recorded in June (during freshet).

Total Molybdenum: A maximum level of 0.0020 mg/L was recorded in August 2013 and the minimum was 0.00049 mg/L recorded in June (during freshet).

Total Copper: A maximum level of 0.0028 mg/L was recorded in June 2013 and the minimum was below MDL in November.

Total cadmium and selenium results were all below MDL.

5.1.16. *Site W11 – Lower Edney Creek U/S of Quesnel Lake*

This site was sampled four times in 2013. This site is a far-field site, selected for comparisons to the sites downstream from the mine disturbance.

Notable observations in POC results:

Sulphate: An increasing trend has been observed at this site from 2000 to 2013 with a maximum value in 2013 of 17.8 mg/L and an annual mean in 2013 of 15.175 mg/L (2012 saw 12.6 mg/L).

There were no other changes in water quality observed at this site in 2013.

5.1.17. *Site W12 – 6K Creek at Road*

This site was sampled four times in 2013.

Notable observations in POC results:

Sulphate: An increasing trend has been observed at this site from 2000 to 2013 with a maximum value in 2013 of 29.2 mg/L and an annual mean in 2013 of 16.94 mg/L (2012 saw 12.4 mg/L).

There were no other significant changes in water quality observed at this monitoring location in 2013.

5.2. Groundwater Monitoring

5.2.1. *Program Background*

In 1995, groundwater-monitoring wells (series 95) were installed in the vicinity of the open pits and the

mill site. One of these wells (95R-5) still exists and remains part of the sampling program. In 1996, in order to monitor aquifers in both surficial deposits and bedrock, the MOE requested the establishment of additional monitoring wells downslope of the pit, rock disposal site and TSF. In conjunction with these 'downslope' wells, background wells were established upslope of any potential impacts by mining activities. This resulted in nine groundwater-monitoring wells being established in 1996 (series 96). Six of these sites are multi-level, consisting of "A" (deep) wells and "B" (shallow) wells, while the remaining three sites monitor a single depth. A commitment to install three additional multi-level monitoring locations along the southeast embankment of the TSF was made in 1996. These wells were subsequently installed in 2000. In 2005, GW05-01 was established to capture groundwater moving from Polley Lake towards the Wight Pit and pump it back into Polley Lake.

In 2011, to monitor potential impacts of newly disturbed areas, two additional multi-level monitoring sites were established below the temporary Potential Acid-Generating (PAG) Dump on Bootjack Road, and below the Southeast Rock Disposal Site (SERDS) on Polley Lake.

In 2012, MPMC retained AMEC to complete a site hydrogeological assessment. Based on AMEC's recommendation, five pairs of monitoring wells were installed in 2012 and well 95R-4 was decommissioned. The full report was included in the *2012 Annual Environmental and Reclamation Report,* The following recommendations for moving forward were:

1. Conduct a study correlating changes in groundwater chemistry with the waste rock and tailings geochemistry data. Some sampling in the tailings would help define mechanisms there.
2. Continue to monitor 95-R5 for two more events but consider replacing this well with a nested pair.
3. Water quality results for the new wells GW12-4 and GW12-5 may indicate a need for expanded monitoring in this area.
4. A detailed water balance should be prepared to assess the groundwater volumes reporting to the pits. This will aid in calibrating a groundwater flow model that can be used for closure planning.

Another hydrological assessment will be completed in 2017 as required under section 3.8 of Permit 11678.

5.2.2.***Monitoring Program***

Objectives of the groundwater-monitoring program include the following (Knight Piésold Ltd., 1996):

- To determine the direction and volume of groundwater flow from the mine site and other disturbed areas to receiving waters.

- To identify the locations of all surficial and deep groundwater aquifers underlying the mine site and their points of discharge to surface water.
- To establish background groundwater quality in aquifers prior to mine development.
- To calculate seepage and groundwater contamination dilution ratios in surface receiving waters in order to minimize impacts.

