
To: Nevada Division of Environmental Protection
Nevada Environmental Response Trust

Cc: Nevada Environmental Response Trust Stakeholders

From: Ryan Sullivan, Vice President Service and O&M

Date: August 20, 2017

Subject: NERT – GWETS Operation Monthly Report – July 2017

At the request of the Nevada Environmental Response Trust (Trust), Envirogen Technologies, Inc. (ETI) is providing this summary of the groundwater extraction and treatment system (GWETS) operation and performance during July 2017.

Summary of GWETS Operation

Envirogen Technologies, Inc. (ETI) mechanically operated the GWETS and ion exchange (IX) system normally in July 2017. Flow from PC-118, PC-119, PC-120, PC-121, and PC-133 was routed to the IX system, bypassing all flow meters associated with the FBR plant. The flow rate to the IX system averaged approximately 267 gallons per minute (gpm). The flow rate to the FBR plant averaged approximately 1,058 gpm during July 2017. At the end of the month, the GW-11 Pond volume was at 34.9 million gallons (MG), which would allow 19.1 days of available additional storage in the event of an emergency FBR plant shutdown with continued well field pumping. The water volume stored in the GW-11 Pond decreased approximately 1.1 MG from the end of June 2017. Figure 1 in this report depicts the actual GW-11 pond volumes and additional storage available.

The influent perchlorate concentration to the IX system averaged 1.8 mg/L for the month. The influent perchlorate concentration to the FBR plant averaged 118 mg/L for the month, with a maximum concentration of 200 mg/L. The increased concentration is due to the addition of the AP-5 decant liquids to the FBR plant influent beginning July 17, 2017. In comparison, the influent perchlorate concentration for the month of June 2017 averaged 95 mg/l, with a maximum concentration of 100 mg/l.

Enhanced Operational Metrics

Tables 1 and 2 provide a summary of the current GWETS operational metrics data for flow rates, perchlorate and chromium concentrations, and mass removal. These tables also include data associated with the AP-5 decant liquids. Figure 2 graphically presents historical perchlorate and chromium mass flux information.

Operational Issues

All routine plant repairs conducted by ETI were performed in accordance with the NERT Perchlorate Treatment System Operations Manual. The following is a list of operational issues and major repairs and/or

equipment replaced during this reporting period.

1. **GW-11**

ETI continued to withdraw water from the GW-11 pond while combining this flow with Lift Station flow in the TK-101 tanks for equalization purposes. The average flow rate for July from the GW-11 pond was approximately 10 gpm.

2. **Biological Plant**

Treatment of AP-5 water through the FBR Biological plant commenced July 17th, 2017 starting at 0.5 gpm flow. The AP-5 flow was incrementally increased to 6.5 gpm by July 31st, 2017.

There were no significant plant interruptions. There were no planned diversions into GW-11 for the month of July and one unplanned diversion. Below is a description of the events that occurred:

Unplanned Diversions:

- Effluent Diversion to GW-11 on July 6th from 1:16am to 2:10am due to a loss of flow at all three Lift Stations and a loss of signal communication from the Lift Stations to the FBR plant possibly due to a power supply irregularity. The loss in flow caused the plant to go into Recycle mode. Upon reestablishing communication and flow, the effluent was diverted as a precaution while samples were tested in the onsite lab. Flow returned to the Outfall after confirmation of acceptable effluent water quality. Physical connections and fuses associated with the communication system were checked and troubleshot.

3. **Spills**

There were no reportable spills in the month of July.

4. **Maintenance**

- Major maintenance performed by ETI in the month included:
 - I. DAF sludge pipeline –The sludge lines on the discharge of the DAF sludge box pumps were replaced with larger 4” lines as well as multiple flush points.
 - II. GW-11 Pond – A new single phase 1/2hp motor was installed on the SW pond corner.
 - III. GW-11 Pond – A new transducer was installed in the still well for GW-11.
 - IV. Extraction well I-U – A new transducer was installed on I-U.
 - V. Extraction well I-O – A new 1/2hp motor was installed on I-O.
 - VI. D-1 Bldg Filter presses – The drip trays for the filter presses were patched and painted.
 - VII. Safety Showers – New scald protectors were installed on the safety showers.
 - VIII. T-205 Tank – The flange of the AP-5 line was tightened down to stop the leak inside the containment.
 - IX. Stabilized Lake Water – The 2” SLW check valve was replaced near the 601 skid.
 - X. Plant air lines – New automatic blow downs were installed around the plant to aid in removing the moisture from the airlines.
 - XI. Plant grounds – A new sensor was installed on the front gate to signal it to close.
 - XII. FBR-A – Sand was loaded into FBR A and the vessel was brought back online.

