Final
Upper Animas River
2012 Surface Water Toxicity Testing Report

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Acronym List

BERA	Baseline Ecological Risk Assessment
BLM	Bureau of Land Management
ºC	Degrees Celsius
CETIS	Comprehensive Environmental Toxicity Information System
DO	Dissolved Oxygen
DRMS	Division of Reclamation, Mining and Safety
EC_{50}	50% Effect Concentration
EPA	United States Environmental Protection Agency
ESAT	Environmental Services Assistance Team
FS	Feasibility Study
gpm	Gallons Per Minute
LC_{50}	50% Lethal Concentration
LCL	Lower Confidence Limit
MHRW	Moderately Hard Reconstituted Water
mL	Milliliter
mg/L	Milligrams per liter
µg/L	Micrograms per liter
µs/cm	Microsiemens/centimeter
QA	Quality Assurance
RI	Remedial Investigation
SGC	Sunnyside Gold Corporation
UCL	Upper Confidence Limit

1.0 INTRODUCTION

Two 96-hour static renewal toxicity tests were performed at the United States Environmental Protection Agency (EPA) Region 8 Laboratory in October and November 2012 using juvenile rainbow trout (*Oncorhynchus mykiss*) to determine the acute toxicity of surface water samples collected from the Animas River and its two major tributaries Cement Creek and Mineral Creek, located in Silverton in the San Juan Country, Colorado. During the first test, conducted in October of 2012, three sets of Site samples were run consisting of an undiluted set, a set diluted with reference water from sample location A56 and another set diluted with reference water from sample location A68. As a Quality Assurance (QA) measure, a simultaneous reference toxicity test with a separate batch of juvenile rainbow trout was performed using Moderately Hard Reconstituted Water (MHRW) spiked with different concentrations of zinc sulfate heptahydrate ($ZnSO_4$).

A second Site toxicity test and concurrent reference toxicity test were conducted following the October, 2012 round of testing. This Site test consisted of three sets of diluted samples, all diluted with reference water from sample location A68. Section 2.5 below provides a detailed description of the sample preparation for all the diluted samples from the October and November 2012 Site tests.

Survival was the endpoint evaluated in all tests. This toxicity test report includes a brief background of the Upper Animas River area, materials and methods, test results, a discussion of results, and supporting references.

1.1 Background

Information in this section was obtained from the *Final 2012 Sampling and Analysis Plan/Quality Assurance Project Plan, Revision 1, Upper Animas Mining District Gladstone, San Juan County, Colorado*, dated September 2012 (Environmental Services Assistance Team [ESAT], 2012).

The discovery of gold and silver brought miners to the Silverton area and Animas Mining District in the early 1870's. The discovery of silver in the base-metal ores was the major factor in establishing Silverton as a permanent settlement. Between 1870 and 1890, the richer ore deposits were discovered and mined to the extent possible. Not until 1890 was any serious attempt made to mine and concentrate the larger low-grade ore bodies in the area. By 1900, there were 12 concentration mills in the valley sending products to the Kendrick and Gelder Smelter near the mouth of Cement Creek. Mining and milling operations slowed down circa 1905, and mines were consolidated into fewer and larger operations with the facilities for milling large volumes of ore. After 1907, mining and milling continued throughout the basin whenever prices were favorable.

Gladstone, located about eight miles upstream of Silverton on Cement Creek, is the site of an historic mining town developed in the 1880s commensurate with the onset of mining in the surrounding area. The town was the central location and railroad terminus for the milling and shipping of mine ores from the surrounding three-square-mile valley. The town declined in the 1920 s and no remnants of the town remain. By the 1970's only one year-round producing mine (Sunnyside Mine) remained in the county. This mine ceased production in 1991, and has since undergone extensive reclamation efforts. The Gold King Mine's permit with Division of Reclamation, Mining and Safety (DRMS) is currently in inactive status; however, landowners hope to rehabilitate the mine. Both the Sunnyside and Gold King properties were partially accessed through the American Tunnel that has its portal in Gladstone.

Previously the American Tunnel drained as much as 1,600 gallons per minute (gpm) of water from the mines. A lime feed and settling pond type treatment facility was constructed in Gladstone in 1979 by Standard Metals Corporation. Water discharging from the American Tunnel was treated as required by the water discharge permit. The facility operations and mine ownership was later transferred to the Sunnyside Gold Corporation (SGC). Under jurisdiction of a court consent decree to terminate their discharge permit, SGC installed several bulkheads within the Sunnyside Mine that greatly reduced the amount of discharge from the American Tunnel. Seventy to one hundred gpm continue to discharge presumably from near surface groundwater. All terms of the consent decree were met by SGC in 2002.

In January 2003 the treatment facility, operations, and permit were transferred to the Gold King Mines Corporation. The settling ponds were deeded to the San Juan Corporation by SGC prior to the lease between the Gold King Mines and San Juan Corporations. The treatment facility continued to treat the remaining American Tunnel discharge and the Gold King discharge until September 2004. The San Juan Corporation required SGC to reclaim the four settling ponds (completed in 2005) following termination of the San Juan Corporation and SGC lease. The Gold King Mines Corporation was subsequently evicted and the balance of the Gold King Mines Corporation land was acquired by the San Juan Corporation as the lien holder. The American Tunnel portal reclamation and removal of some out buildings were completed in 2006. The Bureau of Land Management (BLM) manages land associated with the American Tunnel portal and vicinity; however, the San Juan Corporation owns the majority of the land surrounding the portal.

Numerous historic and now abandoned mines exist within a two-mile radius of Gladstone. They include: the Upper Gold King 7 Level, American Tunnel, Grand Mogul, Mogul, and Red and Bonita, Evelyne, Henrietta, Joe and John, and Lark mines. Some of these mines have acid mine drainage that flows between 30 and 300 gpm directly or indirectly into Cement Creek and eventually into the Animas River, the confluence located about eight miles downstream of Gladstone. The Animas River Stakeholder Group, Bureau of Land Management, Division of Reclamation, Mining and Safety and private stakeholders have completed remediation projects at

the Evelyne, Henrietta, Joe and John, and Lark mines. The remaining sites located in the Cement Creek drainage that will be the focus of these sampling efforts include the American Tunnel, Grand Mogul, Mogul, Red and Bonita, and the Upper Gold King 7 Level.

1.2 Objective

The objective of these toxicity tests was to characterize the effects of mine waste-impacted surface water on juvenile rainbow trout under acute exposure conditions. The results will be used to support the development of a site-wide Remedial Investigation/Feasibility Study (RI/FS) that will include a Baseline Ecological Risk Assessment (BERA) for the Animas River Site.

2.0 MATERIALS AND METHODS

This section outlines the materials and methods used for testing purposes, including surface water collection procedures, water preparation and delivery, test organisms, food preparation, and test conditions. The general test methods and testing criteria followed EPA protocol (EPA, 2002) and are summarized in **Table 2.5-1**.

2.1 Surface Water Collection

Surface water was collected in October 2012 from six locations along the Animas River. Samples from two reference locations (A56 and A68) were collected above where Cement Creek flows into the Animas River. Four Site samples (A72, A73B, A75B, and Baker Bridge) were collected downstream of the confluence with Cement Creek. Surface water was collected from two tributaries (Cement Creek and Mineral Creek) for diluting the Site samples (**Figure 2.1-1**). The water from these two tributaries was not included in the toxicity test other than as a diluent. However, analytical results for water collected from Cement Creek and Mineral Creek are included in the analytical results (**Tables 2.5-2, 2.5-3,** and **2.5-4**). The weather before and during the sampling event was sunny with no rain.

Surface water was collected in November 2012 for a follow-up Site test. Samples were collected from four locations; one reference location on the Animas River (A68) upstream of the confluence with Cement Creek, one location on the Animas River downstream of the confluence with Mineral Creek (A72), one location on Cement Creek (CC48), and one location on Mineral Creek (M34).

Adequate volume of water was collected for each sample location with a minimum of 5 gallons collected at each location. This was accomplished by using one gallon and two and a half gallon cubitainers that were dedicated for each sample location. Equipment decontamination was not necessary because cubitainers were used once. All surface water samples were stored on ice in coolers immediately after collection and were then transported to the Region 8 laboratory in

Golden, CO. All samples were placed in a 4ºC refrigerator at the laboratory for preservation until test initiation, which took place within 36 hours of the last sample collection.

2.2 Water Preparation and Renewal

The MHRW used in the reference toxicity tests was prepared in accordance with Smith *et al.* (1997) by adding 47.4 grams of calcium sulfate, 122.8 grams of magnesium sulfate heptahydrate, 96 grams of sodium bicarbonate, and 4 grams of potassium chloride to the laboratory stainless steel batch tank containing 1,000 liters of deionized water. The batch tank of MHRW was continuously aerated during the toxicity test. The water quality of the MHRW was checked to verify that the following parameters had been met: hardness between 90 and 100 milligrams per liter (mg/L), alkalinity between 50 and 70 mg/L, conductivity between 330 and 360 microsiemens/centimeter (µs/cm), and pH between 7.8 and 8.2 standard units (EPA, 2002). The average results from the four replicates for the MHRW batch water for the October test were as follows: hardness = 96 mg/L; alkalinity = 59.4 mg/L; conductivity = 312 µs/cm; and pH = 7.38. The average results from the four replicates for the MHRW for the November test were as follows: hardness= 91 mg/L; alkalinity = 55.2 mg/L; conductivity = 297.6 µs/cm; and pH = 7.63. Note that both the average conductivity and average pH of the October and November 2012 MHRW fell below the expected range.

The MHRW and site water in the test chambers were renewed entirely each day by pouring 900 mL of site water into a clean 1000 milliters (mL) glass beaker and carefully removing live organisms and placing them into the newly mixed water. Site water used for renewal was first warmed to 12 degrees Celsius (ºC). The water temperature was held constant during the 96-hour exposure period by placing all the test chambers in a temperature-controlled water bath.

2.3 Test Organisms

Juvenile rainbow trout (*O. mykiss*) obtained from Trout Lodge, Inc. (located in Sumner, Washington) were used for site water and reference toxicity testing. An importation license was obtained from the Colorado Division of Wildlife before the *O. mykiss* were shipped by the supplier. The fish in the shipping bag were placed in the holding tank after they arrived at the Region 8 laboratory to equilibrate the temperature. Once temperature was equilibrated, the shipping bag was carefully opened to allow a small amount of laboratory reconstituted water to enter the bag. This procedure was repeated several times throughout the day until laboratory MHRW and shipping water were well mixed. The fish were then released from the shipping bag into the holding tank where they were held for 5 days until used for testing. The fish were also cultured and shipped in MHRW such that water quality acclimation was not an issue. At the time of testing, organisms were 15-30 days post yolk sac absorption and were uniform in size. The average weight of the organisms was 0.28 grams at the start of the October test and an average weight of 0.84 grams at the start of the November test.

2.4 Feeding Procedure

The fish were fed starter trout chow obtained from Nelson's Silver Cup, Inc. in accordance with EPA methodology (EPA, 2002). They were fed twice daily before the test started and once daily thereafter. The fish were not fed for 24 hours before the test started in order to reduce the accumulation of metabolic wastes.

2.5 Test Procedures

The following sections discuss the procedures used for the site water toxicity test and reference toxicity tests.

2.5.1 October 2012 Site Water Toxicity Testing

Site water used for testing purposes during the October 2012 Site test was obtained from the following four locations along the Animas River: A72, A73B, A75B, and Baker Bridge (the furthest down-river sample location). Reference surface water samples were collected from sample locations A56 and A68 on the Animas River, upstream of the confluence with Cement Creek. All six samples were run un-diluted in the Site test. Surface water was also collected from Mineral Creek (M34) and Cement Creek (CC48). The water from these two tributaries was combined in a 61% (M34), 39% (CC48) ratio and then diluted using water from the reference location A56 at concentrations of 6.25%, 12.5%, 25%, 50% and 100% (see table below). The ratio of M34 and CC48 were based on the flow rate of each tributary into the Animas River.

Concentration	Volume M34* (ml)	Volume CC48** (ml)	Volume A56 (ml) (Reference Water)
M34/CC48/A56-Control	0	0	900 (MHRW)
M34/CC48/56A-6.25%	34.3	21.9	844
M34/CC48/A56-12.5%	68.6	43.9	788
M34/CC48/A56-25%	137	87.8	675
M34/CC48/A56-50%	275	176	450
M34/CC48/A56-100%	549	351	0

*Based off a flow rate of 23 cubic feet per second (61%).
** Based off a flow rate of 14 cubic feet per second (39%).

A second set of diluted samples was run using water from Reference location A68 as the diluent to a mixture of M34 and CC48. The identical ratio of M34 and CC48 were used as indicated above, except a 100% solution of M34/CC48 was not included in the Site test (see table below)

Concentration	Volume M34* (ml)	Volume CC48* (ml)	Volume A68 (ml) (Reference Water)
M34/CC48/A68-Control	0	0	900 (MHRW)
M34/CC48/A68-6.25%	34.3	21.9	844
M34/CC48/A68-12.5%	68.6	43.9	788
M34/CC48/A68-25%	137	87.8	675
M34/CC48/A68-50%	275	176	450

*Based off a flow rate of 23 cubic feet per second (61%).
** Based off a flow rate of 14 cubic feet per second (39%).

2.5.2 November 2012 Site Water Toxicity Test

Surface water for use in the November 2012 Site test was obtained from the following four locations; A68 and A72 on the Animas River, M34 from Mineral Creek, and CC48 from Cement Creek. Reference location A68 was collected on the Animas River upstream of the confluence with Cement Creek. Samples M34 and A68 were run undiluted in the Site toxicity test. Surface water from reference location A68 was used to dilute samples A72 and CC48 at various dilutions. Water from A68 was also used to dilute a mixture of CC48 and M34. The tables below explain the three sets of dilutions.

Concentration Percentage of A72 water	Volume A72 (ml)	Volume A68 (ml) (Reference water)
Control	0	900 (MHRW)
A72/A68-5%	45	855
A72/A68-10%	90	810
A72/A68-25%	225	675
A72/A68-50%	450	450

A72/A68-75%	675	225
A72/A68-100%	900	0

Concentration Percentage of CC48 water	**Volume CC48 (ml)**	**Volume A68 (ml)** (Reference water)
Control	0	900 (MHRW)
CC48/A68- 1%	9	891
CC48/A68- 3%	27	873
CC48/A68- 6%	54	846
CC48/A68- 12%	108	792
CC48/A68- 25%	225	675
CC48/A68- 50%	450	450

Concentration Percentage of CC48/M34 water	**Volume CC48 (ml)**	**Volume M34 (ml)**	**Volume A68 (ml)** (Reference water)
Control	0	0	900 (MHRW)
CC48/M34/A68-4%	12	24	864
CC48/M34/A68-9%	26	55	819
CC48/M34/A68-20%	58	122	720
CC48/M34/A68-40%	115	245	540
CC48/M34/A68-65%	187	398	315
CC48/M34/A68-85%	245	520	135

A laboratory control sample of MHRW was simultaneously tested during both the October 2012 and November 2012 Site tests to verify the health of the fish used in the test. The same test procedure was followed for each test. The test chambers consisted of 1-L glass beakers, which were placed in a water bath to maintain a constant temperature of 12º C during the 96-hour exposure period. Four replicates were tested for each location and each sample dilution, as well as the laboratory control. Testing criteria specified in EPA (2002) were followed (**Table 2.5-1**).

Ten organisms were added to each test chamber at the start of the test using a small dip net and an 8-ounce cup, in which the count was quickly verified. Four replicate chambers were used for each of the Site and reference water samples. Each chamber contained 10 fish, for a total of 40 fish per sample location, dilution series or reference test dilution.

As previously stated, each test took place over a 96-hour period, with one daily water renewal. Water quality was measured daily for Dissolved Oxygen (DO), pH, conductivity, and temperature. Water samples were analyzed for alkalinity and hardness at the start and end of each test. Fish mortality was observed daily in each test chamber and recorded. All dead organisms were removed and discarded.

Appendix A provides the water chemistry and mortality data sheets for the October 2012 Site surface water toxicity test and **Appendix B** provides the water chemistry and mortality data sheets for the November 2012 Site surface water toxicity test. Water samples were collected on Day 0 and Day 4 for the following analyses: total and dissolved metals (EPA Method 200.7/200.8), anions (EPA Method 300.0), ammonia (EPA Method 350.1), and alkalinity (EPA Method 310.1). Results from the October 2012 test for dissolved metals are included in **Table 2.5-2**. **Table 2.5-3** shows initial and final results for total recoverable metals and **Table 2.5-4** includes wet chemistry data. **Table 2.5-5a** (Site test) and **Table 2.5-5b** (reference test) show initial and final results for ammonia, as well as calculated ammonia criteria. Results from the November 2012 test for dissolved metals are included in **Table 2.5-6**. **Table 2.5-7** shows initial and final results for total recoverable metals and **Table 2.5-8** includes wet chemistry data. **Table 2.5-9a** (Site test) and **Table 2.5-9b** (reference test) shows initial and final results for ammonia, as well as calculated ammonia criteria for acute toxicity.

2.5.3 Control Water Toxicity Testing

For QA purposes, a control toxicity test using *O. mykiss* was run concurrently with the October 2012 and November 2012 Site water toxicity tests. Test solutions were made by spiking MHRW with $ZnSO_4$ solution via serial dilution. Zinc concentrations were reduced by 50% starting with the highest target concentration (1000 µg/L) until the lowest dilution concentration of 6.25% (62.5 µg/L target concentration) was reached.

The following are the dilutions and average zinc concentrations (calculated from initial and final dissolved metals results) used for the October 2012 reference test: 100% concentration (1029.5 µg/L), 50% concentration (518.5 µg/L), 25% concentration (263.5 µg/L), 12.5% concentration (131.5 µg/L), and 6.25% concentration (68.85µg/L). The following are the dilutions and average zinc concentrations (calculated from initial and final dissolved metals results) used for the November 2012 reference test: 100% concentration (874 µg/L), 50% concentration (435 µg/L), 25% concentration (220 µg/L), 12.5% concentration (107 µg/L), and 6.25% concentration (55.3µg/L).

Zinc concentrations were verified in the analytical laboratory using EPA Method 200.7/200.8. The control surface water toxicity tests were performed using the same approach as outlined at the end of **Section 2.5.2** (November 2012 Site Water Toxicity Test). Mortality and daily water chemistry data for the control tests run in October 2012 and November 2012 are included in **Appendices A and B, respectively.** The measured zinc concentrations for the October 2012 and November 2012 tests are provided in **Tables 2.5-2 and 2.5-6,** respectively.

3.0 RESULTS

This section presents the results for the Site-specific surface water and reference toxicity testing, and also addresses any issues or potentially confounding conditions encountered during the tests.

Appendix A shows that the water quality parameters were consistently within the established criteria throughout both Site water toxicity tests, with one exception. DO was consistently above 6.0 mg/L, and average test chamber temperatures were maintained within +/- 2ºC of the target test temperature (12ºC), which met performance criteria. Sample A68/CC48- Control-Rep 1 was above the target test temperature on day one, ranging from 14.48 to 15.42°C. The average initial and final ammonia levels measured in the four replicates of each of the surface water samples used in the toxicity test were compared to their pH-dependent acute ammonia criterion. **Tables 2.5-5a and 2.5-9a** show the ammonia levels for the October 2012 and November 2012 tests, respectively. All ammonia levels for both tests fell consistently below the relevant criteria. This comparison indicates that any observed toxicity was not caused by excess ammonia in the test chambers.

3.1 Site-Specific Surface Water Toxicity Test - October 2012

Daily mortality numbers were evaluated at the end of the test to determine the Site water toxicity to the test organisms (**Appendix A** and **Figure 3.1-1**). The results of the undiluted Site samples showed 100% survival at both reference locations A56 and A68. Survival was also 100% at locations A73B, A75B, and Baker Bridge. Survival at location A72 was 0%. The laboratory control showed 100% survival, which met the performance criterion of 90% survival.

A combination of water from M34 and CC48 was diluted with water from reference location A56 and run at five different dilutions (6.25%, 12.5%, 25%, 50% and 100%). The results of the acute test showed 100% survival in the 6.25%, 12.5%, and 25% dilutions. The 50% dilution had 97.5% survival while the 100% dilution (with no reference water) had 0% survival. The control, which consisted of 100% reference water from A56, had 100% survival.

A combination of M34 and CC48 surface water was diluted with water from reference location A68 and run at four different dilutions (6.25%, 12.5%, 25%, and 50%). The results of the dilutions showed 100% survival in the 6.25%, 12.5%, and 25% dilutions. The 50% dilution had 37.5% survival. A 100% dilution (with no reference water) was not run. The control sample (0% dilution), consisting of 100% reference water from A68, had 100% survival.

3.2 Control Water Toxicity Test - October 2012

Water quality parameters were similar in all testing chambers, and water chemistries were held within acceptable ranges for temperature, DO, pH, and conductivity (**Appendix B**). Zinc levels are presented as average zinc concentrations taken from the initial and final dissolved metals

analysis. The control and the 6.25% concentration (68.85 µg/L zinc) had 100% survival. The 12.5% concentration (131.5 µg/L zinc) had 75% survival. The 25% (263.5 µg/L zinc) showed 5% survival. The 50% (518.5 µg/L zinc) concentration and the 100% concentration (1029.5 µg/L zinc) had 0% survival (see **Figure 3.2-1**).

The Spearman-Karber Estimates method [Comprehensive Environmental Toxicity Information System (CETIS), 2011] was used to calculate the 50% Lethal Concentration (LC_{50}) value for zinc, as well as Upper Confidence Limits (UCLs) and Lower Confidence Limits (LCLs) confidence limits. The LC_{50} value for the control toxicity test was 162.9 µg/L, with a UCL and LCL of 180.6 µg/L and 146.9 µg/L, respectively. This LC_{50} value is comparable to previous reference toxicity tests performed from 2005 through 2011. **Figure 3.5-1** provides the zinc LC_{50} control chart which shows historical LC_{50} data obtained at the Region 8 laboratory. Note that CETIS uses the term "EC50" (50% maximal Effect Concentration) instead of LC_{50}. Both terms represent the same calculated value.

3.3 Site-Specific Surface Water Toxicity Test - November 2012

Daily mortality numbers were evaluated at the end of the test to determine the Site water toxicity to the test organisms (**Appendix A** and **Figure 3.3**). The results of the undiluted Site samples showed 92.5% survival at reference location A68 and 0% survival at M34. The laboratory control showed 100% survival, which met the performance criterion of 90% survival.

Site sample A72 was diluted with water from reference location A68 and run at six different dilutions (5%, 10%, 25%, 50%, 75%, and 100%). The results of the dilutions showed A68/A72-5% with 92.5% survival while A68/A72-10% and A68/A72-25% showed 94.7% and 92.2% survival, respectively. Sample A68/A72-50% and A68/A72-75% each had 100% survival. Sample A68/A72-100% showed 2.5% survival. The A68/A72 control, which consisted of 100% A68, water had 100% survival.

Site sample CC48 was diluted with water from reference location A68 and run at six different dilutions (1%, 3%, 6%, 12%, 25%, and 50%). The results of the dilutions showed A68/CC48 1% with 85% survival while A68/CC48-3% and A68/CC48-6% had 97.5% survival. A68/CC48-12% and A68/CC48-25% showed 90% survival in each dilution. A68/CC48-50% had 0% survival. The A68/CC48 control which consisted of 100% A68 water had 100% survival.

A combination of CC48 and M34 surface water was diluted with water from reference location A68 at six different dilutions (4%, 9%, 20%, 40%, 65%, and 85%). The results of the dilutions showed A68/CC48/M34-4% with 97.5% survival, A68/CC48/M34-9% showed 95% survival, and A68/CC48/M34-20% showed 100% survival. Sample A68/CC48/M34-40% had 92.5% survival while A68/CC48/M34-65% and A68/CC48/M34-85% had 0% survival. The A68/CC48/M34 control, which consisted of 100% A68 water, had 100% survival.

Nine juvenile rainbow trout escaped from eight separate testing chambers during the November 2012 toxicity test and were found swimming in the water bath. These fish were excluded from the results and the statistical analyses. The number of fish exposed was reduced by the number of fish that escaped to prevent biasing the results (i.e. if one of the ten fish in a test chamber escaped and one of the remaining nine fish died, survival was calculated as 8/9, or 88.9%).

3.4 Control Water Toxicity Test - November 2012

Water quality parameters were similar in all testing chambers, and water chemistries were held within acceptable ranges for temperature, DO, pH, and conductivity (**Appendix B**). Zinc levels are presented as average zinc concentrations taken from the initial and final dissolved metals analysis. Survival was 100% in the control and the 6.25% concentration (55.3 µg/L zinc), and 75% in the 12.5% concentration (107 µg/L zinc). The 25% (220 µg/L zinc), 50% (435 µg/L zinc), and 100% (874 µg/L zinc) concentrations all had 0% survival, (**Figure 3.4-1)**.

The Trimmed Spearman-Karber Estimates method (CETIS, 2011) was used to calculate the LC_{50} value for zinc, as well as UCLs and LCLs. The LC_{50} for the reference toxicity test was 129.1 µg/L, with a UCL and LCL equal to 141.9 µg/L and 117.5 µg/L, respectively. The LC_{50} is comparable to previous control toxicity tests performed from 2005 through 2011. **Figure 3.5-1** provides the zinc LC_{50} control chart which shows historical LC_{50} data obtained at the Region 8 laboratory.

4.0 DISCUSSION

4.1 October 2012 Toxicity Test

Un-diluted Site Samples

Results of the site-specific surface water toxicity test conducted in October 2012 using un-diluted surface water indicated that location A72 was acutely toxic, with 0% survival, to *O. mykiss* over a 96-hour exposure period. 100% survival was observed at A56 (reference location), A68 (reference location), A73B, A75B, and Baker Bridge.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The Steel Many-One Rank test is a non-parametric test which was used in the analyses because the data distribution was non-normal. The data were determined to be non-normal by the Shapiro-Wilk W test because they did not follow a predictable pattern with 50% of the values greater than the mean and 50% values less than the mean. The results of the statistical analysis show the presence of significant mortality at location A72 (p = 0.0480) when compared to the laboratory control sample. No significant difference was observed in mortality between the remaining locations when compared to the laboratory control sample.

A Steel Many-One Rank Test was also used to compare the Site locations to reference locations A56 and A68. The results of this comparison were identical because both reference samples had 100% survival. There was significant mortality at sample location A72 (p = 0.0350) when compared to each reference location. No significant difference in mortality was observed between the remaining locations when compared to either A56 or A68.

M34/CC48 diluted with A56

Results of the Site-specific surface water toxicity test conducted in October 2012 using a combination of M34 and CC48 surface water diluted with water from reference location A56 at five different concentrations indicated that M34/CC48/A56 at 100% was acutely toxic to *O. mykiss* over a 96-hour exposure period. 100% survival was observed in M34/CC48/A56 concentrations of 6.25%, 12.5%, and 25%. M34/CC48/A56-50% had 97.5% survival. Site control sample M34/CC48/A56 (which consisted of 100% A56 surface water) had 100% survival.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The results of the statistical analysis show the presence of significant mortality at M34/CC48/A56-100% (p = 0.0417) when compared to M34/CC48/A56-Control. No significant difference was observed in mortality between the remaining dilutions when compared to the Site control sample.

M34/CC48 diluted with A68

Results of the Site-specific surface water toxicity test conducted in October 2012 using a combination of M34 and CC48 surface water diluted with water from reference location A68 at four different concentrations indicated that M34/CC48/A68 at 50% was acutely toxic to *O. mykiss* over a 96-hour exposure period, with only 37.5% survival. 100% survival was observed in M34/CC48/A68 at concentrations 6.25%, 12.5%, and 25%. The Site control sample, M34/CC48/A68, (100% A68 surface water) had 100% survival.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The results of the statistical analysis show the presence of significant mortality at M34/CC48/A56-100% (p = 0.0350) when compared to M34/CC48/A68-Control. No significant difference was observed in mortality between the remaining dilutions when compared to the Site control sample.

Summary

In conclusion, the results of the October 2012 toxicity test showed that the surface water samples collected from A72 and tested un-diluted, as well as M34/CC48/A56-100% and M34/CC48/A68-50%, were acutely toxic to juvenile rainbow trout after 96 hours of exposure. The mortality at

all the other locations and dilutions were not statistically different from either the laboratory control sample or the two Animas River reference samples.

4.2 November Toxicity Test

Undiluted Samples

Results of the Site-specific surface water toxicity test conducted in November 2012 using un-diluted surface water indicated that location M34 was acutely toxic (0 % survival) to *O. mykiss* over a 96-hour exposure period when tested as an undiluted sample. 92.5% survival was observed at reference location A68. Only a M34 and A68 were run un-diluted during the November 2012 test.

An Equal Variance Two- Sample *t*-test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The data met the conditions for conducting a t-test because the sample variances were statistically equal, determined by Mod Levene Equality of Variance test and the data had normal distribution determined by Shapiro-Wilk W Normality test. The results of the statistical analysis show the presence of significant mortality at location M34 ($p = <0.0001$) when compared to A68.

Site sample A72 diluted with A68

Results of the site-specific surface water toxicity test conducted in November 2012 using A72 surface water diluted with water from reference location A68 at six different concentrations indicated that A68/A72 at 100% was acutely toxic to *O. mykiss* over a 96-hour exposure period with 2.5% survival. 100% survival was observed in the 75% and 50% dilutions. Survival in the 5%, 10% and 25% dilutions resulted in 92.5%, 94.7%, and 92.2% survival, respectively. The Site control sample, A68/A72, (100% A68 surface water) had 100% survival.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The results of the statistical analysis show the presence of significant mortality at A68/A72-100% ($p = 0.0480$) when compared to A68/A72-Control. No significant difference was observed in mortality between the remaining dilutions when compared to the Site control sample.

Site sample CC48 diluted with A68

Results of the Site-specific surface water toxicity test conducted in November 2012 using CC48 surface water diluted with water from reference location A68 at six different concentrations indicated that A68/CC48 at 50% was acutely toxic (0% survival) to *O. mykiss* over a 96-hour exposure period. 90% survival was observed in the 25% and 12% dilutions. The 6%, 3% and 1% dilutions resulted in 97.5%, 97.5%, and 85% survival respectively. The Site control sample, A68/CC48, (100% A68 surface water) had 100% survival.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The results of the statistical analysis show the presence of significant mortality at A68/CC48-50% (p = 0.0480) when compared to A68/CC48-Control. No significant difference was observed in mortality between the remaining dilutions when compared to the Site control sample.

CC48/M34 diluted with A68

Results of the Site-specific surface water toxicity test conducted in November 2012 using a mixture of CC48 and M34 surface water diluted with water from reference location A68 at six different concentrations indicated that A68/CC48/M34 at 65% and 85% were acutely toxic (0% survival) to *O. mykiss* over a 96-hour exposure period. 92.5% survival was observed in A68/CC48/M34-40% while 20%, 9% and 4% dilutions resulted in 100%, 95%, and 97.5% survival, respectively. The Site control sample, A68/CC48/M34, (100% A68 surface water) had 100% survival.

A Steel Many-One Rank Test was performed in order to determine the significance of the observed toxic effects (**Attachment A**). The results of the statistical analysis show the presence of significant mortality at A68/CC48-65% and A68/CC48/M34 (p = 0.0480, for both dilutions) when compared to A68/CC48/M34-Control. No significant difference was observed in mortality between the remaining dilutions when compared to the Site control sample.

Summary

In conclusion, the results of the November 2012 toxicity test showed that the surface water samples collected from M34 (un-diluted) as well as A68/A72-100%, A68/CC48-50%, A68/CC48/M34-65% and A68/CC48/M34-85% were acutely toxic to juvenile rainbow trout after 96 hours of exposure. The survival for all other locations and dilutions was not statistically different from either the laboratory control sample or the two reference samples.

5.0 REFERENCES

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Tables

Table 2.5-1 Summary of Test Conditions

October 2012 and November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O. mykiss*

Test Parameter	Criteria
Test Type	Static Renewal
Test Duration	96-Hour
Temperature	12°C ± 2°C
Light Quality	Ambient Laboratory Illumination
Light Intensity	50-100 ft-c
Photo Period	16 Hours Light, 8 Hours Dark
Test Chamber Size	1 liter
Test Solution Volume	900mL
Renewal of Test Solutions	Daily
Age of Test Organisms	15-30 Days Post Yolk-Sac Absorption
No. Replicate Chambers per Concentration	Four
No. Organisms per Chamber	Ten
No. Organisms per Concentration	40
Feeding Regime	Feeding Not Required
Test Chamber Cleaning	Cleaning Not Required
Test Solution Aeration	Not Exceeding 100 Bubbles per Minute
Dissolved Oxygen	≥6.0 mg/L
Dilution Water	Moderatley Hard Reconstituted Water
End Point	Mortality
Sample Holding Time	36 hours after collection of last sample
Test Acceptability	≥90% survival in controls

Table 2.5-2 Initial and Final Dissolved Metals Results
October 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Dissolved Metals (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Hardness (mg/L)	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River, Mineral creek, and Cement Creek surface water samples																								
Control	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13800	<1.00U	<0.100U	0.736J	96	<100U	<0.100U	14900	<2.00U	0.543J	2210	<0.500U	<0.500U	26900	79.4	<0.500U	<2.00U	<10.0U
Baker Bridge	<20.0U	<0.500U	<0.500U	32.0	<2.00U	0.760	71500	<1.00U	2.42	<0.500U	206	<100U	<0.100U	6690	682	0.829J	1080	<0.500U	<0.500U	3240	649	<0.500U	<2.00U	333
A75B	<20.0U	<0.500U	<0.500U	29.3	<2.00U	1.03	73200	<1.00U	3.87	<0.500U	208	<100U	<0.100U	6080	912	1.95	1020	<0.500U	<0.500U	3290	688	<0.500U	<2.00U	437
A73B	321	<0.500U	<0.500U	24.8	<2.00U	1.61	87200	<1.00U	6.08	8.17	243	429	0.115J	6170	1410	3.11	975J	<0.500U	<0.500U	3450	882	<0.500U	<2.00U	695
A56	29.9J	<0.500U	<0.500U	25.0	<2.00U	0.399	62000	<1.00U	<0.100U	<0.500U	170	<100U	0.218	3580	121	<0.500U	684J	<0.500U	<0.500U	2670	600	<0.500U	<2.00U	165
A72	753	<0.500U	<0.500U	21.5	<2.00U	2.07	108000	<1.00U	7.96	12.6	299	2520	0.574	7050	1910	3.66	1100	<0.500U	<0.500U	4070	1090	<0.500U	<2.00U	864
A68	51.6	<0.500U	<0.500U	24.6	<2.00U	1.26	67000	<1.00U	<0.100U	1.89	183	<100U	0.414	3750	1600	<0.500U	689J	<0.500U	<0.500U	2830	666	<0.500U	<2.00U	374
M34	834	<0.500U	<0.500U	25.0	<2.00U	0.809	94600	<1.00U	9.02	5.19	268	4420	0.735B	7660	536	1.84	833J	0.517J	<0.500U	4390	870	<0.500U	<2.00U	211
CC48	7960D	<5.00U	<5.00U	<50.0U	<20.0U	5.46D	200000D	<10.0U	27.3D	71.0D	546D	6360D	13.7BD	11700D	5330D	16.4D	<2500U	<5.00U	<5.00U	5050JD	2400D	<5.00U	<20.0U	2730D
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56																								
M34/CC48/A56 Control																								
M34/CC48/A56 6.25%	76.0	<0.500U	<0.500U	24.7	<2.00U	1.22	70500	<1.00U	0.805	1.68	193	<100U	<0.100U	4090	1640	<0.500U	735J	0.530J	<0.500U	3010	714	<0.500U	<2.00U	399
M34/CC48/A56 12.5%	33.2J	<0.500U	<0.500U	24.9	<2.00U	0.654	70800	<1.00U	1.63	1.62	194	372	<0.100U	4290	399	0.830J	770J	<0.500U	<0.500U	2950	706	<0.500U	<2.00U	276
M34/CC48/A56 25%	49.8J	<0.500U	<0.500U	24.9	<2.00U	0.854	79700	<1.00U	3.46	2.66	220	822	<0.100U	4990	675	1.75	821J	<0.500U	<0.500U	3220	810	<0.500U	<2.00U	404
M34/CC48/A56 50%	582	<0.500U	<0.500U	22.6	<2.00U	1.37	97700	<1.00U	7.47	9.70	270	1680	0.601B	6360	1240	2.83	986J	<0.500U	<0.500U	3680	1020	<0.500U	<2.00U	654
M34/CC48/A56 100%	3780	<0.500U	<0.500U	18.2	<2.00U	2.45	138000	<1.00U	14.8	25.0	382	4610	5.39B	9230	2410	5.57	1330	0.933J	<0.500U	4620	1430	<0.500U	<2.00U	1190
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																								
M34/CC48/A68 Control																								
M34/CC48/A68 6.25%	70.8	<0.500U	<0.500U	26.1	<2.00U	0.484	65600	<1.00U	0.392	1.29	180	151J	<0.100U	3940	261	<0.500U	735J	1.07	<0.500U	2860	656	<0.500U	<2.00U	219
M34/CC48/A68 12.5%	48.4J	<0.500U	<0.500U	24.5	<2.00U	1.25	71400	<1.00U	1.16	1.06	196	178J	<0.100U	4220	1610	0.518J	744J	<0.500U	<0.500U	3020	724	<0.500U	<2.00U	385
M34/CC48/A68 25%	52.4	<0.500U	<0.500U	23.0	<2.00U	1.46	84000	<1.00U	3.66	2.47	231	615	<0.100U	5150	1800	1.55	847J	0.542J	<0.500U	3330	867	<0.500U	<2.00U	555
M34/CC48/A68 50%	476	<0.500U	<0.500U	22.3	<2.00U	1.73	101000	<1.00U	6.95	8.50	278	1210	0.355JB	6470	1980	2.57	1010	0.772J	<0.500U	3770	1050	<0.500U	<2.00U	768
Reference toxicity test																								
Control-Ref	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13800	<1.00U	<0.100U	0.503J	96	<100U	<0.100U	14900	<2.00U	<0.500U	2220	<0.500U	<0.500U	26800	79.4	<0.500U	<2.00U	<10.0U
6.25%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13900	<1.00U	<0.100U	0.694J	96	<100U	<0.100U	14900	<2.00U	<0.500U	2200	<0.500U	<0.500U	26700	79.1	<0.500U	<2.00U	70.0
12.50%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	14000	<1.00U	<0.100U	0.686J	96	<100U	<0.100U	14900	<2.00U	<0.500U	2230	<0.500U	<0.500U	26400	78.7	<0.500U	<2.00U	142
25%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	14100	<1.00U	<0.100U	0.617J	96	<100U	<0.100U	14900	<2.00U	<0.500U	2170	<0.500U	<0.500U	26300	78.6	<0.500U	<2.00U	279
50%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	14000	<1.00U	<0.100U	0.630J	96	<100U	<0.100U	14900	<2.00U	<0.500U	2190	<0.500U	<0.500U	26300	78.6	<0.500U	<2.00U	543
100%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	14000	2.03	<0.100U	0.577J	96	<100U	<0.100U	14700	<2.00U	<0.500U	2170	<0.500U	<0.500U	26100	78.2	<0.500U	<2.00U	1080

