
To: Andrew Steinberg, Steve Clough - NERT

From: Mark Feldman, David Bohmann - Tetra Tech

CC: Dan Pastor, Derek Amidon - Tetra Tech

Date: November 19, 2015

Subject: **Natural Soil Flushing Study Post-Storm Groundwater Sampling Results for August 2015**

1 INTRODUCTION

At the direction of the Nevada Division of Environmental Protection, Tetra Tech, Inc. (Tetra Tech), on behalf of the Nevada Environmental Response Trust (NERT), has prepared this technical memorandum summarizing the results of post-storm event groundwater sampling for August 2015 at the NERT Site (the Site). The results presented in this memorandum are a component of a soil flushing treatability study, which is part of the ongoing Remedial Investigation/Feasibility Study being performed pursuant to the Interim Consent Agreement effective February 14, 2011. Specifically, the results presented in this memorandum are associated with a study to assess the potential effects of naturally induced soil flushing in the treatability test area by monsoon storm events

1.1 BACKGROUND

As part of Site restoration work associated with a soil removal action performed in 2010 and 2011, two stormwater retention basins (the Central and Northeastern retention basins) were constructed at the Site. The locations of the retention basins are shown on Figure 1. These basins were designed and constructed to allow stormwater runoff to be managed entirely on-Site.

Shortly after completing construction of the retention basins, a series of unusually large monsoon storm events occurred in the Las Vegas Valley, including events on August 22, September 11, and October 11, 2012. Historic rainfall records for the three month period from August 1, 2012 to November 1, 2012 were obtained from the Clark County Regional Flood Control District (CCRFCD) and are summarized in Figure 2. The data presented in Figure 2 are for three automated rain gages operated by the CCRFCD which are located closest to the Site: TIMET (Gage ID. 4774), Pioneer Detention Basin (Gage ID 4769), and Pittman Railroad Channel (Gage ID 4564). The station locations are shown on Figure 1.

The August 22, 2012 storm was the largest of the three storm events. Total rainfall amounts at the three gage stations listed above ranged from 1.14 to 2.56 inches, with a mean of 2.01 inches. The maximum rainfall intensity was 0.83 inches in 15 minutes, measured at the TIMET rain gage. This

storm represented a 30-year recurrence event based on rainfall data for McCarran Airport (CCRFCD, 2012).

Between August and September 2012, the average perchlorate concentration in effluent from the Interceptor Well Field (IWF) increased by approximately 35 percent from 874 mg/L to 1,178 mg/L. The average perchlorate concentration in the IWF effluent continued to increase to 1,450 mg/L in October 2012, an increase of approximately 66 percent from the August 2012 baseline. The large increase in average perchlorate concentration observed at the IWF has been attributed to flushing of perchlorate from the vadose zone to groundwater, due to infiltration of ponded stormwater in the Central Retention Basin (Environ, 2013). It should be noted that the initial concentration increase at the IWF occurred less than 30 days after the August 22, 2012 storm event, which includes the time needed for groundwater to migrate approximately 550 feet from the Central Retention Basin to the IWF. This observation suggests that the time needed for stormwater to infiltrate to the water table must be very short.

1.2 OBJECTIVES

The objective of the natural soil flushing study is to evaluate the effect of a typical monsoon storm event on perchlorate concentrations in groundwater beneath the Central Retention Basin.

2 METHODOLOGY

2.1 RAINFALL MONITORING

Weather observations by staff at the Tetra Tech Henderson office were used to screen potential storm events for this study. On August 13, 2015, a relatively large storm event was identified. During the storm, rainfall amounts at the TIMET, Pioneer Detention Basin, and Pittman Railroad Channel gage stations were monitored in real-time via the CCRFCD website. Based on the total rainfall amounts recorded at these gage stations (0.36, 0.92, and 0.96 inches, respectively), a field crew was mobilized to the Site to begin groundwater sampling.

2.2 GROUNDWATER SAMPLING

After the August 13, 2015 storm, groundwater samples were collected from four monitoring wells installed within the Central Retention Basin as part of the ongoing soil flushing treatability study. The locations of the monitoring wells are shown on Figure 4. Groundwater sampling was performed on August 14, 2015 (baseline event), August 18, 2015, and on August 26, 2015.

Groundwater sampling was performed using conventional low-flow techniques. The wells were purged using dedicated QED Sample Pro bladder pumps. After purging one pump/tubing volume of groundwater, field parameters (pH, electrical conductivity [EC], oxidation-reduction potential [ORP], dissolved oxygen [DO], and turbidity) were measured at approximate three minute intervals using a flow-through cell. Purging continued until field parameters stabilized to within the following limits: pH ± 0.01 standard units, EC ± 10 microsiemens, ORP ± 5 millivolts, DO ± 0.1 part per million, and turbidity < 5 nephelometric turbidity units. Once the field parameter values were

stable for three consecutive measurements, the flow cell was disconnected prior to collecting groundwater samples. The samples were collected in laboratory-provided cups, and were filtered using sterile syringes and sterile 0.03-micron membrane filters into sterile laboratory-prepared containers. The samples were then stored on ice and shipped to TestAmerica Laboratories, Inc. (TestAmerica) under chain-of-custody protocols for perchlorate analysis.

Copies of the monitoring well purge logs are provided in Attachment A.

3 RESULTS

The following sections summarize the results of the post-storm groundwater sampling.

3.1 PRECIPITATION DATA AND WATER DEPTH

Precipitation data for August 13, 2015 for the TIMET, Pioneer Detention Basin, and Pittman Railroad Channel gage stations are summarized in Figure 5. Total rainfall amounts at these gages ranged from 0.36 to 0.96 inches, with a mean of 0.75 inches. The maximum rainfall intensity was 0.28 inches in 15 minutes, measured at the Pioneer Detention Basin station. Both the maximum rainfall amount and maximum rainfall intensity for this storm were considerably lower than for the August 22, 2012 event.

Photographs of the Central Retention Basin taken at 4:31 PM and 4:40 PM on August 13, 2015 (near the end of the storm) are provided in Figure 6. In both photographs, the tops of the concrete skirts around the monitoring well monuments are visible. The concrete skirts were constructed using 2- by 4-inch lumber forms, so the skirts stand approximately three to four inches above grade. Based on this observation, the maximum water depth in the Central Retention Basin in the immediate vicinity of the monitoring wells was estimated to be approximately three to four inches.

3.2 ANALYTICAL RESULTS

The following subsections summarize the laboratory analytical results. Copies of the original laboratory reports are provided in Attachment B.

3.2.1 Data Quality Evaluation

A total of 12 groundwater samples and three duplicate samples were analyzed by TestAmerica for perchlorate using United States USEPA Method E314.0. Level II data validation was performed to assess the usability of the data. Data validation included evaluation of sample holding times, method blank sample results, laboratory control sample results, matrix spike/matrix spike duplicate results, calibration compliance, compound identification, and method compliance. No quality assurance/quality control errors were noted in the results. The data were found to be usable for the intended purpose.

A copy of the data validation summary report prepared by the project chemist is provided in Attachment B.

3.2.2 Perchlorate Concentrations in Groundwater

Analytical data for perchlorate in groundwater are summarized in Table 1a, and are presented as time series plots in Figure 7. Both Table 1 and Figure 7 show little variation in perchlorate concentration between samples collected from individual monitoring wells.

The relative percent difference (RPD) between parent and field duplicate samples for each sampling event are summarized in Table 1b. The RPD values range from 1 percent to 11 percent, with a mean of 5 percent. Using the mean RPD as an estimate of the overall uncertainty of the laboratory-reported perchlorate concentrations, the concentration differences observed in each well across the three sampling events are likely within the precision of the laboratory measurements.

4 CONCLUSIONS AND RECOMMENDATIONS

No significant changes in perchlorate concentration were observed in groundwater over a 13 day period following the August 13, 2015 storm event. Given the relatively small stormwater accumulation observed in the Central Retention Basin, it is likely that the wetting front associated with the storm event dissipated before reaching the water table.

Tetra Tech recommends that this study be repeated in the future, for a storm event that results in a greater accumulation of stormwater in the Central Retention Basin. We recommend that any future studies should be limited to larger storms that result in at least an eight inch water accumulation. Prior to performing these additional studies, a permanent staff gage and/or pressure transducers should be installed in the Central Retention Basin to allow water depth to be accurately and safely measured. Although reasonably good rain gage coverage is available in the area through the CCRFCD, it may also be desirable to install a weather monitoring station at the Site, including a high-quality tipping bucket-type rain gage.

5 REFERENCES

CCRFCD (Clark County Regional Flood Control District), 2012. *Rainfall and Flood Event Report, August 21-22, 2012*. Accessed at <http://gustfront.ccrfcd.org/FileLibrary2/FileLibrary.aspx>, September 17, 2015.

CCRFCD (Clark County Regional Flood Control District), 2015. Online rainfall data accessed at <http://gustfront.ccrfcd.org/sensormap/sensormap.html>. August 13, 2015.

Environ, 2014. *Annual Remedial Performance Report for Chromium and Perchlorate, Nevada Environmental Response Trust Site, Henderson, Nevada, June 2013-June 2014*. October 2014.

Tables

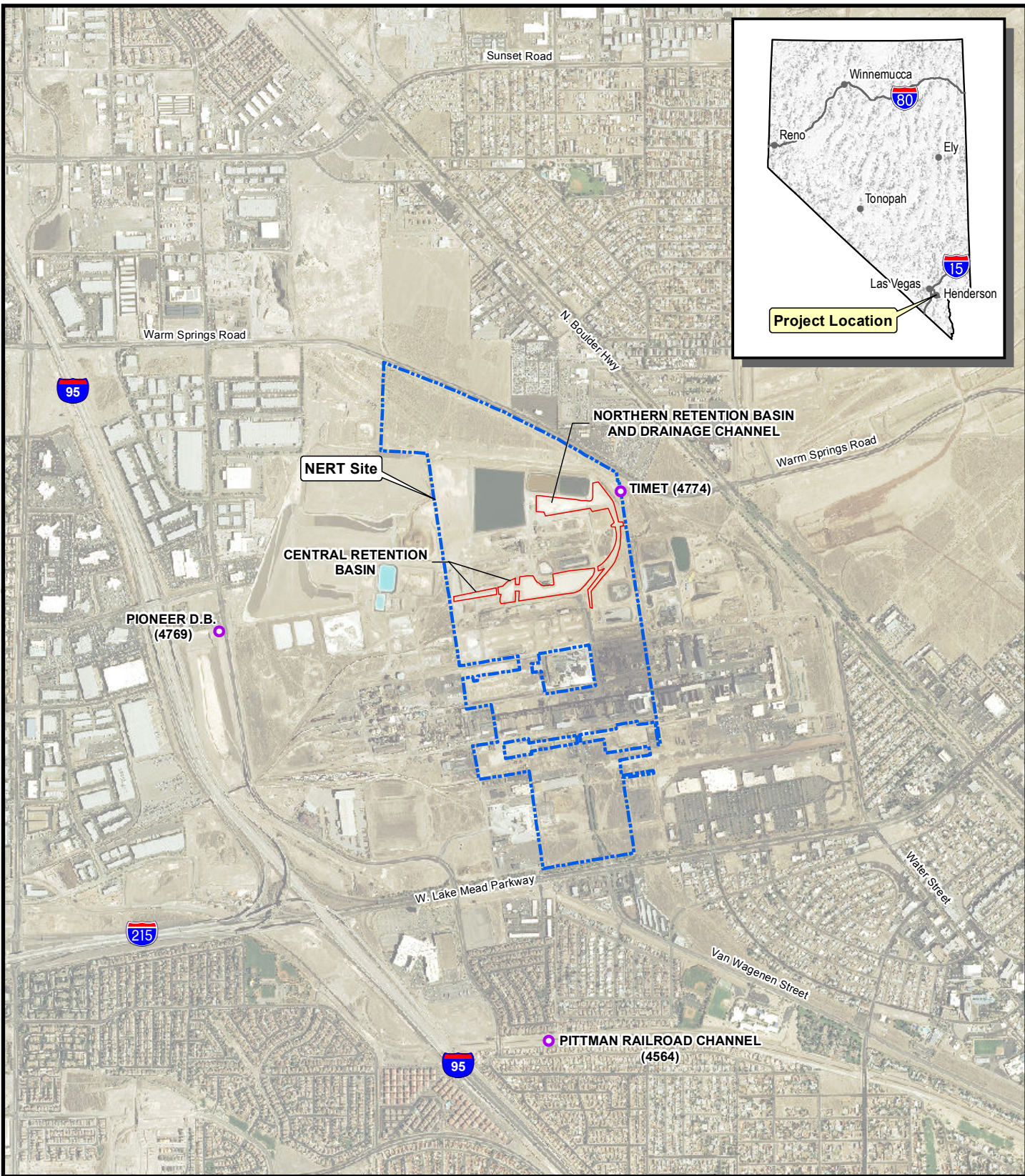
Table 1a
Perchlorate Results




Well	Perchlorate (mg/L)		
	08/14/15	08/18/15	08/26/15
MW-1	900	960	900
MW-4	500	540	500
MW-6	660	670	660
MW-10	790	800	820

