
To: Nevada Division of Environmental Protection
Nevada Environmental Response Trust

Cc: Nevada Environmental Response Trust Stakeholders

From: Michael Del Vecchio, Director Engineering and Project Management

Date: Jan 20, 2021

Subject: NERT – GWETS Operation Monthly Report – December 2021

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 December 2021.

Summary of GWETS Operation

Envirogen Technologies, Inc. (ETI) mechanically operated the GWETS and ion exchange (IX) system normally in December 2021. 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 265 gallons per minute (gpm). The flow rate to the FBR plant averaged approximately 934 gpm during December 2021. At the end of the month, the available GW-11 Pond volume was at 37.7 million gallons (MG), which would allow 16.9 days of available additional storage in the event of an emergency FBR plant shutdown with continued well field pumping. The available water volume stored in the GW-11 Pond increased since the end of November 2021; 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 0.46 mg/L for the month. The influent perchlorate concentration to the FBR plant averaged 42 mg/L for the month, with a maximum concentration of 71 mg/L. In comparison, the influent perchlorate concentration to the FBRs for the month of November 2021 averaged 49 mg/L, with a maximum concentration of 60 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. Figure 2 graphically presents historical perchlorate and chromium mass flux information. Attachment A provides a summary of the NPDES permit analytes with numerical discharge limits. As indicated in the quarterly NPDES discharge monitoring reports, there was an elevated concentration of carbonaceous biological oxygen demand (CBOD) of 43 mg/L in the effluent sample collected from the outfall on December 15, 2021 that exceeded the permit daily maximum limit of 40 mg/L. The sample was re-analyzed for CBOD and found to be non-detect (<5.0 mg/L), but this re-analysis was performed past the analytical method's specified hold time and therefore could not be used for reporting.

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

There were no operational issues with GW-11 in the month of December.

2. Biological Plant

There were influent / effluent diversions during the reporting period generally associated with GW-11 pond level maintenance as well as extraction well short-term shutdown events. Below is a description of the events that occurred:

Diversion Events / Well Shutdowns

- Interceptor Well Field (IWF) Extraction well field shutdown occurred on December 9, 2021 from 6:43am to 6:53am and 12:54pm to 1:00pm due to faulty level indicator signals. Troubleshooting was conducted and maintenance was completed on the level indicator.
- Influent diversion to GW-11 occurred on December 12, 2021 intermittently beginning at 1:13am for approximately 196 minutes due to a level control valve malfunction at Separator 3. Approximately 205,000 gallons of water were diverted to GW-11. The level control valve actuator and positioner were changed and the plant was taken out of Recycle mode and placed into Feeding mode.
- Effluent diversion to GW-11 occurred on December 12, 2021 from 7:16pm to 11:05pm as a precautionary measure due to high perchlorate results in the effluent. Adjustments were made to the process, a subsequent effluent sample was confirmed as compliant with the effluent guideline through onsite lab analysis, and the effluent was returned to the outfall. Approximately 234,000 gallons of water were diverted to GW-11.
- Effluent diversion to GW-11 occurred on December 13, 2021 from 9:05pm to 10:55pm as a precautionary measure due to high perchlorate results in the effluent. Adjustments were made to the process, a subsequent effluent sample was confirmed as compliant with the effluent guideline through onsite lab analysis, and the effluent was returned to the outfall. Approximately 112,000 gallons of water were diverted to GW-11.
- Effluent diversion to GW-11 occurred on December 18, 2021 from 5:16am to 2:11pm as a precautionary measure due to high perchlorate results in the effluent as a result of a malfunctioning ethanol pump regulator. Maintenance was conducted on the regulator, a subsequent effluent sample was confirmed as compliant with the effluent guideline through onsite lab analysis, and the effluent was returned to the outfall. Approximately 536,000 gallons of water were diverted to GW-11.
- Effluent diversion to GW-11 occurred on December 20, 2021 from 4:10am to 11:55am as a precautionary measure due to high perchlorate results in the effluent. Adjustments were made to the process, a subsequent effluent sample was confirmed as compliant with the effluent guideline through onsite lab analysis, and the effluent was returned to the outfall. Approximately 471,000

gallons of water were diverted to GW-11.

- Athen Road Well Field (AWF) Extraction well field shutdown occurred on December 28, 2021 from 7:25am to 8:27am due to maintenance activities on the level indicator. Maintenance was completed on the level indicator and the well field was brought back online.
- Shutdown of Seep Well Field (SWF) extraction well PC-117 occurred on December 29, 2021 from 9:02am to 10:49am due to blown fuse. Maintenance was completed, the fuse was replaced, and the well was brought back online.

3. Spills

There were no reportable spills in the month of December.