Final Dissolved Metals (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Hardness (mg/L)	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River surface water samples																								
Control	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13400	1.90J	<0.100U	0.820J	95	<100U	<0.100U	14900	<2.00U	<0.500U	2440	<0.500U	<0.500U	27000	80.5	<0.500U	<2.00U	<10.0U
Baker Bridge	<20.0U	<0.500U	<0.500U	32.5	<2.00U	0.844	68000	<1.00U	2.39	<0.500U	197	<100U	<0.100U	6530	648	2.30	1380	<0.500U	<0.500U	3180	627	<0.500U	<2.00U	302
A75B	<20.0U	<0.500U	<0.500U	29.5	<2.00U	1.01	72100	<1.00U	3.63	0.718J	205	<100U	<0.100U	6100	902	2.14	1220	<0.500U	<0.500U	3300	693	<0.500U	<2.00U	411
A73B	62.2	<0.500U	<0.500U	24.7	<2.00U	1.66	85700	<1.00U	5.87	3.62	239	<100U	<0.100U	6140	1380	3.01	1250	<0.500U	<0.500U	3540	871	<0.500U	<2.00U	645
A56	21.5J	<0.500U	<0.500U	25.1	<2.00U	0.415	60700	<1.00U	<0.100U	0.676J	166	<100U	<0.100U	3590	106	<0.500U	882J	<0.500U	<0.500U	2680	598	<0.500U	<2.00U	149
A72	560	<0.500U	<0.500U	20.0	<2.00U	2.04	107000	<1.00U	7.42	10.0	296	1420	0.110J	7060	1840	3.03	2350	0.519J	<0.500U	4790	1060	<0.500U	<2.00U	812
A68	34.6J	<0.500U	<0.500U	24.6	<2.00U	1.20	65800	<1.00U	<0.100U	1.71	180	<100U	<0.100U	3720	1590	<0.500U	920J	<0.500U	<0.500U	2820	658	<0.500U	<2.00U	356
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56																								
M34/CC48/A56 Control																								
M34/CC48/A56 6.25%	33.8J	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	64500	<5.00U	0.650JD	<2.50U	177	<100U	<0.500U	3970	258	<2.50U	926J	<2.50U	<2.50U	2880	652	<2.50U	<10.0U	174
M34/CC48/A56 12.5%	20.3J	<2.50U	<2.50U	25.0JD	<2.00U	0.536JD	69700	12.9D	1.70D	<2.50U	192	<100U	<0.500U	4270	398	8.68D	951J	<2.50U	<2.50U	2960	699	<2.50U	<10.0U	211
M34/CC48/A56 25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	0.696JD	78700	<5.00U	3.62D	<2.50U	217	<100U	<0.500U	5010	682	<2.50U	1050	<2.50U	<2.50U	3220	813	<2.50U	<10.0U	306
M34/CC48/A56 50%	51.2	<5.00U	<5.00U	<50.0U	<2.00U	1.56JD	98400	<10.0U	8.09D	<5.00U	272	420	<1.00U	6430	1230	5.79JD	1390	<5.00U	<5.00U	4050	1020	<5.00U	<20.0U	622
M34/CC48/A56 100%	5740	<5.00U	<5.00U	<50.0U	<2.00U	2.27D	139000	22.9D	15.4D	35.3D	385	1220	4.72BD	9440	2380	19.8D	4180	6.96JD	<5.00U	5760	1430	<5.00U	<20.0U	1180
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																								
M34/CC48/A68 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	<5.00U	<0.500U	<2.50U	94	<100U	<0.500U	14800	<2.00U	<2.50U	2430	<2.50U	<2.50U	26900	80.1	<2.50U	<10.0U	<10.0U
M34/CC48/A68 6.25%	34.6J	<2.50U	<2.50U	25.7JD	<2.00U	1.23D	70900	<5.00U	0.930JD	3.47JD	194	<100U	<0.500U	4120	1630	<2.50U	794J	<2.50U	<2.50U	3310	716	<2.50U	<10.0U	364
M34/CC48/A68 12.5%	24.3J	<2.50U	<2.50U	<25.0U	<2.00U	1.14D	74000	<5.00U	1.69D	3.75JD	203	<100U	<0.500U	4440	1660	<2.50U	720J	<2.50U	<2.50U	3460	764	<2.50U	<10.0U	372
M34/CC48/A68 25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	1.42D	83400	<5.00U	3.71D	3.40JD	230	<100U	<0.500U	5170	1770	<2.50U	866J	<2.50U	<2.50U	3710	863	<2.50U	<10.0U	466
M34/CC48/A68 50%	42.5J	<5.00U	<5.00U	<50.0U	<2.00U	1.91JD	101000	<10.0U	7.40D	<5.00U	278	375	<1.00U	6590	1960	5.89JD	1360	<5.00U	<5.00U	4210	1040	<5.00U	<20.0U	730
Reference toxicity test																								
Control-Ref	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13200	3.13	<0.100U	1.81	94	<100U	<0.100U	14800	<2.00U	1.21	2440	0.872J	<0.500U	27000	79.2	<0.500U	<2.00U	<10.0U
6.25%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13800	1.40J	<0.100U	0.826J	97	<100U	<0.100U	15300	<2.00U	<0.500U	2450	<0.500U	<0.500U	27400	82.1	<0.500U	<2.00U	67.7
12.50%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13000	1.10J	<0.100U	1.34	91	<100U	<0.100U	14300	<2.00U	<0.500U	2410	<0.500U	<0.500U	26400	75.8	<0.500U	<2.00U	121
25%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13500	2.76	<0.100U	1.26	95	<100U	<0.100U	14800	<2.00U	1.09	3410	<0.500U	<0.500U	27400	78.8	<0.500U	<2.00U	248
50%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13700	3.58	<0.100U	0.927J	95	<100U	<0.100U	14900	<2.00U	0.918J	3050	<0.500U	<0.500U	27200	78.3	<0.500U	<2.00U	494
100%	<20.0U	<0.500U	<0.500U	<5.00U	<2.00U	<0.100U	13600	<1.00U	<0.100U	<0.500U	94	<100U	<0.100U	14600	<2.00U	<0.500U	2730	<0.500U	<0.500U	26500	78.2	<0.500U	<2.00U	979

* No analytical data is available

Qualifiers:

D= Diluted sample

J= Estimated value

U= Non-detect

Prepared by: EC 3.7.13

Reviewed by: BGK 3.11.13

Table 2.5-3 Initial and Final Total Recoverable Metals Results
October 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Total Metals (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River, Mineral Creek, and Cement Creek surface water samples																							
Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	5.60JD	<0.500U	<2.50U	<100U	<0.500U	14000	<2.00U	<2.50U	2070	<2.50U	<2.50U	25300	78.0	<2.50U	<10.0U	<10.0U
Bbridge	285	<2.50U	<2.50U	31.6JD	<2.00U	0.853JD	69500	<5.00U	2.50D	<2.50U	284	<0.500U	6390	677	<2.50U	1010	<2.50U	<2.50U	3050	641	<2.50U	<10.0U	334
A75B	1560	<2.50U	<2.50U	30.1JD	<2.00U	1.03D	71400	<5.00U	3.73D	7.99D	1830	2.21D	5790	920	<2.50U	970J	<2.50U	<2.50U	3080	688	<2.50U	<10.0U	495
A73B	2450	<2.50U	<2.50U	<25.0U	<2.00U	1.69D	85500	<5.00U	5.81D	13.9D	3290	3.65D	5920	1410	<2.50U	933J	<2.50U	<2.50U	3240	875	<2.50U	<10.0U	659
A56	<20.0U	<2.50U	<2.50U	25.9JD	<2.00U	<0.500U	60300	5.37JD	<0.500U	<2.50U	<100U	0.549JD	3440	123	<2.50U	636J	<2.50U	<2.50U	2530	597	<2.50U	<10.0U	160
A72	3730	<2.50U	2.62JD	<25.0U	<2.00U	1.93D	105000	<5.00U	7.47D	17.2D	6220	6.32D	6700	1890	2.87JD	1020	<2.50U	<2.50U	3810	1080	<2.50U	<10.0U	830
A68	62.9	<2.50U	<2.50U	25.3JD	<2.00U	1.29D	64900	<5.00U	<0.500U	3.17JD	<100U	1.42D	3530	1580	<2.50U	667J	<2.50U	<2.50U	2620	657	<2.50U	<10.0U	354
M34	3900	<2.50U	<2.50U	<25.0U	<2.00U	0.663JD	91500	<5.00U	9.34D	6.83D	5730	2.49D	7230	532	<2.50U	744J	<2.50U	<2.50U	4070	853	<2.50U	<10.0U	197
CC48	7390D	<5.00U	<5.00U	<50.0U	<20.0U	3.58D	199000D	<10.0U	16.9D	43.3D	13800D	9.63D	11300D	5370D	10.5D	<2500U	<5.00U	<5.00U	4630JD	2380D	7.83JD	<20.0U	2720D
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56																							
M34/CC48/A56 Control*																							
M34/CC48/A56 6.25%	386	<2.50U	<2.50U	<25.0U	<2.00U	1.45D	69700	<5.00U	0.725JD	3.91JD	588	1.47D	3960	1660	<2.50U	698J	<2.50U	<2.50U	2860	715	<2.50U	<10.0U	411
M34/CC48/A56 12.5%	651	<2.50U	<2.50U	<25.0U	<2.00U	0.705JD	68100	<5.00U	1.42D	4.47JD	1030	1.19D	4060	402	<2.50U	705J	<2.50U	<2.50U	2750	700	<2.50U	<10.0U	272
M34/CC48/A56 25%	1290	<2.50U	<2.50U	<25.0U	<2.00U	0.912JD	76600	<5.00U	3.26D	7.24D	2040	2.27D	4700	663	<2.50U	784J	<2.50U	<2.50U	2980	785	<2.50U	<10.0U	390
M34/CC48/A56 50%	2670	<2.50U	<2.50U	<25.0U	<2.00U	1.39D	96900	<5.00U	7.25D	13.6D	4270	3.29D	6190	1250	2.52JD	939J	<2.50U	<2.50U	3500	1020	<2.50U	<10.0U	653
M34/CC48/A56 100%	5530	<2.50U	<2.50U	<25.0U	<2.00U	2.32D	136000	<5.00U	16.0D	29.6D	8720	6.70D	8880	2400	6.53D	1220	<2.50U	<2.50U	4360	1420	<2.50U	<10.0U	1160
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																							
M34/CC48/A68 Control*																							
M34/CC48/A68 6.25%	323	<2.50U	<2.50U	25.2JD	<2.00U	<0.500U	63500	<5.00U	0.537JD	<2.50U	510	0.872JD	3740	262	<2.50U	648J	<2.50U	<2.50U	2650	647	<2.50U	<10.0U	216
M34/CC48/A68 12.5%	561	<2.50U	<2.50U	<25.0U	<2.00U	1.37D	70300	<5.00U	1.22D	5.12D	830	1.60D	4040	1630	<2.50U	688J	<2.50U	<2.50U	2830	721	<2.50U	<10.0U	403
M34/CC48/A68 25%	1490	<2.50U	<2.50U	<25.0U	<2.00U	1.62D	80900	<5.00U	3.92D	9.58D	2170	2.65D	4870	1780	<2.50U	781J	<2.50U	<2.50U	3100	852	<2.50U	<10.0U	547
M34/CC48/A68 50%	2610	<2.50U	<2.50U	<25.0U	<2.00U	1.64D	100000	<5.00U	7.66D	15.0D	4070	3.40D	6310	2010	2.95JD	932J	<2.50U	<2.50U	3610	1060	<2.50U	<10.0U	751
Reference toxicity test																							
Control-Ref	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	<5.00U	<0.500U	<2.50U	<100U	<0.500U	14200	<2.00U	<2.50U	2110	<2.50U	<2.50U	25500	78.7	<2.50U	<10.0U	<10.0U
6.25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13600	5.15JD	<0.500U	<2.50U	<100U	<0.500U	14300	<2.00U	<2.50U	2100	<2.50U	<2.50U	25600	79.5	<2.50U	<10.0U	66.2
12.50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13500	19.9D	<0.500U	2.59JD	<100U	0.877JD	14300	<2.00U	9.83D	2140	<2.50U	<2.50U	25400	78.6	3.79JD	<10.0U	132
25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	7.14JD	<0.500U	<2.50U	<100U	<0.500U	14000	<2.00U	2.75JD	2090	<2.50U	<2.50U	25100	78.3	<2.50U	<10.0U	259
50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13400	<5.00U	<0.500U	<2.50U	<100U	<0.500U	14200	<2.00U	<2.50U	2110	<2.50U	<2.50U	25400	79.0	<2.50U	<10.0U	516
100%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13400	<5.00U	<0.500U	<2.50U	<100U	<0.500U	14100	<2.00U	<2.50U	2170	<2.50U	<2.50U	25300	78.2	<2.50U	<10.0U	1000

Final Total Metals (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River surface water samples																							
Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	17.0D	<0.500U	<2.50U	<100U	<0.500U	14500	<2.00U	6.19D	2450	<2.50U	<2.50U	26200	81.0	<2.50U	<10.0U	<10.0U
Bbridge	147	<2.50U	<2.50U	32.2JD	<2.00U	0.856JD	67300	7.01JD	2.60D	<2.50U	114J	<0.500U	6460	662	<2.50U	1360	<2.50U	<2.50U	3130	658	<2.50U	<10.0U	306
A75B	557	<2.50U	<2.50U	31.4JD	<2.00U	1.16D	70500	5.61JD	3.85D	3.17JD	576	0.931JD	5970	911	<2.50U	1240	<2.50U	<2.50U	3250	711	<2.50U	<10.0U	424
A73B	568	<2.50U	<2.50U	25.5JD	<2.00U	1.53D	82800	5.80JD	6.15D	5.97D	644	0.935JD	5990	1390	<2.50U	1250	<2.50U	<2.50U	3490	883	<2.50U	<10.0U	621
A56	38.9J	<2.50U	<2.50U	26.0JD	<2.00U	0.579JD	58600	6.01JD	<0.500U	<2.50U	<100U	1.33D	3470	114	<2.50U	880J	4.89JD	<2.50U	2600	605	<2.50U	<10.0U	147
A72	831	<2.50U	<2.50U	<25.0U	<2.00U	1.96D	103000	5.11JD	8.24D	11.6D	1750	0.841JD	6820	1860	3.13JD	2350	4.98JD	<2.50U	4660	1090	<2.50U	<10.0U	786
A68	72.7	<2.50U	<2.50U	<25.0U	<2.00U	1.25D	62000	6.00JD	<0.500U	2.97JD	<100U	1.25D	3570	1550	<2.50U	928J	4.44JD	<2.50U	2720	653	<2.50U	<10.0U	333
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56																							
M34/CC48/A56 Control*																							
M34/CC48/A56 6.25%	308	<2.50U	<2.50U	26.5JD	<2.00U	0.663JD	64300	5.16JD	0.574JD	<2.50U	463	0.831JD	3890	265	<2.50U	930J	<2.50U	<2.50U	2800	675	<2.50U	<10.0U	201
M34/CC48/A56 12.5%	412	<2.50U	<2.50U	26.4JD	<2.00U	0.583JD	67400	5.31JD	1.41D	<2.50U	625	0.960JD	4170	400	<2.50U	967J	3.29JBD	<2.50U	2880	717	<2.50U	<10.0U	238
M34/CC48/A56 25%	601	<2.50U	<2.50U	<25.0U	<2.00U	0.722JD	76700	<5.00U	3.46D	3.03JD	951	1.30D	4890	683	<2.50U	1070	5.23JBD	<2.50U	3130	825	<2.50U	<10.0U	328
M34/CC48/A56 50%	1540	<2.50U	<2.50U	<25.0U	<2.00U	1.49D	95100	<5.00U	7.03D	7.96D	2620	2.12D	6240	1230	<2.50U	1410	6.03JBD	<2.50U	3950	1020	<2.50U	<10.0U	616
M34/CC48/A56 100%	5700	<2.50U	<2.50U	<25.0U	<2.00U	2.67D	135000	<5.00U	15.2D	27.3D	1930	5.12D	9170	2400	5.94D	4180	<2.50U	<2.50U	5600	1470	<2.50U	<10.0U	1140
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																							
M34/CC48/A68 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	7.61JD	<0.500U	<2.50U	<100U	<0.500U	14300	<2.00U	<2.50U	2440	<2.50U	<2.50U	26000	81.2	<2.50U	<10.0U	<10.0U
M34/CC48/A68 6.25%	335	<2.50U	<2.50U	26.1JD	<2.00U	1.26D	68900	5.33JD	0.842JD	4.00JD	474	1.55D	3960	1630	<2.50U	795J	<2.50U	<2.50U	3170	723	<2.50U	<10.0U	382
M34/CC48/A68 12.5%	577	<2.50U	<2.50U	<25.0U	<2.00U	1.32D	73000	5.25JD	1.79D	5.00D	809	1.91D	4300	1670	<2.50U	722J	<2.50U	<2.50U	3290	775	<2.50U	<10.0U	419
M34/CC48/A68 25%	1190	<2.50U	<2.50U	<25.0U	<2.00U	1.58D	81300	<5.00U	3.87D	7.94D	1710	2.57D	4970	1770	<2.50U	869J	<2.50U	<2.50U	3530	873	<2.50U	<10.0U	523
M34/CC48/A68 50%	753	<2.50U	<2.50U	<25.0U	<2.00U	1.83D	100000	<5.00U	7.70D	6.11D	1310	0.956JD	6360	1970	3.45JD	1330	<2.50U	<2.50U	4010	1060	<2.50U	<10.0U	709
Reference toxicity test																							
Control-Ref	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13200	<5.00U	<0.500U	<2.50U	<100U	<0.500U	14500	<2.00U	<2.50U	2440	7.76JBD	<2.50U	26300	84.3	<2.50U	<10.0U	<10.0U
6.25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13100	6.02JD	<0.500U	<2.50U	<100U	<0.500U	14700	<2.00U	<2.50U	2460	5.17D	<2.50U	26600	81.6	<2.50U	<10.0U	60.1
12.50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	5.84JD	<0.500U	<2.50U	<100U	0.580JD	14600	<2.00U	<2.50U	2470	3.38JD	<2.50U	26200	80.8	3.60JD	<10.0U	121
25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	8.14JD	<0.500U	<2.50U	<100U	<0.500U	14500	<2.00U	2.71JD	3390	<2.50U	<2.50U	26600	80.0	<2.50U	<10.0U	238
50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	5.05JD	<0.500U	<2.50U	<100U	<0.500U	14500	<2.00U	<2.50U	3060	4.65JD	<2.50U	26600	80.3	<2.50U	<10.0U	465
100%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13100	<5.00U	<0.500U	<2.50U	<100U	<0.500U	14100	<2.00U	<2.50U	2740	<2.50U	<2.50U	25500	78.4	<2.50U	<10.0U	910

* No Aanalytical data is available

Qualifiers:

D= Diluted sample

J= Estimated value

U= Non-detect

Prepared by: EC 3.7.13

Reviewed by: BGK 3.11.3

Table 2.5-4 Initial and Final Wet Chemistry Results
October 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Wet Chemistry Results (mg/L)

STATION_ID	Chloride	Fluoride	Nitrate/Nitrite as N	Sulfate as SO4	Dissolved Organic Carbon	Total Alkalinity (mg CaCO3/L)
Profile test of the Animas River, Mineral Creek, and Cement Creek surface water samples						
Control	2.3	<0.1U	<0.2U	84.3	<1.0U	59.4
Baker Bridge	16.8JD	4.3D	<2.0U	1730D	<1.0U	26.5
A75B	1.6J	0.4	<0.2U	184	<1.0U	17.1
A73B	1.5J	0.5	<0.2U	234	<1.0U	<5.00U
A56	1.3J	0.5	<0.2U	127	<1.0U	37.8
A72	<10.0U	<1.0U	<2.0U	263D	<1.0U	<5.00U
A68	1.2J	0.5	<0.2U	141	<1.0U	35.8
M34	<10.0U	<1.0U	<2.0U	232D	<1.0U	<5.00U
CC48	<1.0U	0.2	<0.2U	60.9	<1.0U	<5.00U
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56						
M34/CC48/A56 Control*	--	--	--	--	--	--
M34/CC48/A56 6.25%	1.3J	0.5	<0.2U	145	<1.0U	32.3
M34/CC48/A56 100%	<10.0U	<1.0U	<2.0U	357D	<1.0U	<5.00U
M34/CC48/A56 12.5%	1.3J	0.5	<0.2U	162	<1.0U	27.5
M34/CC48/A56 25%	1.3J	0.5	<0.2U	196	<1.0U	17.5
M34/CC48/A56 50%	<10.0U	<1.0U	<2.0U	239D	<1.0U	<5.00U
M34/CC48/A56 100%	<10.0U	<1.0U	<2.0U	357D	<1.0U	<5.00U
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68						
M34/CC48/A68 Control*	--	--	--	--	--	--
M34/CC48/A68 6.25%	1.2J	0.5	<0.2U	158	<1.0U	31.6
M34/CC48/A68 12.5%	1.3J	0.5	<0.2U	164	<1.0U	31.2
M34/CC48/A68 25%	1.2J	0.6	<0.2U	210	<1.0U	17.6
M34/CC48/A68 50%	<10.0U	<1.0U	<2.0U	254D	<1.0U	<5.00U
Reference toxicity test						
Control-Ref	2.3	<0.1U	<0.2U	84.1	<1.0U	56.6
6.25%	2.3	<0.1U	<0.2U	84.3	<1.0U	60.0
12.50%	2.3	<0.1U	<0.2U	84.3	<1.0U	56.7
25%	2.3	<0.1U	<0.2U	85.0	<1.0U	59.5
50%	2.3	<0.1U	<0.2U	85.2	<1.0U	58.4
100%	2.3	<0.1U	<0.2U	84.3	<1.0U	60.5

Final Wet Chemistry Results (mg/L)

STATION_ID	Chloride	Fluoride	Nitrate/Nitrite as N	Sulfate as SO4	Dissolved Organic Carbon	Total Alkalinity (mg CaCO3/L)
Profile test of the Animas River, Mineral Creek, and Cement Creek surface water samples						
Control	2.3	<0.1U	<0.2U	85.0	<1.0U	61.0
Baker Bridge	<10.0U	<1.0U	<2.0U	160D	<1.0U	31.8
A75B	1.6J	0.4	<0.2U	183	<1.0U	20.5
A73B	1.6J	0.4	<0.2U	232	<1.0U	<5.00U
A56	1.3J	0.4	<0.2U	125	<1.0U	40.9
A72	<10.0U	1.6JD	<2.0U	282D	3.1	<5.00U
A68	1.2J	0.5	<0.2U	139	<1.0U	42.7
Combined sample M34/CC48 serially diluted by Animas River surface water sample A56						
M34/CC48/A56 Control*	--	--	--	--	--	--
M34/CC48/A56 6.25%	1.3J	0.5	<0.2U	144	<1.0U	37.1
M34/CC48/A56 12.5%	1.2J	0.5	<0.2U	161	<1.0U	32.0
M34/CC48/A56 25%	1.3J	0.5	<0.2U	195	1.0	19.5
M34/CC48/A56 50%	<10.0U	<1.0U	<2.0U	242D	<1.0U	5.82
M34/CC48/A56 100%	<10.0U	<1.0U	<2.0U	371D	6.3	<5.00U
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68						
M34/CC48/A68 Control	2.4	<0.1U	<0.2U	85.3	<1.0U	72.2
M34/CC48/A68 6.25%	1.7J	0.5	<0.2U	157	1.2	35.7
M34/CC48/A68 12.5%	1.7J	0.5	<0.2U	173	1.1	28.1
M34/CC48/A68 25%	1.8J	0.5	<0.2U	206	1.0	19.5
M34/CC48/A68 50%	<10.0U	<1.0U	<2.0U	248D	1.3	5.00
Reference toxicity test						
Control-Ref	2.3	<0.1U	<0.2U	84.6	<1.0U	70.5
Ref 6.25%	2.3	<0.1U	<0.2U	85.3	<1.0U	63.8
Ref 12.50%	2.3	<0.1U	<0.2U	85.4	<1.0U	66.3
Ref 25%	3.4	<0.1U	<0.2U	85.4	1.6	64.0
Ref 50%	3.1	<0.1U	<0.2U	84.8	1.3	62.4
Ref 100%	2.8	<0.1U	<0.2U	85.7	<1.0U	59.7

* No analytical data is available

Qualifiers:

D= Diluted sample

J= Estimated value

U= Non-detect

Prepared by: EC 3.7.13

Reviewed by: BGK 3.11.13

Table 2.5-5a: Initial and Final Average Ammonia Results for October 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O. mykiss*

Replicate ID	Day 0 Measured Ammonia Conc. (mg N/L)	Day 0 Measured pH	Day 0 Average Measured Ammonia Conc. (mg N/L)	Day 0 Average Measured pH	Day 0 Ammonia Criterion (mg N/L)[a]	Day 4 Measured Ammonia Conc. (mg N/L)[b]	Day 4 Measured pH [b]	Day 4 Average Measured Ammonia Conc. (mg N/L)	Day 4 Average Measured pH	Day 4 Ammonia Criterion (mg N/L)[a]
PROFILE TEST										
Control-01	0.09422	7.3	0.0932	7.38	15.87	0.9190	7.5	0.9231	7.58	11.84
Control-02	0.09144	7.4				0.8345	7.6			
Control-03	0.08965	7.4				0.9018	7.6			
Control-04	0.09735	7.4				1.0370	7.6			
A56-01	0.10340	6.9	0.1012	7.00	24.10	1.0190	7.0	0.9032	7.10	21.94
A56-02	0.09974	7.0				0.8928	7.2			
A56-03	0.09829	7.0				0.8984	7.1			
A56-04	0.10330	7.1				0.8024	7.1			
A68-01	0.06243	7.2	0.0627	7.23	19.17	0.9075	7.3	0.9958	7.38	15.87
A68-02	0.06379	7.2				1.0410	7.4			
A68-03	0.06102	7.2				1.0590	7.4			
A68-04	0.06375	7.3				0.9758	7.4			
A72-01	0.10640	5.5	0.1072	5.50	38.25	1.1350	6.2	0.8267	6.03	36.59
A72-02	0.10750	5.5				0.7567	6.1			
A72-03	0.10750	5.5				0.4720	5.9			
A72-04	0.10740	5.5				0.9430	5.9			
A73B-01	0.11070	6.3	0.1149	6.15	35.86	1.1990	7.1	1.0718	6.85	27.12
A73B-02	0.11420	6.1				1.1250	6.9			
A73B-03	0.11800	6.1				1.0270	6.7			
A73B-04	0.11680	6.1				0.9361	6.7			
A75B-01	0.10380	7.1	0.1016	7.10	21.94	0.9501	7.4	0.9497	7.35	16.41
A75B-02	0.10130	7.1				0.9315	7.4			
A75B-03	0.10340	7.1				0.8740	7.3			
A75B-04	0.09803	7.1				1.0430	7.3			
Baker Bridge-01	0.11120	7.1	0.1088	7.10	21.94	0.9039	7.4	0.9099	7.40	15.34
Baker Bridge-02	0.10180	7.1				0.8546	7.4			
Baker Bridge-03	0.10270	7.1				0.8947	7.4			
Baker Bridge-04	0.11930	7.1				0.9865	7.4			
SERIAL DILUTION OF SAMPLE 34/48 WITH 56 AS THE DILUENT										
34/48/56 -Control-01	0.05895	7.6	0.0608	7.45	14.30	0.8217	7.6	0.8483	7.68	10.06
34/48/56 -Control-02	0.06058	7.4				0.8818	7.7			
34/48/56 -Control-03	0.06092	7.4				0.8147	7.7			
34/48/56 -Control-04	0.06276	7.4				0.8750	7.7			
34/48/56-6.25%-01	0.06189	7.3	0.0619	7.28	18.06	0.9375	7.6	0.8716	7.53	12.79
34/48/56-6.25%-02	0.06267	7.2				0.8028	7.5			
34/48/56-6.25%-03	0.06153	7.3				0.8767	7.5			
34/48/56-6.25%-04	0.06162	7.3				0.8695	7.5			
34/48/56-12.5%-01	0.05990	7.2	0.0570	7.20	19.73	0.8763	7.5	0.8755	7.43	14.81
34/48/56-12.5%-02	0.05917	7.2				0.9640	7.4			
34/48/56-12.5%-03	0.05431	7.2				0.8171	7.4			
34/48/56-12.5%-04	0.05476	7.2				0.8446	7.4			
34/48/56-25%-01	0.05823	7.1	0.0581	7.08	22.49	0.9556	7.4	0.9013	7.38	15.87
34/48/56-25%-02	0.05733	7.1				0.8771	7.4			
34/48/56-25%-03	0.05855	7.1				0.9341	7.3			
34/48/56-25%-04	0.05816	7.0				0.8384	7.4			
34/48/56-50%-01	0.05896	6.2	0.0581	6.18	35.69	0.9973	7.1	0.9348	6.98	24.63
34/48/56-50%-02	0.05784	6.2				1.0670	7.0			
34/48/56-50%-03	0.05704	6.2				0.7439	6.9			
34/48/56-50%-04	0.05855	6.1				0.9308	6.9			
34/48/56-100%-01	0.05955	3.9	0.0594	3.85	38.98	1.6430	4.2	0.7493	4.15	38.97
34/48/56-100%-02	0.05658	3.9				0.4627	4.1			
34/48/56-100%-03	0.06055	3.8				0.3219	4.1			
34/48/56-100%-04	0.06089	3.8				0.5694	4.2			
SERIAL DILUTION OF SAMPLE 34/48 WITH 68AS THE DILUENT										
34/48/68 Control-01	0.05814	7.2	0.0580	7.23	19.17	0.8449	7.3	0.8699	7.48	13.79
34/48/68 Control-02	0.05853	7.2				0.8881	7.4			
34/48/68 Control-03	0.05827	7.2				0.8595	7.6			
34/48/68 Control-04	0.05719	7.3				0.8872	7.6			
34/48/68-6.25%-01	0.17650	7.3	0.1822	7.33	16.96	0.5949	7.7	0.6156	7.60	11.37
34/48/68-6.25%-02	0.19660	7.3				0.6748	7.6			
34/48/68-6.25%-03	0.16030	7.3				0.5602	7.6			
34/48/68-6.25%-04	0.19520	7.4				0.6323	7.5			
34/48/68-12.5%-01	0.17150	7.3	0.1607	7.25	18.61	0.6344	7.6	0.6206	7.55	12.31
34/48/68-12.5%-02	0.15250	7.3				0.5795	7.6			
34/48/68-12.5%-03	0.15520	7.2				0.6419	7.5			
34/48/68-12.5%-04	0.16350	7.2				0.6265	7.5			
34/48/68-25%-01	0.16250	7.1	0.1656	6.98	24.63	0.6199	7.4	0.7245	7.45	14.30
34/48/68-25%-02	0.17310	6.9				0.8713	7.5			
34/48/68-25%-03	0.15450	7.0				0.6583	7.4			
34/48/68-25%-04	0.17230	6.9				0.7485	7.5			
34/48/68-50%-01	0.14220	6.1	0.1414	6.03	36.59	0.8853	7.1	0.9240	7.00	24.10
34/48/68-50%-02	0.14290	5.9				1.0520	7.1			
34/48/68-50%-03	0.14380	6.0				0.9768	6.9			
34/48/68-50%-04	0.13680	6.1				0.7819	6.9			

[a] The sample-specific acute ammonia criterion was calculated using the "salmon present" formula on p. 54 of the Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 31: The Basic Standards and Methodologies for Surface Water (5 CCR 1002-31).

[b] Values shown are either the measurements made at the end of the test (day 4) or earlier if all test organisms died before the 4-day exposure period was completed.

Prepared by: EC 3/7/13

Reviewed by: BGK 3/13/13

Table 2.5-5b Initial and Final Average Ammonia Results for October 2012 Upper Animas River Concurrent Reference Toxicity Test Using Juvenile O. mykiss

Replicate ID	Day 0 Measured Ammonia Conc. (mg N/L)	Day 0 Measured pH	Day 0 Average Measured Ammonia Conc. (mg N/L)	Day 0 Average Measured pH	Day 0 Ammonia Criterion (mg N/L)[a]	Day 4 Measured Ammonia Conc. (mg N/L) [b]	Day 4 Measured pH [b]	Day 4 Average Measured Ammonia Conc. (mg N/L)	Day 4 Average Measured pH	Day 4 Ammonia Criterion (mg N/L)[a]
Ref Control-01	0.08144	7.40	0.0831	7.50	13.28	0.7470	7.60	0.7812	7.63	10.92
Ref Control-02	0.08438	7.50				0.8759	7.60			
Ref Control-03	0.08350	7.50				0.7547	7.70			
Ref Control-04	0.08304	7.60				0.7471	7.60			
6.25%-01	0.07884	7.50	0.0844	7.55	12.31	0.8604	7.60	0.8056	7.60	11.37
6.25%-02	0.08514	7.50				0.7369	7.60			
6.25%-03	0.08633	7.60				0.7664	7.60			
6.25%-04	0.08711	7.60				0.8588	7.60			
12.5%-01	0.06867	7.60	0.0693	7.60	11.37	0.5868	7.60	0.7010	7.65	10.49
12.5%-02	0.06773	7.60				0.6369	7.70			
12.5%-03	0.07157	7.60				0.8041	7.70			
12.5%-04	0.06908	7.60				0.7761	7.60			
25%-01	0.06999	7.60	0.0710	7.60	11.37	0.3805	7.60	0.4599	7.70	9.64
25%-02	0.07186	7.60				0.6962	7.70			
25%-03	0.07181	7.60				0.2761	7.70			
25%-04	0.07049	7.60				0.4869	7.80			
50%-01	0.06989	7.60	0.0699	7.60	11.37	0.2685	7.70	0.3577	7.75	8.85
50%-02	0.07212	7.60				0.2968	7.80			
50%-03	0.06837	7.60				0.5770	7.70			
50%-04	0.06923	7.60				0.2884	7.80			
100%-01	0.08044	7.60	0.0726	7.60	11.37	0.2373	7.70	0.2477	7.70	9.64
100%-02	0.06943	7.60				0.2355	7.70			
100%-03	0.06942	7.60				0.3495	7.80			
100%-04	0.07124	7.60				0.1686	7.60			

[a] The sample-specific acute ammonia criterion was calculated using the "salmon present" formula on p. 54 of the Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 31: The Basic Standards and Methodologies for Surface Water (5 CCR 1002-31).

[b] Values shown are either the measurements made at the end of the test (day 4) or earlier if all test organisms died before the 4-day exposure period was completed.

