ECF-300FF5-19-0005
Revision 0

INJECTION VOLUMES FOR 300-FF-5 STAGE B INJECTIONS AND SAMPLING

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

CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

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APPROVED
By Julia Raymer at 3:55 pm, Sep 30, 2019

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ENVIRONMENTAL CALCULATION COVER PAGE

SECTION 1 - Completed by the Responsible Manager

Project:
300-FF-5 Stage B Uranium Sequestration

Date: 01/17/2019

Calculation Title and Description:
Injection Volumes for 300-FF-5 Stage B Injections and Sampling. This ECF calculation shall document the polyphosphate injection volumes delivered to the PRZ and vadose zone as part of the 300-FF-5 record of decision for uranium sequestration.

RELEASE / ISSUE

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SECTION 2 - Completed by Preparer

Calculation Number: ECF-300FF5-19-0005 | Revision Number: 0

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ENVIRONMENTAL CALCULATION COVER PAGE (Continued)

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SECTION 5 - Applicable if Calculation is a Risk Assessment or Uses an Environmental Model

Prior to Initiating Modeling:

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Terms

DQO	data quality objective
EA	enhanced attenuation
ECF	environmental calculation file
gpm	gallons per minute
LVZ	lower vadose zone
OU	operable unit
PRZ	periodically rewetted zone
ROD	record of decision

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1 Purpose

The purpose of this environmental calculation file (ECF) is to document the polyphosphate injection volumes and flow rates delivered to the periodically rewetted zone (PRZ) and lower vadose zone (LVZ) for the Stage B uranium sequestration project. The polyphosphate injections are part of the remedial actions planned in the 300-FF-5 Operable Unit (OU) record of decision (ROD) for uranium sequestration (EPA and DOE, 2013, *Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1*).

2 Background

The 300 Area was home to uranium fuel production and experimental and laboratory facilities that generated solid and liquid waste. Solid waste was placed in burial grounds and shallow landfills, while large volumes of liquid waste were discharged to ponds and trenches designed for infiltration to the underlying soil. These past activities resulted in persistent uranium contamination in the soil and groundwater.

Enhanced attenuation (EA) by polyphosphate injection was the chosen remedy to reduce the mobility of uranium. The polyphosphate solution consists of a blend of orthophosphate (NaH_2PO_4 and KH_2PO_4) and pyrophosphate ($Na_4P_2O_7$) which was then mixed with river water at a 1:10 ratio (SGW-60243, *300-FF-5 Operable Unit Stage B Uranium Sequestration Functional Requirements*) to achieve the target phosphate (PO_4) concentration of about 8000 mg/L and pH between 7 and 7.5 (SGW-60778, *300-FF-5 Operable Unit Stage B Uranium Sequestration System Installation Report)*. The target phosphate concentration of 8000 mg/L is the summed target concentrations of orthophosphate as phosphorous and pyrophosphate as phosphorous converted to phosphate (Table 4, DOE/RL-2014-42-ADD1, *300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan Addendum for Stage B Uranium Sequestration*). The volume of injected solution was equivalent to approximately three pore volumes of the LVZ and PRZ of the stage B that has an area of 2.25 acres (0.9 ha) as outlined in DOE/RL-2014-42-ADD1 (Figure 1).

The volume and flow rate of the polyphosphate blend delivered to each injection well was monitored by six totalizers on each skid. The onsite operator would record four field parameter measurements (dissolved oxygen, specific conductance, temperature, and pH) of the polyphosphate blend every four hours each day during injections. The flow rate of the polyphosphate blend was calculated hourly from the volume readings displayed on the totalizers by the onsite operator. The total volume of river water and solution injected into the ground was calculated daily, on site from the volume readings taken at the start of treatment and end of treatment. This ECF calculates the total injection volumes and flow rates into the PRZ and LVZ for the 300-FF-5 OU Stage B polyphosphate injection solution treatment. In addition, this ECF shows whether the data quality objective (DQO) needs for flow rate and volume to the PRZ and LVZ stated in DOE/RL-2014-42-ADD1 were met.

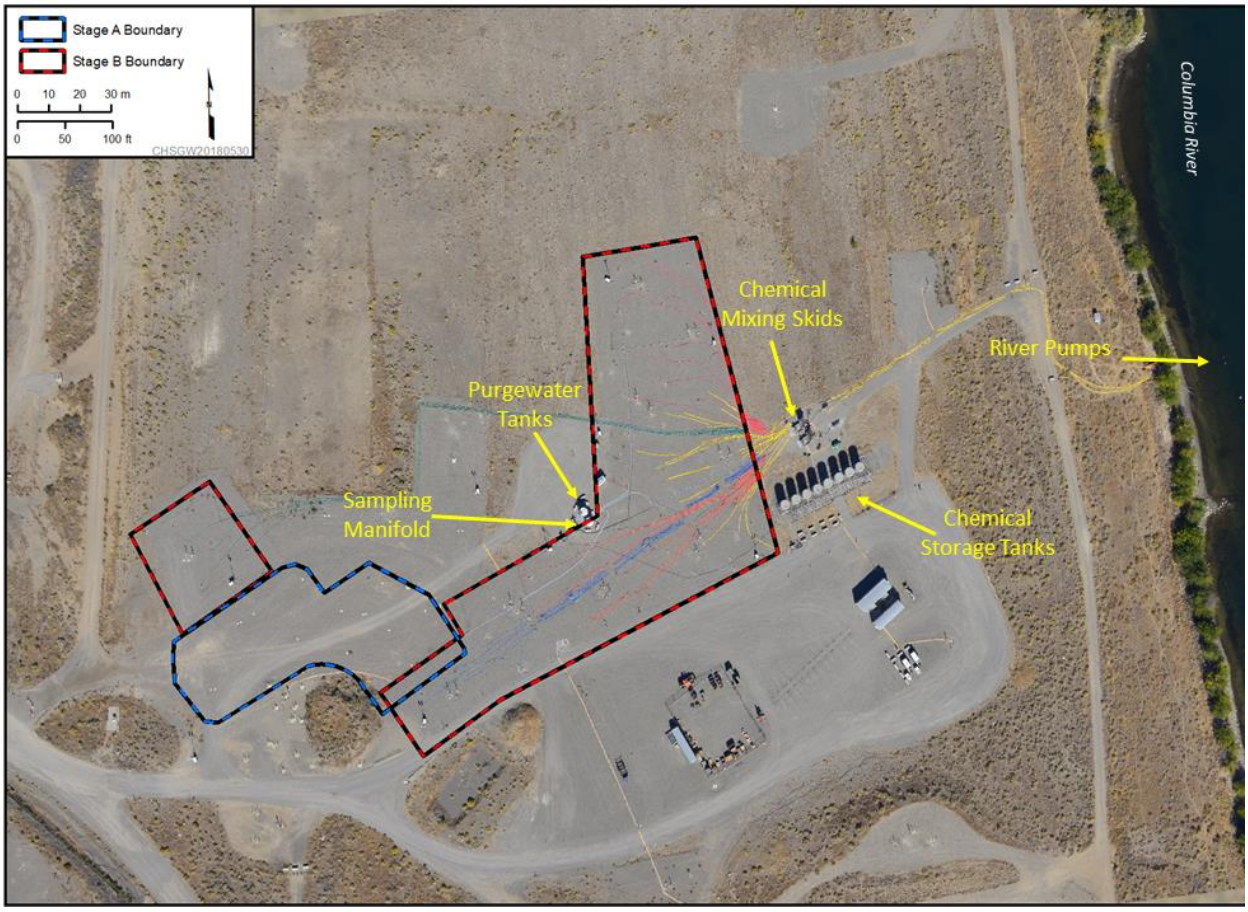

Figure 1. Aerial photo of Stage B Treatment Area

3 Methodology

The Stage B polyphosphate injection treatment system used two chemical mixing skids to deliver a blend of filtered river water and polyphosphate solution to injection wells within the Stage B EA area. Each skid is capable of injecting 6 wells at a time for a total of 12 wells simultaneously. Each skid used two totalizers out of three (FQI-N#-1 and FQI-N#-2 or FQI-N#-3) to monitor the volume of river water and polyphosphate solution delivered to the skid for blending. The FQI-N#4A or -4B totalizer tracks the volume of the overall mixture injected. In addition, skids 1 and 2 were equipped with six totalizers (FQI-N#-4 through FQI-N#-9) that monitored the volume and used to calculate flow rate of fluid injected through each well to the PRZ or LVZ. Tables 1 and 2 correlate the totalizers with the injection wells and their borehole ID. Figure 2 displays the locations of the injection wells denoted by their borehole ID, for each zone within Stage B. Measurements of the blended solution flow rate (gpm) through each well, into either the PRZ or LVZ, were recorded hourly during operations (by field operations personnel), each day for each skid. Figures 3 and 4 display two sheets of the operations document, GW-17-01898/O (see Appendices B and C), on which the field parameters are recorded daily. Appendix B contains the daily operations worksheets associated with skid 1 from start of treatment to end of treatment (9/4/2018 through 9/20/2018). Appendix C contains the daily operations worksheets associated with skid 2 from start of treatment to end of treatment (9/4/2018 through 9/20/2018).

Table 1. Skid 1 Totalizers and Injection Wells

Zone	Totalizer	Injection Well	Borehole ID
1	FQI-N#-4	399-1-139	C9683
	FQI-N#-5	399-1-136	C9680
	FQI-N#-6	399-1-145	C9689
	FQI-N#-7	399-1-137	C9681
	FQI-N#-8	399-1-138	C9682
	FQI-N#-9	399-1-129	C9673
2	FQI-N#-4	399-1-143	C9687
	FQI-N#-5	399-1-120	C9664
	FQI-N#-6	399-1-102	C9646
	FQI-N#-7	399-1-132	C9676
	FQI-N#-8	399-1-124	C9668
	FQI-N#-9	399-1-131	C9675
3	FQI-N#-4	399-1-101	C9645
	FQI-N#-5	399-1-116	C9660
	FQI-N#-6	399-1-115	C9659
	FQI-N#-7	399-1-144	C9688
	FQI-N#-8	399-1-100	C9644
	FQI-N#-9	399-1-99	C9643
4	FQI-N#-4	399-1-106	C9650
	FQI-N#-5	399-1-105	C9649
	FQI-N#-6	399-1-104	C9648
	FQI-N#-7	399-1-107	C9651
	FQI-N#-8	399-1-108	C9652
	FQI-N#-9	399-1-109	C9653

Table 2. Skid 2 Totalizers and Injections Wells

Zone	Totalizer	Injection Well	Borehole ID
1	FQI-N#-4	399-1-103	C9647
	FQI-N#-5	399-1-126	C9670
	FQI-N#-6	399-1-128	C9672
	FQI-N#-7	399-1-130	C9674
	FQI-N#-8	399-1-127	C9671
	FQI-N#-9	399-1-125	C9669
2	FQI-N#-4	399-1-122	C9666
	FQI-N#-5	399-1-135	C9679
	FQI-N#-6	399-1-123	C9667
	FQI-N#-7	399-1-121	C9665
	FQI-N#-8	399-1-133	C9677
	FQI-N#-9	399-1-134	C9678
3	FQI-N#-4	399-1-142	C9686
	FQI-N#-5	399-1-119	C9663
	FQI-N#-6	399-1-117	C9661
	FQI-N#-7	399-1-140	C9684
	FQI-N#-8	399-1-141	C9685
	FQI-N#-9	399-1-118	C9662
4	FQI-N#-4	399-1-112	C9656
	FQI-N#-5	399-1-111	C9655
	FQI-N#-6	399-1-110	C9654
	FQI-N#-7	399-1-113	C9657
	FQI-N#-8	399-1-98	C9642
	FQI-N#-9	399-1-114	C9658

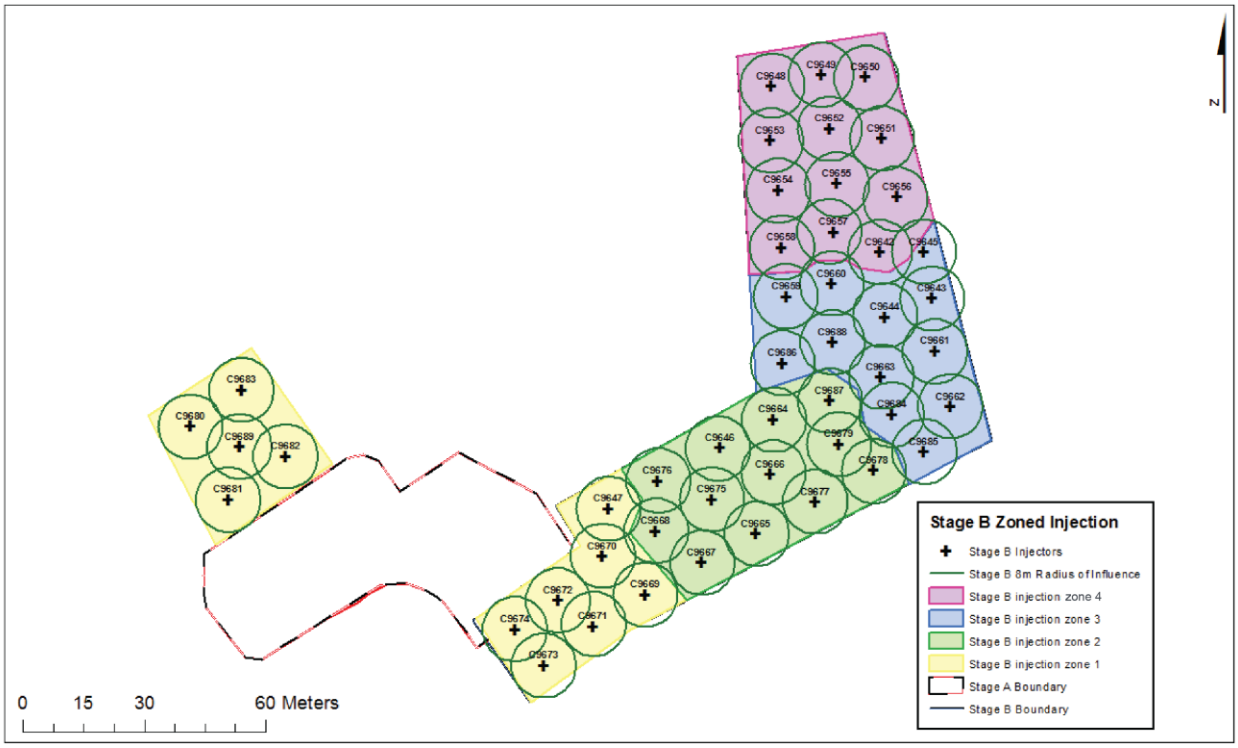

Figure 2. Stage B Zoned Injections

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GW-17-01898/O WCN1

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300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # #1

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	107392	Totalizers Zeroed 9/7/18
	Chem. Injection	FQI-N#-2A or- 2B	N/A	N/A	
	Chem. Injection	FQI-N#-3A or- 3B	0	10602	
	Overall Mixture	FQI-N#-4A or- 4B	0	57112	
	399-1- 139	FQI-N#-4	0	19343	
	399-1- 136	FQI-N#-5	0	19621	
	399-1- 145	FQI-N#-6	0	19604	
	399-1- 137	FQI-N#-7	0	17823	
	399-1- 138	FQI-N#-8	0	19565	
	399-1- 129	FQI-N#-9	0	12765	

Figure 3. Page 51 of 60 for 9/7/2018 Daily Operations Worksheet

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300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1 | Skid ID: #1 | Injection Start Date: 9-4-18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-4-18	1	1030	0	43.2	0	40.9	0	44.3	0	40.0	0	53.4	0	51.6	40
9-4-18	2	1130	0	52	0	45	0	47	0	44	0	44	0	22	40
9-4-18	3	1230	0	52	0	46	0	47	0	44	0	43	0	0	40
9-4-18	4	1330	0	48	0	42	0	43	0	40	0	51	0	18	40
9-4-18	5	1430	0	48	0	42	0	44	0	40	0	49	0	26	40
9-4-18	6	1520	0	48	0	42	0	43	0	40	0	49	0	25	40
	7														
	8														

Figure 4. Page 53 of 57 for 9/4/2018 Daily Operations Worksheet

On skid 1, all six injectors were injecting river water and polyphosphate blend into the wells. However, totalizer FQI-N#-9 for the sixth injection well on skid 1 was malfunctioning and displaying the incorrect volume for the duration of the treatment. Therefore, the injection volume for FQI-N#-9 on skid 1 had to be manually calculated based on the grand total volume of polyphosphate solution injected for the skid minus the injection volumes from FQI-N#-4 through FQI-N#-8. One purpose of this ECF is to present the calculations of volume and flow rate of the polyphosphate solution into the treatment area for each skid during the treatment and for the malfunctioning totalizer on skid 1. The second purpose is to show whether the DQO needs were met for flow rate and volume to the PRZ and LVZ as stated in DOE/RL-2014-42-ADD1.

This ECF presents the calculations on two Microsoft Excel® worksheets specific to skid 1 and skid 2 (see Appendix A). The measurements recorded during treatments (as shown in Figure 3 and 4) are used for the calculations of the daily grand total injection volume for each skid, daily total injection volumes and flow rates for each well, and total average flow rate for the day based off the six injections wells.

® Microsoft Excel is a registered trademark of the Microsoft Corporation in the U.S. and other countries.

3.1 Skid 1 Calculations

The first set of columns under the title "Total Injection Volume," for each day, include the measured volume of river water from totalizer FQI-N#-1A or -1B, polyphosphate solution delivered to the skid that day (totalizer FQI-N#-2A or -2B or FQI-N#-3A or -3B), and the calculated grand total of blended solution injected (Figure 3). Besides the first day of treatment and changeover days (where injection switched from the PRZ to LVZ) when the totalizers were reset to zero, the volume of river water and volume of chemical had to be calculated by subtracting the previous days total from the next treatment day. The grand total of blended solution is the sum of "River Water" volume and "Chemical" volume (Appendix B of this ECF). Total hours pumped is total injection hours to the PRZ or LVZ during that day. From 9/4/2018 to 9/6/2018, the totalizer readings were being recorded onto page 49 of 57 in the daily operations worksheet for each day. From 9/7/2018 to 9/20/2018, the totalizer readings were being recorded onto page 51 of 60.

The next set of columns under the title "Totalizer Injection Volumes (gal) & Injection rates (gpm)" show the daily total volume of blended river water and polyphosphate solution injected through each well. These values are taken directly from the recorded totalizer readings (FQI-N#-4 through FQI-N#-8) for skid 1 in GW-17-01898/O daily operations worksheets in Appendix B of this document. The "Average flow rate per injector (gpm)" is the average of flow recordings calculated hourly, every day, during the treatment for each injection well/totalizer pair. The measurements are read from the totalizers specific to each well and written into their respective columns in the GW-17-01898/O daily operations data sheets in Appendix B of this ECF (Figure 4). From 9/4/2018 to 9/6/2018, totalizer readings were being recorded onto page 53 of 57 in the daily operations worksheet for each day. From 9/7/2018 to 9/20/2018 the totalizer readings were being recorded onto page 56 of 60.

The third set of columns under the title "SUM of Totalizers FQI-N#-4-8" show the sum of volumes and total average flow rate from totalizers FQI-N#-4 through -8. The daily, total average flow rate is calculated as the average of the flow rates from each totalizer (columns E through I). Column L shows the calculated volume and flow rate for the malfunctioning totalizer FQI-N#-9. To calculate the injection volume for totalizer FQI-N#-9, the summed volume of blended solution injected from FQI-N#-4 through FQI-N#-8 (columns E through I) is subtracted from the grand total injection volume of river water and chemical phosphate solution (column D). The injection flow rate for totalizer FQI-N#-9 is calculated by taking the average of the individual average injection flow rates of totalizers FQI-N#-4 through FQI-N#-8. Therefore, the flow rate for totalizer FQI-N#-9 is the same as the "Total Average Flow Rate" under column K.

The values under column M titled "Total gallons injected" is calculated by multiplying the average injection rate, total number of hours pumped, number of wells injected on the skid, and then converting the units to gallons per hour. Column N titled "Average injection volume per well (total gallons)" is calculated by dividing total gallons injected by the number of injection wells on the skid. Columns M and N are calculations based on the average totalizer flow rate for the day, how long the wells were injecting the solution, and the number of totalizers. Column M serves as a check between the calculated grand total volume injected (read at the end of injections from totalizers FQI-N#-1A or B and FQI-N#-2A or B/FQI-N#-3A or B) and what the volume is calculated to be based off the average flow rate from totalizers FQI-N#-4 through FQI-N#-9. Column N is a final summary calculation of average injection volume per well.

3.2 Skid 2 Calculations

The first set of columns under the title "Total Injection Volume," for each day, includes the measured volume of river water from totalizer FQI-N#-1A or -1B, polyphosphate solution delivered to the skid that day (totalizer FQI-N#-2A or -2B or FQI-N#-3A or -3B), and the calculated grand total of blended solution injected (Figure 3). Besides the first day of treatment and changeover days when the totalizers were reset to zero because of a switch from the PRZ to the LVZ, the volume of river water and volume of chemical had to be calculated by subtracting the previous days total from the next treatment day. The grand total of blended solution is the sum of "River Water" volume and "Chemical" volume (Appendix C of this ECF). Total hours pumped is total injection hours to the PRZ or LVZ during that day. From 9/4/2018 to 9/6/2018, totalizer readings were being recorded onto page 49 of 57 in the daily operations worksheet for each day. From 9/7/2018 to 9/20/2018. The totalizer readings were being recorded onto page 51 of 60.

The next set of columns under the title "Totalizer Injection Volumes (gal) & Injection rates (gpm)" show the daily total volume of blended river water and polyphosphate solution injected through each well. These values are taken directly from the recorded totalizer readings (FQI-N#-4 through FQI-N#-9) for skid 2 in GW-17-01898/O daily operations worksheets in Appendix C of this ECF. The "Average flow rate per injector (gpm)" is the average of flow recordings calculated hourly, every day, during the treatment for each injection well/totalizer pair. The measurements are read from the totalizers specific to each well and written into their respective columns in the GW-17-01898/O daily operations worksheets in Appendix C of this document (Figure 4). From 9/4/2018 to 9/6/2018, totalizer readings were being recorded onto page 53 of 57 in the daily operations worksheet for each day. From 9/7/2018 to 9/20/2018 the totalizer readings were being recorded onto page 56 of 60.