4. Maintenance

- Major maintenance performed by ETI in the reporting month included:
 - I. Installed new countertops in the lab.
 - II. Replaced the South DAF sludge pump due to a worn shaft.
 - III. Replaced the motor and pump on AWF extraction well ART-8A.
 - IV. Rebuilt the bed height pump on FBR 1.
 - V. Replaced the fuse associated with SWF extraction well PC-117.
 - VI. Replaced the mechanical seal on the east turbine at Lift Station 3 (LS-3).
 - VII. Replaced the flowmeter on the discharge of the P-101 pond pumps.
 - VIII. Repaired the worn check flap on the discharge of the west turbine at LS-3.
 - IX. Replaced the media return pump on FBR 1.
 - X. Replaced the actuator on the FBR 3 feed valve.
- Preventative maintenance performed by ETI in the reporting month included:
 - I. Drained and cleaned the South DAF.
 - II. Cleaned the swamp coolers for the winter.
 - III. Cleaned the air filters on the Air Conditioning units at all lift stations.
 - IV. Installed bracing and inspected the IWF extraction wells for damage.
 - V. Replaced the drawdown column on the Ferrous Sulfate line.
 - VI. Pressure washed the east press in the D-1 Building.
 - VII. Removed solids from the sand filter reject tank.
 - VIII. Flushed the pH/ORP lines.
 - IX. Cleaned out the flowmeter at the GWTP effluent line.
 - X. Inspected and cleaned out the vaults for the SWF extraction wells.

Attachment B contains a summary of all maintenance activities completed during the reporting period.

Facility Projects

1. Chromium Treatment Subsystem – Envirogen has established a scope of work for this activity and is currently working on system design. It is anticipated Envirogen will submit a Work Authorization for this scope in January 2022. Envirogen is targeting May of 2022 to complete the modifications

required to treat groundwater extracted as part of the Unit 4 Source Area In-Situ Bioremediation Treatability Study as well flow currently routed to the existing Chromium Treatment Plant (i.e. GWTP) from the IWF and AP Area wells.

2. Treatment System Extension (TSE) – Envirogen has delivered all of the contracted equipment for the GWETS extension. TSE construction and system start-up is being facilitated by Arcadis through terms with the Trust and began in December. ETI will incorporate a summary of the treatment operations once the system becomes operational (anticipated to occur in 4Q 2022).
3. Facility Repair/Replacement Items – Envirogen and the Trust have finalized a list of facility items to be addressed in connection with Amendment 8 to the O&M Agreement. Attachment C contains a status summary of all agreed upon items prepared by the Trust. Specific details on in-progress items is provided below:
 - I. (WA 21-03) Wiring at Lift Station 3
 1. Concrete pads were poured in preparation for wiring cabinets.
 - II. (WA 21-04) Motor Control Center at Lift Station 1
 1. Authorization received from the Trust. Procurement/planning in progress.
 - III. (WA 21-05) Replacement of Safety Shower System
 1. Authorization received from the Trust. Procurement/planning in progress.
 - IV. (WA 21-07) Replacement of all pH and ORP probes
 1. Authorization received from the Trust. Procurement/planning in progress.
 - V. (WA 21-08) Wiring IWF wells
 1. Authorization received from the Trust. Procurement/planning in progress.
 - VI. (WA 21-09) Siemens controls upgrade
 1. Authorization received from the Trust. Procurement/planning in progress.
4. Improved Biological Treatment Plant Efficiency – Envirogen plans to take five FBRs out of service and maintain them in working condition should they be needed in the future. This action will reduce the use of electricity and water and still maintain sufficient treatment capacity to address current groundwater extracted from the IWF, AWF, and the SWF as well as groundwater to be extracted as part of the Unit 4 Source Area In-Situ Bioremediation Treatability Study. Additional information is provided in Attachment D.

Tables

Operational Metrics

Nevada Environmental Response Trust Groundwater Extraction and Treatment System Monthly Stakeholder Metrics				
Location ID	Average Flow Rate (gpm)	Perchlorate (mg/L) ^{4 5}	Chromium (TR) (mg/L) ^{4 5}	Chromium(VI) (mg/L) ^{4 5}
SWF Total Extraction ¹	745 ³	6.2	0.0005	0.0012
AWF Total Extraction ¹	455 ³	58	0.13	0.13
IWF Total Extraction ¹	56 ³	392	5.7	5.3
AP Area Total Extraction ¹	8.9 ³	511	0.25	0.23
GWTP Effluent ²	63	323	0.02	ND
GW-11 Influent ¹	0.2	50	0.32	0.230
FBR Influent ²	934	42	0.085	0.084

Notes:

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

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

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

3: Sum of daily average flow for individual wells.

4: All concentrations reported are monthly flow weighted averages.

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

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	1,711	0.13	0.34
AWF Total Extraction	9,925	23	22
IWF Total Extraction	8,216	120	112
AP Area Total Extraction	1,689	0.84	0.75
GWTP Effluent	7,604	0.55	ND
GW-11 Influent	2.8	0.02	0.013
FBR Influent ¹	14,610	29	29.2

Notes:

TR = Total Recoverable; NA = Not Analyzed.

