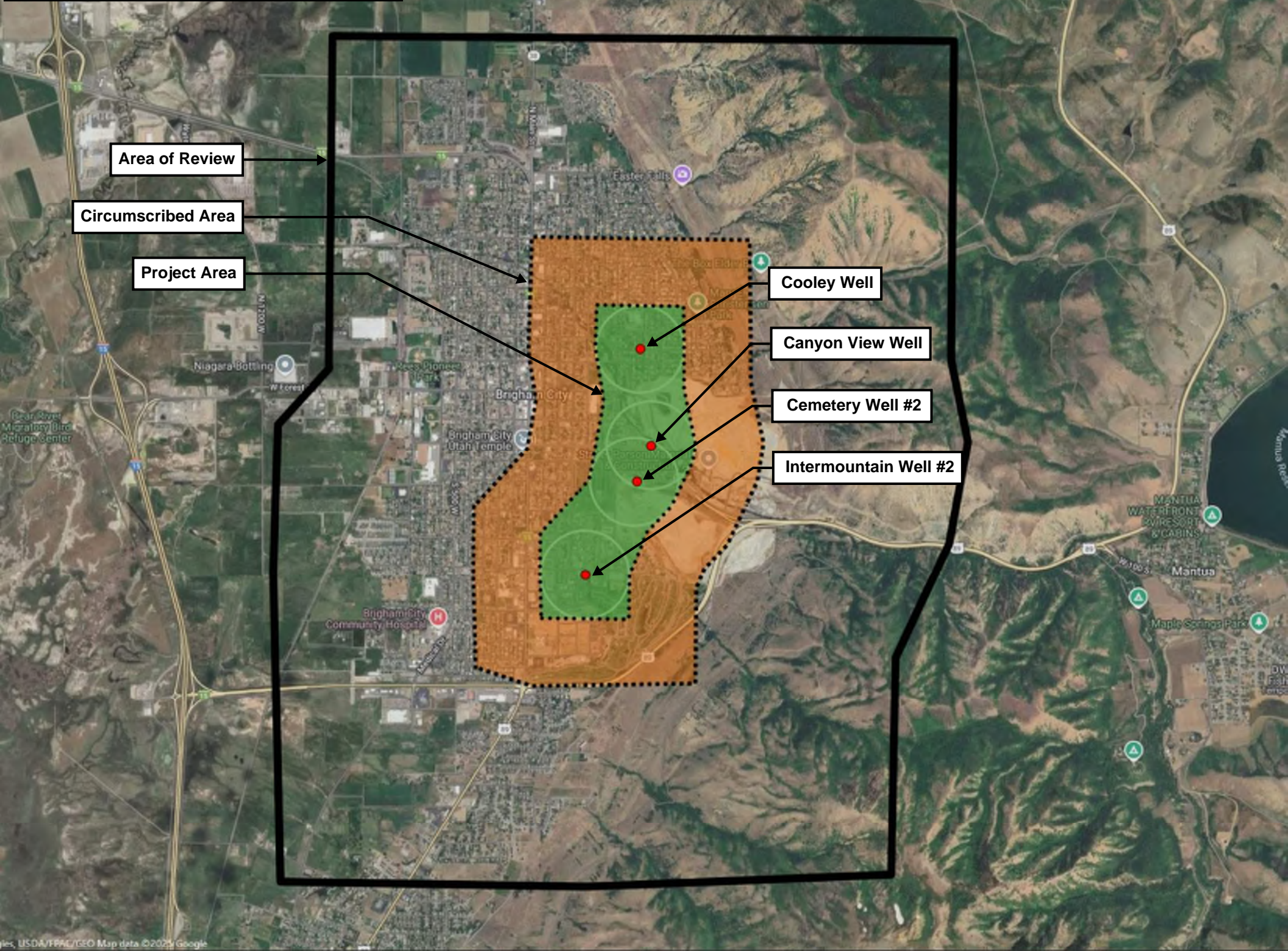


Attachment A

General Location Map Brigham City Class V ASR Permit
Box Elder County

BRIGHAM CITY ASR PROJECT



Attachment B

Table 1 – Monitoring Parameters and Monitoring Schedule

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

ANALYTE	CAS Number	UNITS	MCL (mg/L)	Secondary Drinking Water Regulations (mg/L)	5 Year Cycle per Source	Annually per Injection Source	<u>Annually New Sources</u> (11)
<i>Inorganics:</i>							
Aluminum	7429-90-5	mg/L		0.05 to 0.2	X		X
Antimony	7440-36-0	mg/L	0.006		X		X
Arsenic	7440-38-2	mg/L	0.010		X	X	X
Barium	7440-39-3	mg/L	2		X		X
Beryllium	7440-41-7	mg/L	0.004		X		X
<u>Bromide (1)</u>	24959-67-9	mg/L			X	X	X
Cadmium	7440-43-9	mg/L	0.005		X		X
Chloride	7647-14-5	mg/L		250	X		X
Chromium (Total)	7440-47-3	mg/L	0.1		X		X
Copper	7440-50-8	mg/L		1.0	X		X
Cyanide (as free Cyanide)	143-33-9	mg/L	0.2		X		X
Fluoride	7681-49-4	mg/L	4	2	X	X	X
Iron	7439-89-6	mg/L		0.3	X		X
Manganese	7439-96-5	mg/L		0.05	X		X
Mercury (inorganic)	7487-94-7	mg/L	0.002		X		X
Selenium	7782-49-2	mg/L	0.05		X		X
Silver	7440-22-4	mg/L		0.1	X		X
<u>Sulfate (2)</u>	7757-82-6	mg/L	1,000	250	X	X	X
Thallium	7440-28-0	mg/L	0.002		X		X
<u>Total Dissolved Solids (3)</u>		mg/L		500	X	X	X
Zinc	7440-66-6	mg/L		5	X		X

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

ANALYTE	CAS Number	UNITS	MCL (mg/L)	Secondary Drinking Water Regulations (mg/L)	5 Year Cycle per Source	Annually per Injection Source	<u>Annually New Sources (11)</u>
<i>Nitrate/Nitrite:</i>							
Nitrate (as Nitrogen)	14797-55-8	mg/L	10		X	X	X
Nitrite (as Nitrogen)	14797-65-0	mg/L	1		X	X	X
Total Nitrate and Nitrite (as N)		mg/L	10		X	X	X
<i>Asbestos:</i>							
Asbestos	1332-21-4	million fibers/L longer than 10 microns	7		X		X
<i>Volatile Organic Contaminants (VOC):</i>							
		Method 524.2 VOC					
Benzene	71-43-2	mg/L	0.005		X		X
Carbon tetrachloride	56-23-5	mg/L	0.005		X		X
Dichlorobenzene o-	95-50-1	mg/L	0.6		X		X
Dichlorobenzene p-	106-46-7	mg/L	0.075		X		X
Dichloroethane (1,2-)	107-06-2	mg/L	0.005		X		X
Dichloroethylene (1,1-)	<u>75-35-4</u>	mg/L	0.007		X		X
Dichloroethylene (cis-1,2-)	156-59-2	mg/L	0.07		X		X
Dichloroethylene (trans-1,2-)	156-60-5	mg/L	0.1		X		X
Dichloromethane	75-09-2	mg/L	0.005		X		X

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

ANALYTE	CAS Number	UNITS	MCL (mg/L)	Secondary Drinking Water Regulations (mg/L)	5 Year Cycle per Source	Annually per Injection Source	Annually New Sources (11)
Dichloropropane (1,2-)	78-87-5	mg/L	0.005		X		X
Ethylbenzene	100-41-4	mg/L	0.7		X		X
Monochlorobenzene	108-90-7	mg/L	0.1		X		X
Styrene	100-42-5	mg/L	0.1		X		X
Tetrachloroethylene	127-18-4	mg/L	0.005		X		X
Toluene	108-88-3	mg/L	1		X		X
Trichlorobenzene (1,2,4-)	120-82-1	mg/L	0.07		X		X
Trichloroethane (1,1,1-)	71-55-6	mg/L	0.2		X		X
Trichloroethane (1,1,2-)	79-00-5	mg/L	0.005		X		X
Trichloroethylene	79-01-6	mg/L	0.005		X		X
Vinyl chloride	75-01-4	mg/L	0.002		X		X
Xylenes	1330-20-7	mg/L	10		X		X
<i>Pesticides:</i>	Method 525.2 SVOC Pesticides and Semi-Volatile Organic Compounds						
2,4 - D (2,4 - dichlorophenoxyacetic acid)	94-75-7	mg/L	0.07		X		X
2,4,5-TP (Silvex)	93-72-1	mg/L	0.05		X		X
Alachlor	15972-60-8	mg/L	0.002		X		X
Aldicarb	116-06-3	mg/L	0.003		X		X
Aldicarb sulfone	1646-88-4	mg/L	0.003		X		X
Aldicarb sulfoxide	1646-87-3	mg/L	0.004		X		X

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

ANALYTE	CAS Number	UNITS	MCL (mg/L)	Secondary Drinking Water Regulations (mg/L)	5 Year Cycle per Source	Annually per Injection Source	Annually New Sources (11)
Atrazine	1912-24-9	mg/L	0.003		X		X
Benzo(a)pyrene (PAH)	50-32-8	mg/L	0.0002		X		X
Carbofuran	1563-66-2	mg/L	0.04		X		X
Chlordane	57-74-9	mg/L	0.002		X		X
Dalapon (sodium salt)	75-99-0	mg/L	0.2		X		X
Di(2-ethylhexyl) adipate	103-23-1	mg/L	0.4		X		X
Di(2-ethylhexyl) phthalate	117-81-7	mg/L	0.006		X		X
Dinoseb	88-85-7	mg/L	0.007		X		X
Endrin	72-20-8	mg/L	0.002		X		X
Heptachlor	76-44-8	mg/L	0.0004		X		X
Heptachlor epoxide	1024-57-3	mg/L	0.0002		X		X
Hexachlorobenzene	118-74-1	mg/L	0.001		X		X
Hexachlorocyclopentadiene	77-47-4	mg/L	0.05		X		X
Lindane	58-89-9	mg/L	0.0002		X		X
Methoxychlor	72-43-5	mg/L	0.04		X		X
Oxamyl (Vydate)	23135-22-0	mg/L	0.2		X		X
Pentachlorophenol	87-86-5	mg/L	0.001		X		X
Picloram	1918-02-1	mg/L	0.5		X		X
Polychlorinated biphenyls (PCBs)	1336-36-3	mg/L	0.0005		X		X
Simazine	122-34-9	mg/L	0.004		X		X
Toxaphene	8001-35-2	mg/L	0.003		X		X

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

ANALYTE	CAS Number	UNITS	MCL (mg/L)	Secondary Drinking Water Regulations (mg/L)	5 Year Cycle per Source	Annually per Injection Source	Annually New Sources (11)
<i>Radionuclides:</i>							
Combined Radium 226 & 228	7440-14-4	pCi/L	5		X		X
Gross alpha particle activity (including Radium 226 but excluding Radon and Uranium)		pCi/L	15		X		X
<u>Gross beta particle and photon emitters (5)</u>		mrem/yr	4		X		X
Tritium (only if gross beta exceeds 50 pCi/L)		pCi/L	20,000		X		X
Strontium-90 (only if gross beta exceeds 50 pCi/L)		pCi/L	8		X		X
Radon	10043-92-2	pCi/L	300		X		X
Uranium	7440-61-1	mg/L	0.03		X		X
<i>Total Trihalomethanes (TTHMs): (6)</i>		Method 524.2-THM	0.08		X	X	X
Chloroform	67-66-3	mg/L			X	X	X
Bromodichloromethane	75-27-4	mg/L			X	X	X
Dibromochloromethane	124-48-1	mg/L			X	X	X
Bromoform	75-25-2	mg/L			X	X	X
Trihalomethane Formation Potential (THMFP) - Standard Methods 5710 B			X	X	X		

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

<u>Total Trihalomethanes (TTHMs): (6)</u>		Method 524.2-THM	0.08		X	X	X
Chloroform	67-66-3	mg/L			X	X	X
Bromodichloromethane	75-27-4	mg/L			X	X	X
Dibromochloromethane	124-48-1	mg/L			X	X	X
Bromoform	75-25-2	mg/L			X	X	X
Trihalomethane Formation Potential (THMFP) - Standard Methods 5710 B			X	X	X		
<u>Haloacetic acids (HAA5): (7)</u>		Method 6251 B (HAA)	mg/L	0.06		X	X
<u>Trihaloacetic acids (THAAs)</u>							
Trichloroacetic acid (TCAA)	76-03-9	mg/L			X	X	X
Bromodichloroacetic acid (DBCAA)							
Dibromochloroacetic acid (DBCAA)							
Tribromoacetic acid (TBAA)							
<u>Dihaloacetic acids (DHAAs)</u>							
Dichloroacetic acid (DCAA)	76-43-6	mg/L			X	X	X
Bromochloroacetic acid (BCAA)							
Dibromoacetic acid (DBAA)	631-64-1	mg/L			X	X	X
<u>Monohaloacetic acids (MHAAs)</u>							
Monochloroacetic acid (MCAA)	79-11-8	mg/L			X	X	X
Monobromoacetic acid (MBAA)	79-08-3	mg/L			X	X	X
Haloacetic acids Formation Potential (HAAFP) - Standard Methods 5710 D					X	X	X

TABLE I - BRIGHAM CITY CORPORATION MONITORING PARAMETERS AND MONITORING SCHEDULE Jan 2016

<u>Disinfectants and Their By-Products: (8)</u>							
Chloramine (only if used as a disinfectant)	10599-90-3	mg/L	4		X	X	X
Chlorine	7782-50-5	mg/L	4		X	X	X
Chlorine Dioxide (only if used as a disinfectant)	10049-04-4	mg/L	0.8		X	X	X
Chlorite (only if Chlorine Dioxide is used as a disinfectant)	7758-19-2	mg/L	1		X	X	X
<u>Turbidity:</u>		NTU	<u>(9)</u>		X	X	X
<u>Total Coliform:</u>			<u>(10)</u>		X	X	X
<u>NOTES:</u>							
(1) DWQ has added bromide to the analytical parameter list with an analytical method reporting limit not to exceed 0.02 mg/L. If the bromide concentration exceeds 0.04 mg/L, BCC will be required to analyze for bromate concentrations.							
(2) According to Utah DDW, if Sulfate is greater than 500 mg/l the water management must demonstrate that no better water is available.							
(3) DDW has TDS limits of 2,000 mg/l but because of the Ground Water/UIC Rules, injection of water with TDS concentrations greater than 500 mg/l is not permitted.							
(5) See R309-200-5(4) (d) for actual MCL of 4 millirem/year. Use 50 pCi/L as a screening level for further analysis.							
(6) According to Utah DDW, the maximum contaminant level for community water systems serving a population of 10,000 or more and utilizing chlorine as a disinfectant is 80 µg/l. as system-wide running annual average.							
(7) HAA5 includes MCAA, DCAA, TCAA, MBAA, and DBAA							
(8) The permit limits for disinfectants are maximum residual disinfectant levels (MRDLs) and not MCLs							
(9) The turbidity limit for surface water sources or ground water sources under the direct influence of surface water is 0.3 NTU in at least 95% of the samples per month. The turbidity limit for slow sand filtration and diatomaceous earth filtration is 1.0 NTU in at least 95% of the samples per month. The turbidity level for ground water sources not under the direct influence of surface water is 5.0 NTU.							
10) For a system which collects less than 40 samples per month, no more than one sample per month may be total coliform-positive. For a system which collects 40 or more samples per month, no more than 5.0 % of the samples collected during a month may be total coliform-positive. Any fecal coliform-positive or Escherichia coliform (E. coli)-positive repeat sample or any total coliform-positive repeat sample following a fecal coliform-positive or E.coli-positive routine sample constitutes an acute MCL violation for total coliforms. This applies to samples taken throughout the distribution system. For the injection wells, no more than 5% of the monthly samples collected of the plant effluent may be total coliform-positive.							
(11) BCC will analyze the any new injection source annually for the permit cycle.							

PVNDRAFT

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Attachment C

Standard Operating Procedures version 2021

Cooley Well

Intermountain Well #2

Cemetery Well #2

Canyon View Well

PV DRAFT

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ATTACHMENT C

STANDARD OPERATIONAL PROCEDURES (SOP) for CITY WELLS INJECTION – Canyon View Well

SOP-1

Initial Well Flush to Waste

1. Obtain initial measurements including static water level and flow meter totalizer readings (both magnetic water flow meter and turbine water flow meter).
2. Configure valve system to pump Canyon View Well #2 to waste. Referring to the Canyon View Well #2 Well Piping Layout:
 - a. Close Gate Valve #1.
 - b. Check Pump Control Valve to make sure it is open.
 - c. Set pressure control on Pump Control Valve so that the valve stays open until it is time to stop flushing to waste.
 - d. Check Gate Valve #2 to make sure it is open (this valve is normally left open).
3. Pump Canyon View Well #2 to waste for 1 hour to remove any iron scale or precipitate that has developed in the well piping.

SOP-2

Injection Phase – Startup

1. Obtain measurements of water levels, supply line pressure and flow meter totalizers for Canyon View Well #2. Record the static water level before startup for calculation of the maximum drawup for each injection cycle (see Item 3 SOP 3).
2. Flush injection water supply line to waste with the following steps:
 - a. Make sure that the well pump is not running.
 - b. Supply line should be flushed at 400 - 700 gpm to clear out debris and iron scale in the pipelines.
 - c. Check the Injection Throttling Valve to make sure it is closed.
 - d. Open Gate Valve #1 and flush for at least 1 hour. Water should clear with no detectable debris, sand or iron scale.
 - e. Reset pressure control on Pressure Relief Valve to normal setting.
3. Prepare to inject with the following steps:
 - a. Close Gate Valve #2.
 - b. Check the Injection Throttling Valve to make sure it is closed.
 - c. Check the pressure controls on the Pressure Sustaining/Check Valve to make sure that it is set for normal check valve operation.
 - d. Open the Air/Vacuum Valve on the injection pipeline.
 - e. Open Gate Valve #1.
4. Follow these steps to gradually reach the targeted injection flow rate.
 - a. Slowly divert injection water into well by opening the Injection Throttling Valve until the injection pipeline transitions from vacuum to pressure conditions.
 - b. Close the Air/Vacuum Valve on the injection pipeline.
 - c. Continue slowly opening Injection Throttling Valve until flow rate reaches the target flow rate. Take care not to divert water too rapidly into the well. The process of

diverting injection water into the well may take 15 to 30 minutes to reach the target injection flow rate.

- d. Back pressure at the well head should be from 5 - 30 psi.
5. Measure and record injection flow rate, well head back pressure, pressure upstream of Injection Throttling Valve, and water levels in the well.

SOP-3

Injection Phase – Monitoring

1. Monitor the following parameters daily during injection:
 - a. Injection rate
 - b. Well head back pressure in injection pipeline
 - c. Pressure upstream of Throttling Valve
 - d. Water level
 - e. Water color, turbidity, smell and taste of injection water
2. Evaluate field water quality data and confirm that there are no unusual readings (greater than 10% variation from previous or subsequent readings). Remeasure field parameters immediately if unusual readings are found.
3. Calculate the maximum allowable drawup water level for each injection cycle by subtracting the maximum drawup value (See Line #7 in Table 1 on Page 1) from the static water level measured at the beginning of the injection cycle. If the water level in the Canyon View Well #2 rises above the maximum drawup value, it may indicate possible plugging. If this occurs, contact the supervisor and consider shutting down injection and redeveloping the well (see SOP-4).

Max Drawup = SWL (Item1, SOP2 or Item 4, SOP4) - Max Drawup Value (Line 7, Table 1)
Water Level

4. Redevelop well (see SOP-4) at the end of the injection cycle to the clean well prior to storage and recovery phases.

SOP-4

Injection Phase - Well Re-Development

1. Configure valves to pump Canyon View Well #2 to waste.
 - a. Close Injection Throttling Valve.
 - b. Obtain flow meter totalizer readings (both magnetic water flow meter and turbine water flow meter)
 - c. Close Gate Valve #1.
 - d. Open Gate Valve #2.
 - e. Check Pump Control Valve to make sure it is open.
 - f. Set pressure control on Pump Control Valve so that the valve stays open until it is time to stop flushing to waste.
 - g. Turn on the deep well pumping system.
2. Re-Develop Well as follows:
 - a. Pump well to waste for 15 minutes minimum.
 - b. Measure and record water levels during pumping.
 - c. Surge the well by shutting it off, waiting for all water to finish running back down
 - d. the well (5 min. minimum) and then turning on the pump again.

- e. Pump the well to waste for 2 hours.
 - f. Note the pumped water color, turbidity, smell, and taste and record observations
 - g. every 15 minutes.
3. Calculate specific capacity (S_c).

$$S_c = \frac{\text{Average pumping rate (gpm) over 2 hour period}}{\text{Drawdown (ft) after 2 hour period}}$$

If $S_c >$ Original Specific Capacity During Test Pump (Table 1 Line 5), redevelopment was successful and proceed to Injection Startup (SOP-2).

If $S_c <$ Original Specific Capacity During Test Pump (Table 1 Line 5), continue redevelopment (SOP-4).

4. Obtain a new Static Water Level for calculation of new maximum drawup water level (See Item 3 in SOP 3)
 - a. Allow well to recover for 45 minutes to 1 hour minimum.
 - b. Record new static water level.
 - c. Recalculate maximum allowable drawup water level (Item 3 SOP 3) for next infection cycle.

SOP-5

Recovery Phase – Startup

1. Configure valves to pump to waste.
 - a. Close Injection Throttling Valve.
 - b. Close Gate Valve #1.
 - c. Open Gate Valve #2.
 - d. Check Pump Control Valve to make sure it is open.
 - e. Set pressure control on Pump Control Valve so that the valve stays open until it is time to stop flushing to waste.
2. Obtain baseline measurements including static water levels and flow meter totalizer readings (magmeter and turbine flow meter). Obtain/prepare all equipment for pump testing.
3. Conduct a 24-hour constant rate pump test to document well performance at the start of recovery. Procedure is as follows:
 - a. Turn pump on. From when the pump first comes on to 10 minutes, collect water level and flow rate readings every minute.
 - b. From 11 minutes to 1 hour collect water level and flow rate readings every 5 minutes.
 - c. From 1 hour to 2 hours collect water level and flow rate readings every 20 minutes.
 - d. From 2 hours to 24 hours collect water level and flow rate readings every hour
 - e. Flow rate readings shall be measured accurately and recorded at the same time interval as drawdown data.

SOP-6

Recovery Phase – Monitoring

1. Continue pumping at sustained production flow rate.
2. Discontinue recovery pumping when 110% of the injection volume is reached.

3. Shutdown pump and allow well to recover for at least 48 hours.
4. Conduct a 24-hour constant rate pump test to document well performance at the end of recovery. Procedure is as follows:
 - a. Turn pump on. From when the pump first comes on to 10 minutes, collect water level and flow rate readings every minute.
 - b. From 11 minutes to 1 hour collect water level and flow rate readings every 5 minutes.
 - c. From 1 hour to 2 hours collect water level and flow rate readings every 20 minutes.
 - d. From 2 hours to 24 hours collect water level and flow rate readings every hour
 - e. Flow rate readings shall be measured accurately and recorded at the same time interval as drawdown data.

Attachment D

Monitoring, Recording, and Reporting Plan



ATTACHMENT D

Monitoring, Recording and Reporting Plan for CITY WELLS INJECTION – Canyon View Well

The purpose of this document is to detail the monitoring, recording, and reporting measures that Brigham City will take to ensure compliance with the injection well permit and all relevant water quality standards. This plan details the sampling, data management, and reporting methods used to meet compliance with Parts III.F and III.G of the permit.

Monitoring Plan

Injectate Sampling

Prior to the initialization of injection operations, samples of the injectate water will be collected at the nearest fire hydrant or sampling tap. Laboratory tests will be conducted to ensure that injectate water meets established quality standards. Samples will be collected and sent for analysis according to the timeline set forth within the permit. Samples shall be collected at the beginning of the injection event. Data submitted to meet compliance measures with the Utah Division of Drinking Water will serve to meet the groundwater monitoring requirements.

Sample Analysis

Attachment G of the permit provides a list of parameters for which each sample must be tested. This list is provided as a table which also lists the method and testing entity which must conduct the relevant tests. Samples will be collected according to the method-specific requirements of each parameter, including flushing, preservation, chain-of-custody, and transportation protocols. For the parameters where field analysis is the prescribed analysis method, testing will be performed by trained personnel with calibrated equipment. An example of a sample analysis report is attached to this document for reference.

Recording

The information detailed with each analysis shall include the date, time, and location of each sample collected; the name of the sampler; the date, time, and location of each analysis performed; the analysis method and reporting limit for each parameter; and the sample result. Electronic copies of the analysis report and field logs will be kept and maintained by Brigham City indefinitely.

During injection, the injection rate, injectate pressure, groundwater level, and water characteristics will be monitored daily. Using these logs of static ground water levels and the calculated injection volume, maximum drawup will be calculated and adhered to.

Reporting

All of the above data will be reported to the DWQ on a quarterly basis. Due to the long turnaround time of full laboratory analyses, reports will be submitted approximately 75 days from the end of each calendar quarter if injection occurred during that quarter. If no injection occurred during the previous quarter, a letter stating such will be sent to the DWQ. Each report will include a characterization of the injectate, injection pressure, rate and volume of injection events, injection zone water levels, all associated sample collection data, and all applicable sample results.