- XIII. P-101 pump – The automatic strainers P-101 discharge were pulled and cleaned and new electrical connections were established on the auto flush sequence.
- Preventative Maintenance completed or being performed by ETI in the month included:
 - I. FBR Recycle pump skids – All recycle motors and pumps have been greased and the oil was changed.
 - II. Electrical system – Infrared checks were completed on the electrical motor control units in the D-1 MCC cabinet and the FBR pad MCC cabinet.
 - III. T-1702 Sandfilter – The airlifts and air system was inspected on the sand filter. New weir pieces were cut and installed on the weirs of each of the airlifts.
 - IV. FBR Recycle pump skids – All ORP probes were flushed, cleaned and calibrated.
 - V. Plant sump pumps – The PDM, ISEP and Raw water sump pumps were inspected and greased. The level float on the PDM sump was replaced.
 - VI. T-401 Aeration tank – The oil was changed on the Aeration tank blower and the belt was inspected.

GWETS Upgrades and Facility Projects

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

1. **AP-5 Solids Removal**
The system is mechanically complete and treatment of AP-5 water through the FBRs began on July 17. Construction is complete.
2. **Spill containment enhancements**
The work authorization for secondary containment modifications has been issued by the Trust. Approximately 85% of the work was completed as of the end of July. It is expected that these modifications will be completed in August.
3. **Addition of the Chromium Treatment Plant, GWETS, to the O&M manual**
The Trust completed its review of the document and it was finalized and submitted to NDEP in July. Project is Complete.

Equipment Availability Tracking

ETI operators continue to update the equipment tracking form on a weekly basis or whenever there is a change in the status of key equipment. During regular site visits, Tetra Tech field personnel verify the entries on the form, including both the operating status and confirmation of the inventory of required shelf spares. The equipment tracking form is included as 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)

Tables

Operational Metrics

Nevada Environmental Response Trust Groundwater Extraction and Treatment System Monthly Stakeholder Metrics				
Location ID	Average Flow Rate (gpm)	Perchlorate (mg/L) ^{5 6}	Chromium (TR) (mg/L) ^{5 6}	Chromium(VI) (mg/L) ^{5 6}
SWF Total Extraction ²	759 ¹	9.8	0.00025	0.00050
AWF Total Extraction ²	458 ¹	83	0.16	0.17
IWF Total Extraction ²	63 ¹	669	7.6	7.9
AP Area Total Extraction ³	6.8 ¹	757	NA	0.028
GWTP Effluent ⁴	75	746	0.63	ND
GW-11 Influent ²	0.3	100	0.16	0.013
FBR Influent ^{4 7}	1,058	118	0.044	0.021
T-205 Effluent (AP-5 Wash Water) ^{7 8}	2.7	33,188	NA	NA

Notes:

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

1: Sum of daily average flow for individual wells.

2: Perchlorate and chromium TR sampled monthly, values reported from TestAmerica.

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

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

5: All concentrations reported are monthly flow weighted averages.

6: ND analytical values are treated as zero values in the flow weighted average calculations.

7: AP-5 Wash Water perchlorate data is also included in the GW-11 Effluent/ FBR Influent totals.

8: Flow weighted average concentration based on internal process control samples analyzed by ETI.