Figure 1.3 shows the locations of all monitoring wells, and Table 5.2 provides the depth, elevation and location information for each well, as well as the required monitoring frequency, 2013 sampling events, and years sampled. The following wells have been deactivated due to mine disturbances, or no longer have enough water to be sampled due to fluctuations in the water table, and were not included in the 2013 sampling program:

- 95R-4 (deactivated fall 2013 based on AMEC recommendation)
- GW96-5a (sampled spring 2013; deactivated fall 2013 due to TSF expansion)
- GW96-5b (insufficient flow as of spring 2007; deactivated fall 2013 due to TSF expansion)
- GW96-6 (deactivated fall 2006)
- GW96-8a/b (deactivated winter 2011-2012 due to Ore Switchback Road construction)
- GW96-9 (deactivated spring 2006)
- GW00-2b (insufficient flow as of spring 2011)

Table 5.2 Monitoring well depth, elevation, location, and sampling information

Well ID	MOE EMS #	Well Depth	Elevation	Northing	Easting	Monitoring Frequency	2013 Sampling Events	Years Sampled
95R-5	E229695	79.2	977.69	582 3790.66	59 3687.50	Bi-annually	2	1995 - 2013
GW96-1a	E229679	59.0	927.89	581 9939.06	59 5415.82	Annually	1	1998 - 2013
GW96-1b	E229680	38.72	927.81	581 9935.22	59 5416.16	Annually	1	1998 - 2013
GW96-2a	E229681	54.88	931.42	581 9449.92	59 6065.40	Bi-annually	2	1998 - 2013
GW96-2b	E229682	35.67	931.42	581 9447.08	59 6074.73	Bi-annually	2	1998 - 2013
GW96-3a	E229683	52.59	912.06	581 8308.97	59 5768.75	Annually	1	1998 - 2013
GW96-3b	E229684	19.97	912.06	581 8306.52	59 5765.16	Bi-annually	2	1998 - 2013
GW96-4a	E229685	24.7	940.56	581 8164.58	59 5147.94	Annually	1	1998 - 2013
GW96-4b	E229686	7.16	940.46	581 8162.87	59 5151.26	Annually	1	1996 - 2013
GW96-5a	E229687	19.82	973.55	581 9626.68	59 4330.34	Bi-annually	1	1998 - 2013
GW96-7	E229690	14.12	1021.32	582 1520.53	59 2983.23	Bi-annually	2	1998 - 2013
GW00-1a	E242385	21.03	939.18	5818476	594368.01	Bi-annually	2	2000 - 2013
GW00-1b	E242385	10.58	939.13	5818475.85	594371.26	Bi-annually	2	2000 - 2013
GW00-2a	E242387	21.55	943.4	5818337.53	594651.75	Bi-annually	2	2000 - 2013
GW00-2b	E242386	10.64	943.32	5818336.4	594657.58	Annually	0	2000 - 2010
GW00-3a	E242389	24.29	943.07	5818238.13	594896.38	Bi-annually	2	2000 - 2013
GW00-3b	E242388	13.66	943.22	5818237.65	594899.99	Annually	1	2000 - 2013
GW05-01	E258923			593027	5825267	Bi-annually	5	2005 - 2013
GW11-1a	E291219	15.85	1030	5823845	590766	Bi-annually	2	2011 - 2013
GW11-1b	E291211	8.23	1030	5823845	590766	Bi-annually	2	2011 - 2013
GW11-2a	E291212	29.4	938	5821020	594910	Bi-annually	2	2011 - 2013
GW11-2b	E291213	14.3	938	5821020	594910	Bi-annually	2	2011 - 2013
GW12-1a	E291969	99.6	991.6	5824612.57	590420.67	Bi-annually	2	2013
GW12-1b	E291970	24.4	991.4	5824617.37	590420.53	Bi-annually	2	2013
GW12-2a	E291971	100.6	1035.4	5823179.94	591154.53	Bi-annually	2	2013
GW12-2b	E291972	30.2	1035.4	5823176.64	591153.57	Bi-annually	2	2013
GW12-3a	E291973	99.7	1039.2	5822098.48	592147.96	Bi-annually	3	2013
GW12-3b	E291974	16.1	1039.1	5822101.88	592147.58	Bi-annually	2	2013
GW12-4a	E291976	100.6	989.9	5822894.27	594117.41	Bi-annually	2	2013
GW12-4b	E291977	36.3	990.1	5822890.94	594115.97	Bi-annually	2	2013
GW12-5a	E291978	100.4	965.3	5824582.25	593197.11	Bi-annually	2	2013
GW12-5b	E291979	12.7	966.2	5824568.66	593199.48	Bi-annually	2	2013