The third set of columns under the title "SUM of Totalizers FQI-N#-4-9" show the sum of volumes and total average flow rate from totalizers FQI-N#-4 through -9. The daily, total average flow rate is calculated as the average of the flow rates from each totalizer (columns E through J). Unlike skid 1, all the totalizers were functioning on skid 2, and no further calculations were required for totalizer FQI-N#-9.

The values under column M titled "Total gallons injected" is calculated by multiplying the average injection rate, total number of hours pumped, number of wells injected on the skid, and then converting the units to gallons per hour. Column N titled "Average injection volume per well (total gallons)" is calculated by dividing total gallons injected by the number of injection wells on the skid. Columns M and N are calculations based on the average totalizer flow rate for the day, how long the wells were injecting the solution, and the amount of totalizers. Column M serves as a check between the calculated grand total volume injected (read at the end of injections from totalizers FQI-N#-1A or B and FQI-N#-2A or B/FQI-N#-3A or B) and what the volume is calculated to be based off the average flow rate from totalizers FQI-N#-4 through FQI-N#-9. Column N is a final summary calculation of average injection volume per well.

Columns P, Q, and R are for skid 2 only since all the skid totalizers were functioning. These columns also serve as a check between the calculated grand total volume injected (column D; read at the end of injections from totalizers FQI-N#-1A or B and FQI-N#-1A or B/FQI-N#-2A or B) and the sum of volumes read at the end of injections from totalizers FQI -N#-4 through FQI-N#-9 (column L). The calculated and read total volumes should come out to within five percent of each other (Section 3 of DOE/RL-2014-42-ADD1).

4 Assumptions and Inputs

As injections move from zone 1 through 4, each totalizer that is associated with specific injection wells monitor the volume and flow rate of river water, chemical, and the blended solution. Tables 1 and 2 show the correlation between totalizers and injection wells for each zone. Inputs consist of volume (gallons) and flow rate (gpm) values read and calculated either hourly or at the end of injections from the totalizers on skids 1 and 2. For the dates of 9/4/2018 through 9/6/2018, the inputs used in the ECF calculations are found on pages 49 of 57 and 53 of 57 of the GW-17-01898/O daily operations worksheets for both skids (Appendix B and C of this ECF). For dates 9/7/2018 through 9/20/2018, the inputs are found on pages 51 of 60 and 56 of 60 of the GW-17-01898/O daily operations worksheets for both skids (Appendix B and C of this ECF).

Several assumptions were made for this ECF. To calculate the flow rate through totalizer FQI-N#-9 on skid 1, an assumption was made that the flow rate through totalizer FQI-N#-9 operates at a flow rate equal to the average of the five other totalizers. In addition, it is assumed that the volume of solution through totalizer FQI-N#-9 is equal to the difference between the grand total volume and the sum of the volumes from totalizers FQI-N#-4 through -8. Finally, this ECF does not base the grand total off of the readings from totalizer FQI-N3-4A or -4B. The grand total volume and sum total volume values (shown in column D and column L) are calculated total volumes of blended solution injected into the treatment area because it is assumed to be more accurate than the total injected volume recorded at the end of injections from FQI-N#-4A or -4B. The reasons for this assumption include the project scientist's concern about the uncertainty of one measurement taken at the end of injections from the totalizer FQI-N#-4A or -4B and the idea that a sum of hourly measurements could capture, with more accuracy, the amount of solution injected into each well and thus give a more accurate total volume of solution injected for each day.

On 9/4/2018, the volumes of blended solution injected into each well read from the totalizers FQI-N#-4 through -9 was anomalously low. The low values caused a large difference between the calculated grand total of blended solution injected (column D) and the total volume calculated by summing the individual totalizers (column L). It is assumed that the reason for this anomaly was because the totalizers on both skids had to be reset during the first day of operations.

For skid 1, there was missing flow rate data on 9/11/2018 for totalizer FQI-N#-8. Therefore, the "Total Average flow Rate (gpm)" was calculated from totalizers FQI-N#-4 through -7. Additionally, on 9/11/2018, skid 2 had missing flow rate data for totalizer FQI-N#-9. The average flow rate for FQI-N#-9 was instead calculated by taking the average of totalizers FQI-N#-4 through -8.

5 Software Applications

Microsoft Excel was used in performing these calculations and is exempt from the requirements of PRC-PRO-IRM-309, *Controlled Software Management*. This software is the appropriate and applicable tool for these calculations.

6 Calculation

Injection volumes and rate calculations for skid 1 and skid 2 were performed in Microsoft Excel workbook "ECF-300FF5_19_0005_R0_AppA.xlsx," which is included as Appendix A of this ECF. The data calculation steps for this ECF and corresponding worksheets are listed below:

1. Calculated the volume of river water by subtracting the previous daily total from the end of injections recorded the next day on FQI-N#-1A or -1B when applicable. After 9/4/2018, the river

water total volume on FQI-N#-1A or -1B, chemical injection total volume on FQI-N#-2A or -2B or FQI-N#-3A or -3B, and overall mixture total volume on FQI-N#-4A was only reset on changeover days. Thus the totalizers were running a daily average for each zone (PRZ or LVZ), which necessitated subtraction of the previous daily total to get the end total on a given day.

2. Calculated the volume of chemical by subtracting the previous daily total from the end of injections recorded the next day on FQI-N#-2A or -2B or FQI-N#-3A or -3B when applicable. Similar to step 1, after 9/4/2018, the river water total volume on FQI-N#-1A or -1B, chemical injection total volume on FQI-N#-2A or -2B or FQI-N#-3A or -3B, and overall mixture total volume on FQI-N#-4A was only reset on changeover days. Thus, the totalizers were running a daily average for each zone (PRZ or LVZ), which necessitated subtraction of the previous daily total to get the end total on a given day.
3. Calculated the grand total injected by adding the river water total volume injected plus the chemical total volume injected.
4. Calculated the totalizer injection volumes by subtracting the previous daily total from the end of injections recorded the next day on the totalizers specific to each injection well (FQI-N#-4 through -9).
    a. In the case of skid 1, the totalizer injection volume subtractions were done for totalizers (FQI-N#-4 through -8).
5. Calculated the average flow rate for each injector by taking the average of the hourly readings from page 53 of 57 (9/4/2018-9/6/2018) or page 56 of 60 (9/7/2018-9/20/18) in GW-17-01898.
6. Calculated the sum total volume of injectors by summing all of the recorded injector volumes from FQI-N#-4 through -9.
    a. In the case of skid 1, the sum was calculated by summing FQI-N#-4 through -8 and then subtracting this value from the grand total volume to get the volume at totalizer FQI-N#-9. In addition, calculated the average flow rate at totalizer FQI-N#-9 by taking the average of the flow rates from FQI-N#-4 through -8.
7. Calculated the total gallons injected by multiply the average flow rate calculated for totalizers FQI-N#-4 through -9 from step 5 of this ECF by the total hours pumped by the number of wells by 60.
8. Calculated the average injection volume per well (total gallons) by taking the total gallons injected calculated in step 5 of this ECF and dividing it by the total number of wells.

7 Results

Tables 3 and 5 summarize the total volume (column D) and the summed volume of blended solution injected into each well into the PRZ or LVZ for skid 1 and skid 2 on each day throughout the treatment. For skid 1, the volume data for each well for either the PRZ or LVZ (as noted in the Excel sheet) is taken from columns E through I and column L. For skid 2, the volume data for each well for either the PRZ or LVZ is taken from columns E through J.

Tables 4 and 6 summarize the injection flow rates, for each day, into the PRZ or LVZ for skid 1 and skid 2. These flow rates are from columns E through I and L (skid 1) and columns E through J (skid 2). The injection flow rates summarized in tables 4 and 6 can be compared to the DQO requirements in

Table 5 of DOE/RL-2014-42-ADD1. The objective was to achieve an injection rate of 50 gpm or more or as close to 50 gpm as achievable in the field.

Tables 7 and 8 summarize the summed total volume of solution injected into the PRZ and LVZ by each well for each zone. The calculations for tables 7 and 8 consist of summing the injection volumes specific to one zone, either PRZ or LVZ, for each injection well from columns E through I and column L (skid 1) and columns E through J (skid 2). The values from tables 7 and 8 can be compared to the DQO requirements in Table 5 of DOE/RL-2014-42-ADD1. The objective was to achieve an injection volume of 51,000 ± 5% gallons of solution per PRZ well screen and 38,400 ± 5% gallons of solution per LVZ well screen.

Tables 9 and 10 summarize the calculated values of total gallons injected and average injection total per day (total gallons) for each skid that should be occurring based on the hours of treatment per day, average flow rate, and number of totalizers. These data are from columns M and N in the ECF spreadsheet (Appendix A). Tables 3 through 6 denote when there were changeovers from injecting into the PRZ to injecting into the LVZ. Some days, changeovers from PRZ to LVZ occurred one day.

Table 3. Skid 1 Total Gallons Injected into Each Well Per Day

Zone	Day	Total Gallons of Solution Injected	Total Gallons Injected into Each Well					
1	09/04/2018	34174	399-1-139 PRZ	399-1-136 PRZ	399-1-145 PRZ	399-1-137 PRZ	399-1-138 PRZ	399-1-129 PRZ
			6394	5559	5703	5371	6583	4565
	09/05/2018	128518	21349	20676	20270	19398	22808	24017
	09/06/2018	108685	17834	17306	18017	16523	19272	19733
	09/07/2018*	117994	399-1-139 LVZ	399-1-136 LVZ	399-1-145 LVZ	399-1-137 LVZ	399-1-138 LVZ	399-1-129 LVZ
			19343	19621	19604	17823	19565	22038.0
	09/08/2018	128390	21028	20857	21264	20864	20791	23586.0
2	09/09/2018*	136844	399-1-143 PRZ	399-1-120 PRZ	399-1-102 PRZ	399-1-132 PRZ	399-1-124 PRZ	399-1-131 PRZ
			22391	23121	22495	23119	23023	22695
	09/10/2018	142579	23666	24419	21217	23678	26030	23569
	09/11/2018*	31467	6016	5804	5680	6063	1898	6006
	09/11/2018*	113532	399-1-143 LVZ	399-1-120 LVZ	399-1-102 LVZ	399-1-132 LVZ	399-1-124 LVZ	399-1-131 LVZ
			19484	19257	18982	18730	18996	18083

Table 3. Skid 1 Total Gallons Injected into Each Well Per Day

Zone	Day	Total Gallons of Solution Injected	Total Gallons Injected into Each Well					
	09/12/2018*	117548	19542	19588	19630	19729	20083	18976
3	09/13/2018*	148199	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ
			24243	24137	24125	24183	24238	27273
	09/14/2018	152904	24662	24703	24814	24572	24600	29553
	09/15/2018*	14332	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ
			2283	2246	2235	2390	2372	2806
	09/15/2018*	133145	399-1-101 LVZ	399-1-116 LVZ	399-1-115 LVZ	399-1-144 LVZ	399-1-100 LVZ	399-1-99 LVZ
			18324	21709	21709	21769	21713	27921
	09/16/2018*	99882	20080	16727	16765	16650	16704	12956
	09/16/2018*	27183	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ
			4549	4550	4512	4563	4540	4469
4	09/17/2018*	145430	399-1-106 PRZ	399-1-105 PRZ	399-1-104 PRZ	399-1-107 PRZ	399-1-108 PRZ	399-1-109 PRZ
			24293	24274	24259	24210	24346	24048
	09/18/2018	134018	22304	22345	22428	22449	22316	22176
	09/19/2018*	151494	399-1-106 LVZ	399-1-105 LVZ	399-1-104 LVZ	399-1-107 LVZ	399-1-108 LVZ	399-1-109 LVZ
			25185	25158	25232	25203	25166	25549
	09/20/2018	87555	14522	14473	14581	14686	14617	14676

* Changeover day

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 4. Skid 1 Injection Flow Rates Per Day

Zone	Day	Flow Rates (gpm) per Injection Well					
1	09/04/2018	399-1-139 PRZ	399-1-136 PRZ	399-1-145 PRZ	399-1-137 PRZ	399-1-138 PRZ	399-1-129 PRZ
		49	43	45	41	48	45
	09/05/2018	46	44	43	42	49	45
	09/06/2018	45	44	46	42	49	45
	09/07/2018 *	399-1-139 LVZ	399-1-136 LVZ	399-1-145 LVZ	399-1-137 LVZ	399-1-138 LVZ	399-1-129 LVZ
		45	46	46	42	45	45
	09/08/2018	45	45	46	45	45	45
2	09/09/2018 *	399-1-143 PRZ	399-1-120 PRZ	399-1-102 PRZ	399-1-132 PRZ	399-1-124 PRZ	399-1-131 PRZ
		45	46	45	46	47	46
	09/10/2018	49	51	44	49	55	50
	09/11/2018 *	67	63	64	68	66	66
	09/11/2018 *	399-1-143 LVZ	399-1-120 LVZ	399-1-102 LVZ	399-1-132 LVZ	399-1-124 LVZ	399-1-131 LVZ
		47	47	46	45	46	46
	09/12/2018 *	399-1-143 LVZ	399-1-120 LVZ	399-1-102 LVZ	399-1-132 LVZ	399-1-124 LVZ	399-1-131 LVZ
		47	47	46	45	45	47
3	09/13/2018 *	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ
		47	46	47	46	47	47
	09/14/2018	46	46	46	46	46	46
	09/15/2018 *	46	45	46	44	45	45
	09/15/2018 *	399-1-101 LVZ	399-1-116 LVZ	399-1-115 LVZ	399-1-144 LVZ	399-1-100 LVZ	399-1-99 LVZ
		47	47	47	47	47	47
	09/16/2018 *	48	48	48	47	47	48
	09/16/2018 *	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ

Table 4. Skid 1 Injection Flow Rates Per Day

Zone	Day	Flow Rates (gpm) per Injection Well					
		47	48	47	47	48	47
4	09/17/2018 *	399-1-106 PRZ	399-1-105 PRZ	399-1-104 PRZ	399-1-107 PRZ	399-1-108 PRZ	399-1-109 PRZ
		48	48	48	48	47	48
	09/18/2018	48	48	48	48	48	48
	09/19/2018*	399-1-106 LVZ	399-1-105 LVZ	399-1-104 LVZ	399-1-107 LVZ	399-1-108 LVZ	399-1-109 LVZ
		48	47	48	48	48	48
	09/20/2018	48	47	48	47	48	48

* Changeover day

gpm = gallons per minute

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 5. Skid 2 Total Gallons Injected into Each Well Per Day

Zone	Day	Total Gallons Injected	Total Gallons Injected into Each Well					
1	09/04/2018	37877	399-1-103 PRZ	399-1-126 PRZ	399-1-128 PRZ	399-1-130 PRZ	399-1-127 PRZ	399-1-125 PRZ
			6705	6791	6419	6109	6070	1455
	09/05/2018	124536	21880	22263	20946	19952	19410	20358
	09/06/2018	107679	19045	19148	18019	17058	16814	17810
	09/07/2018*	115694	399-1-103 LVZ	399-1-126 LVZ	399-1-128 LVZ	399-1-130 LVZ	399-1-127 LVZ	399-1-125 LVZ
			21480.72	13956	19613	20485	21665	18677
	09/08/2018	104134	19221	12420	19620	18264	19046	15699
2	09/09/2018*	139947	399-1-122 PRZ	399-1-135 PRZ	399-1-123 PRZ	399-1-121 PRZ	399-1-133 PRZ	399-1-134 PRZ
			22789	24507	21811	21848	22906	26400
	09/10/2018	141638	23268	23717	22272	23007	23724	25980
	09/11/2018	31116	6320	6150	5912	6161	6378	232

Table 5. Skid 2 Total Gallons Injected into Each Well Per Day

Zone	Day	Total Gallons Injected	Total Gallons Injected into Each Well					
	09/11/2018*	114045	399-1-122 LVZ	399-1-135 LVZ	399-1-123 LVZ	399-1-121 LVZ	399-1-133 LVZ	399-1-134 LVZ
			19395	19576	18243	17753	19801	19559
	09/12/2018	118420	19538	19821	18520	19911	19965	20926
3	09/13/2018*	149708	399-1-142 PRZ	399-1-119 PRZ	399-1-117 PRZ	399-1-140 PRZ	399-1-141 PRZ	399-1-118 PRZ
			24895	24958	24964	25002	25054	24938
	09/14/2018	152418	25451	25383	25522	25442	25330	25444
	09/15/2018	4541	761	778	720	751	759	764
	09/15/2018*	132352	399-1-142 LVZ	399-1-119 LVZ	399-1-117 LVZ	399-1-140 LVZ	399-1-141 LVZ	399-1-118 LVZ
			22049	22066	21996	22106	22108	22079
	09/16/2018	98208	16393	16391	16432	16302	16359	16380
	09/16/2018*	27824.6	399-1-142 PRZ	399-1-119 PRZ	399-1-117 PRZ	399-1-140 PRZ	399-1-141 PRZ	399-1-118 PRZ
			4649	4624	4658	4615	4640	4634
4	09/17/2018*	143201	399-1-112 PRZ	399-1-111 PRZ	399-1-110 PRZ	399-1-113 PRZ	399-1-98 PRZ	399-1-114 PRZ
			23922	23915	23908	23791	23819	23906
	09/18/2018	135779	22656	22625	22593	22718	22649	22612
	09/19/2018*	150997.84	399-1-112 LVZ	399-1-111 LVZ	399-1-110 LVZ	399-1-113 LVZ	399-1-98 LVZ	399-1-114 LVZ
			25146	25270	25260	25225	25179	25186
	09/20/2018	87218	14517	14492	14542	14532	14563	14585

* Changeover day

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 6. Skid 2 Injection Flow Rates Per Day

Zone	Day	Flow Rates (gpm) per Injection Well					
1	09/04/2018	399-1-103 PRZ	399-1-126 PRZ	399-1-128 PRZ	399-1-130 PRZ	399-1-127 PRZ	399-1-125 PRZ
		48	50	46	43	43	45
	09/05/2018	49	49	47	44	43	45
	09/06/2018	49	50	47	44	43	46
	09/07/2018 *	399-1-103 LVZ	399-1-126 LVZ	399-1-128 LVZ	399-1-130 LVZ	399-1-127 LVZ	399-1-125 LVZ
		52	33	46	49	51	42
	09/08/2018	52	32	51	49	51	40
2	09/09/2018 *	399-1-122 PRZ	399-1-135 PRZ	399-1-123 PRZ	399-1-121 PRZ	399-1-133 PRZ	399-1-134 PRZ
		45	48	43	43	45	52
	09/10/2018	49	50	47	48	50	54
	09/11/2018	68	64	63	67	69	66
	09/11/2018 *	399-1-122 LVZ	399-1-135 LVZ	399-1-123 LVZ	399-1-121 LVZ	399-1-133 LVZ	399-1-134 LVZ
		47	47	44	43	47	47
	09/12/2018	46	47	42	44	47	49
3	09/13/2018 *	399-1-142 PRZ	399-1-119 PRZ	399-1-117 PRZ	399-1-140 PRZ	399-1-141 PRZ	399-1-118 PRZ
		47	48	47	48	48	47
	09/14/2018	48	48	48	48	48	48
	09/15/2018	48	49	47	47	47	48
	09/15/2018 *	399-1-142 LVZ	399-1-119 LVZ	399-1-117 LVZ	399-1-140 LVZ	399-1-141 LVZ	399-1-118 LVZ
		47	48	47	48	48	48
	09/16/2018	48	48	48	47	48	48
	09/16/2018 *	399-1-142 PRZ	399-1-119 PRZ	399-1-117 PRZ	399-1-140 PRZ	399-1-141 PRZ	399-1-118 PRZ
		47	47	48	48	47	48
4	09/17/2018 *	399-1-112 PRZ	399-1-111 PRZ	399-1-110 PRZ	399-1-113 PRZ	399-1-98 PRZ	399-1-114 PRZ
		48	48	48	47	48	48

Table 6. Skid 2 Injection Flow Rates Per Day

Zone	Day	Flow Rates (gpm) per Injection Well					
	09/18/2018	48	48	47	48	48	48
	09/19/2018 *	399-1-112 LVZ	399-1-111 LVZ	399-1-110 LVZ	399-1-113 LVZ	399-1-98 LVZ	399-1-114 LVZ
		47	47	48	48	48	48
	09/20/2018	48	48	49	48	48	48

* Changeover day

gpm = gallons per minute

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 7. Skid 1 Total Volume of Solution Injected into PRZ/LVZ

Zone	Days	Total Gallons Injected into Each Well						Meet Target Volumes?*
1	09/04-06/2018	399-1-139 PRZ	399-1-136 PRZ	399-1-145 PRZ	399-1-137 PRZ	399-1-138 PRZ	399-1-129 PRZ	
		45576	43541	43990	41292	48663	48285	No. All wells but 399-1-138 did not meet target.
	09/07-08/2018	399-1-139 LVZ	399-1-136 LVZ	399-1-145 LVZ	399-1-137 LVZ	399-1-138 LVZ	399-1-129 LVZ	
		40371	40478	40868	38687	40356	45624	Yes
2	09/09-11/2018	399-1-143 PRZ	399-1-120 PRZ	399-1-102 PRZ	399-1-132 PRZ	399-1-124 PRZ	399-1-131 PRZ	
		52073	53344	49392	52860	50951	52270	Yes
	09/11-12/2018	399-1-143 LVZ	399-1-120 LVZ	399-1-102 LVZ	399-1-132 LVZ	399-1-124 LVZ	399-1-131 LVZ	
		39026	38845	38612	38459	39079	37059	Yes
3	09/13-16/2018	399-1-101 PRZ	399-1-116 PRZ	399-1-115 PRZ	399-1-144 PRZ	399-1-100 PRZ	399-1-99 PRZ	
		55737	55636	55686	55708	55750	64101	Yes
	09/15-16/2018	399-1-101 LVZ	399-1-116 LVZ	399-1-115 LVZ	399-1-144 LVZ	399-1-100 LVZ	399-1-99 LVZ	
		38314	38436	38474	38419	38417	40967	Yes

Table 7. Skid 1 Total Volume of Solution Injected into PRZ/LVZ

Zone	Days	Total Gallons Injected into Each Well						Meet Target Volumes?*
4	09/17-18/2018	399-1-106 PRZ	399-1-105 PRZ	399-1-104 PRZ	399-1-107 PRZ	399-1-108 PRZ	399-1-109 PRZ	
		46597	46619	46687	46659	46662	46224	No
	09/19-20/2018	399-1-106 LVZ	399-1-105 LVZ	399-1-104 LVZ	399-1-107 LVZ	399-1-108 LVZ	399-1-109 LVZ	
		39707	39632	39813	39889	39783	40225	Yes

* Target volumes from Table 5 of DOE/RL-2014-42-ADD1, *300-FF-5 Operable Unity Remedy Implementation Sampling and Analysis Plan Addendum for Stage B Uranium Sequestration,* include 51,000 ± 5% gallons of solution per PRZ well screen and 38,400 ± 5% gallons of solution per LVZ well screen.