Nevada Environmental Response Trust Groundwater Extraction and Treatment System Monthly Stakeholder Metrics			
Location ID	Perchlorate (lbs/month) ¹	Chromium (TR) (lbs/month) ¹	Chromium (VI) (lbs/month) ¹
SWF Total Extraction	2,787	0.07	0.14
AWF Total Extraction	14,149	28	29
IWF Total Extraction	15,743	179	186
AP Area Total Extraction	1,932	NA	0.07
GWTP Effluent	20,962	18	0.00
GW-11 Influent	10	0.02	0.00
FBR Influent ²	46,610	18	8.1
T-205 Effluent (AP-5 Wash Water) ^{2 3}	15,973	NA	NA

Notes:

TR = Total Recoverable; NA = Not Analyzed.

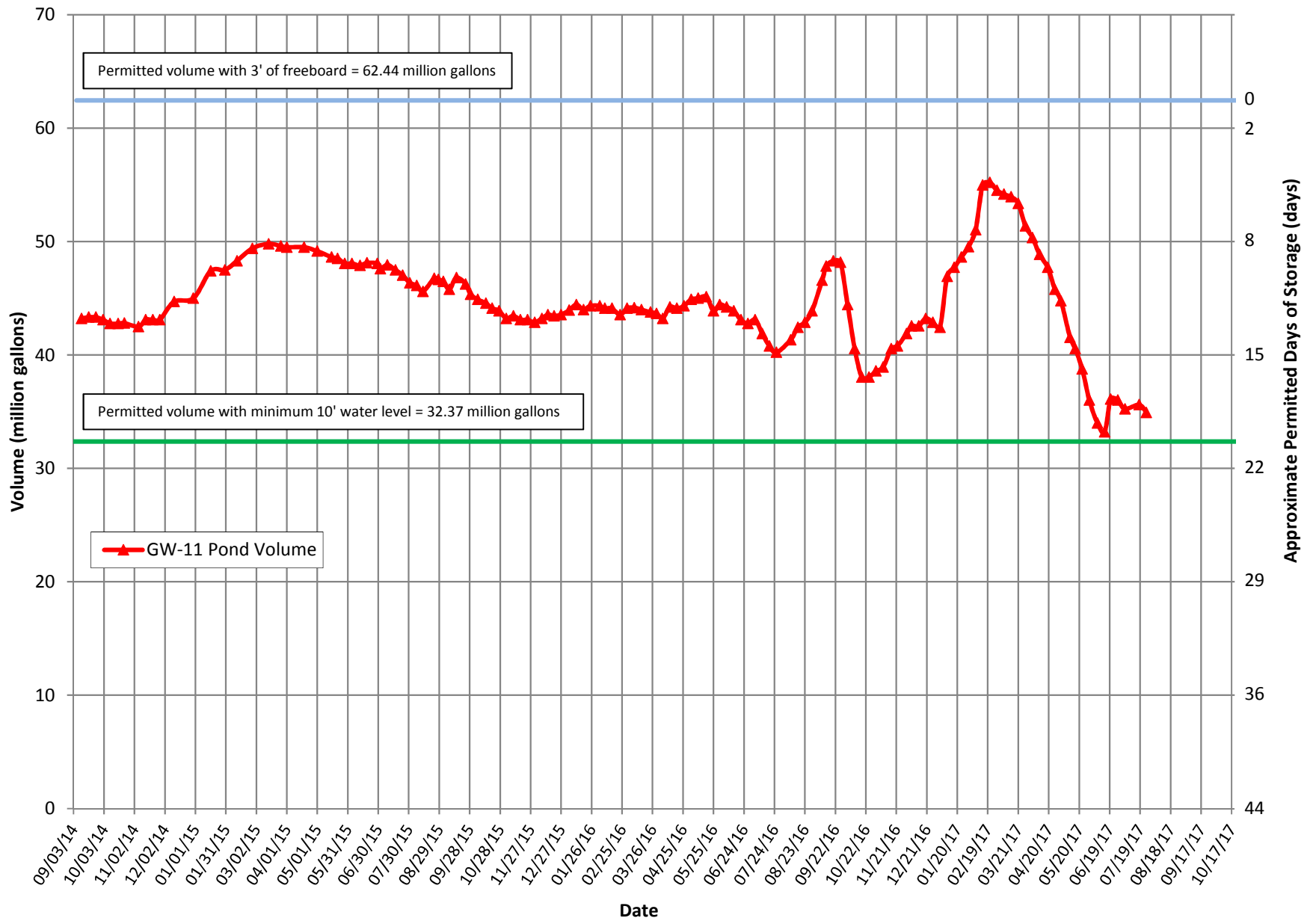
1: Total mass extracted is calculated from flow weighted average concentration and average flow (see Table 1).

