Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com *An EEO Employer*

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Technical Memorandum

To: Stuart Arkley, DNR; Richard Clark, MPCA
From: Barr Engineering Company
Subject: Results of Residential Well Sampling North of LTVSMC Tailings Basin
Date: January 27, 2009
Project: 23/69-862
c: Kevin Pylka and Jim Scott, PolyMet Mining, Inc.

Objective/Background

This memorandum presents the results of residential well sampling completed by Barr Engineering Company on behalf of PolyMet Mining Inc. in response to a request by the cooperating agencies for additional background groundwater quality data following preliminary review of RS74 Draft-02. The well sampling was conducted in accordance with the "Work Plan for Residential Well Sampling North of the LTVSMC Tailings Basin," (Work Plan) submitted on December 10, 2008 by Barr Engineering and approved by Richard Clark of the MPCA on December 12, 2008.

Groundwater Sampling

Groundwater samples were collected from a total of 15 residential wells located north of the former LTV Steel Mining Company (LTVSMC) Tailings Basin located approximately six miles north of Hoyt Lakes, Minnesota. The sampling locations are shown on Figure 1. The sample ID corresponds to the house number or fire number of the residence where the sample was collected. Samples were collected by representatives of Barr Engineering Company on December 19, 2008, January 7, 2009, and January 9, 2009. Following collection, groundwater samples were submitted to Northeast Technical Services in Virginia, Minnesota for analysis of selected general parameters, total metals, and dissolved metals. Analytical parameters are summarized on Table 1. The list of analytical parameters was approved by Richard Clark of the MPCA via email on December 12, 2009. Table 2 summarizes the available information regarding the wells that were sampled. The Minnesota Department of Health (MDH) Unique Well ID was unavailable or unknown for a total of six of the sampled wells. Attachment A contains well logs for wells where the MDH Unique Well ID was available. The sampled wells ranged in depth from approximately 16 feet to 325 feet. As indicated on Figure 1, seven of the sampled wells are completed in

bedrock (Giants Range Granite) and the remaining wells are completed in the unconsolidated glacial deposits. A number of wells were completed at the interface between the surficial deposits and bedrock or less than five feet below the bedrock surface. These wells are considered to be completed in bedrock for classification purposes, although the water they draw may be more reflective of shallow groundwater than water from the bedrock aquifer. Table 2 indicates whether a water softener or other water treatment equipment was observed at the residence. In accordance with the Work Plan, all samples were collected upstream of filters and/or treatment equipment or the treatment equipment was bypassed while the sample was taken. One duplicate laboratory sample was collected during the sampling program.

Results

Laboratory results for each sample are summarized in Table 3 and laboratory reports are provided in Attachment B.

A review of the laboratory quality control data was conducted to assess the validity of the analytical results for the residential well sampling events. This review was performed in accordance with the Barr Engineering Standard Operating Procedure for data validation, which is based on "The National Functional Guidelines for Inorganic and Organic Data Review" (EPA 2004, 2005). Laboratory analysis was performed by Northeast Technical Services, located in Virginia, Minnesota.

Technical holding times and temperatures were evaluated for each sample and target parameter based on the EPA recommendations listed in 40 CFR SW8-46 "Test Methods for Evaluating Hazardous Waste". One group of samples was received by the laboratory at 8.2° C, which is above the recommended 6° C. Since the samples were hand delivered to the laboratory several hours after sampling, they likely did not have enough time to cool to 6° C and no qualifiers were applied. The laboratory met all technical holding times for all samples.

No target analytes were present above the laboratory reporting limits in the method blank samples included in the laboratory reports.

Laboratory accuracy and precision data reviewed for the site included laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS) and matrix spike duplicate (MSD) data.

All LCS/LCSD and MS/MSD samples displayed percent recoveries and relative percent differences (RPDs) within acceptable limits for target analytes.

Laboratory duplicates were analyzed with each analytical batch, as required by the methods, and one field duplicate was collected and analyzed during the residential well sampling event. The RPD between the native sample (4789) and field duplicate was well above the acceptable 30% for copper (151%). The copper results were qualified with an "*" on Table 3 for the native sample and field duplicate and should be considered estimated for these two samples. All remaining duplicate data met acceptance criteria. Several samples had dissolved metals concentrations that were higher than the corresponding total metals concentrations. No qualifiers were deemed necessary because the concentrations were almost identical to each other and/or close to the reporting limit. In these situations, the fact that the dissolved concentrations were higher does not require corrective QC action.

All data met the data project requirements and is deemed acceptable for the purposes of this project with the previously mentioned qualifications.

Discussion

Consistent with RS74B, concentrations were compared with EPA Maximum Contaminant Levels (MCLs), MDH Health Risk Limits (HRLs), and EPA Secondary Maximum Contaminant Levels (sMCLs). It should be noted that the groundwater standards that the NorthMet Project will be required to meet and compliance locations will be established during the permitting process and the above standards were selected strictly for comparative purposes. In general, constituent concentrations are below the standards, with the exception of manganese at eight wells, aluminum at one well, and pH at four wells.

Manganese concentrations ranged from 0.66 ug/L in sample 4488 to 4,710 ug/L in sample 4400 and exceeded NorthMet DEIS evaluation criteria at eight of the sampled wells. The current MDH HRL for manganese is 100 ug/L and the EPA sMCL is 50 ug/L. Recent guidance from the MDH suggests that an EPA recommended value of 300 ug/L should be used instead of the current HRL value (MDH, 2008, http://www.health.state.mn.us/divs/eh/risk/guidance/manganse.html). The MDH plans to conduct an in-depth review of manganese in the near future and will likely revise the current HRL of 100 ug/L at that time. With one exception, the exceedances of manganese groundwater evaluation criteria occurred in

wells completed in the unconsolidated surficial aquifer. The single bedrock well with an exceedance of the manganese evaluation criteria penetrates just two feet of granite bedrock and likely draws groundwater from the unconsolidated-bedrock interface. Several wells completed in the surficial aquifer did not exceed manganese criteria and in some cases, these wells were located within close proximity to wells that exceeded criteria. Manganese concentrations are shown in map view on Figure 2. The reason for the highly variable observed manganese concentrations is unknown, but it is believed to be related to localized oxidation-reduction conditions in the surficial aquifer. The concentrations do not fall outside the range of values that has been observed in previous studies of background groundwater quality in the area. Siegel and Erickson (1980) indicated a mean manganese concentration of 2,140 ug/L, a median concentration of 45 ug/L, and a maximum concentration of 26,000 ug/L based on 38 samples collected from wells completed in sand and gravel aquifers in the "Copper-Nickel Study Region," an area of approximately 1,400 square miles in east-central St. Louis and northwestern Lake County. A more recent MPCA study (1999) of background groundwater quality of the northeastern Minnesota region indicated a mean manganese concentration of 282 ug/L and median concentration 157 ug/L based on samples from 12 wells completed in unconfined buried Quaternary aquifers. It should be noted that the MPCA results include a number of samples collected a significant distance from the NorthMet Project site; thus, the results of the MPCA study are likely not as directly comparable to the samples collected in the immediate project area.

Aluminum was present above the laboratory detection limit (25 ug/L) in two of the sampled wells (samples 4249 and 4400). The single exceedance of aluminum groundwater NorthMet DEIS evaluation criteria occurred in sample 4400, which contained a total aluminum concentration of 83.4 ug/L. This sample also contained elevated manganese concentrations and had a pH of 5.70, which is outside the sMCL-recommended range. According to information provided by the resident, this well is a sand point completed in sand and gravel at an approximate depth of 21 feet. The resident also stated that the water is generally of poor quality and water exposed to oxygen will turn orange, presumably due to the manganese and iron content. This resident does not have a water softener to treat this water prior to use.

Field-measured pH values fell outside the sMCL-recommended range of 6.5 to 8.5 at four of the sampled wells. At these wells, pH values ranged from 5.70 to 6.49. These values are not outside the range of values presented by Siegel and Erickson, which range from 5.7 to 8.0 based on results from 72 wells completed in Quaternary till and sand and gravel. Siegel and Erickson noted a mean pH value of 6.33 for

wells completed in Quaternary sand and gravel. The 1999 MPCA study noted a range of pH values of 6.1 to 8.4 for wells completed in water table aquifers in northeastern Minnesota.

Summary and Conclusions

Sampling of 15 residential wells north of the LTVSMC Tailings Basin was completed by Barr Engineering in December 2008 and January 2009 to provide additional data on baseline groundwater quality in the NorthMet Project area. With the exception of one well completed in the upper two feet of the bedrock, concentrations in samples collected from wells completed in the bedrock aquifer did not exceed health-based groundwater evaluation criteria (i.e. EPA MCLs or MDH HRLs). A total of seven samples from wells completed in the surficial deposits exceeded the current MDH HRL of 100 ug/L for manganese. Due to the widespread nature of these manganese exceedances, these concentrations are not believed to be related to historical activities at the LTVSMC Tailings Basin and are thought to be reflective of localized oxidation-reduction conditions in the surficial aquifer. Previous studies of baseline groundwater quality in the vicinity of the NorthMet project have indicated that elevated manganese concentrations occur in the surficial aquifer and the results of sampling presented in this memo do not fall outside of the range of values that have been observed in those studies. Since the MDH HRL for manganese is currently under consideration and the concentrations observed are within the range of values that have been observed in previous baseline studies, Barr Engineering and PolyMet do not believe that resampling the wells that exceeded manganese criteria is warranted at this time. A copy of the laboratory report will be provided to each well owner.

References

Siegel, D. and D. Ericson. 1980. Hydrology and Water Quality of the Copper-Nickel Study Region, Northeastern Minnesota. U.S. Geological Survey Water-Resources Investigations Open-File Report 80-739.

Minnesota Pollution Control Agency, 1999. Baseline Water Quality of Minnesota's Principal Aquifers – Region 1, Northeastern Minnesota. Available at: http://www.pca.state.mn.us/water/groundwater/gwmap/baselinene-rpt.pdf

Tables

Table 1. Parameters for Groundwater Sample Analysis. Detection limits in ug/L unless otherwise noted.

Description	Method	Detection Limit
Alkalinity, Total as $CaCO_3$	EPA 310.1	10 mg/L
Aluminum, Total	EPA 200.7	25
Aluminum, Dissolved	EPA 200.7	25
Antimony, Total	EPA 200.8	0.5
Arsenic, Total	EPA 200.8	2
Arsenic, Dissolved	EPA 200.8	2
Boron, Total	EPA 200.7	50
Boron, Dissolved	EPA 200.7	50
Calcium, Total	EPA 200.7	0.5 mg/L
Chloride	EPA 300.0	0.5 mg/L
Copper, Total	EPA 200.8	0.7
Copper, Dissolved	EPA 200.8	0.7
Fluoride	EPA 300.0	0.1 mg/L
Hardness, Total (calculated)	SM2340B	10 mg/L
Magnesium, Total	EPA 200.7	0.5 mg/L
Manganese, Total	EPA 200.8	0.5
Manganese, Dissolved	EPA 200.8	0.5
Molybdenum, Total	EPA 200.8	0.2
Nickel, Total	EPA 200.8	0.6
Nickel, Dissolved	EPA 200.8	0.6
pH, Field		0.1 SU
Potassium, Total	EPA 200.7	0.25 mg/L
Sodium, Total	EPA 200.7	2 mg/L
Solids, Total Dissolved	EPA 160.1	10 mg/L
Sulfate	EPA 300.0	1 mg/L

Table 2
Residential Well Details
NorthMet Project
PolyMet Mining, Inc.

Sample ID	Sample Date	MDH Well ID	Township	Range	Section	Well Owner (2007 St. Louis County Plat Book, Tax Rolls, or by Personal Visit)	Well Owner as listed by MDH County Well Index	Well Address	Well Depth (ft bgs)	Open Interval (ft bgs)	Completion Date	Open Interval Lithology	Water Filter/ Treatment
3617	12/19/08	Unknown	60N	14W	24	Rich Grayson	Not in database	3617 Salo Road, Embarrass, MN 55732	Unknown (sandpoint)	Unknown	Unknown	Unknown (assumed unconsolidated deposits)	None known
3854	12/19/08	Unknown	60N	14W	23	Wilbur Ball	Not in database	3854 Salo Road, Embarrass, MN 55732	28 (from owner)	Unknown	>25 years ago	Unknown (assumed unconsolidated deposits)	None known
3857	12/19/08	555048	60N	14W	23	Rodger Porisch	Rodger Porisch	3857 Salo Road, Embarrass, MN 55732	45	29-45	10/7/1994	Bedrock	None known
4249	1/9/09	572971	60N	14W	9	Peter and Karen Larson	Charles Lantz	4249 Highway 21, Embarrass, MN 55732	325	20-325	6/13/1996	Bedrock	Filter
4330	12/19/08	Unknown	60N	14W	29	Harlan Gorecki	Not in database	4330 Beckman Road, Embarrass, MN 55732	16 (from Owner)	Unknown	Unknown	Unknown (assumed unconsolidated deposits)	None known
4400	1/9/09	Unknown	60N	14W	29	Tracey Lilienthal	Not in database	4400 Beckman Road, Embarrass, MN 55732	Sandpoint (from owner)	Unknown	Unknown	Unknown (assumed unconsolidated deposits)	None known
4488	1/7/09	Unknown	60N	14W	29	Cliff Wagenback (Rob and Katie Furnal owners)	Not in database	4488 Beckman Road, Embarrass, MN 55732	200 (from owner)	Unknown	Unknown	Unknown (assumed bedrock)	None known
4492	12/19/08	576439	60N	14W	20	Howard Kari	Howard Kari	4492 Salo Road, Embarrass, MN 55732	80	Bottom of casing*	7/17/1996	Unconsolidated Deposits (sand and gravel)	Filter, softener
4789	1/9/09	151880	60N	15W	25	Ken Scherer	John Brouhard	4789 Byke Road, Embarrass, MN 55732	103	96-103	8/4/1978	Unconsolidated/top of bedrock	Softener
7531	12/19/08	735554	60N	14W	21	Anthony and Susan Licari	Anthony and Susan Licari	7531 Mattson Road, Embarrass, MN 55732	205	31-205	12/12/2005	Bedrock (granite)	Filter
7591	1/7/09	187853	60N	14W	19	Craig Salo	Raymond Lund	7591 Taapa Road, Embarrass, MN 55732	90	Bottom of casing*	11/22/1981	Unconsolidated Deposits (gravel)	Softener
7598	1/7/09	620143	60N	14W	19	Charisse Salo	Mary Jo Salo	7598 Taapa Road, Embarrass, MN 55732	61	Bottom of casing*	11/24/1998	Unconsolidated Deposits (sand and gravel)	None known
7603	1/7/09	Unknown	60N	14W	19	Ronald and Mary Jo Salo	Not in database	7603 Taapa Road, Embarrass, MN 55732	93 (from owner)	Unknown	Unknown	Unknown (assumed unconsolidated deposits)	None known
7611	12/19/08	563293	60N	14W	22	Steve and Jeanne Landwehr	Milton Lerfald	7611 Kaunonen Lake Road, Embarrass, MN 55732	325	18-325	6/23/1995	Bedrock	None known
7695	12/19/08	658445	60N	14W	16	Dwight Light	Dwight Light	7695 Mattson Road, Embarrass, MN 55732	83	81-83	12/17/2001	Bedrock (granite)	Softener