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 8. Skid 2 Total Volume of Solution Injected into PRZ/LVZ

Zone	Days	Total Gallons Injected into Each Well						Meet Target Volumes?*
1	09/04-06/2018	399-1-103 PRZ	399-1-126 PRZ	399-1-128 PRZ	399-1-130 PRZ	399-1-127 PRZ	399-1-125 PRZ	
		47630	48202	45384	43118.9	42294	39623	No. All wells did not meet target.
	09/07-08/2018	399-1-103 LVZ	399-1-126 LVZ	399-1-128 LVZ	399-1-130 LVZ	399-1-127 LVZ	399-1-125 LVZ	
		40702	26376	39233	38749	40711	34376	No. Wells 399-1-126 and 399-1-125 did not meet target.
2	09/09-11/2018	399-1-122 PRZ	399-1-135 PRZ	399-1-123 PRZ	399-1-121 PRZ	399-1-133 PRZ	399-1-134 PRZ	
		52377	54374	49995	51016	53008	52612	Yes
	09/11-12/2018	399-1-122 LVZ	399-1-135 LVZ	399-1-123 LVZ	399-1-121 LVZ	399-1-133 LVZ	399-1-134 LVZ	
		38933	39397	36763	37664	39766	40485	Yes
3	09/13-16/2018	399-1-142 PRZ	399-1-119 PRZ	399-1-117 PRZ	399-1-140 PRZ	399-1-141 PRZ	399-1-118 PRZ	

Table 8. Skid 2 Total Volume of Solution Injected into PRZ/LVZ

Zone	Days	Total Gallons Injected into Each Well						Meet Target Volumes?*
		55756.4	55742.7	55864.1	55809.8	55782.8	55779.7	Yes
	09/15-16/2018	399-1-142 LVZ	399-1-119 LVZ	399-1-117 LVZ	399-1-140 LVZ	399-1-141 LVZ	399-1-118 LVZ	
		38442	38457	38428	38408	38467	38459	Yes
4	09/17-19/2018	399-1-112 PRZ	399-1-111 PRZ	399-1-110 PRZ	399-1-113 PRZ	399-1-98 PRZ	399-1-114 PRZ	
		46578	46540	46501	46509	46468	46518	No. All wells did not meet target.
	09/19-20/2018	399-1-112 LVZ	399-1-111 LVZ	399-1-110 LVZ	399-1-113 LVZ	399-1-98 LVZ	399-1-114 LVZ	
		39663	39762	39802	39757	39742	39771	Yes

* Target volumes from Table 5 of DOE/RL-2014-42-ADD1, *300-FF-5 Operable Unity Remedy Implementation Sampling and Analysis Plan Addendum for Stage B Uranium Sequestration,* include 51,000 ± 5% gallons of solution per PRZ well screen and 38,400 ± 5% gallons of solution per LVZ well screen.

LVZ = lower vadose zone

PRZ = periodically rewetted zone

Table 9. Skid 1 Summary Total Volumes

Day	Total Gallons Injected	Average Injection Per Day (total gallons)
9/4/2018	97546	16258
9/5/2018	112644	18744
9/6/2018	97570	16262
9/7/2018	112435	18739
9/8/2018	129406	21568
9/9/2018	132384	22064
9/10/2018	142870	23812
9/11/2018	161116	26853
9/12/2018	99180	16530
9/13/2018	151089	25182
9/14/2018	149335	24889

Table 9. Skid 1 Summary Total Volumes

Day	Total Gallons Injected	Average Injection Per Day (total gallons)
9/15/2018	147608	19952
9/16/2018	119709	19951
9/17/2018	154037	25673
9/18/2018	120298	20050
9/19/2018	154138	25690
9/20/2018	68501	11417

Table 10. Skid 2 Summary Total Volumes

Day	Total Gallons Injected	Average Injection Per Day (total gallons)
9/4/2018	98766	16461
9/5/2018	116256	19376
9/6/2018	100594	16766
9/7/2018	114564	19094
9/8/2018	132296	22049
9/9/2018	132411	22068
9/10/2018	142614	23769
9/11/2018	163277	27213
9/12/2018	99294	16549
9/13/2018	153745	25624
9/14/2018	154422	25737
9/15/2018	154194	25699
9/16/2018	119891	19982
9/17/2018	154414	25702
9/18/2018	120144	20024
9/19/2018	154518	25753
9/20/2018	69178	11530

8 References

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Appendix A

Calculations

This appendix is stored electronically with this document.

Microsoft Excel® Spreadsheet
ECF-300FF5_19_0005_R0_AppA.xlsx

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Appendix B

Skid 1: Daily Operations Field Data Sheets

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300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid # #1			Operator(s); J. Pope		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0.0	① ~~2922.1~~ 9-4-18	31,251
	Chem. Injection	FQI-N#-2A or- 2B	0.0	① 2922.6	
	Chem. Injection	FQI-N#-3A or- 3B	0.0	① 0.0	
	Overall Mixture	FQI-N#-4A or- 4B	0.0	① 33687	
	399-1- 139	FIQ-N#-4	0.0	① 6893.5	
	399-1- 136	FIQ-N#-5	0.1	① 5558.8	
	399-1- 145	FIQ-N#-6	0.0	① 8702.5	
	399-1- 137	FIQ-N#-7	0.0	① 5370.6	
	399-1- 138	FIQ-N#-8	0.0	① 6583.1	
	399-1- 129	FIQ-N#-9	0.0	① 2862.3	

① RESET TO ZERO during operation

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # #1 | Operator(s); J. Pope

			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 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
Date	Hour	Time	~~FIQ-N1-~~ FQI 2A or 2B Chem. (gpm)	FIQ-N1-1A or 1B River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	
9-4-18	Pre start	0937	N/A	N/A	N/A	N/A	7.2	20.2	166	9.45	Columbia River Water Sample
9-4-18	0	1031	24.1	243	257	✓	7.5	20.9	212	9.35	Flowrate stable-Take first skid sample
9-4-18	1	1130	24.1	247	263	✓					
9-4-18	2	1230	23.7	248	214	✓					
9-4-18	3	1330	24.7	250	262	✓	7.5	20.9	130	9.78	
9-4-18	4	1430	22.9	250.1	370.1	✓	~~7.6~~	~~20.7~~	~~192~~	~~10.07~~	~~JP~~ 9-4-18
	5										
	6										
	7										
	8										
	9										conductivity
9-4-18	10	1530 ~~1500~~	22.5	250.2	270.1	✓	7.5	20.0	63	10.08	.01
	Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page JP 9-4-18										

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); J. Adle

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-4-18	1	~~1030~~ 1130	46.1Hz	18.1		
9-4-18	2	1230	46.4Hz	18.4		
9-4-18	3	1330	45.8Hz	18.6		
9-4-18	4	1430	45.1	18.6		
9-4-18	5	1520	45.8	18.6		
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 1	Operator(s)
COMMENTS: FLOW TOTALIZERS RESET DURING INJECTIONS	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1	Skid ID: #1	Injection Start Date: 9-4-18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-4-18	1	1030	0	43.2	0	40.9	0	44.3	0	40.0	0	53.4	0	51.6	40
9-4-18	2	1130	0	52	0	45	0	47	0	44	0	44	0	22	40
9-4-18	3	1230	0	52	0	46	0	47	0	44	0	43	0	0	40
9-4-18	4	1330	0	48	0	42	0	43	0	40	0	51	0	18	40
9-4-18	5	1430	0	48	0	42	0	44	0	40	0	49	0	26	40
9-4-18	6	1520	0	48	0	42	0	43	0	40	0	49	0	25	40
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	1130 HRS.	Level/Time Date*						
Tank 1	90%							
Tank 2	85%							
Tank 3	85%							
Tank 4	85%							
Tank 5	85%							
Tank 6	85%							
Tank 7	85%							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid # #1			Operator(s): DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	31251	148285	
	Chem. Injection	FQI-N#-2A or- 2B	2922.6	2938.2	
	Chem. Injection	FQI-N#-3A or- 3B	0.00	11484	
	Overall Mixture	FQI-N#-4A or- 4B	33687	133742	
	399-1- 139	~~FIQ~~-N#-4 FQI	6394.1	27743	
	399-1- 136	~~FIQ~~-N#-5 FQI	5559.1	26235	
	399-1- 145	~~FIQ~~-N#-6 FQI	5702.7	25973	
	399-1- 137	~~FIQ~~-N#-7 FQI	5370.7	24769	
	399-1- 138	~~FIQ~~-N#-8 FQI	6583.1	29391	
	399-1- 129	~~FIQ~~-N#-9 FQI	3544.8	14627	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # #1 | Operator(s);

Date	Hour	Time	Flowrates-Skid Parameters Skid and filter parameters will be measured and recorded hourly. FQ5 ~~FIQ-N1-2A or 2B~~ 5A/5B Chem. (gpm)	FQ3 ~~FIQ-N1-1A or 1B~~ River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	Field Parameters-Injection Solution Field parameters will be measured and recorded once every 4 hours. pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
	Pre start	N/A									Columbia River Water Sample
9/5/18	0	0800	25.0	250	241.1	✓	7.57	19.4	219	8.93	Flowrate stable-Take first skid sample
9/5/18	1	0915	25.2	250	223	✓					
9/5/18	2	1015	25.1	249 ~~251~~	223.2	✓					
9/5/18	3	1115	24.9	250	225.0	✓					
9/5/18	4	1215	24.3	250	222.4	✓	7.60	21.0	227 ~~252~~	9.72	11.54 Cond.
9/5/18	5	1315	24.5	250	222.5	✓					
9/5/18	6	1415	25.2	250	223.9	✓					
	7		~~24.9~~	9/5/18 ~~249~~		✓					
	8										
	9										
9/5/18	10	1515	24.9	249	225.2	✓	7.61	22.0	30	10.21	11.84 Cond

Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page
FQI-N1-9 - Flow off / OOS
FQI-N1-3A or 3B - In use

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/5/18	1	0815	45.4	18.3	45.0	18.0
9/5/18	2	0915	45.3	18.3	45.0	18.0
9/5/18	3	1015	45.3	18.3	45.0	18.0
9/5/18	4	1115	45.3	18.3	45.0	18.0
9/5/18	5	1215	45.3	18.4	45.0	18.1
9/5/18	6	1315	45.3	18.3	45.0	18.1
9/5/18	7	1415 ~~1315~~	45.3	18.3	45.0	18.1
	8		~~45.~~ 9/5/18			
	9					
9/5/18	10 Final	1515	45.3	18.4	45.0	18.1

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 1	Operator(s) DelRoas
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: J | Skid ID: #1 | Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/5/18	1	0815	0	46.5	0	42.5	0	43.6	0	41.3	0	45.9	0	17.1	38
9/5/18	2	0915	0	45.8	0	45.1	0	43.0	0	40.8	0	48.3	0	N/A	38
9/5/18	3	1015	0	45.5	0	45.0	0	42.9	0	40.7	0	49.1	0	N/A	36
9/5/18	4	1115	0	45.5	0	44.3	0	43.2	0	43.1	0	48.9	0	N/A	36
9/5/18	5	1215	0	45.5	0	44.4	0	43.1	0	40.5	0	48.9	0	N/A	36
9/5/18	6	1315	0	45.5	0	44.5	0	43.1	0	40.6	0	48.8	0	N/A	38
9/5/18	7	1415	0	45.1	0	44.0	0	42.7	0	43.6	0	48.5	0	N/A	38
	8														
	9														
9/5/18	10	1515	0	44.6	0	43.7	0	45.1	0	43.3	0	48.5	0	N/A	38

Comments:

FQI-N1-9 N/A due to being repaired/OOS

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	70% 9/4/18 0730	80% 0730						
Tank 2	65% 9/5/18 0730	75% 0730						
Tank 3	65% 9/5/18 0730	75% 0730						
Tank 4	65% 9/5/18 0730	75% 0730						
Tank 5	65% 9/5/18 0730	65% 0730						
Tank 6	65% 9/5/18 0730	~~65%~~ 70 0730						
Tank 7	70% 9/5/18 0730	80% 0730						

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid #			Operator(s); L. Kelly / J. Phelps		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	148285	247442	
	Chem. Injection	FQI-N#-2A or- 2B	N/A	N/A	
	Chem. Injection	FQI-N#-3A or- 3B	11484	21012	
	Overall Mixture	FQI-N#-4A or- 4B	133742	204110	
	399-1- 139	FIQ-N#-4	27743	45577	
	399-1- 136	FIQ-N#-5	26235	43541	
	399-1- 145	FIQ-N#-6	25974	43991	
	399-1- 137	FIQ-N#-7	24771	41294	
	399-1- 138	FIQ-N#-8	29391	48663	
	399-1- 129	FIQ-N#-9	14759	22835	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); L. Kelly / J. Lanhalyn

			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 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
Date	Hour	Time	FIQ-N1-2A or ~~2B~~ 3A Chem. (gpm)	FIQ-N1-1A or 1B River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	
N/A	Pre start										Columbia River Water Sample
* 9-6-18	0	0630	22	253	275	✓	7.6	18.7c	50	8.99	Flowrate stable-Take first skid sample
9-6-18	1	0730	25	250	275	✓					
9-6-18	2	0830	24	251	275	✓					
9-6-18	3	0930	24	251	275	✓					
* 9-6-18	4	1030	23	252	275	✓	9.9	19.8	159	9.40	
9-6-18	5	1130	(1) →								
9-6-18	6	1230	(1) →								
9-6-18	7	1330	25	252	277	✓					
	8										
	9										
9-6-18	10	1430	24	250	274	✓	7.6	21.3	60	10.02	10.55 COND

Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page
(1) SKID WAS Shut Down

300-FF-5 Injection and Sample Monitoring for Stage B

SKID 1

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s): L Kelly / J. Lehly

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-6-18	1	0630	45.40	18	~~N/A~~ 45.00 9-6-18	~~N/A~~ 18 9-6-18
9-6-18	2	0730	45.40	18	45.00	18
9-6-18	3	0830	45.40	18	45.00	18
9-6-18	4	0930	45.40	18	45.00	18
9-6-18	5	1030	45.40	18		
9-6-18	6	1130	(1) →			
9-6-18	7	1230	(1) →			
9-6-18	8	1330	45.40	18	45.00	18
	9					
	10 Final		45.40	18	45.00	18

Comments: *comments can be continued on comment page

(1) SKID WAS Shut DOWN

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

SKID 1

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID:	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-6-18	1	0630	0	45	0	45	0	46	0	41	0	49	0	18	38
9-6-18	2	0730	0	46	0	44	0	46	0	42	0	49	0	17	40
9-6-18	3	0830	0	46	0	44	0	46	0	42	0	49	0	17	40
9-6-18	4	0930	0	45	0	44	0	46	0	42	0	49	0	18	38
9-6-18	5	1030	0	45	0	44	0	46	0	41	0	49	0	18	38
9-6-18	6	1130	(1)	→											→
9-6-18	7	1230	(1)	→											→
9-6-18	8	1330	0	45	0	44	0	45	0	42	0	49	0	22	38
9-6-18	9	1430	0	45	0	44	0	45	0	42	0	49	0	28	38
	10														

Comments: (1) SKID WAS SHUT DOWN

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # #1 | Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	107392	Totalizers Zeroed 9/7/18
	Chem. Injection	FQI-N#-2A or- 2B	N/A	N/A	
	Chem. Injection	FQI-N#-3A or- 3B	0	10602	
	Overall Mixture	FQI-N#-4A or- 4B	0	57112	
	399-1- 139	FQI-N#-4	0	19343	
	399-1- 136	FQI-N#-5	0	19621	
	399-1- 145	FQI-N#-6	0	19604	
	399-1- 137	FQI-N#-7	0	17823	
	399-1- 138	FQI-N#-8	0	19565	
	399-1- 129	FQI-N#-9	0	12765	

Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # #1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok	
9/7/18	0	0800	251	N/A	24.8	N/A	✓	
9/7/18	1	0900	250	N/A	24.7	221.5	✓	
9/7/18	2	1000	250	N/A	24.8	221.3	✓	
9/7/18	3	1100	250	N/A	24.5	223.1	✓	
9/7/18	4	1200	250	N/A	25.0	222.1	✓	
9/7/18	5	1300	250	N/A	24.8	~~224.1~~	✓	224.1
9/7/18	6	1400	250	N/A	24.5	~~224.3~~	✓	224.3
9/7/18	7	1500	248	N/A	24.3	225.2	✓	
	8							
	9							
	10							

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page Total gpm does not include FQI-N1-9. FQI-N1-9 OOS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # #1 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/7/18	0	0810	7.56	20.1	19	9.12	11.50 mS	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/7/18	4	1200	7.56	22.2	118	9.68	11.54	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/7/18	10	1500	7.54	23.0	30	10.10	11.54	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/7/18	1	0900	44.6	18.0		
9/7/18	2	1000	44.6	17.9		
9/7/18	3	1100	44.6	18.0		
9/7/18	4	1200	44.5	17.9		
9/7/18	5	1300	44.5	17.9		
9/7/18	6	1400	44.6	18.0		
9/7/18	7	1500	44.8	18.1		
~~9/7/18~~	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied		
Injection Round:		Operator(s) DeRoos
COMMENTS:		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1	Skid ID: 1	Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/2/18	1	0900	0	46.0	0	45.9	0	40.7	0	42.2	0	46.7	0	N/A	38
9/2/18	2	1000	0	44.5	0	46.0	0	47.1	0	40.5	0	43.2	0	N/A	38
9/2/18	3	1100	0	44.4	0	46.0	0	47.0	0	40.3	0	45.4	0	N/A	38
9/2/18	4	1200	0	45.3	0	45.5	0	46.7	0	41.0	0	43.6	0	N/A	38
9/2/18	5	1300	0	45.2	0	45.3	0	46.5	0	41.5	0	45.6	0	N/A	37
9/2/18	6	1400	0	45.2	0	45.6	0	46.6	0	41.5	0	45.4	0	N/A	37
9/2/18	7	1500	0	44.9	0	45.1	0	46.2	0	43.9	0	45.1	0	N/A	37
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	65% 0830 9/7	75% 1540 9/7						
Tank 2	60% 0830 9/7	70% 1540 9/7						
Tank 3	60% 0830 9/7	70% 1540 9/7						
Tank 4	60% 0830 9/7	70% 1540 9/7						
Tank 5	60% 0830 9/7	70% 1540 9/7						
Tank 6	60% 0830 9/7	70% 1546 9/7						
Tank 7	60% 0830 9/7	70% 1546 9/7						

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s): DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	107392	224430 ~~224130~~ KD 8/6/18	
	Chem. Injection	FQI-N#-2A or- 2B	N/A	N/A	
	Chem. Injection	FQI-N#-3A or- 3B	10602	21954	
	Overall Mixture	FQI-N#-4A or- 4B	57112	149981	
	399-1- 139	FQI-N#-4	19348	40376	
	399-1- 136	FQI-N#-5	19621	40478	
	399-1- 145	FQI-N#-6	19604	40868	
	399-1- 137	FQI-N#-7	17823	38687	
	399-1- 138	FQI-N#-8	19565	40356	
	399-1- 129	FQI-N#-9	12794	28901	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRee

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/8/18	0	0700	251	N/A	24.9	N/A	✓
9/8/18	1	0800	251	N/A	24.7	N/A	✓
9/8/18	2	0900	250	N/A	24.6	224.1	✓
9/8/18	3	1000	250	N/A	24.5	221.1	✓
9/8/18	4	1100	250	N/A	24.6	224.8	✓
9/8/18	5	1200	250	N/A	24.8	225.6	✓
9/8/18	6	1300	250	N/A	24.5	225.0	✓
9/8/18	7	1400	250	N/A	24.8	224.5	✓
9/8/18	8	1445	250	N/A	24.8	225.5	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page Total flow does not reflect FQI-N1-9
FQI-N1-9 OOS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRegos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/8/18	0	0710	7.54	20.7	232	9.03	11.60	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/8/18	4	1100	7.49	21.8	236	9.40	11.56	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/8/18	10	1445	7.52	22.6	184	10.18	11.55	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/8/18	1	0800	44.6	18.0		
9/8/18	2	0900	44.5	18.0		
9/8/18	3	1000	44.7	18.0		
9/8/18	4	1100	44.9	18.1		
9/8/18	5	1200	45.0	18.2		
9/8/18	6	1300	44.9	18.1		
9/8/18	7	1400	44.8	18.0		
9/8/18	8	1445	44.9	18.1		
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: i	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1 | Skid ID: #1 | Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 139 FQI: 4		Well: 136 FQI: 5		Well: 145 FQI: 6		Well: 137 FQI: 7		Well: 138 FQI: 8		Well: 129 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/8/18	1	0800	0	44.8	0	45.1	0	46.2	0	43.5	0	44.6	0	N/A	38
9/8/18	2	0900	0	45.1	0	44.6	0	45.6	0	44.7	0	44.1	0	N/A	38
9/8/18	3	1000	0	44.9	0	44.4	0	45.6	0	44.6	0	44.1	0	N/A	38
9/8/18	4	1100	0	45.2	0	44.8	0	45.8	0	44.9	0	44.1	0	N/A	38
9/8/18	5	1200	0	45.4	0	44.8	0	46.0	0	45.0	0	44.4	0	N/A	37
9/8/18	6	1300	0	45.1	0	44.7	0	45.6	0	44.7	0	44.9	0	N/A	38
9/8/18	7	1400	0	44.9	0	44.4	0	45.5	0	45.0	0	44.7	0	N/A	38
9/8/18	8	1445	0	45.1	0	44.6	0	45.6	0	44.9	0	45.3	0	N/A	38
	9														
	10														