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

Figures

Operational Metrics

Figure 1 - GW-11 Pond Volume Through 12/31/2021

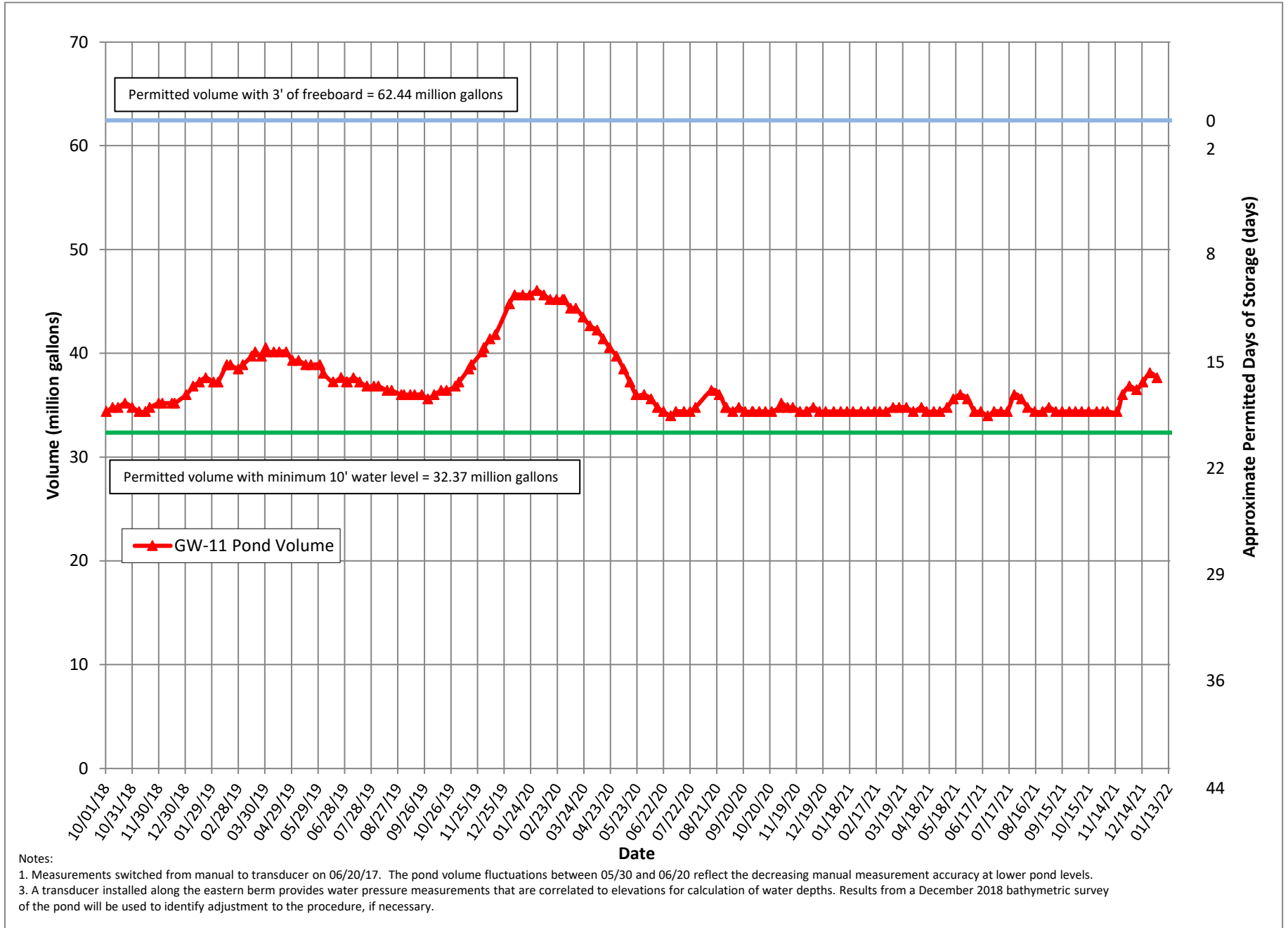
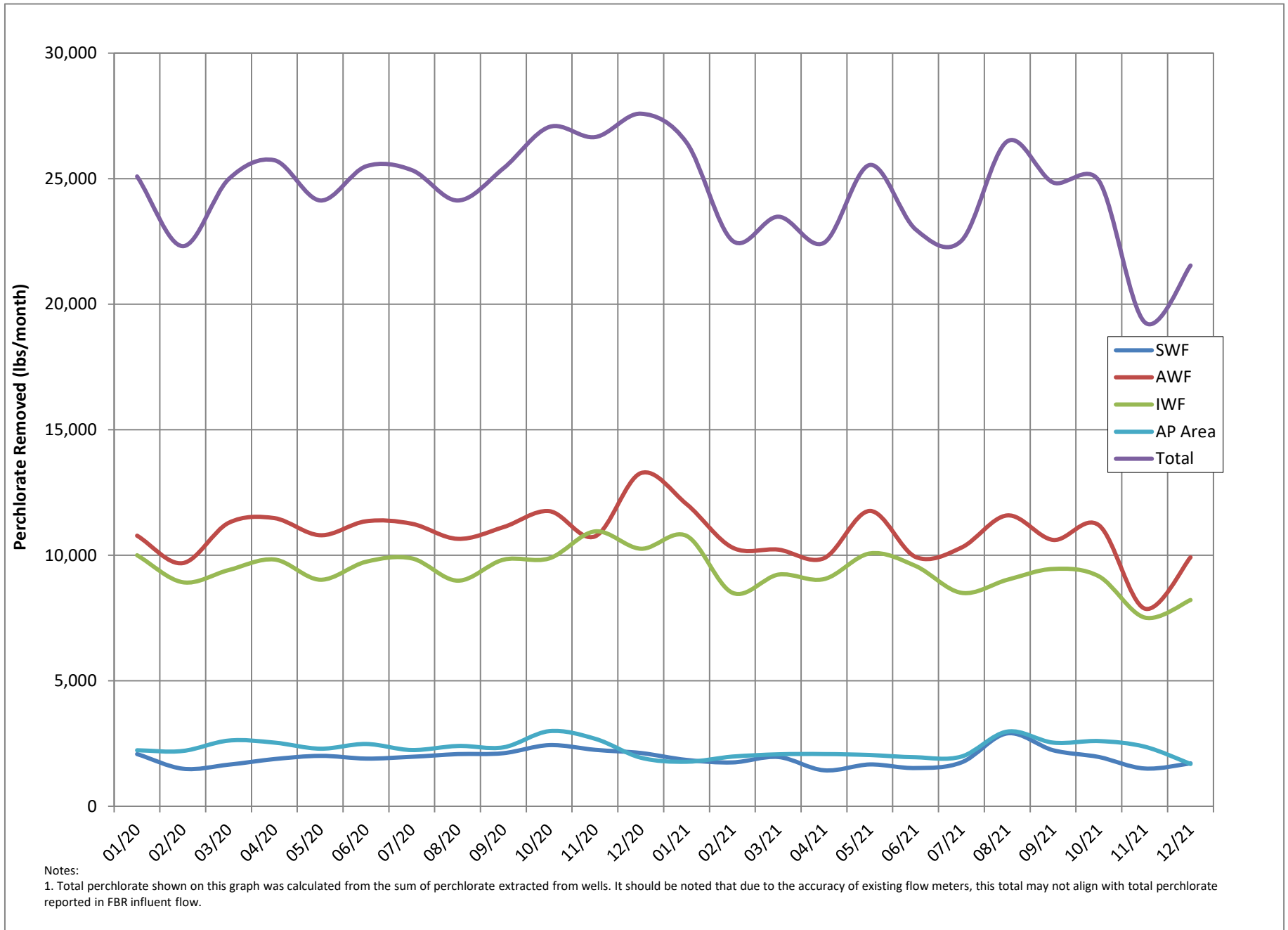


