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CHPRC-02799
Revision 0

# Performance Measure PM-30-5-16: Complete Stage A 300-FF-5 Uranium Sequestration Injections

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

ch2m SM

**P.O. Box 1600**
**Richland, Washington 99352**

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***APPROVED***
*By Ashley Jenkins at 1:47 pm, Feb 11, 2016*

Release Approval Date

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TECHNICAL MEMORANDUM

# Performance Measure PM-30-5-16: Complete Stage A 300-FF-5 Uranium Sequestration Injections

| | |
|---|---|
| **Prepared for:** | 300-FF-5 Operable Unit |
| **Prepared by:** | Randy Hermann |
| **CC:** | Marty Doornbos<br>Patrick Baynes<br>Randy Hermann<br>Virginia Rohay<br>Sunil Mehta<br>Gene Ng<br>Correspondence Control (MSIN G3-39) |
| **Date:** | January 20, 2016 |
| **Doc Number** | CHPRC-02799, REV. 0 |

## 1 Introduction

The purpose of this technical memorandum is to document that Performance Measure PM-30-5-16 has been met through successful completion of the following objective and completion criteria:

- Objective: "Complete Stage A 300-FF-5 uranium sequestration injections by March 31, 2016."
- Completion Criteria: "By March 31, 2016, complete the Stage A 300-FF-5 uranium sequestration injections. Provide technical memo documenting completion of injections with supporting documentation from log books and field data sheets."

## 2 Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) Design Parameters

The enhanced attenuation using the uranium sequestration component of the groundwater remedy involves infiltrating and injecting phosphate solutions to the vadose zone and periodically rewetted zone (PRZ) to sequester, or bind, residual mobile uranium to form insoluble minerals. The target area for application of the phosphate solutions is a 1 ha (3 ac) area containing a persistent source of uranium contamination to groundwater. Phosphate will be injected into the top of the aquifer to mitigate potential impacts to the aquifer from uranium that may be carried downward during phosphate application in the vadose zone.

Uranium sequestration will be implemented using a staged approach. Stage A will consist of performing infiltration/injection in one quadrant of the Enhanced Attenuation Area (EAA), covering approximately 0.3 ha (0.75 ac).

Phosphate will be introduced into the vadose zone using buried irrigation drip line or perforated piping. Injection wells will be used for injecting phosphate into a zone spanning the PRZ and top of the aquifer. The top of aquifer treatment zone will be in place during phosphate infiltration and maintained for a short period afterwards to possibly react with uranium that leaches into groundwater as a result of the phosphate solution applied to the vadose zone.

Phosphate injections will be performed when groundwater conditions are favorable (e.g., during lower river stages). The application in the PRZ will be scheduled to maximize phosphate contact with the PRZ when the PRZ is unsaturated. A detailed description of the approach is provided in DOE/RL-2014-13-ADD2, *Remedial Design Report/Remedial Action Work Plan Addendum for the 300 Area Groundwater* (hereinafter called the remedial design report/remedial action work plan [RDR/RAWP]). Specific details are provided in Section 4.1.2.1 of the RDR/RAWP, and phosphate design elements are described in the following subsections.

## 2.1 Phosphate Infiltration Design Elements

- Conduct continuous (24 hours per day) operation over the 0.3 ha (0.75 ac) Stage A treatment area for the estimated 5 day infiltration period.
- Monitor the advancement of the infiltration wetting front real time using electrical resistivity tomography (ERT).
- Adjust infiltration rates to maximize the contact time of phosphate solution in the vadose zone during the estimated 5 day infiltration period while minimizing the potential for flushing phosphate solution too quickly through the vadose zone and PRZ.

## 2.2 Phosphate Aquifer Injection Design Elements

- Conduct phosphate injections into the nine Stage A aquifer injection well screens intermittently over approximately 7 days.
- Initiate injections the day before beginning phosphate infiltration, resume during infiltration, and conclude the day after finishing phosphate infiltration to establish a layer of phosphate in groundwater below the infiltration area to remediate uranium that may be flushed to groundwater during infiltration operations.
- Conduct phosphate injections into the nine Stage A aquifer well screens. Injections into at least six wells at a time, during daytime hours, while varying the locations of the six wells being injected over the 7 days to maximize the distribution of phosphate in groundwater below the infiltration area.

## 2.3 Phosphate PRZ Injection Design Elements

- Conduct phosphate injections into the nine Stage A PRZ injection well screens over approximately 3 days after completing infiltration, when moisture content in the PRZ will be maximized from infiltration activities.
- Conduct PRZ injections into at least six wells at a time during daytime hours.

## 2.4 Phosphate Concentrate Design Element

Built into each treatment method (infiltration and injection) are the phosphate concentration and phosphate mass design elements. Monosodium phosphate and pyrophosphate solutions are mixed with river water at target ratios and delivered for infiltration and injection. RDR/RAWP (DOE/RL-2014-13-ADD2) Tables 3-2 and 3-4, respectively, provide the phosphate reagent formulation parameters. Table 1 shows the target treatment concentrations along with target total volumes for each treatment method based on the assumed flow rates and schedule presented in Table 4-3 of the RDR/RAWP. Multiplying the chemical concentration by the target total volume gives the chemical mass to be delivered to the treatment area. This is the key design parameter of the Stage A enhanced attenuation.

**Table 1. Uranium Sequestration Stage A Design Summary**

| Design Parameter | Infiltration | PRZ Injection | Aquifer Injection |
|---|---|---|---|
| **Chemical Concentration (mg/L)** | | | |
| Monosodium Phosphate | 5,699 | 9,409 | 9,409 |
| Pyrophosphate | 665 | 1,097 | 1,097 |
| **Target Total Volume (L)** | 3,679,420 | 1,635,298 | 1,635,298 |
| **Chemical Mass (kg)** | | | |
| Monosodium Phosphate | 20,969 | 15,387 | 15,387 |
| Pyrophosphate | 2,447 | 1,794 | 1,794 |

# 3 Operational Completion Summary

Installation of the treatment system occurred between June 2015 and October 2015. Installation commenced with drilling 9 injection wells and 30 monitoring wells from June through mid-August. Well drilling was followed by installation of the infiltration system during the last half of August. The infiltration system consists of a network of high-density polyethylene drip lines installed approximately 1.8 m (6 ft) below ground. Emitters rated at 8 L (2 gal) per hour were welded to the inside of the tubing. The drip lines were spaced 2 m (6.5 ft) apart, resulting in a total of 44 lines aligned southeast to northwest. During September and October, the mixing skids, chemical tanks, river pumps, power supplies, aboveground hoses, and all other required infrastructure were assembled and tested prior to initiating treatment. Figure 1 shows the layout of the infiltration system, injection wells, and monitoring wells in the 0.3 ha (0.75 ac) Stage A EAA.

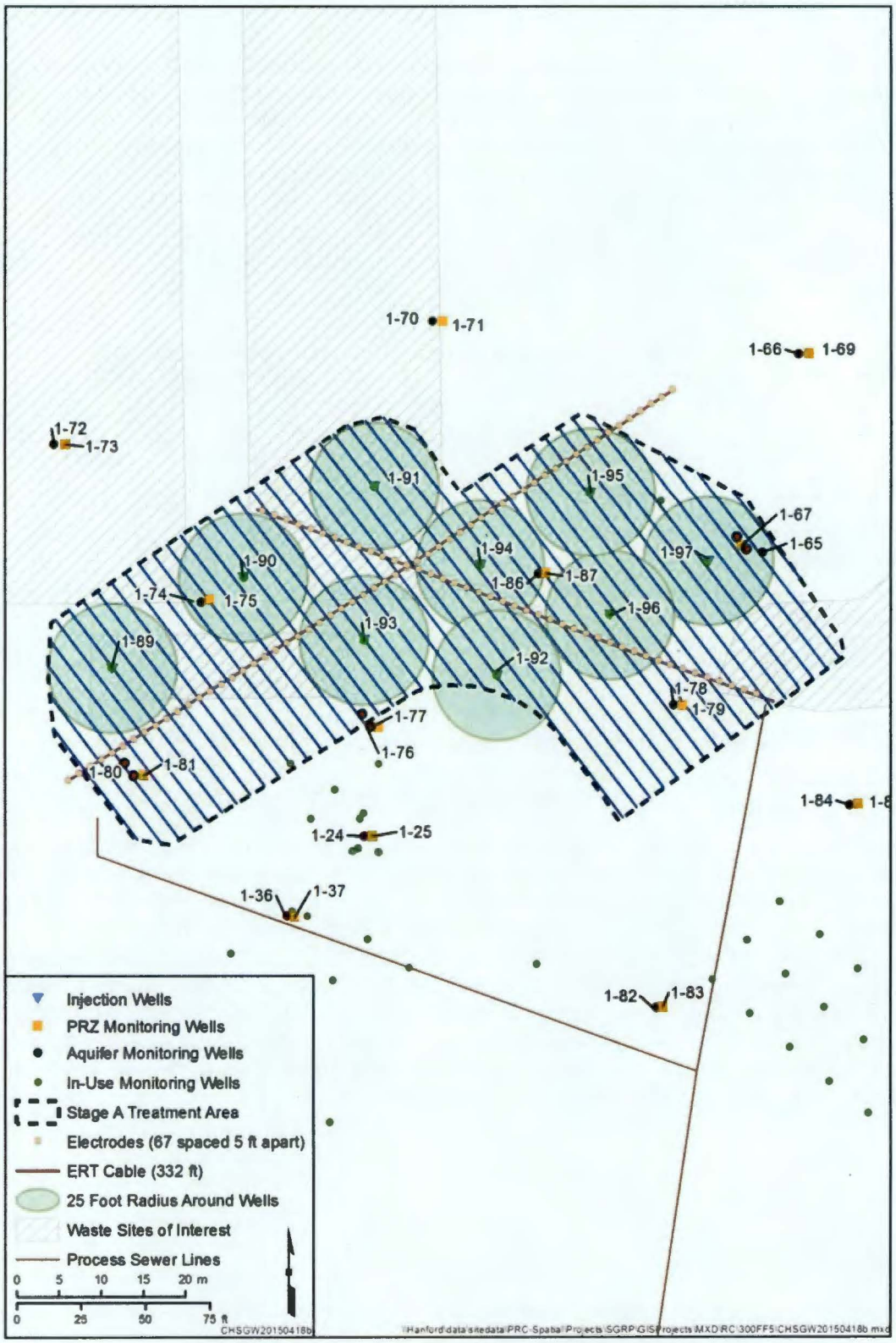


**Figure 1. Installation of the Stage A EAA Wells and Infiltration System**

The operational period for uranium sequestration Stage A infiltration and injections was November 6, 2015, through November 18, 2015. The daily operational activities are summarized in Table 2.

**Table 2. Uranium Sequestration Stage A Operational Summary**

| Operational Day (Date) | Aquifer Injection (Wells)* | PRZ Injection (Wells)* | Infiltration Rate Achieved (gal/min) | Injection Rate Achieved (gal/min) |
|---|---|---|---|---|
| 1 (Nov. 6) | 1-89, 1-90, 1-91, 1-92, 1-93, 1-94 | --- | --- | 300 |
| 2 (Nov. 7) | --- | --- | 56 | --- |
| 3 (Nov. 8) | --- | --- | 56 | --- |
| 4 (Nov. 9) | 1-92, 1-93, 1-94, 1-95, 1-96, 1-97 | --- | 56 | 300 |
| 5 (Nov. 10) | --- | --- | 56 | --- |
| 6 (Nov. 11) | --- | --- | 83 | --- |
| 7 (Nov. 12) | --- | --- | 80 | --- |
| 8 (Nov. 13) | --- | --- | 80 | --- |
| 9 (Nov. 14) | --- | --- | 80 | --- |
| 10 (Nov. 15) | --- | --- | 80 | --- |
| 11 (Nov. 16) | 1-95, 1-96, 1-97, 1-89, 1-90, 1-91 | 1-89, 1-90, 1-91, 1-92, 1-93, 1-94 | --- | 300 |
| 12 (Nov. 17) | --- | 1-92, 1-93, 1-94, 1-95, 1-96, 1-97 | --- | 300 |
| 13 (Nov. 18) | --- | 1-95, 1-96, 1-97, 1-89, 1-90, 1-91 | --- | 300 |

* All wells begin with "399-".

The following subsections compare operational performance to the design parameters of the RDR/RAWP (DOE/RL-2014-13-ADD2). All flow rates, flow volumes, and mixing rates were monitored and recorded by operations personnel. The injection and infiltration data sheets can be found in Appendix A and Appendix B, respectively. The operating logbook, found in Appendix C, contains information related to the operational schedule, shift changes, and maintenance activities.

## 3.1 Infiltration Completion Evaluation

Based on groundwater conductivity data and ERT imaging collected during Stage A operations, the infiltration design elements were achieved. Infiltration commenced on November 7, 2015, and concluded on November 15, 2015.

Because actual infiltration network flow rates were lower than originally planned, the period for infiltration was extended from 5 days to 9 days of 24 hour operations to deliver the target mass of polyphosphate chemicals. Groundwater conductivity data collected from PRZ and aquifer

piezometers and ERT imaging showed that chemical concentration and distribution goals were met with lateral spread of phosphate solution throughout the treatment area and complete vertical migration of the solution through the vadose zone to groundwater.

Groundwater conductivity data collected during infiltration and initial aquifer injections from PRZ and aquifer piezometers, presented in Figure 2, show a sustained increase in conductivity over most of the Stage A area after approximately 4 days. Aquifer injections conducted on operational days 1 and 4 make it difficult to conclude that the phosphate solution wetting front had reached the PRZ, based on evaluation of conductivity alone. However, due to the sustained increase in conductivity in most wells after day 5, along with ERT imaging shown in Figure 3, the wetting front was observed to reach the PRZ at this time. Groundwater samples were collected daily during operations from 7 monitoring wells with the exception of on operational day 8, due to resource availability constraints. Figure 2 shows no data for this day.

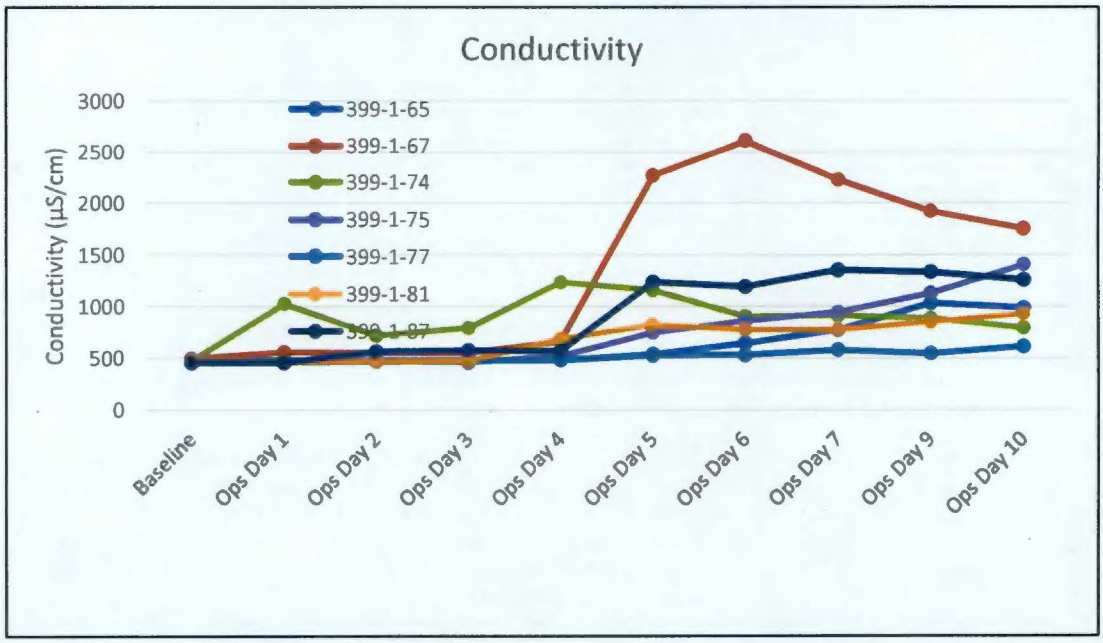


**Figure 2. Conductivity Measured in Monitoring Wells during Operations**

Figure 3 provides ERT imaging for infiltration days (1, 4, 5, and 9). The color scale represents the change in electrical conductivity (EC) of the subsurface compared to pretreatment conditions (Infiltration Day 1). The phosphate amendment is highly electrically conductive and causes a large increase in EC upon application. Color progression from blue to red in the ERT images represent an increase in EC caused by the presence of phosphate solution. Though difficult to distinguish in Figure 3, the groundwater is fairly static at 105 m (344.5 ft) above mean sea level. Images show phosphate solution intruding on the water table on day 4. This is represented where light blue and green colors approach a sharp horizontal line where the colors changes seem to stop. The phosphate solution infiltration progressed for an additional 5 days to increase the moisture content of PRZ sediments. No change in EC was expected to be measured with ERT below the top of the water table due to decreasing resolution with depth and the high dilution rate as treatment solutions disperses into the aquifer however, as observed on the left side of the image (western treatment area) noticeable changes in EC were detected into the aquifer. Further discussion and analysis of the ERT monitoring will be provided in the Stage A Performance Report.