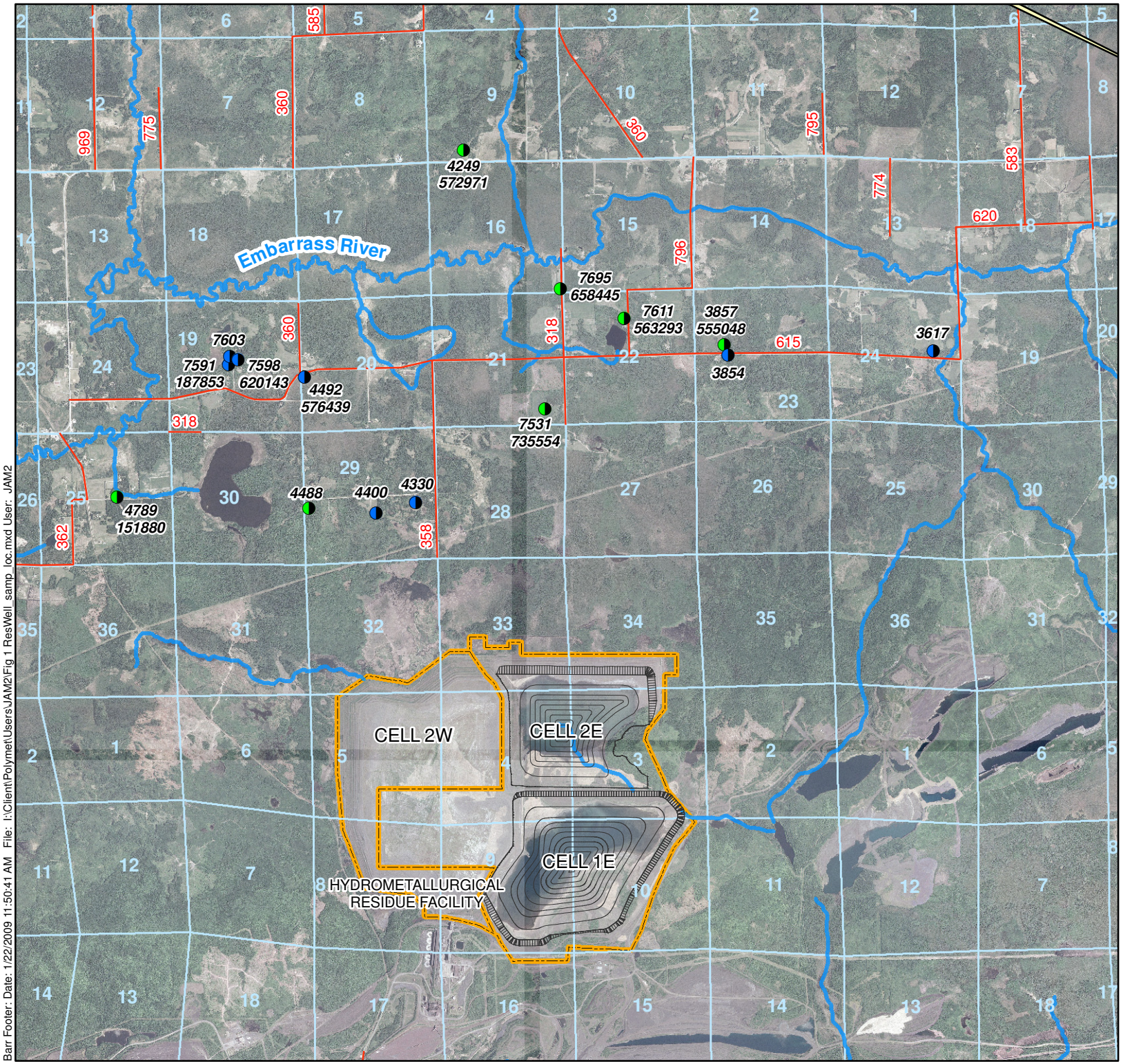
* According to MDH construction records, a number of wells in the area do not have an uncased or screened interval. Presumably, these wells draw water from the open bottom of the casing.

Table 3
Residential Well Sampling Analytical Data Summary
PolyMet Mining, Inc.
(concentrations in ug/L, unless noted otherwise)

Location	EPA Maximum		EPA Secondary	3617	3854	3857	4249	4330	4400	4488	4492	4789	4789	7531	7591	7598	7603	7611	7695
Date	Contaminant	MN Health	Maximum	12/19/2008	12/19/2008	12/19/2008	1/9/2009	12/19/2008	1/9/2009	1/7/2009	12/19/2008	1/9/2009	1/9/2009	12/19/2008	1/7/2009	1/7/2009	1/7/2009	12/19/2008	12/19/2008
Lab	Levels	Risk Limits	Contaminant Levels	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS	NTS
Dup	7/1/2002	8/27/2007	10/1/2002										DUP						
MDH Unique ID				Unknown	Unknown	555048	572971	Unknown	Unknown	Unknown	576439	151880		735554	187853	620143	Unknown	563293	658445
Well Owner				Grayson	Ball	Porisch	Larson	Gorecki	Lilienthal	Furnal	Kari	Scherer		Licari	Craig Salo	Charisse Sa	Ronald/Mai	Landwehr	Light
Well Depth				Unknown	28	45	325	16	Unknown	200	80	103		205	90	61	93	325	83
Casing Depth				Unknown	Unknown	29	20	Unknown	Unknown	Unknown	80	96		31	90	61	Unknown	18	81
Aquifer				Suficial	Surficial	Bedrock	Bedrock	Surficial	Surficial	Bedrock	Surifical	Bedrock		Bedrock	Surficial	Surficial	Surficial	Bedrock	Bedrock
Exceedance Key	Bold	Underline	Box																
General Parameters, mg/L																			
Alkalinity, total	--	--	--	60.7	57.4	59.9	87.7	62.9	111	92	176	86.3	86.8	48.1	136	58.6	115	36.9	104
Chloride	--	--	250	11.2	0.62	0.61	5.08	3.32	12.5	2.81	<0.5	0.86	0.86	9.3	1.49	1.16	0.61	11.2	1.24
Fluoride	4	--	2.0	<0.1	0.1	0.13	0.22	0.11	0.11	0.56	0.12	0.14	0.11	<0.1	0.11	<0.1	0.11	<0.1	0.13
Hardness, total	--	--	--	80.6	62.4	65.2	46.2	68	115	91.4	180	85.8	86.8	89.4	136	64.1	113	57.4	107
Solids, total dissolved	--	--	500	106	83	88	105	98	143	119	243	98	96	123	186	84	145	94	158
Sulfate	--	--	250	5.4	5.57	5.74	10.5	7.55	10.9	6.77	<1	2.48	2.48	20.9	<1	7.17	<1	4.14	<1
Field Parameters																			
pH, standard units	--	--	6.5-8.5	7.33	6.58	6.64	7.50	6.00	5.70	7.65	7.31	7.29	--	6.49	7.11	6.76	7.93	6.31	7.04
Eh, mV	--	--	--	296.5	327.0	317.0	333.2	353.4	338.9	272.1	237.2	37.0	--	331.7	72.2	359.0	174.2	382.9	169.5
Metals																			
Aluminum	--	--	50	<25	<25	<25	44	<25	83.4	<25	<25	<25	27	<25	<25	<25	<25	<25	<25
Antimony	6	6	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	10	--	--	<2	<2	<2	<2	<2	<2	<2	7.2	7.5	8.2	<2	<2	<2	<2	<2	3.3
Boron	--	600	--	<50	<50	<50	459	<50	50.4	79.5	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium, mg/L	--	--	--	21.8	14.3	14.7	11.7	14.8	26	25.9	51.4	23.7	24	21.1	41.6	14.8	34.7	15.4	35
Copper	1300 TT (7)	--	1000	20	86.7	16.9	155	52.3	11.9	5.3	3.4	16.4 *	117 *	46.5	<0.7	23.7	10.2	70	28.8
Magnesium, mg/L	--	--	--	6.36	6.49	6.92	4.12	7.55	12.1	6.48	12.6	6.47	6.52	8.92	7.86	6.59	6.46	4.61	4.84
Manganese	--	100+	50	1.5	2.4	2.7	2.4	284	4710	0.66	1400	583	603	23.6	654	7.3	432	4.7	578
Molybdenum	--	--	--	0.22	0.36	0.21	1.4	<0.2	0.22	2.8	1.3	0.58	0.59	<0.2	0.32	0.34	0.49	<0.2	0.29
Nickel	--	100	--	0.76	1.2	1.9	2.1	2.8	5.1	0.66	2.1	<0.6	1.4	5.5	0.99	1.2	1.3	0.86	1.1
Potassium	--	--	--	1710	1580	1780	1010	920	1720	580	2250	860	830	1840	1170	1590	1120	940	690
Sodium	--	--	--	2980	2280	2360	28400	7770	11800	8380	3510	3050	3090	4920	2760	2300	2450	3340	2560
Metals, dissolved																			
Aluminum, dissolved	--	--	50	<25	<25	<25	<25	<25	70.6	<25	<25	<25	<25	<25	<25	25.2	<25	<25	<25
Arsenic, dissolved	10	--	--	<2	<2	<2	<2	<2	<2	<2	6.7	7.5	7.5	<2	<2	<2	<2	<2	3.0
Boron, dissolved	--	600	--	<50	<50	<50	461	<50	<50	76.1	55.4	<50	<50	<50	<50	<50	<50	<50	<50
Copper, dissolved	1300 TT (7)	--	1000	16.5	40.8	16.2	35.5	42	11.5	6.4	2.2	2	3.6	25.3	<0.7	20.1	3.3	64.5	2.5
Manganese, dissolved	--	100+	50	1.3	2.1	1.9	1.1	272	4850	0.63	1320	580	570	18.4	650	6.2	430	4.3	544
Nickel, dissolved	--	100	--	<0.6	1.0	1.7	<0.6	2.5	4.9	0.76	1.6	<0.6	0.64	5	1.0	1.4	1.2	0.71	0.8

DUP Duplicate sample.
-- No criteria/not measured.
* Estimated value, QA/QC criteria not met.
(7) Copper action level at 1.3 mg/L.
TT Treatment technique.
+ While a HRL was promulgated for this chemical, due to research that has become available since the HRLs were promulgated, the MDH no longer recommends the HRL value. May 2008 MDH guidance recommends U.S. EPA lifetime health advisory value of 300 ug/L.

Figures



NorthMet Tailings Basin

River/stream

PLS sections

Residential well sampling location with Sample ID and MDH Unique Well ID (where available):

Bedrock well

Unconsolidated well

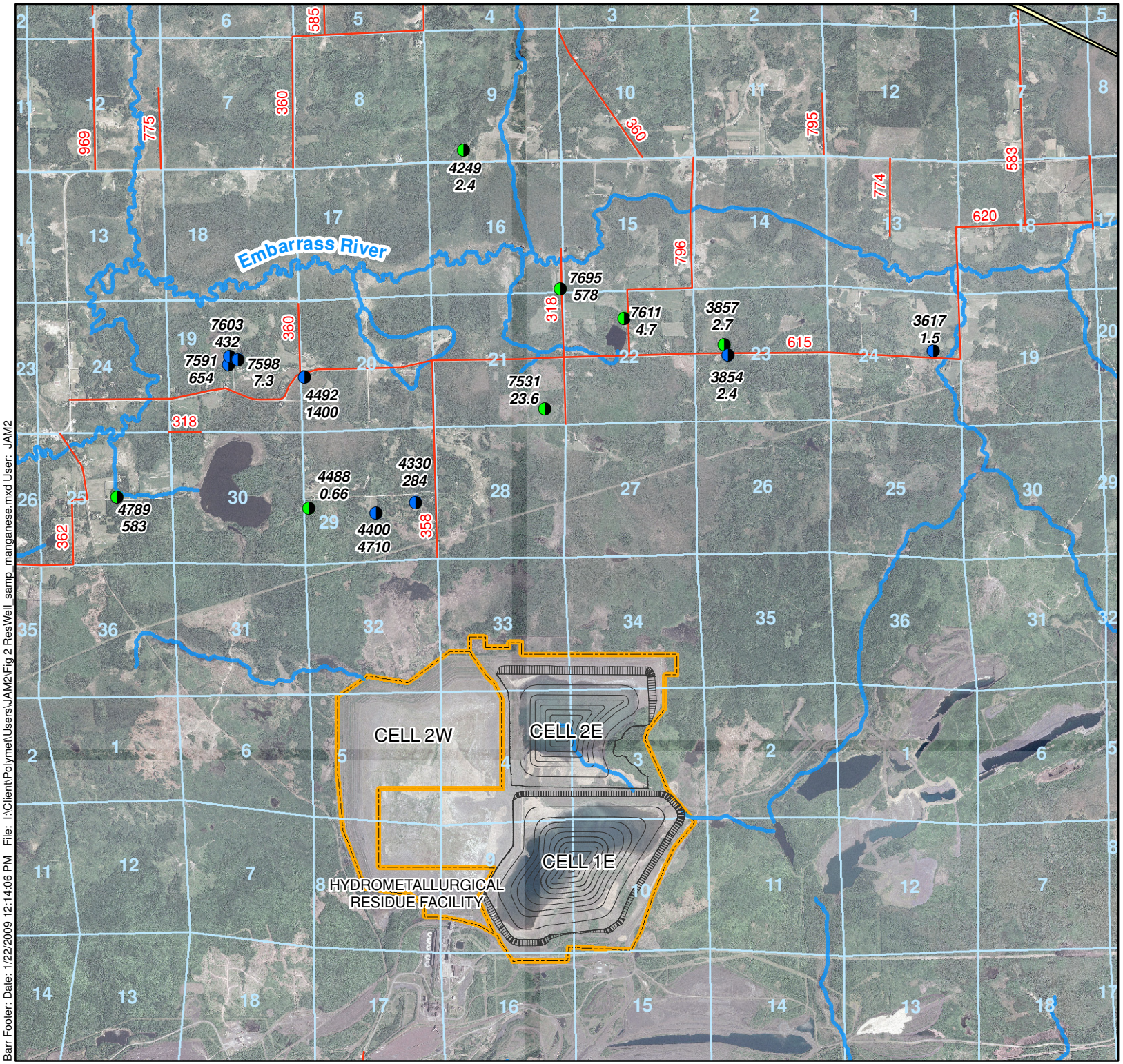
0 0.25 0.5 1 1.5 2

Miles

Figure 1

RESIDENTIAL WELL SAMPLING LOCATIONS
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN

Barr Footer: Date: 1/22/2009 11:50:41 AM File: I:\Client\Polymet\Users\JAM2\Fig 1 ResWell_samp_loc.mxd User: JAM2



NorthMet Tailings Basin

River/stream

PLS sections

Residential well sampling location with Sample ID and total manganese concentration (ug/L):

- Bedrock well
- Unconsolidated well

0 0.25 0.5 1 1.5 2

Miles

Figure 2

MANGANESE CONCETRATIONS
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN

Barr Footer: Date: 1/22/2009 12:14:06 PM File: I:\Client\Polymet\Users\JAM2\Fig 2 ResWell_samp_manganese.mxd User: JAM2

Attachment A

MDH Well Logs

Minnesota Unique Well No.

555048

County St. Louis
Quad Isaac Lake
Quad ID 318A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/16/1995
Update Date 01/07/2004
Received Date

Well Name PORISCH, RODGER

Township Range Dir Section Subsections Elevation 1459 **ft.**

60	14	W	23	BCDDAA	**Elevation Method**	7.5 minute topographic map (+/- 5 feet)

Well Depth	**Depth Completed**	**Date Well Completed**
45 **ft.**	45 **ft.**	10/07/1994

Drilling Method Multiple methods used

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	**Weight**	**Hole Diameter**
6 in. to 29 ft.	20 lbs./ft.	6 in. to 45 ft.

Open Hole from 29 ft. to 45 ft.

Screen NO **Make** **Type**

Diameter	**Slot/Gauze**	**Length**	**Set Between**

Well Address
3857 SALO RD
EMBARRASS MN 55732

Geological Material	**Color**	**Hardness**	**From**	**To**
GRAVEL/SAND	BROWN		0	29
LEDGE ROCK	PINK	MEDIUM	29	45

Static Water Level
0 ft. from Land surface Date Measured 10/07/1994

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
CASING THREADED AND WELDED.

Grouting Information Well Grouted? ☑ Yes ☐ No

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Address verification
Date 09/17/2003
System *UTM - Nad83, Zone15, Meters*
X: 568180 **Y:** 5279661

Nearest Known Source of Contamination
250 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/28/1994
Manufacturer's name AERMOTOR Model number 12 HP 0.5 Volts 230
Length of drop Pipe 19 ft. Capacity g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock Giants Range Granite Und.
Last Strat Giants Range Granite Und.
Aquifer Giants Range Granite Und.
Depth to Bedrock 29 **ft.**

Well Contractor Certification

Kolstad-olson	69554	MAJESKI, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **555048** Printed 11/18/2008 HE-01205-07

Minnesota Unique Well No.
572971

County St. Louis
Quad Embarrass
Quad ID 318B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 10/03/1996
Update Date 01/06/2004
Received Date

Well Name LANTZ, CHARLES
Township Range Dir Section Subsections Elevation 1450 **ft.**
60 14 W 9 CDCCBB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
325 **ft.**	325 **ft.**	06/13/1996

Drilling Method Multiple methods used

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 20 ft.	20 lbs./ft.	6 in. to 325 ft.

Open Hole from 20 ft. to 325 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
9 ft. from Land surface Date Measured 06/13/1996

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Well Address
4249 21 HY
EMBARRASS MN 55732

Geological Material	Color	Hardness	From	To
SAND	BROWN		0	17
GRAVEL	BROWN		17	20
LEDGE ROCK	GRAY	SOFT	20	165
LEDGE ROCK	GRY/PNK	MEDIUM	165	325

REMARKS
CASING THREADED AND WELDED.
GROUTING: CASING SEALER.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Other from to ft.

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Name on mailbox
Date 09/16/2003
System *UTM - Nad83, Zone15, Meters*
X: 564976 **Y:** 5282006

Nearest Known Source of Contamination
115 feet E direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/14/1996
Manufacturer's name AERMOTOR Model number ___ HP 0.75 Volts 230
Length of drop Pipe __ft. Capacity 5 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☑ No

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Kolstad-olson	69554	MAJESKI, T.

First Bedrock Giants Range Granite Und.
Last Strat Giants Range Granite Und.
Aquifer Giants Range Granite Und.
Depth to Bedrock 20 **ft.**

County Well Index Online Report **572971** Printed 1/22/2009
HE-01205-07

Minnesota Unique Well No.

576439

County St. Louis
Quad Embarrass
Quad ID 318B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 06/13/1997
Update Date 01/06/2004
Received Date

Well Name KARI, HOWARD

Township Range Dir Section Subsections Elevation 1447 **ft.**

60 14 W 20 CBBCBD **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
80 **ft.**	80 **ft.**	07/17/1996

Drilling Method Driven

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☐ No From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 80 ft.	19.45 lbs./ft.	6 in. to 80 ft.

Open Hole from 80 ft. to 80 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Well Address
4492 SALO RD
EMBARRASS MN 55732

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	23
SAND & CLAY	BROWN	SOFT	23	76
GRAVEL & SAND	GRAY	MEDIUM	76	80

Static Water Level
7.7 ft. from Land surface Date Measured 07/17/1996

PUMPING LEVEL (below land surface)
40 ft. after 2 hrs. pumping 10 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model SNAPPY
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
CASING THREADED AND WELDED.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 80 ft. 4 bags

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Address verification
Date 09/16/2003
System *UTM - Nad83, Zone15, Meters*
X: 563059 **Y:** 5279306

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/17/1996
Manufacturer's name STA-RITE Model number 10P4C02H
HP 0.5 Volts 230
Length of drop Pipe 40 ft. Capacity g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☑ No

First Bedrock
Last Strat Sand & larger-gray
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock **ft.**

Well Contractor Certification

Petersen Well Co.	69183	CARLSON, M.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **576439** Printed 11/18/2008 HE-01205-07

Minnesota Unique Well No.

151880

County St. Louis
Quad Embarrass
Quad ID 318B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/22/1988
Update Date 03/11/2005
Received Date

Well Name BROUHARD, JOHN

Township Range Dir Section Subsections Elevation 1433 **ft.**

60 15 W 25 ACCDCB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
103 **ft.**	103 **ft.**	08/04/1978

Drilling Method Non-specified Rotary

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 96 ft.	19 lbs./ft.	6 in. to 103 ft.

Well Address
RR 2 BOX 359
EMBARRASS MN 55732

Open Hole from 96 ft. to 103 ft.

Screen NO **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Geological Material	Color	Hardness	From	To
TOPSOIL	DK. BRN		0	5
SAND	DK. TAN		5	96
HARDPAN	PNK/GRY		96	102
LEDGE	PINK		102	103

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☑ No

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)

Unique Number Verification Information from neighbor
Date 09/16/2003

System *UTM - Nad83, Zone15, Meters*
X: 560771 **Y:** 5277870

Nearest Known Source of Contamination
100 feet North East direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/07/1978
Manufacturer's name FLINT & WALLING Model number 5 BA 8
HP 0.5 Volts 230
Length of drop Pipe 60 ft. Capacity 10 g.p.m
Type Submersible Material Plastic

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Well Contractor Certification

Kolstad Well Drill	69111	KOLSTAD, B.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock Weathering Residuum
Last Strat Giants Range Granite Und.
Aquifer Multiple
Depth to Bedrock 96 **ft.**

County Well Index Online Report

151880

Printed 1/22/2009
HE-01205-07

Minnesota Unique Well No.

735554

County St. Louis
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date
Update Date 04/25/2007
Received Date 01/06/2006

Well Name LICARI, ANTHONY & SUSAN
Township Range Dir Section Subsections Elevation **ft.**
60 14 W 21 DDD **Elevation Method**

Well Depth	Depth Completed	Date Well Completed
205 **ft.**	205 **ft.**	12/13/2005

Drilling Method Multiple methods used

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☑ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑
Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 31 ft.	19.45 lbs./ft.	6 in. to 31 ft.
		0 in. to 205 ft.

Open Hole from ft. to ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Well Address
7531 MATTSON RD
EMBARRASS MN 55732

Geological Material	Color	Hardness	From	To
SAND & BOULDERS	BROWN	HARD	0	20
CEMENTED SAND & GRAVEL	RED/BRN	HARD	20	31
BROKEN GRANITE	RED/BLK	SOFT	31	48
GRANTE	RED/BLK	MEDIUM	48	205

Static Water Level
14 ft. from Land surface Date Measured 12/13/2005

PUMPING LEVEL (below land surface)
100 ft. after 24 hrs. pumping 5 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
TP BE SEALED WHEN W/ SYSTEM INSTALLED SPRING 2006 H230624

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from to 31 ft. 2 bags

Nearest Known Source of Contamination
50 feet W direction Sewer type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number ___ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☑
Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☑ No

Well Contractor Certification

Petersen Well Co.	69183	PETERSEN, D.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock **ft.**

County Well Index Online Report **735554** Printed 1/22/2009
HE-01205-07

Minnesota Unique Well No.
187853

County St. Louis
Quad Embarrass
Quad ID 318B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/22/1988
Update Date 01/06/2004
Received Date

Well Name LUND, RAYMOND
Township Range Dir Section Subsections Elevation 1465 **ft.**
60 14 W 19 CAAAAC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
90 **ft.**	90 **ft.**	11/22/1981

Drilling Method Non-specified Rotary

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 1 **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 90 ft.	19 lbs./ft.	6 in. to 90 ft.

Well Address
RR 2 BOX 41A
EMBARRASS MN 55732

Open Hole from 90 ft. to 90 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Geological Material	Color	Hardness	From	To
SAND & ROCK			0	30
SAND			30	85
GRAVEL			85	90

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☑ No

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Information from neighbor
Date 09/16/2003
System *UTM - Nad83, Zone15, Meters*
X: 562172 **Y:** 5279409

Nearest Known Source of Contamination
100 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/24/1981
Manufacturer's name GOULD Model number 7 EH HP 0.33 Volts 115
Length of drop Pipe 60 ft. Capacity 7 g.p.m Type Submersible Material Other

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock
Last Strat Gravel (+larger)
Aquifer Quat. Water Table Aquifer
Depth to Bedrock ft.

Well Contractor Certification

Kolstad Well Drill	69111	KOLSTAD, B.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **187853** Printed 1/22/2009 HE-01205-07

Minnesota Unique Well No.

620143

County St. Louis
Quad Embarrass
Quad ID 318B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 05/24/2000
Update Date 03/11/2005
Received Date

Well Name SALO, MARY JO

Township Range Dir Section Subsections Elevation 1469 **ft.**

60 14 W 19 ACCCBC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
61 **ft.**	61 **ft.**	11/24/1998

Drilling Method Non-specified Rotary

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☑ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 61 ft.	19.45 lbs./ft.	6 in. to 61 ft.

Open Hole from 61 ft. to 61 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
34.4 ft. from Land surface Date Measured 11/24/1998

PUMPING LEVEL (below land surface)
40 ft. after 2 hrs. pumping 11 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model SNAPPY
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Well Address
7598 TAAPA RD
EMBARRASS MN 55732

Geological Material	Color	Hardness	From	To
GRAVEL & BOULDERS	BROWN	HARD	0	40
FINE SAND & ROCKS	RED	MEDIUM	40	58
SAND & GRAVEL	RED/BRN	MEDIUM	58	61

REMARKS
OLD WELL SEALED NO. H-135899.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 61 ft. 5 bags

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Address verification
Date 09/16/2003
System *UTM - Nad83, Zone15, Meters*
X: 562231 **Y:** 5279493

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/23/1998
Manufacturer's name STA-RITE Model number 10P4C01J
HP 0.5 Volts 115
Length of drop Pipe 40 ft. Capacity 10 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☑ No

First Bedrock
Last Strat Sand & larger
Aquifer Quat. Water Table Aquifer
Depth to Bedrock **ft.**

Well Contractor Certification

Petersen Well Co.	69183	PETERSEN, D.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **620143** Printed 1/22/2009 HE-01205-07

Minnesota Unique Well No.

658445

County St. Louis
Quad Isaac Lake
Quad ID 318A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/22/2002
Update Date 03/11/2005
Received Date

Well Name LIGHT, DWIGHT

Township Range Dir Section Subsections Elevation 1436 **ft.**

60 14 W 16 DDDCAA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
83 **ft.**	83 **ft.**	12/17/2001

Drilling Method Multiple methods used

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☑ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 81 ft.	19.45 lbs./ft.	6 in. to 81 ft.
		6 in. to 83 ft.