Prepared by:EC 3/7/13

Reviewed by: BGK 3/11/13

Table 2.5-6 Initial and Final Dissolved Metals Results
November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Analytical Data (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Hardness (mg/L)	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River, Mineral Creek, and Cement Creek surface water samples																								
Profile Control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13000	<1.00U	<0.100	0.544J	91	<100U	<0.100	14100	<2.00U	<0.500	2040	<0.500U	<0.500	25500	73.4	<0.500	<2.00U	<10.0U
A72	965	<2.50U	<2.50U	<25.0U	<2.00U	2.10D	107000	<5.00U	8.95D	17.0D	296	2770	0.849JD	7000	1860	5.13D	1080	<2.50U	<2.50U	4060	1080	<2.50U	<10.0U	827
A68	55.5	<0.500U	<0.500	24.1	<2.00U	1.40	66400	<1.00U	<0.100	1.56J	181	<100U	0.212	3730	1870	<0.500	695J	<0.500U	<0.500	2780	660	<0.500	<2.00U	397
CC48	7700D	<5.00U	<5.00U	<50.0U	<10.0U	5.51D	196000	<10.0U	26.1D	71.0D	536D	6460D	13.1D	11400D	5380D	17.2D	2040JD	<5.00U	<5.00U	4760JD	2370D	<5.00U	<20.0U	2710D
M34	1200	<2.50U	<2.50U	<25.0U	<2.00U	0.789JD	97600	<5.00U	10.1D	6.91D	276	5060	1.03D	7790	585	3.25JD	835J	<2.50U	<2.50U	4470	942	<2.50U	<10.0U	216
Aminas River surface water sample A72 serially diluted by Animas River surface water sample A68																								
A68/A72 control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13100	<1.00U	<0.100	<0.500	92	<100U	<0.100	14500	<2.00U	<0.500	2100	<0.500U	<0.500	26100	78.1	<0.500	<2.00U	<10.0U
A68/A72 5%	67.8	<0.500U	<0.500	23.5	<2.00U	1.40	68500	<1.00U	0.509	1.02J	187	<100U	<0.100	3890	1860	0.840J	682J	<0.500U	<0.500	2860	688	<0.500	<2.00U	389
A68/A72 10%	73.0	<0.500U	<0.500	23.3	<2.00U	1.41	70600	2.43	0.963	1.97J	193	172J	<0.100	4120	1870	2.65	742J	<0.500U	<0.500	2970	715	<0.500	<2.00U	423
A68/A72 25%	33.4J	<0.500U	<0.500	22.5	<2.00U	1.48	76300	<1.00U	2.07	1.86J	209	492	<0.100	4570	1860	1.66	791J	0.643J	<0.500	3150	771	<0.500	<2.00U	482
A68/A72 50%	38.2J	<0.500U	<0.500	22.6	<2.00U	1.74	86500	<1.00U	4.06	3.92	238	1250	<0.100	5440	1700	2.21	920J	0.796J	<0.500	3490	805	<0.500	<2.00U	566
A68/A72 75%	197	<0.500U	<0.500	21.7	<2.00U	1.92	90300	<1.00U	6.27	8.80	250	1880	0.126J	5880	1940	3.84	918J	<0.500U	<0.500	3640	1030	<0.500	<2.00U	727
A68/A72 100%	990	<0.500U	<0.500	20.9	<2.00U	2.12	107000	3.41	8.47	15.0	298	2730	0.860	7130	1910	6.47	1080	0.664J	<0.500	4120	1130	<0.500	<2.00U	835
Cement Creek surface water sample CC48 serially diluted by Animas River surface water sample A68																								
A68/CC48 Control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13100	1.36J	<0.100	0.580J	92	<100U	<0.100	14400	<2.00U	0.709J	2090	<0.500U	<0.500	26200	74.9	<0.500	<2.00U	<10.0U
A68/CC48 1%	101	<0.500U	<0.500	23.9	<2.00U	1.42	67500	<1.00U	0.347	2.07	184	<100U	0.127J	3820	1890	0.748J	700J	<0.500U	<0.500	2840	686	<0.500	<2.00U	410
A68/CC48 3%	72.2	<0.500U	<0.500	23.9	<2.00U	1.47	70700	<1.00U	0.879	1.91J	193	<100U	0.107J	3980	1960	1.52	729J	<0.500U	<0.500	2910	720	<0.500	<2.00U	447
A68/CC48 6%	76.7	<0.500U	<0.500	24.1	<2.00U	1.52	74500	1.22J	1.59	2.67	204	129J	<0.100	4250	2060	1.80	760J	0.728J	<0.500	3000	770	<0.500	<2.00U	516
A68/CC48 12%	56.5	<0.500U	<0.500	22.2	<2.00U	1.84	82600	<1.00U	3.01	2.85	226	248J	<0.100	4710	2310	2.50	843J	0.690J	<0.500	3090	886	<0.500	<2.00U	655
A68/CC48 25%	403	<0.500U	<0.500	20.5	<2.00U	2.34	99600	<1.00U	6.15	8.48	272	483	0.227	5740	2690	4.41	1030	0.520J	<0.500	3380	1070	<0.500	<2.00U	954
A68/CC48 50%	3870	<2.50U	<2.50U	<25.0U	<2.00U	3.26D	134000	6.67JD	12.5D	32.1D	368	1090	4.28D	7830	3510	11.7D	1400	<2.50U	<2.50U	3950	1480	<2.50U	<10.0U	1510
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																								
A68/M34/CC48 Control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13200	<1.00U	<0.100	0.755J	91	<100U	<0.100	14200	<2.00U	<0.500	2030	<0.500U	<0.500	25500	73.2	<0.500	<2.00U	<10.0U
A68/M34/CC48 4%	99.7	<0.500U	<0.500	23.6	<2.00U	1.39	67800	<1.00U	0.561	1.39	185	150J	<0.100	3890	1850	<0.500	721J	<0.500U	<0.500	2880	690	<0.500	<2.00U	397
A68/M34/CC48 9%	84.1	<0.500U	<0.500	23.8	<2.00U	1.48	72600	<1.00U	1.22	1.83	199	373	<0.100	4190	1880	1.00	719J	<0.500U	<0.500	2960	723	<0.500	<2.00U	433
A68/M34/CC48 20%	73.3	<0.500U	<0.500	22.6	<2.00U	1.56	77500	<1.00U	2.91	2.68	213	783	0.119J	4700	1880	2.35	772J	<0.500U	<0.500	3150	802	<0.500	<2.00U	485
A68/M34/CC48 40%	332	<2.50U	<2.50U	<25.0U	<2.00U	1.82D	88300	<5.00U	5.88D	11.1D	244	1600	0.524JD	5680	1910	3.68JD	890J	<2.50U	<2.50U	3480	930	<2.50U	<10.0U	612
A68/M34/CC48 65%	1580	<2.50U	<2.50U	<25.0U	<2.00U	1.92D	107000	<5.00U	9.67D	18.7D	296	2670	1.90D	7150	1960	5.41D	1060	<2.50U	<2.50U	4000	1100	<2.50U	<10.0U	758
A68/M34/CC48 85%	2900	<2.50U	<2.50U	<25.0U	<2.00U	2.26D	118000	5.45JD	12.6D	28.9D	328	3770	5.19D	8190	1980	9.29D	1140	<2.50U	<2.50U	4440	1220	<2.50U	<10.0U	870
Reference toxicity test																								
Control-Ref	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13100	<1.00U	<0.100	<0.500	91	<100U	<0.100	14100	<2.00U	<0.500	2010	<0.500U	<0.500	25400	72.8	<0.500	<2.00U	<10.0U
Ref 6.25%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13000	<1.00U	<0.100	<0.500	90	<100U	<0.100	14100	<2.00U	<0.500	2020	<0.500U	<0.500	25300	73.9	<0.500	<2.00U	57.9
Ref 12.5%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13100	<1.00U	<0.100	0.519J	91	<100U	<0.100	14200	<2.00U	<0.500	2040	<0.500U	<0.500	25600	71.7	<0.500	<2.00U	108
Ref 25%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13100	<1.00U	<0.100	<0.500	91	<100U	<0.100	14200	<2.00U	<0.500	2040	<0.500U	<0.500	25500	73.2	<0.500	<2.00U	214
Ref 50%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13000	<1.00U	<0.100	0.594J	91	<100U	<0.100	14200	<2.00U	<0.500	2040	<0.500U	<0.500	25500	73.2	<0.500	<2.00U	430
Ref 100%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12900	<1.00U	<0.100	0.835J	90	<100U	<0.100	14000	<2.00U	<0.500	2030	<0.500U	<0.500	25300	75.3	<0.500	<2.00U	866

Final Analytical Data (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Hardness (mg/L)	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River and Mineral Creek surface water samples																								
Profile Control	25.1J	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12800	<1.00U	<0.100	1.12	93	<100U	<0.100	14800	<2.00U	<0.500	2500	<0.500U	<0.500	27100	78.5	<0.500	<2.00U	<10.0U
A68	43.9J	<0.500U	<0.500	23.3	<2.00U	1.21	64700	<1.00U	<0.100	2.16	177	<100U	0.106J	3710	1720	<0.500	909J	1.25JB	<0.500	2990	661	<0.500	<2.00U	413
M34	248	<2.50U	<2.50U	<25.0U	<2.00U	0.712JD	99500	<5.00U	8.80D	3.14JD	282	4270	<0.500	8250	592	2.56JD	4010	<2.50U	<2.50U	7380	937	<2.50U	<10.0U	230
Aminas River surface water sample A72 serially diluted by Animas River surface water sample A68																								
A68/A72 control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12700	<1.00U	<0.100	1.35	93	<100U	<0.100	14800	<2.00U	<0.500	2440	<0.500U	<0.500	27200	78.1	<0.500	<2.00U	<10.0U
A68/A72 5%	53.7	<0.500U	<0.500	23.4	<2.00U	1.43	68400	<1.00U	0.480	2.75	187	<100U	<0.100	4000	1910	<0.500	860J	<0.500U	<0.500	3070	701	<0.500	<2.00U	388
A68/A72 10%	46.4J	<0.500U	<0.500	23.5	<2.00U	1.29	70100	1.02J	0.860	2.66	192	<100U	<0.100	4110	1880	0.572J	869J	2.32B	<0.500	3100	720	<0.500	<2.00U	389
A68/A72 25%	41.7J	<0.500U	<0.500	22.5	<2.00U	1.39	76200	<1.00U	1.97	2.62	209	<100U	0.230	4620	1900	0.961J	952J	1.10JB	<0.500	3230	787	<0.500	<2.00U	411
A68/A72 50%	<20.0U	<0.500U	<0.500	20.8	<2.00U	1.54	86100	<1.00U	4.15	1.62	238	<100U	<0.100	5450	1900	2.18	1150	<0.500U	<0.500	3600	898	<0.500	<2.00U	521
A68/A72 75%	20.5J	<0.500U	<0.500	21.2	<2.00U	1.88	96600	<1.00U	6.26	2.12	267	206J	<0.100	6300	1890	3.35	1390	<0.500U	<0.500	4490	1000	<0.500	<2.00U	693
A68/A72 100%	1170	<0.500U	<0.500	19.8	<2.00U	2.08	108000	<1.00U	8.88	14.5	298	758	0.633	7160	1870	4.29	1870	<0.500U	<0.500	4740	1090	<0.500	<2.00U	852
Aminas River surface water sample CC48 serially diluted by Animas River surface water sample A68																								
A68/CC48 Control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12800	1.09J	<0.100	1.42	93	<100U	<0.100	14800	<2.00U	<0.500	2440	<0.500U	<0.500	27000	78.3	<0.500	<2.00U	<10.0U
A68/CC48 1%	72.6	<0.500U	<0.500	23.0	<2.00U	1.35	66800	<1.00U	0.279	1.93	183	<100U	<0.100	3920	1910	0.654J	1020	<0.500U	<0.500	3230	696	<0.500	<2.00U	395
A68/CC48 3%	65.4	<0.500U	<0.500	22.6	<2.00U	1.38	66700	1.30J	0.742	2.13	182	<100U	<0.100	3850	1800	0.690J	899J	0.572JB	<0.500	3000	698	<0.500	<2.00U	431
A68/CC48 6%	56.4	<0.500U	<0.500	22.3	<2.00U	1.46	73400	<1.00U	1.47	2.78	201	<100U	<0.100	4240	1950	1.12	1020	1.12JB	<0.500	3100	776	<0.500	<2.00U	461
A68/CC48 12%	39.7J	<0.500U	<0.500	21.3	<2.00U	1.75	82200	<1.00U	3.17	2.55	225	<100U	<0.100	4790	2170	2.83	1110	<0.500U	<0.500	3350	878	<0.500	<2.00U	573
A68/CC48 25%	34.1J	<0.500U	<0.500	19.6	<2.00U	2.27	98300	<1.00U	6.39	4.32	269	<100U	<0.100	5750	2600	5.15	1390	<0.500U	<0.500	3780	1070	<0.500	<2.00U	820
A68/CC48 50%	2530	<0.500U	<0.500	17.3	<2.00U	3.42	135000	<1.00U	12.1	24.9	371	179J	2.33	8030	3620	7.87	3300	1.68JB	<0.500	9320	1510	<0.500	<2.00U	1560
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																								
A68/M34/CC48 Control	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12600	<1.00U	<0.100	1.16	92	<100U	<0.100	14700	<2.00U	<0.500	2390	<0.500U	<0.500	26600	77.7	<0.500	<2.00U	<10.0U
A68/M34/CC48 4%	60.6	<0.500U	<0.500	23.2	<2.00U	1.30	68100	<1.00U	0.615	2.17	187	<100U	<0.100	4020	1760	0.875J	860J	1.46	<0.500	3180	707	<0.500	<2.00U	408
A68/M34/CC48 9%	40.8J	<0.500U	<0.500	23.2	<2.00U	1.22	71500	<1.00U	1.28	2.11	196	<100U	0.769	4280	1780	0.767J	923J	0.523J	<0.500	3180	741	<0.500	<2.00U	402
A68/M34/CC48 20%	31.6J	<0.500U	<0.500	22.9	<2.00U	1.32	78700	<1.00U	2.70	1.70	217	<100U	0.249	4890	1810	1.35	1100	0.706J	<0.500	3540	816	<0.500	<2.00U	413
A68/M34/CC48 40%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	1.71D	90400	<5.00U	5.62D	7.71D	250	<100U	0.587JD	5930	1890	4.93JD	1250	<2.50U	<2.50U	4040	943	<2.50U	<10.0U	572
A68/M34/CC48 65%	1460	<2.50U	<2.50U	<25.0U	<2.00U	2.01D	109000	<5.00U	9.06D	16.5D	302	1340	1.36D	7440	1980	6.24D	1800	3.35JD	<2.50U	4620	1130	<2.50U	<10.0U	815
A68/M34/CC48 85%	2400	<2.50U	<2.50U	<25.0U	<2.00U	2.26D	122000	<5.00U	12.7D	20.4D	341	2690	2.81D	8600	2080	6.32D	2680	3.54JD	<2.50U	9760	1270	<2.50U	<10.0U	921
Reference toxicity test																								
Control-Ref	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12700	<1.00U	<0.100	0.617J	93	<100U	<0.100	14800	<2.00U	<0.500	2550	<0.500U	<0.500	27100	78.1	<0.500	<2.00U	<10.0U
Ref 6.25%	<20.0U	<0.500U	1.82J	<5.00U	<2.00U	<0.100U	12600	<1.00U	<0.100	0.902J	92	101J	0.279	14800	<2.00U	<0.500	2550	<0.500U	<0.500	27200	78.1	<0.500	<2.00U	52.7
Ref 12.5%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	12700	<1.00U	<0.100	1.02	93	<100U	<0.100	14800	<2.00U	<0.500	2350	1.03J	<0.500	27000	77.9	<0.500	<2.00U	106
Ref 25%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13300	1.58J	<0.100	<0.500	94	<100U	<0.100	14800	<2.00U	<0.500	2540	<0.500U	<0.500	27100	78.3	<0.500	<2.00U	226
Ref 50%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13300	2.01	<0.100	0.657J	94	<100U	<0.100	14900	<2.00U	<0.500	3710	<0.500U	<0.500	27600	78.0	<0.500	<2.00U	440
Ref 100%	<20.0U	<0.500U	<0.500	<5.00U	<2.00U	<0.100U	13300	1.96J	<0.100	<0.500	94	<100U	<0.100	14700	<2.00U	<0.500	3550	0.921J	<0.500	27400	77.6	<0.500	<2.00U	882

Qualifiers:

D= Diluted sample
J= Estimated value
U= Non-detect

Prepared by: EC 3/8/13
Reviewed by: EB 3/13/13

Table 2.5-7 Initial and Final Total Recoverable Metals Results
November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Analytical Data (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of the Animas River, Mineral Creek, and Cement Creek Surface water samples																							
Profile Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13200	6.34JD	<0.500U	<2.50U	<100U	<0.500U	14000	<2.00U	<2.50U	2000	<2.50U	<2.50U	25200	76.8	<2.50U	<10.0U	<10.0U
A68	102	<2.50U	<2.50U	<25.0U	<2.00U	1.86D	64500	<5.00U	<0.500U	3.56JD	104J	8.37D	3610	1900	<2.50U	765J	<2.50U	<2.50U	2750	671	<2.50U	<10.0U	410
A72	3420	<2.50U	<2.50U	<25.0U	<2.00U	1.89D	106000	6.07JD	7.91D	18.6D	5920	5.78D	6770	1910	2.78JD	1080	<2.50U	<2.50U	3910	1100	<2.50U	<10.0U	850
CC48	8080D	<2.50U	2.73JD	<25.0U	<10.0U	5.58D	210000	5.11JD	25.2D	65.5D	16000D	16.2D	11900D	5550D	12.6D	2050JD	<2.50U	<2.50U	4880JD	2420D	<2.50U	<10.0U	2860D
M34	4560	<2.50U	<2.50U	<25.0U	<2.00U	0.914JD	98700	<5.00U	9.97D	7.33D	7080	3.24D	7750	590	<2.50U	856J	<2.50U	<2.50U	4390	931	<2.50U	<10.0U	220
Animas River surface water sample A72 serially diluted by Animas River surface water sample A68																							
A68/A72 control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	12800	5.76JD	<0.500U	<2.50U	<100U	2.88D	13900	<2.00U	<2.50U	2000	<2.50U	<2.50U	25200	76.2	<2.50U	<10.0U	<10.0U
A68/A72 5%	293	<2.50U	<2.50U	<25.0U	<2.00U	1.72D	66900	5.52JD	<0.500U	4.01JD	464	7.69D	3760	1900	<2.50U	706J	2.94JD	<2.50U	2780	702	<2.50U	<10.0U	432
A68/A72 10%	448	<2.50U	<2.50U	<25.0U	<2.00U	1.85D	68800	8.10JD	0.869JD	5.46D	727	4.16D	3900	1890	<2.50U	718J	<2.50U	<2.50U	2800	715	4.77JD	<10.0U	446
A68/A72 25%	873	<2.50U	<2.50U	<25.0U	<2.00U	2.07D	74900	5.05JD	2.20D	8.86D	1480	8.24D	4430	1920	<2.50U	799J	<2.50U	<2.50U	3070	794	<2.50U	<10.0U	526
A68/A72 50%	1330	<2.50U	<2.50U	<25.0U	<2.00U	2.21D	85600	5.37JD	4.09D	10.2D	2470	8.56D	5250	1900	<2.50U	871J	<2.50U	<2.50U	3370	891	<2.50U	<10.0U	620
A68/A72 75%	2380	<2.50U	<2.50U	<25.0U	<2.00U	1.96D	95100	5.21JD	6.32D	14.8D	4120	7.11D	6170	1920	<2.50U	988J	<2.50U	<2.50U	3830	1010	<2.50U	<10.0U	740
A68/A72 100%	3010	<2.50U	<2.50U	<25.0U	<2.00U	3.04D	105000	5.05JD	8.24D	18.8D	5330	10.6D	6850	1900	4.62JD	1120	<2.50U	<2.50U	3980	1120	<2.50U	<10.0U	842
Cement Creek surface wtaer sample CC48 serially diluted by Animas River surface water sample A68																							
A68/CC48 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	5.53JD	<0.500U	<2.50U	<100U	<0.500U	14100	<2.00U	<2.50U	2030	<2.50U	<2.50U	25500	77.0	<2.50U	<10.0U	<10.0U
A68/CC48 1%	168	<2.50U	<2.50U	<25.0U	<2.00U	1.89D	67000	6.87JD	<0.500U	3.67JD	216J	4.71D	3730	1950	<2.50U	717J	<2.50U	<2.50U	2780	697	<2.50U	<10.0U	427
A68/CC48 3%	322	<2.50U	<2.50U	<25.0U	<2.00U	1.40D	69000	<5.00U	0.670JD	4.06JD	473	1.66D	3840	1990	<2.50U	717J	5.18D	<2.50U	2800	731	<2.50U	<10.0U	472
A68/CC48 6%	555	<2.50U	<2.50U	<25.0U	<2.00U	1.72D	72600	6.22JD	1.66D	7.02D	850	2.20D	4070	2110	<2.50U	758J	<2.50U	<2.50U	2900	781	<2.50U	<10.0U	546
A68/CC48 12%	1010	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	80600	<5.00U	<0.500U	<2.50U	1600	<0.500U	4520	2300	<2.50U	820J	<2.50U	<2.50U	2950	876	<2.50U	<10.0U	672
A68/CC48 25%	2020	<2.50U	<2.50U	<25.0U	<2.00U	1.48D	98700	<5.00U	4.04D	11.8D	3500	2.86D	5600	2770	<2.50U	1000	<2.50U	<2.50U	3260	1100	<2.50U	<10.0U	981
A68/CC48 50%	3990	<2.50U	<2.50U	<25.0U	<2.00U	3.61D	133000	<5.00U	13.0D	33.6D	7400	8.55D	7630	3630	5.62D	1360	4.85JD	<2.50U	3840	1510	<2.50U	<10.0U	1550
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																							
A68/M34/CC48 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	7.52JD	<0.500U	<2.50U	<100U	<0.500U	13800	<2.00U	<2.50U	1980	<2.50U	<2.50U	24500	75.6	<2.50U	<10.0U	<10.0U
A68/M34/CC48 4%	314	<2.50U	<2.50U	<25.0U	<2.00U	1.42D	66800	6.39JD	0.573JD	4.13JD	465	1.75D	3770	1910	<2.50U	668J	<2.50U	<2.50U	2760	703	<2.50U	<10.0U	429
A68/M34/CC48 9%	588	<2.50U	<2.50U	<25.0U	<2.00U	1.46D	70200	5.44JD	1.32D	5.28D	904	2.37D	4010	1920	<2.50U	699J	<2.50U	<2.50U	2830	732	<2.50U	<10.0U	462
A68/M34/CC48 20%	1200	<2.50U	<2.50U	<25.0U	<2.00U	1.70D	76200	6.48JD	3.01D	8.36D	1930	2.61D	4600	1930	<2.50U	752J	<2.50U	<2.50U	3050	815	<2.50U	<10.0U	521
A68/M34/CC48 40%	2310	<2.50U	<2.50U	<25.0U	<2.00U	2.04D	90700	6.04JD	5.94D	13.0D	3720	4.36D	5630	2000	<2.50U	876J	<2.50U	<2.50U	3370	950	4.98JD	<10.0U	653
A68/M34/CC48 65%	3760	<2.50U	<2.50U	<25.0U	<2.00U	2.06D	107000	<5.00U	8.87D	16.6D	6620	5.78D	6960	2030	3.22JD	1010	<2.50U	<2.50U	3850	1130	<2.50U	<10.0U	805
A68/M34/CC48 85%	4950	<2.50U	<2.50U	<25.0U	<2.00U	2.45D	119000	<5.00U	12.3D	25.7D	8200	7.97D	7970	2050	4.39JD	1100	<2.50U	<2.50U	4230	1250	<2.50U	<10.0U	912
Reference toxicity test																							
Control-Ref	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	5.97JD	<0.500U	<2.50U	<100U	<0.500U	13900	<2.00U	<2.50U	1980	<2.50U	<2.50U	24700	76.0	<2.50U	<10.0U	<10.0U
Ref 6.25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13100	8.78JD	<0.500U	<2.50U	<100U	<0.500U	13900	<2.00U	<2.50U	2000	<2.50U	<2.50U	24800	75.8	<2.50U	<10.0U	55.8
Ref 12.5%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	6.03JD	<0.500U	<2.50U	<100U	<0.500U	13900	<2.00U	<2.50U	1980	<2.50U	<2.50U	25000	75.9	<2.50U	<10.0U	111
Ref 25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	8.12JD	<0.500U	<2.50U	<100U	<0.500U	13800	<2.00U	<2.50U	1970	<2.50U	<2.50U	24700	75.7	<2.50U	<10.0U	217
Ref 50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	7.31JD	<0.500U	<2.50U	<100U	<0.500U	13800	<2.00U	<2.50U	1980	<2.50U	<2.50U	24600	75.4	<2.50U	<10.0U	430
Ref 100%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13000	5.06JD	<0.500U	<2.50U	<100U	<0.500U	13900	<2.00U	<2.50U	1990	<2.50U	<2.50U	24900	75.8	<2.50U	<10.0U	872

Final Analytical Data (µg/L)

STATION_ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Vanadium	Zinc
Profile test of Animas River and Mineral Creek surface water samples																							
Profile Control	25.2J	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	10700	9.66JD	<0.500U	<2.50U	<100U	<0.500U	12700	<2.00U	<2.50U	2370	<2.50U	<2.50U	25000	70.1	<2.50U	<10.0U	<10.0U
A68	84.4	<2.50U	<2.50U	<25.0U	<2.00U	1.49D	60100	<5.00U	<0.500U	3.40JD	125J	1.85D	3470	1640	<2.50U	976J	<2.50U	<2.50U	2890	636	<2.50U	<10.0U	390
M34	396	<2.50U	<2.50U	<25.0U	<2.00U	0.968JD	94300	8.67JD	10.1D	<2.50U	4100	<0.500U	7940	584	3.01JD	4040	<2.50U	<2.50U	7300	952	<2.50U	<10.0U	212
Animas River surface water sample A72 serially diluted by Animas River surface water sample A68																							
A68/A72 control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	10700	9.90JD	<0.500U	<2.50U	<100U	<0.500U	12800	<2.00U	<2.50U	2360	<2.50U	<2.50U	24900	69.9	<2.50U	<10.0U	<10.0U
A68/A72 5%	168	<2.50U	<2.50U	<25.0U	<2.00U	1.41D	60000	7.65JD	<0.500U	4.11JD	226J	1.72D	3590	1750	<2.50U	857J	<2.50U	<2.50U	2900	657	<2.50U	<10.0U	362
A68/A72 10%	323	<2.50U	<2.50U	<25.0U	<2.00U	1.58D	65500	11.2D	0.857JD	5.24D	503	2.82D	3830	1810	3.30JD	894J	<2.50U	<2.50U	2930	702	4.01JD	<10.0U	402
A68/A72 25%	597	<2.50U	<2.50U	<25.0U	<2.00U	1.60D	70500	6.50JD	2.21D	6.30D	911	3.39D	4370	1840	<2.50U	990J	<2.50U	<2.50U	3160	776	<2.50U	<10.0U	455
A68/A72 50%	830	<2.50U	<2.50U	<25.0U	<2.00U	1.67D	78100	7.70JD	3.85D	7.39D	1310	3.01D	5060	1800	<2.50U	1150	<2.50U	<2.50U	3460	859	<2.50U	<10.0U	525
A68/A72 75%	1450	<2.50U	<2.50U	<25.0U	<2.00U	1.99D	92300	7.30JD	6.33D	9.86D	2380	3.63D	6150	1870	3.02JD	1440	<2.50U	<2.50U	4460	1020	<2.50U	<10.0U	682
A68/A72 100%	1320	<2.50U	<2.50U	<25.0U	<2.00U	2.19D	100000	7.19JD	8.66D	16.7D	1110	1.32D	6780	1840	5.15D	1890	<2.50U	<2.50U	4590	1100	<2.50U	<10.0U	779
Cement Creek surface wtaer sample CC48 serially diluted by Animas River surface water sample A68																							
A68/CC48 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	11000	8.94JD	<0.500U	<2.50U	<100U	<0.500U	12900	2.02J	<2.50U	2330	<2.50U	<2.50U	25100	71.4	<2.50U	<10.0U	<10.0U
A68/CC48 1%	144	<2.50U	<2.50U	<25.0U	<2.00U	1.32D	61600	8.26JD	<0.500U	3.13JD	143J	1.58D	3660	1830	<2.50U	996J	<2.50U	<2.50U	3130	680	<2.50U	<10.0U	377
A68/CC48 3%	255	<2.50U	<2.50U	<25.0U	<2.00U	1.51D	67000	6.18JD	0.815JD	4.59JD	318	2.19D	3890	1880	<2.50U	922J	<2.50U	<2.50U	3020	740	<2.50U	<10.0U	453
A68/CC48 6%	445	<2.50U	<2.50U	<25.0U	<2.00U	1.45D	70900	7.86JD	1.29D	5.50D	591	2.90D	4130	1930	<2.50U	1050	<2.50U	<2.50U	3090	780	<2.50U	<10.0U	509
A68/CC48 12%	719	<2.50U	<2.50U	<25.0U	<2.00U	1.77D	77000	8.62JD	2.86D	8.47D	825	4.03D	4540	2110	<2.50U	1080	<2.50U	<2.50U	3230	875	<2.50U	<10.0U	623
A68/CC48 25%	990	<2.50U	<2.50U	<25.0U	<2.00U	2.33D	92600	8.49JD	6.01D	10.9D	1300	3.42D	5490	2540	3.68JD	1380	<2.50U	<2.50U	3670	1070	<2.50U	<10.0U	847
A68/CC48 50%	2560	<2.50U	<2.50U	<25.0U	<2.00U	3.53D	130000	7.28JD	12.4D	26.8D	201J	2.62D	7770	3580	7.52D	3270	<2.50U	<2.50U	9100	1540	<2.50U	<10.0U	1450
Combined sample M34/CC48 serially diluted by Animas River surface water sample A68																							
A68/M34/CC48 Control	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	12000	8.44JD	<0.500U	<2.50U	<100U	<0.500U	14200	<2.00U	<2.50U	2460	<2.50U	<2.50U	26700	78.4	<2.50U	<10.0U	<10.0U
A68/M34/CC48 4%	229	<2.50U	<2.50U	<25.0U	<2.00U	1.40D	60800	7.94JD	<0.500U	3.52JD	290	1.98D	3620	1630	<2.50U	849J	<2.50U	<2.50U	3010	666	4.26JD	<10.0U	390
A68/M34/CC48 9%	391	<2.50U	<2.50U	<25.0U	<2.00U	1.25D	63600	7.62JD	1.17D	3.81JD	476	1.87D	3870	1660	<2.50U	912J	<2.50U	<2.50U	3020	701	<2.50U	<10.0U	414
A68/M34/CC48 20%	805	<2.50U	<2.50U	<25.0U	<2.00U	1.39D	70500	6.91JD	2.92D	6.84D	967	2.65D	4470	1690	<2.50U	1080	<2.50U	<2.50U	3390	783	<2.50U	<10.0U	468
A68/M34/CC48 40%	1560	<2.50U	<2.50U	<25.0U	<2.00U	1.75D	84600	6.39JD	5.60D	11.7D	1970	7.59D	5590	1830	3.33JD	1240	<2.50U	<2.50U	3940	934	<2.50U	<10.0U	613
A68/M34/CC48 65%	2510	<2.50U	<2.50U	<25.0U	<2.00U	1.87D	100000	7.11JD	9.88D	16.7D	3370	3.46D	6900	1870	5.99D	1710	<2.50U	<2.50U	4400	1110	<2.50U	<10.0U	735
A68/M34/CC48 85%	2830	<2.50U	<2.50U	<25.0U	<2.00U	2.29D	117000	7.09JD	11.7D	18.7D	3300	3.98D	8380	2040	5.60D	2690	<2.50U	<2.50U	9690	1300	<2.50U	<10.0U	863
Reference toxicity test																							
Control-Ref	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	11800	11.6D	<0.500U	<2.50U	<100U	<0.500U	14000	<2.00U	<2.50U	2540	<2.50U	<2.50U	26600	76.3	<2.50U	<10.0U	<10.0U
Ref 6.25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	11700	8.27JD	<0.500U	<2.50U	<100U	<0.500U	13900	<2.00U	<2.50U	2500	<2.50U	<2.50U	26300	76.3	<2.50U	<10.0U	47.6
Ref 12.5%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	11400	6.26JD	<0.500U	<2.50U	<100U	<0.500U	13500	<2.00U	<2.50U	2280	<2.50U	<2.50U	25600	74.1	<2.50U	<10.0U	94.0
Ref 25%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	12700	8.25JD	<0.500U	<2.50U	<100U	<0.500U	14400	<2.00U	<2.50U	2620	<2.50U	<2.50U	26800	79.6	<2.50U	<10.0U	206
Ref 50%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	13300	9.99JD	<0.500U	<2.50U	<100U	<0.500U	15000	<2.00U	<2.50U	3800	<2.50U	<2.50U	28100	80.5	<2.50U	<10.0U	403
Ref 100%	<20.0U	<2.50U	<2.50U	<25.0U	<2.00U	<0.500U	12700	9.91JD	<0.500U	<2.50U	<100U	<0.500U	14400	<2.00U	<2.50U	3560	<2.50U	<2.50U	27200	79.5	<2.50U	<10.0U	794

Qualifiers:
D= Diluted sample
J= Estimated value
U= Non-detect

Prepared by: EC 3/8/13
Reviewed by: EB 3/13/13

Table 2.5-8 Initial and Final Wet Chemistry Results
November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile *O.mykiss*

Initial Wet Chemistry (mg/L)

STATION_ID	Chloride	Fluoride	Nitrate/Nitrite as N	Sulfate as SO4	Dissolved Organic Carbon	Total Alkalinity (mg CaCO3/L)
Profile test of the Animas River, Mineral Creek, and Cement Creek surface water samples						
Profile Control	2.3	<0.1U	<0.2U	86.6	<1.0U	55.2
A68	1.2J	0.5	<0.2U	150	<1.0U	37.6
A72	<10.0U	1.7JD	<2.0U	286D	<1.0U	<5.00U
CC48	<10.0U	1.7JD	<2.0U	594D	<1.0U	<5.00U
M34	22.9D	<1.0U	<2.0U	856D	<1.0U	<5.00U
Animas River surface water sample A72 serially diluted by Animas River surface water sample A68						
A68/A72 control	2.3	<0.1U	<0.2U	85.6	<1.0U	63.1
A68/A72 5%	1.2J	0.4	<0.2U	147	<1.0U	38.5
A68/A72 10%	1.3J	0.5	<0.2U	166	<1.0U	29.9
A68/A72 25%	1.2J	0.4	<0.2U	160	<1.0U	25.9
A68/A72 50%	1.5J	0.6	<0.2U	227	<1.0U	16.6
A68/A72 75%	<10.0U	<1.0U	<2.0U	264D	<1.0U	<5.00U
A68/A72 100%	<10.0U	2.4D	<2.0U	281D	<1.0U	<5.00U
Cement Creek surface water sample CC48 serially diluted by Animas River surface water sample A68						
A68/CC48 Control	2.3	<0.1U	<0.2U	85.9	<1.0U	62.4
A68/CC48 1%	1.2J	0.5	<0.2U	154	<1.0U	33.1
A68/CC48 3%	1.2J	0.5	<0.2U	165	<1.0U	35.9
A68/CC48 6%	1.2J	0.6	<0.2U	179	<1.0U	29.1
A68/CC48 12%	1.2J	0.6	<0.2U	223	<1.0U	22.4
A68/CC48 25%	<10.0U	1.4JD	<2.0U	254D	<1.0U	10.2
A68/CC48 50%	<10.0U	2.1D	<2.0U	364D	<1.0U	<5.00U
Combined sample M34/CC48 serially diluted by Animas River surface water samples A68						
A68/M34/CC48 Control	2.3	<0.1U	<0.2U	85.5	<1.0U	54.8
A68/M34/CC48 4%	1.2J	0.5	<0.2U	160	<1.0U	34.9
A68/M34/CC48 9%	1.2J	0.5	<0.2U	172	<1.0U	28.2
A68/M34/CC48 20%	1.3J	0.5	<0.2U	201	<1.0U	25.2
A68/M34/CC48 40%	<10.0U	<1.0U	<2.0U	268D	<1.0U	10.8
A68/M34/CC48 65%	<10.0U	3.4D	<2.0U	293D	<1.0U	<5.00U
A68/M34/CC48 85%	<10.0U	<1.0U	<2.0U	334D	<1.0U	<5.00U
Reference toxicity test						
Control-Ref	<1.0U	0.2	<0.2U	27.0	<1.0U	61.9
Ref 6.25%	2.3	<0.1U	<0.2U	85.5	<1.0U	58.9
Ref 12.5%	2.3	<0.1U	<0.2U	85.6	<1.0U	61.4
Ref 25%	2.4	<0.1U	<0.2U	97.0	<1.0U	58.2
Ref 50%	2.3	<0.1U	<0.2U	85.7	<1.0U	57.7
Ref 100%	2.2	<0.1U	<0.2U	85.5	<1.0U	60.5

Final Wet Chemistry (mg/L)

STATION_ID	Chloride	Fluoride	Nitrate/Nitrite as N	Sulfate as SO4	Dissolved Organic Carbon	Total Alkalinity (mg CaCO3/L)
Profile test of the Animas River and Mineral Creek						
Profile Control	2.6	<0.1U	<0.2U	87.2	1.5	65.8
A68	1.4J	0.5	<0.2U	147	1.9	47.0J
M34	25.5D	<1.0U	<0.2U	871D	6.6	8.16
Animas River surface water sample A72 serially diluted by Animas River surface water sample A68						
A68/A72 control	2.7	<0.1U	<0.2U	87.8	1.7	72.9
A68/A72 5%	1.3J	0.5	<0.2U	159	1.5	39.2
A68/A72 10%	1.4J	0.5	<0.2U	166	1.5	33.8
A68/A72 25%	1.4J	0.5	<0.2U	189	1.8	33.4
A68/A72 50%	1.5J	0.5	<0.2U	229	1.7	17.5
A68/A72 75%	<10.0U	<1.0U	<2.0U	251D	1.4	7.50
A68/A72 100%	<10.0U	<1.0U	<2.0U	287D	2.3	<5.00U
Cement Creek surface water sample CC48 serially diluted by Animas River surface water sample A68						
A68/CC48 Control	2.6	<0.1U	<0.2U	87.6	1.6	68.7
A68/CC48 1%	1.4J	0.5	<0.2U	155	1.7	39.4
A68/CC48 3%	1.3J	0.5	<0.2U	164	1.1	36.2
A68/CC48 6%	1.3J	0.5	<0.2U	178	1.4	36.8
A68/CC48 12%	1.4J	0.6	<0.2U	209	1.7	32.0
A68/CC48 25%	<10.0U	<1.0U	<2.0U	248D	1.6	13.4
A68/CC48 50%	13.0JD	<1.0U	<2.0U	358D	2.5	<5.00U
Combined sample M34/CC48 serially diluted by Animas River surface water samples A68						
A68/M34/CC48 Control	2.5	<0.1U	<0.2U	87.7	1.6	63.4
A68/M34/CC48 4%	1.4J	0.5	<0.2U	158	1.7	40.8
A68/M34/CC48 9%	1.4J	0.5	<0.2U	171	1.4	38.9
A68/M34/CC48 20%	1.5J	0.5	<0.2U	199	1.8	26.0
A68/M34/CC48 40%	1.7J	0.5	<0.2U	247	1.6	12.5
A68/M34/CC48 65%	<10.0U	<1.0U	<2.0U	294D	2.4	<5.00U
A68/M34/CC48 85%	13.3JD	<1.0U	<2.0U	338D	3.1	<5.00U
Reference toxicity test						
Control-Ref	2.5	<0.1U	<0.2U	86.7	1.5	70.5
Ref 6.25%	2.5	<0.1U	<0.2U	87.3	1.6	63.4
Ref 12.5%	2.2	<0.1U	<0.2U	87.1	1.1	63.6
Ref 25%	2.6	<0.1U	<0.2U	86.3	1.1	60.4
Ref 50%	3.6	<0.1U	<0.2U	87.5	2.9	61.8
Ref 100%	3.5	<0.1U	<0.2U	87.5	3.3	56.2

Qualifiers:
D= Diluted sample
J= Estimated value
U= Non-detect

Prepared by: EC 3/8/13
Reviewed by: EB 3/13/13

Table 2.5-9a: Initial and Final Average Ammonia Results for November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile O.mykiss

Replicate ID	Day 0 Measured Ammonia Conc. (mg N/L)	Day 0 Measured pH	Day 0 Average Measured Ammonia Conc. (mg N/L)	Day 0 Average Measured pH	Day 0 Ammonia Criterion (mg N/L)[a]	Day 4 Measured Ammonia Conc. (mg N/L)[b]	Day 4 Measured pH[b]	Day 4 Average Measured Ammonia Conc. (mg N/L)	Day 4 Average Measured pH	Day 4 Ammonia Criterion (mg N/L)[a]
PROFILE TEST										
Profile Control -01	0.09915	7.6	0.0938	7.63	10.92	1.0820	7.5	1.1470	7.50	13.33
Profile Control -02	0.09042	7.6				1.1090	7.5			
Profile Control -03	0.09398	7.6				1.1560	7.5			
Profile Control -04	0.09148	7.7				1.2410	7.5			
M34-01	0.10580	5.5	0.0931	5.45	38.33	1.5840	6.9	1.2936	6.58	31.60
M34-02	0.08369	5.5				1.6090	6.6			
M34-03	0.09395	5.4				0.1302	6.4			
M34-04	0.08881	5.4				1.8510	6.5			
A68-01	0.07452	7.4	0.0734	7.40	15.34	0.9252	6.3	1.1336	6.53	32.26
A68-02	0.07001	7.4				1.2240	6.6			
A68-03	0.07439	7.4				1.1930	6.6			
A68-04	0.07466	7.4				1.1920	6.6			
SERIAL DILUTION OF SAMPLE A72 WITH A68 AS THE DILUENT										
A68/A72-Control-01	0.04135	7.4	0.0440	7.35	16.41	1.1260	7.1	1.2693	7.07	22.55
A68/A72-Control-02	0.04542	7.4				1.2280	7.1			
A68/A72-Control-03	0.04386	7.3				1.3020	7.1			
A68/A72-Control-04	0.04523	7.3				1.4210	7.1			
A68/A72-5%-01	0.04698	7.8	0.0476	7.80	8.11	1.2880	6.9	1.1100	6.93	25.55
A68/A72-5%-02	0.04922	7.8				1.0150	7.0			
A68/A72-5%-03	0.04737	7.8				1.1230	6.9			
A68/A72-5%-04	0.04678	7.8				1.0140	7.0			
A68/A72 10% -01	0.04988	7.7	0.0372	7.63	10.92	0.9636	6.9	0.9880	6.95	25.19
A68/A72 10% -02	ND	7.6				0.9351	7.0			
A68/A72 10% -03	0.04844	7.6				0.9634	7.0			
A68/A72 10% -04	0.05062	7.6				1.0900	6.9			
A68/A72 25% -01	0.05549	7.5	0.0544	7.43	14.81	0.9789	6.9	1.2147	6.92	25.70
A68/A72 25% -02	0.05454	7.4				1.2540	6.9			
A68/A72 25% -03	0.05449	7.4				1.3120	6.9			
A68/A72 25% -04	0.05306	7.4				1.3140	6.9			
A68/A72 50% -01	0.05491	7.2	0.0551	7.15	20.84	1.2970	6.9	1.2483	6.89	26.35
A68/A72 50% -02	0.05637	7.2				1.3870	6.9			
A68/A72 50% -03	0.05432	7.1				1.1950	6.9			
A68/A72 50% -04	0.05488	7.1				1.1140	6.9			
A68/A72 75% -01	0.06126	6.7	0.0606	6.50	32.61	1.3580	6.9	1.5163	6.81	27.91
A68/A72 75% -02	0.06013	6.5				1.5560	6.8			
A68/A72 75% -03	0.05979	6.4				1.6440	6.8			
A68/A72 75% -04	0.06129	6.4				1.5070	6.8			
A68/A72 100% -01	0.06464	5.6	0.0636	5.60	38.06	0.3088	6.2	0.5028	5.91	37.12
A68/A72 100% -02	0.06302	5.6				0.6791	6.0			
A68/A72 100% -03	0.06331	5.6				0.6192	5.8			
A68/A72 100% -04	0.06358	5.6				0.4039	5.6			
SERIAL DILUTION OF SAMPLE CC48 WITH A68 AS THE DILUENT										
A68/CC48 Control-01	0.08444	7.6	0.0904	7.65	10.49	1.1240	7.2	1.2055	7.31	17.40
A68/CC48 Control-02	0.08753	7.6				1.0750	7.4			
A68/CC48 Control-03	0.09032	7.7				1.2050	7.4			
A68/CC48 Control-04	0.09938	7.7				1.4180	7.2			
A68/CC48 1% -01	0.09961	7.6	0.1049	7.50	13.28	1.3070	7.1	1.2458	7.09	22.11
A68/CC48 1% -02	0.10530	7.5				1.5330	7.1			
A68/CC48 1% -03	0.11370	7.5				1.2920	7.1			
A68/CC48 1% -04	0.10080	7.4				0.8512	7.1			
A68/CC48 3% -01	0.11190	7.4	0.1115	7.40	15.34	1.2220	7.1	1.2065	7.10	21.94
A68/CC48 3% -02	0.10720	7.4				1.3410	7.1			
A68/CC48 3% -03	0.10940	7.4				1.0690	7.1			
A68/CC48 3% -04	0.11750	7.4				1.1940	7.1			
A68/CC48 6% -01	0.12730	7.4	0.1213	7.30	17.51	1.0900	7.1	1.3280	7.09	22.27
A68/CC48 6% -02	0.10770	7.3				1.4650	7.1			
A68/CC48 6% -03	0.11730	7.2				1.1930	7.1			
A68/CC48 6% -04	0.13300	7.3				1.5640	7.1			
A68/CC48 12% -01	0.12320	7.1	0.1320	7.08	22.49	1.0650	7.1	1.2238	7.06	22.93
A68/CC48 12% -02	0.12810	7.1				1.5190	7.1			
A68/CC48 12% -03	0.13000	7.1				1.2540	7.1			
A68/CC48 12% -04	0.14660	7.0				1.0570	7.0			
A68/CC48 25% -01	0.12710	6.4	0.1340	6.28	34.92	0.7729	7.0	1.3542	6.96	24.94
A68/CC48 25% -02	0.13970	6.3				1.5710	7.0			
A68/CC48 25% -03	0.13020	6.2				1.4080	7.0			
A68/CC48 25% -04	0.13910	6.2				1.6650	6.9			
A68/CC48 50% -01	0.11610	4.8	0.1217	4.80	38.85	1.7450	5.2	1.9440	5.20	38.62
A68/CC48 50% -02	0.12460	4.8				1.8930	5.2			
A68/CC48 50% -03	0.11380	4.8				1.9700	5.2			
A68/CC48 50% -04	0.13210	4.8				2.1680	5.2			

