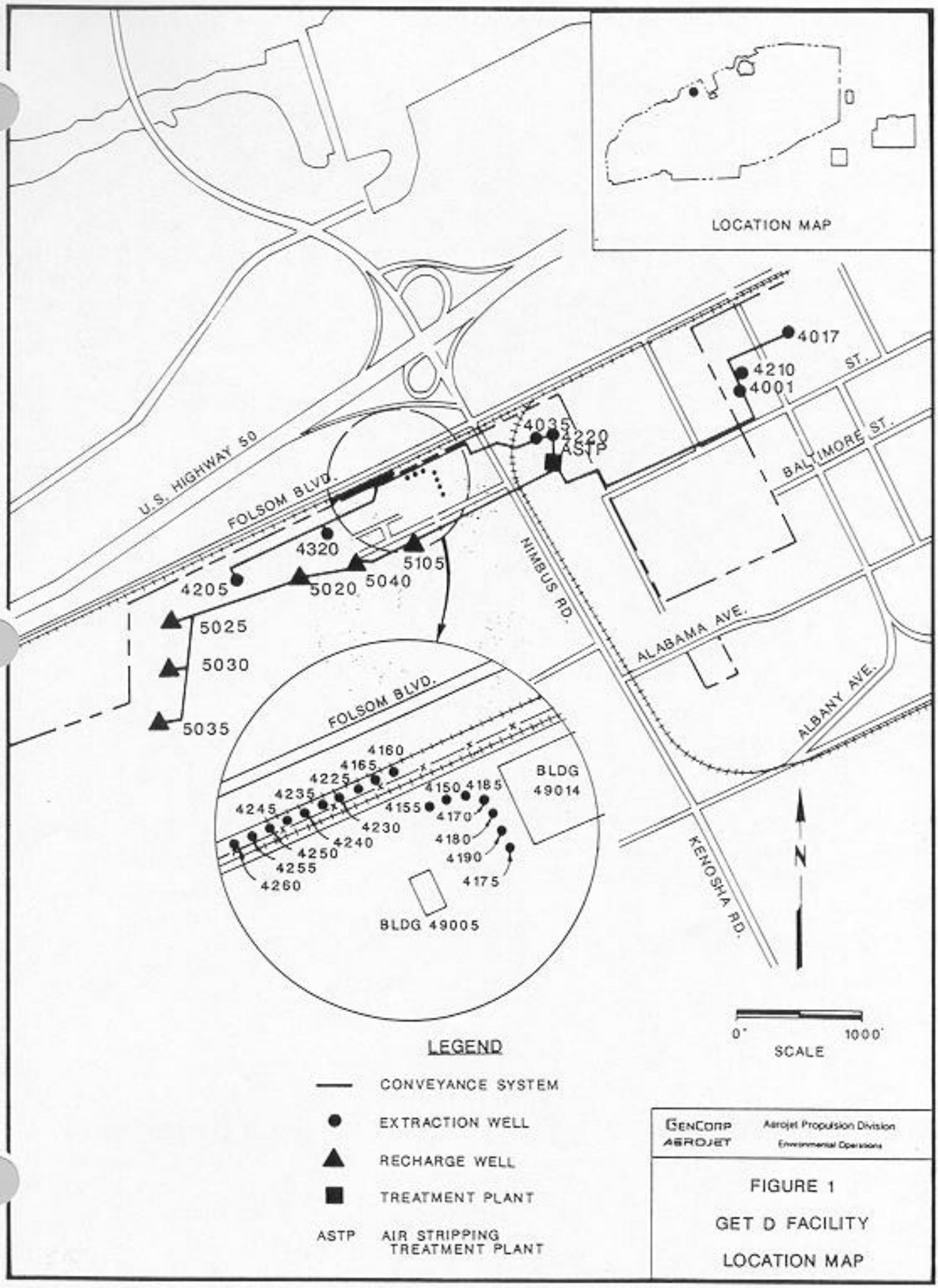
GET D EXTRACTION WELL AND RECHARGE WELL COMPONENTS

COMPONENTS	SPECIFICATIONS
Extraction Well (4320)	14-inch diameter steel cased with stainless steel screen at varioius depth intervals
Extraction Well (4001, 4017, 4035, 4210, 4220)	12-inch diameter steel cased with stainless steel screen at various depth intervals
Extraction Well (4150-4190, 4205)	8-inch diameter steel cased with stainless steel screen at various depth intervals
Extraction Well (4225-4260)	4-inch diameter steelcased with stainless steel screen at various depth intervals
Well Pump (4001, 4017, 4035, 4210, 4220)	Vertical turbine pumps Flow range - see Subparagraph E(1)(a) Pump bowls set at various depths
Well Pump (4150-4190, 4205, 4225-4260, 4320)	Submersible pumps
Flow Meter	
4017	6-inch impellor flow meter
4001, 4035, 4210, 4220	4-inch impellor flow meter
4225-4245	1½-inch paddle wheel flow meter
4150-4190, 4250-4260	1-inch paddle wheel flow meter
4205	2½-inch positive displacement flow meter
4320	3-inch water specialties
Pressure Gauge (Extraction Well)	0-160 psi range
Pressure Gauge (Extraction Well)	30-inch Hg - Mercury - 0-60 psig Compound pressure gauge
Recharge Well (5020-5040, 5105)	12-inch diameter stainless steel cased and screened at various depth intervals
Flow Meter (Recharge Well)	4-inch impellor type flow meter
Filter Vessel (Two [2] each)	Filter vessels with #2 filters bags with a nominal 5 micron filtering rating

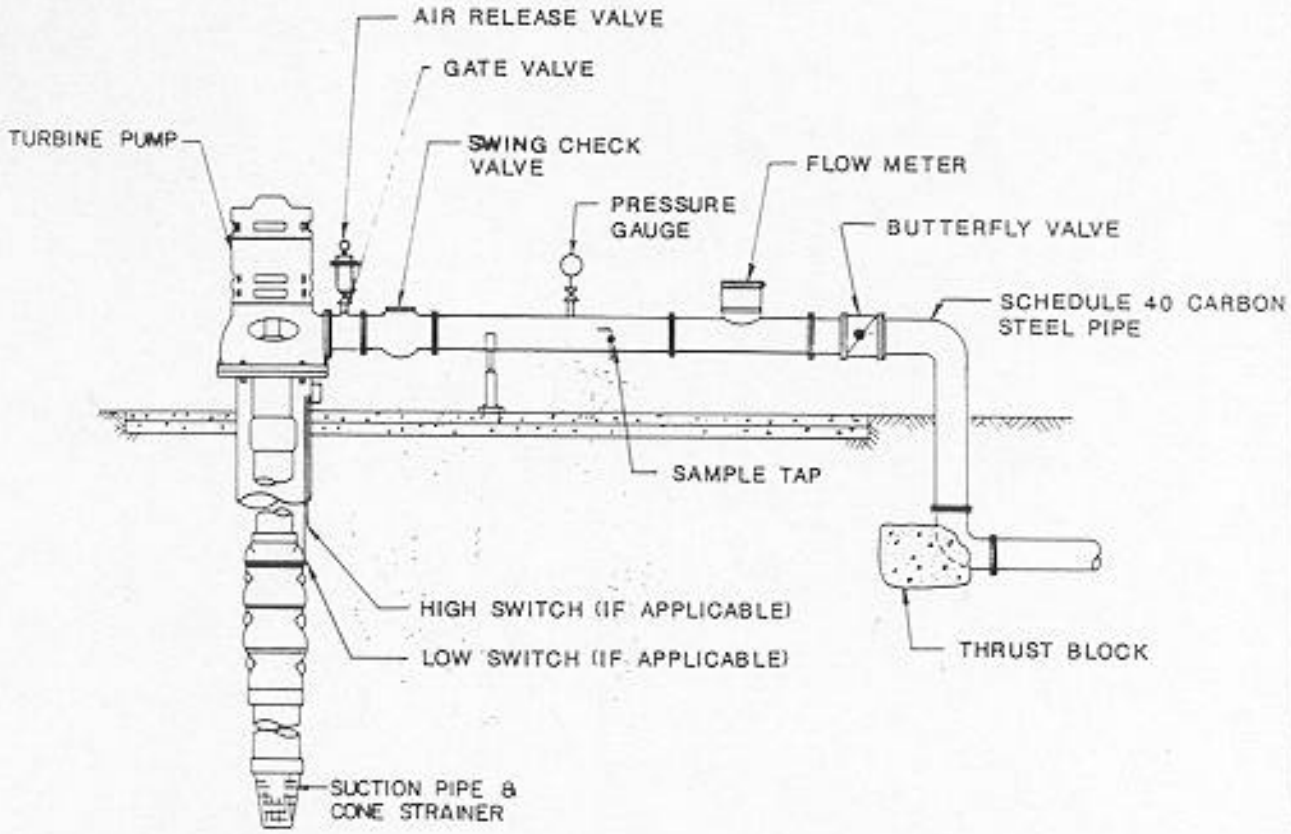
TABLE 2

GET D TREATMENT PLANT COMPONENTS

COMPONENTS	SPECIFICATIONS
Surge Tank (1 each)	FPR vertical tank, 20,000 gallon
Stripping Towers (4 each)	5-foot diameter x 22-foot high fiberglass towers
Influent Pumps 1A and 2A	20 hp centrifugal pumps
Sump Transfer Pumps 1B and 2B (2 each)	20 hp centrifugal pumps
Effluent Pump 3 (1 each)	50 hp centrifugal pump
Centrifugal Blowers (2 each)	10 hp blowers
CO_2 Tank (1 each)	12,000 pound capacity tank
Plant Influent Flow Meter	10-inch Water Specialties
Tower 1A Influent Flow Meter	6-inch Water Specialties
Tower 2A Influent Flow Meter	6-inch Water Specialties


LOCATION MAP
U.S. HIGHWAY 50
FOLSOM BLVD.
NIMBUS RD.
BALTIMORE ST.
ALABAMA AVE.
ALBANY AVE.
KENOSHA RD.
4017
4210
4001
4035
4220
ASTP
4320
5105
5040
5020
4205
5025
5030
5035
BLDG 49014
BLDG 49005
4160
4165
4225
4235
4245
4230
4240
4250
4255
4260
4155
4150
4185
4170
4180
4190
4175
N
0'
1000'
SCALE
LEGEND
CONVEYANCE SYSTEM
EXTRACTION WELL
RECHARGE WELL
TREATMENT PLANT
ASTP AIR STRIPPING TREATMENT PLANT
GENCORP AEROJET
Aerojet Propulsion Division
Environmental Operations
FIGURE 1
GET D FACILITY
LOCATION MAP

Apr-95



PUMP AND ELECTRODE SETTINGS			
WELL NO.	PUMP BOWLS	ELECTRODES	
		OFF	ON
4017	110'	—	—
4035	75'	105'	—
4001	75'	70'	35'
4210	175'	170'	100'
4220	120'	115'	—

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FIGURE 2
GET D
EXTRACTION WELL

Apr-95

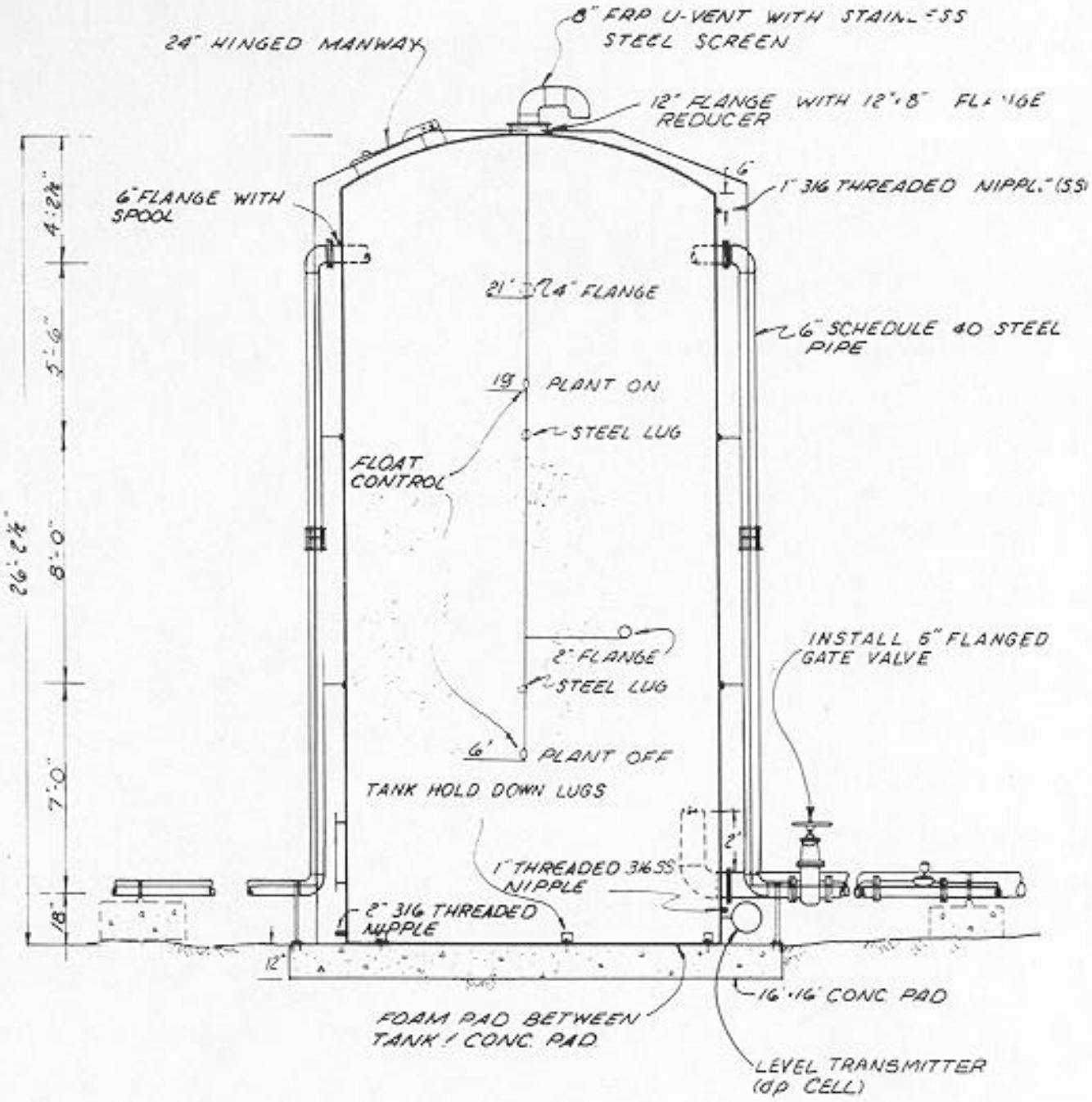

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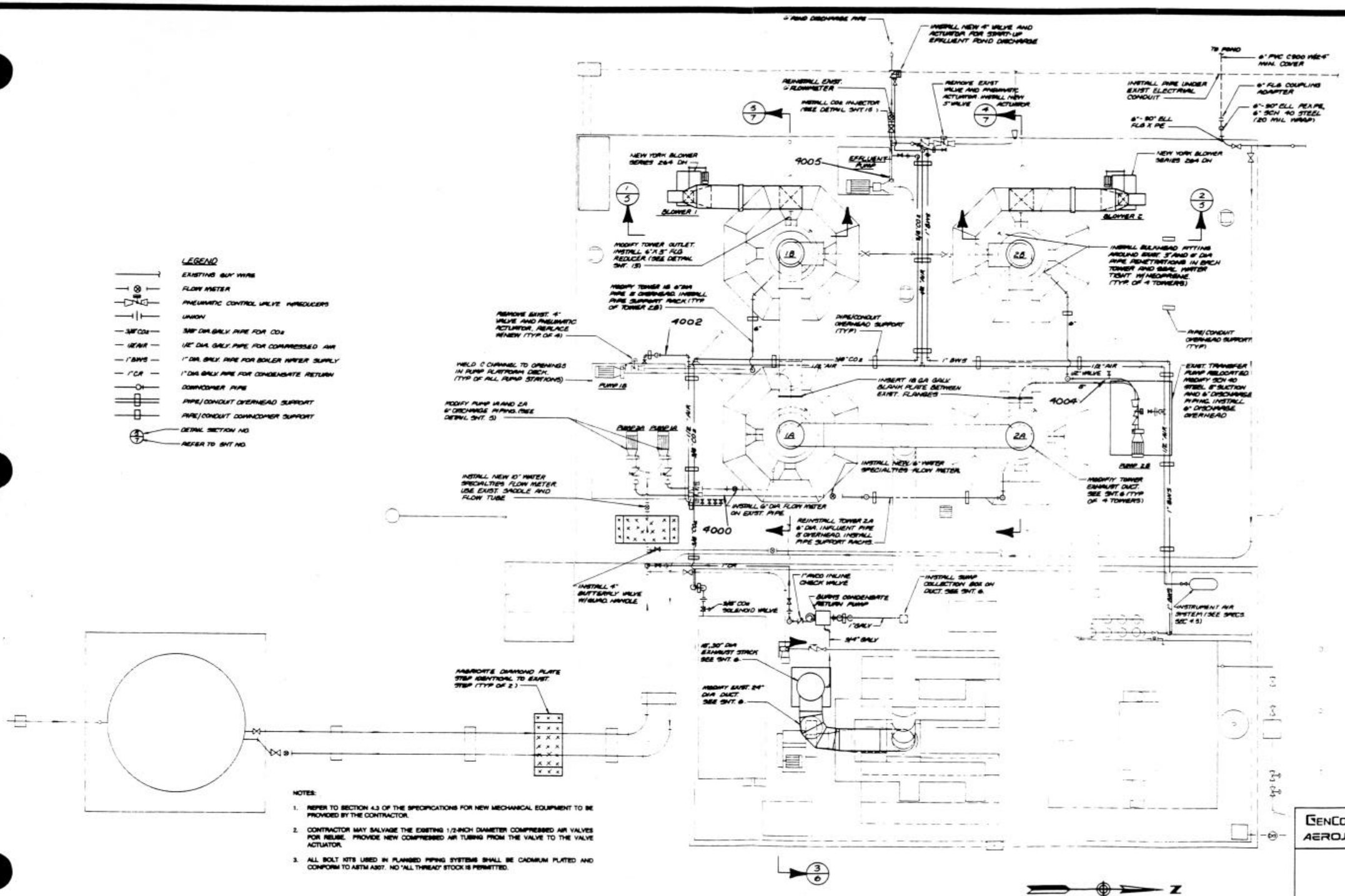
FIGURE 3

GET D

SURGE TANK ASBUILT

Apr-95



NOTES:

1. REFER TO SECTION 4.3 OF THE SPECIFICATIONS FOR NEW MECHANICAL EQUIPMENT TO BE PROVIDED BY THE CONTRACTOR.
2. CONTRACTOR MAY SALVAGE THE EXISTING 1/2-INCH DIAMETER COMPRESSED AIR VALVES FOR REUSE. PROVIDE NEW COMPRESSED AIR TUBING FROM THE VALVE TO THE VALVE ACTUATOR.
3. ALL BOLT KITS USED IN FLANGED PIPING SYSTEMS SHALL BE CADMIUM PLATED AND CONFORM TO ASTM A307. NO "ALL THREAD" STOCK IS PERMITTED.

