APPENDIX F:

QUARRY PIT SEEP WATER QUALITY SAMPLE RESULTS

Memorandum

To: Greg Knapp, Lehigh Hanson
Cc:

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Date: August 29, 2013
Subject: Permanente Quarry COA 76 –Quarry Pit Seep Water Quality Testing

Per Condition Of Approval (COA) 76 Within ninety (90) days of RPA approval, the Mine Operator shall begin and continue throughout the backfilling and reclamation phases and for 5 years following completion of reclamation and for 5 years following the start of groundwater discharge from the Quarry Pit into Permanente Creek as described on page 4.10-39 of the Final Environmental Impact Report, a Verification and Water Quality Monitoring Program. The Mine Operator shall implement the following:

D. Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall be estimated.

To ensure compliance with the above listed COA, On April 24, 2013, Golder Associates performed a seep survey within the Quarry pit. Two seeps were identified during the survey: one seep (Seep-850) was located by the southwest portion of the pit and day-lighted on the 900 and 850 feet elevation benches; and the second seep (Seep-750) was identified by the western/northwestern portion of the pit floor emanating from the northwestern pit wall by the mainslide. Golder did not identify any additional seeps within the Quarry pit. Both seeps were sampled and analyzed for general water chemistry and dissolved metals. The results of the sampling and the estimated flow rates are shown in Table 1 below.

Table 1. Quarry Pit Seep Sampling

Quarry Pit Seeps	Seep-750	Seep-850
Sample Date	**4/24/2013**	**4/24/2013**
Metals (dissolved, 200 series)		
Antimony (ug/L)	0.71	3.6
Arsenic (ug/L)	7.1	0.71
Barium (ug/L)	63	34
Beryllium (ug/L)	ND	ND
Cadmium (ug/L)	ND	0.72
Chromium (ug/L)	0.63	ND
Cobalt (ug/L)	0.13	0.49
Copper (ug/L)	3.1	1.7
Lead (ug/L)	ND	ND
Mercury (ug/L)	ND	ND
Molybdenum (ug/L)	110	110
Nickel (ug/L)	2.1	58
Selenium (ug/L)	5.0	24
Silver (ug/L)	ND	ND
Thallium (ug/L)	ND	0.16
Vanadium (ug/L)	260	150
Zinc (ug/L)	ND	120
Calcium (mg/L)	16	140
Magnesium (mg/L)	9.0	49
Potassium (mg/L)	1.7	1.0
Sodium (mg/L)	200	16
Additional Parameters		
Bicarbonate (mg/L)	210	270
Total Dissolved Solids (mg/L)	680	1000
Total Suspended Solids (mg/L)	8.5	1.0
Hardness	77	558
Nitrate as NO3	10	1.2
Chloride (mg/L)	13	15
Fluoride (mg/L)	0.14	0.14
Sulfate as SO4 (mg/L)	330	430
Turbidity (NTU)	11.5	2.9
pH - Field (s.u.)	8.02	7.36
Temperature - Field (°C)	21.89	18.29
DO - Field (mg/L)	9.32	7.56
Electrical Conductivity - Field (µS/cm)	1181	1120
ORP - Field (mV)	93.3	145.8
Estimated Flow Rate (GPM)	2	250