

MEMO

To: Nevada Division of Environmental Protection
Nevada Environmental Response Trust

Cc: Nevada Environmental Response Trust Stakeholders

From: Andrew Harley/Tt

Date: August 20, 2015

Subject: NERT – GWETS Operation Monthly Report – July 2015

At the request of the Nevada Environmental Response Trust (Trust), Tetra Tech, Inc. (Tetra Tech) provides this summary of the groundwater extraction and treatment system (GWETS) operation and oversight tasks performed during July 2015.

Summary of GWETS Operation

Envirogen Technologies, Inc. (ETI) reports that the GWETS mechanically operated normally in July 2015 with the exception of an Allen Bradley PLC issue on July 7th and 8th and an unscheduled effluent diversion on July 31st that are described in more detail below. The flow rate to the plant averaged approximately 852 gallons per minute (gpm) during July 2015. At the end of the month, the GW-11 Pond volume was 46.4 million gallons (MG), which would allow 11.2 days of available additional storage in event of an emergency plant shutdown with continued well field pumping. The water volume stored in the GW-11 Pond decreased approximately 2 MG from the end of June.

Figure 1 in this report depicts the actual and projected GW-11 pond volumes and additional storage available. Version two and version three of the volume projection were added to Figure 1 during the month of July and represent a “probable” volume trend and a “best case” volume trend. As of the date of this memo, the Trust has engaged ETI and intends to utilize an Ion Exchange treatment system to be installed at or near Lift Station 1 to treat a portion of the groundwater captured by the Seep Well Field as a tool to control the GW-11 pond volume. NERT currently anticipates this system coming online no earlier than January 2016.

The influent perchlorate concentration to the Fluidized Bed Reactor (FBR) plant averaged 100 mg/L for the month, with a maximum concentration of 110 mg/L.

Analytical data indicate that the permitted effluent discharges at GWETS Outfall 001 were within the NPDES permitted numerical discharge limits (Please see Attachment A, prepared by ENVIRON).

Enhanced Operational Metrics

Tetra Tech continues to move forward with the approved Enhanced Operational Metrics program to add instruments, controls, data acquisition systems, along with various other technical upgrades to improve the efficiency of GWETS data collection and reporting. An implementation schedule is presented in more detail under the GWETS Upgrades and Facility Projects section below.

Tables 1 and 2 provide a summary of the current GWETS operational metrics that provide data for flow rates, perchlorate and chromium concentrations, and mass removal. Figure 2 presents historical perchlorate and chromium mass flux.

Operational Issues

All routine plant repairs conducted by ETI were performed in accordance with the NERT Perchlorate Treatment System Henderson, Nevada Operations Manual. The following is a list of operational issues and major repairs and/or equipment replaced during this reporting period.

1. GW-11 Pond

- GW-11 Pond Leak Detection System: On behalf of the Trust, Tetra Tech continues to evaluate how to repair the northeast leak detection pipe so that the correct depth can be determined for the extraction pump. Tetra Tech scheduled a high resolution camera survey of the northeast and northwest detection pipes to be completed in the first week of August to further support development of the repair.
- Diversions:
 - i. A scheduled diversion directed approximately 90,900 gallons to GW-11 on July 16th during airline maintenance on the first and second stage separators.
 - ii. An unscheduled effluent diversion of approximately 191,526 gallons occurred on July 30th when an air compressor failure resulted in high perchlorate concentrations in the FBR plant effluent. Maintenance repairs to the air compressor were made as described in the next section.

2. Maintenance

- Major maintenance that was performed or completed in the month included:
 - i. Electrical issues with the Allen Bradley PLC caused the FBR plant to either be shut down or in recycle mode between approximately 9:30 am on July 7th to 2:50 pm on July 8th. No water was diverted during this event, however, GW-11 pond remained in operation and the FBR plant was not drawing any water from GW-11 for treatment. A new central processing unit (CPU) was installed for communications between the Allen Bradley and Siemens controls.

- ii. Following the air compressor failure on July 30th, the following maintenance activities were completed.
 - 1. Two phases of the west air compressor failed. A new motor was ordered and Ingersoll Rand is installing the new motor the week of August 24th.
 - 2. Ingersoll-Rand serviced and replaced the thermostat switch on the east air compressor.
- iii. ETI replaced the ART-2 motor and pump.
- Preventative Maintenance completed or being performed in the month included:
 - i. ETI installed bracing on the discharge piping of Lift Station 2, Pump A.
 - ii. ETI repaired piping on well I-L to avoid a possible leak.
 - iii. ETI cleaned the filter press plate to stop weeping from the press.
 - iv. The Media Return Pump – P1401 was rebuilt and is back in service.
 - v. The airline supply for the First Stage Separator Tank – T2011 and Second Stage Separator Tank – T-3012 was cleaned to support valve actuation.
 - vi. ETI repaired the abandoned nutrient feed line for FBR A.
- 3. Outstanding maintenance and repairs from the previous month are outlined below:
 - ETI continues the rehabilitation process on FBR 6. Rehabilitation on FBR 5 is complete. ETI expects to return these units to operation when the processing of the AP-5 slurry begins in the first quarter of 2016.
 - New isolation valves were installed on the DAF Pressure Tanks and Pressure Pump 551.
 - A new pressure regulator and piping was installed on the compressed air receiver tank.