2: AP-5 Wash Water perchlorate data is also included in the GW-11 Effluent/ FBR Influent totals.

3: Flow weighted average concentration based on internal process control samples analyzed by ETI.

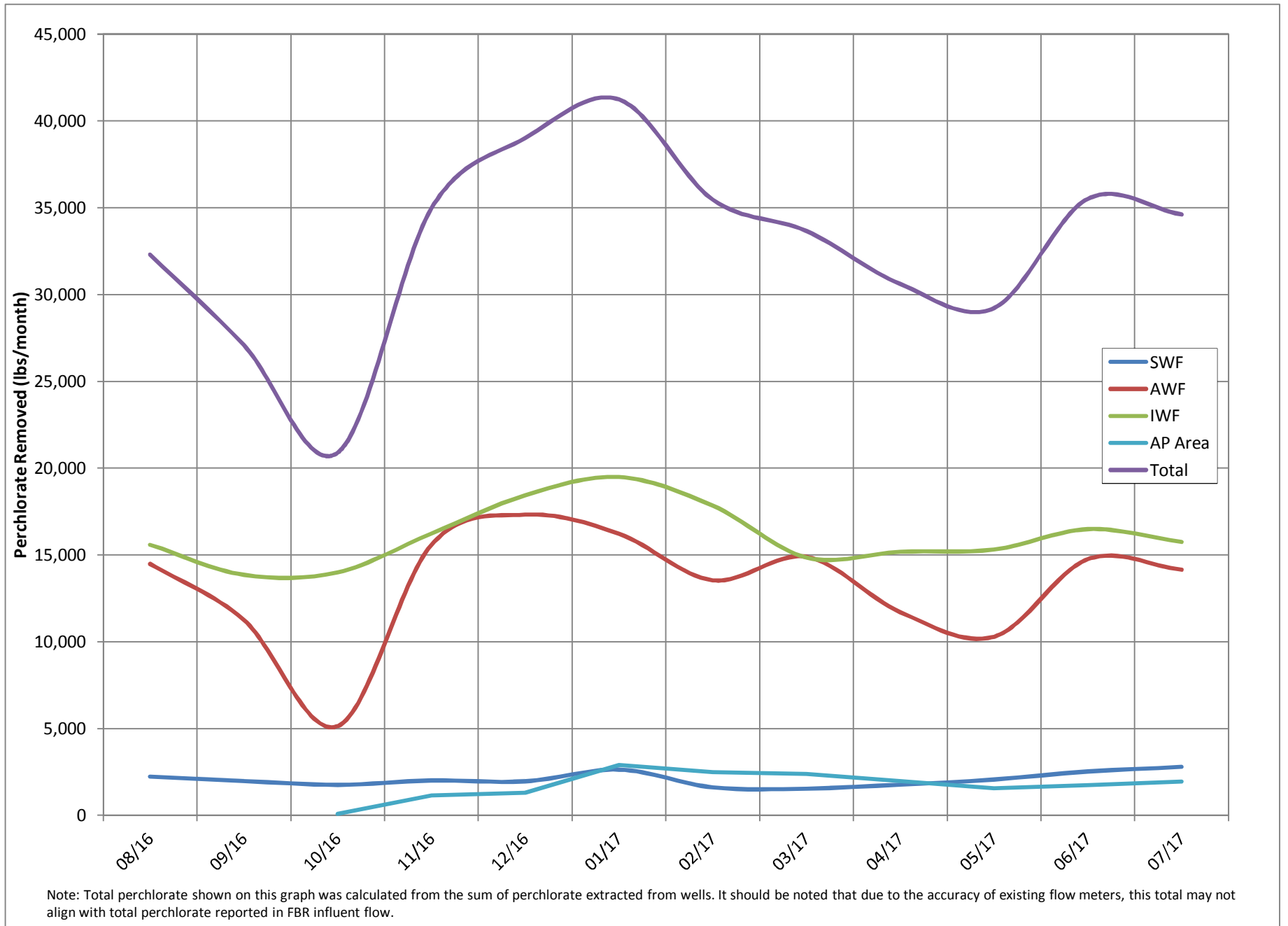
Figures

Operational Metrics



Note: Measurements switched from manual to transducer on 06/20/17. The pond volume fluctuations between 05/30 and 06/20 reflect the decreasing manual measurement accuracy at lower pond levels.

Figure 2 - Historical Perchlorate Mass Flux



Attachment A

NPDES Tracking Sheet (Prepared by ENVIRON)

Attachment B

Equipment Tracking Form

Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
Main Plant Equipment						
1 Seep Wells and Lift Station 1						
1.01		Seep Well Field, 9 wells	Running		2	A new contactor was installed on the electrical bucket of PC-117.
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	Art-2A was showing a ground fault. The well was pulled and the pigtail had a knick in the wire. A new pigtail was installed and the well was brought back into service.
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 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			
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		2	A new 1/2hp motor was installed on I-O.
4.02		Ferrous Sulfate Feed System	Running			
4.03		Polymer Feed System	Running			
4.04		Clarifier	In operation			
4.05		Filter Press	Running			
4.06		GWTP Effluent Tank	In operation		3	The flowmeter was pulled and inspected. No faults were found and the unit was put back into service.
4.07		Interceptor Booster Pump A	Running			
4.08		Interceptor Booster Pump B	Standby			
4.09		Area In And Around GWTP	Running			
5 Equalization Area and GW-11 Pond						
5.01	PID10A	Pond GW-11	In operation		2	A new 1/2 hp single phase motor was installed on the SW corner and the pump was put back into service.
5.02	PID10A	Pond Water Pump - P101A	Running			
5.03	PID10A	Pond Water Pump - P101B	Standby			
5.04	PID10A	Equalization Tanks	In operation			

Status Codes

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 Maintenance - Out of service for maintenance
 Off - Not currently needed for use, but can be placed in service

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
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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
5.05	PID10A	Area in and Around EQ	In operation			
5.06	PID10A	Raw Water Feed Pump - P102A				
5.07	PID10A	Raw Water Feed Pump - P102B				
5.08	PID10A	F-101 Filters	Running			
5.09	PID10B	Carbon Absorber - LGAC 201A	Running			
5.10	PID10B	Carbon Absorber - LGAC 201B	Running			
