

sharada Maligireddy
Nevada Division of Environmental Protection
Bureau of Water Pollution Control
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701-5249

**NPDES PERMIT APPLICATION #6619 ADDENDUM
SUNRISE MOUNTAIN AND HISTORIC LATERAL WEIR DEWATERING TREATMENT
NEVADA ENVIRONMENTAL RESPONSE TRUST SITE, HENDERSON, NEVADA**

Dear Ms. Maligireddy:

May 3, 2017

In response to the Nevada Division of Environmental Protection (NDEP) Bureau of Water Pollution Control (BWPC) April 28, 2017 request, the Nevada Environmental Response Trust (NERT or the Trust) submits this addendum to NPDES Permit Application #6619 containing revised mixing zone calculations to determine maximum end-of-pipe concentrations that result in attainment of instream water quality criteria once the treated weir dewatering effluent has mixed with the Las Vegas Wash (LVW), including the additional local discharges from AMPAC, TIMET, COH, and NERT. These calculations have been revised to 1) meet water quality criteria as defined in NAC 445A.2158, and 2) use the lowest 7-consecutive day average flow expected to occur once every 10 years (7Q10) to represent the upstream critical low flow for LVW.

Ramboll Environ
2200 Powell Street
Suite 700
Emeryville, CA 94608
USA

T +1 510 655 7400
F +1 510 655 9517
www.ramboll-environ.com

As described in NPDES permit application #6619, the Trust requests the use of a mixing zone so that water quality criteria are met at the end of the mixing zone as opposed to at the outfall location. NDEP-BWPC has expressed an interest in monitoring at the end-of-pipe, as opposed to at the end of the mixing zone. The translation of the water quality criteria to end-of-pipe limits can be accomplished using a simple mass balance approach, as described in NPDES permit application #6619. The calculation presented below is identical to the previous calculations presented, with the exception of the following revisions:

- The water quality criteria for Total Dissolved Solids (TDS) has been revised from 1,900 mg/L to 2,400 mg/L, consistent with the water quality criteria (requirement to maintain existing higher quality) defined in NAC 445A.2158.
- Two versions of the calculation are presented. The first uses the minimum upstream daily flow for LVW observed during the ten year period from May 1, 2007 to April 30, 2017 (189 cubic feet per second [cfs], or 122.17 million gallons per day [MGD]). The second uses the

7Q10 flow (lowest 7-consecutive day average flow expected to occur once every 10 years) calculated for the same ten year timeframe (251 cfs, or 162.25 MGD). For this evaluation, the USGS gage 09419700 (LAS VEGAS WASH AT PABCO RD NR HENDERSON, NV) was used.

The mass balance equation can be expressed as follows:

$$C_w = (WQC * Q_{total} - Q_u * C_u - Q_a * C_a - Q_{t1} * C_{t1} - Q_{t2} * C_{t2} - Q_c * C_c - Q_n * C_n) / Q_w$$

Where:

C_w = the maximum concentration at the weir dewatering outfall;

WQC = water quality criteria for boron (0.75 mg/L), manganese (0.2 mg/L), or TDS (2,400 mg/L) at end of mixing zone;

Q_{total} = The total flow in LVW at end of mixing zone, equal to the sum of Q_u , Q_a , Q_{t1} , Q_{t2} , Q_c , Q_n , and Q_w ;

Q_u = either the minimum upstream daily flow or the 7Q10 flow for LVW for the ten year period from 5/1/2007 to 4/30/2017;

C_u = upstream background concentration for boron (0.56 mg/L), manganese (0.041 mg/L), and TDS (1,500 mg/L), equal to the LVW Upgradient average from the 2016 NV0023060 permit renewal application;

Q_a = the daily maximum flow permit limit for NPDES permit NV0024112 for discharge to LVW by AMPAC (1.15 MGD);

C_a = the concentration permit limit for NPDES permit NV0024112 for discharge to LVW by AMPAC, or if no permit limit is available, either the maximum observed concentration between July 2011 and June 2016 or the expected concentration reported in the permit renewal application;