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FIGURE 4
GET D
TREATMENT SYSTEM

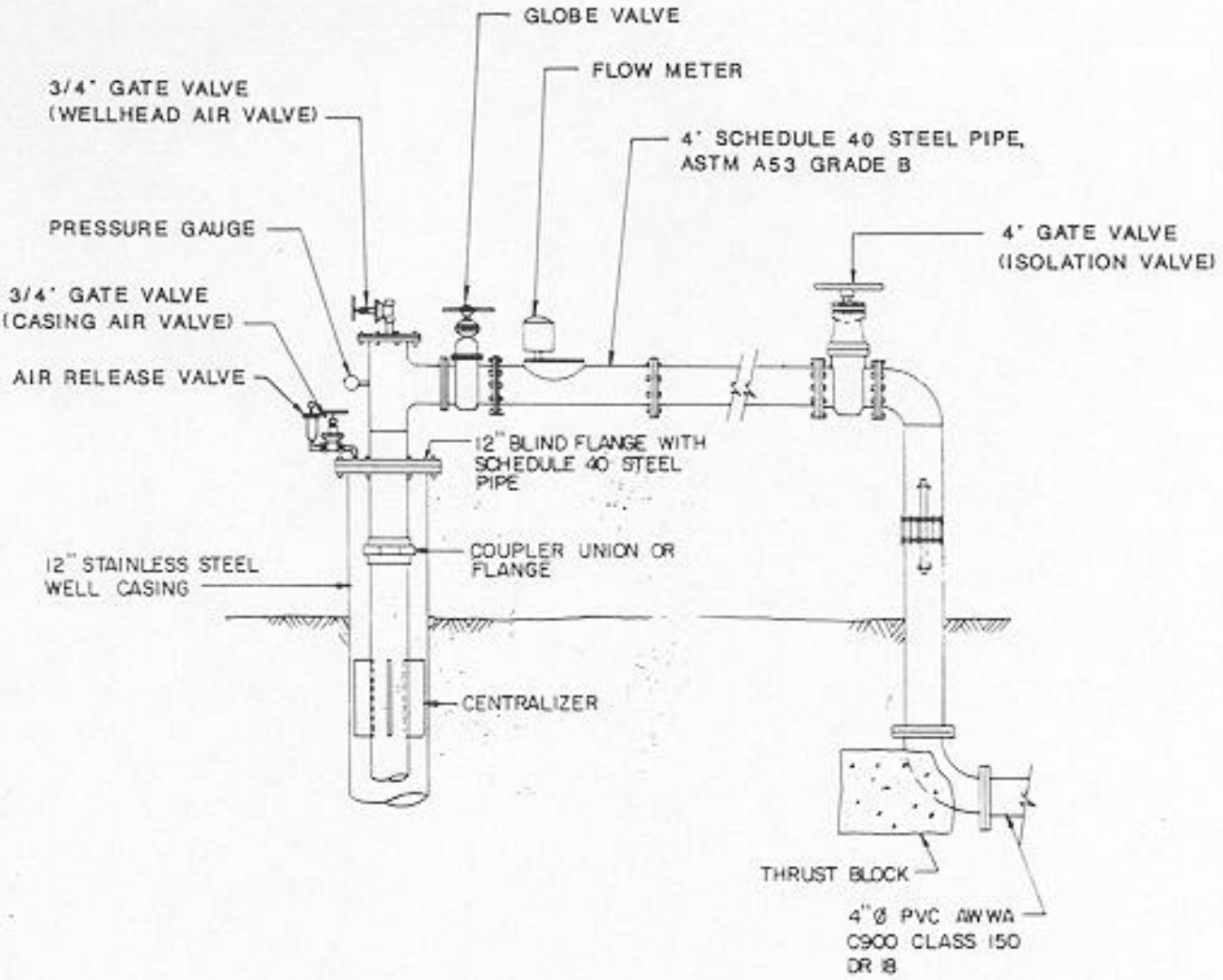

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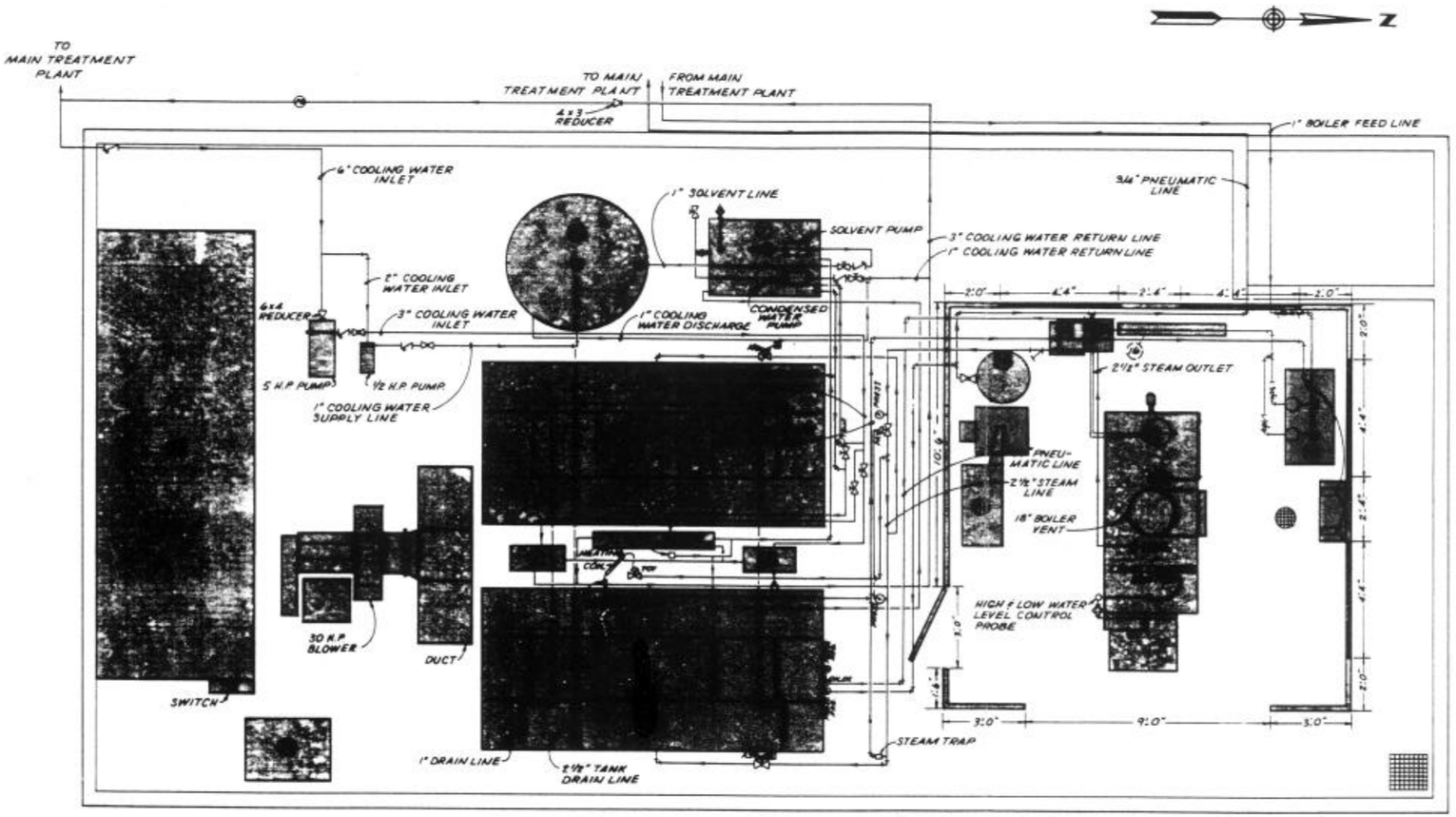
FIGURE 5

GET D

RECHARGE WELL

Apr-95



1. PRIMARY STEAM CONDENSER
2. SECONDARY HEAT EXCHANGER
3. PRIMARY STEAM CONDENSER
4. WEST CARBON ABSORBER
5. EAST CARBON ABSORBER
6. SOLVENT TANK
7. WATER / SOLVENT SEPARATOR TANK
8. CO_2 STORAGE TANK
9. TRANSFORMER
10. STEAM BOILER
11. FEED WATER RETURN TANK
12. COMPRESSOR
13. AIR DRYER
14. SUPPLY CONTROL PANEL
15. PROCESS CONTROL PANEL FOR CARBON SYSTEM

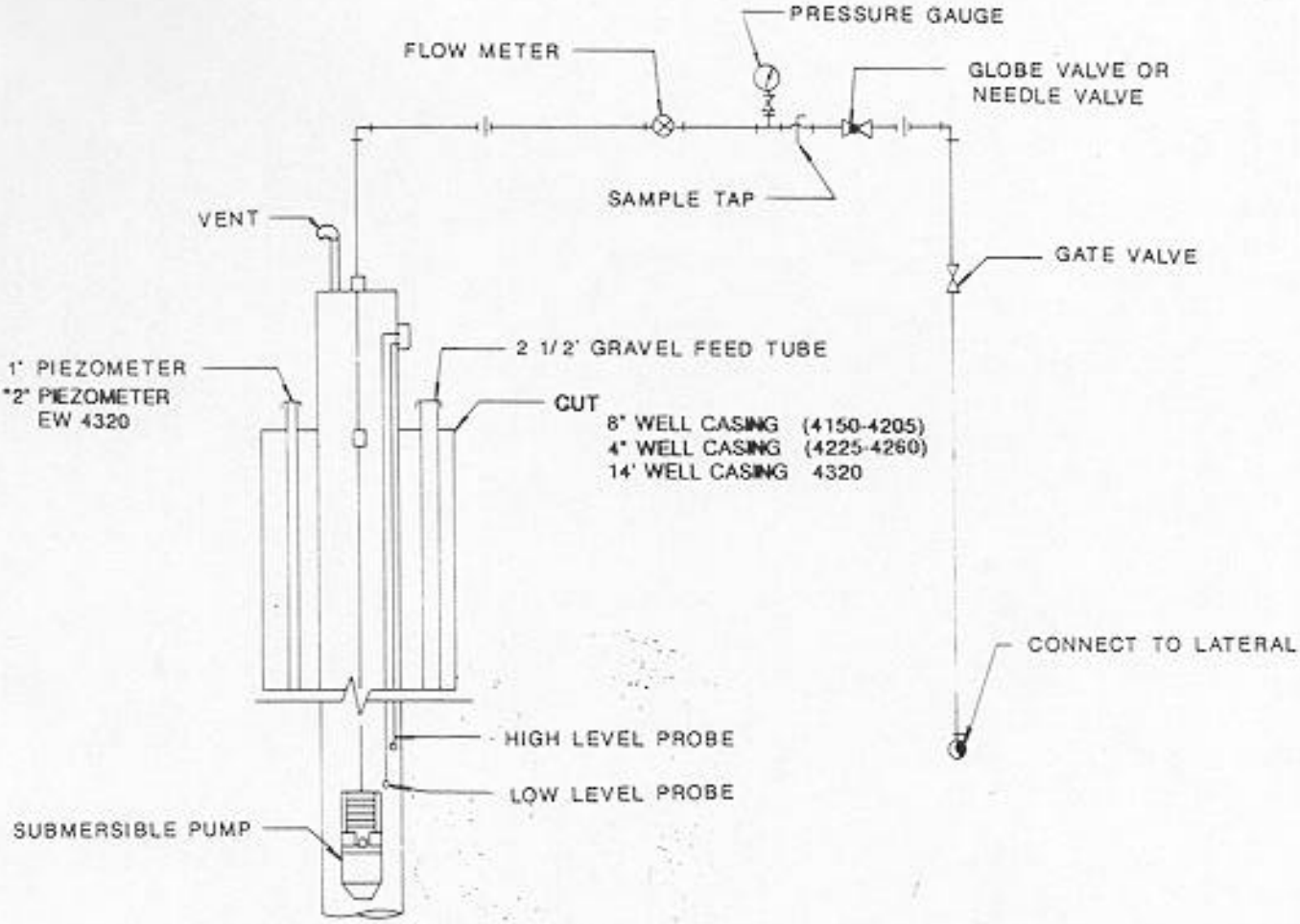
LEGEND

- GATE VALVE
- CHECK VALVE
- GLOBE VALVE
- BALL VALVE
- TEMP. CONTROL VALVE
- PRESSURE RELIEF VALVE
- STRAINER
- TEMP. GAUGE
- PRESSURE REGULATOR
- PRESSURE GAUGE
- REDUCER
- FLOWMETER
- STEAM PNEUMATIC VALVE
- DIRECTION OF FLOW

BOILER ROOM & AIR EMISSION TREATMENT SYSTEM
MECHANICAL AS-BUILT
SCALE: 3/8" = 1'-0"

GENCORP AEROJET — Aerojet Propulsion Division, Environmental Operations

FIGURE 6
BOILER ROOM
AND AIR EMISSION
TREATMENT SYSTEM



PUMP AND ELECTRODE SETTINGS

WELL NO.	PUMP BOWLS	ELECTRODES OFF	ELECTRODES ON
4150	58'	53'	39'
4155	64'	59'	39'
4160	64'	59'	39'
4165	61'	56'	39'
4170	62'	57'	39'
4175	60'	55'	39'
4180	62'	57'	39'
4185	62'	57'	39'
4190	60'	55'	39'
4205	75'	70'	55'
4225	73'	68'	55'
4230	71'	61'	56'
4235	73'	70'	57'
4240	72'	69'	56'
4245	73'	70'	57'
4250	62'	60'	46'
4255	62'	60'	46'
4260	58'	56'	44'
4320	155'	NA	NA

GENCORP AEROJET — Aerojet Propulsion Division, Environmental Operations

FIGURE 7
GET D
SHALLOW
EXTRACTION WELL

Operation and Maintenance Plan for the American River Groundwater Extraction and Treatment Facility

Aerojet Corporation
Sacramento, California

Prepared by:

Aerojet General Corporation
P.O. Box 13222
Sacramento, CA 95813-6000

January 1998

SR10107910

ARGETO&MPLAN.doc

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Figure 1 American River GET System Map

1.0 INTRODUCTION

The American River Groundwater Extraction and Treatment (ARGET) system consists of four components: 15 extraction wells, conveyance piping, treatment system and discharge piping. The purpose of the system is to extract groundwater, remove volatile organic compounds and discharge treated water to Buffalo Creek. This plan deals specifically with the operation and maintenance of the ARGET system components. It also describes the interaction of the various unit processes and components of the system. The plan will serve as a guide for diagnosing and correcting problems that may arise.

2.0 DESIGN CRITERIA

The ARGET system pumps water from three separate aquifers at five different extraction well locations. Each location consists of three extraction wells. The water is pumped through two raw water pipeline systems to the treatment plant for removal chemicals using a combination of treatment processes. The treated water is discharged through a pipeline to Buffalo Creek.

The Southeast Extraction Wells produce water having much higher contaminant levels than the other wells. These three wells have a dedicated dual contained pipeline system. The remaining twelve extraction wells do not require dual contained piping. Flows from these wells will be collected into a single containment pipeline system.

The ARGET system operates continuously, as close to the maximum production capabilities of the extraction wells as possible. The system includes the following major components:

a) Water Treatment Plant
b) Extraction Wells
c) Pipelines
d) Water Discharge
e) Containment System
f) Control System

Water Treatment Plant

The treatment plant includes two treatment processes for the removal of VOCs: UV/Oxidation and Air Stripping. The UV/Oxidation system is utilized to pre-treat the portion of the groundwater conveyed from the southeast wells. The Air Stripping system then treats all of the water for removal of the remaining VOCs.

The groundwater from the Southeast Extraction Wells 4325, 4330 and 4335, approximately 785 gallons per minute (gpm) design flow rate, is pumped to the treatment plant through a separate dedicated pipeline. An UV/Oxidation system is utilized to pre-treat this water to remove the more highly-concentrated VOCs. This water will then be combined with the remainder of the raw groundwater for further VOC removal.

The main raw water collection pipeline conveys a design flow of approximately 2660 gpm from the four remaining extraction well locations (twelve wells) to the treatment plant. This water is

combined with the pre-treated water from the Southeast Extraction Wells for a total design flow rate of approximately 3445 gpm. The Air Stripping system is utilized to remove the remaining VOCs from the water.

Extraction Wells

The five sets of extraction well locations are: The Kenneth Avenue, South Park and Middle Park Extraction Wells on the north side of the river, and the Southeast and Southwest Extraction Wells on the south side. Each set includes three wells, each completed into a separate aquifer. Results from development of the extraction wells are provided in Table 1. Production from the wells is projected at 3445 maximum, based upon these data.

Pipelines

A buried dual-contained polyethylene pipeline conveys the groundwater from the Southeast Extraction Wells to the treatment plant. The water produced by the remaining four well locations is collected into a conventional single wall pipeline system.

Water from the wells north of the American River is collected into a 16-inch pipeline which crosses under the river. On the south side of the river, the water from the Southwest Extraction Wells is combined with the water from the north side into a 20-inch pipeline which conveys the water to the treatment plant on Aerojet property. A separate 10-inch pipeline conveys the water from the Southeast Extraction Wells to the treatment plant. Leak sensors are provided for the 10-inch pipeline which is dual-contained.

Containment System

The groundwater produced by the Southeast Extraction Wells could potentially be hazardous with TCE concentrations of up to 5.0 mg/l, well above the TCLP limit of 0.5 mg/l. All other extraction wells produce water with contaminant levels which do not require secondary containment.

Secondary containment is provided through the use of dual polyethylene pipes for the Southeast Wells pipeline. The containment pipe will drain into sumps at the low points along the pipeline. Water level sensors are provided in the sumps to detect leaks. Leak detection sumps have also been provided at both connection points of the pipeline going underneath the American River.

At the treatment plant, raw water conveyances and vessels are surrounded by a 9-inch high curb that diverts leakage to a sump. Water level sensors are provided in the sump.

If the water level rises in the treatment plant or pipeline sumps, an alarm is sent to the computer at the treatment plant. If the level at any location continues to rise above a preset point, the pumps and treatment plant shut-off automatically.

Control System

The control methodology for the ARGET system consists of: a computer, programmable logic controllers (PLCs), analog to digital field devices, and dry contact closure relays and switches. The overall controlling device is the computer which interrogates the PLCs for each well

location, for the Air Stripper and for the UV/Oxidation system. PLCs for the Air Stripper and the UV/Oxidation system are hard wired to the computer. Well location PLCs are interrogated via a licensed radio frequency.

