
**UIC CLASS I
QUARTERLY REPORT
for the
LOST CREEK ISR PROJECT
1st Quarter 2018**



**LOST CREEK ISR, LLC
SWEETWATER COUNTY, WY**

UIC PERMIT 13-409

**Prepared by Ur-Energy for
Wyoming Department of Environmental Quality -
Water Quality Division – Underground Injection Control**

April 30, 2018



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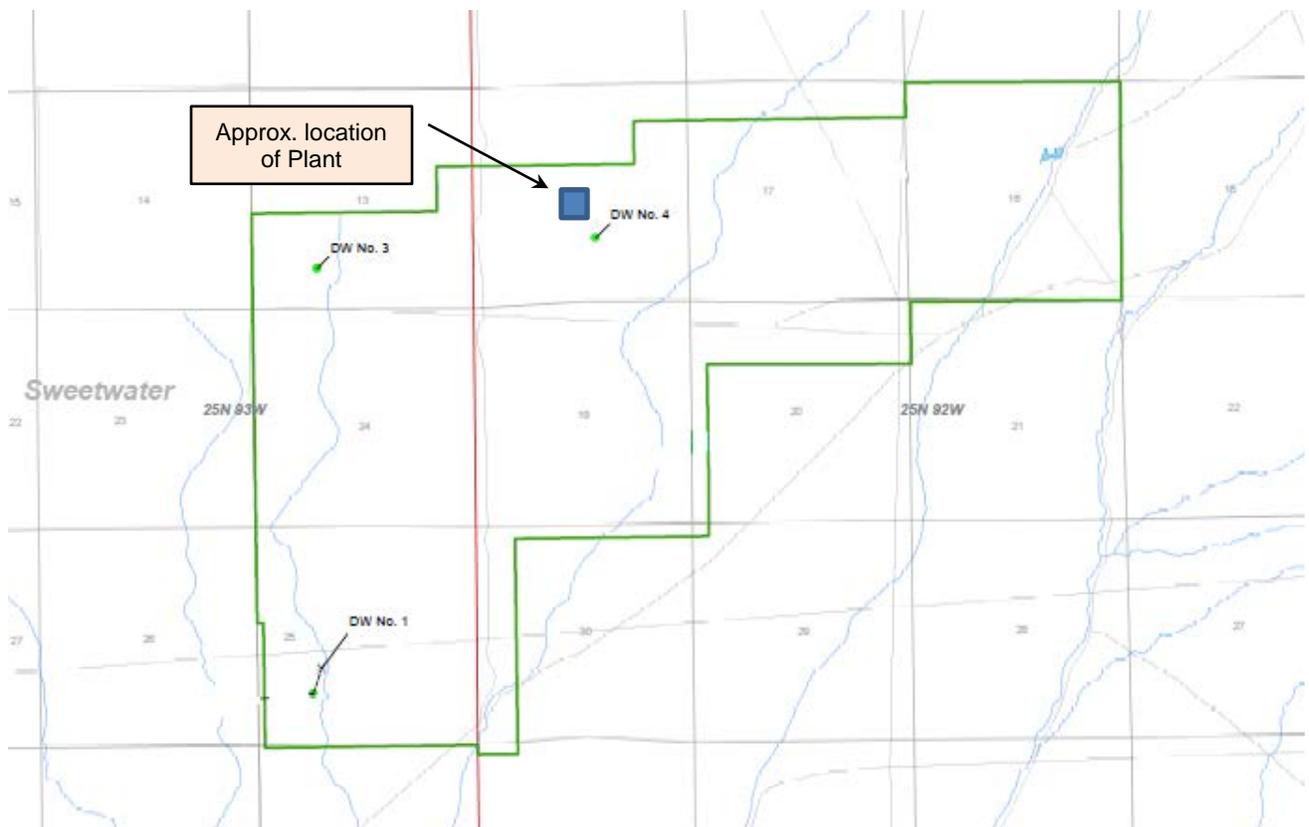


1.0 Introduction

The period covered by this report is the first calendar quarter of 2018 from January 1 to March 31, 2018.

Three Class I disposal wells were operational during the reporting period: LC DW No. 1 (“DDW1”), LC DW No. 3 (“DDW3”), and LC DW No. 4 (“DDW4”). Well locations (labeled) are shown below in relation to the Permit to Mine boundary (green line):

FIGURE 1: Well Locations



All three wells were operated intermittently during the quarter. Operational data was monitored and recorded electronically and also recorded manually by operator each shift.

As per permit requirements, the following elements from Section K(6) of the UIC Permit have been included in this report:

- a. Minimum, volume-weighted average, and maximum instantaneous injection rates for each well for each month*
- b. Minimum, average, and maximum daily injection pressures for each well for each month*



- c. Total injection volume in barrels (bbl) for each well for each month, total for the quarter, and cumulative volume of waste injected to date.
- d. Maximum and minimum annulus pressures for each month with alarm/kill pressure value
- e. Quarterly analytical results
- f. Permit exceedances during the quarter
- g. Any alarms or shutdowns and corrective actions
- h. Summary of well tests or workovers

2.0 Summary Data

Tables 1A, 1B, 1C, and 2 below provide a data summary for above items **a**, **c**, and **d** above. Data for item **b** above is provided in **Appendix 1** including tables and charts of the daily injection pressure values.

TABLE 1A: Operational Data Summary for DDW1

PARAMETER	UNITS	LC DW No. 1			
		January 2018	February 2018	March 2018	Quarterly Total/Min/Max/Avg
Operation Time	min	8,313	25,320	32,975	66,608
% Run Time	%	19%	63%	74%	52%
Injection Rate Minimum Instantaneous	gpm	0.0	0.0	0.0	0.0
Injection Rate Average (TWA)	gpm	0.5	0.8	0.8	0.7
Injection Rate Maximum Instantaneous	gpm	1.7	1.4	1.4	1.7
Injection Rate Maximum Permit Limit	gpm	50			50
Injection Pressure Daily Minimum	psig	444	392	516	392
Injection Pressure Daily Average	psig	575	495	556	542
Injection Pressure Daily Maximum	psig	602	575	584	602
Injection Pressure Permit Limit (LSIP)	psig	609			609
Injection Pressure Automatic Kill	psig	600			600
Injection Volume	gal	4110	20,787	27,423	52,320
Injection Volume	bbl	98	495	653	1,246
Annulus Pressure Minimum	psig	358	288	251	251
Annulus Pressure Average	psig	405	325	273	334
Annulus Pressure Maximum	psig	469	369	293	469
Annulus Pressure Permit Limit	psig	200-800			200-800
Annulus Pressure Automatic Kill	psig	N/A			N/A