Comments: FQI-N1-9-005

Appendix C – Chemical Tank Level / Time Date Data Sheet

***May be copied**

Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1	Operator(s);	Pope

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	124565	
	Chem. Injection	FQI-N#-2A or- 2B	0	N/A	
	Chem. Injection	FQI-N#-3A or- 3B	0	12279	
	Overall Mixture	FQI-N#-4A or- 4B	0	119613	
	399-1- 143	FQI-N#-4	0	22391	
	399-1- 120	FQI-N#-5	0	23121	
	399-1- 102	FQI-N#-6	0	22495	
	399-1- 132	FQI-N#-7	0	23119	
	399-1- 124	FQI-N#-8	500.45	23523	
	399-1- 131	FQI-N#-9	31.48	15245	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); POPE

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-9-18	0	0715	249.9	N/A	25.2	276.9	✓
9-9-18	1	0815	250.2	N/A	24.7	271.2	✓
9-9-18	2	0915	249.7	N/A	24.4	230.1	✓
9-9-18	3	1015	249.7	N/A	24.5	229.9	✓
9/9/18	4	1115	249.7	N/A	24.4	~~210.2~~ 230.2	✓
9/9/18	5	1215	250.3	N/A	24.9	~~196.8~~ 230.5	✓
9/9/18	6	1315	248.5	N/A	24.7	228.5	✓
9/9/18	7	1415	251.3	N/A	24.5	229.6	✓
9/9/18	8	1520	250.7	N/A	24.5	229.8	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page TOTAL GPM DOES NOT Include FQI-N1-9 (005)

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); POPE

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-9-18	0	0740	7.53	19.4	244	8.91	11.65	Flowrate stable- Take first skid sample
	1							
	2							
	3							
	4	1140	7.54	21.3	165	9.46	11.31	4 hour sample
	5							
	6							
	7							
	8							
	9							
9-9-18	10	1530	7.55	22.1	194	10.31	11.49	Final Sample
* 9-9-18	Comments: Comments can be continued on comment page ~~0735~~ 0735 9-9		7.23	18.3	247	8.74	.11	Initial River Sample

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); POPE

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-9-18	1	0715	44.94	18.1		
9-9-18	2	0815	44.95	18.1		
9-9-18	3	0915	~~43.32~~ (1)	18.1	(1) 44.99	
9-9-18	4	1015	44.99	18.1		
9/9/18	5	1115	45.05	18.2		
9/9/18	6	1215	45.04	18.1		
9/9/18	7	1315	45.07	18.1		
9/9/18	8	1415	45.23	18.1		
9/9/18	9	1520	45.13	18.2		
	10 Final					

NA

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:

Skid ID:

Injection Start Date: 9-4-18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-143 FQI: ~~N-14~~ N1-4		Well: 399-1-120 FQI: N1-5		Well: 399-1-102 FQI: N1-6		Well: 399-1-132 FQI: N1-7		Well: 399-1-124 FQI: N1-8		Well: 399-1-131 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-9-18	1	0726	0	44.9	0	45.5	0	47.0	0	46.3	0	46.6	0	N/A (1)	38
9-9-18	2	0815	0	44.6	0	45.2	0	47.2	0	46.3	0	46.4	0	N/A	38
9-9-18	3	0915	0	44.7	0	45.4	0	46.8	0	46.2	0	46.9	0	N/A	38
9-9-18	4	1015	0	44.4	0	46.1	0	46.5	0	46.0	0	46.9	0	N/A	38
9/9/18	5	1115	0	44.5	0	46.3	0	46.6	0	46.1	0	46.7	0	N/A	38
9/9/18	6	1215	0	44.7	0	46.2	0	46.7	0	46.0	0	46.9	0	N/A	38
9/9/18	7	1315	0	45.4	0	47.1	0	46.6	0	46.7	0	47.7	0	N/A	38
9/9/18	8	1415	0	45.7	0	47.3	0	41.5	0	47.0	0	48.1	0	N/A	38
9/9/18	9	1520	0	45.8	0	47.3	0	40.9	0	47.8	0	48.0	0	N/A	38
	10														

Comments:
(1) FQI - N1-9 = 005

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	0800	Level/Time Date*						
Tank 1	80%							
Tank 2	75%							
Tank 3	75%							
Tank 4	74%							
Tank 5	73%							
Tank 6	72%							
Tank 7	72%							

Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1		Operator(s): DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	124565	253901	
	Chem. Injection	FQI-N#-2A or- 2B	1.39	1.77	
	Chem. Injection	FQI-N#-3A or- 3B	12279	25522	
	Overall Mixture	FQI-N#-4A or- 4B	119613	246597	
	399-1- 143	FQI-N#-4	22391	46057	
	399-1- 120	FQI-N#-5	23131	47550	
	399-1- 102	FQI-N#-6	22603	43820	
	399-1- 132	FQI-N#-7	23251	46929	
	399-1- 124	FQI-N#-8	23606	49636	
	399-1- 131	FQI-N#-9	15249	35375	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

GROUP 2 PRZ

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoon

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/10/18	0	0730	251	N/A	25.2	N/A	✓
9/10/18	1	0830	250	N/A	25.8	~~N/A~~ 231.1	✓
9/10/18	2	0930	250	N/A	27.6	232.2	✓
9/10/18	3	1030	250	N/A	27.7	232.2	✓
9/10/18	4	1130	250	N/A	24.9	229.1	✓
9/10/18	5	1230	250	N/A	24.8	230.8	✓
9/10/18	6	1330	300	N/A	29.9	278.5	✓
9/10/18	7	1430	300	N/A	29.2	275.2	✓
9/10/18	8	1530	300	N/A	29.6	274.6	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page TOTAL GPM DOES NOT INCLUDE FQI-N1-9 (OOS)

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1	Operator(s);	Dellaos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/10/18	0	0730	7.57	19.8	267	8.99	11.98	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/10/18	4	1130	7.58	21.1	244	9.61	11.46	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/10/18	10	1530	7.54	21.8	203	9.94	11.52	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); JeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/10/18	1	0830	45.0	18.2		
9/10/18	2	0930	45.0	18.2		
9/10/18	3	1030	45.1	18.2		
9/10/18	4	1130	44.9	18.1		
9/10/18	5	1230	45.1	18.2	N	
9/10/18	6	1330	50.9	21.9		A
9/10/18	7	1430	50.9	21.9		
9/10/18	8	1530	50.7	21.7		
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DeRoos
COMMENTS: Adjusted flows to 300 gpm River and 30.0 gpm chemical 1300	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-143 FQI: N1-4		Well: 399-1-120 FQI: N1-5		Well: 399-1-102 FQI: N1-6		Well: 399-1-132 FQI: N1-7		Well: 399-1-124 FQI: N1-8		Well: 399-1-131 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/10/18	1	0830	0	45.6	0	47.0	0	40.9	0	45.8	0	51.8	0	N/A	38
9/10/18	2	0930	0	~~45.9~~ 45.9	0	47.2	0	40.7	0	45.9	0	~~55.5~~ 52.5	0	N/A	38
9/10/18	3	1030	0	46.0	0	48.3	0	40.6	0	46.0	0	52.9	0	N/A	38
9/10/18	4	1130	0	45.3	0	46.8	0	39.8	0	45.1	0	52.1	0	N/A	38
9/10/18	5	1230	0	45.5	0	47.1	0	39.7	0	45.6	0	52.9	0	N/A	38
9/10/18	6	1330	0	54.2	0	55.3	0	49.5	0	53.6	0	65.9	0	N/A	38
9/10/18	7	1430	0	55.8	0	58.0	0	51.3	0	55.6	0	54.5	0	N/A	38
9/10/18	8	1530	0	55.6	0	57.8	0	51.0	0	55.4	0	54.8	0	N/A	38
	9													N/A	
	10													N/A	

Comments: FQI-N1-9 (OOS)

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	70 0830 9/10	60 1530 9/10						
Tank 2	70 0830 9/10	55 1530 9/10						
Tank 3	70 0830 9/10	55 1530 9/10						
Tank 4	70 0830 9/10	55 1530 9/10						
Tank 5	70 0830 9/10	55 1530 9/10						
Tank 6	70 0830 9/10	55 1530 9/10						
Tank 7	70 0830 9/10	55 1530 9/10						

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s); DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	103350	
	Chem. Injection	FQI-N#-2A or- 2B	0	0.79	
	Chem. Injection	FQI-N#-3A or- 3B	0	10182	
	Overall Mixture	FQI-N#-4A or- 4B	0	46103	
	399-1- 143	FQI-N#-4	0	19484	
	399-1- 120	FQI-N#-5	0	19257	
	399-1- 102	FQI-N#-6	0	18982	
	399-1- 132	FQI-N#-7	0	18730	
	399-1- 124	FQI-N#-8	0	18996	
	399-1- 131	FQI-N#-9	0	14489	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

GROUP 2 LVZ

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/11/18	0	0840	252	N/A	24.9	N/A	✓
9/11/18	1	0940	251	N/A	24.5	~~N/A~~ 275.5	✓
9/11/18	2	1040	250	N/A	24.8	274.8	✓
9/11/18	3	1140	251	N/A	24.7	275.7	✓
9/11/18	4	1240	251	N/A	24.8	275.8	✓
9/11/18	5	1340	250	N/A	24.7	274.7	✓
9/11/18	6	1440	250	N/A	24.5	274.5	✓
9/11/18	7	1530	250	N/A	24.5	274.5	✓
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/11/18	0	0840	7.52	19.8	203	8.97	11.50	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/11/18	4	1240	7.54	21.4	184	9.48	11.66	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/11/18	10	1530	7.53	21.5	219	9.80	11.45	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DeRoo

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/11/18	1	0940	43.8	17.6		
9/11/18	2	1040	43.8	17.6		
9/11/18	3	1140	43.8	17.6		
9/11/18	4	1240	43.7	17.6		
9/11/18	5	1340	43.7	17.6		
9/11/18	6	1440	43.7	17.6		
9/11/18	7	1530	43.7	17.6		
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-143 FQI: N1-4		Well: 399-1-120 FQI: N1-5		Well: 399-1-162 FQI: N1-6		Well: 399-1-132 FQI: N1-7		Well: 399-1-124 FQI: N1-8		Well: 399-1-131 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/11/18	1	0940	0	48.0	0	47.9	0	46.6	0	46.1	0	46.6	0	N/A	38
9/11/18	2	1040	0	48.0	0	47.2	0	46.6	0	46.1	0	46.6	0	N/A	38
9/11/18	3	1140	0	47.1	0	46.2	0	45.7	0	45.1	0	45.6	0	N/A	38
9/11/18	4	1240	0	46.7	0	46.2	0	45.5	0	44.9	0	45.6	0	N/A	38
9/11/18	5	1340	0	46.7	0	46.3	0	45.5	0	45.0	0	45.7	0	N/A	38
9/11/18	6	1440	0	46.6	0	46.3	0	45.5	0	44.8	0	45.1	0	N/A	38
9/11/18	7	1530	0	46.6	0	46.4	0	45.7	0	45.0	0	45.1	0	N/A	38
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	253801	282492	
	Chem. Injection	FQI-N#-2A or- 2B	1.79	1.79	
	Chem. Injection	FQI-N#-3A or- 3B	25522	28298	
	Overall Mixture	FQI-N#-4A or- 4B	246597	271688	
	399-1- 143	FQI-N#-4	46057	52073	
	399-1- 120	FQI-N#-5	47554	53358	
	399-1- 102	FQI-N#-6	43820	49500	
	399-1- 132	FQI-N#-7	47061	53124	
	399-1- 124	FQI-N#-8	49637	51535	
	399-1- 131	FQI-N#-9	35377	39181 *	

Safety Shower weekly check has been performed.	Check if Complete ☑	

Grp 2 PR2

* FQI-N1-9 NOT READING ACCURATELY. CALCULATED TOTAL FOR WELL 399-1-131 IS 51,200 GALLONS.

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/11/18	0	0630	301	N/A	29.7	331.7	✓
9/11/18	1	0730	301	N/A	29.7	264.8	✓
9/11/18	2	0800	301	N/A	29.7	261.7	✓
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

Total GPM DOES NOT INCLUDE FQI-N1-9 (OOS)

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRocci

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/11/18	0	0630	7.52	19.5	266	8.89	11.56	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/11/18	4	0800	7.53	19.3	266	8.86	11.50	4 hour sample
	5							
	6							
	7							
	8							
	9							
N/A	10							~~Final Sample~~

Comments: Comments can be continued on comment page

Last Sample 0800

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DeRosi

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/11/18	1	0130	51.5	22.2		
9/11/18	2	0800	51.8	22.3		
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10 Final					

N/A

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2 PR2	Operator(s) DaRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-143 FQI: N1-4		Well: 399-1-120 FQI: N1-5		Well: 399-1-62 FQI: N1-6		Well: 399-N-132 FQI: N1-7		Well: 399-N-124 FQI: N1-8		Well: 399-1-131 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
	1	0730	0	66.4	0	68.8	0	65.0	0	66.6	N/A	OFF	0	N/A	38
	2	0800	0	68.3	0	58.1	0	65.7	0	69.6	NA	OFF	0	NA	38
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments: FQI-W1-9(005)

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1		Operator(s); Ramirez / Fillion		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	103350	211069	
	Chem. Injection	FQI-N#-2A or- 2B	0.79	1.95	
	Chem. Injection	FQI-N#-3A or- 3B	10182	20011	
	Overall Mixture	FQI-N#-4A or- 4B	46103	112573	
	399-1- 143	FQI-N#-4	19484	39026	
	399-1- 120	FQI-N#-5	19257	38845	
	399-1- 102	FQI-N#-6	18982	38612	
	399-1- 132	FQI-N#-7	18730	38459	
	399-1- 124	FQI-N#-8	18996	39079	
	399-1- 131	FQI-N#-9	14489	23319 *	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

GRP 2 LVZ

* FQI-N1-9 NOT READING ACCURATELY. CALCULATED TOTAL FOR WELL 399-1-131 IS 37,059 GALLONS.

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # L

Operator(s); RAMWCK

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/12/18	0	7:38 ~~0830~~	250	N/A	24.6	NA	✓
9/12/18	1	0830	250	NA	24.6	NA	✓
9/12/18	2	0930	250	NA	24.5	NA	✓
9/12/18	3	1030	250	NA	24.7	NA	✓
9/12/18	4	1130	250	NA	24.5	NA	✓
9/12/18	5	1230	250	NA	24.5	NA	✓
9/12/18	6	1330	250	NA	24.7	NA	✓
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1							Operator(s); Ramirez	
			Field Parameters-Injection Solution Field parameters will be measured and recorded once every 4 hours.						
Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.	
9/12/18	0	0758	7.54	19.1	247	9.03	11.46	Flowrate stable-Take first skid sample	
	1								
	2								
	3								
9/12/18	4	1450	7.51	21.2	177	9.33	11.50	4 hour sample	
	5								
	6								
	7								
	8								
	9								
9/12/18	10	1421	7.55	21.2	188	9.13	11.31	Final Sample	
	Comments: Comments can be continued on comment page								

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); RAMIREZ

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-12-18	1	0830	45.1	18.2		
9-12-18	2	0930	45.1	18.2		
9-12-18	3	1030	45.1	18.2		
9-12-18	4	11:30	45.1	18.2	NA	
9-12-18	5	1230	45.1	18.2		
9-21-18	6	1330	45.1	18.2		
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-143 FQI: IVI-4		Well: 399-1-120 FQI: IVI-5		Well: 162 399-1-~~162~~ FQI: IVI-6		Well: 132 399-1-~~162~~ FQI: IVI-7		Well: 399-1-124 FQI: IVI-8		Well: 399-1-131 FQI: IVI-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/12/18	1	0830	0	46.9	0	46.2	0	46.2	0	44.5	0	45.3	0	15.7	38
9/12/18	2	0930	0	46.7	0	46.4	0	46.5	0	44.6	0	45.3	0	NA	38
9/12/18	3	1030	0	46.9	0	46.3	0	46.5	0	44.6	0	45.3	0	NA	38
9/12/18	4	1130	0	46.9	0	46.4	0	46.3	0	44.7	0	45.4	0	NA	38
9/12/18	5	1230	0	46.7	0	46.4	0	46.3	0	44.7	0	45.4	0	NA	38
9/12/18	6	1330	0	46.4	0	47.3	0	46.1	0	44.8	0	45.5	0	NA	38
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s); J. Pope		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	134941	
	Chem. Injection	FQI-N#-2A or- 2B	0	1.93	
	Chem. Injection	FQI-N#-3A or- 3B	0	13258	
	Overall Mixture	FQI-N#-4A or- 4B	0	125708	
	399-1- 101	FQI-N#-4	0	24243	
	399-1- 116	FQI-N#-5	0	24137	
	399-1- 115	FQI-N#-6	0	24125	
	399-1- 144	FQI-N#-7	0	24183	
	399-1- 100	FQI-N#-8	0	24238	
	399-1- 99	FQI-N#-9	0	12024 *	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

* FQI-N1-9 IS OOS.

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); J. POPE

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm) *	Filter dPs <20 Check if ok
9-13-18	0	0630	0	N/A	0	0	✓
9-13-18	1	0815	255.5	N/A	25.6	233.0	✓
9-13-18	2	0925	260.1	N/A	25.4	236.9	✓
9-13-18	3	1015	259.2	n/a	25.6	237.0	✓
9-13-18	4	1115	262.8	N/A	25.8	233.1	✓
9-13-18	5	1215	263.1	N/A	26.2	289.3	✓
9-13-18	6	1315	263.0	NA	24.3	287.3	✓
9-13-18	7	1415	260.0	N/A	25.6	285.6	✓
9-13-18	8	1515	259	NA	25.7	284.7	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

*FQI-N1-9 DOS - TOTAL DOES NOT INLUDE FQI-N1-9 FLOW.

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1	Operator(s):	J. POPE

			Field Parameters-Injection Solution Field parameters will be measured and recorded once every 4 hours.						
Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.	
9/13/18	0	0715 ~~0630~~	7.58	18.6	267	8.99	10.96	Flowrate stable- Take first skid sample	
	1								
	2								
	3								
9-13-18	4	1115	7.54	20.0	214	9.45	10.90	4 hour sample	
	5								
	6								
	7								
	8								
	9								
9-13-18	10	1505	7.54	21.2	199	10.21	11.05 ~~10.21~~ ~~9-13-18~~	Final Sample	
	Comments: Comments can be continued on comment page								
9-13-18	0700		7.19	18.0	264	8.85	138.1		River water sample

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); J-POPE

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/13/18	1	0815	46.90	19.1		
9-13-18	2	0915	47.56	19.5		
9-13-18	3	1015	47.56	19.5		
9-13-18	4	1115	47.56	19.6		
9-13-18	5	1215	47.56	19.5		
9-13-18	6	1315	47.56	19.6		
9-13-18	7	1415	47.26	19.4		
9-13-18	8	1515	47.26	19.4		
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-101 FQI: N1-4		Well: 399-1-116 FQI: N1-5		Well: 399-1-115 FQI: N1-6		Well: 399-1-144 FQI: N1-7		Well: 399-1-100 FQI: N1-8		Well: 399-1-99 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-13-18	1	0815	0	47.2	0	46.0	0	45.9	0	47.1	0	46.8	0	N/A	38
9-13-18	2	0915	0	47.5	0	46.6	0	47.5	0	47.8	0	47.5	0	N/A	38
9-13-18	3	1015	0	47.1	0	46.8	0	47.6	0	48.0	0	47.5	0	N/A	38
9-13-18	4	1115	0	46.5	0	46.2	0	46.9	0	46.8	0	46.7	0	N/A	38
9-13-18	5	1215	0	46.6	0	46.4	0	46.5	0	46.9	0	46.7	0	N/A	38
9-13-18	6	1315	0	46.5	0	46.4	0	46.5	0	46.8	0	46.7	0	N/A	38
9-13-18	7	1415	0	46.4	0	46.2	0	46.3	0	45.9	0	45.7	0	NA	38
9-13-18	8	1515	0	47.1	0	47.3	0	47.4	0	40.7	0	46.3	0	N/A	38
	9														
	10														

Comments: FII-N1-9 (OOS)

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s); DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	134942	274118	
	Chem. Injection	FQI-N#-2A or- 2B	3.04	4.77	
	Chem. Injection	FQI-N#-3A or- 3B	13258	26986	
	Overall Mixture	FQI-N#-4A or- 4B	125708	253833	
	399-1- 101	FQI-N#-4	24243	48905	
	399-1- 116	FQI-N#-5	24156	48859	
	399-1- 115	FQI-N#-6	24125	48939	
	399-1- 144	FQI-N#-7	24183	48755	
	399-1- 100	FQI-N#-8	24238	48838	
	399-1- 99	FQI-N#-9	12163	25302	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s): DeLoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/14/18	0	0630	260	N/A	25.7	285.7	✓
9/14/18	1	0730	260	N/A	25.9	285.9	✓
9/14/18	2	0830	260	N/A	25.6	285.6	✓
9/14/18	3	0930	260	N/A	25.7	285.7	✓
9/14/18	4	1030	260	N/A	25.7	285.7	✓
9/14/18	5	1130	261	N/A	25.8	285.8	✓
9/14/18	6	1230	261	N/A	25.7	286.7	✓
9/14/18	7	1330	261	N/A	25.7	286.7	✓
9/14/18	8	1430	261	N/A	25.7	286.7	✓
9/14/18	9	1530	260	N/A	25.7	286.7	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s): [illegible] 0630-1030

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/18/18	0	0030	7.57	17.8	252	9.18	11.58	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/14/18	4	1030	7.56	19.9	192	9.44	11.56	4 hour sample
	5							
	6							
	7							
	8							
	9							
9-14-18	10	1505	7.56	21.5	200	10.33	11.54	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 3