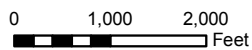
Table 1b
Parent/Duplicate Sample Results

Date	Perchlorate (mg/L)		
	Parent Sample	Duplicate Sample	RPD
08/14/15	790	800	1%
08/18/15	800	890	11%
08/26/15	500	510	2%

Figures



-  Rain Gage Location
-  Stormwater Retention Basin Footprint
-  Site Boundary

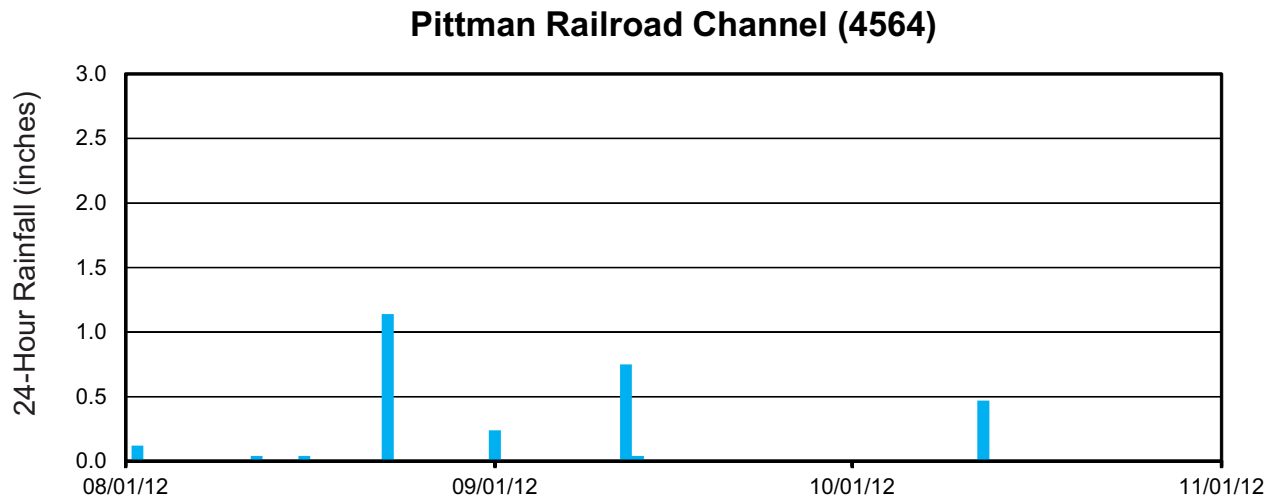
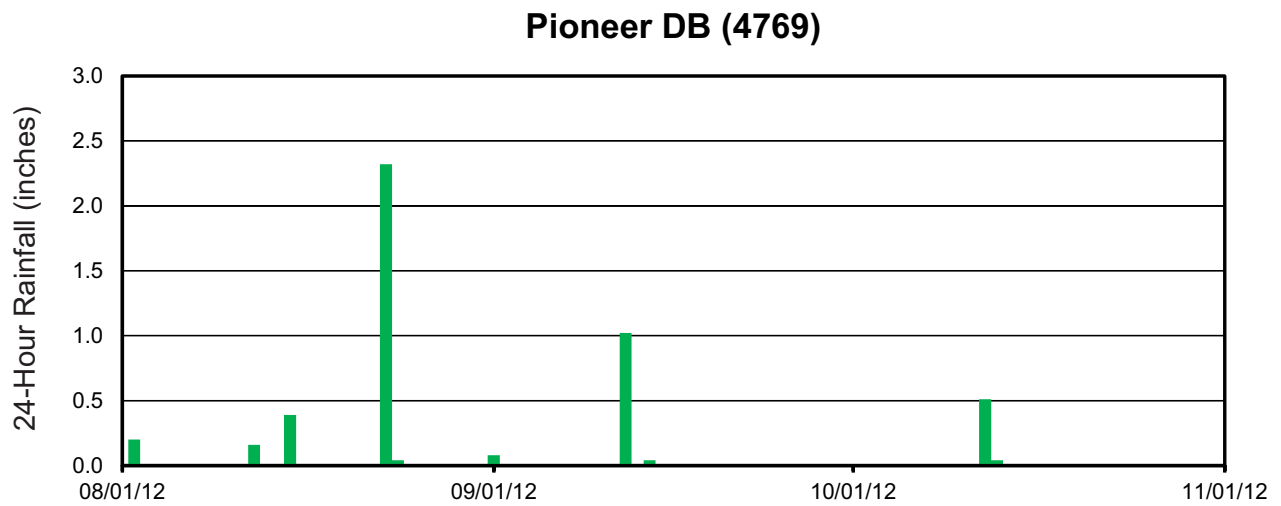
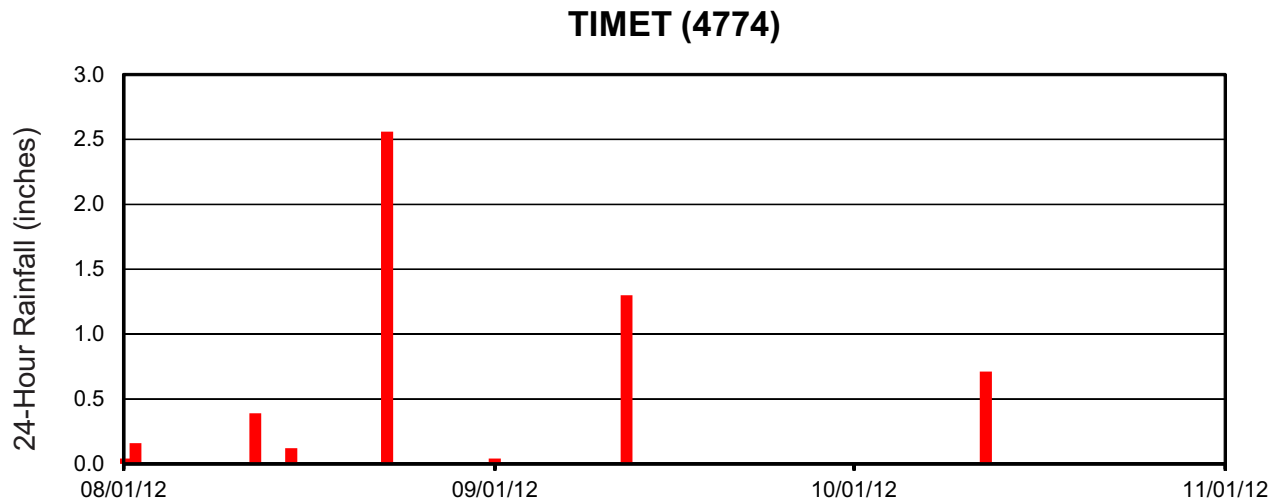


Source:
NAIP 2013 aerial photograph.

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Figure 1
Site Location

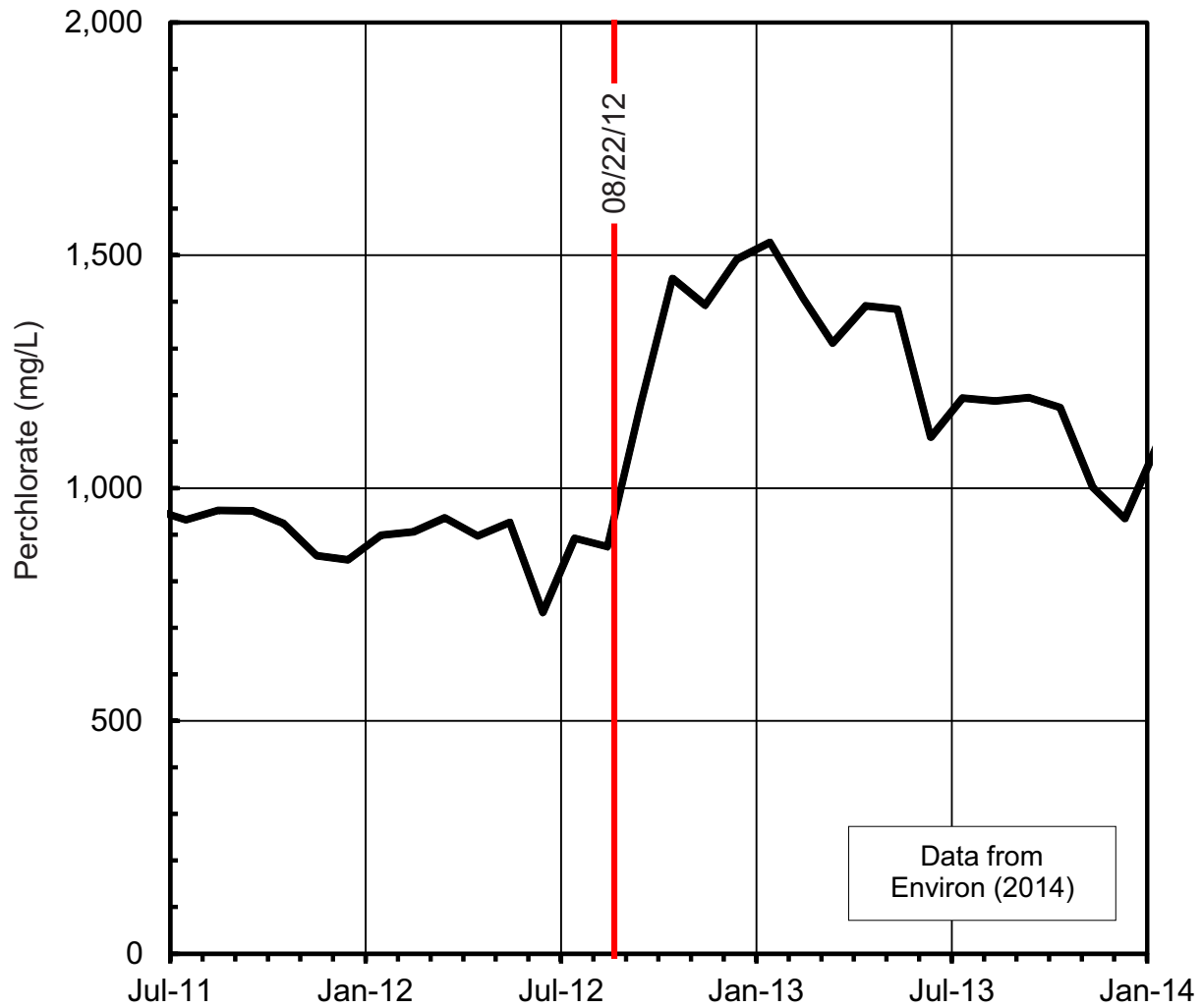




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RESPONSE TRUST

Figure 2
Precipitation Data,
August 1, 2015 –
November 1, 2015

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Figure 3
**Average Perchlorate
Concentrations
Interceptor Well Field
July 2011 to January 2014**