PLCs receive data from analog to digital field devices and dry contact closure relays and switches under their control. The data received by the PLCs is transmitted to the computer. The computer receives and stores process data and makes decisions regarding startup, operation and shutdown of system components. Redundancy is built into the system. In the event of failure of a component due to loss of communication or power, the system will automatically shutdown and an alarm will be issued.

During normal operation process data monitored from field devices are:

a) Influent flow rate to UV/Oxidation system
b) Influent flow rate to Air Stripper
c) Flow rate from Extraction wells
d) Water level in the Air Stripper
e) Water level secondary containment collection tank at treatment plant
f) Conveyance pipeline pressure

Alarm conditions resulting in a complete system shutdown are:

a) Leak detection switch activated in sumps associated with American River crossing
b) High stripping tower level
c) Fan failure
d) High transmission line pressure

Alarm conditions resulting in shutdown of only Southeast Extraction Wells are:

a) Leak detection switches in sumps associated with secondary containment piping
b) UV/Oxidation system failure
c) Plant secondary containment sump high alarm
d) Plant containment collection tank high alarm

3.0 OPERATION and MAINTENANCE PLAN

The purpose of the ARGET Operation and Maintenance Plan is to describe required planned activities which ensure proper operation and maintenance of the ARGET system. Also detailed in this plan are examples of unplanned activities that will cause system outages that are beyond the control of the operator. Planned and unplanned activities involved in the operation and maintenance of the ARGET system include:

a) System startup/shutdown
b) Normal operation
c) Routine preventative maintenance
d) Identified maintenance
e) Instrument calibration
f) Hydrologic testing
g) Well rehabilitation

h) Catastrophic equipment failure

System Startup/Shutdown

Startup of the overall system centers around startup of the UV/Oxidation unit and the Air Stripper. Therefore, the extraction wells must be prepared to deliver water to the treatment plant. Water from the Southeast Wells is directed to the collection/circulation tank to provide water for the UV/Oxidation unit. Water from the other four well locations is conveyed directly to the Air Stripper. After the UV/Oxidation unit has achieved treatment status the collection/circulation tank is bypassed and water from the Southeast Wells is pumped directly to the UV/Oxidation unit. The effluent from the UV/Oxidation unit is blended with the water from the other extraction wells. The blended water is then treated in the Air Stripper. The treated water is pumped to Buffalo Creek for final discharge. The startup routine is performed automatically by the system computer. The start sequence is initiated by the operator. The shutdown sequence automatically shuts down the system gradually resulting in minimal stress on components. Shutdown can be initiated by the operator, or automatically if an alarm condition arises.

Normal Operation

During normal operation all 15 extraction wells and the treatment system are running at optimal conditions. Routine daily observations of all equipment is performed to detect problems and collect process data. Process data collected is reviewed in order to optimize the performance of the system.

Routine Preventative Maintenance

Aerojet Facility Maintenance Department operates a program of preventative maintenance. After completion of construction activities, a physical inventory is performed to identify the equipment and systems that require routine preventative maintenance. During the inventory, a maintenance number is assigned to each piece of equipment. These maintenance numbers are entered into the computerized database with a corresponding schedule for daily, weekly, monthly, quarterly, or yearly maintenance. Depending on the schedule entered for the equipment, the computer routinely generates Maintenance Work Orders (MWOs). These MWOs are then assigned to maintenance crews depending on the type of work required (i.e., lubrication, mechanical, electrical, sheet metal or HVAC). The foreman of the maintenance crew then coordinates with Environmental Operations. If equipment shutdown is required, the equipment is secured by Environmental Operations personnel, the required work is performed, and the equipment is placed back online. These types of tasks usually require minimal downtime.

Identified Maintenance

The Maintenance Work Request (MWR) system is employed in conjunction with the preventative maintenance program. This program gives the facility operating personnel the option to place MWRs for the problems that become evident during routine operations or preventative maintenance that requires immediate attention. The MWR system is intended to facilitate rapid response which, if left unattended, would lead to catastrophic equipment failure and result in extended periods of system outages.

Instrument Calibration

The ARGET system uses sophisticated electronic equipment to operate and monitor the treatment process. These instruments require periodic calibration that is currently performed semiannually. The system must be shutdown for a period of up to two (2) days to perform this work.

Hydrologic Testing

To determine accurately what modifications should be performed on the existing extraction system to assure system effectiveness, it is routinely necessary to periodically suspend pumping in selected wells. These shutdowns are required to allow the system to obtain hydrologic equilibrium conditions for hydrologic measurements. The lengths of these shutdowns are variable and will normally continue until there is enough data to predict accurate aquifer characteristics. The normal testing period will usually require between 5 and 14 days.

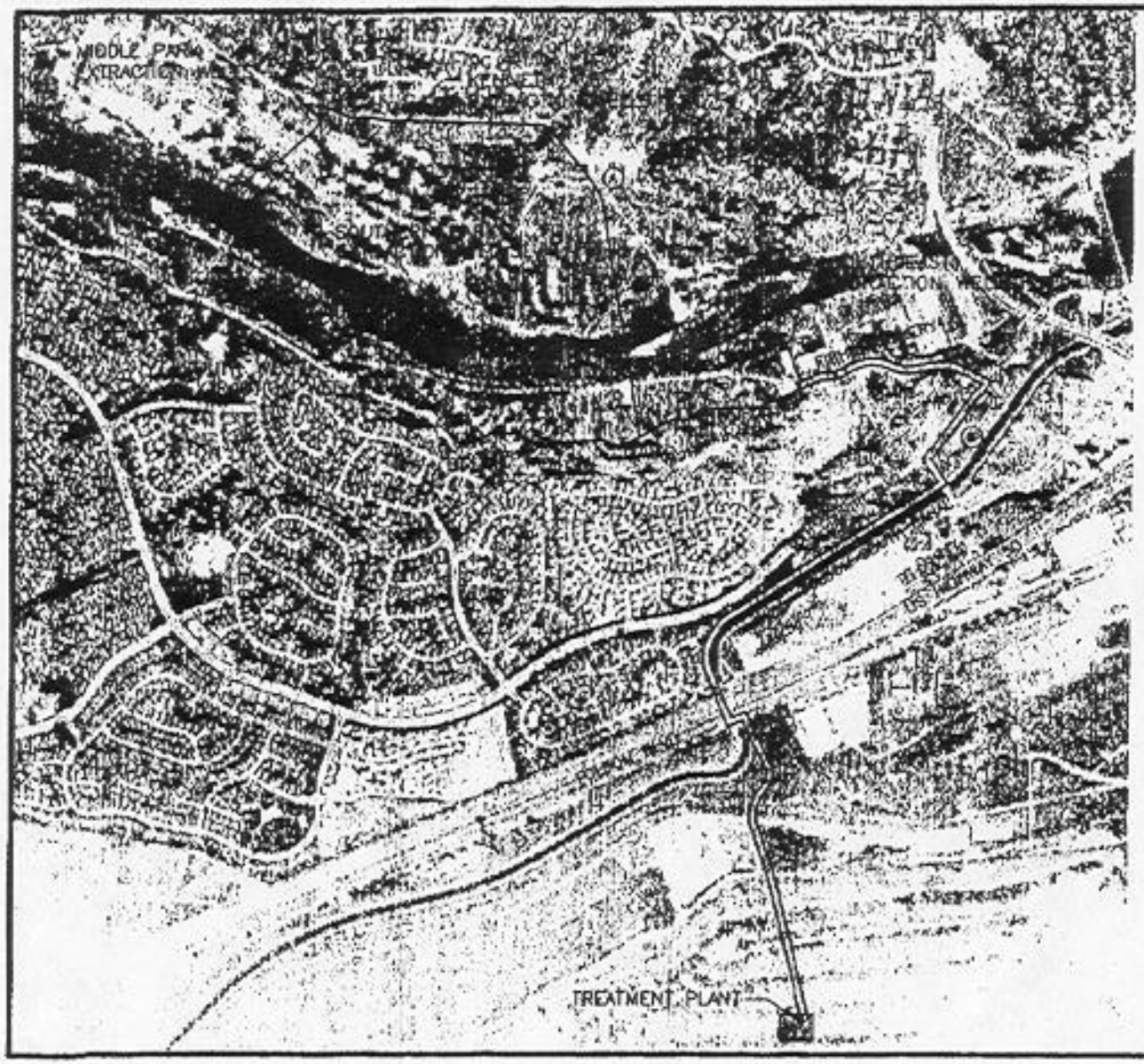
Well Rehabilitation

During normal operation of the ARGET system the capability of the production wells to produce water will decline. This decline depends on the volume and rate of water produced and aquifer characteristics. When the specific capacity has declined sufficiently, as indicated by the extraction wells not producing the desired hydraulic control, the wells must be rehabilitated. The rehabilitation of an extraction well usually lasts 7 to 14 days depending on the cause of the reduced hydraulic capacity. This outage generally affects only a portion of the hydrologic control exerted by the extraction wells.

Equipment Failure

An equipment failure is defined as failure or malfunction of any support equipment which causes an unplanned shutdown of part or all of the ARGET system. To minimize the occurrence of unscheduled outages, Aerojet has developed certain contingency plans. These contingency plans include:

a) Continuous and on-call maintenance capabilities provided by in-plant services.
b) Time and material contracts with specialty contractors to provide support for maintenance capabilities that are not provided by Aerojet facility services (i.e., water well equipment and well rehabilitation).
c) A maintenance store to provide replacement parts and equipment.
d) Open purchase order accounts at numerous local supply houses for parts and equipment not normally stocked at the maintenance store.



	Pipeline			
	A	B	C	D
Nominal Size, inches	16	23	6	10
Design flow, gpm	2030	2830	830	785
Design Velocity, fps	4.84	4.06	5.17	4.15
Friction loss @ design flow, ft/1000	4.15	2.47	10.35	3.32
Flow @ 7.0 fps, gpm	2836	4588	850	1326
Friction loss @ 7.0 fps	8.51	6.18	8.15	14.03
Carrier Pipe—Polyethylene				
SDR	11	11	11	11
Outside Dia., inches	16.20	20.40	6.625	10.75C
Wall thickness, inches	1.455	1.836	0.764	0.977
Inside Dia., inches	13.991	18.364	5.057	8.795
Area, ft², sq. ft.	0.835	1.480	0.172	0.422
Weight, lb./ft.	28.27	44.5	5.21	12.75
Containment Pipe—Polyethylene				
SDR	26	26	26	26
Outside Dia., inches	22.00	28.00	12.750	18.00
Wall thickness, inches	0.846	1.000	0.490	0.815
Inside Dia., inches	20.308	26.080	11.768	14.749
Weight, lb./ft.	23.15	33.45	8.04	12.84

N

SCALE: 1" = APPROX. 1000'

Aerojet Propulsion Division
Environmental Operations

FIGURE 1
American River GET

SYSTEM MAP

Table I Extraction Well Data

Well No.	Aquifer	Location	Capacity (gpm)	Screen Level	Casing Depth	Pump Setting
KENNETH AVENUE EXTRACTION WELLS						
4300	Upper	Middle	300	76 to 106'	116'	110'
4301	Middle	East	220	116 to 126'	136'	130'
4302	Lower	West	35	186 to 186'	196'	190'
Static water level for Kenneth Avenue Extraction Wells is 65' deep.						
SOUTH PARK EXTRACTION WELLS						
4340	Upper	West	65	68 to 88'	98'	89'
4345	Middle	East (Low Area)	400	104 to 117'	127'	94'
4350	Lower	Middle	100	150 to 154' 163 to 170'	190'	155'
Static water level for Wells 4340 and 4350 is 59' deep, and for Well 4345 is 42' deep.						
MIDDLE PARK EXTRACTION WELLS						
4355	Upper	East	400	65 to 72' 79 to 87'	97'	72'
4360	Middle	Middle	450	94 to 96' 106 to 118'	128'	88'
4365	Lower	West	60	130 to 136' 145 to 152'	162'	137'
Static water level for Middle Park Extraction Wells is 49' deep.						
TOTAL FLOW FROM NORTH SIDE WELLS = 2030 GPM						
SOUTHEAST EXTRACTION WELLS						
4325	Upper	South	260	72 to 88'	98'	89'
4330	Middle	Middle	310	101 to 109' 117 to 137'	147'	110'
4335	Lower	East	215	160 to 184'	195'	185'
Static water level for wells 4325 and 4330 is approx. 26' deep, and for well 4335 approx. 37' deep						
SOUTHWEST EXTRACTION WELLS						
4370	Upper	Middle	325	82 to 92'	102'	93'
4375	Middle	West	200	108 to 132' 141 to 145'	158'	133'
4380	Lower	East	105	200 to 218'	228'	219'
Static water level for wells 4370 and 4375 is approx. 45' deep, and for well 4380 approx. 55' deep.						
TOTAL DESIGN FLOW = 3445 GPM						

FACILITY REPORT

GET B SYSTEM

Revised 10 June 2002

FACILITY REPORT
GET B SYSTEM

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FACILITY REPORT
GET B SYSTEM

Aerojet has prepared this facility report in accordance with provisions contained in Exhibit VI of the Partial Consent Decree.

SUBPARAGRAPH E(1)(a)

Figures 1 through 6 are as built schematic drawings of the GET B facility showing process units, piping, flow direction, influent, effluent, and intermediate monitoring stations. The hydraulic capacity and the expected normal range for flow rates of all GET B pumps are presented in the following table:

PUMP NUMBER	HYDRAULIC CAPACITY (GPM)[1]	EXPECTED NORMAL RANGE FLOW RATE (GPM)[2]
Well Pump 98	15	0-5
Well Pump 4011	150	0-25
Well Pump 4080	150	0-100
Well Pump 4085	150	0-100
Well Pump 4095	150	0-100
Well Pump 4195	150	0-100
Well Pump 4215	150	0-100
Well Pump 4303	150	0-150
Well Pump 4304	15	0-5
Well Pump 4400	600	0-500
Well Pump 4405	200	0-150
Well Pump 4410	600	0-400
Well Pump 4450	300	0-200
Well Pump 4455	300	0-200
Well Pump 4460	600	0-400
Well Pump 4465	600	0-500
Well Pump 4475	150	0-100
Well Pump 4480	250	0-150
Well Pump 4505	20	0-10
Well Pump 4510	20	0-5
Well Pump 4515	20	0-10
Well Pump 4520	20	0-5
Well Pump 4525	20	0-20
Well Pump 4565	60	0-60
Well Pump 4570	60	0-60
Well Pump 4575	60	0-60

[1]Hydraulic capacity indicates the maximum capacity of the pump, not the well capacity.

[2]Expected normal flow rate is a range because it is principally a function of the level of the groundwater table and the period of time following well development/redevelopment.

SUBPARAGRAPH E(1)(b)

Identification numbers for the major components of the GET B facility are as follows, and as indicated in Figures 1 and 2. Data in Aerojet's computer data base may be accessed by these identification numbers.

IDENTIFICATION	DESCRIPTION
98	Extraction Well/North System
4011	Extraction Well/North System
4080	Extraction Well/North System
4085	Extraction Well/North System
4095	Extraction Well/North System
4195	Extraction Well/North System
4215	Extraction Well/North System
4303	Extraction Well/North System
4304	Extraction Well/North System
4400	Extraction Well/South System
4405	Extraction Well/North System
4410	Extraction Well/South System
4450	Extraction Well/North System
4455	Extraction Well/North System
4460	Extraction Well/South System
4465	Extraction Well/South System
4475	Extraction Well/North System
4480	Extraction Well/North System
4505	Extraction Well/South System
4510	Extraction Well/South System
4515	Extraction Well/South System
4520	Extraction Well/South System
4525	Extraction Well/South System
4565	Extraction Well/South System
4570	Extraction Well/South System
4575	Extraction Well/South System
7060	Influent North System
7061	Effluent UVOX/Influent Air Stripper North System
7062	Effluent Air Stripper North System
7063	Influent Air Stripper South System
7064	Effluent Air Stripper South System

SUBPARAGRAPH E(1)(c)

From the initial step draw down tests and observed recovery rates, the design extraction rates for the GET B facility are estimated as follows:

WELL NUMBER	DESIGN CAPACITY (GPM)[3]
Extraction Well 98	5
Extraction Well 4011	50
Extraction Well 4080	100
Extraction Well 4085	100
Extraction Well 4095	100
Extraction Well 4195	100
Extraction Well 4215	100
Extraction Well 4303	200
Extraction Well 4304	5
Extraction Well 4400	500
Extraction Well 4405	150
Extraction Well 4410	400
Extraction Well 4450	250
Extraction Well 4455	250
Extraction Well 4460	400
Extraction Well 4465	500
Extraction Well 4475	100
Extraction Well 4480	200
Extraction Well 4505	10
Extraction Well 4510	5
Extraction Well 4515	10
Extraction Well 4520	5
Extraction Well 4525	20
Extraction Well 4565	60
Extraction Well 4570	60
Extraction Well 4575	60
Influent North Treatment System	1,710
Influent South Treatment System	2,030
Combined Effluent Infiltration Area	3,750

SUBPARAGRAPH E(1)(d)

[3]Design capacity is an engineering estimate calculated to determine size requirements of well and treatment plant components.

The GET B facility is designed to remove the following chemicals:

N-Nitrosodimethylamine (NDMA) – North System

1,1-Dichloroethane

1,1-Dichloroethylene

Trichloroethylene

1,2-Dichloroethane

Chloroform

1,1,2-Trichloro-1,2,2-Trifluoroethane

The treatment process employed to remove these chemicals is described in thefollowing paragraphs.

The GET B facility consists of two treatment systems, the North System and the South System. The components of the North System consist of 14 extraction wells, conveyance piping, a UV oxidation system, a hydrogen peroxide feed system and an air stripper. The components of the South System are 12 extraction wells, conveyance piping and an air stripper. The effluent from both systems are combined and discharged to a common infiltration area.

Currently influent from both the North and South systems are combined prior to being processed through the North System. The South treatment system is not currently in use.

Groundwater is pumped from the North and South extraction wells at a rate of approximately 1,400 gallons per minute and is conveyed to the UV oxidation system and air stripper. Hydrogen Peroxide is added to the water to enhance the degradation of unsaturated VOCs in the UV oxidation system. The water is then conveyed to the top of the air stripping tower where the water cascades down over tower packing material. The packing material increases water surface area exposure to a counter current air flow of approximately 18,000 cubic feet per minute, thus causing the remaining VOCs to be transferred from the water to the air. The treated effluent is then conveyed in Rebel Hill Ditch to the effluent infiltration area.

SUBPARAGRAPH E(1)(e)

Identified substances analyzed for but not specifically intended to be removed by the GET B facility are as follows:

Bicarbonate	Chloride	Magnesium	Perchlorate	Sodium
Carbonate	Fluoride	Nitrate	Potassium	Sulfate
Calcium				

None of these substances have been found in concentrations that exceed primary or secondary State of California drinking water standards under Title 22 of the California Code of Regulations. Perchlorate has a current DHS action level of 4 ppb.