Table 2.5-9a: Initial and Final Average Ammonia Results for November 2012 Upper Animas River Surface Water Toxicity Test Using Juvenile O.mykiss

Replicate ID	Day 0 Measured Ammonia Conc. (mg N/L)	Day 0 Measured pH	Day 0 Average Measured Ammonia Conc. (mg N/L)	Day 0 Average Measured pH	Day 0 Ammonia Criterion (mg N/L)[a]	Day 4 Measured Ammonia Conc. (mg N/L)[b]	Day 4 Measured pH[b]	Day 4 Average Measured Ammonia Conc. (mg N/L)	Day 4 Average Measured pH	Day 4 Ammonia Criterion (mg N/L)[a]
SERIAL DILUTION OF SAMPLE M34/CC48 WITH A68 AS THE DILUTENT										
A68/M34/CC48 Control -01	0.04273	7.7	0.0421	7.63	10.92	1.0710	7.3	1.1590	7.35	16.36
A68/M34/CC48 Control -02	0.04165	7.6				1.3430	7.4			
A68/M34/CC48 Control -03	0.04259	7.6				1.1660	7.4			
A68/M34/CC48 Control -04	0.04136	7.6				1.0560	7.4			
A68/M34/CC48 4% -01	0.04308	7.4	0.0434	7.40	15.34	1.1190	7.1	1.2160	7.07	22.60
A68/M34/CC48 4% -02	0.04428	7.4				1.0230	7.1			
A68/M34/CC48 4% -03	0.04365	7.4				1.4570	7.1			
A68/M34/CC48 4% -04	0.04270	7.4				1.2650	7.1			
A68/M34/CC48 9% -01	0.04428	7.4	0.0445	7.33	16.96	1.1650	7.1	1.1380	7.08	22.33
A68/M34/CC48 9% -02	0.04636	7.3				1.2340	7.1			
A68/M34/CC48 9% -03	0.04378	7.3				0.9838	7.1			
A68/M34/CC48 9% -04	0.04353	7.3				1.1690	7.1			
A68/M34/CC48 20% -01	0.04468	7.3	0.0439	7.25	18.61	1.1900	7.1	1.1478	7.08	22.49
A68/M34/CC48 20% -02	0.04355	7.3				1.1460	7.1			
A68/M34/CC48 20% -03	0.04479	7.2				1.1490	7.1			
A68/M34/CC48 20% -04	0.04263	7.2				1.1060	7.1			
A68/M34/CC48 40% -01	0.04493	7.1	0.0448	7.08	22.49	1.4140	7.0	1.4218	6.99	24.26
A68/M34/CC48 40% -02	0.04445	7.1				1.4350	7.0			
A68/M34/CC48 40% -03	0.04535	7.1				1.2290	7.0			
A68/M34/CC48 40% -04	0.04454	7.0				1.6090	7.0			
A68/M34/CC48 65% -01	0.04417	5.7	0.0448	5.63	38.01	0.2124	6.5	0.3039	6.10	36.20
A68/M34/CC48 65% -02	0.04407	5.6				0.1931	6.4			
A68/M34/CC48 65% -03	0.04552	5.6				0.3011	5.8			
A68/M34/CC48 65% -04	0.04535	5.6				0.5090	5.6			
A68/M34/CC48 85% -01	0.04524	4.8	0.0461	4.75	38.86	1.7680	5.1	1.7890	5.10	38.70
A68/M34/CC48 85% -02	0.04522	4.8				1.7120	5.1			
A68/M34/CC48 85% -03	0.04697	4.7				2.0110	5.1			
A68/M34/CC48 85% -04	0.04696	4.7				1.6650	5.1			

[a]The sample-specific acute ammonia criterion was calculated using the "salmon present" formula on p. 54 of the Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 31: The Basic Standards and Methodologies for Surface Water (5 CCR 1002-31).

[b]Values shown are either the measurements made at the end of the test (day 4) or earlier if all test organisms died before the 4-day exposure period was completed.

Prepared by: EC 3/7/13

Reviewed by: EB 3/13/13

Table 2.5-9b Initial and Final Average Ammonia Results for November 2012 Upper Animas River Concurrent Reference Toxicity Toxicity Test Using Juvenile *O.mykiss*

Replicate ID	Initial (Day 0) Measured Ammonia Conc. (mg N/L)[a]	Initial (Day 0) Measured pH	Initial (Day 0) Average Measured Ammonia Conc. (mg N/L)	Initial (Day 0) Average Measured pH	Initial (Day 0) Ammonia Criterion (mg N/L)[a]	Final Measured Ammonia Conc. (mg N/L)	Final Measured pH	Final Average Measured Ammonia Conc. (mg N/L)	Final Average Measured pH	Final Ammonia Criterion (mg N/L)[a]
Ref Control-01	0.04525	8.00	0.0431	8.00	5.62	1.0190	7.47	1.0740	7.46	14.04
Ref Control-02	0.04274	8.00				1.1450	7.47			
Ref Control-03	0.04226	8.00				1.0550	7.46			
Ref Control-04	0.04211	8.00				1.0770	7.45			
6.25%-01	0.04487	8.00	0.0429	8.05	5.11	1.1310	7.46	1.1548	7.46	14.14
6.25%-02	0.04148	8.10				1.2320	7.46			
6.25%-03	0.04279	8.00				1.2320	7.46			
6.25%-04	0.04244	8.10				1.0240	7.45			
12.5%-01	0.04344	8.00	0.0434	8.08	4.87	0.6100	7.46	0.9802	7.45	14.40
12.5%-02	0.04696	8.00				1.2480	7.46			
12.5%-03	0.04195	8.20				1.1050	7.43			
12.5%-04	0.04107	8.10				0.9578	7.43			
25%-01	0.04180	8.00	0.0422	8.00	5.62	1.5420	7.20	0.4968	7.28	18.00
25%-02	0.04242	8.00				0.1751	7.30			
25%-03	0.04186	8.00				0.1281	7.31			
25%-04	0.04271	8.00				0.1420	7.30			
50%-01	0.04197	8.00	0.0428	8.03	5.36	0.9176	7.24	0.9436	7.26	18.34
50%-02	0.04282	8.00				1.2000	7.25			
50%-03	0.04278	8.10				0.9934	7.27			
50%-04	0.04359	8.00				0.6633	7.29			
100%-01	0.04281	8.00	0.0425	8.00	5.62	0.4526	6.50	0.4550	6.73	29.35
100%-02	0.04205	8.00				0.4628	6.60			
100%-03	0.04292	8.00				0.3182	6.90			
100%-04	0.04216	8.00				0.5862	6.90			

[a] The sample-specific acute ammonia criterion was calculated using the "salmon present" formula on p. 54 of the Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 31: The Basic Standards and Methodologies for Surface Water (5 CCR 1002-31).

[b]Values shown are either the measurements made at the end of the test (day 4) or earlier if all test organisms died before the 4-day exposure period was completed.

Prepared by: EC 3/7/13
Reviewed by: EB 3/13/13

Figures

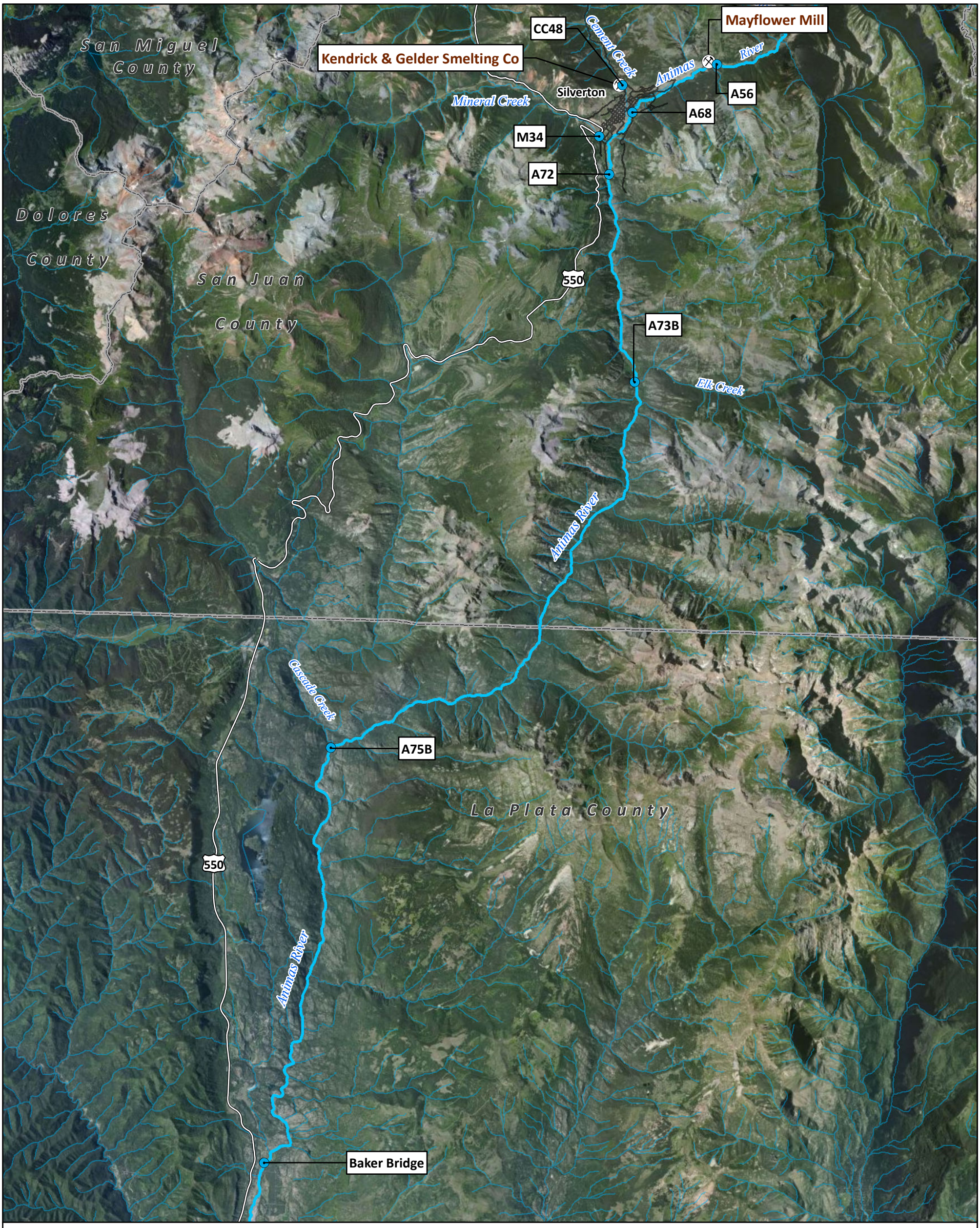


Figure 2.1-1
Upper Animas Mining District
2012 Surface Water Toxicity Test

Sample Locations

Mine Locations

Rivers and Streams

Roads

County Boundaries

Date: July 15, 2013

Data Sources:
Sample Locations: U.S. EPA Region 8 and UOS (2013)
Mine Locations: U.S. EPA and ESAT (2012)
Roads: Navteq (2011)
Rivers and Streams: CDOW 1:24k (2004)
County Boundaries: U.S. Census Bureau (2011)
Image: Bing (2013)

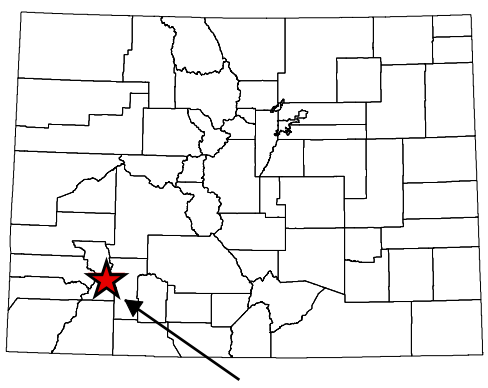
Coordinate System/Projection:
UTM Zone 13 North, NAD 83, Meters

N W E S

0 1 2 Miles

0 1 2 Kilometers

Colorado



Area of Interest

Figure 3.1-1
October 2012 Upper Animas River
Acute Surface Water Toxicity Test Using *O. mykiss*
Average Percent Survival + Percent SD per Location

* = Samples are statistically different when compared to their corresponding control

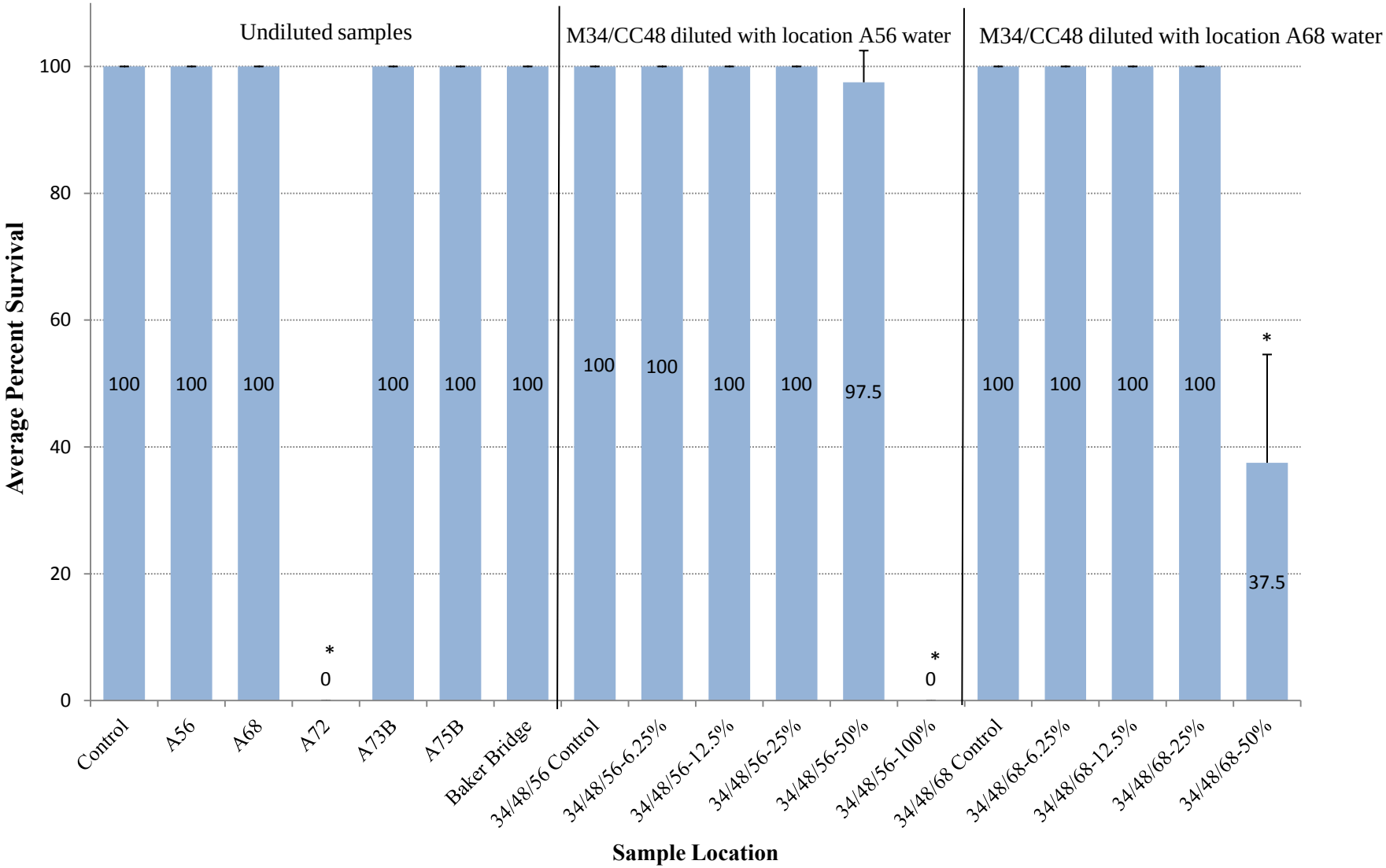


Figure 3.2-1
October 2012 Acute Reference Toxicity Test Using *O. mykiss* and Zinc Sulfate ($ZnSO_4$)
Average Percent Survival + Percent SD per Zinc Concentration

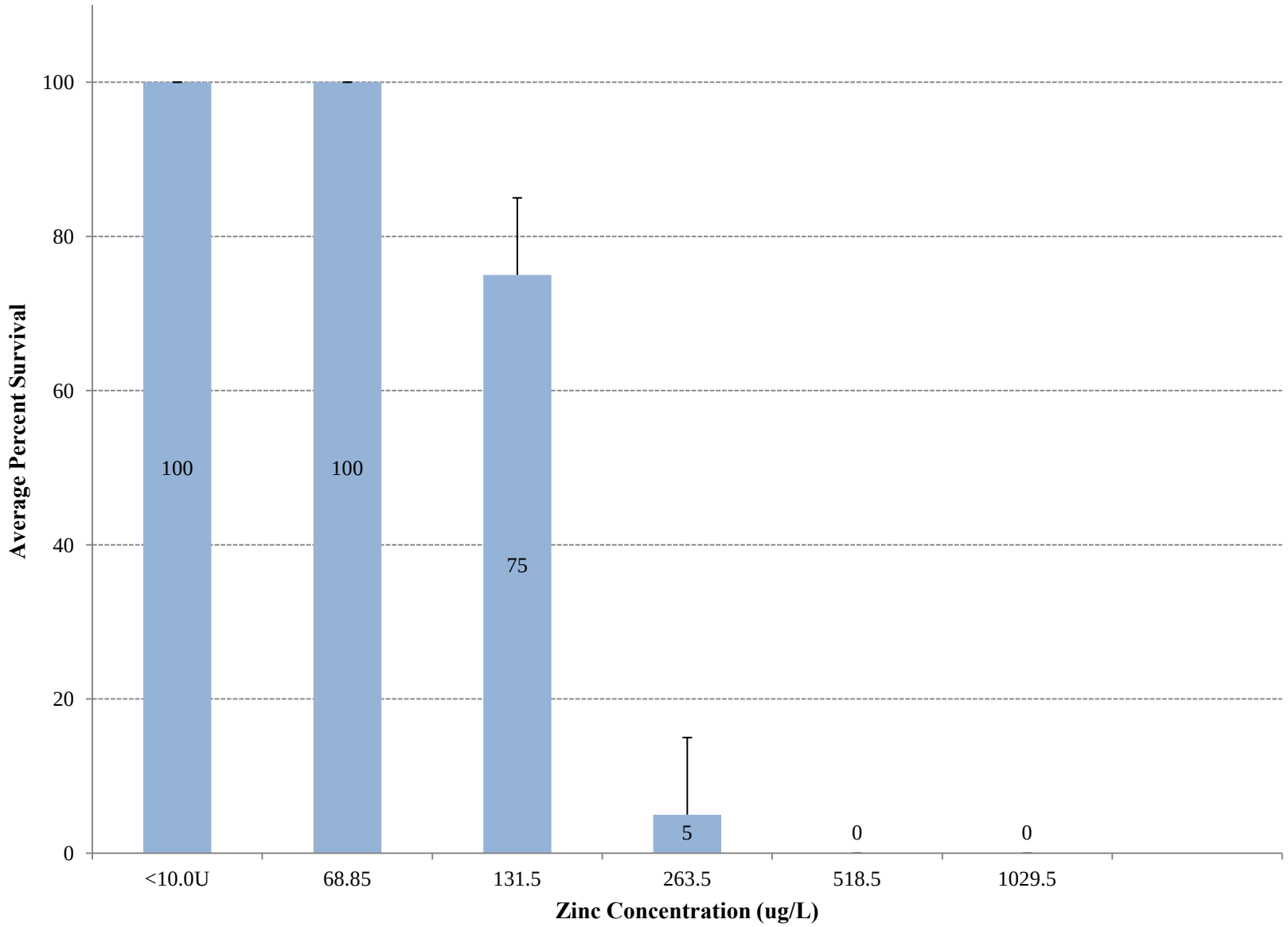


Figure 3.3-1
November 2012 Upper Animas River
Acute Surface Water Toxicity Test Using *O. mykiss*
Average Percent Survival + Percent SD per Location

* = Samples are statistically different when compared to the corresponding control.

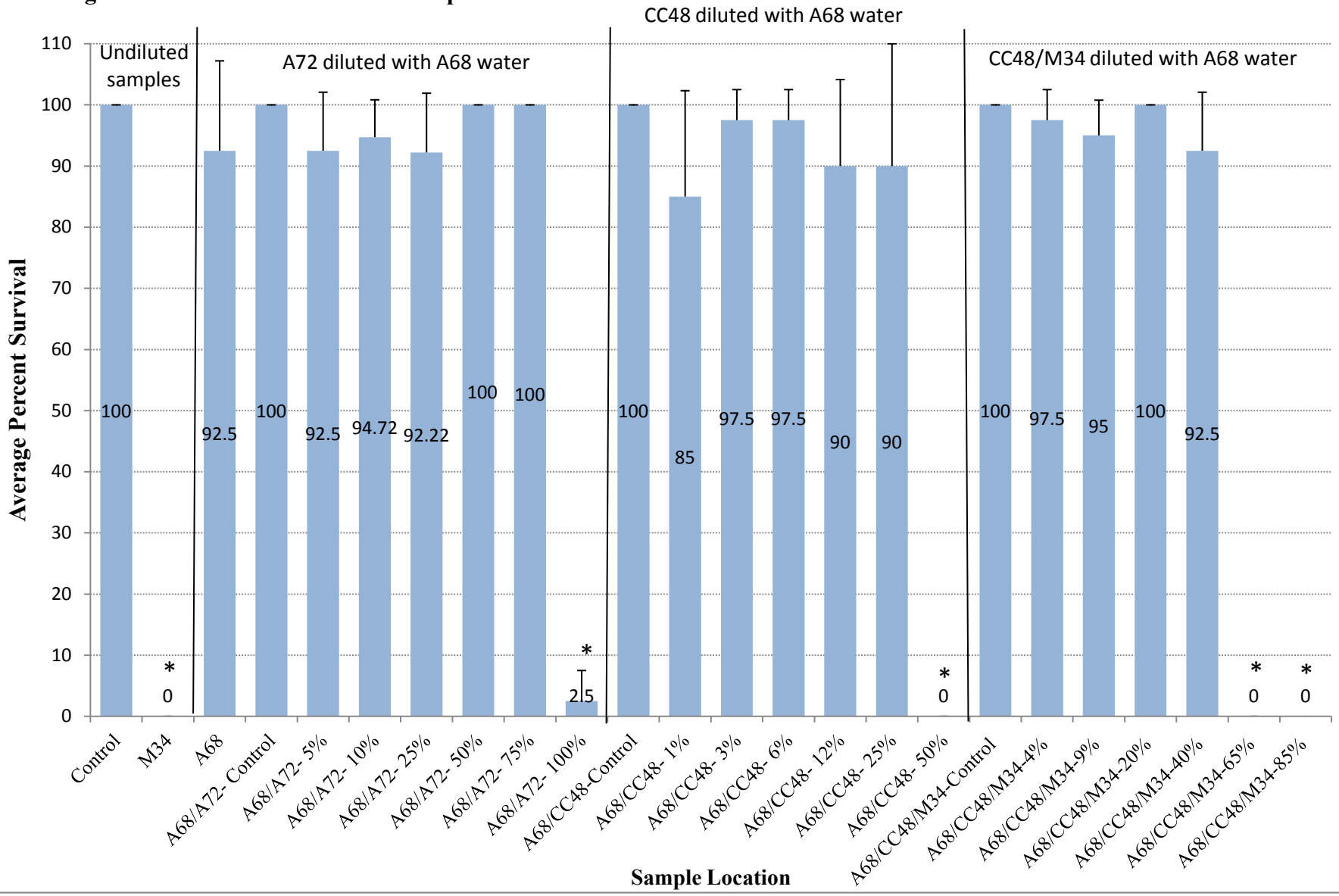


Figure 3.4-1
November 2012 Acute Reference Toxicity Test Using *O. mykiss* and Zinc Sulfate ($ZnSO_4$)
Average Percent Survival + Percent SD per Zinc Concentration

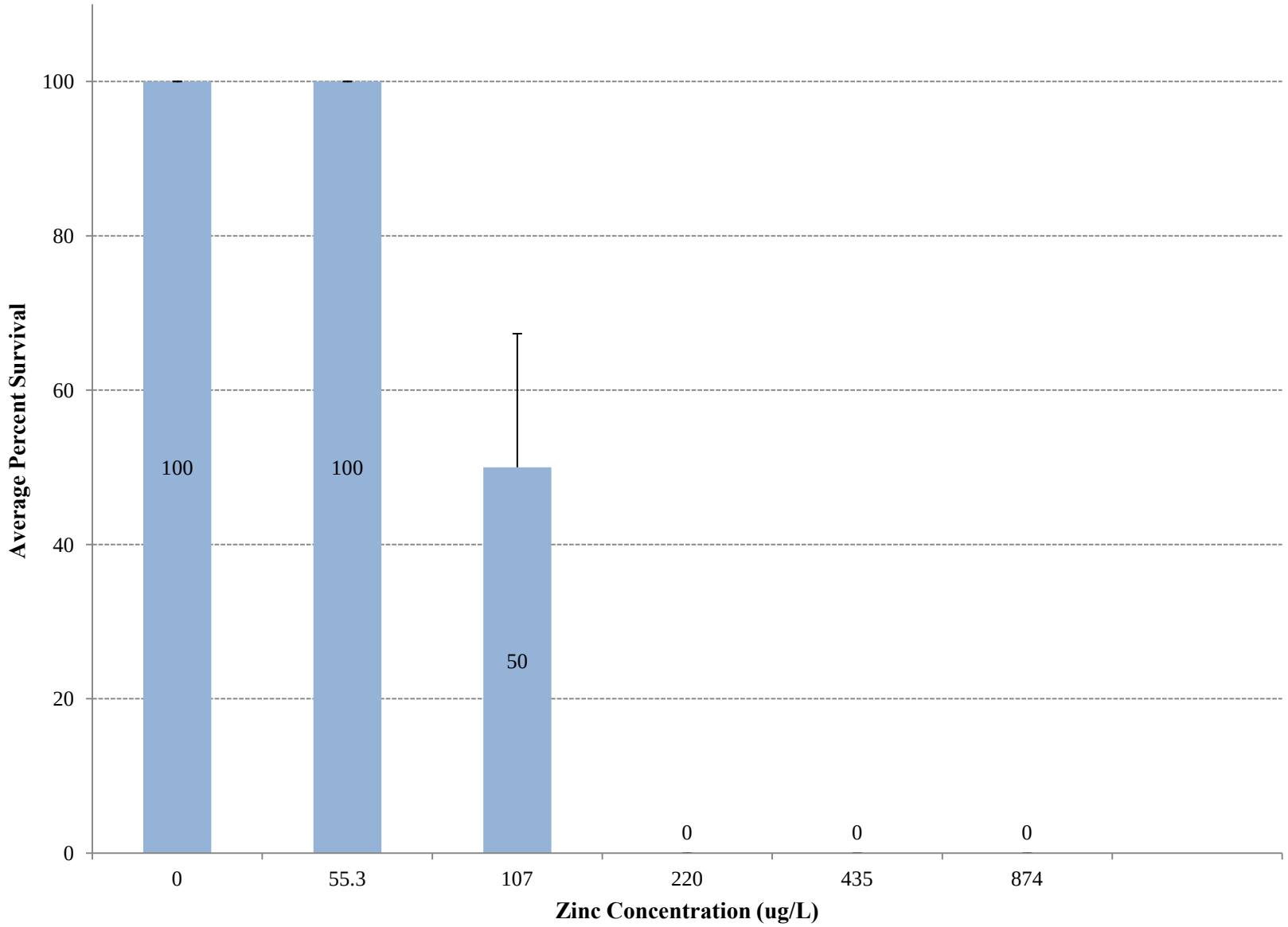
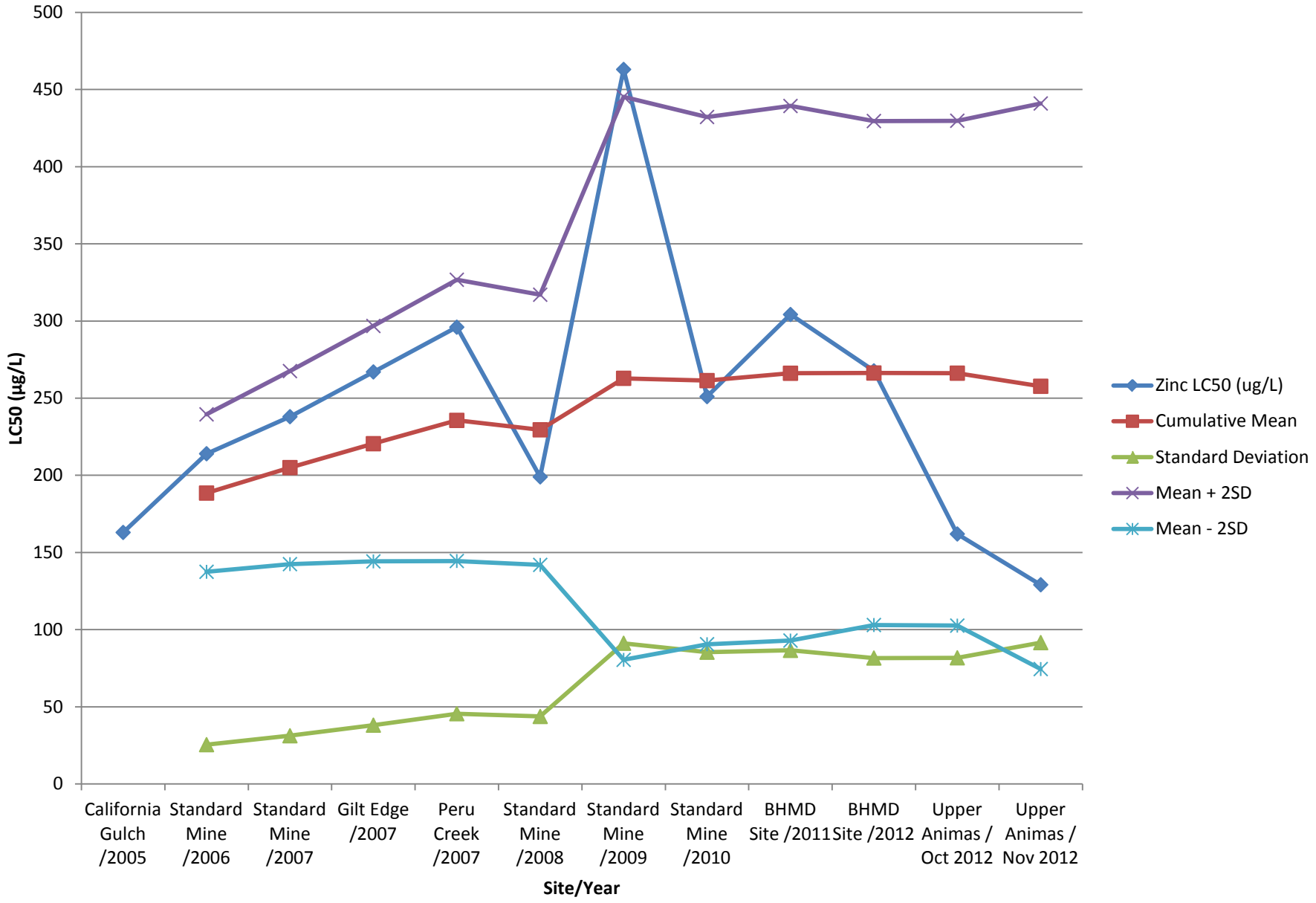


Figure 3.5-1 Zinc LC_{50} Reference Chart



Appendix A
October 2012 Upper Animas River Superfund Site
Site Water Toxicity Test and Reference Toxicity Test
Daily Water Chemistries

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Profile Test

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-01	No. Alive	10	10	10	10	10
Control-01	pH	7.3	7.1	7.3	7.4	7.5
Control-01	Temp °(C)	11.91	11.63	11.77	11.97	11.66
Control-01	D.O. (mg/L)	7.76	7.93	7.76	7.9	8.14
Control-01	Conductivity (us/cm)	310.9	315.4	316.8	319.5	319.3
Control-01	Alkalinity (mg $CaCO_3$/L)	59.4	-	-	-	61
Control-01	Hardness (mg /L)	96	-	-	-	95

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-02	No. Alive	10	10	10	10	10
Control-02	pH	7.4	7.2	7.3	7.4	7.6
Control-02	Temp °(C)	11.8	11.61	11.65	11.82	11.6
Control-02	D.O. (mg/L)	8.31	7.87	7.76	7.95	8.06
Control-02	Conductivity (us/cm)	312.2	314.7	318.3	318.8	320.5
Control-02	Alkalinity (mg $CaCO_3$/L)	59.4	-	-	-	61
Control-02	Hardness (mg /L)	96	-	-	-	95

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-03	No. Alive	10	10	10	10	10
Control-03	pH	7.4	7.3	7.3	7.4	7.6
Control-03	Temp °(C)	11.76	11.62	11.64	11.83	11.63
Control-03	D.O. (mg/L)	8.48	7.89	7.76	7.99	8.11
Control-03	Conductivity (us/cm)	309.9	315.5	318.5	319.1	320.9
Control-03	Alkalinity (mg $CaCO_3$/L)	59.4	-	-	-	61
Control-03	Hardness (mg /L)	96	-	-	-	95

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-04	No. Alive	10	10	10	10	10
Control-04	pH	7.4	7.4	7.4	7.4	7.6
Control-04	Temp °(C)	11.79	11.61	11.65	11.82	11.64
Control-04	D.O. (mg/L)	8.52	8.05	7.83	8.13	8.12
Control-04	Conductivity (us/cm)	311.2	315.4	318.6	320.4	321.7
Control-04	Alkalinity (mg $CaCO_3$/L)	59.4	-	-	-	61
Control-04	Hardness (mg /L)	96	-	-	-	95

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Baker-01	No. Alive	10	10	10	10	10
Baker-01	pH	7.1	7.2	7.1	7.3	7.4
Baker-01	Temp °(C)	12.49	11.69	11.76	11.92	11.69
Baker-01	D.O. (mg/L)	8.63	7.18	7.37	7.39	7.55
Baker-01	Conductivity (us/cm)	427.4	430	435.9	433.3	434.7
Baker-01	Alkalinity (mg $CaCO_3$/L)	26.5	-	-	-	31.8
Baker-01	Hardness (mg /L)	206	-	-	-	197

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Baker-02	No. Alive	10	10	10	10	10
Baker-02	pH	7.1	7.3	7.1	7.4	7.4
Baker-02	Temp °(C)	11.79	11.61	11.65	11.86	11.66
Baker-02	D.O. (mg/L)	8.64	7.4	7.47	7.57	7.77
Baker-02	Conductivity (us/cm)	423.1	429	431.7	431	432.6
Baker-02	Alkalinity (mg $CaCO_3$/L)	26.5	-	-	-	31.8
Baker-02	Hardness (mg /L)	206	-	-	-	197

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Baker-03	No. Alive	10	10	10	10	10
Baker-03	pH	7.1	7.3	7.1	7.4	7.4
Baker-03	Temp °(C)	11.79	11.58	11.58	11.78	11.6
Baker-03	D.O. (mg/L)	8.69	7.42	7.66	7.68	7.97
Baker-03	Conductivity (us/cm)	424	428.8	432.3	431.5	431.6
Baker-03	Alkalinity (mg $CaCO_3$/L)	26.5	-	-	-	31.8
Baker-03	Hardness (mg /L)	206	-	-	-	197

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Baker-04	No. Alive	10	10	10	10	10
Baker-04	pH	7.1	7.2	7.2	7.3	7.4
Baker-04	Temp °(C)	11.76	11.55	11.59	11.8	11.58
Baker-04	D.O. (mg/L)	8.69	7.62	7.71	7.81	7.96
Baker-04	Conductivity (us/cm)	422	430	431.8	431.2	431.5
Baker-04	Alkalinity (mg $CaCO_3$/L)	26.5	-	-	-	31.8
Baker-04	Hardness (mg /L)	206	-	-	-	197