TABLE 1B: Operational Data Summary for DDW3

PARAMETER	UNITS	LC DW No. 3			
		January 2018	February 2018	March 2018	Quarterly Total/Min/Max/Avg
Operation Time	min	40,412	37,349	37,714	115,476
% Run Time	%	91%	93%	84%	89%
Injection Rate Minimum Instantaneous	gpm	0	0	0	0
Injection Rate Average (TWA)	gpm	7	6	6	6
Injection Rate Maximum Instantaneous	gpm	11	7	8	11
Injection Rate Maximum Permit Limit	gpm	50			50
Injection Pressure Daily Minimum	psig	759	753	773	753
Injection Pressure Daily Average	psig	837	842	831	837
Injection Pressure Daily Maximum	psig	874	881	885	885
Injection Pressure Permit Limit (LSIP)	psig	915			915
Injection Pressure Automatic Kill	psig	910			910
Injection Volume	gal	275,961	218,933	213,335	708,230
Injection Volume	bbl	6,571	5,213	5,079	16,863
Annulus Pressure Minimum	psig	213	219	213	213
Annulus Pressure Average	psig	241	241	238	240
Annulus Pressure Maximum	psig	412	268	261	412
Annulus Pressure Permit Limit	psig	200-800			200-800
Annulus Pressure Automatic Kill	psig	N/A			N/A



TABLE 1C: Operational Data Summary for DDW4

PARAMETER	UNITS	LC DW No. 4			
		January 2018	February 2018	March 2018	Quarterly Total/Min/Max/Avg
Operation Time	min	20,596	37,610	40,690	98,897
% Run Time	%	46%	93%	91%	77%
Injection Rate Minimum Instantaneous	gpm	0	0	0	0
Injection Rate Average (TWA)	gpm	8	7	7	7
Injection Rate Maximum Instantaneous	gpm	10	8	8	10
Injection Rate Maximum Permit Limit	gpm	50			50
Injection Pressure Daily Minimum	psig	0	529	562	0
Injection Pressure Daily Average	psig	563	652	668	628
Injection Pressure Daily Maximum	psig	771	696	726	771
Injection Pressure Permit Limit (LSIP)	psig	838			838
Injection Pressure Automatic Kill	psig	830			830
Injection Volume	gal	162,171	255,213	290,841	708,225
Injection Volume	bbl	3,861	6,077	6,925	16,863
Annulus Pressure Minimum	psig	158	242	233	158
Annulus Pressure Average	psig	305	272	265	281
Annulus Pressure Maximum	psig	364	328	315	364
Annulus Pressure Permit Limit	psig	200-800			200-800
Annulus Pressure Automatic Kill	psig	N/A			N/A

TABLE 2: Cumulative Injection Volumes to Date

TIME PERIOD	UNITS	LC DW No. 1	LC DW No. 3	LC DW No. 4
2013	bbl	14,625	N/A	6,471
2014	bbl	31,278	8,239	164,694
2015	bbl	14,966	130,113	105,999
2016	bbl	9,300	95,653	107,254
2017	bbl	10,414	10,414	10,414
2018Q1	bbl	1,246	16,863	16,863
CUMULATIVE TOTAL TO DATE	bbl	81,829	261,281	411,695



3.0 Analytical Results

A quarterly grab sample in duplicate of the injectate was collected from the Plant waste water line upstream of the branch points to each individual well. Sample parameters pH, conductivity, and temperature were measured with a field meter at the sampling site or in the onsite lab and other applicable parameters were analyzed by Energy Laboratories in Casper, WY. Results of the sample analyses are summarized in **Table 3** below and the associated lab report is included as **Appendix 2**.

TABLE 3: Analytical Results Summary

Sample ID: DDW-Injectate				
Sample Date: 3/29/2018				
Lab Analyte or Parameter	Method Used	Results	Duplicate Results	Units
pH, field	SM4500-H+B	6.91	6.93	s.u.
Specific Cond. at 25°C, field	120.1	27,400	27,200	uS/cm
Temperature, field	SM2550B	14.0	14.0	°C
Specific Gravity	n/a	1.01	1.01	---
Total Dissolved Solids	SM2540C	13500	13400	mg/L
Bicarbonate	SM2320B	1360	1340	mg/L
Carbonate	SM2320B	ND(5)	ND(5)	mg/L
Chloride, total	300.0	6370	6150	mg/L
Sulfate, total	300.0	1420	1410	mg/L
Sulfide (as hydrogen sulfide)	A4500-S F	0.01	ND	mg/L
Arsenic, dissolved	200.8	ND(0.005)	ND(0.005)	mg/L
Selenium, dissolved	200.8	0.246	0.257	mg/L
Vanadium, dissolved	200.8	ND(0.02)	ND(0.02)	mg/L
Uranium, total	200.7	3.78	4.58	mg/L
Radium-226, total	E903.0	1810	1650	pCi/L

The only constituent with a defined Permit limit is pH which must have a value between 2.0 and 12.5. The measured value for pH of 6.91 was within the limit.

4.0 Permit Exceedances

No operational exceedances occurred during the quarter. However, during maintenance activities, the annulus pressure for DDW4 dropped below the lower limit. This occurred when the nitrogen tank was switched out.



TABLE 4: Summary of Exceedances

Event	Well	Date	Limit Exceeded	Value	Permit Limit	Comment
1	DDW4	1/3/2018	Annulus pressure	158	200-800	Occurred during tank change

5.0 Alarms, Shut-Downs, and Corrective Actions

Nominal shutdowns both automatic and manual occurred due to pressure limit shutoff or due to maintenance activity such as changing inline filters or repairs. Intermittent operation of the injection systems is typical.

6.0 Summary of Maintenance, Well Tests, or Workovers

Maintenance completed during the quarter included:

- Routine filter changes
- Replacement of annulus nitrogen tank for each well as needed
- Routine pressure shutoff testing
- The pump in the pump house for DDW4 was repaired in January

Testing of the pressure switches to verify operation of automatic shutdown occurred in February. Digital shutoff is tested by reducing the shutoff pressure setting to prevent test pressure from exceeding permit limit and verifying the system shuts off at that pressure. Results of the testing are summarized on **Table 5**:

TABLE 5: Summary of Automatic Pressure Shutoff Testing

Well	Permit Pressure Limit (psi)	Test Date	Digital Shutoff Tested at (psi)	Digital Shutoff Set to (psi)	Digital Shutoff Function	Analog Pressure Switch Shutoff At (psi)	Analog Pressure Switch Function
DDW-1	609	2/5/2018	---	---	---	603	Pass
DDW-1	609	2/20/2018	475	600	Pass	---	---
DDW-3	915	2/5/2018	---	---	---	910	Pass
DDW-3	915	2/20/2018	800	890	Pass	---	---
DDW-4	838	2/5/2018	---	---	---	835	Pass
DDW-4	838	2/20/2018	600	825	Pass	---	---