Groundwater sampling and analysis was conducted in accordance with the *2013 Annual Monitoring Plan* (Appendix C), which was reviewed by AMEC and approved by MOE. The calibration, sampling, filtering, preservation and shipping procedures outlined in the *Quality Assurance / Quality Control Manual* (MPMC, 2013) and the *British Columbia Field Sampling Manual: 2003 – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* and the Mount Polley *Quality Assurance/Quality Control Manual* are followed in the monitoring program. In situ pH, temperature and conductivity were measured at the time of sampling using a WTW Multimeter. Refer to section 4.1 for additional information on Data Quality Assurance/Quality Control, and Field Methodology.

Prior to drawing water from each well for purging and/or sampling, the phreatic (static) water level is measured and recorded. Results are presented in section 9.3. Samples are collected and then submitted to ALS Laboratory Group for water chemistry analysis, including: physical parameters (alkalinity, turbidity, total suspended solids, and hardness); anions and nutrients (sulfate, ammonia (N), nitrate, nitrite, nitrogen and phosphorus); and dissolved metals.

To monitor changes in groundwater quality, in the subsequent sections, nine key parameters of concern (POCs) are examined for each well over time:

Physical Parameters: Hardness

Anions: Sulphate

Nutrients: Nitrate

Dissolved Metals: Aluminum, Arsenic, Cadmium, Copper, Molybdenum, Selenium,

These POCs were identified in the Chemical Characterization of the Proposed Effluent for Discharge to Hazeltine Creek (Knight Piésold, 2009) based on site geochemistry, concentrations relative to current guidelines and regulations, historical water quality trends, and existing and projected waste and water management practices.

No groundwater quality guidelines are included in Permit 11678, so to establish if changes in water quality at any well are cause for concern or intervention, POC results are compared with the BC MOE Contaminated Sites Regulation (CSR) drinking water standards (the most stringent guidelines).

Table 5.3 BC MOE Contaminated Sites Regulation Schedule 6: Selected Water Standards

Parameter	Drinking Water (mg/L)
Dissolved aluminum	9.5
Total ammonia	no standard
Dissolved antimony	0.006
Dissolved arsenic	0.01
Dissolved barium	1
Dissolved beryllium	no standard
Dissolved boron	5
Dissolved cadmium	0.005
Dissolved chromium	0.05
Dissolved cobalt	no standard
Dissolved copper	1
Dissolved fluoride	1.5
Dissolved iron	6.5
Dissolved lead	0.01
Dissolved magnesium	100
Dissolved manganese	0.55
Dissolved mercury	0.001
Dissolved molybdenum	0.25
Dissolved nickel	
Nitrate N	10
Nitrite N	3.2
Dissolved selenium	0.01
Dissolved silver	no standard
Sulphate	500
Dissolved thallium	no standard
Dissolved titanium	no standard
Dissolved uranium	0.02
Dissolved zinc	5

Note: H means water hardness in mg/L CaCO3.

All groundwater results are presented in Appendix F of this report. This includes data in tabular form for each site, and graphs of the nine POCs (selenium was only graphed when results were above MDL). Note that results below method detection limit (MDL) are represented as 0.5*MDL in statistical calculations and graphs. Graphs were not included for wells installed in 2012, as they have only been sampled twice.

5.2.3. *Water Quality Results*

5.2.3.1. 95R-5 (Lower SERDS Well)

95R-5 is located along the old Polley Lake Forest Service Road, northwest of the East RDS, and immediately east of the NEZ soil stockpile location. In reviewing the water quality data from this well, it should be noted that the phreatic level dropped significantly in 2008 (refer to Appendix M). With the exception of Arsenic, major improvements in water quality at this site were observed in 2013. Notable observations in POC results:

Hardness: Increased from approximately 190 mg/L in 2004 to a historic maximum of 782 mg/L in October 2010. Since 2010, hardness levels have gradually decreased, and in 2013 a significant decrease down to 276 mg/L in October was observed.