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A75B-01	No. Alive	10	10	10	10	10
A75B-01	pH	7.1	7.3	7.1	7.3	7.4
A75B-01	Temp °(C)	11.76	11.52	11.6	11.78	11.69
A75B-01	D.O. (mg/L)	8.7	8.24	8.1	8.09	8.05
A75B-01	Conductivity (us/cm)	432	438.5	438.1	440.4	440.5
A75B-01	Alkalinity (mg $CaCO_3$/L)	17.1	-	-	-	20.5
A75B-01	Hardness (mg /L)	208	-	-	-	205

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A75B-02	No. Alive	10	10	10	10	10
A75B-02	pH	7.1	7.2	7.1	7.2	7.4
A75B-02	Temp °(C)	11.77	11.56	11.59	11.78	11.6
A75B-02	D.O. (mg/L)	8.73	8.16	7.87	8.04	8.06
A75B-02	Conductivity (us/cm)	433.6	437.8	440.1	439.2	440.9
A75B-02	Alkalinity (mg $CaCO_3$/L)	17.1	-	-	-	20.5
A75B-02	Hardness (mg /L)	208	-	-	-	205

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A75B-03	No. Alive	10	10	10	10	10
A75B-03	pH	7.1	7.2	7.1	7.2	7.3
A75B-03	Temp °(C)	11.77	11.56	11.59	11.77	11.61
A75B-03	D.O. (mg/L)	8.73	8.12	7.85	7.95	7.99
A75B-03	Conductivity (us/cm)	433.8	438	439	438.5	438.8
A75B-03	Alkalinity (mg $CaCO_3$/L)	17.1	-	-	-	20.5
A75B-03	Hardness (mg /L)	208	-	-	-	205

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A75B-04	No. Alive	10	10	10	10	10
A75B-04	pH	7.1	7.2	7.1	7.2	7.3
A75B-04	Temp °(C)	11.75	11.55	11.58	11.78	11.6
A75B-04	D.O. (mg/L)	8.69	7.82	7.83	8	8.13
A75B-04	Conductivity (us/cm)	430.6	438.8	439.8	440.1	440.5
A75B-04	Alkalinity (mg $CaCO_3$/L)	17.1	-	-	-	20.5
A75B-04	Hardness (mg /L)	208	-	-	-	205

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A73B-01	No. Alive	10	10	10	10	10
A73B-01	pH	6.3	6.9	6.8	7	7.1
A73B-01	Temp °(C)	11.7	11.56	11.56	11.78	11.57
A73B-01	D.O. (mg/L)	8.69	7.98	8.2	8.29	8.33
A73B-01	Conductivity (us/cm)	505	509.9	512.2	512.6	515
A73B-01	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	<5.00U
A73B-01	Hardness (mg /L)	243	-	-	-	239

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A73B-02	No. Alive	10	10	10	10	10
A73B-02	pH	6.1	6.8	6.6	6.9	6.9
A73B-02	Temp °(C)	11.67	11.55	11.61	11.77	11.58
A73B-02	D.O. (mg/L)	8.72	8	8.07	8.29	8.27
A73B-02	Conductivity (us/cm)	502.8	510.1	511.3	511.3	512.2
A73B-02	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	<5.00U
A73B-02	Hardness (mg /L)	243	-	-	-	239

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A73B-03	No. Alive	10	10	10	10	10
A73B-03	pH	6.1	6.7	6.5	6.8	6.7
A73B-03	Temp °(C)	11.69	11.55	11.59	11.74	11.59
A73B-03	D.O. (mg/L)	8.72	7.89	8.02	8.22	8.13
A73B-03	Conductivity (us/cm)	501.9	508.7	510.7	511.3	511.1
A73B-03	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	<5.00U
A73B-03	Hardness (mg /L)	243	-	-	-	239

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A73B-04	No. Alive	10	10	10	10	10
A73B-04	pH	6.1	6.6	6.5	6.7	6.7
A73B-04	Temp °(C)	11.75	11.56	11.58	11.77	11.59
A73B-04	D.O. (mg/L)	8.71	7.94	8	8.1	8.2
A73B-04	Conductivity (us/cm)	504	507.3	510.5	509.1	510.3
A73B-04	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	<5.00U
A73B-04	Hardness (mg /L)	243	-	-	-	239

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A56-01	No. Alive	10	10	10	10	10
A56-01	pH	6.9	7.1	7.1	7.5	7
A56-01	Temp °(C)	12.02	11.59	11.65	11.84	11.57
A56-01	D.O. (mg/L)	7.91	7.82	8.16	7.99	8.38
A56-01	Conductivity (us/cm)	350.4	358.1	358.9	359.2	360.9
A56-01	Alkalinity (mg $CaCO_3$/L)	37.8	-	-	-	40.9
A56-01	Hardness (mg /L)	170	-	-	-	166

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A56-02	No. Alive	10	10	10	10	10
A56-02	pH	7	7.1	7.2	7.6	7.2
A56-02	Temp °(C)	11.71	11.6	11.58	11.8	11.6
A56-02	D.O. (mg/L)	8.4	7.59	8.24	8.28	8.4
A56-02	Conductivity (us/cm)	351.2	356.7	359.2	358.2	359.9
A56-02	Alkalinity (mg $CaCO_3$/L)	37.8	-	-	-	40.9
A56-02	Hardness (mg /L)	170	-	-	-	166

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A56-03	No. Alive	10	10	10	10	10
A56-03	pH	7	7.2	7.2	7.5	7.1
A56-03	Temp °(C)	11.73	11.59	11.59	11.79	11.57
A56-03	D.O. (mg/L)	8.57	7.67	8.21	8.28	8.28
A56-03	Conductivity (us/cm)	352.6	356.6	358.9	359.8	360.2
A56-03	Alkalinity (mg $CaCO_3$/L)	37.8	-	-	-	40.9
A56-03	Hardness (mg /L)	170	-	-	-	166

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A56-04	No. Alive	10	10	10	10	10
A56-04	pH	7.1	7.2	7.2	7.5	7.1
A56-04	Temp °(C)	11.76	11.59	11.6	11.77	11.53
A56-04	D.O. (mg/L)	8.6	7.74	7.92	8.07	8.16
A56-04	Conductivity (us/cm)	353.1	356.4	359.1	357.6	358.4
A56-04	Alkalinity (mg $CaCO_3$/L)	37.8	-	-	-	40.9
A56-04	Hardness (mg /L)	170	-	-	-	166

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A72-01	No. Alive	10	10	9	0	-
A72-01	pH	5.5	6.1	6.2	6.2	-
A72-01	Temp °(C)	11.94	11.57	11.59	11.8	-
A72-01	D.O. (mg/L)	8.13	8.23	8.47	8.54	-
A72-01	Conductivity (us/cm)	607.2	612.5	612.3	614.1	-
A72-01	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	<5.00U	-
A72-01	Hardness (mg /L)	299	-	-	296	-

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A72-02	No. Alive	10	10	8	0	-
A72-02	pH	5.5	6.1	6.1	6.1	-
A72-02	Temp °(C)	11.88	11.57	11.61	11.79	-
A72-02	D.O. (mg/L)	8.29	8.29	7.99	8.61	-
A72-02	Conductivity (us/cm)	605.6	613.1	616.6	615.3	-
A72-02	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	<5.00U	-
A72-02	Hardness (mg /L)	299	-	-	296	-

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A72-03	No. Alive	10	10	4	0	-
A72-03	pH	5.5	6.1	6.1	5.9	-
A72-03	Temp °(C)	11.73	11.6	11.59	11.78	-
A72-03	D.O. (mg/L)	8.51	8.17	8.21	8.67	-
A72-03	Conductivity (us/cm)	607.7	613	618.6	610	-
A72-03	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	<5.00U	-
A72-03	Hardness (mg /L)	299	-	-	296	-

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A72-04	No. Alive	10	10	7	0	-
A72-04	pH	5.5	6.1	6.1	5.9	-
A72-04	Temp °(C)	11.73	11.59	11.6	11.8	-
A72-04	D.O. (mg/L)	8.63	8.21	8.41	8.71	-
A72-04	Conductivity (us/cm)	603.3	613.3	616.3	612.6	-
A72-04	Alkalinity (mg $CaCO_3$/L)	<5.00U			<5.00U	
A72-04	Hardness (mg /L)	299			296	

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-01	No. Alive	10	10	10	10	10
A68-01	pH	7.2	7.4	7.4	7.1	7.3
A68-01	Temp °(C)	11.77	11.75	11.85	11.95	11.86
A68-01	D.O. (mg/L)	8.41	8.34	8.4	7.99	8.08
A68-01	Conductivity (us/cm)	379.9	384.1	386	382.6	385
A68-01	Alkalinity (mg $CaCO_3$/L)	35.8	-	-	-	42.7
A68-01	Hardness (mg /L)	183	-	-	-	180

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-02	No. Alive	10	10	10	10	10
A68-02	pH	7.2	7.3	7.4	7.2	7.4
A68-02	Temp °(C)	11.78	11.74	11.83	11.93	11.82
A68-02	D.O. (mg/L)	8.37	8.32	8.44	8.07	8.14
A68-02	Conductivity (us/cm)	382.5	385.7	386.9	386.7	386.1
A68-02	Alkalinity (mg $CaCO_3$/L)	35.8	-	-	-	42.7
A68-02	Hardness (mg /L)	183	-	-	-	180

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-03	No. Alive	10	10	10	10	10
A68-03	pH	7.2	7.3	7.4	7.3	7.4
A68-03	Temp °(C)	11.76	11.81	11.83	11.93	11.81
A68-03	D.O. (mg/L)	8.3	7.98	8.24	8.01	8.06
A68-03	Conductivity (us/cm)	380.9	385.1	386.9	386.3	388.7
A68-03	Alkalinity (mg $CaCO_3$/L)	35.8	-	-	-	42.7
A68-03	Hardness (mg /L)	183	-	-	-	180

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-04	No. Alive	10	10	10	10	10
A68-04	pH	7.3	7.3	7.4	7.4	7.4
A68-04	Temp °(C)	11.78	11.82	11.83	11.91	11.8
A68-04	D.O. (mg/L)	8.24	8.03	7.84	7.87	7.92
A68-04	Conductivity (us/cm)	379.8	385	388.7	387.6	388.6
A68-04	Alkalinity (mg $CaCO_3$/L)	35.8	-	-	-	42.7
A68-04	Hardness (mg /L)	183	-	-	-	180

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Serial dilution of M34/CC48 with A56

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-control-01	No. Alive	10	10	10	10	10
34/48/56-control-01	pH	7.6	7.4	7.5	7.5	7.6
34/48/56-control-01	Temp °(C)	11.79	11.63	11.68	11.9	11.8
34/48/56-control-01	D.O. (mg/L)	7.73	7.87	8.32	8.4	8.08
34/48/56-control-01	Conductivity (us/cm)	309.6	316.5	319.1	319	320.9
34/48/56-control-01	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	*
34/48/56-control-01	Hardness (mg /L)	*	-	-	-	*

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-control-02	No. Alive	10	10	10	10	10
34/48/56-control-02	pH	7.4	7.4	7.5	7.6	7.7
34/48/56-control-02	Temp °(C)	11.69	11.63	11.69	11.86	11.68
34/48/56-control-02	D.O. (mg/L)	7.82	7.86	8.27	8.41	8.07
34/48/56-control-02	Conductivity (us/cm)	309.9	315.3	318.8	319.6	320.9
34/48/56-control-02	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	*
34/48/56-control-02	Hardness (mg /L)	*	-	-	-	*

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-control-03	No. Alive	10	10	10	10	10
34/48/56-control-03	pH	7.4	7.4	7.5	7.6	7.7
34/48/56-control-03	Temp °(C)	11.65	11.62	11.67	11.85	11.66
34/48/56-control-03	D.O. (mg/L)	7.79	8.06	8.25	8.26	8.32
34/48/56-control-03	Conductivity (us/cm)	311.9	315	318.5	319.2	320.5
34/48/56-control-03	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	*
34/48/56-control-03	Hardness (mg /L)	*	-	-	-	*

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-control-04	No. Alive	10	10	10	10	10
34/48/56-control-04	pH	7.4	7.4	7.4	7.5	7.7
34/48/56-control-04	Temp °(C)	11.63	11.64	11.65	11.85	11.67
34/48/56-control-04	D.O. (mg/L)	7.88	7.84	8.13	8.21	8.17
34/48/56-control-04	Conductivity (us/cm)	311.4	314.9	320.1	318.9	321
34/48/56-control-04	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	*
34/48/56-control-04	Hardness (mg /L)	*	-	-	-	*

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-6.25%-01	No. Alive	10	10	10	10	10
34/48/56-6.25%-01	pH	7.3	7.1	7.4	7.4	7.6
34/48/56-6.25%-01	Temp °(C)	11.68	11.62	11.64	11.86	11.67
34/48/56-6.25%-01	D.O. (mg/L)	7.92	7.54	8.27	8.3	7.99
34/48/56-6.25%-01	Conductivity (us/cm)	382.3	384.4	386.1	386.8	388.8
34/48/56-6.25%-01	Alkalinity (mg $CaCO_3$/L)	32.3	-	-	-	37.1
34/48/56-6.25%-01	Hardness (mg /L)	193	-	-	-	177

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-6.25%-02	No. Alive	10	10	10	10	10
34/48/56-6.25%-02	pH	7.2	7.2	7.3	7.4	7.5
34/48/56-6.25%-02	Temp °(C)	11.65	11.63	11.66	11.87	11.66
34/48/56-6.25%-02	D.O. (mg/L)	7.97	7.69	8.11	8.25	8.04
34/48/56-6.25%-02	Conductivity (us/cm)	377.2	380.7	385	384	385.6
34/48/56-6.25%-02	Alkalinity (mg $CaCO_3$/L)	32.3	-	-	-	37.1
34/48/56-6.25%-02	Hardness (mg /L)	193	-	-	-	177

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-6.25%-03	No. Alive	10	10	10	10	10
34/48/56-6.25%-03	pH	7.3	7.2	7.4	7.4	7.5
34/48/56-6.25%-03	Temp °(C)	11.65	11.65	11.66	11.85	11.66
34/48/56-6.25%-03	D.O. (mg/L)	8.13	7.82	8.19	8.24	8.25
34/48/56-6.25%-03	Conductivity (us/cm)	380.6	382.4	385.2	384.9	387
34/48/56-6.25%-03	Alkalinity (mg $CaCO_3$/L)	32.3	-	-	-	37.1
34/48/56-6.25%-03	Hardness (mg /L)	193	-	-	-	177

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-6.25%-04	No. Alive	10	10	10	10	10
34/48/56-6.25%-04	pH	7.3	7.2	7.4	7.4	7.5
34/48/56-6.25%-04	Temp °(C)	11.66	11.64	11.66	11.85	11.65
34/48/56-6.25%-04	D.O. (mg/L)	8.2	7.76	8.19	8.31	8.31
34/48/56-6.25%-04	Conductivity (us/cm)	377	383	385.5	385	386
34/48/56-6.25%-04	Alkalinity (mg $CaCO_3$/L)	32.3	-	-	-	37.1
34/48/56-6.25%-04	Hardness (mg /L)	193	-	-	-	177

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-12.5%-01	No. Alive	10	10	10	10	10
34/48/56-12.5%-01	pH	7.2	7.2	7.3	7.3	7.5
34/48/56-12.5%-01	Temp °(C)	11.65	11.61	11.68	11.84	11.66
34/48/56-12.5%-01	D.O. (mg/L)	8.25	8.12	7.93	8.29	8.36
34/48/56-12.5%-01	Conductivity (us/cm)	405.9	408	412.7	410.5	413.6
34/48/56-12.5%-01	Alkalinity (mg $CaCO_3$/L)	27.5	-	-	-	32
34/48/56-12.5%-01	Hardness (mg /L)	194	-	-	-	192

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-12.5%-02	No. Alive	10	10	10	10	10
34/48/56-12.5%-02	pH	7.2	7.3	7.2	7.3	7.4
34/48/56-12.5%-02	Temp °(C)	11.65	11.63	11.67	11.83	11.66
34/48/56-12.5%-02	D.O. (mg/L)	8.29	8.17	7.86	8.06	7.94
34/48/56-12.5%-02	Conductivity (us/cm)	405.5	409.8	413.3	411	412.3
34/48/56-12.5%-02	Alkalinity (mg $CaCO_3$/L)	27.5	-	-	-	32
34/48/56-12.5%-02	Hardness (mg /L)	194	-	-	-	192

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-12.5%-03	No. Alive	10	10	10	10	10
34/48/56-12.5%-03	pH	7.2	7.3	7.2	7.3	7.4
34/48/56-12.5%-03	Temp °(C)	11.64	11.62	11.68	11.85	11.65
34/48/56-12.5%-03	D.O. (mg/L)	8.32	8.3	7.7	7.85	7.82
34/48/56-12.5%-03	Conductivity (us/cm)	408	408.9	412	410.5	409.4
34/48/56-12.5%-03	Alkalinity (mg $CaCO_3$/L)	27.5	-	-	-	32
34/48/56-12.5%-03	Hardness (mg /L)	194	-	-	-	192

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-12.5%-04	No. Alive	10	10	10	10	10
34/48/56-12.5%-04	pH	7.2	7.2	7.3	7.3	7.4
34/48/56-12.5%-04	Temp °(C)	11.66	11.62	11.67	11.85	11.66
34/48/56-12.5%-04	D.O. (mg/L)	8.31	8.28	7.93	7.86	8.18
34/48/56-12.5%-04	Conductivity (us/cm)	404.6	408.3	412.7	410.4	412.1
34/48/56-12.5%-04	Alkalinity (mg $CaCO_3$/L)	27.5	-	-	-	32
34/48/56-12.5%-04	Hardness (mg /L)	194	-	-	-	192

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-25%-01	No. Alive	10	10	10	10	10
34/48/56-25%-01	pH	7.1	7.1	7.2	7.2	7.4
34/48/56-25%-01	Temp °(C)	11.66	11.66	11.68	11.88	11.67
34/48/56-25%-01	D.O. (mg/L)	8.23	7.76	8.07	8.28	8.27
34/48/56-25%-01	Conductivity (us/cm)	456.6	458.5	461.7	462.9	465.4
34/48/56-25%-01	Alkalinity (mg $CaCO_3$/L)	17.5	-	-	-	19.5
34/48/56-25%-01	Hardness (mg /L)	220	-	-	-	217

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-25%-02	No. Alive	10	10	10	10	10
34/48/56-25%-02	pH	7.1	7.1	7.2	7.2	7.4
34/48/56-25%-02	Temp °(C)	11.66	11.66	11.67	11.87	11.59
34/48/56-25%-02	D.O. (mg/L)	8.15	7.84	8.06	8.17	8.29
34/48/56-25%-02	Conductivity (us/cm)	452.2	457.9	463.4	461.8	464.4
34/48/56-25%-02	Alkalinity (mg $CaCO_3$/L)	17.5	-	-	-	19.5
34/48/56-25%-02	Hardness (mg /L)	220	-	-	-	217

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-25%-03	No. Alive	10	10	10	10	10
34/48/56-25%-03	pH	7.1	7.1	7.1	7.2	7.3
34/48/56-25%-03	Temp °(C)	11.68	11.66	11.66	11.86	11.66
34/48/56-25%-03	D.O. (mg/L)	8.21	7.9	8.08	8.05	8.27
34/48/56-25%-03	Conductivity (us/cm)	456.1	458	464.8	461.1	465.4
34/48/56-25%-03	Alkalinity (mg $CaCO_3$/L)	17.5	-	-	-	19.5
34/48/56-25%-03	Hardness (mg /L)	220	-	-	-	217

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-25%-04	No. Alive	10	10	10	10	10
34/48/56-25%-04	pH	7	7.1	7.1	7.1	7.4
34/48/56-25%-04	Temp °(C)	11.67	11.65	11.66	11.86	11.66
34/48/56-25%-04	D.O. (mg/L)	8.24	7.75	8.1	7.99	8.29
34/48/56-25%-04	Conductivity (us/cm)	458.8	458.2	463	460.9	464.1
34/48/56-25%-04	Alkalinity (mg $CaCO_3$/L)	17.5	-	-	-	19.5
34/48/56-25%-04	Hardness (mg /L)	220	-	-	-	217

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-50%-01	No. Alive	10	10	10	10	10
34/48/56-50%-01	pH	6.2	6.5	6.7	6.9	7.1
34/48/56-50%-01	Temp °(C)	11.66	11.66	11.69	11.87	11.67
34/48/56-50%-01	D.O. (mg/L)	8.25	8.1	7.84	8.55	8.48
34/48/56-50%-01	Conductivity (us/cm)	559.1	563.6	569.4	567.1	569.1
34/48/56-50%-01	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.82
34/48/56-50%-01	Hardness (mg /L)	270	-	-	-	272

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-50%-02	No. Alive	10	10	10	10	10
34/48/56-50%-02	pH	6.2	6.5	6.7	6.8	7
34/48/56-50%-02	Temp °(C)	11.66	11.67	11.65	11.91	11.69
34/48/56-50%-02	D.O. (mg/L)	8.28	7.95	7.84	8.35	8.54
34/48/56-50%-02	Conductivity (us/cm)	563.2	564	568.8	568.1	568.9
34/48/56-50%-02	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.82
34/48/56-50%-02	Hardness (mg /L)	270	-	-	-	272

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-50%-03	No. Alive	10	10	10	9	9
34/48/56-50%-03	pH	6.2	6.5	6.6	6.7	6.9
34/48/56-50%-03	Temp °(C)	11.67	11.67	11.65	11.89	11.69
34/48/56-50%-03	D.O. (mg/L)	8.28	7.96	8.1	8.31	8.43
34/48/56-50%-03	Conductivity (us/cm)	556	563	569.3	565.6	565.5
34/48/56-50%-03	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.82
34/48/56-50%-03	Hardness (mg /L)	270	-	-	-	272

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/56-50%-04	No. Alive	10	10	10	10	10
34/48/56-50%-04	pH	6.1	6.5	6.6	6.7	6.9
34/48/56-50%-04	Temp °(C)	11.68	11.67	11.68	11.88	11.69
34/48/56-50%-04	D.O. (mg/L)	8.24	8.16	8.23	8.35	8.49
34/48/56-50%-04	Conductivity (us/cm)	555.3	563.3	568.1	566.7	568.4
34/48/56-50%-04	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.82
34/48/56-50%-04	Hardness (mg /L)	270	-	-	-	272

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
34/48/56-100%-01	No. Alive	10	10	0	-	-
34/48/56-100%-01	pH	3.9	4.5	4.2	-	-
34/48/56-100%-01	Temp °(C)	11.68	11.67	11.69	-	-
34/48/56-100%-01	D.O. (mg/L)	8.32	8.51	8.58	-	-
34/48/56-100%-01	Conductivity (us/cm)	814.1	798.6	841.3	-	-
34/48/56-100%-01	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	<5.00U	-	-
34/48/56-100%-01	Hardness (mg /L)	382	-	385	-	-

Replicate I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
34/48/56-100%-02	No. Alive	10	4	0	-	-
34/48/56-100%-02	pH	3.9	4.5	4.1	-	-
34/48/56-100%-02	Temp °(C)	11.67	11.65	11.69	-	-
34/48/56-100%-02	D.O. (mg/L)	8.33	8.43	8.61	-	-
34/48/56-100%-02	Conductivity (us/cm)	818.9	802.4	816.7	-	-
34/48/56-100%-02	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	<5.00U	-	-
34/48/56-100%-02	Hardness (mg /L)	382	-	385	-	-

Replicate I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
34/48/56-100%-03	No. Alive	10	2	0	-	-
34/48/56-100%-03	pH	3.8	4.1	4.1	-	-
34/48/56-100%-03	Temp °(C)	11.7	11.69	11.65	-	-
34/48/56-100%-03	D.O. (mg/L)	8.22	8.37	8.67	-	-
34/48/56-100%-03	Conductivity (us/cm)	836	822.4	816	-	-
34/48/56-100%-03	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	<5.00U	-	-
34/48/56-100%-03	Hardness (mg /L)	382	-	385	-	-

Replicate I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
34/48/56-100%-04	No. Alive	10	7	0	-	-
34/48/56-100%-04	pH	3.8	4.3	4.2	-	-
34/48/56-100%-04	Temp °(C)	11.72	11.7	11.71	-	-
34/48/56-100%-04	D.O. (mg/L)	8.17	8.19	8.63	-	-
34/48/56-100%-04	Conductivity (us/cm)	825.4	807.5	817.6	-	-
34/48/56-100%-04	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	<5.00U	-	-
34/48/56-100%-04	Hardness (mg /L)	382	-	385	-	-

Serial dilution of M34/CC48 with A68

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-control-01	No. Alive	10	10	10	10	10
34/48/68-control-01	pH	7.2	7	7.1	7.6	7.3
34/48/68-control-01	Temp °(C)	12.05	11.76	12.05	11.95	11.82
34/48/68-control-01	D.O. (mg/L)	7.74	7.54	7.7	7.66	7.85
34/48/68-control-01	Conductivity (us/cm)	308.4	314.9	315.4	318.1	321.3
34/48/68-control-01	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	72.2
34/48/68-control-01	Hardness (mg /L)	*	-	-	-	94

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-control-02	No. Alive	10	10	10	10	10
34/48/68-control-02	pH	7.2	7.1	7.2	7.6	7.4
34/48/68-control-02	Temp °(C)	12.01	11.72	11.74	11.91	11.73
34/48/68-control-02	D.O. (mg/L)	7.79	7.69	8.07	8.1	7.78
34/48/68-control-02	Conductivity (us/cm)	287.5	315.3	318.5	319.1	321.4
34/48/68-control-02	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	72.2
34/48/68-control-02	Hardness (mg /L)	*	-	-	-	94

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-control-03	No. Alive	10	10	10	10	10
34/48/68-control-03	pH	7.2	7.1	7.3	7.6	7.6
34/48/68-control-03	Temp °(C)	11.91	11.71	11.74	11.91	11.71
34/48/68-control-03	D.O. (mg/L)	7.88	7.96	8.08	8.22	8.15
34/48/68-control-03	Conductivity (us/cm)	310.8	314.7	318	318.6	320.4
34/48/68-control-03	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	72.2
34/48/68-control-03	Hardness (mg /L)	*	-	-	-	94

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-control-04	No. Alive	10	10	10	10	10
34/48/68-control-04	pH	7.3	7.1	7.3	7.6	7.6
34/48/68-control-04	Temp °(C)	11.88	11.72	11.73	11.91	11.72
34/48/68-control-04	D.O. (mg/L)	7.87	7.87	7.94	8.09	8.13
34/48/68-control-04	Conductivity (us/cm)	311.2	314	318.4	318.7	320.6
34/48/68-control-04	Alkalinity (mg $CaCO_3$/L)	*	-	-	-	72.2
34/48/68-control-04	Hardness (mg /L)	*	-	-	-	94

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-6.25%-01	No. Alive	10	10	10	10	10
34/48/68-6.25%-01	pH	7.3	7	7.4	7.3	7.7
34/48/68-6.25%-01	Temp °(C)	11.84	11.76	11.91	11.73	11.91
34/48/68-6.25%-01	D.O. (mg/L)	8.12	6.29	7.9	7.7	8.04
34/48/68-6.25%-01	Conductivity (us/cm)	406.2	426.9	415.3	412.3	414.4
34/48/68-6.25%-01	Alkalinity (mg $CaCO_3$/L)	31.6	-	-	-	35.7
34/48/68-6.25%-01	Hardness (mg /L)	180	-	-	-	194

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-6.25%-02	No. Alive	10	10	10	10	10
34/48/68-6.25%-02	pH	7.3	7.1	7.4	7.3	7.6
34/48/68-6.25%-02	Temp °(C)	11.76	11.75	11.9	11.73	11.8
34/48/68-6.25%-02	D.O. (mg/L)	8.3	6.47	7.75	7.61	7.78
34/48/68-6.25%-02	Conductivity (us/cm)	406.6	423.8	414.4	411.5	414.3
34/48/68-6.25%-02	Alkalinity (mg $CaCO_3$/L)	31.6	-	-	-	35.7
34/48/68-6.25%-02	Hardness (mg /L)	180	-	-	-	194

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-6.25%-03	No. Alive	10	10	10	10	10
34/48/68-6.25%-03	pH	7.3	7.1	7.3	7.3	7.6
34/48/68-6.25%-03	Temp °(C)	11.75	11.76	11.86	11.72	11.81
34/48/68-6.25%-03	D.O. (mg/L)	8.37	6.87	7.86	7.77	7.61
34/48/68-6.25%-03	Conductivity (us/cm)	406.1	424.1	416.5	415.9	413
34/48/68-6.25%-03	Alkalinity (mg $CaCO_3$/L)	31.6	-	-	-	35.7
34/48/68-6.25%-03	Hardness (mg /L)	180	-	-	-	194

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-6.25%-04	No. Alive	10	10	10	10	10
34/48/68-6.25%-04	pH	7.4	7.1	7.3	7.3	7.5
34/48/68-6.25%-04	Temp °(C)	11.72	11.77	11.89	11.7	11.81
34/48/68-6.25%-04	D.O. (mg/L)	8.4	7.18	7.78	7.66	7.61
34/48/68-6.25%-04	Conductivity (us/cm)	405.9	423	415.6	419.9	413
34/48/68-6.25%-04	Alkalinity (mg $CaCO_3$/L)	31.6	-	-	-	35.7
34/48/68-6.25%-04	Hardness (mg /L)	180	-	-	-	194

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-12.5%-01	No. Alive	10	10	10	10	10
34/48/68-12.5%-01	pH	7.3	7.3	7.4	7.3	7.6
34/48/68-12.5%-01	Temp °(C)	11.75	11.77	11.93	11.74	11.82
34/48/68-12.5%-01	D.O. (mg/L)	8.47	7.88	8.18	7.74	8.3
34/48/68-12.5%-01	Conductivity (us/cm)	430	449	440.7	442.9	443.1
34/48/68-12.5%-01	Alkalinity (mg $CaCO_3$/L)	31.2	-	-	-	28.1
34/48/68-12.5%-01	Hardness (mg /L)	196	-	-	-	203

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-12.5%-02	No. Alive	10	10	10	10	10
34/48/68-12.5%-02	pH	7.3	7.2	7.4	7.3	7.6
34/48/68-12.5%-02	Temp °(C)	11.73	11.77	11.93	11.73	11.8
34/48/68-12.5%-02	D.O. (mg/L)	8.5	8.03	8.25	8.03	8.02
34/48/68-12.5%-02	Conductivity (us/cm)	429.7	446.8	440.4	442.4	440.2
34/48/68-12.5%-02	Alkalinity (mg $CaCO_3$/L)	31.2	-	-	-	28.1
34/48/68-12.5%-02	Hardness (mg /L)	196	-	-	-	203

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-12.5%-03	No. Alive	10	10	10	10	10
34/48/68-12.5%-03	pH	7.2	7.2	7.4	7.4	7.5
34/48/68-12.5%-03	Temp °(C)	11.67	11.77	11.93	11.72	11.81
34/48/68-12.5%-03	D.O. (mg/L)	8.57	7.86	8.21	8.18	7.99
34/48/68-12.5%-03	Conductivity (us/cm)	429.6	447.9	440.1	444.3	441.7
34/48/68-12.5%-03	Alkalinity (mg $CaCO_3$/L)	31.2	-	-	-	28.1
34/48/68-12.5%-03	Hardness (mg /L)	196	-	-	-	203

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-12.5%-04	No. Alive	10	10	10	10	10
34/48/68-12.5%-04	pH	7.2	7.2	7.3	7.4	7.5
34/48/68-12.5%-04	Temp °(C)	11.68	11.76	11.92	11.74	11.81
34/48/68-12.5%-04	D.O. (mg/L)	8.56	7.81	8.1	8.31	7.78
34/48/68-12.5%-04	Conductivity (us/cm)	429.9	449.4	442	443.7	441.2
34/48/68-12.5%-04	Alkalinity (mg $CaCO_3$/L)	31.2	-	-	-	28.1
34/48/68-12.5%-04	Hardness (mg /L)	196	-	-	-	203

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-25%-01	No. Alive	10	10	10	10	10
34/48/68-25%-01	pH	7.1	7.2	7.3	7.3	7.4
34/48/68-25%-01	Temp °(C)	11.8	11.76	11.81	11.73	11.8
34/48/68-25%-01	D.O. (mg/L)	8.55	7.84	8.24	8.29	7.77
34/48/68-25%-01	Conductivity (us/cm)	480.8	497	489.2	490.4	491.1
34/48/68-25%-01	Alkalinity (mg $CaCO_3$/L)	17.6	-	-	-	19.5
34/48/68-25%-01	Hardness (mg /L)	231	-	-	-	230

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-25%-02	No. Alive	10	10	10	10	10
34/48/68-25%-02	pH	6.9	7.1	7.2	7.3	7.5
34/48/68-25%-02	Temp °(C)	11.77	11.77	11.91	11.72	11.82
34/48/68-25%-02	D.O. (mg/L)	8.54	8.02	8.01	8.12	8.07
34/48/68-25%-02	Conductivity (us/cm)	479.2	496.8	489	493.1	492.1
34/48/68-25%-02	Alkalinity (mg $CaCO_3$/L)	17.6	-	-	-	19.5
34/48/68-25%-02	Hardness (mg /L)	231	-	-	-	230

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-25%-03	No. Alive	10	10	10	10	10
34/48/68-25%-03	pH	7	7.2	7.3	7.3	7.4
34/48/68-25%-03	Temp °(C)	11.74	11.75	11.92	11.72	11.84
34/48/68-25%-03	D.O. (mg/L)	8.55	7.79	7.94	8.05	8.01
34/48/68-25%-03	Conductivity (us/cm)	480	495.9	489	491.8	490.1
34/48/68-25%-03	Alkalinity (mg $CaCO_3$/L)	17.6	-	-	-	19.5
34/48/68-25%-03	Hardness (mg /L)	231	-	-	-	230

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-25%-04	No. Alive	10	10	10	10	10
34/48/68-25%-04	pH	6.9	7.1	7.2	7.3	7.5
34/48/68-25%-04	Temp °(C)	11.73	11.76	11.94	11.72	11.85
34/48/68-25%-04	D.O. (mg/L)	8.57	8.05	8.08	8.23	7.9
34/48/68-25%-04	Conductivity (us/cm)	480	497.9	488	490.2	486.2
34/48/68-25%-04	Alkalinity (mg $CaCO_3$/L)	17.6	-	-	-	19.5
34/48/68-25%-04	Hardness (mg /L)	231	-	-	-	230

Appendix A 1: Upper Animas October 2012
Aquatic Toxicity Test
Site Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms per replicate: 10	
End Date	10/26/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA,CL,LC

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-50%-01	No. Alive	10	10	10	7	3
34/48/68-50%-01	pH	6.1	6.9	7.1	7.1	7.1
34/48/68-50%-01	Temp °(C)	11.94	11.79	11.79	11.74	11.86
34/48/68-50%-01	D.O. (mg/L)	8.5	7.9	8.3	8.23	7.97
34/48/68-50%-01	Conductivity (us/cm)	574.7	590	582.3	588.7	590.1
34/48/68-50%-01	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.00
34/48/68-50%-01	Hardness (mg /L)	278	-	-	-	278

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-50%-02	No. Alive	10	10	8	5	2
34/48/68-50%-02	pH	5.9	6.9	6.9	7	7.1
34/48/68-50%-02	Temp °(C)	11.66	11.77	11.78	11.74	11.84
34/48/68-50%-02	D.O. (mg/L)	8.53	7.94	8.48	8.43	8.11
34/48/68-50%-02	Conductivity (us/cm)	572.7	591.4	584.6	587.4	589.2
34/48/68-50%-02	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.00
34/48/68-50%-02	Hardness (mg /L)	278	-	-	-	278

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-50%-03	No. Alive	10	10	10	8	6
34/48/68-50%-03	pH	6	6.9	6.9	6.9	6.9
34/48/68-50%-03	Temp °(C)	11.6	11.77	11.89	11.75	11.9
34/48/68-50%-03	D.O. (mg/L)	8.58	7.8	8.33	8.57	8.21
34/48/68-50%-03	Conductivity (us/cm)	572.7	592	585.1	589.9	588.3
34/48/68-50%-03	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.00
34/48/68-50%-03	Hardness (mg /L)	278	-	-	-	278

Replicate I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
34/48/68-50%-04	No. Alive	10	10	10	8	4
34/48/68-50%-04	pH	6.1	6.9	6.9	6.9	6.9
34/48/68-50%-04	Temp °(C)	11.59	11.77	11.91	11.69	11.87
34/48/68-50%-04	D.O. (mg/L)	8.61	8.03	8.37	8.63	7.92
34/48/68-50%-04	Conductivity (us/cm)	572	588.2	582	587.2	591.2
34/48/68-50%-04	Alkalinity (mg $CaCO_3$/L)	<5.00U	-	-	-	5.00
34/48/68-50%-04	Hardness (mg /L)	278	-	-	-	278

* No data available

Qualifiers:

U= Non Detect

Prepared by: EC 3/6/13

QC'd by: BGK 3/13/13

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
Control-01	No. Alive	10	10	10	10	10
Control-01	pH	7.4	7.5	7.6	7.6	7.6
Control-01	Temp °(C)	11.73	11.85	11.91	11.94	11.64
Control-01	D.O. (mg/L)	8.33	8.18	8.14	7.99	8.42
Control-01	Conductivity (us/cm)	309.6	315.2	317.9	317.7	318.4
Control-01	Alkalinity (mg $CaCO_3$/L)	56.6	-	-	-	70.5
Control-01	Hardness (mg/L)	96	-	-	-	94

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
Control-02	No. Alive	10	10	10	10	10
Control-02	pH	7.5	7.6	7.6	7.6	7.6
Control-02	Temp °(C)	11.68	11.83	11.88	11.88	11.65
Control-02	D.O. (mg/L)	8.66	8.27	8.27	8.25	8.44
Control-02	Conductivity (us/cm)	308.4	316.2	318.5	319	320
Control-02	Alkalinity (mg $CaCO_3$/L)	56.6	-	-	-	70.5
Control-02	Hardness (mg/L)	96	-	-	-	94

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
Control-03	No. Alive	10	10	10	10	10
Control-03	pH	7.5	7.6	7.6	7.6	7.7
Control-03	Temp °(C)	11.71	11.84	11.84	11.86	11.64
Control-03	D.O. (mg/L)	8.65	8.13	8.28	8.32	8.46
Control-03	Conductivity (us/cm)	310.1	315.8	317.4	317.7	319.3
Control-03	Alkalinity (mg $CaCO_3$/L)	56.6	-	-	-	70.5
Control-03	Hardness (mg/L)	96	-	-	-	94

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
Control-04	No. Alive	10	10	10	10	10
Control-04	pH	7.6	7.6	7.6	7.6	7.6
Control-04	Temp °(C)	11.72	11.84	11.85	11.83	11.63
Control-04	D.O. (mg/L)	8.64	7.73	8.12	8.25	8.33
Control-04	Conductivity (us/cm)	308	315.4	317.4	318.3	319.3
Control-04	Alkalinity (mg $CaCO_3$/L)	56.6	-	-	-	70.5
Control-04	Hardness (mg/L)	96	-	-	-	94

