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1.0 Introduction

This volume of the Annual Water Quality Monitoring Summary report contains the results of water quality monitoring conducted in 2012 in accordance with the requirements of the Alaska Pollutant Discharge Elimination System (APDES Permit No. AK0050571) for the Kensington Gold Project, near Juneau, Alaska. A graphical presentation of water quality data collected at both outfalls and receiving water monitoring stations, along with tabular summary statistics is included in this summary report.

2.0 Methods

Monitoring of water quality at Outfall 001 (treated mine discharge) and Outfall 002 (treated tails pond water) occurred during 2012 as required by the APDES permit. In addition to outfall sampling, monitoring was conducted at four receiving water streams (Johnson, Slate, Sherman and Ophir Creeks) for ambient upstream and downstream water quality. The following list describes the sampling activities at these outfalls and receiving water stations:

2.1 Monitoring Currently Active

- Continuous monitoring of flow and pH at Outfall 001 effluent; daily samples from the effluent of Outfall 001 for total suspended solids (TSS) analysis; weekly water sampling of the effluent for analysis of field, general and trace parameters; quarterly sampling of the effluent for TDS anions and cations; monthly sampling of the effluent for whole effluent toxicity testing.
- Continuous monitoring of flow and pH at Outfall 002 effluent along with; daily samples from the effluent of Outfall 002 for total suspended solids (TSS) analysis; weekly water sampling at Outfall 002 effluent for analysis of field, general and trace parameters; monthly sampling of the effluent for whole effluent toxicity testing. Monthly receiving water field, general and trace parameters from stations MLA, SMP-5, SLB, SLC on Slate Creek; stations SH113 (twice monthly for manganese), SH105, SH109 on Sherman; stations JS2, JS4, JS5 on Johnson Creek. Stations SH111 and SH103 on Ophir Creek were also sampled monthly.

2.2 Monitoring Currently Suspended

- No monitoring is currently suspended.

2.3 Changes during 2012 Monitoring

- No changes from the previous year's monitoring occurred during 2012.

3.0 QC Summary

3.1 Plan QC

Coeur Alaska has complied with the approved quality assurance plan for the 2012 water quality data. At least ten percent of all lab reports are reviewed for issues pertinent to the five categories of quality control:

- Precision
- Accuracy
- Comparability
- Representativeness
- Completeness

Based on the results of this review, lab reports, individual samples, or individual parameters within samples may be qualified on a variety of issues as:

- Accepted
- Estimated
- Rejected

No data were rejected from the 2012 dataset, but some parameters within individual samples were flagged as estimated within the database when one or more of the quality controls were not met. During 2008, Coeur implemented the practice of completing the QA/QC review of all data gathered for the NPDES permit on a monthly basis in conjunction with preparation of the

monthly Discharge Monitoring Report. This was continued through 2012 to allow for timely resolution of any issues identified during the QA/QC review with the contract laboratory or field personnel.

3.1.1 Precision- Field Blind Duplicate Comparison

Precision is a qualitative measure of the reproducibility of a measurement under a given set of conditions. Precision in the analytical results of laboratory analysis is determined by laboratory quality control measures such as duplicate matrix spikes and sample duplicates. The plan criterion for laboratory precision is a relative percent difference between duplicate samples of less than or equal to 20%. In addition, field blind duplicate sample pairs, which are collected throughout the year, are also used as a quality control for precision in the laboratory results.

Receiving water sample field duplicates are selected and collected on a random basis. The total number of receiving water field duplicates collected during 2012 was 33. Blind duplicates were performed on the receiving water sites in 2012. The relative percent difference (RPD) was calculated for each duplicated parameter. 7.5% of all duplicated parameter results were greater than 20% RPD and therefore did not pass the precision criteria. Compared with previous years, 2011 had a 5% failure, 9% in 2010, 6% in 2009, 7% in 2008 and 12% in 2007. The parameters that most frequently showed greater than 20% difference in 2012 were turbidity and TDS followed by aluminum, nitrate, manganese, mercury, and hardness. Turbidity showed more than 20% difference in slightly more than one half of the field blind duplicate samples. No field blind duplicates were collected from either Outfall 001 or Outfall 002. The results of comparisons between duplicate sets are tabulated in **Appendix A**.

3.1.2 Accuracy

Accuracy in the analytical results of laboratory analysis is determined by percent recovery of laboratory quality control measures such as matrix spikes, control samples and method blanks. The criterion for accuracy in most analytical procedures is a percent recovery between 85 and 115 percent. Less than 1 % of all sample results typically fail this criterion and are qualified appropriately in the database. Accuracy in field measurements is controlled and verified by using

calibrated instruments. Field meters were calibrated prior to their use during 2012 monitoring.

3.1.3 Representativeness

Representativeness is controlled by sampling plan design, sampling techniques and sample handling procedures.

3.1.4 Comparability

Comparability is maintained by using consistent sampling and analytical methods as well as consistent units of measurement. ALS Environmental, formerly Colombia Analytical Services located in Kelso, Washington has conducted all NPDES/APDES water quality analyses since March 2008. This has helped maintain comparability within data sets. In addition, the sample and data management process is streamlined.

3.1.5 Completeness

As stated in the quality assurance plan for the Kensington Gold Project, the completeness criterion goal for monitoring data is 90% due to the extreme conditions observed on site. Overall data capture was close to 100% for 2012. One field parameter was missed at Outfall 001 and one at Outfall 002. All other sites had 100% data collection unless there was no flowing water; such was the case at Ophir Creek site SH111 January, February, March, April and December of 2012.

3.2 Detection

The laboratory Practical Quantitation Limit (PQL) remained consistent for each analytical method during all 2012 water quality monitoring. Arsenic, cadmium, lead, silver and chromium were not detected in any samples collected from the receiving water stations on Slate, Sherman, Ophir and Johnson Creeks. Nickel was not detected at Sherman and Ophir Creeks. Selenium also remained undetected throughout the year with the exception of two results slightly over the detection limit at the SH113 site on Sherman Creek. Aluminum was present in all receiving water samples and exceeded the water quality standard on fifteen occasions, for some of the results the elevated levels could be attributed to higher background levels. Manganese was present in all Slate Creek samples. Manganese was slightly over the detection level in background Sherman samples, but was present in all downstream samples. On Sherman Creek copper concentrations throughout the year were low with the highest concentration at the downstream site which was slightly over

the detection limit. Zinc was present in two Sherman background samples and downstream on four occasions. Aluminum was the only metal detected in all samples collected from Sherman Creek and Ophir Creek stations. Of the twelve samples from the downstream site on Ophir Creek, six contained copper, two contained zinc and six contained manganese. Upstream Ophir Creek samples with the exception of aluminum only contained one metal result above the detection limit, which was May's copper result. Most metals in Johnson Creek samples were either detected in a fraction of samples or none at all. Johnson Creek contained aluminum concentrations throughout the year while all downstream samples contained detectable levels of manganese. Copper and zinc were detected only in March in both downstream Johnson Creek sites. The number of undetected metals per site among the four receiving water streams was highest in Ophir Creek, followed by Sherman Creek, then Johnson Creek and lastly Slate Creek.