Sulphate: Increased from approximately 20 mg/L in 2004 to a historic maximum of 531 mg/L in October 2010. Since 2010, sulphate levels have gradually decreased, and in 2013 a significant decrease down to 127 mg/L in October was observed.

Arsenic: Increased from historic lows of approximately 0.0004 mg/L in 2009 through 2012 to a historic maximum of 0.0025 mg/L in October 2013.

Molybdenum: Increased from historic lows of approximately 0.015 mg/L in 2008 through 2012 to 0.0246 mg/L in October 2013. 2013 concentrations continue to be equal to or below baseline levels.

For the remaining POCs, 2013 values were similar to or below historic results, and any fluctuations or spikes in previous years have discontinued. All results were below the CSR guidelines.

5.2.3.2. GW96-1a (TSF North Well – Deep)

GW96-1a is located downslope of the PESCP. There were no significant changes in water quality at this well in 2013. For all of the POCs, 2013 values were similar to historic levels, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.3. GW96-1b (TSF North Well – Shallow)

GW96-1b is located downslope of the PESCP. Notable observations in POC results:

Hardness: Has steadily increased since 1998 from 32.9 mg/L to 60.4 mg/L and 58.3 mg/L in May and October 2013, respectively.

For all remaining POCs, 2013 values were similar to or slightly below historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.4. GW96-2a (TSF East Well – Deep)

Groundwater monitoring well GW96-2a is located approximately 900 m southeast of the GW96-1 monitoring wells and was commissioned to monitor potential groundwater effects from the TSF on Hazeltine Creek. Notable observations in POC results:

Nitrate: Was elevated in 2012 from typical levels of 0.01 mg/L or lower, and spiked to a historic maximum of 0.0896 mg/L in June 2013 before decreasing to below MDL in October 2013.

For all remaining POCs, 2013 values were similar to or below historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.5. GW96-2b (TSF East Well – Shallow)

GW96-2b is located approximately 900 m Southeast from the GW96-1 monitoring wells and was commissioned to monitor potential groundwater effects from the Tailings Storage Facility on Hazeltine Creek. Notable observations in POC results:

Hardness: Has fluctuated significantly over time, but reached a historic maximum of 269 mg/L in October 2013 before decreasing to a more typical level of 243 mg/L in October.

Sulphate: Has steadily increased from approximately 6 mg/L in 2003 to a historic maximum of 82 mg/L in June 2013, followed by a decrease to 64.3 mg/L in October 2013.

Aluminum: Was typically below MDL and/or less than 0.001 mg/L from 2002 through 2013, but showed increases to 0.0043 mg/L, 0.0031 mg/L, and 0.0055 mg/L in May 2012, October 2012, and October 2013, respectively.

Molybdenum: Has shown increases above baseline (approximately 0.005 mg/L) since 2007, with spikes in September 2009 and October 2010. Levels continue to be elevated in 2013 at 0.00797 mg/L in June and 0.0094 mg/L in October.

Arsenic: Has remained slightly elevated above baseline (approximately 0.0013 mg/L) since 2008, with levels fluctuating between 0.0015 mg/L and 0.0018 mg/L.

For the remaining POCs, 2013 values were similar to or below historic results, and any spikes or fluctuations in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.6. GW96-3a (TSF Southeast Well – Deep)

GW96-3a is located adjacent to MESCP. Throughout the monitoring period, many parameters have exhibited constant fluctuations including hardness, sulphate, aluminum, arsenic, cadmium, copper, and molybdenum. For POCs, 2013 values were within historic fluctuations, and any spikes in previous years have stabilized. Notably, nitrate levels decreased after being slightly elevated in 2012. All results were below the CSR guidelines.

5.2.3.7. GW96-3b (TSF Southeast Well – Shallow)

GW96-3b is located adjacent to the MESCP. Throughout the monitoring period, many parameters have exhibited constant fluctuations including sulphate, aluminum, arsenic, copper, and molybdenum. For POCs, 2013 values were within historic fluctuations, and any spikes in previous years have stabilized. Notably, nitrate levels decreased after being slightly elevated in 2012. All results were below the CSR guidelines.

5.2.3.8. GW96-4a (TSF Southwest Well – Deep)

GW96-4a is located downslope of the south and main embankments. Notable observations in POC results:

Hardness: In 2012 and 2013, increased to above previously observed fluctuations to a historic maximum of 119 mg/L in May 2013.