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/14/18	1	0830	46.6	19.1		
9/14/18	2	0830	46.8	19.1		
9/14/18	3	0930	47.1	19.4		
9/14/18	4	1030	47.0	19.3		
9/14/18	5	1130	47.2	19.4		
9/14/18	6	1230	47.1	19.3		
9/14/18	7	1330	47.2	19.4		
9/14/18	8	1430	47.2	19.4		
9/14/18	9	1530	47.0	19.3		
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 3	Operator(s) [illegible]
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-101 FQI: N1-4		Well: 399-1-116 FQI: N1-5		Well: 399-1-115 FQI: N1-6		Well: 399-1-114 FQI: N1-7		Well: 399-1-100 FQI: N1-8		Well: 399-1-99 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/14/18	1	0730	0	45.5	0	45.8	0	46.5	0	46.1	0	45.8	0	N/A	38
9/14/18	2	0830	0	45.9	0	46.3	0	45.9	0	45.8	0	45.5	0	N/A	38
9/14/18	3	0930	0	46.1	0	46.9	0	46.4	0	46.5	0	46.0	0	N/A	38
9/14/18	4	1030	0	46.3	0	45.7	0	46.1	0	46.3	0	45.9	0	N/A	38
9/14/18	5	1130	0	45.7	0	46.5	0	46.1	0	46.8	0	46.0	0	N/A	38
9/14/18	6	1230	0	46.3	0	46.2	0	46.3	0	45.2	0	46.0	0	N/A	38
9/14/18	7	1330	0	46.4	0	46.2	0	46.6	0	45.4	0	45.1	0	N/A	38
9/14	8	1430	0	46.4	0	46.5	0	46.8	0	45.5	0	45.1	0	N/A	38
9/14	9	1530	0	45.3	0	45.3	0	45.2	0	48.2	0	47.7	0	N/A	38
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	75% 0730	50% 1520 9/14						
Tank 2	70% 0730 9/14	48% 1520 9/14						
Tank 3	70% 0730 9/14	45% 1520 9/14						
Tank 4	70% 0730 9/14	45% 1520 9/14						
Tank 5	70% 0730 9/14	45% 1520 9/14						
Tank 6	70% 0750 9/14	45% 1520 9/14						
Tank 7	70% 0730 9/14	45% 1520 9/14						

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s);		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	274118	287254	
	Chem. Injection	FQI-N#-2A or- 2B	4.86	4.88	
	Chem. Injection	FQI-N#-3A or- 3B	26986	28182	
	Overall Mixture	FQI-N#-4A or- 4B	253833	266817	
	399-1- 101	FQI-N#-4	48907	51190	
	399-1- 116	FQI-N#-5	48859	51105	
	399-1- 115	FQI-N#-6	48973	51208	
	399-1- 144	FQI-N#-7	48755	51145	
	399-1- 100	FQI-N#-8	48838	51210	
	399-1- 99	FQI-N#-9	25467	26437	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeGon

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
	0	0630	260	N/A	25.7	285.7	✓
	1	0730	260	N/A	25.7	285.7	✓
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
	0	0630	7.56	18.2	68	9.05	11.53	Flowrate stable-Take first skid sample
	1							
	2							
	3							
	4	0730	7.55	18.4	221	9.11	11.59	4 hour sample
	5							
	6							
	7							
	8							
	9							
	10	N/A						Final Sample

Comments: Comments can be continued on comment page
0730 - Final Sample

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 3

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/15	1	0730	46.8	19.2		
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 3	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-101 FQI: N1-4		Well: 399-1-116 FQI: N1-5		Well: 399-1-115 FQI: N1-6		Well: 399-1-114 FQI: N1-7		Well: 399-1-100 FQI: N1-8		Well: 399-1-118 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
	1	0730	0	46.1	0	45.2	0	45.7	0	45.9	0	45.3	0	N/A	38
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments: FQI N1-9 OOS

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	55% 0800 9/11							
Tank 2	50% 0800 9/11							
Tank 3	50% 0800 9/11							
Tank 4	50% 0800 9/11							
Tank 5	50% 0800 9/11							
Tank 6	50% 0800 9/11							
Tank 7	50% 0800 9/11							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s); Deffoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	121192	
	Chem. Injection	FQI-N#-2A or- 2B	0	.26	
	Chem. Injection	FQI-N#-3A or- 3B	0	11953	
	Overall Mixture	FQI-N#-4A or- 4B	0	111019	
	399-1- 101	FQI-N#-4	0	18324	
	399-1- 116	FQI-N#-5	0	21709	
	399-1- 115	FQI-N#-6	0	21709	
	399-1- 144	FQI-N#-7	0	21769	
	399-1- 100	FQI-N#-8	0	21713	
	399-1- 99	FQI-N#-9	0	21677	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/15	0	0745	260	N/A	25.7	285.7	✓
9/15	1	0845	260	N/A	25.7	285.7	✓
9/15	2	0945	260	N/A	25.7	285.7	✓
9/15	3	1045	260	N/A	25.6	285.6	✓
9/15	4	1145	260	N/A	25.6	285.6	✓
9/15	5	1245	260	N/A	25.6	285.6	✓
9/15	6	1345	260	N/A	25.7	285.7	✓
9/15	7	1445	260	N/A	25.6	285.7	✓
9/15	8	1530	260	N/A	25.7	285.7	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoa / [illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/15	0	0745	7.55	18.8	212	9.21	11.57	Flowrate stable- Take first skid sample
9/15	1							
9/15	2							
9/15	3							
9/15	4	1145	7.54	21.4	174	9.82	11.47	4 hour sample
9/15	5							
9/15	6							
9/15	7							
9/15	8							
9/15	9							
9/16	10	1550	7.55	21.9	213	10.21	11.56	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 3

Operator(s); DeRon

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/15	1	0745	45.5	18.6		
9/15	2	0845	45.5	18.6		
9/15	3	1045	45.5	18.6		
9/15	4	1145	46.0	18.9		
9/15	5	1245	46.0	18.9		
9/15	6	1345	46.1	18.9		
9/15	7	1445	46.0	18.9		
9/15	8	1530	46.0	18.8		
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 3	Operator(s) DeLoa
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: ~~2~~ 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-101 FQI: N-4		Well: 399-1-116 FQI: N1-5		Well: 399-1-115 FQI: N1-6		Well: 399-1-114 FQI: N1-7		Well: 399-1-108 FQI: N1-8		Well: 399-1-99 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/15	1	0845	0	46.2	0	46.3	0	46.9	0	46.1	0	45.9	0	N/A	40
9/15	2	0945	0	46.2	0	46.4	0	47.4	0	45.9	0	46.0	0	N/A	40
9/15	3	1045	0	46.4	0	46.5	0	45.9	0	46.3	0	46.4	0	N/A	39
9/15	4	1145	0	46.6	0	46.6	0	47.2	0	46.4	0	46.4	0	N/A	39
9/15	5	1245	0	46.3	0	46.4	0	46.5	0	46.6	0	46.6	0	N/A	39
9/15	6	1345	0	46.7	0	46.4	0	47.1	0	46.6	0	46.6	0	N/A	39
9/15	7	1445	0	46.9	0	47.2	0	47.8	0	47.5	0	47.2	0	N/A	39
9/15	8	1530	0	47.0	0	47.3	0	47.7	0	47.7	0	47.3	0	N/A	39
	9														
	10														

Comments: FQI N1-9 005

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	65% 1600 K6							
Tank 2	60% 1600 9/15							
Tank 3	60% 1600 9/15							
Tank 4	60% 1600 9/15							
Tank 5	60% 1600 9/15							
Tank 6	60% 1600 9/15							
Tank 7	60% 1600 9/15							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1	Operator(s);	J. Pope

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	121192	212829	
	Chem. Injection	FQI-N#-2A or- 2B	.26	154.93	
	Chem. Injection	FQI-N#-3A or- 3B	11953	20198	
	Overall Mixture	FQI-N#-4A or- 4B	111019	205618	
	399-1- 101	FQI-N#-4	18324	38404	
	399-1- 116	FQI-N#-5	21709	38436	
	399-1- 115	FQI-N#-6	21709	38474	
	399-1- 144	FQI-N#-7	21769	38419	
	399-1- 100	FQI-N#-8	21713	38417	
	399-1- 99	FQI-N#-9	21677	15961 ①	

Safety Shower weekly check has been performed.	Check if Complete ☑	

① FQI-N1-9 (005)

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); J. Pope

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-16-18	0	0722	259.9	N/A	~~24.6~~ 25.6	238.3	✓
9-16-18	1	0820	260.2	N/A	25.7	237.1	✓
9-16-18	2	0920	260.1	n/a	25.6	239.3	✓
9-16-18	3	1020	259.2	n/a	25.7	237.8	✓
9-16-18	4	1120	260.2	n/a	25.3	240.0	✓
9-16-18	5	1220	261.9	N/A	24.9	238.7	✓
9-16-18	6	1330	261.4	N/A	25.4	239.4	✓
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

TOTAL DOES NOT INCLUDE FQI-N1-9 (OOS)

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1	Operator(s);	J. Pope

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-16-18	0	0730	7.55	18.5	249	9.22	11.48	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9-16-18	4	1120	7.55	19.3	223	9.67	11.37	4 hour sample
	5							
	6							
	7							
	8							
	9							
	10	1300	7.55	19.4	218	9.43	11.41	Final Sample
	Comments: Comments can be continued on comment page							RIVER SAMPLE

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); J - POPE

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-16-18	1	0720	45.27	18.4		
9-16-18	2	0820	45.51	18.5		
9-16-18	3	0920	45.90	18.7		
9-16-18	4	1020	45.40	18.8		
9-16-18	5	1120	45.50	18.8		
9-16-18	6	1220	45.50	18.8		
9-16-18	7	1300	45.50	18.8		
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID:	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-101 FQI: NI-4		Well: 399-1-116 FQI: NI-5		Well: 399-1-115 FQI: NI-6		Well: 399-1-114 FQI: NI-7		Well: 399-1-100 FQI: NI-8		Well: 399-1-99 FQI: NI-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-16-18	1	0722	0	49.5	0	47.6	0	46.5	0	47.5	0	47.2	0	N/A	40
9-16-18	2	0820	0	46.6	0	49.6	0	47.1	0	46.2	0	47.6	0	N/A	40
9-16-18	3	0920	0	46.5	0	49.1	0	47.9	0	48.5	0	47.3	0	N/A	40
9-16-18	4	1020	0	46.6	0	49.1	0	46.7	0	48.7	0	47.4	0	N/A	40
9-16-18	5	1120	0	49.2	0	47.3	0	48.8	0	46.9	0	47.8	0	N/A	40
9-16-18	6	1220	0	48.9	0	47.5	0	47.9	0	46.7	0	47.7	0	N/A	40
9-16-18	7	1320	0	48.8	0	47.1	0	47.9	0	47.7	0	41.8	0	N/A	40
	8													N/A	
	9													N/A	
	10													N/A	

Comments: FQI - NI-9 (005)

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	0930	Level/Time Date*						
Tank 1	68							
Tank 2	60							
Tank 3	68							
Tank 4	60							
Tank 5	60							
Tank 6	60							
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1

Operator(s); J. Pope

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	24770	
	Chem. Injection	FQI-N#-2A or- 2B	0	0	
	Chem. Injection	FQI-N#-3A or- 3B	0	2413	
	Overall Mixture	FQI-N#-4A or- 4B	0	24414	
	399-1- 106	FQI-N#-4	0	4549	
	399-1- 105	FQI-N#-5	0	4550	
	399-1- 104	FQI-N#-6	0	4512	
	399-1- 107	FQI-N#-7	0	4563	
	399-1- 108	FQI-N#-8	0	4540	
	399-1- 109	FQI-N#-9	0	1656 *	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

* FQI-N1-9 005. Not reading correctly.

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1	Operator(s);	J. POPE

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-16-18	0	1350	259.0	N/A	25.7	238.3	✓
9-16-18	1	1450	259.5	N/A	25.6	238.2	✓
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

TOTAL SUM DOES NOT INCLUDE FQI-N1-9 9-16-18

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	1	Operator(s);	S. Pope

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-16-18	0	1350	7.59	20.4	221	9.93	11.37	Flowrate stable- Take first skid sample
	1							
	2							
	3							
N/A	4							4 hour sample
	5							
	6							
	7							
	8							
	9							
9-16-18	10	1520	7.56	20.3	185	10.01	11.46	Final Sample
	River Sample	1350	7.22	20.2	208	9.58	215.4	

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); J Pope

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-16-18	1	1350	46.25	18.9		
9-16-18	2	1450	47.05	19.3		
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: FQI: NI-4		Well: FQI: NI-5		Well: FQI: NI-6		Well: FQI: NI-7		Well: FQI: NI-8		Well: FQI: NI-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-16-18	1	1350	0	48.4	0	48.1	0	47.8	0	46.5	0	47.5	0	N/A	<10
9-16-18	2	1450	0	47.9	0	47.6	0	47.0	0	47.9	0	47.8	0	N/A	<10
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments: FQI-NI-9

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1		Operator(s); DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	24770	157184	
	Chem. Injection	FQI-N#-2A or- 2B	0	.01	
	Chem. Injection	FQI-N#-3A or- 3B	2413	15429	
	Overall Mixture	FQI-N#-4A or- 4B	24414	142901	
	399-1- 106	FQI-N#-4	4549	28842	
	399-1- 105	FQI-N#-5	4550	28824	
	399-1- 104	FQI-N#-6	4512	28771	
	399-1- 107	FQI-N#-7	4563	28773	
	399-1- 108	FQI-N#-8	4540	28886	
	399-1- 109	FQI-N#-9	1656	12369	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/17	0	0710	260	N/A	25.7	285.7	✓
9/17	1	0800	260	N/A	25.7	285.7	✓
9/17	2	0900	260	N/A	25.7	236.9	✓
9/17	3	1000	259	N/A	25.7	237.4	✓
9/17	4	1100	260	N/A	25.7	237.8	✓
9/17	5	1200	260	N/A	25.8	237.8	✓
9/17	6	1300	260	N/A	25.6	239.1	✓
9/17	7	1400	260	N/A	25.5	238.0	✓
9/17	8	1500	260	N/A	25.7	238.6	✓
	9	1530	260	N/A	25.6	238.3	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

Total Flow does not reflect FQI-N1-9 due to OOS Rosemount - ~~Flow Head Frame~~ Comm

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/17	0	0710	7.55	17.4	276	9.28	11.52	Flowrate stable-Take first skid sample
9	1							
	2							
	3							
9/17	4	1100	7.54	19.4	206	9.38	11.46	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/17	10	1530	7.55	20.4	213	10.36	11.45	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: A1

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/17	1	0700	47.0	19.3		
9/17	2	0800	47.3	19.4		
9/17	3	1000	47.5	19.5		
9/17	4	1100	47.1	19.6		
9/17	5	1200	47.7	19.7		
9/17	6	1300	47.7	19.6		
9/17	7	1400	47.6	19.5		
9/17	8	1500	47.6	19.5		
9/17	9	1530	47.6	19.5		
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 4	Operator(s) DeRoo
COMMENTS:	

Appendix B – Injection Well Monitoring Data Sheet

***May be copied**

Injection Round: 1	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-N1-106 FQI: N1-4		Well: 399-1-105 FQI: N1-5		Well: 399-1-104 FQI: N1-6		Well: 399-1-103 FQI: N1-7		Well: 399-1-108 FQI: N1-8		Well: 399-1-109 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/17	1	0800	0	47.9	0	47.8	0	47.3	0	48.0	0	48.1	0	N/A	40
9/17	2	0900	0	47.6	0	47.6	0	48.0	0	47.7	0	48.0	0	N/A	40
9/17	3	1000	0	47.8	0	47.2	0	47.3	0	47.2	0	47.9	0	N/A	40
9/17	4	1100	0	47.5	0	47.6	0	47.6	0	47.5	0	47.6	0	N/A	40
9/17	5	1200	0	47.5	0	47.8	0	47.5	0	47.3	0	47.7	0	N/A	40
9/17	6	1300	0	48.1	0	47.7	0	47.8	0	47.8	0	47.7	0	N/A	40
9/17	7	1400	0	47.5	0	47.6	0	47.3	0	47.8	0	47.8	0	N/A	40
9/17	8	1500	0	47.8	0	47.5	0	48.2	0	47.5	0	47.6	0	N/A	40
9/17	9	1550	0	47.6	0	47.9	0	48.6	0	47.0	0	48.2	0	N/A	40
	10														

Comments: FQI-N1-9 005

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	70% 0900 9/17							
Tank 2	65% 0900 9/17							
Tank 3	65% 0900 9/17							
Tank 4	65% 0900 9/17							
Tank 5	65% 0900 9/17							
Tank 6	85% 0900 9/17							
Tank 7	65% 0900 9/17							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	1	Operator(s);	RAMIREZ	
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	157184	279498	
	Chem. Injection	FQI-N#-2A or- 2B	0.1	0.0	
	Chem. Injection	FQI-N#-3A or- 3B	15429	27133	
	Overall Mixture	FQI-N#-4A or- 4B	142901	264124	
	399-1- 106	FQI-N#-4	28842	51146	
	399-1- 105	FQI-N#-5	28824	51169	
	399-1- 104	FQI-N#-6	28771	51199	
	399-1- 107	FQI-N#-7	28773	51222	
	399-1- 108	FQI-N#-8	28886	51202	
	399-1- 109	FQI-N#-9	12369	24812	
	Safety Shower weekly check has been performed. ✓ 9/17/18		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); RAMIREZ

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/18	0	0647	260	NA	25.7	242	✓
9/18	1	0750	261	NA	25.7	260	✓
9/18	2	0850	260	NA	25.7	261	✓
9/18	3	0950	260	NA	25.7	261	✓
9/18	4	1050	260	NA	25.7	263	✓
9/18	5	1150	260	NA	25.7	261	✓
9/18	6	1250	260	NA	25.7	261	✓
9/18	7	1350	260	NA	25.7	261	✓
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); Ramirez

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/18	0	0650	7.42	17.0	255	9.19	14.68	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/18	4	1050	7.57	19.8	210	9.71	11.21	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/18	10	1423	7.00	21.3	237	9.78	11.42	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s); RAMIREZ

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9/18	1	0750	45.6	19.5		
9/18	2	0850	47.7	19.6		
9/18	3	0950	47.7	19.6		
9/18	4	1050	47.7	19.6		
9/18	5	1150	47.7	19.6		
9/18	6	1250	47.7	19.6		
9/18	7	1350	47.7	19.6		
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/18	1	0750	0	47.5	0	47.9	0	48.2	0	47.3	0	47.0	NA	NA	36
9/18	2	0850	0	47.7	0	47.9	0	48.2	0	47.3	0	47.1	0	NA	36
9/18	3	0950	0	47.7	0	47.8	0	48.4	0	47.4	0	47.1	0	NA	36
9/18	4	1050	0	47.7	0	47.9	0	48.2	0	47.3	0	47.1	0	NA	36
9/18	5	1150	0	47.6	0	47.0	0	48.2	0	42.8	0	50.0	0	NA	36
9/18	6	1250	0	47.3	0	47.3	0	48.3	0	42.4	0	47.3	0	44.8	36
9/18	7	1350	0	47.1	0	47.1	0	49.1	0	47.0	0	47.3	0	N/A	36
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	75% 9/18 0750							
Tank 2	75% 9/18 0750							
Tank 3	75% 9/18-0750							
Tank 4	75% 9/18 0750							
Tank 5	75% 9/18 0750							
Tank 6	75% 9/18 0750							
Tank 7	75% 9/18 0750							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	.0	138091	
	Chem. Injection	FQI-N#-2A or- 2B	.0	175.75	
	Chem. Injection	FQI-N#-3A or- 3B	.0	134605	
	Overall Mixture	FQI-N#-4A or- 4B	.0	132821	
	399-1- 106	FQI-N#-4	22.77	25208	
	399-1- 105	FQI-N#-5	.11	25159	
	399-1- 104	FQI-N#-6	.40	25232	
	399-1- 107	FQI-N#-7	.00	25203	
	399-1- 108	FQI-N#-8	.00	25166	
	399-1- 109	FQI-N#-9	473.81	9570.5	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/19	0	0630	266	N/A	25.7	N/A	✓
9/19	1	0730	260	N/A	25.7	236.6	✓
9/19	2	0830	260	N/A	25.7	236.1	✓
9/19	3	0930	260	N/A	25.7	237.2	✓
9/19	4	1030	260	N/A	25.7	238.7	✓
9/19	5	1130	260	N/A	25.7	237.9	✓
9/19	6	1230	260	N/A	25.7	237.9	✓
9/19	7	1330	260	N/A	25.7	239.6	✓
9/19	8	1430	260	N/A	25.7	239.1	✓
9/19	9	1530	260	N/A	25.6	237.9	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page FQI-N1-9 005 Total flow does not reflect All Flowmeters N1-9 005

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoos / [illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/19	0	0830	7.54	17.0	225	8.99	11.93	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/19	4	1050	7.54	19.3	208	9.76	11.55	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/19	10	1530	7.56	22.4	194	10.62	11.45	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s): DeLeon

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/19	1	0730	46.6	19.0		
9/19	2	0830	46.6	19.1		
9/19	3	0930	47.0	19.2		
9/19	4	1030	47.1	19.3		
9/19	5	1130	47.0	19.2		
9/19	6	1230	47.2	19.3		
9/19	7	1330	47.2	19.3		
9/19	8	1430	47.1	19.3		
9/19	9	1530	47.2	19.3		
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 4	Operator(s) DeRoon
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-106 FQI: N1-4		Well: 399-1-105 FQI: N1-5		Well: 399-1-104 FQI: N1-6		Well: 399-1-107 FQI: N1-7		Well: 399-1-108 FQI: N1-8		Well: 399-1-109 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/19	1	0730	0	47.5	0	47.4	0	47.0	0	47.4	0	47.3	0	N/A	30
9/19	2	0830	0	47.0	0	47.3	0	48.3	0	47.3	0	46.3	0	N/A	30
9/19	3	0930	0	47.9	0	47.5	0	47.7	0	47.6	0	46.5	0	N/A	35
9/19	4	1030	0	46.8	0	47.1	0	47.6	0	48.5	0	48.7	0	N/A	35
9/19	5	1130	0	46.2	0	46.7	0	47.6	0	47.1	0	48.1	0	N/A	35
9/19	6	1230	0	48.2	0	47.8	0	49.5	0	45.9	0	46.5	0	N/A	35
9/19	7	1330	0	48.0	0	48.5	0	47.9	0	47.1	0	46.1	0	N/A	40
9/19	8	1430	0	47.8	0	48.2	0	47.7	0	48.4	0	47.0	0	N/A	40
9/19	9	1530	0	48.2	0	45.9	0	47.9	0	48.6	0	47.3	0	N/A	45
	10														