Tt TETRA TECH

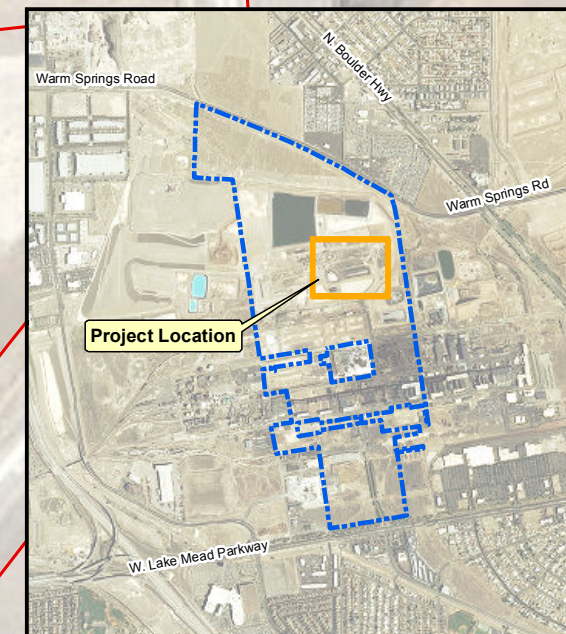
P:\GIS\35000_NERT\MOSB_Fig4Test_Plot_Loc_R1.mxd



0 50 100 Feet

Source:
Google Earth 2014 aerial photograph.

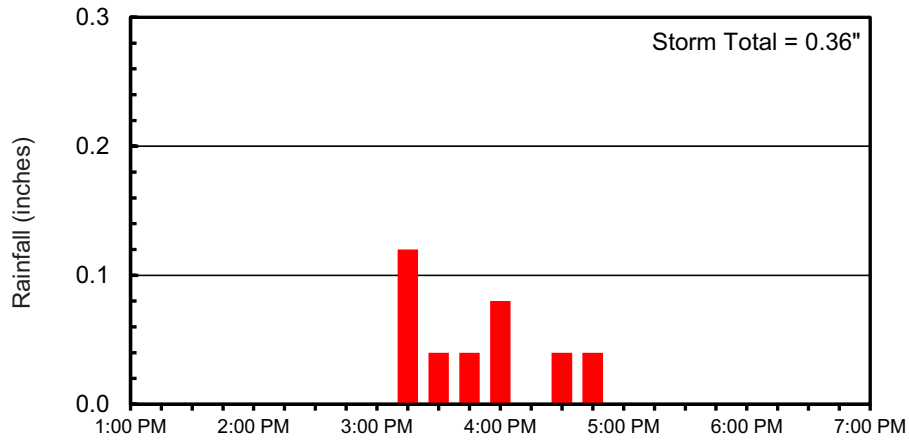
- Interceptor Well
- Monitoring Well
- Monitoring Well Sampled for this Study
- Groundwater Barrier Wall
- Stormwater Retention Basin Footprint
- Site Boundary
- Test Plot Location



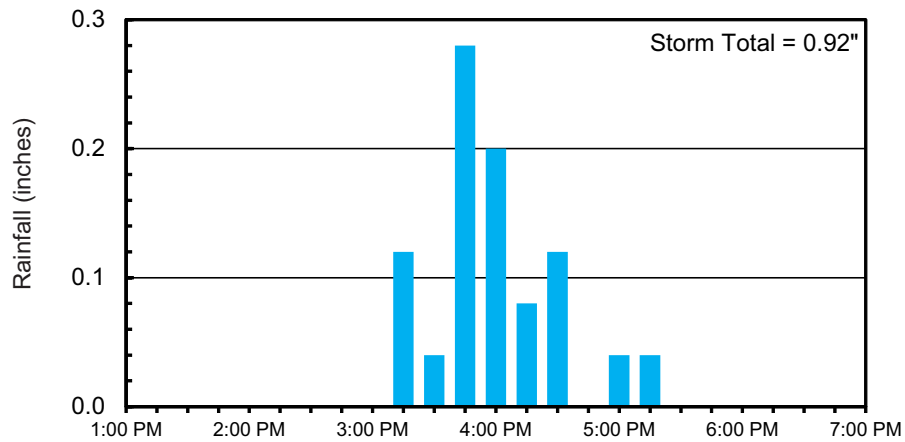
NEVADA ENVIRONMENTAL
RESPONSE TRUST

Figure 4
Monitoring Well Locations

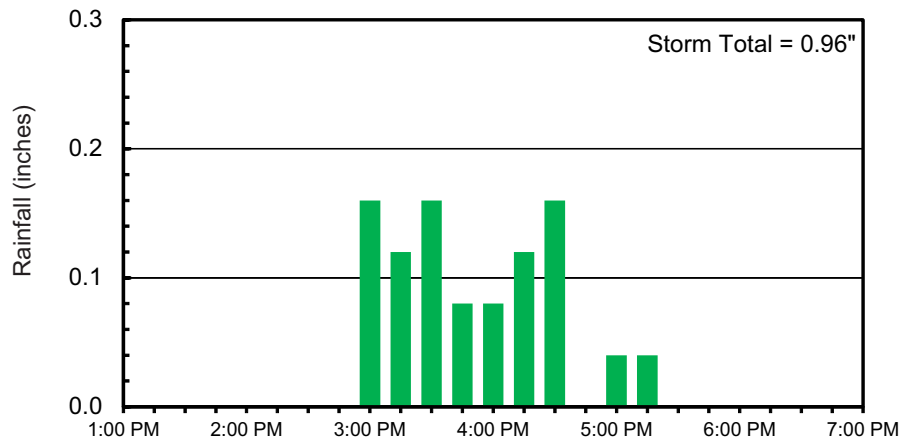
TIMET (4774)



Pioneer DB (4769)



Pittman Railroad Channel (4564)



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Figure 5
Precipitation Data
August 13, 2015



Central Retention Basin,
view facing northwest.
Photo taken at 4:40 PM, August 13, 2015.

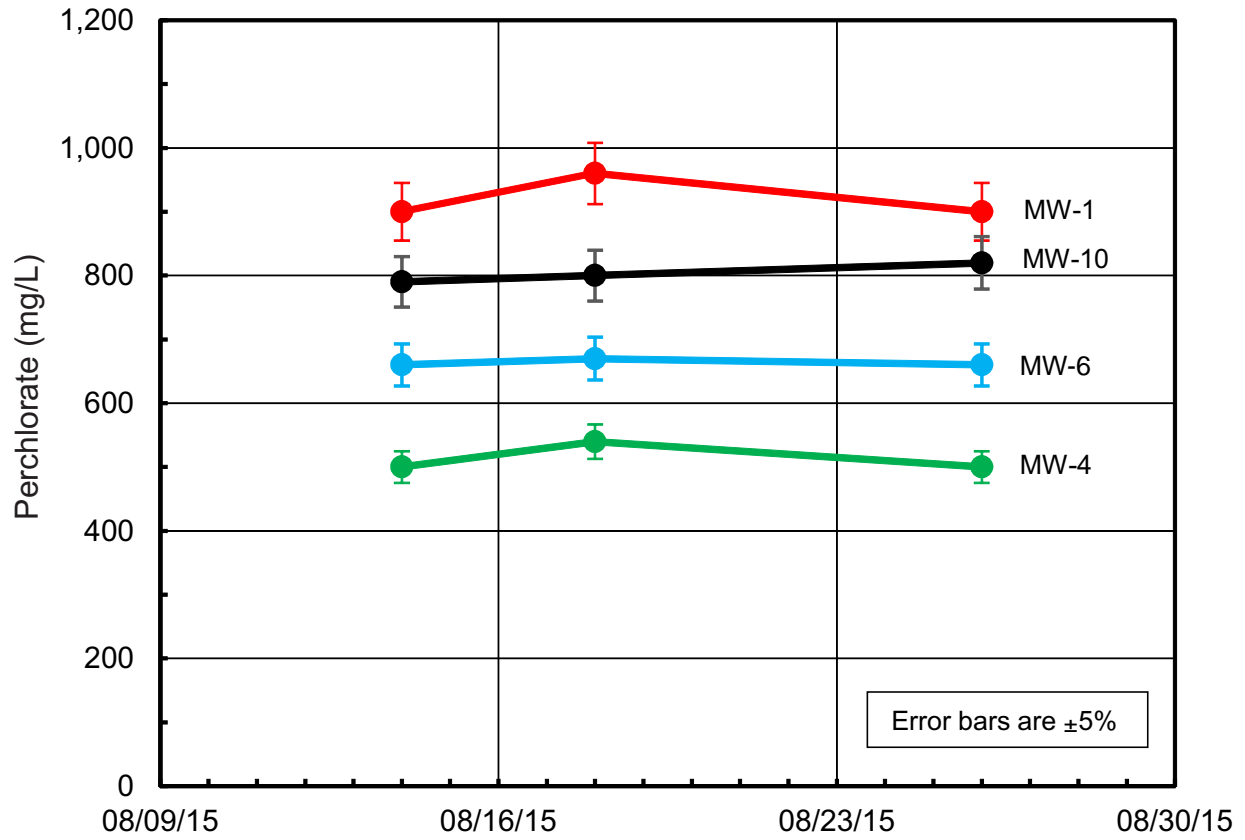


Central Retention Basin,
view facing north.
Photo taken at 4:31 PM, August 13, 2015.