Figure 2 - Historical Perchlorate Mass Removed From Environment



Attachment A

NPDES Tracking Sheet (Prepared by Ramboll)

NPDES Permit NV0023060 - Analytes with Numerical Discharge Limits

Treated Effluent at Outfall 001																		
Continuous		Daily Samples, composited weekly		Weekly Grab Samples								Weekly, collected separately			Quarterly			
Flow Rate		Perchlorate		pH	Hexavalent Chromium	Total Chromium	Manganese	Total Iron	Total Inorganic Nitrogen (TIN)	Total Suspended Solids (TSS)	Total Ammonia as N		Total Phosphorus as P		BOD ₅ (inhibited)	Total Dissolved Solids (TDS)		
30-Day Avg. (MGD)	Daily Maximum (MGD)	30-Day Avg. (lbs/day)	30-Day Avg. (lbs/day)	Daily Min. (S.U.)	Daily Max. (µg/L)	Daily Max. (µg/L)	Daily Max. (µg/L)	Daily Max. (µg/L)	Daily Max. (µg/L)	Daily Average (mg/L)	30-Day Avg. (lbs/day)	30-Day Avg. (lbs/day)	30-Day Avg. (lbs/day)	Daily Max. (lbs/day)	30-Day Avg. (lbs/day)	Daily Max. (mg/L)		
2.52	2.88	18	0.38	6.5	9.0	10	100	5,000	10,000	20	135	2,839	20*	10*	25	40	525	8,000
January 2021	1.80	1.90	0.6	0.009	6.6	6.8	ND (<0.25)	12	100	1,300	1.0	19	290	4	7	ND (<5.0)	ND (<5.0)	38
February 2021	1.76	1.85	0.55	0.008	6.5	6.7	ND (<0.25)	5.6	100	1,200	10	21	320	6	6.1	11	38	170
March 2021	1.76	1.84	ND (<0.31)	0.0023	6.5	6.9	ND (<0.25)	2.2	110	1,100	1.4	15	220	2.6	6.6	5	15	80
April 2021	1.72	1.82	9	0.12	6.6	7.2	ND (<0.25)	1.2	72	940	0.29	7	100	2.2	5.2	ND (<5.0)	ND (<5.0)	37
May 2021	1.65	1.84	ND (<0.31)	0.0021	6.5	6.9	ND (<0.40)	4.7	100	1,700	0.56	16	220	2.8	3.2	ND (<5.0)	ND (<5.0)	34
June 2021	1.72	1.82	ND (<0.31)	0.0022	6.5	6.6	ND (<0.25)	2.1	78	990	0.69	15	230	1.7	5.7	ND (<5.0)	ND (<5.0)	35
July 2021	1.63	1.86	ND (<0.31)	0.0021	6.6	7.0	ND (<0.25)	14	100	1,500	0.50	20	210	3.0	4.4	ND (<5.0)	ND (<5.0)	37
August 2021	1.69	1.84	ND (<0.31)	0.0022	6.5	6.7	ND (<0.20)	3.7	110	1,900	0.67	17	250	3.1	6	ND (<4.3)	ND (<5.0)	30
September 2021	1.70	1.85	0.9	0.013	6.5	7.2	ND (<0.50)	ND (<0.85)	110	1,200	0.43	13	160	1.5	2.1	ND (<5.0)	ND (<5.0)	38
October 2021	1.71	1.79	2.3	0.03	6.6	6.8	ND (<0.50)	0.85 J	69	700	0.48	21	290	2.1	4.8	ND (<5.0)	ND (<5.0)	37
November 2021	1.66	1.78	ND (<0.31)	0.0022	6.5	7.3	ND (<0.50)	1.9	130	1,300	0.52	9	120	1.6	4.6	ND (<5.0)	ND (<5.0)	35
December 2021	1.78	1.88	1.0	0.015	6.5	6.6	ND (<0.50)	26	94	1,400	0.26	ND (<10)	70	1.4	6.2	11	43	160
January 2022 (month to date)	1.83	1.88	NA	NA	7.0	7.0	ND (<0.50)	4.8	11	910	0.35	14	220	2.0	7.4	ND (<5.0)	ND (<5.0)	NA