Q_{t1} = the daily maximum flow permit limit for Outfall 001 under NPDES permit NV0000060 for discharge to LVW by TIMET (10.19 MGD);

C_{t1} = the concentration permit limit for Outfall 001 under NPDES permit NV0000060 for discharge to LVW by TIMET, or if no permit limit is available, the reported concentration in the permit renewal application;

Q_{t2} = the daily maximum flow permit limit for Outfall 002 under NPDES permit NV0000060 for discharge to LVW by TIMET (0.58 MGD);

C_{t2} = the concentration permit limit for Outfall 002 under NPDES permit NV0000060 for discharge to LVW by TIMET, or if no permit limit is available, the reported concentration in the permit renewal application;

Q_c = the minimum 30-day average flow reported between July 2011 and June 2016 for Outfall 001 under NPDES permit NV0022098 for discharge to LVW by COH (6.96 MGD);

C_c = the maximum observed concentration between July 2011 and June 2016 for Outfall 001 under NPDES permit NV0022098 for discharge to LVW by COH, as no permit limits were available;

Q_n = the daily maximum flow permit limit for NERT Outfall 001 in NPDES permit NV0023060 (2.88 MGD);

C_n = the concentration permit limit for NERT Outfall 001 under NPDES permit NV0023060 for discharge to LVW by NERT, or if no permit limit is available, the maximum observed concentration between July 2011 and June 2016; and

Q_w = the maximum design flow rate for the proposed weir dewatering treatment discharge (6,900 gpm = 9.94 MGD).

The results of this mixing calculation are presented in the attached tables. When the minimum observed daily flow for LVW is used for Q_u , the calculated end-of-pipe concentrations (C_w) are 12,338 mg/L for TDS, 1.08 mg/L for manganese, and 2.94 mg/L for boron. When the 7Q10 flow for LVW is used for Q_u , the calculated end-of-pipe concentrations (C_w) are 15,968 mg/L for TDS, 1.72 mg/L for manganese, and 3.71 mg/L for boron.

Should you have any questions concerning these revised calculations, please contact Kimberly Kuwabara at (510) 420-2525 or kkuwabara@ramboll.com.

Yours Sincerely,



Kimberly Kuwabara, MS

Senior Manager

CEM #2353, expires 3/20/19

Tables

Table 1: Revised Mixing Zone Analysis (minimum observed LVW flow)

Table 2: Revised Mixing Zone Analysis (7Q10 LVW flow)

cc: Nevada Environmental Response Trust
John Pekala, Ramboll Environ
Dan Pastor, Tetra Tech

Table 1: Revised Mixing Zone Analysis (minimum observed LVW flow)
Nevada Environmental Response Trust Site
NPDES Permit Application #6619, Addendum

Parameter	Variable	Value	Source
Water Quality Criteria			
TDS (mg/L)	C _u	2400	NAC Section 445A.2158, requirement to maintain existing higher quality
Manganese (mg/L)		0.2	
Boron (mg/L)		0.75	
Upstream Las Vegas Wash			
Flow (MGD)	Q _u	122.17	minimum upstream daily flow for Las Vegas Wash at USGS gage 09419700 for 5/1/2007 to 4/30/2017
TDS (mg/L)	C _u	1500	upstream background concentration equal to upgradient average reported in NPDES permit renewal application for NV0023060
Manganese (mg/L)		0.041	
Boron (mg/L)		0.56	
AMPAC			
Flow (MGD)	Q _a	1.15	daily maximum flow permit limit
TDS (mg/L)	C _a	3000	30-day average concentration permit limit
Manganese (mg/L)		0.3	
Boron (mg/L)		1.08	
TIMET (Outfall 001)			
Flow (MGD)	Q _{t1}	10.19	daily maximum flow permit limit
TDS (mg/L)	C _{t1}	2600	daily maximum concentration permit limit
Manganese (mg/L)		0.0066	
Boron (mg/L)		0.25	
TIMET (Outfall 002)			
Flow (MGD)	Q _{t2}	0.58	daily maximum flow permit limit
TDS (mg/L)	C _{t2}	3000	daily maximum concentration permit limit
Manganese (mg/L)		0.2	
Boron (mg/L)		0.4	
City of Henderson			
Flow (MGD)	Q _c	6.96	minimum 30-day average flow reported in the last five years (Q3 2011 through Q2 2016)
TDS (mg/L)	C _c	1252	maximum reported concentration in the last five years (Q3 2011 through Q2 2016)
Manganese (mg/L)		0.0156	
Boron (mg/L)		0.445	
NERT Site			
Flow (MGD)	Q _n	2.88	daily maximum flow permit limit
TDS (mg/L)	C _n	8000	30-day average concentration permit limit
Manganese (mg/L)		5	
Boron (mg/L)		3.7	
Weir Dewatering Treatment			
Flow (MGD)	Q _w	9.94	maximum design flow rate for the proposed weir dewatering treatment discharge