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
6.25%-01	No. Alive	10	10	10	10	10
6.25%-01	pH	7.5	7.5	7.6	7.6	7.6
6.25%-01	Temp °(C)	11.71	11.84	11.84	11.85	11.62
6.25%-01	D.O. (mg/L)	8.65	7.72	8.03	8.23	8.34
6.25%-01	Conductivity (us/cm)	311.6	316.8	318.4	318.8	320.2
6.25%-01	Alkalinity (mg $CaCO_3$/L)	60	-	-	-	63.8
6.25%-01	Hardness (mg/L)	96	-	-	-	97

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
6.25%-02	No. Alive	10	10	10	10	10
6.25%-02	pH	7.5	7.6	7.5	7.6	7.6
6.25%-02	Temp °(C)	11.71	11.85	11.83	11.82	11.63
6.25%-02	D.O. (mg/L)	8.62	7.72	7.6	7.87	8.43
6.25%-02	Conductivity (us/cm)	308.1	315.5	317.7	317.6	318.9
6.25%-02	Alkalinity (mg $CaCO_3$/L)	60	-	-	-	63.8
6.25%-02	Hardness (mg/L)	96	-	-	-	97

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
6.25%-03	No. Alive	10	10	10	10	10
6.25%-03	pH	7.6	7.5	7.5	7.5	7.6
6.25%-03	Temp °(C)	11.66	11.86	11.83	11.83	11.63
6.25%-03	D.O. (mg/L)	8.6	7.65	7.54	7.71	8.01
6.25%-03	Conductivity (us/cm)	307.7	316	318.4	317.9	319
6.25%-03	Alkalinity (mg $CaCO_3$/L)	60	-	-	-	63.8
6.25%-03	Hardness (mg/L)	96	-	-	-	97

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
6.25%-04	No. Alive	10	10	10	10	10
6.25%-04	pH	7.6	7.6	7.6	7.6	7.6
6.25%-04	Temp °(C)	11.66	11.85	11.84	11.76	11.65
6.25%-04	D.O. (mg/L)	8.61	7.58	7.77	8.16	7.97
6.25%-04	Conductivity (us/cm)	311.5	316.4	318.9	319	319.9
6.25%-04	Alkalinity (mg $CaCO_3$/L)	60	-	-	-	63.8
6.25%-04	Hardness (mg/L)	96	-	-	-	97

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
12.5%-01	No. Alive	10	10	8	8	8
12.5%-01	pH	7.6	7.5	7.6	7.6	7.6
12.5%-01	Temp °(C)	11.67	11.85	11.83	11.79	11.64
12.5%-01	D.O. (mg/L)	8.67	7.81	8.17	8.24	8.45
12.5%-01	Conductivity (us/cm)	311.4	317.5	319.7	316.5	318
12.5%-01	Alkalinity (mg $CaCO_3$/L)	56.7	-	-	-	66.3
12.5%-01	Hardness (mg/L)	96	-	-	-	91

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
12.5%-02	No. Alive	10	10	6	6	6
12.5%-02	pH	7.6	7.5	7.6	7.6	7.7
12.5%-02	Temp °(C)	11.65	11.86	11.84	11.75	11.64
12.5%-02	D.O. (mg/L)	8.67	7.76	8.2	8.25	8.52
12.5%-02	Conductivity (us/cm)	311.8	318.3	322.9	317.4	318.4
12.5%-02	Alkalinity (mg $CaCO_3$/L)	56.7	-	-	-	66.3
12.5%-02	Hardness (mg/L)	96	-	-	-	91

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
12.5%-03	No. Alive	10	10	8	8	8
12.5%-03	pH	7.6	7.5	7.6	7.6	7.7
12.5%-03	Temp °(C)	11.66	11.86	11.84	11.77	11.65
12.5%-03	D.O. (mg/L)	8.68	7.63	8.15	8.38	8.51
12.5%-03	Conductivity (us/cm)	309.8	317.8	321.8	319.6	320.1
12.5%-03	Alkalinity (mg $CaCO_3$/L)	56.7	-	-	-	66.3
12.5%-03	Hardness (mg/L)	96	-	-	-	91

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
12.5%-04	No. Alive	10	10	8	8	8
12.5%-04	pH	7.6	7.5	7.6	7.6	7.6
12.5%-04	Temp °(C)	11.67	11.86	11.85	11.77	11.64
12.5%-04	D.O. (mg/L)	8.69	7.78	8	8.32	8.44
12.5%-04	Conductivity (us/cm)	308.2	319.2	323.5	318.9	319.1
12.5%-04	Alkalinity (mg $CaCO_3$/L)	56.7	-	-	-	66.3
12.5%-04	Hardness (mg/L)	96	-	-	-	91

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-01	No. Alive	10	6	0	-	-
25%-01	pH	7.6	7.5	7.6	-	-
25%-01	Temp °(C)	11.69	11.86	11.77	-	-
25%-01	D.O. (mg/L)	8.68	7.82	8.32	-	-
25%-01	Conductivity (us/cm)	311.3	318.6	319.2	-	-
25%-01	Alkalinity (mg $CaCO_3$/L)	59.5		64	-	-
25%-01	Hardness (mg/L)	96		95	-	-

Site I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-02	No. Alive	10	10	0	-	-
25%-02	pH	7.6	7.4	7.7	-	-
25%-02	Temp °(C)	11.69	11.87	11.86	-	-
25%-02	D.O. (mg/L)	8.64	7.6	8.49	-	-
25%-02	Conductivity (us/cm)	308.2	320.4	324	-	-
25%-02	Alkalinity (mg $CaCO_3$/L)	59.5	-	64	-	-
25%-02	Hardness (mg/L)	96	-	95	-	-

Site I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-03	No. Alive	10	9	2	2	2
25%-03	pH	7.6	7.4	7.7	7.7	7.7
25%-03	Temp °(C)	11.7	11.87	11.88	11.75	11.67
25%-03	D.O. (mg/L)	8.62	6.83	8.51	8.51	8.6
25%-03	Conductivity (us/cm)	309.2	318.6	323.1	313.9	315.1
25%-03	Alkalinity (mg $CaCO_3$/L)	59.5	-	64	-	-
25%-03	Hardness (mg/L)	96	-	95	-	-

Site I.D.	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-04	No. Alive	10	7	0	-	-
25%-04	pH	7.6	7.4	7.8	-	-
25%-04	Temp °(C)	11.67	11.88	11.88	-	-
25%-04	D.O. (mg/L)	8.65	7.39	8.49	-	-
25%-04	Conductivity (us/cm)	311	319.5	319.3	-	-
25%-04	Alkalinity (mg $CaCO_3$/L)	59.5	-	64	-	-
25%-04	Hardness (mg/L)	96	-	95	-	-

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
50%-01	No. Alive	10	7	0	-	-
50%-01	pH	7.6	7.4	7.7	-	-
50%-01	Temp °(C)	11.68	11.84	11.86	-	-
50%-01	D.O. (mg/L)	8.7	7.87	8.63	-	-
50%-01	Conductivity (us/cm)	308.9	319.5	316.4	-	-
50%-01	Alkalinity (mg $CaCO_3$/L)	58.4	-	62.4	-	-
50%-01	Hardness (mg/L)	96	-	95	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
50%-02	No. Alive	10	7	0	-	-
50%-02	pH	7.6	7.4	7.8	-	-
50%-02	Temp °(C)	11.7	11.88	11.88	-	-
50%-02	D.O. (mg/L)	8.67	7.42	8.63	-	-
50%-02	Conductivity (us/cm)	308.6	319.3	316	-	-
50%-02	Alkalinity (mg $CaCO_3$/L)	58.4	-	62.4	-	-
50%-02	Hardness (mg/L)	96	-	95	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
50%-03	No. Alive	10	9	0	-	-
50%-03	pH	7.6	7.4	7.7	-	-
50%-03	Temp °(C)	11.71	11.91	11.89	-	-
50%-03	D.O. (mg/L)	8.65	7.2	8.63	-	-
50%-03	Conductivity (us/cm)	308.9	319.5	322.8	-	-
50%-03	Alkalinity (mg $CaCO_3$/L)	58.4	-	62.4	-	-
50%-03	Hardness (mg/L)	96	-	95	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
50%-04	No. Alive	10	6	0	-	-
50%-04	pH	7.6	7.4	7.8	-	-
50%-04	Temp °(C)	11.68	11.91	11.88	-	-
50%-04	D.O. (mg/L)	8.68	7.87	8.57	-	-
50%-04	Conductivity (us/cm)	309.6	320.2	318.4	-	-
50%-04	Alkalinity (mg $CaCO_3$/L)	58.4	-	62.4	-	-
50%-04	Hardness (mg/L)	96	-	95	-	-

Appendix A 2: October 2012 Aquatic Toxicity Test
Reference Static Renewal Data Sheets

Start Date	10/22/12	No. Organisms	10
End Date	10/26/12	No. of Replicates	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
100%-01	No. Alive	10	4	0	-	-
100%-01	pH	7.6	7.4	7.7	-	-
100%-01	Temp °(C)	11.72	11.88	11.88	-	-
100%-01	D.O. (mg/L)	8.67	8	8.66	-	-
100%-01	Conductivity (us/cm)	309.8	319.5	315.8	-	-
100%-01	Alkalinity (mg $CaCO_3$/L)	60.5	-	59.7	-	-
100%-01	Hardness (mg/L)	96	-	94	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
100%-02	No. Alive	10	3	0	-	-
100%-02	pH	7.6	7.4	7.7	-	-
100%-02	Temp °(C)	11.69	11.88	11.89	-	-
100%-02	D.O. (mg/L)	8.69	8.15	8.6	-	-
100%-02	Conductivity (us/cm)	310.9	320.4	316	-	-
100%-02	Alkalinity (mg $CaCO_3$/L)	60.5	-	59.7	-	-
100%-02	Hardness (mg/L)	96	-	94	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
100%-03	No. Alive	10	5	0	-	-
100%-03	pH	7.6	7.5	7.8	-	-
100%-03	Temp °(C)	11.68	11.9	11.88	-	-
100%-03	D.O. (mg/L)	8.71	8.19	8.66	-	-
100%-03	Conductivity (us/cm)	311.9	319.7	318	-	-
100%-03	Alkalinity (mg $CaCO_3$/L)	60.5	-	59.7	-	-
100%-03	Hardness (mg/L)	96	-	94	-	-

Site I.D.	**Parameter**	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 4**
100%-04	No. Alive	10	7	1	0	-
100%-04	pH	7.6	7.4	7.8	7.6	-
100%-04	Temp °(C)	11.67	11.9	11.9	11.79	-
100%-04	D.O. (mg/L)	8.8	8.09	8.66	8.7	-
100%-04	Conductivity (us/cm)	313.1	320.4	318.3	313.2	-
100%-04	Alkalinity (mg $CaCO_3$/L)	60.5	-	59.7	-	-
100%-04	Hardness (mg/L)	96	-	94	-	-

Appendix B
November 2012 Upper Animas River Superfund Site Site Water Toxicity Test and Reference Toxicity Test Daily Water Chemistries

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Profile Test

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-01	No. Alive	10	10	10	10	10
Control-01	pH	7.6	7.3	7.27	7.22	7.52
Control-01	Temp (°C)	11.87	11.83	11.62	11.97	11.74
Control-01	D.O. (mg/L)	8.59	7.61	8.01	8.33	8.15
Control-01	Conductivity (us/cm)	298.3	304.2	322	327.2	318.9
Control-01	Alkalinity (mg $CaCO_3$/L)	55.2	-	-	-	65.8
Control-01	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-02	No. Alive	10	10	10	10	10
Control-02	pH	7.6	7.2	7.21	7.24	7.51
Control-02	Temp (°C)	11.71	11.82	11.83	11.94	11.79
Control-02	D.O. (mg/L)	8.71	7.51	8	8.27	8.03
Control-02	Conductivity (us/cm)	297.3	303.3	318	324.6	317.7
Control-02	Alkalinity (mg $CaCO_3$/L)	55.2	-	-	-	65.8
Control-02	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-03	No. Alive	10	10	10	10	10
Control-03	pH	7.6	7.2	7.2	7.26	7.5
Control-03	Temp (°C)	11.71	11.82	11.61	11.89	11.74
Control-03	D.O. (mg/L)	8.71	7.68	8.2	8.11	8
Control-03	Conductivity (us/cm)	297.4	303.6	316	326.8	319.3
Control-03	Alkalinity (mg $CaCO_3$/L)	55.2	-	-	-	65.8
Control-03	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-04	No. Alive	10	10	10	10	10
Control-04	pH	7.7	7.3	7.3	7.28	7.46
Control-04	Temp (°C)	11.74	11.82	11.52	11.88	11.77
Control-04	D.O. (mg/L)	8.72	7.95	7.7	8.03	7.77
Control-04	Conductivity (us/cm)	297.2	303.6	311	328.1	318.6
Control-04	Alkalinity (mg $CaCO_3$/L)	55.2	-	-	-	65.8
Control-04	Hardness (mg/L)	91	-	-	-	93

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
M34-01	No. Alive	10	9	0	-	-
M34-01	pH	5.5	6.5	6.87	-	-
M34-01	Temp (°C)	11.75	11.84	11.83	-	-
M34-01	D.O. (mg/L)	8.79	8.15	8.09	-	-
M34-01	Conductivity (us/cm)	574.2	600.8	621	-	-
M34-01	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	8.16	-	-
M34-01	Hardness (mg/L)	276	-	282	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
M34-02	No. Alive	10	8	1	0	-
M34-02	pH	5.5	6.4	6.67	6.61	-
M34-02	Temp (°C)	11.7	11.8	11.87	11.82	-
M34-02	D.O. (mg/L)	8.81	8.37	8	8.7	-
M34-02	Conductivity (us/cm)	577	602.4	627	622.3	-
M34-02	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	8.16	-
M34-02	Hardness (mg/L)	276	-	-	282	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
M34-03	No. Alive	10	10	1	1	0
M34-03	pH	5.4	6.5	6.71	6.54	6.35
M34-03	Temp (°C)	11.69	11.86	11.9	11.76	11.67
M34-03	D.O. (mg/L)	8.81	8.32	7.87	8.74	8.33
M34-03	Conductivity (us/cm)	577.2	608.1	629	632.1	591.9
M34-03	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	8.16
M34-03	Hardness (mg/L)	276	-	-	-	282

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
M34-04	No. Alive	10	8	1	0	-
M34-04	pH	5.4	6.4	6.61	6.48	-
M34-04	Temp (°C)	11.75	11.85	11.83	11.73	-
M34-04	D.O. (mg/L)	8.8	8.18	8.01	8.75	-
M34-04	Conductivity (us/cm)	577.4	609.1	629	633.1	-
M34-04	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	8.16	-
M34-04	Hardness (mg/L)	276	-	-	282	-

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-01	No. Alive	10	10	10	9	9
A68-01	pH	7.4	7	6.93	7.08	6.29
A68-01	Temp (°C)	11.7	11.85	11.68	11.76	11.65
A68-01	D.O. (mg/L)	8.73	7.6	8.05	8.18	8
A68-01	Conductivity (us/cm)	378.4	389.6	406	413.5	393.9
A68-01	Alkalinity (mg $CaCO_3$/L)	37.6	-	-	-	47
A68-01	Hardness (mg/L)	181	-	-	-	177

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-02	No. Alive	10	10	9	8	8
A68-02	pH	7.4	7	6.98	7.05	6.61
A68-02	Temp (°C)	11.68	11.85	11.59	11.79	11.62
A68-02	D.O. (mg/L)	8.79	7.54	8.05	7.4	8
A68-02	Conductivity (us/cm)	378.6	388.3	406	421.3	395.8
A68-02	Alkalinity (mg $CaCO_3$/L)	37.6	-	-	-	47
A68-02	Hardness (mg/L)	181	-	-	-	177

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-03	No. Alive	10	10	10	10	10
A68-03	pH	7.4	7	6.93	7.06	6.6
A68-03	Temp (°C)	11.66	11.86	11.58	11.79	11.59
A68-03	D.O. (mg/L)	8.79	7.09	8.32	7.41	7.82
A68-03	Conductivity (us/cm)	378.7	388.7	405	413.3	395.2
A68-03	Alkalinity (mg $CaCO_3$/L)	37.6	-	-	-	47
A68-03	Hardness (mg/L)	181	-	-	-	177

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68-04	No. Alive	10	10	10	10	10
A68-04	pH	7.4	6.9	6.97	7.05	6.61
A68-04	Temp (°C)	11.68	11.87	11.57	11.79	11.6
A68-04	D.O. (mg/L)	8.8	6.62	6.97	7.53	7.66
A68-04	Conductivity (us/cm)	378.5	387.6	404	414.3	395.1
A68-04	Alkalinity (mg $CaCO_3$/L)	37.6	-	-	-	47
A68-04	Hardness (mg/L)	181	-	-	-	177

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Serial dilution of A72 with A68

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-100%-Rep1	No. Alive	10	10	3	2	0
A68/A72-100%-Rep1	pH	5.6	6.5	6.84	6.8	6.23
A68/A72-100%-Rep1	Temp (°C)	12.2	11.77	11.7	11.91	11.58
A68/A72-100%-Rep1	D.O. (mg/L)	8.66	8.33	8.06	8.63	8.67
A68/A72-100%-Rep1	Conductivity (us/cm)	602.2	632.3	664	672	624.7
A68/A72-100%-Rep1	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/A72-100%-Rep1	Hardness (mg/L)	298	-	-	-	298

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-100%-Rep2	No. Alive	10	10	5	4	1
A68/A72-100%-Rep2	pH	5.6	6.3	6.72	6.79	6
A68/A72-100%-Rep2	Temp (°C)	12.21	11.77	11.62	11.91	11.62
A68/A72-100%-Rep2	D.O. (mg/L)	8.62	8.37	8.35	8.53	8.71
A68/A72-100%-Rep2	Conductivity (us/cm)	602.4	623.9	660	672.2	627.1
A68/A72-100%-Rep2	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/A72-100%-Rep2	Hardness (mg/L)	298	-	-	-	298

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-100%-Rep3	No. Alive	10	10	5	4	0
A68/A72-100%-Rep3	pH	5.6	6.3	6.66	6.79	5.81
A68/A72-100%-Rep3	Temp (°C)	12.24	11.76	11.6	11.91	11.62
A68/A72-100%-Rep3	D.O. (mg/L)	8.63	8.24	8.43	8.47	8.71
A68/A72-100%-Rep3	Conductivity (us/cm)	602.3	626.1	655	667.5	626.7
A68/A72-100%-Rep3	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/A72-100%-Rep3	Hardness (mg/L)	298	-	-	-	298

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-100%-Rep4	No. Alive	10	10	5	3	0
A68/A72-100%-Rep4	pH	5.6	6.3	6.64	6.77	5.61
A68/A72-100%-Rep4	Temp (°C)	12.25	11.78	11.58	11.91	11.59
A68/A72-100%-Rep4	D.O. (mg/L)	8.68	8.36	8.54	8.69	8.75
A68/A72-100%-Rep4	Conductivity (us/cm)	603	626.2	665	678.4	628
A68/A72-100%-Rep4	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/A72-100%-Rep4	Hardness (mg/L)	298	-	-	-	298

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-75%-Rep1	No. Alive	10	9	9	9	9	1 Jumper
A68/A72-75%-Rep1	pH	6.7	6.5	6.93	6.91	6.85	
A68/A72-75%-Rep1	Temp (°C)	12.04	11.7	11.75	11.89	11.58	
A68/A72-75%-Rep1	D.O. (mg/L)	8.71	8.23	8.26	8.16	8.35	
A68/A72-75%-Rep1	Conductivity (us/cm)	547	560.6	582.6	597	566.4	
A68/A72-75%-Rep1	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	7.5	
A68/A72-75%-Rep1	Hardness (mg/L)	250	-	-	-	267	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-75%-Rep2	No. Alive	10	9	9	9	9	1 Jumper
A68/A72-75%-Rep2	pH	6.5	6.4	6.88	6.89	6.82	
A68/A72-75%-Rep2	Temp (°C)	12.02	11.7	11.72	11.88	11.59	
A68/A72-75%-Rep2	D.O. (mg/L)	8.74	8.09	8.11	8.21	8.3	
A68/A72-75%-Rep2	Conductivity (us/cm)	546.4	559.5	582	591.9	569.4	
A68/A72-75%-Rep2	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	7.5	
A68/A72-75%-Rep2	Hardness (mg/L)	250	-	-	-	267	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-75%-Rep3	No. Alive	10	10	10	10	10
A68/A72-75%-Rep3	pH	6.4	6.6	6.86	6.88	6.79
A68/A72-75%-Rep3	Temp (°C)	12.02	11.73	11.76	11.87	11.61
A68/A72-75%-Rep3	D.O. (mg/L)	8.74	7.98	6.96	8.02	8.09
A68/A72-75%-Rep3	Conductivity (us/cm)	546.4	564.9	580	595.8	569.8
A68/A72-75%-Rep3	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	7.5
A68/A72-75%-Rep3	Hardness (mg/L)	250	-	-	-	267

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-75%-Rep4	No. Alive	10	10	10	10	10
A68/A72-75%-Rep4	pH	6.4	6.6	6.84	6.88	6.77
A68/A72-75%-Rep4	Temp (°C)	12.1	11.72	11.72	11.88	11.6
A68/A72-75%-Rep4	D.O. (mg/L)	8.72	8.06	7.6	8.31	8.13
A68/A72-75%-Rep4	Conductivity (us/cm)	546.9	557.5	577.4	587.3	577.4
A68/A72-75%-Rep4	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	7.5
A68/A72-75%-Rep4	Hardness (mg/L)	250	-	-	-	267

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-50%-Rep1	No. Alive	10	10	10	10	10
A68/A72-50%-Rep1	pH	7.2	7.3	7.2	6.99	6.9
A68/A72-50%-Rep1	Temp (°C)	11.96	11.67	11.86	11.87	11.6
A68/A72-50%-Rep1	D.O. (mg/L)	8.78	7.8	7.87	8.03	8.19
A68/A72-50%-Rep1	Conductivity (us/cm)	489.6	499.2	515	527.4	512.3
A68/A72-50%-Rep1	Alkalinity (mg $CaCO_3$/L)	16.6	-	-	-	17.5
A68/A72-50%-Rep1	Hardness (mg/L)	238	-	-	-	238

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-50%-Rep2	No. Alive	10	10	10	10	10
A68/A72-50%-Rep2	pH	7.2	7.3	7.1	6.96	6.89
A68/A72-50%-Rep2	Temp (°C)	11.96	11.68	11.85	11.87	11.6
A68/A72-50%-Rep2	D.O. (mg/L)	8.79	7.87	7.96	7.97	8.14
A68/A72-50%-Rep2	Conductivity (us/cm)	489.7	499.7	520	532.5	513.4
A68/A72-50%-Rep2	Alkalinity (mg $CaCO_3$/L)	16.6	-	-	-	17.5
A68/A72-50%-Rep2	Hardness (mg/L)	238	-	-	-	238

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-50%-Rep3	No. Alive	10	9	9	9	9	1 Jumper
A68/A72-50%-Rep3	pH	7.1	7.3	7	6.97	6.89	
A68/A72-50%-Rep3	Temp (°C)	12	11.66	11.84	11.87	11.64	
A68/A72-50%-Rep3	D.O. (mg/L)	8.8	7.97	8.36	8.05	8.16	
A68/A72-50%-Rep3	Conductivity (us/cm)	490	499.6	523.5	532.5	509.8	
A68/A72-50%-Rep3	Alkalinity (mg $CaCO_3$/L)	16.6	-	-	-	17.5	
A68/A72-50%-Rep3	Hardness (mg/L)	238	-	-	-	238	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-50%-Rep4	No. Alive	10	10	10	10	10
A68/A72-50%-Rep4	pH	7.1	7.3	6.99	6.93	6.88
A68/A72-50%-Rep4	Temp (°C)	12.07	11.67	11.84	11.86	11.63
A68/A72-50%-Rep4	D.O. (mg/L)	8.77	7.87	8.28	8.19	8.14
A68/A72-50%-Rep4	Conductivity (us/cm)	489.8	499.6	518	527	507.7
A68/A72-50%-Rep4	Alkalinity (mg $CaCO_3$/L)	16.6	-	-	-	17.5
A68/A72-50%-Rep4	Hardness (mg/L)	238	-	-	-	238

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-25%-Rep1	No. Alive	10	10	10	8	8
A68/A72-25%-Rep1	pH	7.5	7.4	7.24	7	6.93
A68/A72-25%-Rep1	Temp (°C)	12.18	11.65	11.88	11.85	11.58
A68/A72-25%-Rep1	D.O. (mg/L)	8.76	7.58	8.1	7.51	8.37
A68/A72-25%-Rep1	Conductivity (us/cm)	435.3	445.4	471	486.8	459.1
A68/A72-25%-Rep1	Alkalinity (mg $CaCO_3$/L)	25.9	-	-	-	33.4
A68/A72-25%-Rep1	Hardness (mg/L)	209	-	-	-	209

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-25%-Rep2	No. Alive	10	10	10	10	10
A68/A72-25%-Rep2	pH	7.4	7.4	7.15	7	6.92
A68/A72-25%-Rep2	Temp (°C)	12.21	11.65	11.88	11.85	11.6
A68/A72-25%-Rep2	D.O. (mg/L)	8.75	7.35	8.31	7.74	8.4
A68/A72-25%-Rep2	Conductivity (us/cm)	435.4	445.4	467	480.9	460.6
A68/A72-25%-Rep2	Alkalinity (mg $CaCO_3$/L)	25.9	-	-	-	33.4
A68/A72-25%-Rep2	Hardness (mg/L)	209	-	-	-	209

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-25%-Rep3	No. Alive	10	9	9	8	8	1 Jumper
A68/A72-25%-Rep3	pH	7.4	7.4	7.12	7.02	6.92	
A68/A72-25%-Rep3	Temp (°C)	12.22	11.66	11.88	11.86	11.66	
A68/A72-25%-Rep3	D.O. (mg/L)	8.74	7.47	8.23	7.62	7.65	
A68/A72-25%-Rep3	Conductivity (us/cm)	435.3	447.4	470	481	455.4	
A68/A72-25%-Rep3	Alkalinity (mg $CaCO_3$/L)	25.9	-	-	-	33.4	
A68/A72-25%-Rep3	Hardness (mg/L)	209	-	-	-	209	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-25%-Rep4	No. Alive	10	10	10	10	10
A68/A72-25%-Rep4	pH	7.4	7.4	7.06	7.02	6.92
A68/A72-25%-Rep4	Temp (°C)	12.35	11.66	11.89	11.84	11.6
A68/A72-25%-Rep4	D.O. (mg/L)	8.74	7.76	8.24	7.59	7.54
A68/A72-25%-Rep4	Conductivity (us/cm)	435	445.5	454	464.6	447.9
A68/A72-25%-Rep4	Alkalinity (mg $CaCO_3$/L)	25.9	-	-	-	33.4
A68/A72-25%-Rep4	Hardness (mg/L)	209	-	-	-	209

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-10%-Rep1	No. Alive	10	9	8	8	8	1 Jumper
A68/A72-10%-Rep1	pH	7.7	7.4	7.16	7.1	6.94	
A68/A72-10%-Rep1	Temp (°C)	11.82	11.64	11.83	11.85	11.63	
A68/A72-10%-Rep1	D.O. (mg/L)	8.79	8.01	8.3	8.37	8.25	
A68/A72-10%-Rep1	Conductivity (us/cm)	401.3	414.9	453	443.1	420	
A68/A72-10%-Rep1	Alkalinity (mg $CaCO_3$/L)	29.9	-	-	-	33.8	
A68/A72-10%-Rep1	Hardness (mg/L)	193	-	-	-	192	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/A72-10%-Rep2	No. Alive	10	10	10	8	8	2 Jumpers
A68/A72-10%-Rep2	pH	7.6	7.5	7.17	7.1	6.96	
A68/A72-10%-Rep2	Temp (°C)	11.81	11.66	11.84	11.85	11.64	
A68/A72-10%-Rep2	D.O. (mg/L)	8.82	7.76	8.24	8.34	8.25	
A68/A72-10%-Rep2	Conductivity (us/cm)	401.2	413.4	433	444.2	420.2	
A68/A72-10%-Rep2	Alkalinity (mg $CaCO_3$/L)	29.9	-	-	-	33.8	
A68/A72-10%-Rep2	Hardness (mg/L)	193	-	-	-	192	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-10%-Rep3	No. Alive	10	10	10	9	9
A68/A72-10%-Rep3	pH	7.6	7.4	7.06	7.1	6.95
A68/A72-10%-Rep3	Temp (°C)	11.82	11.63	11.84	11.85	11.6
A68/A72-10%-Rep3	D.O. (mg/L)	8.84	7.55	8.06	8.05	8.28
A68/A72-10%-Rep3	Conductivity (us/cm)	401.4	414.9	433	443.7	419.8
A68/A72-10%-Rep3	Alkalinity (mg $CaCO_3$/L)	29.9	-	-	-	33.8
A68/A72-10%-Rep3	Hardness (mg/L)	193	-	-	-	192

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-10%-Rep4	No. Alive	10	10	10	10	10
A68/A72-10%-Rep4	pH	7.6	7.4	7.06	7.07	6.94
A68/A72-10%-Rep4	Temp (°C)	11.89	11.64	11.86	11.83	11.66
A68/A72-10%-Rep4	D.O. (mg/L)	8.87	7.76	7.87	8.34	8.24
A68/A72-10%-Rep4	Conductivity (us/cm)	401.3	414.1	432	440	420.5
A68/A72-10%-Rep4	Alkalinity (mg $CaCO_3$/L)	29.9	-	-	-	33.8
A68/A72-10%-Rep4	Hardness (mg/L)	193	-	-	-	192

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-5%-Rep1	No. Alive	10	10	10	10	10
A68/A72-5%-Rep1	pH	7.8	7.4	7.19	7.1	6.88
A68/A72-5%-Rep1	Temp (°C)	12.27	11.67	11.81	11.84	11.72
A68/A72-5%-Rep1	D.O. (mg/L)	8.36	7.37	7.2	7.91	7.98
A68/A72-5%-Rep1	Conductivity (us/cm)	392.6	407.1	442	436.6	413.8
A68/A72-5%-Rep1	Alkalinity (mg $CaCO_3$/L)	38.5	-	-	-	39.2
A68/A72-5%-Rep1	Hardness (mg/L)	187	-	-	-	187

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-5%-Rep2	No. Alive	10	10	10	8	8
A68/A72-5%-Rep2	pH	7.8	7.4	7.17	7.1	6.98
A68/A72-5%-Rep2	Temp (°C)	12.21	11.64	11.83	11.85	11.73
A68/A72-5%-Rep2	D.O. (mg/L)	8.75	7.39	7.83	8.06	8.12
A68/A72-5%-Rep2	Conductivity (us/cm)	390.4	402.2	422	436.7	410.5
A68/A72-5%-Rep2	Alkalinity (mg $CaCO_3$/L)	38.5	-	-	-	39.2
A68/A72-5%-Rep2	Hardness (mg/L)	187	-	-	-	187

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-5%-Rep3	No. Alive	10	10	10	10	10
A68/A72-5%-Rep3	pH	7.8	7.4	7.16	7.1	6.9
A68/A72-5%-Rep3	Temp (°C)	12.18	11.59	11.83	11.82	11.67
A68/A72-5%-Rep3	D.O. (mg/L)	8.78	7.32	7.57	8.18	8.09
A68/A72-5%-Rep3	Conductivity (us/cm)	391.4	402.5	419	429.3	412.5
A68/A72-5%-Rep3	Alkalinity (mg $CaCO_3$/L)	38.5	-	-	-	39.2
A68/A72-5%-Rep3	Hardness (mg/L)	187	-	-	-	187

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-5%-Rep4	No. Alive	10	10	10	9	9
A68/A72-5%-Rep4	pH	7.8	7.5	7.17	7.1	6.96
A68/A72-5%-Rep4	Temp (°C)	12.27	11.63	11.83	11.84	11.65
A68/A72-5%-Rep4	D.O. (mg/L)	8.78	7.64	7.89	8.34	8.25
A68/A72-5%-Rep4	Conductivity (us/cm)	390.8	401.2	418	430.2	412.1
A68/A72-5%-Rep4	Alkalinity (mg $CaCO_3$/L)	38.5	-	-	-	39.2
A68/A72-5%-Rep4	Hardness (mg/L)	187	-	-	-	187

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-Control-Rep1	No. Alive	10	10	10	10	10
A68/A72-Control-Rep1	pH	7.4	7.6	7.48	7.3	7.05
A68/A72-Control-Rep1	Temp (°C)	11.63	11.79	11.9	11.87	11.93
A68/A72-Control-Rep1	D.O. (mg/L)	7.42	7.74	8.32	8.1	7.88
A68/A72-Control-Rep1	Conductivity (us/cm)	301.5	307.7	326	337.4	321.8
A68/A72-Control-Rep1	Alkalinity (mg $CaCO_3$/L)	63.1	-	-	-	72.9
A68/A72-Control-Rep1	Hardness (mg/L)	92	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-Control-Rep2	No. Alive	10	10	10	10	10
A68/A72-Control-Rep2	pH	7.4	7.6	7.5	7.3	7.07
A68/A72-Control-Rep2	Temp (°C)	11.6	11.65	11.83	11.85	11.89
A68/A72-Control-Rep2	D.O. (mg/L)	6.38	7.61	7.97	7.86	7.82
A68/A72-Control-Rep2	Conductivity (us/cm)	299.9	306.6	323	333.9	320.7
A68/A72-Control-Rep2	Alkalinity (mg $CaCO_3$/L)	63.1	-	-	-	72.9
A68/A72-Control-Rep2	Hardness (mg/L)	92	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-Control-Rep3	No. Alive	10	10	10	10	10
A68/A72-Control-Rep3	pH	7.3	7.6	7.43	7.31	7.08
A68/A72-Control-Rep3	Temp (°C)	11.62	11.64	11.81	11.86	11.85
A68/A72-Control-Rep3	D.O. (mg/L)	6.19	7.76	8.16	7.64	7.57
A68/A72-Control-Rep3	Conductivity (us/cm)	299.6	306	325.8	336.6	320.9
A68/A72-Control-Rep3	Alkalinity (mg $CaCO_3$/L)	63.1	-	-	-	72.9
A68/A72-Control-Rep3	Hardness (mg/L)	92	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/A72-Control-Rep4	No. Alive	10	10	10	10	10
A68/A72-Control-Rep4	pH	7.3	7.6	7.35	7.3	7.09
A68/A72-Control-Rep4	Temp (°C)	11.6	11.64	11.8	11.84	11.8
A68/A72-Control-Rep4	D.O. (mg/L)	6.04	7.62	8.28	7.63	7.4
A68/A72-Control-Rep4	Conductivity (us/cm)	299.2	304.8	324.6	336.2	321.4
A68/A72-Control-Rep4	Alkalinity (mg $CaCO_3$/L)	63.1	-	-	-	72.9
A68/A72-Control-Rep4	Hardness (mg/L)	92	-	-	-	93

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Serial dilution of CC48 with A68

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/CC48-Control-Rep1	No. Alive	10	9	9	9	9	1 Jumper
A68/CC48-Control-Rep1	pH	7.6	7.5	7.29	7.2	7.24	
A68/CC48-Control-Rep1	Temp (°C)	15.42	11.62	11.63	11.72	11.9	
A68/CC48-Control-Rep1	D.O. (mg/L)	7.75	7.88	7.9	8.11	8.02	
A68/CC48-Control-Rep1	Conductivity (us/cm)	299.1	306.2	323	329.8	318.1	
A68/CC48-Control-Rep1	Alkalinity (mg $CaCO_3$/L)	62.4	-	-	-	68.7	
A68/CC48-Control-Rep1	Hardness (mg/L)	92	-	-	-	93	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-Control-Rep2	No. Alive	10	10	10	10	10
A68/CC48-Control-Rep2	pH	7.6	7.7	7.3	7.22	7.4
A68/CC48-Control-Rep2	Temp (°C)	14.67	11.56	11.59	11.71	11.87
A68/CC48-Control-Rep2	D.O. (mg/L)	7.77	8.3	8.13	7.91	7.5
A68/CC48-Control-Rep2	Conductivity (us/cm)	299	304.4	323	332.5	331
A68/CC48-Control-Rep2	Alkalinity (mg $CaCO_3$/L)	62.4	-	-	-	68.7
A68/CC48-Control-Rep2	Hardness (mg/L)	92	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-Control-Rep3	No. Alive	10	10	10	10	10
A68/CC48-Control-Rep3	pH	7.7	7.8	7.34	7.24	7.4
A68/CC48-Control-Rep3	Temp (°C)	15.24	11.54	11.58	11.62	11.84
A68/CC48-Control-Rep3	D.O. (mg/L)	7.85	8.18	8.29	8.3	8.11
A68/CC48-Control-Rep3	Conductivity (us/cm)	298.8	304.4	324	333.9	334
A68/CC48-Control-Rep3	Alkalinity (mg $CaCO_3$/L)	62.4	-	-	-	68.7
A68/CC48-Control-Rep3	Hardness (mg/L)	92	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-Control-Rep4	No. Alive	10	10	10	10	10
A68/CC48-Control-Rep4	pH	7.7	7.8	7.35	7.25	7.18
A68/CC48-Control-Rep4	Temp (°C)	14.48	11.55	11.58	11.61	11.92
A68/CC48-Control-Rep4	D.O. (mg/L)	7.89	8.37	8.09	8.28	8.14
A68/CC48-Control-Rep4	Conductivity (us/cm)	298.6	304.3	324	334.2	331
A68/CC48-Control-Rep4	Alkalinity (mg $CaCO_3$/L)	62.4	-	-	-	68.7
A68/CC48-Control-Rep4	Hardness (mg/L)	92	-	-	-	93

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-50%-Rep1	No. Alive	10	0	-	-	-
A68/CC48-50%-Rep1	pH	4.8	5.2	-	-	-
A68/CC48-50%-Rep1	Temp (°C)	12.45	11.65	-	-	-
A68/CC48-50%-Rep1	D.O. (mg/L)	8.68	8.73	-	-	-
A68/CC48-50%-Rep1	Conductivity (us/cm)	732.6	760.5	-	-	-
A68/CC48-50%-Rep1	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48-50%-Rep1	Hardness (mg/L)	368	371	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-50%-Rep2	No. Alive	10	0	-	-	-
A68/CC48-50%-Rep2	pH	4.8	5.2	-	-	-
A68/CC48-50%-Rep2	Temp (°C)	12.2	11.63	-	-	-
A68/CC48-50%-Rep2	D.O. (mg/L)	8.72	8.67	-	-	-
A68/CC48-50%-Rep2	Conductivity (us/cm)	736.5	768.6	-	-	-
A68/CC48-50%-Rep2	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48-50%-Rep2	Hardness (mg/L)	368	371	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-50%-Rep3	No. Alive	10	0	-	-	-
A68/CC48-50%-Rep3	pH	4.8	5.2	-	-	-
A68/CC48-50%-Rep3	Temp (°C)	12.04	11.65	-	-	-
A68/CC48-50%-Rep3	D.O. (mg/L)	8.76	8.7	-	-	-
A68/CC48-50%-Rep3	Conductivity (us/cm)	735.8	761.9	-	-	-
A68/CC48-50%-Rep3	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48-50%-Rep3	Hardness (mg/L)	368	371	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-50%-Rep4	No. Alive	10	0	-	-	-
A68/CC48-50%-Rep4	pH	4.8	5.2	-	-	-
A68/CC48-50%-Rep4	Temp (°C)	12.21	11.63	-	-	-
A68/CC48-50%-Rep4	D.O. (mg/L)	8.73	8.67	-	-	-
A68/CC48-50%-Rep4	Conductivity (us/cm)	737	772.6	-	-	-
A68/CC48-50%-Rep4	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48-50%-Rep4	Hardness (mg/L)	368	371	-	-	-