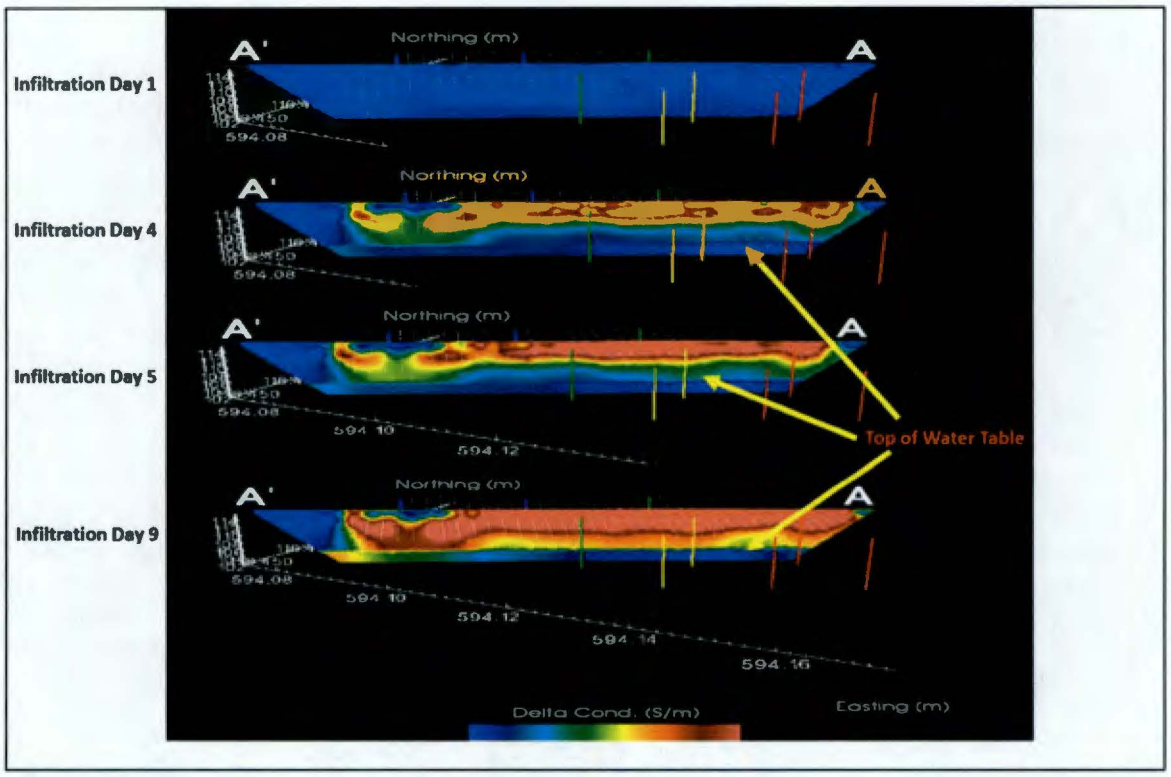


**Figure 3. ERT Imaging of Phosphate Solution Migration through the Vadose Zone to Groundwater**

Table 3 summarizes the Stage A infiltration chemical solution design parameters along with concentrations, volumes, and chemical mass delivered during operations. Calculations for chemical concentrations observed during operations (shown in Table 3) were based on starting concentration of each treatment solution as reported by the chemical vendor, multiplied by a dilution factor from mixing with river water.

**Table 3. Stage A Infiltration Solution and Treatment Summary**

| Treatment Solution | Stage A Operations | Design Parameter |
|---|---|---|
| Monosodium Phosphate Infiltration Concentration (mg/L) | 6,454 | 5,699[a] |
| Pyrophosphate Infiltration Concentration (mg/L) | 757 | 665[a] |
| Total Volume (L) | 3,338,555 | 3,679,420[b] |
| Monosodium Phosphate Mass Infiltrated (kg) | 21,547 | 20,969 |
| Pyrophosphate Mass Infiltrated (kg) | 2,527 | 2,447 |

a. DOE/RL-2014-13-ADD2, Table 3-2.

b. DOE/RL-2014-13-ADD2, Table 4-3.

As shown in Table 3, the amount of phosphate that was delivered to the subsurface through infiltration exceeded the design parameters. This information, along with the supporting conductivity data and ERT imaging, demonstrates that the Stage A infiltration objectives have been met.

## 3.2 Aquifer Injection Completion Evaluation

The sequencing of the Stage A aquifer injections specified in the RDR/RAWP (DOE/RL-2014-13-ADD2) was to inject phosphate solution into the aquifer at least 1 day before, during, and after the phosphate infiltration period to establish a layer of phosphate in groundwater below the infiltration area to attempt to capture uranium that may be flushed to groundwater during infiltration operations.

Based on the operational schedule summarized in Table 2, the Stage A aquifer injection objective was achieved. As shown in Table 2, aquifer injections were conducted on operational day 1, the day prior to the start of infiltration; on operational day 4, the third day of infiltration; and on operational day 11, the day after infiltration was completed.

Table 4 summarizes the Stage A aquifer injection chemical solution concentrations and volumes achieved during operations and the design specification concentration and volumes. Calculations of chemical concentrations observed during operations (shown in Table 4) were based on starting concentration of each treatment solution as reported by the chemical vendor, multiplied by a dilution factor from mixing with river water. Chemical mass injection goals were exceeded.

**Table 4. Stage A Aquifer Injection Solution and Treatment Summary**

| Treatment Compound | Stage A Operations | Design Parameter |
|---|---|---|
| Monosodium Phosphate Aquifer Injection Concentration (mg/L) | 9,747 | 9,409[a] |
| Pyrophosphate Aquifer Injection Concentration (mg/L) | 1,109 | 1,097[a] |
| Total Volume (L) | 1,681,650 | 1,635,298[b] |
| Monosodium Phosphate Mass Infiltrated (kg) | 16,391 | 15,387 |
| Pyrophosphate Mass Infiltrated (kg) | 1,865 | 1,794 |

a. DOE/RL-2014-13-ADD2, Table 3-4.
b. DOE/RL-2014-13-ADD2, Table 4-3.

## 3.3 PRZ Injection Completion Evaluation

Based on the operational schedule summarized in Table 2, the Stage A PRZ injection objectives were achieved. PRZ injections were conducted over a 3 day period after infiltrations were completed.

The infiltrated phosphate solution had penetrated the PRZ sediments for approximately 5 days prior to the initiation of PRZ injections, so moisture content was maximized during injections.

Table 5 summarizes the Stage A PRZ injection chemical solution concentrations and volumes achieved during operations and the design specification concentrations and volumes. Calculations of chemical concentrations observed during operations (shown in Table 5) were based on starting concentration of each treatment solution as reported by the chemical vendor, multiplied by a dilution factor from mixing with river water. Chemical mass injection goals were exceeded.

**Table 5. Stage A PRZ Injection Solution Concentrations and Volumes**

| Treatment Compound | Stage A Operations | Design Parameter |
|---|---|---|
| Monosodium Phosphate PRZ Injection Concentration (mg/L) | 9,742 | 9,409[a] |
| Pyrophosphate PRZ Injection Concentration (mg/L) | 1,085 | 1,097[a] |
| Total Volume (gallons) | 1,792,638 | 1,635,298[b] |
| Monosodium Phosphate Mass Infiltrated (kg) | 17,464 | 15,387 |
| Pyrophosphate Mass Infiltrated (kg) | 1,945 | 1,794 |

a. DOE/RL-2014-13-ADD2, Table 3-4.

b. DOE/RL-2014-13-ADD2, Table 4-3.

# 4 Conclusions

Stage A EAA treatment occurred over 13 days of operations from November 6, 2015, through November 18, 2015. Operations were initiated by injection into the aquifer on day 1, followed by 10 days of continuous infiltration during which a second aquifer injection was accomplished. ERT imaging and sustained increases to groundwater conductivity confirmed that infiltration solution had reached the PRZ and aquifer by the fifth day of infiltration. Infiltration was continued for 5 additional days to deliver the required amount of chemical to the vadose zone and to ensure that PRZ moisture content was maximized prior to injection into the PRZ. Directly following the conclusion of infiltration, the final aquifer injection commenced and was followed by 3 days of injections into the PRZ.

Target treatment mass of phosphate compounds of 20,969 kg for infiltration, 15,387 kg for PRZ injection, and 15,387 kg, prescribed in the RDR/RAWP (DOE/RL-2014-13-ADD2) for aquifer injection, was met during Stage A operations. This memorandum documents the completion of Stage A 300-FF-5 Operable Unit uranium sequestration injections. The effectiveness of Stage A uranium sequestration will be summarized in the Stage A Performance Report.

# 5 Reference

DOE/RL-2014-13-ADD2, 2015, *Remedial Design Report/Remedial Action Work Plan Addendum for the 300 Area Groundwater*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0081151H.

# Appendix A

# Injection Skid Monitoring Data Sheets

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix A - Injection Skid Monitoring Data Sheet

**Skid #1** Round 1 **Operator(s):** Ramirez, ANDOR

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 0 | 132912 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 0 | 14093 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 0 | 8288 | |
| | Overall Mixture | FQI-N1-4A or -4B | 0 | 113077 | |
| | (399-1- 89 ) | FQI-N1-4 | 0 | 25212 | |
| | (399-1- 90 ) | FQI-N1-5 | 0 | 23442 | |
| | (399-1- 91 ) | FQI-N1-6 | 0 | 27687 | |
| | (399-1- 92 ) | FQI-N1-7 | 0 | 26310 | |
| | (399-1- 93 ) | FQI-N1-8 | 0 | 28355 | |
| | (399-1- 94 ) | FQI-N1-9 | 0 | 25471 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | FQI-N1-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~) mg/L RH 2-4-16 | |
| 11/2/2015 | Pre Start | 0941 | ? | ? | ? | ? | ? | 6.79 | 12.1 | 136 | 234 | 10.19 | Columbia River Water Sample |
| 11/2/2015 | 0 | 0954 | 28.7 | 16.4 | 263 | 253 (1) | ✓ | 6.68 | 12.3 | 9200 | 238 | 10.16 | Flow Rate Stable – Take first skid sample |
| 11/2/2015 | 1 | 0941 | 28.7 | 16.3 | 262 | ~~2~~ (1) | ✓ | | | | | | |
| 11/2/2015 | 2 | 1041 | 28.5 | 16.3 | 261 | 300 | ✓ | | | | | | |

832219

Comments: Ultra Meter II S/N 62 12777 CH. Conductivity (µS) Instrument 0709000121336W.

Total flow meter reading oscillating, added well flows = 309.2 0947 11/2/2015

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: 1 Skid ID: #1 Operator(s): ANDOR, RAMIREZ

Wells: 399-1-89, 90, 91, 92, 93 & 94

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | FQI-N1-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/6/15 | 3 | 1154 | 28.6 | 16.3 | 262 | 305 | ✓ | | | | | | RA 2-4-16 |
| 11/6/15 | 4 | 1254 | 28.5 | 16.3 | 261 | 305 | ✓ | 6.91 | 15.8c | 10,550 | 201 | 9.95 | B32120 |
| 11/6/15 | 5 | 1354 | 28.6 | 16.4 | 262 | 306 | ✓ | | | | | | |
| 11/6/15 | 6 | 1454 | 28.5 | 16.4 | 261 | 282 | ✓ | | | | | | |
| | 7 | 1554 | 28.4 | 16.3 | 260 | 305 | ✓ | | | | | | |
| | 8 FINAL | 1646 | 28.4 | 16.2 | 260 | 304 | ✓ | 6.96 | 13.9c | 10,400 | 180 | 10.10 | Take final skid sample, at time of shutdown B32121 |

Comments:

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix A - Injection Skid Monitoring Data Sheet

Skid #1: Round 2 Operator(s): Ramirez / Faath / PLAYTER

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 132912 | 250609 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 14093 | 27976 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 8288 | 16900 | |
| | Overall Mixture | FQI-N1-4A or -4B | 113077 | 210819 | |
| | (399-1-95) | FQI-N1-4 | 25212 | 42686 | |
| | (399-1-96) | FQI-N1-5 | 23442 | 53030 | |
| | (399-1-97) | FQI-N1-6 | 27687 | 42439 | |
| | (399-1-92) | FQI-N1-7 | 26310 | 53144 | |
| | (399-1-94) | FQI-N1-8 | 25471 | 50583 | |
| | (399-1-93) | FQI-N1-9 | 28355 | 55940 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | FQI-N1-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/9/15 | Pre Start | 634 | 0 | 0 | 0 | 0 | ✓ | 5.98 | 14.6 | 47116 | 276 | 8.06 | Columbia River Water Sample |
| 11/9/15 | 0 | 0935 | 28.3 | 16.1 | 260 | 304.4 | ✓ | 6.99 | 14.7 | 10,350 | 260 | 8.28 | Flow Rate Stable – Take first skid sample |
| 11/9/15 | 1 | 1026 | 28.1 | 16.2 | 254 | 300.3 | ✓ | | | | | | |
| 11/9/15 | 2 | 1120 | 27.9 | 16.0 | 256 | 299.9 | ✓ | | | | | | |

Comments:

B32Jm 43
~~B33KTR~~ SEC
B349 K5
1/13/16

A-3

CHPRC-02799, Rev. 0

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: Round 2 Skid ID: #1 Operator(s): Faith/Ramirez

Wells: 399-1-95, 96, 97, 92, 94, 93

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | FQI-N1-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~mg/L~~) mg/L | |
| 11/9/15 | 3 | 1220 | 27.8 | 16.2 | 258 | 302 | ✓ | | | | | | RH 2-4-16 |
| 11/9/15 | 4 | 1309 | 27.8 | 15.9 | 255 | 298.7 | ✓ | 6.99 | 15.7 | 10380 | 270 | 9.30 | |
| 11/9/15 | 5 | 1410 | 27.8 | 15.9 | 256 | 299.7 | ✓ | | | | | | |
| ~~11/9/15~~ 11/9/15 | 6 | 1505 | 27.7 | 16.1 | 255 | 298.8 | ✓ | | | | | | |
| N/A | 7 | | | | | | → | | | | | | |
| 11/9/15 | 8 FINAL | 1600 | 27.2 | 16.1 | 256 | 300.6 | ✓ | 7.05 | 14.8 | 9145 | 242 | 8.26 | Take final skid sample, at time of shutdown |

