

TABLES

Logan Wash Mine Annual Report
Permit No. M-1977-424

Table 1. Reclamation Status at Logan Wash Mine, March 2020

Area Number (Exhibit E & F)	Name	Approved Area	Actual Disturbed Area	Acres Reclaimed (acres/year)	Acres Released (acres/year)
1	Mine Dump ^a	30.00	13.36	13.36/2004	NR
2	Upper Mine Bench	3.00	0.74	0.74/2005	NR
3	Lower Mine Bench	3.80	2.10	2.10/2003 ^b	NR
4	Research Mine Bench and	5.00	4.26	4.26/2004	NR
5	Old Surface Process Facility	3.00	1.82	1.82/<1986	1.82/1986
6	Two Overflow Ponds	2.00	2.86	2.86/<1986	2.86/2006
7	Equipment & Parts Storage	2.55	0.67	0.67/<1986	0.67/1986
8	Ventilation Fan Site	1.30	0.41	0.41/1986	0.41/2006
9	Power Substation	0.75	0.75	0.75/1986	0.75/2006
10	Helo Pad	1.00	0.24	0.24/-	NR ^c
11	Guard Gate Area	5.00	8.30	Not to be reclaimed	Transferred/1983 ^d
12	Met Tower	1.00	0.80	0.80/<1982	0.80/2006
13	Misc. Access Roads ^e	11.5	15.58	11.78/2005	8.12/1986
14	Oil Transfer Pipeline	0.5	0.5	0.5/<1998	0.5/2006
15	Heater/Treater	3.00	2.96	2.96/1986	2.96/2006
16	Microwave Tower	1.00	0.11	0.11/<1998	0.11/2006
17	Exhaust Stack	3.00	3.00	3.00	3.00/2006
18	Logan Wash Road	55.55	53.43	Not to be reclaimed ^f	---
19	Surface Process Control	1.00	1.0	1.0/<1998	1.0/2006
20	Top Soil Storage	0.5	0.25	0.25/<1998	0.5/2006
21	Berm Material	0.25	0.33	0.25/<1986	0.33/1986
22	Heater Treater Meteorological	0.18-	0.18	0.18/<1986	0.18./1986
B1-B10	Logan Wash Road Realign	6.0	6.0	6.0/<1986	~5.0/1986
New	Soil Barrow Area (2005)	2.0	0.65	0.65/2005	0.65/2006
23	Evaporation Pond and Pipeline	14.87	14.87	5.07/<1986	NR
Total		157.75	135.17	59.84	29.41

Table 1 Notes: ^aThe Mine Dump area is to be reclaimed by establishing “vegetated islands”; the entire acreage will not be vegetated. ^bConducted hydromulch test on Lower Bench; ^cArea 10 was excavated for a pond for the landowner and is under reclamation; ^dArea 11 transferred to Chevron, not to be reclaimed; ^e See Table 2 for description of access roads, release is assumed; ^f The original reclamation plan named the Logan Wash Road as disturbed acreage, but noted that it would not be reclaimed because the road serves as a main access road to BLM and private lands; NR = Not Released

Table 2. Reclamation Status of Miscellaneous Access Roads, March 2020

Area	Estimated Disturbed Area	Acres Reclaimed (as of March 2015)	Acres Remaining to be Reclaimed
Mine Bench and Portal ^a	7.46	3.66	3.8
Old Surface Process	1.51	1.51	0.0
New Surface Process	2.17	2.17	0.0
Heater/Treater ^b	1.36	1.36	1.36
Beyond Microwave	2.33	2.33	0.0
Vicinity of the Microwave	0.75	0.75	0.0
Total	15.58	11.78	5.16 ^a

^a Based on Upper Access Road and Lower Bench Road, and Upper Bench Road map measurements

^b Lower Access Road was under reclamation but unsuccessful due to cattle foraging. Road is still used to access Well LWCW-1A.

Table 3. Well Abandonment Schedule, March 2020

Monitoring Well ID	Abandonment Date	Status
LW-22A	TBD	Monitoring Suspended
LW-32	TBD	To be abandoned
LW-45	TBD	To be abandoned
LW-102	2007	Cement plugged
LW-103	TBD	To be abandoned
LW-104	2007	Cement plugged
LW-108	2005	Cement plugged
LW-112	2005	Cement plugged
LW-116	TBD	To be abandoned
LW-242	2005	Cement plugged
LW-243	2007	Cement plugged
LWCW-1A	TBD	Monitoring

Notes: TBD: to be determined

Table 4. Summary of Unreclaimed Acreage at Logan Wash Mine

Area	Acreage	Area to be Requested for Release in 2020
1 – Mine Dump	13.4	Yes
2 – Upper Mine Bench	0.7	Yes
3 – Lower Mine Bench	2.1	No
4 – Research Mine Bench	4.3	Yes
10 – Helo Pad	0.2	Yes
Portions of Area 13*	10.9	Portions
Soil Barrow Area	0.7	Yes
Evaporation Pond	10.2	No
Total	42.5	

*See Section 2.2

Table 5. Summary of Areas Under Reclamation at Logan Wash Mine

Area	Name	Estimated Acres	Revegetation Date
1*	Upper & Lower Mine Dump Faces	13.4	2003-2005
2*	Upper Mine Bench	0.7	2004-2005
3	Lower Mine Bench	2.1	Natural revegetation
4*	Research Mine Bench & Dump	4.3	2003-2004
10*	Helo Pad	0.2	Pre-2000
---*	Soil Barrow Area	0.7	2004
Total		21.4	

* = Area anticipated for request for release in 2020

Table 6. Summary of Areas Not Under Reclamation at Logan Wash Mine

Area	Name	Estimated Acres
3	Lower Bench	2.1
13	Lower Bench Road	1.5
13	Upper Access Road	4.8
13	Evap. Pond Access Road	1.3
23	Evaporation Pond & Pipeline	10.2
13	Lower Access Road	1.8
Total		21.7

Table 7. Summary of Reclamation Status at Logan Wash Mine

Acreage Status Category	Estimated Acreage
Total original disturbed/used acres	135.2
Acres not to be reclaimed (Logan Wash Road, Chevron land)	61.7
Total acres requiring reclamation	73.5
Total acres released to date	31.3
Total new disturbed acres this reporting period	0.0
Total new acreage under reclamation this reporting period	0.0
Total acres under reclamation to date	21.4
Total estimated acres not currently under reclamation	21.7
Total estimated reclaimed acres needing release	43.1

Table 8. Logan Wash Mine Site Monitoring Results, March 2019 to March 2020

Date	LW-002 ¹ Manometer (inches)	LW-001 ² (L-1 Portal) (gpm)	Upper Manhole ³ (gpm)	Lower Manhole ⁴ (gpm)	Other
3/21/19	NM	NM	NM	NM	Conduct pond monitoring. Unable to access mine bench by vehicle.
4/5/19	0	1.18	2.13	2.46	Conduct mine and pond monitoring; Launched rain gauges at the Evaporation Pond and on the Lower Bench
5/8/19	0	1.05	NM	NM	Conduct mine and pond monitoring.
5/17/19	NM	NM	NM	NM	Purge LWCW-1A for semi-annual sampling.
5/20/19	NM	NM	NM	NM	Semi-annual sampling of LW-22A, Lower Manhole and Evaporation Pond.
5/21/19	NM	NM	NM	NM	Attempted to collect semi-annual sample from Big Seep. Adverse weather and road conditions prohibited access.
5/22/19	NM	1.07	NM	NM	Semi-annual sampling of Big Seep, mine water, retort water and Lower Manhole.
5/29/19	0	1.07	2.28	2.22	Conduct mine and pond monitoring. Semi-annual sampling of LWCW-1A.
6/27/19	NM	NM	NM	NM	<i>P. debilis</i> status survey with CNAP and BLM.
7/12/19	0	1.02	2.27	2.32	Conduct mine and pond monitoring.
8/23/19	0	0.96	1.96	2.23	Conduct mine and pond monitoring.
9/27/19	0	0.93	2.09	2.25	Conduct mine and pond monitoring.
10/2/19	NM	NM	NM	NM	Survey and mark new <i>P. debilis</i> .
10/7/19	NM	NM	NM	NM	Purge LWCW-1A for semi-annual sampling.
10/9/19	NM	0.94	NM	NM	Semi-annual sampling of mine water, retort water, Evaporation Pond, and Lower Manhole.
11/14/19	0	0.81	NM	NM	Conduct mine and pond monitoring.
12/13/19	0	1.13	1.99	2.30	Conduct mine and pond monitoring.
1/17/20	NM	NM	1.62	2.20	Conduct pond monitoring. Unable to access mine bench by vehicle.
3/10/20	NM	NM	2.07	2.10	Conduct pond monitoring. Unable to access mine bench by vehicle.

Table 4 Notes: LW-002 discharge originates at the Research Mine portal, the manometer measures head behind a concrete dam inside the sealed adit.

² LW-001 discharge originates at the L-1 portal of Logan Wash Mine and during the reporting period discharged into the Infiltration Trench. All measurements recorded by electronic flowmeter display.

³ Upper Manhole is located on Retort Water Pipeline in Logan Wash approximately 3000 ft down drainage of the Lower Dump.

⁴ Lower Manhole is located on Retort Water Pipeline immediately north of Evaporation Pond.

NM = not measured

Table 9. Logan Wash Minewater Analytical Data

SampleID		MINE WATER	MINE WATER	MINE WATER	LWM-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		3/9/2000	10/26/2000	9/26/2001	10/2/2002	10/11/2007	3/19/2008	10/30/2008	6/3/2009	11/5/2009	6/2/2010
Parameters	Units										
General Chemistry											
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	390	249	278	287	287	288 J	272	290	272	271
Alkalinity, Carbonate (as CaCO ₃)	mg/L	5 U	30.1	25.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Alkalinity, Total (As CaCO ₃)	mg/L	390	280	303	291	287	288 J	272	290	272	271
Ammonia	mg/L	0.5	0.8 U	0.1 U	0.1 U	0.1 U	0.1 U	5.8 J	0.31	0.25	0.1 U
Bromide	mg/L	---	80	---	0.2 U	0.11 J	0.074 B	0.2 U	0.2 U	0.2 U J	1 U
Chemical Oxygen Demand (COD)	mg/L	---	17	---	64.5	23.4	21.9	104	26.7	19.7	20.3 U
Chloride	mg/L	31 J	35.1	40.3	36	53.4	35.8	37.9	37	36.4	25.5
Specific Conductivity	umhos/cm	---	---	---	2600	2830	3640 J	3540	3500	3500	3420
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	3.1	2.7	3	---	---	---	---	---	---	---
Fluoride (dissolved)	mg/L	---	2.1	---	2.3	2.5	2.6	2.3	2.7	1.8	2.3
Hardness	mg/L	---	564	---	572	590	540	580	570	590	590
Nitrate (as N)	mg/L	---	3.4	---	2.5	5.4	3.5	3.1	3.1	2.9	2.8
Nitrite (as N)	mg/L	---	0.01 U	---	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U J	0.25 U
Oil and Grease, Total	mg/L	---	3.7	---	---	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	---	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), total	mg/L	5 U	---	5 U	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	4.6 U	4.6 U
pH	s.u.	---	---	---	8.2	8.1 J	8	8.2 J	8.2 J	8.1 J	8.2 J
Phenolics (Total)	mg/L	50 U	50 U	10 U	0.01 U	0.007 J	0.0087 B, J	0.01 U	0.0042 J	0.01 U	0.01 U
Phosphorus as P, total	mg/L	---	0.023	---	0.1 U	0.3	0.044 B	0.1 U	0.1 U	0.1 U	0.1 U
Silica	mg/L	---	16.7	---	---	---	---	---	---	---	---
Sulfate	mg/L	210 J	1060	1170	1080	1510	1140	1170	1140	1150	1220
Sulfide	mg/L	---	---	---	---	3 U	---	3.2	3 U	3 U	1.7 J
Sulfite	mg/L	2 J	2 U	2 U	---	---	---	---	---	---	---
Thiocyanate	mg/L	0.4 U	1 U	0.7 U	---	---	---	---	---	---	---
Thiosulfate	mg/L	0.4 U	1 U	0.7 U	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	1870	1840	2020	1890	2010	1830	1820	2140	1790	2170
Nitrogen, Total Kjeldahl	mg/L	---	---	---	---	3.5	2.8 B	6.2	4.5	4.5	3 U
Total Organic Carbon (TOC)	mg/L	---	---	---	7.7	9.2	---	7.4	7.9	7.6	6.7
Total Suspended Solids (TSS)	mg/L	---	5 U	---	---	4 U	4 U	4 U	3.6 J	4 U	4 U
Dissolved Organic Carbon (DOC)	mg/L	7.8 J	8.5	7.9	7.5	9.2	10.5	7.2	8.2	8.1 J	6.5

Table 9. Logan Wash Minewater Analytical Data

SampleID		MINE WATER	MINE WATER	MINE WATER	LWM-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		3/9/2000	10/26/2000	9/26/2001	10/2/2002	10/11/2007	3/19/2008	10/30/2008	6/3/2009	11/5/2009	6/2/2010
Parameters	Units										
Metals											
Arsenic	ug/L	30	31.8	29.5	24.7	19.3	---	19	17.4	18 J	15.8
Arsenic (Dissolved)	ug/L	---	33.2	---	---	---	20.6	---	16.4	17.1	16.3
Boron	ug/L	4300	4540	4580	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	---	4330	---	4280 J	5510	6210	4030	5260	4740 J	4050
Cadmium	ug/L	2 U	0.22	5 U	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	---	0.05 U	---	0.17	1 U	1 U	0.42 J	1 U	0.12 J	1 U
Calcium (Dissolved)	ug/L	---	78100	---	74900	84300	---	73100	78500	83400 J	78600
Chromium	ug/L	---	0.6 U	---	---	0.59 J	0.54 B	0.6 J	0.49 J	2 U	0.6 J
Chromium (Dissolved)	ug/L	---	0.04 U	---	10.7	0.54 J	0.46 B	0.88 J	0.61 J	2 U J	0.44 J
Chromium III	ug/L	---	10 U	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	0.05 U	---	10 U	---	---	---	---	---	---
Copper	ug/L	---	2.8	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	---	2.7	---	8.9	5.8	5.8	5.9	4.4	4 J	3.5
Iron	ug/L	---	0 U	---	29 U	32.1 J	19.7 B	20.9 J	31.2 J	47.1 J	50.7
Iron (Dissolved)	ug/L	---	10 U	---	---	41.4 J	42 B	50.8	17.1 J	11.4 J	22.5 J
Lead	ug/L	---	0.19 U	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	---	0.03 U	---	1 U	0.38 J	0.064 B, J	1 U	0.24 J	1 U J	0.25 J
Lithium	ug/L	250	368 J	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	---	382 J	384	386	395	352	372	379	37.8 J	370
Magnesium	ug/L	---	98900	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	---	89700	---	90800 J	87300	82700	77100	96100	97700 J	82700
Manganese	ug/L	---	1.2	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	---	1.5	---	1.4	2.1	1.2	0.88	0.91	0.89 J	1.1 U
Mercury	ug/L	---	0.12 U	---	0.2 U	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	---	0.12 U	---	---	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U J	0.2 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	8.2	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	10.9	---	6.9	---	---	---	---	---	---
Potassium	ug/L	---	20700	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	---	15200	---	15600	91400	74600	83700	82200	94000 J	86200
Selenium	ug/L	---	3.3	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	---	5	---	7.1 J	7	8.7	6.5	7.2 J	5.6 J	5.1
Silicon	ug/L	---	---	---	---	---	---	---	---	---	---
Silicon (Dissolved)	ug/L	---	---	---	7850 J	7490	7380	6680	8630	7520 J	6430

