NAS7.10587
NASA-JPL
SSIC No. 9661

Technical Memorandum

Operable Unit 1 Source Area Treatment System Progress Report
September through February 2014
National Aeronautics and Space Administration
Jet Propulsion Laboratory, Pasadena, California

April 2014

This technical memorandum provides a summary of field, analytical, and operational data collected from September 1, 2013 through February 28, 2014, for the Operable Unit 1 (OU-1) source area treatment system. The OU-1 system is being implemented as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Program at the National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL) in Pasadena, California.

This memorandum summarizes system performance based on the extracted and reinjected groundwater volumes, as well as removal of volatile organic compounds (VOCs) and perchlorate. Other operational data presented in this memorandum include the performance of the biomass removal and backwash recovery system, reinjection well performance and rehabilitation, and an evaluation of the water levels and water quality data collected within the OU-1 source area treatment zone. In addition, the following attachments are also included:

- Attachment A: Laboratory Analytical Results
- Attachment B: Field Monitoring Results

SYSTEM PERFORMANCE SUMMARY

Table 1 summarizes the performance of the OU-1 system through February 28, 2014. Figure 1 presents the treatment process flow diagram.

Table 1. OU-1 System Operational Summary (through February 28, 2014)

Parameter	Units	EW-1	EW-2	EW-3	Total
Total Volume of Groundwater Extracted	Acre Feet	166	949	1,992	3,107
Total Volume of Wastewater to Sewer	Acre Feet	–	–	–	2.97
Mass of Perchlorate Removed	lb	231	637	907	1,775
Mass of CCl_4 Removed	lb	2.6	22.3	11.7	36.6
Mass of TCE Removed	lb	0.60	2.9	2.6	6.1

EW = extraction well; lb = pound; CCl_4 = carbon tetrachloride; TCE = trichloroethylene

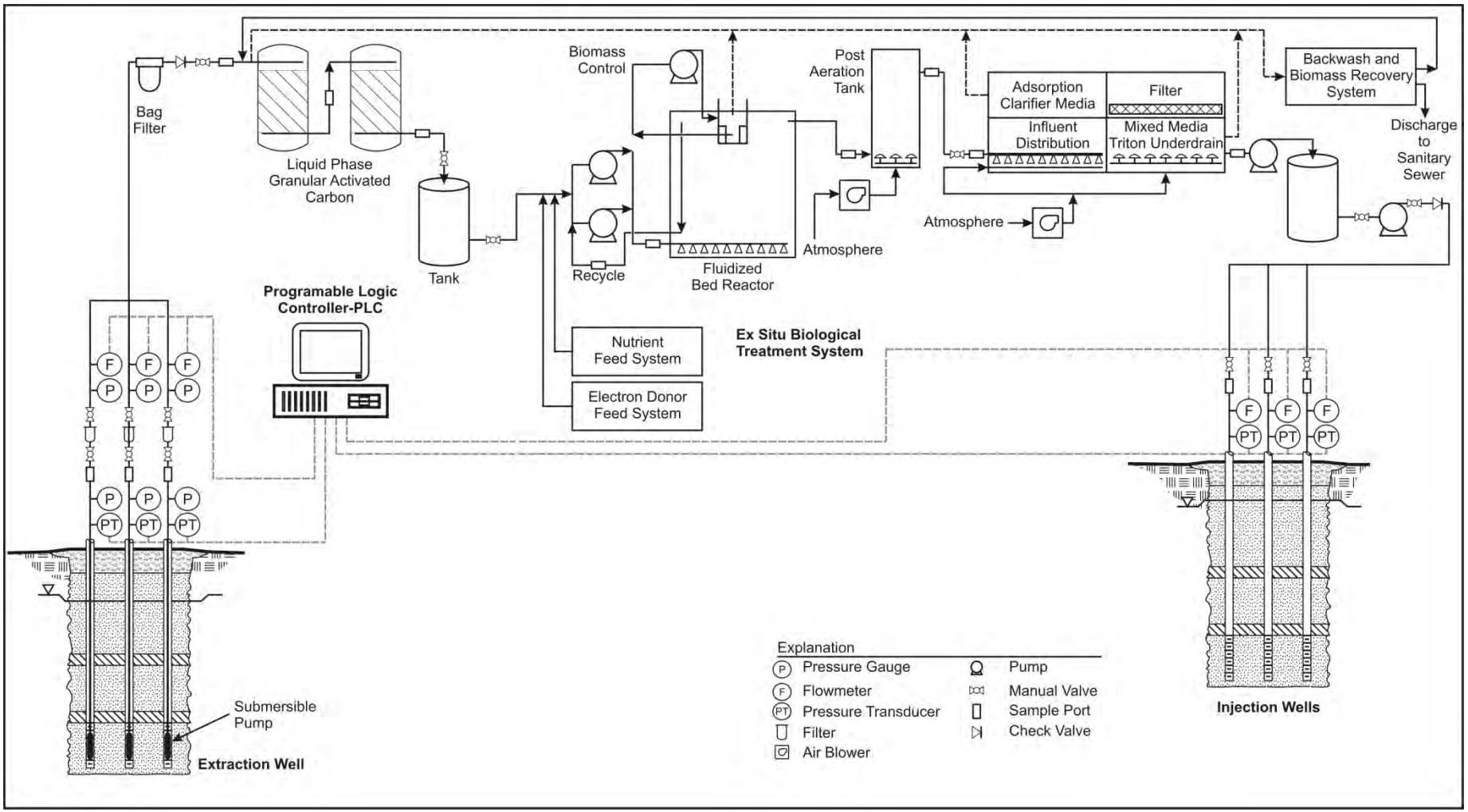

Figure 1. Process Flow Diagram

Additional information regarding system performance is summarized below and presented in more detail in the subsequent sections.

- **Extraction.** The OU-1 system operated at an average extraction flow rate of 139 gallons per minute (gpm) and has extracted approximately 3,107 acre-feet of water through February 28, 2014. Over the past 6 months, EW-1 has been operated intermittently but was shut down due to declining water levels, however, during operation EW-1 varied from 0 to 86 gpm. The flow rate from EW-2 varied from 0 to 142 gpm and the flow rate from EW-3 has varied from 0 to 233 gpm. During this reporting period, extraction well maintenance was required on EW-2 and EW-3. Extraction well maintenance activities were performed in February 2014 and are documented in this progress report.

- **Reinjection.** During the past 6 months, sustained reinjection flow rates as high as 187 gpm have been achieved at Injection Well No. 1 (IW-1), as high as 175 gpm at IW-2, and as high as 282 gpm at IW-3. IW-3 has been in operation since January 2008 and is equipped with a 300 gpm extraction pump so that flow can be reversed periodically to help maintain injection capacity. In the past 6 months, no water has been extracted from IW-3 due to the decreased water levels associated with the drought in Southern California.

- **Injection Well Rehabilitation.** During operation of the OU-1 treatment system injection flow rates and wellhead pressures are monitored for injection well performance and efficiency. As a result of increased well head injection pressures and decreased injection flow rates, rehabilitation activities were conducted at injection wells IW-1 and IW-2 in September and October 2013. Details of the rehabilitation activities are documented in this progress report.

- **Chlorination.** Chlorination of treated groundwater prior to reinjection was initiated on December 15, 2006, and has been successful in extending the time period between well rehabilitation events. Currently, residual chlorine levels in treated water are averaging 3.0 mg/L prior to reinjection. The sodium hypochlorite (12.5%) use rate is approximately 23 gallons per day (gpd).

- **Mass Removal.** The cumulative chemical mass removed by the OU-1 system through the end of February 2014 was estimated at approximately 1,775 lb of perchlorate, 36.6 lb of CCl_4, and 6.1 lb of TCE. Between September 1, 2013 and February 28, 2014, the chemical mass removed by the OU-1 system was 14 lb of perchlorate, 0.5 lb of CCl_4, and no measurable TCE. Figure 2 shows the cumulative perchlorate removal for the OU-1 system since startup.

- **Hexavalent Chromium.** In August 2013, the California Department of Public Health (CDPH) announced a proposed maximum contaminant level (MCL) for hexavalent chromium of 10 µg/L. To evaluate the potential impact of a reduction in the MCL, additional sampling was conducted at the source area treatment plant extraction wells. Twenty samples were collected and submitted to the analytical laboratory. Concentrations of hexavalent chromium at the extraction wells ranged from 8.6 to 14 µg/L , and averaged 11.8 µg/L. Plant effluent samples are collected quarterly, with detections of 2.8 and 11 µg/L during this reporting period. Based on these results, quarterly sampling for hexavalent chromium at the plant influent and effluent will continue.

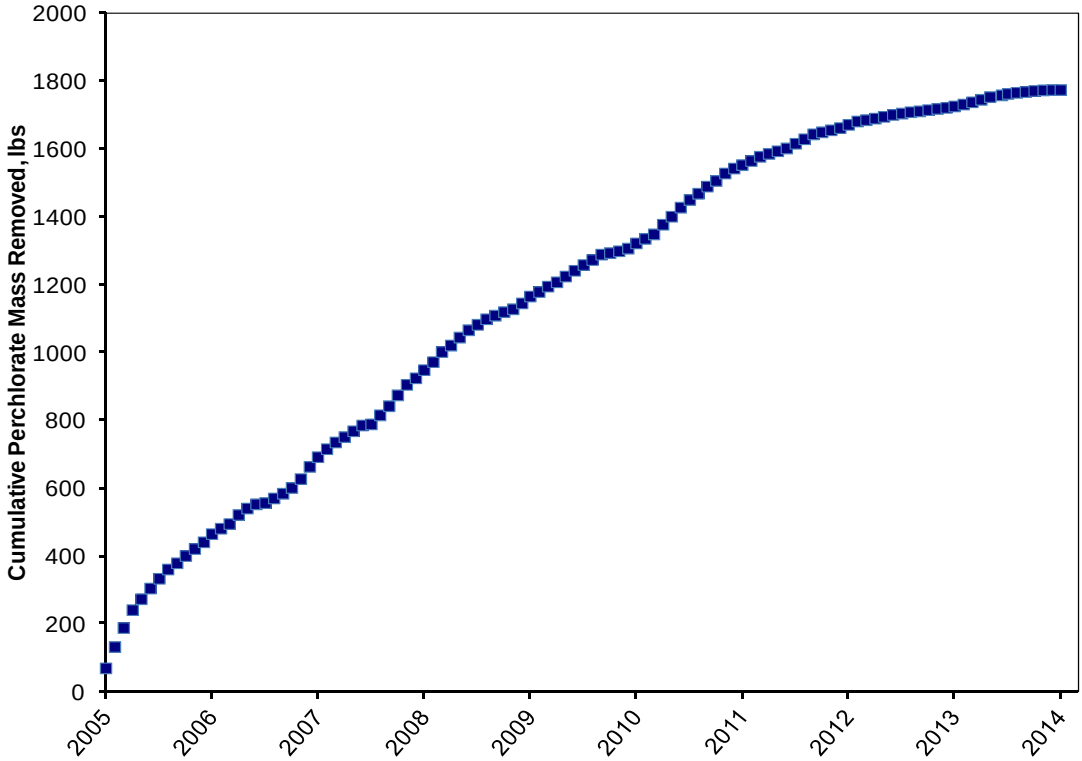

Figure 2. Cumulative Mass of Perchlorate Removed by the OU-1 System

EXTRACTION WELL MAINTENANCE

Maintenance and repair activities were completed at EW-3 from February 17 through February 19, 2014, following pump failure on January 10, 2014. After the pump and motor were removed from the well, it was determined that the 40 horsepower (HP) motor burned out. This motor had been in service since January 2008. Following pump removal, the extraction well was video logged on February 18, 2014, followed by the installation of a new Hitachi 15 HP motor coupled with 8-stage Grundfos pump (rated at 150 gpm), a new 20 foot long section of 3-inch diameter Schedule 80 polyvinyl chloride (PVC) drop pipe, and a new stainless steel airline (for manually measuring pumping water levels). The new pump was sized to optimize motor efficiency when operating concurrently with EW-2 and EW-1. The pump was installed at 304 feet below top of casing, as compared to the previous setting of 284 feet below top of casing, to accommodate declining water levels associated with the drought in Southern California. EW-3 was placed back into service on February 19, 2014.

While a crew was on site for maintenance and repair of EW-3, it was decided to also conduct maintenance at EW-2. EW-2 was shut down for maintenance on February 20 and 21, 2014. During maintenance activities, the 3-inch diameter galvanized drop pipe and 15 HP pump were removed from the well. The pump was inspected and determined to be in good working order. The following day, a video log was performed, and the pump was re-installed with new 3-inch Schedule 80 PVC drop pipe (replacing the galvanized drop pipe), stainless steel airline, and new wellhead flange. Based on declining water levels, the pump was installed at 304 feet below top of casing as compared to the previous setting of 258 feet below top of casing. EW-2 was placed back in service on February 21, 2014.

INJECTION WELL REHABILITATION

Periodic injection well rehabilitation activities were performed at IW-1 and IW-2 from September 16 through October 31, 2013. It is important to note that static water levels at IW-1 and IW-2 were approximately 50 feet below those recorded during the 2012 rehabilitation event, due to the drought in Southern California. The static water level at IW-1 was 205.00 feet below ground surface (bgs) on May 10, 2012 compared to 256.30 feet bgs measured on September 17, 2013. The static water level at IW-2 was measured at 217.83 feet bgs on June 12, 2012 compared to 267.20 feet bgs measured October 15, 2013. Rehabilitation activities are documented below.

IW-1 and IW-2 Rehabilitation Activities

Rehabilitation activities were initiated by removing the drop pipes and associated monitoring equipment from IW-1 and IW-2. Following equipment removal, a video log was performed at IW-1 to inspect the well casing and screen condition. A video log was not completed at IW-2 because the logging truck was unavailable due to maintenance activities. Next, two groundwater samples were collected (one sample collected below static water, and the other in the middle of the screen) for laboratory analyses by Water Systems Engineering to support selection of rehabilitation chemicals. Following the sample collection, the screened zone of each well was brushed and each well was pumped utilizing an open-ended air-lift system to remove sediment that accumulated in the bottom of the well. Next, each well was pumped utilizing a dual-swab airlift system.

Following the initial pumping, each well was cleaned using a chemical mixture that included an ANSI/NSF 60 certified liquid descaler (i.e., blend of liquid acids, polymers, surfactants, and inhibitors) mixed with water. The chemical mixture was injected and swabbed in ten foot intervals from the top of the screen to the bottom of the screen. Following the chemical treatment, an Aquafreed® treatment (i.e., gaseous and liquid carbon dioxide injection into the well and filter pack) was performed at each well. Following the Aquafreed® treatment, each well was pumped utilizing dual-swab airlifting. The pH of the purge water was monitored, and neutralized using sodium carbonate prior to transfer to the containment tanks.

Both wells were pumped with an electric submersible pump at different pumping rates. IW-1 was pumped in three zones at 30, 50, and 75 gpm, and IW-2 was pumped in the lowest zones at 30 gpm. At IW-2 pumping flowrates above 30 gpm resulted in the pump breaking suction (i.e., pumping air due to drawdown).

All purge water generated during the well rehabilitation efforts was pumped into the OU-1 treatment system for processing. At the completion of well rehabilitation, the drop pipe and monitoring equipment were re-installed into each well and injection was resumed.

IW-1 Rehabilitation

IW-1 rehabilitation was conducted September 16 through October 14, 2013. Approximately 96,000 gallons of water was purged from the well. The average flowrate and wellhead pressure during the four weeks prior to rehabilitation were 39.4 gpm and 8.7 pounds per square inch (psi), respectively. After well rehabilitation, the four week average injection flowrate increased to 121.8 gpm, and the wellhead pressure was reduced to 2.2 psi. These results indicate that rehabilitation of IW-1 was successful.

IW-2 Rehabilitation

IW-2 rehabilitation was conducted October 14 through October 31, 2013. Approximately 28,000 gallons of water was purged from the well, which is less volume than removed during previous rehabilitation

events. Since the static water level was around 270 feet bgs and approximately 55% of the screen was above the static water level, pumping at flows greater than 30 gpm caused the pump to run dry. It is believed that the lower static water level was the cause of the below normal pumping performance, and that it was not due to particulate, chemical, or biological plugging issues. The average flowrate and wellhead pressure during the four weeks prior to rehabilitation were 114.8 gpm and 5.4 psi, respectively. After well rehabilitation the average injection flowrate and wellhead pressure wered to 128.1 gpm and 1.7 psi, respectively. These results indicate that rehabilitation of IW-2 was successful.

VOC Removal by Liquid-Phase Granular Activated Carbon

Liquid-phase granular activated carbon (LGAC) vessels arranged in a lead-lag configuration are used to remove VOCs from extracted groundwater. Weekly samples are collected for VOC analysis at the LGAC lead vessel effluent (LGAC mid-point), and the fluidized bed reactor (FBR) effluent. Samples are collected quarterly for VOC analysis at the LGAC influent and at each of the three extraction wells (see Attachment A).

The total VOCs at the LGAC influent ranged from 13.2 to 16.0 µg/L during September 2013 through February 2014. The concentration of total VOCs has been steadily declining since they were first measured in 2005 (Figure 3). Since May 2007, concentrations of several disinfection byproducts have been detected in samples collected from the OU-1 extraction wells, currently the disinfection byproducts make up approximately 95% of the VOCs entering the LGAC. The disinfection byproducts are chloroform, bromodichloromethane, dibromochloromethane, and bromoform, and are associated with chlorination of injected water to control biofouling at the injection wells. Chloroform was also detected prior to the start of chlorination; although, concentrations increased following chlorination. The total concentration of the disinfection byproducts has ranged from 2 to 19 µg/L since initiating chlorination. Influent concentrations of TCE and CCl_4 remained low and stable over the past 6 months.