Comments:

SEC 1/13/16 ~~B33X19~~ B349K6

SEC 1/13/16 ~~B33X18~~ B349K7

CHPRC-02799, Rev. 0

A-4

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - Injection Skid Monitoring Data Sheet

**Skid #1** Round #3 **Operator(s):** FAITH, RAMIREZ, ANDOR

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 250448 | 377654 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 27999 | 41956 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 16763 | 24635 | |
| | Overall Mixture | FQI-N1-4A or -4B | 218034 | 314034 * | |
| | (399-1- 95 ) | FQI-N1-4 | 42686 | 64448 | |
| | (399-1- 96 ) | FQI-N1-5 | 53030 | 84560 | |
| | (399-1- 97 ) | FQI-N1-6 | 42440 | 53629 | |
| | (399-1- 89 ) | FQI-N1-7 | 53147 | 81390 | |
| | (399-1- 90 ) | FQI-N1-8 | 50584 | 77578 | |
| | (399-1- 91 ) | FQI-N1-9 | 55940 | 86857 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/16/15 | Pre Start | 0920 | 0 | 0 | 0 | 0 | ✓ | 7.95 | 12.9 | 28.01 | 188 | 10.23 | Columbia River Water Sample 1332LP |
| 11/16/15 | 0 | 930 | 27.9 | 15.8 | 255.7 | 302.7 | ✓ | 7.07 | 14.5 | 11,150 | 198 | 9.03 | Flow Rate Stable – Take first skid sample |
| 11/16/15 | 1 | 1000 | 29.1 | 15.8 | 256.3 | 303.0 | ✓ | | | | | | 0 HOUR SAMPLES WERE TAKEN late (at 1200) 1332L2 |
| 11/16/15 | 2 | 1100 | 29.3 | 16.1 | 257.6 | 307.7 | ✓ | | | | | | |

**Comments:** * NOT Accurate READING. Total READING IS 448,492 gallon. Sum of wells FQI-N1 4,5,6,7,8,9

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: 3 Skid ID: 1 Operator(s): FAITH, RAMIREZ, ANDOR.

Wells:

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/10/15 | 3 | 1200 | 32.9 | 18.7 | 303.6 | 358.1 | ✓ | | | | | | ~~B32L20~~ ODO 11/10/15 |
| 11/10/15 | 4 | 1300 | 32.7 | 18.8 | 304.2 | 361.7 | ✓ | 7.06 ~~7.16~~ 11/10/15 | 13.6 | 11020 | 245 | 10.21 | B32L26 |
| 11/10/15 | 5 | 1400 | 26.3 | 16.4 | 265.1 | ① 309.3 | ✓ | | | | | | |
| 11/10/15 | 6 | 1500 | 33.6 | 18.3 | 293.9 | ② 350.6 | ✓ | | | | | | |
| 11/10/15 | 7 | 1600 | 32.8 | 18.7 | 300.1 | 353.6 | ✓ | | | | | | |
| | 8 FINAL | ② | | | | | | | | | | | Take final skid sample, at time of shutdown B32L27 |

Comments: ① Well 399-1-95 valved out due to broken airline. ② Well 399-1-95 airline repaired per GW-15-0743/6
② S/O Skid ~~S/D~~ on 8HRS. done each total gallon So Samples NOT TAKEN. 11/16/15

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - Injection Skid Monitoring Data Sheet

**Skid #1** #4 **Operator(s):** ANDOR, DAVIS

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 377654 | 511514 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 41954 | 56475 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 24635 | 32967 | |
| | Overall Mixture | FQI-N1-4A or -4B | * 314036 | * 444869 | |
| | (399-1- ) 92 | FQI-N1-4 | 64448 | 91909 | |
| | (399-1- ) 93 | FQI-N1-5 | 84560 | 110818 | |
| | (399-1- ) 94 | FQI-N1-6 | 53629 | 79482 | |
| | (399-1- ) 89 | FQI-N1-7 | 81390 | 107327 | |
| | (399-1- ) 90 | FQI-N1-8 | 77578 | 102193 | |
| | (399-1- ) 91 | FQI-N1-9 | 86887 | 114934 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/16/15 | Pre Start | 1850 | 0 | 0 | 0 | 0 | ✓ | 7.88 | 13.6° | 170.0 | 198 | 9.49 | Columbia River Water Sample |
| 11-16-15 | 0 | 1855 | 27.8 | 16.0 | 255.4 | 300.1 | ✓ | 7.01 | 14.3° | 11.940 | 182 | 9.12 | Flow Rate Stable – Take first skid sample |
| 11-16-15 | 1 | 2000 | 28.2 | 16.2 | 259.0 | 306.5 | ✓ | | | | | | |
| 11-16-15 | 2 | 2100 | 28.2 | 16.1 | 260.1 | 305.4 | ✓ | | | | | | |

B32J69
B32L28

Comments: * FQI-N1-4A/B SUSPECT READING - READING OF OVERALL MIXTURE IS SUM OF FQI-N1-4A/B 4,5,6,7,8,9-

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: 4 Skid ID: 1 Operator(s): Faith, Rust

Wells: 89-94

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11-16-15 | 3 | 2200 | 28.2 | 16.1 | 260.1 | 306.5 | ✓ | | | | | | B32L29 |
| 11-16-15 | 4 | 2300 | 28.2 | 16.1 | 259.8 | 306.5 | ✓ | 7.09 | 13.8 | 11,860 | 194 | 9.45 | ~~B32L27~~ CDR 11/17/15 |
| | 5 | 0001 | 28.5 | 16.1 | 258.2 | 306.5 | ✓ | | | | | | |
| 11-17-15 | 6 | 01:00 | 28.3 | 16.3 | 259.4 | 307.0 | ✓ | | | | | | |
| 11-17-15 | 7 | 02:00 | 28.5 | 16.2 | 260.7 | 308.4 | ✓ | | | | | | |
| 11-17-15 | 8 FINAL | 03:00 | 28.5 | 16.3 | 260.2 | 308.8 | ✓ | 7.06 | 13.9 | 10,800 | 198 | 9.50 | Take final skid sample, at time of shutdown ~~B32L29~~ B32L30, CDR2 11/17/15 |

Comments:

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - Injection Skid Monitoring Data Sheet

Skid #1 Round-up Operator(s): FAITH, RUST

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 511514 | 639194 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 56475 | 70351 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 32967 | 40860 | |
| | Overall Mixture | FQI-N1-4A or -4B | * 444864 | 558420 | |
| | (399-1- 92 ) | FQI-N1-4 | 91909 | 117224 | |
| | (399-1- 93 ) | FQI-N1-5 | 110818 | 134958 | |
| | (399-1- 94 ) | FQI-N1-6 | 79482 | 102676 | |
| | (399-1- 95 ) | FQI-N1-7 | 107327 | 131711 | |
| | (399-1- 96 ) | FQI-N1-8 | 102193 | 127799 | |
| | (399-1- 97 ) | FQI-N1-9 | 114934 | 142888 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/17/15 | Pre Start | 0330 | 0 | 0 | 0 | 0 | ✓ | 7.38 | 13.1 | 1439 | 174 | 1037 | Columbia River Water Sample |
| 11/17/15 | 0 | 0404 | 28.4 | 16.0 | 260.3 | 302.9 | ✓ | 7.14 | 12.6 | 10580 | 178 | 10.18 | Flow Rate Stable – Take first skid sample |
| 11-17-15 | 1 | 0500 | 28.4 | 16.0 | 262.1 | 308.1 | ✓ | | | | | | |
| 11/17/15 | 2 | 0600 | 28.3 | 16.0 | 262 | 302.3 | ✓ | | | | | | |

B32JM0
B32L31

Comments: * FQI-N1-4A/B suspect readings, Reading of overall mixture is sum FQI-N1-4/B, 4, 5, 6, 7, 8, 9

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: #5 Skid ID: #1 Operator(s): FAITH, ~~ANDRE~~ RUST, Ramirez / POPE

Wells: 399-1-92,93,94,95,96,97

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/17/15 | 3 | 0700 | 28.5 | 16.1 | 262 | 309.1 | ✓ | | | | | | ~~B32L32~~ 11/17/15 |
| 11/17/15 | 4 | 0800 | 28.7 | 16.4 | 262 | 309.8 | ✓ | 7.03 | 15.0 | 11,070 | 188 | 9.48 | B32L32 |
| 11/17/15 | 5 | 0902 | 28.7 | 16.2 | 263 | 308.4 | ✓ | | | | | | |
| 11/17/15 | 6 | 1000 | 28.5 | 16.3 | 263 | 308.6 | ✓ | | | | | | |
| 11/17/15 | 7 | 1100 | 28.4 | 16.3 | 263 | 309 | ✓ | | | | | | |
| 11/17/15 | 8 FINAL | 1200 | 28.5 | 16.3 | 263 | 308.5 | ✓ | 7.11 | 14.2 | 10,610 | 128 | 9.82 | Take final skid sample, at time of shutdown B32L33 |

Comments:

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

| Instrument | S/N | Cal Due Date | Check Std (Pre) | Standard |
|---|---|---|---|---|
| Myron L pH | 6221191 | 2-3-16 | 4.05 @ 20.2°C | Std. 4.01 @ 25C |
| | | | 6.98 @ 20.2°C | Std. 7.00 @ 25C |
| | | | 10.04 @ 20.1 °C | Std. 10.01 @ 25C |
| Myron L Cond | | | 446.4 @ 20.0 °C | Std. 442uS @ 25C |
| Myron L ORP | | | 233 mV@20.2C | Std. 231 mV @ 25C |
| pH 4.00 Hach | Lot#: A5243 | Exp Date: Aug 2019 | Name: | |
| pH 7.00 Hach | Lot#: A5237 | Exp Date: Aug 2017 | Date: | |
| pH 10.0 Hach | Lot#: A5260 | Exp Date: Sept 2016 | Procedure: | |
| Cond Myron L 442 | Lot#: 121741 AS | Exp Date: | | |
| ORP YSI ZOBELL | Lot#: 15B 100453 | Exp Date: | | |

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix A - Injection Skid Monitoring Data Sheet

**Skid #1** Rd 6 **Operator(s):** Pope, Ramirez

| Write well numbers in spaces provided | Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|---|
| | River Water | FQI-N1-1A or -1B | 639194 | 780824 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in log book |
| | Chem Injection#1 (Monosodium Phosphate) | FQI-N1-2A or -2B | 70351 | 86658 | |
| | Chem Injection#2 (Pyrophosphate) | FQI-N1-3A or -3B | 40860 | 50328 | |
| | Overall Mixture | FQI-N1-4A or -4B | * 558420 | * 683278 | |
| | (399-1- 89 ) | FQI-N1-4 | 117224 | 144208 | |
| | (399-1- 90 ) | FQI-N1-5 | 134958 | 160133 | |
| | (399-1- 91 ) | FQI-N1-6 | 102676 | 131135 | |
| | (399-1- 95 ) | FQI-N1-7 | 131711 | 158827 | |
| | (399-1- 96 ) | FQI-N1-8 | 127799 | 157717 | |
| | (399-1- 97 ) | FQI-N1-9 | 142888 | 174456 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | | |
| 11/17/15 | Pre Start | 1210 | 0 | 0 | 0 | 0 | ✓ | 7.62 | 13.3 | 13960 | 182 | 10.38 | Columbia River Water Sample | 832 3mL |
| 11/17/15 | 0 | 1225 | 28.9 | 17.8 | 261 | 308.6 | ✓ | 7.14 | 14.3 | 10860 | 109 | 9.99 | Flow Rate Stable – Take first skid sample | 832L34 |
| 11/18/15 | 1 | 0800 | 28.9 | 18.3 | 263.1 | 311.4 | ✓ | | | | | | | |
| 11/18/15 | 2 | 0900 | 28.9 | 16.8 | 261 | 311 | ✓ | | | | | | | |

Comments: Restarted at 0700 from Shutdown due to high winds on 11/17/15. 1st ~~Sample~~ Readings 11/18/15 will be taken at 0800, and then as previously procedurally scheduled.

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

* overall mixture note: Rosemount was inconsistant in its readings. End Rosemount reading = 683278.

Sum of FQI-N1-4,5,6,7,8,9 readings. = ~~[illegible]~~ ~~FQI-N1-1A/~~ FQI-N1-1A, 2A, 3A = 167405

169250 11/18/15

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/11/15 Effective Date: 11/11/15

### Appendix A - (Cont.) Injection Skid Monitoring Data Sheet

Injection Round: 6 Skid ID: 1 Operator(s): Faoth, Ramirez.

Wells: 399-1-89, 90, 91, 95, 96, 97

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24 hr mark, and third/final at end of injections. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N1-2A or -2B Chem 1 (gpm) | FQI-N1-3A or -3B Chem 2 (gpm) | FQI-N1-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/18/15 | 3 | 1000 | 28.9 | 16.9 | 263 | 310.1 | ✓ | | | | | | |
| 11/18/15 | 4 | 1100 | 33.2 | 19.9 | 300 | 356.1 | ✓ | 7.09 | 13.2 | 10680 | 218 | 9.98 | B32L35 |
| 11/18/15 | 5 | 1200 | 33.2 | 19.8 | 300 | 355 | ✓ | | | | | | |
| 11/18/15 | 6 | 1300 | 33.2 | 19.6 | 300 | 356.4 | ✓ | | | | | | |
| 11/18/15 | 7 | ① | ① | ① | ① | ① | ① | | | | | | |
| 11/18/15 | 8 FINAL | 0 | 0 | 0 | 0 | 0 | 0 | 7.22 | 12.9 | 11280 | 177 | 9.71 | Take final skid sample at time of shutdown B32L36 |

Comments: met the target parameters during 1st hour #6 @ 1242. Took reading at 1300 hrs.

* Sum of FQI-N1-4, 5, 6, 7, 8, 9

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# Appendix B

# Infiltration Skid Monitoring Data Sheets

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - Infiltration Skid Monitoring Data Sheet

Skid #2 Operator(s): ANDOR / PLAYTER

| Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|
| River Water | FQI-N2-1A or 1B | 0 | 795611 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in Comments sections |
| Chem Injection#1 (Monosodium Phosphate) | FQI-N2-2A or 2B | 0 | 53004 | |
| Chem Injection#2 (Pyrophosphate) | FQI-N2-3A or 3B | 0 | 33338 | |
| Overall Mixture | FQI-N2-4A or 4B | 0 | 956011 | |
| | FQI-N2-4 | 0 | 293981 | |
| | FQI-N2-5 | 0 | 298244 | |
| | FQI-N2-6 | 0 | 290969 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or 2B Chem 1 (gpm) | FQI-N2-3A or 3B Chem 2 (gpm) | FQI-N2-1A or 1B River (gpm) | FQI-N2-4A or 4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | RH 2-4-16 |
| 4/7/15 | Pre Start | 0710 | 3.3 | 2.1 | 56 | 76 | ✓ | 7.08 | 13.3 | 154.6 | 275 | 11.78 | Columbia River Water Sample B32JM2 |
| 4/7/15 | 0 | 0716 | 3.3 | 2.8 | 56 | 85 | ✓ | 6.94 | 12.8 | 13,940 | 210 | 13.11 | Flow Rate Stable – Take first skid sample B32L37 |
| 4/7/15 | 1 | 0800 | 3.1 | 2.5 | 52 | 65 | ✓ | | | | | | |
| 4/7/15 | 2 | 0900 | 2.9 | 2.0 | 49 | 59 | ✓ | | | | | | |

Day 1

Comments: TOTAL FLOW METER FQI-N2-4A READINGS ARE ERRATIC. STARTING HOUR #2 LOOKING THE SUM OF METERS FQI-N2-4,5 & 6 ~~TO BE~~ FOR TOTAL FLOW.