Nitrate: Starting in 2012 levels increased from baseline of approximately 0.01 mg/L to a historic maximum of 0.0957 mg/L in May 2013.

Sulphate: Levels were stable at approximately 2.5 mg/L from 2005 through 2011, then began increasing

to a historic maximum of 19.9 mg/L in May 2013, although 1998 levels were approximately 12 mg/L.

For all other POCs, 2012 values were similar to or below historic results, and fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.9. GW96-4b (TSF Southwest Well – Shallow)

GW96-4b is located downslope of the South and Main Embankments. Notable observations in POC results:

Hardness: Has steadily increased from approximately 180 mg/L in 1996 through 1998 to a historic maximum of 44 g/L in May 2013.

Nitrate: Has increased from below MDL (0.005 mg/L) in May 2011 to greater than an average of 0.53 mg/L in 2012 and 2013.

Sulphate: Has increased from approximately 2 mg/L in 2010 to a historic maximum of 218 mg/L in May 2013.

For all other POCs, 2013 values were similar to historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.10. GW96-5a (Tailings Storage Facility Control Well – Deep)

GW96-5a is located at the upstream (north) of the TSF and is monitored as a control site. For all of the POCs, 2013 values were similar to or below historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

GW96-5a and GW96-5b were decommissioned with grout plugs in November 27, 2014 as the site was being lost due to expansion of the TSF.

5.2.3.11. GW96-7 (Southeast Sediment Pond Well)

GW96-7 is located downslope of the Mill Site, half way down the tailings access road (near the booster pump station). Notable observations in POC results:

Hardness: Was stable at approximately 145 mg/L through 2010, but spiked to 267 mg/L in May 2011, and has since decreased to 159 mg/L in October 2013.

Sulphate: Was stable at approximately 27 mg/L through 2010, but spiked to 158 mg/L in May 2011, and has since decreased to 36.2 mg/L in October 2013.

Molybdenum: Was stable at approximately 0.005 mg/L through 2010, but increased to 0.01 mg/L in May 2011, and has since decreased to 0.00583 mg/L in October 2013.

For the remaining POCs, 2013 values were similar to historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.12. GW00-1a (TSF Northwest Well – Deep)

GW00-1a is located across the Gavin Lake FSR, beside the TSF South Embankment. Notable observations in POC results:

Hardness: From the historic maximum of 53.6 mg/L in 2000, levels decreased through 2005, but have since increased from a historic minimum of 29 mg/L in 2005 to 36.1 mg/L in October 2013.

Sulphate: From the historic maximum of 335 mg/L in 2000, levels decreased through 2005, but have since increased from a historic minimum of 187 mg/L in 2005 to 281 mg/L in October 2013.

Molybdenum: From the historic maximum of 0.0271 mg/L in 2000, levels decreased through 2004, but have since increased from a historic minimum of 0.0165 mg/L in 2004 to 0.0257 mg/L and 0.0247 mg/L in June and October of 2013, respectively.

For the remaining POCs, 2013 values were similar to or below historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.13. GW00-1b (TSF Northwest Well – Shallow)

GW00-1b is located across the Gavin Lake FSR, beside the TSF South Embankment. Notable observations in POC results:

Hardness: Levels were stable at approximately 260 mg/L through 2008, but increased between 2008 and 2010, and have since fluctuated around 530 mg/L.

Nitrate: Has decreased from the spike of 17.1 mg/L in October 2011 to 2.71 mg/L in October 2013, but still remains above baseline levels of below MDL (0.005 mg/L).

Sulphate: Levels were stable at approximately 8 mg/L through 2007, but increased in 2008 and 2009, and have since fluctuated around 275 mg/L.

Cadmium: In 2007, levels spiked from approximately 0.00003 mg/L to a historic maximum of 0.000186 mg/L in 2008. Concentrations had been decreasing since 2008, but increased again in 2013 to 0.000137 mg/L in October 2013.

Molybdenum: Increased from 0.004 mg/L in 2007 to a historic maximum of 0.041 mg/L in May 2012, but have since decreased to 0.0287 mg/L and 0.0338 mg/L in May and October of 2013, respectively.