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Figure 6
Central Retention Basin
Photos
August 13, 2015





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Figure 7
Perchlorate
Time-Series Plots
August 13, 2015 –
August 26, 2015

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Attachment A
Purge Records



TETRA TECH, INC.
5383 Hollister Ave., Suite 130
Santa Barbara, CA 93111
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 8/14/2015 SITE NUMBER NERT
PROGRAM NAME NERT TRIP BLANK I.D.
MONITORING WELL ID MW-01 MS/MSD (Y/N)
SAMPLE I.D. MW-01 FILTERED ID
DUPLICATE ID N/A FILTERED DUPLICATE ID N/A
STATIC W.L. (ft btoc) 27.35 TOTAL DEPTH (ft btoc) 346.1 WATER COLUMN (feet) 7.16
PUMP INLET DEPTH (ft btoc) 33.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 479

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
PID READING IN CASING (ppm) (initial) (vented to)
PID READING IN BREATHING ZONE (ppm) (initial) (vented to)
SAMPLE TIME 1102 FILTERED TIME 1102 DUPLICATE TIME
FILTERED DUPLICATE TIME N/A WELL DIAMETER 2"
SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
0900	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1100	Begin Purge	—	—	—	—	—	—	—	—	—	—	—
1104	monitoring	27.46	10.37	29.65	11.83	1.59	7.02	185.0	yellowish	480	1.0	120
1107	↓	27.55	10.40	27.91	11.78	0.73	7.08	155.1	yellowish, clear	840	1.5	↓
1110	↓	27.59	10.13	27.58	11.80	0.61	7.08	143.3	yellowish, clear	1,200	2.0	↓
1113	↓	27.63	8.46	27.40	11.80	0.54	7.05	124.5	yellowish, clear	1,560	3.3	↓
1116	↓	27.66	4.64	27.29	11.79	0.47	7.03	116.0	yellowish, clear	1,920	4.0	↓
1119	↓	27.69	4.47	27.14	11.79	0.47	7.01	110.4	yellowish, clear	2,280	4.8	↓
1122	collect sample	27.71	4.21	27.02	11.78	0.45	6.99	107.0	yellowish, clear	2,640	5.5	↓

Fe+2 (ppm)

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 27.71

Comments: 5.43 x (30 x 2 - 27) x 300 = 479 ml time to purge 98V = 4min

PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS

Temperature +/- 1 °C D.O. +/- 10% 0.3 ppm
Conductivity +/- 3% pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)

Bladder Volume = 495 ml
3/8" O.D Tubing Volume = 10 ml/ft
1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 8/14/2015 SITE NUMBER NERT
PROGRAM NAME NERT TRIP BLANK I.D.
MONITORING WELL ID MW-04 MS/MSD (Y/N)
SAMPLE I.D. MW-04 FILTERED ID
DUPLICATE ID FILTERED DUPLICATE ID
STATIC W.L. (ft btoc) 26.42 TOTAL DEPTH (ft btoc) 34.63 WATER COLUMN (feet) 8.21
PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 450ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
PID READING IN CASING (ppm) (initial) (vented to)
PID READING IN BREATHING ZONE (ppm) (initial) (vented to)
SAMPLE TIME 1215 FILTERED TIME 1215 DUPLICATE TIME
FILTERED DUPLICATE TIME WELL DIAMETER 2"
SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
1150	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1157	Begin Purge	—	—	—	—	—	—	—	—	—	—	180
1200	monitoring	26.50	15.1	29.01	11.32	5.35	7.42	163.8	yellowish, clear	540	1.2	↓
1203		26.47	11.33	27.21	11.21	4.28	7.36	155.1	yellowish, clear	1,080	2.4	
1206		26.45	8.84	26.87	11.18	3.98	7.32	150.6	yellowish, clear	1,620	3.6	
1209		26.45	7.53	26.47	11.18	3.89	7.30	143.6	yellowish, clear	2,160	4.8	
1212		26.45	5.15	26.34	11.16	3.72	7.28	139.9	yellowish, clear	2,700	6.0	
1215		collect sample	26.45	4.18	26.25	11.15	3.76	7.27	138.9	yellowish, clear	3,240	
1218	dis + ms/msd									3,780	8.4	dis

Fe+2 (ppm)

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.45

Comments: 5.43 x (27 x 2 - 26.42) x 300 = 450ml time for purge 450 @ 3 w/min

PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS

Temperature +/- 1 °C	D.O. +/- 10% 0.3 ppm
Conductivity +/- 2%	pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)	

Bladder Volume = 495 ml
3/8" O.D Tubing Volume = 10 ml/ft
1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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TETRA TECH, INC.
5383 Hollister Ave., Suite 130
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Telephone (805) 681-3100
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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 8/14/2010 SITE NUMBER NERST
PROGRAM NAME NERST TRIP BLANK I.D.
MONITORING WELL ID MS/MSD (Y/N)
SAMPLE I.D. MW-06 FILTERED ID MW-06
DUPLICATE ID FILTERED DUPLICATE ID
STATIC W.L. (ft btoc) 26.45 TOTAL DEPTH (ft btoc) 34.47 WATER COLUMN (feet) 8.02
PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 450ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
PID READING IN CASING (ppm) (initial) (vented to)
PID READING IN BREATHING ZONE (ppm) (initial) (vented to)
SAMPLE TIME 1243 FILTERED TIME 1243 DUPLICATE TIME
FILTERED DUPLICATE TIME WELL DIAMETER 2"
SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)	
1222	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	
1222	Begin Purge	—	—	—	—	—	—	—	—	—	—	<u>105</u> <u>180-240</u>	
1225	monitoring	26.52	3.78	26.03	12.12	2.03	7.31	172.4	yellowish, clear	720	1.6		
1228	↓	26.56	2.41	25.65	12.07	0.63	7.29	154.1	yellowish, clear	1,440	3.2		
1231	↓	26.52	2.41	25.74	12.07	0.53	7.28	148.0	yellowish, clear	2,160	4.8		
1234	↓	26.52	1.46	25.58	12.07	0.44	7.27	129.4	yellowish, clear	2,880	6.4		
1237	↓	26.52	1.42	25.50	12.07	0.36	7.27	120.4	yellowish, clear	3,600	8.0		
1240	↓	26.52	1.71	25.51	12.07	0.33	7.27	117.0	yellowish, clear	4,320	9.6		
1243	collect sample	26.52	1.21	25.55	12.06	0.31	7.27	115.6	yellowish, clear	5,040	11.2		↓
	2:44/1:40												

Fe+2 (ppm)
WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.52
Comments: SSV = ~~4.28~~ 5.93 (2.27 - 26.42) + 300 = 450 ml time to purge SSV = 3 min

PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS

Temperature +/- 1 °C	D.O. +/- 10%
Conductivity +/- 5%	pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)	

Bladder Volume = 495 ml
3/8" O.D Tubing Volume = 10 ml/ft
1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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TETRA TECH, INC.
5383 Hollister Ave., Suite 130
Santa Barbara, CA 93111
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 8/14/2005 SITE NUMBER NERT
PROGRAM NAME NERT TRIP BLANK I.D. —
MONITORING WELL ID MW-10 MS/MSD (Y/N) MW-10
SAMPLE I.D. MW-10 FILTERED ID MW-10
DUPLICATE ID MW-10-DUP FILTERED DUPLICATE ID MW-10-DUP
STATIC W.L. (ft btoc) 26.25 TOTAL DEPTH (ft btoc) 34.17 WATER COLUMN (feet) 7.92
PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 450 ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
PID READING IN CASING (ppm) (initial) — (vented to) —
PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —
SAMPLE TIME 1310 FILTERED TIME 1310 DUPLICATE TIME 1310
FILTERED DUPLICATE TIME 1310 WELL DIAMETER 2"
SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
1252	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1252	Begin Purge	—	—	—	—	—	—	—	—	—	—	250
1255	monitoring	26.34	2.13	26.57	12.18	4.17	7.32	167.0	yellowish, clear	750	6.7	↓
1258	↓	26.35	2.24	25.78	12.13	4.08	7.31	179.9	yellowish, clear	1,500	3.3	↓
1301	↓	27.37	1.83	25.68	12.11	3.95	7.31	173.9	yellowish, clear	2,250	6.0	↓
1304	↓	27.39	1.68	25.65	12.10	3.99	7.31	170.1	yellowish, clear	3,000	6.7	↓
1307	↓	27.39	1.60	25.56	12.10	3.97	7.31	166.5	yellowish, clear	3,750	8.3	↓
1310	collect sample + DUP	27.39	1.34	25.52	12.10	3.99	7.31	164.8	yellowish, clear	4,500	10.0	↓

Fe+2 (ppm) —
WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 27.39
Comments: 5.43 x (2.7 x 2 - 26.25) = 2.457 ml + volume purge = 3 ml

PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS
Temperature +/- 1 °C D.O. +/- 10%
Conductivity +/- 5% pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)

Bladder Volume = 495 ml
3/8" O.D Tubing Volume = 10 ml/ft
1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 8/18/2015 SITE NUMBER NERT
 PROGRAM NAME NERT TRIP BLANK I.D. _____
 MONITORING WELL ID MW-01 MS/MSD (Y/N) -
 SAMPLE I.D. MW-01 FILTERED ID MW-01
 DUPLICATE ID _____ FILTERED DUPLICATE ID _____
 STATIC W.L. (ft btoc) 27.31 TOTAL DEPTH (ft btoc) 34.51 WATER COLUMN (feet) 7.2
 PUMP INLET DEPTH (ft btoc) 33.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 479

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
 PID READING IN CASING (ppm) (initial) _____ (vented to) _____
 PID READING IN BREATHING ZONE (ppm) (initial) _____ (vented to) _____
 SAMPLE TIME 0837 FILTERED TIME 0837 DUPLICATE TIME _____
 FILTERED DUPLICATE TIME _____ WELL DIAMETER 2"
 SAMPLER'S SIGNATURE _____

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
0800	Arrived at well	---	---	---	---	---	---	---	---	---	---	---
0819	Begin Purge	---	---	---	---	---	---	---	---	---	---	180
0822	monitoring	27.54	2.07	27.89	11.75	1.17	6.81	249.8	yellowish, clear	540	1.1	↓
0825	↓	27.61	1.94	26.67	11.71	0.53	6.94	247.1	yellowish, clear	1,080	2.3	↓
0828	↓	27.67	1.92	26.53	11.69	0.44	6.95	245.3	yellowish, clear	1,620	3.4	↓
0831	↓	27.70	1.73	26.50	11.67	0.37	6.95	244.6	yellowish, clear	2,160	4.5	↓
0834	↓	27.75	1.78	26.44	11.66	0.32	6.96	243.2	yellowish, clear	2,700	5.6	↓
0837	stable, sampling	27.79	1.60	26.40	11.67	0.32	6.96	242.0	yellowish, clear	3,240	6.8	↓

Fe+2 (ppm) _____
 WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 27.79
 Comments: time to purge = 3 min

**PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS**

Temperature +/- 1 °C	D.O. +/- 10%
Conductivity +/- 5%	pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)	

Bladder Volume = 495 ml
 3/8" O.D Tubing Volume = 10 ml/ft
 1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

Page ____ of ____

DATE 8/18/2015 SITE NUMBER NERT
 PROGRAM NAME NERT TRIP BLANK I.D. _____
 MONITORING WELL ID MW-04 MS/MSD (Y/N) Y
 SAMPLE I.D. MW-04 FILTERED ID MW-04
 DUPLICATE ID _____ FILTERED DUPLICATE ID _____
 STATIC W.L. (ft btoc) 26.42 TOTAL DEPTH (ft btoc) 34.63 WATER COLUMN (feet) 8.21
 PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 495ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
 PID READING IN CASING (ppm) (initial) _____ (vented to) _____
 PID READING IN BREATHING ZONE (ppm) (initial) _____ (vented to) _____
 SAMPLE TIME 0903 FILTERED TIME 0903 DUPLICATE TIME _____
 FILTERED DUPLICATE TIME _____ WELL DIAMETER 2"
 SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
0843	Arrived at well	---	---	---	---	---	---	---	---	---	---	---
0845	Begin Purge	---	---	---	---	---	---	---	---	---	---	180
0848	monitoring	26.42	4.60	27.14	11.15	3.45	7.21	222.0	yellowish, clear	540	1.2	↓
0851		26.44	4.08	26.18	11.10	3.44	7.20	218.1	yellowish, clear	1,080	2.4	
0854		26.44	3.96	25.87	11.10	3.41	7.20	216.1	yellowish, clear	1,620	3.6	
0857		26.44 OCB 25.84	4.08	25.83	11.08	3.39	7.19	214.1	yellowish, clear	2,160	4.8	
0900		26.44	2.48	25.70	11.06	3.42	7.18	210.0	yellowish, clear	2,700	6.0	
0903	stable sampling	26.44	2.00	25.63	11.07	3.46	7.18	206.8	yellowish, clear	3,240	7.2	