Daily Grab Sample Dates	Composite Sample Date	µg/L	lbs/day	Sample Date	S.U.	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	Sample Date	mg/L	lbs/day	Sample Date	mg/L				
1/3 - 1/9	1/9/2021	ND (<0.31)	0.16	0.0023	1/4/2021	6.6	ND (<0.25)	2.2	100	650	0.16	24	367	--	0.064	1.0	--	0.38	5.8	1/6/2021	ND (<5.0)	2.5	38		
1/10 - 1/16	1/16/2021	ND (<0.31)	0.16	0.0023	1/12/2021	6.7	ND (<0.25)	2.9	82	720	0.32	21	319	--	0.14	2.1	--	0.36	5.5	1/13/2021	ND (<5.0)	2.5	38		
1/17 - 1/23	1/23/2021	1.8	1.8	0.027	1/18/2021	6.8	ND (<0.25)	3.6	83	1,300	1.0	18	278	--	0.87	13	--	0.68	10	1/20/2021	ND (<5.0)	2.5	38		
1/24 - 1/30	1/30/2021	ND (<0.31)	0.16	0.0023	1/25/2021	6.6	ND (<0.25)	12	64	940	0.21	14	215	--	0.095	1.5	--	0.39	6.0	1/27/2021	ND (<5.0)	2.5	39		
1/31 - 2/6	2/6/2021	ND (<0.31)	0.16	0.0023	2/1/2021	6.7	ND (<0.25)	5.3	5.6 [*]	49	880	1.1	13	198	--	0.99	15	--	0.43	6.6	2/3/2021	ND (<5.0)	2.5	38	
2/7 - 2/13	2/13/2021	0.92 J	0.92	0.14	2/8/2021	6.6	ND (<0.25)	4.4	57	1,100	10	28	429	--	0.25	3.8	--	0.45	6.9	2/10/2021	ND (<5.0)	2.5	36		
2/14 - 2/20	2/20/2021	ND (<0.31)	0.16	0.0023	2/15/2021	6.5	ND (<0.25)	2.9	76	930	0.16	22	330	--	0.16	2.4	--	0.38	5.7	2/17/2021	38	569			
2/21 - 2/27	2/27/2021	0.96 J	0.96	0.0140	2/22/2021	6.7	ND (<0.25)	ND (<0.85)	100	1,200	0.19	21	316	--	0.16	2.4	--	0.34	5.1	2/24/2021	ND (<5.0)	2.5	37		
2/28 - 3/6	3/6/2021	ND (<0.31)	0.16	0.0022	3/2/2021	6.5	ND (<0.25)	1.1	96	970	1.4	11	155	--	0.30	4.2	--	0.34	4.8	3/4/2021	ND (<5.0)	2.5	38		
3/7 - 3/13	3/13/2021	ND (<0.31)	0.16	0.0023	3/8/2021	6.6	ND (<0.25)	2.2	110	760	0.21	20	286	--	0.21	3.0	--	0.37	5.3	3/10/2021	ND (<5.0)	2.5	37		
3/14 - 3/20	3/20/2021	ND (<0.31)	0.16	0.0023	3/15/2021	6.5	ND (<0.25)	ND (<0.85)	78	700	0.46	21	316	--	0.22	3.3	--	0.63	9.5	3/17/2021	ND (<5.0)	2.5	37		
3/21 - 3/27	3/27/2021	ND (<0.31)	0.16	0.0023	3/22/2021	6.9	ND (<0.25)	ND (<0.85)	53	1,100	ND (<0.050)	18	271	ND (<0.039)	0.020	0.29	--	0.55	8.3	3/24/2021	15	228			
3/28 - 4/3	4/3/2021	ND (<0.31)	0.16	0.0023	3/29/2021	6.6	ND (<0.25)	ND (<0.85)	61	840	0.25	ND (<10)	5	74	--	0.13	1.9	--	0.34	5.0	3/31/2021	ND (<5.0)	2.5	37	
4/4 - 4/10	4/10/2021	10	10	0.14	4/5/2021	6.6	ND (<0.25)	1.1	38	880	0.22	ND (<10)	5	74	--	0.16	2.4	--	0.37	5.5	4/7/2021	ND (<5.0)	2.5	37	
4/11 - 4/17	4/17/2021	ND (<0.31)	0.16	0.0023	4/12/2021	7.0	7.0 [*]	ND (<0.85)	30	920	0.24	13	194	--	0.14	2.1	--	0.33	4.9	4/14/2021	ND (<5.0)	2.5	37		
4/18 - 4/24	4/24/2021	ND (<0.31)	0.16	0.0022	4/19/2021	7.0	ND (<0.25)	1.2	49	940	0.29	ND (<10)	5	75	--	0.15	2.2	--	0.33	4.9	4/21/2021	ND (<5.0)	2.5	37	