APPENDIX 1

**APPENDIX 1: Daily Injection Pressures
DDW-1 1st Quarter 2018
Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
1/1/2018	544	559	580	601	609	
1/2/2018	540	544	555	601	609	
1/3/2018	553	569	581	601	609	
1/4/2018	580	590	598	601	609	
1/5/2018	544	576	599	601	609	
1/6/2018	586	591	593	601	609	
1/7/2018	576	582	590	601	609	
1/8/2018	560	574	578	601	609	
1/9/2018	555	571	573	601	609	
1/10/2018	572	581	590	601	609	
1/11/2018	557	585	596	601	609	
1/12/2018	588	592	595	601	609	
1/13/2018	552	586	602	601	609	
1/14/2018	579	591	598	601	609	
1/15/2018	564	593	599	601	609	
1/16/2018	588	593	596	601	609	
1/17/2018	594	596	598	601	609	
1/18/2018	594	597	598	601	609	
1/19/2018	594	596	598	601	609	
1/20/2018	567	594	598	601	609	
1/21/2018	572	594	598	601	609	
1/22/2018	563	587	593	601	609	
1/23/2018	555	578	589	601	609	
1/24/2018	569	571	574	601	609	
1/25/2018	563	580	588	601	609	
1/26/2018	574	586	590	601	609	
1/27/2018	509	549	575	601	609	
1/28/2018	520	522	528	601	609	
1/29/2018	493	522	545	601	609	
1/30/2018	462	476	493	601	609	
1/31/2018	444	452	463	601	609	
2/1/2018	419	437	449	601	609	
2/2/2018	421	426	444	601	609	
2/3/2018	411	416	421	601	609	
2/4/2018	402	407	411	601	609	
2/5/2018	392	407	453	601	609	
2/6/2018	451	491	516	601	609	
2/7/2018	494	514	519	601	609	
2/8/2018	510	518	528	601	609	
2/9/2018	526	533	538	601	609	
2/10/2018	469	501	542	601	609	
2/11/2018	444	455	469	601	609	

**APPENDIX 1: Daily Injection Pressures
DDW-1 1st Quarter 2018
Lost Creek ISR Project 13-409**

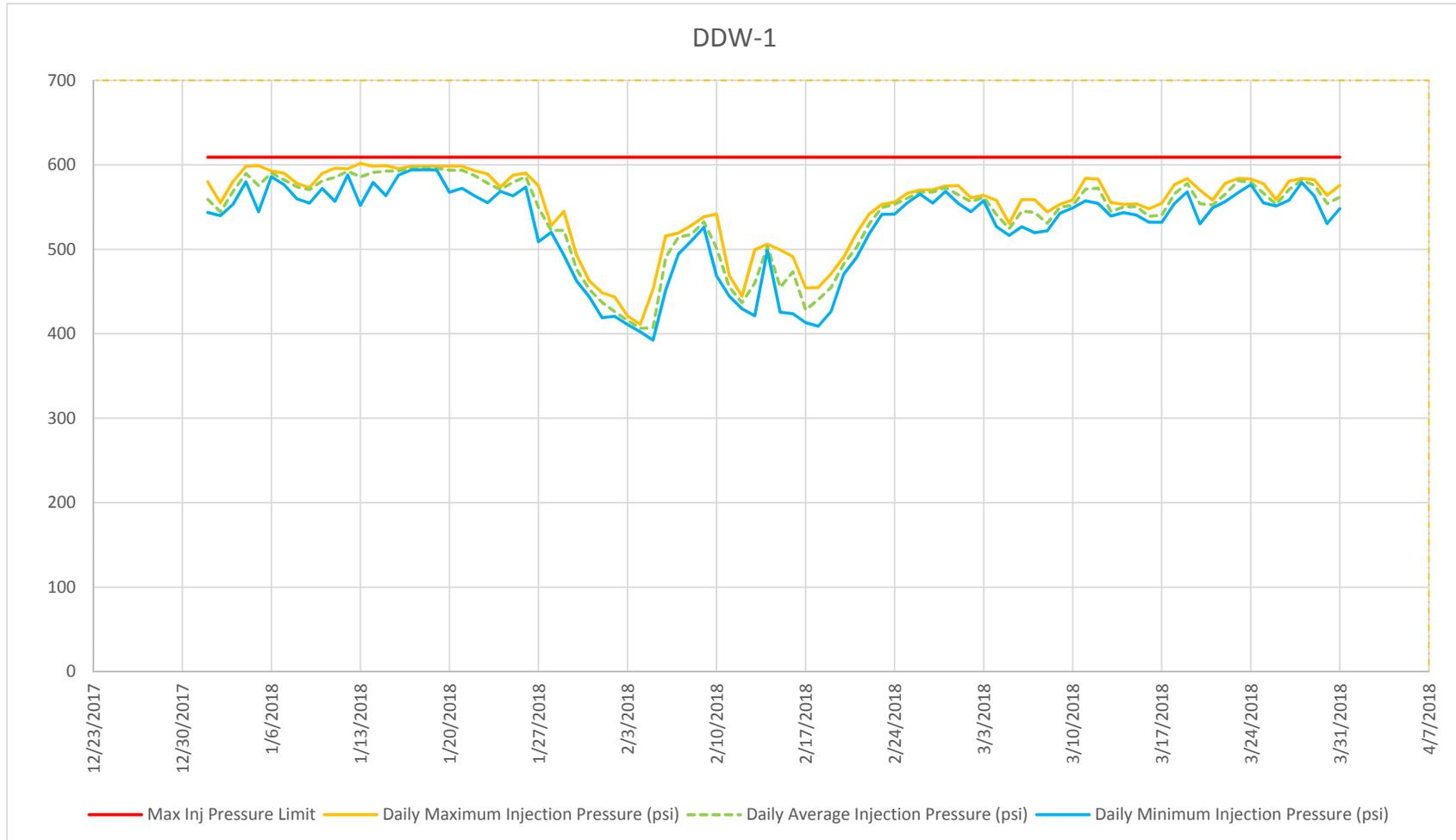
Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
2/12/2018	430	437	444	601	609	
2/13/2018	421	460	500	601	609	
2/14/2018	499	503	506	601	609	
2/15/2018	425	455	499	601	609	
2/16/2018	424	473	491	601	609	
2/17/2018	413	428	454	601	609	
2/18/2018	409	441	455	601	609	
2/19/2018	426	455	471	601	609	
2/20/2018	471	483	491	600	609	
2/21/2018	490	502	519	600	609	
2/22/2018	518	530	542	600	609	
2/23/2018	541	549	553	600	609	
2/24/2018	542	553	556	600	609	
2/25/2018	555	561	566	600	609	
2/26/2018	565	567	570	600	609	
2/27/2018	555	568	570	600	609	
2/28/2018	569	573	575	600	609	
3/1/2018	554	565	575	600	609	
3/2/2018	544	556	561	600	609	
3/3/2018	557	562	564	600	609	
3/4/2018	527	541	558	600	609	
3/5/2018	516	525	531	600	609	
3/6/2018	527	545	559	600	609	
3/7/2018	520	544	559	600	609	
3/8/2018	522	531	544	600	609	
3/9/2018	543	550	553	600	609	
3/10/2018	549	552	558	600	609	
3/11/2018	557	571	584	600	609	
3/12/2018	554	572	583	600	609	
3/13/2018	539	545	555	600	609	
3/14/2018	543	550	553	600	609	
3/15/2018	540	550	554	600	609	
3/16/2018	532	539	548	600	609	
3/17/2018	532	540	554	600	609	
3/18/2018	554	566	576	600	609	
3/19/2018	568	578	584	600	609	
3/20/2018	530	554	570	600	609	
3/21/2018	549	553	558	600	609	
3/22/2018	557	565	578	600	609	
3/23/2018	567	581	584	600	609	
3/24/2018	577	579	583	600	609	
3/25/2018	555	566	578	600	609	