As expected, sulfate, TDS and hardness parameters were detected in all samples collected from all stations on each of the four receiving water creeks with the exception of one non-detect result for the background Johnson Creek station. TDS and conductivity were highest in downstream samples from Slate Creek with the exception of a few months at the downstream Ophir Creek site. TDS and conductivity also showed an increase in downstream samples from Sherman Creek during the winter months. Conductivity was low in upstream Johnson samples but showed some increase downstream. Hardness was lowest in Johnson Creek, followed by Sherman Creek, Slate Creek and then Ophir Creek.

Ultra low detection limits, provided through the use of method 1631, were used to determine mercury concentrations in the receiving waters. Mercury was detected in eight samples at Johnson Creek one at JS-2, five at JS-4 and the remaining at JS-5. At Sherman Creek, mercury was not detected at SH109 and was detected in five samples from SH113 and four samples from SH105. The Ophir Creek background site had no detectable mercury levels throughout the year and the downstream site had four results above the detection limit. In the case of Slate Creek, mercury was detected on most sampling occasions at both upstream and downstream sites.

3.3 Outlier(s)

A variance analysis was conducted on each monthly set of monitoring data. Variance analysis reports compare sample results to historical results for the same parameters at the same sampling stations. Those results that exceeded the threshold level of two standard deviations are listed in the table for the appropriate month in **Appendix B**.

4.0 General Major Chemistry

Area waters generally:

- Have peak water temperature in August or September
- Are at or near oxygen saturation
- Have mildly basic pH
- Seasonal fluctuation of conductivity with peak values in the winter
- Contain low levels of sulfate
- Are generally soft (in most cases <100ppm hardness)
- Have low concentrations of dissolved metals

5.0 Summary Statistics

Summary statistics were calculated for all parameters at each discharge and receiving water station. The calculations include the minimum, maximum, arithmetic mean and standard deviations for each monitoring station contained in the 2011 data set. The results are presented in Tables 4 through 15. Also included in the summary tables are the total number of samples collected, total number of non-detect results and the percentage of non-detects.

6.0 Watersheds

Upstream/downstream receiving water monitoring stations are present on Johnson, Slate, Ophir and Sherman Creeks. A comparison of the chemistry between these station pairs is discussed below. Tables 1 and 2 contain the monitoring parameters that remained undetected for the entire year at each station.

6.1 Receiving Waters- Johnson Creek

Monitoring Sites

- JS2- Johnson Creek upstream of disturbance
- JS5- Johnson Creek downstream of mill process area and Bridge 2
- JS4- Johnson Creek downstream of Bridge 1

6.1.1 Major Chemistry

Water quality monitoring on Johnson Creek was intended to identify potential impacts from mill facility construction and operation. The water sampling sites are somewhat confusingly labeled since JS-5 lies downstream of Bridge 2, which is in between JS-2 (background, upstream site) and JS-4 (downstream of Bridge 1). Water quality at Johnson Creek shows some seasonal trends for temperature, TDS, nitrate, pH, and sulfate. Some elevation of conductivity, turbidity, TDS, sulfate, hardness, and color is also seen from upstream to downstream, particularly in winter months (Figures 6a, 6b). Upstream temperature was higher than downstream sites in January, February, October, November and December. The highest temperature was recorded at JS-4 in August (6.4°C) and lowest again at JS-4 in January (0.6°C). Nitrate was present at similar concentrations at all sites, with exception of the highest concentration at JS-5 during January. The pH tended to be higher at the middle site, JS-5, except for October and November. There was some elevation of pH (over 8 s.u.) at JS-5 from July through October and then again in December. JS-2 had lower pH in January and November.

Sulfate showed fairly consistent increases downstream through the year with both downstream sites being higher in spring and lower in summer. The highest sulfate level was 21.8 mg/L at JS-5 in April. Dissolved oxygen was very similar at all sites throughout 2012. Conductivity measurements were consistently higher downstream throughout 2012 with the peak values in spring. Values ranged from around 24µmhos/cm to 157µmhos/cm. Turbidity was less than 2NTUs at all sites throughout the year with the exception of JS-5 in April with a value of 5.79NTU. Total dissolved solids consistently increased from upstream to downstream with the highest result of 121mg/L in January at JS-4. Hardness showed consistent increases downstream during 2012. Hardness did not vary much throughout the year at JS-2, with a low of 9.3mg/L in

August and high of 18.2mg/L in both February and March. The downstream sites were markedly higher in late winter/early spring, with JS-5 ranging from 47.9 to 66.8 mg/L from January to April. JS-4 was relatively the same time during that time period with a range of 59.5 to 63mg/L. All sites were less than 30mg/L from June through September. Color was not detected at JS-2 during 2012. Color was detected at JS-5 in February, April, March, August and September and at JS-4 in February, April, May, August and again in October through December. The highest color value recorded was 20cu in October at JS-4.

Ammonia mostly remained undetected at all Johnson Creek sites throughout 2012. Chloride was detected only one time at JS-2 and periodically detected at the downstream sites. The highest chloride result was 2.6 mg/L at JS-5 in April. TSS was detected only once throughout 2012 on Johnson Creek, October had a result of 5.6 mg/L at JS-5 in April.

6.1.2 Trace Chemistry

The majority of dissolved metals (7 of the 13) tested at Johnson Creek were not detected at any sites at any time of the year. These included arsenic, cadmium, chromium, lead, nickel, selenium and silver. Concentrations of aluminum were higher at downstream sites (JS-4 and JS-5) than the upstream site (JS-2) throughout 2012. The highest aluminum levels recorded in Johnson Creek in 2012 were at JS-5, 701 ug/L in July and 265 ug/L in April. Manganese was also elevated at JS-5 in July (53.6.4ug/L) and April (34.3ug/L), and December (5.7ug/L) while levels never exceeded 2.5ug/L at JS-2.