4/25 - 5/1	5/1/2021	24	24	0.35	4/27/2021	7.2	ND (<0.25)	ND (<0.85)	72	990	0.23	ND (<10)	5	75	--	0.15	2.3	--	0.35	5.3	4/28/2021	ND (<5.0)	2.5	38	
5/2 - 5/8	5/8/2021	ND (<0.31)	0.16	0.0020	5/8/2021	6.8	ND (<0.40)	ND (<0.85)	54	950	0.33	ND (<10)	5	59	--	0.19	2.3	--	0.31	3.7	5/5/2021	ND (<5.0)	2.5	35	
5/9 - 5/15	5/15/2021	ND (<0.31)	0.16	0.0021	5/11/2021	6.7	ND (<0.25)	<0.85 - 0.85	72	970	0.56	15	217	--	0.44	6.4	--	0.38	5.5	5/12/2021	ND (<5.0)	2.5	37		
5/16 - 5/22	5/22/2021	ND (<0.31)	0.16	0.0021	5/17/2021	6.9	ND (<0.25)	3.7	100	1,700	0.14	23	301	--	0.11	1.4	--	0.079	1.0	5/19/2021	ND (<5.0)	2.5	37		
5/23 - 5/29	5/29/2021	ND (<0.31)	0.16	0.0023	5/24/2021	6.5	ND (<0.25)	4.7	98	790	0.21	20	295	--	0.090	1.3	--	0.17	2.5	5/26/2021	ND (<5.0)	2.5	37		
5/30 - 6/5	6/5/2021	ND (<0.31)	0.16	0.0023	6/1/2021	6.6	ND (<0.25)	2.1	77	690	0.33	12	180	--	0.15	2.2	--	0.41	6.1	6/2/2021	ND (<5.0)	2.5	37		
6/6 - 6/12	6/12/2021	ND (<0.31)	0.16	0.0023	6/7/2021	6.6	ND (<0.20)	1.6	78	990	0.22	16	237	--	0.065	1.0	--	0.10	1.5	6/9/2021	ND (<5.0)	2.5	37		
6/13 - 6/19	6/19/2021	ND (<0.31)	0.16	0.0022	6/14/2021	6.6	ND (<0.20)	1.7	61	960	0.69	23	343	--	0.11	1.6	--	0.53	7.9	6/16/2021	ND (<5.0)	2.5	35		
6/20 - 6/26	6/26/2021	ND (<0.31)	0.16	0.0021	6/21/2021	6.5	ND (<0.20)	ND (<0.85)	50	530	0.35	15	222	--	0.12	1.8	--	0.36	5.3	6/23/2021	ND (<5.0)	2.5	30		
6/27 - 7/3	7/3/2021	ND (<0.31)	0.16	0.0022	6/28/2021	6.5	ND (<0.20)	1.4	54	860	0.52	11	164	--	0.12	1.8	--	0.52	7.8	6/30/2021	ND (<5.0)	2.5	30		
7/4 - 7/10	7/10/2021	ND (<0.31)	0.16	0.0022	7/6/2021	6.7	ND (<0.20)	1.9	55	630	0.27	20	205	--	0.084	0.86	--	0.31	3.2	7/7/2021	ND (<5.0)	2.5	37		
7/11 - 7/17	7/17/2021	ND (<0.31)	0.16	0.0022	7/13/2021	6.6	ND (<0.20)	0.94	45	750	0.22	ND (<10)	5	66	--	0.058	0.76	--	0.28	3.7	7/14/2021	ND (<5.0)	2.5	37	
7/18 - 7/24	7/24/2021	ND (<0.31)	0.16	0.0017	7/20/2021	6.6	ND (<0.20)	14	100	1,500	0.50	45	404	--	0.22	2.0	--	0.45	4.0	7/21/2021	ND (<5.0)	2.5	34		
7/25 - 7/31	7/31/2021	ND (<0.31)	0.16	0.0024	7/27/2021	6.5	ND (<0.25)	2.7	50	1,100	ND (<0.050)	11	171	ND (<0.039)	0.020	0.30	--	0.43	6.7	7/28/2021	ND (<5.0)	2.5	38		
8/1 - 8/7	8/7/2021	ND (<0.31)	0.16	0.0023	8/2/2021	7.0	ND (<0.20)	1.2	36	1,900	0.67	29	445	--	0.40	6.1	--	0.88	14	8/4/2021	ND (<5.0)	2.5	37		
8/8 - 8/14	8/14/2021	ND (<0.31)	0.16	0.0022	8/9/2021	6.5	ND (<0.20)	2.5	91	730	0.50	16	238	--	0.14	2.1	--	0.42	6.3	8/11/2021	ND (<5.0)	2.5	31		
8/15 - 8/21	8/21/2021	ND (<0.31)	0.16	0.0022	8/17/2021	6.5	ND (<0.20)	1.4	1.8	110	0.60	0.39	ND (<10)	5	60	--	0.17	2.0	--	0.33	4.0	8/18/2021	ND (<2.0)	1.0	13
8/22 - 8/28	8/28/2021	ND (<0.31)	0.16	0.0020	8/23/2021	6.5																			