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: Skid #2 Operator(s): Andrz / Playter

| | | | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~mg/L~~) mg/L | |
| 11/7/15 | 3 | 1000 | 2.8 | 2.0 | 47 | 57.1 | ✓ | | | | | | RH 2-4-16 |
| 11/7/15 | 4 | 1100 | 2.9 | 2.0 | 48 | 57.3 | ✓ | 6.97 | 15.8 C | 13,830 | 203 | 8.50 | |
| 11/7/15 | 5 | 1200 | 2.8 | 2.1 | 47 | 56.2 | ✓ | | | | | | |
| 11/7/15 | 6 | 1300 | 2.8 | 1.7 | 48 | 57 | ✓ | | | | | | |
| 11/7/15 | 7 | 1400 | 2.9 | 2.0 | 49 | 58.3 | ✓ | | | | | | |
| 11/7/15 | 8 | 1500 | 2.9 | 2.0 | 48 | 58.4 | ✓ | 6.9 | 15.9 | 13,620 | 216 | 9.65 | |

Comments:

B32238

B32239

CHPRC-02788 Rev. 0

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** ANDOR / PLAYTER / FAITH / RAMIREZ

| | | | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-2A or 2B Chem 1 (gpm) | FQI-N2-3A or 3B Chem 2 (gpm) | FQI-N2-1A or 1B River (gpm) | FQI-N2-4A or 4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~ mg/L) | |
| 11/7/15 | 9 | 1615 | 2.6 | 2.1 | 41 | 49.1 | ✓ | | | | | | RH 2-4-16 |
| 11/7/15 | 10 | 1700 | 2.7 | 2.1 | 45 | 54.4 | ✓ | 7.01 | 15.0 | 16,530 | 209 | 942 | |
| 11/7/15 | 11 | 1800 | 2.7 | 2.2 | 45 | 49.9 | ✓ | | | | | | |
| 11/7/15 | 12 | 1925 | 1.4 | 1.0 | 49 | 51.4 | ✓ | | | | | | |
| 11/7/15 | 13 | 2020 | 2.5 | 1.8 | 45 | 49.3 | ✓ | | | | | | |
| 11/7/15 | 14 | 2110 | 2.4 | 1.7 | 45 | 49.3 | ✓ | 6.87 | 16.1 | 13,460 | 279 | 8.85 | |

**Comments:** SYSTEM SHUT DOWN FOR 45 MIN (1530-1615) TO FIX LEAK IN HOSE

B32240

B32241

CHPRC-02799, Rev. 0

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: 2 Operator(s): FAITH/RAMIREZ

| | | | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-1/2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~) mg/L | |
| 11/7/15 | 15 | 2205 | 2.5 | 1.7 | 45 | 49.2 | ✓ | | | | | | RH 2-4-16 |
| 11/7/15 | 16 | 2305 | 2.5 | 1.5 | 45 | 49.0 | ✓ | 6.88 | 16.2 c | 16,260 | 268 | 8.86 | |
| 11/8/15 | 17 | 0005 | 2.5 | 1.4 | 44 | 48.1 | ✓ | | | | | | |
| 11/8/15 | 18 | 0105 | 2.6 | 1.6 | 44 | 49.0 | ✓ | | | | | | |
| 11/8/15 | 19 | 0215 | ① 3.0 | 1.8 | 49 | 53.8 | ✓ | | | | | | |
| 11/8/15 | 20 | 0300 | 3.0 | 1.7 | 49 | 53.7 | ✓ | 6.90 | 14.6 | 10,780 | 289 | 7.94 | |

Comments: ① At 0200, Readings will now be taken at FQI-N2-2A, due to a Flow rate issue between the Flow meter on SKID and the Control Panel display.

B32L2

B32L43

CHPRC-02799, Rev. 0

B-4

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: 2 Operator(s): Faith / Ramirez, Windsor /

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/8/15 | 21 | 0400 | 2.9 | 1.8 | 48 | 52.7 | ✓ | | | | | | RH 2-4-16 |
| 11/8/15 | 22 | 0500 | 2.9 | 1.9 | 48 | 52.8 | ✓ | 6.93 | 14.0 | 10,280 | 277 | 8.50 | |
| 11/8/15 | 23 | 0600 | 2.9 | 2.1 | 46.8 | 51.6 | ✓ | | | | | | |
| 11/8/15 | 24 | 0700 | 2.8 | 2.1 | 46.8 | 50.8 | ✓ | | | | | | |
| 11/8/15 | 25 | 0800 | 2.8 | 2.0 | 46.5 | 50.8 | ✓ | | | | | | |
| 11/8/15 | 26 | 0900 | 2.8 | 2.1 | 45.5 | 50.5 | ✓ | 7.08 | 15.2 | ~~6,8300~~ 6830 11/8/15 | 231 | 9.25 | |

Day 2

Comments:

B32244

B32245

CHPRC-02798, Rev. 0

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: Operator(s):

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~ mg/L) | |
| 11/9/15 | 27 | 1000 | 3.0 | 2.8 | 47.9 | 52.9 | ✓ | | | | | | UP 44 HZ |
| 11/8/15 | 28 | 1100 | 2.9 | 2.3 | 47.3 | 52.5 | ✓ | 7.07 | 13.0 | 6995 ~~6950~~ | 192 | 6.60 | N/A |
| 11/8/15 | 29 | 1200 | 2.9 | 2.2 | 47.2 | 52.5 | ✓ | | | | | | |
| 11/8/15 | 30 | 1300 | 2.9 | 1.9 | 47.3 | 52.4 | ✓ | | | | | | |
| 11/8/15 | 31 | 1400 | 2.9 | 2.0 | 46.9 | 52.0 | ✓ | | | | | | |
| 11/8/15 | 32 | 1500 | 2.8 | 2.3 | 46.7 | 52.0 | ✓ | 7.12 | 15.7 | ~~7940~~ 7199 | 147 | 4.24 | N/A |

Comments:

B32L46

B32L47

CHPRC-02789, Rev. 0

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** **Operator(s):** Billings & Andor

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-1A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/8/15 | 33 | 1600 | 3.0 | 1.9 | 48.6 | 53.7 | ✓ | | | | | | RH 2-4-16 |
| 11/8/15 | 34 | 1700 | 3.0 | 2.0 | 48.4 | 53.4 | ✓ | 7.10 | 14.7 | 6906 | 150 | 5.84 | |
| 11/8/15 | 35 | 1800 | 2.9 | 2.1 | 48.3 | 52.7 | ✓ | | | | | | |
| 11/8/15 | 36 | 1900 | 3.0 | 2.3 | 47.7 | 52.9 | ✓ | | | | | | |
| 11/8/15 | 37 | 2000 | 2.9 | 2.0 | 47.8 | 53.1 | ✓ | | | | | | |
| 11/8/15 | 38 | 2100 | 2.9 | 2.0 | 47.9 | 52.9 | | 7.11 | 14.2 C | 6898 | ~~219~~ 209 | 9.17 | |

**Comments:**

CHPRC-02799, Rev. 0

B32218

B32249

B-7

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** S **Operator(s):** ANOOR, Billingya

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/8/15 | 39 | 2200 | 2.9 | 2.0 | 47.9 | 52.8 | ✓ | | | | | | RH 2-4-16 |
| 11/8/15 | 40 | 2300 | 2.9 | 1.9 | 48 | 52.8 | ✓ | 6.89 | 15.7 | 8574 | 235 | 878 | B349T2 |
| 11/9/15 | 41 | 0001 | 2.9 | 1.8 | 48 | 52.7 | ✓ | | | | | | |
| 11/9/15 | 42 | 0103 | 2.9 | 1.7 | 48 | 52.6 | ✓ | | | | | | |
| 11/9/15 | 43 | 0200 | 2.9 | 1.9 | 48 | 52.8 | ✓ | | | | | | |
| 11/9/15 | 44 | 0300 | 2.9 | 1.9 | 47 | 51.8 | ✓ | 7.08 | 14.7 | 6940 | 246 | 883 | B349T3 |

**Comments:**

CHPRC-03255 Rev. 0

B32 SEC 1/13/16

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: 2 Operator(s): FAHH / RAmirez

| Date | Hour | Time | Flowrates - Skid Parameters (Skid and filter parameters will be measured and recorded hourly) FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | Field Parameters - Infiltration Solution (Field parameters will be measured and recorded once every 4 hours) pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~) mg/L | Comments (After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/9/15 | 45 | 0400 | 2.9 | 1.9 | 48 | 52.8 | ✓ | | | | | | RH 2-4-16 |
| 11/9/15 | 46 | 0500 | 2.8 | 2.2 | 47 | 52.0 | ✓ | 6.96 | 14.7 c | 8,043 | 240 | 8.79 | |
| 11/9/15 | 47 | 0612 | 2.8 | 2.6 | 46 | 51.4 | ✓ | | | | | | |
| 11/9/15 | 48 | 0700 | 2.8 | 1.9 | 46 | 50.7 | ✓ | | | | | | |
| 11/9/15 | 49 | 0800 | 2.8 | 2.1 | 46 | 50.9 | ✓ | | | | | | |
| 11/9/15 | 50 | 0905 | 2.8 | 1.7 | 46 | 50.5 | ✓ | 7.01 | 14.2 | 7377 | 265 | 8.74 | |

Comments:

Day 3

SEC 1/12/16 ~~B338TO~~ B349T4

SEC 1/13/16 ~~B338TT~~ B349T5

CHPRC-[illegible] Rev. 0

## Phosphate Solution Infiltration/Injection Operations

Published Date: 11/05/15 Effective Date: 11/05/15

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: 2 Operator(s): Faulk/Ramirez

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/9/15 | 51 | 1010 | 2.0 | 2.1 | 47 | 51.1 | ✓ | | | | | | RH 2-4-16 |
| 11/9/15 | 52 | 1110 | 2.6 | 1.9 | 47 | 51.5 | ✓ | 7.03 | 15.5 | 7728 | 255 | 8.87 | |
| 11/9/15 | 53 | 1210 | 2.6 | 1.6 | 46 | 50.2 | ✓ | | | | | | |
| 11/9/15 | 54 | 1306 | 2.6 | 1.7 | 46 | 50.3 | ✓ | | | | | | |
| 11/9/15 | 55 | 1400 | 2.6 | 1.6 | 47 | 51.2 | ✓ | | | | | | |
| 11/9/15 | 56 | 1500 | 2.6 | 1.6 | 47 | 51.2 | ✓ | 7.01 | 14.9 | 6265 | 240 | 8.54 | |

Comments:

SEC 1/13/16 ~~B33XXX~~ B34986.

SEC 1/13/16 ~~B33XXX~~ B34987

CHPRO-PRO-OP-53038 Rev. 0

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** **Operator(s):** Playtor / Billingsley

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~) mg/L | |
| 11/9/15 | 57 | 1600 | 2.7 | 1.8 | 48.5 | 53.1 | ✓ | | | | | | RH 2-4-16 |
| 11/9/15 | 58 | 1700 | 2.7 | 1.8 | 48.3 | 53.0 | ✓ | 7.09 | 15.0 | 6316 ~~6346~~ 11/9/15 | 210 | 9.59 ~~9.22~~ 11/9/15 | SEC 4/13/16 ~~B33480~~ B34958 |
| 11/9/15 | 59 | 1800 | 2.7 | 1.7 | 48.7 | 53.1 | ✓ | | | | | | |
| 11/9/15 | 60 | 1900 | 2.7 | 2.0 | 48.2 | 53.2 | ✓ | | | | | | |
| 11/9/15 | 61 | 2000 | 2.7 | 1.8 | 48.2 | 53 | ✓ | | | | | | |
| 11/9/15 | 62 | 2100 | 2.7 | 1.8 | 48.6 | 53.1 | ✓ | 7.09 | 15.4 | 6460 | 192 | 9.25 | SEC 4/13/16 ~~B33476~~ B34979 |

**Comments:**

CHPRC-27 Rev. 0

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Playter / Billingsley / Wise

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/9/15 | 63 | 2200 | 2.7 | 2.2 | 48.3 | 53.2 | ✓ | | | | | | RH 2-4-16 |
| 11/9/15 | 64 | 2300 | 2.7 | 1.9 | 48.8 | 53.5 | ✓ | 7.21 | 14.9 | 6377 | 148 | 9.24 | |
| 11-10-15 | 65 | 0010 | 2.7 | 1.9 | 49.0 | 53.6 | ✓ | | | | | | |
| 11-10-15 | 66 | 0105 | 2.7 | 2.1 | 48.9 | 53.7 | ✓ | | | | | | |
| 11/10/15 | 67 | 0205 | 2.7 | 1.9 | 49.1 | 53.7 | ✓ | | | | | | |
| 11/10/15 | 68 | 0300 | 2.7 | 2.0 | 48.5 | 53.2 | ✓ | 7.21 | 13.9 | 6335 | 157 | 8.96 | mg/L |

**Comments:**

SEC 1/29/16 ~~B22487~~ B349V0

SEC 1/13/16 ~~B33418~~ B349V1

CHPRC-02796 Rev. 0

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Wm Wise / ANDOR, Ramirez

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (~~µg/L~~) mg/L | |
| 11/10/15 | 69 | 0400 | 2.7 | 1.7 | 48.6 | 53.0 | ✓ | | | | | | RH 2-4-16 |
| 11/10/15 | 70 | 0500 | 2.7 | 1.8 | 48.1 | 52.6 | ✓ | 7.24 | 13.9 | 6826 | 147 | 9.25 mg/L | |
| 11/10/15 | 71 | 0600 | 2.6 | 2.1 | 47.6 | 52.2 | ✓ | | | | | | |
| 11/10/15 | 72 | 0700 | 3.2 | 2.0 | 48 | 53.2 | ✓ | | | | | | |
| 11/10/15 | 73 | 0800 | 3.0 | 2.0 | 48 | 53 | ✓ | | | | | | |
| 11/10/15 | 74 | 0900 | 3.0 | 2.2 | 48 | 53.2 | ✓ | 6.95 | 14.3 | 7812 | 226 | 9.30 mg/L | |

Day 4

SEC 1/13/16 ~~B33X9~~ B348V2

SEC 1/13/16 ~~B33X10~~ B349V3

**Comments:**

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** SKID #2 **Operator(s):** Ramerez, Anour

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/10/15 | 75 | 1000 | 3.0 | 2.0 | 48 | 53 | ✓ | | | | | | RH 2-4-16 |
| 11/10/15 | 76 | 1100 | 3.0 | 2.0 | 48 | 53 | ✓ | 7.27 | 14.6 | 7038 | 185 | 9.40 mg/L | |
| 11/10/15 | 77 | 1200 | 3.2 | 2.1 | 49 | 54.3 | ✓ | | | | | | |
| 11/10/15 | 78 | 1300 | 3.1 | 2.0 | 48.5 | 53.5 | ✓ | | | | | | |
| 11/10/15 | 79 | 1400 | 3.0 | 2.1 | 49 | 54.1 | ✓ | | | | | | |
| 11/10/15 | 80 | 1500 | 11/10/15 ~~3.0~~ | 2.0 | 49 | 54 | ✓ | 7.28 | 14.5 C | 6746 | 175 | 9.83 | |