Fe+2 (ppm) _____

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.44

Comments: time to purge 495 = 3 min
M5/M417

PARAMETERS FOR WATER QUALITY STABILIZATION OVER THREE READINGS

Temperature +/- 1 °C D.O. +/- 10%
 Conductivity +/- 5% pH +/- 0.1 pH units
 Turbidity +/- 10 (when turbidity is >10 NTUs)

Bladder Volume = 495 ml
 3/8" O.D Tubing Volume = 10 ml/ft
 1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 8/18/2015 SITE NUMBER NERT
PROGRAM NAME NERT TRIP BLANK I.D. —
MONITORING WELL ID MW-06 MS/MSD (Y/N) N
SAMPLE I.D. MW-06 FILTERED ID Alt-06
DUPLICATE ID — FILTERED DUPLICATE ID —
STATIC W.L. (ft btoc) 26.46 TOTAL DEPTH (ft btoc) 34.47 WATER COLUMN (feet) 8.01
PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 450ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
PID READING IN CASING (ppm) (initial) — (vented to) —
PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —
SAMPLE TIME — FILTERED TIME — DUPLICATE TIME —
FILTERED DUPLICATE TIME — WELL DIAMETER 2"
SAMPLER'S SIGNATURE [Signature]

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
0914	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
0916	Begin Purge	—	—	—	—	—	—	—	—	—	—	240
0919	monitoring ↓	26.46	1.45	25.82	12.05	0.80	7.24	204.5	yellowish, clear	720	1.6	
0922		26.47	1.49	25.49	12.05	0.45	7.23	193.8	yellowish, clear	1,440	3.2	
0925		26.48	1.31	25.49	12.03	0.38	7.23	190.1	yellowish, clear	2,160	4.8	
0928		26.49	1.31	25.45	12.03	0.33	7.22	184.0	yellowish, clear	2,880	6.4	
0931		26.50	1.26	25.36	12.03	0.30	7.21	176.3	yellowish, clear	3,600	8.0	
0934		26.53	1.27	25.39	12.03	0.27	7.21	168.1	yellowish, clear	4,320	9.6	
0937		26.49	1.28	25.35	12.03	0.26	7.21	164.6	yellowish, clear	5,040	11.2	
0940	stable, sampling	26.49	1.28	25.34	12.04	0.27	7.21	162.4	yellowish, clear	5,760	12.8	✓

Fe+2 (ppm) —

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.49

Comments: time to purge SSV = 3 min

PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS

Temperature +/- 1 °C D.O. +/- 10%
Conductivity +/- 5% pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)

Bladder Volume = 495 ml
3/8" O.D Tubing Volume = 10 ml/ft
1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 8/18/2015 SITE NUMBER NERT
 PROGRAM NAME NERT TRIP BLANK I.D.
 MONITORING WELL ID MW-10 MS/MSD (Y/N) N
 SAMPLE I.D. MW-10 FILTERED ID MW-10
 DUPLICATE ID MW-10-DUP FILTERED DUPLICATE ID MW-10-DUP
 STATIC W.L. (ft btoc) 26.22 TOTAL DEPTH (ft btoc) 34.17 WATER COLUMN (feet) 7.95
 PUMP INLET DEPTH (ft btoc) 30.5 TUBING DIAMETER (in) 1/4" PUMP & TUBING (V)(ml) 450ml

PURGING/SAMPLING DEVICE MICROPURGE DEDICATED PUMP / NON-DEDICATED PUMP
 PID READING IN CASING (ppm) (initial) (vented to)
 PID READING IN BREATHING ZONE (ppm) (initial) (vented to)
 SAMPLE TIME FILTERED TIME DUPLICATE TIME
 FILTERED DUPLICATE TIME WELL DIAMETER 2"
 SAMPLER'S SIGNATURE *[Signature]*

Time	Activity	Water Level (ft btoc)	Turbidity (NTU)	Temp (Deg. C)	EC (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Color	Volume Purged (ml)	Pump & Tubing Volumes Purged	Flow Rate (ml)
0945	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
0948	Begin Purge	—	—	—	—	—	—	—	—	—	—	270
0951	monitoring	26.34	1.36	26.14	12.11	3.58	7.31	185.5	yellowish, clear	810	1.8	↓
0954		26.37	1.44	25.49	12.08	3.72	7.30	173.8	yellowish, clear	1,620	3.6	
0957		26.39	1.40	25.35	12.08	3.71	7.29	168.5	yellowish, clear	2,430	5.4	
1000		26.40	1.20	25.41	12.07	3.61	7.29	163.8	yellowish, clear	3,240	7.2	
1003		26.40	1.23	25.35	12.08	3.74	7.29	159.6	yellowish, clear	4,050	9.0	
1006	stable, sampling & collect DUP	26.40	1.31	25.37	12.06	3.65	7.28	157.7	yellowish, clear	4,860	10.8	

Fe+2 (ppm)
 WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.40
 Comments: time to purge 550 = 3 min

**PARAMETERS FOR WATER QUALITY
STABILIZATION OVER THREE READINGS**

Temperature +/- 1 °C	D.O. +/- 10%
Conductivity +/- 5%	pH +/- 0.1 pH units
Turbidity +/- 10 (when turbidity is >10 NTUs)	

Bladder Volume = 495 ml
 3/8" O.D Tubing Volume = 10 ml/ft
 1/4" O.D. Tubing Volume = 6 ml/ft

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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Telefax (909) 889-139

**GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - SAMPLING**

DATE: 8/26/2015 SITE NAME/NUMBER: NERT PURGING DEVICE: Dedicated Pump
 PROGRAM NAME: NERT SAMPLING DEVICE: Purging Pump
 WELL ID MW- 01 OVA: PID In Casing (ppm) (initial) --- (vented to) ---
 SAMPLE ID MW- 01 - 150826 DUPLICATE ID --- IN BREATHING ZONE (ppm) (initial) --- (vented to) ---
 STATIC WATER LEVEL (ft btoc): 27.35 WELL DEPTH (ft): 34.51 PUMP DEPTH (ft btoc): 33.5
 WATER COLUMN (ft): 7.16 TUBE DIAMETER(in): 1/4 SAMPLER'S SIGNATURE MWXX ✓
 PUMP VOLUME (ml): (33.5) 479 WELL SAMPLE TIME: 0841

Time	Activity	Water Level (ft btoc)	Temp (°C)	EC (ms/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Volume Purged (ml)	Pump Volumes Purged	Flow Rate (ml/min)	Remarks
0819 0819	Start	-	-	-	-	-	-	-	-	-	-	270	
0822		27.62	26.21	11.89	0.97	6.87	245.2	1.97	Yellow	1080	2.25	↑	
0826		27.76	25.82	11.86	0.46	6.92	236.2	1.48	yellow	1890	3.94	240	
0829		27.85	25.88	11.83	0.43	6.91	229.8	1.31	yellow	2610	5.45	180	
0832		27.85	26.07	11.82	0.36	6.89	226.0	0.61	yellow	3150	6.58	↓	
0835		27.85	26.13	11.84	0.39	6.92	217.4	1.09	yellow	3690	7.70	↓	
0838		27.88	26.13	11.85	0.35	6.93	211.5	0.46	yellow	4230	8.83	↓	
0841	Sample	27.90	26.09	11.86	0.35	6.94	207.4	0.28	yellow	4770	9.95	↓	

Colorimetric test (taken prior to sampling) Sulfide (mg/L): --- Fe⁺² (mg/L): ---

PARAMETERS FOR WATER QUALITY STABILIZATION	
Temperature collect readings	Conductivity ± 3 %
pH ± 0.1	DO ± 0.3 mg/L
Turbidity < 10 NTUs (if > 10 NTUs ± 10 %)	
WL ± 0.1 foot	ORP ± 10 mV

Comments: MS / MSD

Note:
 If volatiles are detected in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.
 All water levels and pump depths are measured from the reference point (notch) in the top of the well casing.
 If no reference point is observed then the casing high point should be notched and measurements should be collected from this point.
 Every attempt should be made to limit water level drawdown to less than 0.33 feet and purge rate to less than 0.5 L/min.



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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - SAMPLING

DATE: 8/26/2015 SITE NAME/NUMBER: NERT PURGING DEVICE: Dedicated Pump
 PROGRAM NAME: NERT SAMPLING DEVICE: Purging Pump
 WELL ID MW-04 OVA: PID In Casing (ppm) (initial) - (vented to) -
 SAMPLE ID MW-04-150826 DUPLICATE ID MW-04-Dup-150826 IN BREATHING ZONE (ppm) (initial) - (vented to) -
 STATIC WATER LEVEL (ft btoc): 27.46 WELL DEPTH (ft): 34.63 PUMP DEPTH (ft btoc): 33.5
 WATER COLUMN (ft): 7.17 TUBE DIAMETER(in): 1/4 SAMPLER'S SIGNATURE: [Signature]
 PUMP VOLUME (ml): 480 WELL SAMPLE TIME: 0924

Time	Activity	Water Level (ft btoc)	Temp (°C)	EC (ms/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Volume Purged (ml)	Pump Volumes Purged	Flow Rate (ml/min)	Remarks
0905	Start	-	-	-	-	-	-	-	-	-	-	180	
0909		27.50	25.79	11.28	3.05	7.13	196.7	2.77	yellow	720	1.50		
0912		27.50	25.60	11.26	2.89	7.12	191.8	1.75	yellow	1260	2.63		
0915		27.50	25.43	11.26	2.88	7.11	186.8	1.23	yellow	1800	3.75		
0918		27.50	25.40	11.25	2.92	7.11	184.0	1.31	yellow	2340	4.88		
0921		27.50	25.42	11.25	2.84	7.10	182.0	1.11	yellow	2880	6.00		
0924	Sample	27.50	25.40	11.26	2.83	7.10	181.6	1.04	yellow	3420	7.13		

Colorimetric test (taken prior to sampling) Sulfide (mg/L): - Fe⁺² (mg/L): -

PARAMETERS FOR WATER QUALITY STABILIZATION	
Temperature collect readings	Conductivity ± 3 %
pH ± 0.1	DO ± 0.3 mg/L
Turbidity < 10 NTUs (if > 10 NTUs ± 10 %)	
WL ± 0.1 foot	ORP ± 10 mV

Comments: Dup

Note:
 If volatiles are detected in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.
 All water levels and pump depths are measured from the reference point (notch) in the top of the well casing.
 If no reference point is observed then the casing high point should be notched and measurements should be collected from this point.
 Every attempt should be made to limit water level drawdown to less than 0.33 feet and purge rate to less than 0.5 L/min.