Copper was not detected at JS-2 in 2012; it was present on two occasions at the two downstream sites (JS-4, JS-5) with the highest result being 1.2 ug/L at both JS-4 and JS-5 in April, which is still below the hardness-based WQS. Dissolved mercury was detected once at JS-2 throughout the year, while the two downstream sites showed a total of six detectable results – the highest of 0.0019 ug/L at JS-4 in March. Dissolved zinc was detected at all Johnson Creek sites periodically through 2011. Zinc detection decreased in 2012 and was detected only twice. The highest zinc result was 3.1 ug/L at JS-5 in April.

Comparison with 2006 to 2011 data shows that Johnson Creek pH was slightly lower than previous years. The higher pH values trended towards 8.0 s.u. whereas in previous years the higher

values trended towards 8.5 s.u. Turbidity in 2012 was lower than previous years with the all results below 1.5 NTU with the exception of one JS-5 April result of 5.6 NTU. Total suspended solids demonstrated similar levels compared to previous years. Mercury was detected on eight occasions in 2012, five in 2011, three times in 2010, twice in 2009 and once in 2008, whereas 2006 and 2007 showed much more frequent occurrences of mercury. Manganese levels showed elevation in 2012 compared to the previous year, but levels did not get as high as they were in 2006 when they exceeded 70ug/L on three occasions. Copper was not detected from 2006 to 2009, but did appear in November 2010 and again in four instances in 2011. In 2012 copper was detected twice with both results having concentrations lower than the previous year. Nickel has not been detected in Johnson Creek since September of 2007.

Nitrate levels showed a similar pattern to previous years, with concentrations trending higher in late spring. Sulfate levels also showed a similar pattern to previous years, being lowest in June and July and increasing in August. Ammonia was not detected throughout 2012 at all sites. Ammonia was detected twice at very low levels in 2010 and was previously detected at the end of 2006 and 2007 and in January 2008.

6.2 Receiving Waters - Slate Creek

Monitoring Sites

- MLA- Middle Lake Slate Creek upstream of disturbance
- SMP-5 (Site #5) – Downstream of the tailings impoundment dam
- SLB – East Fork Slate Creek upstream of confluence with West Fork Slate Creek
- SLC- Slate Creek downstream of confluence with West Fork Slate Creek

6.2.1 Major Chemistry

Water quality monitoring on Slate Creek in 2012 was intended to identify potential impacts from the Tailings Treatment Facility (TTF). Figures 7a through 7b are graphical presentations of analytical results gathered throughout the year. Compared to the other streams, Slate Creek was

the warmest, most likely due to the presence of lakes in the system that warm up in summer due to their large surface area. Only Upper Slate Lake contributes to this warming affect now as Lower Slate Lake has been converted to a tails treatment facility. MLA is the sampling site upstream of the tailings treatment facility, SMP-5 is approximately 200 meters downstream of the tailings impoundment dam. SLB is approximately 1.6 kilometers downstream of the tailings treatment area and SLC is a further 10m downstream and receives water from both east and west forks of Slate Creek. Temperatures on Slate Creek appeared similar to 2011 results the highest 2012 temperature recorded at SMP-5 was 16.2°C.

Some increase of, DO and chloride was evident from upstream to downstream when compared to last year's results (Figures 7a, 7b). pH exhibited a slightly higher trend than last year with the highest result of 8.2 at SLB, compared to 2010's result of 8.29 at the same site. SMP-5 had lower pH throughout most of the the year, with the lowest result of 7.09 in December. Dissolved oxygen measured at Slate Creek stations showed a seasonal trend similar to those of the other receiving water streams in being slightly higher in winter months. MLA had lower DO measurements than the downstream sites with the exception of SMP-5 in November and January. Dissolved oxygen measurements at SLB and SLC were similar. The lowest DO was observed at MLA in April at 8.53mg/L. Dissolved oxygen increases as temperature decreases and is likely to be lower in the lake (near MLA) than downstream where several cascades help to mix oxygen into the water. Chloride results in Slate Creek samples were higher than results from Johnson Creek throughout the year, but still well within water quality standards. Chloride was highest at SMP-5 (13.8 mg/L) with MLA typically being around 2mg/L and SMP-5 between 3 and 13.8 mg/L.

Conductivity was also higher at all sites in Slate Creek than Johnson Creek and was highest at SMP-5 in December (732umho/cm). Background conductivity was 140umhos/cm at this time. Site SLC was 401umho/cm at the same time. During the rest of the year, conductivity had a large range from 81 to 732umho/cm at all sites. Sulfate showed a similar pattern with all sites ranging from 1.9 mg/L in August to 187 mg/L in December. Sulfate at MLA remained less than 2.7mg/L throughout the year. During 2012 turbidity was low at all sites, SLB being the lowest (usually less than 1 NTU) and the highest result of 2.37 NTU at SMP-5 in November. Ammonia was detected at low levels at MLA throughout the year. SMP-5, SLB and SLC typically ranged from non-detect

to 1.1 mg/L showing an upward trend during the last quarter of the year. Nitrate was not detected at MLA in 2012, but was detected at low levels in most samples downstream through the year. Generally nitrate results for Slate Creek were higher than the three other creeks, but all results were below the water quality standard.

Hardness demonstrated a similar trend to last year, downstream sites having higher values than the background site. Generally downstream hardness was above 100mg/l with spikes reaching 294 mg/l. Hardness was the lowest at the background site (MLA) with results ranging from 39 to 56 mg/l. TDS remained similar at sites MLA and SLC. However SLB and SMP-5 showed higher levels of TDS than MLA and SLC throughout the year. TSS was below detection limits at all four stations throughout 2012. Color appeared to decrease from upstream to downstream, and was lowest at all sites during lower flows in the summer (25 to 50cu). Some color is attributable to tannins in the water associated with vegetation die-off in the lakes. The West Fork has no lakes so would be expected to have less color and have a dilution effect on SLC.

6.2.2 Trace Chemistry

Trace metals not detected in Slate Creek during 2012 were arsenic, cadmium, chromium, lead, copper, selenium and silver. Manganese was higher in later winter/early spring with the highest result of 256ug/L at SMP-5 (Figure 7c). Aluminum tended to be higher at the background site MLA reaching 177ug/L in August and 142 ug/L in September. The August MLA value resulted in elevated aluminum downstream at stations SLB, SMP-5 and SLC which produced results over the water quality standard. Again in December higher levels of aluminum occurred at station SMP-5 (253 ug/L) and SLB (147 ug/L). On average, throughout the year SLC had the lowest aluminum levels, although all sites were lower in summer. Some of this may be attributed to dilution from West Fork Slate Creek.