5.11	PID10B	Carbon Absorber - LGAC 201C	Running		3	New tubing was installed on the the old flow meter that had a small drip leak. The leak was contained.
6		First Stage FBRs A, 1 & 2				
6.01	PID14	FBR A			3	Sand was loaded into the FBR and the unit was brought back into service. The FBR is running.
6.02	PID14	Separator Tank - 1401				
6.03	PID14	Media Return Pump - P 1401				
6.04	PID14	P1401A				
6.05	PID01A	P1401B				
6.06	PID01A	FBR 1	Running		2	A new positioner was installed on the feed valve.
6.07	PID02A	FBR 2	Running			
6.08	PID01A	First Stage Separator Tank - T2011	Running			
6.09	PID01A	Media Return Pump - P2011	Running		3	The discharge lines were unclogged on the catwalk so the pump can discharge to either FBR.
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	Off			
6.14	PID07A	FBR 1 pH Feed Pump - P711	Off			
6.15	PID07A	FBR 2 pH Feed Pump - P712	Off			
6.16	PID07A	FBR A Nutrient (Urea) Feed Pump - P72A	Off			
6.17	PID07A	FBR 1 Nutrient (Urea) Feed Pump - P721	Off			
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			
7		First Stage FBRs 3 & 4				
7.01	PID01B	FBR 3	Running			
7.02	PID01B	FBR 4	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
7.03	PID02B	First Stage Separator Tank - T2012	Running			
7.04	PID01B	Media Return Pump - P2012	Running			
7.05	PID01B	First Stage FBR Pump - P1013	Running			
7.06	PID01B	First Stage FRB Pump - P1014	Running			
7.07	PID01B	First Stage FBR Pump - P102A	Running			
7.08	PID07A	FBR 3 pH Feed Pump - P713	Running			
7.09	PID07A	FBR 4 pH Feed Pump - P714	Running			
7.10	PID07A	FBR 3 Nutrient (Urea) Feed Pump - P723				
7.11	PID07A	FBR 4 Nutrient (Urea) Feed Pump - P 724	Off			
7.12	PID15	FBR 3 Nutrient (Phos Acid) Feed Pump - P1523	Running			
7.13	PID15	FBR 4 Nutrient (Phos Acid) Feed Pump - P1524	Running			
7.14	PID07B	FBR 3 Electron Donor Assembly Pump - P733	Running			
7.15	PID07B	FBR 4 Electron Donor Assembly Pump - P734	Running			
8		Second Stage FBRs 5 & 6				
8.01	PID03A	FBR 5	Running			
8.02	PID03A	FBR 6	Running			
8.03	PID03C	Second Stage Separator Tank - T3011	Running			
8.04	PID03A	Media Return Pump - P3011	Running			
8.05	PID03A	Second Stage FBR Pump - P3015	Running			
8.06	PID03A	Second Stage FBR Pump - P3016	Standby			
8.07	PID03A	Second Stage FBR Pump - P301A	Running			
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	Running			
8.13	PID07B	FBR 6 Electron Donor Assembly Pump - P736	Running			
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			
9.04	PID03B	Media Return Pump - P3012	Running		3	The media return pump was rebuilt with new discs and housings. The old housings were recoated.
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	Running			
9.08	PID07A	FBR 7 pH Feed Pump - P717	Off			