GWETS Upgrades and Facility Projects

The following is a summary of initiatives in-progress during the reporting period at the direction of the Trust:

1. AP-5 Solids Removal

Based on results from a HAZOP analysis, Tetra Tech is sequencing the Phase II AP-5 Solids Removal project into two distinct steps. First, the upper layer of solids will be removed and then the remaining perchlorate salts will be dissolved and pumped to the treatment process. Tetra Tech is continuing on to the next phase of design. Coordination between Tetra Tech and NDEP, ETI, and the Trust on this project is ongoing.

2. Enhanced Operational Metrics

All survey work and pot-holing to confirm pipeline locations was completed and minor adjustments were made to the conduit trench routing. All design documents were submitted to ETI for review and incorporation of comments prior to issuing final for construction. Some minor changes to the design were updated during this period. The budget amendment was reviewed with the Trust and is in the process of approval. At the direction of the Trust and NDEP, work

continues within the limits of the current budget while the budget increase is analyzed and the budget is amended. Construction activities will resume after the budget increase is approved. Phased activation of the operational metrics upgrades will continue through the end of October 2015, with all data available in late October to early November, barring any schedule delays.

Equipment Availability Tracking

ETI operators continue to update the equipment tracking form on a weekly basis at a minimum, or whenever there is a change in the status of key equipment. During regular site visits, Tetra Tech field personnel continue to verify the entries on the form, including both the operating status and confirming the inventory of required shelf spares. The equipment tracking form submitted by ETI to Tetra Tech on August 5, 2015, is attached (Please see Attachment B).

GWETS Staffing

ETI continues with 24-hour staffing of the GWETS at the direction of the Trust and continues to follow the security procedures in the Standard Operating Procedures (SOP).

GWETS Security

During weekly calls, ETI notifies Tetra Tech of any issues with GWETS security. There were no GWETS security issues reported during the month of July.

Tetra Tech Activities

Tetra Tech conducted calls with ETI to review operation of the GWETS on July 2nd, 9th, 16th, 23rd, and 30th. Becki Dano, CEM, performed visits to the GWETS on July 2nd, 10th, 24th, and 31st. Ms. Dano also reviewed permit and sampling forms for the entire month to ensure each was correct and up-to-date, checked equipment status, and verified shelf spare inventory.

Summary

Based on our review of available and relevant information, Tetra Tech concurs with ETI's management of the GWETS during the reporting period. No additional involvement from either the Trust or Tetra Tech is recommended at this time.

Tables

Operational Metrics

Nevada Environmental Response Trust Groundwater Extraction and Treatment System Monthly Stakeholder Metrics				
Location ID	Average Flow Rate (gpm)	Perchlorate (mg/L) ²	Chromium TR (mg/L) ²	Chromium(VI) (mg/L) ^{2,8}
SWF Total Extraction ⁵	546 ¹	11	0.000	Future Metric
AWF Total Extraction ⁵	280 ¹	105	0.23	Future Metric
IWF Total Extraction ⁶	64 ¹	902	7.43	Future Metric
GWTP Effluent ⁷	69	688	0.10	ND
GW-11 Influent ⁴	857 ³	Future Metric	Future Metric	Future Metric
GW-11 Effluent/ FBR Influent ⁷	857	100	0.02	0.01

Notes:

TR = Total Recoverable; NA = Not Available; ND = not detectable above laboratory method detection limit (Chromium (VI) = 0.25 ug/L).

1: Sum of daily average flow for individual wells .

2: All concentrations reported are monthly flow weighted averages.

3: Flow has historically been a calculated metric, but Tetra Tech transitioned to flow meter measurement beginning on April 27, 2015.

4: Following contractual amendment agreements, ETI will begin collecting analytical samples at the GW-11 influent sample tap.

5: Perchlorate sampled monthly, chromium TR sampled quarterly, values reported from TestAmerica.

6: Perchlorate and chromium TR sampled quarterly, values reported from TestAmerica.

7: Perchlorate, chromium TR and chromium (VI) sampled weekly, values reported from TestAmerica.

8: Hexavalent chromium will be analyzed and reported monthly beginning in 2015 as part of the Enhanced Operational Metrics project.

Nevada Environmental Response Trust Groundwater Extraction and Treatment System Monthly Stakeholder Metrics		
Location ID	Perchlorate (lbs/month) ¹	Chromium TR (lbs/month) ¹
SWF Total Extraction	2,252	0.09
AWF Total Extraction	10,927	24
IWF Total Extraction	21,548	177
GWTP Effluent	17,580	2
GW-11 Influent ²	Future Metric	Future Metric
GW-11 Effluent/FBR Influent	31,704	6

Notes:

TR = Total Recoverable; NA = Not Available.

1: Total lbs extracted is calculated from flow weighted average concentration and average flow (see Table 1).

2: Following contractual amendment agreements, ETI will begin collecting analytical samples at the GW-11 influent sample tap.