Table 9. Logan Wash Minewater Analytical Data

SampleID SampleDate Parameters	Units	MINE WATER 3/9/2000	MINE WATER 10/26/2000	MINE WATER 9/26/2001	LWM-001 10/2/2002	LW-001 10/11/2007	LW-001 3/19/2008	LW-001 10/30/2008	LW-001 6/3/2009	LW-001 11/5/2009	LW-001 6/2/2010
Metals											
Silver	ug/L	5 U	0.05 U	10 U	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	0.03 U	---	0.07 J	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	---	374000	---	424000	490000	446000	408000	390000	431000 J	403000
Strontium	ug/L	---	7030 J	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	---	7060 J	---	6330	5820	5280	5810	5430	6140 J	5560
Uranium (Dissolved)	ug/L	---	---	---	4.1 J	---	---	---	---	---	---
Zinc	ug/L	---	5.6	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	---	4.9	---	24.1	18.5	10.7	15.5 U	13.6	7.1 J	29.2
Volatile Organic Compounds - BTEX											
Benzene	ug/L	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	ug/L	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	ug/L	1 U	2 U	1 U	3 U	3 U	1 U	3 U	3 U	3 U	3 U
Petroleum Products											
Diesel fuel	mg/L	---	---	---	---	---	---	---	---	---	---
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	0.1 U	---	0.1 U	42	0.11	0.12 U	0.21	0.21 U	0.16 U
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---
Radiology											
Gross Alpha Analytes	pci/l	0	14 + or - 16	2 + or - 12	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	26	18 + or - 9	6.8 + or - 2	---	---	---	---	---	---	---
Field Parameters											
Conductivity, field	umhos/cm	---	---	---	---	---	---	---	---	---	---
Dissolved oxygen (DO), field	mg/L	---	---	---	---	---	---	---	---	---	---
Oxidation reduction potential (ORP), field	millivolts	---	---	---	---	---	---	---	---	---	---
pH, field	s.u.	---	---	---	---	---	---	---	---	---	---
Temperature, ambient	Deg C	---	---	---	---	---	---	---	---	---	---
Temperature, field	Deg C	---	---	---	---	---	---	---	---	---	---
Turbidity, field	NTU	---	---	---	---	---	---	---	---	---	---

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		11/22/2010	5/11/2011	10/19/2011	6/14/2012	10/24/2012	5/28/2013	10/24/2013	5/21/2014	10/22/2014	5/12/2015
Parameters	Units										
General Chemistry											
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	261	281	250	260	290	260	250	250	260 B	360
Alkalinity, Carbonate (as CaCO ₃)	mg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	12	5 U	5 U
Alkalinity, Total (As CaCO ₃)	mg/L	261	281	250	260	290	260	250	260	260 B	360
Ammonia	mg/L	0.1 U	0.1 U	0.24 U	0.1 U	0.15	0.12 U	0.16 U	0.1 U	0.1 U	0.1 U
Bromide	mg/L	0.15 J	0.5 U	1 U	0.5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	0.5 U
Chemical Oxygen Demand (COD)	mg/L	23.8	27.8	17	21	9.1 J	23 U	23	19	25	19
Chloride	mg/L	42.4	33.8	32	35	38	32	48	29	42	31
Specific Conductivity	umhos/cm	3560	3390	3900	3600	3600	3300	3100	2600	2900	2500
Cyanide (free)	mg/L	---	0.0029 J	0.003 J	---	---	---	---	---	---	---
Fluoride	mg/L	---	---	---	---	---	---	---	---	---	---
Fluoride (dissolved)	mg/L	2.1	3	2.1	2.6	2.6	2.2	3	2.5	2.4	2.6
Hardness	mg/L	600	680	690	680	660	640	680	620	640	520
Nitrate (as N)	mg/L	2.9	4.4	3.3	2.9	2.5	2.5	3.6	2.5	2.8	2.7
Nitrite (as N)	mg/L	0.27	1.2 U	0.25 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.05 U
Oil and Grease, Total	mg/L	---	---	---	---	---	---	---	---	1.9 J	---
Oil and grease (HEM), polar	mg/L	---	---	4.9 U	4.7 U	1.4 J	4.8 U	1.4 J	4.7 U	---	4.4 U
Oil and grease (HEM), total	mg/L	4.6 U	2.4 J	---	---	---	---	---	---	---	---
pH	s.u.	8 J	8.1 J	7.85 J	8.08 J	8.08 J	7.66 J	8.22 J	8.39 J	7.97 HF	8.25 J
Phenolics (Total)	mg/L	0.01 U	0.0088 J	0.01 U	0.042	0.02	0.01 U	0.0073 J	0.01 U	0.01 U	0.011
Phosphorus as P, total	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Silica	mg/L	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	1320	1200	1200	1400	1300	1200	1500	1200	1300	1100
Sulfide	mg/L	3 U	3 U	3 U	3 U	3 U	0.24 J	0.32 J	3 U	3 U	0.76 J
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	2230	2100	2100	1900	2100	1700	1900	2000	2100	1900
Nitrogen, Total Kjeldahl	mg/L	5 U	3.3 J	5 U	5 U	0.41	5 U	5 U	2.8 J	1.7 J	2.7 J
Total Organic Carbon (TOC)	mg/L	7.1	8.9	6.9	6.4	5.9	4.8	8.3	5.9	5.7	9.4
Total Suspended Solids (TSS)	mg/L	4 U	4 U	4 U	4 U	4 U	2 U	2 U	2 U	2.8	---
Dissolved Organic Carbon (DOC)	mg/L	7.4	8.8	7.7	---	6.3	4.8	8.3	6	6.9	13

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		11/22/2010	5/11/2011	10/19/2011	6/14/2012	10/24/2012	5/28/2013	10/24/2013	5/21/2014	10/22/2014	5/12/2015
Parameters	Units										
Metals											
Arsenic	ug/L	18.9	15.9	17	19	16	18	14	16	15	14
Arsenic (Dissolved)	ug/L	20.1	16.5	15	18	17	17	18	15	15	14
Boron	ug/L	---	4800	5100	---	---	---	---	---	---	5200
Boron (Dissolved)	ug/L	4690	4640	4500	4600	4400	4700	6000	3900	4200 B	---
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	1 U	1 U	1 U	1 U	1 U	0.13 J	5 U	1 U	1 U	1 U
Calcium (Dissolved)	ug/L	100000	85700	92000	94000	90000	91000	100000	82000	81000 B	70000
Chromium	ug/L	0.54 J	0.37 J	1.4 J	2 U	0.42 J	0.43 J	2 U	1 J	0.32 J	2 U
Chromium (Dissolved)	ug/L	0.49 J	0.42 J	0.38 J	2 U	0.56 J	0.46 J	10 U	0.89 J	2 U	2 U
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	4.3	3.3	2.4	4.4	4.2	4.3	9.5 J	3.5	3.3 B	4.1
Iron	ug/L	235 J	50 U	160	200	50	95	38 J	120	24 J	61
Iron (Dissolved)	ug/L	53.2	50 U	30 J	59	18 J	20 J	250 U	50 U	19 J	18 J
Lead	ug/L	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.32 J	1 U	1 U	1 U	0.034 J	1 U	5 U	1 U	0.17 JB	0.082 J
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	398	336	360	400	400	380	430	350	430	390
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	116000	95200	100000	110000	96000	110000	110000	98000	89000 B	78000
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	1.9	1.3	3 J	5 U	1.7 J	1.7 J	2.3 J	1.8 J	1.9 JB	2.8 J
Mercury	ug/L	---	0.2 U	0.2 U	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.047 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum (Dissolved)	ug/L	---	330	300	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	115000	69600	76000	86000	83000	87000	78000	69000	68000	49000
Selenium	ug/L	---	11	6.5	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	7.6	11.6	5.6	7	3.7 J	4.6 J	11 J	5.8	3.6 J	8.4
Silicon	ug/L	---	---	---	---	---	---	---	---	---	---
Silicon (Dissolved)	ug/L	9440	7030	7200	8200	7800	8400	7400	8000	6500	6600

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		11/22/2010	5/11/2011	10/19/2011	6/14/2012	10/24/2012	5/28/2013	10/24/2013	5/21/2014	10/22/2014	5/12/2015
Parameters	Units										
Metals											
Silver	ug/L	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	468000	405000	410000	420000	420000	430000	510000	360000	380000	370000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	8100	5320	5400	6800	6300	6500	7100	5400	5600	4100
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	67.5	9.4	6.3 U	7.5	7.4 U	18	25 U	12	9.3 B	30
Volatile Organic Compounds - BTEX											
Benzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Ethylbenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Toluene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Xylenes, Total	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	10 U
Petroleum Products											
Diesel fuel	mg/L	---	---	---	---	0.35 J	---	0.35 J	0.25 J	0.35 J	0.92
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	0.23	0.5 U	0.37 J	0.36 J	---	0.48 U	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---
Radiology											
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---
Field Parameters											
Conductivity, field	umhos/cm	---	---	---	---	2670	3090	2760	2870	3053	3000
Dissolved oxygen (DO), field	mg/L	---	---	---	---	5.90	6.82	3.34	10.39	3.36	6.1
Oxidation reduction potential (ORP), field	millivolts	---	---	---	---	184.1	183.3	61.9	204	86.8	62.4
pH, field	s.u.	---	---	---	---	7.58	8.14	7.93	7.92	8.12	8.26
Temperature, ambient	Deg C	---	---	---	---	8.2	32	18	15.5	---	18
Temperature, field	Deg C	---	---	---	---	9.5	11.1	10.9	9.22	11.5	10.4
Turbidity, field	NTU	---	---	---	---	0.28	0.76	3.07	3.69	---	2.35

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/22/2019	10/09/2019
Parameters	Units									
General Chemistry										
Alkalinity, Bicarbonate (as CaCO3)	mg/L	270 B	271	233	234	240	258	245	271	248
Alkalinity, Carbonate (as CaCO3)	mg/L	5 U	2.7 U	5.93 J	2.71 U	2.71 U	6.17 J	3.69 J	3.06 J	11.8 J
Alkalinity, Total (As CaCO3)	mg/L	270	271	239 J	234	240	264	249	274	259
Ammonia	mg/L	0.1 U	0.038 U	0.038 U	0.042 U	0.0317 U	0.1 U	0.0317 U	0.0317 U	0.0317 U
Bromide	mg/L	2.5 U	0.079 U	R	1.58 U	0.079 U	1 U	1.58 U	3.95 U	1.58 U
Chemical Oxygen Demand (COD)	mg/L	10 U	32.3	21.3	13.2	10.8	15	19	26.7	---
Chloride	mg/L	35	37.4	38.9	32.3	41.2	34.3	38	38	49.1
Specific Conductivity	umhos/cm	3000	2910	2890	2840	3030	2870	1920	2.99	3.04
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	---	2.55	2.28	2.25	2.56	2.14	2.49	---	---
Fluoride (dissolved)	mg/L	2.3	---	---	---	---	---	---	2.55	2.74
Hardness	mg/L	640	612	623	674	666	628	637	725	738 B
Nitrate (as N)	mg/L	2.3	1.99	1.8	0.972	1.91	0.655	1.78	4.2	1.74
Nitrite (as N)	mg/L	0.25 U	0.045 J	0.0277 U	0.0277 U	0.0277 U	0.1 U	0.0277 U	0.0277 U	0.0277 U
Oil and Grease, Total	mg/L	---	---	---	---	---	---	---	1.29 U	1.45 U
Oil and grease (HEM), polar	mg/L	4.3 U	---	---	---	---	---	---	---	---
Oil and grease (HEM), total	mg/L	---	1.16 U	1.16 U	1.16 U	1.16 U	5.88 U	2.05 J	---	---
pH	s.u.	8.13 HF	7.76 J	8.36 J	8.17 J	8.71 J	8.26 T8	8.23 J	8.24 J	8.19 T8
Phenolics (Total)	mg/L	0.01 U	0.008 U	0.0249 U	0.0083 U	0.0083 U	0.0292 J	0.0083 U	0.0144 U	0.0137 B
Phosphorus as P, total	mg/L	0.1 U	0.043 J	0.035 U	0.035 U	0.035 U	0.1 U	0.27	0.035 U	0.035 U
Silica	mg/L	---	15.9	16.3	15	15.8	15.8	14.3	11	15.9
Sulfate	mg/L	1100	1280	1320	1330	1440	1410	1290	1310	1440
Sulfide	mg/L	1.6 J	0.0065 U	0.0065 U	0.0065 U	0.007 J	0.05 U	0.0065 U	0.007 J	0.0065 U
Sulfite	mg/L	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	2300	2120	2210	2050	2220	2010	1930	2280	2330
Nitrogen, Total Kjeldahl	mg/L	5 U	0.94	0.444	0.326	0.48	0.425	1.29	1.14	---
Total Organic Carbon (TOC)	mg/L	6.6	51.3	5.98	5.67	6.51	5.74	6.73	12	7.79
Total Suspended Solids (TSS)	mg/L	---	---	---	---	---	0	0	---	0.4 J
Dissolved Organic Carbon (DOC)	mg/L	7.8	32.8	6.13	6.13	6.35	5.82	6.4	11.6	---