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	Replaced the fuse in the bucket for 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	Installed the 7.5 hp motor and pump back into ART-8A. New fittings were also installed on the discharge of the well.
2.02		Lift Station 3 Lift Pump A	Standby			
2.03		Lift Station 3 Lift Pump B	Running		1	Pulled the turbine to replace the mechanical seal. The turbine shaft shifted causing the pump to lock up. The pump was brought back to the plant to rebuild the shaft. The pump was torn down and repaired. The turbine is ready for service.
2.04		Area in and around Lift Station 3	Running		3	The flap on the check valve on the discharge of the turbines was not creating a seal. The flap was removed and the mounting hardware was repaired. The check flap is ready for service.
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		4	Installed additional bracing on the I-well piping.
4.02		Ferrous Sulfate Feed System	Running		4	Installed heat tracing to the drawdown column of the suction side of the pump.
4.03		Polymer Feed System	Running			
4.04		Clarifier	In operation			
4.05		Filter Press	Running			
4.06		GWTP Effluent Tank	In operation			
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		3	Replaced the power cable for the pond corner pump.

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
5.02	PID10A	Pond Water Pump - P101A	Running			
5.03	PID10A	Pond Water Pump - P101B	Standby			
5.04	PID10A	Equalization Tanks	In operation			
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			
6		First Stage FBRs A, 1 & 2				
6.01	PID14	FBR A			3	Repipe the feed valve air supply for the actuator.
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			
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 pump was rebuilt due to a blown trunnion.
6.10	PID01A	First Stage FBR Pump - P1011	Standby			
6.11	PID01A	First Stage FBR Pump - P1012				
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			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
7.02	PID01B	FBR 4	Running			
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			
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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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
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		2	Drained and inspected the vessel.
10.12	PID05	DAF Pressure Pump - P501	Running			
10.13	PID05	DAF Float Pump - P502	Running		3	The pump was changed out. The drive shaft was replaced.
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				
12		Sand Filter System				
12.01	PID17	Sand Filter				
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	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		4	The valve handle for the filtrate was replaced.
14.08	PID09	East Press	Running		2	The press is being pressure washed.
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		2	Tested and rotated the booster pumps.
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	In operation			
24	PID07B	Polymer Systems - DAF	In operation		3	Replaced the suction tubing.
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		1	The new compressor has been installed and is running.
26.03	PID08	O2 Compressor	Running			
26.04	PID08	Compressed Air Receiver Tank	In operation			
26.05	PID08	Air Dryer	Running			

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Sub-System	P&ID	Description	Status ¹	Checked	Criticality ²	Notes
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			

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Attachment C

Facility Repair/Replacement Project Status

GWETS AMENDMENT 8 REPAIR/REPLACEMENT STATUS

PREPARED BY NEVADA ENVIRONMENTAL RESPONSE TRUST

ITEM	RESOLUTION	WORK AUTHORIZATION	STATUS AS OF 12/31/21	
1	Dissolved Air Floatation (DAF) Vessels	ETI to pilot an alternate technology (AquaDisk filters) and make a recommendation	-	Draft Work Authorization submitted to the Trust on 12/20/21.
2	DAF Pump Skid Rebuild	On-hold pending outcome of DAF pilot and evaluation of plant hydraulics	-	N/A
3	Main Influent Pipeline Air/Vacuum Release Valves	ETI to replace valves and valve boxes as required	ETI WA 21-06 \$40,535 <i>Executed 12/21</i>	Work Authorization approved by NERT 12/21/21. Procurement and installation planning underway.
4	In-kind Replacement of GWTP	GWTP replacement not required due to design/build of Chromium Treatment Subsystem	N/A	N/A
5	Wiring at Lift Station #3 (controls)	ETI to replace wiring as required	ETI WA 21-03 \$60,035 <i>Executed 11/21</i>	Procurement and installation planning underway. Site work has begun.
6	Wiring at Lift Station #1 (wells)	Project on hold due to potential modification of the SWF with ROD or due to Cadence Sports Park. NERT will authorize interim repairs if necessary.	N/A	N/A
7	Motor Control Center at Lift Station #1	ETI to replace as required	ETI WA 21-04 \$186,315 <i>Executed 12/21</i>	Work Authorization approved by NERT 12/7/21. Procurement and installation planning underway.
8	IWF Wiring	ETI to replace as required	ETI WA 21-08 \$436,481 <i>Executed 12/21</i>	Work Authorization approved by NERT 12/7/21. Procurement and installation planning underway.
9	FBR Skid Equipment Replacements	ETI to replace what is immediately required in lieu of complete replacements	-	Draft Work Authorization submitted to the Trust 12/10/21.
10	Influent / Effluent Pump Motors	ETI to procure additional motors for more frequent rotation	-	Draft Work Authorization submitted to the Trust 12/05/21.
11	Overhaul Lift Station #2 West Wet Well Turbine	ETI to overhaul as required	-	Preparation of draft Work Authorization by ETI in progress. To Trust by 1/31.
12	Replacement of Safety Showers	ETI to replace safety shower system in batches over ~2 years	ETI WA 21-05 \$131,899 <i>Executed 11/21</i>	Procurement and installation planning underway.

GWETS AMENDMENT 8 REPAIR/REPLACEMENT STATUS

PREPARED BY NEVADA ENVIRONMENTAL RESPONSE TRUST

ITEM		RESOLUTION	WORK AUTHORIZATION	STATUS AS OF 12/31/21
13	East Air Compressor	ETI to replace as required	ETI WA 21-02 \$29,784 <i>Executed 10/21</i>	Compressor installed. Project complete.
14	pH and ORP Probes	ETI to replace certain probes as required throughout FBR plant	ETI WA 21-07 \$108,893 <i>Executed 11/21</i>	Procurement and installation planning underway.
15	Exterior Shell of Ethanol Storage Tank	ETI to repair as required	-	Preparation of draft Work Authorization for Trust review by 3/31/22.
16	FBR Containment Pad Concrete	ETI to monitor status of affected areas. NERT will authorize interim repairs if necessary.	N/A	N/A
17	Siemens Control System Repairs	Spare parts and software updates to be procured in lieu of a complete system replacement.	ETI WA 21-09 \$103,061 <i>Executed 11/21</i>	Procurement and installation planning underway.
18	Sludge Pump and Sluge Bins	ETI to replace as required	-	Draft Work Authorization submitted to the Trust 12/06/21.
19	FBR Fluidization Pumps Check Valves	ETI to replace as required	-	Draft Work Authorization submitted to the Trust 12/10/21.
20	D-1 Asbestos Evaluation	NERT to complete an asbestos survey	TT WA 21-12 \$7,400 <i>Executed 11/21</i>	Survey complete. Report preparation in progress.

Attachment D

FBR Mothball Letter



December 21, 2021

Mr. Steve Clough
Nevada Environmental Response Trust
510 S. Fourth Street
Henderson, NV 89015

Re: Mothballing of FBR reactors

The current treatment plant is designed for 1,893 equivalent pounds per day of contaminate as calculated by the following formula:

$$(0.9 \cdot \text{NO}_3\text{-N} + 0.17 \cdot \text{ClO}_3\text{-} + 0.18 \cdot \text{ClO}_4\text{-}) \cdot \text{FLOW} \cdot 1,440 \cdot 8.34 / 10^6$$

Where:

NO₃-N – concentration of Nitrate as N in ppm

ClO₃ – concentration of Chlorate in ppm

ClO₄ – concentration of Perchlorate in ppm

Flow – in million gallons per day

Currently the system is seeing less than 450 equivalent pounds or 24% load. The addition of the Unit 4 treatment water is projected at a maximum to be an additional 210 equivalent pounds for a total of 660 or 35% load.

As such, the current treatment operation is not efficient as it relates to energy and water usage and Envirogen recommends mothballing five FBRs. These activities would be completed over an approximate six-month period. The planned operational changes retain treatment capabilities to handle both the current extraction of groundwater from the IWF (including the AP Area wells), AWF, and SWF as well as the planned groundwater extraction at the Unit 4 treatability study location.

In order to improve of the efficiency of the biological treatment plant operations it is the intent of Envirogen to proceed as follows :

1. During February 2022, Envirogen will shut down FBR A. The media will, as possible, be transferred to the other four sand FBRs. The FBR and Separator along with the lines for the FBR A system will be drained.
2. Next, and as specified in ETI Work Authorization xx-yy, the upgrades to the pump skids associated with FBRs 3,4,7, and 8 will be completed to ensure this infrastructure is in

optimum operating condition. The materials needed for these upgrades should arrive by April 1, 2022.

3. Envirogen will overhaul the fluidization skid for FBRs 3&4 during April 2022 while running FBRs 1&2.
4. Envirogen will overhaul the fluidization skid for FBRs 7&8 during May 2022 while running FBRs 5&6.
5. After startup of the Unit 4 project water and establishment of steady state and load, ETI will begin gradually transferring load to FBRs 3, 4, 7, and 8, starting with 5. It is anticipated this will take about two weeks per FBR reactor until all four are shut down and mothballed.
6. Once mothballed, the reactors will be fluidized for about an hour on a weekly basis in order to maintain these FBRs if they are required to be restarted.

It is anticipated the entire process noted above should take to the June/July timeframe unless there are extenuating circumstances. If there are any question about this process feel free to call or email.

Best regards,



Mike Del Vecchio

Envirogen Technologies, Inc.
Director of Engineering and Project Management

cc: Robert Campbell – Envirogen
Wendy Prescott - Envirogen
Andrew Steinberg – NERT