**APPENDIX 1: Daily Injection Pressures
DDW-1 1st Quarter 2018
Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
3/26/2018	551	553	559	600	609	
3/27/2018	558	571	581	600	609	
3/28/2018	579	582	584	600	609	
3/29/2018	563	576	582	600	609	
3/30/2018	530	554	564	600	609	
3/31/2018	548	562	576	600	609	

psi: pounds per square inch

APPENDIX 1: Daily Injection Pressures
DDW-1 1st Quarter 2018
Lost Creek ISR Project 13-409



**APPENDIX 1: Daily Injection Pressures
DDW-3 1st Quarter 2018
Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
1/1/2018	798	819	845	890	915	
1/2/2018	842	851	861	890	915	
1/3/2018	827	852	861	890	915	
1/4/2018	781	813	833	890	915	
1/5/2018	764	790	817	890	915	
1/6/2018	771	788	807	890	915	
1/7/2018	759	780	801	890	915	
1/8/2018	763	797	824	890	915	
1/9/2018	808	824	834	890	915	
1/10/2018	800	830	843	890	915	
1/11/2018	817	841	853	890	915	
1/12/2018	844	848	851	890	915	
1/13/2018	848	850	852	890	915	
1/14/2018	850	853	858	890	915	
1/15/2018	856	860	863	890	915	
1/16/2018	859	862	864	890	915	
1/17/2018	861	863	866	890	915	
1/18/2018	864	867	869	890	915	
1/19/2018	865	867	869	890	915	
1/20/2018	844	858	869	890	915	
1/21/2018	843	845	847	890	915	
1/22/2018	845	852	871	890	915	
1/23/2018	864	867	871	890	915	
1/24/2018	800	844	868	890	915	
1/25/2018	765	777	802	890	915	
1/26/2018	766	805	837	890	915	
1/27/2018	828	854	874	890	915	
1/28/2018	859	863	867	890	915	
1/29/2018	811	818	860	890	915	
1/30/2018	813	835	858	890	915	
1/31/2018	840	858	870	890	915	
2/1/2018	824	847	873	890	915	
2/2/2018	845	859	866	890	915	
2/3/2018	863	865	867	890	915	
2/4/2018	809	844	868	890	915	
2/5/2018	753	779	830	890	915	
2/6/2018	829	847	858	890	915	
2/7/2018	844	851	857	890	915	
2/8/2018	856	863	870	890	915	
2/9/2018	813	823	861	890	915	
2/10/2018	815	836	852	890	915	
2/11/2018	850	861	869	890	915	

**APPENDIX 1: Daily Injection Pressures
DDW-3 1st Quarter 2018
Lost Creek ISR Project 13-409**

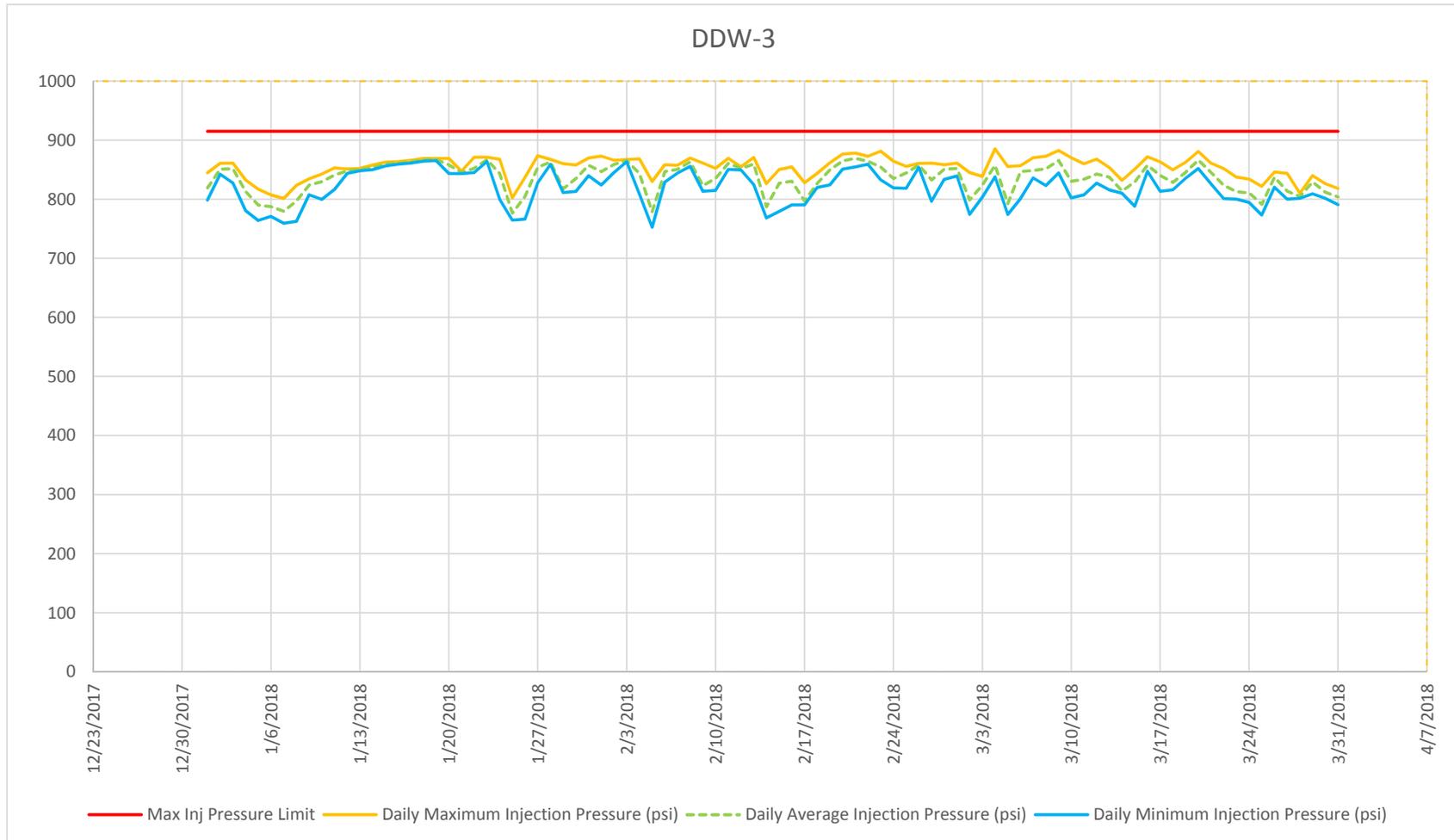
Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
2/12/2018	850	852	855	890	915	
2/13/2018	825	860	871	890	915	
2/14/2018	768	787	826	890	915	
2/15/2018	779	827	850	890	915	
2/16/2018	791	831	855	890	915	
2/17/2018	791	797	828	890	915	
2/18/2018	820	827	844	890	915	
2/19/2018	824	850	862	890	915	
2/20/2018	851	865	876	890	915	
2/21/2018	855	869	878	890	915	
2/22/2018	859	864	873	890	915	
2/23/2018	833	855	881	890	915	
2/24/2018	819	835	864	890	915	
2/25/2018	818	845	856	890	915	
2/26/2018	854	858	861	890	915	
2/27/2018	796	833	861	890	915	
2/28/2018	834	851	858	890	915	
3/1/2018	839	852	861	890	915	
3/2/2018	774	799	845	890	915	
3/3/2018	803	824	839	890	915	
3/4/2018	838	858	885	890	915	
3/5/2018	774	793	855	890	915	
3/6/2018	801	847	857	890	915	
3/7/2018	836	849	870	890	915	
3/8/2018	823	852	873	890	915	
3/9/2018	844	866	883	890	915	
3/10/2018	802	830	870	890	915	
3/11/2018	807	834	860	890	915	
3/12/2018	827	843	868	890	915	
3/13/2018	816	837	853	890	915	
3/14/2018	810	814	832	890	915	
3/15/2018	788	829	851	890	915	
3/16/2018	847	858	872	890	915	
3/17/2018	813	840	863	890	915	
3/18/2018	816	829	850	890	915	
3/19/2018	835	846	863	890	915	
3/20/2018	852	866	881	890	915	
3/21/2018	826	846	861	890	915	
3/22/2018	801	824	852	890	915	
3/23/2018	800	813	837	890	915	
3/24/2018	795	811	834	890	915	
3/25/2018	773	791	822	890	915	

