

July 31, 2013

MEMORANDUM

To: Mr. Greg Lovato, Nevada Division of Environmental Protection

From: ENVIRON International Corporation

Subject: Operational Status and Problems Encountered at the Groundwater Extraction and Treatment System at the Nevada Environmental Response Trust Site, July 2, 2013 through July 11, 2013

This memorandum, prepared by ENVIRON International Corporation (ENVIRON) on behalf of the Nevada Environmental Response Trust (NERT or the Trust), is in response to a July 11, 2013 request from Greg Lovato, Chief of the Bureau of Corrective Actions at the Nevada Division of Environmental Protection (NDEP), to provide a summary of the current operational status and recent problems encountered at the Groundwater Extraction and Treatment System (GWETS) at the NERT site during the period from July 2 to July 11, 2013. This request specifically asked for the following items:

1. *A list of equipment failures and how specifically these have affected treatment system flow-rate capacity;*
2. *SWF, AWF, IWF daily extracted flow volumes (and calculated average daily gallons per gpm);*
3. *Daily influent flow volumes to plant (and calculated average daily gpm);*
4. *Daily untreated diverted flow to GW-11 (and calculated average daily gpm);*
5. *Daily treated effluent flow volumes to LV wash (and calculated average daily gpm) and partially treated to GW-11 (and calculated average daily gpm);*
6. *Cumulative of items 2 through 5 since 7/2;*
7. *Daily GW-11 freeboard and total volume; and*
8. *Any effluent violations in discharge to LV Wash.*

A summary of the operational status and problems encountered at the NERT GWETS plant leading up to and during the period of July 2 to July 11, 2013, along with the individual items requested above are provided in the sections below. Except where noted, all of the information presented herein has been provided by Veolia Water North America (Veolia). We are still awaiting information from Veolia for July 10-11, which they did not originally report. For this time period, ENVIRON has provided estimates based on currently available information and our engineering judgment and will revise the estimates as necessary upon receipt of data from Veolia covering these dates.

Summary

According to Veolia, electrical problems caused by power fluctuations starting on June 30, 2013 potentially led to the plant¹ disruptions that occurred during the period under review. On June 30, 2013, Veolia observed a power fluctuation which they believed caused the Programmable Logic Controller (PLC) battery backup to kick in. Veolia believes that similar power spikes continued throughout the week.

July 1

At 7:45 a.m., the plant was operational and running manually for approximately 30 minutes. At 8:15 a.m., effluent had to be diverted to the GW-11 pond as Veolia's subcontractor started troubleshooting on the PLC. At this point the plant was shut down. At 11:00 a.m., the plant was started manually, with a somewhat lower influent feed. At 12:00 p.m., Veolia's subcontractor successfully performed systematic diagnostics and reset the PLC at multiple locations, which had the plant operating by 12:30 p.m. At 4:15 p.m., the plant was shut down again due to the overheating of a plant air compressor and the subsequent loss of the ethanol feed pump (which runs on plant air). From 4:15 p.m. onward, the plant was operating, but effluent was being diverted to the GW-11 pond because the effluent quality was questionable (sulfide levels were high).

July 2

Effluent from the plant was still being diverted to the GW-11 pond due to high sulfide levels. At 6:00 p.m., sulfide levels were determined acceptable and effluent was sent to Las Vegas Wash. At 6:30 p.m., an issue occurred with the flow switch for Fluidized Bed Reactor (FBR) 4, which prompted the operator to distribute the influent feed among the other FBRs. No effluent was diverted at this time. At 8:30 p.m., Lift Station-3 (LS-3) went down, but the plant continued to operate and effluent was sent to Las Vegas Wash. At 8:45 p.m., effluent was diverted to the GW-11 pond due to high perchlorate levels. At 9:00 p.m., the operator noted that Lift Station-3 was down, and tried to restart the pumps, but was unsuccessful. The operator adjusted the flow at Lift Station-2 (LS-2) to compensate the loss of LS-3.

July 3

On the morning of July 3, LS-3 continued to be down. The plant continued to operate, but at a reduced capacity of approximately 600 gpm. At 3:30 p.m., LS-3 was up and running. At 4:10 p.m., the plant was temporarily shut down to hook up a rental air compressor. Influent was diverted to the GW-11 pond at this time. At 4:35 p.m., the plant was restarted after the rental air compressor hook up, but effluent continued to be diverted to the GW-11 pond as plant had not yet stabilized.

July 4

At 12:50 a.m. on July 4, effluent quality was acceptable and effluent was discharged to Las Vegas Wash. At 4:10 p.m. the air compressor overheated and stopped operating as it reached the temperature set point. At that point the standby air compressor was started. Power tripped at Motor Control Center-3 (MCC-3) and the plant was shut down. Subsequently influent was diverted to the GW-11 pond. At 7:00 p.m. the plant was up and running, but effluent continued to be diverted to the GW-11 pond.