Open Hole from 81 ft. to 83 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
-2 ft. from Land surface Date Measured 10/19/2001

PUMPING LEVEL (below land surface)
0 ft. after 24 hrs. pumping 25 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model SNAPPY
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Well Address
7695 MATTSON RD
EMBARRASS MN 55732

Geological Material	Color	Hardness	From	To
CLAY & PEAT	GRAY	SOFT	0	5
CLAY	GRAY	SOFT	5	60
SAND	GRAY	SOFT	60	81
BROKEN GRANITE	RED/BLK	SOFT	81	83

REMARKS
CASING JOINT: THREADED & WELDED.
WELL FLOWS.
OLD WELL TO BE SEALED: H-182017.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 81 ft. 4 bags

Located Minnesota Geological Survey **Method** Digitization (Screen) - Map (1:24,000)

Unique Number Verification Address verification **Date** 09/17/2003

System *UTM - Nad83, Zone15, Meters* **X:** 566091 **Y:** 5280421

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/09/2001
Manufacturer's name STA-RITE Model number 10P4C01H
HP 0.5 Volts 115
Length of drop Pipe 20 ft. Capacity 10 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☑ No

First Bedrock Giants Range Granite Und.
Last Strat Giants Range Granite Und.
Aquifer Giants Range Granite Und.
Depth to Bedrock 81 **ft.**

Well Contractor Certification

Petersen Well Co.	69183	PETERSEN, D.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **658445** Printed 11/18/2008 HE-01205-07

Minnesota Unique Well No.

563293

County St. Louis
Quad Isaac Lake
Quad ID 318A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 04/22/1996
Update Date 01/07/2004
Received Date

Well Name LERFALD, MILTON

Township Range Dir Section Subsections Elevation 1459 **ft.**

60 14 W 22 BADDBA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
325 **ft.**	325 **ft.**	06/23/1995

Drilling Method Multiple methods used

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☐ No From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
6 in. to 18 ft.	20 lbs./ft.	6 in. to 325 ft.

Well Address
7611 KAUNONEN LAKE RD
EMBARRASS MN 55732

Open Hole from 18 ft. to 325 ft.

Screen NO **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Geological Material	Color	Hardness	From	To
SAND/GRAVEL	BROWN		0	18
LEDGE ROCK	GRY/PNK	MEDIUM	18	265
LEDGE ROCK	PINK	MEDIUM	265	290
LEDGE ROCK	PNK/GRY	MEDIUM	290	325

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
CASING THREADED AND WELDED.
GROUTING: CASING SEALER.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Other from to ft.

Located Minnesota Geological Survey

Method Digitization (Screen) - Map (1:24,000)

Unique Number Verification Address verification

Date 09/17/2003

System *UTM - Nad83, Zone15, Meters*

X: 566922 **Y:** 5280035

Nearest Known Source of Contamination
60 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number ___ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock Giants Range Granite Und.

Last Strat Giants Range Granite Und.

Aquifer Giants Range Granite Und.

Depth to Bedrock 18 **ft.**

Well Contractor Certification

Kolstad-olson	69554	MAJESKI, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report

563293

Printed 11/18/2008
HE-01205-07

Attachment B

Laboratory Reports

"Solutions for Technical Concerns"

December 24, 2008

Rita Gabrielson
Northeast Technical Services Inc.
P.O. Box 1142
Virginia, MN 55792

RE: Project 7158C.08; COC 92232

Dear Ms. Gabrielson,

Enclosed are the analytical results and Quality Assurance information for the project identified above. Samples were collected on December 19, 2008 and received in our laboratory on December 19, 2008.

Routine Quality Control procedures were performed and no problems were encountered.

If you have any questions, please call at (218) 742-1042.

Sincerely,

Brandy Muhich
Quality Control Manager

SAMPLE SUMMARY

Northeast Technical Services
315 Chestnut Street
PO Box 1142
Virginia, MN 55792
Phone: 218-741-4290
Fax: 218-742-1010

MDH Certification: 027-137-157

Laboratory Results

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Sample Description	Sample ID	Sample Type	Matrix	Sample Date	Received Date
7611/Kavnonen	330828	Grab	Aqueous	12/19/2008 9:34:00 AM	12/22/2008 8:50:00 AM
4492	330829	Grab	Aqueous	12/19/2008 10:22:00 AM	12/22/2008 8:50:00 AM
3617	330830	Grab	Aqueous	12/19/2008 11:06:00 AM	12/22/2008 8:50:00 AM
3857	330831	Grab	Aqueous	12/19/2008 1:17:00 PM	12/22/2008 8:50:00 AM
4330	330832	Grab	Aqueous	12/19/2008 2:27:00 PM	12/22/2008 8:50:00 AM
7531	330833	Grab	Aqueous	12/19/2008 1:05:00 PM	12/22/2008 8:50:00 AM
7695	330834	Grab	Aqueous	12/19/2008 3:45:00 PM	12/22/2008 8:50:00 AM
3854	330835	Grab	Aqueous	12/19/2008 1:50:00 PM	12/22/2008 8:50:00 AM
7611/Kavnonen	330836	Grab - Filtered	Aqueous	12/19/2008 9:34:00 AM	12/22/2008 8:50:00 AM
4492	330837	Grab - Filtered	Aqueous	12/19/2008 10:22:00 AM	12/22/2008 8:50:00 AM
3617	330838	Grab - Filtered	Aqueous	12/19/2008 11:06:00 AM	12/22/2008 8:50:00 AM
3857	330839	Grab - Filtered	Aqueous	12/19/2008 1:17:00 PM	12/22/2008 8:50:00 AM
4330	330840	Grab - Filtered	Aqueous	12/19/2008 2:27:00 PM	12/22/2008 8:50:00 AM
7531	330841	Grab - Filtered	Aqueous	12/19/2008 1:05:00 PM	12/22/2008 8:50:00 AM
7695	330842	Grab - Filtered	Aqueous	12/19/2008 3:45:00 PM	12/22/2008 8:50:00 AM
3854	330843	Grab - Filtered	Aqueous	12/19/2008 1:50:00 PM	12/22/2008 8:50:00 AM

SAMPLE RESULTS

NTS Sample: 330828
Description: 7611/Kavnonen
Sample Date: 12/19/2008 9:34:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	15.4	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	70	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	4.61	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	4.7	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	<0.2	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	0.86	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	0.94	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	3.34	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	36.9	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	11.2	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	<0.1	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	94	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	4.14	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	57.4	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330829
Description: 4492
Sample Date: 12/19/2008 10:22:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	7.2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	51.4	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	3.4	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	12.6	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	1400	µg/L	25	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	1.3	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	2.1	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	2.25	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	3.51	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	176	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	<0.5	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	0.12	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	243	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	<1	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	180	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330830
Description: 3617
Sample Date: 12/19/2008 11:06:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	21.8	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	20	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	6.36	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	1.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	0.22	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	0.76	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	1.71	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	2.98	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	60.7	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	11.2	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	<0.1	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	106	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	5.4	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	80.6	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330831
Description: 3857
Sample Date: 12/19/2008 1:17:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	14.7	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	16.9	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	6.92	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	2.7	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	0.21	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	1.9	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	1.78	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	2.36	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	59.9	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	0.61	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	0.13	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	88	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	5.74	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	65.2	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330832
Description: 4330
Sample Date: 12/19/2008 2:27:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	14.8	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	52.3	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	7.55	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	284	µg/L	5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	<0.2	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	2.8	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	0.92	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	7.77	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	62.9	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	3.32	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	0.11	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	98	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	7.55	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	68	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330833
Description: 7531
Sample Date: 12/19/2008 1:05:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	21.1	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	46.5	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	8.92	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	23.6	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	<0.2	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	5.5	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	1.84	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	4.92	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	48.1	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	9.3	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	<0.1	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	123	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	20.9	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	89.4	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330834
Description: 7695
Sample Date: 12/19/2008 3:45:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	3.3	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	35	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	28.8	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	4.84	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	578	µg/L	10	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	0.29	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	1.1	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	0.69	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	2.56	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	104	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	1.24	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	0.13	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	158	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	<1	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	107	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330835
Description: 3854
Sample Date: 12/19/2008 1:50:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 6.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Arsenic	<2	µg/L	2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Calcium	14.3	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Copper	86.7	µg/L	0.7	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Magnesium	6.49	mg/L	0.5	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Manganese	2.4	µg/L	0.5	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Molybdenum	0.36	µg/L	0.2	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Nickel	1.2	µg/L	0.6	EPA 200.8	12/22/2008	12/24/2008	E-122408-1
Potassium	1.58	mg/L	0.25	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Sodium	2.28	mg/L	2	EPA 200.7	12/22/2008	12/23/2008	I-122308-1
Alkalinity, Total	57.4	mg/L as CaCO3	10	EPA 310.1		12/23/2008	A-122308-1
Chloride	0.62	mg/L	0.5	EPA 300.0		12/23/2008	M-122308-1
Fluoride	0.1	mg/L	0.1	EPA 300.0		12/23/2008	M-122308-1
Solids, Filterable (TDS)	83	mg/L	10	EPA 160.1		12/23/2008	D-122308-1
Sulfate	5.57	mg/L	1	EPA 300.0		12/23/2008	M-122308-1
Hardness, Total (calc)	62.4	mg/L	10	SM 2340B		12/23/2008	

SAMPLE RESULTS

NTS Sample: 330836
Description: 7611/Kavnonen
Sample Date: 12/19/2008 9:34:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	64.5	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	4.3	µg/L	0.5	EPA 200.8		12/23/2008	E-122308-1
Nickel	0.71	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330837
Description: 4492
Sample Date: 12/19/2008 10:22:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	6.7	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	55.4	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	2.2	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	1320	µg/L	25	EPA 200.8		12/23/2008	E-122308-1
Nickel	1.6	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330838
Description: 3617
Sample Date: 12/19/2008 11:06:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	16.5	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	1.3	µg/L	0.5	EPA 200.8		12/23/2008	E-122308-1
Nickel	<0.6	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330839
Description: 3857
Sample Date: 12/19/2008 1:17:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	16.2	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	1.9	µg/L	0.5	EPA 200.8		12/23/2008	E-122308-1
Nickel	1.7	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330840
Description: 4330
Sample Date: 12/19/2008 2:27:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	42	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	272	µg/L	5	EPA 200.8		12/23/2008	E-122308-1
Nickel	2.5	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330841
Description: 7531
Sample Date: 12/19/2008 1:05:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	25.3	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	18.4	µg/L	0.5	EPA 200.8		12/23/2008	E-122308-1
Nickel	5	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330842
Description: 7695
Sample Date: 12/19/2008 3:45:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	3.0	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	2.5	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	544	µg/L	10	EPA 200.8		12/23/2008	E-122308-1
Nickel	0.8	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

SAMPLE RESULTS

NTS Sample: 330843
Description: 3854
Sample Date: 12/19/2008 1:50:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92232

Client: - Northeast Technical Services
Project: 7158C - PolyMet Mining, Inc. - EIS Task
Sampled By: Client
Report Date: 12/24/2008
Rec'd Temperature: 5.9 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7		12/22/2008	I-122208-1
Arsenic	<2	µg/L	2	EPA 200.8		12/23/2008	E-122408-1
Boron	<50	µg/L	50	EPA 200.7		12/22/2008	I-122208-1
Copper	40.8	µg/L	0.7	EPA 200.8		12/23/2008	E-122308-1
Manganese	2.1	µg/L	0.5	EPA 200.8		12/23/2008	E-122308-1
Nickel	1.0	µg/L	0.6	EPA 200.8		12/23/2008	E-122308-1

Quality Control Report:	Metals EPA 200.8	NTS COC:	92232
		Client:	Northeast Technical Services
		Project:	#7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: E-122408-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Arsenic	<	2	ug/L	2	200.8	NA	NA	NA	NA	NA	NA	
Copper	<	0.7	ug/L	0.7	200.8	NA	NA	NA	NA	NA	NA	
Manganese	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Molybdenum	<	0.2	ug/L	0.2	200.8	NA	NA	NA	NA	NA	NA	
Nickel	<	0.6	ug/L	0.6	200.8	NA	NA	NA	NA	NA	NA	

QC Batch ID: E-122408-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	43.0	ug/L	0.5	200.8	50.0	NA	86.0	85-115	NA	NA	
Arsenic	44.5	ug/L	2	200.8	50.0	NA	89.0	85-115	NA	NA	
Copper	45.8	ug/L	0.7	200.8	50.0	NA	91.6	85-115	NA	NA	
Manganese	43.9	ug/L	0.5	200.8	50.0	NA	87.8	85-115	NA	NA	
Molybdenum	44.0	ug/L	0.2	200.8	50.0	NA	88.0	85-115	NA	NA	
Nickel	44.7	ug/L	0.6	200.8	50.0	NA	89.4	85-115	NA	NA	

QC Batch ID: E-122408-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	42.6	ug/L	0.5	200.8	50.0	43.0	85.2	85-115	0.9	20	
Arsenic	44.6	ug/L	2	200.8	50.0	44.5	89.2	85-115	0.2	20	
Copper	45.5	ug/L	0.7	200.8	50.0	45.8	91.0	85-115	0.7	20	
Manganese	43.9	ug/L	0.5	200.8	50.0	43.9	87.8	85-115	0.0	20	
Molybdenum	43.7	ug/L	0.2	200.8	50.0	44.0	87.4	85-115	0.7	20	
Nickel	44.7	ug/L	0.6	200.8	50.0	44.7	89.4	85-115	0.0	20	

QC Batch ID: E-122408-1
Description: Matrix Spike Source: 329704

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	45.3	ug/L	0.5	200.8	50.0	ND	90.6	70-130	NA	NA	
Arsenic	44.3	ug/L	2	200.8	50.0	3.8	81.0	70-130	NA	NA	
Copper	37.7	ug/L	0.7	200.8	50.0	1.1	73.2	70-130	NA	NA	
Manganese	700	ug/L	0.5	200.8	50.0	581	NA	70-130	NA	NA	NA:Sample conc>4x Post Spike = 111%
Molybdenum	92.3	ug/L	0.2	200.8	50.0	45.3	94.0	70-130	NA	NA	
Nickel	39.5	ug/L	0.6	200.8	50.0	3.1	72.8	70-130	NA	NA	

QC Batch ID: E-122408-1
Description: Matrix Spike Duplicate Source: 329704

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	44.7	ug/L	0.5	200.8	50.0	ND	89.4	70-130	1.3	20	
Arsenic	45.7	ug/L	2	200.8	50.0	3.8	83.8	70-130	3.1	20	
Copper	37.9	ug/L	0.7	200.8	50.0	1.1	73.6	70-130	0.5	20	
Manganese	717	ug/L	0.5	200.8	50.0	581	NA	70-130	2.4	20	NA:Sample conc>4x Post Spike = 111%
Molybdenum	91.7	ug/L	0.2	200.8	50.0	45.3	92.8	70-130	0.7	20	
Nickel	40.5	ug/L	0.6	200.8	50.0	3.1	74.8	70-130	2.5	20	