Figures

Operational Metrics

Figure 1 - Projected vs Actual GW-11 Volume

Nevada Environmental Response Trust
 GW-11 Pond Volume
 Projected v. Actual
 Update 08/07/2015

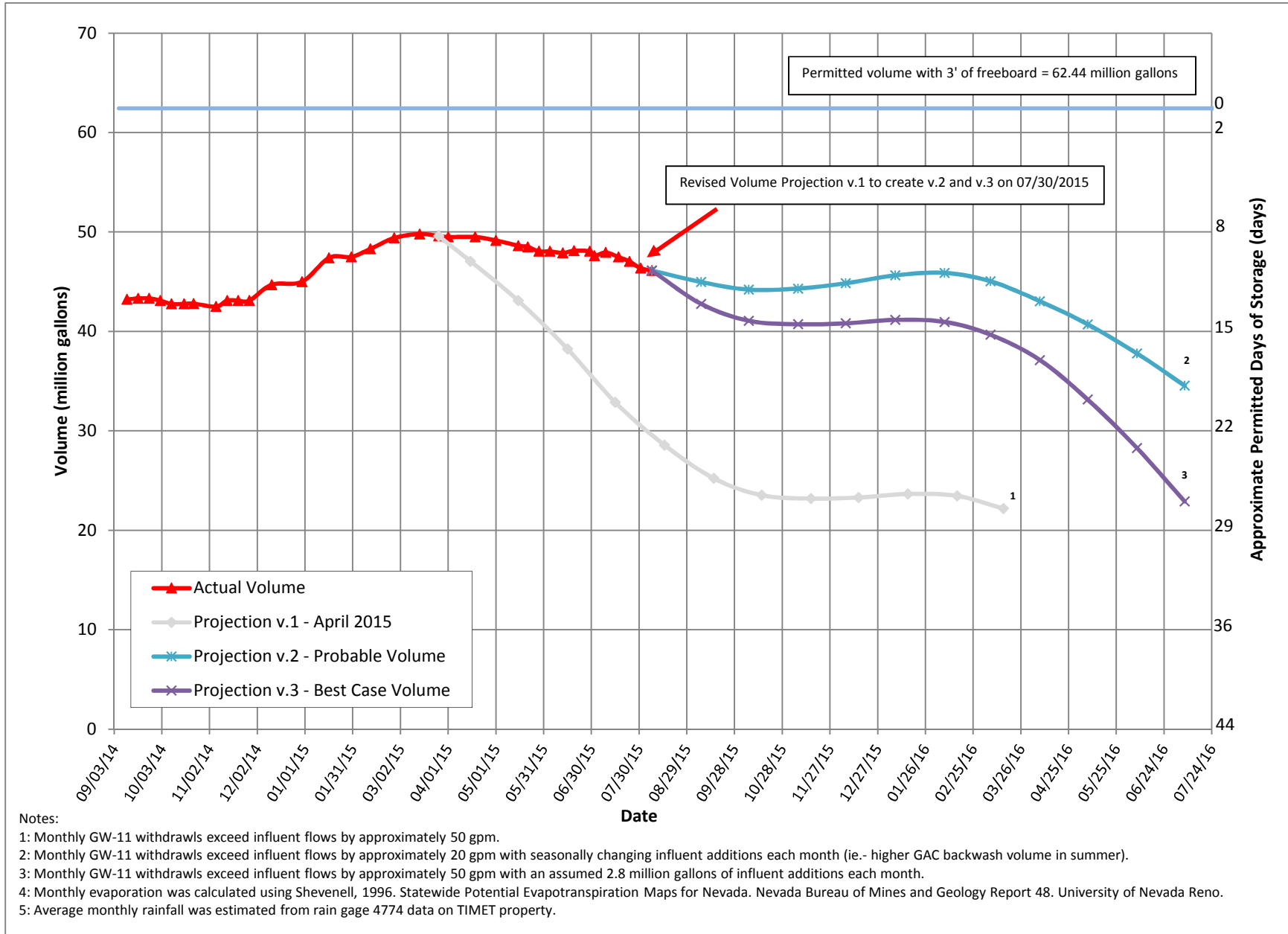
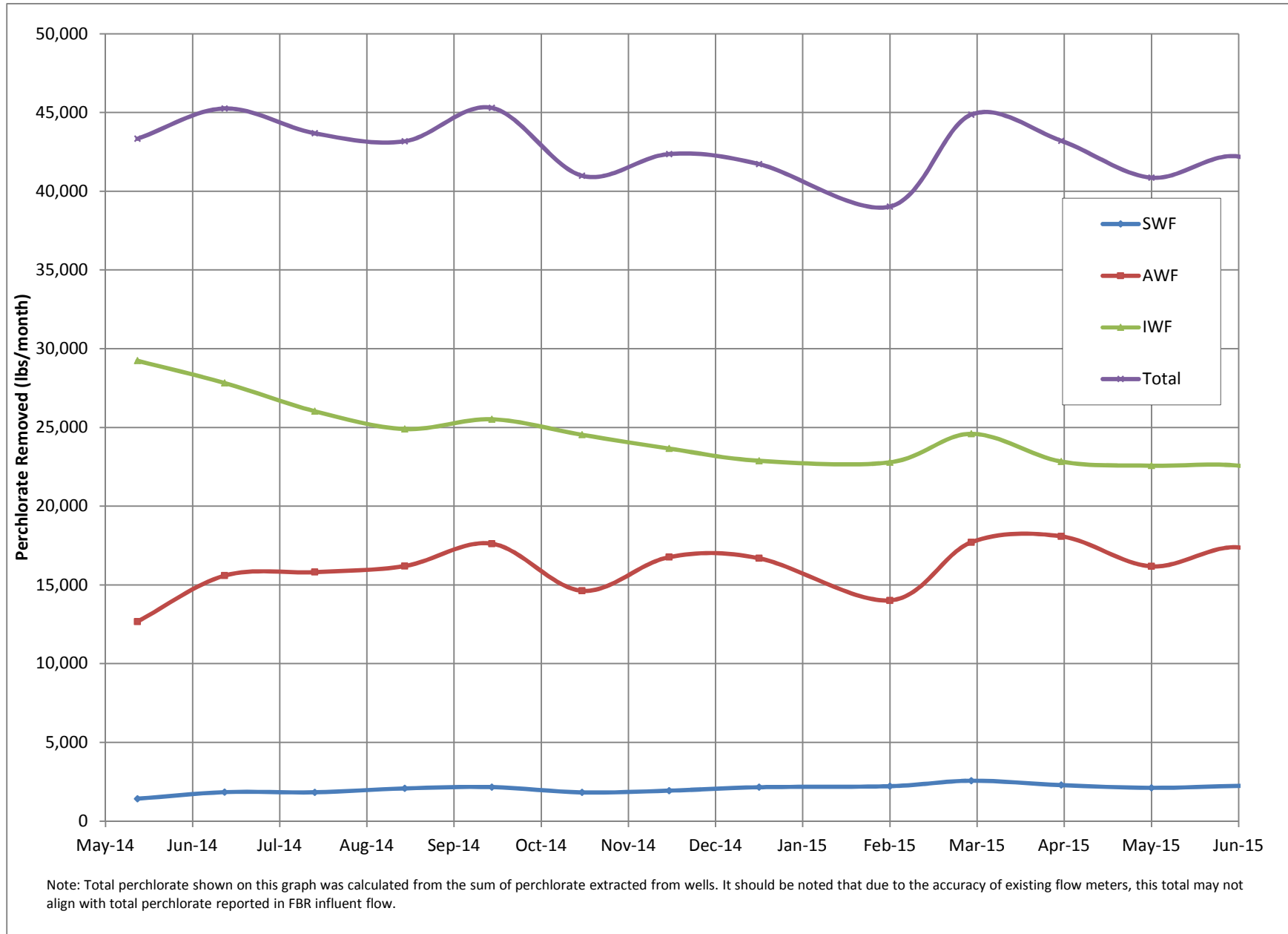