Maximum Weir Dewatering Treatment End-of-Pipe Concentration that Results in Attainment of Instream Water Quality Criteria			
TDS (mg/L)	C _w	12338	determined based on mixing calculation
Manganese (mg/L)		1.08	
Boron (mg/L)		2.94	

Table 2: Revised Mixing Zone Analysis (7Q10 LVW flow)
Nevada Environmental Response Trust Site
NPDES Permit Application #6619, Addendum

Parameter	Variable	Value	Source
Water Quality Criteria			
TDS (mg/L)	C _u	2400	NAC Section 445A.2158, requirement to maintain existing higher quality
Manganese (mg/L)		0.2	
Boron (mg/L)		0.75	
Upstream Las Vegas Wash			
Flow (MGD)	Q _u	162.25	7Q10 flow for Las Vegas Wash at USGS gage 09419700 for 5/1/2007 to 4/30/2017
TDS (mg/L)	C _u	1500	upstream background concentration equal to upgradient average reported in NPDES permit renewal application for NV0023060
Manganese (mg/L)		0.041	
Boron (mg/L)		0.56	
AMPAC			
Flow (MGD)	Q _a	1.15	daily maximum flow permit limit
TDS (mg/L)	C _a	3000	30-day average concentration permit limit
Manganese (mg/L)		0.3	
Boron (mg/L)		1.08	
TIMET (Outfall 001)			
Flow (MGD)	Q _{t1}	10.19	daily maximum flow permit limit
TDS (mg/L)	C _{t1}	2600	daily maximum concentration permit limit
Manganese (mg/L)		0.0066	
Boron (mg/L)		0.25	
TIMET (Outfall 002)			
Flow (MGD)	Q _{t2}	0.58	daily maximum flow permit limit
TDS (mg/L)	C _{t2}	3000	daily maximum concentration permit limit
Manganese (mg/L)		0.2	
Boron (mg/L)		0.4	
City of Henderson			
Flow (MGD)	Q _c	6.96	minimum 30-day average flow reported in the last five years (Q3 2011 through Q2 2016)
TDS (mg/L)	C _c	1252	maximum reported concentration in the last five years (Q3 2011 through Q2 2016)
Manganese (mg/L)		0.0156	
Boron (mg/L)		0.445	
NERT Site			
Flow (MGD)	Q _n	2.88	daily maximum flow permit limit
TDS (mg/L)	C _n	8000	30-day average concentration permit limit
Manganese (mg/L)		5	
Boron (mg/L)		3.7	
Weir Dewatering Treatment			
Flow (MGD)	Q _w	9.94	maximum design flow rate for the proposed weir dewatering treatment discharge

Maximum Weir Dewatering Treatment End-of-Pipe Concentration that Results in Attainment of Instream Water Quality Criteria			
TDS (mg/L)	C _w	15968	determined based on mixing calculation
Manganese (mg/L)		1.72	
Boron (mg/L)		3.71	