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/22/2019	10/09/2019
Parameters	Units									
Metals										
Arsenic	ug/L	16	17.0	16.2	16.4	14.8	17	16.2	12.2	---
Arsenic (Dissolved)	ug/L	16	14.7	14.7	16.7	14.2	16.6	14.7	14.1	12.6
Boron	ug/L	5600	---	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	---	5760	4450	5940	3410	3440 O1 V	3920	5070	5160
Cadmium	ug/L	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	0.47 J	0.220 U	0.220 U	0.220 U	2.2 U	1.00 U	0.220 U	0.220 U	108000
Calcium (Dissolved)	ug/L	86000 B	95100	108000	103000	106000	98400 V	116000	123000	---
Chromium	ug/L	0.8 J	0.320 U	0.499 U	0.320 U	0.32 U	1.00 U	0.970 J	0.320 U	---
Chromium (Dissolved)	ug/L	0.87 J	0.320 U	0.438 U	0.398 J	3.2 U	1.00 U	0.320 U	0.462 J	---
Chromium III	ug/L	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	4.2	3.25	4.11	9.29	6.56 J	6.24	3.19	6.55	---
Iron	ug/L	20 J	33.6 J	21.8 J	15.0 U	32.1 J	100 U	30.1 J	23.2 J	---
Iron (Dissolved)	ug/L	12 J	15.0 U	15.0 U	15.0 U	150 U	100 U	17.8 J	29.3 U	15.0 U
Lead	ug/L	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.12 J	0.260 U	0.260 U	0.452 J	2.6 U	1.00 U	0.260 U	0.260 U	---
Lithium	ug/L	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	430	415	426	415	388	361	384	336	---
Magnesium	ug/L	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	88000 B	92200	92500	102000	99000	97700 O1 V	97700	129000	102000
Manganese	ug/L	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	2 JB	4.38 J	3.01 J	4.99 J	5.1 U	1.65 J	1.93 J	2.85 J	---
Mercury	ug/L	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.033 JB	0.0490 U	0.0490 U	0.0490 U	0.049 U	0.0591 B J	0.0490 U	0.326	---
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	73000	61800	64300	77300	88000	74800 V	70400	56000	69800
Selenium	ug/L	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	5.2	5.60	5.22	4.89	3.2 U	3.82	5.01	22.2	4.03
Silicon	ug/L	---	7420	7640	6990	7390	7390	6700	5140	7430
Silicon (Dissolved)	ug/L	8300	---	---	---	---	---	---	---	---

Table 9. Logan Wash Minewater Analytical Data

SampleID		LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001	LW-001
SampleDate		10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/22/2019	10/09/2019
Parameters	Units									
Metals										
Silver	ug/L	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	360000	386000	368000	388000	393000	379000 O1 V	410000	447000	395000
Strontium	ug/L	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	5900	5260	7510	6650	5930	6350	5510	5510	---
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	5.1 B	10.3 U	22.6	34.8	84.3 U	6.17 J	10.1	27.5	---
Volatile Organic Compounds - BTEX										
Benzene	ug/L	5 U	0.331 U	0.331 U	0.331 U	0.331 U	1.00 U	0.331 U	0.331 U	0.331 U
Ethylbenzene	ug/L	5 U	0.384 U	0.384 U	0.384 U	0.384 U	1.00 U	0.384 U	0.384 U	0.384 U
Toluene	ug/L	5 U	0.780 U	0.780 U	0.412 U	0.412 U	1.00 U	0.412 U	0.412 U	0.412 U
Xylenes, Total	ug/L	10 U	1.06 U	1.06 U	1.06 U	1.06 U	3.00 U	1.06 U	1.06 U	1.06 U
Petroleum Products										
Diesel fuel	mg/L	0.51	0.83	0.198	0.174	0.33	0.213 B	0.247	0.155	0.4
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---
Radiology										
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---
Field Parameters										
Conductivity, field	umhos/cm	3450	3500	2127	2745	2233	2796	2770	2891	3216
Dissolved oxygen (DO), field	mg/L	7.13	4.17	7.83	5.97	63.4	NM	7.44	7.51	4.29
Oxidation reduction potential (ORP), field	millivolts	---	-43.8	-24.3	153.9	83.7	313.2	178.1	-58.8	42
pH, field	s.u.	8.2	7.47	8.63	7.71	8.54	7.04	7.17	8.74	7.04
Temperature, ambient	Deg C	29.4	---	---	15.6	7.2	---	---	60	60
Temperature, field	Deg C	13	11.21	10.6	9.9	11.2	10.7	11.15	10.5	11.6
Turbidity, field	NTU	0.02	2.07	1.39	1.85	1.33	2.17	0.72	4.02	5.07

Table 9. Logan Wash Mine Retort Water Analytical Data

Notes:

U = result not detected at the reporting limit

J = result value greater than the MDL and less than the RL; result considered estimated

B = analyte found in sample and associated blank

HF = analysis holding time exceeded; result considered estimated

E = result estimated due to the presence of interference

R = rejected data

O1 = failed the method required serial dilution test and or subsequent post spike criteria. Failures indicate matrix interference

V = sample concentration is too high to evaluate accurate spike recoveries

--- = Analysis not performed

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LWRT-RT-Pipe	Retort Water	RT-1	Upper Manhole	Retort Water	RW-1	RW-2	Retort Water	Retort Water	Retort Water	LW-RETORT
SampleDate		2/16/2000	10/26/2000	10/26/2000	10/26/2000	10/2/2002	10/2/2002	10/2/2002	10/3/2006	10/11/2007	3/19/2008	10/30/2008
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	---	426	439	---	471	474	487	---	439	436	497
Alkalinity, Carbonate (as CaCO ₃)	mg/L	---	12.9	5 U	---	43.1	43	72	---	57.1	69.6	5 U
Alkalinity, Total (As CaCO ₃)	mg/L	---	439	439	---	515	517	559	521	496	506	497
Ammonia	mg/L	26 D	0.8 U	4 U	1.9	11.1	10.7	5.3	7 J	3.5	4.9 J	0.33 U J
Bromide	mg/L	---	240	---	---	0.2	0.2	0.22	---	240	0.24	0.23
Chemical Oxygen Demand (COD)	mg/L	---	135	---	---	167	94.3	67.2	---	142	171	16.7
Chloride	mg/L	---	75.9	---	---	72.7	72.1	77.6	87.8	94.6	86.1	94.2
Specific Conductivity	umhos/cm	1800	---	---	---	6870	6930	8370	---	7750	11200	10800
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	3.5	13.7	14.8	---	---	---	---	8	---	---	---
Fluoride (dissolved)	mg/L	---	11.6	---	---	9.2	9.9	11	---	11.5	10.1	10
Hardness	mg/L	---	279	---	---	224	228	193	---	300	340	310
Nitrate (as N)	mg/L	---	0.8	0.74	---	0.05 U	0.05 U	0.05 U	U	0.05 U	0.05 U	0.05 U
Nitrite (as N)	mg/L	---	0.01 U	0.01 U	---	0.05 U	0.05 U	0.05 U	---	0.05 U	0.05 U	0.05 U
Oil and Grease, Total	mg/L	---	14.5	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	---	---	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), total	mg/L	---	---	---	---	4.9 U	---	4.9 U	15.8	4.8 U	11.4	4.7 U
pH	s.u.	8.3	---	---	---	8.7	8.8	8.8	---	8.6 J	8.6	8.4 J
Phenolics (Total)	mg/L	---	50 U	---	---	0.034	---	---	93 J	0.046	0.058 J	0.065
Phosphorus as P, total	mg/L	---	0.15	---	---	0.1 U	0.1 U	0.1 U	---	0.1 U	0.1 U	0.081 J
Silica	mg/L	---	20700	---	---	---	---	---	---	---	11200	---
Sulfate	mg/L	---	3920	---	1810	3110	2770	3740	3790	4060	3650	3680
Sulfide	mg/L	---	---	---	---	---	---	---	---	---	---	23.4
Sulfite	mg/L	---	2 U	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	1 U	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	1 U	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	---	6660	---	---	5350	5290	6380	6180	1470	5990	5730
Nitrogen, Total Kjeldahl	mg/L	---	---	---	---	---	---	---	---	5.8	4.5	10.1
Total Organic Carbon (TOC)	mg/L	---	---	---	---	22.8	---	---	---	---	35.5	24.3
Total Suspended Solids (TSS)	mg/L	---	179	---	---	---	---	---	---	4 U	4.8	2.4 J
Dissolved Organic Carbon (DOC)	mg/L	---	40 U	---	---	23.8	---	---	---	1.4	35.7	24.4

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LWRTRT-Pipe	Retort Water	RT-1	Upper Manhole	Retort Water	RW-1	RW-2	Retort Water	Retort Water	Retort Water	LW-RETORT
SampleDate		2/16/2000	10/26/2000	10/26/2000	10/26/2000	10/2/2002	10/2/2002	10/2/2002	10/3/2006	10/11/2007	3/19/2008	10/30/2008
Parameters	Units											
Metals												
Arsenic	ug/L	20	75.2	314	---	28.9	24.9	47.7	---	---	---	33.6
Arsenic (Dissolved)	ug/L	---	128	---	---	---	---	---	25.2	24.9	34.7	---
Boron	ug/L	6700	12900 E	13600 E	---	---	---	---	129000	---	---	---
Boron (Dissolved)	ug/L	---	13500 E	---	---	12800 J	12500 J	13600 J	---	10400	12600	9620
Cadmium	ug/L	2 U	2.4	3.9	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	---	2.3	---	---	0.75	0.68	0.64	---	1 U	1 U	0.68 J
Calcium	ug/L	---	---	---	---	---	---	---	61500 J	---	---	---
Calcium (Dissolved)	ug/L	---	68400	---	---	37300	37100	37100	---	51100	60100	49900
Chromium	ug/L	---	0.6 U	0.6 U	---	---	---	---	---	2 U	---	0.38 J
Chromium (Dissolved)	ug/L	---	1.1	---	---	18.6	15.4	19.5	---	0.36 J	0.26	0.67 J
Chromium III	ug/L	---	10 U	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	0.05 U	---	---	10 U	10 U	10 U	---	---	---	---
Copper	ug/L	---	3	16.9	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	---	3.1	---	---	13.5	14	16.4	---	12.1	2.1	5.9
Iron	ug/L	---	13900 E	54800 E	---	741 J	922 J	206 U	---	403	604	110
Iron (Dissolved)	ug/L	---	16800 E	---	---	---	---	---	---	280	114	235
Lead	ug/L	---	1.3	3.6	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	---	1.6	---	---	1 U	1 U	0.12	---	0.63 J	0.089 J	1 U
Lithium	ug/L	---	491 J	407 J	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	---	582 J	---	---	355	349	367	---	435	489	503
Magnesium	ug/L	---	26700 E	28300 E	---	---	---	---	47200 J	---	---	---
Magnesium (Dissolved)	ug/L	---	26300 E	---	---	30700 J	30100 J	22200 J	---	34100	43300	36300
Manganese	ug/L	---	38	62.1	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	---	42.1	---	---	70.5	83	13.9	---	19.4	15.4	14.8
Mercury	ug/L	---	0.12 U	0.12 U	---	0.2 U	0.2 U	0.2 U	---	---	---	---
Mercury (Dissolved)	ug/L	---	0.12 U	---	---	---	---	---	---	0.2 U	0.2 U	0.2 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	3.7	6.4	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	3.9	---	---	0.37	0.29	0.17	---	---	---	---
Potassium	ug/L	---	167000 E	1160000 E	---	---	---	---	559000 J	---	---	---
Potassium (Dissolved)	ug/L	---	858000 E	---	---	754000	743000	917000	---	978000	711000	943000
Selenium	ug/L	---	15.1	57.7	---	---	---	---	3.1 B	---	---	---
Selenium (Dissolved)	ug/L	---	11.8	---	---	14.2 J	14 J	18.6 J	---	3.9 J	5.4	4.6 J

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LWRT-RT-Pipe	Retort Water	RT-1	Upper Manhole	Retort Water	RW-1	RW-2	Retort Water	Retort Water	Retort Water	LW-RETORT
SampleDate		2/16/2000	10/26/2000	10/26/2000	10/26/2000	10/2/2002	10/2/2002	10/2/2002	10/3/2006	10/11/2007	3/19/2008	10/30/2008
Parameters	Units											
Metals												
Silicon	ug/L											
Silicon (Dissolved)	ug/L	---	---	---	---	11700 J	11400 J	12800 J	---	---	12200	10100
Silver	ug/L	5 U	0.05 U	0.05 U	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	0.03 U	---	---	0.049 J	0.028 J	1 U	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	1450000 J	---	---	---
Sodium (Dissolved)	ug/L	---	1070000	---	---	1160000	1140000	1320000	---	740000	1430000	1320000
Strontium	ug/L	---	1300 J	2150 J	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	---	998 J	---	---	1450	1440	1480	---	1700	1970	1700
Uranium (Dissolved)	ug/L	---	---	---	---	1.6 J	1.5 J	1.7 J	---	---	---	---
Zinc	ug/L	---	4.9	18 U	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	---	10.6	---	---	1.9	1.8	2.3	---	5.9	4.5 B	14.8 U
Volatile Organic Compounds - BTEX												
Benzene	ug/L	47 D	0.52 J	0.51 J	0.52 J	5.3	5.5	0.47 J	3.0	2.6	1.5	3.5
Ethylbenzene	ug/L	11 D	0.37 J	0.36 J	0.35 J	1.5	1.6	0.23 J	1.2	1.2	0.59 J	1.8
Toluene	ug/L	2 U	0.33 J	0.33 J	0.37 J	0.36 J	0.38 J	0.24 J	3.0	1.4	0.6 J	2.6
Xylenes, Total	ug/L	46 D	0.94 J	0.91 J	1 J	6.3	6.6	0.64 J	7.9	8.2	3.4	12
Petroleum Products												
Diesel fuel	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH - Extractable	mg/L	---	---	---	---	4.9	---	5.1	7.3	0.36	---	5
TPH (non-polar)	mg/L	---	---	---	---	4.9	---	5.1	7.3	0.36	26	5
TPH (C21 - C28)	mg/L	---	16	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	---	180 + or - 95	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	650 + or - 80	---	---	---	---	---	---	---	---	---
Field Parameters												
Conductivity, field	uS/cm	---	---	---	---	---	---	---	---	---	---	---
Dissolved oxygen (DO), field	mg/L	---	---	---	---	---	---	---	---	---	---	---
Oxidation reduction potential (ORP), field	millivolts	---	---	---	---	---	---	---	---	---	---	---
pH, field	s.u.	---	---	---	---	---	---	---	---	---	---	---
Temperature, ambient	Deg C	---	---	---	---	---	---	---	---	---	---	---
Temperature, field	Deg C	---	---	---	---	---	---	---	---	---	---	---
Turbidity, field	NTU	---	---	---	---	---	---	---	---	---	---	---