Selenium: Increased from below MDL in 2008 to a historic maximum of 0.029 mg/L in October 2011, but has subsequently decreased to 0.0007 mg/L in October 2013.

For all remaining POCs, 2013 values were similar to historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.14. GW00-2a (TSF West Well – Deep)

GW00-2a is located downstream of the TSF South Embankment. For all POCs, 2013 values were similar to historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.15. GW00-3a (TSF Southwest Well – Deep)

GW00-3a is located downstream of the TSF South Embankment. For all POCs, 2013 values were similar to historic results, and any fluctuations or spikes in previous years have stabilized. All results were below the CSR guidelines.

5.2.3.16. GW00-3b (TSF Southwest Well – Shallow)

GW00-3b is located downstream of the TSF South Embankment. This well was not sampled in 2012 due to a lack of water, but for all POCs, 2013 values were similar to historic results. All results were below the CSR guidelines.

5.2.3.17. GW05-01 (Wight Pit/Polley Lake Interface Well)

GW05-01 is located between the Wight Pit and Polley Lake. It was established in 2005 to capture groundwater moving from Polley Lake towards the Wight Pit and continuously pump it back to Polley Lake. In June of 2010, pumping was terminated making it impossible to sample; however, this now

provides domestic water for the underground operations, and sampling from the tap commenced in June 2012. Notable observations in POC results:

Copper: Levels fluctuated around 0.001 mg/L until 2012 when an increase to the historic maximum of 0.0272 mg/L was observed in November. In 2013 results ranged from 0.00064 mg/L to 0.0133 mg/L.

Molybdenum: Fluctuated around 0.005 mg/L until 2009 when it began increasing, reaching a historic maximum of 0.008 mg/L in November 2013.

Selenium: Spiked from below MDL to a historic maximum of 0.00063 mg/L in June 2012, but has since decreased to approximately 0.0005 mg/L in 2013.

For all remaining POCs, 2013 values were similar to historic results. Many parameters have undergone significant fluctuations or spikes in previous years, but results have either stabilized or fall within the typical range of values. All results were below the CSR guidelines.

5.2.3.18. GW11-1a (Below Temporary PAG Stockpile on Bootjack Road - Deep)

GW11-1a is located below the Temporary PAG Stockpile on Bootjack Road to monitor potential impacts on Bootjack Lake. Notable observations in POC results:

Hardness: Levels ranged from 73.2 mg/L to 83.0 mg/L in 2011 and 2012. In 2013 an increase to 91.4 mg/L in October was observed.

Aluminum: Increased from approximately 0.003 mg/L in 2011 and 2013 to 0.0054 mg/L in October 2013.

For all remaining POCs, 2013 values were similar to or below 2011 and 2012 levels. All results were below the CSR Guidelines. Nitrate, copper, and selenium levels have been below MDL since sampling commenced in 2011.

5.2.3.19. GW11-1b (Below Temporary PAG Stockpile on Bootjack Road - Shallow)

GW11-1b is located below the Temporary PAG Stockpile on Bootjack Road to monitor potential impacts on Bootjack Lake. Notable observations in POC results:

Hardness: Has increased from approximately 140 mg/L in December 2011 and May 2012 to 219 mg/L in October 2013.

Nitrate: Was below MDL (0.005 mg/L) for all sample results until October 2013 when levels increased to 0.0076 mg/L.

Cadmium: After fluctuating around approximately 0.000015 mg/L, levels increased to 0.000053 mg/L in October 2013.

Copper: After fluctuating from below MDL (0.0005 mg/L) to 0.00083 mg/L, levels increased to 0.00135 mg/L in October 2013.

For all remaining POCs, results were similar to or below 2011 and 2012 levels. All results were below the CSR Guidelines.

5.2.3.20. GW11-2a (Below SERDS on Polley Lake Road - Deep)

GW11-2a is located below the SERDS on Polley Lake Road. Notable observations in POC results:

Copper: Has increased from 0.00131 mg/L in December 2011 to 0.0049 mg/L in June 2013, then decreased to 0.00213 mg/L in October 2013.