**Comments:**

SEC 1/13/16 ~~B33X01~~ B349V4

CHPRC-00197 Rev. 0

SEC 1/13/16 ~~B33X02~~ B349V5

~~B33~~ ~~B32~~ 11/10/15

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** AWOOR

| Date | Row | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of Infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/10/15 | ~~1700~~ 84 | 1600 | 3.0 | 2.3 | 48.5 | 53.8 | ✓ | | | | | | RH 2-4-16 |
| 11/10/15 | ~~17~~ 82 | 1700 | 3.0 | 1.9 | 49.1 | 54 | ✓ | 7.17 | 14.6° | 7422 | 159 | 10.01 | |
| 11/10/15 | 83 | 1800 | 2.9 | 2.0 | 48.8 | 53.6 | ✓ | | | | | | |
| 11/10/15 | 84 | 1900 | 3.0 | 2.1 | 48.6 | 53.6 | ✓ | | | | | | |
| 11/10/15 | 85 | 2000 | 2.9 | 2.1 | 48.7 | 54.3 | ✓ | | | | | | |
| 11/10/15 | 86 | 2100 | 2.9 | 1.8 | 48.9 | 48.8 | ✓ | 7.18 | 14.4 | 7279 | 150 | 9.70 | |

**Comments:**

B349V6 ~~B33X85~~ SEC 1/13/16

B349V7 ~~B33X84~~ SEC 1/13/16

CHPRP-27091 Rev. 0

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Andor / Patterson.

| | | | Flowrates - Skid Parameters<br>Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution<br>Field parameters will be measured and recorded once every 4 hours | | | | | Comments<br>After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/10/15 | 87 | 2200 | 2.9 | 1.9 | 49.0 | 53.9 | | | | | | | RH 2-4-16 |
| 11/10/15 | 88 | 2300 | 2.9 | 1.8 | 49.2 | 53.8 | | 7.28 | 13.6 | 6670 | 155 | 9.06 | |
| 11/11/15 | 89 | 0010 | 2.5 | 1.8 | 49.0 | 53.9 | | | | | | | |
| 11/11/15 | 90 | 0100 | 2.8 | 2.4 | 48.3 | 54.1 | | | | | | | |
| 11/11/15 | 91 | 0200 | 2.9 | 2.0 | 49.5 | 54.1 | | | | | | | |
| 11/11/15 | 92 | 0300 | 2.9 | 2.0 | 49.6 | 54.0 | | 7.25 | 12.6 | 6440 | 174 | 9.58 | |

B349V8 ~~B33X15~~ SGC 1/13/16 ~~B33X16~~ ~~B33X15~~ 11/20/15

B349V9 ~~B33X16~~ SGC 1/13/16

**Comments:**

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Patterson /

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | FQI-N2-4A or -4B Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ mg/L | |
| 11/11/15 | 93 | ~~0400~~ ~~0500~~ ~~0600~~ | 2.8 | 1.9 | 48.4 | 49.5 | ✓ | | | | | | RH 2-4-16 |
| 11/11/15 | 94 | 0500 | 2.8 | 2.0 | 48.1 | 53.2 | ✓ | 7.21 | 12.0 | 6546 | 157 | 9.57 | |
| 11/11/15 | 95 | 0600 | 3.0 | 2.0 | 47.9 | 52.5 | ✓ | | | | | | |
| 11/11/15 | 96 | 0700 | 3.0 | 2.0 | 49.0 | 54 | ✓ | | | | | | |
| 11/11/15 | 97 | 0800 | 3.0 | 2.1 | 48 | 53.1 | ✓ | | | | | | |
| 11/11/15 | 98 | 0900 | 3.0 | 2.1 | 49.1 | 54.2 | ✓ | 6.99 | 14.8° | 6980 | 215 | 9.56 | |

Day 5

B349W1 ~~B332~~ SEC 1/13/16

B349 ~~B332~~ SEC 1/13/16

**Comments:**

CHPRC-02199 Rev. 0

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** # 2 **Operator(s):** RAMENZ, ANDOR

| | | | Flowrates - Skid Parameters<br>Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution<br>Field parameters will be measured and recorded once every 4 hours | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * ~~FQI-N2-4A or -4B~~ Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ (mg/L) | After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of Infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 11/11/15 | 99 | 1000 | 3.0 | 2.0 | 49.3 | 54.2 | ✓ | | | | | | |
| 11/11/15 | 100 | 1100 | 3.0 | 2.1 | 49.2 | 54.3 | ✓ | | | | | | |
| 11/11/15 | 101 | 1200 | 3.0 | 2.1 | 49.7 | 54.2 | ✓ | | | | | | |
| 11/11/15 | 102 | 1300 | 3.0 | 2.0 | 50 | 55 | ✓ | 7.15 | 15.2 | 6714 | 200 | 9.81 | |

**Comments:**

SEE 11/13/16 ~~B33~~ B334W8 B349W2

* Sum of FQI-N2-4,5,6

| Instrument | S/N | Cal Due Date | Check Std (Pre) | Standard |
|---|---|---|---|---|
| Myron L pH | 6212777 | 1-21-16 | 4.07 @ 18.9C | Std. 4.01 @ 25C |
| [redacted] | | | 7.04 @ 19.1 °C | Std. 7.00 @ 25C |
| | | | 10.07 @ 18.7°C | Std. 10.01 @ 25C |
| Myron L Cond | | | 453 @ 17.1°C | Std. 442uS @ 25C |
| Myron L ORP | | | 231 mV@ 17 °C | Std. 231 mV @ 25C |
| pH 4.00 Hach | Lot#: A5243 | Exp Date: Aug 2019 | Name: | |
| pH 7.00 Hach | Lot#: A5237 | Exp Date: Aug 2017 | Date: | |
| pH 10.0 Hach | Lot#: A5260 | Exp Date: Sept 2016 | Procedure: | |
| Cond Myron L 442 | Lot#: 121741 AS | Exp Date: 12-19-15 | | |
| ORP YSI ZOBELL | Lot#: 15B 100453 | Exp Date: 11-10-15 | | |

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/05/15** **Effective Date: 11/05/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Ramirez - ANOOR -

| | | | Flowrates - Skid Parameters<br>Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution<br>Field parameters will be measured and recorded once every 4 hours | | | | | Comments<br>After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of Infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Hour | Time | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * ~~FQI-N2-4A or -4B~~ Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen ~~(µg/L)~~ (mg/L) | |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| * 11/11/15 | 103 | 1410 ~~1400~~ | 4.7 | 2.6 | 78.1 | 85.6 | ✓ | X | X | X | X | X | |
| 11/11/15 | 104 | 1510 | 4.8 | 3.1 | 79.3 | 87.2 | ✓ | X | X | X | X | X | |
| 11/11/15 | 105 | 1610 | 4.7 | 3.0 | 78.9 | 86.9 | ✓ | X | X | X | X | X | |
| 11/11/15 | 106 | 1705 | 4.7 | 3.0 | 79.0 | 86.6 | ✓ | 7.29 | 14.6 | 6329 | 178 | 10.33 | SEE 1/13/16 ~~B335X~~ V4 B349W3 |

**Comments:** * New 20psi Regulators installed on 1400 HRS Readings
New Ratio's 4.7 Mono, 3.0 Pyro - River Flow 78-80 GPM

* Sum of FQI-N2-4,5,6

## Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: 2 Operator(s): PLAYTER

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of Infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/11/15 | 107 | 1803 | 4.7 | 2.9 | 78.4 | 86.3 | ✓ | | | | | | |
| 11/11/15 | 108 | 1905 | 4.7 | 3.1 | 77.9 | 86 | ✓ | | | | | | |
| 11/11/15 | 109 | 2006 | 4.7 | 2.9 | 77.4 | 85.3 | ✓ | | | | | | |
| 11/11/15 | 110 | 2100 | 4.7 | 2.8 | 77.4 | 84.9 | ✓ | 7.17 | 14.6 | 6595 | 167 | 9.72 | |

Comments:

B349W ~~B3~~ SEC 1/13/16

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** PLAYTER / Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/11/15 | 111 | 2200 | 4.6 | 3.0 | 77.1 | 84.8 | ✓ | | | | | | |
| 11/11/15 | 112 | 2300 | 4.7 | 2.9 | 77.0 | 83.9 | ✓ | | | | | | |
| 11/12/15 | 113 | 0004 | 4.7 | 3.0 | 77.0 | 84.7 | ✓ | | | | | | |
| 11/12/15 | 114 | 0100 | 4.7 | 2.8 | 77.0 | 84.5 | ✓ | 7.19 | 15.0 | 8145 | 164 | 9.53 | |

**Comments:**

SEE 1/13/16 ~~B33~~ B349W5

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 115 | 0200 | 4.7 | 3.0 | 77 | 84.7 | ✓ | | | | | | |
| 11/12/15 | 116 | 0300 | 4.7 | 2.8 | 78 | 84.5 | ✓ | | | | | | |
| 11/12/15 | 117 | 0400 | 4.7 | 2.8 | 78 | 84.5 | ✓ | | | | | | |
| 11/12/15 | 118 | 0500 | 4.6 | 3.1 | 77 | 84.7 | ✓ | 7.21 | 14.9 | 6934 | 157 | 9.28 | |

**Comments:**

* Sum of FQI-N2-4, 5, 6

B349W6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Farah

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 119 | 600 | 4.7 | 3.1 | 77 | 84.8 | ✓ | | | | | | |
| 11/12/15 | 120 | 700 | 4.6 | 3.2 | 77 | 84.8 | ✓ | | | | | | |
| 11/12/15 | 121 | 800 | 4.6 | 3.5 | 76 | 84.1 | ✓ | | | | | | |
| 11/12/15 | 122 | 900 | 4.6 | 3.2 | 75 | 84.8 | ✓ | 7.21 ~~14.9~~ 14.7 | 14.7 | 6799 | 162 | 9.65 | |

Day 6

Comments:

B349W7

* Sum of FQI-N2-4, 5, 6

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CHPRC-02799, Rev. 5

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Faith Ramey [illegible]

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 123 | 1000 | 4.6 | 3.1 | 74 | 84.7 | ✓ | | | | | | |
| 11/12/15 | 124 | 1100 | 4.7 | 3.2 | 73 | 82.1 | ✓ | | | | | | |
| 11/12/15 | 125 | 1200 | 4.6 | 3.3 | 73 | 81.0 | ✓ | | | | | | |
| 11/12/15 | 126 | 1300 | 4.6 | 3.2 | 73 | 80.7 | ✓ | 7.07 | 14.4 | 7343 | 221 | 9.83 mg/L | |

**Comments:**

B349W8

* Sum of FQI-N2-4, 5, 6

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Pg. 1 of 2

| Instrument | S/N | Cal Due Date | Check Std (Pre) | Standard |
|---|---|---|---|---|
| Myron L pH | 622 1191 | 2-3-16 | 4.01 @ 19.4°C | Std. 4.01 @ 25C |
| | | | 7.02 @ 19 °C | Std. 7.00 @ 25C |
| | | | 10.01 @ 19.4°C | Std. 10.01 @ 25C |
| Myron L Cond | | | 447 @ 19 °C | Std. 442uS @ 25C |
| Myron L ORP | | | 231 mV@ 19.0C | Std. 231 mV @ 25C |
| pH 4.00 Hach | Lot#: A5243 | Exp Date: Aug 2019 | Name: | |
| pH 7.00 Hach | Lot#: A5237 | Exp Date: Aug 2017 | Date: | |
| pH 10.0 Hach | Lot#: A5260 | Exp Date: Sept 2016 | Procedure: | |
| Cond Myron L 442 | Lot#: 121741 AS | Exp Date: | | |
| ORP YSI ZOBELL | Lot#: 15B 100453 | Exp Date: | | |

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Andor, Ramirez

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 127 | 1400 | 4.6 | 3.1 | 73 | 80.6 | ✓ | | | | | | |
| 11/12/15 | 128 | 1500 | 4.6 | 3.1 | 73 | 80.6 | ✓ | | | | | | |
| 11/12/15 | 129 | 1600 | 4.6 | 3.1 | 73 | 80.6 | ✓ | | | | | | |
| 11/12/15 | 130 | 1700 | 4.7 | 3.4 | 74.6 | 82.8 | ✓ | 7.28 | 13.8 | 7278 | 164 | 9.86 | B349W9 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Billingsly

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 131 | 1800 | 4.7 | 3.3 | 74.5 | 81.9 | ✓ | | | | | | |
| 11/12/15 | 132 | 1900 | 4.7 | 3.3 | 74.2 | 82.1 | ✓ | | | | | | |
| 11/12/15 | 133 | 2000 | 4.6 | 3.1 | 76.2 | 84 | ✓ | | | | | | |
| 11/12/15 | 134 | 2100 | 4.6 | 3.1 | 76.1 | 84.1 | ✓ | 7.28 | 13.8 | 6867 | 187 | 9.67 | ~~B33XWB~~ |

**Comments:** B349XO

* Sum of FQI-N2-4, 5, 6

SEC 4/13/16

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Billingsley / Davor

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/12/15 | 135 | 2000 ~~2100~~ ~~50~~ n/a | 4.6 | 3.1 | 76 | 83.9 | ✓ | | | | | | |
| 11/12/15 | 136 | 2300 | 4.6 | 3.1 | 76.7 | 84.6 | ✓ | | | | | | |
| 11/13/15 | 137 | 2400 | 4.6 | 3.1 | 76.3 | 84.2 | ✓ | | | | | | |
| 11/13/15 | 138 | 0100 | 4.6 | 3.1 | 76.0 | 83.9 | ✓ | 7.38 | 13.4 C | 6920 | 144 | 9.58 | ~~B33X07~~ 4/13/16 ~~Bx~~ B349X1 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** ANDOR

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | 139 | 0200 | 4.6 | 3.1 | 75.7 | 83.9 | ✓ | | | | | | |
| 11/13/15 | 140 | 0300 | 4.6 | 3.1 | 76.3 | 81.2 | ✓ | | | | | | |
| 11/13/15 | 141 | 0400 | 4.6 | 3.1 | 76.8 | 84.1 | ✓ | | | | | | |
| 11/13/15 | 142 | 0500 | 4.5 | 3.4 | 76.5 | 83.2 | ✓ | 7.37 | 13.8 | 7005 | 133 | 9.19 | ~~B33XW8~~ B349X2 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

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SEC 1/13/16

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** PLAYER / RAMIREZ

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | 143 ~~142~~ 11/13/15 | 0600 | 4.6 | 3.1 | 74 | 81.7 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 144 ~~143~~ | 0700 | 4.6 | 3.1 | 73 | 80.7 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 145 ~~144~~ | 0800 | 4.6 | 3.1 | 72 | 79.7 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 146 ~~145~~ | 0900 | 4.5 | 3.1 | 73.2 | 81.2 | ✓ | 7.21 | 13.6 | 7233 | 112 | 9.53 | ~~B33XX0~~ B349X3 SEC 11/13/16 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

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Lay 7

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| Instrument | S/N | Cal Due Date | Check Std (Pre) | Standard |
|---|---|---|---|---|
| Myron L pH | 6212777 | 1-21-16 | 4.08 @ 20 °C | Std. 4.01 @ 25C |
| [redacted] | | | 6.98 @ 20 °C | Std. 7.00 @ 25C |
| | | | 10.02 @ 20 °C | Std. 10.01 @ 25C |
| Myron L Cond | | | 446.9 @ 20 °C | Std. 442uS @ 25C |
| Myron L ORP | | | 230 mV@20 °C | Std. 231 mV @ 25C |
| pH 4.00 Hach | Lot#: A5243 | Exp Date: Aug 2019 | Name: | |
| pH 7.00 Hach | Lot#: A5237 | Exp Date: Aug 2017 | Date: | |
| pH 10.0 Hach | Lot#: A5260 | Exp Date: Sept 2016 | Procedure: | |
| Cond Myron L 442 | Lot#: 121741 AS | Exp Date: 12-18-15 | | |
| ORP YSI ZOBELL | Lot#: 15B 100453 | Exp Date: 12-10-15 | | |