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-RETORT	Settling Pond	LW-005	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT
SampleDate		6/3/2009	11/5/2009	11/5/2009	6/2/2010	6/2/2010	11/22/2010	5/11/2011	10/19/2011	6/14/2012	10/24/2012	5/28/2013
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	557	470	435	474	485	457	515	440	470	410 J	420
Alkalinity, Carbonate (as CaCO ₃)	mg/L	34.4	46.1	30.5	58.7	58.9	67.8	33.3	70	46	61 J	59
Alkalinity, Total (As CaCO ₃)	mg/L	592	516	465	532	543	525	572	510	520	470 J	480
Ammonia	mg/L	5.7	5.9	2.3	7.9	5.4	3.5	3.8	3.1	3.6	2.8 J	2.8
Bromide	mg/L	0.2 U	0.2 U J	0.2 U J	2 U	2 U	0.2 U	1 U	2 U	1 U	2.5 U	2.5 U
Chemical Oxygen Demand (COD)	mg/L	138	106	73.4	128	112	267	150	120	110	120 J	100
Chloride	mg/L	73.2	87.9	97	59.5	58.9	65.8	87.3	68	85	75	80
Specific Conductivity	umhos/cm	12500	11300	11500	10500	10300	11000	10000	12000	11000	13000 J	9900
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride (dissolved)	mg/L	13.4	12.6	12.3	9.4	9.3	10.1	12	10	9.9	10	9.7
Hardness	mg/L	352	300	340	320	310	300	400	300	330	330	320
Nitrate (as N)	mg/L	0.05 U	0.05 U	0.98	0.5 U	0.5 U	0.05 U	0.25 U	0.5 U	0.25 U	1 U J	0.5 U
Nitrite (as N)	mg/L	0.031 J	2.5 U J	2.5 U J	0.5 U	0.5 U	0.46	2.5 U	0.5 U	0.25 U	0.25 U J	0.25 U
Oil and Grease, Total	mg/L	---	---	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	---	---	---	---	---	---	---	22	10	5 J	4.7 U
Oil and grease (HEM), total	mg/L	4.7 U	11.5	4.8 U	48.8 J	6.8 J	38.5	558	---	---	---	---
pH	s.u.	8.5 J	8.6 J	8.5 J	8.7 J	8.6 J	8.6 J	8.5 J	8.26 J	8.53 J	8.76 J	8.16 J
Phenolics (Total)	mg/L	0.1	0.069	0.018	0.071 J	0.07 J	0.072	0.1	0.06	0.066	0.071 J	0.044
Phosphorus as P, total	mg/L	0.1 U	0.045 J	0.07 J	0.1 U	0.1 U	0.1 U	0.031 J	0.1 U	0.045 J	0.038 J	0.058 J
Silica	mg/L	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	3930	4150	4140	3980	4210	3310	3820	3600	3700	3600 J	3900
Sulfide	mg/L	5.8	5	2.4 J	5.5	6.4	14.3	18.5	46	20	20 J	46
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	6930	5360	7200	7010	6690	6580	1520	6900	6500	6000 J	6100
Nitrogen, Total Kjeldahl	mg/L	11.2	10.4	7.1	7.9	7.3	7.2	11.5	4.6 J	5.6	5.0 J	5.1
Total Organic Carbon (TOC)	mg/L	27.5	31.7	23.9	70.6	240	45.7	21.7	20	20	17 J	13
Total Suspended Solids (TSS)	mg/L	8.8	4 U	2.8 J	11.6 J	5.2 J	100	4 U	16	4 U	4 U J	2 U
Dissolved Organic Carbon (DOC)	mg/L	22	23.3 J	24.2 J	20.9	20.9	21.3	20.6	19	17	17 J	17

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-RETORT	Settling Pond	LW-005	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT	LW-RETORT
SampleDate		6/3/2009	11/5/2009	11/5/2009	6/2/2010	6/2/2010	11/22/2010	5/11/2011	10/19/2011	6/14/2012	10/24/2012	5/28/2013
Parameters	Units											
Metals												
Arsenic	ug/L	34.6	39.6 J	35.9	26.5	30.4	31.3	19.2	25	39	37	28
Arsenic (Dissolved)	ug/L	29.2	29.2	37.1 J	28.6	25.7	12.1	29.5	31	36	32	36 J
Boron	ug/L	---	---	---	---	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	11800	11500 J	---	10700	11100	11000	10600	11000	11000	9500	13000 J
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	1 U	0.23 J	11500 J	1 U	0.2 J	1 U	0.28 J	1 U	0.2 J	0.12 J	0.64 J
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	52100	50600 J	54600 J	49600	51500	49500	48100	52000	57000	50000	68000 J
Chromium	ug/L	0.41 J	2 U	2 U J	2 U	0.19 J	2 U	0.24 J	0.91 J	0.18 J	2 U	10 U
Chromium (Dissolved)	ug/L	0.46 J	2 U J	2 U J	0.26 J	0.25 J	0.27 J	0.2 J	2 U	2 U	2 U	10 U J
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	0.89 J	1.2 J	---	0.42 J	0.46 J	0.1 J	0.54 J	0.41 J	1.5 J	0.89 J	3.6 J
Iron	ug/L	154	112	174	273	70.9	206 J	132	150	130	80	110 J
Iron (Dissolved)	ug/L	75.3	5.1 J	33.1 J	50 U	50 U	3.9 J	50 U	46 J	37 J	15 J	250 U J
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.065 J	1 U J	1 U J	0.025 J	0.02 J	1 U	1 U	1 U	1 U	1 U	5 U J
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	498	492 J	483 J	519	533	536	472	470	520	450	480 J
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	43600	42400 J	48700 J	36700	37700	46800	43400	41000	45000	37000	48000 J
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	16.2	13.3 J	17 J	11.5	11.7	11.2	11.4	13	11	7.8	9.1 J
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.2 U	0.2 U J	0.2 U J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U J
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	939000	960000 J	950000 J	906000	904000	1050000	865000	950000	930000	890000	1100000 J
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	2.6 J	4.3 J	4.4 J	2.2 J	2.1 J	4.4 J	3.7 J	2.2 J	1.8 J	5 U	25 U J

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID SampleDate Parameters	Units	LW-RETORT 6/3/2009	LW-RETORT 11/5/2009	Settling Pond 11/5/2009	LW-005 6/2/2010	LW-RETORT 6/2/2010	LW-RETORT 11/22/2010	LW-RETORT 5/11/2011	LW-RETORT 10/19/2011	LW-RETORT 6/14/2012	LW-RETORT 10/24/2012	LW-RETORT 5/28/2013
Metals												
Silicon	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silicon (Dissolved)	ug/L	11800	10600 J	11200 J	9130	9270	12600	9590	9600	11000	9100	12000 J
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	1350000	1320000 J	1780 J	1310000	1310000	1460000	1250000	1300000	1400000	1300000	1700000 J
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	1790	1730 J	3.5 J	1690	1730	2170	1780	1800	2300	1900	2400 J
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	4 J	2.3 J	3.5 J	1.6 J	1 J	2.6 J	2 J	5 U	5.4 U	5 U	25 U J
Volatile Organic Compounds - BTEX												
Benzene	ug/L	5.1	4.3	1 U	3.7	3.8	3.2	4.1	2.5	2.5	2.4 J	2.1
Ethylbenzene	ug/L	1.5	1.6	1 U	1.3	1.7	1.4	1.9	1.6	1.6	1.1 J	1.1
Toluene	ug/L	3.2	2.3	1 U	1.8	1.9	2.3	3.1	1.4	1.8	1 J	1.1
Xylenes, Total	ug/L	9.5	11	3 U	8.4	12	11	12	9.6	11	5.7 J	8.6
Petroleum Products												
Diesel fuel	mg/L	---	---	---	---	---	---	---	---	---	7.3 J	6.3
TPH - Extractable	mg/L	28	7.6	2.9	16 J	7.1 J	47	110	4.5	6.9	---	---
TPH (non-polar)	mg/L	28	7.6	2.9	16 J	7.1 J	47	110	4.5	6.9	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Field Parameters												
Conductivity, field	uS/cm	---	---	---	---	---	---	---	5590	5480	6008	8850
Dissolved oxygen (DO), field	mg/L	---	---	---	---	---	---	---	0.58	1.41	0.83	0.37
Oxidation reduction potential (ORP), field	millivolts	---	---	---	---	---	---	---	-182.9	-298	-256	-192.8
pH, field	s.u.	---	---	---	---	---	---	---	8.8	8.92	8.79	8.78
Temperature, ambient	Deg C	---	---	---	---	---	---	---	22	34	8.2	32
Temperature, field	Deg C	---	---	---	---	---	---	---	14.7	15	14.2	14.1
Turbidity, field	NTU	---	---	---	---	---	---	---	1.43	3.34	1.48	1.48

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)
SampleDate		5/28/2013	10/24/2013	5/21/2014	5/21/2014	10/22/2014	5/12/2015	5/12/2015	10/14/2015	10/14/2015	5/23/2016	5/23/2016
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO3)	mg/L	460 J	540	690	680	580 B	410	500	370 B	277 B	354	372
Alkalinity, Carbonate (as CaCO3)	mg/L	410 J	45	120	610	5 U	100	390	76	390 B	21.5	26.9
Alkalinity, Total (As CaCO3)	mg/L	49 J	590	810	69	580 B	520	110	440 B	---	375	399
Ammonia	mg/L	3.9 J	4.8	5.7	6	3.2	2.8	3.2	2.6	2.8	1.7	1.69
Bromide	mg/L	2.5 U J	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	0.08 U	0.08 U
Chemical Oxygen Demand (COD)	mg/L	97 J	190	380	100	750	50	83	81	81	114	87.5
Chloride	mg/L	80 J	94	98	91	96	84	83	67	68	76.8	77.3
Specific Conductivity	umhos/cm	---	8800	8300	8400	8700	8500	8600	8700	---	85700	85100
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	---	---	---	---	---	---	---	---	---	9.5	9.72
Fluoride (dissolved)	mg/L	9.6 J	10	14	8.7	10	10	10	8.7	8.9	---	---
Hardness	mg/L	330 J	370	410	390	400	330	310	340	340	332	336
Nitrate (as N)	mg/L	0.5 U J	0.5 U	0.5 U	0.5 U	0.035 J	0.64	0.5 U	1 U	1 U	0.023 U	0.023 U
Nitrite (as N)	mg/L	0.25 U J	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.028 U	0.028 U
Oil and Grease, Total	mg/L	---	---	---	---	560	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	4.7 U J	20	14	4.7 U	---	3.4 J	2.9 J	1.6 J	4.1 U	---	---
Oil and grease (HEM), total	mg/L	---	---	---	---	---	---	---	---	---	1.38 J	1.74 J
pH	s.u.	0.00834 J	8.48 J	8.46 J	8.5 J	8.62 HF	8.44 J	8.58 J	8.74 HF	8.76 H F	8.25 J	7.36
Phenolics (Total)	mg/L	0.047 J	0.18	0.25	0.091	0.11	0.033	0.02065 U	0.058	0.031 U	0.014 U	0.046 U
Phosphorus as P, total	mg/L	0.062 J	0.075 J	0.11	0.067 J	1.2	0.056 J	0.087 J	0.077 J	0.059 J	0.064 J	0.054 J
Silica	mg/L	---	---	---	---	---	---	---	---	---	19.7	19.6
Sulfate	mg/L	4000 J	4000	3300	3800	4100	4200	4200	3500	3700	4120	4160
Sulfide	mg/L	38 J	58	110	55	3 U	46	45	46	50	0.34 J	1.32 J
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	6300 J	5800	5800	5700	6500	7100	7200	7100	7000	6740	6810
Nitrogen, Total Kjeldahl	mg/L	---	6.8	12	---	15	4.9 J	4.4 J	3.9 J	4.5 J	2.75	2.68
Total Organic Carbon (TOC)	mg/L	13 J	24	27	17	2.6	19	---	19	19	686	166
Total Suspended Solids (TSS)	mg/L	2 U J	7.2	22	2 U	1500	---	---	---	---	---	---
Dissolved Organic Carbon (DOC)	mg/L	13 J	24	25	23	19	20	20	19	18	118	74.8

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)
SampleDate		5/28/2013	10/24/2013	5/21/2014	5/21/2014	10/22/2014	5/12/2015	5/12/2015	10/14/2015	10/14/2015	5/23/2016	5/23/2016
Parameters	Units											
Metals												
Arsenic	ug/L	28	21	40	34	630	9.5 J	12 J	14	17	32.9	34.3
Arsenic (Dissolved)	ug/L	33 J	19	38	32	39	21 J	23 J	26	30	28.7	26.2
Boron	ug/L	---	---	---	---	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	12000 J	12000	13000	12000	10000 B	10000	11000	11000	11000	10800	11200
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	0.61 J	5 U	1 U	1 U	10 U	1 U	1 U	1.9 J	2.2 J	0.52 J	0.568 J
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	63000 J	65000	60000	60000	53000 B	53000	53000	58000 B	59000 B	65400	64700
Chromium	ug/L	10 U	2 U	0.77 J	0.79 J	4 J	2 U	2 U	20 U	20 U	0.32 U	0.320 U
Chromium (Dissolved)	ug/L	10 U J	10 U	0.79 J	0.57 J	20 U	2 U	2 U	20 U	20 U	0.32 U	0.320 U
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	3.6 J	6 J	0.55 J	0.63 J	20 U	1.4 J	1.4 J	7.3 J	7.3 J	16.2	0.412 J
Iron	ug/L	340	820	2900	180	200000	180	120	340 J	210 J	462	123
Iron (Dissolved)	ug/L	250 U J	250 U	50 U	50 U	500 U	9.1 J	12 J	500 U	500 U	227	15 U
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	5 U J	5 U	1 U	1 U	10 U	1 U	1 U	10 U	10 U	1.63	0.26 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	490 J	520	520	530	530	500	500	550	540	518	513
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	44000 J	47000	70000	67000	39000 B	36000	37000	41000 B	41000 B	39300	39200
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	8.7 J	13 J	1.2	12	12 JB	13	13	15 J	16 J	10.4	9.77
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.2 U J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.037 JB	0.04 J B	0.049 U	0.0490 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	1100000 J	920000	760000	780000	870000	930000	920000	910000	940000	968000	994000
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	25 U J	6.6 J	2.9 J	3.2 J	50 U	4.5 J	4.1 J	3.6 J	4.8 J	3.18	2.75

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)
SampleDate		5/28/2013	10/24/2013	5/21/2014	5/21/2014	10/22/2014	5/12/2015	5/12/2015	10/14/2015	10/14/2015	5/23/2016	5/23/2016
Parameters	Units											
Metals												
Silicon	ug/L	---	---	---	---	---	---	---	---	---	9220	9160
Silicon (Dissolved)	ug/L	11000 J	8900	11000	11000	8100	7900	8400	8500	8800	---	---
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	1500000 J	1500000	1400000	1400000	1200000	1500000	1600000	1300000	1300000	1370000	1400000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	2200 J	2600	2400	2300	1900	1600	1600	1900	2000	2100	2140
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	25 U J	25 U	5 U	5 U	25 JB	1.1 J	1.5 J	15 JB	14 J B	163	2.39 U
Volatile Organic Compounds - BTEX												
Benzene	ug/L	2.1 J	6.7	10	3.5	0.75 J	4.9 J	3.6 J	5 U	5 U	1.22	1.21
Ethylbenzene	ug/L	1.4 J	1.9	3	2	1 U	3.6 J	3.1 J	5 U	5 U	0.85 J	0.825 J
Toluene	ug/L	1.2 J	7.6	12	3.7	1 U	5 U	5 U	5 U	5 U	0.78 U	0.780 U
Xylenes, Total	ug/L	9 J	16	21	14	1.2 J	24	19	10	9.7 J	4.38	4.14
Petroleum Products												
Diesel fuel	mg/L	5.2 J	15	39	5	1400	5.2	5.4	7.3	7	6.8	7.34
TPH - Extractable	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Field Parameters												
Conductivity, field	uS/cm	---	5690	9230	9500	9600	9730	9660	9670	9670	9550	9520
Dissolved oxygen (DO), field	mg/L	---	0.17	---	---	1.09	0.85	1.44	5.24	5.24	11.7	5.9
Oxidation reduction potential (ORP), field	millivolts	---	-281	-267	-190.1	-266	-226	-259	---	---	-256	-275
pH, field	s.u.	---	8.64	8.16	8.77	8.61	8.92	8.92	8.88	8.77	8.75	8.79
Temperature, ambient	Deg C	---	32	---	---	---	18	65	24	---	---	---
Temperature, field	Deg C	---	14	13.4	14.8	13.7	11.8	12.2	25	14.1	13.2	13.7
Turbidity, field	NTU	---	12.98	10.92	---	---	2.27	1.7	1.93	1.93	3.36	2.73