Cadmium was not detected at any Slate Creek sites in 2012, whereas in 2011 it was detected on four occasions.

Copper was not detected at MLA, SLB or SLC, but occurred once at the detection level at SMP-5. Iron levels trended similarly among all the sites. The lowest iron levels among all sites occurred in midsummer. MLA showed slightly elevated levels of iron in March (0.6mg/L). All

samples throughout 2012 were below the iron WQS of 1mg/L.

Elevated levels of manganese were observed at SMP-5 throughout the year. The highest value in 256 mg/L in late March, however all sites exhibited increased manganese concentrations during that time.

Nickel was not detected at MLA and SLC during any month, nor was it detected at SMP-5 SLC from May through December. The highest concentration occurred at SMP-5 in April yielding a copper result of 1.7 ug/L. Zinc was present at MLA in May, September, October and November. Zinc was detected at low concentrations in seven of the twelve samples throughout the year at SLB. SLB yielded the highest zinc result reaching 6 ug/L in October, but below the WQS of 140 ug/L. Slightly elevated zinc levels were observed at SMP-5 from February through April with a maximum of 5.9 ug/L in April. Mercury was detected at very low levels in the majority of samples collected from all Slate Creek monitoring stations. The values among sites trended similarly. The highest mercury result occurred at station SLB (0.0054 ug/L). A comparison of Slate Creek data with the previous year shows that pH was slightly higher at MLA and SLB in 2012, but still within the 6.5 to 8.5 s.u. threshold. Sulfate was relatively low at all Slate Creek sites through 2006 and up to June 2007, remaining below 5mg/L. Sulfate increased at SLB and SLC from August 2007 to February 2008 and showed a peak of 16mg/L at SLB in April 2008. Levels dropped again in May 2008, but again increased to around 15mg/L in September 2008 with another peak in September 2009. Sulfate levels approached 17mg/L in March 2010, but the greatest increase was seen in December 2010 when sulfate reached 85mg/L. 2011 showed an increase in sulfate levels for all stations except MLA. In 2012 sulfate showed a significant decrease compared to 2011. The highest sulfate levels occurred at stations SMP-5 and SLB with respective values of 166 and 187 mg/L. Nitrate was present at low levels (<0.2mg/L) during 2006 and occasionally in 2007 and early 2008. It was not detected between April 2008 and February 2009 but appeared again at all sites from March to June 2009 (around 0.35mg/L). This contrasted with 2010 when no nitrate was detected at MLA and only very low levels were present at SLB in March and May (<0.1mg/L) followed by an increase at SLB in December (0.36mg/L). Similar to 2010, in 2011 MLA did not have detectable levels of nitrate with the exception of one result in May of 0.055 mg/L. 2012 demonstrated consistently low levels of nitrate for the majority of the

year at all sites, however the last quarter of the year showed an upward trend at all sites with the exception of MLA.

During most of 2012, conductivity typically ranged from around 100 to 300umho/cm at MLA and SLC. However, at SMP-5 and SLB higher levels occurred January through March ranging from 379umho/cm to 572 umho/cm, then again higher levels of conductivity occurred in October through December. The highest conductivity in Slate Creek in 2012 was 632 uhmos/cm recorded at SMP-5 in December. TDS typically fluctuated from 60 to 80mg/L among all Slate Creek sites in 2006, increasing slightly in August 2007 when MLA reached 100mg/L, SLB reached 110mg/L and SLC registered 710mg/L. MLA showed a peak of 180mg/L in November 2007, while downstream sites remained less than 100mg/L. TDS levels were mostly 60 to 100mg/L during 2008 with SLB reaching 129 in September 2008. TDS remained relatively stable in 2009 fluctuating between 30 and 85mg/L at all sites. This continued into 2010 until SLB increased to 114mg/L in July, 146mg/L in October and 225mg/L in December. TDS in 2011 showed similar trending with conductivity with the highest level in March at SLB (474 mg/L) and SMP-5 exhibited a similar pattern. In 2012 TDS trended lower than 2011. MLA values stayed below 100 mg/L for the year with the exception of one result in October. SLB and SMP-5 trended similarly through the year with SMP-5 yielding the highest result of 387 mg/L in March.

In 2006, color was very similar at MLA and SLB remaining around 40cu through the first part of the year then increasing in October to 120cu at MLA and 130cu at SLC. MLA tended to show the highest color in 2007, 2008, and 2009 with color reaching a maximum of 210cu in September 2007. The highest color level for 2009 was 125cu in November at SLB. Color was lower in 2010 decreasing to 15cu in June and only reaching 80cu in November. 2011 demonstrated an increase with summer levels at all sites ranging from 15 -150cu. Similarly in 2012 color ranged 10-120 cu with MLA generally having the highest values throughout the year.

Cadmium was not consistently detected at SLB until August 2007, reaching a peak in April 2008 (1.9ug/L). The water quality standard for cadmium was exceeded on five occasions in 2009, but levels were lower than 2008. Cadmium was just above the WQS in March 2010 and was not detected June through December during 2010. Cadmium showed a drop in 2011 with no results over the WQS. Cadmium once again decreased in 2012, it remained undetectable at all sites

throughout the year. Copper has never been detected at MLA, and was first detected downstream at SLB in September 2006 (2ug/L). Low levels (1ug/L) were present on three occasions in 2007, then slightly higher levels (4ug/L) in October and November 2007 and again in April and September 2008. These levels came close to the hardness-based WQS, but did not exceed it. Copper did, however, exceed water quality standards in September 2009 when it reached 14.2ug/L at SLB. Copper was detected at low level during the first part of 2010, but has not been detected after May during 2010. Copper in 2011 continued a downward trend with all results below the WQS and the highest result occurring at SMP-5 (3.1 ug/L) in October. Copper in 2012 was non-detectable at all sites throughout the year with the exception of one result at the detection level at SMP-5. Iron levels were highest at MLA from January to April 2006 and March/April 2007, but were exceeded by SLB in July-December 2006 (peak of 0.43mg/L in July 2006), September-October 2007 and September 2008 (0.45mg/L). Iron levels were lower in 2009 and 2010, peaking at 0.252mg/L at MLA in November 2009 and 0.247mg/L at SLB in May 2010. In 2011 iron trended similarly among the sites with all results under 0.2 mg/L, which is under WQS of 1mg/L. Showing a similar pattern in 2012, iron trending similarly among the sites with all results under the WQS.