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** PLAYTER / RAMIREZ

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | ~~146~~ 147 COR | 1000 | 4.6 | 3.1 | 74 | 82 | ✓ | | | | | | |
| 11/13/15 | ~~147~~ 148 COR | 1100 | 4.6 | 3.1 | 73 | 80.9 | ✓ | | | | | | |
| 11/13/15 | ~~148~~ 149 COR | 1200 | 4.6 | 3.1 | 72.6 | 80.3 | ✓ | | | | | | |
| 11/13/15 | ~~149~~ 150 COR | 1300 | 4.6 | 3.0 | 72.3 | 79.8 | ✓ | 7.3 | 14.6 | 72.75 | 172 | 9.82 | ~~B33XX1~~ SEC 11/13/16 B349X4 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** P. DUTOIL / RAMIREZ

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | 11/13/15 151 ~~150~~ | 1400 | 4.7 | 3.1 | 73.9 | 81.8 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 152 ~~151~~ | 1500 | 4.7 | 3.3 | 73.3 | 81.0 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 153 ~~152~~ | 1600 | 4.6 | 3.1 | 73 | 80.7 | ✓ | | | | | | |
| 11/13/15 | 11/13/15 154 ~~153~~ | 1700 | 4.6 | 3.3 | 73 | 80.7 | ✓ | 7.13 | 15.7 | 7456 | 169 | 8.93 | ~~333XX2~~ SEC 4/13/16 B349X5 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | ~~154~~ 155 | 1800 | 4.7 | 3.1 | 74.8 | 82.5 | ✓ | | | | | | |
| 11/13/15 | 156 ~~155~~ | 1900 | 4.7 | 3.0 | 75 | 84.7 | ✓ | | | | | | |
| 11/13/15 | 157 ~~156~~ | 2000 | 4.7 | 3.3 | 74 | 82.8 | ✓ | | | | | | |
| 11/13/15 | 158 ~~157~~ | 2100 | 4.7 | 3.1 | 74 | 82.0 | ✓ | 7.24 | 15.5 | 7368 | 175 | 9.10 | ~~B33XX3~~ SEC 11/13/15 B349X6 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/13/15 | 0800 ~~159~~ 158 11/13/15 | 2200 | 4.7 | 3.0 | 74 | 81.9 | ✓ | | | | | | |
| 11/13/15 | 0900 ~~160~~ ~~159~~ 11/13/15 | 2300 | 4.7 | 3.0 | 76 | 83.9 ~~85.9~~ 11/14/15 | ✓ | | | | | | |
| 11/14/15 | 0000 ~~161~~ ~~160~~ 11/14/15 | 0001 | 4.6 | 3.0 | 76 | 83.9 | ✓ | | | | | | |
| 11/14/15 | 0100 ~~162~~ ~~161~~ 11/14/15 | 0100 | 4.8 | 2.9 | 76 | 82.9 | ✓ | 7.18 | 15.5 | 7212 | 151 | 9.27 | |

**Comments:** B349X7

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 163 | 0200 | 47 | 3.0 | 75 | 82.4 | ✓ | | | | | | |
| 11/14/15 | 164 | 0300 | 47 | 3.1 | 75 | 82.7 | ✓ | | | | | | |
| 11/14/15 | 165 | 0400 | 47 | 3.1 | 74 | 82.1 | ✓ | | | | | | |
| 11/14/15 | 166 | 0500 | 47 | 2.9 | 75 | 83.1 | ✓ | 7.22 | 14.9 | 8057 | 152 | 9.47 | |

**Comments:** B349X8

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Billingsley

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 167 | 0600 | 4.7 | 3.0 | 73.5 | 81.2 | ✓ | | | | | | |
| 11/14/15 | 168 | 0700 | 4.8 | 3.0 | 72.6 | 80.3 | ✓ | | | | | | |
| 11/14/15 | 169 | 0800 | 4.7 | 2.8 | 71.6 | 79.3 | ✓ | | | | | | |
| 11/14/15 | 170 | 0900 | 4.7 | 3.7 | 70.4 | 78.8 | ✓ | 6.96 | 15.1 | 7540 | 170 | 8.65 | |

Day 8

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**Comments:**

* Sum of FQI-N2-4, 5, 6

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B33MX1

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Billingsley / Ramirez

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 171 | 1000 | 4.6 | 3.3 | 70.2 | 78.2 | ✓ | | | | | | |
| 11/14/15 | 172 | 1100 | 4.6 | 3.4 | 69.9 | 78.1 | ✓ | | | | | | |
| 11/14/15 | 173 | 1200 | 4.6 | 3.3 | 69.9 | 77.9 | ✓ | | | | | | |
| 11/14/15 | 174 | 1300 | 4.6 | 3.0 | 70 | 77.8 | ✓ | 7.03 | 16.1c | 795-2 | 230 | 9.42 | |

**Comments:**

* Sum of FQI-N2-4, 5, 6





B33mx2

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: #2 Operator(s): Billingsley / Ramirez

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 175 | 1400 | 4.6 | 3.2 | 70.1 | 78 | ✓ | | | | | | |
| 11/14/15 | 176 | 1500 | 4.6 | 3.2 | 70.1 | 78.4 | ✓ | | | | | | |
| 11/14/15 | 177 | 1600 | 4.6 | 3.3 | 70.3 | 78.5 | ✓ | | | | | | |
| 11/14/15 | 178 | 1700 | 4.7 | 3.1 | 70.9 | 78.7 | ✓ | 7.19 | 15.0 | 7487 | 237 | 9.45 | B33MX3 |

Comments:

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** # 2 **Operator(s):**

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 179 | 1800 | 4.7 | 3.1 | 71.3 | 79.1 | ✓ | | | | | | |
| 11/14/15 | 180 | 1900 | 4.7 | 3.1 | 71.3 | 79.1 | ✓ | | | | | | |
| 11/14/15 | 181 | 2000 | 4.7 | 2.9 | 71.5 | 80.0 | ✓ | | | | | | |
| 11/14/15 | 182 | 2100 | 4.7 | 3.0 | 73.2 | 80.9 | ✓ | 7.07 | 14.1 | 7389 | 225 | 9.60 | B33mx |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):**

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/14/15 | 183 | 2200 | 4.6 | 3.0 | 73.1 | 81.2 | ✓ | | | | | | |
| 11/14/15 | 184 | 2300 | 4.6 | 3.1 | 73.1 | 81.3 | ✓ | | | | | | |
| 11/15/15 | 185 | 0000 | 4.6 | 3.1 | 72.9 | 80.4 | ✓ | | | | | | |
| 11/15/15 | 186 | 0100 | 4.6 | 2.9 | 72.9 | 80.8 | ✓ | 7.11 | 13.6 | 7113 | 189 | 9.68 | B33MX5 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

Skid ID: #2 Operator(s): Playter

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/15 | 187 | 0200 | 4.6 | 2.9 | 73.9 | 80.7 | ✓ | | | | | | |
| 11/15/15 | 188 | 0300 | 4.8 | 3.1 | 73.4 | 80.6 | ✓ | | | | | | |
| 11/15/15 | 189 | 0400 | 4.6 | 2.9 | 72.9 | 80.7 | ✓ | | | | | | |
| 11/15/15 | 190 | 0500 | 4.3 | 2.2 | 73.4 | 80.4 | ✓ | 7.17 | 12.1 | 6724 | 206 | 9.29 | B33MX6 |

Comments:

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** # 2 **Operator(s):** Andre, Faith.

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/15 | 191 | 0600 | 4.4 | 2.4 | 73 | 80.1 | ① ✓ | | | | | | |
| 11/15/15 | 192 | 0700 | 4.1 | 2.6 | 71.6 | 78.6 | ✓ | | | | | | |
| 11/15/15 | 193 ~~192~~ | 0800 | 4.3 | 2.7 | 71.5 | 78.1 | ✓ | | | | | | |
| 11/15/15 | 194 ~~193~~ | 0900 | 4.3 | 2.7 | 70.7 | 78.8 | ✓ | 7.12 | 13.8 | 7036 | 221 | 959 | B33MX7 |

Day 9

**Comments:** ① Opened P1-F1H1, F2H1, F3H1 Valves per management direction due to adjustments made on skid #2.

* Sum of FQI-N2-4, 5, 6

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## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** # 2 **Operator(s):** FAITH, ANOOR

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/15 | 195 ~~199~~ | 1000 | 4.2 | 2.8 | 70.4 | 77.5 | ✓ | | | | | | |
| 11/15/15 | 196 ~~195~~ | 1100 | 4.3 | 2.8 | 70.3 | 77.6 | ✓ | | | | | | |
| 11/15/15 | 197 ~~196~~ | 1200 | 4.2 | 2.8 | 69.7 | 76.8 | ① ✓ | | | | | | |
| 11/15/15 | 198 ~~197~~ | 1300 ~~0100~~ out 11/14 | 4.2 | 2.8 | 70.1 (US) | 77.1 | ✓ | 7.29 | 14.5 | 7526 | 213 | 9.80 | B33MX8 |

Comments: ① Filters have been changed out. all Filters online per management direction.

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** FAITH ANDOR

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/15 | 199 | 1400 | 4.2 | 2.8 | 69.6 | 77.1 | ✓ | | | | | | |
| 11/15/15 | 200 | 1500 | 4.2 | 2.7 | 69.6 | 76.9 | ✓ | | | | | | |
| 11/15/15 | 201 | 1600 | 4.4 | 2.8 | 69.1 | 77.1 | ✓ | | | | | | |
| 11/15/15 | 202 | 1700 | 4.3 | 2.7 | 70.2 | 77.3 | ✓ | 1.22 | 15.2 | 7583 | 201 | 9.73 | B33MX9 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** 2 **Operator(s):** Billingsley

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/15 | 203 | 1800 | 4.3 | 2.8 | 70.3 | 77.7 | ✓ | | | | | | |
| 11/15/15 | 204 | 1900 | 4.3 | 2.7 | 71.1 | 78.1 | ✓ | | | | | | |
| 11/15/15 | 205 | 2000 | 4.3 | 2.7 | 71.1 | 78.4 | ✓ | | | | | | |
| 11/15/15 | 206 | 2100 | 4.3 | 2.7 | 71.5 | 78.8 | ✓ | 7.22 | 13.9 | 7190 | 215 | 9.30 | B33mYO |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Billingsley / Playter

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/15/14 | 207 | 2200 | 4.4 | 2.6 | 71.8 | 79.5 | ✓ | | | | | | |
| 11/15/14 | 208 | 2300 | 4.4 | 2.7 | 72.1 | 79.8 | ✓ | | | | | | |
| 11/16/14 AM 15 | 209 | 0000 | 4.4 | 2.7 | 72.5 | 80.1 | ✓ | | | | | | |
| 11/16/15 | 210 | 0100 | 4.4 | 2.7 | 73.8 | 80.1 | ✓ | 7.09 | 12.7 | 7058 | 214 | 9.57 | B33 mV |

**Comments:**

* Sum of FQI-N2-4, 5, 6

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):**

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/16/15 | 211 | 0200 | 4.4 | 2.7 | 73.3 | 80.4 | ✓ | | | | | | |
| 11/16/15 | 212 | 0300 | 4.4 | 2.7 | 73.2 | 80.1 | ✓ | | | | | | |
| 11/16/15 | 213 | 0400 | 4.4 | 2.7 | 73.2 | 80.3 | ✓ | | | | | | |
| 11/16/15 | 214 | 0500 | 4.4 | 2.7 | 73.2 | 80.3 | ✓ | 6.99 | 12.6 | 7185 | 209 | 9.11 | B33mV2 |

**Comments:**

* Sum of FQI-N2-4, 5, 6

52,442
53,335
Pt

## Phosphate Solution Infiltration/Injection Operations

**Published Date: 11/11/15** **Effective Date: 11/11/15**

### Appendix C - (Cont.) Infiltration Skid Monitoring Data Sheet

**Skid ID:** #2 **Operator(s):** Ramirez, Playter, Antoine / Faith

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Infiltration Solution: Field parameters will be measured and recorded once every 4 hours | | | | | Comments: After flow rate is stable take 1st skid sample, take 2nd at 24-hour mark, and third/final at end of infiltrations. Where a sample is required, it is noted in this column. Note any other observations, irregularities, problems in Comments sections including system interruptions, filter change outs, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/16/15 | 215 | 0600 | 4.4 | 2.7 | 73.2 | 80.6 | ✓ | | | | | | |
| 11/16/15 | 216 | 0700 | 4.4 | 2.9 | 73.0 | 80.4 | ✓ | | | | | | |
| 11/16/15 | 217 | 0800 | 4.2 | 2.6 | 72.9 | 80.0 | ✓ | | | | | | |
| 11/16/15 | | 0810 | ① | ① | ① | ① | ① | ① | ① | ① | ① | ① | B33MY3 |

Comments: ① Target totals met. SKID #2 shutdown per procedure.

* Sum of FQI-N2-4, 5, 6

B-50

CHPRC-02799, Rev. 0

## Appendix C - Infiltration Skid Monitoring Data Sheet

Skid #2 Operator(s): Faith, Ramirez, ANDOR.

| Totalizer Readings | | Start of Injections | End of Injections | Comments |
|---|---|---|---|---|
| River Water | FQI-N2-1A or -1B | | 795611 | During hourly recording, note any observations, irregularities, and/or problems such as system downtime, totalizer maintenance/outage/re-set in Comments sections |
| Chem Injection#1 (Monosodium Phosphate) | FQI-N2-2A or -2B | | 53004 | |
| Chem Injection#2 (Pyrophosphate) | FQI-N2-3A or -3B | | 33338 | |
| Overall Mixture ① | FQI-N2-4A or -4B | | ① 956011 | |
| | FQI-N2-4 | | 293981 | |
| | FQI-N2-5 | | 298244 | |
| | FQI-N2-6 | | 290969 | |

| Date | Hour | Time | Flowrates - Skid Parameters: Skid and filter parameters will be measured and recorded hourly | | | | | Field Parameters - Injection Solution: Field parameters will be measured and recorded once every 4 hours | | | | | After flow rate is stable take 1st skid sample, take 2nd at 4-hour mark, and third/final at end of injections (8 hr). Where a sample is required, it is noted in this column. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FQI-N2-2A or -2B Chem 1 (gpm) | FQI-N2-3A or -3B Chem 2 (gpm) | FQI-N2-1A or -1B River (gpm) | * Total (gpm) | Filter dPs < 45 (✓) | pH | Temperature (°C) | Conductivity (µS/cm) | Oxidation Reduction Potential (± mV) | Dissolved Oxygen (mg/L) | |
| 11/16/15 | Pre Start | | | | | | | | | | | | Columbia River Water Sample |
| | 0 | | | | | | | | | | | | Flow Rate Stable – Take first skid sample |
| | 1 | | | | | | | | | | | | |
| | 2 | | | | | | | | | | | | |

Comments: ① overall mixture note: Rosemont was inconsistant in its Readings - End Rosemont Reading = 956011. FQI-N2-1B, 2A & 3B readings = 881953. Sum of FQI-N2-4,5,6 = 883194. Totals listed per R. Herman per DA. 11/16/15 OD Faith