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003 (Dup)
SampleDate		10/4/2016	10/4/2016	5/1/2017	5/1/2017	10/3/2017	10/3/2017	5/29/2018	5/29/2018	10/22/2018	10/22/2018	05/22/2019	05/22/2019
Parameters	Units												
General Chemistry													
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	352	334	307	309	324	348	337	353	346	347	351	353
Alkalinity, Carbonate (as CaCO ₃)	mg/L	61.6	64.7	54.8	55.2	79.3	34.2	36.3	14.3 J	10.9 J	11.6 J	2.71 U	2.71 U
Alkalinity, Total (As CaCO ₃)	mg/L	413 J	399 J	362	364	403	382	373	367	357	359	351	353
Ammonia	mg/L	2.65	1.85	1 U	1.49	1.52	1.5	0.798	0.802	1.24	1.22	1.02	0.997
Bromide	mg/L	R	R	7.9 U	7.9 U	0.079 U	0.079 U	1 U	1 U	3.95 U	3.95 U	990	923
Chemical Oxygen Demand (COD)	mg/L	102	12.9	173	78.2	75.3	89.4	162	125	53.8	3 U	156	102
Chloride	mg/L	80.4	80.5	79.1	83.5	84.5	84.4	83.2	83.3	79.7	80.1	79	79.3
Specific Conductivity	umhos/cm	8310	8260	8780	8800	9080	9040	9290	9280	9050	8990	9.1	9.14
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	8.87	8.9	8.53	8.73	8.37	8.49	9.57	9.62	9.95	9.99	---	---
Fluoride (dissolved)	mg/L	---	---	---	---	---	---	---	---	---	---	9.68	9.71
Hardness	mg/L	327	320	520	527	525 0	374	374	378	332	357	329	338
Nitrate (as N)	mg/L	0.023 U	0.023 U	2.27 UJ	2.27 UJ	0.0227 U	0.0227 U	0.1 U	0.1 U	0.0227 U	0.0227 U	0.0227 U	0.0227 U
Nitrite (as N)	mg/L	0.028 U	0.028 U	0.0277 U	0.0277 U	0.0277 U	0.0277 U	0.1 U	0.1 U	0.0277 U	0.0277 U	0.0277 U	0.0704 J
Oil and Grease, Total	mg/L	---	---	---	---	---	---	---	---	---	---	88.8	16.9
Oil and grease (HEM), polar	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), total	mg/L	3.58 J	1.160 U	157	12.5	25.3	3.51 J	54.5	434	589	327	---	---
pH	s.u.	8.43 J	8.73 J	8.60 J	8.61 J	8.48 J	8.69 J	8.77 T8	8.74 T8	8.68 J	8.65 J	8.75 J	8.92 J
Phenolics (Total)	mg/L	0.039 UJ	0.188 J	0.0309 J	0.0291 J	0.0137 U	0.0148 U	0.0387 J	0.033 J	0.0356 U	0.0352 U	0.0145 U	0.0425 U
Phosphorus as P, total	mg/L	0.059 J	0.058 J	0.109	0.0744 J	0.0526 U	0.0686 U	0.0447 J	0.0414 J	0.344	0.314	0.0499 J	0.054 J
Silica	mg/L	19.6	19.6	15.6	15.8	15.7	16.3	15.9	15.5	15.2	14.4	16.4	18.1
Sulfate	mg/L	4010	3930	4090	4980	4400	4460	4570	4760	4660	4640	4840	4620
Sulfide	mg/L	1.77	1.84	0.274	1.12	0.091	0.079	0.043 J	0.027 J	0.019 J	0.007 J	0.07	0.059
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	6250	6330	6280	6870	6890	5970	7080	6860	6950	7010	7360	7400
Nitrogen, Total Kjeldahl	mg/L	2.98	2.99	3.81	2.85	2.46	2.38	2.18	2.51	3.64	5.28	3.03	2.85
Total Organic Carbon (TOC)	mg/L	25.4	16.9	17.7	16.2	19.7	18.1	25	25.1	20.7	20.1	16.6	16
Total Suspended Solids (TSS)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Organic Carbon (DOC)	mg/L	21.1	21.7	17.2	20.3	33.9	18.8	16.7	16.3	17.7	17.8	17.1	16.9

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (DUP)	LW-RETORT	LW-003 (Dup)
SampleDate		10/4/2016	10/4/2016	5/1/2017	5/1/2017	10/3/2017	10/3/2017	5/29/2018	5/29/2018	10/22/2018	10/22/2018	05/22/2019	05/22/2019
Parameters	Units												
Metals													
Arsenic	ug/L	45.6	50.8	34.1	23.7	36.3	38.2	32.1	30.5	73.5	49.4	44.6	44.3
Arsenic (Dissolved)	ug/L	32.2	43.0	35.0	37.8	34.9	28.1	29.1	29.4	63.3	60	38.3	35.4
Boron	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	10800	11500	13600	11900	10100	9470	10500	10900	10600	10400	10000	11100
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	0.26 J	0.335 J	0.230 J	0.220 U	4.4 U	4.4 U	0.318 J	0.393 J	0.220 U	0.220 U	0.391 J	0.396 J
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	48600	70300	109000	112000	77200	78800	81200	80800	68300	68200	72900	69200
Chromium	ug/L	0.32 U	0.320 U	0.320 U	0.320 U	0.32 U	0.32 U	1.00 U	1.00 U	1.72	0.744 J	0.406 J	0.518 J
Chromium (Dissolved)	ug/L	0.38 U	0.650 U	0.320 U	0.455 J	6.4 U	6.4 U	0.390 J	1.00 U	0.320 U	0.320 U	0.614 J	0.716 J
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	0.29 J	0.66 J	13.0	15.1	18.1 J	16.7 J	15.9	16.1	0.749 J	1.52	0.503 J	0.587 J
Iron	ug/L	250	228	1380	1030	19.1 J	2480	19.9 J	19.8 J	42700	1020	6440	7310
Iron (Dissolved)	ug/L	15 U	22.1 J	20.6 J	36.4 J	300 U	300 U	21.0 B J	16.8 B J	157	89.2 J	15.0 U	15.0 U
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.26 U	0.260 U	0.260 U	0.260 U	5.2 U	5.2 U	1.00 U	1.00 U	0.260 U	0.260 U	0.260 U	0.260 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	528	524	584	569	475	460	438	463	448	463	476	471
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	28200	39300	44400	45100	40900	40200	47100	46000	39300	38800	46500	46000
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	14.1	20.5	46.5	47.6	27.4 J	24.9 J	39.9	38.7	24	23.5	15.3	15.1
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.049 U	0.0490 U	0.0490 U	0.0490 U	0.049 U	0.049 U	0.0673 B J	0.0636 B J	0.0490 U	0.0490 U	0.345	0.397
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	670000	963000	1270000	1130000	997000	984000	1100000	1070000	952000	933000	1150000	1060000
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	2.38	3.07	4.94	5.20	6.4 U	6.4 U	4.24	3.96	4.99	4.88	4.52	4.56

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003	LW-RETORT	LW-003 (Dup)
SampleDate		10/4/2016	10/4/2016	5/1/2017	5/1/2017	10/3/2017	10/3/2017	5/29/2018	5/29/2018	10/22/2018	10/22/2018	05/22/2019	05/22/2019
Parameters	Units												
Metals													
Silicon	ug/L	9170	9170	7310	7360	7310	7630	7420	7220	7100	6720	7660	8480
Silicon (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	1560000	1370000	1770000	1570000	1330000	1310000	1520000	1480000	1440000	1390000	1610000	1460000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	1530	2400	2790	2900	2070	2080	2430	2560	2200	2250	2380	2140
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	4.24 J	15.6 J	2.39 J	3.67 J	38.2 U	38.2 U	10.0 U	10.0 U	2.89 J	3.46 J	2.38 J	3.13 J
Volatile Organic Compounds - BTEX													
Benzene	ug/L	1.9	1.85	1.44	1.47	1.59	1.67	1.15	1.17	1.23	1.16	1.78	1.82
Ethylbenzene	ug/L	0.92 J	0.845 J	0.857 J	0.807 J	0.732 J	0.743 J	0.484 J	0.501 J	0.427 J	0.436 J	0.448 J	0.443 J
Toluene	ug/L	0.78 U	0.780 U	0.419 J	0.432 J	0.425 J	0.417 J	1.00 U	1.00 U	0.412 U	0.412 U	0.412 U	0.412 U
Xylenes, Total	ug/L	4.86	4.56	4.56	4.38	3.21	3.24	1.57 J	1.55 J	1.37 J	1.38 J	1.35 J	1.49 J
Petroleum Products													
Diesel fuel	mg/L	5.2	4.34	5.9	9.55	5.11	5.7	24.3	3.41	9.55	6.9	5.64	4.17
TPH - Extractable	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Radiology													
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Field Parameters													
Conductivity, field	uS/cm	8740	8870	8840	8730	9200	9130	8847	8791	8556	8577	9018	9058
Dissolved oxygen (DO), field	mg/L	1.26	1.14	--	6	27.0	28.6	NM	NM	1.46	2.58	1.05	1.03
Oxidation reduction potential (ORP), field	millivolts	-220	-249	-166.4	-199.6	-240	-242	-208.9	-241.9	-228.1	-232.5	-256.6	-244.5
pH, field	s.u.	8.75	8.87	8.67	8.8	8.55	8.65	7.6	7.58	8.53	8.3	9.42	9.37
Temperature, ambient	Deg C	---	---	60	60	12.8	12.8	---	---	---	---	60	60
Temperature, field	Deg C	13.8	13.4	13.4	12.8	12.9	12.9	14.1	14.1	14.1	14.4	11.1	10.3
Turbidity, field	NTU	3.17	3.29	11.75	7.31	7.97	7.01	0.79	15.65	6.4	60.5	19.41	22.04

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-POND
SampleDate		10/09/2019	5/13/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/20/2019	10/09/2019	05/20/2019
Parameters	Units												
General Chemistry													
Alkalinity, Bicarbonate (as CaCO3)	mg/L	408	490	410 B	391	391	342	374	348	350	350	363	312
Alkalinity, Carbonate (as CaCO3)	mg/L	2.71 U	5 U	5 U	2.71 U	2.71 U	2.71 U	7.7 J	20 U	2.71 U	2.71 U	14 J	64.3
Alkalinity, Total (As CaCO3)	mg/L	409	490	410 B	391	391 J	342	382	348	350	350	377	376
Ammonia	mg/L	1.91	0.1	0.1 U	0.038 U	0.038 U	0.05 U	0.0317 U	0.1 U	0.0317 U	0.0317 U	0.0317 U	0.0317 U
Bromide	mg/L	7.45 J	2.5 U	5 U	0.079 U	R	7.9 U	0.079 U	1 U	3.95 U	3.95 U	7.9 U	3.95 U
Chemical Oxygen Demand (COD)	mg/L	---	30	39	49.9	83.9	41.2	44.3	38.4	3 U	45.8	---	48.7
Chloride	mg/L	87.9	80	66	78.8	82.4	81.8	86.4	82.9	80.4	79.7	84.6	83.6
Specific Conductivity	umhos/cm	7.94	8500	8700	86000	8300	8760	8920	9310	9000	27.9	8.48	27.9
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	---	---	---	9.6	8.95	8.81	8.57	9.55	9.99	---	---	---
Fluoride (dissolved)	mg/L	9.65	10	8.7	---	---	---	---	---	---	9.78	9.79	10
Hardness	mg/L	332 B	350	330	351	325	526	376	396	330	364	303 B	368
Nitrate (as N)	mg/L	0.0227 U	3	330	0.0227 U	0.0227 U	2.27 U	1.01	0.1 U	0.807	0.785	0.0227 U	0.764
Nitrite (as N)	mg/L	0.0277 U	0.25 U	330	0.0277 U	0.0227 U	0.0277 U	0.0277 U	0.1 U	0.0277 U	0.0277 U	0.0277 U	0.0277 U
Oil and Grease, Total	mg/L	2.56 J	---	330	---	---	---	---	---	---	2.33 J	1.3 U	2.16 J
Oil and grease (HEM), polar	mg/L	---	4.7 U	330	---	---	---	---	---	---	---	---	---
Oil and grease (HEM), total	mg/L	---	---	330	1.86 J	1.16 U	1.16 U	1.16 U	5.56 U	1.16 U	---	---	---
pH	s.u.	8.76 T8	8.04 J	330	7.36 J	8.22 J	8.36 J	8.15 T8	7.75 T8	7.93 J	7.79 J	8.11 T8	8.88 J
Phenolics (Total)	mg/L	0.0385 B	0.027	330	0.0188 U	0.0215 U	0.0142 J	0.0083 U	0.00934 J	0.012 U	0.0083 U	0.0101 B	0.0083 U
Phosphorus as P, total	mg/L	0.035 U	0.055 J	330	0.0814 J	0.0541 J	0.0738 J	0.0737 B J	0.1 U	0.14 U	0.035 U	0.0564 J	0.035 U
Silica	mg/L	16.1	---	330	19.6	19.6	17.4	17.2	14.6	15	18.2	17	14.2
Sulfate	mg/L	4730	4000	330	4020	4100	4830	4580	4580	4330	4330	4950	4300
Sulfide	mg/L	0.026 J	1.8 J	330	0.0065 U	0.0065 U	0.0065 U	0.0065 U	0.05 U	0.0065 U	0.0065 U	0.0065 U	0.0065 U
Sulfite	mg/L	---	---	330	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	330	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	330	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	7290	6900	330	6770	6470	7460	5860	7040	6980	7260	7470000 4	7270
Nitrogen, Total Kjeldahl	mg/L	---	3.3 J	330	1.21	1.1	1.16	1.26	0.979	1.22	1.03	---	1.3
Total Organic Carbon (TOC)	mg/L	17.4	15	330	68.3	14	16.2	15.6	---	---	14.5	13.8	15.4
Total Suspended Solids (TSS)	mg/L	1.4 J	---	330	---	---	---	---	14.8	15.9	---	1.3 J	---
Dissolved Organic Carbon (DOC)	mg/L	---	15	330	20 J	17.2	15	15.6	13.9	15.1	13.6	---	13.8