Aluminum has occasionally been present in background samples at concentrations exceeding the WQS of 87ug/L, but rarely the permit limit of 143ug/L eg. January 2006 (99ug/L), October 2007 (90ug/L), April 2008 (106ug/L), October 2008 (89ug/L) and December 2008 (90ug/L), April 2010 (101ug/L), November 2010 (95ug/L), December 2010 (214ug/L). Levels downstream at SLB have also exceeded the WQS as follows: October 2006 (119ug/L), October 2007 (124ug/L,) April 2008 (134ug/L), September 2008 (145ug/L), December 2008 (90ug/L), January 2010 (92ug/L) and April 2010 (101ug/L). The background level was frequently responsible for the high aluminum recorded downstream. Aluminum at MLA was 82ug/L in February 2010, but this did not exceed the WQS. Aluminum levels at SLB and SLC were much lower than MLA in December 2010. In 2011, aluminum continued to be present in higher concentrations which is thought to have resulted in increased downstream results during summer and early fall. Aluminum increased in 2012, with several results over the water quality standard in early spring and fall. Again some of this can be attributed to increased concentrations at the

background site MLA.

Mercury had a peak of almost 0.01ug/L at SLB in 2008, but only reached 0.003ug/L at SLB and 0.005ug/L at SLC in 2009. 2010 levels were similar to 2009, but only reached a maximum of 0.0026ug/L at MLA and SLB. During 2011 mercury levels were similar to 2010 except for one result at SMP-5 (0.0654 ug/L) in July which is thought to be an anomaly as it was well above all other results for SMP-5 in 2011. Mercury in 2012 was periodically present in low concentrations at all sites throughout 2012; all results were below the WQS. Zinc was not detected during the first part of 2006, appearing at low level in both background and downstream sites in fall 2006. Zinc levels at SLB increased in May 2007 and exceeded the WQS in March 2008 (81.2ug/L), April 2008 (180ug/L), October 2008 (72.7ug/L), January 2009 (58.3ug/L), but values were much lower throughout the rest of 2009 and 2010, only reaching 13.7ug/L in April 2010. Zinc continued a downward trend in 2011 with a peak value of 12.0 ug/L in August. Zinc in 2012 continued to trend downward with the highest result of 6.0 ug/L found at SLB in October.

Nickel was present at SLB and SLC at low level during 2006, increased in August 2007 and peaked in April 2008, but remained less than 5ug/L in 2009 and less than 2ug/L in 2010. Nickel marked a slight increase during 2011 with a peak value of 4.4 ug/L in October. During 2012 nickel showed a decrease with the peak value of 1.7 ug/L occurring at SMP-5 in March. Manganese was not detected at downstream sites during the first part of 2006, but showed elevated levels at SLB in September 2006 (90ug/L). Background manganese was above the WQS at this time (56ug/L) and again in December 2006, March, April, August, November and December 2007, November 2008 and October 2009. SLB exceeded the WQS for manganese in October and November 2007, March, April, October, November, December 2008, January and May 2009, and January, March, May and December 2010. The highest level recorded was 228ug/L in March 2010. As with previous years, 2011 demonstrated an increase in manganese concentrations with a peak value of 334 ug/L in March. Manganese in 2012 was similar to 2011 results, with higher trends in winter and early spring.

6.3 Receiving Waters- Sherman Creek

Monitoring Sites

- SH109- Upper Sherman Creek upstream of disturbance
- SH113- Sherman Creek downstream of Outfall 001
- SH105- Sherman Creek downstream at mouth of creek

6.3.1 Major Chemistry

Water quality monitoring on Sherman Creek was intended to help identify any potential impacts from underground mine activities as all drainage from the mine flows to the Sherman Creek drainage (Figures 8a, 8b). Temperature was typically highest at SH113 just downstream from the 001 effluent and coolest at SH109 the background station for Sherman Creek. The difference between these two sites was greatest in March (SH113 was 1.9°C higher). There was little difference in temperature between these sites throughout the year. Dissolved oxygen was similar at upstream and downstream sites throughout the year except for late January when SH105 close to twice the value of SH113, perhaps due to changes in flow. Measurements of DO tended to be slightly lower in summer as water temperature increased and DO was higher in winter as temperatures decreased. Measurements of pH appeared to decrease from upstream to downstream. The highest pH was 8.29 at SH109 in March. Monitoring station SH113 had the greatest range in pH values of all the Sherman Creek sites.

Conductivity was highest at site SH113 (middle site) and lowest at SH109 (upper site) throughout the year, except for one measurement in September. All three sites showed lowest conductivity in June with the exception of SH113 in September. Turbidity was less than 3.0 NTU throughout the year at all sites. Turbidity was 2.8 NTU at SH109 in May, which accounts for the highest value in 2012. Total dissolved solids tended to increase from upstream to downstream and were higher during late winter months. TDS was highest at SH113 (211mg/L) in March and lowest at SH105 (<10mg/L) in May.

Ammonia was detected in seventeen of the twenty samples at SH113, ranging from 0.10mg/L to 0.69 mg/L. Ammonia was present only twice at other sites, SH105 was 0.32 mg/L in December and SH109 was 0.11 mg/L in March. The nitrate level at the upstream site was below

0.2 mg/L throughout the year. Of the three sites, SH113 showed the highest level in October at 1.37 mg/L while SH105's peak downstream value reached 1.04mg/L in December. All reported measurements were below the WQS of 10mg/L. Sulfate, chloride and hardness tended to be highest at SH113 and lowest at SH109. Sulfate tended to be higher at SH113 than other sites, though less so in June and July. The highest sulfate was found at SH113 in February(58.9mg/L). The lowest sulfate level recorded at SH109 was 2.99 mg/L in June. Sulfate was less than 40mg/L at SH105 throughout the year and less than 15mg/L at SH109. Chloride was detected in most samples throughout 2012 with the exception of five non-detect results at SH109. Chloride reached a peak of 19mg/L at SH113 in December. All chloride concentrations were well below the water quality standard of 230mg/L. Hardness was relatively high (>75mg/L) at SH113 in January, through April. Hardness remained below 60mg/L at SH109 and below 70 mg/L at SH105 (except for January and December) throughout the year and was lowest in summer months. Hardness levels at SH105 downstream were very similar to the background site SH109. The highest hardness values were found at SH113 January through March. Total suspended solids were not detected at any sites on Sherman Creek throughout 2012.

6.3.2 Trace Chemistry

Trace metals not detected in Sherman Creek during 2012 were arsenic, cadmium, chromium, lead, nickel, selenium and silver. Aluminum was higher at SH105 near the stream mouth than both SH109 and SH113 for all months except April and June, as this was also the case in 2009, 2010 and 2011 but in April and August. This suggests there is some source of aluminum downstream that is not associated with the 001 effluent. Aluminum at SH113 reached 97.4ug/L in April accounting for the highest value in 2012. Peaks were observed at upstream sites during May and June, but were still lower than the downstream SH105 station. Aluminum was low at all sites in summer. Copper was not detected at any sites in January and February or June or August. The highest level for copper was 1.3 ug/L at SH105. Manganese was detected at low levels in most samples from SH109, also present in all samples at SH113, with concentrations reaching 100ug/L in February and 109ug/L in March. Mercury was detected at SH113 on four occasions, February, March, twice in April and in November. SH105 had a highest level of all sites in March with a result of .0021 ug/L. Mercury was not detected at SH109 in 2012. Zinc was not detected at SH109 in 2012. Zinc was found at SH113 in low concentrations on four occasions and two

occasions at SH105. The highest value for Zinc was 5.6 ug/L in March at SH105. Iron was found on ten occasions on Sherman Creek throughout 2012 four times at SH113 and once at SH109 and five at SH105 all concentrations were below 1.0 mg/L with the highest being 0.177 mg/L at SH113 in April.

A comparison with previous data shows that Sherman Creek appeared to have slightly lower pH in the latter half of 2008 than previous years, but remained at normal levels in 2009 and 2010. The pH at the background site SH109 was lower than usual in August 2010. This changed in 2011 with pH values at SH109 ranging between 7.5 and slightly over 8.0. The same pattern held for SH109 throughout 2012. Turbidity appeared lower in 2011 than 2010, this may be in part due to higher background turbidity in 2010, but 2011 displayed the opposite results with much lower background turbidity. Turbidity in 2012 remained below 3NTU, with the highest result of 2.8 NTU occurring at the background site in May. Ammonia was present at a low level in late 2006 and early 2007, spring of 2007 and December 2007, then it remained undetected until June and August 2009 and July-September and December 2010. In 2011 ammonia was present in the majority of the samples from SH113 whereas it remained undetected at all other sites with the exception of one result in July at SH105. The peak ammonia value in 2011 was 1.12 mg/L at SH113. Ammonia in 2012 was detected once at SH105, once at SH109 and seventeen times at SH113. The peak ammonia result of 0.69 mg/L occurred at SH113 in October. Chloride appeared to have an increasing trend from July 2007 to March 2008, but was present at much lower levels (less than 4mg/L) from May 2008 and remained below 6mg/L during 2009 and the first half of 2010. Slightly higher chloride levels (8-14mg/L) were observed in August, September and December 2010, but these levels are well below the 230mg/L WQS. Again in 2011 a slight upward trend for chloride was noted in the downstream sites with a peak value of 18.7 mg/L at SH113. Chloride in 2012 was present in most samples with the exception of five non-detect results at SH109. Chloride trended similar to 2011 with the peak value of 19.0 mg/L at SH113 in December.

Nickel seems to have declined since July 2007. It was not detected between June 2008 and November 2009 and most of 2010 (only detected in February, September, December at low level). Fewer detections of nickel occurred in 2011 when compared to previous years. Only two samples had nickel results both in March at SH113 and both under 2.0 ug/L. Nickel continued to follow a

downward trend with no detectable concentrations at any Sherman Creek sites in 2012. Manganese was low until July 2007, increasing at SH113 at high flow in fall of 2007 and spring and fall of 2008. Manganese levels at SH113 never exceeded 26ug/L in 2009, but in 2010 three samples exceeded 50ug/L. The upward trend of manganese continued in 2011 with slightly more than half the samples at SH113 over 50 ug/L. Manganese trended upward at SH113 during the first three months of 2012 with five results greater than 80 ug/L. However for the remainder of the year all results were below 42 ug/L with the exception one result of 60.7 ug/L at SH113. As for the other sites manganese remained below 35 ug/L for 2012. Iron was detected at SH105 in previous years (twice in 2006 and twice in 2007). Iron was not detected in 2008 and appeared only once at SH113 in 2009 (January) and once in 2010 (November) at low levels. In 2011 Iron was detected three times with all values at or below 0.075 mg/L. During 2012 iron was periodically detected at all sites with the greatest result of 0.177 ug/L occurring at SH113 in April.

Sulfate, TDS and conductivity tend to follow hardness patterns, peaking at SH113 in February 2008, March 2009, and February 2010. The same pattern continued in 2011 with Sulfate, TDS and conductivity peaking in March, with the exception of TDS peaking in February at SH113. Conductivity has typically been higher at SH113 than upstream or downstream sites and this held true though 2011. Conductivity during the historical peak months of January through April was higher in 2011 as compared to previous years during the same period. TDS and conductivity followed similar patterns when compared to 2011, with historical peaks in winter. Sulfate has demonstrated a downward trend since 2008 with a peak value of 82.9mg/L in February as compared to February's peak value in 2010 of 40.7mg/L. Sulfate showed a slight increase during peak months in 2011 but was still lower than historical peaks. Following the 2011 trend sulfate during 2012 peaked in the winter/early spring months with a high result of 58.9 mg/L at SH113 in February. Similarly, TDS has exhibited a downward trend since 2008. TDS in February of 2008 was greater than 200mg/L whereas TDS in February of 2010 was less than 150mg/L. TDS appeared to take an upward turn from 2010 with increased peak values between 175 and 200 mg/L recorded in 2011. TDS in 2012 appeared the same in 2012 with peak values between 125mg/L and 211 mg/L. Hardness values decreased slightly over last year's values, 2012 had three peak values between 100 and 118 mg/L.

Nitrate has been observed at low levels in Sherman Creek. It showed a slight increase in February, May, October and November 2007 and in February 2008 then remained low until April to June of 2009 when levels were similar to November 2007. Nitrate levels in 2010 appeared slightly lower than 2009. Nitrate levels in 2011 were greater than 2010 levels with peak values between 1.3 and 1.9 mg/L whereas the previous year ranged approximately 1 mg/L less. However, 2012 nitrate levels were lower than the previous year and more closely resembling pre-2011 levels with peak values less than 1.4 mg/L.

6.4 Receiving Waters- Ophir Creek

Monitoring Sites

- SH111- Ophir Creek upstream of Comet Development Rock Stockpile
- SH103- Ophir Creek downstream of Comet Development Rock Stockpile

6.4.1 Major Chemistry

Water monitoring on Ophir Creek was intended to help identify any potential impacts from mine construction and development activities associated with the Comet Development Rock Stockpile. Figures 9a through 9c are graphical presentations of analytical results gathered throughout 2012. Monitoring station SH111 is often unavailable for sampling during low flow periods and frozen conditions in winter and at times inaccessible due to avalanche danger. During previous years under the sampling plan monitoring was only required at SH111 and SH103 once every other month between May and November. Effective September 1st 2011 under the new APDES permit monitoring at both sites was increased to monthly, year-round.

As with the other receiving waters, Ophir Creek's monitoring data exhibited many trends in accordance with expected seasonal changes, increasing in summer and decreasing in winter. DO was very similar at both sites each time measurements were made. Measured conductivity at SH103 has often been the highest of all 11 monitoring sites on the project receiving waters,

reaching 650umhos/cm from January to April 2009 and 495umhos/cm in November 2009. No samples were collected during this period in 2010. The highest recorded conductivity in 2010 was 165umhos/cm in November with 161umhos/cm recorded in October. Consistent with previous years, SH103 had a high conductivity result of 558 umhos/cm in December 2011. Following a similar but in increasing trend the highest conductivity measurement for SH103 was 828 umhos/cm in April 2012.

Total dissolved solids were present at similar concentrations at both sites in May through October (less than 100mg/L) and increased at SH103 in November reaching a peak in April (566 mg/L). Due to environmental conditions no samples were collected at the background site in January, February, March, April and then again December. Sulfate was found at low concentrations at SH111 for each sample event in 2012. SH103 had significantly higher sulfate concentrations with a peak value of 318 mg/L in April. Consistent with sulfate and TDS, hardness showed a similar pattern with the concentrations less than 110mg/L at both SH103 and SH111 – May through November. In the past chloride tended to be higher in winter than summer and was not detected at all in 2010 May-November samples. In 2011 chloride samples were detected in May at both stations and ranging 1.0 and 2.5 mg/L. In 2012 chloride ranged higher with concentrations 1.1 – 5.2 mg/L. In 2011's trend, nitrate levels were low at both sites through the year with highest levels in November and December, but both results below 2.0 mg/L. 2012 resulted in higher nitrate levels yielding a range of 0.1 – 5.1 mg/l at SH103 and a range of <0.050 to 0.52 mg/L at SH111.

The pH results were similar to previous years; samples collected at SH103 and SH111 ranged between 7.12 and a peak value of 7.84. Ammonia was not detected in any Ophir Creek samples in 2011; this was also the case in 2010. The same pattern followed in 2012 with no detectable concentrations of ammonia. Total suspended solids also remained undetected through 2012 at both Ophir Creek sites. Color was detected once at the background site with a result of 5cu and detected seven times at SH103 with a low of 5cu and two peak values of 15cu.

6.4.2 Trace Chemistry

Non-detected metals for both SH111 and SH103 included arsenic, cadmium, chromium,

iron, lead, nickel, selenium and silver. Copper was in one sample at the detection limit for SH111, and was present in low concentrations in half the samples from SH103. Zinc was not present in samples at SH111 but present in two samples collected from SH103. The highest zinc value at SH103 was 10.1 ug/L. Manganese was not detected at the background site, but was present in half the samples from SH103 with values ranging from 1.5 to 7.2 ug/L. Mercury was not found in any background samples but was present in four downstream samples at SH103 with a peak result of 0.0017 ug/L in March.

Similar to 2011, low levels of aluminum were measured in all samples collected at both Ophir Creek sites during 2012 with little difference between the sites. SH111 and SH103 had by far the lowest concentrations of aluminum of all the receiving waters, as was the case in 2008, 2009, 2010 and 2011.

7.0 Discharges

7.1 Outfall 001

The Comet water treatment plant (WTP) discharge (Outfall 001) was sampled weekly, resulting in at least four times the data compared to most receiving water stations. This larger group of sample results is a greater opportunity to identify trends (Figures 10a – 10d). Discharge Monitoring Reports containing results of required monitoring were submitted each month during 2012.

7.1.1 Major Chemistry

Dissolved oxygen (DO) in the effluent tended to be higher in winter (12-13mg/L) and lower during the summer season (11-12mg/L), with low levels recorded in January and August (7-8mg/L). DO is typically negatively correlated with temperature, which was seen to increase from less than 5°C from January to early March to around 10°C in late April, reaching a maximum of 13.0°C in mid-May, before declining to 1°C in December. Grab samples from the effluent and background station SH109 are collected weekly in conjunction with the effluent composite samples. The difference between background turbidity and effluent turbidity remained low for the year (under the limit of 5 NTU). The peak effluent turbidity reached 4.35 NTU in June.

Background turbidity reached 29.1 NTU in late August, but effluent turbidity remained less than 1.0 NTU.

pH fluctuated throughout 2012 with two peak values of 7.8 s.u. and two low value less than 6.5 S.U. The period of time the pH was out of the 6.5 to 8.5 s.u. threshold was relatively short. pH readings were in compliance greater than 99% of the time in 2012.

Both TDS and sulfate (associated with calcium and magnesium) were well below permit limits in 2012. Throughout the year, major cations (represented by hardness) and anions (represented by sulfate), plus total dissolved solids showed consistent trends with few spikes. TDS ranged 157-378 mg/L for the year. Effluent sulfate was less than 20 mg/L through the year. Downstream hardness ranged 37 to 143mg/L in 2012, slightly lower than the previous year.

Daily samples were collected for TSS analysis. In 2012 all but three samples were non-detect. In August, October and December the respective detectable results were 7.6, 4.0 and 5.2 mg/L, whereas in 2011 there were eighteen detectable results some of which exceeded the WQS. In 2010 there were nineteen TSS samples above the detection limit but all below the WQS. Only 7 samples had detectable levels in 2009 and all were below the permit limit.

Both nitrate and ammonia remained below daily maximum permit limitations during the year. In general, ammonia ranged between 0.3 and 3.3 mg/l. Nitrate was positively correlated with ammonia. Nitrate ranged 1.22 -6.59 mg/L for the majority of the year with only three results greater than 6.0 mg/L.

7.1.2 Trace Chemistry

Arsenic, lead and silver were undetected in effluent samples during 2012. Arsenic and cadmium were undetected in 2011. Chromium and silver were undetected in 2010. Cadmium, copper and lead were undetected in 2009. Copper was present on seventeen occasions in 2012 with a peak of 12.7 ug/L in March. Lead was present in four samples in 2011 but as mentioned remained undetectable in 2012. In 2012 Aluminum remained at low concentrations (less than 20ug/L) the peak value was 15 ug/L in February. Iron showed a similar pattern, levels remained below 0.6 mg/L throughout the year. The remainder of the year exhibited iron levels at or below 0.35 mg/L. Overall, 2012 showed decreased concentrations of iron as compared to 2011. Mercury concentrations were slightly lower in 2012 than the previous year. However, all results remained at

low concentrations with the greatest being 0.0026 ug/L in July, well below the permit limit of .0200 ug/L. Zinc concentrations varied little throughout the year with all but one result was below 12 ug/L. The highest zinc value came in March (14.1 ug/L) but still considerably lower than the hardness-based limit. Nickel concentrations fluctuated throughout the year from 1.0 to 3.8ug/L. 2012's nickel pattern reflected the previous year's trends. Selenium varied slightly throughout the year mostly ranging from 1-2ug/L.

Manganese fluctuated through 2012 with values ranging from a high of 382 mg/L in January to a low of 21 mg/L in September. Overall, manganese concentrations for the effluent demonstrated a decrease in 2012 when compared to 2011. The average manganese result was 190 ug/L in 2010, dropped to 157 ug/L for 2011 and dropped slightly again 2012 with an average of 155 ug/L.

Chromium remained undetectable for most of the year. There were two samples with detectable results present with respective results of 2.7 and 4.6 ug/L.

7.1.3 Whole Effluent Toxicity Testing

Whole Effluent Toxicity (WET) Tests were conducted monthly on the 24-hour composite samples collected from Outfall 001 effluent. The following three tests were rotated throughout the year such that each test was conducted once a quarter:

- *Pimephales promelas* (fathead minnow)- static, renewal, larval survival and growth test.
- *Ceriodaphnia dubia* (water flea)- 7-day static, renewal, survival and reproduction test.
- *Selanastrum capricornutum* (green algae)- 4-day static, growth.

All monthly WET tests conducted on 001 discharge water in 2012 were within permit limits.

7.2 Outfall 002

Outfall 002 discharge is from the tailing treatment facility (TTF), which began in early December 2010 after the new water treatment plant was commissioned. 2012 was the second full

year of operation for the TTF water treatment plant. Discharge Monitoring Reports containing results of required monitoring were submitted each month during 2012.

7.2.1 Major Chemistry

pH fluctuated some throughout 2012 at Outfall 002. Results ranged from 6.5s.u. to 7.4 s.u., which were within compliance range for the year. Flow rate fluctuated throughout 2012 ranging from 1118 gpm to 1477 gpm while staying under the permit limit of 1500 gpm. Temperature, as expected, trended seasonal through the year. Temperature varied from 2.0°C in December to 17.0 °C in July. Background samples for turbidity were collected weekly at MLA in conjunction with the effluent grab samples. The difference between background turbidity and effluent turbidity remained low through the year, with two noticeable peaks one of which was a permit exceedence of 7.61 NTU in August. Background turbidity reached 2.81 NTU in August, while effluent turbidity remained less than 1.50 NTU.

Sulfate in 2012 ranged between 179.0 and 250.0 mg/L and no permit exceedences occurred. In 2011 sulfate exceeded the permit limit on six occasions. Total dissolved solids (TDS) ranged from 279mg/L to 482mg/L, below the permit limit of 500 mg/L, whereas in 2011 one permit exceedence occurred.

In 2012 hardness ranged from 210 to 278 mg/L, slightly less compared to 2011 when effluent hardness ranged from 181 to 319 mg/L. Downstream hardness fluctuated considerably in 2012 ranging from 39.6 - 236 mg/L, the higher values occurring in winter and early spring. The wide range of values may be attributed to varying flow rates at the sample site.

Daily samples were collected for total suspended solids (TSS) through 2012. Thirty seven samples had detectable results all well below the permit limit. This was an increase over 2011 when seven samples had detectable amounts of TSS. Both nitrate and ammonia remained well below daily maximum permit limitations in 2012. As expected the two parameters trended together. Ammonia stayed below 1.0 mg/L through August when it slowly trended slightly above 1.0 mg/L. Following a similar pattern, nitrate was around 0.5– 1.5 mg/L until September, then concentrations increased to over 2.0 mg/L for the remainder of the year.

7.2.2 Trace Chemistry

Arsenic, chromium, lead, selenium and silver were undetected at Outfall 002 effluent samples during 2012. Aluminum was present in all samples during 2012. Results ranged from 6.9 to 379.0 ug/L, this resulted in five spikes over the permit limit. In 2011, aluminum was present in all samples at concentrations between 1.7 and 29.0 ug/L. Overall, iron concentrations were consistent through the year; four spikes occurred during the first five months of the year, two exceeded the WQS. Nickel experienced fluctuations all year, results remained below 2.5 ug/L throughout the year with the exception of one result in June. This is a slight decrease compared to 2011. Similar to 2011, zinc was undetectable most of the year; fourteen samples total registered a detectable amount of zinc, none of which were greater than 5.3 ug/L. Copper was periodically detectable throughout 2012 none of the sample results were greater than 1.9 ug/L, this demonstrated a slight increase over 2011. Mercury was detectable for most of 2012 with a peak value of 0.0047 in December. This was an increase over 2011 where in the first third of the year mercury was not detected in effluent samples.

7.2.3 Whole Effluent Toxicity Testing

Whole Effluent Toxicity (WET) Tests were conducted monthly on the 24-hour composite samples collected from Outfall 002 effluent. The following three tests were rotated throughout the year such that each test was conducted once a quarter:

- *Pimephales promelas* (fathead minnow)- static, renewal, larval survival and growth test.
- *Ceriodaphnia dubia* (water flea)- 7-day static, renewal, survival and reproduction test.
- *Selanastrum capricornutum* (green algae)- 4-day static, growth.

With respect to WET testing, Outfall 002 had one permit exceedence in January of 2012. The *Selanastrum capricornutum* (green algae) did not pass the growth test requirement. All other WET tests conducted at Outfall 002 throughout the year passed.