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9.09	PID07A	FBR 8 pH Feed Pump - P718	Off			
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	Bio filter	In operation			
10.04	PID04	Nutrient Solution	Running			
10.05	PID04	Bio filter Sump				
10.06	PID04	Nutrient Pump - P401	Running			
10.07	PID04	Bio filter Sump Pump - P402A	Standby			
10.09	PID04	Bio filter Blower	Running			
10.10	PID05	DAF Pressure Tanks	In operation			
10.11	PID05	DAF Vessel - D501	Running		3	The sludge lines from the DAF's to the conditioning tank were increased to 4" lines from 2" to improve flow through the piping.
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			
10.17	PID05	Screw Conveyer Drive	Standby			
10.18	PID05	Skimmer Drive	Running			
11		Pumping System (Old Effluent)				
11.01	PID06	Effluent Tank 601	In operation			
11.02	PID06	Effluent Pump - P601	Running			
11.03	PID06	Effluent Pump - P602	Standby			
12		Sand Filter System				
12.01	PID17	Sand Filter				
12.02	PID17	Filter Reject Tank	In operation		3	Solids were removed from the reject tank.
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	Standby			
13.04	PID10C	Area Around Effluent and North D-1	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
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				
14.07	PID09	West Press	Standby		3	The drip trays have been patched and painted and are ready for service.
14.08	PID09	East Press	Running		3	The drip trays have been patched and painted and are ready for service.
14.09	PID09	Filtrate Tank	In operation			
14.10	PID09	Filtrate Tank Effluent (recycle) Pump - P903	Running			
		Chemical Systems				
15		Electron Donor System				
15.01	PID07B	Electron Donor Tank	In operation			
15.02	PID07B	Booster Pump P739A	Running			
15.03	PID07B	Booster Pump P739B	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	West Compressor	Running			
26.02	PID08	East Compressor	Running			
26.03	PID08	O2 Compressor	Running			
26.04	PID08	Compressed Air Receiver Tank	In operation			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
26.05	PID08	Air Dryer	Running			
26.06	PID08	Oil Removal Filter	In operation			
26.07	PID08	Particulate Filter	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			
30		MCC FBR Pad	In operation			
31		MCC in D-1	In operation			
32		MCC in EQ area	In operation			
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			
		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			Spares are on the shelf.

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