**APPENDIX 1: Daily Injection Pressures
DDW-3 1st Quarter 2018
Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Automatic Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
3/26/2018	820	838	846	890	915	
3/27/2018	800	814	844	890	915	
3/28/2018	801	805	810	890	915	
3/29/2018	809	829	840	890	915	
3/30/2018	802	812	826	890	915	
3/31/2018	791	804	818	890	915	

psi: pounds per square inch

APPENDIX 1: Daily Injection Pressures
DDW-3 1st Quarter 2018
Lost Creek ISR Project 13-409



**APPENDIX 1: Daily Injection Pressures
DDW-4 1st Quarter 2018
Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
1/1/2018	548	556	564	828	838	
1/2/2018	537	542	595	828	838	
1/3/2018	502	564	662	828	838	
1/4/2018	561	626	683	828	838	
1/5/2018	597	652	687	828	838	
1/6/2018	576	654	691	828	838	
1/7/2018	620	672	714	828	838	
1/8/2018	620	688	721	828	838	
1/9/2018	639	693	726	828	838	
1/10/2018	0	334	771	828	838	
1/11/2018	0	0	0	828	838	Off for pump repair
1/12/2018	0	0	11	828	838	Off for pump repair
1/13/2018	0	4	11	828	838	Off for pump repair
1/14/2018	0	7	11	828	838	Off for pump repair
1/15/2018	0	0	0	828	838	Off for pump repair
1/16/2018	0	0	11	828	838	Off for pump repair
1/17/2018	0	0	0	828	838	Off for pump repair
1/18/2018	0	0	0	828	838	Off for pump repair
1/19/2018	0	0	0	828	838	Off for pump repair
1/20/2018	0	0	10	828	838	Off for pump repair
1/21/2018	10	112	599	828	838	
1/22/2018	68	106	171	828	838	
1/23/2018	0	354	756	828	838	
1/24/2018	516	549	584	828	838	
1/25/2018	484	529	570	828	838	
1/26/2018	567	606	637	828	838	
1/27/2018	595	626	648	828	838	
1/28/2018	592	622	638	828	838	
1/29/2018	589	595	618	828	838	
1/30/2018	615	629	639	828	838	
1/31/2018	636	648	654	828	838	
2/1/2018	623	650	657	828	838	
2/2/2018	646	661	674	828	838	
2/3/2018	634	660	673	828	838	
2/4/2018	552	618	651	828	838	
2/5/2018	559	613	661	828	838	
2/6/2018	651	656	664	828	838	
2/7/2018	632	664	689	828	838	
2/8/2018	635	668	682	828	838	
2/9/2018	629	633	655	828	838	
2/10/2018	653	664	676	828	838	
2/11/2018	638	664	675	828	838	