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-POND
SampleDate		10/09/2019	5/13/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/20/2019	10/09/2019	05/20/2019
Parameters	Units												
Metals													
Arsenic	ug/L	---	33	41	33.1	32.7	20.1	31.7	25.1	44.1	34.2	---	37.5
Arsenic (Dissolved)	ug/L	29.5	33	39	34.7	29.5	20.5	28.1	25.8	41.3	44.6	40.8	47.7
Boron	ug/L	---	9600	11000	---	---	---	---	---	---	---	---	---
Boron (Dissolved)	ug/L	12000	---	---	11200	11200	11300	9690 V	11300	10900	8970	11400	11000
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	63400	1 U	2.7 J	0.663 J	0.263 J	0.240 J	4.40 U	0.352 J	0.220 U	0.428 J	63700	0.444 J
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	---	55000	59000 B	74600	62600	107000	79800 V	82100	68000	70400	---	74200
Chromium	ug/L	---	2 U	20 U	0.320 U	0.320 U	0.320 U	0.649 J	1.00 U	0.407 J	0.320 U	---	0.320 U
Chromium (Dissolved)	ug/L	---	2 U	20 U	0.536 J	0.386 U	0.320 U	6.40 U	1.00 U	0.320 U	0.852 J	---	0.952 J
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	---	1.6 J	6.8 J	1.02	0.270 U	14.4	19.5 J	16.2	0.631 J	0.467 J	---	2.68
Iron	ug/L	---	61	81 J	67.5 J	105	46.3 J	67.9 J	19.1 J	89.2 J	31.6 J	---	30.8 J
Iron (Dissolved)	ug/L	17.8 J	40 J	500 U	15.0 U	22.5 J	25.9 J	300 U	18.8 B J	55.2 J	27.8 U	27.9 J	15.0 U
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	---	1 U	10 U	0.260 U	0.260 U	1.01	5.20 U	1.00 U	0.260 U	0.260 U	---	0.260 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	---	480	530	510	525	607	469 O1	453 O1	455	462	---	488
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	44400	38000	43000 B	46500	36500	46100	43300 V	46400	38100	47500	42400	48200
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	---	14	3.4 J	4.72 J	7.65	17.4	29.7 B J	18.7	37	18.4	---	5.73
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	---	0.2 U	0.034 JB	0.0490 U	0.0490 U	0.0490 U	0.0677 J	0.0605 B J	0.0490 U	0.0490 U	---	0.0490 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	941000	890000	950000	1030000	837000	1050000	994000 V	1110000	957000	1050000	992000	1030000
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	2.95	4.4 J	6.3 J	4.48	4	7.81	6.40 U	10	6.34	8.84	6.39	8.79

Table 10. Logan Wash Mine Retort Water Analytical Data

SampleID		LW-RETORT	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-LM	LW-POND
SampleDate		10/09/2019	5/13/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/3/2017	5/29/2018	10/22/2018	05/20/2019	10/09/2019	05/20/2019
Parameters	Units												
Metals													
Silicon	ug/L	7540	---	---	9150	9170	8150	8030	6840	7030	8500	7960	6660
Silicon (Dissolved)	ug/L	---	7800	9000	---	---	---	---	---	---	---	---	---
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	1290000	1500000	1400000	1520000	1400000	1510000	1360000 V	1520000	1420000	1510000	1340000	1560000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	---	1900	2000	2510	2510	2790	2140 V	2580	2250	2210	---	2190
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	---	2 J	14 JB	6.41 U	4.21 J	12	38.2 U	2.69 J	1.91 J	4.09 J	---	4.60 J
Volatile Organic Compounds - BTEX													
Benzene	ug/L	2.93	5 U	5 U	0.331 U	0.331 U	0.331 U	0.331 U	1.00 U	0.331 U	0.331 U	0.331 U	0.331 U
Ethylbenzene	ug/L	0.922 J	5 U	5 U	0.384 U	0.384 U	0.384 U	0.384 U	1.00 U	0.384 U	0.384 U	0.384 U	0.384 U
Toluene	ug/L	1.03	5 U	5 U	0.780 U	0.780 U	0.412 U	0.412 U	1.00 U	0.412 U	0.412 U	0.412 U	0.412 U
Xylenes, Total	ug/L	2.81 J	10 U	10 U	1.06 U	1.06 U	1.06 U	1.06 U	3.00 U	1.06 U	1.06 U	1.06 U	1.06 U
Petroleum Products													
Diesel fuel	mg/L	4.6	2.2	3.2	3.41	2.24	3.24	2.67	1890	3340	1.91	2.06	0.973
TPH - Extractable	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Radiology													
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Field Parameters													
Conductivity, field	uS/cm	9387	8866	8851	9730	8510	8980	8980	8783	8663	9100	9058	8998
Dissolved oxygen (DO), field	mg/L	0.42	7.04	5.37	---	5.22	--	12.12	NM	5.39	--	5.1	--
Oxidation reduction potential (ORP), field	millivolts	-229.8	-7.6	26.5	236	208	172.5	69.1	194.7	176.5	70.3	-83	3.3
pH, field	s.u.	8.62	7.91	7.98	7.52	8.04	7.74	7.26	7.9	7.74	7.15	7.99	8.62
Temperature, ambient	Deg C	60	21	24	---	---	60	---	---	---	60	60	60
Temperature, field	Deg C	14.1	11.25	16.8	12.8	15.6	12.2	17.9	12.8	16.6	10.9	17.1	18.6
Turbidity, field	NTU	3.99	1.07	1.43	1.32	4.29	3.21	0.73	4.46	1.98	3.7	1.03	2.94

Table 10. Logan Wash Mine Retort Water Analytical Data

Notes:

U = result not detected at the reporting limit

J = result value greater than the MDL and less than the RL; result considered estimated

B = analyte found in sample and associated blank

HF = analysis holding time exceeded; result considered estimated

E = result estimated due to the presence of interference

R = rejected data

O1 = failed the method required serial dilution test and or subsequent post spike criteria. Failures indicate matrix interference

V = sample concentration is too high to evaluate accurate spike recoveries

--- = Analysis not performed

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		2/2/2000	3/9/2000	4/7/2000	8/3/2000	10/26/2000	2/7/2001	5/23/2001	9/26/2001	5/10/2011	10/27/2011	6/13/2012
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO3)	mg/L	360	390	---	---	471	---	---	376	425	360	370
Alkalinity, Carbonate (as CaCO3)	mg/L	5 U	5 U	---	---	5 U	---	---	5 U	5 U	5 U	5 U
Alkalinity, Total (As CaCO3)	mg/L	360	390	---	---	471	---	---	376	432	360	370
Ammonia	mg/L	1.2	0.8 U	---	---	0.8 U	---	---	0.15	0.1 U	0.12 U	0.14 U
Bromide	mg/L	---	---	---	---	180	---	---	---	0.5 U	1 U	0.5 U
Chemical Oxygen Demand (COD)	mg/L	---	---	---	---	26.3	---	---	---	38.8	28	38
Chloride	mg/L	31 D	35 J	---	---	46.7	---	---	41.6	35.4	16	24
Conductivity	umhos/cm	---	---	---	---	---	---	---	---	5550	4300	4000
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	4.2	3.1	0.4 U	1.8	3.9	2.5	2.3	3.1	---	---	---
Fluoride (dissolved)	mg/L	---	---	---	---	3.1	---	---	---	1.2	1.1 U	1.1
Hardness	mg/L	---	---	---	---	244	---	---	---	1130	770	820
Nitrate (as N)	mg/L	---	---	---	---	19.4	---	---	---	23.1	14	14
Nitrite (as N)	mg/L	---	---	---	---	0.01 U	---	---	---	1.2 U	0.25 U	0.13 U
Oil and Grease, Total	mg/L	---	---	---	---	---	---	---	5 U	---	---	---
Oil and grease (HEM), polar	mg/L	---	---	---	---	---	---	---	---	---	4.7 U	2.4 J
Oil and grease (HEM), total	mg/L	5	2 U	---	---	---	---	---	---	2 J	---	---
pH	s.u.	---	---	---	---	---	---	---	---	7.5 J	7.66 J	7.39 J
Phenolics (Total)	mg/L	0.092	0.05 U	---	---	0.05 U	---	---	0.01 U	0.025	0.01 U	0.01 U
Phosphorus as P, total	mg/L	---	---	---	---	---	---	---	---	0.1 U	0.1 U	0.1 U
Silica	mg/L	---	---	---	---	---	---	---	---	---	---	---
Sulfate	mg/L	1200 D	220 J	---	---	1510	---	---	1340	1950	1400	1700
Sulfide	mg/L	---	---	---	---	---	---	---	---	1.8 J	3 U	3 U
Sulfite	mg/L	2 U	2 U J	---	---	2 U	---	---	2 U	---	---	---
Thiocyanate	mg/L	0.4 U	0.4 U	---	---	1 U	---	---	0.7 U	---	---	---
Thiosulfate	mg/L	0.4 U	0.4 U	---	---	1 U	---	---	0.7 U	---	---	---
Total Dissolved Solids (TDS)	mg/L	2170	2770	---	---	2710	---	---	2400	3620	2700	2500
Nitrogen, Total Kjeldahl	mg/L	1.2	1.7	---	---	1.8	---	---	1.7	5 U	5 U	5 U
Total Organic Carbon (TOC)	mg/L	---	---	---	---	---	---	---	---	14.1	11	11
Total Pet_ Hydrocarbons	mg/L	---	---	---	---	---	---	---	---	0.67	0.48 U	0.5 U
Total Suspended Solids (TSS)	mg/L	---	---	---	---	34	---	---	---	9.2	17	40
Dissolved Organic Carbon (DOC)	mg/L	8.3	11 J	---	---	14.2	---	---	10.9	14.4	12	10

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		2/2/2000	3/9/2000	4/7/2000	8/3/2000	10/26/2000	2/7/2001	5/23/2001	9/26/2001	5/10/2011	10/27/2011	6/13/2012
Parameters	Units											
Metals												
Arsenic	ug/L	20	20	20	13	23.2	41	47 U	19.6	14.7	13	15
Arsenic (Dissolved)	ug/L	---	---	---	---	24.9	---	---	---	14.7	14	13
Boron	ug/L	4900	8300	8800	7700	6300 E	2330	6400	5780	---	---	---
Boron (Dissolved)	ug/L	---	---	---	---	6550 E	---	---	---	9590	8200	9700
Cadmium	ug/L	2 U	2 U	0.9 J	2.1 U	0.84	0.73	---	0.51	---	---	---
Cadmium (Dissolved)	ug/L	---	---	---	---	0.49	---	---	---	0.098 J	1 U	1 U
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	---	---	---	---	98000	---	---	---	126000	98000	110000
Chromium	ug/L	---	---	---	---	1.4	---	---	---	4.9	3.7	3.2
Chromium (Dissolved)	ug/L	---	---	---	---	1.5	---	---	---	4.6	3.6	2.5
Chromium III	ug/L	---	---	---	---	10 U	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	0.05 U	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	18.9	---	26	---	---	---	---
Copper (Dissolved)	ug/L	---	---	---	---	14.9	---	---	---	6.2	6.5	8.1
Iron	ug/L	---	---	---	---	628 E	---	---	---	198	420	780
Iron (Dissolved)	ug/L	---	---	---	---	369 E	---	---	---	50 U	8.1 J	24 J
Lead	ug/L	---	---	---	59 U	6.9	39.6	59 U	---	---	---	---
Lead (Dissolved)	ug/L	---	---	---	---	7.7	---	---	---	1 U	1 U	1 U
Lithium	ug/L	200 J	620	---	---	337 J	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	---	---	---	---	339 J	---	---	308	264	200	240
Magnesium	ug/L	---	---	---	---	93100 E	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	---	---	---	---	28.6 U	---	---	---	167000	130000	140000
Manganese	ug/L	---	---	---	---	16.1	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	---	---	---	---	15.1	---	---	---	0.22 J	1.5 J	1 J
Mercury	ug/L	---	---	---	---	0.12 U	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	---	---	---	---	0.12 U	---	---	---	0.2 U	0.2 U	0.2 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	5.2	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	7.1	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	1100000 E	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	---	---	---	---	151000 E	---	---	---	18400	18000	17000

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		2/2/2000	3/9/2000	4/7/2000	8/3/2000	10/26/2000	2/7/2001	5/23/2001	9/26/2001	5/10/2011	10/27/2011	6/13/2012
Parameters	Units											
Metals												
Selenium	ug/L	---	---	---	---	3.8	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	---	---	---	---	7.1	---	---	---	46.1	37	37
Silicon	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silicon (Dissolved)	ug/L	---	---	---	---	---	---	---	---	6730	6800	7400
Silver	ug/L	5 U	5 U	10 U	---	0.05 U	---	---	10 U	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	0.03 U	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	---	---	---	---	489000	---	---	---	596000	480000	660000
Strontium	ug/L	---	---	---	---	5000 J	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	---	---	---	---	4280 J	---	---	---	4100	3100	4000
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	66	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	---	---	---	---	58.4	---	---	---	3.5 J	9.9 U	10
Volatile Organic Compounds - BTEX												
Benzene	ug/L	1 U	1 U	1 U	0.2 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	1 U	1 U	1 U	0.2 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Toluene	ug/L	1 U	1 U	1 U	0.2 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Xylenes, Total	ug/L	1 U	1 U	1 U	0.2 U	2 U	2 U	2 U	1 U	3 U	3 U	3 U
Petroleum Products												
Diesel fuel	mg/L	---	---	---	---	0.1 U	---	---	---	---	---	---
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	0.67	0.48 U	0.5 U
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	53	5	---	---	10 + or - 16	---	---	5 + or - 2	---	---	---
Gross Beta Analytes	pci/l	150	100	---	---	150 + or - 30	---	---	15 + or - 2	---	---	---
Field Parameters												
Specific conductivity, field	umhos/cm	---	---	---	---	---	---	---	---	---	---	---
Dissolved oxygen (DO), field	mg/L	---	---	---	---	---	---	---	---	---	---	---
Oxidation reduction potential (ORP), field	millivolts	---	---	---	---	---	---	---	---	---	---	---
pH, field	s.u.	---	---	---	---	---	---	---	---	---	---	---
Temperature, ambient	Deg C	---	---	---	---	---	---	---	---	---	---	---
Temperature, field	Deg C	---	---	---	---	---	---	---	---	---	---	---
Turbidity, field	NTU	---	---	---	---	---	---	---	---	---	---	---