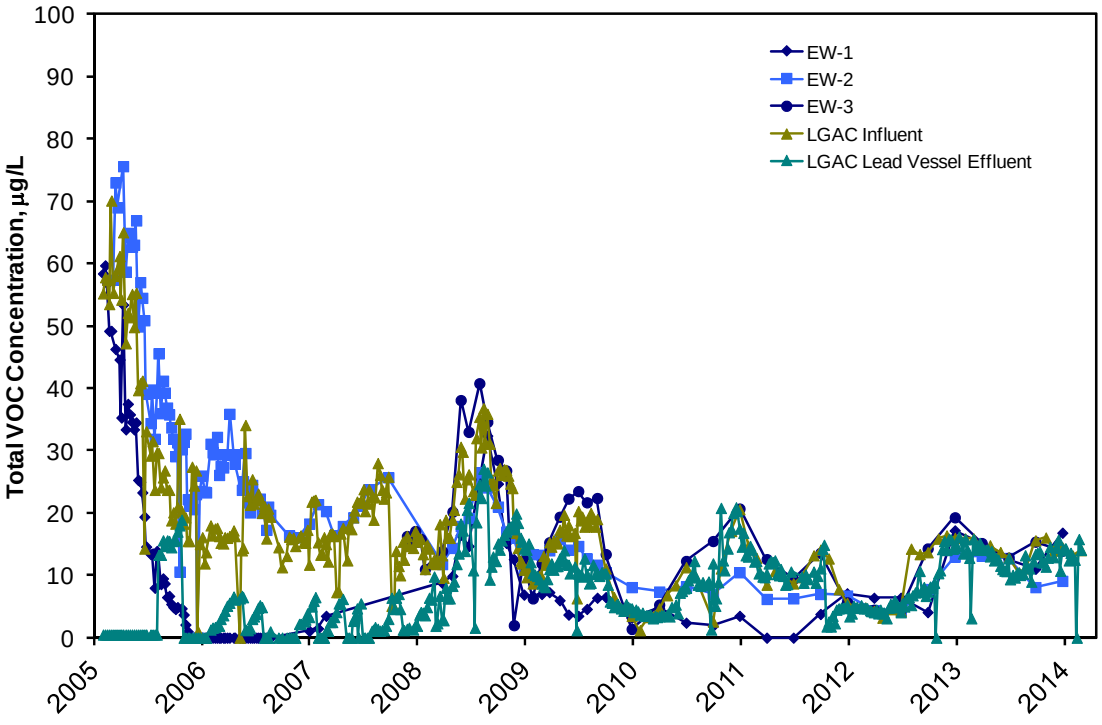

Figure 3. Total VOC Extraction Well Concentrations

The U.S. Environmental Protection Agency (EPA) has published the Stage 1 Disinfectants/Disinfection Byproducts Rule[1] to regulate total trihalomethanes (disinfection byproducts) at a maximum allowable annual average level of 80 µg/L. The average level of trihalomethanes recorded at the OU-1 extraction wells is currently 13.4 µg/L. The treatment system removes the disinfection byproducts and finished water concentrations have been non-detect with the exception of chloroform, which was detected in 15 of 24 samples at a concentration ranging between 0.14 and 1.3 µg/L. The disinfection byproducts will continue to be monitored and evaluated over time based on the concentrations detected at the system extraction wells.

An LGAC media change-out was performed on the LGAC vessel, GC-201B, on August 28, 2013. Prior to virgin media loading, vessel relining was completed the week of September 9, 2013 by Goodwest Linings and Coatings of Rancho Cucamonga, CA. Relining activities consisted of abrasive blast cleaning (i.e., sandblast) of the vessel interior followed by a decontamination process to remove elevated salt levels to ensure lining adhesion. Filling of pits utilizing a ceramic metal repair compound was completed at 26 locations with weld patches applied to the interior and exterior of the vessel wall. Lastly, an elastomeric polyurethane coating was applied to all wetted interior surfaces of the vessel at approximately 40 to 60 mils dry film thickness (DFT). Following relining completion, 10,000 lbs of virgin media was loaded into the lead LGAC vessel, and the lag vessel moved to the lead position following media loading. Exterior priming and painting was completed on the 26 patch locations to protect the exterior of the vessel.

The other LGAC vessel, GC-201A, also required relining based on previous evaluations during media loading. GC-201A vessel relining was completed the week of December 16, 2013 by Goodwest Linings & Coatings of Rancho Cucamonga, CA. The relining approach described above was used for GC-201A; however, no significant pitting was observed so only the elastomeric polyurethane coating was required. Once vessel relining was completed, 10,000 lbs of virgin media was loaded into the LGAC vessel. Currently GC-201B is the lead vessel and GC-201A is the lag vessel.

Spent LGAC media and waste from vessel relining were characterized and disposed at a CERCLA-approved facility. Waste characterization and manifest documentation were approved by JPL's environmental waste coordinator, Mark Araki.

NITRATE AND PERCHLORATE REMOVAL BY THE FLUIDIZED BED REACTOR

Nitrate and perchlorate biodegradation only occurs within the FBR when redox conditions are reducing (signified by a negative oxidation-reduction potential [ORP] and dissolved oxygen [DO] <1 mg/L) and with an adequate supply of electron donor (acetic acid) and nutrients (urea/diammonium phosphate). Treatment within the FBR produces biomass, carbon dioxide, water, nitrogen, and chloride. Nitrate and perchlorate removal through February 2014 is summarized in this section.

*Nitrate Removal***.** The concentration of nitrate in groundwater in the combined plant effluent has been declining over time (Figure 4). The nitrate concentration, which was more than 9 mg/L at the start of system operations in February 2005, has decreased to approximately 1.8 mg/L in February 2014, which is consistent with the concentration during the last reporting period.

Acetic acid demand within the FBR is determined by the concentration of DO, nitrate, and perchlorate found in extracted groundwater. Acetic acid inputs are manually adjusted on a weekly basis consistent with demand. The acetic acid dosage from September 1 through February 28, 2014 ranged from 0.96 to

[1] U.S. Environmental Protection Agency. 2003. *National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproducts*, Volume 63, Number 241. December.

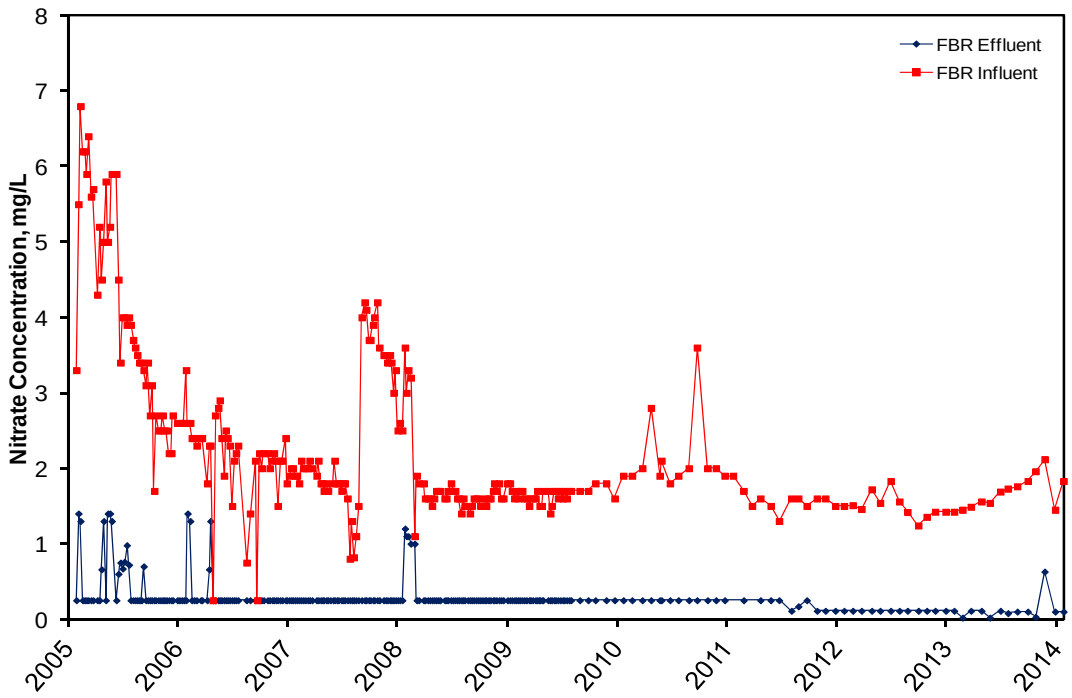

Figure 4. Nitrate Removal by the FBR

6.72 gpd, with an average of 4.34 gpd. Acetic acid use has decreased from previous years, which is consistent with the decrease in the concentration of perchlorate and nitrate.

Because nitrate must be removed before perchlorate can be removed, nitrate removal must be optimized. The concentration of nitrate at the FBR effluent was <0.10 mg/L (as NO3_N) for all sampling events this reporting period, excluding 12/26/14 (see Figure 4). The Nitrate detection correlates with a perchlorate breakthrough and an upset condition within the FBR that is detailed in the section below.

Perchlorate Removal. Perchlorate is analyzed in groundwater extracted from EW-1, EW-2, EW-3, and in the combined plant influent (Figure 5). Perchlorate concentrations in the combined plant influent ranged between < 4 µg/L and 41 µg/L over the past six months. The concentration of perchlorate in the combined influent has decreased from approximately 2,300 µg/L in February 2005 to 18 µg/L during the February 27, 2014 sampling event.

Increased concentrations of perchlorate at EW-1 during the June 27, 2013 sampling event resulted in EW-1 being operated full time until January 2014 . The concentration of perchlorate in EW-1 during this reporting period ranged between 21 µg/L and 120 µg/L (average: 59.7 µg/L). While perchlorate concentrations remained elevated, the water levels in EW-1 continued to decrease due to the drought and on January 16, 2014, operation of EW-1 was discontinued. Groundwater levels will continue to be evaluated and operation of EW-1 will recommence when the pump can be operated with sustained submergence.

Perchlorate was measured on a weekly basis at EW-2, when operational. The concentration of perchlorate in EW-2 during this reporting period ranged between 1.9 µg/L and 37 µg/L (average: 16 µg/L). Higher concentrations were reported during the winter months (January and February 2014) and have increased to 36 µg/L during the last sampling event of the reporting period (February 27,

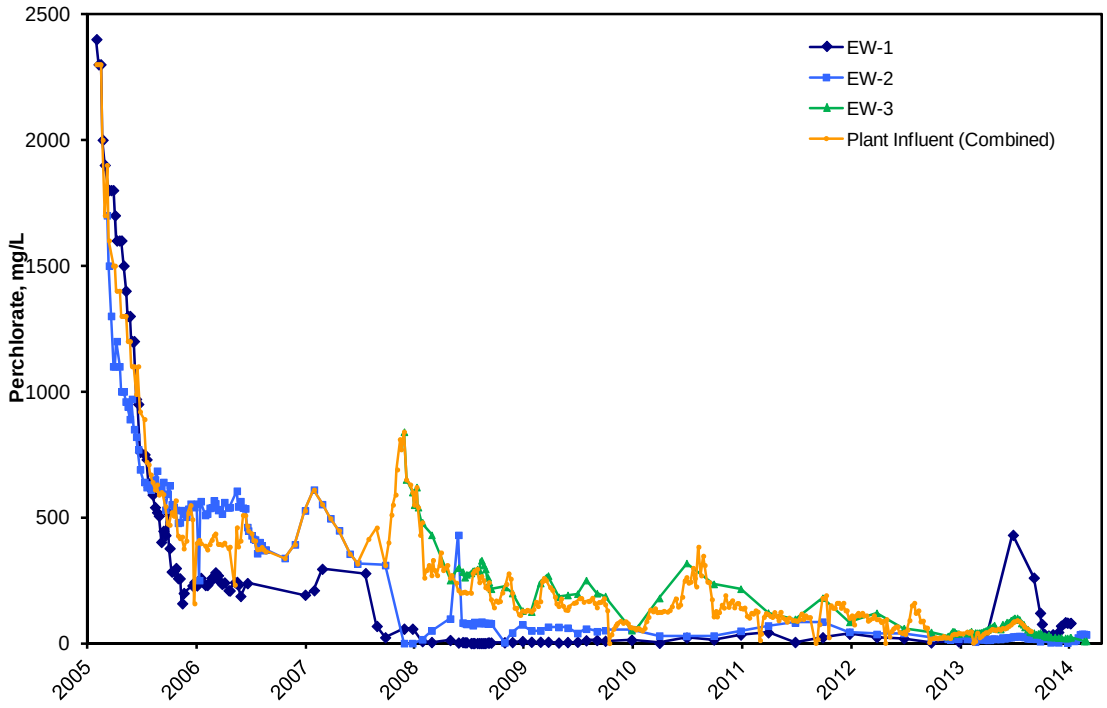

Figure 5. Influent Perchlorate Concentrations at EW-1, EW-2, EW-3 and the Combined Plant Influent

2014). The change in pump location associated with extraction well maintenance may have resulted in a change in the influent perchlorate concentrations from EW-2.

Perchlorate was measured on a weekly basis at EW-3, when operational. The concentration of perchlorate during this reporting period ranged between 8.2 µg/L and 41 µg/L (average: 26 µg/L). The trend at EW-3 showed higher concentrations were reported during the drier fall months (September and October 2013) and have decreased to 8.8 µg/L during the last sampling event of the reporting period (February 27, 2014). The change in pump location may have resulted in a change in the influent perchlorate concentrations from EW-3.

The FBR effluent is sampled on a weekly basis (see Figure 6). 23 of the 26 sampling events over the past 6 months yielded no breakthrough events of perchlorate above the method detection limit of 4.0 µg/L; however, detectable concentrations of perchlorate were found in the effluent during three weekly sampling events (i.e., 8.3 µg/L on September 5, 2013, 20 µg/L on November 14, 2013 and 17 µg/L on December 26, 2013). Water chemistry changes within the FBR during system maintenance caused all three breakthrough events, specifically during LGAC vessel repairs (September and December 2013) and extraction well maintenance (November 2013).

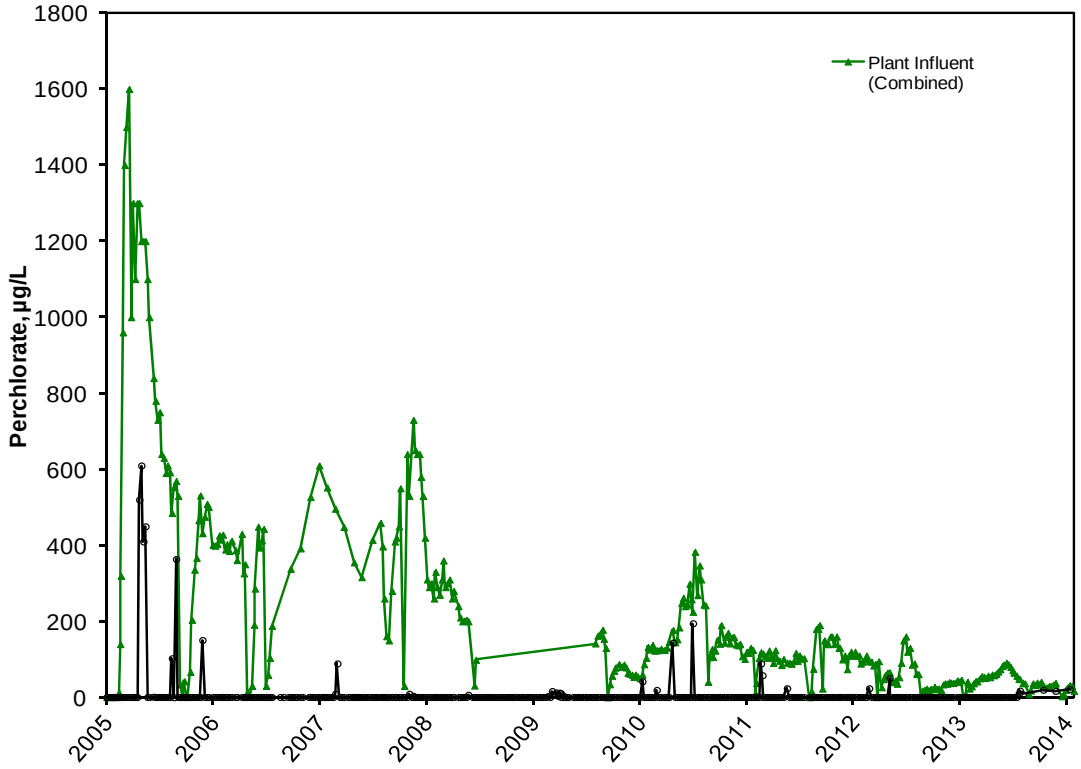

Figure 6. Perchlorate Removal by the FBR

ORP Conditions and Sulfate Reduction. The ORP values within the FBR averaged -130 millivolts (mV) during this reporting period (Attachment B). The ORP values were within the optimal range for nitrate and perchlorate removal.

Under normal operations, the FBR will convert small amounts of natural sulfate in the groundwater to dissolved hydrogen sulfide (H_2S). During certain non-optimal conditions, larger amounts of H_2S can be generated. H_2S has a noticeable odor at a threshold value of 0.0005 parts per million by volume (ppmv) in the ambient air based on data from the Agency for Toxic Substances and Disease Registry (ATSDR).

The total sulfide measurement in the water following FBR treatment is performed on site using a Hach™ spectrophotometer, which indicates the total quantity of H_2S, bisulfide, and metal sulfides in a sample. Based on the neutral pH of the treated water, it is assumed that the majority of the total sulfide is present in the form of H_2S. Sulfide levels in the FBR effluent water never reached a concentration higher than the threshold level of 100 µg/L over the past 6 months. The maximum concentration measured during this reporting period was 7 µg/L.

In addition, the daily H_2S monitoring at the OU-1 treatment plant yielded no detectable H_2S concentrations (i.e., <1 ppmv) in the aeration tank effluent air between September 2013 and February 2014. As a precautionary measure, carbon vessels are in place to ensure no H_2S releases into the ambient air. The vessel is located at the air exhaust of the aeration tank and typically needs changed out due to moisture content rather than H_2S saturation of the media.

BIOMASS REMOVAL AND BACKWASH WATER RECOVERY

The biomass removal and backwash recovery system consists of a Trimite™ filter, backwash sump, and clarifier. The filter recovers biomass solids, reducing the turbidity of the treated water prior to reinjection, to protect injection wells. This process is monitored by testing the turbidity of the effluent from the filter using an in-line Hach™ turbidimeter. During this reporting period, the turbidity of the effluent was negligible (see Figure 7). Turbidity ranged between 0 and 0.01 nephelometric turbidity units (NTU; average: 0.006 NTU).

The Trimite™ filter has been in operation for more than 8 years and the media is starting to show signs of wear. Typical operations of low turbidity water yield a media life-cycle of approximately 10 to 15 years according to the manufacturer; however, the age of the filter warrants careful monitoring. NASA's contractor will continue to clean and replace the media, as required.

The total suspended solids (TSS) in the filter effluent were consistently 1.0 mg/L or less during this reporting period, representing effective TSS removal by the Trimite™ filter.