SUBPARAGRAPH E(1)(f)

Design and operational treatment capabilities of the facility at full-scale operation are as follows:

PARAMETER	DESIGN CAPACITY	OPERATIONAL TREATMENT CAPACITY
Fluid Flow, gpm - North System	1,710	1350
Air Flow, cfm – North System	18,000	18,000
Fluid Flow, gpm – South System	2,030	2,030
Air Flow, cfm – South System	18,000	18,000

CHEMICAL	OPERATIONAL TREATMENT CAPABILITY MAX. INFLUENT (PPB) TO YIELD VOC EFFLUENT OF <1PPB AND AN NDMA EFFLUENT OF <0.02 PPB	AVERAGE NORTH / SOUTH INFLUENT CONCENTRATION (ppb)
1,1-Dichloroethane	20	1.3 / ND
1,1-Dichloroethylene	50	12 / 0.52
1,2-Dichloroethane	10	2.5 / ND
Trichloroethylene	500	70 / 36
Chloroform	20	1.1 / ND
NDMA	20	30 / 0.136
1,1,2-Trichloro; 1,2,2-Trifluoroethane	1,000	2.0 / ND

SUBPARAGRAPH E(1)(g)

Based on the annual average flow and water quality information in Environmental Remediation's data base the average emission rates of VOCs in Subparagraph E(1)(d) from the GET B facility to the ambient air are presented below:

SUBSTANCE	AVERAGE EMISSION RATE (LB/DAY)[4]
1,1-Dichloroethane	0.005
1,2-Dichloroethane	0.02
Trichloroethylene	0.03
Chloroform	0.008
1,1,2-Trichloro; 1,2,2-Trifluoroethane	0.006
Other VOCs	<0.001

[4]The average emission rate is calculated from water quality data.

Emission rates of NDMA and the chemicals listed in Subparagraph E(1)(e) have not been estimated because NDMA is not volatile and should not enter the air stream.

SUBPARAGRAPH E(1)(h)

I. GET B OPERATING PLAN

The operating objective of the GET B facility is to remove compounds listed in Subparagraph E(1)(d) from extracted groundwater and then discharge treated effluent for infiltration into the ground. This plan outlines facility operation and maintenance procedures intended to maximize operating time and minimize down time while complying with discharge limits set forth in the Partial Consent Decree. The plan defines normal operating parameters, and serves as a guide for diagnosing and correcting problems that may arise with system components at the GET B facility. In addition to this plan Site remediation maintains a library of manufacturers' manuals at 16010 which contain detailed information on all system components.

II. OVERALL SYSTEM

A. System Components

The GET B facility, as shown in Figure 3, employs five major system components in the treatment of groundwater. The five system components are as follows:

1. Twenty-six Extraction Wells. Fourteen are connected to the North system and twelve are connected to the South system (see Figure 1)
2. UV Oxidation System North system
3. Air Stripper North system
4. Air Stripper South system
5. Hydrogen Peroxide (chemical addition system North system)

Normal operating parameters for the five system components of the GET B facility are as follows:

SYSTEM	PARAMETER	NORMAL OPERATING RANGE[5]
Extraction Wells (14) (North)	Cumulative Flow Rate (gpm)	1,000-1,600
Extraction Wells (12) (South)	Cumulative Flow Rate (gpm)	1,000-2,030
UV Oxidation System (North)	Liquid Flow Rate (gpm)	1,000-1,600
Air Stripping Unit (North)	Liquid flow Rate (gpm)	1,000-1,600
	Air Flow Rate (cfm)	18,000
Air Stripping System (South)	Liquid Flow Rate (gpm)	1,000-2,030

[5]Normal operating values are expressed in ranges because operating conditions vary, requiring adjustment of system parameters.

	Air Flow Rate (cfm)	18,000
Hydrogen Peroxide System (North)	ml/min	50-150

B. Startup/Shutdown

Under normal operating conditions each system (North or South) starts automatically once the Off-Auto-Start switch is turned to start for the respective system.

The North System starts up in the following way:

1. The air stripper blower starts.
2. The valve on the industrial water system opens automatically supplying water to the UV oxidation system.
3. The UV oxidation system starts and warms up utilizing industrial water.[6]
4. The UV oxidation system goes into treat mode after twenty minutes.
5. The wells associated with the North System start automatically.
6. The industrial water valve gradually closes when flow from the north wells is detected.

Shutdown of the North System is achieved by turning the Off-Auto-Start switch to off.

System components shut off in the following way:

1. The wells shutdown and the influent control valve closes.
2. The UV system shuts down when no flow is detected at the influent flow meter.
3. The air stripper blower shuts down.

The South System starts up in the following way: (Currently not in use.)

1. The air stripper blower starts.
2. The influent valve opens and a signal is sent to the south wells to start.
3. The south wells start and flow is detected at the influent flow meter for the South System.

Shutdown of the South System is achieved by turning the Off-Auto-Start switch to off. System components shut off in the following way:

1. The wells shut down and the influent control valve closes.
2. The air stripper blower shuts down.

C. Maintenance

Efficient plant operations require scheduled preventive maintenance and a capability to respond quickly to unscheduled equipment failure. General maintenance procedures are briefly discussed in this plan. If additional maintenance information is required, it can be found in the manufacturers' operation and maintenance manuals. Environmental Remediation personnel, Aerojet Site Services personnel, and maintenance contractors perform maintenance of the GET B facility. Maintenance considerations include routine site maintenance, utility maintenance, preventive maintenance and

6 The UV system can be started using water from the South extraction wells (see figure 3).

routine surveillance. Pipelines, valves, pumps and other mechanical equipment need regular maintenance for proper performance. Those items in contact with water need routine cleaning and painting to protect against corrosion. Plant maintenance and the frequency with which this required maintenance must be performed is the responsibility of Aerojet Site Services. More detailed descriptions of maintenance procedures of the system components are given in the following sections of this report.

III. EXTRACTION WELLS

Twenty-six extraction wells are associated with GET B, of which, twenty-one are located offsite along White Rock Road south of the main Aerojet property and five are located onsite south of the GET B treatment system (see Figure 1).

A. Well Components

Twenty-four of the wells were constructed as extraction wells while Well 98 and Well 4510 are converted monitoring wells. The major components of the extraction wells include the well, flow meter, check valve, manual control valve and control panel. Details of the GET B extraction wells are presented in Figure 4 and a functional description is presented in Table 1.

B. Normal Operation

During normal operation, the pump flow rates are within the expected normal range listed in Subparagraph E(1)(a). All GET B pump motors are equipped with a motor saver that shuts the pump off in the event that the water level in the well casing is low. The motor saver detects a low current condition when the pump unloads due to having less than the minimum required submergence of the pump.

C. Startup/Shutdown

Startup of the well pumps is performed in the following steps:

1. Check all circuit breakers in the control panel and reset if necessary.
2. Report any abnormalities the GET facility engineer.
3. Adjust the control valve position to achieve the desired flow rate.

Shutdown of the extraction well is performed by simply turning the “Hand-Off-Auto” switch to the off position and closing the valve.

D. Malfunctions

Infrequently during the hot season, GET B wells may automatically shutdown due to excessive heat in the control panel. Bimetallic circuit breakers in the control panel will “trip-out” on very hot days and shutdown the extraction wells. These circuit breakers must be reset before starting the well pump. If the pump does not start after resetting the circuit breaker, it may be necessary to replace the circuit breakers. However, it is important that the operator be familiar with all service manuals before attempting to repair electrical circuits.

E. Maintenance

GET B submersible pumps require a minimum amount of maintenance. Routine surveillance includes: a check of flow rate, cumulative gallons, and observation of the well piping and casing for leaks. Any abnormal vibrations or noise should be reported to the GET facility engineer.

IV. UV TREATMENT SYSTEM

A. UV Treatment System Components

The UV treatment system consists of seven 90- kilowatt UV oxidation units. Each unit consists of three 30- kilowatt reactors and a Programmable Logic Controller (PLC). Unit 1 is designated as the master unit. This unit controls and monitors input signals from the remaining six units. The master unit PLC controls startup and shutdown of the UV system components and communicates with the overall system PLC through contract closure relays (CCRs). The state that these CCRs are in communicates alarm conditions, system warm up, ready to run or run conditions to the overall system PLC.

B. Normal Operation

During normal operation, groundwater from the North wells will be pumped through the UV treatment system and to the top of the North System air stripper at a rate of between 1,000 and 1,350 gpm.

The UV treatment System is designed to achieve an effluent water quality of less than 0.020 ppb of NDMA at a maximum of influent concentration of 20 ppb NDMA at a maximum flow rate of 1,350 gpm.

C. Operation During Periods of Maintenance

During periods when maintenance activities require that the UV treatment system be removed from operation, the wells will be shutdown.

D. Startup/Shutdown

Startup and shutdown of the UV treatment system is automatic as described in the startup and shutdown of the overall system.

E. Malfunctions

In the event of an electrical or mechanical failure of the UV treatment system, the extraction wells will shutdown and the influent control valve will close.

F. Maintenance

Maintenance of the GET B UV treatment system involves daily and monthly surveillance by GET operations personnel which evaluate support equipment performance and treatment performance. Additional maintenance is performed on the UV system every 3,000-4,000 hours at which time the UV lamps are replaced.

V. AIR STRIPPING SYSTEM

A. Major Components

There are two independent air strippers at the GET B facility. Each air stripper is equipped with a blower, ducting, packed tower and influent/effluent conveyance piping. A schematic diagram is presented in Figure 2. The strippers are designed to remove VOCs listed in Subparagraph E(1)(d).

B. Normal Operation

During normal operation water is pumped to the top of each air stripping unit. The water flows down over packing that maximizes water surface area. Air flowing upward through packing contacts the water. Volatile organic compounds (VOCs) are removed from the water and transferred to the air. Water is collected in the sump of each tower. Water flows from the tower sumps by gravity through the effluent conveyance system to the surface infiltration area.

C. Startup/Shutdown

Startup and shutdown of the air stripping systems is automatic as described in the startup and shutdown of the overall system. To enable this feature, the hand-off-auto switches for each blower must be in auto.

D. Malfunctions

Malfunctions associated with the air stripping system are of two types, mechanical failure or electrical failure.

Mechanical failures include loose or worn fan belts or improper fan alignment resulting in treatment plant shutdown. Electrical failures are normally due to power outages.

E. Maintenance

The operator is required to be familiar with the manufacturer's suggested maintenance procedures before attempting to repair components of the air stripping system. Maintenance of the GET B air stripping system involves surveillance of:

1. Speed of fan rotation, (belt slipping)
2. Fan belt wear and tension, and
3. Any unusual noise or vibration.

Periodic maintenance involves:

1. Adjustment and/or replacement of fan belts as needed,
2. Lubrication of motor and fan bearings.

VI. CHEMICAL FEED SYSTEM

The addition of Hydrogen Peroxide by the Chemical Feed System enhances the degradation of unsaturated VOCs in the UV Treatment System. The Hydrogen Peroxide exposed to UV light produces hydroxyl radicals that enhance the destruction of unsaturated VOCs.

A. Chemical Feed System Components

The major components of the chemical feed system are a 6,000 gallon storage tank, 100 gallon day tank, transfer pump, metering pumps and conveyance tubing. A layout for the hydrogen peroxide room is shown in Figure 5.

B. Normal Operation

Under normal conditions the UV Treatment System is operated with hydrogen peroxide injection. Hydrogen peroxide is typically added at a rate of approximately 30 gallons per day. Hydrogen Peroxide provides a source of oxidizing agents that facilitate decomposition of unsaturated VOCs.

C. Startup/Shutdown

The chemical feed system starts automatically once flow from the extraction wells is detected in the UV Treatment System. The chemical feed system shuts down automatically when water flow in the UV Treatment System goes to zero.

D. Malfunctions

Problems with the chemical feed system can usually be attributed to:

1. Pump failure;
2. Electrical failure; or
3. Pipe, tank, or pump leak.

Equipment should be replaced if malfunctions are discovered during routine surveillance. Before working on any chemical feed system, the operator should review MSDS information and safety procedures. Storage tanks should be isolated and all feed lines and pumps should be flushed to ensure no residual chemicals remain.

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VII. REBEL HILL DITCH AND EFFLUENT INFILTRATION AREA

A. Rebel Hill Ditch Components

Rebel Hill Ditch is made up of an open channel and corrugated metal pipe system which historically served as part of the industrial water conveyance system for the Aerojet facility and as conveyance for water used in gold dredging activities. (See Figure 6.)

B. Normal Operation

Treated effluent from the GET B treatment facility is discharged to dredge tailings located to the west of the treatment facility. The effluent drains into Rebel Hill Ditch in the vicinity of building 37024 and then flows down the ditch to a control structure. The control structure is a five foot wide by 10 inch deep weir over which the effluent flows. The total depth of Rebel Hill Ditch is three feet. Operation of Rebel Hill Ditch at a water depth of 1.5 feet (1/2 the total depth of the ditch) would result in a flow across the control structure of approximately 4,000 gallons per minute. The effluent flowing over the control structure then enters a 30- inch diameter corrugated metal pipe that conveys the effluent for a distance of approximately 2,000 feet and results in an elevation change of approximately 40 feet. At a flow rate of 4,000 gallons per minute the head losses are insignificant compared with the elevation change of 40 feet. The water exits the pipe into an open channel behind VBM 3 and continues through Line Four. The water enters a dredge pond to the east of Building 04009. The water exits the dredge pond and enters an open channel flowing south to Old White Rock Road. The channel then turns west parallel to Old White Rock Road. The water crosses under Old White Rock Road in a culvert and infiltrates back into the ground on the south side of Old White Rock Road west of the Gate Eight Road behind Line Three. Based on historical data, losses due to leakage and evaporation constitute approximately 40% of total flow through the ditch. It is estimated that 2,400 gallons per minute would reach the infiltration area.

C. Maintenance

Many years of neglect has left Rebel Hill Ditch in a state of disrepair. However, a concerted effort is currently being undertaken to restore the ditch.

Maintenance tasks include:

1. Daily cleaning of debris screens.
2. Monthly surveillance along the full length of the ditch to identify areas to be cleaned and repaired.
3. Annual maintenance and improvement of access roads.
4. Periodic repairs of portions of the ditch.

VIII. GET OUTAGES OPERATING PLAN

The purpose of the GET Outages Operating Plan is to describe required planned activities that will cause suspension of the operation of all or part of a GET system. Also detailed in this plan are examples of unplanned activities that will cause GET system outages that are beyond the control of the operator.

Inherent in the operation of any treatment facility are periods when all or part of the treatment facility will be unavailable due to one or all of the following events:

- routine preventive maintenance
- identified maintenance
- annual inspection
- instrument validation
- hydrologic testing
- well rehabilitation
- catastrophic equipment failures
- new construction

In the following subsections, an explanation of these events is provided.

A. Preventive Maintenance

Aerojet Site Services operates a program of preventive maintenance. After completion of construction activities, a physical inventory is performed to identify the equipment and systems that require routine preventive maintenance. During the inventory, a maintenance number is assigned to each piece of equipment. These maintenance numbers are entered into the computerized database with a corresponding schedule for daily, weekly, monthly, quarterly, or yearly maintenance. Depending on the schedule entered for the equipment, the computer routinely generates Maintenance Work Orders (MWOs). These MWOs are then assigned to maintenance crews depending on the type of work required (i.e., lubrication, mechanical, electrical, boiler, sheet metal or HVAC). The foreman of the maintenance crew then coordinates with Environmental Remediation. If equipment shutdown is required, equipment is secured by Environmental Remediation personnel, the required work is performed, and equipment is placed back online. These types of tasks usually require minimal downtime.

B. Identified Maintenance

The Maintenance Work Request (MWR) system is employed in conjunction with the preventive maintenance program. This program gives the facility operating personnel the option to place MWRs for the problems that become evident during routine operations or preventive maintenance that requires immediate attention. The MWR system is intended to facilitate rapid response to situations which, if left unattended, would lead to catastrophic equipment failure and result in extended periods of GET system outages.

C. Annual Inspections

As required by state and local codes, there are several types of equipment (e.g., boiler and compressor) that require annual inspections. These required inspections necessitate the shutdown of the equipment for a few hours to as much as 24 hours, resulting in the inability to continue to operate the GET facility. Currently at GET B only a compressor falls under this inspection requirement and the records are maintained by Aerojet Site Services.

D. Instrument Validation

The existing GET facilities use sophisticated electronic equipment to operate and monitor the treatment process. These instruments require periodic validation that is currently performed on an as needed basis. The facilities must be shutdown for a period of up to two (2) days to perform this work.

E. Hydrologic Testing

To determine accurately what modifications should be performed on the existing extraction or recharge systems to assure system effectiveness, or to verify if system modifications are producing the required zones of capture or other hydrologic effects, it is routinely necessary to periodically suspend pumping of selected wells. These shutdowns are required to allow the system to obtain hydrologic equilibrium conditions for hydrologic measurements. The lengths of these shutdowns are variable and will normally continue until there are enough data to predict accurate aquifer characteristics. The normal testing period will usually require between 5 to 14 days.

F. Well Rehabilitation

During normal operation of the GET facilities, the capacity of production wells to produce water will decline. This decline depends on the volume and rate of water produced and aquifer characteristics. When a well's specific capacity measured in gallons per minute per foot of draw down has declined sufficiently, as indicated by the extraction well not producing the desired hydraulic effect, the well must be rehabilitated. The rehabilitation of an extraction usually lasts 5 to 7 days depending on the cause of the reduced hydraulic capacity. This outage generally affects only a portion of the hydrologic control of a GET facility.

G. Equipment Failure

An equipment failure is defined as failure or malfunction of any GET facility to related support equipment that causes and unplanned shutdown of part or all of a GET facility. To minimize the occurrence of unscheduled outages, Aerojet has developed certain contingency plans. These contingency plans include:

- continuous on-call maintenance capabilities provided by in-plant facility services;
- time and material contracts with specialty contractors to provide support for maintenance capabilities that are not provided by Aerojet Site Services, (i.e., water well equipment and well rehabilitation);
- a maintenance store to provide replacement parts and equipment; and

- open purchase order accounts at numerous local supply houses for parts and equipment not normally stocked at the maintenance store.

H. New Construction (Existing GET Facilities)

During the long-term operation of a GET system, head and water quality data are routinely collected and evaluated to determine effectiveness of the system. As a result of this evaluation, Aerojet may identify a need to modify the system to enhance effectiveness. These modifications usually consist of the addition of extraction and recharge wells and modification to GET treatment facilities with subsequent system shutdown during the construction of these modifications. The period of time required for system shutdowns varies from a few hours to several months depending upon the nature of the construction work.

SUBPARAGRAPH E(1)(i)

Aerojet has no planned material modifications to GET B prior to the completion of the ongoing Perimeter Groundwater Operable Unit RI/FS.