For all remaining POCs, results were similar or below 2011 and 2012 levels. All results were below the CSR Guidelines. It is also of note that typically the in situ pH is greater than 12, and the in situ conductivity is approximately 3000 µS/cm. This is likely because the well is located in a calcium deposit; dissolved calcium levels exceed 200 mg/L.

5.2.3.21. GW11-2b (Below SERDS on Polley Lake Road - Shallow)

GW11-2b is located below the SERDS on Polley Lake Road.

Aluminum: Decreased from approximately 0.05 mg/L in 2011 and 2012 to 0.0255 mg/L in October 2013.

Arsenic: Increased from 2011 and 2012 levels of approximately 0.005 mg/L to 0.0086 mg/L in June 2013, with the arsenic concentration returning to 0.00447 mg/L in October 2013.

For all remaining POCs, results were similar or below 2011 and 2012 levels. All results were below the CSR Guidelines, and cadmium, copper, and selenium were below MDL.

5.2.3.22. GW12-1a (NW of Temporary PAG Stockpile – Deep)

GW12-1a is located below the Temporary PAG Stockpile, just above the NW Sump, to monitor the expanding dump. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except sulphate and arsenic decreased between June and October 2013, and nitrate levels were below MDL.

5.2.3.23. GW12-1b (NW of Temporary PAG Stockpile – Shallow)

GW12-1b is located below the Temporary PAG Stockpile, just above the NW Sump, to monitor the expanding dump. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except arsenic decreased between June and October 2013, and aluminum levels were below MDL.

5.2.3.24. GW 12-2a (Springer Pit Well – Deep)

GW12-2a is located between the Springer Pit and Bootjack Lake, and was installed to replace the compromised well 95R-4. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except cadmium and molybdenum decreased between June and October 2013, and copper levels were below MDL.

5.2.3.1. GW 12-2b (Springer Pit Well – Shallow)

GW12-2b is located between the Springer Pit and Bootjack Lake, and was installed to replace the compromised well 95R-4. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except arsenic decreased between June and October 2013, and aluminum, cadmium, and copper levels were below MDL.

5.2.3.2. GW12-3a (Below Waste Haul Road – Deep)

GW12-3a is located below the Waste Haul Road and was installed to replace GW96-8a, which was lost due to construction of the Ore Switchback Haul Road, and to monitor potential impacts of the haul road on Mine Drainage Creek and Bootjack Lake. The three sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except hardness, nitrate, and arsenic decreased between June and October 2013, and copper levels were below MDL.

5.2.3.1. GW12-3b (Below Waste Haul Road – Shallow)

GW12-3b is located below the Waste Haul Road and was installed to replace GW96-8b, which was lost due to construction of the Ore Switchback Haul Road, and to monitor potential impacts of the haul road

on Mine Drainage Creek and Bootjack Lake. The three sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except nitrate increased between June and October 2013, and aluminum and copper levels were below MDL.

5.2.3.2. **GW12-4a (Below NEZ Dump – Deep)**

GW12-4a is located below the NEZ Dump, above the Long Ditch, and was installed to improve monitoring of groundwater inflow into Polley Lake. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, and all POCs except hardness, sulphate, and arsenic decreased between June and October 2013.

5.2.3.1. **GW12-4b (Below NEZ Dump – Shallow)**

GW12-4b is located below the NEZ Dump, above the Long Ditch, and was installed to improve monitoring of groundwater inflow into Polley Lake. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except hardness, nitrate, and molybdenum decreased between June and October 2013, and aluminum, copper, and selenium levels were below MDL.

5.2.3.2. **GW12-5a (Below Wight Pit Haul Road – Deep)**

GW12-5a is located below the Wight Pit Haul Road, and was installed to improve monitoring of groundwater inflow into Polley Lake. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, sulphate, aluminum, and cadmium decreased between June and October 2013, and nitrate, aluminum, copper, and selenium levels were below MDL.

5.2.3.1. **GW12-5b (Below Wight Pit Haul Road – Shallow)**

GW12-5b is located below the Wight Pit Haul Road, and was installed to improve monitoring of groundwater inflow into Polley Lake. The two sampling events in 2013 are insufficient to indicate trends; however, all results are below the CSR guidelines, all POCs except arsenic decreased between June and October 2013, and aluminum levels were below MDL.