The backwash water from the Trimite™ filter is routed to the sump and pumped to the clarifier. After the biomass solids settle out in the clarifier, the clarified water (supernatant) is returned to the FBR inlet. No polymers and/or coagulant aids are being used in the clarifier. The clarifier solids are disposed of in the sanitary sewer in batch discharges of approximately 12,000 gallons once every 4 to 6 weeks. The volume of wastewater discharged to the sanitary sewer is recorded and reported to the Raymond Basin Management Board on a monthly basis.

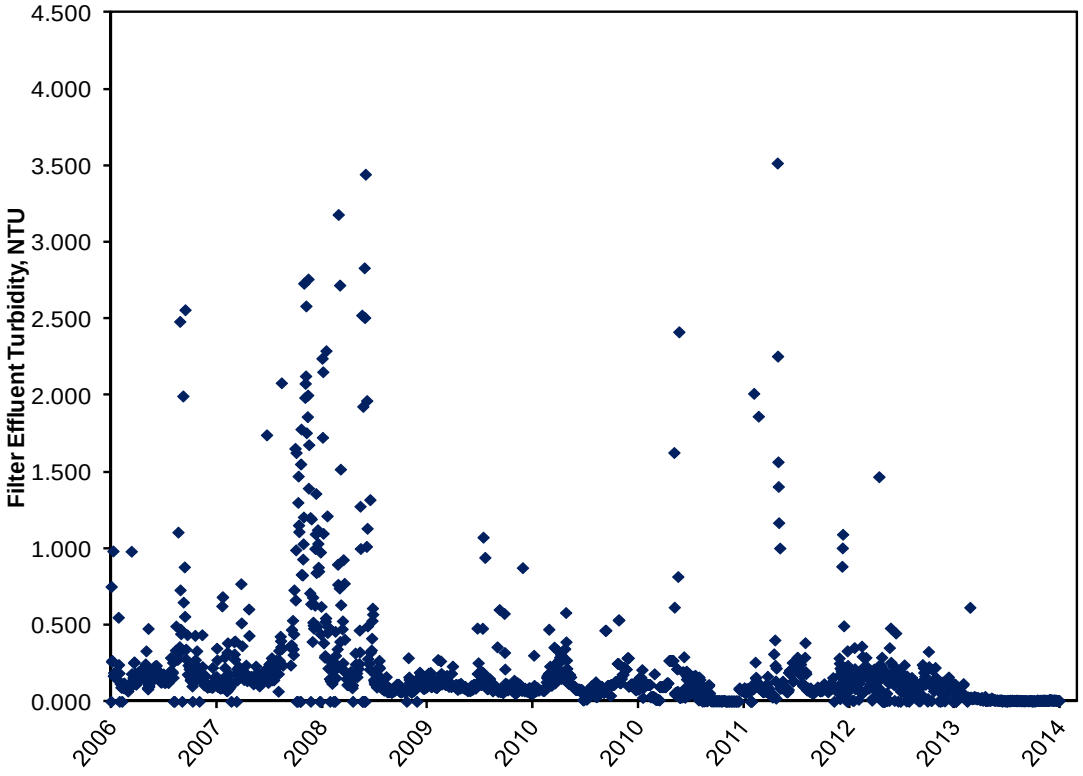

Figure 7. Trimite™ Filter Effluent Turbidity

HEXAVALENT CHROMIUM ASSESSMENT

In August 2013, the CDPH announced a proposed MCL for hexavalent chromium of 10 µg/L. Currently, hexavalent chromium is regulated at 50 µg/L, consistent with total chromium. To evaluate the potential impact of a reduction in the MCL, additional sampling was conducted at the source area treatment plant extraction wells. In addition to routine quarterly samples, 20 samples were collected monthly and submitted to the analytical laboratory. Table 2 provides a summary of hexavalent chromium concentrations in samples collected at the source area treatment facility during the reporting period of this progress report.

Since OU-1 system startup in 2005, hexavalent chromium has been sampled at the system inlet (GACIN) and system outlet (TFOUT) on a quarterly basis. GACIN samples have ranged from 2.7 to 14 µg/L and averaged 7.8 µg/L over the past three years. Hexavalent chromium levels in the TFOUT samples have only exceeded the proposed MCL of 10 µg/L one time (11 µg/L on 12/26/13) since operations began in 2005. Hexavalent chromium concentrations have averaged 5.4 µg/L over the past three years at the OU-1 system outlet (TFOUT). Therefore, it does not appear that treatment changes would be required if the MCL is lowered to 10 µg/L. Quarterly sampling for hexavalent chromium at the OU-1 system influent and effluent will continue.

Table 2. Summary of Hexavalent Chromium Concentrations

Hexavalent Chromium (µg/L)					
Date	**EW-1**	**EW-2**	**EW-3**	**GACIN**	**TFOUT**
9/5/2013	12	11	13	--	--
9/26/2013	14	11	11	12	2.8
10/31/2013	12	9.6	11	--	--
11/26/2013	11	9.5	14	--	--
12/26/2013	12	8.6	14	14	11
1/30/2014	--	12	--	--	--
2/27/2014	--	12	14	--	--
Average:	**12.2**	**10.5**	**12.8**	**13.0**	**6.9**

WATER LEVEL AND WATER QUALITY ASSESSMENT

Groundwater elevation and chemical data are used to evaluate the impact of OU-1 system operations on local aquifers. Groundwater elevations at select NASA JPL monitoring wells (MW-7, MW-8, MW-13, MW-16, and IRZ-IW2) are taken weekly as part of OU-1 system operations. In addition, groundwater elevations are collected from the entire JPL monitoring well network on a quarterly basis. In addition, airlines were installed in January and February at EW-2 and EW-3 to manually record groundwater elevations in the extraction wells.

Historic elevation data (April 2004) indicate a steep southwest gradient from the mouth of the Arroyo Seco to the OU-1 system area coupled with a southeastern gradient from the northwestern portion of the JPL facility. Flow converges to the south of the treatment zone and migrates toward the south/southeast under a reduced gradient (Figure 8). The groundwater elevation contour map showing conditions in October/November 2013 (Figure 9) demonstrates groundwater flow is significantly affected by operation of the system, with a drawdown of roughly 25 to 30 ft observed in the extraction wells. Data indicate that the extraction wells effectively influence groundwater within a radius greater than 160 ft of the extraction wells.

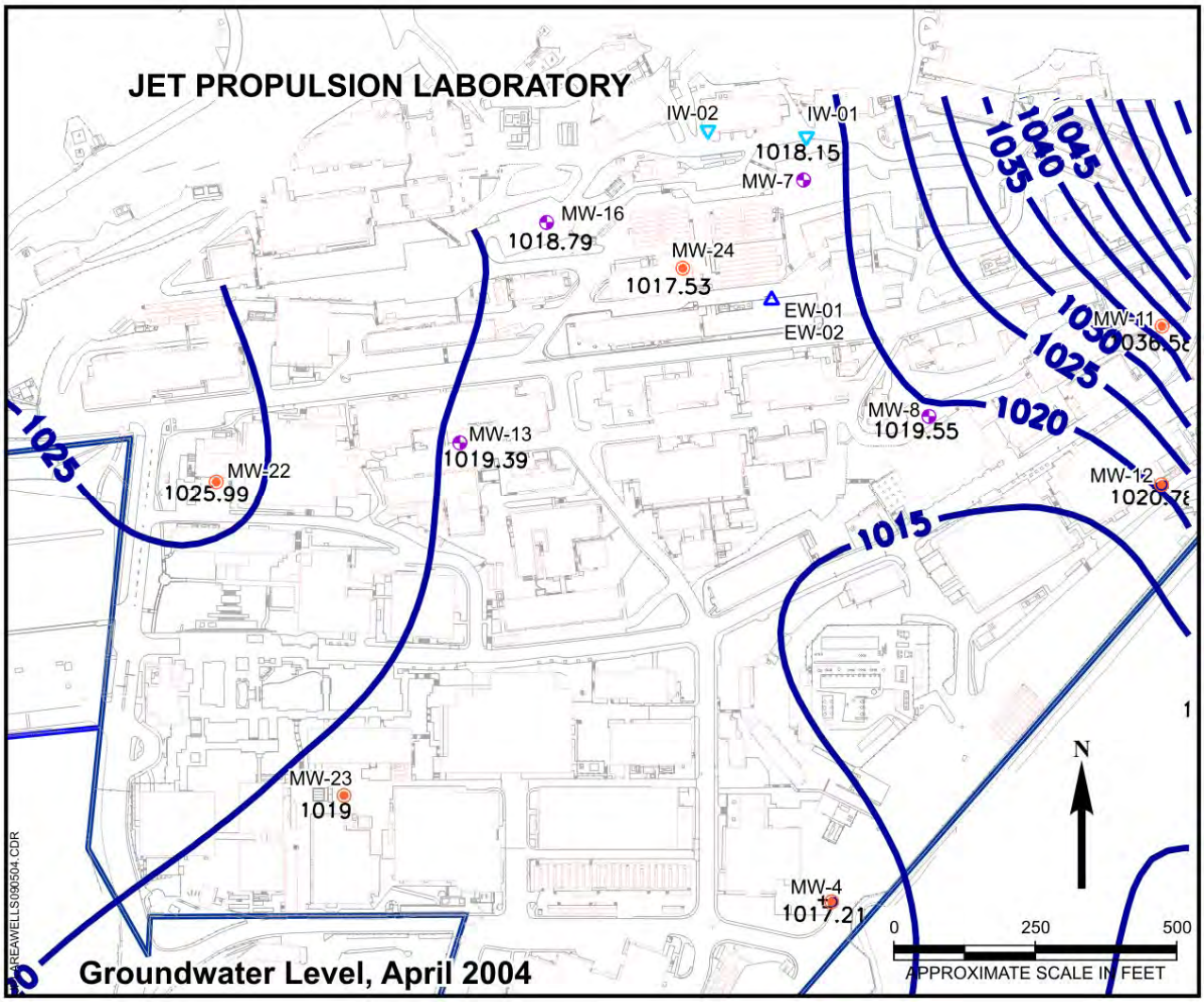

Figure 8. Groundwater Contour Map, April 2004 (Baseline before Extraction)

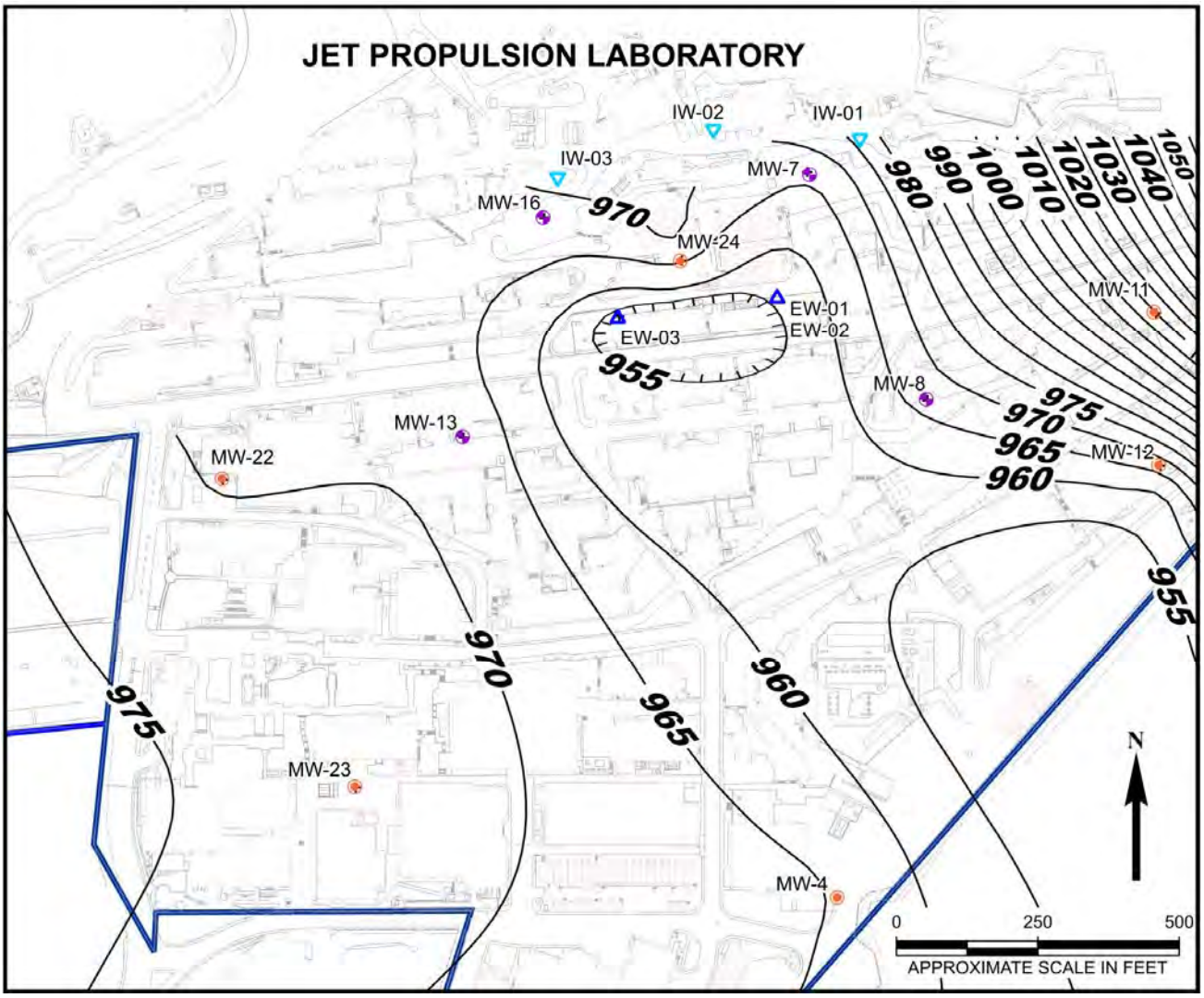

Figure 9. Groundwater Contour Map, October/November 2013 (with Extraction)

Isoconcentration contour maps (Figures 10 through 12) using data from NASA JPL's quarterly groundwater monitoring program are provided for TCE, CCl_4, and perchlorate for baseline conditions before operation (October/November 2004) and for the most recent monitoring data (October/November 2013). Table 3 provides a summary of current concentrations, historical highs, and baseline conditions for perchlorate, CCl_4 and TCE.

Table 3. OU-1 Source Area Monitoring Well Concentrations

Source Area Monitoring Well Concentrations		MW-7	MW-13	MW-16	MW-24
		µg/L			
Current Levels (Oct/Nov 2013	Perchlorate	6.1	520	< 4.0	9.7
	CCl_4	<0.5	*<0.5*	*<0.5*	0.4
	TCE	*<0.5*	*0.2*	< 0.5	*0.2*
Prior to OU-1 Startup	Perchlorate	4,810	51.5	322	4,880
	CCl_4	51.4	*0.4*	< 0.5	7.8
	TCE	8.7	1.4	< 0.5	1.6
Historic Highs	Perchlorate	13,300	2,100	13,100	4,880
	CCl_4	310	70	200	58
	TCE	48	73	43	15

Italicized values were below detection limits and reported as "J" values.

Data collected during the quarterly groundwater monitoring indicate the following:

- The concentration of VOCs and perchlorate in the treatment zone (i.e., MW-7, MW-13, MW-16, and MW-24) has decreased significantly since system startup.
- Concentrations of TCE in the treatment zone are below the state and federal maximum contaminant level (MCL; 5.0 µg/L).
- CCl_4 was detected at an estimated concentration below the state MCL (0.5 µg/L) in MW-24 (0.4J µg/L); however, CCl_4 in all other source area wells was below detection in October/November 2013.
- Perchlorate concentrations in MW-7 and MW-24 have declined from 4,810 µg/L and 4,880 µg/L to concentrations of 6.1 µg/L and 9.7 µg/L, respectively.
- The perchlorate concentration in MW-13 was 520 µg/L in October/November 2013. Perchlorate levels in this well have varied widely since commencing operation of the OU-1 system and are currently well below the historic high concentration (2,100 µg/L).
- The perchlorate concentration in MW-16 was non-detect during the October/November 2013 sampling event, with a reporting limit of 4.0 µg/L.
- During the fourth quarter of 2013, hexavalent chromium was detected in 19 of 25 monitoring wells ranging from 0.7 to 18 µg/L. Hexavalent Chromium will continue to be sampled as part of the quarterly groundwater monitoring of source area wells.