* Sum of FQI-N2-4, 5, 6

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# Appendix C

# HNF-N-737

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HNF-N-737 1

## NOTEBOOK/LOGBOOK COVERSHEET

| SECTION I | Notebook/Logbook No. |
|---|---|
| | HNF-N-737 1 |
| | Date of Issue: 08/27/2015 — Copy: 1 |
| **RECORD COPY** | Title: 300 AREA SEQUESTRATION |
| **Not for Circulation** | |
| Author: EP BERTRAND | If continued from another notebook/ logbook, give the book number |

This is a controlled notebook/logbook. The assigned custodian is responsible for this book. See MSC-PRO-10863, *Notebooks and Logbooks*, for instructions about controlling, placing input, preserving, and retiring the notebook/ logbook. When the book is completed or no longer needed, contact your Records Management Specialist for a Retention Schedule. Complete Section II of this form and return the notebook/logbook to Controlled Document Management, G3-39. **DO NOT DESTROY.**

| Responsible Custodian | Hanford ID No. | MSIN | Date Assigned |
|---|---|---|---|
| ERIC P BERTRAND | 3464477 | R3-20 | 08/27/2015 |
| | | | |
| | | | |
| | | | |

**SECTION II** Complete this section before returning notebook/logbook to Controlled Document Management, G3-39

Abstract: (Give brief description of contents)

Period Covered: (Inclusive dates - Month/Day/Year)

Custodian's Name — Custodian's Signature and Date

| CDD Name: | Date Received: |
|---|---|
| | |

BD-6001-256 (REV 4)

1

10/27/2015
Ramirez 0907 - Started transfer of Monosodium Phosphate to
Andor. Storage tanks.
Bertrand 0937 - Completed Transfer of Mono Sodium Phosphate.
Dep. 11 17 - Started ~~Mono~~ Sodium phosphate to Storage tank
1140 - Completed Transfer of ~~Mono~~ Sodium phosphate.
0955 - Started transfer of Mono phosphate to Chem tanks.
- Late Entry -
1515 filters ok on Skids, and also. Sixpackers Ready to go.
1525 REVIEWED LOG BOOK. ERIC BERTRAND 10/27/15

10/28/15 Onsite at 0715.
Andor ~~0825~~ 0740 Started Monosodium Phosphate Transfer to Receiving
Ramirez tanks. S/O down at 0825 due to noticing crystaling in site tubes
Bertrand Shutdown transfer. Call Supervisor, will received on what happens
next. Drain Pump was also froze up. Returned to Two Rivers.
0841 Pyrophospate Transfer ~~Started~~ Started to Receiving Tank.
0910 S/O down, Pyrophosphate transfers completed tanks are full.
1120 Discovered a leak on TK #4 Monophoate. Contacted Supervision
Rope offare and Hung Signs around area. Regrouping on recovery.
1430 Started dumping TP-4 tank to tanker, (Two Rivers) - Sent back.
Isolated all Values on tanks.
1520 Access to area has a barrier at the speedbump area Needs
to be clear by OPS Supervisor - for entry - Phone # is on Sign at barrier.
Completed fixing Replacement flow Controllers.
1530 Offsite for the Day.
1535 PROCEDURE SGRP-PRO-OP-52729 "Spill or leak response for pump
and tract activities" was used to handle spill/leak on the
#4 MONOSODIUM PHOSPHATE TANK. All proper notifications were made.
Log book reviewed. ERIC BERTRAND 10/28/15

10/29/15 0800 - ON SITE AND FUELER ON SITE TO REFUEL
RAMIREZ LIGHT PLANTS AND GENERATORS
BERTRAND 0932 - ELECTRICIAN ON SITE TO INSPECT SAMPLE VAN
1077 STARTED TRANSFER OF MONOSODIUM PHOSPHATE TO 2 RIVERS
TANKER. ERIC BERTRAND
1118 TRANSFER COMPLETED (TANKER FULL). APPROX. 4,000 gallons OF MONOSODIUM
PHOSPHATE REMAINING IN TANKS. ERIC BERTRAND
1520 ALL MONOSODIUM PHOSPHATE FROM TANKS 1-6 AND ASSOCIATED
HOSE HAVE BEEN DRAINED BACK TO 2 RIVERS TANKER AND REMOVED
FROM SITE. AREA BARRICADED AROUND TANKS (MONOSODIUM PHOSPHATE 2, 4 & 6)
TO PREVENT ACCESS TO SPILL AREA AT THE BOTTOM OF TANK 4. CLEAN
UP OF AREA WILL OCCUR AT A LATER DATE. ERT POWER SUPPLY
REPLACED AND BACK IN OPERATION. LOG BOOK REVIEWED ERIC BERTRAND

2

11/2/15
Ramirez
Andor
Bertrand

0800 - On Site -
0830 - Rope, Signs Cones blown down, Resetup area - all is good.
1310 - Removed Rope & Signs from Tank farm area
1345 - Fitter line to hose to Disconnect line for freeze protection per Work package GW-15-06882/W.
1349 Installing out of Service tag on TK# 4 inlet Valve ~~4~~ V-MP-10 Inlet Valve. DA notified by OS per telecon. to authorized hanging.
1520 Completed fitter & OPS drain piping + Skid #1 + Skid #2 per GW-15-06882/W.
1530 Offsite
1530 LOG BOOK REVIEWED. ERK BERTRAND

11/3/2015
Bertrand
Ramirez
Andor
Sheely
Crume

0615 On site to receive shipments of Monosodium phosphate from two Rivers chemical
0730 Completed receipt of monosodium phosphate batch # 95765. Temperature of batch upon receipt 69°F. (GW15-70041/0)
0845 Completed receipt of monosodium phosphate batch # 95761 per GW-15-07094/0. Temperature of batch upon receipt 60°F. Noted precipitate accumulating to the two ~~sight~~ sight tubes utilized for level monitoring, tanks 1 and 6. Operations Manager informed of precipitation issue.
1100 Operations, engineering, BTR discussed precipitation issue with vendor and the determination has been made remove the delivered chemicals, and replace with a newly made batch. GW-15-07094/0 will be used to off load. Chemical is NON regulated.
1115 PNNL released to reestablish BRT communication with Cyclay per GW-15-07271/W, work complete PNNL off site.
1300 ALL MONOSODIUM PHOSPHATE TANKS ARE EMPTIED AND CHEMICAL IS BEING TRANSPORTED BACK TO 2 RIVERS. CHEMICAL LINES FROM MONOSODIUM TANKS TO DISCHARGE HEADER HAVE CHEMICAL IN THEM. CALLED RICK ~~[illegible]~~ (LEO) AND RECEIVED APPROVAL TO DISCHARGE TO INFILTRATION FIELD. WORK PACKAGE GW-15-06882/W HAVING A PEN AND INK CHANGE PERFORMED TO PERMIT DRAINING OF LINES.
1320 PLANNER, FWS, PIPE FITTER AND ELECTRICIAN PERFORMING WALK DOWN FOR GW-15-06878/W 200 AREA, INS SKIDS, PIPING, AND ELECTRICAL DISCONNECTS.
1500 Fitters are draining chemical lines to Skids from the tank farms per 15-068821 Winterization Package. Was Completed.

Cont.

3

11/3/15

1630 Offsite.

11/4/15 0708 ON SITE TO WALK DOWN PROCEDURE FOR INJECTION
Ramirez 1000 DD.& WALK DOWN AND INSPECTION
Platter 1230 · Samplers ON Site WALKING DOWN INJECTION
Bertrand SYSTEM AND WPT SURVEYED SAMPLE TRUCK
1630 - Off Site
1635 - REVIEWED LOG BOOK. ERIC BERTRAND

11/5/15 ~~Onsite at 0530~~
Ramirez 0530 - Onsite
Anoor 1030 - Wrapping Chemical Hose in Blankets as well electric Blankets.
Bertrand 1755 Received First tanker Manifest # 95799 Temp 110°-115°
1818 Transfer Completed Monophosphate.
1909 2nd Tanker Started Manifest 95794 Temp 110° Monophosphate
1939 Transfer Completed
1950 Drain Level tube into bucket, and pour appropriate Amt in injection ~~fitting~~ fuel
2000 OFF Site A.E. Anoor / Alvin E. Anoor

11-6-15 0530 Onsite to perform system standup of injection per OP-53030
Ramirez A.E. Anoor / Alvin E. Anoor
Anoor 0704 Late Entry 1939 11/6/2015, Received monosodium phosphate
Bertrand FIRST shipment transfer complete @ 1818 delivery temperature
shady ~110°F to 115°F, second delivery transfer complete @ 1939 chemical temperature 110°F. Manifest numbers are 95799 and 95794
0815 Started skid per SGRP-PRO-OP-53030
0900 Skid is now operating, in order to get river pump to operate at a stable flow rate on river pump had to place river pump in hand per 4.8.13, chemical pumps are operating in AUTO. Total flow instrument FQI-N1-43 flow indication appears to be unreliable but river and individual wells indication operating normally
0940 Total well flow rates read on individual wells = 309.1, chemical pump plus river water flow rate = 306.8
1000 Took an informational set of chemical readings, pH = 6.97, temp = 14.7°C, conduct 10.77 mS, ORP 270, DO 100
1110 Took Information Samples PH - 6.95, Temp 15.6 C, Conductivity 10.43 ORP - 126, DO. 10.09 A.E. Anoor, Alvin E. Anoor
1028 Received Monophosphate Shipment Start off-loading Manifest 95804 Temperature 105°.
1057 Completed Transfer of Monophosphate to tank farm from Tanker.
1442 Started Transfer on Monophosphate to tank farm - Manifest #95808

Cont'

11/6/15 1442- Temp 105°
Renteriz 1519- Completed Transfer of Monophosphate to Tank farm per
Andor SGRP-PRO-OP-53038
Bertrand 1615 Electricians Set up electric blankets on various areas of Chem Lines Teamsters Setup Portable Generators for Electric Blankets Fuel Truck Notified to refill Portable Generator.
1615 Completed all Sampling for Injection Well, our process samples plus Samplers were here doing Sampling
1620 HEIS Sample #'s used for Round 1 of Injection
B32L20, B32L19, Samples were PH, Temp, Conductivity, ORP, DO.
1630 Generator left running to Support heat blanket on Skid #1
1644 Skid #1 S/D 8 hrs Run time
1703 Flushing, Hose Change, and Skid valving Complete
1704 Hoses to Wells 95, 96, 97 Hooked up.
1720 S/D Compressor, for Packers
1725 Offsite, - A.E. Andor/ Alan E. Andor
1730 REVIEWED LAB BOOK. ERIC BERTRAND 11/6/15
0530 Onsite A.E. Andor A.E. Andor
11-7-15 0700 Started Infiltration on Skid #2 System running
Playter- header ~~Pressure~~ at 56gpm, Discharge Pressure 34 PSI
Andor- Completed Intial Sampling of River Water + Skid per
Ford- SGRP-PRO-OP-53038
0730 Drain River Pump 4" Hose Discharge Valve Drain Valve #1 Closed position
0800 Samplers here doing their Samples for project
1200 Received Pyrophosphate 85°- Manifest 95812 Transfer Started to Pyro tank #2 per SGRP-PRO-OP-53038
1245 Transfer Completed of Pyrophosphate.
1300 Received Monophosphate 104° Manifest 95813 Transfer Started
1330 Transfer of ~~Pyrophosphate~~ Monophosphate Completed. per SGRP-PRO-OP-53038
1535 Discovered small Pin hole Leak in Red Discharge Hose from Skid to Infiltration field. Filters repairing with Work package GW-14-29 / y. filter repair package. Shutdown Skid #2 to make repairs
1610 Hose Repaired Section Replaced + Restarted Plant Skid ~~#1~~ #2
1620 Received Tanker of Monophosphate Manifest 95815, Temp 100° Transferred to tank farm.
1700 Transfer of Monophosphate Completed. #3 Shipment for today. per SGRP-PRO-OP-53038.
1735 Turned ~~Andor~~ Logbook over to Ray Renteriz + Cindy Tilk/Bert Andor

11-7-15 1738 Assumed Logbook duties from B. Ander and Kevin Playter.
C. Faith 1750 Received Tanker of Monosodium Phosphate. Transfer started at
R. Ramirez 0654 and stopped at 0737. Manifest 95821. Temperature ~110.
Bertrand Transfer of Monosodium Phosphate completed per SGRP-PRO-OP-53038.
11-8-15 0200. At this time readings will now be taken at FQI-N2-2A, due to a Flow rate issue between the Flow Meter on SKID and the Control panel display.
0415 Walkdown of System and Area, Checked water from Blanket Heaters. No issues found.
0532 Turned Logbook over to Kevin Playter. C. Faith. R. Ramirez

11/8/15 0532 ASSUMED LOGBOOK DUTIES FROM C. FAITH K. PLAYTER K. Playter
FORD 0750 SAMPERS ON SITE FOR ROUTINE PROJECT SAMPLES
PLAYTER 0824 FUEL TRUCKS ON SITE TO FILL UP GENERATORS
1619 FUEL TRUCK ON SITE TO FILL UP GENERATORS
1730 TURNED LOGBOOK OVER TO B. ANDER K. PLAYTER K. Playter 11/8/15

11/08/15 1730 Received Logbook from Kevin Playter / Bert Ander
ANDER 2119 UPON REVIEW OF PREVIOUS CONDUCTIVITY READINGS, IT WAS DISCOVERED
BILLINGSLEY THAT AN ERROR WAS MADE RECORDING MICROSIEMENS AS
CRAIME MILLISIEMENS ON THE ROUNDS DATA SHEETS. THE ERRORS WERE CORRECTED AND EMPHASIS WILL BE PLACED ON RECORDING READINGS IN CORRECT UNITS.
2330 Turn ~~Control Room~~ Logbook over to Ray Ramirez / Andy Faith —

11/8/15 2332 Assumed Logbook duties. C. Faith R. Ramirez
C. Faith 0600 Attempted to Start up SKID #1, AFD-N1-3 showed FAULT.
R. Ramirez 0730 Trouble shooting & Repair on P-N1-3 started.
0830 SKID #1 Started at target flowrates. P-N1-3 operating normally. P-N1-1 in hand, P-N1-2, 3 in Auto.
0845 Samplers arrived to sample for project.
0915 Received Pyrophosphate 91°F Manifest 95822.
1145 Received monosodium phosphate 114°F manifest 95829.
1400 Received monosodium phosphate 114°F manifest 95831.
1622 Turned Logbook over to J. Billingsley. C. Faith 11/9/15

11/9/15 1622 Assumed logbook duties J. Billingsley
1627 Completed injections to wells 399-D-92 thru 97
Injected 13,883 gallons monosodium phosphate, 8,412 gallons pyro phosphate.
Skid 1 flushed, shutdown, isolated and drained.
1113 Turned logbook over to Will Wise. J. Billingsley 11/9/15
2314 recieved shift turnover and accepted duties of FF-5 by sequestration NEO. Will Wise Continued on Page 6

Cont. from Pg 5

11-10-15 Wise Bertrand

0010 Performed hour 65 rounds [illegible]
0105 Performed hour 66 rounds [illegible]
0205 Performed hour 67 rounds [illegible]
0300 Performed hour 68 rounds and field readings, HELS # B33X+8 [illegible]
0400 Performed hour 69 rounds [illegible]
0500 Performed hour 70 rounds Plus field readings [illegible]
0555 REVIEWED LOG BOOK. ERIC BERTRAND [illegible]