Figure 2 - Historical Perchlorate Mass Flux



Attachment A

NPDES Tracking Sheet (Prepared by ENVIRON)

Continuous		Daily samples, composited weekly	
Flow Rate		Perchlorate	
30-Day Avg. (MGD)	Daily Maximum (MGD)	30-Day Avg. (ug/L)	30-Day Avg. (lbs/day)
1.45	1.75	18	0.22

Weekly samples								
pH	Hexavalent Chromium	Total Chromium	Total Suspended Solids (TSS)		Total Iron		Total Ammonia as N	Total Phosphorus as P
30-Day Avg. (S.U.)	Daily Max. (mg/L)	Daily Max. (mg/L)	30-Day Avg. (mg/L)	30-Day Avg. (lbs/day)	30-Day Avg. (mg/L)	30-Day Avg. (lbs/day)	30-Day Avg. (lbs/day)	30-Day Avg. (lbs/day)
6.5 to 9.0	0.01	0.1	135	1,634	10	121.03	40	20

Weekly samples, collected separately			Quarterly sample	
BOD ₅ (inhibited)			Manganese	
30-Day Avg. (mg/L)	Daily Max. (mg/L)	30-Day Avg. (lbs/day)	30-Day Avg. (mg/L)	30-Day Avg. (lbs/day)
25	40	254	5	60.52

January 2015	1.20	1.39	1.3	0.013	6.59	0.00013	0.021	25	250	4.1	40	2.6	1.5	3.7	6.0	37	0.20	2.1
February 2015	1.34	1.42	1.3	0.014	6.85	0.00013	0.029	21	230	3.3	37	2.5	1.6	6	13	69		
March 2015	1.32	1.38	1.3	0.014	6.71	0.00013	0.043	26	280	4.9	54	7.4	2.0	4.6	9.2	49		
April 2015	1.30	1.34	1.3	0.014	6.83	0.00013	0.0080	13	140	3.4	36	3.4	1.4	1.9	2.9	21	0.090	0.93
May 2015	1.23	1.29	1.3	0.013	6.52	0.00034	0.0060	13	130	3.6	37	2.4	0.7	0.6	1.1	6.4		
June 2015	1.21	1.32	1.3	0.012	6.84	0.00013	0.013	17	170	4.1	41	4.0	2.0	2.3	2.6	23		
July 2015 (month to date)	1.25	1.37	1.3	0.013	6.73	0.00013	0.0049	12	125	2.9	30	2.3	0.8	1.3	1.5	13	0.14	1.5