Comments: FQI-N1-9 OOS

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 1			Operator(s); DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	138092	217447	
	Chem. Injection	FQI-N#-2A or- 2B	957.1	1229.6	
	Chem. Injection	FQI-N#-3A or- 3B	13415	21615	
	Overall Mixture	FQI-N#-4A or- 4B	132827	213899	
	399-1- 106	FQI-N#-4	25219	39741	
	399-1- 105	FQI-N#-5	25327	39800	
	399-1- 104	FQI-N#-6	25235	39816	
	399-1- 107	FQI-N#-7	25214	39900	
	399-1- 108	FQI-N#-8	25166	39783	
	399-1- 109	FQI-N#-9	9838.7	14874	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1 | Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/20	0	0645	260	N/A	28.7	N/A	✓
9/20	1	0745	260	N/A	25.6	237.1	✓
9/20	2	0845	260	N/A	25.6	236.4	✓
9/20	3	0945	259	N/A	25.6	238.3	✓
9/20	4	1045	260	N/A	28.0	239.6	✓
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B.comments can be continued on comment page FQI-N1-9 005 and Total does not reflect total reading

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 1

Operator(s); DeRoos/[illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/20	0	0645	7.54	18.8	261	9.18	11.53	Flowrate stable-Take first skid sample
	1							
	2							
	3							
9/20	4	1045	7.51	20.2	205	9.70	13.82	4 hour sample
	5							
	6							
	7							
	8							
	9							
	10							Final Sample

Comments: Comments can be continued on comment page

Last Sample 1045

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/20	1	0745	46.7	19.1		
9/20	2	0845	46.6	19.0		
9/20	3	0945	46.6	19.0		
9/20	4	1045	46.8	19.1		
	5					
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 4	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-106 FQI: N1-4		Well: 399-1-105 FQI: N1-5		Well: 399-1-104 FQI: N1-6		Well: 399-1-107 FQI: N1-7		Well: 399-1-108 FQI: N1-8		Well: 399-1-109 FQI: N1-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/20	1	0715	0	49.1	0	46.6	0	48.1	0	48.6	0	47.7	0	NA	45
9/20	2	0815	0	47.5	0	47.5	0	47.2	0	47.1	0	47.1	0	N/A	45
9/20	3	0945	0	47.5	0	47.2	0	47.9	0	47.9	0	47.8	0	N/A	45
9/20	4	1045	0	47.9	0	47.8	0	47.8	0	48.5	0	47.6	0	N/A	45
	5														
	6														
	7														
	8														
	9														
	10														

Comments: FQI-N1-9 OOS

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	005							
Tank 2	005							
Tank 3	005							
Tank 4	005							
Tank 5	40 0730 9/20							
Tank 6	40 0730 9/20							
Tank 7	40 0730 9/20							

* Tank levels are for information only and may be taken as requested by the OS/FWS

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Appendix C

Skid 2: Daily Operations Field Data Sheets

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300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid # #2			Operator(s); LK		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0.0	① 35105	
	Chem. Injection	FQI-N#-2A or- 2B	0.0	① 2771.7	NEED TAG
	Chem. Injection	FQI-N#-3A or- 3B	0.0	① .63	
	Overall Mixture	FQI-N#-4A or- 4B	0.0	① 19474	
	399-1- 103	FIQ-N#-4	0.0	① 6705.3	
	399-1- 126	FIQ-N#-5	0.0	① 6791.0	
	399-1- 128	FIQ-N#-6	0.0	① 6418.9	
	399-1- 130	FIQ-N#-7	0.0	① 6109.4	
	399-1- 127	FIQ-N#-8	0.0	① 6069.6	
	399-1- 125	FIQ-N#-9	0.0	① 14552	

① RESET to 0 DURING Operation

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # #2 | Operator(s); LK

			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 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
			FQI-N2-2A OR 2B	FQI-N2-2A OR 2B							
Date	Hour	Time	~~FIQ-N1-2A or 2B~~ JL 9/4/18 Chem. (gpm)	~~FIQ-N1-1A or 1B~~ JL 9/4/18 River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	
9-4-18	Pre start	~~1030~~	~~22.6~~	~~245~~	~~269.5~~	✓	7.2	20.2	166	9.45	Columbia River Water Sample
9-4-18	0	1030	22.6	245	269.5	✓	7.5	21.2 c	165	9.45	Flowrate stable-Take first skid sample
9-4-18	1	1130	22.3	245	268	✓	7.5	20.6	161	9.24	
9-4-18	2	1230	21.4	247	268	✓					
9-4-18	3	1330	24.4	247	271.3	✓					
9-4-18*	4	1430	24.2	259	277.4	✓	7.5	21.1	142	9.82	
LK 9-4-18 ~~9-4-18~~	5	1520	~~23.9~~ 23.9 LK	259		✓					
	6										
	7										
	8										
	9										Conductivity
9-4-18	10	1520	23.9	259	282	✓	7.5	20.8	8	9.83	11.01
	Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page										

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); LK

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-4-18	1	1030			44.7	18
9-4-18	2	1130			44	18
9-4-18	3	1230			44	18
9-4-18	4	1330			44.6	17.7
9-4-18	5	1430			45.7	18.5
	6					
	7					
	8					
	9					
	10 Final					

N/A

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 1	Operator(s) LK

COMMENTS:

FLOW TOTALIZERS WERE RESET DURING INJECTIONS. LD 9/4/18

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1

Skid ID: #2

Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-103 FQI: ~~39~~ N2-4		Well: 399-1-126 FQI: N2-5		Well: 399-1-128 FQI: N2-6		Well: 399-1-130 FQI: N2-7		Well: 399-1-127 FQI: N2-8		Well: 399-1-125 FQI: N2 8		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-4-18	1	1030	0	45.9	0	49.2	0	45.3	0	42.5	0	42.7	0	43.8	40
9-4-18	2	1130	0	47	0	49	0	45	0	42	0	42	0	44	40
9-4-18	3	1230	0	47	0	49	0	45	0	42	0	42	0	44	40
9-4-18	4	1330	0	47.4	0	48.7	0	45.2	0	42.8	0	42.3	0	44.4	40
9-4-18	5	1430	0	49.0	0	50.6	0	47.5	0	45.2	0	44.9	0	47.0	40
9-4-18	6	1520	0	49.0	0	50.6	0	47.6	0	45.2	0	44.2	0	47.1	40
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3				N				
Tank 4				A				
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

TANK LEVELS RECORDED ON SKID #1 DATA SHEET

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid # #2			Operator(s); RcRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	35105	148482	
	Chem. Injection	FQI-N#-2A or- 2B	2771.7	13931	
	Chem. Injection	FQI-N#-3A or- 3B	0.63	0.63	
	Overall Mixture	FQI-N#-4A or- 4B	19474	123422	
	399-1- 103	~~FIQ~~-N#-4 FQI	6705.3	28585	
	399-1- 126	~~FIQ~~-N#-5 FQI	6791.0	29054	
	399-1- 128	~~FIQ~~-N#-6 FQI	6418.9	27365	
	399-1- 130	~~FIQ~~-N#-7 FQI	6109.5	26061	
	399-1- 127	~~FIQ~~-N#-8 FQI	6069.6	25480	
	399-1- 125	~~FIQ~~-N#-9 FQI	14552	34910	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); DeRoos

			Flowrates-Skid Parameters Skid and filter parameters will be measured and recorded hourly. FQI-N2-2A, FQI-N2-2A or 1B				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 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
Date	Hour	Time	~~FIQ-N1-2A or 2B~~ Chem. (gpm)	~~FIQ-N1-1A or 1B~~ River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	
9/5/18	Pre start	N/A								~~8.0~~ 8.0	Columbia River Water Sample
9/5/18	0	0800	24.7	251.0	277.5	✓	7.69	19.3	63	9.31 ~~8.93~~	Flowrate stable-Take first skid sample
9/5/18	1	0915	24.5	251.0	277.3	✓					
9/5/18	2	1015	24.5	252.0	277.2	✓					
9/5/18	3	1115	24.7	252.1	276.7	✓					
9/5/18	4	1215	24.6	251.1	276.3	✓	7.64	21.4	232	9.51	11.72 Cured
9/5/18	5	1315	24.7	252	276.1	✓					
9/5/18	6	1415	24.9	251	276.6	✓					
	7										
	8										
	9										
9/5/18	10	1515	25.1	251	276.8	✓	7.60	22.0	49	9.80	11.91
	Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page										

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: #2

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/5/18	1	0815	45.3	18.3	45.0	18.0
9/5/18	2	0915	45.3	18.3	45.0	18.0
9/5/18	3	1015	45.3	18.3	45.0	18.0
9/5/18	4	1115	45.3	18.3	45.0	18.0
9/5/18	5	1215	45.3	18.4	45.0	18.1
9/5/18	6	1315	45.3	18.3	45.0	18.1
9/5/18	7	1415	45.3	18.3	45.0	18.1
	8					
	9					
9/5/18	10 Final	1515	45.3 ~~24.9~~ 9/5/18	18.4 ~~24.9~~ 9/5/18	45.0	18.1

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1	Skid ID: #2	Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1 FQI: 103 N2-4		Well: 399-1 FQI: 126 N2-5		Well: 399-1 FQI: 128 N2-6		Well: 399-1 FQI: 130 N2-7		Well: 399-1 FQI: 127 N2-8		Well: 399-1 FQI: 125 N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/5/18	1	0820	0	48.5	0	49.6	0	46.8	0	44.2	0	42.9	0	45.5	38
9/5/18	2	0915	0	48.7	0	49.5	0	46.5	0	44.1	0	43.4	0	45.1	38
9/5/18	3	1015	0	48.6	0	49.5	0	46.6	0	44.4	0	43.1	0	45.0	36
9/5/18	4	1115	0	48.5	0	49.4	0	46.5	0	44.5	0	42.6	0	45.2	36
9/5/18	5	1215	0	48.4	0	49.4	0	46.5	0	44.3	0	43.0	0	44.7	36
9/5/18	6	1315	0	48.4	0	49.5	0	46.5	0	44.1	0	43.0	0	44.6	38
9/5/18	7	1415	0	48.7	0	49.5	0	46.6	0	44.0	0	43.1	0	44.7	38
	8														
	9														
9/5/18	10	1515	0	48.8	0	49.5	0	46.7	0	44.0	0	43.1	0	44.7	38

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet

***May be copied**

Tank	Level/Time Date*							
Tank 1	(1)	(1)						
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

(1) = Data Recorded on Skid # 1

* Tank levels are for information only and may be taken as requested by the OS/FWS

Appendix A- Injection Skid Monitoring Data Sheet *May be copied					
Skid # 2			Operator(s); Filler		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	148482	246923	
	Chem. Injection	FQI-N#-2A or- 2B	13931	23169	
	Chem. Injection	FQI-N#-3A or- 3B	N/A	N/A	
	Overall Mixture	FQI-N#-4A or- 4B	123422	223389	
	399-1- 103	FIQ-N#-4	28585	47630	
	399-1- 126	FIQ-N#-5	29054	48202	
	399-1- 128	FIQ-N#-6	27374	45393	
	399-1- 130	FIQ-N#-7	26065	43123	
	399-1- 127	FIQ-N#-8	25485	42299	
	399-1- 125	FIQ-N#-9	34912	52722	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Fillion

			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 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
Date	Hour	Time	FIQ-N1-2A or 2B Chem. (gpm)	FIQ-N1-1A or 1B River (gpm)	*Total (gpm)	Filter dPs <45 Check if ok	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Disolved Oxygen (mg/L)	
N/A	Pre start										Columbia River Water Sample
* 9-6-18	0	0630	25	255	280	✓	7.6	18.9	59	9.09	Flowrate stable-Take first skid sample
9-6-18	1	0730	25	256	281	✓					
9-6-18	2	0830	24	255	279	✓					
9-6-18	3	0930	24	255	279	✓					
* 9-6-18	4	1030	24	256	280	✓	9.9	19.8	159	9.20	
9-6-18	5	1130	(1)	→							
9-6-18	6	1230	(1)	→							
9-6-18	7	1330	23	254	277	✓					
	8										
	9										
9-6-18	10	1430	22	254	276	✓	7.6	21.0	64	9.77	11.28 COND

Comments: * Sum of FQI-N#-4,5,6,7,8,9 ,comments can be continued on comment page
(1) skid was shutdown

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); Fillion

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-6-18	1	0630	45.00	18	45.00	18
9-6-18	2	0730	45.40	18	45.00	18
9-6-18	3	0830	45.40	18	45.00	18
9-6-18	4	0930	45.40	18	45.00	18
9-6-18	5	1030	45.40	18	45.00	18
9-6-18	6	1130	(1) →			
9-6-18	7	1230	(1) →			
9-6-18	8	1330	45.40	18	45.00	18
	9					
9-6-18	10 Final	1430	45.40	18	45.00	18

Comments: *comments can be continued on comment page

(1) skid was shutdown

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s) Fillion
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

***May be copied**

Injection Round:	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 103 FQI: 4		Well: 126 FQI: 5		Well: 128 FQI: 6		Well: 130 FQI: 7		Well: 127 FQI: 8		Well: 125 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-6-18	1	0630	0	50	0	50	0	47	0	45	0	44	0	46	38
9-6-18	2	0730	0	50	0	50	0	47	0	45	0	43	0	46	40
9-6-18	3	0830	0	50	0	50	0	47	0	45	0	43	0	46	40
9-6-18	4	0930	0	50	0	50	0	47	0	44	0	43	0	46	38
9-6-18	5	1030	0	50	0	50	0	47	0	44	0	43	0	46	38
9-6-18	6	1130	1	→											→
9-6-18	7	1230	1	→											→
9-6-18	8	1330	0	48	0	49	0	46	0	43	0	44	0	46	38
9-6-18	9	1430	0	48	0	49	0	46	0	43	0	44	0	46	38
	10														

Comments: 1 skid was shut down

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	NA							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # #2

Operator(s); DeRoon

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	105231	
	Chem. Injection	FQI-N#-2A or- 2B	0	10463	
	Chem. Injection	FQI-N#-3A or- 3B	N/A	N/A	
	Overall Mixture	FQI-N#-4A or- 4B	0	108314	
	399-1- 103	FQI-N#-4	.28	21481	
	399-1- 126	FQI-N#-5	0	13956	
	399-1- 128	FQI-N#-6	0	19613	
	399-1- 130	FQI-N#-7	0	20485	
	399-1- 127	FQI-N#-8	0	21645	
	399-1- 125	FQI-N#-9	0	18677	

Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/7/18	0	0800	250	24.8	N/A	N/A	✓
9/7/18	1	0900	250	24.7	N/A	268.2	✓
9/7/18	2	1000	251	24.9	N/A	268.3	✓
9/7/18	3	1100	250	24.7	N/A	275.7	✓
9/7/18	4	1200	249	24.8	N/A	274.9	✓
9/7/18	5	1300	250	24.9	N/A	275.4	✓
9/7/18	6	1400	250	24.6	N/A	275.6	✓
9/7/18	7	1500	251	24.6	N/A	275.9	✓
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Delcon

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/7/18	0	0820	7.56	20.2	15	9.18	11.65 mS	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/7/18	4	1200	7.54	22.3	91	9.36	11.84	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/7/18	10	1500	7.52	23.6	55	9.93	11.61	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: ~~2~~ 1 9/7/18

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/7/18	1	0900			45.1	18.1
9/7/18	2	1000			45.2	18.2
9/7/18	3	1100			44.5	17.8
9/7/18	4	1200			44.5	17.8
9/7/18	5	1300			44.5	17.8
9/7/18	6	1400			44.5	17.8
9/7/18	7	1500			44.6	17.8
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 1	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1	Skid ID: 2	Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 103 FQI: 4		Well: 126 FQI: 5		Well: 128 FQI: 6		Well: 130 FQI: 7		Well: 127 FQI: 8		Well: 127 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/2/18	1	0900	0	56.8	0	22.5	0	50.6	0	52.7	0	54.9	0	30.7	38
9/2/18	2	1000	0	57.0	0	22.6	0	49.6	0	52.9	0	55.5	0	30.7	38
9/2/18	3	1100	0	49.4	0	37.0	0	45.1	0	47.2	0	50.1	0	46.9	38
9/2/18	4	1200	0	49.4	0	37.0	0	44.7	0	46.8	0	50.0	0	47.0	38
9/2/18	5	1300	0	49.4	0	36.9	0	45.2	0	46.8	0	50.0	0	47.1	37
9/2/18	6	1400	0	49.5	0	37.0	0	45.0	0	47.0	0	49.9	0	47.2	37
9/2/18	7	1500	0	49.5	0	36.9	0	45.2	0	47.1	0	50.1	0	47.1	37
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	105231	200008	
	Chem. Injection	FQI-N#-2A or- 2B	10463	19820	
	Chem. Injection	FQI-N#-3A or- 3B	~~.02~~ .26	.28	
	Overall Mixture	FQI-N#-4A or- 4B	108314	208492	
	399-1- 103	FQI-N#-4	21665	40886	
	399-1- 126	FQI-N#-5	13979	26399	
	399-1- 128	FQI-N#-6	19614	39234	
	399-1- 130	FQI-N#-7	20485	38749	
	399-1- 127	FQI-N#-8	21669	40715	
	399-1- 125	FQI-N#-9	18678	34377	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoon

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/8/18	0	0710	250	24.7	N/A	N/A	✓
9/8/18	1	0800	250	24.7	N/A	275.7	✓
9/8/18	2	0900	251	24.7	N/A	282.9	✓
9/8/18	3	1000	250	24.7	N/A	276.1	✓
9/8/18	4	1100	250	24.7	N/A	275.9	✓
9/8/18	5	1200	250	24.7	N/A	274.9	✓
9/8/18	6	1300	250	24.7	N/A	274.6	✓
~~9/8/18~~	~~7~~						
~~9/8/18~~	~~8~~						
a	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

~~Total clear 9/11/18 [illegible]~~

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/8/18	0	0716	7.54	21.0	217	9.07	11.68	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/8/18	4	1100	7.52	21.8	219	9.24	11.69	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/8/18	10	1350	7.52	22.4	171	9.81	12.20	Final Sample

Comments: Comments can be continued on comment page

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s): [illegible]

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/8/18	1	0800			44.9	18.0
9/8/18	2	0900			44.9	18.0
9/8/18	3	1000			44.9	17.9
9/8/18	4	1100			44.9	18.0
9/8/18	5	1200			44.8	17.9
9/8/18	6	1300			44.8	17.9
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: i	Operator(s) DeRaos
COMMENTS:	

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 1	Skid ID: 2	Injection Start Date: 9/4/18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 103 FQI: 4		Well: 126 FQI: 5		Well: 128 FQI: 6		Well: 130 FQI: 7		Well: 127 FQI: 8		Well: 125 FQI: 9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/8/18	1	0800	0	52.3	0	32.6	0	47.3	0	50.1	0	52.1	0	41.3	38
9/8/18	2	0900	0	52.0	0	32.4	0	51.9	0	49.0	0	51.7	0	41.2	38
9/8/18	3	1000	0	51.7	0	31.9	0	51.7	0	49.9	0	51.7	0	40.2	38
9/8/18	4	1100	0	51.8	0	31.9	0	51.8	0	49.1	0	51.1	0	40.2	38
9/8/18	5	1200	0	51.8	0	31.6	0	51.6	0	48.8	0	50.4	0	40.3	37
9/8/18	6	1300	0	51.7	0	31.7	0	50.6	0	49.1	0	50.9	0	40.6	38
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	80% 0630 9/8/12							
Tank 2	75% 0630 9/8/12							
Tank 3	75% 0630 9/8/12							
Tank 4	75% 0630 9/8/12							
Tank 5	75% 0630 9/8/12							
Tank 6	75% 0630 9/8/12							
Tank 7	75% 0630 9/8/12							

Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

2	Appendix A- Injection Skid Monitoring Data Sheet *May be copied				
Skid # 2			Operator(s); POPE		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections ~~9-9-18~~	Comments
	River Water	FQI-N#-1A or- 1B	2.18	~~22789~~	127397
	Chem. Injection	FQI-N#-2A or- 2B	0	12552	
	Chem. Injection	FQI-N#-3A or- 3B	0	n/a	
	Overall Mixture	FQI-N#-4A or- 4B	0	136420	
	399-1- 122	FQI-N#-4	0	22789	
	399-1- 135	FQI-N#-5	190.31	24697	
	399-1- 123	FQI-N#-6	32.34	21843	
	399-1- 121	FQI-N#-7	0	21848	
	399-1- 133	FQI-N#-8	.41	22906	
	399-1- 134	FQI-N#-9	17.09	26417	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); POPE

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-9-18	0	0715	253.4	24.1	N/A	277.9	✓
9-9-18	1	0815	250.1	24.7	N/A	275.6	✓
9-9-18	2	0915	250.1	24.9	N/A	275.4	✓
9-9-18	3	1015	249.8	24.7	N/A	275.1	✓
9/9/18	4	1115	250.3	24.7	N/A	275.7	✓
9/9/18	5	1215	249.8	24.8	N/A	275.7	✓
9/9/18	6	1315	249.9	25.1	N/A	~~275.~~ 275.4	✓ 9/9/18
9/9/18	7	1415	250.2	24.6	n/a	275.9	✓
9-9-18	8	1520	250.2	24.6	n/a	276.0	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Pope

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-9-18	0	0740	7.53	19.5	215	8.87	11.43	Flowrate stable- Take first skid sample *
	1							
	2							
	3							
	4	1140	7.55	21.4	151	9.43	11.54	4 hour sample
	5							
	6							
	7							
	8							
	9							
9-9-18	10	1530	7.56	22.4	211	10.09	11.53	Final Sample
* 9-9-18	Comments: Comments can be continued on comment page	0735	7.23	18.3	247	8.74	.11	INITIAL RIVER Sample

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 1

Operator(s); POPE

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-9-18	1	0715			44.95	18.1
9-9-18	2	0815			44.63	17.9
9-9-18	3	0915			44.63	17.9
9-9-18	4	1015			44.63	17.9
9/9/18	5	1115	N/A		44.61	17.8
9/9/18	6	1215			44.61	17.8
9/9/18	7	1315			44.61	17.8
9/9/18	8	1415			44.63	17.9
9-9-18	9	1520			44.63	17.8
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 2	Injection Start Date: 9-4-18