TABLE 1

GET B EXTRACTION WELL COMPONENTS

COMPONENT	SPECIFICATIONS
Extraction Well (26)	16 - 14” diameter steel casing
	1 - 10” diameter steel casing
	7 - 8” diameter steel casing
	1 - 6” diameter steel casing
	1 - 5” diameter steel casing
Extraction Pump (26)	Submersible pumps
	Flow range [see Subparagraph E(1)(a)]
	Pumps set at various depths
Flow Meter (26)	5 - Water Specialties 6”
	4 - Water Specialties 4”
	7 - Great Lakes 3”
	3 - Great Lakes 2”
	7 - Great Lakes 1”

TABLE 2

TREATMENT PLANT COMPONENTS

COMPONENT	SPECIFICATIONS	SUPPLIER
Air Striping Towers (2)	12' – 0" diameter 31' – 0" packing depth	DEI
Fans (2)	Single-width PLR Size 30/18,000 CFM	NYB
Flow Meter (9)	2 - 12" (Propeller type) 7 – 6" (Magnetic)	Water Specialties Endress Hauser
Control Valve (11)	3 – 12" 1 – 6" 7 – 4"	Keystone Keystone Keystone
UV Skid (7)	3 x 30 kw reactors	Calgon

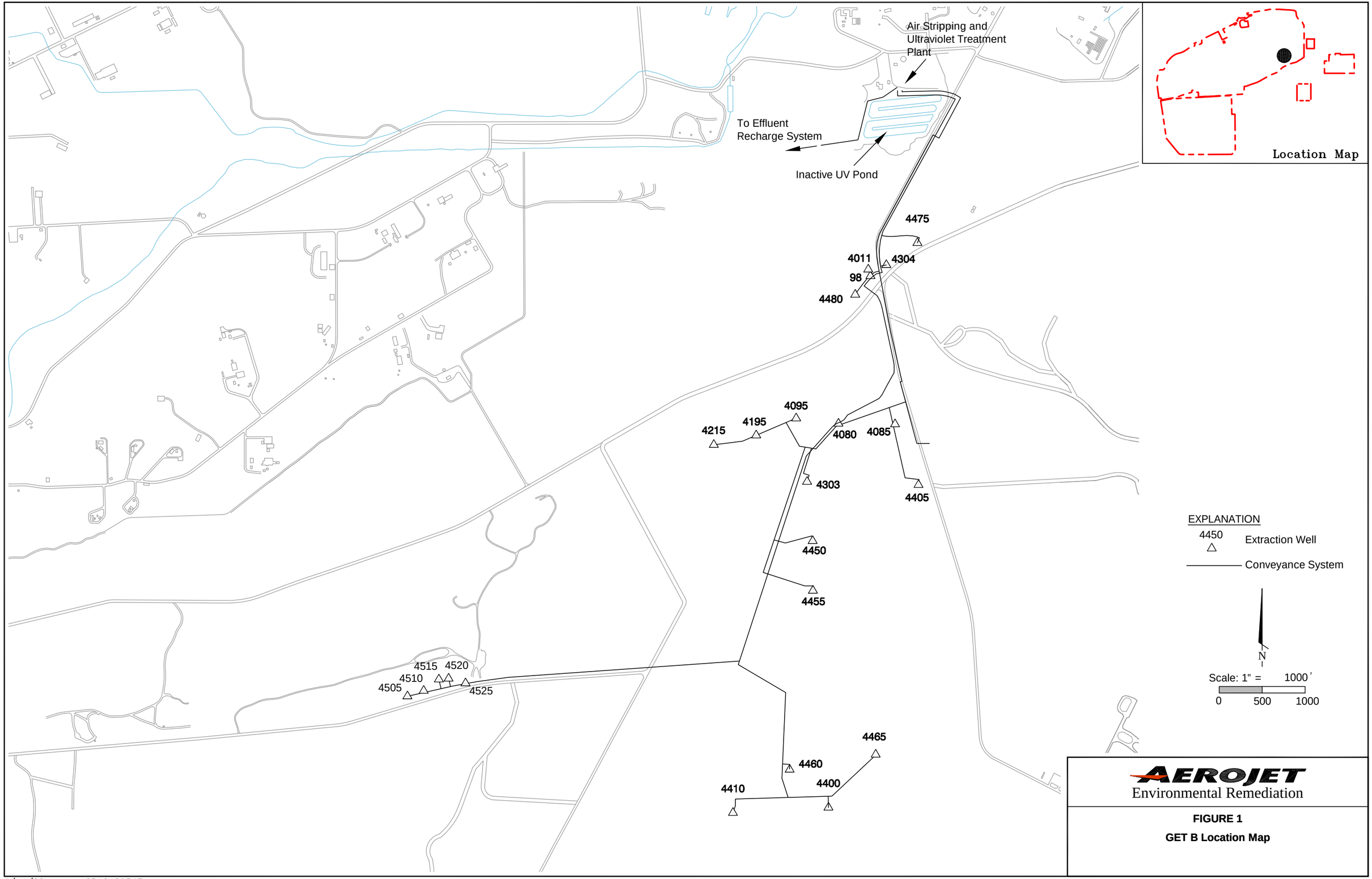

FIGURE 1

GET B Location Map

4/11/00 ah SR10109543

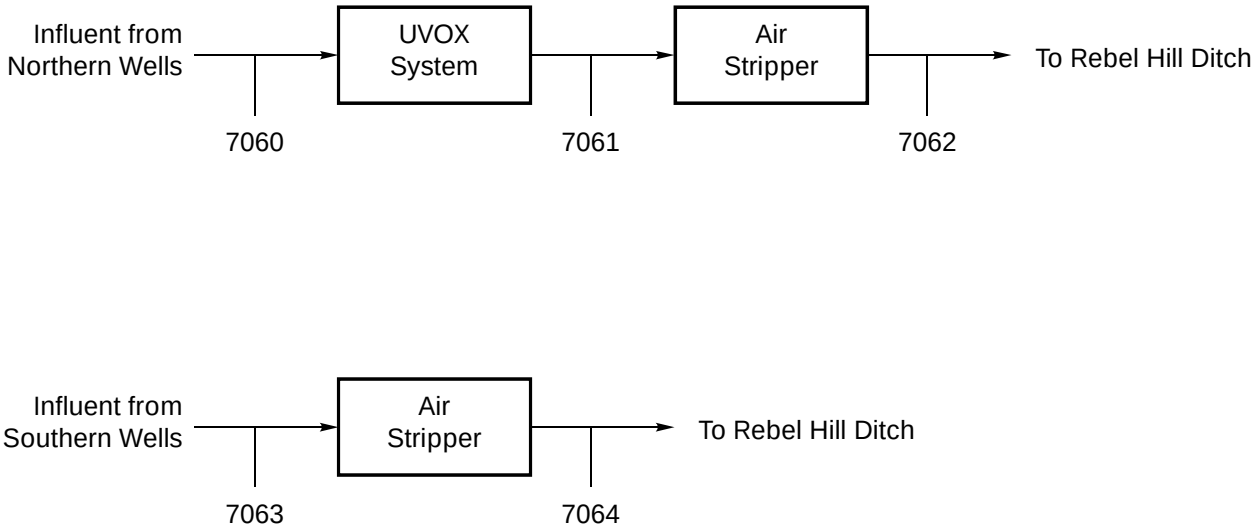

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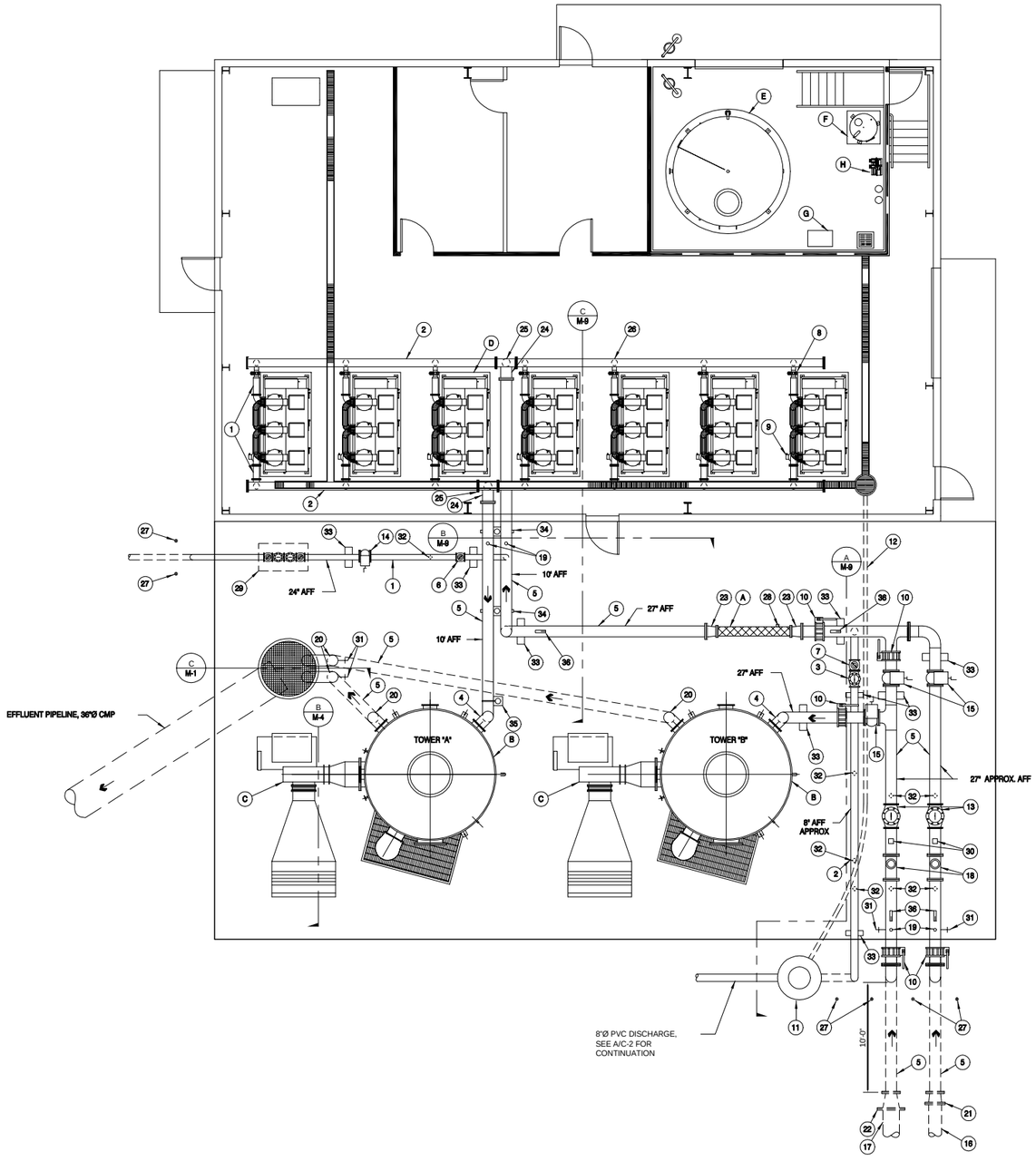
FIGURE 2
Treatment Plant and
Monitoring Points



PLAN NOTES

CONTRACTOR FURNISHED

1. 6"Ø STEEL PIPING, AS REQUIRED
2. 8" STEEL PIPING, AS REQUIRED
3. 8"Ø PRESSURE RELIEF VALVE
4. 12"Ø FIBERGLASS PIPING, AS REQUIRED
5. 12"Ø STEEL PIPING, AS REQUIRED
6. 6"Ø GATE VALVE, 1 EA
7. 8"Ø GATE VALVE, 1 EA
8. 4"Ø BUTTERFLY VALVE, 7 EA.
9. 6"Ø BUTTERFLY VALVE, 7 EA
10. 12"Ø BUTTERFLY VALVE, 5 EA
11. 48"Ø CMP MANHOLE, PER E/C-11
12. 4"Ø PVC PIPING, AS REQUIRED
13. 12"Ø CHECK VALVE, 2 EA
14. 6"Ø CONTROL VALVE, 1 EA
15. 12"Ø CONTROL VALVE, 3 EA
16. 14"Ø PVC TO TIE-IN POINT
17. 18"Ø PVC TO TIE-IN POINT
18. 12"Ø FLOW METER, 2 EA
19. AIR RELIEF VALVE, 4 EA, PER D/M-1
20. SLEEVED CONCRETE SLAB PENETRATION, 4 PLACES
21. 14"x12" REDUCER' 1 EA
22. 18"x12" REDUCER, 1 EA
23. 12"x10" REDUCER, 2 EA
24. 12"x8" REDUCING ELBOW, FLANGED 2 EA
25. 8"x8"x8" TEE, FLANGED 2 EA
26. 8"x8"x6" REDUCING TEE, WELDED, 14 EA
27. BOLLARD, 6 EA
28. HYDROGEN PEROXIDE INJECTION PIPING, [" SST, AS REQUIRED
29. 6"Ø REDUCED PRESSURE BACKFLOW PREVENTER
30. PRESSURE TRANSMITTER TUBING, PER A/M-1, 2 PLACES
31. SAMPLE TAP, PER B/M-1, 4 EA
32. PIPE SUPPORT, PER B/M-8, 8 EA
33. PIPE SUPPORT, PER C/M-8, 9 EA
34. PIPE SUPPORT, PER D/M-8, 2 EA
35. PIPE SUPPORT, PER E/M-8, 1 EA
36. PRESSURE GAUGE, 4 EA

AEROJET EQUIPMENT

- (A) STATIC MIXING SPOOL, FLANGED 10"Ø, 1 EA
- (B) AIR STRIPPING TOWER, 2 EA
- (C) BLOWER, 2 EA
- (D) ULTRAVIOLET MODULES, 7 EA
- (E) 6000 GAL PEROXIDE STORAGE TANK (INSTALL BEFORE ERECTING BUILDING)
- (F) 100 GAL PEROXIDE DAY TANK
- (G) TRANSFER PUMP
- (H) METERING PUMPS

GENERAL NOTES

1. PIPE HEIGHTS AFF ARE TO THE BOTTOM OF PIPES. SEE SHEET M-8.

N

Scale: 1" = 150"

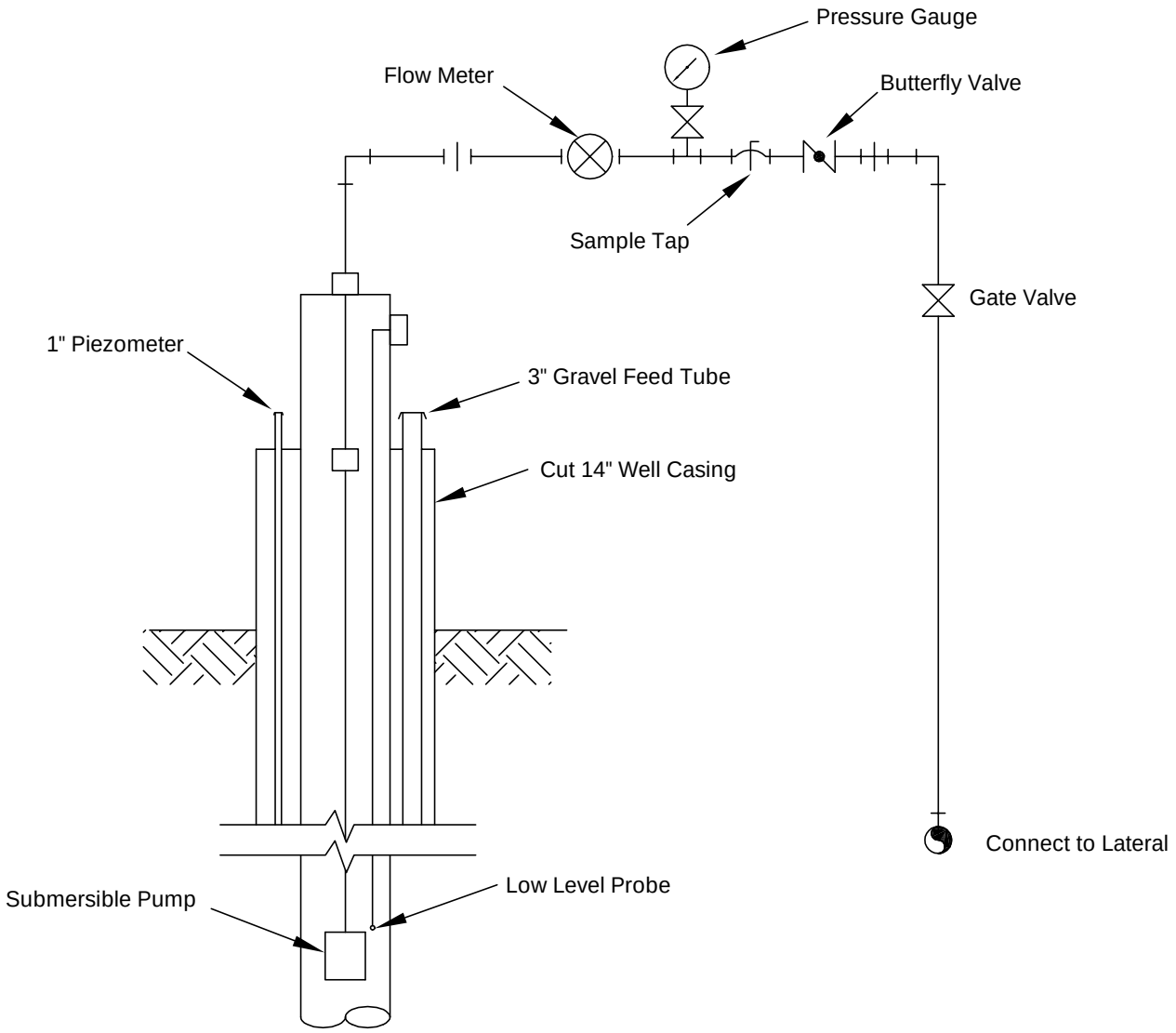
0 75 150

AEROJET
Environmental Remediation

FIGURE 3

Treatment Plant Layout

6/10/02 ah SR10108085



PUMP SETTINGS

Well No.	Pump Bowls	Well No.	Pump Bowls
98	112'	4450	191'
4011	116'	4455	151'
4080	165'	4460	203'
4085	160'	4465	213'
4095	155'	4475	170'
4195	159'	4480	183'
4215	160'	4505	159'
4303	163'	4510	142'
4304	103'	4515	145'
4400	225'	4520	141'
4405	169'	4525	147'
4410	178'		