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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - SAMPLING

DATE: 8/26/2015 SITE NAME/NUMBER: NERT PURGING DEVICE: Dedicated Pump
 PROGRAM NAME: NERT SAMPLING DEVICE: Purging Pump
 WELL ID MW- 06 OVA: PID In Casing (ppm) (initial) - (vented to) -
 SAMPLE ID MW- 06-150826 DUPLICATE ID - IN BREATHING ZONE (ppm) (initial) - (vented to) -
 STATIC WATER LEVEL (ft btoc): 27.50 WELL DEPTH (ft): 39.47 PUMP DEPTH (ft btoc): 30.5
 WATER COLUMN (ft): 6.97 TUBE DIAMETER(in): 1/4 SAMPLER'S SIGNATURE Munkow
 PUMP VOLUME (ml): 480 WELL SAMPLE TIME: 1002

Time	Activity	Water Level (ft btoc)	Temp (°C)	EC (ms/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Volume Purged (ml)	Pump Volumes Purged	Flow Rate (ml/min)	Remarks
0943	Start	-	-	-	-	-	-	-	-	-	-	180	
0947		27.51	25.45	12.23	0.61	7.11	191.0	2.08	Yellow	720	1.50		
0950		27.51	25.33	12.22	0.37	7.11	186.7	1.97	Yellow	1260	2.63		
0953		27.51	25.31	12.22	0.38	7.11	182.3	1.37	yellow	1800	3.75		
0956		27.52	25.09	12.22	0.21	7.11	179.2	1.52	yellow	2340	4.88		
0959		27.52	24.91	12.20	0.26	7.11	175.9	1.21	yellow	2800	6.00		
1002	Sample	27.52	24.89	12.20	0.23	7.10	173.0	1.23	yellow	3420	7.13		

Colorimetric test (taken prior to sampling) Sulfide (mg/L): - Fe⁺² (mg/L): -

PARAMETERS FOR WATER QUALITY STABILIZATION	
Temperature collect readings	Conductivity ± 3 %
pH ± 0.1	DO ± 0.3 mg/L
Turbidity < 10 NTUs (if > 10 NTUs ± 10 %)	
WL ± 0.1 foot	ORP ± 10 mV

Comments:

Note:
 If volatiles are detected in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.
 All water levels and pump depths are measured from the reference point (notch) in the top of the well casing.
 If no reference point is observed then the casing high point should be notched and measurements should be collected from this point.
 Every attempt should be made to limit water level drawdown to less than 0.33 feet and purge rate to less than 0.5 L/min.



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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - SAMPLING

DATE: 8/26/2015 SITE NAME/NUMBER: NERT PURGING DEVICE: Dedicated Pump
 PROGRAM NAME: NERT SAMPLING DEVICE: Purging Pump
 WELL ID MW- 10 OVA: PID In Casing (ppm) (initial) - (vented to) -
 SAMPLE ID MW- 10- 150826 DUPLICATE ID - IN BREATHING ZONE (ppm) (initial) - (vented to) -
 STATIC WATER LEVEL (ft btoc): 27.30 WELL DEPTH (ft): 39.17 PUMP DEPTH (ft btoc): 30.5
 WATER COLUMN (ft): 6.87 TUBE DIAMETER(in): 1/4 SAMPLER'S SIGNATURE [Signature]
 PUMP VOLUME (ml): 480 WELL SAMPLE TIME: 1042

Time	Activity	Water Level (ft btoc)	Temp (°C)	EC (ms/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Volume Purged (ml)	Pump Volumes Purged	Flow Rate (ml/min)	Remarks
1023	Start	-	-	-	-	-	-	-	-	-	-	180	
1027		27.40	25.39	12.27	3.49	7.17	217.9	0.26	yellow	720	1.50		
1030		27.40	25.41	12.27	3.15	7.18	211.2	0.77	yellow	1260	2.63		
1033		27.40	25.37	12.27	3.16	7.18	206.3	6.67	yellow	1800	3.75		
1036		27.39	25.39	12.26	3.09	7.18	203.6	0.76	yellow	2340	4.88		
1039		27.40	25.35	12.27	3.16	7.18	199.2	0.89	yellow	2880	6.00		
1042		27.40	25.37	12.24	3.06	7.18	196.8	0	yellow	3420	7.13		

Colorimetric test (taken prior to sampling) Sulfide (mg/L): - Fe⁺² (mg/L): -

PARAMETERS FOR WATER QUALITY STABILIZATION	
Temperature collect readings	Conductivity ± 3 %
pH ± 0.1	DO ± 0.3 mg/L
Turbidity < 10 NTUs (if > 10 NTUs ± 10 %)	
WL ± 0.1 foot	ORP ± 10 mV

Comments:

Note:
 If volatiles are detected in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.
 All water levels and pump depths are measured from the reference point (notch) in the top of the well casing.
 If no reference point is observed then the casing high point should be notched and measurements should be collected from this point.
 Every attempt should be made to limit water level drawdown to less than 0.33 feet and purge rate to less than 0.5 L/min.

Attachment B
Laboratory Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Irvine

17461 Derian Ave

Suite 100

Irvine, CA 92614-5817

Tel: (949)261-1022

TestAmerica Job ID: 440-118170-1

Client Project/Site: NERT Soil Flush Test

For:

Tetra Tech, Inc.

301 East Vanderbilt Way

Suite 450

San Bernardino, California 92408

Attn: Mark Feldman



Authorized for release by:

8/26/2015 11:12:34 AM

Urvashi Patel, Project Manager I

urvashi.patel@testamericainc.com

Designee for

Patty Mata, Senior Project Manager

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-118170-1	MW-01	Water	08/14/15 11:22	08/15/15 10:20
440-118170-2	MW-04	Water	08/14/15 12:15	08/15/15 10:20
440-118170-3	MW-06	Water	08/14/15 12:43	08/15/15 10:20
440-118170-4	MW-10	Water	08/14/15 13:10	08/15/15 10:20
440-118170-5	MW-10-DUP	Water	08/14/15 13:10	08/15/15 10:20

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Case Narrative

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Job ID: 440-118170-1

Laboratory: TestAmerica Irvine

Narrative

**Job Narrative
440-118170-1**

Comments

No additional comments.

Receipt

The samples were received on 8/15/2015 10:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

Receipt Exceptions

Perchlorate analysis requires that samples have significant headspace (1/3 of container volume) to reduce potential anaerobic biodegradation. The following samples were received with insufficient headspace: MW-01 (440-118170-1), MW-04 (440-118170-2), MW-04 (440-118170-2[MSJ]), MW-04 (440-118170-2[MSD]), MW-06 (440-118170-3), MW-10 (440-118170-4) and MW-10-DUP (440-118170-5).

HPLC/IC

Method(s) 314.0: Due to the high concentration of Perchlorate, the matrix spike / matrix spike duplicate (MS/MSD) for analytical batch 440-274974 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Client Sample ID: MW-01
Date Collected: 08/14/15 11:22
Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-1
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	900000		40000	9500	ug/L			08/21/15 14:51	10000

Client Sample ID: MW-04
Date Collected: 08/14/15 12:15
Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-2
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	500000	F1	40000	9500	ug/L			08/21/15 13:42	10000

Client Sample ID: MW-06
Date Collected: 08/14/15 12:43
Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-3
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	660000		40000	9500	ug/L			08/21/15 15:08	10000

Client Sample ID: MW-10
Date Collected: 08/14/15 13:10
Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-4
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	790000		40000	9500	ug/L			08/21/15 15:25	10000

Client Sample ID: MW-10-DUP
Date Collected: 08/14/15 13:10
Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-5
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	800000		40000	9500	ug/L			08/21/15 15:42	10000

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Method	Method Description	Protocol	Laboratory
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Client Sample ID: MW-01

Date Collected: 08/14/15 11:22

Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		274974	08/21/15 14:51	CH	TAL IRV

Client Sample ID: MW-04

Date Collected: 08/14/15 12:15

Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		274974	08/21/15 13:42	CH	TAL IRV

Client Sample ID: MW-06

Date Collected: 08/14/15 12:43

Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		274974	08/21/15 15:08	CH	TAL IRV

Client Sample ID: MW-10

Date Collected: 08/14/15 13:10

Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		274974	08/21/15 15:25	CH	TAL IRV

Client Sample ID: MW-10-DUP

Date Collected: 08/14/15 13:10

Date Received: 08/15/15 10:20

Lab Sample ID: 440-118170-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		274974	08/21/15 15:42	CH	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TestAmerica Irvine

QC Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-274974/3
Matrix: Water
Analysis Batch: 274974

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			08/21/15 12:23	1

Lab Sample ID: LCS 440-274974/2
Matrix: Water
Analysis Batch: 274974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.6		ug/L		99	85 - 115

Lab Sample ID: MRL 440-274974/5
Matrix: Water
Analysis Batch: 274974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.58		ug/L		114	75 - 125

Lab Sample ID: 440-118170-2 MS
Matrix: Water
Analysis Batch: 274974

Client Sample ID: MW-04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	500000	F1	25000	511000	4	ug/L		32	80 - 120

Lab Sample ID: 440-118170-2 MSD
Matrix: Water
Analysis Batch: 274974

Client Sample ID: MW-04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	500000	F1	25000	518000	4	ug/L		60	80 - 120	1	20

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

HPLC/IC

Analysis Batch: 274974

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-118170-1	MW-01	Total/NA	Water	314.0	
440-118170-2	MW-04	Total/NA	Water	314.0	
440-118170-2 MS	MW-04	Total/NA	Water	314.0	
440-118170-2 MSD	MW-04	Total/NA	Water	314.0	
440-118170-3	MW-06	Total/NA	Water	314.0	
440-118170-4	MW-10	Total/NA	Water	314.0	
440-118170-5	MW-10-DUP	Total/NA	Water	314.0	
LCS 440-274974/2	Lab Control Sample	Total/NA	Water	314.0	
MB 440-274974/3	Method Blank	Total/NA	Water	314.0	
MRL 440-274974/5	Lab Control Sample	Total/NA	Water	314.0	

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118170-1

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.


Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA01531	06-30-16
Arizona	State Program	9	AZ0671	10-13-15
California	LA Cty Sanitation Districts	9	10256	01-31-16 *
California	State Program	9	2706	06-30-16
Guam	State Program	9	Cert. No. 12.002r	01-23-16
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA015312007A	07-31-16 *
New Mexico	State Program	6	N/A	01-29-16
Northern Mariana Islands	State Program	9	MP0002	01-29-16
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P330-09-00080	07-08-18

* Certification renewal pending - certification considered valid.

TestAmerica Irvine

LYH 065

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <u>Mark Feldman</u>		Site Contact:		Date: <u>8/14/2015</u>		COC No:	
Company Name: <u>Tetra Tech</u>		Tel/Fax: <u>909-382-5116</u>		Lab Contact:		Carrier:		1 of 1 COCs	
Address: <u>301 E. Vanderbilt Ste 450</u>		Analysis Turnaround Time		Filtered Sample (Y/N) Perchlorate (314)				Sampler: <u>DEB/PSM</u> For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:	
City/State/Zip: <u>San Bernardino, CA 92408</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS							
Phone: <u>909-381-1674</u>		TAT if different from Below <u>Standard</u>							
Fax: <u>909-889-1391</u>		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day							
Project Name: <u>NERT</u>		Sample Date		Sample Time		Sample Type (C=Comp, G=Grab)		# of Cont.	
Site: <u>OCB Pond AP-5 Soil Flush Test</u>		MW-01		8/14/2015 1122		G Water		1	
PO# <u>114-520225-2015-K05</u>		MW-04		↓ 1215		↓ ↓		1	
		MW-06		↓ 1243		↓ ↓		3	
		MW-10		↓ 1310		↓ ↓		1	
		MW-10-DUP		↓ 1310		↓ ↓		1	
Sample Specific Notes: Includes MS/MSD Includes MS/MSD plus Field Duplicate									
 440-118170 Chain of Custody									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other									
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown					<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months				
Special Instructions/QC Requirements & Comments:									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: <u>4.1</u> Corr'd: <u>2.9</u>		Therm ID No.: <u>73</u>			
Relinquished by: <u>Daniel Bertolacci</u>		Company: <u>Tetra Tech</u>		Date/Time: <u>8/14/2015 1335</u>		Received by: <u>Dan G</u>		Company: <u>TA</u>	
Relinquished by: <u>Dan G</u>		Company: <u>TA</u>		Date/Time: <u>8/14/15</u>		Received by: <u>1620</u>		Company:	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by: <u>TA</u>		Company: <u>TA</u>	

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9/26/2015

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-118170-1

Login Number: 118170

List Number: 1

Creator: Kim, Guerry

List Source: TestAmerica Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Irvine

17461 Derian Ave

Suite 100

Irvine, CA 92614-5817

Tel: (949)261-1022

TestAmerica Job ID: 440-118452-1

Client Project/Site: NERT Soil Flush Test

For:

Tetra Tech, Inc.

301 East Vanderbilt Way

Suite 450

San Bernardino, California 92408

Attn: Mark Feldman



Authorized for release by:

8/27/2015 6:21:02 PM

Patty Mata, Senior Project Manager

(949)261-1022

patty.mata@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-118452-1	MW-01	Water	08/18/15 08:37	08/19/15 17:25
440-118452-2	MW-04	Water	08/18/15 09:03	08/19/15 17:25
440-118452-3	MW-06	Water	08/18/15 09:40	08/19/15 17:25
440-118452-4	MW-10	Water	08/18/15 10:06	08/19/15 17:25
440-118452-5	MW-10-DUP	Water	08/18/15 10:06	08/19/15 17:25

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Case Narrative

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Job ID: 440-118452-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-118452-1

Comments

No additional comments.

Receipt

The samples were received on 8/19/2015 5:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Client Sample ID: MW-01
Date Collected: 08/18/15 08:37
Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-1
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	960000		40000	9500	ug/L			08/25/15 11:13	10000

Client Sample ID: MW-04
Date Collected: 08/18/15 09:03
Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-2
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	540000	F1	40000	9500	ug/L			08/25/15 10:19	10000

Client Sample ID: MW-06
Date Collected: 08/18/15 09:40
Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-3
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	670000		40000	9500	ug/L			08/25/15 11:31	10000

Client Sample ID: MW-10
Date Collected: 08/18/15 10:06
Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-4
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	800000		40000	9500	ug/L			08/25/15 11:49	10000

Client Sample ID: MW-10-DUP
Date Collected: 08/18/15 10:06
Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-5
Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	890000		40000	9500	ug/L			08/25/15 12:07	10000

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Method	Method Description	Protocol	Laboratory
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

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Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Client Sample ID: MW-01

Date Collected: 08/18/15 08:37

Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		275823	08/25/15 11:13	CH	TAL IRV

Client Sample ID: MW-04

Date Collected: 08/18/15 09:03

Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		275823	08/25/15 10:19	CH	TAL IRV

Client Sample ID: MW-06

Date Collected: 08/18/15 09:40

Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		275823	08/25/15 11:31	CH	TAL IRV

Client Sample ID: MW-10

Date Collected: 08/18/15 10:06

Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		275823	08/25/15 11:49	CH	TAL IRV

Client Sample ID: MW-10-DUP

Date Collected: 08/18/15 10:06

Date Received: 08/19/15 17:25

Lab Sample ID: 440-118452-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		275823	08/25/15 12:07	CH	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TestAmerica Irvine

QC Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-275823/3
Matrix: Water
Analysis Batch: 275823

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			08/25/15 09:01	1

Lab Sample ID: LCS 440-275823/2
Matrix: Water
Analysis Batch: 275823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.8		ug/L		99	85 - 115

Lab Sample ID: MRL 440-275823/5
Matrix: Water
Analysis Batch: 275823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	3.72	J	ug/L		93	75 - 125

Lab Sample ID: 440-118452-2 MS
Matrix: Water
Analysis Batch: 275823

Client Sample ID: MW-04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	540000	F1	25000	487000	4	ug/L		-228	80 - 120

Lab Sample ID: 440-118452-2 MSD
Matrix: Water
Analysis Batch: 275823

Client Sample ID: MW-04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	540000	F1	25000	490000	4	ug/L		-218	80 - 120	1	20

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

HPLC/IC

Analysis Batch: 275823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-118452-1	MW-01	Total/NA	Water	314.0	
440-118452-2	MW-04	Total/NA	Water	314.0	
440-118452-2 MS	MW-04	Total/NA	Water	314.0	
440-118452-2 MSD	MW-04	Total/NA	Water	314.0	
440-118452-3	MW-06	Total/NA	Water	314.0	
440-118452-4	MW-10	Total/NA	Water	314.0	
440-118452-5	MW-10-DUP	Total/NA	Water	314.0	
LCS 440-275823/2	Lab Control Sample	Total/NA	Water	314.0	
MB 440-275823/3	Method Blank	Total/NA	Water	314.0	
MRL 440-275823/5	Lab Control Sample	Total/NA	Water	314.0	

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Soil Flush Test

TestAmerica Job ID: 440-118452-1

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA01531	06-30-16
Arizona	State Program	9	AZ0671	10-13-15
California	LA Cty Sanitation Districts	9	10256	01-31-16 *
California	State Program	9	2706	06-30-16
Guam	State Program	9	Cert. No. 12.002r	01-23-16
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA015312007A	07-31-16 *
New Mexico	State Program	6	N/A	01-29-16
Northern Mariana Islands	State Program	9	MP0002	01-29-16
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P330-09-00080	07-08-18

* Certification renewal pending - certification considered valid.

TestAmerica Irvine

TestAmerica Irvine

17461 Derian Ave
Suite 100

Irvine, CA 92614

Phone: 949.261.1022 Fax:

Chain of Custody Record


079796

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <u>Mark Feldman</u>		Site Contact:		Date: <u>8/18/2015</u>		COC No:	
Company Name: <u>Tetra Tech</u>		Tel/Fax: <u>909-382-5116</u>		Lab Contact:		Carrier:		_____ of _____ COCs	
Address: <u>301 E. Vanderbilt Ste 450</u>		Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <u>Perchlorate (3/4)</u>				Sampler:	
City/State/Zip: <u>San Bernardino, CA 92408</u>									
Phone: <u>909-381-1674</u>		TAT if different from Below <u>Standard</u>						For Lab Use Only:	
Fax: <u>909-889-1391</u>		<input type="checkbox"/> 2 weeks						Walk-in Client:	
Project Name: <u>NERI</u>		<input type="checkbox"/> 1 week						Lab Sampling:	
Site: <u>Soil Flush Test</u>		<input type="checkbox"/> 2 days						Job / SDG No.:	
P O # <u>114-520225-2015-K05</u>		<input type="checkbox"/> 1 day							
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
<u>MW-01</u>		<u>8/18/2015</u>	<u>0837</u>	<u>G</u>	<u>Water</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-04</u>		<u>↓</u>	<u>0903</u>	<u>↓</u>	<u>↓</u>	<u>3</u>	<u>Y</u>	<u>X</u>	<u>Includes MS/MSD</u>
<u>MW-06</u>		<u>↓</u>	<u>0940</u>	<u>↓</u>	<u>↓</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-10</u>		<u>↓</u>	<u>1006</u>	<u>↓</u>	<u>↓</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-10-DUP</u>		<u>↓</u>	<u>1006</u>	<u>↓</u>	<u>↓</u>	<u>1</u>	<u>Y</u>	<u>X</u>	<u>Field Duplicate</u>
 440-118452 Chain of Custody									
Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other _____									
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown					<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months				
Special Instructions/QC Requirements & Comments:									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: <u>10</u> Corr'd: <u>0.4</u>		Therm ID No.: <u>7.3</u>			
Relinquished by: <u>[Signature]</u>		Company: <u>Tetra Tech</u>		Date/Time: <u>8/19/2015 1005</u>		Received by: <u>[Signature]</u>		Company: <u>OC</u>	
Relinquished by: <u>[Signature]</u>		Company: <u>OC</u>		Date/Time: <u>8/19/15 1725</u>		Received by: <u>[Signature]</u>		Company: <u>OC</u>	
Relinquished by: <u>[Signature]</u>		Company: _____		Date/Time: _____		Received in Laboratory by: <u>[Signature]</u>		Company: <u>TA</u>	

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Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-118452-1

Login Number: 118452

List Source: TestAmerica Irvine

List Number: 1

Creator: Soderblom, Tim

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Field on COC is blank.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Irvine

17461 Derian Ave

Suite 100

Irvine, CA 92614-5817

Tel: (949)261-1022

TestAmerica Job ID: 440-119240-1

Client Project/Site: NERT Natural Soil Flush

For:

Tetra Tech, Inc.

301 East Vanderbilt Way

Suite 450

San Bernardino, California 92408

Attn: Mark Feldman



Authorized for release by:

9/8/2015 1:56:13 PM

Patty Mata, Senior Project Manager

(949)261-1022

patty.mata@testamericainc.com

LINKS

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results through
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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-119240-1	MW-01-150826	Water	08/26/15 08:41	08/27/15 09:50
440-119240-2	MW-04-150826	Water	08/26/15 09:24	08/27/15 09:50
440-119240-3	MW-04-DUP-150826	Water	08/26/15 09:24	08/27/15 09:50
440-119240-4	MW-06-150826	Water	08/26/15 10:02	08/27/15 09:50
440-119240-5	MW-10-150826	Water	08/26/15 10:42	08/27/15 09:50

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Case Narrative

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Job ID: 440-119240-1

Laboratory: TestAmerica Irvine

Narrative

**Job Narrative
440-119240-1**

Comments

No additional comments.

Receipt

The samples were received on 8/27/2015 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.7° C and 2.9° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Client Sample ID: MW-01-150826

Date Collected: 08/26/15 08:41

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-1

Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	900000		40000	9500	ug/L			08/28/15 09:37	10000

Client Sample ID: MW-04-150826

Date Collected: 08/26/15 09:24

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-2

Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	500000		40000	9500	ug/L			08/28/15 11:08	10000

Client Sample ID: MW-04-DUP-150826

Date Collected: 08/26/15 09:24

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-3

Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	510000		40000	9500	ug/L			08/28/15 11:26	10000

Client Sample ID: MW-06-150826

Date Collected: 08/26/15 10:02

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-4

Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	660000		40000	9500	ug/L			08/28/15 11:44	10000

Client Sample ID: MW-10-150826

Date Collected: 08/26/15 10:42

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-5

Matrix: Water

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	820000		40000	9500	ug/L			08/28/15 12:02	10000

TestAmerica Irvine

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Method	Method Description	Protocol	Laboratory
314.0	Perchlorate (IC)	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Client Sample ID: MW-01-150826

Date Collected: 08/26/15 08:41

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		276734	08/28/15 09:37	CH	TAL IRV

Client Sample ID: MW-04-150826

Date Collected: 08/26/15 09:24

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		276734	08/28/15 11:08	CH	TAL IRV

Client Sample ID: MW-04-DUP-150826

Date Collected: 08/26/15 09:24

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		276734	08/28/15 11:26	CH	TAL IRV

Client Sample ID: MW-06-150826

Date Collected: 08/26/15 10:02

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		276734	08/28/15 11:44	CH	TAL IRV

Client Sample ID: MW-10-150826

Date Collected: 08/26/15 10:42

Date Received: 08/27/15 09:50

Lab Sample ID: 440-119240-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		10000	1 mL		276734	08/28/15 12:02	CH	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TestAmerica Irvine

QC Sample Results

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 440-276734/3
Matrix: Water
Analysis Batch: 276734

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		4.0	0.95	ug/L			08/28/15 08:28	1