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-122 FQI: N2-4		Well: 399-1-135 FQI: N2-5		Well: 399-1-123 FQI: N2-6		Well: 399-1-121 FQI: N2-7		Well: 399-1-133 FQI: N2-8		Well: 399-1-134 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-9-18	1	0720	0	45.1	0	48.8	0	42.7	0	42.8	0	45.6	0	52.9	38
9-9-18	2	0815	0	44.9	0	48.3	0	42.6	0	42.7	0	45.1	0	52.0	38
9-9-18	3	0915	0	44.7	0	48.1	0	42.9	0	42.7	0	45.0	0	52.0	38
9-9-18	4	1015	0	44.6	0	48.2	0	42.9	0	42.8	0	45.0	0	51.6	38
9/9/18	5	1115	0	44.8	0	48.1	0	43.0	0	43.1	0	45.1	0	51.6	38
9/9/18	6	1215	0	44.9	0	48.1	0	43.0	0	43.2	0	44.8	0	51.7	38
9/9/18	7	1315	0	44.7	0	48.2	0	42.9	0	43.1	0	44.7	0	51.8	38
9/9/18	8	1415	0	44.7	0	48.2	0	42.9	0	43.1	0	44.9	0	52.1	38
9/9/18	9	1520	0	44.9	0	47.4	0	43.3	0	43.5	0	45.1	0	51.8	38
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet

*May be copied

Tank	Level/Time Date*							
	0800							
Tank 1	80%							
Tank 2	75%							
Tank 3	75%							
Tank 4	74%							
Tank 5	73%							
Tank 6	72%							
Tank 7	72%							

Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	2	Operator(s);	DeRoos	
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	127397	255872	
	Chem. Injection	FQI-N#-2A or- 2B	12552	25715	
	Chem. Injection	FQI-N#-3A or- 3B	.12	.17	
	Overall Mixture	FQI-N#-4A or- 4B	136420	273410	
	399-1- 122	FQI-N#-4	22789	46057	
	399-1- 135	FQI-N#-5	24701	48418	
	399-1- 123	FQI-N#-6	21843	44115	
	399-1- 121	FQI-N#-7	21849	44856	
	399-1- 133	FQI-N#-8	22906	46650	
	399-1- 134	FQI-N#-9	26418	52398	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

GROUP 2 PRZ

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/10/18	0	0730	250	25.8	N/A	N/A	✓
9/10/18	1	0830	250	25.7	N/A	275.2	✓
9/10/18	2	0930	250	27.8	N/A	277.9	✓
9/10/18	3	1030	250	27.8	N/A	278.2	✓
9/10/18	4	1130	251	24.5	N/A	276.8	✓
9/10/18	5	1230	250	24.8	N/A	274.8	✓
9/10/18	6	1330	302	29.5	N/A	331.5	✓
9/10/18	7	1430	301	29.8	N/A	330.5	✓
9/10/18	8	1530	300	29.8	N/A	331.1	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/10/18	0	0750	7.56	20.0	250	9.31	11.93	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/10/18	4	1130	7.58	21.3	213	9.55	11.44	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/10/18	10	1530	7.54	21.8	203	9.94	11.52	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/10/18	1	0830			44.2	17.8
9/10/18	2	0930			44.4	17.8
9/10/18	3	1030			44.4	17.8
9/10/18	4	1130			44.4	17.8
9/10/18	5	1230			44.2	17.7
9/10/18	6	1330	N		50.5	21.5
9/10/18	7	1430	A		50.5	21.5
9/10/18	8	1530			50.2	21.3
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) D. Roos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-122 FQI: N2-4		Well: 399-1-135 FQI: N2-5		Well: 399-1-123 FQI: N2-6		Well: 399-1-121 FQI: N2-7		Well: 399-1-133 FQI: N2-8		Well: 399-1-134 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/10/18	1	0830	0	44.7	0	46.4	0	43.3	0	44.4	0	45.7	0	51.1	38
9/10/18	2	0930	0	45.3	0	46.4	0	43.4	0	45.1	0	45.9	0	51.8	38
9/10/18	3	1030	0	45.3	0	46.6	0	43.9	0	45.1	0	46.2	0	51.6	38
9/10/18	4	1130	0	45.0	0	46.4	0	43.4	0	44.7	0	46.1	0	51.2	38
9/10/18	5	1230	0	44.7	0	46.2	0	43.2	0	44.5	0	45.3	0	50.9	38
9/10/18	6	1330	0	55.1	0	54.7	0	52.2	0	54.2	0	55.9	0	59.4	38
9/10/18	7	1430	0	55.5	0	55.1	0	52.6	0	54.6	0	56.2	0	56.5	38
9/10/18	8	1530	0	55.1	0	54.9	0	52.6	0	54.4	0	55.9	0	58.2	38
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	103769	
	Chem. Injection	FQI-N#-2A or- 2B	0	10276	
	Chem. Injection	FQI-N#-3A or- 3B	~~#~~ .02	.08	
	Overall Mixture	FQI-N#-4A or- 4B	0	110385	
	399-1- 122	FQI-N#-4	0	19395	
	399-1- 135	FQI-N#-5	0	19576	
	399-1- 123	FQI-N#-6	0	18243	
	399-1- 121	FQI-N#-7	0	17753	
	399-1- 133	FQI-N#-8	0	19801	
	399-1- 134	FQI-N#-9	0	19559	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

GROUP 2 LVZ

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoo

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/11/18	0	0840	250	24.8	N/A	N/A	✓
9/11/18	1	0940	253	24.9	N/A	277.9	✓
9/11/18	2	1040	250	24.7	N/A	274.7	✓
9/11/18	3	1140	249	24.8	N/A	273.8	✓
9/11/18	4	1240	250	24.9	N/A	274.9	✓
9/11/18	5	1340	250	24.7	N/A	274.7	✓
9/11/18	6	1440	250	24.8	N/A	274.8	✓
9/11/18	7	1530	250	24.1	N/A	274.1	✓
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Delfino

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/11/18	0	0840	7.52	19.9	195	8.94	11.90	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/11/18	4	1240	7.53	21.4	188	9.45	11.90	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/11/18	10	1530	7.53	21.5	177	9.85	11.38	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DeRous

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/11/18	1	0940			43.9	17.6
9/11/18	2	1040			43.6	17.4
9/11/18	3	1140			43.6	17.4
9/11/18	4	1240			43.7	17.4
9/11/18	5	1340			43.8	17.5
9/11/18	6	1440			43.8	17.5
9/11/18	7	1530			43.8	17.5
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DeRoo
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-122 FQI: N2-4		Well: 399-1-135 FQI: N2-5		Well: 399-1-123 FQI: N2-6		Well: 399-1-121 FQI: N2-7		Well: 399-1-133 FQI: N2-8		Well: 399-1-134 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/11/18	1	0940	0	46.1	0	48.0	0	43.8	0	41.2	0	48.5	0	50.7	38
9/11/18	2	1040	0	46.0	0	47.5	0	43.1	0	41.1	0	46.6	0	50.6	38
9/11/18	3	1140	0	45.4	0	47.5	0	42.7	0	42.7	0	48.3	0	50.4	38
9/11/18	4	1240	0	46.1	0	45.5	0	43.8	0	42.7	0	48.7	0	48.9	38
9/11/18	5	1340	0	47.9	0	47.4	0	45.8	0	45.2	0	44.6	0	43.2	38
9/11/18	6	1440	0	48.0	0	47.4	0	44.8	0	45.1	0	45.9	0	43.0	38
9/11/18	7	1530	0	48.1	0	47.6	0	45.8	0	45.3	0	44.9	0	43.1	38
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	75% 1240 gal							
Tank 2	70% 1240 gal							
Tank 3	70% 1240 gal							
Tank 4	70% 1240 gal							
Tank 5	70% 1240 gal							
Tank 6	70% 1240 gal							
Tank 7	70% 1240 gal							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s); DeRoo		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	255873	284210	
	Chem. Injection	FQI-N#-2A or- 2B	25715	28494	
	Chem. Injection	FQI-N#-3A or- 3B	N/A	0.21	
	Overall Mixture	FQI-N#-4A or- 4B	273410	302475	
	399-1- 122	FQI-N#-4	46057	52377	
	399-1- 135	FQI-N#-5	48424	54574	
	399-1- 123	FQI-N#-6	44116	50028	
	399-1- 121	FQI-N#-7	44857	51018	
	399-1- 133	FQI-N#-8	46632	53010	
	399-1- 134	FQI-N#-9	52408	52640	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

GRP 2 PR2

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-11-18	0	0630	291	28	N/A	319	✓
9/11/18	1	0700	300	29.8		330.8	✓
9/11/18	2	0800	302	29.7		331.1	✓
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	2	Operator(s); DeRoo,

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-11-18	0	0630	7.52	19.8	270	9.09	11.64	Flowrate stable- Take first skid sample
	1							
	2							
	3							
	4	0800	7.52	19.3	256	8.88	11.59	4 hour sample
	5							
	6							
	7							
	8							
	9							
N/A	10							Final Sample

Comments: Comments can be continued on comment page

Final Sample 0800

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-11-18	1	0730			51.2	~~45.4~~ 21.8 gal/min
	2	0800			51.6	22.0
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-122 FQI: N2-4		Well: 399-1-135 FQI: N2-5		Well: 399-1-123 FQI: N2-6		Well: 399-1-121 FQI: N2-7		Well: 399-1-133 FQI: N2-8		Well: 399-1-134 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-11-18	1	0730 ~~0630~~	0	67.3	0	67.7	0	62.8	0	65.3	0	67.7	N/A	off	38
9/11/18	2	2nd 9-11-18 0800	0	68.1	0	60.5	0	64.0	0	67.8	0	70.7	N/A	off	38
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	0630 9-11-18	Level/Time Date*						
Tank 1	70%							
Tank 2	65%							
Tank 3	65%							
Tank 4	65%							
Tank 5	65%							
Tank 6	65%							
Tank 7	65%							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s); Fillion / Ramirez		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	103769	211633	
	Chem. Injection	FQI-N#-2A or- 2B	10276	20832	
	Chem. Injection	FQI-N#-3A or- 3B	.08	.07	
	Overall Mixture	FQI-N#-4A or- 4B	110385	228804	
	399-1- 122	FQI-N#-4	19395	38933	
	399-1- 135	FQI-N#-5	19576	39397	
	399-1- 123	FQI-N#-6	18243	36763	
	399-1- 121	FQI-N#-7	17753	37664	
	399-1- 133	FQI-N#-8	19801	39766	
	399-1- 134	FQI-N#-9	19559	40485	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); Fillion / RAMIREZ

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/12/18	0	0730	250	24.7	NA	NA	✓
9/12/18	1	0830	250	24.6	NA	NA	✓
9/12/18	2	0930	250	24.7	NA	NA	✓
9/12/18	3	1030	250	24.7	NA	NA	✓
9/12/18	4	1130	250	24.7	NA	NA	✓
9/12/18	5	1230	250	24.6	NA	NA	✓
9/12/18	6	1330	251	24.6	NA	NA	✓
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Ramirez

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/12/18	0	0758	7.54	18.8	225	9.27	11.62	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/12/18	4	1180	7.51	20.8	172	9.11	11.54	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/12/18	10	1421	7.56	21.4	188	9.27	11.26	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); Ramirez

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/12/18	1	0830			44.0	17.6
9/12/18	2	0930			43.7	17.5
9/12/18	3	1030			43.5	17.5
9/12/18	4	1130			43.5	17.5
9/12/18	5	1230			43.5	17.5
9/12/18	6	1330			43.5	17.5
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) Ramirez
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 2	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-122 FQI: N2-4		Well: 399-1-135 FQI: N2-5		Well: 399-1-123 FQI: N2-6		Well: 399-1-121 FQI: N2-7		Well: 399-1-133 FQI: N2-8		Well: 399-1-134 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/12/18	1	0830	0	44.0	0	47.4	0	42.2	0	44.6	0	47.4	0	49.6	38
9/12/18	2	0930	0	44.7	0	47.2	0	43.3	0	43.9	0	47.3	0	49.6	38
9/12/18	3	1030	0	46.2	0	47.0	0	42.4	0	43.7	0	47.2	0	49.3	38
9/12/18	4	1130	0	46.3	0	47.1	0	42.3	0	43.8	0	47.1	0	49.4	38
9/12/18	5	1230	0	46.2	0	47.1	0	42.4	0	43.7	0	47.1	0	49.3	38
9/12/18	6	1330	0	46.1	0	46.8	0	42.0	0	43.8	0	48.5	0	48.9	38
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	75 % 0830 9/12							
Tank 2	75 % 0830 9/12							
Tank 3	75 % 0830 9/12							
Tank 4	75 % 0830 9/12							
Tank 5	75 % 0830 9/12							
Tank 6	75 % 0830 9/12							
Tank 7	75 % 0830 9/12							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2

Operator(s); L. Kelly

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0.0	136337	
	Chem. Injection	FQI-N#-2A or- 2B	0.0	~~13371~~ LK 9-13-18	
	Chem. Injection	FQI-N#-3A or- 3B	N/A	13371	
	Overall Mixture	FQI-N#-4A or- 4B	0.0	149708	
	399-1- 142	FQI-N#-4	0.0	24895	
	399-1- 119	FQI-N#-5	0.0	24958	
	399-1- 117	FQI-N#-6	0.0	24964	
	399-1- 140	FQI-N#-7	0.0	25002	
	399-1- 141	FQI-N#-8	0.0	25054	
	399-1- 118	FQI-N#-9	0.0	24938	

Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); J. Pope

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-13-18	0	0630	0.0	0.0	N/A	0.0	✓
9-13-18	1	0815	254.2	N/A	25.6	280.0	✓
9-13-18	2	0915	259.3	N/A	25.7	285.6	✓
9-13-18	3	1015	260.0	N/A	25.8	285.8	✓
9-13-18	4	1115	259.6	N/A	25.4	285.1	✓
9-13-18	5	1215	260	N/A	25.9	285.9	✓
9-13-18	6	1315	259.6	NA	25.6	284.6	✓
9-13-18	7	1415	260.0	N/A	25.4	285.4	✓
9-13-18	8	1515	260	N/A	25.7	285.7	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page ~~TOTAL GPM DOES NOT Include FQI-N1-9 (005)~~ JP 9-13-18

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); J. POPE

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-13-18	0	0715	7.57	18.8	246	9.14	11.05	Flowrate stable- Take first skid sample
~~9-13-18~~	1							
	2							
	3							
9-3-18	4	1115	7.55	20.0	195	9.41	11.14	4 hour sample
	5							
	6							
	7							
	8							
	9							
9-13-18	10	1505	7.61	21.1	181	10.22	11.03	Final Sample
9-13-18	Comments: Comments can be continued on comment page	0700	7.19	18.0	264	8.85	138.1	REVER water sample

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); J. POPE

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9-13-18	1	0815			45.97	18.5
9-13-18	2	0915			46.70	18.9
9-13-18	3	1015			46.10	18.6
9-13-18	4	1115			46.10	18.6
9-13-18	5	1215			46.10	18.6
9-13-18	6	1315			46.10	18.7
9-13-18	7	1415			46.10	18.7
9-13-18	8	1515			46.10	18.7
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-142 FQI: N2-4		Well: 399-1-119 FQI: N2-5		Well: 399-1-117 FQI: N2-6		Well: 399-1-140 FQI: N2-7		Well: 399-1-141 FQI: N2-8		Well: 399-1-138 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-13-18	1	0815	0	46.8	0	46.4	0	46.2	0	48.0	0	46.6	0	46.0	38
9-13-18	2	0915	0	47.1	0	47.8	0	47.4	0	48.9	0	47.8	0	46.6	38
9-13-18	3	1015	0	48	0	47	0	48	0	47	0	49	0	48	38
9-13-18	4	1115	0	47.0	0	47.6	0	47.4	0	47.6	0	48.5	0	47.0	38
9-13-18	5	1215	0	47	0	48	0	47	0	48	0	48	0	47	38
9-13-18	6	1315	0	47.1	0	47.9	0	47.4	0	47.2	0	47.1	0	47.1	38
9-13-18	7	1415	0	47.5	0	48.1	0	48.0	0	47.1	0	46.4	0	47.7	38
9-13-18	8	1515	0	47.7	0	48.1	0	48.1	0	47.1	0	47.0	0	47.9	38
	9														
	10														

Comments:

~~FQI-N1-9 Cows~~ 9-13-18

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
	0630	1530						
Tank 1	70	70						
Tank 2	70	70						
Tank 3	70	70						
Tank 4	70	70						
Tank 5	70	70						
Tank 6	70	70						
Tank 7	70	70						

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s): DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	136337	275126	
	Chem. Injection	FQI-N#-2A or- 2B	69.91	69.91	
	Chem. Injection	FQI-N#-3A or- 3B	13371	27000	
	Overall Mixture	FQI-N#-4A or- 4B	96358	183748	
	399-1- 142	FQI-N#-4	24895	50346	
	399-1- 119	FQI-N#-5	24961	50344	
	399-1- 117	FQI-N#-6	24964	50486	
	399-1- 140	FQI-N#-7	25002	50444	
	399-1- 141	FQI-N#-8	25054	50384	
	399-1- 118	FQI-N#-9	24938	50382	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/14/18	0	0630	260	N/A	25.7	285.7	✓
9/14/18	1	0730	260	N/A	25.7	285.7	✓
9/14/18	2	0830	261	N/A	25.7	286.7	✓
9/14/18	3	0930	261	N/A	25.7	286.7	✓
9/14/18	4	1030	260	N/A	25.6	285.6	✓
9/14/18	5	1130	260	N/A	25.7	285.7	✓
9/14/18	6	1230	260	N/A	25.7	285.7	✓
9/14/18	7	1330	260	N/A	25.6	285.6	✓
9/14	8	1430	260	N/A	25.6	285.6	✓
9/14	9	1530	260	N/A	25.6	285.6	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); [illegible] 0630 1030

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/14/18	0	0630	7.58	18.2	207	9.42	11.48	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/14/18	4	1030	7.57	20.0	192	9.43	11.52	4 hour sample
	5							
	6							
	7							
	8							
	9							
9-14-18	10	1505	7.55	21.5	184	10.05	11.56	Final Sample

Comments: Comments can be continued on comment page

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 3

Operator(s); DeRoo;

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/14	1	0730			45.8	18.5
9/14	2	0830			45.8	18.5
9/14	3	0930			45.8	18.5
9/14	4	1030			45.9	18.5
9/14	5	1130			45.8	18.5
9/14	6	1230			45.8	18.5
9/14	7	1330			45.8	18.5
9/14	8	1430			45.8	18.5
9/14	9	1530			45.8	18.5
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 3	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-142 FQI: N2-4		Well: 399-1-119 FQI: N2-5		Well: 399-1-117 FQI: N2-6		Well: 399-1-140 FQI: N2-7		Well: 399-1-141 FQI: N2-8		Well: 399-1-118 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/14	1	0730	0	47.9	0	47.6	0	47.9	0	47.6	0	47.4	0	47.8	38
9/14	2	0830	0	47.7	0	47.6	0	47.8	0	47.6	0	47.3	0	47.8	38
9/14	3	0930	0	47.7	0	47.5	0	47.8	0	47.5	0	47.4	0	47.8	38
9/14	4	1030	0	48.0	0	47.7	0	48.2	0	47.3	0	47.7	0	47.1	38
9/14	5	1130	0	47.7	0	47.6	0	48.6	0	47.8	0	47.1	0	47.6	38
9/14	6	1230	0	47.8	0	47.6	0	48.7	0	47.6	0	47.6	0	47.6	38
9/14	7	1330	0	47.8	0	47.7	0	47.2	0	47.6	0	47.6	0	47.6	38
9/14	8	1430	0	47.8	0	47.6	0	47.2	0	47.7	0	47.2	0	47.6	38
9/14	9	1530	0	48.2	0	47.8	0	46.2	0	47.8	0	48.2	0	49.5	38
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2

Operator(s): DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	275127	279384	
	Chem. Injection	FQI-N#-2A or- 2B	69.91	69.91	
	Chem. Injection	FQI-N#-3A or- 3B	27000	27284	
	Overall Mixture	FQI-N#-4A or- 4B	183748	186214	
	399-1- 142	FQI-N#-4	50382	51143	
	399-1- 119	FQI-N#-5	50384	51162	
	399-1- 117	FQI-N#-6	50554	51274	
	399-1- 140	FQI-N#-7	50407	51158	
	399-1- 141	FQI-N#-8	50345	51104	
	399-1- 118	FQI-N#-9	50349	51113	

Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s): DeRose / [illegible]

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
	0	0830	260	N/A	25.7	285.7	✓
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

Initial and Final Sample are Same due to 30 min. Run time

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); DeBox

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/15	0	0030	7.56	17.9	70	10.00	11.57	Flowrate stable- Take first skid sample
	1							
	2							
	3							
N/A	4							4 hour sample
	5							
	6							
	7							
	8							
	9							
N/A	10							Final Sample

Comments: Comments can be continued on comment page
Initial and Final Sample are Same Sample due to 30 min Run time

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 2

Operator(s); DoRoo

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/15	1	0630			45.9	18.5
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-142 FQI: N2-4		Well: 399-1-119 FQI: N2-5		Well: 399-1-117 FQI: N2-6		Well: 399-1-140 FQI: N2-7		Well: 399-1-141 FQI: N2-8		Well: 399-1-118 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/15	1	0630	0	47.8	0	48.7	0	46.8	0	47.2	0	46.9	0	47.7	38
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s); DeRoos		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	120478	
	Chem. Injection	FQI-N#-2A or- 2B	0	0	
	Chem. Injection	FQI-N#-3A or- 3B	0	11874	
	Overall Mixture	FQI-N#-4A or- 4B	0	61643	
	399-1- 142	FQI-N#-4	.07	22049	
	399-1- 119	FQI-N#-5	0	22066	
	399-1- 117	FQI-N#-6	0	21996	
	399-1- 140	FQI-N#-7	0	22106	
	399-1- 141	FQI-N#-8	0	22108	
	399-1- 118	FQI-N#-9	0	22079	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/15	0	0745	260	N/A	25.7	285.7	✓
9/15	1	0845	260	N/A	25.7	285.7	✓
9/15	2	0945	260	N/A	25.7	285.7	✓
9/15	3	1045	260	N/A	25.6	285.6	✓
9/15	4	1145	260	N/A	25.6	285.6	✓
9/15	5	1245	260	N/A	25.6	285.4	✓
9/15	6	1345	260	N/A	25.6	285.4	✓
9/15	7	1445	260	N/A	25.6	285.3	✓
9/15	8	1550	260	N/A	25.7	285.9	✓
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s): [illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/15	0	0745	7.55	19.8	212	9.19	11.32	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/15	4	1145	7.55	21.6	176	9.71	11.48	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/15	10	1530	7.54	22.0	232	10.25	11.44	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 3