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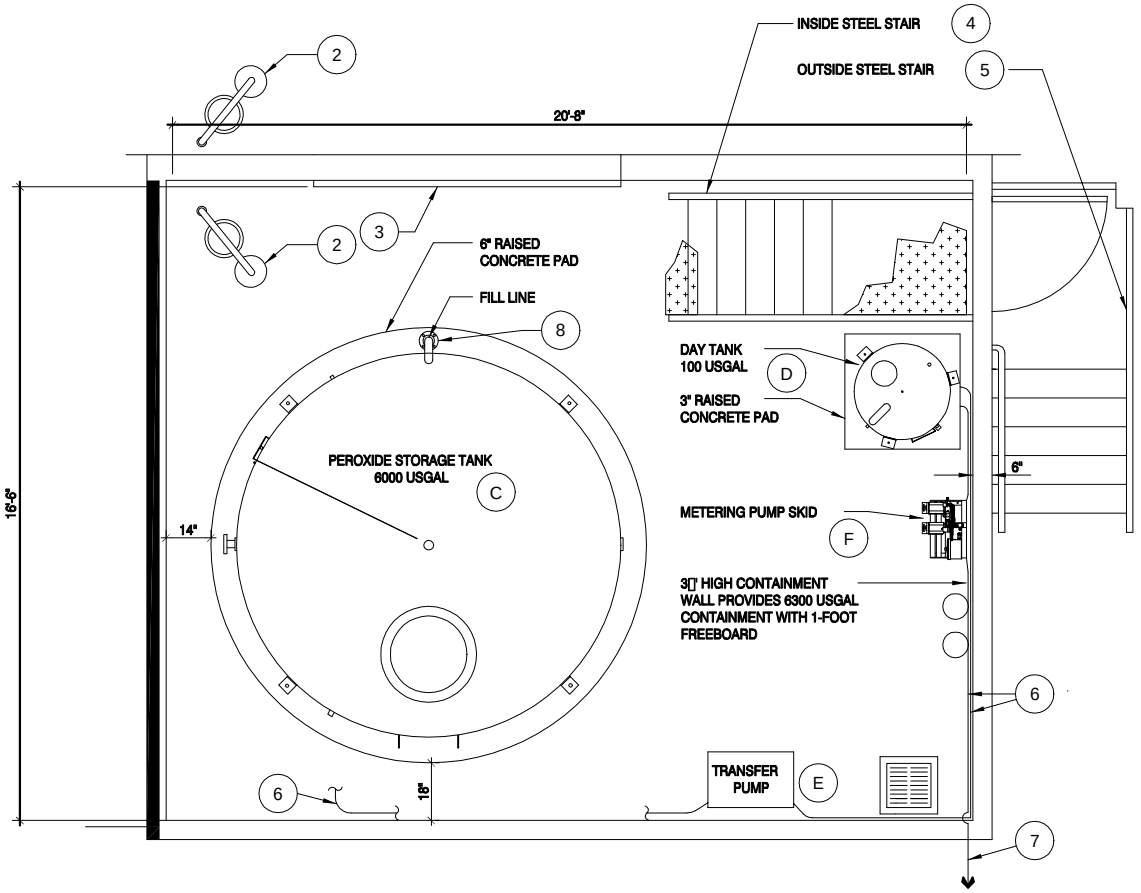
FIGURE 4

GET B
Extraction Well



PEROXIDE TANK ROOM

C
M-5

SCALE : 3/8" = 1'-0"

AEROJET FURNISHED EQUIPMENT

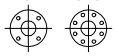
- (A) STATIC MIXER SPOOL PIECE, 1 EA.
- (B) ULTRAVIOLET MODULES, 7 EA.
- (C) 6000 GAL. STORAGE TANK, 1 EA.
- (D) 100 GAL. DAY TANK, 1 EA.
- (E) TRANSFER PUMP, 1 EA.
- (F) METERING PUMP SKID, 1 EA.

CONTRACTOR FURNISHED EQUIPMENT

- (1) ALL ANCHORS
- (2) EYEWASH/SHOWER, 2 EA
- (3) ROLL-UP DOOR
- (4) INSIDE STEEL STAIR
- (5) OUTSIDE STEEL STAIR
- (6) PEROXIDE LINES, TYPE 304 SST
- (7) PEROXIDE LINE TO INJECTION POINT, []" TYPE 304 SST APPROX. 50'
- (8) FILL QUICK-CONNECT, 2"Ø MALE, TYPE 304 SST

INSTALLATION NOTES

1. LEAVE AT LEAST 36" CLEARANCE AROUND RAYOX SKID FOR MAINTENANCE.
2. RAYOX SKID TO BE MOUNTED ON A 6" RAISED CONCRETE PAD.
3. ALL FLANGES ARE 150lb. RAISED FACE UNLESS OTHERWISE NOTED. TYPICAL FLANGE ORIENTATION:



STRADDLE CENTERLINES

4. LAMP REMOVAL REQUIRES 127" HIGH CEILING.
5. DO NOT RUN ANY PROCESS PIPE DIRECTLY OVER REACTORS.

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Environmental Remediation

FIGURE 5

Hydrogen Peroxide Room

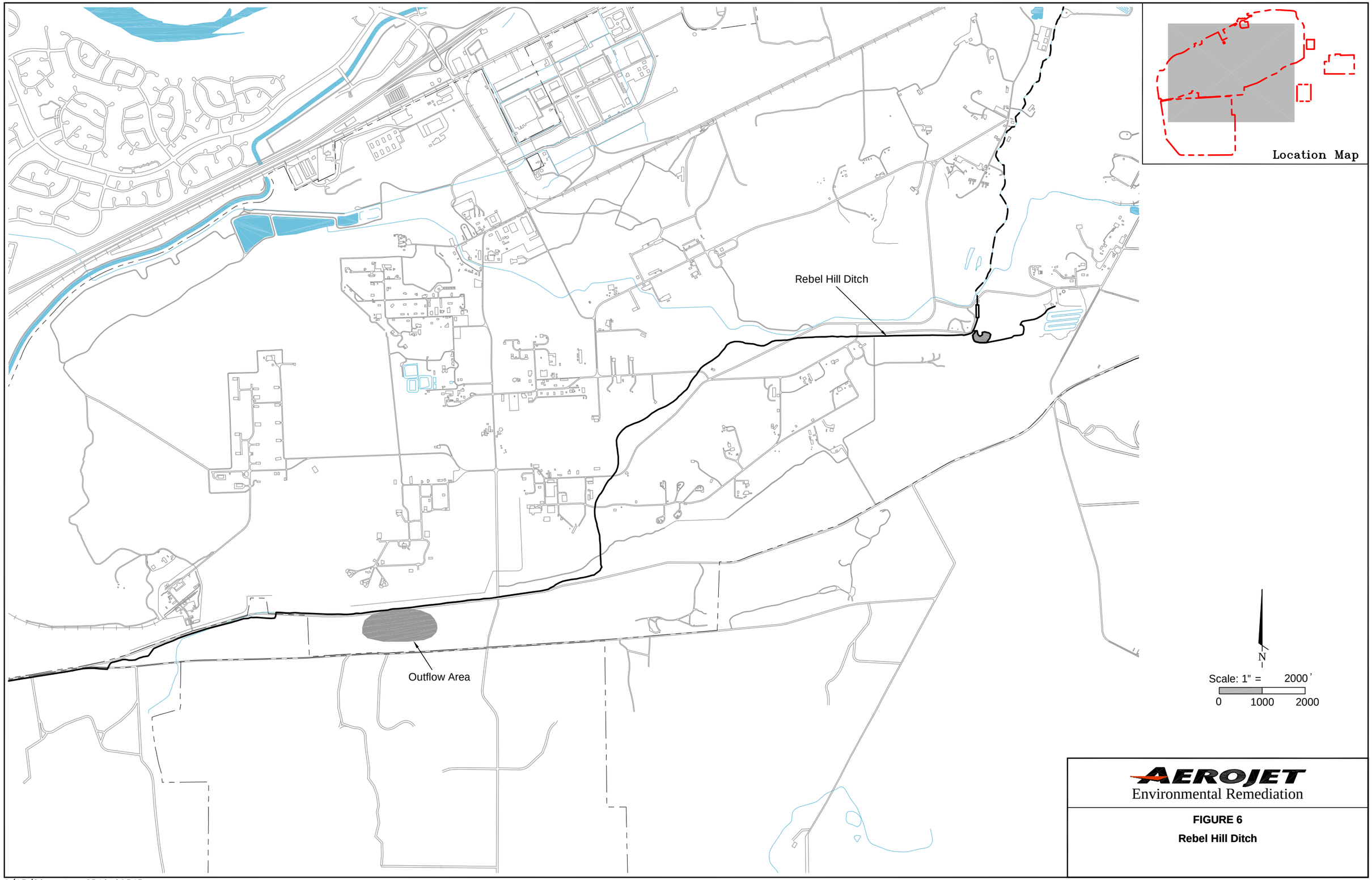

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FIGURE 6

Rebel Hill Ditch

4/13/00 ah SR10109545

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SR10107854

FACILITY REPORT

GET A SYSTEM

FACILITY REPORT
GET A SYSTEM

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FACILITY REPORT
GET A SYSTEM

Aerojet has prepared this facility report in accordance with provisions contained in Exhibit VI of the Partial Consent Decree. The GET A facility began operation in July of 1986.

SUBPARAGRAPH E(1)(a)

Figures 1 through 6 are asbuilt schematic drawings of the GET A facility showing process units, piping, flow direction, influent, effluent, and intermediate monitoring stations. The hydraulic capacity and the expected normal range for flow rates of all GET A pumps are presented below:

PUMP NUMBER	HYDRAULIC CAPACITY (GPM)[1]	EXPECTED NORMAL RANGE FLOW RATE (GPM)[2]
Well Pump 4012	50	5-20
Well Pump 4013	20	1-10
Well Pump 4100	90	70-80
Well Pump 4105	90	8-12
Well Pump 4110	90	30-40
Well Pump 4120	90	20-28
Well Pump 4125	90	1-6
Well Pump 4130	90	12-20
Well Pump 4430	20	8-14
Well Pump 4500	90	100-140

SUBPARAGRAPH E(1)(b)

Identification numbers for the major components of the GET A facility are as follows, and as indicated in Figures 1 and 2. Data in Aerojet's computer database may be accessed by these identification numbers.

---

[1]Hydraulic capacity indicates the maximum capacity of the pump, not what the well will produce.

[2]Expected normal flow rate is a range because it is principally a function of the level of the ground water table and the period of time following well development/redevelopment.

IDENTIFICATION	DESCRIPTION
4012	Extraction Well
4013	Extraction Well
4100	Extraction Well
4105	Extraction Well
4110	Extraction Well
4120	Extraction Well
4125	Extraction Well
4130	Extraction Well
4430	Extraction Well
4500	Extraction Well
7013	UV Treatment System Influent
7017	UV Treatment System Effluent/Influent to Air Stripper
7018	Seepage Sump
7019	Discharge to Rebel Hill Ditch
7039	Effluent Air Stripper Sample Port

SUBPARAGRAPH E(1)(c)

From the initial step draw down tests and observed recharge rates, the design extraction and recharge rates for the GET A facility are estimated as follows:

WELL NUMBER	DESIGN CAPACITY (GPM)[3]
Extraction Well 4012	40
Extraction Well 4013	12
Extraction Well 4100	50
Extraction Well 4105	50

[3]Design capacity is an engineering estimate calculated to determine size requirements of well and treatment plant components.

WELL NUMBER	DESIGN CAPACITY (GPM)
Extraction Well 4110	50
Extraction Well 4120	50
Extraction Well 4125	50
Extraction Well 4130	50
Extraction Well 4430	12
Extraction Well 4500	50
Influent Treatment System	400
Effluent Infiltration Area	400

SUBPARAGRAPH E(1)(d)

The GET A facility is designed to remove the following chemicals:

N-Nitrosodimethylamine (NDMA)
1,2-Dichloroethane
1,1-Dichlorethylene
1,1,2-Trichloro-1,2,2-Trifloroethane
Trichloroethylene
1,2-Dichloroethane

In addition, the following VOCs have been sporadically detected at de minimis levels; these chemicals will also be removed in the treatment process.

cis/trans-1,2-Dichloroethylene
1,1,1-Trichloroethane
Bromodichloromethane

The treatment process employed to remove these chemicals is described in the following paragraphs.

The GET A facility consists of ten extraction wells, a chemical feed system, a UV oxidation unit, an air stripping system consisting of a counter current, packed air stripping tower with a lift pump and effluent infiltration area.

Groundwater is pumped from the extraction wells at an average rate of approximately 312 gallons per minute and is conveyed to the UV oxidation unit by a piping system. Hydrogen Peroxide is added to the water to enhance the degradation of NDMA in the UV oxidation unit. The treatment process employed by the GET A facility begins with conveyance of water from the extraction wells to the UV oxidation unit. The water is discharged from the UV oxidation unit into a collection sump where it is pumped to the top of the air stripping tower. In the air stripping tower the water cascades down over packing material which provides water surface area exposure to a counter current air flow of 1,600 cubic feet per minute, thus causing the volatile dissolved chemicals to leave the water and enter the air. The water is discharged to a diversion box from which it is conveyed to the effluent infiltration area.

During periods when maintenance is required on the air stripping unit or in the event of a power failure effluent may be above the effective treatment limits, in which case the effluent is discharged upgradient for probable recapture by the extraction wells.

SUBPARAGRAPH E(1)(e)

Identified substances analyze for but not specifically intended to be removed by the GET A facility are as follows:

Bicarbonate	Chloride	Nitrate	Sulfate
Carbonate	Fluoride	Potassium	
Calcium	Magnesium	Sodium	

None of these substances have been found in concentrations which exceed primary or secondary State of California drinking water standards under Title 22 of the California Code of Regulations.

SUBPARAGRAPH E(1)(f)

Design and operational treatment capabilities of the facility at full scale operation are as follows:

PARAMETER	DESIGN CAPACITY	OPERATIONAL TREATMENT CAPACITY
Fluid Flow, gpm	400	340
Air Flow, cfm	1,600	1,600

CHEMICAL	OPERATIONAL TREATMENT CAPABILITY MAX, INFLUENT (PPB) TO YIELD EFFLUENT OF <1 PPB	AVERAGE INFLUENT CONCENTRATION (ppb)
1,2-Dichloroethane	20	15
1,1-Dichloroethylene	50	10
1,1,2-Trichloro-1,2,2-Trifloroethane	1000	600
Trichloroethylene	500	100
NDMA	30	12

SUBPARAGRAPH E(1)(g)

Based on data collected March of 1995, average emission rates of chemicals in Subparagraph E(1)(d) from the GET A facility to the ambient air are presented below:

SUBSTANCE	AVERAGE EMISSION RATE (LB/DAY)[4]
1,1-Dichloroethane	.01
1,1-Dichloroethylene	.07
1,1,2-Trichloro-1,2,2-Trifloroethane	1.22
1,2-Dichloroethylene	.01
1,2-Dichloroethane	.06
Trichloroethylene	.17
Other VOCs	<.01

[4]The average emission rate is calculated from water quality data.

Emission rates of NDMA and the chemicals listed in Subparagraph E(1)(e) have not been estimated because they are not volatile and should not enter the air stream.

SUBPARAGRAPH E(1)(h)

I. GET A OPERATING PLAN

The operating objective of the GET A facility is to remove compounds listed in Subparagraph E(1)(d) from extracted groundwater and then discharge effluent for percolation to the ground. This plan outlines facility operation and maintenance procedures intended to maximize operating time and minimize down time while complying with discharge limits set forth in the Partial Consent Decree. The plan defines normal operating parameters, and serves as a guide for diagnosing and correcting problems that may arise with system components at the GET A facility. In addition to this plan, a library of manufacturers' manuals is maintained; these manuals contain detailed information on all system components.

II. OVERALL SYSTEM

A. System Components

The GET A facility, as shown in Figure 1, employs four major system components in the treatment of groundwater.

The four system components are as follows:

1. Ten Extraction Wells
2. Air Stripping System
3. UV Oxidation System and Flow Distribution System

4. Chemical Feed System (Hydrogen Peroxide)

Normal operating parameters for the four system components of the GET A facility are as follows:

SYSTEM	PARAMETER	NORMAL OPERATING RANGE[5]
Extraction Wells (10)	Cumulative Flow Rate (gpm)	255-370
Air Stripping System	Air Flow Rate (cfm)	1,600
	Liquid Flow Rate (gpm)	255-370
UV Oxidation System	Liquid Flow Rate (gpm)	255-370
Chemical Feed System UVOX Unit	Hydrogen Peroxide Flow Rate (gal/day)	30-50

B. Startup/Shutdown

Startup of the overall system centers around startup of the UVOX unit. Therefore, the extraction wells, lift station pump and air stripper must be prepared for startup before the UVOX unit is started. Preparing the treatment system to receive groundwater involves the following steps:

1. Turn on potable water to the UVOX unit.
2. Turn the air stripping system on.[6]
3. Turn the collection sump pumps on by placing switches in the automatic mode.
4. Direct the effluent to the desired location using the slide gate valves in the divesion box.
5. Place switches in the automatic start mode (see Subsection IIIc) at the extraction wells.

[5]Normal operating values are expressed in ranges because operating conditions vary, requiring adjustment of system parameters.

[6]With the air stripping units on the collection sump pumps will automatically start when water is flowing.

6. Start UVOX unit and wait until warm up cycle is completed.
7. The wells will automatically start when the UVOX unit warm up cycle is completed.
8. Startup Hydrogen Peroxide system.
9. Ensure that system is operating normally and clear alarms.

Shut down is performed using the following steps:

1. Turn off and secure Hydrogen Peroxide system.
2. Turn on potable water to UVOX unit and shutdown UVOX system.
3. The extraction wells automatically turn off.
4. Turn the air stripping system off.
5. Turn the lift station pump off.
6. Secure the potable water.

C. Maintenance

Efficient plant operations require scheduled preventive maintenance and a capability to respond quickly to unscheduled equipment failure. General maintenance procedures are briefly discussed in this plan. If additional maintenance information is required, it can be found in the manufacturer's operation and maintenance manuals. Maintenance of the GET A facility is performed by Environmental Operations personnel, Aerojet Facility Services personnel and maintenance contractors. Maintenance considerations include routine site maintenance, utility maintenance, preventive maintenance and routine inspections. Pipelines, valves, pumps and other mechanical equipment need regular maintenance for proper performance. Those items in contact with water need routine cleaning and painting to protect against corrosion. Plant maintenance and the frequency with which this required maintenance must be performed is the responsibility of Aerojet Facility Services. More

detailed descriptions of maintenance procedures of the system components are given in the following sections of this report.

III. EXTRACTION WELLS

The ten extraction wells associated with GET A are located on the northeastern border of the Aerojet property (see Figure 1).

A. Well Components

Each of the ten wells at GET A is of similar design. The major components of the extraction wells include the well, flowmeter, check valve, and control panel. Details of the GET A extraction wells are presented in Figure 4, functional description is presented in Table 1.

B. Normal Operation

During normal operation, the pump flow rates are within the expected normal range listed in Subparagraph E(1)(a). GET A pump motors are equipped with either a low water level shutoff or a motor saver module either of which prevents pump operation when the water level in the well casing is low.