Daily Grab Sample Dates	Composite Sample Date	ug/L	lbs/day	Sample Date	S.U.	mg/L	mg/L	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	Sample Date	mg/L	lbs/day	mg/L	lbs/day			
1/4 - 1/10	1/10/2015	ND (<2.5)	1.3	0.010	1/5/2015	6.53	ND (<0.00025)	0.021	24	201	4.8	40	--	0.94	7.9	--	0.083	0.69	1/7/2015	3.1	26	0.20	2.1
1/11 - 1/17	1/17/2015	ND (<2.5)	1.3	0.013	1/12/2015	6.64	ND (<0.00025)	0.019	19	192	3.9	39	ND (<0.10)	0.05	0.51	--	0.16	1.6	1/14/2015	3.9	39		
1/18 - 1/24	1/24/2015	ND (<2.5)	1.3	0.014	1/19/2015	6.65	ND (<0.00025)	0.018	25	276	3.4	38	--	0.13	1.4	--	0.16	1.8	1/21/2015	1.8	20		
1/25 - 1/31	1/31/2015	ND (<2.5)	1.3	0.013	1/26/2015	6.54	ND (<0.00025)	0.019	30	316	4.1	43	ND (<0.10)	0.05	0.53	--	0.17	1.8	1/28/2015	6.0	63		
2/1 - 2/7	2/7/2015	ND (<2.5)	1.3	0.014	2/2/2015	6.90	ND (<0.00025)	0.010	11	121	1.6	18	--	0.20	2.2	--	0.12	1.3	2/4/2015	4.5	49		
2/8 - 2/14	2/14/2015	ND (<2.5)	1.3	0.014	2/9/2015	6.67	ND (<0.00025)	0.024	17	196	0.66	7.6	--	0.33	3.8	--	0.27	3.1	2/11/2015	5.7	66		
2/15 - 2/21	2/21/2015	ND (<2.5)	1.3	0.014	2/17/2015	6.97	ND (<0.00025)	0.0064	19	212	3.9	44	--	0.21	2.3	--	0.067	0.75	2/18/2015	1.5	17		
2/22 - 2/28	2/28/2015	ND (<2.5)	1.3	0.014	2/23/2015	6.85	ND (<0.00025)	0.029	36	401	7.1	79	--	0.16	1.8	--	0.12	1.3	2/25/2015	13	145		
3/1 - 3/7	3/7/2015	ND (<2.5)	1.3	0.013	3/2/2015	6.82	ND (<0.00025)	0.043	42	441	4.9	51	--	0.22	2.3	--	0.25	2.6	3/5/2015	9.2	97		
3/8 - 3/14	3/14/2015	ND (<2.5)	1.3	0.014	3/9/2015	6.89	ND (<0.00025)	0.011	26	296	4.8	55	--	0.44	5.0	--	0.46	5.2	3/11/2015	2.6	30		
3/15 - 3/21	3/21/2015	ND (<2.5)	1.3	0.014	3/16/2015	6.64	ND (<0.00025)	0.0071	23	257	5.0	56	--	0.69	7.7	--	0.066	0.74	3/18/2015	2.2	25		
3/22 - 3/28	3/28/2015	ND (<2.5)	1.3	0.014	3/23/2015	6.64	ND (<0.00025)	0.013	19	211	4.8	53	--	0.71	7.9	--	0.11	1.2	3/25/2015	4.2	47		
3/29 - 4/4	4/4/2015	ND (<2.5)	1.3	0.014	3/30/2015	6.55	ND (<0.00025)	0.0074	20	219	4.9	54	--	1.3	14	ND (<0.025)	0.013	0.14	4/1/2015	2.7	30		
4/5 - 4/11	4/11/2015	ND (<2.5)	1.3	0.013	4/6/2015	6.96	ND (<0.00025)	0.0057	18	193	4.7	50	--	0.27	2.9	--	0.13	1.4	4/8/2015	2.9	31		
4/12 - 4/18	4/18/2015	ND (<2.5)	1.3	0.014	4/13/2015	7.04	ND (<0.00025)	0.0080	4.7	52	0.38	4.2	--	0.37	4.1	--	0.28	3.1	4/15/2015	1.9	21	0.090	0.93
4/19 - 4/25	4/25/2015	ND (<2.5)	1.3	0.013	4/20/2015	6.62	ND (<0.00025)	0.0046	17	183	4.2	45	--	0.55	5.9	--	0.064	0.69	4/22/2015	0.85	9.1		
4/26 - 5/2	5/2/2015	ND (<2.5)	1.3	0.013	4/27/2015	6.69	ND (<0.00025)	0.0040	14	149	4.3	46	ND (<0.10)	0.050	0.53	--	0.044	0.47	4/29/2015	1.2	13		
5/3 - 5/9	5/9/2015	ND (<2.5)	1.3	0.012	5/4/2015	6.61	ND (<0.00025)	0.0046	8.0	77	3.7	36	--	0.22	2.1	--	0.041	0.39	5/6/2015	ND (<0.50)	0.25	2.4	
5/10 - 5/16	5/16/2015	ND (<2.5)	1.3	0.013	5/12/12015	6.62	ND (<0.00025)	0.0046	12	127	3.9	41	--	0.39	4.1	--	0.098	1.0	5/13/2015	0.57	6.0		
5/17 - 5/23	5/23/2015	ND (<2.5)	1.3	0.013	5/18/2015	6.42	0.00034	0.0060	13	138	3.7	39	--	0.11	1.2	--	0.030	0.32	5/20/2015	1.1	12		
5/24 - 5/30	5/30/2015	ND (<2.5)	1.3	0.013	5/26/2015	6.44	ND (<0.00025)	0.0046	18	187	3.0	31	--	0.23	2.4	--	0.088	0.92	5/27/2015	0.52	5.4		
5/31 - 6/6	6/6/2015	ND (<2.5)	1.3	0.012	6/1/2015	6.57	ND (<0.00025)	ND (<0.013)	10	95	3.8	36	--	0.24	2.3	--	0.070	0.66	6/3/2015	2.6	25		
6/7 - 6/13	6/13/2015	ND (<2.5)	1.3	0.013	6/8/2015	6.74	ND (<0.00025)	0.013	21	211	6.9	69	--	0.91	9.1	--	0.26	2.6	6/10/2015	1.6	16		
6/14 - 6/20	6/20/2015	ND (<2.5)	1.3	0.013	6/15/2015	7.21	ND (<0.00025)	0.0088	9.5	98	2.0	21	--	0.27	2.8	--	0.26	2.7	6/17/2015	2.6	27		
6/21 - 6/27	6/27/2015	ND (<2.5)	1.3	0.013	6/22/2015	6.98	ND (<0.00025)	0.0068	22	224	4.2	43	--	0.18	1.8	--	0.17	1.7	6/24/2015	2.3	23		
6/28 - 7/4	7/4/2015	ND (<2.5)	1.3	0.013	6/29/2015	6.70	ND (<0.00025)	0.0061	23	240	3.6	38	--	0.39	4.1	--	0.22	2.3	7/1/2015	1.5	16		
7/5 - 7/11	7/11/2015	ND (<2.5)	1.3	0.011	7/6/2015	6.79	ND (<0.00025)	0.0049	14	126	3.5	32	--	0.20	1.8	--	0.11	1.0	7/9/2015	0.93	8.4	0.14	1.5
7/12 - 7/18	7/18/2015	ND (<2.5)	1.3	0.014	7/14/2015	6.92	ND (<0.00025)	ND (<0.0025)	13	143	2.5	27	--	0.19	2.1	--	0.066	0.73	7/15/2015	1.5	16		
7/19 - 7/25	7/25/2015	ND (<2.5)	1.3	0.014	7/20/2015	6.48	ND (<0.00025)	ND (<0.0025)	9.4	105	2.7	30	--	0.27	3.0	--	0.063	0.70	7/22/2015	1.2	13		
					7/27/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7/29/2015	NA	NA		