¹ The GWETS is comprised of various treatment components. The Fluidized Bed Reactor (FBR) process provides the treatment for perchlorate via a biological reduction process mediated by microorganisms. It is the operational status of the FBR process that is the focus of this memorandum. For simplicity, the FBR process is referred to herein as the "plant".

July 5

At 1:20 a.m. on July 5, effluent quality was acceptable and effluent was discharged to Las Vegas Wash. At 7:45 a.m., issues occurred with the PLC battery back-up and the plant was shut down. Influent was diverted to the GW-11 pond.

July 6

Plant shut down due to PLC issues. Influent continues to be diverted to the GW-11 pond.

July 7

At 12:50 p.m. on July 7, the plant was back up and running, but effluent continued to be diverted to the GW-11 pond due to high sulfide and perchlorate levels.

July 8

At 10:20 p.m. on July 8, effluent was discharged to Las Vegas Wash, but at a reduced flow of approximately 700 gpm. Approximately 200 gpm was diverted to the GW-11 pond at this time.

July 9

At 9:00 a.m. on July 9, effluent continued to be discharged to Las Vegas Wash at the reduced flow rate. At 10 a.m., effluent was diverted back to the GW-11 pond due to high perchlorate levels.

July 10

At 4:00 p.m. on July 10, the plant had stabilized and effluent was discharged to Las Vegas Wash. The flow of the plant at this time was 900 gpm, with 100 gpm coming from the GW-11 pond.

July 11

On July 11, the plant was fully operational with a flow of 916 gpm, including 100 gpm from the GW-11 pond. The plant was shut down for approximately 15 minutes due to a drop in plant air pressure, but no influent or effluent had to be diverted.

Specific Requests

1. A list of equipment failures and how specifically these have affected treatment system flow-rate capacity

According to Veolia, the following equipment failures occurred at the site during the period of June 30, 2013 to July 11, 2013:

June 30, 2013 – Issues occur with the PLC battery backup and the plant is shut down. All influent diverted to GW-11 Pond for approximately 16 hours.

July 1, 2013 – The plant air compressor overheats, which triggers a plant shutdown. It also causes the ethanol feed pump to stop working, since the pump operates on plant air. All influent diverted to GW-11 Pond for approximately 26 hours.

July 2, 2013 - FBR 4 flow switch issue noted. Influent feed was distributed among other FBRs, no diversion needed. No treatment system flow rate capacity issues.

July 2, 2013 – LS-3 went down due to a power fluctuation. The standby pump wouldn't start due to an electrical fault. No flow from AWF to the plant. The plant was operated at reduced flow (i.e. normal flow less the 290 gpm from LS-3) for approximately 19 hours.

July 3, 2013 – Plant temporarily shut down to hook up the rental air compressor. All influent diverted to GW-11 Pond for approximately 8 hours.

July 4, 2013 – Air compressor overheated and power tripped at MCC-3. The plant was shut down. All influent diverted to GW-11 Pond for approximately 10 hours.

July 5, 2013 – Issues occur with the PLC battery back-up and the plant is shut down. All influent diverted to GW-11 Pond for approximately 16 hours.

July 6, 2013 – Issues continue with the PLC battery back-up. All influent diverted to GW-11 Pond for approximately 70 hours.

After all plant shut downs, Veolia reported that effluent is diverted to GW-11 as necessary to allow the plant to stabilize as measured by in-house analytical testing of the effluent. Once the effluent meets permit requirements discharge to the Wash is recommenced.

2. SWF, AWF, IWF daily extracted flow volumes (and calculated average daily gallons per gpm)

Calculated Daily Average Flow Rates (GPM)				
Date	SWF	AWF	IWF	Average Flow
7/2/2013	571.53	244.44	61.20	877.17
7/3/2013	574.31	114.58	67.10	755.99
7/4/2013	580.56	284.03	67.80	932.38
7/5/2013	580.56	281.94	66.10	928.60
7/6/2013	581.25	281.25	66.50	929.00
7/7/2013	581.25	281.94	66.20	929.39
7/8/2013	578.47	281.94	66.50	926.92
7/9/2013	578.47	279.86	68.10	926.43
7/10/2013 ¹	570.14	281.94	62.57	914.66
7/11/2013 ¹	584.72	281.25	65.65	931.63

Calculated Daily Volumes (Gallons)			
Date	SWF	AWF	IWF
7/2/2013	823,000	352,000	88,128
7/3/2013	827,000	165,000	96,624
7/4/2013	836,000	409,000	97,632
7/5/2013	836,000	406,000	95,184
7/6/2013	837,000	405,000	95,760
7/7/2013	837,000	406,000	95,328
7/8/2013	833,000	406,000	95,760
7/9/2013	833,000	403,000	98,064
7/10/2013 ¹	821,000	406,000	90,106
7/11/2013 ¹	842,000	405,000	94,540

Notes:

GPM=gallons per minute

SWF=Seep Well Field

AWF=Athens Road Well Field

IWF=Interceptor Well Field

All data and calculations provided by Veolia except where noted.