C. Startup/Shutdown

Startup of the well pumps is performed in the following steps:

1. Set the valve position to approximately 25% open.
2. Check all circuit breakers in the control panel and reset if necessary.
3. Report any abnormalities. The pump will not activate immediately due to a back spin relay time delay.

4. Adjust valve position to achieve the desired flow rate. Shutdown of the extraction well is performed locally by turning the "Hand-Off-Auto" switch to the off position and closing the isolation valve; or remotely by shutting down the UVOX system.

D. Malfunctions

Infrequently during the hot season, GET A wells may automatically shutdown due to excessive heat in the control panel. Bimetallic circuit breakers in the control panel will "trip-out" on very hot days and shutdown the extraction wells. These circuit breakers must be reset before starting the well pump. EO personnel inspect the wells daily (5 days/week) for any shutdowns. If the pump still refuses to start after resetting the circuit breaker, it may be necessary to replace the circuit breakers. However, it is very important that the operator be familiar with all service manuals before attempting to repair electrical circuits.

E. Maintenance

GET A submersible pumps require a minimum of maintenance. Maintenance routine includes:

1. Check flow rate, cumulative gallons and pressure.
2. Inspect well piping and casing for leaks.
3. Report any abnormalities.

IV. UV TREATMENT SYSTEM COMPONENTS

A. UV Treatment System

The UV Treatment and conveyance system consists of a 90 kilowatt UV oxidation unit, control valves, conveyance pipelines. The UV oxidation unit has three 30 kilowatt reactors and a Programmable Logic Controller (PLC). The PLC receives various input signals from instruments such as flow and temperatures and output signals such as alarm well shut down and valve positioning. It has the ability to shut down the system under certain alarm conditions. Schematic drawings of the UV oxidation unit, and conveyance system are provided in Figures 3, 5 and 6. Functional descriptions of the UV oxidation unit is provided in Table 2.

B. Normal Operation

During normal operation, groundwater will flow through the UV oxidation unit at a rate between 255 and 370 gpm and then be discharged to the lift station at the effluent end of the pond. The UV oxidation unit is hydraulically designed to treat a maximum flow of 400 gpm with a concentration of 30 parts per billion (ppb) of NDMA in the influent stream.

C. Operation During Periods of Maintenance

During periods when maintenance activities require that the UV oxidation unit be removed from operation, extraction wells will be shut down.

D. Startup/Shutdown

Startup of the UV oxidation unit consists of preparing the unit for extracted groundwater by performing the following steps:

1. Open the potable water line introducing potable water to the UV oxidation unit.
2. Push the system startup button.
3. Once treating annuciator signal is displayed the extraction wells will automatically start up.
4. Close potable water valve.

Shutdown of the UV oxidation unit can be achieved in the following way:

1. Turn on the potable water.
2. Engage the system shutdown button.
3. The extraction wells automatically shut down.
4. Allow the system to cool down then turn the potable water off.

E. Malfunctions

In the event of an electrical or mechanical failure of the UV oxidation unit the extraction wells will automatically be shut down and an alarm will be sent to on call personnel.

F. Maintenance

Maintenance of the GET A UV oxidation system involves daily and monthly inspections by GET operations personnel which evaluate support equipment performance and treatment performance. Additional maintenance is performed on the reactors and power supplies by Rayox personnel every 3,000 hours at which time the reactor lamps are replaced.

V. AIR STRIPPING SYSTEM

A. The major components of air stripping system include an air stripping tower and an associated lift pump that delivers water to the air stripper and a double gate valve diversion

box which allows treated effluent to flow into Rebel Hill Ditch[7] for surface infiltration or partially treated water to flow into an adjacent dredge tailing ravine which is upgradient of groundwater flow. A schematic diagram is presented in Figure 5.

B. Normal Operation

During normal operation water from the UV treatment system effluent is pumped from a collection sump to the top of the air stripper. The effluent from the stripper is then discharged to the effluent infiltration area. The stripper is designed to remove volatile organic compounds listed in Subparagraph E(1)(d). The air stripper is interlocked with the collection sump pump and the UVOX unit. If there is a malfunction with the air stripper the sump pump and UVOX unit automatically shuts down preventing untreated water from being discharged.

C. Startup/Shutdown

Startup of the air stripping system is performed by first starting the blower and then placing the "Hand-Off-Auto" switch for the sump pump in the "Auto" mode. As the water level in the collection sump rises to the set point the pump will start automatically. Stability is normally achieved after approximately fifteen minutes. Shutdown is achieved by turning the sump pump off and then turning the blower off.

D. Malfunctions

Malfunctions associated with the air stripping system are of two types, mechanical failure or electrical failure.

[7] Rebel Hill Ditch is dammed such that a section of the ditch located close to the treated effluent discharge point for GET A has become a surface infiltration area.

Mechanical failures include loose or worn fan belts resulting in system shutdown. Electrical failures are normally due to power outages which require resetting of circuit breakers.

E. Maintenance

The operator is required to be familiar with the manufacturer's suggested maintenance procedures before attempting to repair components of the air stripping system. Maintenance of the GET A air stripping system involves inspection of:

1. Fan belt wear and tension,
2. Inspection for any unusual noise or vibration, and
3. Inspection of the sump pump.

Periodic maintenance involves:

1. Weekly inspection and filling, if necessary, of the oil reservoir associated sump pump.
2. Adjustment and/or replacement of fan belts as needed.
3. Cleaning or replacing of air intake filter, and
4. Cleaning of filter on air conditioning unit for the motor control panel.

VI. CHEMICAL FEED SYSTEM

The chemical feed system enhances the treatment of NDMA in the UV treatment system with the injection of hydrogen peroxide. The hydrogen peroxide when exposed to UV light produce hydroxl radicals. The hydroxl radicals enhance the destruction of NDMA.

A. Chemical Feed System Components

The major components of the chemical feed system are a storage tank, chemical metering pumps and conveyance piping. A schematic diagram of the GET A chemical feed system is shown in Figure 6.

B. Normal Operation

Under normal conditions the UV oxidation unit is operated with hydrogen peroxide injection. The Hydrogen Peroxide is usually fed at a rate of 40 gallons per day. Hydrogen Peroxide provides a source of oxidizing agents which help to decompose the NDMA.

C. Startup/Shutdown

Startup of chemical feed system consists of the following steps once flow from the extraction wells has been established:

1. Open isolation valves at storage tank and injection point.
2. Start metering pump and prime, if necessary.
3. Monitor residual hydrogen peroxide with chemical specific test kit.

Shutdown is accomplished by turning off metering pump, isolating storage tank and injection point.

D. Malfunctions

Problems with the chemical feed system can usually be attributed to:

1. Pump failure,
2. Electrical failure, or

3. Pipe leak/tank leak.

Equipment should be replaced or repaired if malfunctions are discovered. Before working on any chemical feed system, the operator should review MSDS information and safety procedures. Storage tanks should be isolated and all feed lines and pump should be flushed to ensure no residual chemicals remain.

E. Maintenance

Daily operation and maintenance of the hydrogen peroxide system is as follows:

1. Inspection of pump and pump components.
2. Inspection of feed lines and tank for leakage.
3. Record tank staff gauge height for consumption records.
4. Monitor and record chemical residual in effluent stream from UV system.

VII. GET OUTAGES OPERATING PLAN

The purpose of the GET Outages Operating Plan is to describe required planned activities that will cause suspension of the operation of all or part of a GET system(s). Also detailed in this plan are examples of unplanned activities that will cause GET system(s) outages that are beyond the control of the operator.

Inherent in operation of any treatment facility are periods when all or part of the treatment facility will be unavailable due to one or all of the following events:

- routine preventive maintenance
- identified maintenance
- annual inspection

- instrument calibration
- hydrologic testing
- well rehabilitation
- catastrophic equipment failures
- new construction

In the following subsections, an explanation of these events is provided.

A. Preventive Maintenance

Aerojet Facility Maintenance Department operates a program of preventive maintenance. After completion of construction activities, a physical inventory is performed to identify the equipment and systems that require routine preventive maintenance. During the inventory, a maintenance number is assigned to each piece of equipment. These maintenance numbers are entered into the computerized database with a corresponding schedule for daily, weekly, monthly, quarterly, or yearly maintenance. Depending on the schedule entered for the equipment, the computer routinely generates Maintenance Work Orders (MWOs). These MWOs are then assigned to maintenance crews depending on the type of work required (i.e., lubrication, mechanical, electrical, boiler, sheet metal or HVAC). The foreman of the maintenance crew then coordinates with Environmental Operations. If equipment shutdown is required, the equipment is secured by Environmental Operations personnel, the required work is performed, and the equipment is placed back online. These types of tasks usually require minimal downtime.

B. Identified Maintenance

The Maintenance Work Request (MWR) system is employed in conjunction with the preventive maintenance program. This program gives the facility operating personnel the

option to place MWRs for the problems that become evident during routine operations or preventive maintenance that requires immediate attention. The MWR system is intended to facilitate rapid response to situations which, if left unattended, would lead to catastrophic equipment failure and result in extended periods of GET system outages.

C. Annual Inspections

As required by state and local codes, there are several types of equipment (e.g., boilers and compressors) that require annual inspections. These inspections necessitate the shutdown of the equipment for a few hours to as much as 24 hours, resulting in the inability to continue to operate the GET facility.

D. Instrument Calibration

The existing GET facilities use sophisticated electronic equipment to operate and monitor the treatment process. These instruments require periodic calibration that is currently performed on a quarterly basis. The facilities must be shutdown for a period of up to two (2) days to perform this work.

E. Hydrologic Testing

To determine accurately what modifications should be performed on the existing extraction or recharge systems to assure system effectiveness, or to verify if the completed modification is producing the required zones of capture or other hydrologic effects, it is routinely necessary to periodically suspend pumping or recharge in selected wells. These shutdowns are required to allow the system to obtain hydrologic equilibrium conditions for hydrologic measurements. The lengths of these shutdowns are variable and will normally

continue until there are enough data to predict accurate aquifer characteristics. The normal testing period will usually require between 5 to 14 days.

F. Well Rehabilitation

During normal operation of the GET facilities, the capability of the production wells or recharge wells to produce or accept water will decline. This decline depends on the volume and rate of water produced or recharged and aquifer characteristics. When the specific capacity has declined sufficiently, as indicated by either the extraction well not producing the desired hydraulic control, or the recharge well not accepting the volume of water necessary to maintain hydraulic control, the wells must be rehabilitated. The rehabilitation of an extraction or recharge well usually lasts 5 to 7 days depending on the cause of the reduced hydraulic capacity . This outage generally affects only a portion of the hydrologic control of a GET facility.

G. Equipment Failure

An equipment failure is defined as failure or malfunction of any GET facility to related support equipment which causes an unplanned shutdown of part or all of a GET facility. To minimize the occurrence of unscheduled outages, Aerojet has developed certain contingency plans. These contingency plans include:

- continuous and on-call maintenance capabilities provided by in-plant facility services;
- time and material contracts with specialty contractors to provide support for maintenance capabilities that are not provided by Aerojet facility services (i.e., water well equipment and well rehabilitation);
- a maintenance store to provide replacement parts and equipment; and

- open purchase order accounts at numerous local supply houses for parts and equipment nor normally stocked at the maintenance store.

H. New Construction (Existing GET Facilities)

During the long-term operation of a GET system, head and water quality data are routinely collected and evaluated to determine effectiveness of the system. As a result of this evaluation, Aerojet may identify a need to modify the system(s) to enhance effectiveness. These modifications usually consist of the addition of extraction and recharge wells and modification to GET treatment facilities with subsequent system shutdown during the construction of these modifications. The period of time required for system shutdowns varies from a few hours to several months depending upon the nature of the construction work.

SUBPARAGRAPH E(1)(i)

No new modifications are planned at this time.

TABLE 1

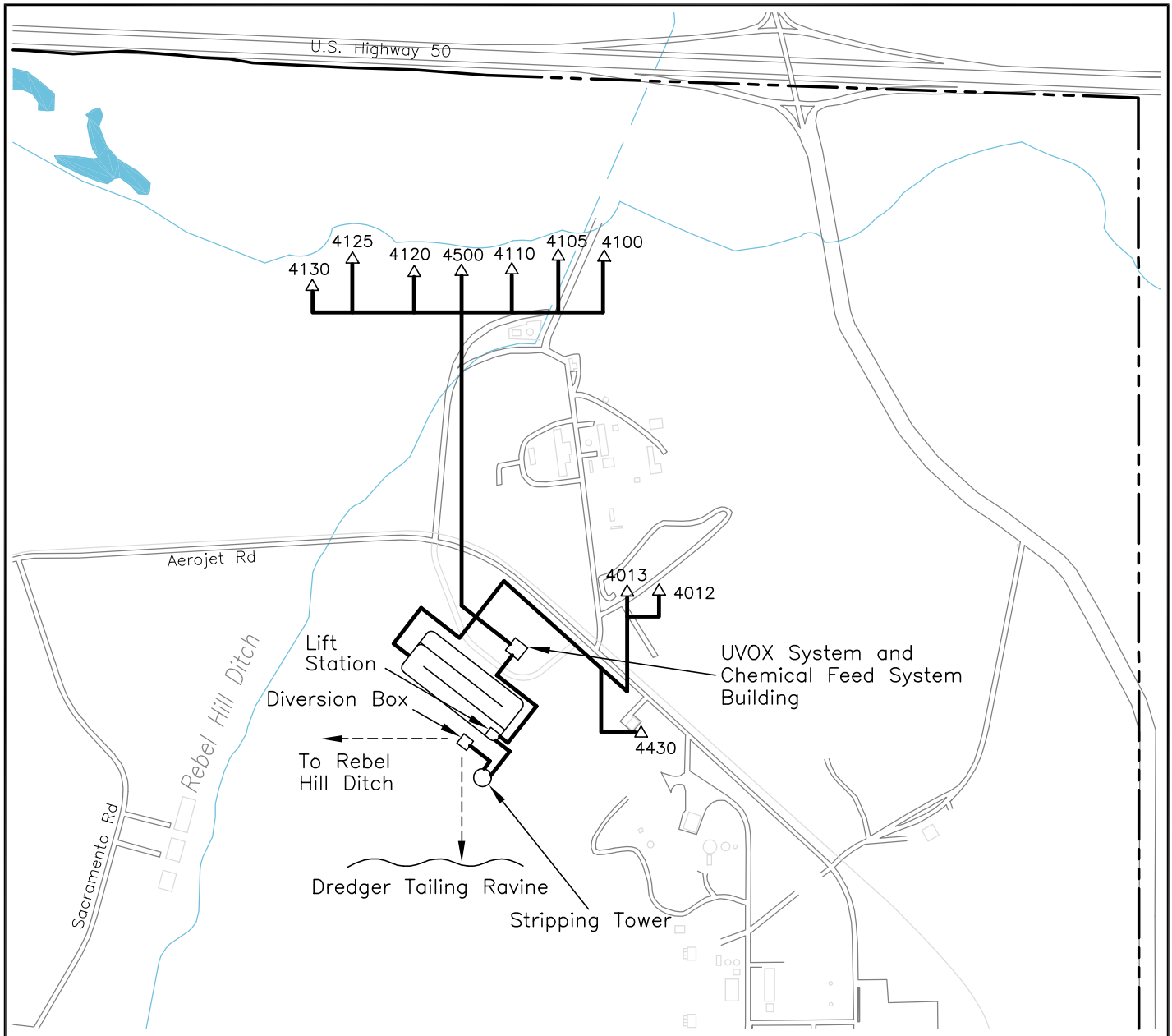
GET A EXTRACTION WELL COMPONENTS

COMPONENT	SPECIFICATION
Extraction Well (10)	8" diameter steel casing with stainless steel screen set at various depths
Extraction Pump	3 - Berkeley submersible 5 hp
Extraction Pump	1 - Grundfos submersible 7 hp 1 - Grundfos submersible 5 hp 1 - Grundfos submersible 3 hp 2 - Grundfos submersible 2 hp 1 - Grundfos submersible 1 hp 1 - Grundfos submersible - hp
Flow Meter	5 - 2½ inch Rockwell positive displacement 2 - 2½ inch water specialties positive displacement 1 - 2 inch Water specialties positive displacement 2 - 1 inch Badger positive displacement
Check Valve	7 - 2½ inch 1 - 2 inch 2 - 1 inch
Globe Valve	7 - 2½ inch 1 - 2 inch 2 - 1 inch

TABLE 2

GET A AIR STRIPING AND UV OXIDATION SYSTEM COMPONENTS

COMPONENT	SPECIFICATIONS
Air Stripper	Paramount fiberglass tower with 27.5 feet of packing
Blower	New Your Blower Size 122 - 1,600 cfm
Influent Flow Meter	Water Specialties 6"
Influent Control Valve	2 - 6" automatically torc actuated baily butterfly valves
Effluent Diversion Structure Control Valve	2 - 2' Waterman Slide Gate
Air Stripper Lift Pump	Gould 7.5 hp size 10IHC
UVOX unit	90 kilowatt Rayox System supplied by SolarChem Environmental Systems



EXPLANATION

△ Extraction Well

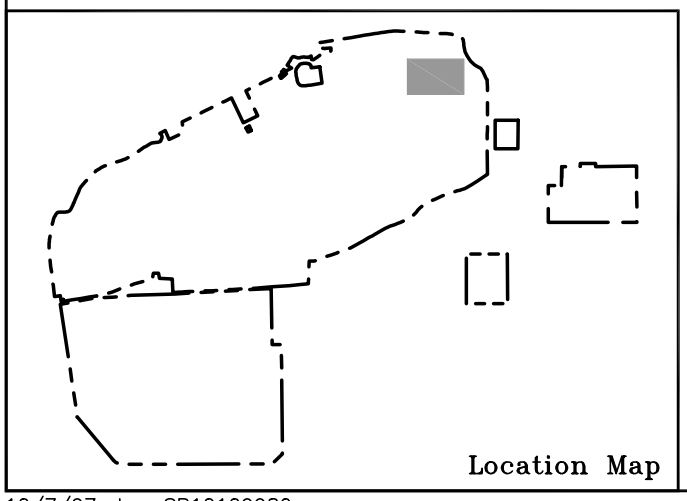
Conveyance System

Effluent Recharge System

N

Scale: 1" = 800'