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		10/25/2012	6/12/2013	10/23/2013	5/21/2014	10/27/2014	5/13/2015	10/19/2015	5/25/2016	10/11/2016	5/2/2017	10/11/2017
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO3)	mg/L	380	390	400	420	440 B	470	430	367	351	374	391
Alkalinity, Carbonate (as CaCO3)	mg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.71 U	2.71 U	2.71 U	2.71 U
Alkalinity, Total (As CaCO3)	mg/L	380	390	400	420	440 B	470	430	367	351	374	391
Ammonia	mg/L	0.32	0.15	0.13 U	0.05 J	0.1 U	0.24	0.1 U	0.038 U	0.038 U	0.0317 U	0.0317 U
Bromide	mg/L	1.3 U	2.5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	0.079 U	0.079 U	0.079 U	0.079 U
Chemical Oxygen Demand (COD)	mg/L	18	34	30	33	51	32	28 B	53.1	64.4	34	31.6
Chloride	mg/L	32	27	28	17	22	23	26	20.2	20.7	23.5	23
Conductivity	umhos/cm	4000	4100	4200	---	4100	4000	4400	4160	38300	3850	4030
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	---	---	---	---	---	---	---	1.31	1.37	1.17	1.19
Fluoride (dissolved)	mg/L	1.1	0.41	0.76	0.38	0.87	1.1	1.2	---	---	---	---
Hardness	mg/L	760	1000	1200	990	1100	1100	1100	896	814	907	995
Nitrate (as N)	mg/L	14 J	16	18	18	22 H	21	21 B	16.4	16.4	18	22.7 U
Nitrite (as N)	mg/L	0.13 U J	0.13 U	0.13 U	0.13 U	0.13 UH	0.13 U	U*	0.0277 U	0.0277 U	0.0277 U	0.0277 U
Oil and Grease, Total	mg/L	---	---	---	---	3.4 J	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	5.2 U	1.4 J	1.8 J	4.7 U	---	4.5 U	4.5 U	---	---	---	---
Oil and grease (HEM), total	mg/L	---	---	---	---	---	---	---	1.16 U	1.16 U	1.16 U	1.16 U
pH	s.u.	7.74 J	7.79 J	7.52 J	7.93 J	7.5 HF	7.74 J	7.69 HF	7.56 J	7.70 J	7.69 J	7.6 J
Phenolics (Total)	mg/L	0.01 U	0.0077 J	0.01 U	0.01 U	0.01 U	0.015	0.01 U	0.0205 U	0.0179 J	0.0083 U	0.0083 U
Phosphorus as P, total	mg/L	0.058 J	0.1 U	0.1 U	0.017 J	0.1 U	0.1 U	0.1 U	0.035 U	0.035 U	0.0843 U	0.0958 J
Silica	mg/L	---	---	17	---	---	---	---	16.7	15.8	16.7	16.9
Sulfate	mg/L	1600	1900	2100	1800	2100	2000	2200	1800	1700	1820	1790
Sulfide	mg/L	3 U	3 U	3 U	3 U	0.53 J	0.49 J	30 U	0.0065 U	0.0065 U	0.0065 U	0.0065 U
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	2500	2600	2700	2800	3000	3500	3600	3360	2240	3020	2900
Nitrogen, Total Kjeldahl	mg/L	1.1 J	3.4 J	3.9 J	7.9	5 U	5 U	3.4 J	1.32	0.847	0.951	0.120 U
Total Organic Carbon (TOC)	mg/L	11	8.5	10	10	12	13	13	89.3	10.3	11.3	11.6
Total Pet_ Hydrocarbons	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Suspended Solids (TSS)	mg/L	150	24	7.2	6.4	13	---	---	---	---	---	---
Dissolved Organic Carbon (DOC)	mg/L	11	10	11	10	11	13	13	88.4	9.73	11.4	11.9

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		10/25/2012	6/12/2013	10/23/2013	5/21/2014	10/27/2014	5/13/2015	10/19/2015	5/25/2016	10/11/2016	5/2/2017	10/11/2017
Parameters	Units											
Metals												
Arsenic	ug/L	15	12	14	14	14	13	16	21.5	14.5	384	13
Arsenic (Dissolved)	ug/L	11	12	19	15	13	13	15	15.2	13.8	15.3	14.3
Boron	ug/L	---	---	---	---	---	11000	12000	---	---	---	---
Boron (Dissolved)	ug/L	7900	11000	11000	12000	10000	---	---	8450	9720	12800	10600
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	0.099 J	0.14 J	0.85 J	1 U	0.081 J	1 U	1.5	0.220 U	0.220 U	0.220 U	0.22 U
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	78000	130000	170000	130000	130000	120000	150000 B	115000	121000	141000	139000
Chromium	ug/L	2.5	2.5	2.6	4.9	3.6	3.2	4.7	6.26	2.94	118	3.47
Chromium (Dissolved)	ug/L	1.1 J	2.6	4 J	4.9	3.2	2.9	4.3	4.44	2.98	4.52	3.39
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	6	7	12	5.5	6	5.6	9.8	5.83	6.92	18.3	11.2
Iron	ug/L	1900	340	160	64	240	350	120	98.8 J	133	2630	22.7 J
Iron (Dissolved)	ug/L	22 J	5.3 J	250 U	50 U	11 J	30 J	50 U	65.9 J	15.0 U	15.0 U	15 U
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.14 J	0.57 J	5 U	1 U	0.074 J	1 U	0.9 J	0.260 U	0.260 U	0.260 U	0.26 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	250	240	240	230	250	250	270	286	255	323	243
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	97000	150000	210000	160000	160000	150000	170000	125000	128000	152000	155000
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	13	5 U	0.46 J	0.32 J	0.87 JB	0.2 J	0.42 J	2.07 J	0.510 U	0.510 U	0.51 U
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.0490 U	0.0490 U	0.0490 U	0.049 U
Molybdenum (Dissolved)	ug/L	---	---	570	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	4.5 J	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	13000	19000	28000	22000	21000	20000	21000	18300	17200	21500	20600

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A
SampleDate		10/25/2012	6/12/2013	10/23/2013	5/21/2014	10/27/2014	5/13/2015	10/19/2015	5/25/2016	10/11/2016	5/2/2017	10/11/2017
Parameters	Units											
Metals												
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	17	40	52	49	46	49	60	42.7	41.1	52.1	45.6
Silicon	ug/L	---	---	---	---	---	---	---	7810	7410	7810	7880
Silicon (Dissolved)	ug/L	6000	6500	8100	8000	6600	6700	7600	---	---	---	---
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	5 U	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	630000	540000	720000	610000	600000	550000	720000	556000	576000	649000	631000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	2800	4400	6200	4100	4500	3700	4600	3380	3590	4650	4710
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	9.9	15	25 U	5 U	7.7 B	1.9 J	17 B	3.21 U	1.91 U	9.69 J	7.22 U
Volatile Organic Compounds - BTEX												
Benzene	ug/L	1 U	1 U	1 U	1 U	1 U	5 U	5 U	0.331 U	0.331 U	0.331 U	0.331 U
Ethylbenzene	ug/L	1 U	1 U	1 U	1 U	1 U	5 U	5 U	0.384 U	0.384 U	0.384 U	0.384 U
Toluene	ug/L	1 U	1 U	1 U	1 U	1 U	5 U	5 U	0.780 U	0.780 U	0.412 U	0.412 U
Xylenes, Total	ug/L	3 U	3 U	3 U	3 U	3 U	10 U	10 U	1.06 U	1.06 U	1.06 U	1.06 U
Petroleum Products												
Diesel fuel	mg/L	0.51 U	0.48 U	0.49 U	0.52 U	0.54:U	0.5 U	0.33 J	0.148	0.0247 U	0.067 U	0.113
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Field Parameters												
Specific conductivity, field	umhos/cm	---	---	4265	4007	4177	4227	4515	4164	3669	3884	4052
Dissolved oxygen (DO), field	mg/L	---	---	6.80	9.52	6.34	7.39	9.14	8.02	8.84	9.53	73.4
Oxidation reduction potential (ORP), fie	millivolts	---	---	203.7	213.6	162.3	252	198.8	173.5	313.6	209.2	75.7
pH, field	s.u.	---	---	7.45	7.41	6.34	7.37	6.91	7.73	6.49	7.67	6.07
Temperature, ambient	Deg C	---	---	12.7	18.3	10.0	18	---	---	---	15.6	15.6
Temperature, field	Deg C	---	---	8.72	8.48	9.69	8.7	9.07	8.09	9.26	9	9.3
Turbidity, field	NTU	---	---	9.67	5.43	10.30	23.51	3.46	16.78	4.56	9.46	1.65

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A
SampleDate		6/4/2018	11/13/2018	05/29/2019	10/14/2019	5/13/2015	10/15/2015	5/24/2016	10/5/2016	5/3/2017	10/10/2017	5/23/2018
Parameters	Units											
General Chemistry												
Alkalinity, Bicarbonate (as CaCO3)	mg/L	432	411	395	369	520	480 B	412	435	448	451	338 J3
Alkalinity, Carbonate (as CaCO3)	mg/L	20 U	2.71 U	2.71 U	2.71 U	5 U	5 U	2.71 U	2.71 U	2.71 U	2.71 U	20 U
Alkalinity, Total (As CaCO3)	mg/L	432	411	395	369	520	480 B	412	435	448	451	338 J3
Ammonia	mg/L	0.1 U	0.0317 U	0.0317 U	0.0317 U	0.1 U	0.1 U	0.038 U	0.038 U	0.0317 U	0.0317 U	0.1 U
Bromide	mg/L	1 U	1.58 U	0.079 U	0.079 U	0.5 U	1.3 U	0.079 U	0.079 U	0.079 U	0.079 U	1 U
Chemical Oxygen Demand (COD)	mg/L	56.8	33	32.8	---	9.4 J	11	10.9	26.8	20.7	14.4	12.7
Chloride	mg/L	25.2	28.1	17.9	18.7	15	14	16.7	16.9	15.9	15.5	14.9
Conductivity	umhos/cm	3510	4240	3.97	3.28	2400	2500	37600	2750	1430	2500	2390
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	1.11	1.28	---	---	---	---	0.679	0.683	0.603	0.611	0.568
Fluoride (dissolved)	mg/L	---	---	1.48	1.47	0.66	0.56	---	---	---	---	---
Hardness	mg/L	1070	935	629	756 B	870	900	924	930	970	861	825000 B
Nitrate (as N)	mg/L	16.6	19	15.3	16.1	8.3	9.3	6.76	7.81	8.91	6.65	7.36
Nitrite (as N)	mg/L	0.1 U	0.0277 U	0.0277 U	0.0277 U	0.05 U	0.13 U	0.0277 U	0.0277 U	0.0277 U	0.0277 U	0.1 U
Oil and Grease, Total	mg/L	---	---	1.35 U	1.29 U	---	---	---	---	---	---	---
Oil and grease (HEM), polar	mg/L	---	---	---	---	4.3 U	4.5 U	---	---	---	---	---
Oil and grease (HEM), total	mg/L	5.56 U	1.29 U	---	---	---	---	1.16 U	1.16 U	1.16 U	1.16 U	5.56 U
pH	s.u.	7.70 T8	7.65 J	7.92 J	7.88 T8	7.62 J	7.39 HF	7.44 J	7.70 J	8.42 J	7.53 J	7.41 T8
Phenolics (Total)	mg/L	0.0126 J	0.0083 U	0.0083 U	0.026 J	0.01 U	0.014	0.015 J	0.0207 U	0.0083 U	0.0083 U	0.0443
Phosphorus as P, total	mg/L	0.1 U	0.0621 U	0.036 J	0.052 B	0.1 U	0.1 U	0.0414 U	0.035 U	0.0693 J	0.0748 U	0.0558 JB
Silica	mg/L	23.6	14.7	17.1	15.5	---	---	17.9	20.8	25	18.6	25.9
Sulfate	mg/L	2030	2000	1780	1560	950	910	986	1100	1030	880	1020
Sulfide	mg/L	0.05 U	0.0065 U	0.0065 U	0.0065 U	3 U	7.5	0.0065 U	0.0065 U	0.0065 U	0.0065 U	0.05 U
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	2790	3320	2760	2490	1900	2000	1730	1840 J	1970	1900	1650
Nitrogen, Total Kjeldahl	mg/L	1.1 J6	1.2	0.522	---	5 U	5 U	0.633	0.608	0.208 J	0.035 U	0.25 U
Total Organic Carbon (TOC)	mg/L	11.7	13.6	13	10.8	5.3	5.6	92.8	5.5	5.91	5.73	---
Total Pet_ Hydrocarbons	mg/L	---	---	---	---	---	---	---	---	---	---	---
Total Suspended Solids (TSS)	mg/L	---	---	---	4.4	---	---	---	---	---	---	5.23
Dissolved Organic Carbon (DOC)	mg/L	10.9	12.5	12.7	---	12	5.5	96.1	5.13	5.65	6.45	5.22

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A
SampleDate		6/4/2018	11/13/2018	05/29/2019	10/14/2019	5/13/2015	10/15/2015	5/24/2016	10/5/2016	5/3/2017	10/10/2017	5/23/2018
Parameters	Units											
Metals												
Arsenic	ug/L	13.4	12.6	12.6	---	2.4	2.5	2.14	1.92	2.5	2.47	3.46
Arsenic (Dissolved)	ug/L	13.6	13	14.4	12.3	0.92 J	1.9	1.97	1.78	1.15	1.24	1.96
Boron	ug/L	---	---	---	---	2200	2600	---	---	---	---	---
Boron (Dissolved)	ug/L	10700	9890	9700	10200 V	---	---	1720	2380	2590	2850	2960
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	1.00 U	0.220 U	0.352 J	116000	1 U	0.28 J	0.220 U	0.220 U	0.220 U	0.22 U	1.00 U
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	159000	148000	162000	---	110000	140000 B	145000	162000	149000	140000	148000
Chromium	ug/L	3.61	2.52	3.21	---	0.78 J	1.5 J	1.34	0.460 U	1.7 U	0.958 J	1.13 B
Chromium (Dissolved)	ug/L	3.15	3.22	4.04	---	2 U	0.97 J	1.18	1.29 U	0.320 U	0.342 J	0.602 B J
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	13	10.7	7.36	---	1.8 J	3	2.63	2.44 U	4.03	3.47	4.4
Iron	ug/L	83.8 J	27.1 J	96.6 J	---	1900	5200	3620	1430	2960	3820	4210
Iron (Dissolved)	ug/L	100 U	15.0 U	82.9 U	15.0 U	55	180	3340	812	116	136	157 B
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.357 J	0.260 U	0.388 J	---	1 U	0.064 J	0.351 J	0.260 U	0.260 U	0.26 U	1.00 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	248	256	303	---	110	110	123	114	131	107	112
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	158000	173000	184000	128000	97000	110000	119000	130000	127000	122000	133000
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	5.00 U	0.510 U	86.8	---	16	9.5	28.3	10.2	9.72	11.7	23.8
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.200 U	0.0490 U	0.0490 U	---	0.2 U	0.031 JB	0.0490 U	0.0490 U	0.0490 U	0.049 U	0.200 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	21500	21000	21800	16900	3400	4100	4190	4440	4180	4340	4470