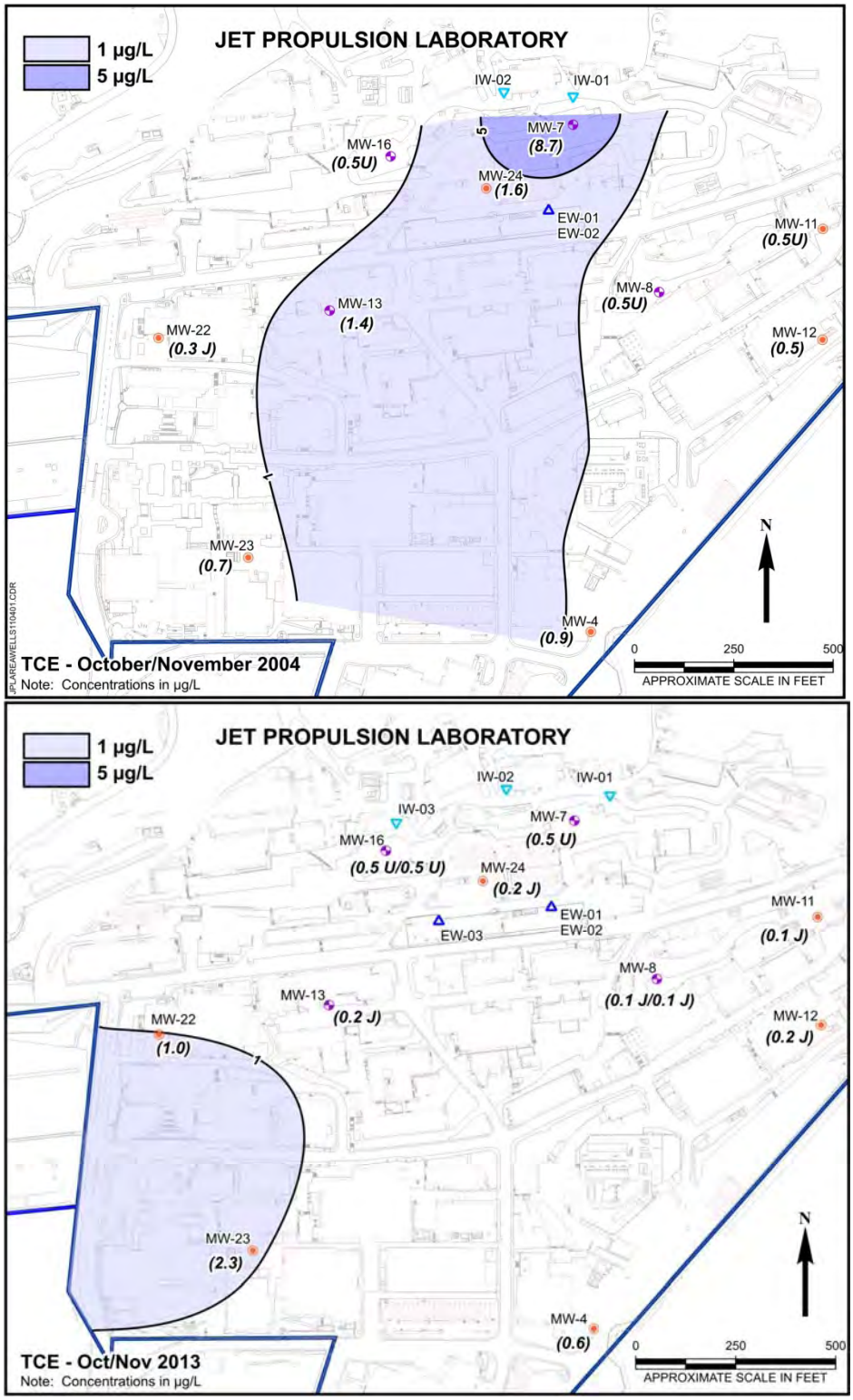

Figure 10. TCE in Groundwater before (October/November 2004) and during (October/November 2013) System Implementation

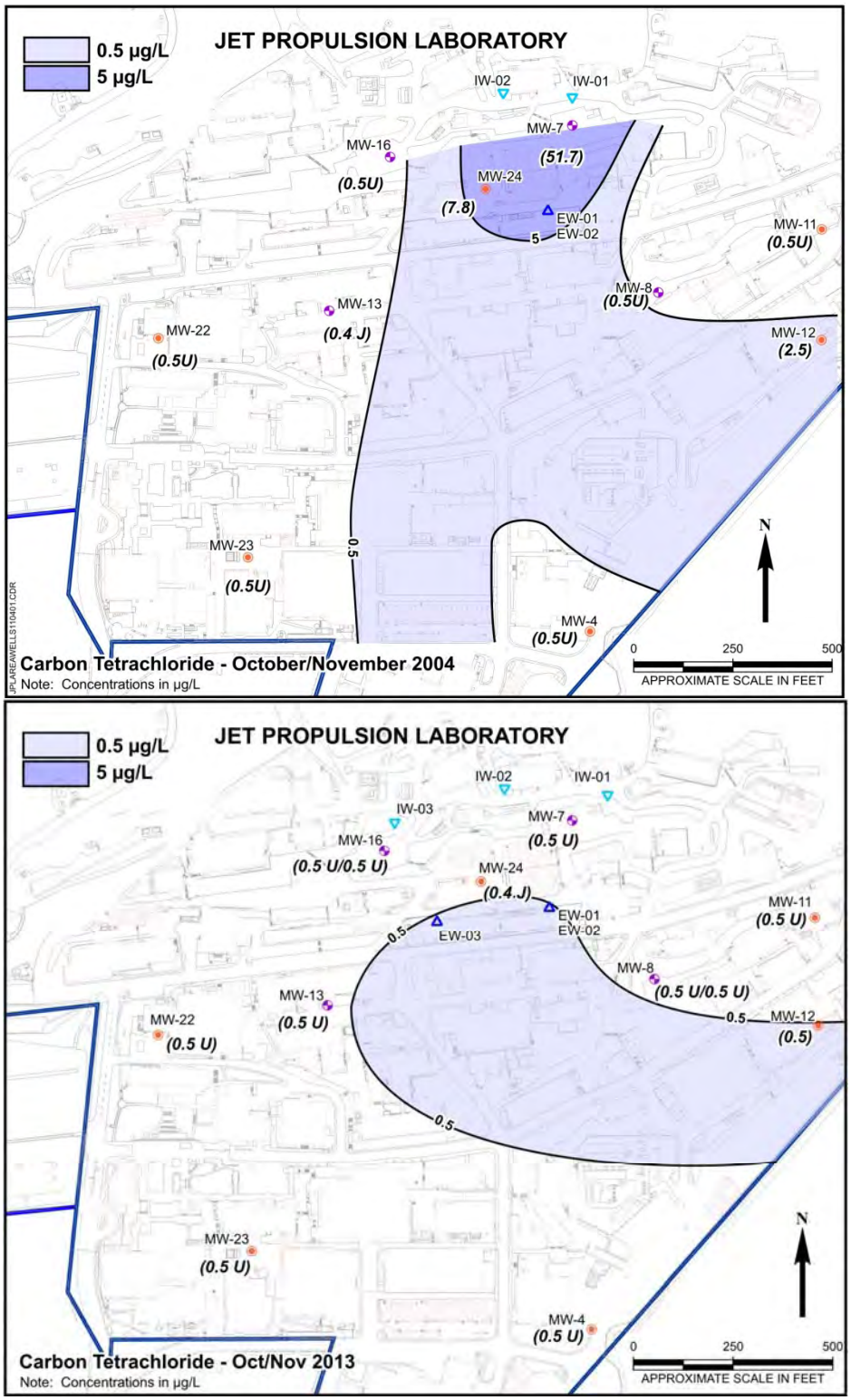

Figure 11. Carbon Tetrachloride in Groundwater before (October/November 2004) and during (October/November 2013) System Implementation

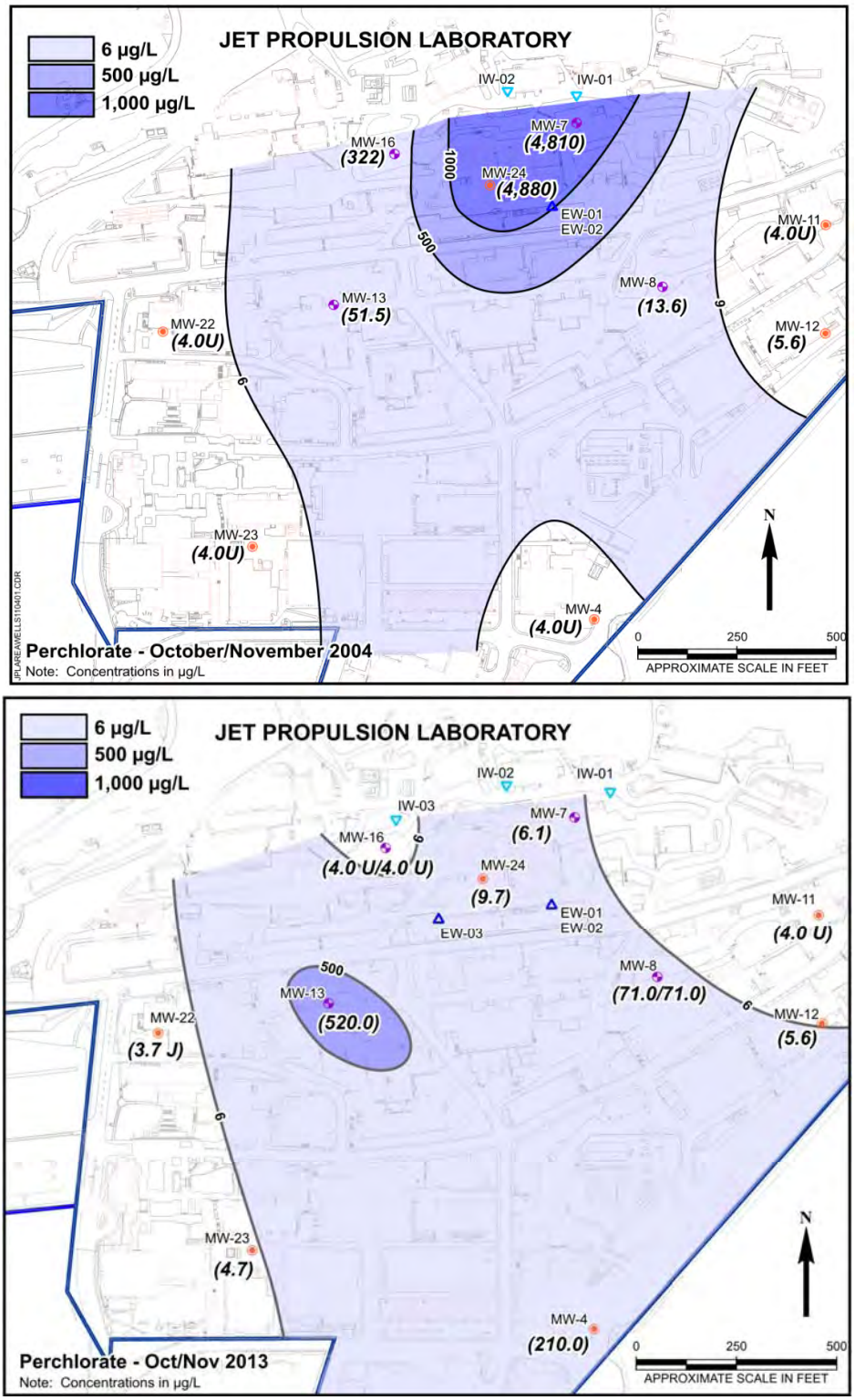

Figure 12. Perchlorate in Groundwater before (October/November 2004) and during (October/November 2013) System Implementation

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations associated with the performance of the OU-1 system through February 28, 2014 are as follows:

- Approximately 36.6 lb of CCl_4 and 6.1 lb of TCE have been removed since the startup of the OU-1 system.
- Approximately 1,775 lb of perchlorate has been removed since the startup of the OU-1 system.
- The OU-1 system is operating effectively, reducing perchlorate and VOC concentrations in the treatment zone (represented by chemical concentrations in samples collected from EW-1, EW-2, EW-3, MW-7, MW-13, MW-16, and MW-24).
- Sulfide production has been effectively controlled. In addition, the vapor phase treatment system continues to ensure that the system does not release any nuisance odors to the ambient air. H_2S concentrations in the ambient air are measured daily at locations within and nearby the OU-1 plant and continue to be below detection limits.
- Only 60,000 gallons, or approximately 0.18 acre-feet, of wastewater was sent to the sanitary sewer during this reporting period. Discharge volumes have been reported to the Raymond Basin Management Board.
- Routine rehabilitation and well maintenance of IW-1 and IW-2 was successfully completed in September and October 2013, resulting in increase capacity of the injection wells. Rehabilitation of IW-3 was not performed.
- Extraction well maintenance was performed on EW-2 and EW-3 during this reporting period. EW-1 was shut down in mid-January due to the drought in Southern California.
- LGAC vessel maintenance and relining was successfully completed on both LGAC vessels during this reporting period. The patching and relining process will ensure that the LGAC vessels continue to function properly and effectively.
- Hexavalent chromium will continue to be evaluated at the plant influent, plant effluent and source area monitoring wells. The proposed MCL of 10 µg/L will continue to be tracked for any formal regulatory changes.

Attachment A
Laboratory Analytical Results

Sampling Date		9/5/2013						9/12/2013					9/19/2013						9/26/2013									
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-1	EW-2	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-2	EW-3	GACMID	Right LGAC 75%	FBR Inlet	FBR Outlet	EW-2	EW-3	GACIN	GACMID	Right LGAC 75%	FBR Inlet	FBR Outlet	TFIN	TFOUT	EW-1	EW-2	EW-3
	Unit																											
Perchlorate	µg/L	-	38/40	8.3	260	18	41	-	37/34	<4.0	17	35	-	-	<4.0/<4.0	<4.0	19	38	-	-	-	8.5/7.1	<4.0	-	-	120	7.5	42
Hexavalent Chromium	µg/L	-	-	-	12	11	13	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	2.8	14	11	11
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	-
Nitrite	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<170	-	-	-	-	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.76/1.76	<0.10	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	-	-	-	-	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	430	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.83	-	-	-	-	2.7	<0.83	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	-	-	-	-	0.76	0.11	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Chloroform	µg/L	10	-	1.6	-	-	-	7.3	-	0.69	-	-	11	8.8	-	0.87	-	-	8.9	12	10	-	*0.35*	-	-	8.8	7.8	8.8
Carbon Tetrachloride	µg/L	*0.22*	-	<0.50	-	-	-	*0.43*	-	<0.50	-	-	*0.23*	*0.41*	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Trichloroethene	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Bromodichloromethane	µg/L	0.90	-	<0.50	-	-	-	1.1	-	<0.50	-	-	1.0	1.1	-	<0.50	-	-	2.8	1.4	1.5	-	<0.50	-	-	1.7	*0.31*	2.9
Dibromochloromethane	µg/L	<0.50	-	<0.50	-	-	-	*0.14*	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	3.4	<0.50	<0.50	-	<0.50	-	-	< 0.50	< 0.50	3.3
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	0.5	<0.50	<0.50	-	<0.50	-	-	0.55	<0.50	*0.39*
Bromoform	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	<0.50	-	<0.50	-	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Total VOCs	µg/L	11.12	-	1.6	-	-	-	8.97	-	0.69	-	-	12.23	10.31	-	0.87	-	-	15.6	13.4	11.5	-	0.35	-	-	11.05	8.11	15.39
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-	1.3	-	-	1.2	1.5	1.4

Sampling Date		9/26/2013	
Sampling Location		GACIN	TFOUT
Parameter	Unit		
Beryllium	mg/L	<0.0010	<0.0010
Magnesium	mg/L	23	24
Calcium	mg/L	69	71
Vanadium	mg/L	0.0034	0.0052
Chromium	mg/L	0.012	*0.0011*
Hexavalent Chromium	µg/L	12	2.8
Manganese	mg/L	<0.0010	*0.00076*
Iron	mg/L	<0.050	<0.050
Cobalt	mg/L	*0.0002*	*0.00018*
Nickel	mg/L	*0.0016*	*0.0018*
Copper	mg/L	*0.00098*	*0.003*
Zinc	mg/L	*0.004*	*0.0033*
Arsenic	mg/L	*0.00078*	<0.0020
Selenium	mg/L	<0.0020	<0.0020
Molybdenum	mg/L	0.0054	0.0041
Silver	mg/L	<0.0010	<0.0010
Cadmium	mg/L	<0.0010	<0.0010
Antimony	mg/L	*0.00046*	*0.00015*
Barium	mg/L	0.087	0.086
Mercury	mg/L	<0.00020	0.0018
Thallium	mg/L	*0.00022*	<0.0010
Lead	mg/L	*0.00011*	*0.00011*

*Lab Qualifiers A26 and S05
^Lab Qualifers A01

Sampling Date		10/2/2013					10/10/2013					10/17/2013					10/24/2013					10/31/2013						
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACIN	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-2	EW-3
	Unit																											
Perchlorate	µg/L	-	18/18	<4.0	76	34	-	37/34	<4.0	36	30	-	33/33	<4.0	25	26	-	39/41	<4.0	30	33	-	-	34/35	<4.0	21	*3.0*	24
Hexavalent Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	9.6	11
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75/75	76	-	-	-
Nitrite (NO2-N)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.22/8.53	1.37	-	-	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.83/1.76	<0.10	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45/45	47	-	-	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Chloroform	µg/L	12	-	<0.50	-	-	12	-	*0.14*	-	-	11	-	<0.50	-	-	10	-	<0.50	-	-	7.1	10	-	<0.50	-	-	-
Carbon Tetrachloride	µg/L	*0.28*	-	<0.50	-	-	*0.35*	-	<0.50	-	-	<0.50	-	<0.50	-	-	*0.35*	-	<0.50	-	-	3.0	<0.50	-	<0.50	-	-	-
Trichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Bromodichloromethane	µg/L	1.30	-	<0.50	-	-	1.50	-	<0.50	-	-	1.10	-	<0.50	-	-	1.70	-	<0.50	-	-	2.4	1.4	-	<0.50	-	-	-
Dibromochloromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	3.3	<0.50	-	<0.50	-	-	-
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	*0.25*	<0.50	-	<0.50	-	-	-
Bromoform	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
1,1,2-Trichloro-1,2,2-trifluoro	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Total VOCs	µg/L	13.58	-	0	-	-	13.85	-	0.14	-	-	12.1	-	0	-	-	12.05	-	0	-	-	16.05	11.4	-	0	-	-	-
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sampling Date		11/7/2013					11/14/2013					11/26/2013						
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-1	EW-2	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACIN	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-2	EW-3
	Unit																	
Perchlorate	µg/L	-	41/40	<4.0	35	9.3	-	31/28	20	29	24	-	-	26/27	<4.0	44	*2.6*	22
Hexavalent Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	9.5	14
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	76/75	77	-	-	-
Nitrite (NO2-N)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.10/<0.10	<0.10	-	-	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	1.94/1.96	0.03	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	44/44	45	-	-	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Chloroform	µg/L	11	-	<0.50	-	-	12	-	*0.18*	-	-	8.7	11	-	<0.50	-	-	-
Carbon Tetrachloride	µg/L	*0.33*	-	<0.50	-	-	*0.39*	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Trichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Bromodichloromethane	µg/L	1.50	-	<0.50	-	-	1.90	-	<0.50	-	-	3.7	1.9	-	<0.50	-	-	-
Dibromochloromethane	µg/L	<0.50	-	<0.50	-	-	*0.27*	-	<0.50	-	-	1.1	<0.50	-	<0.50	-	-	-
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	*0.45*	<0.50	-	<0.50	-	-	-
Bromoform	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
1,1,2-Trichloro-1,2,2-trifluoro	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	-
Total VOCs	µg/L	12.83	-	0	-	-	14.56	-	0.18	-	-	13.95	12.9	-	0	-	-	-
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sampling Date		12/5/2013					12/12/2013					12/19/2013					12/26/2013								
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACIN	GACMID	FBR Inlet	FBR Outlet	TFIN	TFOUT	EW-1	EW-2	EW-3
	Unit																								
Perchlorate	µg/L	-	30/28	<4.0	69	22	-	33/33	<4.0	82	22	-	34/35	<4.0	83	20	-	-	36/37	17	-	-	81	1.9	20
Hexavalent Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	11	12	8.6	14
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79	-	-	-	-	-
Nitrite (NO2-N)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	-	-	-	-	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.12/2.12	0.63	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47	-	-	-	-	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	440	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.67	-	-	-	1.4	<0.67	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.46	-	-	-	1	0.14	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Chloroform	µg/L	11	-	*0.16*	-	-	11	-	0.16	-	-	10	-	0.64	-	-	8.6	13	-	1.3	-	-	11	9.1	8
Carbon Tetrachloride	µg/L	*0.36*	-	<0.50	-	-	0.31	-	<0.50	-	-	<0.50	-	<0.50	-	-	0.5	<0.50	-	<0.50	-	-	0.75	<0.50	0.38
Trichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Bromodichloromethane	µg/L	2.60	-	<0.50	-	-	2.60	-	<0.50	-	-	0.73	-	<0.50	-	-	3.3	1.0	-	<0.50	-	-	3.7	<0.50	3.3
Dibromochloromethane	µg/L	*0.45*	-	<0.50	-	-	1.8	-	<0.50	-	-	<0.50	-	<0.50	-	-	1.1	<0.50	-	<0.50	-	-	0.68	<0.50	1.2
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	0.5	<0.50	-	<0.50	-	-	0.7	<0.50	0.43
Bromoform	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	0.5	<0.50	-	<0.50	-	-	<0.50	<0.50	0.64
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluor	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	<0.50
Total VOCs	µg/L	14.41	-	0.16	-	-	15.71	-	0.16	-	-	10.73	-	0.64	-	-	14.47	14	-	1.3	-	-	16.83	9.1	13.95
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	1.2	-	-	1.0	1.0	1.1