0 400 800



GENCORP AEROJET

Environmental Operations

FIGURE 1

GET A Location Map

10/7/97 ah SR10109980

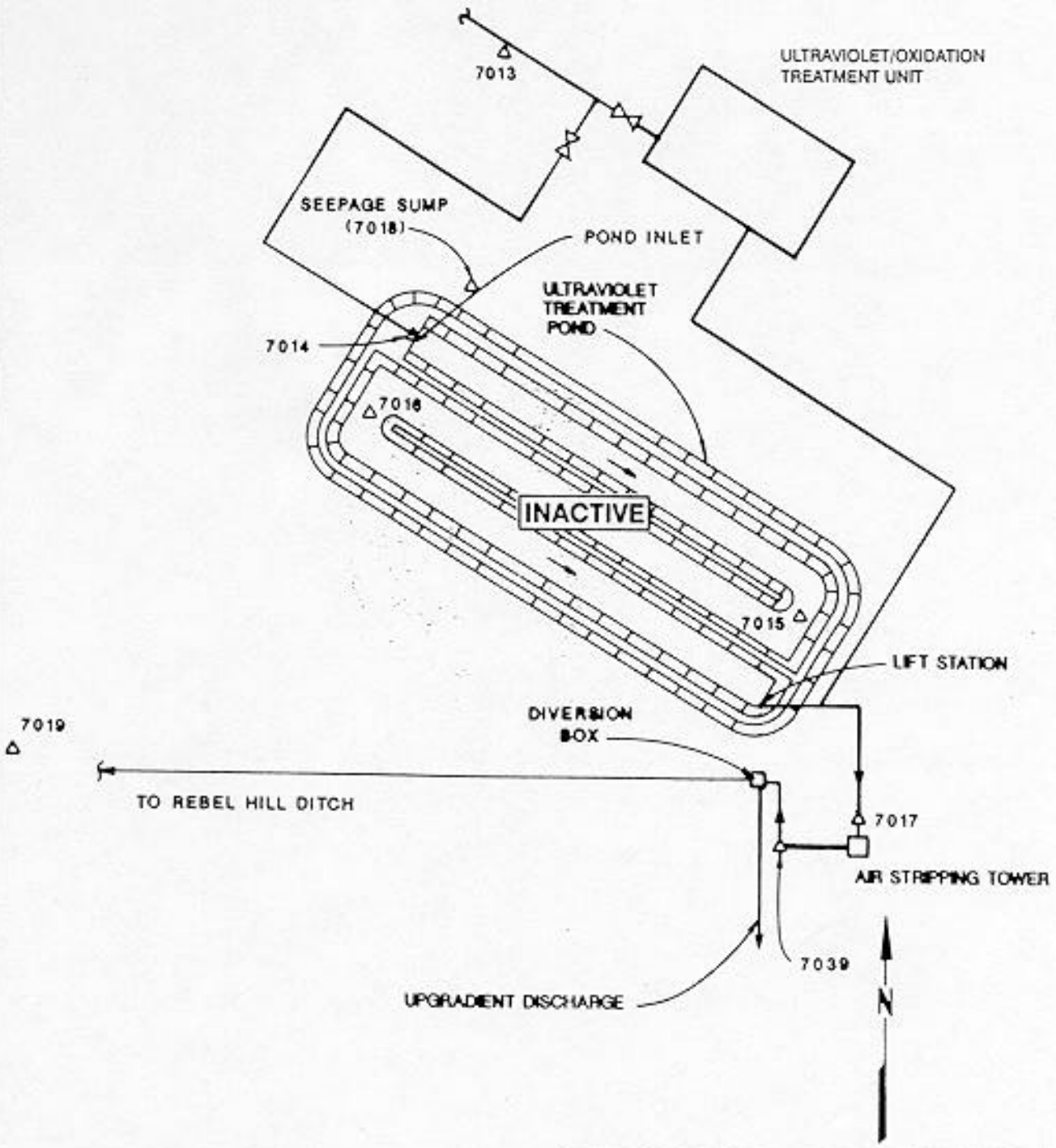


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FIGURE 2

GET A Treatment Plant and Monitoring Points

SR10107856

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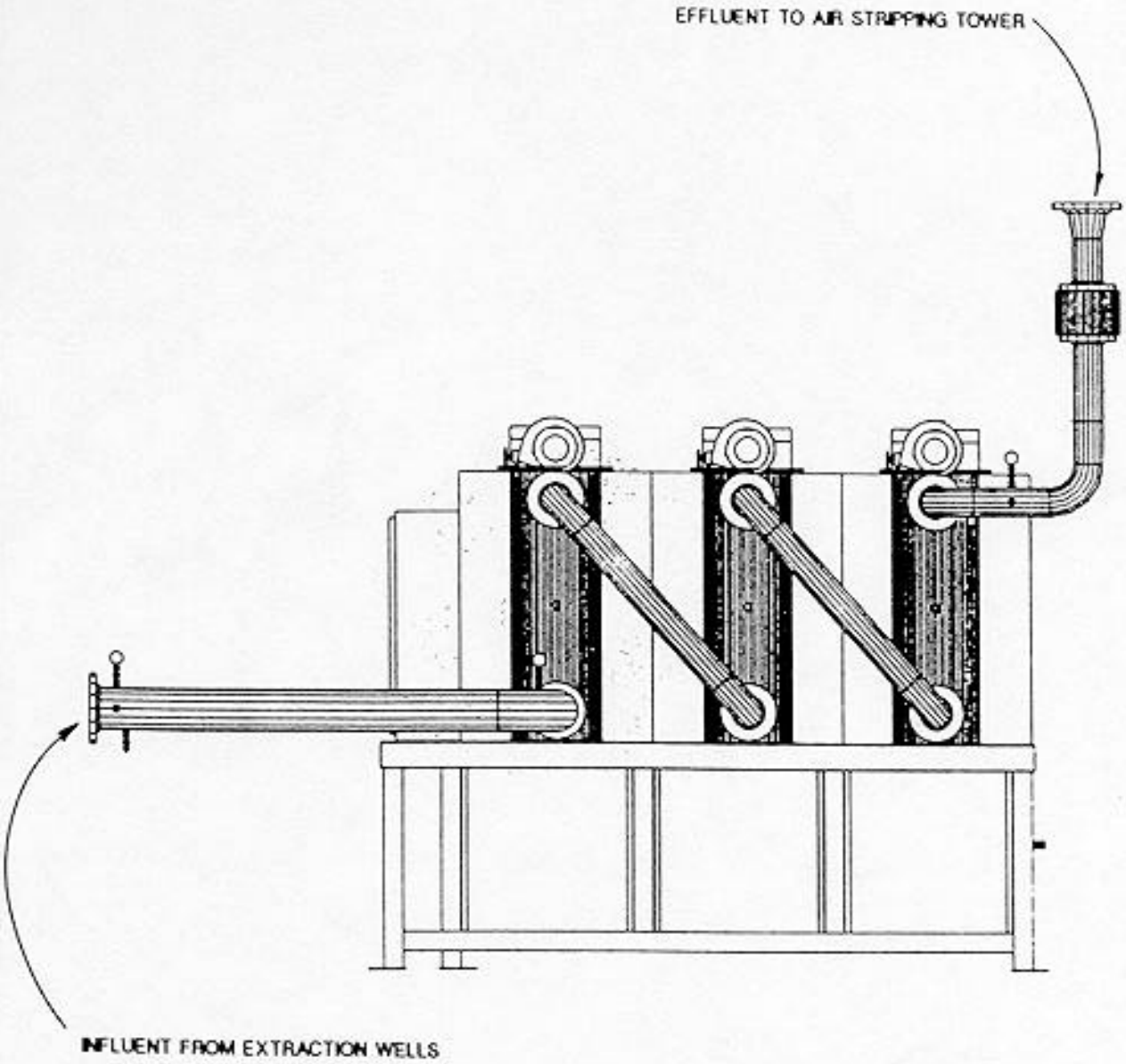

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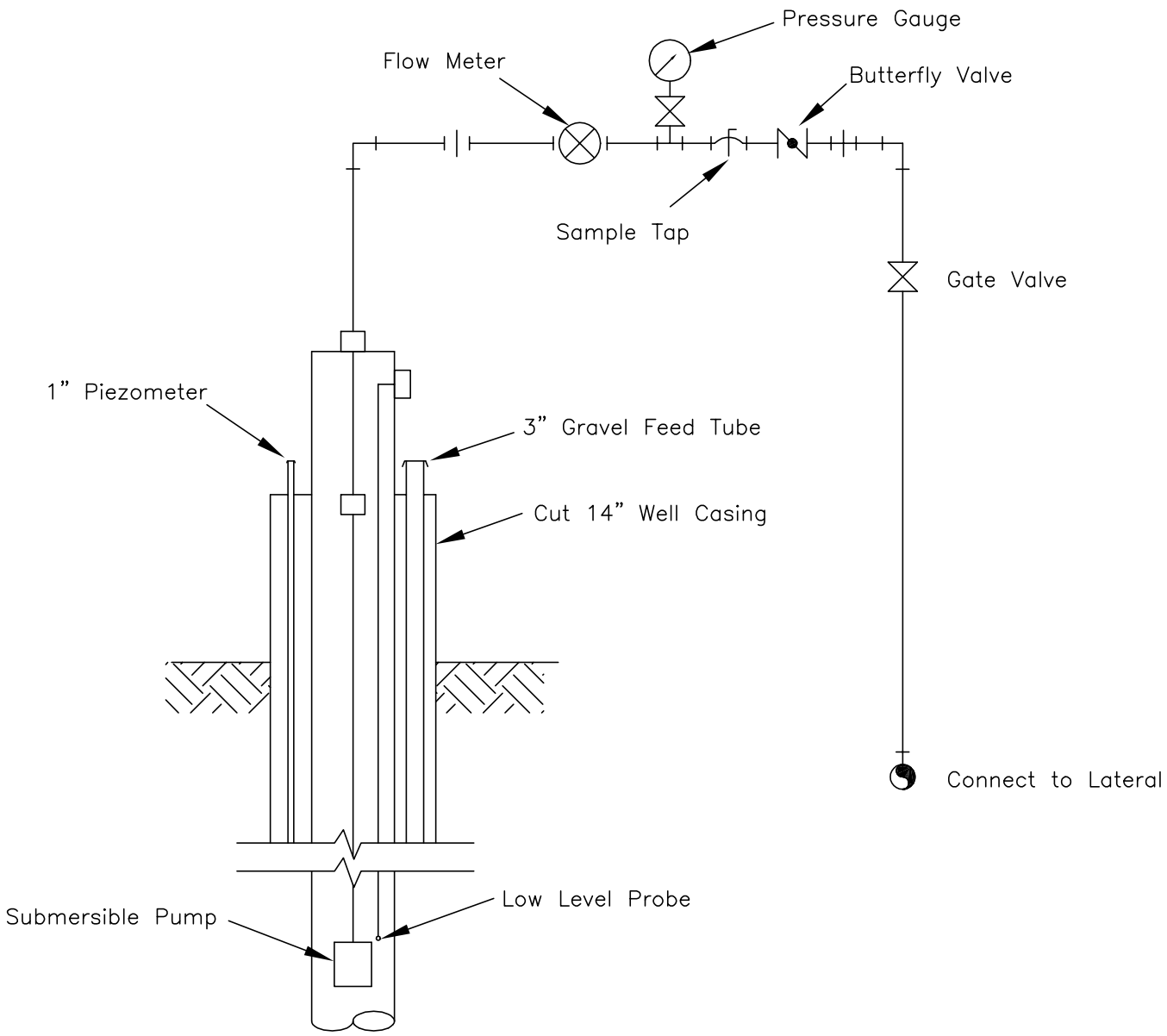
FIGURE 3

GET A UVOX Treatment Plant



Pump Settings

Well No.	Pump Bowls	Electrodes OFF	Electrodes ON
4012	81'	NA	NA
4013	92'	NA	NA
4100	50'	40'	20'
4105	50'	40'	20'
4110	50'	40'	20'
4120	50'	40'	20'
4125	50'	40'	20'
4130	50'	40'	20'
4430	73'	NA	NA
4500	50'	40'	20'

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FIGURE 4

GET A Extraction Well

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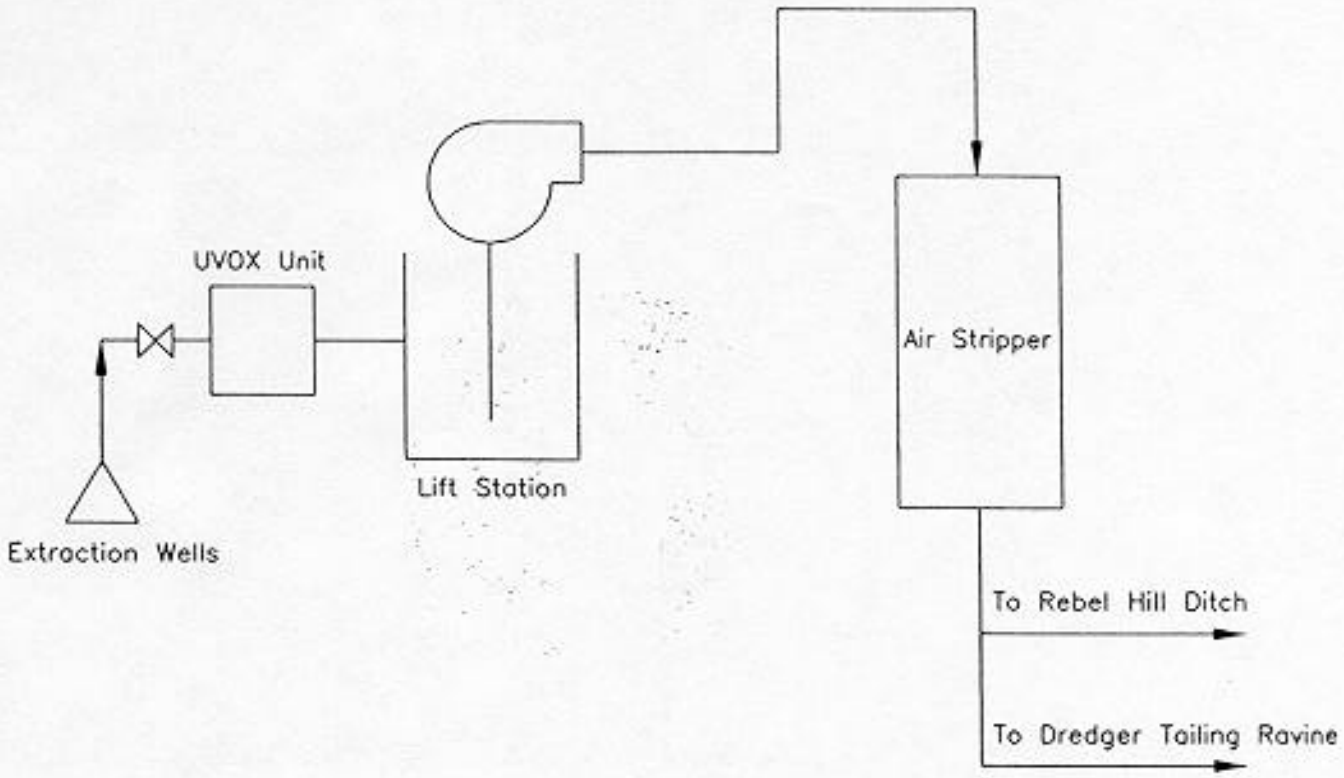

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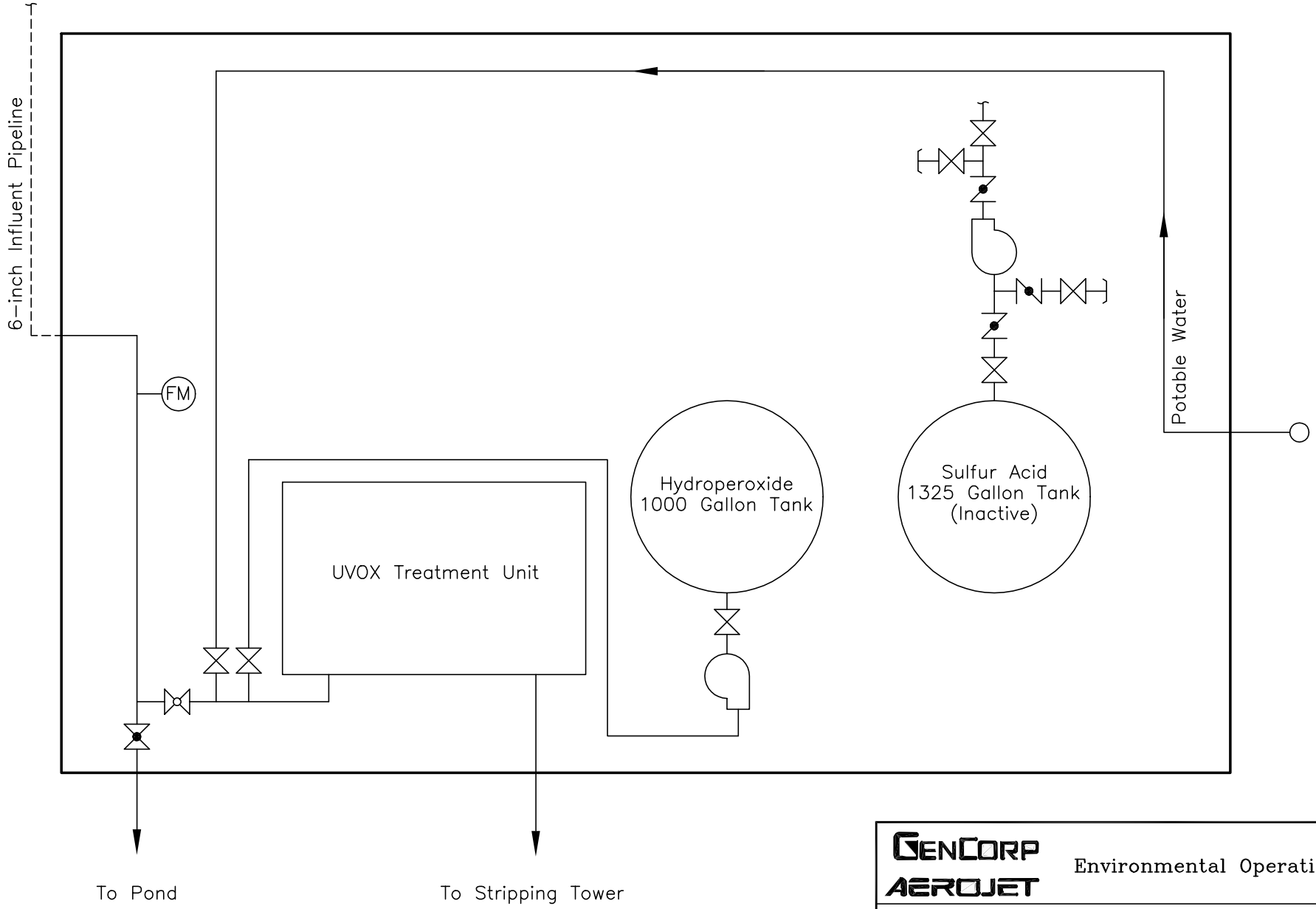
FIGURE 5

Treatment System Schematic
GET A

SR10107859



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Environmental Operations

FIGURE 6

GET A UVOX Unit and
Chemical Feed System
Containment Area

10/8/97 ah SR10109985