11/10/15 FORD RAMEREZ ANDOR

0630 Late Entry Discussed & Review Logbook Belt Order / Ray Ramirez
0800 S/O Skid #2 to Repair outlet Red house per W/O GW ~~-15-0029T/V~~ 11/10/15 / GW/14-0029/X
0800- Walking down job for fixing Pyro Pump on Skid 1 from per W/14-0029/X.
0830 Started Skid #2, after repairs made on Red discharge hoses. to infiltration lines
1225 Received Monophosphate Shipment
1230 Started Monophosphate Shipment to Tank farm. Manifest #95837. Temp- 108°
1300 Monophosphate Shipment Completed.
1600 Entrance Barricade has been Removed per management Request
1930 Late Entry Started pyrophosphate transfer to Tank farm Manifest 95843 Temp. 77°
1600- Transfer Completed Pyrophosphate.
1755 Keep a Eye on 6 Packers DP's "20"
2305 Turn Logbook over to Kevin Patterson / Allen S. Andor —
2304 Accepted logbook & Duties of EF-5 Uranium Sequestration Project. K. Patterson. [illegible]

11/11/15 Patterson

0100 make adjustment to FA1-N2-SB increased to 1.4 per operational supervisor.
0250 - During FIELD walk down a clear liquid was IDENTIFIED Running Down the side of Pyro-phosphate TANK 1. O/S Notified. Due do high winds.
0325 attempted to capture some flowing liquid to Perform ph test. No Further liquid coming from top of Tank. unable to Perform ph test.
0512 PATTERSON Relieved By R. RAMEREZ [illegible]

11/11/15 Ramirez ANDOR FORD

0517 - ASSUMED CONTROL OF LOG BOOK R. RAMIREZ / Allen Andor
0810 - Changed Six packs on Infilteration Skid 2 from 1,2,3 banks to 4,5,6, Banks. 1,2,3 Bank Need Changing
0812 Samplers here to do Standards on Mylonk. This will be a daily Routine.
0900 Maintenance Started Work Package W/14-0029/X To

7

Cont

11-11-15 Replace Pyrophosphate Pump + Drains of System. ~~Skid~~ Skid #1
Ramirez 1030 Completed replacing Pyrophosphate Pump. Bump test for Rotation
Andor of pump OK, Pump will be retested for leak tested. per W/14-0029/Y
Ford on Skid #1
1310 S/O Skid #2 for maintence activity flush System with River Water isolated Chemical Valves. Maintenance will perform per W/O 15-029933/Y. Replacing Infiltration Regulators also Replace Sample Valve V-N2-2 on Skid #2 add hose clamps to hose Regulators higher PSI 20 to give better flow through infiltration lines.
1460 Fitters Complete Regulators installation per 15-029933/Y.
1410 Started Skid #2 Back in operation. 20PSI-Regulators
1455 Skid #2 Stabalize New Ratio - River Water 78-80-
4.7 Mono, 3.0 pyro.
1440 Late Entry Tanker with mono, delivered + Started, Manifest #95854
Temp - 108°
1515 Completed Mono transfer to Tank farm.
1630 Turned Logbook to Kevin Playter - A.E. Andor / Alvin E. Andor
11/11/15 1630 RECEIVED LOGBOOK DUTIES FROM A.E. ANDOR FOR SWING
Playter SHIFT K. PLAYTER K. Playter
2310 TURNED LOGBOOK OVER TO E. FAITH K. PLAYTER K. Playter 11/11/15
Faith 2312 Assumed Logbook from K. Playter. E. Faith 11/11/15.
11/12/15 0505 REVIEWED LOG BOOK.
Faith 0515 MONOSODIUM PUMPING 4.6 - 4.7 gpm AND PYROPHOSPHATE PUMPING
Bertrand AT 2.0 - 3.1 gpm AND RIVER BAR RUNNING AT 77 gpm.
11/12/15 0715 - ERT Back up Running / Windows was updating
Davis Battelle here Complete. All Running.
Ramirez 1010 - Started Pyrophosphate receipt at ~~1000~~ 0935 and ended
Andor at 1008. Manifest 95857 84°F
Faith 1235 Late Entry - Changed filters out on Both Skids * Six Packers
Ford from the River.
1235 Late Entry - Assumed Logbook at 0600 A.E. Andor / Alvin Andor
1330 Received Pyrophosphate #95868 7,502 GALLONS, 84°
1400 Stopped Transfer - Sent Back around 2,000 gallons due tanks are full.
1430 Received Monophosphate Manifest # 95869 110° F. pumping
1500 S/O Transfer to Tank Farm ~~Mono~~ Monophosphate Complete.
1610 Turn ~~Control Room~~ / Logbook over to Jim Billingsley / Bert Andor -
11/12/15 1610 Accepted Log book duties J. Billingsley J. Billingsley
Swings No further entries this page

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11/12/15 Billingsly Ford Bertrand
1700 Field readings of infiltration solution taken.
2100 Field readings of infiltration solution taken.
2317 Turn over logbook to B Andor J Billingsley

11/12/15 ~~Billingsley~~ Bertrand Andor
2317 Assumed Control Room duties from Jan Billingsley A.E. ANDOR / Alvin E Andor
0530 Turn Logbook over to Roy Ramirez + Kevin Playter / Bert Andor A.E. ANDOR.
0540 LOG BOOK REVIEWED. ERIC BERTRAND

11/13/15 Playter Ramirez Crume
0540 ASSUMED CONTROL OF LOG BOOK R RAMIREZ
0730 - SAMPLER ON SITE TO SWITCH OUT MYRON
0800 - RECEIVED 329 GALLONS OF PYROPHOSPHATE ALONG W/ BALANCE OF SHIPMENT FROM 11/12/15 DAYSHIFT. TEMP: 84°F. RECEIVED 3,512 GALLONS OF MONOSODIUM PHOSPHATE, TEMP: 100°F. CHEMICAL RECEIPT COMPLETED AT 0805
1140 - RECEIVED 6,435 GALLONS OF MONOSODIUM PHOSPHATE. TEMP 108°F Chemical RECEIPT complete At 1200 pm
1430 RECEIVED 6,022 GALLONS OF MONOSODIUM PHOSPHATE. TEMP 82°F. CHEMICAL RECEIPT COMPLETE AT 1455.
1740 - RELINQUISHED LOG BOOK TO ERIC BERTRAND R Ramirez

CFaith
1820 Assumed logbook duties. CFaith
1925 Finished a walkdown of work area, checking for leaks & uprighting stantions. No new leaks found.
Turned logbook over to R. Ramirez. CDFaith

11/14/15 Billingsly Ramirez Bowen
0535 - ASSUMED CONTROL OF LOG BOOK R RAMIREZ
0540 - VALVED IN FILTERS 1, 2 AND 3 AND VALVED OUT #4, 5 AND 6 ON SIX PACK
0800 - RECEIVED 6,479 GALLONS OF MONOSODIUM Phosphate COMPLETED UNLOADING AT 0826. TEMP. 112°F
0850 RECEIVED 7,218 GALLONS OF PYRO PHOSPHATE. TEMP 84°F
0915 COMPLETED UNLOADING OF CHEMICAL
1055 - RECEIVED 4,461 GALLONS OF MONOSODIUM PHOSPHATE TEMP 102°F
1125 - COMPLETED UNLOADING OF CHEMICALS
1705 REVIEWED LOGBOOK + ANDSHEET. [illegible]
1730 TURNED OVER LOG BOOK TO ERIC BORTRAND R RAMIREZ

11/14/15 Playter
1730 ASSUMED LOGBOOK DUTIES, SKID #2 AT 78 GPM AND CHEMICALS AT 4.7 FOR CHEM 1 AND 3.1 FOR CHEM 2 K. PLAYTER
0500 CHANGED CHEMICAL RATIOS
0530 TURNED LOGBOOK OVER TO B. ANDOR K. PLAYTER 11/15/15
0530 Received Logbook + Assumed + Review A.E. ANDOR / Alvin Andor

11/15/15
B. Andor
Cindy Fall
Joe Ford
Days

0615- Adjust Chem pumps (Pyro) + (Mono) also put 4,5,6, filters back on line. Chemical pumps adjusted to + filters open to allowing more River Water flow.
0730 Samplers brought Myron L. Sample meter
1140 Fitters here to replace filters on Skid # 2 (River) Side filters for w/o 15-04754 Y. all Canisters are on-line (6)

1

1315 Received 6054 gallons of Monosodium Phosphate Transfer Started at 1220 and ended at 1305. Manifest Number 95893, Temp 118°F.
1400 Took Levels on Pyrophosphate, Monophosphate Pyro 11' 5226 AND, Mono 13' 6398.
1730 Turn Logbook over to Jon Billingsley/Bert Andor

11/15/15
Billingsley
Swing Shift
Playter

1733 Accepted logbook from B Andor. J Billingsley
1106 completed filter skid 2 data monitoring for swing shift.
1116 Turn logbook over to K Playter J Billingsley

11/15/15
PLAYTER

~~1116~~ 1116 11/15/15 ACCEPTED LOGBOOK FROM J. BILLINGSLEY K. PLAYTER
2316 SKID #2 IS ON LINE AND RUNNING ABOUT 80 GPM CHEMICAL #1 IS 4.4 GPM CHEMICAL #2 IS 2.7 GPM
0545 TURNED LOGBOOK OVER TO B. ANDOR K. PLAYTER
0545 Received Logbook duties from + assumed from K. Playter/Bert Andor

CDFaith
11/16/15
Ramirez

0605 Started valve line-up of Skid #1 for Injection per procedure SGRP-PRO-OP-53038. Filters 4, 5, & 6 are open for use on Skid #1.

ANDOR

0608. Late Entry. Received logbook duties. CD Faith 11/16/15

FORD

0810 Started shut down of Skid #2 per procedure SGRP-PRO-OP-53038. Target totals for Monosodium Phosphate: 52940 and Totals for Pyrophosphate: 33,335 were reached.
The infiltration header was flushed and drained.
0815- The chemical lines need to be flushed and drained.
0930- Started SKID #1 and commenced injections into Well's 399-1-95, 96, 97, 89, 90 and 91. Retest completed satisfactorily for new Pyrophosphate pump per GW-15-02931Y.
1055 Late Entry for 1013 - Started Recieving Pyrophosphate. Transfer ended at 1045. Total recept 7280 gallons. Manifest 95894, 70°F.
1215- Increased total flow to approximately 350 gpm. Placed Mono pump "IN HAND".
1310 Started Recipt of Monosodium Phosphate. Manifest 95908, 110°F. 6523 gallons. Chemical recipt completed at 1330
11/15/15 OK 1331 1355 - Valved out 399-1-95 due to broken airline.
1413 - Started recipt of Monosodium Phosphate. Manifest 95903, 106°F
1500 Chemical recipt completed.

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| | |
|---|---|
| 11/10/15 | 1435 Well 399-1-95 repaired per GW-15-01743/G and |
| FAITH | placed back online. |
| RAMIREZ | 1621 - Logbook is turned over to B. Andor. CFaith 11/10/15 |
| ANDOR | 1628 Logbook assumed A.E. Anders A.B. ANDOR |
| FORD | 1600 Started Mono off-loading Manifest # 95910 Temp. 105°F |
| | 1700 Completed Mono Transfer Tank Farm. |
| | 1700 #3 Injection Completed on Wells. Per. SGRP-PRO-OP-53038 |
| | 1855 Started Skid # 1 #4 |
| 11/10/15 1805 | Late Entry Started Pyro tanker to Tank farm #95914 66° TEMP |
| ANDOR | 1840 Late Entry Pyrophosphate Transfer Complete. |
| Davis | 2310 Turned Logbook over to Cindy Faith/ Bert Anders BRET ANDOR |
| Bertrand | 2315 Assumed logbook duties, CFaith |
| Swings 11/11/15 | 0380 Completed Injection Round #3 on wells. Shut down per |
| CFaith | SGRP-PRO-OP-53038. |
| SRust | 0345 - Started Round #5 of Injections to wells per SGRP-PRO-OP-53038. Performed walkdowns of lines to wells. All readings are being taken from the Rosemonts as the |
| 11/11/15 | Control panel readings are not the same. |
| DAYS | 0553 - Turned logbook over to R. Ramirez. CFaith 11/11/15 |
| RAMIREZ | 0553 - ASSUMED CONTROL OF LOG BOOK R RAMIREZ |
| POPE | 0825 - RECEIVED PYROPHOSPHATE 6,704 GAL AT 78° F |
| | 0850 COMPLETED UNLOADING PYROPHOSPHATE |
| | 0857 RECEIVED 6,429 GAL. of MONOSODIUM PHOSPHATE AT 112° F |
| | 0915 COMPLETED UNLOADING OF CHEMICALS AND RECEIVED NEW MYRON INSTRUMENT. |
| | 1130 - RECEIVED, 4,500 GALS OF PYROPHOSPHATE 78° F |
| | 1149 - COMPLETED UNLOADING PYROPHOSPHATE |
| | 1150 - UNITED RENTALS ON SITE TO CHANGE OIL ON GENERATOR FOR SKID 2 |
| | 1225 - RECEIVED MONOSODIUM PHOSPHATE 2,415 GAL AT 112° F |
| | 1254 - COMPLETED UNLOADING OF CHEMICALS |
| | 1403 - SHUT SYSTEM DOWN DUE TO HIGH WINDS |
| | OFF SITE BY RAMIREZ 11-11-15 |
| 11/12/15 | 0600 - REPAIRED LOCK AND TAG BOUNDARYS AFTER |
| DAYS | ASSUMING CONTROL OF LOG BOOK R RAMIREZ |
| FAITH | 0700 Started SKID #1 Injection operation. First |
| RAMIREZ | readings to be taken at 0800. |
| | 0755 Walkdown of work site done. Stantions uplighted for Lock & Tag boundary. Other Stantions and roped areas righted. |
| 0805 | Well 399-1-91 has some subsidence noted around the well. |

11/18/15 Faith Ramirez
1242 · Final Injection targets for Pyrophosphate and monophosphate were achieved. Both chemicals had ~500 gallons left. Running system to inject remainder of mono and pyro into the ground to empty chemical storage tanks.
1345 Completed emptying chemical tanks and lines to extent possible. Flushed and drained skid filters and U pack and opened Skid #1 River Drain Valve.
1440 - All chemical Tank valves have been isolated.
1515 - Last Entry. CDFaith

11/23/15 Andrz Bartnal
0800 Light plant for ERT S/O - ERT All Down, PNNL will be started it up!
0946 United Rentals here fixed light plant, for ERT, apparently had run out fuel so fuel line full of air. Light Plant on line and good.
0947 Cleaned out Sample Van, It has been picked up and removed from Projects
1000 Fitters are working on Wrapping hose up and putting them in Wooden transport Boxes
1001 Electricians removed lights atop Skids #1 & #2 per W/O GW-15-06878/W.
1030 Electricians Secure ground Cables at light Plants, and Generators by Skids put Cone around ends. per W/O GW-15-06878/W.
1310 Carpenters Removed Plywood on Skids #1 and #2 Plywood laying on ground.
1315 Fitters Continued to Roll hoses up

12/9 Shelby Days
0830 Onsite, Set up Stanchions and Sign around site as well as Wet n' Jay Boundries after wind blew them down
1300 Operators Fitters, and teamster here rolling up hoses. Also removed Six pack from site and both Skids #1 & 2 off site. Sent to 273 W. Lay down yard.
Offsite 1530

12/10 Shelby
0830 Onsite at 0830 Reestablished ropes + signs around boundries and Wet n' Jay boundries from wind blowing down Samplers are here. Sampling wells.
0845 Put empty Signs on all Chemical tanks 1-6. Entry labels in Cones Shed.

12/10/2015 Sheely
1315 ERT system had stopped communicating, GW-15-6727/W released. B pen and inlet was incorperated. Held briefing, reset ERT per step 5.2.1. Took some Pictures. Off site Sheely