Sampling Date		12/26/2013	
Sampling Location		GACIN	TFOUT
Parameter	Unit		
Beryllium	mg/L	<0.0010	<0.0010
Magnesium	mg/L	22	23
Calcium	mg/L	73	72
Vanadium	mg/L	0.004	0.0190
Chromium	mg/L	0.014	*0.0059*
Hexavalent Chromium	µg/L	14	11.0
Manganese	mg/L	<0.0010	*0.00091*
Iron	mg/L	<0.050	<0.050
Cobalt	mg/L	*0.00016*	*<0.0010*
Nickel	mg/L	*0.0015*	*0.0013*
Copper	mg/L	*0.00045*	*0.00055*
Zinc	mg/L	*<0.0050*	*0.007*
Arsenic	mg/L	<0.0020	0.00096
Selenium	mg/L	0.00027	<0.0020
Molybdenum	mg/L	0.0050	0.0049
Silver	mg/L	<0.0010	<0.0010
Cadmium	mg/L	0.00018	<0.0010
Antimony	mg/L	*0.002*	*<0.0020*
Barium	mg/L	0.089	0.089
Mercury	mg/L	0.0018	0.00012
Thallium	mg/L	*<0.0010*	<0.0010
Lead	mg/L	*<0.0010*	*<0.0010*

*Lab Qualifiers A26 and S05
^Lab Qualifers A01

Sampling Date		1/4/2014					1/6/2014					1/17/2014				1/23/2014				1/30/2014				
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-1	EW-3	GACMID	FBR Inlet	FBR Outlet	EW-2	GACMID	FBR Inlet	FBR Outlet	EW-2	GACIN	GACMID	FBR Inlet	FBR Outlet	EW-2
	Unit																							
Perchlorate	µg/L	-	<4.0/<4.0	<4.0	79	23	-	<4.0/0.57J	<4.0	80	23	-	2.9/2.4	<4.0	8.8	-	8.6/8.9	<4.0	11	-	-	20/18	<4.0	22.0
Hexavalent Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	69/69	70	-
Nitrite (NO2-N)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<170/<170	<170/<170	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.45/1.40	<0.10	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39/39	39	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-
Chloroform	µg/L	13	-	0.99	-	-	13	-	0.66	-	-	11	-	<0.50	-	12	-	0.19	-	10.0	11	-	*0.23*	-
Carbon Tetrachloride	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	0.47	<0.50	-	<0.50	-
Trichloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-
Bromodichloromethane	µg/L	1.30	-	<0.50	-	-	1.30	-	<0.50	-	-	1.40	-	<0.50	-	1.60	-	<0.50	-	2.0	1.5	-	<0.50	-
Dibromochloromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	0.46	<0.50	-	<0.50	-
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	0.38J	-	<0.50	-	<0.50	-	<0.50	-	*0.24*	<0.50	-	<0.50	-
Bromoform	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-
1,1,2-Trichloro-1,2,2-trifluorc	µg/L	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-
Total VOCs	µg/L	14.3	-	0.99	-	-	14.3	-	0.66	-	-	12.4	-	0	-	13.6	-	0.19	-	13.17	12.5	-	0.23	-
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sampling Date		2/6/2014				2/13/2014				2/20/2014				2/27/2014					
Sample Locations		GACMID	FBR Inlet	FBR Outlet	EW-2	GACMID	FBR Inlet	FBR Outlet	EW-2	GACMID	FBR Inlet	FBR Outlet	EW-3	GACIN	GACMID	FBR Inlet	FBR Outlet	EW-2	EW-3
	Unit																		
Perchlorate	µg/L	-	27/27	<4.0	34	-	32/33	22	37	-	30/29	<4.0	8.2	-	-	17/18	<4.0	36.0	8.8
Hexavalent Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	14
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79/79	80	-	-
Nitrite (NO2-N)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<170/<170	<170	-	-
Nitrate (NO3-N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.83/1.83	<0.10	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45/45	45	-	-
TDS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-	-
Chloroform	µg/L	11	-	0.23	-	<0.50	-	*0.23*	-	14	-	<0.50	-	8.9	12	-	<0.50	-	-
Carbon Tetrachloride	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	0.36	<0.50	-	<0.50	-	-
Trichloroethene	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-	-
Bromodichloromethane	µg/L	1.50	-	<0.50	-	<0.50	-	<0.50	-	1.80	-	<0.50	-	2.8	1.9	-	<0.50	-	-
Dibromochloromethane	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	1.1	*0.18*	-	<0.50	-	-
Tetrachloroethene	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	*0.30*	<0.50	-	<0.50	-	-
Bromoform	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	0.57	<0.50	-	<0.50	-	-
Trichlorofluoromethane	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-	-
1,1,2-Trichloro-1,2,2-trifluorc	µg/L	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	-	-
Total VOCs	µg/L	12.5	-	0.23	-	0	-	0.23	-	15.8	-	0	-	14.03	14.08	-	0	-	-
1,4-Dioxane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Attachment B
Field Monitoring Results

Table B-1. OU-1 On Site Water Quality Log Comparison Sheet FBR Influent and Effluent

Date	DO In	DO Out	ORP In	ORP Out	ClO4 In[a]	ClO4 Out[a]	Nitrate-N In	Nitrate-N Out
d/m/y	mg/L	mg/L	mV	mV	mg/L	mg/L	mg/L	mg/L
Avg.	0.72	0.03	190.53	-129.67	0.12	0.06	1.44	0.44
Std.	0.56	0.01	89.25	114.18	0.01	0.01	0.30	0.18
Max.	2.36	0.08	461.00	175.00	0.14	0.09	2.20	0.60
Min.	0.05	0.01	-15.00	-375.00	0.09	0.04	0.18	0.00
3-Sep-13	1.40	0.03	259	98	0.13	0.05	1.9	0.6
4-Sep-13	1.83	0.05	206	112	0.13	0.05	--	--
5-Sep-13	1.61	0.04	204	-35	0.13	0.05	1.8	0.6
6-Sep-13	1.12	0.04	167	-123	0.13	0.05	--	--
9-Sep-13	1.71	0.03	200	-210	0.13	0.05	--	--
10-Sep-13	1.68	0.04	210	-247	0.13	0.05	1.9	0.5
11-Sep-13	0.71	0.02	84	-116	0.14	0.06	--	--
12-Sep-13	0.82	0.01	143	-277	0.14	0.06	2.2	0.2
13-Sep-13	0.84	0.01	170	-235	0.14	0.05	--	--
16-Sep-13	1.14	0.05	65	-19	0.14	0.05	--	--
17-Sep-13	1.14	0.06	32	-211	0.14	0.06	1.7	0.0
18-Sep-13	0.05	0.06	29	-86	0.14	0.06	--	--
19-Sep-13	0.23	0.06	85	-97	0.09	0.06	1.5	0.3
20-Sep-13	0.71	0.06	125	-77	0.09	0.06	--	--
23-Sep-13	0.37	0.02	162	-46	0.10	0.05	--	--
24-Sep-13	0.05	0.02	150	-95	0.10	0.05	1.5	0.5
25-Sep-13	0.13	0.04	130	-181	0.09	0.05	1.4	0.6
26-Sep-13	0.06	0.07	144	-87	0.11	0.05	1.9	0.6
27-Sep-13	0.61	0.04	163	-157	0.11	0.05	--	--
30-Sep-13	0.05	0.04	192	-231	0.11	0.05	--	--
1-Oct-13	0.65	0.06	176	-189	0.11	0.05	0.2	0.5
2-Oct-13	0.71	0.04	140	-181	0.11	0.05	--	--
3-Oct-13	--	--	--	--	--	--	--	--
4-Oct-13	0.81	0.04	209	-173	0.11	0.05	--	--
7-Oct-13	0.86	0.04	222	-203	0.11	0.05	--	--
8-Oct-13	0.89	0.04	213	-201	0.11	0.05	1.4	0.5
9-Oct-13	0.88	0.05	218	-218	0.11	0.05	--	--
10-Oct-13	0.97	0.06	212	-243	0.11	0.05	1.7	0.5
11-Oct-13	0.95	0.05	215	-235	0.11	0.05	--	--
14-Oct-13	0.50	0.02	5	-121	0.11	0.08	--	--
15-Oct-13	0.52	0.02	45	-263	0.11	0.08	1.4	0.5
16-Oct-13	0.07	0.02	319	-126	0.12	0.08	--	--
17-Oct-13	0.09	0.03	236	-170	0.12	0.09	1.3	0.5
18-Oct-13	0.11	0.05	226	-200	0.12	0.09	--	--
21-Oct-13	0.20	0.02	223	-252	0.11	0.05	--	--
22-Oct-13	0.60	0.03	111	-204	0.11	0.05	1.6	0.5
23-Oct-13	0.64	0.03	160	-110	0.11	0.05	--	--

Date	DO In	DO Out	ORP In	ORP Out	ClO4 In[a]	ClO4 Out[a]	Nitrate-N In	Nitrate-N Out
d/m/y	mg/L	mg/L	mV	mV	mg/L	mg/L	mg/L	mg/L
24-Oct-13	0.17	0.03	224	-200	0.11	0.05	1.7	0.5
25-Oct-13	0.53	0.04	238	-207	0.11	0.05	--	--
28-Oct-13	0.66	0.03	457	-188	0.11	0.08	--	--
29-Oct-13	0.68	0.03	264	-182	0.11	0.08	1.5	0.5
30-Oct-13	0.61	0.03	236	-169	0.12	0.08	--	--
31-Oct-13	0.15	0.05	211	-182	0.13	0.08	1.4	0.5
1-Nov-13	0.61	0.02	64	-40	0.12	0.06	--	--
4-Nov-13	0.64	0.03	203	-82	0.13	0.05	--	--
5-Nov-13	0.89	0.04	180	-185	0.13	0.05	1.4	0.6
6-Nov-13	0.78	0.04	143	-192	0.13	0.05	--	--
7-Nov-13	0.05	0.02	124	-204	0.13	0.05	1.4	0.6
8-Nov-13	0.15	0.03	168	-189	0.13	0.05	--	--
11-Nov-13	0.67	0.04	461	24	0.13	0.06	--	--
12-Nov-13	0.62	0.03	299	-135	0.13	0.06	1.4	0.6
13-Nov-13	0.45	0.07	271	25	0.13	0.06	--	--
14-Nov-13	0.63	0.03	260	43	0.13	0.07	1.4	0.6
15-Nov-13	0.13	0.05	342	74	0.13	0.07	--	--
18-Nov-13	0.17	0.05	373	82	0.13	0.06	--	--
19-Nov-13	0.63	0.06	399	175	0.13	0.06	1.2	0.3
20-Nov-13	0.60	0.03	329	-73	0.13	0.05	--	--
21-Nov-13	0.61	0.03	249	-205	0.13	0.05	1.5	0.5
22-Nov-13	0.15	0.04	190	-177	0.13	0.05	--	--
25-Nov-13	0.15	0.02	370	-111	0.13	0.05	--	--
26-Nov-13	0.46	0.03	174	2	0.13	0.05	1.5	0.5
27-Nov-13	0.80	0.02	149	-128	0.13	0.05	--	--
28-Nov-13	--	--	--	--	--	--	--	--
29-Nov-13	--	--	--	--	--	--	--	--
2-Dec-13	0.25	0.04	204	10	0.13	0.05	--	--
3-Dec-13	0.79	0.04	165	-226	0.13	0.05	1.4	0.6
4-Dec-13	0.24	0.02	302	-252	0.13	0.05	--	--
5-Dec-13	0.53	0.04	267	-208	0.13	0.05	1.5	0.5
6-Dec-13	1.05	0.04	295	-216	0.13	0.05	--	--
9-Dec-13	0.32	0.03	306	-270	0.13	0.05	--	--
10-Dec-13	0.25	0.02	243	-265	0.13	0.05	1.5	0.5
11-Dec-13	0.23	0.02	230	-196	0.13	0.05	--	--
12-Dec-13	0.26	0.02	247	-186	0.13	0.05	1.5	0.5
13-Dec-13	1.39	0.04	252	-120	0.13	0.05	--	--
16-Dec-13	1.20	0.03	258	-98	0.13	0.05	--	--
17-Dec-13	1.15	0.02	254	-44	0.13	0.05	1.5	0.6
18-Dec-13	1.62	0.03	154	5	0.13	0.05	--	--
19-Dec-13	1.28	0.04	287	-81	0.13	0.05	1.5	0.6
20-Dec-13	1.69	0.02	229	45	0.13	0.05	--	--
23-Dec-13	1.73	0.03	241	22	0.09	0.05	--	--
24-Dec-13	--	--	--	--	--	--	--	--

Date	DO In	DO Out	ORP In	ORP Out	ClO4 In[a]	ClO4 Out[a]	Nitrate-N In	Nitrate-N Out
d/m/y	mg/L	mg/L	mV	mV	mg/L	mg/L	mg/L	mg/L
25-Dec-13	--	--	--	--	--	--	--	--
26-Dec-13	1.76	0.04	219	16	0.09	0.05	1.3	0.6
27-Dec-13	1.88	0.05	225	29	0.09	0.04	--	--
30-Dec-13	1.95	0.03	277	78	0.09	0.05	--	--
31-Dec-13	1.85	0.04	315	35	0.09	0.05	0.9	0.4
1-Jan-14	--	--	--	--	--	--	--	--
2-Jan-14	2.33	0.01	315	55	0.09	0.05	0.9	0.4
3-Jan-14	2.36	0.01	347	69	0.09	0.05	--	--
6-Jan-14	0.80	0.02	241	-200	0.12	0.05	--	--
7-Jan-14	0.77	0.03	231	-167	0.12	0.05	1.5	0.6
8-Jan-14	0.21	0.01	270	-221	0.12	0.05	--	--
9-Jan-14	0.21	0.01	198	-227	0.12	0.05	1.7	0.6
10-Jan-14	1.17	0.02	183	-207	0.12	0.05	--	--
13-Jan-14	1.12	0.03	151	-286	0.10	0.05	--	--
14-Jan-14	0.39	0.03	93	-222	0.10	0.05	1.5	0.6
15-Jan-14	0.23	0.03	40	-199	0.10	0.05	--	--
16-Jan-14	0.41	0.03	84	-147	0.10	0.05	1.5	0.6
17-Jan-14	1.08	0.06	126	-217	0.10	0.05	--	--
20-Jan-14	1.26	0.02	167	89	0.14	0.06	--	--
21-Jan-14	0.69	0.02	200	-16	0.14	0.06	1.1	0.5
22-Jan-14	0.10	0.02	93	-185	0.14	0.06	--	--
23-Jan-14	0.42	0.02	170	-87	0.14	0.06	1.1	0.5
24-Jan-14	0.55	0.03	173	-160	0.14	0.06	--	--
27-Jan-14	0.11	0.03	228	46	0.14	0.06	--	--
28-Jan-14	1.71	0.02	212	115	0.14	0.06	1.2	0.3
29-Jan-14	0.09	0.06	238	140	0.14	0.06	--	--
30-Jan-14	0.61	0.01	251	-375	0.14	0.06	1.2	0.1
31-Jan-14	1.05	0.02	71	-269	0.14	0.06	--	--
3-Feb-14	1.39	0.08	158	-321	0.13	0.07	--	--
4-Feb-14	1.47	0.04	144	-255	0.13	0.07	1.4	0.1
5-Feb-14	0.05	0.02	146	-254	0.13	0.07	--	--
6-Feb-14	1.43	0.01	128	-342	0.13	0.07	1.4	0.0
7-Feb-14	1.56	0.01	206	-287	0.13	0.07	--	--
10-Feb-14	0.16	0.04	102	-231	0.13	0.06	--	--
11-Feb-14	0.10	0.04	109	-40	0.13	0.06	1.4	0.1
12-Feb-14	0.81	0.03	106	-194	0.13	0.06	--	--
13-Feb-14	0.98	0.02	115	-125	0.13	0.06	1.4	0.1
14-Feb-14	0.05	0.03	112	-74	0.13	0.06	--	--
17-Feb-14	0.07	0.02	145	-116	0.13	0.06	--	--
18-Feb-14	0.99	0.02	-15	-110	0.13	0.06	1.4	0.2
19-Feb-14	0.08	0.03	111	-67	0.13	0.06	--	--
20-Feb-14	1.26	0.03	121	-146	0.13	0.06	1.4	0.2
21-Feb-14	0.24	0.04	68	-119	0.13	0.06	--	--
24-Feb-14	0.09	0.03	93	-112	0.13	0.06	--	--

Date	DO In	DO Out	ORP In	ORP Out	ClO4 In[a]	ClO4 Out[a]	Nitrate-N In	Nitrate-N Out
d/m/y	mg/L	mg/L	mV	mV	mg/L	mg/L	mg/L	mg/L
25-Feb-14	0.36	0.03	68	-158	0.13	0.06	1.4	0.3
26-Feb-14	0.49	0.03	54	-196	0.13	0.06	--	--
27-Feb-14	0.12	0.02	93	-185	0.13	0.06	1.4	0.3
28-Feb-14	0.21	0.03	91	-191	0.13	0.06	--	--

Note:

(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L.