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-25%-Rep1	No. Alive	10	10	10	6	6
A68/CC48-25%-Rep1	pH	6.4	6.9	7.09	6.98	6.98
A68/CC48-25%-Rep1	Temp (°C)	12.12	11.68	11.83	11.64	11.86
A68/CC48-25%-Rep1	D.O. (mg/L)	8.78	8.15	8.31	8.2	8.38
A68/CC48-25%-Rep1	Conductivity (us/cm)	554.6	566.9	599.7	612.4	578
A68/CC48-25%-Rep1	Alkalinity (mg $CaCO_3$/L)	10.2	-	-	-	13.4
A68/CC48-25%-Rep1	Hardness (mg/L)	272	-	-	-	269

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-25%-Rep2	No. Alive	10	10	10	10	10
A68/CC48-25%-Rep2	pH	6.3	6.9	7	6.96	6.96
A68/CC48-25%-Rep2	Temp (°C)	12.17	11.63	11.84	11.65	11.85
A68/CC48-25%-Rep2	D.O. (mg/L)	8.81	8.17	8.12	7.93	8.34
A68/CC48-25%-Rep2	Conductivity (us/cm)	553.6	565.8	600	611.8	572
A68/CC48-25%-Rep2	Alkalinity (mg $CaCO_3$/L)	10.2	-	-	-	13.4
A68/CC48-25%-Rep2	Hardness (mg/L)	272	-	-	-	269

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-25%-Rep3	No. Alive	10	10	10	10	10
A68/CC48-25%-Rep3	pH	6.2	6.9	6.98	6.95	6.96
A68/CC48-25%-Rep3	Temp (°C)	12.78	11.62	11.83	11.64	11.83
A68/CC48-25%-Rep3	D.O. (mg/L)	8.53	8.24	8.27	7.65	8.14
A68/CC48-25%-Rep3	Conductivity (us/cm)	548.1	565.9	599.8	609.4	568.5
A68/CC48-25%-Rep3	Alkalinity (mg $CaCO_3$/L)	10.2	-	-	-	13.4
A68/CC48-25%-Rep3	Hardness (mg/L)	272	-	-	-	269

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-25%-Rep4	No. Alive	10	10	10	10	10
A68/CC48-25%-Rep4	pH	6.2	6.9	6.96	6.93	6.94
A68/CC48-25%-Rep4	Temp (°C)	12.34	11.65	11.84	11.64	11.38
A68/CC48-25%-Rep4	D.O. (mg/L)	8.67	8.26	8.23	7.1	8.14
A68/CC48-25%-Rep4	Conductivity (us/cm)	552.9	567.2	601.2	614.1	571.1
A68/CC48-25%-Rep4	Alkalinity (mg $CaCO_3$/L)	10.2	-	-	-	13.4
A68/CC48-25%-Rep4	Hardness (mg/L)	272	-	-	-	269

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-12%-Rep1	No. Alive	10	10	10	9	9
A68/CC48-12%-Rep1	pH	7.1	7.2	7.05	7.06	7.06
A68/CC48-12%-Rep1	Temp (°C)	12.62	11.64	11.79	11.65	11.94
A68/CC48-12%-Rep1	D.O. (mg/L)	8.59	7.85	8.05	7.96	7.84
A68/CC48-12%-Rep1	Conductivity (us/cm)	464.6	475.5	500	508.6	484.1
A68/CC48-12%-Rep1	Alkalinity (mg $CaCO_3$/L)	22.4	-	-	-	32
A68/CC48-12%-Rep1	Hardness (mg/L)	226	-	-	-	225

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-12%-Rep2	No. Alive	10	10	10	10	10
A68/CC48-12%-Rep2	pH	7.1	7.2	7.05	7.04	7.05
A68/CC48-12%-Rep2	Temp (°C)	12.1	11.63	11.78	11.61	11.9
A68/CC48-12%-Rep2	D.O. (mg/L)	8.62	7.83	8.11	7.85	8.01
A68/CC48-12%-Rep2	Conductivity (us/cm)	465.4	476.1	505	519.9	490.4
A68/CC48-12%-Rep2	Alkalinity (mg $CaCO_3$/L)	22.4	-	-	-	32
A68/CC48-12%-Rep2	Hardness (mg/L)	226	-	-	-	225

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-12%-Rep3	No. Alive	10	10	10	10	10
A68/CC48-12%-Rep3	pH	7.1	7.2	7.06	7.05	7.07
A68/CC48-12%-Rep3	Temp (°C)	12.5	11.62	11.79	11.62	11.88
A68/CC48-12%-Rep3	D.O. (mg/L)	8.5	7.38	8.13	7.77	7.45
A68/CC48-12%-Rep3	Conductivity (us/cm)	467.8	476.4	505	509.3	486.7
A68/CC48-12%-Rep3	Alkalinity (mg $CaCO_3$/L)	22.4	-	-	-	32
A68/CC48-12%-Rep3	Hardness (mg/L)	226	-	-	-	225

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-12%-Rep4	No. Alive	10	10	8	7	7
A68/CC48-12%-Rep4	pH	7	7.2	7.06	7.03	7.04
A68/CC48-12%-Rep4	Temp (°C)	12.19	11.62	11.78	11.01	11.88
A68/CC48-12%-Rep4	D.O. (mg/L)	8.43	7.93	8.34	8.26	7.53
A68/CC48-12%-Rep4	Conductivity (us/cm)	466.1	479.7	513.9	531.1	484
A68/CC48-12%-Rep4	Alkalinity (mg $CaCO_3$/L)	22.4	-	-	-	32
A68/CC48-12%-Rep4	Hardness (mg/L)	226	-	-	-	225

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-6%-Rep1	No. Alive	10	10	9	9	9
A68/CC48-6%-Rep1	pH	7.4	7.4	7.07	7.08	7.08
A68/CC48-6%-Rep1	Temp (°C)	12.04	11.62	11.69	11.6	11.94
A68/CC48-6%-Rep1	D.O. (mg/L)	8.83	7.94	7.13	8.41	7.84
A68/CC48-6%-Rep1	Conductivity (us/cm)	422.7	435.7	460	466.6	441.3
A68/CC48-6%-Rep1	Alkalinity (mg $CaCO_3$/L)	29.1	-	-	-	36.8
A68/CC48-6%-Rep1	Hardness (mg/L)	204	-	-	-	201

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-6%-Rep2	No. Alive	10	10	10	10	10
A68/CC48-6%-Rep2	pH	7.3	7.2	7.04	7.09	7.08
A68/CC48-6%-Rep2	Temp (°C)	11.88	11.61	11.77	11.62	11.93
A68/CC48-6%-Rep2	D.O. (mg/L)	8.85	7.1	7.25	8.16	7.99
A68/CC48-6%-Rep2	Conductivity (us/cm)	422.6	431.4	456	465.1	443.8
A68/CC48-6%-Rep2	Alkalinity (mg $CaCO_3$/L)	29.1	-	-	-	36.8
A68/CC48-6%-Rep2	Hardness (mg/L)	204	-	-	-	201

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-6%-Rep3	No. Alive	10	10	10	10	10
A68/CC48-6%-Rep3	pH	7.2	7.2	7.13	7.09	7.09
A68/CC48-6%-Rep3	Temp (°C)	11.81	11.6	11.71	11.61	11.93
A68/CC48-6%-Rep3	D.O. (mg/L)	8.89	7.36	7.97	7.98	8.23
A68/CC48-6%-Rep3	Conductivity (us/cm)	422	432	458	467.2	439.7
A68/CC48-6%-Rep3	Alkalinity (mg $CaCO_3$/L)	29.1	-	-	-	36.8
A68/CC48-6%-Rep3	Hardness (mg/L)	204	-	-	-	201

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-6%-Rep4	No. Alive	10	10	10	10	10
A68/CC48-6%-Rep4	pH	7.3	7.2	7.07	7.08	7.09
A68/CC48-6%-Rep4	Temp (°C)	11.82	11.59	11.74	11.6	11.92
A68/CC48-6%-Rep4	D.O. (mg/L)	8.87	7.13	7.57	8.04	8.26
A68/CC48-6%-Rep4	Conductivity (us/cm)	423.9	435	463	473.7	443
A68/CC48-6%-Rep4	Alkalinity (mg $CaCO_3$/L)	29.1	-	-	-	36.8
A68/CC48-6%-Rep4	Hardness (mg/L)	204	-	-	-	201

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-3%-Rep1	No. Alive	10	10	10	10	10
A68/CC48-3%-Rep1	pH	7.4	7.2	7.12	7.03	7.09
A68/CC48-3%-Rep1	Temp (°C)	11.91	11.61	11.63	11.62	11.95
A68/CC48-3%-Rep1	D.O. (mg/L)	8.87	6.59	8.12	7.56	8.07
A68/CC48-3%-Rep1	Conductivity (us/cm)	401.5	410.8	437	447.2	422.4
A68/CC48-3%-Rep1	Alkalinity (mg $CaCO_3$/L)	35.9	-	-	-	36.2
A68/CC48-3%-Rep1	Hardness (mg/L)	193	-	-	-	182

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/CC48-3%-Rep2	No. Alive	10	10	10	9	9	1 Jumper
A68/CC48-3%-Rep2	pH	7.4	7.3	7.03	7.06	7.1	
A68/CC48-3%-Rep2	Temp (°C)	12.01	11.58	11.63	11.6	11.93	
A68/CC48-3%-Rep2	D.O. (mg/L)	8.82	7.14	8.1	8.24	8.27	
A68/CC48-3%-Rep2	Conductivity (us/cm)	399.9	410.6	437	448.1	420.8	
A68/CC48-3%-Rep2	Alkalinity (mg $CaCO_3$/L)	35.9	-	-	-	36.2	
A68/CC48-3%-Rep2	Hardness (mg/L)	193	-	-	-	182	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-3%-Rep3	No. Alive	10	10	9	9	9
A68/CC48-3%-Rep3	pH	7.4	7.3	7.11	7.08	7.11
A68/CC48-3%-Rep3	Temp (°C)	12.06	11.56	11.63	11.58	11.93
A68/CC48-3%-Rep3	D.O. (mg/L)	8.84	7.11	8.22	8.3	8.23
A68/CC48-3%-Rep3	Conductivity (us/cm)	401.3	411	437	446.4	418.8
A68/CC48-3%-Rep3	Alkalinity (mg $CaCO_3$/L)	35.9	-	-	-	36.2
A68/CC48-3%-Rep3	Hardness (mg/L)	193	-	-	-	182

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-3%-Rep4	No. Alive	10	10	10	10	10
A68/CC48-3%-Rep4	pH	7.4	7.2	7.12	7.1	7.1
A68/CC48-3%-Rep4	Temp (°C)	12.1	11.59	11.65	11.61	11.95
A68/CC48-3%-Rep4	D.O. (mg/L)	8.82	6.72	7.92	8	8.12
A68/CC48-3%-Rep4	Conductivity (us/cm)	401.7	410.4	432	439.8	419
A68/CC48-3%-Rep4	Alkalinity (mg $CaCO_3$/L)	35.9	-	-	-	36.2
A68/CC48-3%-Rep4	Hardness (mg/L)	193	-	-	-	182

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-1%-Rep1	No. Alive	10	10	9	9	9
A68/CC48-1%-Rep1	pH	7.6	7.4	7.13	7.02	7.1
A68/CC48-1%-Rep1	Temp (°C)	11.43	11.44	11.62	11.64	11.93
A68/CC48-1%-Rep1	D.O. (mg/L)	8.54	8.13	7.92	7.79	7.44
A68/CC48-1%-Rep1	Conductivity (us/cm)	390.5	396.5	421	432.8	407
A68/CC48-1%-Rep1	Alkalinity (mg $CaCO_3$/L)	33.1				39.4
A68/CC48-1%-Rep1	Hardness (mg/L)	184				183

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-1%-Rep2	No. Alive	10	10	9	9	9
A68/CC48-1%-Rep2	pH	7.5	7.4	7.1	6.99	7.08
A68/CC48-1%-Rep2	Temp (°C)	11.56	11.58	11.61	11.64	11.9
A68/CC48-1%-Rep2	D.O. (mg/L)	8.71	7.62	7.82	7.53	7.5
A68/CC48-1%-Rep2	Conductivity (us/cm)	386.2	397.7	423	434.4	412.6
A68/CC48-1%-Rep2	Alkalinity (mg $CaCO_3$/L)	33.1	-	-	-	39.4
A68/CC48-1%-Rep2	Hardness (mg/L)	184	-	-	-	183

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-1%-Rep3	No. Alive	10	10	10	10	10
A68/CC48-1%-Rep3	pH	7.5	7.4	7.09	7.04	7.09
A68/CC48-1%-Rep3	Temp (°C)	11.54	11.58	11.61	11.63	11.91
A68/CC48-1%-Rep3	D.O. (mg/L)	8.84	7.63	7.66	7.04	7.74
A68/CC48-1%-Rep3	Conductivity (us/cm)	386.3	396.8	419	426.6	408.8
A68/CC48-1%-Rep3	Alkalinity (mg $CaCO_3$/L)	33.1	-	-	-	39.4
A68/CC48-1%-Rep3	Hardness (mg/L)	184	-	-	-	183

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48-1%-Rep4	No. Alive	10	10	8	6	6
A68/CC48-1%-Rep4	pH	7.4	7.3	7.07	6.99	7.1
A68/CC48-1%-Rep4	Temp (°C)	11.67	11.58	11.61	11.59	11.92
A68/CC48-1%-Rep4	D.O. (mg/L)	8.87	6.92	7.68	8.16	8.07
A68/CC48-1%-Rep4	Conductivity (us/cm)	386.4	396.2	422	431.6	405.4
A68/CC48-1%-Rep4	Alkalinity (mg $CaCO_3$/L)	33.1	-	-	-	39.4
A68/CC48-1%-Rep4	Hardness (mg/L)	184	-	-	-	183

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Serial dilution of M34/CC48 with A68

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-85%-Rep1	No. Alive	10	0	-	-	-
A68/CC48/M34-85%-Rep1	pH	4.8	5.1	-	-	-
A68/CC48/M34-85%-Rep1	Temp (°C)	11.69	11.82	-	-	-
A68/CC48/M34-85%-Rep1	D.O. (mg/L)	8.25	8.5	-	-	-
A68/CC48/M34-85%-Rep1	Conductivity (us/cm)	695.5	719.8	-	-	-
A68/CC48/M34-85%-Rep1	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48/M34-85%-Rep1	Hardness (mg/L)	328	341	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-85%-Rep2	No. Alive	10	0	-	-	-
A68/CC48/M34-85%-Rep2	pH	4.8	5.1	-	-	-
A68/CC48/M34-85%-Rep2	Temp (°C)	11.66	11.84	-	-	-
A68/CC48/M34-85%-Rep2	D.O. (mg/L)	8.14	8.6	-	-	-
A68/CC48/M34-85%-Rep2	Conductivity (us/cm)	697.4	724.5	-	-	-
A68/CC48/M34-85%-Rep2	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48/M34-85%-Rep2	Hardness (mg/L)	328	341	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-85%-Rep3	No. Alive	10	0	-	-	-
A68/CC48/M34-85%-Rep3	pH	4.7	5.1	-	-	-
A68/CC48/M34-85%-Rep3	Temp (°C)	11.67	11.84	-	-	-
A68/CC48/M34-85%-Rep3	D.O. (mg/L)	8.09	8.46	-	-	-
A68/CC48/M34-85%-Rep3	Conductivity (us/cm)	694.3	719.2	-	-	-
A68/CC48/M34-85%-Rep3	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48/M34-85%-Rep3	Hardness (mg/L)	328	341	-	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-85%-Rep4	No. Alive	10	0	-	-	-
A68/CC48/M34-85%-Rep4	pH	4.7	5.1	-	-	-
A68/CC48/M34-85%-Rep4	Temp (°C)	11.66	11.86	-	-	-
A68/CC48/M34-85%-Rep4	D.O. (mg/L)	7.56	8.53	-	-	-
A68/CC48/M34-85%-Rep4	Conductivity (us/cm)	698.8	722.2	-	-	-
A68/CC48/M34-85%-Rep4	Alkalinity (mg $CaCO_3$/L)	<5.00 U	<5.00 U	-	-	-
A68/CC48/M34-85%-Rep4	Hardness (mg/L)	328	341	-	-	-

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-65%-Rep1	No. Alive	10	7	3	1	0
A68/CC48/M34-65%-Rep1	pH	5.7	6.3	6.93	6.85	6.49
A68/CC48/M34-65%-Rep1	Temp (°C)	11.67	11.82	11.58	11.72	11.75
A68/CC48/M34-65%-Rep1	D.O. (mg/L)	7.96	7.92	8.03	8.62	8.61
A68/CC48/M34-65%-Rep1	Conductivity (us/cm)	615.5	641.5	685	688.5	632.7
A68/CC48/M34-65%-Rep1	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/CC48/M34-65%-Rep1	Hardness (mg/L)	296	-	-	-	302

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-65%-Rep2	No. Alive	10	9	3	1	0
A68/CC48/M34-65%-Rep2	pH	5.6	6.4	6.93	6.83	6.42
A68/CC48/M34-65%-Rep2	Temp (°C)	11.64	11.82	11.58	11.75	11.73
A68/CC48/M34-65%-Rep2	D.O. (mg/L)	7.92	8.14	8.03	8.65	8.71
A68/CC48/M34-65%-Rep2	Conductivity (us/cm)	615.8	646.3	685	699.6	634.1
A68/CC48/M34-65%-Rep2	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/CC48/M34-65%-Rep2	Hardness (mg/L)	296	-	-	-	302

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-65%-Rep3	No. Alive	10	9	2	2	0
A68/CC48/M34-65%-Rep3	pH	5.6	6.4	6.93	6.82	5.83
A68/CC48/M34-65%-Rep3	Temp (°C)	11.64	11.83	11.58	11.75	11.68
A68/CC48/M34-65%-Rep3	D.O. (mg/L)	7.89	8.22	8.03	8.67	8.6
A68/CC48/M34-65%-Rep3	Conductivity (us/cm)	614.5	641.1	685	685	640.6
A68/CC48/M34-65%-Rep3	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/CC48/M34-65%-Rep3	Hardness (mg/L)	296	-	-	-	302

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-65%-Rep4	No. Alive	10	10	4	4	0
A68/CC48/M34-65%-Rep4	pH	5.6	6.5	6.93	6.81	5.64
A68/CC48/M34-65%-Rep4	Temp (°C)	11.61	11.83	11.58	11.77	11.68
A68/CC48/M34-65%-Rep4	D.O. (mg/L)	7.99	8.3	8.03	8.67	8.78
A68/CC48/M34-65%-Rep4	Conductivity (us/cm)	613.1	642.1	685	692.6	639.6
A68/CC48/M34-65%-Rep4	Alkalinity (mg $CaCO_3$/L)	<5.00 U	-	-	-	<5.00 U
A68/CC48/M34-65%-Rep4	Hardness (mg/L)	296	-	-	-	302

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-40%-Rep1	No. Alive	10	10	10	10	9
A68/CC48/M34-40%-Rep1	pH	7.1	6.9	7.07	7.04	7.01
A68/CC48/M34-40%-Rep1	Temp (°C)	11.68	11.78	11.71	11.72	11.73
A68/CC48/M34-40%-Rep1	D.O. (mg/L)	7.78	7.81	8.02	7.78	7.43
A68/CC48/M34-40%-Rep1	Conductivity (us/cm)	524.5	533.7	569	575.9	543.5
A68/CC48/M34-40%-Rep1	Alkalinity (mg $CaCO_3$/L)	10.8	-	-	-	12.5
A68/CC48/M34-40%-Rep1	Hardness (mg/L)	244	-	-	-	250

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-40%-Rep2	No. Alive	10	10	10	10	10
A68/CC48/M34-40%-Rep2	pH	7.1	6.9	7.03	7.02	7
A68/CC48/M34-40%-Rep2	Temp (°C)	11.67	11.78	11.68	11.71	11.7
A68/CC48/M34-40%-Rep2	D.O. (mg/L)	7.69	7.82	8.09	7.79	7.45
A68/CC48/M34-40%-Rep2	Conductivity (us/cm)	524.7	533.9	568	575.6	530.4
A68/CC48/M34-40%-Rep2	Alkalinity (mg $CaCO_3$/L)	10.8	-	-	-	12.5
A68/CC48/M34-40%-Rep2	Hardness (mg/L)	244	-	-	-	250

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-40%-Rep3	No. Alive	10	10	10	10	8
A68/CC48/M34-40%-Rep3	pH	7.1	6.9	7.01	7.01	6.99
A68/CC48/M34-40%-Rep3	Temp (°C)	11.62	11.8	11.63	11.72	11.3
A68/CC48/M34-40%-Rep3	D.O. (mg/L)	7.88	7.63	8.1	7.63	7.52
A68/CC48/M34-40%-Rep3	Conductivity (us/cm)	523.9	534.4	572	575.6	530.2
A68/CC48/M34-40%-Rep3	Alkalinity (mg $CaCO_3$/L)	10.8	-	-	-	12.5
A68/CC48/M34-40%-Rep3	Hardness (mg/L)	244	-	-	-	250

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-40%-Rep4	No. Alive	10	10	10	10	10
A68/CC48/M34-40%-Rep4	pH	7	6.9	7	7.01	6.97
A68/CC48/M34-40%-Rep4	Temp (°C)	11.62	11.8	11.66	11.72	11.66
A68/CC48/M34-40%-Rep4	D.O. (mg/L)	7.97	7.64	8.02	7.63	7.98
A68/CC48/M34-40%-Rep4	Conductivity (us/cm)	524.5	533.8	568	575.6	545.6
A68/CC48/M34-40%-Rep4	Alkalinity (mg $CaCO_3$/L)	10.8	-	-	-	12.5
A68/CC48/M34-40%-Rep4	Hardness (mg/L)	244	-	-	-	250

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-20%-Rep1	No. Alive	10	10	10	10	10
A68/CC48/M34-20%-Rep1	pH	7.3	7.1	7.12	7.11	7.08
A68/CC48/M34-20%-Rep1	Temp (°C)	11.71	11.77	11.78	11.7	11.65
A68/CC48/M34-20%-Rep1	D.O. (mg/L)	7.91	7.78	8.06	7.82	8.07
A68/CC48/M34-20%-Rep1	Conductivity (us/cm)	451.9	459.8	492	499.3	469.1
A68/CC48/M34-20%-Rep1	Alkalinity (mg $CaCO_3$/L)	25.2	-	-	-	26
A68/CC48/M34-20%-Rep1	Hardness (mg/L)	213	-	-	-	217

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-20%-Rep2	No. Alive	10	10	10	10	10
A68/CC48/M34-20%-Rep2	pH	7.3	7.1	7.12	7.11	7.07
A68/CC48/M34-20%-Rep2	Temp (°C)	11.68	11.77	11.77	11.7	11.68
A68/CC48/M34-20%-Rep2	D.O. (mg/L)	7.2	7.84	8.18	8.07	8.28
A68/CC48/M34-20%-Rep2	Conductivity (us/cm)	451.9	459.7	487	495.3	471.1
A68/CC48/M34-20%-Rep2	Alkalinity (mg $CaCO_3$/L)	25.2	-	-	-	26
A68/CC48/M34-20%-Rep2	Hardness (mg/L)	213	-	-	-	217

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-20%-Rep3	No. Alive	10	10	10	10	10
A68/CC48/M34-20%-Rep3	pH	7.2	7.1	7.12	7.11	7.08
A68/CC48/M34-20%-Rep3	Temp (°C)	11.66	11.77	11.72	11.7	11.66
A68/CC48/M34-20%-Rep3	D.O. (mg/L)	7.99	7.66	8.03	8.09	8.42
A68/CC48/M34-20%-Rep3	Conductivity (us/cm)	452	458.6	487	495.4	470.6
A68/CC48/M34-20%-Rep3	Alkalinity (mg $CaCO_3$/L)	25.2	-	-	-	26
A68/CC48/M34-20%-Rep3	Hardness (mg/L)	213	-	-	-	217

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-20%-Rep4	No. Alive	10	10	10	10	10
A68/CC48/M34-20%-Rep4	pH	7.2	7.1	7.12	7.09	7.07
A68/CC48/M34-20%-Rep4	Temp (°C)	11.62	11.79	11.72	11.71	11.7
A68/CC48/M34-20%-Rep4	D.O. (mg/L)	7.96	7.52	8.11	7.83	8.18
A68/CC48/M34-20%-Rep4	Conductivity (us/cm)	451.5	461.2	488	493.5	469.5
A68/CC48/M34-20%-Rep4	Alkalinity (mg $CaCO_3$/L)	25.2	-	-	-	26
A68/CC48/M34-20%-Rep4	Hardness (mg/L)	213	-	-	-	217

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-9%-Rep1	No. Alive	10	10	10	10	10
A68/CC48/M34-9%-Rep1	pH	7.4	7.2	7.15	7.16	7.07
A68/CC48/M34-9%-Rep1	Temp (°C)	11.79	11.74	11.84	11.67	11.74
A68/CC48/M34-9%-Rep1	D.O. (mg/L)	7.64	7.65	8.11	8.02	7.91
A68/CC48/M34-9%-Rep1	Conductivity (us/cm)	413	422.2	446	453.6	430.9
A68/CC48/M34-9%-Rep1	Alkalinity (mg $CaCO_3$/L)	28.2	-	-	-	38.9
A68/CC48/M34-9%-Rep1	Hardness (mg/L)	199	-	-	-	196

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-9%-Rep2	No. Alive	10	10	9	9	9
A68/CC48/M34-9%-Rep2	pH	7.3	7.3	7.16	7.14	7.07
A68/CC48/M34-9%-Rep2	Temp (°C)	11.74	11.73	11.81	11.66	11.77
A68/CC48/M34-9%-Rep2	D.O. (mg/L)	7.69	8.05	8.26	8.08	8.1
A68/CC48/M34-9%-Rep2	Conductivity (us/cm)	412.5	421.4	448	456.4	429.6
A68/CC48/M34-9%-Rep2	Alkalinity (mg $CaCO_3$/L)	28.2	-	-	-	38.9
A68/CC48/M34-9%-Rep2	Hardness (mg/L)	199	-	-	-	196

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-9%-Rep3	No. Alive	10	10	10	10	10
A68/CC48/M34-9%-Rep3	pH	7.3	7.2	7.17	7.15	7.09
A68/CC48/M34-9%-Rep3	Temp (°C)	11.76	11.73	11.79	11.66	11.68
A68/CC48/M34-9%-Rep3	D.O. (mg/L)	7.6	7.65	8.28	8.17	8.31
A68/CC48/M34-9%-Rep3	Conductivity (us/cm)	412.4	419.7	443	450	427.5
A68/CC48/M34-9%-Rep3	Alkalinity (mg $CaCO_3$/L)	28.2	-	-	-	38.9
A68/CC48/M34-9%-Rep3	Hardness (mg/L)	199	-	-	-	196

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-9%-Rep4	No. Alive	10	10	10	9	9
A68/CC48/M34-9%-Rep4	pH	7.3	7.2	7.15	7.15	7.1
A68/CC48/M34-9%-Rep4	Temp (°C)	11.7	11.77	11.78	11.68	11.67
A68/CC48/M34-9%-Rep4	D.O. (mg/L)	7.65	7.73	7.69	8.04	7.94
A68/CC48/M34-9%-Rep4	Conductivity (us/cm)	412.8	421.2	445	455.3	428.4
A68/CC48/M34-9%-Rep4	Alkalinity (mg $CaCO_3$/L)	28.2	-	-	-	38.9
A68/CC48/M34-9%-Rep4	Hardness (mg/L)	199	-	-	-	196

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates: 4	
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-4%-Rep1	No. Alive	10	10	10	10	10
A68/CC48/M34-4%-Rep1	pH	7.4	7.3	7.18	7.17	7.07
A68/CC48/M34-4%-Rep1	Temp (°C)	11.89	11.68	11.91	11.67	11.91
A68/CC48/M34-4%-Rep1	D.O. (mg/L)	7.53	8	8.46	8.41	8.37
A68/CC48/M34-4%-Rep1	Conductivity (us/cm)	394.7	403.2	428	434.9	412.4
A68/CC48/M34-4%-Rep1	Alkalinity (mg $CaCO_3$/L)	34.9	-	-	-	40.8
A68/CC48/M34-4%-Rep1	Hardness (mg/L)	185	-	-	-	187

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
A68/CC48/M34-4%-Rep2	No. Alive	10	9	9	9	9	1 Jumper
A68/CC48/M34-4%-Rep2	pH	7.4	7.3	7.21	7.18	7.06	
A68/CC48/M34-4%-Rep2	Temp (°C)	11.82	11.71	11.88	11.66	11.79	
A68/CC48/M34-4%-Rep2	D.O. (mg/L)	7.76	8.09	8.19	8.34	8.31	
A68/CC48/M34-4%-Rep2	Conductivity (us/cm)	394.6	401.4	421	427.2	408	
A68/CC48/M34-4%-Rep2	Alkalinity (mg $CaCO_3$/L)	34.9	-	-	-	40.8	
A68/CC48/M34-4%-Rep2	Hardness (mg/L)	185	-	-	-	187	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-4%-Rep3	No. Alive	10	10	10	10	10
A68/CC48/M34-4%-Rep3	pH	7.4	7.3	7.17	7.16	7.07
A68/CC48/M34-4%-Rep3	Temp (°C)	11.79	11.72	11.87	11.68	11.75
A68/CC48/M34-4%-Rep3	D.O. (mg/L)	7.72	7.96	8.03	8.21	8.02
A68/CC48/M34-4%-Rep3	Conductivity (us/cm)	394.9	403.5	426	435.7	412.5
A68/CC48/M34-4%-Rep3	Alkalinity (mg $CaCO_3$/L)	34.9	-	-	-	40.8
A68/CC48/M34-4%-Rep3	Hardness (mg/L)	185	-	-	-	187

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-4%-Rep4	No. Alive	10	10	10	9	9
A68/CC48/M34-4%-Rep4	pH	7.4	7.3	7.16	7.16	7.08
A68/CC48/M34-4%-Rep4	Temp (°C)	11.77	11.71	11.88	11.68	11.71
A68/CC48/M34-4%-Rep4	D.O. (mg/L)	7.77	7.66	7.61	8.04	7.7
A68/CC48/M34-4%-Rep4	Conductivity (us/cm)	394.5	404.2	427	436.7	411.1
A68/CC48/M34-4%-Rep4	Alkalinity (mg $CaCO_3$/L)	34.9	-	-	-	40.8
A68/CC48/M34-4%-Rep4	Hardness (mg/L)	185	-	-	-	187

Appendix B 1: Upper Animas November 2012

Aquatic Toxicity Test

Site Static Renewal Data Sheets

Start Date	11/02/12		No. Organisms per replicate: 10
End Date	11/06/12		No. of Replicates: 4
Organism	Juvenile *O.mykiss* (rainbow trout) (0.84 grams)	Analysts	SA,CL,LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-Control-Rep1	No. Alive	10	10	10	10	10
A68/CC48/M34-Control-Rep1	pH	7.7	7.4	7.28	7.33	7.33
A68/CC48/M34-Control-Rep1	Temp (°C)	12.14	11.75	12.02	11.68	12.12
A68/CC48/M34-Control-Rep1	D.O. (mg/L)	7.19	7.81	8.06	8.08	7.77
A68/CC48/M34-Control-Rep1	Conductivity (us/cm)	298.1	302.8	317	323.8	319.5
A68/CC48/M34-Control-Rep1	Alkalinity (mg $CaCO_3$/L)	54.8	-	-	-	63.4
A68/CC48/M34-Control-Rep1	Hardness (mg/L)	91	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-Control-Rep2	No. Alive	10	10	10	10	10
A68/CC48/M34-Control-Rep2	pH	7.6	7.4	7.36	7.34	7.35
A68/CC48/M34-Control-Rep2	Temp (°C)	12.01	11.72	11.92	11.71	11.91
A68/CC48/M34-Control-Rep2	D.O. (mg/L)	6.97	8.1	8.08	8.11	7.21
A68/CC48/M34-Control-Rep2	Conductivity (us/cm)	299.1	305.8	319	327.9	319.1
A68/CC48/M34-Control-Rep2	Alkalinity (mg $CaCO_3$/L)	54.8	-	-	-	63.4
A68/CC48/M34-Control-Rep2	Hardness (mg/L)	91	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-Control-Rep3	No. Alive	10	10	10	10	10
A68/CC48/M34-Control-Rep3	pH	7.6	7.5	7.41	7.37	7.36
A68/CC48/M34-Control-Rep3	Temp (°C)	12.08	11.71	11.9	11.65	11.88
A68/CC48/M34-Control-Rep3	D.O. (mg/L)	6.71	8.14	8.15	8.11	7.92
A68/CC48/M34-Control-Rep3	Conductivity (us/cm)	298.7	304	318	326.9	320.8
A68/CC48/M34-Control-Rep3	Alkalinity (mg $CaCO_3$/L)	54.8	-	-	-	63.4
A68/CC48/M34-Control-Rep3	Hardness (mg/L)	91	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
A68/CC48/M34-Control-Rep4	No. Alive	10	10	10	10	10
A68/CC48/M34-Control-Rep4	pH	7.6	7.5	7.39	7.37	7.37
A68/CC48/M34-Control-Rep4	Temp (°C)	11.98	11.71	11.91	11.68	11.91
A68/CC48/M34-Control-Rep4	D.O. (mg/L)	6.69	7.93	7.39	8.01	7.91
A68/CC48/M34-Control-Rep4	Conductivity (us/cm)	298.9	304.1	318	325.2	323.6
A68/CC48/M34-Control-Rep4	Alkalinity (mg $CaCO_3$/L)	54.8	-	-	-	63.4
A68/CC48/M34-Control-Rep4	Hardness (mg/L)	91	-	-	-	92

Prepared by: EC 3/8/13
Reviewed by: EB 3/13/13

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate:	10
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-01	No. Alive	10	10	10	10	10
Control-01	pH	8	7.4	7.4	7.4	7.47
Control-01	Temp (°C)	13.9	11.91	11.76	11.71	11.74
Control-01	D.O. (mg/L)	7.81	7.74	8.3	8.18	8.31
Control-01	Conductivity (us/cm)	302	308.5	317	319	319.8
Control-01	Alkalinity (mg $CaCO_3$/L)	61.9	-	-	-	70.5
Control-01	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-02	No. Alive	10	10	10	10	10
Control-02	pH	8	7.5	7.5	7.4	7.47
Control-02	Temp (°C)	13.79	11.94	11.92	11.67	11.75
Control-02	D.O. (mg/L)	8.17	7.67	8.03	8.26	8.2
Control-02	Conductivity (us/cm)	298.9	304.6	311.3	319.4	318.6
Control-02	Alkalinity (mg $CaCO_3$/L)	61.9	-	-	-	70.5
Control-02	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-03	No. Alive	10	10	10	10	10
Control-03	pH	8	7.4	7.5	7.4	7.46
Control-03	Temp (°C)	13.7	11.92	11.63	11.68	11.77
Control-03	D.O. (mg/L)	8.14	7.21	8.02	8.09	8.03
Control-03	Conductivity (us/cm)	298.5	303.9	316.5	316.9	318.9
Control-03	Alkalinity (mg $CaCO_3$/L)	61.9	-	-	-	70.5
Control-03	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
Control-04	No. Alive	10	10	10	10	10
Control-04	pH	8	7.4	7.4	7.4	7.45
Control-04	Temp (°C)	13.75	11.9	11.63	11.69	11.77
Control-04	D.O. (mg/L)	8.15	6.62	7.95	8.12	8.12
Control-04	Conductivity (us/cm)	298.1	303.9	317.9	317.7	318.3
Control-04	Alkalinity (mg $CaCO_3$/L)	61.9	-	-	-	70.5
Control-04	Hardness (mg/L)	91	-	-	-	93

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
6.25%-01	No. Alive	10	10	10	10	10
6.25%-01	pH	8	7.5	7.6	7.3	7.46
6.25%-01	Temp (°C)	13.64	11.91	11.65	11.73	11.76
6.25%-01	D.O. (mg/L)	8.17	6.69	8.24	8.26	8.35
6.25%-01	Conductivity (us/cm)	297.8	303.7	321	319.5	318.1
6.25%-01	Alkalinity (mg $CaCO_3$/L)	58.9	-	-	-	63.4
6.25%-01	Hardness (mg/L)	90	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
6.25%-02	No. Alive	10	10	10	10	10
6.25%-02	pH	8.1	7.4	7.5	7.3	7.46
6.25%-02	Temp (°C)	13.71	11.92	11.62	11.69	11.75
6.25%-02	D.O. (mg/L)	8.17	7.5	8.17	8.39	8.35
6.25%-02	Conductivity (us/cm)	297.6	304.6	320	321.2	320.1
6.25%-02	Alkalinity (mg $CaCO_3$/L)	58.9	-	-	-	63.4
6.25%-02	Hardness (mg/L)	90	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
6.25%-03	No. Alive	10	10	10	10	10
6.25%-03	pH	8	7.4	7.6	7.3	7.46
6.25%-03	Temp (°C)	13.67	11.91	11.63	11.7	11.78
6.25%-03	D.O. (mg/L)	8.19	6.74	8.16	8.35	8.15
6.25%-03	Conductivity (us/cm)	297.7	304.5	321	319.8	318.7
6.25%-03	Alkalinity (mg $CaCO_3$/L)	58.9	-	-	-	63.4
6.25%-03	Hardness (mg/L)	90	-	-	-	92

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
6.25%-04	No. Alive	10	10	10	10	10
6.25%-04	pH	8.1	7.4	7.6	7.3	7.45
6.25%-04	Temp (°C)	13.73	11.89	11.65	11.72	11.78
6.25%-04	D.O. (mg/L)	8.22	6.85	8.17	8.21	8.13
6.25%-04	Conductivity (us/cm)	296.3	304.3	320.7	318.3	317.3
6.25%-04	Alkalinity (mg $CaCO_3$/L)	58.9	-	-	-	63.4
6.25%-04	Hardness (mg/L)	90	-	-	-	92