Operator(s); DeRoo

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/15	1	0845			45.1	18.1
9/15	2	0945			45.1	18.2
9/15	3	1045			45.1	18.2
9/15	4	1145			45.1	18.2
9/15	5	1245			45.1	18.2
9/15	6	1345			45.2	18.3
9/15	7	1445			45.2	18.2
9/15	8	1530			45.2	18.3
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 3	Operator(s) D. Roos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 3	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-142 FQI: N2-4		Well: 399-1-119 FQI: N2-5		Well: 399-1-117 FQI: N2-6		Well: 399-1-140 FQI: N2-7		Well: 399-1-141 FQI: N2-8		Well: 399-1-118 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/15	1	0845	0	47.8	0	47.6	0	47.6	0	47.8	0	47.7	0	47.7	40
9/15	2	0945	0	47.5	0	47.5	0	47.6	0	47.6	0	47.8	0	47.6	40
9/15	3	1045	0	47.4	0	47.5	0	47.4	0	47.7	0	47.8	0	47.7	39
9/15	4	1145	0	47.6	0	47.5	0	46.7	0	47.7	0	47.8	0	47.7	39
9/15	5	1245	0	47.6	0	47.6	0	47.6	0	47.6	0	47.8	0	47.7	39
9/15	6	1345	0	47.6	0	47.7	0	46.8	0	47.7	0	47.9	0	47.7	39
9/15	7	1445	0	47.6	0	47.6	0	47.6	0	47.8	0	48.0	0	47.7	39
9/15	8	1550	0	47.7	0	47.6	0	47.4	0	47.7	0	47.9	0	47.6	39
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	N/A							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	2	Operator(s);	J. Pope

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	120478	210444	
	Chem. Injection	FQI-N#-2A or- 2B	0	0	
	Chem. Injection	FQI-N#-3A or- 3B	11874	20116	
	Overall Mixture	FQI-N#-4A or- 4B	61643	122350	
	399-1- 142	FQI-N#-4	22049	38442	
	399-1- 119	FQI-N#-5	22066	38457	
	399-1- 117	FQI-N#-6	21996	38428	
	399-1- 140	FQI-N#-7	22106	38408	
	399-1- 141	FQI-N#-8	22108	38467	
	399-1- 118	FQI-N#-9	22079	38459	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); J. Pope

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-16-18	0	0720	260.1	N/A	25.5	285.1	✓
9-16-18	1	0820	260.2	N/A	25.8	286.3	✓
9-16-18	2	0920	259.9	N/A	25.7	286.2	✓
9-16-18	3	1020	259.6	N/A	25.7	285.0	✓
9-16-18	4	1120	259.8	N/A	25.3	286.9	✓
9-16-18	5	1220	260.1	N/A	24.8	285.5	✓
9/16/18	6	1320	261.1	N/A	25.4	286.4	
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); J. POPE

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9-16-18	0	0730	7.55	18.4	236	9.25	11.47	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9-16-18	4	1120	7.53	19.3	202	9.61	11.34	4 hour sample
	5							
	6							
	7							
	8							
	9							
	10	1300	7.54	19.4	212	9.41	11.38	Final Sample

Comments: Comments can be continued on comment page

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:

Operator(s); J. Pope

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

			Injection Skid #1 River Pump		Injection Skid #2 River Pump	
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)
9-16-18	1	0720			45.41	18.3
9-16-18	2	0820			45.39	18.4
9-16-18	3	0920			45.39	18.4
9-16-18	4	1020			45.39	18.3
9-16-18	5	1120			45.39	18.4
9-16-18	6	1220			45.39	18.3
9-16-18	7	1360			45.39	18.3
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	Operator(s)
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 2 1	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-142 FQI: N2-4		Well: 399-1-114 FQI: N-2-5		Well: 399-1-117 FQI: N2-6		Well: 399-1-140 FQI: N2-7		Well: 399-1-141 FQI: N2-8		Well: 399-1-118 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/16/18	1	0720	0	47.9	0	48.0	0	46.6	0	48.0	0	47.5	0	47.1	40
9-16-18	2	0820	0	47.4	0	47.3	0	47.5	0	47.8	0	47.9	0	48.0	40
9-16-18	3	0920	0	47.5	0	47.2	0	48.1	0	47.6	0	47.9	0	47.9	40
9-16-18	4	1020	0	47.3	0	47.2	0	46.9	0	47.6	0	48.0	0	48.0	40
9-16-18	5	1120	0	47.9	0	47.9	0	48.0	0	47.1	0	47.3	0	47.7	40
9-16-18	6	1220	0	47.9	0	47.9	0	47.8	0	47.1	0	47.4	0	47.4	40
9-16-18	7	1320	0	47.9	0	47.4	0	47.6	0	47.2	0	47.3		47.5	40
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s);		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	0	25342	
	Chem. Injection	FQI-N#-2A or- 2B	0	0	
	Chem. Injection	FQI-N#-3A or- 3B	0	2482.6	
	Overall Mixture	FQI-N#-4A or- 4B	0	13242	
	399-1- 112	FQI-N#-4	0	4649.4	
	399-1- 111	FQI-N#-5	0	4623.7	
	399-1- 110	FQI-N#-6	0	4658.1	
	399-1- 113	FQI-N#-7	0	4614.8	
	399-1- 98	FQI-N#-8	0	4639.8	
	399-1- 114	FQI-N#-9	0	4633.7	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	2	Operator(s);

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9-16-18	0	1350	260	0	25.5	285.5	✓
9-16-18	1	1450	260.1	N/A	25.6	285.3	✓
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid #	2	Operator(s);

			Field Parameters-Injection Solution Field parameters will be measured and recorded once every 4 hours.						
Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.	
9-16-18	0	1350	7.55	20.4	208	9.26	11.49	Flowrate stable-Take first skid sample	
	1								
	2								
	3								
	4							4 hour sample	
	5								
	6								
	7								
	8								
	9								
9-16-18	10	1320	7.54	21.3	186	9.86	11.44	Final Sample	
	Comments: Comments can be continued on comment page								
	Filter Sample	1350	7.22	20.2	208	9.58	215.4		

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round:							Operator(s);
			River Pump -Skid Parameters River pump parameters will be measured and recorded hourly.				
			Injection Skid #1 River Pump		Injection Skid #2 River Pump		
Date	Hour	Time	Speed/ Frequency (RPM/Hz)	Current (amps)	Speed/ Frequency (RPM/Hz)	Current (amps)	
9-16-18	1	1350			45.59	18.5	
9-16-18	2	1450			45.50	18.4	
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10 Final						
	Comments: *comments can be continued on comment page						

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round:	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: FQI: N2-4		Well: FQI: N2-5		Well: FQI: N2-6		Well: FQI: N2-7		Well: FQI: N2-8		Well: FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9-6-18	1	1350	0	47.6	0	47.2	0	47.5	0	47.9	0	47.2	0	47.9	40
9-6-18	2	1450	0	47.0	0	47.7	0	48.2	0	47.4	0	47.5	0	47.5	48
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s); DeRoes		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	25342	155671	
	Chem. Injection	FQI-N#-2A or- 2B	0	.04	
	Chem. Injection	FQI-N#-3A or- 3B	2482	15354	
	Overall Mixture	FQI-N#-4A or- 4B	13424	102330	
	399-1- 112	FQI-N#-4	4649	28571	
	399-1- 111	FQI-N#-5	4623	28538	
	399-1- 110	FQI-N#-6	4658	28566	
	399-1- 113	FQI-N#-7	4614	28405	
	399-1- 98	FQI-N#-8	4639	28458	
	399-1- 114	FQI-N#-9	4633	28539	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); Nelson

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/17	0	0710	260	N/A	25.7	285.7	✓
9/17	1	0800	260	N/A	25.7	286.1	✓
9/17	2	0900	260	N/A	25.7	286.3	✓
9/17	3	1000	261	N/A	25.5	285.2	✓
9/17	4	1100	260	N/A	25.6	286.1	✓
9/17	5	1200	260	N/A	25.7	285.1	✓
9/17	6	1300	260	N/A	25.7	285.4	✓
9/17	7	1400	260	N/A	25.5	285.7	✓
9/17	8	1500	260	N/A	25.6	284.9	✓
9/17	9	1550	260	N/A	25.6	286.0	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s): [illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/17	0	0710	7.55	17.2	26.1	9.53	11.55	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/17	4	1100	7.55	19.5	204	9.47	11.45	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/17	10	1530	7.52	20.5	217	10.43	11.50	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s); D. Allen

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/17	1	0900			46.0	18.6
9/17	2	0900			46.0	18.6
9/17	3	1000			45.9	18.6
9/17	4	1100			46.0	18.6
9/17	5	1200			45.9	18.6
9/17	6	1300			45.9	18.6
9/17	7	1400			45.8	18.6
9/17	8	1500			45.8	18.6
9/17	9	1530			45.8	18.5
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 2	Operator(s) DC
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-112 FQI: N2-4		Well: 399-1-111 FQI: N2-5		Well: 399-1-110 FQI: N2-6		Well: 399-1-113 FQI: N2-7		Well: 399-1-98 FQI: N2-8		Well: 399-1-114 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/17	1	0800	0	47.7	0	48.0	0	48.4	0	47.4	0	47.5	0	47.5	40
9/17	2	0900	0	47.7	0	47.6	0	48.0	0	47.6	0	47.7	0	47.7	40
9/17	3	1000	0	47.7	0	47.4	0	47.6	0	47.3	0	47.4	0	47.8	40
9/17	4	1100	0	47.9	0	47.7	0	47.9	0	47.5	0	47.4	0	47.7	40
9/17	5	1200	0	47.9	0	47.7	0	47.1	0	47.5	0	47.5	0	47.6	40
9/17	6	1300	0	47.6	0	47.7	0	47.7	0	47.7	0	47.8	0	47.4	40
9/17	7	1400	0	47.6	0	47.8	0	46.6	0	46.7	0	47.5	0	47.5	40
9/17	8	1500	0	47.6	0	47.7	0	47.5	0	47.6	0	47.4	0	47.7	40
9/17	9	1570	0	47.7	0	47.7	0	47.8	0	47.8	0	47.5	0	47.8	40
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2			Operator(s); Ramirez		
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	155621	279504	
	Chem. Injection	FQI-N#-2A or- 2B	0.4	.28	
	Chem. Injection	FQI-N#-3A or- 3B	15354	27300	
	Overall Mixture	FQI-N#-4A or- 4B	102330	169297	
	399-1- 112	FQI-N#-4	28571	51227	
	399-1- 111	FQI-N#-5	28538	51163	
	399-1- 110	FQI-N#-6	28566	51159	
	399-1- 113	FQI-N#-7	285405	51123	
	399-1- 98	FQI-N#-8	28457	51107	
	399-1- 114	FQI-N#-9	28539	51151	
	Safety Shower weekly check has been performed. ✓ 9/17/18		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); Ramirez

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/18	0	0640	260	NA	25.6	225	✓
9/18	1	0750	260	NA	25.7	261	✓
9/18	2	0850	260	NA	25.7	260	✓
9/18	3	0950	260	NA	25.7	260	✓
9/18	4	1050	260	NA	25.7	263	✓
9/18	5	1150	260	NA	25.7	263	✓
9/18	6	1250	260	NA	25.7	260	✓
9/18	7	1350	260	N/A	25.7	260	✓
	8						
	9						
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); Ramirez

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/18	0	0650	7.54	16.5	250	9.50	11.90	Flowrate stable-Take first skid sample
	1							
	2							
	3							
9/18	4	1050	7.57	19.1	213	9.70	11.41	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/18	10	1423	7.61	20.7	236	9.83	10.94	Final Sample

Comments: Comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s); Ramirez

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/18	1	0750			46.6	15.5
9/18	2	0850			46.0	18.6
9/18	3	0950			46.1	18.7
9/18	4	1050			46.1	18.7
9/18	5	1150			44.14	18.7
9/18	6	1250			44.14	18.7
9/18	7	1350			46.04	18.7
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round:	**Operator(s)**
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Well: FQI:		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/18	1	0750	0	48.0	0	48.3	0	47.0	0	47.7	0	47.7	0	47.7	36
9/18	2	0850	0	47.8	0	48.2	0	46.9	0	47.7	0	47.6	0	47.8	36
9/18	3	0950	0	47.7	0	47.2	0	47.4	0	48.1	0	47.5	0	47.7	36
9/18	4	1050	0	47.4	0	47.1	0	48.0	0	48.0	0	47.5	0	47.8	36
9/18	5	1150	0	47.9	0	47.2	0	47.5	0	48.3	0	47.5	0	47.8	36
9/18	6	1250	0	47.8	0	47.0	0	48.1	0	48.1	0	47.7	0	47.9	36
9/18	7	1350	0	47.1	0	47.9	0	46.9	0	47.9	0	48.6	0	47.0	36
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	75% 9/18 0750							
Tank 2	75% 9/18 0750							
Tank 3	75% 9/18 0750							
Tank 4	75% 9/18 0750							
Tank 5	75% 9/18 0750							
Tank 6	75% 9/18 0750							
Tank 7	75% 9/18 0750							

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid #	2	Operator(s);	DeRoos	
Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	2.16	137827	
	Chem. Injection	FQI-N#-2A or- 2B	0.78	223.34	
	Chem. Injection	FQI-N#-3A or- 3B	0.00	13173	
	Overall Mixture	FQI-N#-4A or- 4B	0.70	97432	
	399-1- 112	FQI-N#-4	72.63	25219	
	399-1- 111	FQI-N#-5	2.57	25273	
	399-1- 110	FQI-N#-6	0.00	25260	
	399-1- 113	FQI-N#-7	0.00	25225	
	399-1- 98	FQI-N#-8	1.24	25180	
	399-1- 114	FQI-N#-9	9.46	25195	
	Safety Shower weekly check has been performed.		Check if Complete ☑		

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/19	0	0630	260	N/A	25.7	N/A	✓
9/19	1	0730	260	N/A	25.7	286.4	✓
9/19	2	0830	260	N/A	25.6	288.1	✓
9/19	3	0930	260	N/A	25.7	285.4	✓
9/19	4	1030	260	N/A	25.6	287.8	✓
9/19	5	1130	260	N/A	25.4	285.4	✓
9/19	6	1230	260	N/A	25.7	285.5	✓
9/19	7	1330	260	N/A	25.7	277.6	✓
9/19	8	1430	260	N/A	25.6	295.9	✓
9/19	9	1530	260	N/A	25.6	284.9	✓
	10						

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

1430 - flows adjusted During Readings

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); DeRoos

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/19	0	0930	7.55	17.2	200	9.59	11.42	Flowrate stable-Take first skid sample
	1							
	2							
	3							
9/19	4	1030	7.55	19.2	210	9.76	11.38	4 hour sample
	5							
	6							
	7							
	8							
	9							
9/19	10	1550	7.56	21.8	191	10.40	11.46	Final Sample

Comments: Comments can be continued on comment page

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s): DeRoos

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/19	1	0730			45.3	18.3
9/19	2	0830			45.3	18.3
9/19	3	0930			45.4	18.4
9/19	4	1030			45.5	18.4
9/19	5	1130			45.4	18.4
9/19	6	1230			45.5	18.4
9/19	7	1330			45.4	18.5
9/19	8	1430			45.7	18.5
9/19	9	1550			45.7	18.5
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 4	Operator(s) DeRoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-112 FQI: N2-4		Well: 399-1-111 FQI: N2-5		Well: 399-1-110 FQI: N2-6		Well: 399-1-113 FQI: N2-7		Well: 399-1-~~115~~ 118 FQI: N2-8		Well: 399-1-114 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/19	1	0730	0	47.6	0	47.9	0	47.6	0	47.9	0	47.7	0	47.7	30
9/19	2	0830	0	47.1	0	47.2	0	49.6	0	49.0	0	47.1	0	47.5	30
9/19	3	0930	0	46.4	0	47.6	0	48.6	0	46.9	0	48.1	0	47.8	35
9/19	4	1030	0	46.7	0	47.7	0	48.4	0	47.2	0	46.7	0	46.1	35
9/19	5	1130	0	46.9	0	47.1	0	46.2	0	48.5	0	48.5	0	48.2	35
9/19	6	1230	0	47.9	0	46.8	0	46.8	0	48.3	0	47.7	0	48.0	35
9/19	7	1330	0	47.9	0	47.1	0	46.2	0	45.2	0	45.3	0	45.9	40
9/19	8	1430	0	49.7	0	49.1	0	50.6	0	48.5	0	48.8	0	49.2	40
	9	1530	0	45.6	0	46.4	0	45.4	0	49.4	0	48.4	0	49.0	45
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1								
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet
*May be copied

Skid # 2

Operator(s); DeRoos

Write well number in spaces provided	Totalizer Readings		Start of Injections	End of Injections	Comments
	River Water	FQI-N#-1A or- 1B	137827	216661	
	Chem. Injection	FQI-N#-2A or- 2B	223.34	227.08	
	Chem. Injection	FQI-N#-3A or- 3B	13178	21562	
	Overall Mixture	FQI-N#-4A or- 4B	97433	144390	
	399-1- 112	FQI-N#-4	25220	39737	
	399-1- 111	FQI-N#-5	25273	39765	
	399-1- 110	FQI-N#-6	25260	39802	
	399-1- 113	FQI-N#-7	25225	39757	
	399-1- 98	FQI-N#-8	25180	39743	
	399-1- 114	FQI-N#-9	25195	39780	

	Safety Shower weekly check has been performed.	Check if Complete ☑	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2

Operator(s); DeRoos

Flowrates-Skid Parameters

Skid and filter parameters will be measured and recorded hourly.

Date	Hour	Time	FQI-N#-1A or 1B River (gpm)	FQI-N#-2A or 2B Chem. (gpm)	FQI-N#-3A or 3B Chem. (gpm)	*Total (gpm)	Filter dPs <20 Check if ok
9/20	0	0845	260	N/A	25.7	N/A	✓
9/20	1	0945	260	N/A	25.6	~~286.5~~	✓
9/20	2	0845	260	N/A	25.7	286.2	✓
9/20	3	0945	260	N/A	25.7	286.2	✓
9/20	4	1045	260	N/A	28.0	287.9	✓
9/20	5	1145	260	N/A	33.7	294.3	✓
	6						
	7						
	8						
	9						
	10						

286.5

Comments: * Sum of FQI-N#-4,5,6,7,8,9 or Read from 4A or 4B,comments can be continued on comment page

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A- Injection Skid Monitoring Data Sheet Cont.
*May be copied

Skid # 2 | Operator(s); [illegible]

Field Parameters-Injection Solution

Field parameters will be measured and recorded once every 4 hours.

Date	Hour	Time	pH	Temperature (degree c)	Oxidation Reduction Potential (+/- mV)	Dissolved Oxygen (mg/L)	Conductivity	After flow rate is stable take 1st. skid sample, take 2nd. At 4 hr mark, and 3rd.(final) at end of injections (8hr). Where a sample is required it is noted in this column.
9/20	0	0645	7.54	17.9	250	9.22	12.59	Flowrate stable- Take first skid sample
	1							
	2							
	3							
9/20	4	1045	7.49	20.4	200	9.74	14.1	4 hour sample
	5							
	6							
	7							
	8							
	9							
	10							Final Sample

Comments: Comments can be continued on comment page
1045- Last Sample taken

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix A-(Cont.) River Pump Monitoring Data Sheet
*May be copied

Injection Round: 4

Operator(s); Mellors

River Pump -Skid Parameters

River pump parameters will be measured and recorded hourly.

Date	Hour	Time	Injection Skid #1 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #1 River Pump Current (amps)	Injection Skid #2 River Pump Speed/ Frequency (RPM/Hz)	Injection Skid #2 River Pump Current (amps)
9/20	1	0715			45.6	18.4
9/20	2	0845			45.6	18.4
9/20	3	0945			45.8	18.5
9/20	4	1045			45.7	18.5
9/20	5	1145			45.9	18.6
	6					
	7					
	8					
	9					
	10 Final					

Comments: *comments can be continued on comment page

Appendix A-(Cont.) Comments Data Sheet *May be copied	
Injection Round: 4	Operator(s) DeBoos
COMMENTS:	

300-FF-5 Injection and Sample Monitoring for Stage B

Appendix B – Injection Well Monitoring Data Sheet

*May be copied

Injection Round: 4	Skid ID: 2	Injection Start Date:

N/A pressure readings for injection lines above well packer.

Note any well anomalies(i.e. well shut down, flow observed out of well, packer lifting, etc.) here denoting the well number date, time and duration:

Date	Hour	Time	Well: 399-1-112 FQI: N2-4		Well: 399-1-111 FQI: N2-5		Well: 399-1-110 FQI: N2-6		Well: 399-1-113 FQI: N2-7		Well: 399-1-98 FQI: N2-8		Well: 399-1-114 FQI: N2-9		Packer Press.
			psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi	flow gpm	psi
9/20	1	0715	0	47.4	0	47.4	0	48.8	0	46.9	0	49.1	0	46.9	45
9/20	2	0845	0	48.6	0	49.3	0	48.1	0	47.1	0	46.8	0	45.7	45
9/20	3	0945	0	48.2	0	47.1	0	48.5	0	47.5	0	46.5	0	48.5	45
9/20	4	1045	0	47.1	0	47.5	0	48.8	0	48.0	0	48.1	0	48.4	45
9/20	5	1145	0	48.1	0	48.6	0	49.0	0	49.3	0	49.5	0	49.8	45
	6														
	7														
	8														
	9														
	10														

Comments:

Appendix C – Chemical Tank Level / Time Date Data Sheet *May be copied								
Tank	Level/Time Date*							
Tank 1	See Skd #1							
Tank 2								
Tank 3								
Tank 4								
Tank 5								
Tank 6								
Tank 7								

* Tank levels are for information only and may be taken as requested by the OS/FWS

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