**APPENDIX 1: Daily Injection Pressures
DDW-4 1st Quarter 2018
Lost Creek ISR Project 13-409**

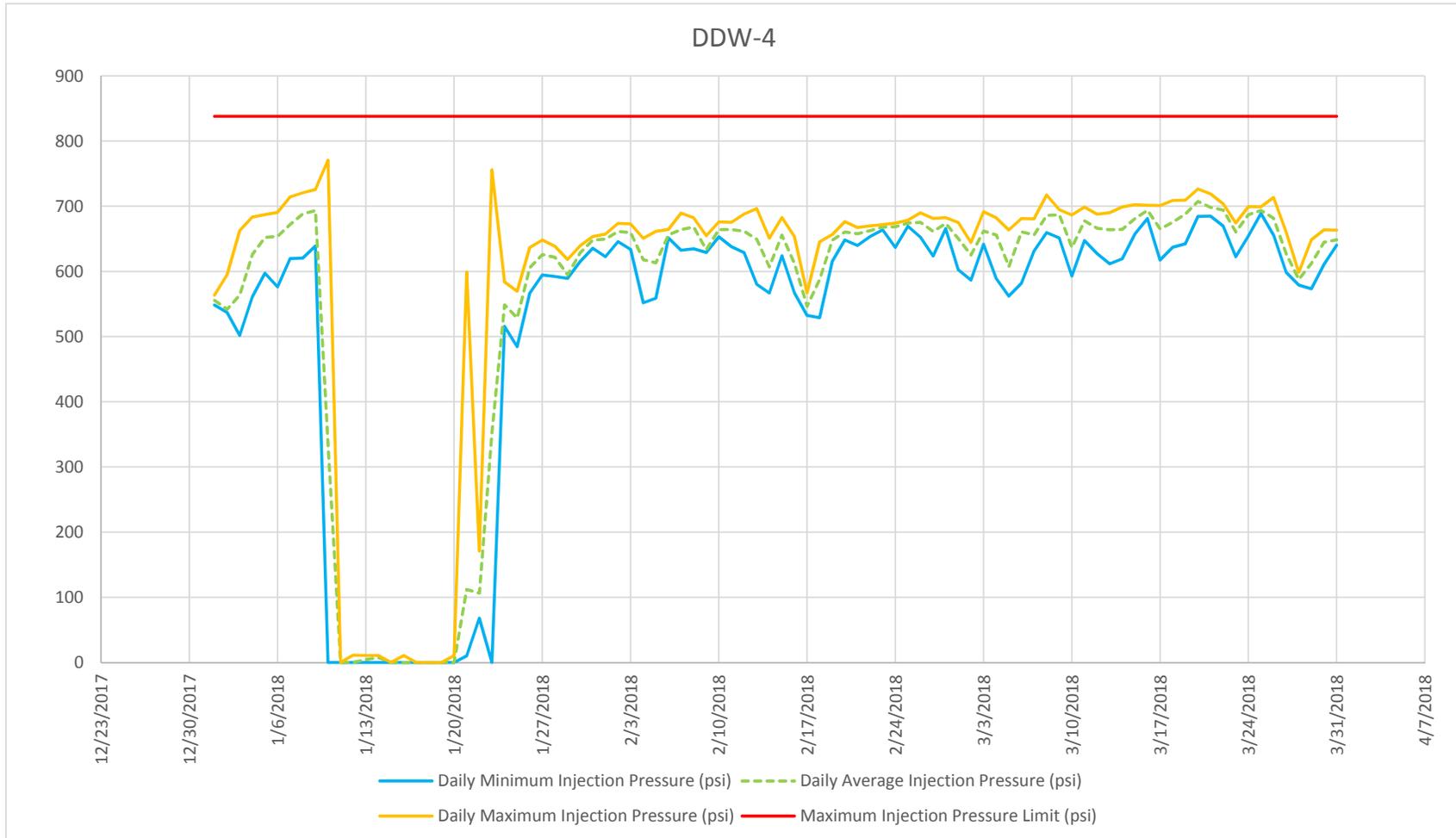
Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
2/12/2018	629	662	688	828	838	
2/13/2018	580	649	696	828	838	
2/14/2018	567	607	651	828	838	
2/15/2018	624	656	683	828	838	
2/16/2018	567	612	653	828	838	
2/17/2018	532	547	567	828	838	
2/18/2018	529	588	645	828	838	
2/19/2018	615	648	656	828	838	
2/20/2018	648	661	676	825	838	
2/21/2018	640	658	667	825	838	
2/22/2018	654	663	670	825	838	
2/23/2018	664	668	672	825	838	
2/24/2018	637	669	674	825	838	
2/25/2018	669	674	678	825	838	
2/26/2018	652	675	690	825	838	
2/27/2018	624	661	681	825	838	
2/28/2018	666	674	683	825	838	
3/1/2018	602	650	675	825	838	
3/2/2018	587	625	644	825	838	
3/3/2018	642	662	692	825	838	
3/4/2018	589	656	682	825	838	
3/5/2018	562	608	664	825	838	
3/6/2018	582	661	681	825	838	
3/7/2018	631	656	681	825	838	
3/8/2018	660	686	717	825	838	
3/9/2018	651	687	695	825	838	
3/10/2018	593	637	687	825	838	
3/11/2018	647	678	699	825	838	
3/12/2018	627	666	688	825	838	
3/13/2018	612	664	690	825	838	
3/14/2018	619	665	699	825	838	
3/15/2018	657	681	702	825	838	
3/16/2018	681	694	702	825	838	
3/17/2018	617	665	701	825	838	
3/18/2018	637	675	709	825	838	
3/19/2018	642	688	709	825	838	
3/20/2018	684	707	726	825	838	
3/21/2018	685	698	719	825	838	
3/22/2018	670	694	704	825	838	
3/23/2018	623	661	674	825	838	
3/24/2018	654	687	699	825	838	
3/25/2018	689	694	699	825	838	

**APPENDIX 1: Daily Injection Pressures
 DDW-4 1st Quarter 2018
 Lost Creek ISR Project 13-409**

Date	Daily Minimum Injection Pressure (psi)	Daily Average Injection Pressure (psi)	Daily Maximum Injection Pressure (psi)	Shutdown Pressure (psi)	Maximum Injection Pressure Limit (psi)	Comments
3/26/2018	656	682	713	825	838	
3/27/2018	599	627	660	825	838	
3/28/2018	579	588	599	825	838	
3/29/2018	573	612	649	825	838	
3/30/2018	611	645	664	825	838	
3/31/2018	640	649	663	825	838	

psi: pounds per square inch

APPENDIX 1: Daily Injection Pressures
DDW-4 1st Quarter 2018
Lost Creek ISR Project 13-409





APPENDIX 2



Inter-Mountain Labs
Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

All shaded fields must be completed.
This is a legal document: any misrepresentation may be construed as fraud.

Page of
176283

Client Name UR-ENERGY	Project Identification LOST CREEK CLASS I	Sampler (Signature/Attestation of Authenticity) <i>M. GAITHER</i>	Telephone # 307 265-2373
Report Address 5880 ENTERPRISE DR SUITE 200 CASPER, WY 82609	Contact Name MIKE GAITHER	ANALYSES / PARAMETERS Preservative Lot # 1:1 HNO3-M-100417-2 H2SO4-2509H29 NaOH-Wet-2-41-3	
Invoice Address	Email MIKE.GAITHER@UR-ENERGY.COM		
	Phone 307 265-2373 X 321	Purchase Order #	Quote #

ITEM	LAB ID <i>(Lab Use Only)</i>	DATE	TIME	SAMPLE IDENTIFICATION	Matrix	# of Containers	ANALYSES / PARAMETERS										REMARKS
							PH / COND.	BICARB / CARB	CHLORIDE	SULFATE	HYD. SULFIDE	SP. GRAVITY	TDS	As, Se, V, Uranium	Pb - 226		
1	S1803368-001	3/29/2018	0810	DDW-INJECTATE - A	WT	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		
2	002	3/29/2018	0810	DDW-INJECTATE - B	WT	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

LAB COMMENTS	Relinquished By (Signature/Printed)	DATE	TIME	Received By (Signature/Printed)	DATE	TIME
0.2" ROI	<i>M. Gaither</i> M. GAITHER	3/29/2018	1630	<i>R. Boyd</i> R. BOYD	3.30.18	12:15

SHIPPING INFO	MATRIX CODES	TURNAROUND TIMES	COMPLIANCE INFORMATION	ADDITIONAL REMARKS
<input type="checkbox"/> UPS <input type="checkbox"/> Fed Express <input type="checkbox"/> US Mail <input type="checkbox"/> Hand Carried <input checked="" type="checkbox"/> Other ACTION	Water WT Soil SL Solid SD Filter FT Other OT	<input type="checkbox"/> Check desired service <input checked="" type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH - 5 Working Days <input type="checkbox"/> URGENT - < 2 Working Days <i>Rush & Urgent Surcharges will be applied</i>	Compliance Monitoring? Y / N Program (SDWA, NPDES,...) PWSID / Permit # Chlorinated? Y / N Sample Disposal: Lab Client	



Date:

CLIENT: UR-Energy
Project: Lost Creek Class I
Lab Order: S1803368

CASE NARRATIVE
Report ID: S1803368001

Samples DDW-INJECTATE-A and DDW-INJECTATE-B were received on March 30, 2018.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