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LWCW-1A	LWCW-1A	LWCW-1A	LWCW-1A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A	LW-22A
SampleDate		6/4/2018	11/13/2018	05/29/2019	10/14/2019	5/13/2015	10/15/2015	5/24/2016	10/5/2016	5/3/2017	10/10/2017	5/23/2018
Parameters	Units											
Metals												
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	47.1	48.4	54.1	44.0	15	19	18.4	20.5	20.5	19.2	22.1
Silicon	ug/L	11000	6890	7980	7270	---	---	8360	9740	11700	8700	12100
Silicon (Dissolved)	ug/L	---	---	---	---	6500	8100	---	---	---	---	---
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	582000	647000	692000	547000	210000	250000	257000	276000	272000	257000	296000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	4660	4360	4560	---	2200	2700	3060	3170	3370	3630	3390
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	9.96 J	9.49 J	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	---	---	15.1	---	15	23 B	36.2	25.4	12.2	2.23 U	17
Volatile Organic Compounds - BTEX												
Benzene	ug/L	1.00 U	0.331 U	0.331 U	0.331 U	5 U	5 U	0.331 U	0.331 U	0.331 U	0.331 U	1.00 U
Ethylbenzene	ug/L	1.00 U	0.384 U	0.384 U	0.384 U	5 U	5 U	0.384 U	0.384 U	0.384 U	0.384 U	1.00 U
Toluene	ug/L	1.00 U	0.412 U	0.412 U	0.412 U	5 U	5 U	0.780 U	0.780 U	0.412 U	0.412 U	1.00 U
Xylenes, Total	ug/L	3.00 U	1.06 U	1.06 U	1.06 U	10 U	10 U	1.06 U	1.06 U	1.06 U	1.06 U	3.00 U
Petroleum Products												
Diesel fuel	mg/L	0.198	0.159	0.0835 U	0.119	0.46 U	0.25 J	0.289	24.7 U	0.0517 U	0.0247 U	0.0293 J
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---
Radiology												
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---
Field Parameters												
Specific conductivity, field	umhos/cm	4281	4185	3692	3737	1700	1844	1935	1814	2559	2436	2548
Dissolved oxygen (DO), field	mg/L	9.82	7.00	13.44	6.03	6.16	7.5	---	6.92	7.88	6.54	7.42
Oxidation reduction potential (ORP), fie millivolts		93.1	126.1	17	8.3	22.9	59.0	10.7	75.3	38.8	19.7	-14.0
pH, field	s.u.	6.89	8.77	6.52	7.09	7.28	7.32	7.44	7.19	7.39	7.31	6.89
Temperature, ambient	Deg C	---	---	60	60	21	24	---	---	15.6	10	---
Temperature, field	Deg C	10.06	8.7	10.98	9.92	11	11.05	11.1	10.38	11.2	11.0	11.1
Turbidity, field	NTU	70.4	3.73	7.84	12.69	57.37	21.52	34.8	23.4	52.6	47.00	70.4

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LW-22A	LW-22A	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Research
SampleDate		10/31/2018	05/20/2019	5/12/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/11/2017	5/29/2018	10/22/2018	05/22/2019	Trib
Parameters	Units												5/12/2015
General Chemistry													
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	436	455	240	260 B	288	228	243	252	257	246	260	280
Alkalinity, Carbonate (as CaCO ₃)	mg/L	2.71 U	2.71 U	36	16	2.71 U	17.4 J	7.72 J	7.98 J	15.8 J	8.18 J	12.8 J	32
Alkalinity, Total (As CaCO ₃)	mg/L	436	455	280	280 B	290	246 J	251	260	273	254	272	320
Ammonia	mg/L	0.0317 U	0.0317 U	0.1 U	0.1 U	0.038 U	0.038 U	0.059 U	0.0317 U	0.1 U	0.0317 U	0.0317 U	0.1 U
Bromide	mg/L	0.395 U	1.58 U	0.5 U	0.5 U	0.079 U	R	1.58 U	0.079 U	1 U	0.79 U	0.79 U	0.5 U
Chemical Oxygen Demand (COD)	mg/L	9.08 J	13.5	15	2.7 J	12.2	54.6	4.94 J	10.6	6.66 J	3 U	5.35 J	10 U
Chloride	mg/L	14.8	15.2	7.2	7.8	7.85	8.98	10	11.3	11.9	10.6	7.57	50
Conductivity	umhos/cm	2500	2.41	1400	1700	1400	1620	1560	1920	1980	9030	1.32	1600
Cyanide (free)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Fluoride	mg/L	0.66	---	---	---	0.0895 J	0.0538 J	0.0733 J	0.0689 J	0.111	0.122	---	---
Fluoride (dissolved)	mg/L	---	0.656	0.14	0.086 J	---	---	---	---	---	---	0.102	0.2
Hardness	mg/L	832	919	600	720	561	605	673	832	757	698	535	660
Nitrate (as N)	mg/L	8.62	8.36	0.53	0.07 J	0.511	0.276	0.454 UJ	0.291	0.1 U	0.214	0.395	2.2
Nitrite (as N)	mg/L	0.0277 U	0.0277 U	0.05 U	0.05 U	0.0277 U	0.0277 U	0.0277 U	0.0277 U	0.1 U	0.0277 U	0.0277 U	0.05 U
Oil and Grease, Total	mg/L	---	1.29 U	---	---	---	---	---	---	---	---	1.16 U	---
Oil and grease (HEM), polar	mg/L	---	---	4.3 U	4 U	---	---	---	---	---	---	---	4.5 U
Oil and grease (HEM), total	mg/L	1.16 U	---	---	---	1.16 U	1.16 U	1.16 U	1.16 U	5.05 U	1.16 U	---	---
pH	s.u.	7.52 J	7.54 J	8.57 J	8.52 HF	7.72 J	8.55 J	8.35 J	8.4 J	8.45 T8	8.38 J	8.57	8.55 J
Phenolics (Total)	mg/L	0.0083 U	0.0083 U	0.01 U	0.01 U	0.0083 U	0.013 U	0.0083 U	0.0083 U	0.04	0.0083 U	0.0164 U	0.01 U
Phosphorus as P, total	mg/L	0.165 U	0.396 J	0.1 U	0.1 U	0.048 J	0.035 U	0.0362 J	2.96	0.1 U	0.0473 U	0.035 U	0.1 U
Silica	mg/L	21	20.2	---	---	18.5	17.9	18.9	20.3	20.3	17.5	15	---
Sulfate	mg/L	993	982	580	630	472	704	607	755	1080	849	461	580
Sulfide	mg/L	0.0065 U	0.0065 U	3 U	1.2 J	0.0065 U	0.030 J	0.0065 U	0.0065 U	0.05 U	0.0065 U	0.014 J	0.7 J
Sulfite	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Thiocyanate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Thiosulfate	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Total Dissolved Solids (TDS)	mg/L	1850	2010	1100	1400	1100	1110	1170	1530 0	1480	1450	956	1300
Nitrogen, Total Kjeldahl	mg/L	0.55	0.35 U	2.7 J	5 U	0.444	0.255	0.101 J	0.259 U	0.190 J6	0.254 J	0.211 U	3.3 J
Total Organic Carbon (TOC)	mg/L	---	5.44	3.6	3	43.4	3.23	2.87	3.47 0	---	---	3.65	11
Total Pet_ Hydrocarbons	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Total Suspended Solids (TSS)	mg/L	5.59	---	---	---	---	---	---	---	3.78	3.5	---	---
Dissolved Organic Carbon (DOC)	mg/L	5.25	5.46	9.5	3.7	22.5	3.38	3.13	3.62	3.53	3.74	3.57	16

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LW-22A	LW-22A	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Research
SampleDate		10/31/2018	05/20/2019	5/12/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/11/2017	5/29/2018	10/22/2018	05/22/2019	Trib
Parameters	Units												5/12/2015
Metals													
Arsenic	ug/L	2.49	0.930 J	4.5	4.3	3.9	3.9	4.44	4.68	5.55	5.28	3.48	4.2
Arsenic (Dissolved)	ug/L	1.09	2.09	5	4.1	3.55	3.75	6.15	6.1	5.59	4.87	3.99	4.4
Boron	ug/L	---	---	48	70	---	---	---	---	---	---	---	100
Boron (Dissolved)	ug/L	2690	2550	---	---	89.6	74.9	624	93 J	111	153 J	172 J	---
Cadmium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Dissolved)	ug/L	0.220 U	0.220 U	1 U	1 U	0.220 U	0.220 U	0.220 U	0.22 U	1.00 U	0.220 U	0.220 U	1 U
Calcium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Calcium (Dissolved)	ug/L	136000	157000	87000	95000 B	95000	112000	98900	106000	112000	116000	99500	110000
Chromium	ug/L	0.830 J	0.320 U	0.46 J	0.76 J	1.18	1.02 U	0.320 U	0.701 J	0.441 J	0.840 J	1.17	0.74 J
Chromium (Dissolved)	ug/L	0.320 U	1.30	0.52 J	0.89 J	1.01	1.20 U	0.704 J	0.686 J	0.572 J	0.471 U	1.26	0.58 J
Chromium III	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Chromium VI	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Copper (Dissolved)	ug/L	3.34	3.18	1.7 J	2.2	1.4	1.26	8.95	2.5	3.33	1.82	2.20	3.4
Iron	ug/L	3340	77.2 J	15 J	50 U	15.0 U	74.6 J	15.0 U	15 U	100 U	121	39.1 J	120
Iron (Dissolved)	ug/L	182	76.6 J	10 J	50 U	15.0 U	15.0 U	15.0 U	15 U	100 U	15.0 U	15.0 U	12 J
Lead	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lead (Dissolved)	ug/L	0.260 U	0.535 J	1 U	0.066 J	0.260 U	0.260 U	0.260 U	0.26 U	1.00 U	0.260 U	0.260 U	1 U
Lithium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Lithium (Dissolved)	ug/L	118	112	44 J	51	53	53.3	58.4	56.1	66.3	59.7	42.1	35 J
Magnesium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Magnesium (Dissolved)	ug/L	126000	135000	69000	89000 B	75600	104000	103000	117000	133000	121000	76400	78000
Manganese	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Manganese (Dissolved)	ug/L	28.4	35.6	0.9 J	0.11 JB	0.611 J	1.11 J	0.510 U	0.561 J	5.00 U	44.8	0.510 U	1.3 J
Mercury	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Mercury (Dissolved)	ug/L	0.0490 U	0.0490 U	0.2 U	0.2 U	0.0490 U	0.0490 U	0.0490 U	0.049 U	0.0614 B J	0.0490 U	0.341	0.2 U
Molybdenum (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Nickel (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Potassium (Dissolved)	ug/L	3940	4620	950	1200	1070	1040	1550	1470	1350	2040	1170	1600

Table 11. Logan Wash Monitoring Well Analytical Data

SampleID		LW-22A	LW-22A	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Big Seep	LW-Research
SampleDate		10/31/2018	05/20/2019	5/12/2015	10/14/2015	5/23/2016	10/4/2016	5/1/2017	10/11/2017	5/29/2018	10/22/2018	05/22/2019	Trib
Parameters	Units												5/12/2015
Metals													
Selenium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Selenium (Dissolved)	ug/L	18.5	22.6	3.5 J	1.9 J	2.56	1.80 J	1.73 J	1.74 J	1.88 J	1.56 J	2.21	7.7
Silicon	ug/L	9800	9420	---	---	8620	8350	8850	9470	9480	8170	7000	---
Silicon (Dissolved)	ug/L	---	---	7200	7800	---	---	---	---	---	---	---	8200
Silver	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Silver (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Sodium (Dissolved)	ug/L	281000	303000	100000	120000	114000	138000	144000	148000	182000	166000	120000	110000
Strontium	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Strontium (Dissolved)	ug/L	2960	3550	3800	4500	3970	5450	5680	5830	6320	5050	4250	3000
Uranium (Dissolved)	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	ug/L	---	---	---	---	---	---	---	---	---	---	---	---
Zinc (Dissolved)	ug/L	6.64 J	26.4	0.94 J	1.5 JB	2.51 U	4.00 J	2.83 J	2.52 U	10.0 U	12.2	3.07 J	0.43 J
Volatile Organic Compounds - BTEX													
Benzene	ug/L	0.331 U	0.331 U	5 U	5 U	0.331 U	0.331 U	0.331 U	0.331 U	1.00 U	0.331 U	0.331 U	5 U
Ethylbenzene	ug/L	0.384 U	0.384 U	5 U	5 U	0.384 U	0.384 U	0.384 U	0.384 U	1.00 U	0.384 U	0.384 U	5 U
Toluene	ug/L	0.412 U	0.412 U	5 U	5 U	0.780 U	0.780 U	0.412 U	0.412 U	1.00 U	0.412 U	0.412 U	5 U
Xylenes, Total	ug/L	1.06 U	1.06 U	10 U	10 U	1.06 U	1.06 U	1.06 U	1.06 U	3.00 U	1.06 U	1.06 U	10 U
Petroleum Products													
Diesel fuel	mg/L	0.0362 J	0.0471 J	0.48 U	0.22 J	0.0526 J	0.0458 J	0.0781 J	0.0247 U	0.0717 B J	0.0610 J	0.029 J	0.5 U
TPH - Extractable (DRO)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (non-polar)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
TPH (C21 - C28)	mg/L	---	---	---	---	---	---	---	---	---	---	---	---
Radiology													
Gross Alpha Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Gross Beta Analytes	pci/l	---	---	---	---	---	---	---	---	---	---	---	---
Field Parameters													
Specific conductivity, field	umhos/cm	2455	2451	1445	1098	896	923	1542	1826	1946	1941	1296	1627
Dissolved oxygen (DO), field	mg/L	6.46	1.84	8.52	8.44	11.1	13.75	8.57	7.25	9.21	9.24	13.73	7.24
Oxidation reduction potential (ORP), fie	millivolts	87.5	37.4	341.3	306.8	343.6	234.7	257	185	129.3	150.5	21	222.6
pH, field	s.u.	6.95	7.12	8.25	6.51	6.25	6.57	6.16	8.31	7.22	6.43	--	8.35
Temperature, ambient	Deg C	---	60	16	24	---	---	15.6	15.6	---	---	60	16
Temperature, field	Deg C	11.3	11.35	10.39	8.9	4.62	1.7	6.4	7.9	8.56	10.1	6.93	10.71
Turbidity, field	NTU	43.18	22.51	2.89	1.48	---	4.51	1.42	0.87	0.98	0.19	1.21	2.67

Table 11. Logan Wash Mine Retort Water Analytical Data

Notes:

U = result not detected at the reporting limit

J = result value greater than the MDL and less than the RL; result considered estimated

B = analyte found in sample and associated blank

HF = analysis holding time exceeded; result considered estimated

E = result estimated due to the presence of interference

R = rejected data

O1 = failed the method required serial dilution test and or subsequent post spike criteria. Failures indicate matrix interference

V = sample concentration is too high to evaluate accurate spike recoveries

--- = Analysis not performed