Lab Sample ID: LCS 440-276734/2
Matrix: Water
Analysis Batch: 276734

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	23.5		ug/L		94	85 - 115

Lab Sample ID: MRL 440-276734/5
Matrix: Water
Analysis Batch: 276734

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	3.69	J	ug/L		92	75 - 125

Lab Sample ID: 440-119240-1 MS
Matrix: Water
Analysis Batch: 276734

Client Sample ID: MW-01-150826
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	900000		25000	890000	4	ug/L		-31	80 - 120

Lab Sample ID: 440-119240-1 MSD
Matrix: Water
Analysis Batch: 276734

Client Sample ID: MW-01-150826
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	900000		25000	893000	4	ug/L		-19	80 - 120	0	20

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

HPLC/IC

Analysis Batch: 276734

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-119240-1	MW-01-150826	Total/NA	Water	314.0	
440-119240-1 MS	MW-01-150826	Total/NA	Water	314.0	
440-119240-1 MSD	MW-01-150826	Total/NA	Water	314.0	
440-119240-2	MW-04-150826	Total/NA	Water	314.0	
440-119240-3	MW-04-DUP-150826	Total/NA	Water	314.0	
440-119240-4	MW-06-150826	Total/NA	Water	314.0	
440-119240-5	MW-10-150826	Total/NA	Water	314.0	
LCS 440-276734/2	Lab Control Sample	Total/NA	Water	314.0	
MB 440-276734/3	Method Blank	Total/NA	Water	314.0	
MRL 440-276734/5	Lab Control Sample	Total/NA	Water	314.0	

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT Natural Soil Flush

TestAmerica Job ID: 440-119240-1

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA01531	06-30-16
Arizona	State Program	9	AZ0671	10-13-15
California	LA Cty Sanitation Districts	9	10256	01-31-16 *
California	State Program	9	2706	06-30-16
Guam	State Program	9	Cert. No. 12.002r	01-23-16
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA015312007A	07-31-16 *
New Mexico	State Program	6	N/A	01-29-16
Northern Mariana Islands	State Program	9	MP0002	01-29-16
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P330-09-00080	07-08-18

* Certification renewal pending - certification considered valid.

TestAmerica Irvine

TestAmerica Irvine

17461 Derian Ave
Suite 100

Irvine, CA 92614

Phone: 949.261.1022 Fax:

LYH019

Chain of Custody Record

079797

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: <u>Mark Feldman</u>		Site Contact:		Date: <u>8/26/15</u>		COC No:	
Company Name: <u>Tetra Tech</u>		Tel/Fax:		Lab Contact:		Carrier:		of COCs	
Address: <u>301 E. Vanderbilt way suit 450</u>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <u>Perchlorate (3/4.0)</u>				Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:	
City/State/Zip: <u>San Bernardino CA 92408</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS							
Phone: <u>909 381 674</u>		TAT if different from Below <u>Standard</u>							
Fax:		<input type="checkbox"/> 2 weeks							
Project Name: <u>NERT natural soil flush</u>		<input type="checkbox"/> 1 week							
Site: <u>NERT</u>		<input type="checkbox"/> 2 days							
P O # <u>100-580-T3500-N05</u>		<input type="checkbox"/> 1 day							
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
<u>MW-01-150826</u>		<u>8/26/15</u>	<u>0841</u>		<u>W</u>	<u>1</u>	<u>Y</u>	<u>X</u>	<u>MS/MSD</u>
<u>MW-04-150826</u>		<u>↓</u>	<u>0924</u>		<u>W</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-04-Dup-150826</u>		<u>↓</u>	<u>0924</u>		<u>W</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-06-150826</u>		<u>↓</u>	<u>1002</u>		<u>W</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<u>MW-10-150826</u>		<u>↓</u>	<u>1042</u>		<u>W</u>	<u>1</u>	<u>Y</u>	<u>X</u>	
<p>Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other</p> <p>Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.</p> <p><input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown</p> <p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <p><input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months</p> <p>Special Instructions/QC Requirements & Comments: <u>Fed: 6339 3848 4283</u> <u>(CS)</u></p> <p>Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Custody Seal No.: _____ Cooler Temp. (°C): Obs'd: <u>2.3</u> Corr'd: <u>2.7</u> Therm ID No.: _____</p>									
Relinquished by: <u>Max W.</u>		Company: <u>Tetra Tech</u>		Date/Time: <u>8/26/15 1120</u>		Received by: <u>Dr. Oden</u>		Company: <u>TA</u>	
Relinquished by: <u>[Signature]</u>		Company: <u>TA</u>		Date/Time: <u>8/26/15 160</u>		Received by: _____		Company: _____	
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory by: <u>Subaru</u>		Company: <u>TAI</u>	



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9.1

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-119240-1

Login Number: 119240

List Source: TestAmerica Irvine

List Number: 1

Creator: Kim, Guerry

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Field on COC is blank.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TETRA TECH, INC.
DATA VALIDATION MEMORANDUM

TO: Mark Feldman, Task Manager

FROM: Michael Wilson, Senior Chemist

DATE: September 17, 2015

SUBJECT: One Hundred Percent Data Validation Review for the NERT Post-Storm Groundwater Sampling Results from Test America Laboratory in Irvine, CA

Introduction

This report summarizes the findings from data validation efforts conducted on one hundred percent of the sample data results for NERT project. The validation guidance used in evaluating the data is presented in the current versions of *USEPA National Functional Guidelines for Inorganic Data Review* and *USEPA National Functional Guidelines for Organic Data Review*. The data were audited at a Level II effort. The Level II effort requires review of all applicable Quality Control (QC) sample results as it relates to the field data under review. Level II effort also determines the usability of the data based on the Data Quality Objectives (DQOs) for the project.

Executive Summary

The Test America data for the project were contained in three Sample Delivery Groups (SDG) that were designated with SDG numbers 440-118452-1, 440-119240-1, and 440-118170-1.

The total data set consisted of 15 individual (per analyte) results from environmental samples analyses. The number of samples per analytical method (or method group) is given below.

1. Fifteen water samples for Perchlorate analysis by Method E314.0

The samples were logged into the lab under compliant Chain of Custody documentation with no exceptions noted. The samples were analyzed in one or two preparation batch per analytical method per SDG. All QC samples were reviewed and if the QC result caused the data to be qualified the reason for the qualification was identified.

The data showed the laboratory analyzed all samples in accordance with method guidelines. The instances where qualification was required are listed below and explained under individual method sections. All other data is of known precision and accuracy and did not require any qualification and can be used as stated.

All data for this NERT sampling event were usable for their intended purpose.

Evaluation Criteria

The data were evaluated by results from the following Quality Control (QC) entities.

- Method/Field Blanks
- Laboratory Control Samples
- Holding Times
- Surrogate Recovery (Organic Methods)
- Spiked and Field Duplicate Compliance
- Calibration Compliance
- Compound Identification
- Analytical Method Compliance

Chain-of-Custody (COC) forms were reviewed and no unresolved discrepancies were noted.

Evaluation of Accuracy, Precision, Representativeness, Comparability, and Completeness

1. Accuracy is established by reviewing spiked sample analysis. A blank spike (LCS) measures the accuracy of the instrument and the LCS results for this data set were all found to be within control limits. Therefore, accuracy for the NERT project meets the Data Quality Objectives (DQO).
2. Precision is established by calculating the RPD values for MS/MSD pairs and/or field duplicates. The RPD values calculated for the NERT project show that 100% of the RPD calculated were within control limits. Therefore, the precision for the NERT projects meets the DQO.
3. Representativeness is established by using standard field sampling techniques. Because the field sampling was conducted under approved work plans and by following established SOPs, the sampling is judged to have adequate representativeness. The DQO was met.
4. Comparability of the data is preserved if the analytical analyses are conducted under approved and vetted EPA analytical methods. Because the EPA methods are constructed with comparability built into the methods, by using these approved analytical methods for the NERT project, the data is comparable. The DQO was met.
5. Completeness is measured by determine the amount of valid data produced by the laboratory as compared to the total possible data from the chain. This data set had no rejected data and all samples were analyzed as per the chains. Therefore, the data completeness is 100% which is above the 90% criterion. The DQO was met.

Validation Qualifiers and Comment Descriptors Definitions

Validation Qualifiers

- B:** The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result qualified for blank contamination is considered not to have originated from the environmental sample, since cross-contamination is suspected.
- J:** The analyte was positively identified, but the analyte concentration is an estimated value.
- R:** The sample result is rejected and not usable for any purpose. The presence or absence of the analyte cannot be verified.

- U: The analyte was analyzed for, but was not detected above the MDL.
- UJ: The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limits

Qualifier Descriptor Comments

- a: The analyte was found in the method blank.
- b: The surrogate spike recovery was outside control limits.
- c: The Matrix Spike and/or Matrix Spike Duplicate recoveries were outside control limits.
- d: The Laboratory Control Sample (LCS) recovery was outside control limits.
- e: A holding time violation occurred.
- f: The duplicate samples Relative Percent Difference (RPD) was outside the control limit.
- g: The datum met prescribed method criteria.
- h: The method requires a confirmation result, but none was performed.
- k: The analyte was found in a field blank.
- l: The second column confirmation result indicates the analyte was not confirmed.
- p: The result was qualified based on professional judgment.
- q: The analyte detection was below the Practical Quantitation Limit (PQL).
- r: The result is above the instrument's calibration range.
- t: The sample temperature was outside acceptance criteria.
- n: The laboratory case narrative indicated a QC problem.

1.0 Analyses for Perchlorate by Method E314.0

1.1 Method/Field Blanks

The method blanks and/or field blanks reported no detections of target analytes above the detection limit. One method blank was extracted for each preparation batch. The method blanks were compliant with the analytical method.

1.2 Laboratory Control Samples

The laboratory control sample (LCS) analysis showed the method required spiked analytes were recovered within control limits. One LCS was extracted for each preparation batch

1.3 Holding Times

All extraction and analysis holding times were met.

1.4 Surrogate Recovery

Surrogates do not apply to Method E314.0.

1.5 Spiked and Field Duplicate Compliance

Both the MS and MSD failed spike recovery. However, the native perchlorate levels in the parent sample of the MS/MSD was greater than 4X the spike level and as a consequence the MS/MSD results are not used for validation purposes.

The EPA guidance indicates that when the native concentration of analytes exceed the spike concentration by a factor of four, the normal accuracy associated with the recovery is degraded and should not be used in qualifying the sample results. In this sample set, the parent sample's perchlorate level was over 20X the spike level's concentrations. Therefore, the 4X threshold is greatly exceeded and the MS/MSD results have no effect on the data results.

The field duplicate precision results (RPDs) were within control limits.

1.6 Calibration Compliance

The calibration of the analytical instrument met criteria.

1.7 Compound Identification

All reported compound detections were identified by the correct retention time and mass spectra.

1.8 Analytical Method Compliance

The Level II data review showed the data to be method compliant except for headspace. The case narrative indicated that the samples were received at the laboratory without the standard headspace (to deter anaerobic degradation) in the sample container. The EPA recommends that one third of the container be empty to fulfill this requirement. Based on professional judgement, this oversight will not cause the data to be qualified since the small amount of anaerobic degradation that might occur is insignificant compared to the very high perchlorate concentrations in the samples.

1.9 Conclusions

Based on the results of this Level II Data Validation effort, it is concluded that the data for water analyses by method E314.0 are usable as reported. The target analyte identifications are considered correct and reliable. The DQOs were satisfied as per the Work Plan and the data is usable for its intended purpose.