- "Standard Methods For The Examination of Water and Wastewater", approved method versions
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
- 40 CFR Parts 136 and 141
- 40 CFR Part 50, Appendices B, J, L, and O
- Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
- ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Tom Patten, Laboratory Manager



Sample Analysis Report

Company: UR-Energy
5880 Enterprise Dr. Suite 200
Casper, WY 82609

Date Reported 4/26/2018
Report ID S1803368001

ProjectName: Lost Creek Class I
Lab ID: S1803368-001
ClientSample ID: DDW-INJECTATE-A
COC: 176283
PWS ID:

WorkOrder: S1803368
CollectionDate: 3/29/2018 8:10:00 AM
DateReceived: 3/30/2018 12:15:00 PM
FieldSampler: MG
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Anions/Cations							
Alkalinity, Total (As CaCO3)	1120	mg/L		5	SM 2320B	04/02/2018 1921	IBS
Alkalinity, Bicarbonate as HCO3	1360	mg/L		5	SM 2320B	04/02/2018 1921	IBS
Alkalinity, Carbonate as CO3	ND	mg/L		5	SM 2320B	04/02/2018 1921	IBS
Chloride	6370	mg/L		1	EPA 300.0	04/03/2018 1025	AB
Sulfate	1420	mg/L		1	EPA 300.0	04/02/2018 2029	AB
General Parameters							
Electrical Conductivity	20500	umhos/cm		5	SM 2510B	04/02/2018 1921	IBS
pH	7.8	s.u.		0.1	SM 4500 H B	04/02/2018 1921	IBS
Specific Gravity	1.01	20°C/4°C		0.01	ASTM D1429-08	03/30/2018 1442	KB
Sulfide as H2S	0.01	mg/L		0.01	HACH 8131	03/30/2018 1235	KB
Total Dissolved Solids (180)	13500	mg/L		10	SM 2540	04/02/2018 1108	NLG
Metals - Total							
Arsenic	ND	mg/L		0.005	EPA 200.8	04/04/2018 102	MS
Selenium	0.246	mg/L		0.001	EPA 200.8	04/04/2018 102	MS
Uranium	3.78	mg/L		0.0003	EPA 200.8	04/04/2018 102	MS
Vanadium	ND	mg/L		0.02	EPA 200.8	04/04/2018 102	MS
Radionuclides - Dissolved							
Radium 226	1810	pCi/L		0.2	SM 7500 Ra-B	04/25/2018 1526	MB
Radium 226 Precision (±)	4.6	pCi/L			SM 7500 Ra-B	04/25/2018 1526	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - ND Not Detected at the Reporting Limit
 - S Spike Recovery outside accepted recovery limits
 - X Matrix Effect

- C Calculated Value
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL or is less than LCL
- O Outside the Range of Dilutions
- U Analysis reported under the reporting limit

Reviewed by: Tom Patten
Tom Patten, Laboratory Manager



Sample Analysis Report

Company: UR-Energy
5880 Enterprise Dr. Suite 200
Casper, WY 82609

Date Reported 4/26/2018
Report ID S1803368001

ProjectName: Lost Creek Class I
Lab ID: S1803368-002
ClientSample ID: DDW-INJECTATE-B
COC: 176283
PWS ID:

WorkOrder: S1803368
CollectionDate: 3/29/2018 8:10:00 AM
DateReceived: 3/30/2018 12:15:00 PM
FieldSampler: MG
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init

Anions/Cations

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Alkalinity, Chloride, Sulfate.

General Parameters

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Electrical Conductivity, pH, Specific Gravity, Sulfide as H2S, Total Dissolved Solids (180).

Metals - Total

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Arsenic, Selenium, Uranium, Vanadium.

Radionuclides - Dissolved

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radium 226, Radium 226 Precision (±).

These results apply only to the samples tested.

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits
X Matrix Effect

RL - Reporting Limit

- C Calculated Value
G Analyzed at IML Gillette laboratory
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
U Analysis reported under the reporting limit

Reviewed by: Tom Patten
Tom Patten, Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: UR-Energy
Work Order: S1803368
Project: Lost Creek Class I

Date:

Alkalinity	Sample Type	MBLK						Units: mg/L
BLANK (04/02/18 16:22)			RunNo: 155779					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Alkalinity, Total (As CaCO3)	ND	5						

Alkalinity	Sample Type	LCS						Units: mg/L
ATQC (04/02/18 16:10)			RunNo: 155779					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Alkalinity, Total (As CaCO3)	582	5	595		97.8	90 - 110		

Alkalinity	Sample Type	DUP						Units: mg/L
S1803363-001AD (04/02/18 19:00)			RunNo: 155779					
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	

Alkalinity, Bicarbonate as HCO3	725	5	750	3.36		20
Alkalinity, Carbonate as CO3	ND	5	ND			20
Alkalinity, Total (As CaCO3)	594	5	615	3.36		20

Conductivity by SM2510B	Sample Type	MBLK						Units: µmhos/cm
BLANK (04/02/18 16:22)			RunNo: 155779					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Electrical Conductivity	ND	5				
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Conductivity by SM2510B	Sample Type	LCS						Units: µmhos/cm
ATQC (04/02/18 16:10)			RunNo: 155779					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Electrical Conductivity	1050	5	1060		99.1	90 - 110
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Conductivity by SM2510B	Sample Type	DUP						Units: µmhos/cm
S1803363-001AD (04/02/18 19:00)			RunNo: 155779					
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	

Electrical Conductivity	3890	5	3880	0.257		20
-------------------------	------	---	------	-------	--	----

- | | |
|---|---|
| <p>Qualifiers:</p> <ul style="list-style-type: none"> B Analyte detected in the associated Method Blank G Analyzed at IML Gillette laboratory J Analyte detected below quantitation limits ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits X Matrix Effect | <ul style="list-style-type: none"> E Value above quantitation range H Holding times for preparation or analysis exceeded L Analyzed by another laboratory O Outside the Range of Dilutions S Spike Recovery outside accepted recovery limits |
|---|---|



ANALYTICAL QC SUMMARY REPORT

CLIENT: UR-Energy
Work Order: S1803368
Project: Lost Creek Class I

Date:

Anions by ION Chromatography

Sample Type **MBLK**

Units: mg/L

BLK (04/02/18 08:22)	RunNo: 155771							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	ND	1						
Sulfate	ND	1						

BLK (04/03/18 08:03)	RunNo: 155815							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	ND	1						
Sulfate	ND	1						

Anions by ION Chromatography

Sample Type **LCS**

Units: mg/L

DIONEX (04/02/18 08:35)	RunNo: 155771							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	31	1	30		105	90 - 110		
Sulfate	148	1	150		98.8	90 - 110		

DIONEX (04/03/18 08:15)	RunNo: 155815							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	31	1	30		103	90 - 110		
Sulfate	144	1	150		95.8	90 - 110		

Anions by ION Chromatography

Sample Type **MS**

Units: mg/L

S1803377-005ASPK (04/02/18 22:34)	RunNo: 155771							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	141	1	100	31	110	80 - 120		
Sulfate	1480	1	750	622	114	80 - 120		