Note: All analytical responsibilities are performed by TestAmerica Laboratories, Inc. (TestAmerica) in Irvine, California, unless otherwise indicated.

NA = Not Available To Date

NS = No Sample

ND = Not Detected above laboratory reporting limit; concentration in adjacent cell to right is one-half the reporting limit (per Permit condition)

-- = Analyte detected; see column adjacent to right

Last Updated: July 31, 2015

Attachment B

Equipment Tracking Form

Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
		<u>Main Plant Equipment</u>				
1		Seep Wells and Lift Station 1				
1.01		Seep Well Field, 9 wells	Running			
1.02		Lift Station 1 Lift Pump A	Running			
1.03		Lift Station 1 Lift Pump B	Standby			
1.04		Area in and around Lift Station 1	Running			
2		Athens Road Wells and Lift Station 3				
2.01		Athens Road Well Field, 9 wells	Running			
2.02		Lift Station 3 Lift Pump A	Standby			
2.03		Lift Station 3 Lift Pump B	Running			
2.04		Area in and around Lift Station 3	Running		3	ETI replaced the ART-2 motor and pump.
3		Lift Station 2 and Transmission Pipelines				
3.01		Influent Pipeline	In operation			
3.02		Effluent Pipeline	Running			
3.03		Lift Station 2 Lift Pump A	Running		4	ETI installed bracing on the 6" piping on discharge side of pump.
3.04		Lift Station 2 Lift Pump B	Standby			
3.05		Area in and around Lift Station 2	Running			
4		Interceptor Wells and Cr Treatment Plant				
4.01		IWF Well Field, 30 wells	Running		3	ETI repaired piping on I-L to avoid possible leak.
4.02		Ferrous Sulfate Feed System	Running			
4.03		Polymer Feed System	Running			
4.04		Clarifier	In operation			
4.05		Filter Press	Running		4	Filter press plates were cleaned to stop weeping from press while operating. Weeping is a normal result of the press.
4.06		GWTP Effluent Tank	In operation			
4.07		Interceptor Booster Pump A	Standby			
4.08		Interceptor Booster Pump B	Running			
4.09		Area In And Around GWTP	Running		4	ETI sucked out sump pit with trash pump and is exploring different options for sump pumps.

¹Status Codes

Running - Unit is in operation

Standby - Spare or duplicate, not currently in operation

Maintenance - Out of service for maintenance

Off - Not currently needed for use, but can be placed in service

Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
5		Equalization Area and GW-11 Pond				
5.01	PID10A	Pond GW-11	In operation			
5.02	PID10A	Pond Water Pump - P101A	Standby			
5.03	PID10A	Pond Water Pump - P101B	Running			
5.04	PID10A	Equalization Tanks	In operation			
5.05	PID10A	Area in and Around EQ	In operation		3	ETI removed and cleaned strainers multiple times to improve flow. ETI replaced the spring pin for the motor drive for the auto cleaning cycle. ETI replaced the top cleaning paddle.
5.06	PID10A	Raw Water Feed Pump - P102A	Running			
5.07	PID10A	Raw Water Feed Pump - P102B	Maintenance		3	ETI received quote on repairs to be made and is waiting on approval to move forward with work.
5.08	PID10B	Carbon Absorber - LGAC 201A	Running			
5.09	PID10B	Carbon Absorber - LGAC 201B	Running			
5.10	PID10B	Carbon Absorber - LGAC 201C	Running			
6		First Stage FBRs A, 1 & 2				
6.01	PID14	FBR A	Running			
6.02	PID14	Separator Tank - 1401	Running			
6.03	PID14	Media Return Pump - P 1401	Running		3	The pump was rebuilt and is back in service.
6.04	PID14	P1401A	Running			
6.05	PID01A	P1401B	Standby			
6.06	PID01A	FBR 1	Running			
6.07	PID02A	FBR 2	Running			
6.08	PID01A	First Stage Separator Tank - T2011	Running		3	ETI cleared air line supply to actuate valves.
6.09	PID01A	Media Return Pump - P2011	Running			
6.10	PID01A	First Stage FBR Pump - P1011	Standby			
6.11	PID01A	First Stage FBR Pump - P1012	Running			
6.12	PID01A	First Stage FRB Pump - P101A	Running			
6.13	PID07A	FBR A pH Feed Pump - P71A	Standby			
6.14	PID07A	FBR 1 pH Feed Pump - P711	Standby			
6.15	PID07A	FBR 2 pH Feed Pump - P712	Standby			
6.16	PID07A	FBR A Nutrient (Urea) Feed Pump - P72A	Off		4	ETI repaired the abandoned nutrient feed line in overhead rack.
6.17	PID07A	FBR 1 Nutrient (Urea) Feed Pump - P721	Off			

¹Status Codes

Running - Unit is in operation

Standby - Spare or duplicate, not currently in operation

Maintenance - Out of service for maintenance

Off - Not currently needed for use, but can be placed in service

Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
6.18	PID07A	FBR 2 Nutrient (Urea) Feed Pump - P722	Off			
6.19	PID15	FBR A Nutrient (Phos Acid) Feed Pump - P1520A	Running			
6.20	PID15	FBR 1 Nutrient (Phos Acid) Feed Pump - P1521	Running			
6.21	PID15	FBR 2 Nutrient (Phos Acid) Feed Pump - P1522	Running			
6.22	PID07B	FBR A Electron Donor Assembly Pump - P73A	Running			
6.23	PID07B	FBR 1 Electron Donor Assembly Pump - P731	Running			
6.24	PID07B	FBR 2 Electron Donor Assembly Pump - P732	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
7		First Stage FBRs 3 & 4				
7.01	PID01B	FBR 3	Off			
7.02	PID01B	FBR 4	Off			
7.03	PID02B	First Stage Separator Tank - T2012	Off			
7.04	PID01B	Media Return Pump - P2012	Off			
7.05	PID01B	First Stage FBR Pump - P1013	Off			
7.06	PID01B	First Stage FRB Pump - P1014	Off			
7.07	PID01B	First Stage FBR Pump - P102A	Off			
7.08	PID07A	FBR 3 pH Feed Pump - P713	Off			
7.09	PID07A	FBR 4 pH Feed Pump - P714	Off			
7.10	PID07A	FBR 3 Nutrient (Urea) Feed Pump - P723	Off			
7.11	PID07A	FBR 4 Nutrient (Urea) Feed Pump - P 724	Off			
7.12	PID15	FBR 3 Nutrient (Phos Acid) Feed Pump - P1523	Off			
7.13	PID15	FBR 4 Nutrient (Phos Acid) Feed Pump - P1524	Off			
7.14	PID07B	FBR 3 Electron Donor Assembly Pump - P733	Off			
7.15	PID07B	FBR 4 Electron Donor Assembly Pump - P734	Off			
8		Second Stage FBRs 5 & 6				
8.01	PID03A	FBR 5	Off			
8.02	PID03A	FBR 6	Off		4	ETI opened the manway to access the remaining carbon in bottom of FBR.
8.03	PID03C	Second Stage Separator Tank - T3011	Off			
8.04	PID03A	Media Return Pump - P3011	Off			
8.05	PID03A	Second Stage FBR Pump - P3015	Off			
8.06	PID03A	Second Stage FBR Pump - P3016	Off			
8.07	PID03A	Second Stage FBR Pump - P301A	Off			
8.08	PID07A	FBR 5 pH Feed Pump - P715	Off			
8.09	PID07A	FBR 6 pH Feed Pump - P716	Off			
8.1	PID07A	FBR 5 Nutrient (Urea) Feed Pump - P725	Off			
8.11	PID07A	FBR 6 Nutrient (Urea) Feed Pump - P726	Off			
8.12	PID07B	FBR 5 Electron Donor Assembly Pump - P735	Off			
8.13	PID07B	FBR 6 Electron Donor Assembly Pump - P736	Off			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
9		Second Stage FBRs 7 & 8				
9.01	PID03B	FBR 7	Running			
9.02	PID03B	FBR 8	Running			
9.03	PID03D	Second Stage Separator Tank - T3012	Running		3	ETI cleared airline supply to actuate level control valves.
9.04	PID03B	Media Return Pump - P3012	Running			
9.05	PID03B	Second Stage FBR Pump - P3017	Running			
9.06	PID03B	Second Stage FBR Pump - P3018	Running			
9.07	PID03B	Second Stage FBR Pump - P302A	Standby			
9.08	PID07A	FBR 7 pH Feed Pump - P717	Standby			
9.09	PID07A	FBR 8 pH Feed Pump - P718	Standby			
9.10	PID07A	FBR 7 Nutrient (Urea) Feed Pump - P727	Off			
9.11	PID07A	FBR 8 Nutrient (Urea) Feed Pump - P728	Off			
9.12	PID07B	FBR 7 Electron Donor Assembly Pump - P737	Running			
9.13	PID07B	FBR 8 Electron Donor Assembly Pump - P738	Running			
10		Aeration and DAF System				
10.01	PID04	Aeration Tank	In operation			
10.02	PID04	Aeration Blower - B401	Running			
10.03	PID04	Biofilter	In operation			
10.04	PID04	Nutrient Solution	Running			
10.05	PID04	Biofilter Sump	Running			
10.06	PID04	Nutrient Pump - P401	Running			
10.07	PID04	Biofilter Sump Pump - P402A	Standby			
10.09	PID04	Biofilter Blower	Running			
10.10	PID05	DAF Pressure Tanks	In operation		4	ETI received a quote for isolation valve installation and is waiting for approval to move forward.
10.11	PID05	DAF Vessel - D501	Running			
10.12	PID05	DAF Pressure Pump - P501	Running			
10.13	PID05	DAF Float Pump - P502	Running			
10.14	PID05	DAF Vessel - D551	Running			
10.15	PID05	DAF Pressure Pump - P551	Running			
10.16	PID05	DAF Float Pump - P552	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
10.17	PID05	<i>Screw Conveyer Drive</i>	Standby			
10.18	PID05	<i>Skimmer Drive</i>	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
11		Pumping System (Old Effluent)				
11.01	PID06	Effluent Tank 601	In operation			
11.02	PID06	Effluent Pump - P601	Standby			
11.03	PID06	Effluent Pump - P602	Running			
12		Sand Filter System				
12.01	PID17	Sand Filter	Running			
12.02	PID17	Filter Reject Tank	In operation			
12.03	PID17	Filter Reject Pump - P1701A	Standby			
12.04	PID17	Filter Reject Pump - P1701B	Running			
13		Effluent Tank and Pumping				
13.01	PID10C	UV Effluent Tank	Running			
13.02	PID10C	Effluent Booster Pump - P1302A	Running			
13.03	PID10C	Effluent Booster Pump - P1302B	Running			
13.04	PID10C	Area Around Effluent and North D-1	Running		3	The valve was replaced and is ready for service.
14		Solids Collection and Pressing System				
14.01	PID16	Sludge Storage Tank	In operation			
14.02	PID16	Solids Storage Effluent Pump - P1601	Running			
14.03	PID16	Solids Cond. Tank	In operation			
14.04	PID09	Sludge Mixer	Running			
14.05	PID09	Filter Press Pump - P901	Running			
14.06	PID09	Filter Press Pump - P902	Running			
14.07	PID09	West Press	Standby			
14.08	PID09	East Press	Running			
14.09	PID09	Filtrate Tank	In operation			
14.10	PID09	Filtrate Tank Effluent (recycle) Pump - P903	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
Chemical Systems						
15		Electron Donor System				
15.01	PID07B	<i>Electron Donor Tank</i>	In operation			
15.02	PID07B	<i>Booster Pump P739A</i>	Running			
15.03	PID07B	<i>Booster Pump P739B</i>	Standby			
17	PID07C	Micro Nutrient System	In operation			
18	PID07C	Hydrogen Peroxide System	In operation			
19	PID07C	De-Foam System	In operation			
20	PID15	Nutrient (Phosphoric Acid) System (Tank only - pumps included in FBRs)	In operation			
21	PID07A	Nutrient (Urea) System (Tank only - pumps included in FBRs)	In operation			
22	PID07A	pH System (Tank and effluent pH feed pump only - other pumps included in FBRs)	In operation			
23	PID07C	Ferric Chloride System	In operation			
24	PID07B	Polymer Systems - DAF	In operation			
25	PID09	Polymer System - Solids Dewatering (2 tanks, 2 centrifugal pumps, mixer, volumetric feeder)	In operation			
Utility Systems						
26		Compressed Air System				
26.01	PID08	<i>West Compressor</i>	Running		2	Two phases of the motor went out. A new motor was required to put the compressor back into service.
26.02	PID08	<i>East Compressor</i>	Running		2	Ingersoll-Rand serviced and replaced the thermostat switch after finding a high air end temp.
26.03	PID08	<i>O2 Compressor</i>	Running			
26.04	PID08	<i>Compressed Air Receiver Tank</i>	In operation			
26.05	PID08	<i>Air Dryer</i>	Running			
26.06	PID08	<i>Oil Removal Filter</i>	In operation			
26.07	PID08	<i>Particulate Filter</i>	In operation			
27	PID16	Oxygen System	In operation			
28		GWETS Plant Controls/ Siemens Controls	In operation			
29		Well Control System/ Allen Bradley Controls	In operation			