¹ Estimated by ENVIRON pending the receipt of data from Veolia.

3. Daily influent flow volumes to plant (and calculated average daily gpm)

Date	LS-2 to Plant (GPM)	GW-11 to Plant (GPM)	IWF to Plant (GPM)	Daily Average Flow to Plant (GPM)	Daily Volume to Plant (MGD)
7/2/2013	700.0	103.0	61.20	864.2	1.24
7/3/2013	580.6	99.4	67.10	747.0	1.08
7/4/2013	749.3	0.0	67.80	817.1	1.18
7/5/2013	750.0	0.0	66.10	816.1	1.18
7/6/2013	750.0	0.0	66.50	816.5	1.18
7/7/2013	749.3	0.0	66.20	815.5	1.17
7/8/2013	750.0	90.9	66.50	907.4	1.31
7/9/2013	747.2	103.0	68.10	918.3	1.32
7/10/2013 ¹	749.3	96.8	62.6	908.7	1.31
7/11/2013 ¹	750.0	101.1	65.7	916.7	1.32

Notes:

Although shown as influent flows to the plant, some of these flows were diverted the GW-11 holding pond due to plant shut downs. See item 4 for estimates of diverted flows.

GPM=gallons per minute

MGD=million gallons per day

LS-2=Lift Station 2

All data and calculations provided by Veolia except where noted.

¹ Estimated by ENVIRON pending the receipt of data from Veolia.

4. Daily untreated diverted flow to GW-11 (and calculated average daily gpm);

Date	Estimated Daily Average Flow Diverted to GW-11 (GPM)	Estimated Volume Diverted to GW-11 (MGD)	Effluent Average Daily Flow to LVW (GPM)	Estimated Effluent Volume Discharged to LVW (MGD)
7/2/2013	681.91	0.98	90.02	0.13
7/3/2013	440.75	0.63	264.51	0.38
7/4/2013	295.18	0.43	521.93	0.75
7/5/2013	597.79	0.86	218.31	0.31
7/6/2013	816.50	1.18	0.00	0.00
7/7/2013	815.51	1.17	0.00	0.00
7/8/2013	773.60	1.11	69.46	0.10
7/9/2013	475.60	0.68	425.55	0.61
7/10/2013 ¹	541.25	0.78	302.90	0.44
7/11/2013 ¹	0.00	0.00	916.74	1.32

GPM=gallons per minute

MGD=million gallons per day

LVW=Las Vegas Wash

All data and calculations provided by Veolia except where noted.

¹ Estimated by ENVIRON pending the receipt of data from Veolia.

5. Daily treated effluent flow volumes to LV wash (and calculated average daily gpm) and partially treated to GW-11 (and calculated average daily gpm)

See table under Item 4.

6. Cumulative of items 2 through 5 since 7/2

Average Flow (GPM)			Cumulative Total (MG)		
SWF	AWF	IWF	SWF	AWF	IWF
578	261	65.8	8.33	3.76	0.95

Average Influent Flow to Plant (GPM)	Total Volume of Influent (MG)
853	12.3

Average Diversion Flow (GPM)	Total Volume Diverted (MG)
544	7.83

Average Effluent Flow (GPM)	Total Effluent Volume (MG)
281	4.05

GPM=gallons per minute

MG=million gallons

7. Daily GW-11 freeboard and total volume

According to Veolia, measurements of the GW-11 pond are taken semi-monthly; therefore, daily measurements are not available. Veolia measured the pond level on July 24, 2013 at 6:20 a.m. and estimated that it contained 49.8 million gallons of water.

On July 12, the Trust instituted daily measurements of GW-11 to be performed by Envirogen Technologies, Inc. (Envirogen), who took over operation of the GWETS from Veolia effective July 24, 2013. On July 12, Envirogen reported a side slope measurement of 17.0 feet in GW-11 for a water volume of 48.7 million gallons. ENVIRON estimates that the side slope measurement corresponds to 4.8 feet of freeboard. As of the date of this memorandum, Envirogen reported that the GW-11 side slope measurement is 16.33 feet for a water volume of 49.3 million gallons. ENVIRON estimates that the side slope measurement corresponds to 4.6 feet of freeboard.

8. *Any effluent violations in discharge to LV Wash*

According to Veolia, there were no effluent violations in the discharge to Las Vegas Wash during the period from July 2, 2013 to July 11, 2013.