Quality Control Report:	Metals EPA 200.8	NTS COC:	92232
		Client:	Northeast Technical Services
		Project:	#7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: E-122308-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Arsenic	<	2	ug/L	2	200.8	NA	NA	NA	NA	NA	NA	
Copper	<	0.7	ug/L	0.7	200.8	NA	NA	NA	NA	NA	NA	
Manganese	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Nickel	<	0.6	ug/L	0.6	200.8	NA	NA	NA	NA	NA	NA	

QC Batch ID: E-122308-1
Description: Initial Calibration Verification

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Arsenic	53.6	ug/L	2	200.8	50.0	NA	107.2	85-115	NA	NA	
Copper	51.7	ug/L	0.7	200.8	50.0	NA	103.4	85-115	NA	NA	
Manganese	52.2	ug/L	0.5	200.8	50.0	NA	104.4	85-115	NA	NA	
Nickel	51.8	ug/L	0.6	200.8	50.0	NA	103.6	85-115	NA	NA	

QC Batch ID: E-122308-1
Description: Matrix Spike Source: 330836

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Arsenic	48.7	ug/L	2	200.8	50.0	ND	97.4	70-130	NA	NA	
Copper	116.2	ug/L	0.7	200.8	50.0	65.4	101.6	70-130	NA	NA	
Manganese	49.2	ug/L	0.5	200.8	50.0	4.3	89.8	70-130	NA	NA	
Nickel	45.9	ug/L	0.6	200.8	50.0	0.71	90.4	70-130	NA	NA	

QC Batch ID: E-122308-1
Description: Matrix Spike Duplicate Source: 330836

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Arsenic	51.3	ug/L	2	200.8	50.0	ND	102.6	70-130	5.2	20	
Copper	117.4	ug/L	0.7	200.8	50.0	65.4	104.0	70-130	1.0	20	
Manganese	51.6	ug/L	0.5	200.8	50.0	4.3	94.6	70-130	4.8	20	
Nickel	48.2	ug/L	0.6	200.8	50.0	0.71	95.0	70-130	4.9	20	

Quality Control Report:	Metals EPA 200.7	NTS COC: Client: Project:	92232 Northeast Technical Services #7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: I-122308-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	<	25	ug/L	25	200.7	NA	NA	NA	NA	NA	NA	
Boron	<	50	ug/L	50	200.7	NA	NA	NA	NA	NA	NA	
Calcium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	
Magnesium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	
Potassium	<	0.25	mg/L	0.25	200.7	NA	NA	NA	NA	NA	NA	
Sodium	<	2	mg/L	2	200.7	NA	NA	NA	NA	NA	NA	

QC Batch ID: I-122308-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	518	ug/L	25	200.7	500	NA	103.6	85-115	NA	NA	
Boron	513	ug/L	50	200.7	500	NA	102.6	85-115	NA	NA	
Calcium	52.4	mg/L	0.5	200.7	50.0	NA	104.8	85-115	NA	NA	
Magnesium	50.8	mg/L	0.5	200.7	50.0	NA	101.6	85-115	NA	NA	
Potassium	5.73	mg/L	0.25	200.7	5.00	NA	114.6	85-115	NA	NA	
Sodium	9.72	mg/L	2	200.7	10.0	NA	97.2	85-115	NA	NA	

QC Batch ID: I-122308-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	517	ug/L	25	200.7	500	518	103.4	85-115	0.1	20	
Boron	510	ug/L	50	200.7	500	513	102.0	85-115	0.4	20	
Calcium	51.8	mg/L	0.5	200.7	50.0	52.4	103.6	85-115	0.8	20	
Magnesium	50.0	mg/L	0.5	200.7	50.0	50.8	100.0	85-115	1.1	20	
Potassium	5.62	mg/L	0.25	200.7	5.00	5.73	112.4	85-115	1.3	20	
Sodium	9.55	mg/L	2	200.7	10.0	9.72	95.5	85-115	1.2	20	

QC Batch ID: I-122308-1
Description: Matrix Spike Source: 330835

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	522	ug/L	25	200.7	500	ND	104.4	75-125	NA	NA	
Boron	525	ug/L	50	200.7	500	ND	105.0	75-125	NA	NA	
Calcium	65.5	mg/L	0.5	200.7	50.0	14.3	102.4	75-125	NA	NA	
Magnesium	56.3	mg/L	0.5	200.7	50.0	6.49	99.6	75-125	NA	NA	
Potassium	7.45	mg/L	0.25	200.7	5.00	1.58	117.4	75-125	NA	NA	
Sodium	12.1	mg/L	2	200.7	10.0	2.28	98.2	75-125	NA	NA	

QC Batch ID: I-122308-1
Description: Matrix Spike Duplicate Source: 330835

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	527	ug/L	25	200.7	500	ND	105.4	75-125	1.0	15	
Boron	531	ug/L	50	200.7	500	ND	106.2	75-125	1.1	15	
Calcium	66.2	mg/L	0.5	200.7	50.0	14.3	103.8	75-125	1.1	15	
Magnesium	56.9	mg/L	0.5	200.7	50.0	6.49	100.8	75-125	1.1	15	
Potassium	7.57	mg/L	0.25	200.7	5.00	1.58	119.8	75-125	1.6	15	
Sodium	12.2	mg/L	2	200.7	10.0	2.28	99.2	75-125	0.8	15	

Quality Control Report:	Metals EPA 200.7	NTS COC: Client: Project:	92232 Northeast Technical Services #7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: I-122208-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	<	25	ug/L	25	200.7	NA	NA	NA	NA	NA	NA	
Boron	<	50	ug/L	50	200.7	NA	NA	NA	NA	NA	NA	

QC Batch ID: I-122208-1
Description: Initial Calibration Verification

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	997	ug/L	25	200.7	1000	NA	99.7	85-115	NA	NA	
Boron	997	ug/L	50	200.7	1000	NA	99.7	85-115	NA	NA	

QC Batch ID: I-122208-1
Description: Matrix Spike Source: 330836

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	499	ug/L	25	200.7	500	ND	99.8	75-125	NA	NA	
Boron	528	ug/L	50	200.7	500	ND	105.6	75-125	NA	NA	

QC Batch ID: I-122208-1
Description: Matrix Spike Duplicate Source: 330836

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	500	ug/L	25	200.7	500	ND	100.0	75-125	0.2	15	
Boron	532	ug/L	50	200.7	500	ND	106.4	75-125	0.8	15	

Quality Control Report:	Alkalinity SM 2320B	NTS COC:	92232
		Client:	Northeast Technical Services
		Project:	#7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: A-122308-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	< 10	mg/L CaCO3	10	2320B	NA	NA	NA	NA	NA	NA	

QC Batch ID: A-122308-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	132	mg/L CaCO3	10	2320B	138	NA	95.7	85-115	NA	NA	

QC Batch ID: A-122308-1
Description: Sample Duplicate Source: 330833

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	48.1	mg/L CaCO3	10	2320B	NA	49.5	NA	NA	2.9	15	

Quality Control Report:	Anions EPA 300.0	NTS COC:	92232
		Client:	Northeast Technical Services
		Project:	#7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: M-122308-1
Description: Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	<	0.5	mg/L	0.5	300.0	NA	NA	NA	NA	NA	NA	
Fluoride	<	0.1	mg/L	0.1	300.0	NA	NA	NA	NA	NA	NA	
Sulfate	<	1	mg/L	1	300.0	NA	NA	NA	NA	NA	NA	

QC Batch ID: M-122308-1
Description: Continuing Calibration Verification Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.2	mg/L	0.5	300.0	10.0	NA	101.9	90-110	NA	NA	
Fluoride	10.2	mg/L	0.1	300.0	10.0	NA	102.0	90-110	NA	NA	
Sulfate	10.1	mg/L	1	300.0	10.0	NA	101.4	90-110	NA	NA	

QC Batch ID: M-122308-1
Description: Matrix Spike Source: 330831

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	9.90	mg/L	0.5	300.0	10.0	0.6	93.0	80-120	NA	NA	
Fluoride	9.40	mg/L	0.1	300.0	10.0	0.1	93.0	80-120	NA	NA	
Sulfate	15.1	mg/L	1	300.0	10.0	5.7	94.0	80-120	NA	NA	

QC Batch ID: M-122308-1
Description: Matrix Spike Duplicate Source: 330831

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	9.90	mg/L	0.5	300.0	10.0	0.6	NA	NA	0.0	15	
Fluoride	9.40	mg/L	0.1	300.0	10.0	0.1	NA	NA	0.0	15	
Sulfate	15.2	mg/L	1	300.0	10.0	5.7	NA	NA	0.7	15	

Quality Control Report:	Total Dissolved Solids EPA 160.1	NTS COC:	92232
		Client:	Northeast Technical Services
		Project:	#7158C - PolyMet Mining, Inc. - EIS Task RS64

QC Batch ID: D-122308-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	< 10	mg/L	10	160.1	NA	NA	NA	NA	NA	NA	

QC Batch ID: D-122308-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	464	mg/L	10	160.1	441	NA	105.2	85-115	NA	NA	

QC Batch ID: D-122308-1
Description: Sample Duplicate Source: 330830

Analyte	Result (Avg S:D)	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	%Diff (S:Avg)	%Diff Limits	Notes
TDS	105	mg/L	10	160.1	NA	106	NA	NA	1	5	

7158C

92232

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 1 of 1

Project Number: 23/69-862-096-001

Project Name: Polymet-Residential Wells № 27466

Project Manager: Keri Mohr

Project Contact: Margaret Treanor

Sampled by: Kinnan Stanbro

Laboratory: NTS

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)	Total No. Of Containers	Remarks
1. 7611/Kavanen	12/19/08	0934	X		X																					3	# 330828 to 330836 Separate Sheet for analysis
2. 4492		1022																								3	330829 330837
3. 3617		1106																								3	330830 330838
4. 3857		1317																								3	330831 330839
5. 4330		1427																								3	330832 330840
6. 7531		1305																								3	330833 330841
7. 7695		1545																								3	330834 330842
8. 3854	↓	1350	↓		↓																					3	330835 330843
9. Temp Blank																											
10.																											
11.																											
12.																											Rec'd at 5.9°C

Common Parameter/Container - Preservation Key

*1 - Volatile Organics = BTEX, GRO, TPH, Full List
*2 - Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs
*3 - General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate
*4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By: Kinnan Stanbro	On Ice? Y (N)	Date 12/19/08	Time 1656	Received by:	Date 12/19/08	Time 16:56
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date 12-22-08	Time 8:50

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☒ Other personally

Air Bill Number: from Sample Lookup

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

H:RLG\STDFORMS\Chain Of Custody Form RLG Rev. 07\01\05

Table 2. Proposed Parameters for Groundwater Sample Analysis. Detection limits in ug/L unless otherwise noted.

Description	Method	Detection Limit
Alkalinity, Total as $CaCO_3$	EPA 310.1	10 mg/L
Aluminum, Total	EPA 200.7	25
Aluminum, Dissolved	EPA 200.7	25
Antimony, Total	EPA 200.8	0.5
Arsenic, Total	EPA 200.8	2
Arsenic, Dissolved	EPA 200.8	2
Boron, Total	EPA 200.7	50
Boron, Dissolved	EPA 200.7	50
Calcium, Total	EPA 200.7	0.5 mg/L
Chloride	EPA 300.0	0.5 mg/L
Copper, Total	EPA 200.8	0.7
Copper, Dissolved	EPA 200.8	0.7
Fluoride	EPA 300.0	0.1 mg/L
Hardness, Total (calculated)	SM2340B	10 mg/L
Magnesium, Total	EPA 200.7	0.5 mg/L
Manganese, Total	EPA 200.8	0.5
Manganese, Dissolved	EPA 200.8	0.5
Molybdenum, Total	EPA 200.8	0.2
Nickel, Total	EPA 200.8	0.6
Nickel, Dissolved	EPA 200.8	0.6
pH, Field		0.1 SU
Potassium, Total	EPA 200.7	0.25 mg/L
Sodium, Total	EPA 200.7	2 mg/L
Solids, Total Dissolved	EPA 160.1	10 mg/L
Sulfate	EPA 300.0	1 mg/L

"Solutions for Technical Concerns"

January 15, 2009

Keely Pearson
Barr Engineering
332 West Superior St.
Duluth, MN 55802

RE: Polymet Residential Wells Revised Report
23/69-0862

Dear Ms. Pearson,

Please find attached the analytical results and Quality Assurance information for the above mentioned project. This is a revised report that now includes Ca, Na and K per your request.

The samples were collected on January 7, 2009 and received in the laboratory on the same day. Routine Quality Control procedures were followed and there were no problems encountered. Some of the metals concentrations in the field filtered samples are slightly higher than the totals. A filter blank was not supplied.

If you have any questions, please do not hesitate to call at (218) 742-1042.

Sincerely,

Renee Stone

Renee Stone
NTS Laboratory Manager

SAMPLE SUMMARY

Northeast Technical Services
315 Chestnut Street
PO Box 1142
Virginia, MN 55792
Phone: 218-741-4290
Fax: 218-742-1010

Laboratory Results

MDH Certification: 027-137-157

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Sample Description	Sample ID	Sample Type	Matrix	Sample Date	Received Date
7598	332261	Grab	Aqueous	1/7/2009 9:30:00 AM	1/7/2009 1:15:00 PM
7591	332262	Grab	Aqueous	1/7/2009 10:15:00 AM	1/7/2009 1:15:00 PM
4488	332263	Grab	Aqueous	1/7/2009 10:50:00 AM	1/7/2009 1:15:00 PM
7603	332264	Grab	Aqueous	1/7/2009 11:25:00 AM	1/7/2009 1:15:00 PM
7598	332265	Grab - Filtered	Aqueous	1/7/2009 9:30:00 AM	1/7/2009 1:15:00 PM
7591	332266	Grab - Filtered	Aqueous	1/7/2009 10:15:00 AM	1/7/2009 1:15:00 PM
4488	332267	Grab - Filtered	Aqueous	1/7/2009 10:50:00 AM	1/7/2009 1:15:00 PM
7603	332268	Grab - Filtered	Aqueous	1/7/2009 11:25:00 AM	1/7/2009 1:15:00 PM

SAMPLE RESULTS

NTS Sample: 332261
Description: 7598
Sample Date: 1/7/2009 9:30:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Calcium	14.8	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	23.7	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Magnesium	6.59	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Manganese	7.3	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Molybdenum	0.34	µg/L	0.2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	1.2	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Potassium	1.59	mg/L	0.25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Sodium	2.30	mg/L	2	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Alkalinity, Total	58.6	mg/L as CaCO3	10	EPA 310.1		1/9/2009	A-010909-1
Chloride	1.16	mg/L	0.5	EPA 300.0		1/8/2009	M-010809-1
Fluoride	<0.1	mg/L	0.1	EPA 300.0		1/8/2009	M-010809-1
Solids, Filterable (TDS)	84	mg/L	10	EPA 160.1		1/9/2009	D-010909-1
Sulfate	7.17	mg/L	1	EPA 300.0		1/8/2009	M-010809-1
Hardness, Total (calc)	64.1	mg/L	10	SM 2340B		1/12/2009	

SAMPLE RESULTS

NTS Sample: 332262
Description: 7591
Sample Date: 1/7/2009 10:15:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Calcium	41.6	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	<0.7	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Magnesium	7.86	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Manganese	654	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Molybdenum	0.32	µg/L	0.2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	0.99	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Potassium	1.17	mg/L	0.25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Sodium	2.76	mg/L	2	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Alkalinity, Total	136	mg/L as CaCO3	10	EPA 310.1		1/9/2009	A-010909-1
Chloride	1.49	mg/L	0.5	EPA 300.0		1/8/2009	M-010809-1
Fluoride	0.11	mg/L	0.1	EPA 300.0		1/8/2009	M-010809-1
Solids, Filterable (TDS)	186	mg/L	10	EPA 160.1		1/9/2009	D-010909-1
Sulfate	<1	mg/L	1	EPA 300.0		1/8/2009	M-010809-1
Hardness, Total (calc)	136	mg/L	10	SM 2340B		1/12/2009	

SAMPLE RESULTS

NTS Sample: 332263
Description: 4488
Sample Date: 1/7/2009 10:50:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	79.5	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Calcium	25.9	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	5.3	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Magnesium	6.48	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Manganese	0.66	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Molybdenum	2.8	µg/L	0.2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	0.66	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Potassium	0.58	mg/L	0.25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Sodium	8.38	mg/L	2	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Alkalinity, Total	92	mg/L as CaCO3	10	EPA 310.1		1/9/2009	A-010909-1
Chloride	2.81	mg/L	0.5	EPA 300.0		1/8/2009	M-010809-1
Fluoride	0.56	mg/L	0.1	EPA 300.0		1/8/2009	M-010809-1
Solids, Filterable (TDS)	119	mg/L	10	EPA 160.1		1/9/2009	D-010909-1
Sulfate	6.77	mg/L	1	EPA 300.0		1/8/2009	M-010809-1
Hardness, Total (calc)	91.4	mg/L	10	SM 2340B		1/12/2009	

SAMPLE RESULTS

NTS Sample: 332264
Description: 7603
Sample Date: 1/7/2009 11:25:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Calcium	34.7	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	10.2	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Magnesium	6.46	mg/L	0.5	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Manganese	432	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Molybdenum	0.49	µg/L	0.2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	1.3	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Potassium	1.12	mg/L	0.25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Sodium	2.45	mg/L	2	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Alkalinity, Total	115	mg/L as CaCO3	10	EPA 310.1		1/9/2009	A-010909-1
Chloride	0.61	mg/L	0.5	EPA 300.0		1/8/2009	M-010809-1
Fluoride	0.11	mg/L	0.1	EPA 300.0		1/8/2009	M-010809-1
Solids, Filterable (TDS)	145	mg/L	10	EPA 160.1		1/9/2009	D-010909-1
Sulfate	<1	mg/L	1	EPA 300.0		1/8/2009	M-010809-1
Hardness, Total (calc)	113	mg/L	10	SM 2340B		1/12/2009	

SAMPLE RESULTS

NTS Sample: 332265
Description: 7598
Sample Date: 1/7/2009 9:30:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92447
Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	25.2	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	20.1	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Manganese	6.2	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	1.4	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1

SAMPLE RESULTS

NTS Sample: 332266
Description: 7591
Sample Date: 1/7/2009 10:15:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	<0.7	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Manganese	650	µg/L	10	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	1.0	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1

SAMPLE RESULTS

NTS Sample: 332267
Description: 4488
Sample Date: 1/7/2009 10:50:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92447
Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	76.1	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	6.4	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Manganese	0.63	µg/L	0.5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	0.76	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1

SAMPLE RESULTS

NTS Sample: 332268
Description: 7603
Sample Date: 1/7/2009 11:25:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92447

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 4.6 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Arsenic	<2	µg/L	2	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Boron	<50	µg/L	50	EPA 200.7	1/8/2009	1/9/2009	I-010909-1
Copper	3.3	µg/L	0.7	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Manganese	430	µg/L	5	EPA 200.8	1/8/2009	1/13/2009	E-011309-1
Nickel	1.2	µg/L	0.6	EPA 200.8	1/8/2009	1/13/2009	E-011309-1

Quality Control Report:	Metals EPA 200.7	NTS COC: Client: Project:	92447 Northeast Technical Services #3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: I-010909-1 — Revised to include Sodium and Potassium
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	<	25	ug/L	25	200.7	NA	NA	NA	NA	NA	NA	
Boron	<	50	ug/L	50	200.7	NA	NA	NA	NA	NA	NA	
Calcium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	
Magnesium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	
Sodium	<	2	mg/L	2	200.7	NA	NA	NA	NA	NA	NA	
Potassium	<	0.25	mg/L	0.25	200.7	NA	NA	NA	NA	NA	NA	

QC Batch ID: I-010909-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	503	ug/L	25	200.7	500	NA	100.6	85-115	NA	NA	
Boron	493	ug/L	50	200.7	500	NA	98.6	85-115	NA	NA	
Calcium	51.7	mg/L	0.5	200.7	50.0	NA	103.4	85-115	NA	NA	
Magnesium	50.3	mg/L	0.5	200.7	50.0	NA	100.6	85-115	NA	NA	
Sodium	9.53	mg/L	2	200.7	10.0	NA	95.3	85-115	NA	NA	
Potassium	5.62	mg/L	0.25	200.7	5.00	NA	112.4	85-115	NA	NA	

QC Batch ID: I-010909-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	505	ug/L	25	200.7	500	503	101.0	85-115	0.3	20	
Boron	498	ug/L	50	200.7	500	493	99.6	85-115	0.7	20	
Calcium	51.6	mg/L	0.5	200.7	50.0	51.7	103.2	85-115	0.1	20	
Magnesium	50.5	mg/L	0.5	200.7	50.0	50.3	101.0	85-115	0.3	20	
Sodium	9.57	mg/L	2	200.7	10.0	9.53	95.7	85-115	0.3	20	
Potassium	5.63	mg/L	0.25	200.7	5.00	5.62	112.6	85-115	0.1	20	

QC Batch ID: I-010909-1
Description: Matrix Spike — Source: 332261

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	509	ug/L	25	200.7	500	ND	101.8	75-125	NA	NA	
Boron	506	ug/L	50	200.7	500	ND	101.2	75-125	NA	NA	
Calcium	65.6	mg/L	0.5	200.7	50.0	14.8	101.6	75-125	NA	NA	
Magnesium	56.5	mg/L	0.5	200.7	50.0	6.59	99.8	75-125	NA	NA	
Sodium	11.8	mg/L	2	200.7	10.0	2.30	95.0	75-125	NA	NA	
Potassium	7.40	mg/L	0.25	200.7	5.00	1.59	116.2	75-125	NA	NA	

QC Batch ID: I-010909-1
Description: Matrix Spike Duplicate — Source: 332261

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	499	ug/L	25	200.7	500	ND	99.8	75-125	2.0	15	
Boron	507	ug/L	50	200.7	500	ND	101.4	75-125	0.2	15	
Calcium	65.3	mg/L	0.5	200.7	50.0	14.8	101.0	75-125	0.5	15	
Magnesium	56.6	mg/L	0.5	200.7	50.0	6.59	100.0	75-125	0.2	15	
Sodium	11.7	mg/L	2	200.7	10.0	2.30	94.0	75-125	0.9	15	
Potassium	7.43	mg/L	0.25	200.7	5.00	1.59	116.8	75-125	0.4	15	

Quality Control Report:	Metals EPA 200.8	NTS COC:	92447
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: E-011309-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Arsenic	<	2	ug/L	2	200.8	NA	NA	NA	NA	NA	NA	
Copper	<	0.7	ug/L	0.7	200.8	NA	NA	NA	NA	NA	NA	
Manganese	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Molybdenum	<	0.2	ug/L	0.2	200.8	NA	NA	NA	NA	NA	NA	
Nickel	<	0.6	ug/L	0.6	200.8	NA	NA	NA	NA	NA	NA	

QC Batch ID: E-011309-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	48.4	ug/L	0.5	200.8	50.0	NA	96.8	85-115	NA	NA	
Arsenic	48.2	ug/L	2	200.8	50.0	NA	96.4	85-115	NA	NA	
Copper	47.5	ug/L	0.7	200.8	50.0	NA	95.0	85-115	NA	NA	
Manganese	49.0	ug/L	0.5	200.8	50.0	NA	98.0	85-115	NA	NA	
Molybdenum	46.0	ug/L	0.2	200.8	50.0	NA	92.0	85-115	NA	NA	
Nickel	47.0	ug/L	0.6	200.8	50.0	NA	94.0	85-115	NA	NA	

QC Batch ID: E-011309-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	48.3	ug/L	0.5	200.8	50.0	48.4	96.6	85-115	0.1	20	
Arsenic	48.5	ug/L	2	200.8	50.0	48.2	97.0	85-115	0.4	20	
Copper	49.8	ug/L	0.7	200.8	50.0	47.5	99.6	85-115	3.1	20	
Manganese	49.6	ug/L	0.5	200.8	50.0	49.0	99.2	85-115	0.8	20	
Molybdenum	46.4	ug/L	0.2	200.8	50.0	46.0	92.8	85-115	0.6	20	
Nickel	47.6	ug/L	0.6	200.8	50.0	47.0	95.2	85-115	0.8	20	

QC Batch ID: E-011309-1
Description: Matrix Spike Source: 332265

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	49.2	ug/L	0.5	200.8	50.0	ND	98.4	75-125	NA	NA	
Arsenic	46.6	ug/L	2	200.8	50.0	ND	93.2	75-125	NA	NA	
Copper	65.5	ug/L	0.7	200.8	50.0	20.1	90.8	75-125	NA	NA	
Manganese	51.0	ug/L	0.5	200.8	50.0	6.2	89.6	75-125	NA	NA	
Molybdenum	47.1	ug/L	0.2	200.8	50.0	0.65	92.9	75-125	NA	NA	
Nickel	46.6	ug/L	0.6	200.8	50.0	1.4	90.4	75-125	NA	NA	

QC Batch ID: E-011309-1
Description: Matrix Spike Duplicate Source: 332265

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	48.6	ug/L	0.5	200.8	50.0	ND	97.2	75-125	1.2	20	
Arsenic	45.6	ug/L	2	200.8	50.0	ND	91.2	75-125	2.2	20	
Copper	63.9	ug/L	0.7	200.8	50.0	20.1	87.6	75-125	2.5	20	
Manganese	51.1	ug/L	0.5	200.8	50.0	6.2	89.8	75-125	0.2	20	
Molybdenum	46.4	ug/L	0.2	200.8	50.0	0.65	91.5	75-125	1.5	20	
Nickel	45.5	ug/L	0.6	200.8	50.0	1.4	88.2	75-125	2.4	20	

Quality Control Report:	Anions EPA 300.0	NTS COC:	92447
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: M-010809-1
Description: Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	<	0.5	mg/L	0.5	300.0	NA	NA	NA	NA	NA	NA	
Fluoride	<	0.1	mg/L	0.1	300.0	NA	NA	NA	NA	NA	NA	
Sulfate	<	1	mg/L	1	300.0	NA	NA	NA	NA	NA	NA	

QC Batch ID: M-010809-1
Description: Continuing Calibration Verification Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	9.35	mg/L	0.5	300.0	10.0	NA	93.5	90-110	NA	NA	
Fluoride	9.34	mg/L	0.1	300.0	10.0	NA	93.4	90-110	NA	NA	
Sulfate	9.17	mg/L	1	300.0	10.0	NA	91.7	90-110	NA	NA	

QC Batch ID: M-010809-1
Description: Matrix Spike Source: 332193

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.1	mg/L	0.5	300.0	10.0	0.9	92.0	80-120	NA	NA	
Fluoride	9.30	mg/L	0.1	300.0	10.0	0.1	92.0	80-120	NA	NA	
Sulfate	73.8	mg/L	1	300.0	10.0	65.8	80.0	80-120	NA	NA	

QC Batch ID: M-010809-1
Description: Matrix Spike Duplicate Source: 332193

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.1	mg/L	0.5	300.0	10.0	0.9	NA	NA	0.0	15	
Fluoride	9.30	mg/L	0.1	300.0	10.0	0.1	NA	NA	0.0	15	
Sulfate	73.5	mg/L	1	300.0	10.0	65.8	NA	NA	0.4	15	

QC Batch ID: M-010809-1
Description: Matrix Spike Source: 332261

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.4	mg/L	0.5	300.0	10.0	1.2	92.0	80-120	NA	NA	
Fluoride	9.30	mg/L	0.1	300.0	10.0	0.1	92.0	80-120	NA	NA	
Sulfate	16.3	mg/L	1	300.0	10.0	7.2	91.0	80-120	NA	NA	

QC Batch ID: M-010809-1
Description: Matrix Spike Duplicate Source: 332261

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.4	mg/L	0.5	300.0	10.0	1.2	NA	NA	0.0	15	
Fluoride	9.30	mg/L	0.1	300.0	10.0	0.1	NA	NA	0.0	15	
Sulfate	16.3	mg/L	1	300.0	10.0	7.2	NA	NA	0.0	15	

Quality Control Report:	Alkalinity SM 2320B	NTS COC:	92447
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: A-010909-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	< 10	mg/L CaCO3	10	2320B	NA	NA	NA	NA	NA	NA	

QC Batch ID: A-010909-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	134	mg/L CaCO3	10	2320B	138	NA	97.3	85-115	NA	NA	

QC Batch ID: A-010909-1
Description: Sample Duplicate Source: 332261

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	58.6	mg/L CaCO3	10	2320B	NA	58.4	NA	NA	0.4	15	

Quality Control Report:	Total Dissolved Solids EPA 160.1	NTS COC:	92447
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: D-010909-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	< 10	mg/L	10	160.1	NA	NA	NA	NA	NA	NA	

QC Batch ID: D-010909-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	386	mg/L	10	160.1	441	NA	87.5	85-115	NA	NA	

QC Batch ID: D-010909-1
Description: Sample Duplicate Source: 332263

Analyte	Result (Avg S:D)	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	%Diff (S:Avg)	%Diff Limits	Notes
TDS	118	mg/L	10	160.1	NA	119	NA	NA	1	5	

92447

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 1 of 1

Project Number: 23/69-0862

Project Name: PdyMet Res. Well Samplins

№ 27468

Project Manager: JAMZ

Project Contact: KDP

Sampled by: REE

Laboratory: NTS

	Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)	Total No. Of Containers	Remarks
1.	7598	1/7/09	930	X					3	3	2	2	6	1		3	3	2	2	65							3	see Table 3-5day rush
2.	7591	↓	10:15	↓		↓			3	3	2	2	62			3	3	2	2	66							3	
3.	4488		10:50						3	3	2	2	63			3	3	2	2	67							3	
4.	7603	↓	11:25	↓		↓			3	3	2	2	64			3	3	2	2	68							3	
5.																												
6.																												
7.																												
8.																												
9.																												
10.																												
11.																												
12.																												

Common Parameter/Container - Preservation Key

*1 - *Volatile Organics = BTEX, GRO, TPH, Full List*
*2 - *Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs*
*3 - *General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate*
*4 - *Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN*

Relinquished By:	On Ice? (Y) N	Date	Time	Received by:	Date	Time
REE		1/7/08	13:15			
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
				LAKOSKI	1-7-08	13:15

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other

Air Bill Number: Onice 4.6°C

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

H:RLG\STDFORMS\Chain Of Custody Form RLG Rev. 07\01\05

Table 2. Proposed Parameters for Groundwater Sample Analysis. Detection limits in ug/L unless otherwise noted.

Description	Method	Detection Limit
Alkalinity, Total as $CaCO_3$	EPA 310.1	
Aluminum, Total	EPA 200.7	
Aluminum, Dissolved	EPA 200.7	
Antimony, Total	EPA 200.8	
Arsenic, Total	EPA 200.8	2
Arsenic, Dissolved	EPA 200.8	2
Boron, Total	EPA 200.7	50
Boron, Dissolved	EPA 200.7	50
Chloride	EPA 300.0	0.5 mg/L
Copper, Total	EPA 200.8	0.7
Copper, Dissolved	EPA 200.8	0.7
Fluoride	EPA 300.0	0.1 mg/L
Hardness, Total (calculated)	SM2340B	10 mg/L
Magnesium, Total	EPA 200.7	0.5 mg/L
Manganese, Total	EPA 200.8	0.5
Manganese, Dissolved	EPA 200.8	0.5
Molybdenum, Total	EPA 200.8	0.2
Nickel, Total	EPA 200.8	0.6
Nickel, Dissolved	EPA 200.8	0.6
pH, Field		0.1 SU
Solids, Total Dissolved	EPA 160.1	10 mg/L
Sulfate	EPA 300.0	1 mg/L

1/15/08 Added Na, K per Keely Pearson @ Barr. Email in file.
EAM

Send revised report.

Sample Receiving Checklist 4.07

(non criminal Chain of Custody)

Samples require client direction, discrepancies noted below: COC# 92447

- o No COC Documentation supplied
- o Incomplete COC Documentation
- o Sample Containers listed on COC do not match
- o Sample Containers listed on COC are compromised
- o Sample Temp is over range and cooling preservation is required
- o Signatures and Times for collection and/or transfer are not complete
- o Custody seals requested but not intact
- o Sample parameters exceed hold time
- o Sample volume/mass does not meet minimum requirements (PM to discuss w/analysts)

Attach to COC if available and notify Project Manager

PM Record of client information:

No Problems

Date: 1-7-09

PM Signature: BM

"Solutions for Technical Concerns"

January 16, 2009

Keely Pearson
Barr Engineering
332 West Superior St.
Duluth, MN 55802

RE: Polymet Residential Wells
23/69-0862

Dear Ms. Pearson,

Please find attached the analytical results and Quality Assurance information for the above mentioned project.

The samples were collected on January 9, 2009 and received in the laboratory on the same day. The temperature upon receipt was 8.2 degrees C. The samples were collected and received the same day, the temperature was < 10 degrees C and the analyses were for inorganic tests so the samples were deemed suitable for analysis per our QA manual. Calcium, Sodium and Potassium were added as you requested. A filter blank was not supplied.

The duplicate values for Total Copper did not match very well. Samples were reanalyzed from the original containers and the results were confirmed. Routine Quality Control procedures were followed and no other problems encountered.

If you have any questions, please do not hesitate to call at (218) 742-1042.

Sincerely,

Renee Stone

Renee Stone
NTS Laboratory Manager

SAMPLE SUMMARY

Northeast Technical Services
315 Chestnut Street
PO Box 1142
Virginia, MN 55792
Phone: 218-741-4290
Fax: 218-742-1010

Laboratory Results

MDH Certification: 027-137-157

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Sample Description	Sample ID	Sample Type	Matrix	Sample Date	Received Date
4400	332492	Grab	Aqueous	1/9/2009 9:30:00 AM	1/9/2009 1:00:00 PM
4789	332493	Grab	Aqueous	1/9/2009 10:20:00 AM	1/9/2009 1:00:00 PM
4249	332494	Grab	Aqueous	1/9/2009 12:10:00 PM	1/9/2009 1:00:00 PM
Duplicate	332495	Grab	Aqueous		1/9/2009 1:00:00 PM
4400	332496	Grab - Filtered	Aqueous	1/9/2009 9:30:00 AM	1/9/2009 1:00:00 PM
4789	332497	Grab - Filtered	Aqueous	1/9/2009 10:20:00 AM	1/9/2009 1:00:00 PM
4249	332498	Grab - Filtered	Aqueous	1/9/2009 12:10:00 PM	1/9/2009 1:00:00 PM
Duplicate	332499	Grab - Filtered	Aqueous		1/9/2009 1:00:00 PM

SAMPLE RESULTS

NTS Sample: 332492
Description: 4400
Sample Date: 1/9/2009 9:30:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID	
Aluminum	83.4	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Arsenic	<2	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Boron	50.4	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Calcium	26	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Copper	11.9	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Magnesium	12.1	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Manganese	4710	µg/L	100	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Molybdenum	0.22	µg/L	0.2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Nickel	5.1	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2	
Potassium	1.72	mg/L	0.25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Sodium	11.8	mg/L	2	EPA 200.7	1/12/2009	1/13/2009	I-011309-1	
Alkalinity, Total	111	mg/L as CaCO3	10	EPA 310.1		1/13/2009	A-011309-1	i
Chloride	12.5	mg/L	0.5	EPA 300.0		1/13/2009	M-011309-1	i
Fluoride	0.11	mg/L	0.1	EPA 300.0		1/13/2009	M-011309-1	i
Solids, Filterable (TDS)	143	mg/L	10	EPA 160.1		1/13/2009	D-011309-1	i
Sulfate	10.9	mg/L	1	EPA 300.0		1/13/2009	M-011309-1	i
Hardness, Total (calc)	115	mg/L	10	SM 2340B		1/14/2009		

Qualifier	Description	Note
i	Improper sample preservation noted, analysis performed.	Sample received at 8.2 °C

SAMPLE RESULTS

NTS Sample: 332493
Description: 4789
Sample Date: 1/9/2009 10:20:00 AM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Arsenic	7.5	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	<50	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Calcium	23.7	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	16.4	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Magnesium	6.47	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Manganese	583	µg/L	10	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Molybdenum	0.58	µg/L	0.2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	<0.6	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Potassium	0.86	mg/L	0.25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Sodium	3.05	mg/L	2	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Alkalinity, Total	86.3	mg/L as CaCO3	10	EPA 310.1		1/13/2009	A-011309-1 i
Chloride	0.86	mg/L	0.5	EPA 300.0		1/13/2009	M-011309-1 i
Fluoride	0.14	mg/L	0.1	EPA 300.0		1/13/2009	M-011309-1 i
Solids, Filterable (TDS)	98	mg/L	10	EPA 160.1		1/13/2009	D-011309-1 i
Sulfate	2.48	mg/L	1	EPA 300.0		1/13/2009	M-011309-1 i
Hardness, Total (calc)	85.8	mg/L	10	SM 2340B		1/14/2009	

Qualifier	Description	Note
i	Improper sample preservation noted, analysis performed.	Sample received at 8.2 °C

SAMPLE RESULTS

NTS Sample: 332494
Description: 4249
Sample Date: 1/9/2009 12:10:00 PM

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	44	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Arsenic	<2	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	459	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Calcium	11.7	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	155	µg/L	14	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Magnesium	4.12	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Manganese	2.4	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Molybdenum	1.4	µg/L	0.2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	2.1	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Potassium	1.01	mg/L	0.25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Sodium	28.4	mg/L	2	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Alkalinity, Total	87.7	mg/L as CaCO3	10	EPA 310.1		1/13/2009	A-011309-1 i
Chloride	5.08	mg/L	0.5	EPA 300.0		1/13/2009	M-011309-1 i
Fluoride	0.22	mg/L	0.1	EPA 300.0		1/13/2009	M-011309-1 i
Solids, Filterable (TDS)	105	mg/L	10	EPA 160.1		1/13/2009	D-011309-1 i
Sulfate	10.5	mg/L	1	EPA 300.0		1/13/2009	M-011309-1 i
Hardness, Total (calc)	46.2	mg/L	10	SM 2340B		1/14/2009	

Qualifier	Description	Note
i	Improper sample preservation noted, analysis performed.	Sample received at 8.2 °C

SAMPLE RESULTS

NTS Sample: 332495
Description: Duplicate
Sample Date: 1/9/2009

Matrix: Aqueous
Sample Type: Grab

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	27	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Antimony	<0.5	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Arsenic	8.2	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	<50	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Calcium	24	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	117	µg/L	14	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Magnesium	6.52	mg/L	0.5	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Manganese	603	µg/L	10	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Molybdenum	0.59	µg/L	0.2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	1.4	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Potassium	0.83	mg/L	0.25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Sodium	3.09	mg/L	2	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Alkalinity, Total	86.8	mg/L as CaCO3	10	EPA 310.1		1/13/2009	A-011309-1 i
Chloride	0.86	mg/L	0.5	EPA 300.0		1/13/2009	M-011309-1 i
Fluoride	0.11	mg/L	0.1	EPA 300.0		1/13/2009	M-011309-1 i
Solids, Filterable (TDS)	96	mg/L	10	EPA 160.1		1/13/2009	D-011309-1 i
Sulfate	2.48	mg/L	1	EPA 300.0		1/13/2009	M-011309-1 i
Hardness, Total (calc)	86.8	mg/L	10	SM 2340B		1/14/2009	

Qualifier	Description
i	Improper sample preservation noted, analysis performed.

Note
Sample received at 8.2 °C

SAMPLE RESULTS

NTS Sample: 332496
Description: 4400
Sample Date: 1/9/2009 9:30:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	70.6	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	<50	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	11.5	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Manganese	4850	µg/L	200	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	4.9	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2

SAMPLE RESULTS

NTS Sample: 332497
Description: 4789
Sample Date: 1/9/2009 10:20:00 AM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Arsenic	7.5	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	<50	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	2	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Manganese	580	µg/L	10	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	<0.6	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2

SAMPLE RESULTS

NTS Sample: 332498
Description: 4249
Sample Date: 1/9/2009 12:10:00 PM

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Arsenic	<2	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	461	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	35.5	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Manganese	1.1	µg/L	0.5	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	<0.6	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2

SAMPLE RESULTS

NTS Sample: 332499
Description: Duplicate
Sample Date: 1/9/2009

Matrix: Aqueous
Sample Type: Grab - Filtered

NTS COC: 92522

Client: 0662 - Barr Engineering
Project: 3933 - 23/69-862-006-001 Polymet Res
Sampled By: Client
Report Date: 1/15/2009
Rec'd Temperature: 8.2 °C

Analyte	Result	Units	RL	Method	Prepared Date	Analysis Date	Batch ID
Aluminum	<25	µg/L	25	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Arsenic	7.5	µg/L	2	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Boron	<50	µg/L	50	EPA 200.7	1/12/2009	1/13/2009	I-011309-1
Copper	3.6	µg/L	0.7	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Manganese	570	µg/L	10	EPA 200.8	1/12/2009	1/13/2009	E-011309-2
Nickel	0.64	µg/L	0.6	EPA 200.8	1/12/2009	1/13/2009	E-011309-2

Quality Control Report:	Metals EPA 200.7	NTS COC: Client: Project:	92522 Northeast Technical Services #3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: I-011309-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	<	25	ug/L	25	200.7	NA	NA	NA	NA	NA	NA	
Boron	<	50	ug/L	50	200.7	NA	NA	NA	NA	NA	NA	
Calcium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	
Magnesium	<	0.5	mg/L	0.5	200.7	NA	NA	NA	NA	NA	NA	

QC Batch ID: I-011309-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	529	ug/L	25	200.7	500	NA	105.8	85-115	NA	NA	
Boron	517	ug/L	50	200.7	500	NA	103.4	85-115	NA	NA	
Calcium	54.0	mg/L	0.5	200.7	50.0	NA	108.0	85-115	NA	NA	
Magnesium	53.4	mg/L	0.5	200.7	50.0	NA	106.8	85-115	NA	NA	

QC Batch ID: I-011309-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	522	ug/L	25	200.7	500	529	104.4	85-115	0.9	20	
Boron	517	ug/L	50	200.7	500	517	103.4	85-115	0.0	20	
Calcium	53.5	mg/L	0.5	200.7	50.0	54.0	107.0	85-115	0.6	20	
Magnesium	52.7	mg/L	0.5	200.7	50.0	53.4	105.4	85-115	0.9	20	

QC Batch ID: I-011309-1
Description: Matrix Spike Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	584	ug/L	25	200.7	500	83.4	100.1	75-125	NA	NA	
Boron	551	ug/L	50	200.7	500	50.4	100.1	75-125	NA	NA	
Calcium	78.8	mg/L	0.5	200.7	50.0	26.0	105.6	75-125	NA	NA	
Magnesium	64.5	mg/L	0.5	200.7	50.0	12.1	104.8	75-125	NA	NA	

QC Batch ID: I-011309-1
Description: Matrix Spike Duplicate Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alumimum	589	ug/L	25	200.7	500	83.4	101.1	75-125	0.9	15	
Boron	556	ug/L	50	200.7	500	50.4	101.1	75-125	0.9	15	
Calcium	79.5	mg/L	0.5	200.7	50.0	26.0	107.0	75-125	0.9	15	
Magnesium	64.7	mg/L	0.5	200.7	50.0	12.1	105.2	75-125	0.3	15	

Quality Control Report:	Metals EPA 200.7	NTS COC:	92552
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: I-011309-1
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Sodium	<	2	mg/L	2	200.7	NA	NA	NA	NA	NA	NA	
Potassium	<	0.25	mg/L	0.25	200.7	NA	NA	NA	NA	NA	NA	

QC Batch ID: I-011309-1
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Sodium	10.1	mg/L	2	200.7	10.0	NA	101	85-115	NA	NA	
Potassium	5.70	mg/L	0.25	200.7	5.00	NA	114	85-115	NA	NA	

QC Batch ID: I-011309-1
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Sodium	10.1	mg/L	2	200.7	10.0	10.1	101.0	85-115	0.0	20	
Potassium	5.75	mg/L	0.25	200.7	5.0	5.70	115.0	85-115	0.6	20	

QC Batch ID: I-011309-1
Description: Matrix Spike Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Sodium	22.4	mg/L	2	200.7	10.0	11.8	106.0	75-125	NA	NA	
Potassium	7.77	mg/L	0.25	200.7	5.00	1.72	121.0	75-125	NA	NA	

QC Batch ID: I-011309-1
Description: Matrix Spike Duplicate Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Sodium	22.7	mg/L	2	200.7	10.0	11.8	109.0	75-125	1.3	15	
Potassium	7.76	mg/L	0.25	200.7	5.00	1.72	120.8	75-125	0.1	15	

Quality Control Report:	Metals EPA 200.8	NTS COC:	92522
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: E-011309-2
Description: Method Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Arsenic	<	2	ug/L	2	200.8	NA	NA	NA	NA	NA	NA	
Copper	<	0.7	ug/L	0.7	200.8	NA	NA	NA	NA	NA	NA	
Manganese	<	0.5	ug/L	0.5	200.8	NA	NA	NA	NA	NA	NA	
Molybdenum	<	0.2	ug/L	0.2	200.8	NA	NA	NA	NA	NA	NA	
Nickel	<	0.6	ug/L	0.6	200.8	NA	NA	NA	NA	NA	NA	

QC Batch ID: E-011309-2
Description: Laboratory Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	50.6	ug/L	0.5	200.8	50.0	NA	101.2	85-115	NA	NA	
Arsenic	53.6	ug/L	2	200.8	50.0	NA	107.2	85-115	NA	NA	
Copper	49.5	ug/L	0.7	200.8	50.0	NA	99.0	85-115	NA	NA	
Manganese	51.2	ug/L	0.5	200.8	50.0	NA	102.4	85-115	NA	NA	
Molybdenum	47.5	ug/L	0.2	200.8	50.0	NA	95.0	85-115	NA	NA	
Nickel	48.3	ug/L	0.6	200.8	50.0	NA	96.6	85-115	NA	NA	

QC Batch ID: E-011309-2
Description: Laboratory Control Sample Duplicate

Analyte	Result	Units	RL	Method	Spike Level	LCS Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	50.7	ug/L	0.5	200.8	50.0	50.6	101.4	85-115	0.1	20	
Arsenic	54.0	ug/L	2	200.8	50.0	53.6	108.0	85-115	0.5	20	
Copper	49.8	ug/L	0.7	200.8	50.0	49.5	99.6	85-115	0.4	20	
Manganese	51.6	ug/L	0.5	200.8	50.0	51.2	103.2	85-115	0.5	20	
Molybdenum	48.0	ug/L	0.2	200.8	50.0	47.5	96.0	85-115	0.7	20	
Nickel	48.2	ug/L	0.6	200.8	50.0	48.3	96.4	85-115	0.1	20	

QC Batch ID: E-011309-2
Description: Matrix Spike Source: 332265

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	52.2	ug/L	0.5	200.8	50.0	ND	104.4	75-125	NA	NA	
Arsenic	52.2	ug/L	2	200.8	50.0	ND	104.4	75-125	NA	NA	
Copper	55.5	ug/L	0.7	200.8	50.0	11.5	88.0	75-125	NA	NA	
Manganese	4910	ug/L	200	200.8	50.0	4850	NA	75-125	NA	NA	NA:Sample conc>4x; PS=106.5%
Molybdenum	49.6	ug/L	0.2	200.8	50.0	0.26	98.7	75-125	NA	NA	
Nickel	48.1	ug/L	0.6	200.8	50.0	4.9	86.4	75-125	NA	NA	

QC Batch ID: E-011309-2
Description: Matrix Spike Duplicate Source: 332496

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Antimony	52.8	ug/L	0.5	200.8	50.0	ND	105.6	75-125	1.1	20	
Arsenic	56.1	ug/L	2	200.8	50.0	ND	112.2	75-125	7.2	20	
Copper	57.3	ug/L	0.7	200.8	50.0	11.5	91.6	75-125	3.2	20	
Manganese	4800	ug/L	200	200.8	50.0	4850	NA	75-125	2.3	20	NA:Sample conc>4x; PS=106.5%
Molybdenum	50.1	ug/L	0.2	200.8	50.0	0.26	99.7	75-125	1.0	20	
Nickel	50.0	ug/L	0.6	200.8	50.0	4.9	90.2	75-125	3.9	20	

NA = Not Applicable
PS = Post Spike

Quality Control Report:	Alkalinity SM 2320B	NTS COC:	92522
		Client:	Northeast Technical Services
		Project:	#3933 - 23-69-862-006-001 Polymet Res Wells

QC Batch ID: A-011309-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	< 10	mg/L CaCO3	10	2320B	NA	NA	NA	NA	NA	NA	

QC Batch ID: A-011309-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	137	mg/L CaCO3	10	2320B	138	NA	99.3	85-115	NA	NA	

QC Batch ID: A-011309-1
Description: Sample Duplicate Source: 332494

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Alkalinity	88.1	mg/L CaCO3	10	2320B	NA	87.7	NA	NA	0.5	15	

Quality Control Report:	Anions EPA 300.0	NTS COC:	92522
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: M-011309-1
Description: Blank

Analyte		Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	<	0.5	mg/L	0.5	300.0	NA	NA	NA	NA	NA	NA	
Fluoride	<	0.1	mg/L	0.1	300.0	NA	NA	NA	NA	NA	NA	
Sulfate	<	1	mg/L	1	300.0	NA	NA	NA	NA	NA	NA	

QC Batch ID: M-011309-1
Description: Continuing Calibration Verification Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	10.0	mg/L	0.5	300.0	10.0	NA	100.0	90-110	NA	NA	
Fluoride	9.63	mg/L	0.1	300.0	10.0	NA	96.3	90-110	NA	NA	
Sulfate	9.48	mg/L	1	300.0	10.0	NA	94.8	90-110	NA	NA	

QC Batch ID: M-011309-1
Description: Matrix Spike Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	22.3	mg/L	0.5	300.0	10.0	12.5	98.0	80-120	NA	NA	
Fluoride	9.70	mg/L	0.1	300.0	10.0	0.11	95.9	80-120	NA	NA	
Sulfate	20.5	mg/L	1	300.0	10.0	10.9	96.0	80-120	NA	NA	

QC Batch ID: M-011309-1
Description: Matrix Spike Duplicate Source: 332492

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	22.2	mg/L	0.5	300.0	10.0	12.5	NA	NA	0.4	15	
Fluoride	9.70	mg/L	0.1	300.0	10.0	0.11	NA	NA	0.0	15	
Sulfate	20.5	mg/L	1	300.0	10.0	10.9	NA	NA	0.0	15	

QC Batch ID: M-011309-1
Description: Matrix Spike Source: 332487

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	12.2	mg/L	0.5	300.0	10.0	2.48	97.2	80-120	NA	NA	
Fluoride	9.70	mg/L	0.1	300.0	10.0	0.11	95.9	80-120	NA	NA	
Sulfate	11.7	mg/L	1	300.0	10.0	2.44	92.6	80-120	NA	NA	

QC Batch ID: M-011309-1
Description: Matrix Spike Duplicate Source: 332487

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
Chloride	12.2	mg/L	0.5	300.0	10.0	2.48	NA	NA	0.0	15	
Fluoride	9.70	mg/L	0.1	300.0	10.0	0.11	NA	NA	0.0	15	
Sulfate	11.7	mg/L	1	300.0	10.0	2.44	NA	NA	0.0	15	

Quality Control Report:	Total Dissolved Solids EPA 160.1	NTS COC:	92522
		Client:	Northeast Technical Services
		Project:	#3933 - 23/69-862-006-001 Polymet Res Wells

QC Batch ID: D-011309-1
Description: Blank

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	< 10	mg/L	10	160.1	NA	NA	NA	NA	NA	NA	

QC Batch ID: D-011309-1
Description: Quality Control Sample

Analyte	Result	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	RPD	RPD Limits	Notes
TDS	262	mg/L	10	160.1	255	NA	102.7	85-115	NA	NA	

QC Batch ID: D-011309-1
Description: Sample Duplicate Source: 332263

Analyte	Result (Avg S:D)	Units	RL	Method	Spike Level	Source Result	Spike %R	%R Limits	%Diff (S:Avg)	%Diff Limits	Notes
TDS	101	mg/L	10	160.1	NA	96.0	NA	NA	5	5	

92522

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

Project Number: 23/69-0862

Project Name: Poly Met Res. Well Sampling

№ 27467

COC 1 of 1

Project Manager: JAMZ

Project Contact: KDP

Sampled by: REE

Laboratory: NTS

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix:	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Prcs.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)			Total No. Of Containers	Remarks
1. 4400	1/9/09	9:30	X			X			3	3	2	4	9	2			3	3	2	4	9	6								3	See table 3-5day Rush
2. 4789	↓	10:20	X			X			3	3	2	4	9	3			3	3	2	4	9	7								3	
3. 4249	↓	12:10	X			X			3	3	2	4	9	4			3	3	2	4	9	8								3	
4. Duplicate	↓	—	X			X			3	3	2	4	9	5			3	3	2	4	9	9								3	↓
5.																															
6.																															
7.																															
8.																															
9.																															
10.																															
11.																															Temp: 8.2°C
12.																															

Common Parameter/Container - Preservation Key

*1 - *Volatile Organics = BTEX, GRO, TPH, Full List*
*2 - *Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs*
*3 - *General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate*
*4 - *Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN*

Relinquished By:	On Ice? Y (N)	Date	Time	Received by:	Date	Time
REE		1/9/09	1500			
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
					1/9/09	1300

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☒ Sampler ☐ Other

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

H:RLGISTDFORMS\Chain Of Custody Form RLG Rev. 07\01\05

Table 2. Proposed Parameters for Groundwater Sample Analysis. Detection limits in ug/L unless otherwise noted.

Description	Method	Detection Limit
Alkalinity, Total as $CaCO_3$	EPA 310.1	
Aluminum, Total	EPA 200.7	
Aluminum, Dissolved	EPA 200.7	
Antimony, Total	EPA 200.8	
Arsenic, Total	EPA 200.8	2
Arsenic, Dissolved	EPA 200.8	2
Boron, Total	EPA 200.7	50
Boron, Dissolved	EPA 200.7	50
Chloride	EPA 300.0	0.5 mg/L
Copper, Total	EPA 200.8	0.7
Copper, Dissolved	EPA 200.8	0.7
Fluoride	EPA 300.0	0.1 mg/L
Hardness, Total (calculated)	SM2340B	10 mg/L
Magnesium, Total	EPA 200.7	0.5 mg/L
Manganese, Total	EPA 200.8	0.5
Manganese, Dissolved	EPA 200.8	0.5
Molybdenum, Total	EPA 200.8	0.2
Nickel, Total	EPA 200.8	0.6
Nickel, Dissolved	EPA 200.8	0.6
pH, Field		0.1 SU
Solids, Total Dissolved	EPA 160.1	10 mg/L
Sulfate	EPA 300.0	1 mg/L

Sample Receiving Checklist 4.07

(non criminal Chain of Custody)

Samples require client direction, discrepancies noted below: COC# 92522

- o No COC Documentation supplied
- ☒ Incomplete COC Documentation
- o Sample Containers listed on COC do not match
- o Sample Containers listed on COC are compromised
- o Sample Temp is over range and cooling preservation is required
- o Signatures and Times for collection and/or transfer are not complete
- o Custody seals requested but not intact
- o Sample parameters exceed hold time
- o Sample volume/mass does not meet minimum requirements (PM to discuss w/analysts)

Attach to COC if available and notify Project Manager

PM Record of client information:

No Table of Analysis Attached to CoC.
Contacted Barr on 1-9-09.
On 1-9-09 @ 13:00 Voicemail from Barr indicated to use same attached analysis Table from the samples submitted from them on Wed 1-7-09. Res. Well Samples.

Date: 1-9-09

PM Signature: [signature]

tribal/qapcurrent/Virginia/sops/support/title