(b) Samples shaded red are possible monitoring/equipment errors and are not included in

(c) A dash signifies parmeters that were not read.

(d) UR = Under Range

Table B-2. OU-1 On Site Water Quality Log Sheet Combined Well Influent

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
Avg.	1511	6.81	23.10	672	2.15	351	0.14	1.6
Std.	206	0.30	0.23	28	0.46	156	0.01	0.3
Max.	2130	7.50	23.51	713	3.28	646	0.16	2.8
Min.	1000	4.86	22.56	576	1.06	111	0.11	1.2
3-Sep-13	1630	6.89	23.43	647	2.38	311	0.13	2.2
4-Sep-13	1300	6.95	23.32	646	2.45	273	0.13	--
5-Sep-13	1530	6.84	23.36	643	2.48	258	0.13	2.1
6-Sep-13	1300	7.01	23.38	657	2.45	163	0.13	--
9-Sep-13	1600	6.97	23.11	650	1.91	259	0.13	--
10-Sep-13	1730	6.95	23.08	648	1.86	251	0.13	2.1
11-Sep-13	2130	6.91	23.02	658	1.68	166	0.14	--
12-Sep-13	1700	6.89	23.26	654	1.74	183	0.14	2.8
13-Sep-13	1900	6.95	23.12	647	1.78	246	0.14	--
16-Sep-13	1800	6.78	23.18	652	1.54	285	0.14	--
17-Sep-13	1430	6.86	23.08	653	1.59	385	0.15	1.9
18-Sep-13	1630	6.90	23.05	653	1.55	344	0.14	--
19-Sep-13	1515	6.89	23.05	655	1.59	376	0.13	1.9
20-Sep-13	1100	6.91	22.96	657	1.59	399	0.13	--
23-Sep-13	1545	6.42	23.25	659	1.60	351	0.13	--
24-Sep-13	1745	6.75	23.24	658	1.60	349	0.13	2.0
25-Sep-13	1550	6.80	23.18	662	1.64	387	0.14	1.6
26-Sep-13	1100	6.76	23.12	662	1.66	337	0.16	1.4
27-Sep-13	1500	6.68	23.13	662	1.67	351	0.15	--
30-Sep-13	1530	6.75	23.39	669	2.16	335	0.15	--
1-Oct-13	1630	6.84	23.26	671	2.14	323	0.15	1.7
2-Oct-13	1630	6.80	23.35	669	2.15	370	0.15	--
3-Oct-13	--	--	--	--	--	--	--	--
4-Oct-13	1600	6.70	23.33	670	2.13	472	0.15	--
7-Oct-13	1400	6.73	23.41	672	2.68	324	0.15	--
8-Oct-13	1500	6.71	23.38	673	2.65	355	0.15	1.5
9-Oct-13	1530	6.76	23.30	674	2.67	346	0.15	--
10-Oct-13	1600	6.83	23.16	675	2.66	386	0.15	1.5
11-Oct-13	1200	6.81	23.18	676	2.61	371	0.15	--
14-Oct-13	1600	6.84	23.40	678	1.83	441	0.14	--
15-Oct-13	1700	6.88	23.36	674	1.77	374	0.14	1.6
16-Oct-13	1830	6.93	23.17	675	1.89	507	0.14	--
17-Oct-13	1000	6.87	23.21	677	1.87	393	0.14	1.6
18-Oct-13	1200	6.94	23.29	675	1.87	297	0.14	--
21-Oct-13	1600	6.79	23.28	673	2.02	273	0.15	--
22-Oct-13	1500	6.09	23.35	673	2.02	252	0.15	1.5
23-Oct-13	1800	6.79	23.26	673	2.03	311	0.15	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
24-Oct-13	1615	6.66	23.35	673	2.04	402	0.15	1.5
25-Oct-13	1430	6.81	23.13	674	2.06	504	0.15	--
28-Oct-13	1830	6.83	22.92	680	2.11	646	0.14	--
29-Oct-13	1700	6.81	23.10	683	2.09	588	0.14	1.6
30-Oct-13	1830	6.80	23.11	681	2.09	606	0.14	--
31-Oct-13	1500	6.72	23.23	685	2.11	561	0.14	1.4
1-Nov-13	1630	6.91	23.12	658	1.63	156	0.14	--
4-Nov-13	1500	6.78	22.89	655	1.35	257	0.14	--
5-Nov-13	1700	6.76	22.79	655	1.39	167	0.14	1.7
6-Nov-13	1300	6.79	22.91	654	1.36	181	0.14	--
7-Nov-13	1530	6.83	23.03	659	1.39	169	0.14	1.7
8-Nov-13	1600	6.84	23.40	681	1.73	476	0.14	--
11-Nov-13	1700	6.79	23.21	680	1.06	618	0.14	--
12-Nov-13	1500	6.72	23.24	682	1.90	575	0.14	1.6
13-Nov-13	1500	6.61	23.51	683	1.96	493	0.14	--
14-Nov-13	1430	6.69	23.39	684	1.89	551	0.14	1.7
15-Nov-13	1400	6.78	23.21	682	1.92	542	0.14	--
18-Nov-13	1500	6.67	23.26	684	2.05	470	0.14	--
19-Nov-13	1300	6.89	23.14	686	2.07	638	0.14	1.8
20-Nov-13	1330	6.88	23.17	686	2.05	593	0.14	--
21-Nov-13	1500	6.86	23.16	687	2.10	486	0.14	--
22-Nov-13	1330	6.81	23.09	687	2.12	496	0.14	--
25-Nov-13	1630	6.78	23.27	688	2.35	551	0.14	;--
26-Nov-13	1600	6.69	23.32	690	2.42	571	0.14	1.6
27-Nov-13	1700	6.74	23.30	693	2.45	552	0.14	--
28-Nov-13	--	--	--	--	--	--	--	--
29-Nov-13	--	--	--	--	--	--	--	--
2-Dec-13	1400	6.73	23.30	692	2.53	562	0.14	--
3-Dec-13	1530	6.99	23.16	688	2.46	604	0.14	1.6
4-Dec-13	1530	6.89	23.14	690	2.52	587	0.14	--
5-Dec-13	1700	6.85	23.07	692	2.54	580	0.14	1.6
6-Dec-13	1400	6.91	23.09	696	2.59	598	0.14	--
9-Dec-13	1500	6.82	23.13	685	2.23	474	0.14	--
10-Dec-13	1300	6.96	23.14	688	2.25	525	0.14	1.6
11-Dec-13	1530	6.31	23.39	695	2.28	494	0.14	--
12-Dec-13	1300	6.89	23.15	690	2.26	570	0.14	1.5
13-Dec-13	1400	6.78	23.25	689	2.28	517	0.14	--
16-Dec-13	1230	6.56	23.48	695	2.65	366	0.14	--
17-Dec-13	1200	6.51	23.46	693	2.63	363	0.14	1.6
18-Dec-13	1500	6.56	23.25	696	2.72	354	0.14	--
19-Dec-13	1430	7.16	22.98	696	2.77	365	0.14	1.6
20-Dec-13	1800	6.95	23.14	691	2.83	283	0.14	--
23-Dec-13	2000	6.60	23.09	696	2.87	285	0.14	--
24-Dec-13	--	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
25-Dec-13	--	--	--	--	--	--	--	--
26-Dec-13	1300	6.55	23.28	700	2.88	293	0.14	1.4
27-Dec-13	1000	6.56	23.30	701	2.89	295	0.14	--
30-Dec-13	1700	6.86	23.11	699	2.70	404	0.14	--
31-Dec-13	1300	7.26	23.19	696	2.86	433	0.14	1.6
1-Jan-14	--	--	--	--	--	--	--	--
2-Jan-14	2045	5.76	23.34	698	2.98	578	0.14	1.6
3-Jan-14	1200	7.44	23.22	702	3.02	547	0.14	--
6-Jan-14	1500	7.09	23.17	712	2.63	461	0.14	--
7-Jan-14	1400	7.28	23.12	703	2.83	396	0.14	1.7
8-Jan-14	1800	7.15	23.14	703	3.21	456	0.14	--
9-Jan-14	1700	7.30	22.99	708	3.28	444	0.14	1.7
10-Jan-14	1530	7.01	23.25	677	1.84	151	0.14	--
13-Jan-14	1730	7.01	23.01	659	2.59	161	0.11	--
14-Jan-14	1500	6.85	23.00	660	2.69	132	0.11	1.6
15-Jan-14	1500	4.86	23.15	653	2.80	116	0.11	--
16-Jan-14	1730	7.03	22.73	641	2.36	121	0.11	1.6
17-Jan-14	1400	7.08	22.78	647	2.40	125	0.11	--
20-Jan-14	1500	6.47	22.96	654	1.40	168	0.16	--
21-Jan-14	1530	6.62	22.72	646	1.45	214	0.16	1.2
22-Jan-14	1450	6.73	22.76	655	1.46	139	0.16	--
23-Jan-14	1400	6.81	22.80	653	1.49	188	0.16	1.2
24-Jan-14	1300	6.65	22.68	658	1.45	190	0.16	--
27-Jan-14	1300	6.74	22.72	576	2.04	309	0.16	--
28-Jan-14	1600	6.87	22.74	581	2.07	267	0.16	1.2
29-Jan-14	1300	6.61	22.77	582	2.08	222	0.16	--
30-Jan-14	1200	7.23	22.61	577	2.14	264	0.16	1.2
31-Jan-14	1500	7.13	22.59	579	2.13	188	0.16	--
3-Feb-14	1530	6.60	22.58	587	2.30	201	0.15	--
4-Feb-14	1430	7.03	22.67	687	1.92	158	0.15	1.3
5-Feb-14	1540	7.31	22.73	688	1.86	111	0.15	--
6-Feb-14	1430	7.50	22.56	690	1.89	128	0.15	1.3
7-Feb-14	1100	6.93	22.59	688	1.89	212	0.15	--
10-Feb-14	1330	7.25	22.67	700	2.20	136	0.15	--
11-Feb-14	1400	6.67	22.78	699	2.28	134	0.15	1.5
12-Feb-14	1600	6.61	22.85	702	2.25	131	0.15	--
13-Feb-14	1630	6.93	22.82	697	2.28	132	0.15	1.5
14-Feb-14	1300	6.55	22.85	705	2.29	130	0.15	--
17-Feb-14	1630	6.96	22.77	713	2.03	147	0.15	--
18-Feb-14	1645	7.24	22.68	715	2.08	129	0.15	1.5
19-Feb-14	1830	6.95	23.04	724	1.82	126	0.15	--
20-Feb-14	1530	6.88	23.52	726	1.72	145	0.15	1.5
21-Feb-14	1500	6.94	23.48	725	1.95	154	0.15	--
24-Feb-14	1330	7.08	23.08	721	1.90	137	0.15	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
25-Feb-14	1800	7.12	22.99	720	1.93	134	0.15	1.5
26-Feb-14	1130	7.34	22.88	719	1.96	127	0.15	--
27-Feb-14	1445	6.91	23.02	724	1.97	134	0.15	1.5
28-Feb-14	1340	7.05	22.63	719	2.04	146	0.15	--

Note:
(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L.
(b) Samples shaded red are possible monitoring/equipment errors and are not included in calculations.
(c) A dash signifies parmeters that were not read.
(d) UR = Under Range

Table B-3. OU-1 On Site Water Quality Log Sheet FBR Influent

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L
Avg.		6.98	23.29	679	0.72	205	0.12	0	1.5	0.012	48
Std.		0.25	0.34	30	0.56	186	0.01	1	0.2	0.018	4
Max.		7.63	23.99	729	2.36	2000	0.14	7	2.2	0.130	53
Min.		5.82	22.20	581	0.05	-15	0.09		0.9	0.003	38
3-Sep-13	1630	6.89	23.74	655	1.40	259	0.13		1.9	0.004	49
4-Sep-13	1300	6.99	23.99	658	1.83	206	0.13	--	--	--	--
5-Sep-13	1530	7.01	23.89	656	1.61	204	0.13		1.8	0.004	50
6-Sep-13	1300	7.03	23.70	660	1.12	167	0.13	--	--	--	--
9-Sep-13	1600	7.00	23.38	656	1.71	2000	0.13	--	--	--	--
10-Sep-13	1730	7.01	23.39	658	1.68	210	0.13		1.9	0.006	49
11-Sep-13	2130	6.96	23.09	657	0.71	84	0.14	--	--	--	--
12-Sep-13	1700	6.99	23.42	657	0.82	143	0.14		2.2	0.006	51
13-Sep-13	1900	6.97	23.19	658	0.84	170	0.14	--	--	--	--
16-Sep-13	1800	6.92	23.67	657	1.14	65	0.14	--	--	--	--
17-Sep-13	1430	7.06	23.46	658	1.14	32	0.14		1.7	0.007	49
18-Sep-13	1630	7.19	23.37	672	0.05	29	0.14	--	--	--	--
19-Sep-13	1515	7.09	23.33	667	0.23	85	0.09		1.5	0.010	49
20-Sep-13	1100	7.08	23.00	660	0.71	125	0.09	--	--	--	--
23-Sep-13	1545	6.94	23.72	659	0.37	162	0.10	--	--	--	--
24-Sep-13	1745	6.87	23.43	658	0.05	150	0.10		1.5	0.019	49
25-Sep-13	1550	6.88	23.54	663	0.13	130	0.09	--	1.4	--	--
26-Sep-13	1100	6.82	23.32	663	0.06	144	0.11		1.9	0.008	50
27-Sep-13	1500	6.65	23.42	664	0.61	163	0.11	--	--	--	--
30-Sep-13	1530	6.89	23.58	673	0.05	192	0.11	--	--	--	--
1-Oct-13	1630	6.93	23.69	672	0.65	176	0.11		1.8	0.012	49
2-Oct-13	1630	6.97	23.61	676	0.71	140	0.11	--	--	--	--
3-Oct-13	--	--	--	--	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L
4-Oct-13	1600	6.96	23.78	671	0.81	209	0.11	--	--	--	--
7-Oct-13	1400	6.89	23.77	676	0.86	222	0.11	--	--	--	--
8-Oct-13	1500	6.88	23.78	674	0.89	213	0.11		1.4	0.009	49
9-Oct-13	1530	6.86	23.70	675	0.88	218	0.11	--	--	--	--
10-Oct-13	1600	6.88	23.18	677	0.97	212	0.11		1.7	0.010	50
11-Oct-13	1200	6.87	23.25	678	0.95	215	0.11	--	--	--	--
14-Oct-13	1600	6.94	23.68	675	0.50	5	0.11	--	--	--	--
15-Oct-13	1700	6.98	23.78	675	0.52	45	0.11	1	1.4	0.008	49
16-Oct-13	1830	6.94	23.25	680	0.07	319	0.12	--	--	--	--
17-Oct-13	1000	6.89	23.62	679	0.09	239	0.12	3	1.3	0.007	50
18-Oct-13	1200	6.96	23.67	676	0.11	226	0.12	--	--	--	--
21-Oct-13	1600	6.87	23.72	675	0.20	223	0.11	--	--	--	--
22-Oct-13	1500	6.88	23.73	676	0.60	111	0.11		1.6	0.010	49
23-Oct-13	1800	6.90	23.19	673	0.64	160	0.11	--	--	--	--
24-Oct-13	1615	6.81	23.42	678	0.17	224	0.11		1.7	0.011	49
25-Oct-13	1430	6.86	23.26	676	0.53	238	0.11	--	--	--	--
28-Oct-13	1830	6.90	22.73	685	0.66	457	0.11	--	--	--	--
29-Oct-13	1700	6.90	22.98	686	0.68	264	0.11		1.5	0.008	49
30-Oct-13	1830	6.82	23.02	682	0.61	236	0.12	--	--	--	--
31-Oct-13	1500	6.87	23.58	681	0.15	211	0.13		1.4	0.008	49
1-Nov-13	1630	6.85	23.51	660	0.61	64	0.12	--	--	--	--
4-Nov-13	1500	6.85	22.99	656	0.64	203	0.13	--	--	--	--
5-Nov-13	1700	6.80	22.87	678	0.89	180	0.13		1.4	0.012	51
6-Nov-13	1300	6.87	23.38	659	0.78	143	0.13	--	--	--	--
7-Nov-13	1530	6.81	23.35	655	0.05	124	0.13		1.4	0.013	50
8-Nov-13	1600	6.94	23.51	683	0.15	168	0.13	--	--	--	--
11-Nov-13	1700	6.86	23.32	684	0.67	461	0.13	--	--	--	--
12-Nov-13	1500	6.85	23.41	684	0.62	299	0.13		1.4	0.010	50
13-Nov-13	1500	6.72	23.78	682	0.45	271	0.13	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L
14-Nov-13	1430	6.80	23.83	683	0.63	260	0.13		1.4	0.011	50
15-Nov-13	1400	6.82	23.35	684	0.13	342	0.13	--	--	--	--
18-Nov-13	1500	6.82	23.32	688	0.17	373	0.13	--	--	--	--
19-Nov-13	1300	6.95	23.14	688	0.63	399	0.13		1.2	0.015	52
20-Nov-13	1330	6.98	23.11	692	0.60	329	0.13	--	--	--	--
21-Nov-13	1500	6.99	23.09	686	0.61	249	0.13		1.5	0.015	51
22-Nov-13	1330	7.00	23.02	690	0.15	190	0.13	--	--	--	--
25-Nov-13	1630	6.89	23.33	687	0.14	370	0.13	--	--	--	--
26-Nov-13	1600	6.90	23.43	694	0.46	174	0.13		1.5	0.014	50
27-Nov-13	1700	6.93	23.40	694	0.80	149	0.13	--	--	--	--
28-Nov-13	--	--	--	--	--	--	--	--	--	--	--
29-Nov-13	--	--	--	--	--	--	--	--	--	--	--
2-Dec-13	1400	6.87	23.47	689	0.25	204	0.13	--	--	--	--
3-Dec-13	1530	7.03	23.37	692	0.79	165	0.13		1.4	0.130	50
4-Dec-13	1530	6.44	23.17	690	0.24	302	0.13	--	--	--	--
5-Dec-13	1700	7.01	22.87	691	0.53	267	0.13		1.5	0.010	49
6-Dec-13	1400	7.03	23.00	696	1.05	295	0.13	--	--	--	--
9-Dec-13	1500	7.04	23.13	689	0.32	306	0.13	--	--	--	--
10-Dec-13	1300	6.91	23.33	688	0.25	243	0.13		1.5	0.012	50
11-Dec-13	1530	6.87	23.44	693	0.23	230	0.13	--	--	--	--
12-Dec-13	1300	6.87	23.31	691	0.26	247	0.13		1.5	0.013	50
13-Dec-13	1400	7.08	23.22	694	1.39	252	0.13	--	--	--	--
16-Dec-13	1230	6.61	23.60	696	1.20	258	0.13	--	--	--	--
17-Dec-13	1200	6.59	23.58	695	1.15	254	0.13		1.5	0.015	49
18-Dec-13	1500	6.87	23.28	699	1.62	154	0.13	--	--	--	--
19-Dec-13	1430	7.17	22.90	697	1.28	287	0.13		1.5	0.014	49
20-Dec-13	1800	7.17	23.04	698	1.69	229	0.13	--	--	--	--
23-Dec-13	2000	6.97	22.96	700	1.73	241	0.09	--	--	--	--
24-Dec-13	--	--	--	--	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L
25-Dec-13	--	--	--	--	--	--	--	--	--	--	--
26-Dec-13	1300	6.67	23.33	706	1.76	219	0.09		1.3	0.013	50
27-Dec-13	1000	6.69	23.35	708	1.88	225	0.09	--	--	--	--
30-Dec-13	1700	7.30	22.83	701	1.95	277	0.09	--	--	--	--
31-Dec-13	1300	7.34	23.34	702	1.85	315	0.09		0.9	0.014	50
1-Jan-14	--	--	--	--	--	--	--	--	--	--	--
2-Jan-14	2045	5.82	23.55	704	2.33	315	0.09		0.9	0.015	50
3-Jan-14	1200	7.53	23.33	706	2.36	347	0.09	--	--	--	--
6-Jan-14	1500	7.39	23.29	723	0.80	241	0.12	--	--	--	--
7-Jan-14	1400	7.45	23.12	715	0.77	231	0.12		1.5	0.012	50
8-Jan-14	1800	7.36	23.26	713	0.21	270	0.12	--	--	--	--
9-Jan-14	1700	7.49	23.02	717	0.21	198	0.12		1.7	0.013	50
10-Jan-14	1530	7.07	23.40	693	1.17	183	0.12	--	--	--	--
13-Jan-14	1730	7.39	22.98	657	1.12	151	0.10	--	--	--	--
14-Jan-14	1500	6.23	23.51	659	0.39	93	0.10		1.5	0.013	49
15-Jan-14	1500	6.70	23.50	659	0.23	40	0.10	--	--	--	--
16-Jan-14	1730	7.19	23.06	644	0.41	84	0.10		1.7	0.014	49
17-Jan-14	1400	7.16	23.29	647	1.08	126	0.10	--	--	--	--
20-Jan-14	1500	6.64	23.45	653	1.26	167	0.14	--	--	--	--
21-Jan-14	1530	6.86	22.90	656	0.69	200	0.14		1.1	0.008	50
22-Jan-14	1450	6.66	23.41	658	0.10	93	0.14	--	--	--	--
23-Jan-14	1400	6.92	23.22	658	0.42	170	0.14		1.1	0.009	51
24-Jan-14	1300	6.79	22.76	658	0.55	173	0.14	--	--	--	--
27-Jan-14	1300	6.88	23.15	581	0.11	228	0.14	--	--	--	--
28-Jan-14	1600	7.06	23.05	581	1.71	212	0.14	5	1.2	0.006	51
29-Jan-14	1300	6.74	23.34	581	0.09	238	0.14	--	--	--	--
30-Jan-14	1200	7.33	22.59	582	0.61	251	0.14	7	1.2	0.005	53
31-Jan-14	1500	7.16	22.71	594	1.05	71	0.14	--	--	--	--
3-Feb-14	1530	7.02	22.46	587	1.39	158	0.13	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L
4-Feb-14	1430	7.30	22.43	686	1.47	144	0.13		1.4	0.005	49
5-Feb-14	1540	7.45	23.01	690	0.05	146	0.13	--	--	--	--
6-Feb-14	1430	7.63	22.20	689	1.43	128	0.13		1.4	0.005	49
7-Feb-14	1100	7.09	22.36	690	1.56	206	0.13	--	--	--	--
10-Feb-14	1330	7.24	23.03	705	0.16	102	0.13	--	--	--	--
11-Feb-14	1400	6.97	23.21	706	0.10	109	0.13		1.4	0.003	38
12-Feb-14	1600	7.15	23.46	710	0.81	106	0.13	--	--	--	--
13-Feb-14	1630	6.90	23.32	709	0.98	115	0.13		1.4	0.003	38
14-Feb-14	1300	6.79	23.48	710	0.05	112	0.13	--	--	--	--
17-Feb-14	1630	7.44	22.83	720	0.07	145	0.13	--	--	--	--
18-Feb-14	1645	7.32	22.93	720	0.99	-15	0.13		1.4	0.003	39
19-Feb-14	1830	7.37	22.94	722	0.08	111	0.13	--	--	--	--
20-Feb-14	1530	7.29	23.82	724	1.26	121	0.13		1.4	0.003	39
21-Feb-14	1500	7.03	23.94	729	0.24	68	0.13	--	--	--	--
24-Feb-14	1330	7.17	23.40	718	0.09	93	0.13	--	--	--	--
25-Feb-14	1800	7.28	23.05	719	0.36	68	0.13		1.4	0.003	40
26-Feb-14	1130	7.51	22.79	722	0.49	54	0.13	--	--	--	--
27-Feb-14	1445	7.43	23.17	721	0.12	93	0.13		1.4	0.003	40
28-Feb-14	1340	7.15	22.89	717	0.21	91	0.13	--	--	--	--

Note:

(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L. Readings below this value are

(b) A dash signifies parmeters that were not read.

(c) UR = Under Range

Table B-4. OU-1 On Site Water Quality Log Sheet FBR Skid On-Line			
Date	Time	PH	Temperature
d/m/y			°C
Avg.		7.15	24.26
Std.		0.16	0.28
Max.		7.44	24.80
Min.		6.45	23.40
3-Sep-13	1630	7.12	24.6
4-Sep-13	1300	7.17	24.7
5-Sep-13	1530	7.18	24.7
6-Sep-13	1300	7.16	24.6
9-Sep-13	1600	7.14	24.4
10-Sep-13	1730	7.13	24.3
11-Sep-13	2130	7.15	24.5
12-Sep-13	1700	7.18	24.4
13-Sep-13	1900	7.19	24.2
16-Sep-13	1800	7.15	24.3
17-Sep-13	1430	7.15	24.3
18-Sep-13	1630	7.44	24.2
19-Sep-13	1515	7.30	24.3
20-Sep-13	1100	7.28	23.8
23-Sep-13	1545	7.18	24.4
24-Sep-13	1745	7.21	24.4
25-Sep-13	1550	7.18	24.3
26-Sep-13	1100	7.18	24.2
27-Sep-13	1500	7.18	24.5
30-Sep-13	1530	7.18	24.5
1-Oct-13	1630	7.15	24.5
2-Oct-13	1630	7.18	24.3
3-Oct-13	--	--	--
4-Oct-13	1600	7.16	24.7
7-Oct-13	1400	7.19	24.5
8-Oct-13	1500	7.18	24.4
9-Oct-13	1530	7.16	24.3
10-Oct-13	1600	7.09	24.2
11-Oct-13	1200	7.10	24.3
14-Oct-13	1600	7.20	24.6
15-Oct-13	1700	7.19	24.6
16-Oct-13	1830	7.22	24.3
17-Oct-13	1000	7.21	24.4
18-Oct-13	1200	--	--
21-Oct-13	1600	7.20	24.6
22-Oct-13	1500	7.19	24.7
23-Oct-13	1800	7.19	24.1
24-Oct-13	1615	7.20	24.4

Date	Time	PH	Temperature
d/m/y			°C
25-Oct-13	1430	--	--
28-Oct-13	1830	7.19	23.8
29-Oct-13	1700	7.19	24.0
30-Oct-13	1830	7.13	23.9
31-Oct-13	1500	7.18	24.4
1-Nov-13	1630	7.13	24.6
4-Nov-13	1500	7.16	24.0
5-Nov-13	1700	7.12	24.0
6-Nov-13	1300	7.13	24.2
7-Nov-13	1530	7.18	24.3
8-Nov-13	1600	7.24	24.6
11-Nov-13	1700	7.27	24.3
12-Nov-13	1500	7.26	24.3
13-Nov-13	1500	7.38	24.8
14-Nov-13	1430	7.35	24.7
15-Nov-13	1400	7.24	24.3
18-Nov-13	1500	7.23	24.4
19-Nov-13	1300	7.19	24.1
20-Nov-13	1330	7.18	24.0
21-Nov-13	1500	7.18	24.1
22-Nov-13	1330	7.19	24.0
25-Nov-13	1630	7.18	24.4
26-Nov-13	1600	7.18	24.3
27-Nov-13	1700	7.19	24.4
2-Dec-13	1400	7.20	24.5
3-Dec-13	1530	7.17	24.3
4-Dec-13	1530	7.19	24.1
5-Dec-13	1700	7.17	24.1
6-Dec-13	1600	7.14	23.9
9-Dec-13	1500	7.18	24.3
10-Dec-13	1300	7.17	24.3
11-Dec-13	1530	7.19	24.5
12-Dec-13	1300	7.18	24.2
13-Dec-13	1400	7.20	24.2
16-Dec-13	1230	7.25	24.4
17-Dec-13	1200	7.26	24.5
18-Dec-13	1500	7.22	24.2
19-Dec-13	1430	7.17	23.7
20-Dec-13	1800	7.18	24.1
23-Dec-13	2000	7.20	23.8
24-Dec-13	--	--	--
25-Dec-13	--	--	--
26-Dec-13	1300	7.17	24.4
27-Dec-13	1000	7.18	24.3

Date	Time	PH	Temperature
d/m/y			°C
30-Dec-13	1700	7.24	23.9
31-Dec-13	1300	7.15	24.2
1-Jan-14	--	--	--
2-Jan-14	2045	7.23	24.1
3-Jan-14	1200	7.21	24.0
6-Jan-14	1500	7.36	24.4
7-Jan-14	1400	7.31	24.0
8-Jan-14	1800	7.28	23.9
9-Jan-14	1700	7.18	23.9
10-Jan-14	1530	7.14	24.5
13-Jan-14	1730	7.18	24.3
14-Jan-14	1500	7.18	24.3
15-Jan-14	1500	7.20	24.5
16-Jan-14	1730	7.18	24.5
17-Jan-14	1400	7.18	24.2
20-Jan-14	1500	7.20	24.6
21-Jan-14	1530	7.20	24.0
22-Jan-14	1450	7.20	24.5
23-Jan-14	1400	7.18	24.3
24-Jan-14	1300	7.17	23.8
27-Jan-14	1300	7.14	24.1
28-Jan-14	1600	7.16	24.2
29-Jan-14	1300	7.13	24.2
30-Jan-14	1200	7.13	23.4
31-Jan-14	1500	--	--
3-Feb-14	1530	7.02	23.8
4-Feb-14	1430	7.06	23.5
5-Feb-14	1540	6.45	24.2
6-Feb-14	1430	6.45	24.0
7-Feb-14	1100	6.57	23.6
10-Feb-14	1330	6.64	23.6
11-Feb-14	1400	6.62	24.3
12-Feb-14	1600	6.64	24.6
13-Feb-14	1630	6.82	24.7
14-Feb-14	1300	6.67	24.6
17-Feb-14	1630	6.86	24.1
18-Feb-14	1645	6.77	23.8
19-Feb-14	1830	6.84	23.9
20-Feb-14	1530	6.62	24.5
21-Feb-14	1500	--	--
24-Feb-14	1330	6.68	24.4
25-Feb-14	1800	6.69	23.9
26-Feb-14	1130	6.70	23.6
27-Feb-14	1445	6.72	24.1

Date	Time	PH	Temperature
d/m/y			°C
28-Feb-14	1340	6.72	23.5

(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L.
(b) A dash signifies parmeters that were not read.

Table B-5. OU-1 On Site Water Quality Log Sheet FBR Effluent

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate	Ammonia-N	PO_4	Filtered TOC
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avg.		7.15	23.54	686	0.03	-129	0.08	4	0.4	0.003	48	1.1	1.14	3.0
Std.		0.25	0.39	32	0.01	114	0.27	12	0.2	0.002	4	0.2	0.07	0.5
Max.		7.98	24.45	744	0.08	175	3.05	83	0.6	0.012	51	1.7	1.26	4.7
Min.		6.65	22.20	578	0.01	-375	0.04	0	0.0	0.002	35	0.6	0.78	1.8
3-Sep-13	1630	6.93	24.04	663	0.03	98	0.05	0	0.60	0.006	48	0.90	1.18	2.9
4-Sep-13	1300	7.01	24.24	663	0.05	112	0.05	--	--	--	--	--	--	--
5-Sep-13	1530	7.08	24.24	665	0.04	-35	0.05	0	0.60	0.006	49	0.90	1.17	2.7
6-Sep-13	1300	7.14	24.09	664	0.04	-123	0.05	--	--	--	--	--	--	--
9-Sep-13	1600	7.08	23.59	665	0.03	-210	0.05	--	--	--	--	--	--	--
10-Sep-13	1730	7.07	23.49	663	0.04	-247	0.05	0	0.50	0.004	48	1.00	1.19	2.8
11-Sep-13	2130	6.99	23.39	667	0.02	-116	0.06	--	--	--	--	--	--	--
12-Sep-13	1700	7.07	23.55	668	0.01	-227	0.06	9	0.20	0.005	49	1.00	1.16	3.0
13-Sep-13	1900	7.04	23.46	662	0.01	-235	0.05	--	--	--	--	--	--	--
16-Sep-13	1800	6.95	23.76	664	0.01	-19	0.05	--	--	--	--	--	--	--
17-Sep-13	1430	7.01	23.79	667	0.03	-211	0.06	0	0.00	0.005	50	0.60	1.14	2.6
18-Sep-13	1630	7.27	23.61	682	0.04	-86	0.06	--	--	--	--	--	--	--
19-Sep-13	1515	7.21	23.62	674	0.05	-97	0.06	4	0.30	0.012	47	1.20	1.23	2.5
20-Sep-13	1100	7.18	23.58	671	0.04	-77	0.06	--	--	--	--	--	--	--
23-Sep-13	1545	7.01	24.00	668	0.02	-46	0.05	--	--	--	--	--	--	--
24-Sep-13	1745	6.98	23.73	668	0.02	-95	0.05	0	0.50	0.002	48	1.20	1.18	3.0
25-Sep-13	1550	6.95	23.79	667	0.04	-181	0.05	--	0.60	--	--	--	--	--
26-Sep-13	1100	6.92	23.70	669	0.07	-87	0.05	9	0.60	0.003	48	0.70	1.13	2.9
27-Sep-13	1500	6.96	23.88	665	0.04	-157	0.05	--	--	--	--	--	--	--
30-Sep-13	1530	6.96	23.92	673	0.04	-231	0.05	--	--	--	--	--	--	--
1-Oct-13	1630	7.01	23.95	671	0.06	-189	0.05	7	0.5	0.003	48	1.10	1.15	2.9
2-Oct-13	1630	6.97	23.80	681	0.04	-181	0.05	--	--	--	--	--	--	--
3-Oct-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Oct-13	1600	6.98	24.06	673	0.04	-173	0.05	--	--	--	--	--	--	--
7-Oct-13	1400	6.92	24.01	675	0.04	-203	0.05	--	--	--	--	--	--	--
8-Oct-13	1500	6.90	23.89	675	0.04	-201	0.05	5	0.5	0.003	49	1.00	1.15	2.9
9-Oct-13	1530	6.88	23.77	676	0.05	-218	0.05	--	--	--	--	--	--	--
10-Oct-13	1600	6.84	23.56	676	0.06	-243	0.05	4	0.5	0.003	48	1.10	1.18	3.1
11-Oct-13	1200	6.86	23.69	677	0.05	-235	0.05	--	--	--	--	--	--	--
14-Oct-13	1600	6.97	23.95	681	0.02	-121	0.08	--	--	--	--	--	--	--
15-Oct-13	1700	7.04	23.90	685	0.02	-263	0.08	20	0.5	0.003	48	1.10	1.13	3.2
16-Oct-13	1830	7.03	23.54	685	0.02	-126	0.08	--	--	--	--	--	--	--
17-Oct-13	1000	7.01	23.96	684	0.03	-170	0.09	83	0.5	0.002	47	1.10	1.08	3.4
18-Oct-13	1200	7.02	23.92	686	0.05	-200	0.09	--	--	--	--	--	--	--
21-Oct-13	1600	6.99	23.90	682	0.02	-252	3.05	--	--	--	--	--	--	--
22-Oct-13	1500	6.98	24.01	682	0.03	-204	0.05	0	0.5	0.003	49	1.10	1.17	3.0
23-Oct-13	1800	6.92	23.39	684	0.03	-110	0.05	--	--	--	--	--	--	--
24-Oct-13	1615	6.91	23.66	685	0.03	-200	0.05	0	0.5	0.002	49	1.10	1.18	2.9