S1804012-001ASPK (04/03/18 12:31)	RunNo: 155815							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Chloride	9	1	9.09	ND	104	80 - 120		
Sulfate	72	1	68.2	ND	104	80 - 120		

Anions by ION Chromatography

Sample Type **MSD**

Units: mg/L

S1803377-005ASPKD (04/02/18 22:47)	RunNo: 155771							
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	

Chloride	141	1	141	0.201	110	20		
Sulfate	1480	1	1480	0.0947	114	20		

S1804012-001ASPKD (04/03/18 12:43)	RunNo: 155815							
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	

Chloride	9	1	9	1.01	103	20		
Sulfate	71	1	72	0.881	103	20		

Qualifiers: B Analyte detected in the associated Method Blank
 G Analyzed at IML Gillette laboratory
 J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit
 R RPD outside accepted recovery limits
 X Matrix Effect

E Value above quantitation range
 H Holding times for preparation or analysis exceeded
 L Analyzed by another laboratory
 O Outside the Range of Dilutions
 S Spike Recovery outside accepted recovery limits



ANALYTICAL QC SUMMARY REPORT

CLIENT: UR-Energy
Work Order: S1803368
Project: Lost Creek Class I

Date:

Radium 226 in Water - Dissolved		Sample Type	MBLK		Units: pCi/L			
MB-1852 (04/25/18 15:26)	Analyte	RunNo:	156467	PrepDate:	04/11/18 0:00	BatchID 14471		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
	Radium 226 (Dissolved)	ND	0.2					

Radium 226 in Water - Dissolved		Sample Type	LCS		Units: pCi/L			
LCS-1852 (04/25/18 15:26)	Analyte	RunNo:	156467	PrepDate:	04/11/18 0:00	BatchID 14471		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
	Radium 226 (Dissolved)	7.3	0.2	6.95		105	67.1 - 122	

Radium 226 in Water - Dissolved		Sample Type	LCSD		Units: pCi/L			
LCSD-1852 (04/25/18 15:26)	Analyte	RunNo:	156467	PrepDate:	04/11/18 0:00	BatchID 14471		
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
	Radium 226 (Dissolved)	7.6	0.2	7.3	3.82	109	20	

Radium 226 in Water - Dissolved		Sample Type	MS		Units: pCi/L			
S1803366-005CMS (04/25/18 15:26)	Analyte	RunNo:	156467	PrepDate:	04/11/18 0:00	BatchID 14471		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
	Radium 226 (Dissolved)	11.8	0.2	13.9	0.8	78.7	65 - 131	

Solids By SM 2540		Sample Type	MBLK		Units: mg/L			
DI (04/02/18 10:58)	Analyte	RunNo:	155864					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
	Total Dissolved Solids (180)	ND	10					

Solids By SM 2540		Sample Type	LCS		Units: mg/L			
CONTROL (04/02/18 10:59)	Analyte	RunNo:	155864					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
	Total Dissolved Solids (180)	220	10	226		97.3	80 - 110	

Solids By SM 2540		Sample Type	DUP		Units: mg/L			
S1803368-002A (04/02/18 11:10)	Analyte	RunNo:	155864					
		Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
	Total Dissolved Solids (180)	13400	10	13400	0		20	

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - G Analyzed at IML Gillette laboratory
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits



ANALYTICAL QC SUMMARY REPORT

CLIENT: UR-Energy
Work Order: S1803368
Project: Lost Creek Class I

Date:

Sulfide by HACH 8131

Sample Type **MBLK**

Units: mg/L

BLANK (03/30/18 12:33)	RunNo: 155741							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Sulfide as H2S	ND	0.01						

Sulfide by HACH 8131

Sample Type **LCS**

Units: mg/L

QC (03/30/18 12:33)	RunNo: 155741							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Sulfide as H2S	0.51	0.01	0.452		112	80 - 120		

Sulfide by HACH 8131

Sample Type **MS**

Units: mg/L

S1803336-001D (03/30/18 12:35)	RunNo: 155741							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Sulfide as H2S	0.53	0.01	0.452	ND	117	70 - 130		

Sulfide by HACH 8131

Sample Type **MSD**

Units: mg/L

S1803336-001D (03/30/18 12:35)	RunNo: 155741							
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Sulfide as H2S	0.53	0.01	0.53	0.597	118	20		

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - G Analyzed at IML Gillette laboratory
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits



ANALYTICAL QC SUMMARY REPORT

CLIENT: UR-Energy
Work Order: S1803368
Project: Lost Creek Class I

Date:

Total (200.2) Metals by EPA 200.8 - Water

Sample Type **MBLK**

Units: mg/L

MB-14383 (04/03/18 23:30)	RunNo: 155813	PrepDate: 04/03/18 7:00	BatchID 14383				Qual
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Arsenic	ND	0.005					
Selenium	ND	0.005					
Uranium	ND	0.0003					
Vanadium	ND	0.02					

Total (200.2) Metals by EPA 200.8 - Water

Sample Type **LCS**

Units: mg/L

LCS-14383 (04/03/18 23:36)	RunNo: 155813	PrepDate: 04/03/18 7:00	BatchID 14383				Qual
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Arsenic	0.200	0.005	0.2		100	85 - 115	
Selenium	0.417	0.005	0.4		104	85 - 115	
Uranium	0.200	0.0003	0.2		100	85 - 115	
Vanadium	0.20	0.02	0.2		101	85 - 115	

Total (200.2) Metals by EPA 200.8 - Water

Sample Type **MS**

Units: mg/L

S1803360-002ES (04/04/18 00:05)	RunNo: 155813	PrepDate: 04/03/18 7:00	BatchID 14383				Qual
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Arsenic	0.207	0.001	0.2	ND	103	70 - 130	
Selenium	0.409	0.001	0.4	ND	102	70 - 130	
Uranium	0.213	0.001	0.2	0.010	102	70 - 130	
Vanadium	0.21	0.01	0.2	ND	102	70 - 130	

Total (200.2) Metals by EPA 200.8 - Water

Sample Type **MSD**

Units: mg/L

S1803360-002EMSD (04/04/18 00:10)	RunNo: 155813	PrepDate: 04/03/18 7:00	BatchID 14383				Qual
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Arsenic	0.203	0.001	0.207	1.96	101	20	
Selenium	0.458	0.001	0.409	11.4	114	20	
Uranium	0.213	0.001	0.213	0.351	101	20	
Vanadium	0.20	0.01	0.21	1.30	101	20	

pH Water by SM 4500 H B

Sample Type **LCS**

Units: s.u.

ATQC (04/02/18 16:10)	RunNo: 155779						Qual
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
pH	8.9	0.1	8.6		104	90 - 110	

pH Water by SM 4500 H B

Sample Type **DUP**

Units: s.u.

S1803340-003AD (04/02/18 16:47)	RunNo: 155779						Qual
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
pH	8.3	0.1	8.3	0.201		20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- X Matrix Effect

- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits