July - September 2015 Eagle Mine Groundwater Benchmark Deviation Summary



2015 Q3 Eagle Mine Groundwater Benchmark Deviation Summary

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During the Third Quarter 2015 (July – September) some monitoring well locations had groundwater parameters that were outside of the established benchmarks under the Mine Permit (Part 632) for at least two consecutive sampling events (Table 1). Two sets of benchmarks were calculated for all mine permit groundwater monitoring locations based on the guidance provided by the Mine Permit o1 2007 (Mine), Mining Permit o1 2010 (Mill), and Part 632. The benchmark that is used for screening monitoring data is the lower of the two values. Due to the required statistical nature of these benchmark values, the accuracy will improve over time as the quantity of data that becomes available increases. If data collected during future monitoring events is deemed to be representative of baseline conditions it may be incorporated into the benchmark calculations. Following is a description of the current calculated benchmarks:

- Upper prediction limit (UPL) benchmark: Per reporting requirements under R 426.406(6) and General Condition s of the Mine Permit (MP o1 2007 & MP o1 2010), the UPL has been developed as the upper threshold limit for increased monitoring and is based on a statistical analysis of qualified baseline data. Data outliers are not included in the baseline information. The UPL benchmark represents a value that is two standard deviations above the long-term average. Again, as the data set increases over time, the long term average and standard deviations may need to be adjusted for improved accuracy.
- Maximum contaminant level (MCL) derived benchmark: Per reporting requirements under R 426.406(7a), the MCL benchmark was developed as an upper threshold action limit and represents the value ½ way between the long-term average and the drinking water standard (MCL) determined by US EPA. These values may also be reviewed and adjusted as the data set increases over time.

Parameters such as metals and nitrates are found naturally in groundwater but can pose human health risks at high levels. A complete list of potential risks from contaminants based on the U.S. EPA Drinking Water Standards can be found at: <u>http://www.epa.gov/your-drinking-water/table-regulated-drinking-water-contaminants</u>. CEMP monitoring rated the following locations as <u>YELLOW</u> indicating an area that is being watched/tracked for changes but currently poses no known risk to the environment (Table 1).

LOCATION	PARAMETER	UNIT	BENCHMARK	Q3 2015
0.17.00.1.1	Alkalinity,			
QAL024A	Bicarbonate	mg/L	24	31 e
Fagle Mine	Chloride	mg/L	1.4	92
Vent Raise	Nitrogen, Nitrate	mg/L	0.2	1.1
	Sodium	mg/L	1.2 t	27
QAL060A				
Contact Area		/T	0.10	0.14
near CWBs	Nitrogen, Nitrate	mg/L	0.12	0.14
OAL062A	Alkalinity, Dicarbonato	ma/I	18 +	00 a
Contact Area	Chlorite	IIIg/L	401	90.6
Near TDRSA	Chloride	mg/L	1.0	20
	Sodium	mg/L	0.76 t	1.3
QAL063A	Alkalinity,	m a/I	42.4	66.0
Contact Area	Bicarbonate	mg/L	421	00 0
near COSA	Sodium	mg/L	0.78	0.81
QAL064D				
Soun oj Salmon	Alkalinity			
Trout River	Bicarbonate	mg/L	69	76 e
QAL066D				
South of				
Triple A				
Road	pH	SU	10.4 - 11.4 p	9
	Alkalinity,	1.	27	
0410(74	Bicarbonate	mg/L	27	46
QAL06/A	Chloride	mg/L	1.9	890
Near TDRSA	Nitrate	mg/L	0.25 t	2.1
110000 1210011	Sodium	mg/L	1.6 t	490
	Sulfate	mg/L	8.4 t	15
	pH	mg/L	8.1-9.1	8
	Alkalinity,			
OAL071A	Bicarbonate	mg/L	44 t	130 e
Contact Area	Chloride	mg/L	1.5	44
Near CWBs	Nitrate	mg/L	0.31	7.4
	Sodium	mg/L	1.8	11
	Sulfate	mg/L	3.3	7.6

Table 1. 2015 Q3 Groundwater Benchmark Deviation Summary

Benchmarks listed as "pending" (p) or "trending" (t) cannot be statistically derived with accuracy utilizing the baseline data collected to date, either because there are insufficient values (p) or the sequence of values suggest a trend is present (t). "e" = estimated value.

					EPA Drinking Water Standards (Inorganic Chemicals)					
LOCATION	PARAMETER	UNIT	BENCHMARK	Q3 2015 Result	MCLG ¹ (mg/L)	MCL ² or TT ³ (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term);	Secondary ⁴ MCL	Noticeable Effects above the Secondary MCL	
	Alkalinity, Bicarbonate	mg/L	24	31 e	-	-	-	-	-	
	Chloride	mg/L	1.4	92	-	-	-	250 mg/L	Salty taste	
QAL024A Near the Eagle Mine Vent Raise	<u>Nitrogen,</u> <u>Nitrate</u>	mg/L	0.2	1.1	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.		_	
	Sodium	mg/L	1.2 t	27	-	-	-	-	-	
QAL060A Contact Area Near CWBs	<u>Nitrogen,</u> <u>Nitrate</u>	mg/L	0.12	0.14	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	-	-	
QAL062A	Alkalinity, Bicarbonate	mg/L	48 t	90 e	-	-	-	-	-	
Contact	Chloride	mg/L	1.6	20	-	-	-	250 mg/L	Salty taste	

Table 2. 2015 Q3 Groundwater Benchmark Deviation Summary and EPA Drinking Water Standards for ParametersExceeding Benchmark Values

					EPA Drinking Water Standards (Inorganic Chemicals)				<u>als)</u>
LOCATION	PARAMETER	UNIT	BENCHMARK	Q3 2015 Result	MCLG ¹ (mg/L)	MCL ² or TT ³ (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term);	Secondary ⁴ MCL	Noticeable Effects above the Secondary MCL
Area Near TDRSA	Sodium	mg/L	0.76 t	1.3	-	-	-	-	-
QAL063A Contact	Alkalinity, Bicarbonate	mg/L	42 t	66 e	-	-	-	-	-
Area Near COSA	Sodium	mg/L	0.78	0.81	-	-	-	-	-
QAL064D South of Salmon Trout River	Alkalinity, Bicarbonate	mg/L	69	76 e	-	-	-	-	-
QAL066D South of Triple A Road	pН	SU	10.4-11.4 p	9	-	-	-	6.5 - 8.5	Low pH: bitter metallic taste; corrosion. High pH: slippery feel; soda taste; deposits
QAL067A	Alkalinity, Bicarbonate	mg/L	27	46	-	-	-	-	-
Contact	Chloride	mg/L	1.9	890	-	-	-	250 mg/L	Salty taste

					EPA Drinking Water Standards (Inorganic Chemicals)				
LOCATION	PARAMETER	UNIT	BENCHMARK	Q3 2015 Result	MCLG ¹ (mg/L)	MCL ² or TT ³ (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term);	Secondary ⁴ MCL	Noticeable Effects above the Secondary MCL
Area Near TDRSA	<u>Nitrate</u>	mg/L	0.25 t	2.1	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	-	-
	Sodium	mg/L	1.6 t	490	-	-	-	-	-
	Sulfate	mg/L	8.4 t	15	-	-	-	-	-
QAL071A Contact Area Near CWBs	pH	mg/L	8.1-9.1	8	-	-	-	6.5 - 8.5	Low pH: bitter metallic taste; corrosion. High pH: slippery feel; soda taste; deposits
	Alkalinity, Bicarbonate	mg/L	44 t	130 e	-	-	-	-	-
	Chloride	mg/L	1.5	44	-	-	-	250 mg/L	Salty taste

					EPA Drinking Water Standards (Inorganic Chemicals)				<u>als)</u>
							Potential Health Effects		Noticeable
							from Long-Term		Effects
				Q3		MCL ² or	Exposure Above the		above the
				2015	MCLG ¹	TT ³	MCL (unless specified	Secondary ⁴	Secondary
LOCATION	PARAMETER	UNIT	BENCHMARK	Result	(mg/L)	(mg/L)	as short-term);	MCL	MCL
	Nitrate	mg/L	0.31	7.4	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	-	-
	Sodium	mg/L	1.8	11	-	-	-	-	-
	Sulfate	mg/L	3.3	7.6	-	-	-	250 mg/L	Salty taste

Benchmarks listed as "pending" (p) or "trending" (t) cannot be statistically derived with accuracy utilizing the baseline data collected to date, either because there are insufficient values (p) or the sequence of values suggest a trend is present (t). "e" = estimated value.

1 - MCLG = Maximum Contaminant Level Goal; The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.

2 - MCL = Maximum Contaminant Level; The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

3 - TT = Treatment Technique; A requird process intended to reduce the level of a contaminant in drinking water.

4 - Secondary Standards: Non-enforcable standsards established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.

















