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Maintenance - Out of service for maintenance

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
30		MCC FBR Pad	In operation			
31		MCC in D-1	In operation			
32		MCC in EQ area	In operation			

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Maintenance - Out of service for maintenance

Off - Not currently needed for use, but can be placed in service

Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
Miscellaneous Systems						
33		Operations Office/Network	In operation			
34		Laboratory Analyzers	In operation			
35		Security Systems	In operation			
Shelf Spares						
		Media Return Pump Rebuild Kit	In stock			ETI ordered new trunnions and bearings after most recent repairs
		pH Feed Pump	In stock			
		Nutrient Feed Pump	In stock			
		Electron Donor Feed Pump	In stock			
		Phosphoric Acid Feed Pump	In stock			
		Interceptor Well Pumps (4 each)	In stock			
		Seep Well Pump (1 each, same as Athens so total of 2)	In stock			
		Athens Road Well Pump (1 each, same as Seep so total of 2)	In stock			A new 1.5 hp motor and 60gpm pump was purchased and items replaced were used for the ART-2 repair.

¹ Status Codes

Equipment

Running Unit is in operation
 Standby Duplicate or installed spare, not currently operating
 Maintenance Out for repairs or maintenance
 Off Not currently needed, but available

¹ Criticality Codes

1 = Critical Cannot continue with operation until repairs made
 2 = Important Can still operate safely and in compliance with permits, but risks are increased
 3 = Moderate Work needs to be performed, but plant can still operate with redundancy that is in place
 4 = Low - Tasks performed to either improve the existing equipment (i.e., testing new options)
 - Minor repairs that in no way alter the performance of the plant

Tanks, Pipelines, Ponds

In operation
 Out of service

Spares

In stock

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