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate	Ammonia-N	PO_4	Filtered TOC
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Oct-13	1430	6.95	23.72	686	0.04	-207	0.05	--	--	--	--	--	--	--
28-Oct-13	1830	6.93	22.88	685	0.03	-188	0.08	--	--	--	--	--	--	--
29-Oct-13	1700	6.96	23.14	684	0.03	-182	0.08	0	0.5	0.003	48	1.10	1.15	3.1
30-Oct-13	1830	6.87	23.26	691	0.03	-169	0.08	--	--	--	--	--	--	--
31-Oct-13	1500	6.94	23.83	692	0.05	-182	0.08	0	0.5	0.003	48	1.10	1.13	3.0
1-Nov-13	1630	6.89	23.89	666	0.02	-40	0.06	--	--	--	--	--	--	--
4-Nov-13	1500	6.91	23.16	658	0.03	-82	0.05	--	--	--	--	--	--	--
5-Nov-13	1700	6.89	23.18	692	0.04	-185	0.05	0	0.6	0.003	49	1.10	1.15	3.2
6-Nov-13	1300	6.93	23.67	659	0.04	-192	0.05	--	--	--	--	--	--	--
7-Nov-13	1530	6.96	23.65	663	0.02	-204	0.05	3	0.6	0.003	49	1.10	1.16	3.1
8-Nov-13	1600	7.05	23.77	695	0.03	-189	0.05	--	--	--	--	--	--	--
11-Nov-13	1700	7.03	23.53	696	0.04	24	0.06	--	--	--	--	--	--	--
12-Nov-13	1500	7.08	23.60	698	0.03	-135	0.06	0	0.6	0.003	49	1.10	1.14	3.0
13-Nov-13	1500	7.09	24.15	706	0.07	25	0.06	--	--	--	--	--	--	--
14-Nov-13	1430	7.17	24.19	708	0.03	43	0.07	2	0.6	0.003	49	1.10	1.18	3.1
15-Nov-13	1400	7.01	23.61	693	0.05	74	0.07	--	--	--	--	--	--	--
18-Nov-13	1500	7.04	23.51	701	0.05	82	0.06	--	--	--	--	--	--	--
19-Nov-13	1300	7.02	23.31	697	0.06	175	0.06	4	0.3	0.002	51	1.10	1.05	3.0
20-Nov-13	1330	7.10	23.21	693	0.03	-73	0.05	--	--	--	--	--	--	--
21-Nov-13	1500	7.09	23.24	693	0.03	-205	0.05	2	0.5	0.003	50	1.10	1.11	3.1
22-Nov-13	1330	7.09	23.05	695	0.04	-177	0.05	--	--	--	--	--	--	--
25-Nov-13	1630	7.01	23.46	693	0.02	-111	0.05	--	--	--	--	--	--	--
26-Nov-13	1600	6.97	23.60	696	0.03	2	0.05	0	0.5	0.003	49	1.10	1.13	3.1
27-Nov-13	1700	7.04	23.49	695	0.02	-128	0.05	--	--	--	--	--	--	--
28-Nov-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Nov-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Dec-13	1400	7.01	23.71	698	0.04	10	0.05	--	--	--	--	--	--	--
3-Dec-13	1530	7.20	23.53	696	0.04	-226	0.05	0	0.6	0.004	49	1.10	1.15	3.0
4-Dec-13	1530	7.17	23.18	699	0.02	-252	0.05	--	--	--	--	--	--	--
5-Dec-13	1700	7.10	23.04	692	0.04	-208	0.05	0	0.5	0.005	49	1.10	1.18	2.9
6-Dec-13	1400	7.10	23.79	698	0.04	-216	0.05	--	--	--	--	--	--	--
9-Dec-13	1500	7.17	23.36	694	0.03	-270	0.05	--	--	--	--	--	--	--
10-Dec-13	1300	7.22	23.50	693	0.02	-265	0.05	0	0.5	0.003	49	1.10	1.15	3.0
11-Dec-13	1530	7.14	23.64	696	0.02	-196	0.05	--	--	--	--	--	--	--
12-Dec-13	1300	7.16	23.51	697	0.02	-186	0.05	0	0.5	0.004	49	1.10	1.12	2.8
13-Dec-13	1400	7.23	23.39	704	0.04	-120	0.05	--	--	--	--	--	--	--
16-Dec-13	1230	7.30	23.45	711	0.03	-98	0.05	--	--	--	--	--	--	--
17-Dec-13	1200	7.33	23.47	715	0.02	-44	0.05	0	0.6	0.003	49	1.10	1.16	3.0
18-Dec-13	1500	7.18	23.50	710	0.03	5	0.05	--	--	--	--	--	--	--
19-Dec-13	1430	7.32	22.74	708	0.04	-81	0.05	0	0.5	0.003	49	1.10	1.18	3.1
20-Dec-13	1800	7.38	22.97	708	0.02	45	0.05	--	--	--	--	--	--	--
23-Dec-13	2000	7.09	23.08	715	0.03	22	0.05	--	--	--	--	--	--	--
24-Dec-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Dec-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate	Ammonia-N	PO_4	Filtered TOC
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
26-Dec-13	1300	6.65	23.73	713	0.04	16	0.05	0	0.6	0.002	49	1.10	1.15	3.0
27-Dec-13	1000	6.68	23.79	720	0.05	29	0.04	--	--	--	--	--	--	--
30-Dec-13	1700	7.53	23.08	707	0.03	78	0.05	--	--	--	--	--	--	--
31-Dec-13	1300	7.38	23.58	712	0.04	35	0.05	0	0.4	0.003	49	1.10	1.16	2.8
1-Jan-14	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Jan-14	2045	7.79	23.19	716	0.01	55	0.05	0	0.4	0.003	49	1.10	1.18	2.8
3-Jan-14	1200	7.80	23.35	717	0.01	69	0.05	--	--	--	--	--	--	--
6-Jan-14	1500	7.50	23.64	725	0.02	-200	0.05	--	--	--	--	--	--	--
7-Jan-14	1400	7.59	23.24	719	0.03	-167	0.05	0	0.6	0.003	49	1.10	1.16	2.9
8-Jan-14	1800	7.67	23.20	722	0.01	-221	0.05	--	--	--	--	--	--	--
9-Jan-14	1700	7.67	23.13	718	0.01	-227	0.05	0	0.6	0.003	49	1.10	1.10	2.8
10-Jan-14	1530	7.36	23.84	705	0.02	-207	0.05	--	--	--	--	--	--	--
13-Jan-14	1730	7.54	23.20	665	0.03	-286	0.05	--	--	--	--	--	--	--
14-Jan-14	1500	7.29	23.84	670	0.03	-222	0.05	0	0.6	0.004	49	1.20	1.18	2.7
15-Jan-14	1500	7.06	23.95	671	0.03	-199	0.05	--	--	--	--	--	--	--
16-Jan-14	1730	7.35	23.76	652	0.03	-147	0.05	0	0.6	0.004	49	1.20	1.20	2.6
17-Jan-14	1400	7.07	23.70	651	0.06	-217	0.05	--	--	--	--	--	--	--
20-Jan-14	1500	6.78	23.85	663	0.02	89	0.06	--	--	--	--	--	--	--
21-Jan-14	1530	7.03	23.28	671	0.02	-16	0.06	0	0.5	0.003	49	1.00	1.13	2.0
22-Jan-14	1450	6.98	23.82	668	0.02	-185	0.06	--	--	--	--	--	--	--
23-Jan-14	1400	7.10	23.62	668	0.02	-87	0.06	0	0.5	0.003	50	1.00	1.05	1.8
24-Jan-14	1300	6.92	23.07	667	0.03	-160	0.06	--	--	--	--	--	--	--
27-Jan-14	1300	7.18	23.48	578	0.03	46	0.06	--	--	--	--	--	--	--
28-Jan-14	1600	7.19	23.49	586	0.02	115	0.06	10	0.3	0.003	49	0.90	1.00	2.5
29-Jan-14	1300	6.81	23.60	587	0.06	140	0.06	--	--	--	--	--	--	--
30-Jan-14	1200	7.35	22.73	578	0.01	-375	0.06	19	0.1	0.003	50	0.60	0.78	2.8
31-Jan-14	1500	7.31	23.00	586	0.02	-269	0.06	--	--	--	--	--	--	--
3-Feb-14	1530	7.16	23.03	581	0.08	-321	0.07	--	--	--	--	--	--	--
4-Feb-14	1430	7.41	22.71	683	0.04	-255	0.07	9	0.1	0.002	49	0.70	1.21	4.7
5-Feb-14	1540	7.63	23.21	690	0.02	-254	0.07	--	--	--	--	--	--	--
6-Feb-14	1430	7.68	22.20	690	0.01	-342	0.07	7	0.0	0.003	49	0.70	1.24	4.6
7-Feb-14	1100	7.31	22.76	695	0.01	-287	0.07	--	--	--	--	--	--	--
10-Feb-14	1330	7.46	23.20	711	0.04	-231	0.06	--	--	--	--	--	--	--
11-Feb-14	1400	7.24	23.65	719	0.04	-40	0.06	10	0.1	0.003	35	1.70	1.26	3.9
12-Feb-14	1600	7.44	23.91	716	0.03	-194	0.06	--	--	--	--	--	--	--
13-Feb-14	1630	7.53	24.04	736	0.02	-125	0.06	8	0.1	0.003	36	1.10	1.08	3.8
14-Feb-14	1300	7.22	23.94	724	0.03	-74	0.06	--	--	--	--	--	--	--
17-Feb-14	1630	7.98	23.27	739	0.02	-116	0.06	--	--	--	--	--	--	--
18-Feb-14	1645	7.84	23.26	744	0.02	-110	0.06	3	0.2	0.003	39	1.10	1.11	3.8
19-Feb-14	1830	7.71	23.13	730	0.03	-67	0.06	--	--	--	--	--	--	--
20-Feb-14	1530	7.40	24.45	734	0.03	-146	0.06	0	0.2	0.003	39	1.10	1.10	3.9
21-Feb-14	1500	7.15	24.43	741	0.04	-119	0.06	--	--	--	--	--	--	--
24-Feb-14	1330	7.27	23.66	725	0.03	-112	0.06	--	--	--	--	--	--	--
25-Feb-14	1800	7.36	23.21	724	0.03	-158	0.06	0	0.3	0.003	40	1.10	1.18	3.0

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Sulfide	Nitrate-N	Nitrite-N	Sulfate	Ammonia-N	PO_4	Filtered TOC
d/m/y			°C	µS/cm	mg/L	mV	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
26-Feb-14	1130	7.44	22.98	723	0.03	-196	0.06	--	--	--	--	--	--	--
27-Feb-14	1445	7.50	23.41	722	0.02	-185	0.06	0	0.3	0.003	40	1.10	1.15	3.1
28-Feb-14	1340	7.38	22.70	721	0.03	-191	0.06	--	--	--	--	--	--	--

Note:
(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L.
(b) A dash signifies parmeters that were not read.
(c) UR = Under Range

Table B-6. OU-1 On Site Water Quality Log Sheet Combined Wellhead Effluent

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
Avg.		7.09	23.87	701	0.89	708	#DIV/0!	#DIV/0!
Std.		0.21	0.97	29	0.74	219	#DIV/0!	#DIV/0!
Max.		7.45	24.82	740	3.78	852	0.00	0.0
Min.		6.81	20.29	598	0.13	136	0.00	0.0
3-Sep-13	1630	--	--	--	--	--	--	--
4-Sep-13	1300	--	--	--	--	--	--	--
5-Sep-13	1530	--	--	--	--	--	--	--
6-Sep-13	1300	6.94	24.82	680	0.31	796	--	--
9-Sep-13	1600	--	--	--	--	--	--	--
10-Sep-13	1730	--	--	--	--	--	--	--
11-Sep-13	2130	--	--	--	--	--	--	--
12-Sep-13	1700	--	--	--	--	--	--	--
13-Sep-13	1900	6.91	23.85	682	0.13	761	--	--
16-Sep-13	1800	--	--	--	--	--	--	--
17-Sep-13	1430	--	--	--	--	--	--	--
18-Sep-13	1630	--	--	--	--	--	--	--
19-Sep-13	1515	--	--	--	--	--	--	--
20-Sep-13	1100	6.97	24.14	686	0.29	765	--	--
23-Sep-13	1545	--	--	--	--	--	--	--
24-Sep-13	1745	--	--	--	--	--	--	--
25-Sep-13	1550	--	--	--	--	--	--	--
26-Sep-13	1100	--	--	--	--	--	--	--
27-Sep-13	1500	6.82	24.69	687	0.45	761	--	--
30-Sep-13	1530	--	--	--	--	--	--	--
1-Oct-13	1630	--	--	--	--	--	--	--
2-Oct-13	1630	--	--	--	--	--	--	--
3-Oct-13	--	--	--	--	--	--	--	--
4-Oct-13	1600	6.84	24.68	690	0.45	754	--	--
7-Oct-13	1400	--	--	--	--	--	--	--
8-Oct-13	1500	--	--	--	--	--	--	--
9-Oct-13	1530	--	--	--	--	--	--	--
10-Oct-13	1600	--	--	--	--	--	--	--
11-Oct-13	1200	6.85	24.65	688	0.47	766	--	--
14-Oct-13	1600	--	--	--	--	--	--	--
15-Oct-13	1700	--	--	--	--	--	--	--
16-Oct-13	1830	--	--	--	--	--	--	--
17-Oct-13	1000	--	--	--	--	--	--	--
18-Oct-13	1200	6.81	24.65	694	0.31	779	--	--
21-Oct-13	1600	--	--	--	--	--	--	--
22-Oct-13	1500	--	--	--	--	--	--	--
23-Oct-13	1800	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
24-Oct-13	1615	--	--	--	--	--	--	--
25-Oct-13	1430	6.82	24.75	695	0.45	795	--	--
28-Oct-13	1830	--	--	--	--	--	--	--
29-Oct-13	1700	--	--	--	--	--	--	--
30-Oct-13	1830	--	--	--	--	--	--	--
31-Oct-13	1500	--	--	--	--	--	--	--
1-Nov-13	1630	6.88	24.35	691	0.34	803	--	--
4-Nov-13	1500	--	--	--	--	--	--	--
5-Nov-13	1700	--	--	--	--	--	--	--
6-Nov-13	1300	--	--	--	--	--	--	--
7-Nov-13	1530	--	--	--	--	--	--	--
8-Nov-13	1600	6.96	23.87	710	0.41	804	--	--
11-Nov-13	1700	--	--	--	--	--	--	--
12-Nov-13	1500	--	--	--	--	--	--	--
13-Nov-13	1500	--	--	--	--	--	--	--
14-Nov-13	1430	--	--	--	--	--	--	--
15-Nov-13	1400	7.01	23.99	719	0.44	803	--	--
18-Nov-13	1500	--	--	--	--	--	--	--
19-Nov-13	1300	--	--	--	--	--	--	--
20-Nov-13	1330	--	--	--	--	--	--	--
21-Nov-13	1500	--	--	--	--	--	--	--
22-Nov-13	1330	7.08	23.00	707	0.91	797	--	--
25-Nov-13	1630	--	--	--	--	--	--	--
26-Nov-13	1600	--	--	--	--	--	--	--
27-Nov-13	1700	6.98	23.69	712	0.95	781	--	--
28-Nov-13	--	--	--	--	--	--	--	--
29-Nov-13	--	--	--	--	--	--	--	--
2-Dec-13	1400	--	--	--	--	--	--	--
3-Dec-13	1530	--	--	--	--	--	--	--
4-Dec-13	1530	--	--	--	--	--	--	--
5-Dec-13	1700	--	--	--	--	--	--	--
6-Dec-13	1400	7.07	23.34	707	1.65	838	--	--
9-Dec-13	1500	--	--	--	--	--	--	--
10-Dec-13	1300	--	--	--	--	--	--	--
11-Dec-13	1530	--	--	--	--	--	--	--
12-Dec-13	1300	--	--	--	--	--	--	--
13-Dec-13	1400	7.22	23.69	696	0.46	139	--	--
16-Dec-13	1230	--	--	--	--	--	--	--
17-Dec-13	1200	--	--	--	--	--	--	--
18-Dec-13	1500	--	--	--	--	--	--	--
19-Dec-13	1430	--	--	--	--	--	--	--
20-Dec-13	1800	7.32	23.04	721	0.83	852	--	--
23-Dec-13	2000	--	--	--	--	--	--	--
24-Dec-13	--	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
25-Dec-13	--	--	--	--	--	--	--	--
26-Dec-13	1300	--	--	--	--	--	--	--
27-Dec-13	1000	7.30	23.06	720	0.95	850	--	--
30-Dec-13	1700	--	--	--	--	--	--	--
31-Dec-13	1300	--	--	--	--	--	--	--
1-Jan-14	--	--	--	--	--	--	--	--
2-Jan-14	2045	--	--	--	--	--	--	--
3-Jan-14	1200	7.31	23.10	725	1.10	838	--	--
6-Jan-14	1500	--	--	--	--	--	--	--
7-Jan-14	1400	--	--	--	--	--	--	--
8-Jan-14	1800	--	--	--	--	--	--	--
9-Jan-14	1700	--	--	--	--	--	--	--
10-Jan-14	1530	7.39	24.34	740	0.90	792	--	--
13-Jan-14	1730	--	--	--	--	--	--	--
14-Jan-14	1500	--	--	--	--	--	--	--
15-Jan-14	1500	--	--	--	--	--	--	--
16-Jan-14	1730	--	--	--	--	--	--	--
17-Jan-14	1400	7.21	24.73	668	1.25	816	--	--
20-Jan-14	1500	--	--	--	--	--	--	--
21-Jan-14	1530	--	--	--	--	--	--	--
22-Jan-14	1450	--	--	--	--	--	--	--
23-Jan-14	1400	--	--	--	--	--	--	--
24-Jan-14	1300	6.96	23.40	680	0.86	842	--	--
27-Jan-14	1300	--	--	--	--	--	--	--
28-Jan-14	1600	--	--	--	--	--	--	--
29-Jan-14	1300	--	--	--	--	--	--	--
30-Jan-14	1200	--	--	--	--	--	--	--
31-Jan-14	1500	7.34	23.24	598	0.69	515	--	--
3-Feb-14	1530	--	--	--	--	--	--	--
4-Feb-14	1430	--	--	--	--	--	--	--
5-Feb-14	1540	--	--	--	--	--	--	--
6-Feb-14	1430	--	--	--	--	--	--	--
7-Feb-14	1100	7.19	20.29	702	3.78	760	--	--
10-Feb-14	1330	--	--	--	--	--	--	--
11-Feb-14	1400	--	--	--	--	--	--	--
12-Feb-14	1600	--	--	--	--	--	--	--
13-Feb-14	1630	--	--	--	--	--	--	--
14-Feb-14	1300	7.15	24.79	738	1.64	730	--	--
17-Feb-14	1630	--	--	--	--	--	--	--
18-Feb-14	1645	--	--	--	--	--	--	--
19-Feb-14	1830	--	--	--	--	--	--	--
20-Feb-14	1530	--	--	--	--	--	--	--
21-Feb-14	1500	7.44	24.59	738	1.55	136	--	--
24-Feb-14	1330	--	--	--	--	--	--	--

Date	Time	PH	Temperature	Conductivity	DO	ORP	ClO4	Nitrate-N
d/m/y			°C	µS/cm	mg/L	mV	mg/L	mg/L
25-Feb-14	1800	--	--	--	--	--	--	--
26-Feb-14	1130	--	--	--	--	--	--	--
27-Feb-14	1445	--	--	--	--	--	--	--
28-Feb-14	1340	7.45	23.88	740	1.48	145	--	--

Note:

(a) The ion selective probe for perchlorate is calibrated to <0.1 mg/L

(b) A dash signifies parmeters that were not read.

(c) UR = Under Range