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate: 10	
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
12.5%-01	No. Alive	10	10	5	5	5
12.5%-01	pH	8	7.6	7.5	7.3	7.46
12.5%-01	Temp (°C)	13.74	11.89	11.63	11.74	11.79
12.5%-01	D.O. (mg/L)	8.18	7.8	8.16	8.58	8.55
12.5%-01	Conductivity (us/cm)	298.4	309.1	329	315.7	314.1
12.5%-01	Alkalinity (mg $CaCO_3$/L)	61.4	-	-	-	63.6
12.5%-01	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
12.5%-02	No. Alive	10	10	9	8	8
12.5%-02	pH	8	7.6	7.6	7.3	7.46
12.5%-02	Temp (°C)	13.69	11.88	11.65	11.73	11.8
12.5%-02	D.O. (mg/L)	8.2	7.8	8.36	8.34	8.5
12.5%-02	Conductivity (us/cm)	297.8	308	328	320.1	318.8
12.5%-02	Alkalinity (mg $CaCO_3$/L)	61.4	-	-	-	63.6
12.5%-02	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
12.5%-03	No. Alive	10	10	9	9	9
12.5%-03	pH	8.2	7.5	7.5	7.3	7.43
12.5%-03	Temp (°C)	13.66	11.89	11.67	11.73	11.82
12.5%-03	D.O. (mg/L)	8.21	7.75	8.22	8.37	7.93
12.5%-03	Conductivity (us/cm)	297.7	306.5	324	320	316.7
12.5%-03	Alkalinity (mg $CaCO_3$/L)	61.4	-	-	-	63.6
12.5%-03	Hardness (mg/L)	91	-	-	-	93

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
12.5%-04	No. Alive	10	9	9	8	8
12.5%-04	pH	8.1	7.5	7.5	7.3	7.43
12.5%-04	Temp (°C)	13.86	11.86	11.67	11.75	11.81
12.5%-04	D.O. (mg/L)	8.22	7.34	8.17	8.41	8.12
12.5%-04	Conductivity (us/cm)	297.8	306	322.9	321	315.4
12.5%-04	Alkalinity (mg $CaCO_3$/L)	61.4	-	-	-	63.6
12.5%-04	Hardness (mg/L)	91	-	-	-	93

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate:	10
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-01	No. Alive	10	10	0	-	-
25%-01	pH	8	7.5	7.2	-	-
25%-01	Temp (°C)	13.79	11.85	11.64	-	-
25%-01	D.O. (mg/L)	8.22	7.79	8.62	-	-
25%-01	Conductivity (us/cm)	297.9	307.3	333.6	-	-
25%-01	Alkalinity (mg $CaCO_3$/L)	58.2	-	-	60.4	-
25%-01	Hardness (mg/L)	91	-	-	94	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-02	No. Alive	10	9	1	0	-
25%-02	pH	8	7.4	7.19	7.3	-
25%-02	Temp (°C)	13.89	11.82	11.68	11.76	-
25%-02	D.O. (mg/L)	8.21	7.15	8.62	8.78	-
25%-02	Conductivity (us/cm)	297.8	310.7	328.7	315.2	-
25%-02	Alkalinity (mg $CaCO_3$/L)	58.2	-	-	60.4	-
25%-02	Hardness (mg/L)	91	-	-	94	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-03	No. Alive	10	8	1	0	-
25%-03	pH	8	7.4	7.31	7.31	-
25%-03	Temp (°C)	13.74	11.8	11.7	11.77	-
25%-03	D.O. (mg/L)	8.2	6.88	8.56	8.79	-
25%-03	Conductivity (us/cm)	297.8	308.7	324.8	312.9	-
25%-03	Alkalinity (mg $CaCO_3$/L)	58.2	-	-	60.4	-
25%-03	Hardness (mg/L)	91	-	-	94	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
25%-04	No. Alive	10	10	2	0	-
25%-04	pH	8	7.4	7.22	7.3	-
25%-04	Temp (°C)	13.86	11.76	11.68	11.76	-
25%-04	D.O. (mg/L)	8.22	6.66	8.61	8.78	-
25%-04	Conductivity (us/cm)	297.8	309.6	335	312.9	-
25%-04	Alkalinity (mg $CaCO_3$/L)	58.2	-	-	60.4	-
25%-04	Hardness (mg/L)	91	-	-	94	-

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate:	10
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
50%-01	No. Alive	10	6	0	-	-
50%-01	pH	8	7.4	7.24	-	-
50%-01	Temp (°C)	12.95	11.75	11.71	-	-
50%-01	D.O. (mg/L)	8.28	7.29	8.61	-	-
50%-01	Conductivity (us/cm)	297.3	311.7	323.4	-	-
50%-01	Alkalinity (mg $CaCO_3$/L)	57.7	-	61.8	-	-
50%-01	Hardness (mg/L)	91	-	94	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
50%-02	No. Alive	10	10	0	-	-
50%-02	pH	8	7.4	7.25	-	-
50%-02	Temp (°C)	12.7	11.7	11.73	-	-
50%-02	D.O. (mg/L)	8.32	7.4	8.64	-	-
50%-02	Conductivity (us/cm)	297.2	311.4	331.4	-	-
50%-02	Alkalinity (mg $CaCO_3$/L)	57.7	-	61.8	-	-
50%-02	Hardness (mg/L)	91	-	94	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
50%-03	No. Alive	10	9	0	-	-
50%-03	pH	8.1	7.4	7.27	-	-
50%-03	Temp (°C)	12.79	11.68	11.72	-	-
50%-03	D.O. (mg/L)	8.3	7.38	8.62	-	-
50%-03	Conductivity (us/cm)	297.2	310.4	330.2	-	-
50%-03	Alkalinity (mg $CaCO_3$/L)	57.7	-	61.8	-	-
50%-03	Hardness (mg/L)	91	-	94	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
50%-04	No. Alive	10	6	0	-	-	1 Jumper
50%-04	pH	8	7.4	7.29	-	-	
50%-04	Temp (°C)	13.74	11.66	11.73	-	-	
50%-04	D.O. (mg/L)	8.25	7.49	8.74	-	-	
50%-04	Conductivity (us/cm)	297.8	310.7	324.6	-	-	
50%-04	Alkalinity (mg $CaCO_3$/L)	57.7	-	61.8	-	-	
50%-04	Hardness (mg/L)	91	-	94	-	-	

Appendix B 2: November 2012 Aquatic Toxicity Test

Reference Static Renewal Data Sheets

Start Date	11/02/12	No. Organisms per replicate:	10
End Date	11/06/12	No. of Replicates:	4
Organism	Juvenile *O.mykiss* (rainbow trout)	Analysts	SA, CL, LC

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
100%-01	No. Alive	10	5	0	-	-	2 Jumpers
100%-01	pH	8	7.4	6.5	-	-	
100%-01	Temp (°C)	12.61	11.68	12.08	-	-	
100%-01	D.O. (mg/L)	8.31	7.63	8.55	-	-	
100%-01	Conductivity (us/cm)	297.3	311.9	322	-	-	
100%-01	Alkalinity (mg $CaCO_3$/L)	60.5	-	56.2	-	-	
100%-01	Hardness (mg/L)	90	-	94	-	-	

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
100%-02	No. Alive	10	5	0	-	-
100%-02	pH	8	7.4	6.6	-	-
100%-02	Temp (°C)	12.71	11.67	11.87	-	-
100%-02	D.O. (mg/L)	8.32	7.35	8.6	-	-
100%-02	Conductivity (us/cm)	297.3	311.9	*	-	-
100%-02	Alkalinity (mg $CaCO_3$/L)	60.5	-	56.2	-	-
100%-02	Hardness (mg/L)	90	-	94	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4
100%-03	No. Alive	10	4	0	-	-
100%-03	pH	8	7.3	6.9	-	-
100%-03	Temp (°C)	12.62	11.65	11.92	-	-
100%-03	D.O. (mg/L)	8.37	6.74	6.48	-	-
100%-03	Conductivity (us/cm)	297.1	313.2	322	-	-
100%-03	Alkalinity (mg $CaCO_3$/L)	60.5	-	56.2	-	-
100%-03	Hardness (mg/L)	90	-	94	-	-

Replicate ID	Parameter	Day 0	Day 1	Day 2	Day 3	Day 4	
100%-04	No. Alive	10	5	0	-	-	1 Jumper
100%-04	pH	8	7.3	6.9	-	-	
100%-04	Temp (°C)	12.68	11.65	11.97	-	-	
100%-04	D.O. (mg/L)	8.37	6.36	8.65	-	-	
100%-04	Conductivity (us/cm)	297.1	310.5	324	-	-	
100%-04	Alkalinity (mg $CaCO_3$/L)	60.5	-	56.2	-	-	
100%-04	Hardness (mg/L)	90	-	94	-	-	

* No data available

Prepared by: EC 3/8/13

Reviewed by: EB 3/13/13

Attachment 1
October 2012 Upper Animas River Surface Water Toxicity Report
CETIS Analytical Reports

CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date: 22 Oct-12 | **Species:** Oncorhynchus mykiss | **Sample Code:** Control
End Date: 26 Oct-12 | **Protocol:** EPA/821/R-02-012 (2002) | **Sample Source:** Upper Animas River
Sample Date: 22 Oct-12 | **Material:** Lab Control | **Sample Station:** Control

Batch Note: R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED)

Sample Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
Control	1	1	10	10	10	10	10	
Control	2	25	10	10	10	10	10	
Control	3	26	10	10	10	10	10	
Control	4	15	10	10	10	10	10	
A56	1	23	10	10	10	10	10	
A56	2	13	10	10	10	10	10	
A56	3	7	10	10	10	10	10	
A56	4	9	10	10	10	10	10	
A68	1	27	10	10	10	10	10	
A68	2	2	10	10	10	10	10	
A68	3	24	10	10	10	10	10	
A68	4	20	10	10	10	10	10	
A72	1	5	10	10	9	0	0	
A72	2	17	10	10	8	0	0	
A72	3	16	10	10	4	0	0	
A72	4	28	10	10	7	0	0	
A73B	1	11	10	10	10	10	10	
A73B	2	14	10	10	10	10	10	
A73B	3	8	10	10	10	10	10	
A73B	4	19	10	10	10	10	10	
A75B	1	22	10	10	10	10	10	
A75B	2	12	10	10	10	10	10	
A75B	3	10	10	10	10	10	10	
A75B	4	6	10	10	10	10	10	
Baker Bridge	1	18	10	10	10	10	10	
Baker Bridge	2	4	10	10	10	10	10	
Baker Bridge	3	21	10	10	10	10	10	
Baker Bridge	4	3	10	10	10	10	10	

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID:	14-7261-3366	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 12:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Sample Code	Sample Comments
Control	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A56	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A68	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A72	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A73B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A75B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
Baker Bridge	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					2.5%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
Control		A56	18	10	6	1	0.8571	Non-Significant Effect
		A68	18	10	6	1	0.8571	Non-Significant Effect
		A72	10	10	6	0	0.0480	Significant Effect
		A73B	18	10	6	1	0.8571	Non-Significant Effect
		A75B	18	10	6	1	0.8571	Non-Significant Effect
		Baker Bridge	18	10	6	1	0.8571	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.384915	0.8974859	6	65540	<0.0001	Significant Effect
Error	0	0	21			
Total	5.384915	0.8974859	27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	65540	3.812	<0.0001	Unequal Variances

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	1	1	1	1	1	0	0	0.0%	0.0%
A56	4	1	1	1	1	1	0	0	0.0%	0.0%
A68	4	1	1	1	1	1	0	0	0.0%	0.0%
A72	4	0	0	0	0	0	0	0		100.0%
A73B	4	1	1	1	1	1	0	0	0.0%	0.0%
A75B	4	1	1	1	1	1	0	0	0.0%	0.0%
Baker Bridge	4	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A56	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A68	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A72	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%
A73B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A75B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
Baker Bridge	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%

Fish 96-h Acute Survival Test

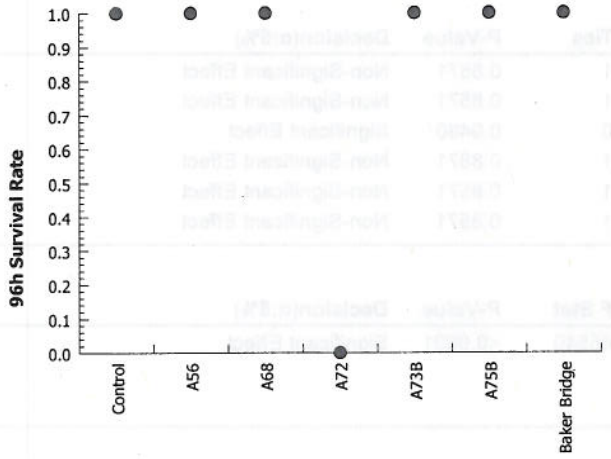
U.S. EPA Region 8 Lab

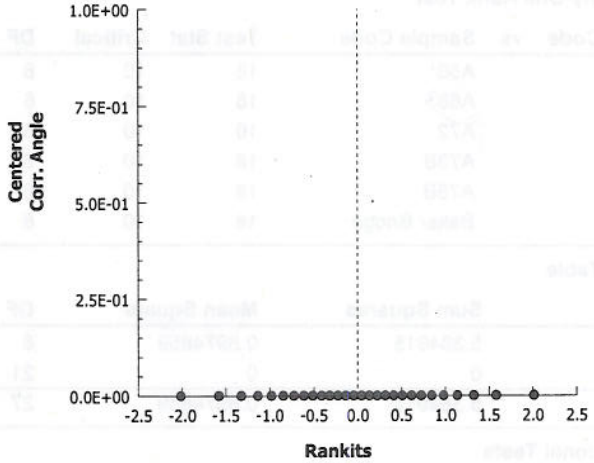
Analysis ID:	14-7261-3366	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 12:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	1	1
A56	1	1	1	1
A68	1	1	1	1
A72	0	0	0	0
A73B	1	1	1	1
A75B	1	1	1	1
Baker Bridge	1	1	1	1

Graphics





Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID:	14-2444-3659	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 12:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Sample Code	Sample Comments
Control	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A56	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A68	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A72	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A73B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A75B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
Baker Bridge	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					2.5%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
A56		A72	10	10	6	0	0.0350	Significant Effect
		A73B	18	10	6	1	0.8000	Non-Significant Effect
		A75B	18	10	6	1	0.8000	Non-Significant Effect
		Baker Bridge	18	10	6	1	0.8000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.025921	1.25648	4	65540	<0.0001	Significant Effect
Error	0	0	15			
Total	5.025921	1.25648	19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	65540	4.893	<0.0001	Unequal Variances

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A56	4	1	1	1	1	1	0	0	0.0%	0.0%
A72	4	0	0	0	0	0	0	0		100.0%
A73B	4	1	1	1	1	1	0	0	0.0%	0.0%
A75B	4	1	1	1	1	1	0	0	0.0%	0.0%
Baker Bridge	4	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A56	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A72	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%
A73B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A75B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
Baker Bridge	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%

Fish 96-h Acute Survival Test

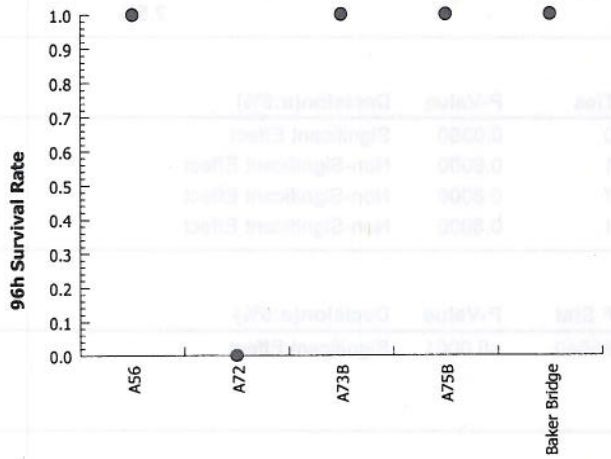
U.S. EPA Region 8 Lab

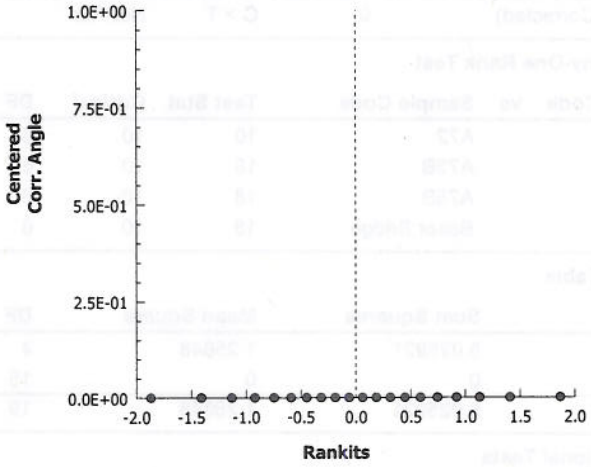
Analysis ID:	14-2444-3659	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 12:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
A56	1	1	1	1
A72	0	0	0	0
A73B	1	1	1	1
A75B	1	1	1	1
Baker Bridge	1	1	1	1

Graphics





Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID: 02-5955-8725 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.0
Analyzed: 13 Mar-13 12:51 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Sample Code	Sample Comments
Control	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A56	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A68	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A72	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A73B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
A75B	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
Baker Bridge	R8: October 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					2.5%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
A68		A72	10	10	6	0	0.0350	Significant Effect
		A73B	18	10	6	1	0.8000	Non-Significant Effect
		A75B	18	10	6	1	0.8000	Non-Significant Effect
		Baker Bridge	18	10	6	1	0.8000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.025921	1.25648	4	65540	<0.0001	Significant Effect
Error	0	0	15			
Total	5.025921	1.25648	19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	65540	4.893	<0.0001	Unequal Variances

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68	4	1	1	1	1	1	0	0	0.0%	0.0%
A72	4	0	0	0	0	0	0	0		100.0%
A73B	4	1	1	1	1	1	0	0	0.0%	0.0%
A75B	4	1	1	1	1	1	0	0	0.0%	0.0%
Baker Bridge	4	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A72	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%
A73B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A75B	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
Baker Bridge	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%

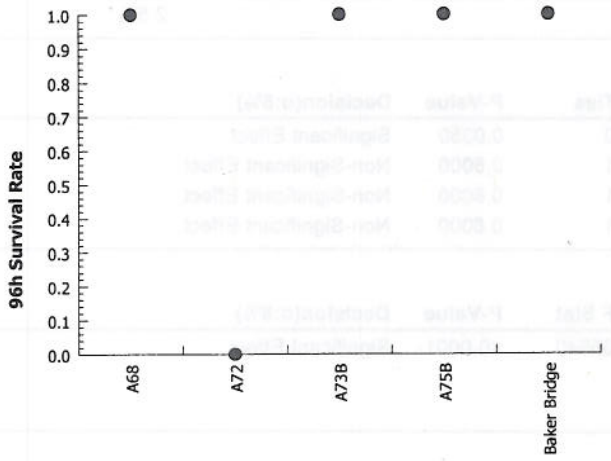
Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

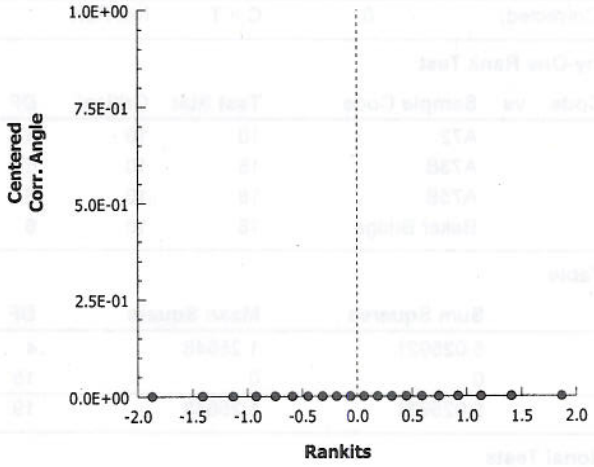
Analysis ID:	02-5955-8725	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 12:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
A68	1	1	1	1
A72	0	0	0	0
A73B	1	1	1	1
A75B	1	1	1	1
Baker Bridge	1	1	1	1

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date: 22 Oct-12
End Date: 26 Oct-12
Sample Date: 22 Oct-12
Species: Oncorhynchus mykiss
Protocol: EPA/821/R-02-012 (2002)
Material: Mining Discharge/Runoff
Sample Code: 34/48/56 6.25%
Sample Source: Upper Animas River
Sample Station: M34/CC48/A56 6.25%

Batch Note: R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water)

Sample Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
M34/CC48/A56CON	1	22	10	10	10	10	10	
M34/CC48/A56CON	2	10	10	10	10	10	10	
M34/CC48/A56CON	3	11	10	10	10	10	10	
M34/CC48/A56CON	4	14	10	10	10	10	10	
34/48/56 6.25%	1	13	10	10	10	10	10	
34/48/56 6.25%	2	2	10	10	10	10	10	
34/48/56 6.25%	3	7	10	10	10	10	10	
34/48/56 6.25%	4	8	10	10	10	10	10	
34/48/56 12.5%	1	19	10	10	10	10	10	
34/48/56 12.5%	2	17	10	10	10	10	10	
34/48/56 12.5%	3	3	10	10	10	10	10	
34/48/56 12.5%	4	18	10	10	10	10	10	
34/48/56 25%	1	1	10	10	10	10	10	
34/48/56 25%	2	23	10	10	10	10	10	
34/48/56 25%	3	6	10	10	10	10	10	
34/48/56 25%	4	9	10	10	10	10	10	
34/48/56 50%	1	21	10	10	10	10	10	
34/48/56 50%	2	15	10	10	10	10	10	
34/48/56 50%	3	20	10	10	10	9	9	
34/48/56 50%	4	24	10	10	10	10	10	
34/48/56 100%	1	5	10	10	0	0	0	
34/48/56 100%	2	16	10	4	0	0	0	
34/48/56 100%	3	4	10	2	0	0	0	
34/48/56 100%	4	12	10	7	0	0	0	

Analyst: BCK QA: EC

Fish 96-h Acute Survival Test

U.S. EPA Region 8 Lab

Analysis ID: 07-7333-0804 Endpoint: 96h Survival Rate CETIS Version: CETISv1.8.0
Analyzed: 13 Mar-13 13:50 Analysis: Nonparametric-Control vs Treatments Official Results: Yes

Sample Code	Sample Comments
M34/CC48/A56CON	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).
34/48/56 6.25%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).
34/48/56 12.5%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).
34/48/56 25%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).
34/48/56 50%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).
34/48/56 100%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A56 water).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run				N/A	4.57%

Steel Many-One Rank Test

Sample Code vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
M34/CC48/A56CO	34/48/56 6.25%	18	10	6	1	0.8333	Non-Significant Effect
	34/48/56 12.5%	18	10	6	1	0.8333	Non-Significant Effect
	34/48/56 25%	18	10	6	1	0.8333	Non-Significant Effect
	34/48/56 50%	16	10	6	1	0.6105	Non-Significant Effect
	34/48/56 100%	10	10	6	0	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.172787	1.034557	5	934.9	<0.0001	Significant Effect
Error	0.0199195	0.001106639	18			
Total	5.192707	1.035664	23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	4.248	0.4457	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.4634	0.884	<0.0001	Non-normal Distribution

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
M34/CC48/A56CON	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/56 6.25%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/56 12.5%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/56 25%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/56 50%	4	0.975	0.956	0.994	0.9	1	0.025	0.05	5.13%	2.5%
34/48/56 100%	4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
M34/CC48/A56CON	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/56 6.25%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/56 12.5%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/56 25%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/56 50%	4	1.371	1.34	1.402	1.249	1.412	0.04074	0.08149	5.94%	2.89%
34/48/56 100%	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%

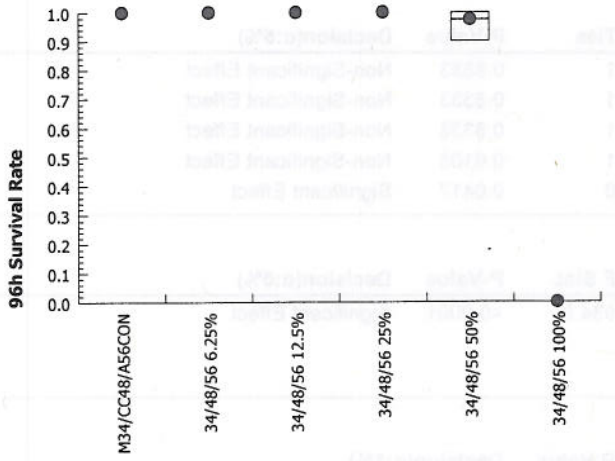
Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

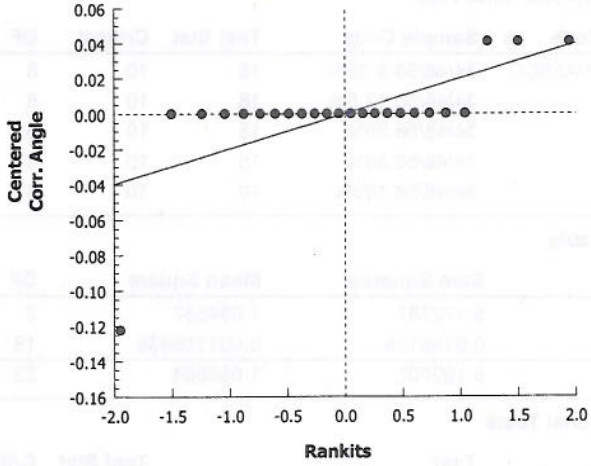
Analysis ID:	07-7333-0804	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 13:50	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
M34/CC48/A56CON	1	1	1	1
34/48/56 6.25%	1	1	1	1
34/48/56 12.5%	1	1	1	1
34/48/56 25%	1	1	1	1
34/48/56 50%	1	1	0.9	1
34/48/56 100%	0	0	0	0

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date: 22 Oct-12 **Species:** Oncorhynchus mykiss **Sample Code:** 34/48/68 CON
End Date: **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Upper Animas River
Sample Date: 22 Oct-12 **Material:** Mining Discharge/Runoff **Sample Station:** M34/CC48/A68 Control

Batch Note: R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water)

Conc-%	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
34/48/68 CON	1	11	10	10	10	10	10	
34/48/68 CON	2	13	10	10	10	10	10	
34/48/68 CON	3	14	10	10	10	10	10	
34/48/68 CON	4	6	10	10	10	10	10	
34/48/68 6.25%	1	12	10	10	10	10	10	
34/48/68 6.25%	2	8	10	10	10	10	10	
34/48/68 6.25%	3	10	10	10	10	10	10	
34/48/68 6.25%	4	16	10	10	10	10	10	
34/48/68 12.5%	1	4	10	10	10	10	10	
34/48/68 12.5%	2	15	10	10	10	10	10	
34/48/68 12.5%	3	7	10	10	10	10	10	
34/48/68 12.5%	4	5	10	10	10	10	10	
34/48/68 25%	1	17	10	10	10	10	10	
34/48/68 25%	2	2	10	10	10	10	10	
34/48/68 25%	3	3	10	10	10	10	10	
34/48/68 25%	4	20	10	10	10	10	10	
34/48/68 50%	1	9	10	10	10	7	3	
34/48/68 50%	2	1	10	10	8	5	2	
34/48/68 50%	3	19	10	10	10	8	6	
34/48/68 50%	4	18	10	10	10	8	4	

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID: 00-4654-0837 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.0
Analyzed: 13 Mar-13 16:51 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Sample Code	Sample Comments
34/48/68 CON	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water).
34/48/68 6.25%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water).
34/48/68 12.5%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water).
34/48/68 25%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water).
34/48/68 50%	R8: October 2012 Upper Animas RBT Acute SW Tox Test (DILUTED with A68 water).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run				N/A	8.31%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
34/48/68 CON		34/48/68 6.25%	18	10	6	1	0.8000	Non-Significant Effect
		34/48/68 12.5%	18	10	6	1	0.8000	Non-Significant Effect
		34/48/68 25%	18	10	6	1	0.8000	Non-Significant Effect
		34/48/68 50%	10	10	6	0	0.0350	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.841008	0.460252	4	71.49	<0.0001	Significant Effect
Error	0.09656602	0.006437735	15			
Total	1.937574	0.4666897	19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	7.241	4.893	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.5659	0.866	<0.0001	Non-normal Distribution

96h Survival Rate Summary

Conc-%	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
34/48/68 CON	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/68 6.25%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/68 12.5%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/68 25%	4	1	1	1	1	1	0	0	0.0%	0.0%
34/48/68 50%	4	0.375	0.31	0.44	0.2	0.6	0.08539	0.1708	45.54%	62.5%

Angular (Corrected) Transformed Summary

Conc-%	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
34/48/68 CON	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/68 6.25%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/68 12.5%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/68 25%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
34/48/68 50%	4	0.6535	0.5853	0.7218	0.4636	0.8861	0.08971	0.1794	27.45%	53.72%

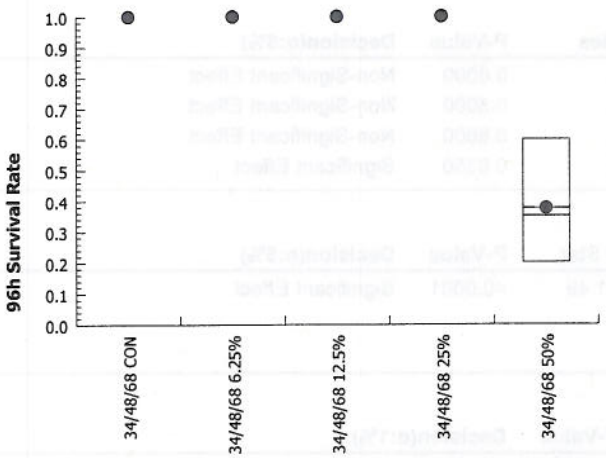
Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

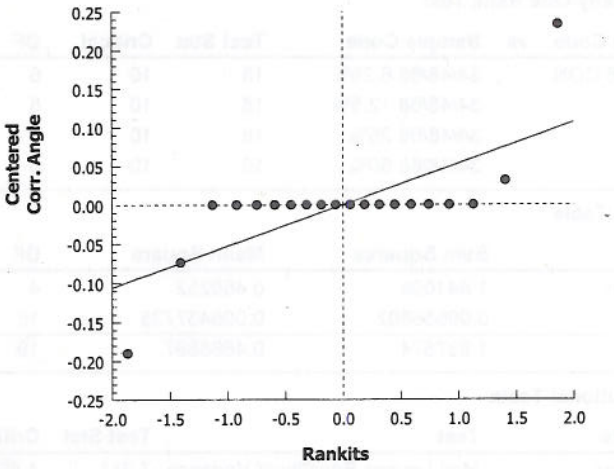
Analysis ID:	00-4654-0837	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	13 Mar-13 16:51	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Conc-%	Rep 1	Rep 2	Rep 3	Rep 4
34/48/68 CON	1	1	1	1
34/48/68 6.25%	1	1	1	1
34/48/68 12.5%	1	1	1	1
34/48/68 25%	1	1	1	1
34/48/68 50%	0.3	0.2	0.6	0.4

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date: 22 Oct-12 **Species:** Oncorhynchus mykiss **Sample Code:** 1012OMARTT
End Date: 26 Oct-12 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Reference Toxicant
Sample Date: 22 Oct-12 **Material:** Zinc sulfate **Sample Station:**

Batch Note: Region 8: Acute RBT Ref Tox Test (concurrent to Oct 2012 Upper Animas SW Tox Test)

Sample Note: Region 8: Acute RBT Ref Tox Test (concurrent to Oct 2012 Upper Animas SW Tox Test)

Conc-µg/L	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	L	1	19	10	10	10	10	10	
0	L	2	18	10	10	10	10	10	
0	L	3	12	10	10	10	10	10	
0	L	4	17	10	10	10	10	10	
68.85		1	16	10	10	10	10	10	
68.85		2	23	10	10	10	10	10	
68.85		3	11	10	10	10	10	10	
68.85		4	6	10	10	10	10	10	
131.5		1	21	10	10	8	8	8	
131.5		2	10	10	10	6	6	6	
131.5		3	5	10	10	8	8	8	
131.5		4	20	10	10	8	8	8	
263.5		1	4	10	6	0	0	0	
263.5		2	24	10	10	0	0	0	
263.5		3	14	10	9	2	2	2	
263.5		4	9	10	7	0	0	0	
518.5		1	22	10	7	0	0	0	
518.5		2	2	10	7	0	0	0	
518.5		3	7	10	9	0	0	0	
518.5		4	13	10	6	0	0	0	
1029.5		1	15	10	4	0	0	0	
1029.5		2	3	10	3	0	0	0	
1029.5		3	8	10	5	0	0	0	
1029.5		4	1	10	7	1	0	0	

CETIS Analytical Report

Test Code: 7978ECB8 | 20-3796-8056

Fish 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Analysis ID:	09-5896-4300	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 10:27	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.212	0.02244	162.9	146.9	180.6

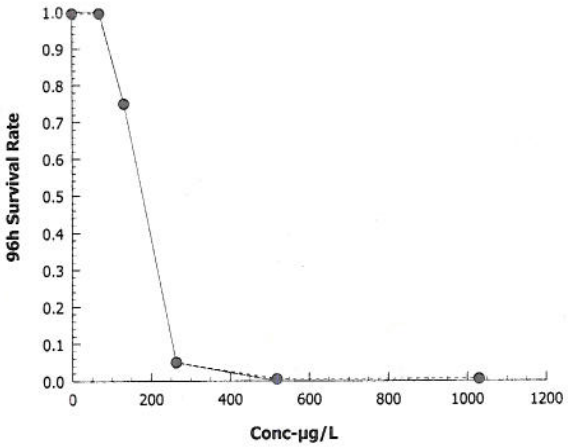
96h Survival Rate Summary — Calculated Variate(A/B)

Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Water	4	1	1	1	0	0	0.0%	0.0%	40	40
68.85		4	1	1	1	0	0	0.0%	0.0%	40	40
131.5		4	0.75	0.6	0.8	0.05	0.1	13.33%	25.0%	30	40
263.5		4	0.05	0	0.2	0.05	0.1	200.0%	95.0%	2	40
518.5		4	0	0	0	0	0		100.0%	0	40
1029.5		4	0	0	0	0	0		100.0%	0	40

96h Survival Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water	1	1	1	1
68.85		1	1	1	1
131.5		0.8	0.6	0.8	0.8
263.5		0	0	0.2	0
518.5		0	0	0	0
1029.5		0	0	0	0

Graphics



 Analyst: BCK QA: EC

Attachment 2
November 2012 Upper Animas River Surface Water Toxicity Report
CETIS Analytical Reports

CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date:	02 Nov-12	**Species:**	Oncorhynchus mykiss	**Sample Code:**	M34
End Date:	06 Nov-12	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	Upper Animas River
Sample Date:	02 Nov-12	**Material:**	Mining Discharge/Runoff	**Sample Station:**	M34

Batch Note: R8: November 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED)

Conc-NA	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
A68	1	7	10	10	10	9	9	
A68	2	2	10	10	9	8	8	
A68	3	3	10	10	10	10	10	
A68	4	5	10	10	10	10	10	
M34	1	4	10	9	0	0	0	
M34	2	8	10	8	1	0	0	
M34	3	1	10	10	1	1	0	
M34	4	6	10	8	1	0	0	

 Analyst: BGK QA: EC

CETIS Analytical Report

Report Date: 14 Mar-13 11:25 (p 1 of 1)
Test Code: 18617ABB | 04-0904-1595

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID:	14-8077-4318	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 11:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample Comments
A68	R8: November 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).
M34	R8: November 2012 Upper Animas RBT Acute SW Tox Test (UNDILUTED).

Data Transform	Zeta	Alt Hyp	MC Trials	Test Result	PMSD
Angular (Corrected)	0	C > T	Not Run	Sample passes 96h survival rate endpoint	9.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
A68		M34	15.46	1.943	6	0.1428	<0.0001	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.582248	2.582248	1	239.2	<0.0001	Significant Effect
Error	0.06478542	0.01079757	6			
Total	2.647034	2.593046	7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	10.87	13.75	0.0165	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8598	0.6451	0.1195	Normal Distribution

96h Survival Rate Summary

Conc-NA	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68	4	0.925	0.8886	0.9614	0.8	1	0.04787	0.09574	10.35%	0.0%
M34	4	0	0	0	0	0	0	0		100.0%

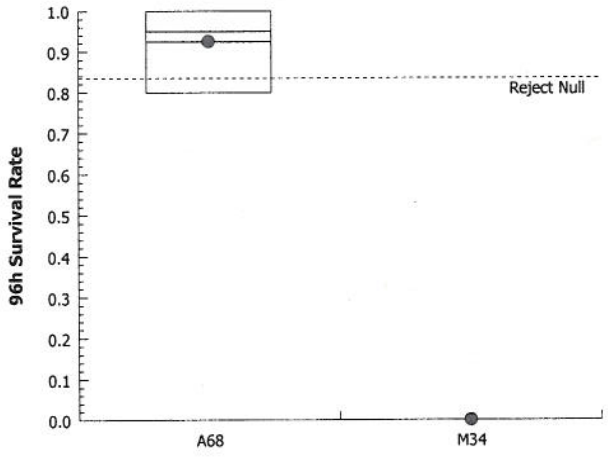
Angular (Corrected) Transformed Summary

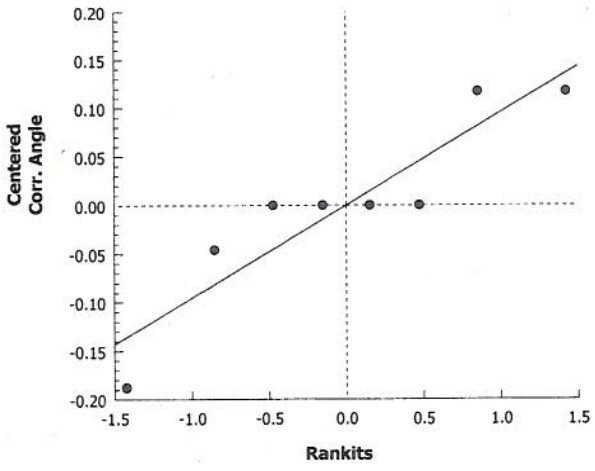
Conc-NA	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68	4	1.295	1.239	1.351	1.107	1.412	0.07348	0.147	11.35%	0.0%
M34	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	87.74%

96h Survival Rate Detail

Conc-NA	Rep 1	Rep 2	Rep 3	Rep 4
A68	0.9	0.8	1	1
M34	0	0	0	0

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date:	02 Nov-12	**Species:**	Oncorhynchus mykiss	**Sample Code:**	A68/A72 100%
End Date:	06 Nov-12	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	Upper Animas River
Sample Date:	02 Nov-12	**Material:**	Mining Discharge/Runoff	**Sample Station:**	A68/A72 100%

Batch Note: R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68)

Conc-NA	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
A68/A72 Control	1	8	10	10	10	10	10	
A68/A72 Control	2	5	10	10	10	10	10	
A68/A72 Control	3	3	10	10	10	10	10	
A68/A72 Control	4	10	10	10	10	10	10	
A68/A72 5%	1	4	10	10	10	10	10	
A68/A72 5%	2	1	10	10	10	8	8	
A68/A72 5%	3	26	10	10	10	10	10	
A68/A72 5%	4	12	10	10	10	9	9	
A68/A72 10%	1	20	9	9	8	8	8	
A68/A72 10%	2	17	8	8	8	8	8	
A68/A72 10%	3	2	10	10	10	9	9	
A68/A72 10%	4	22	10	10	10	10	10	
A68/A72 25%	1	28	10	10	10	8	8	
A68/A72 25%	2	16	10	10	10	10	10	
A68/A72 25%	3	15	9	9	9	8	8	
A68/A72 25%	4	11	10	10	10	10	10	
A68/A72 50%	1	27	10	10	10	10	10	
A68/A72 50%	2	24	10	10	10	10	10	
A68/A72 50%	3	14	9	9	9	9	9	
A68/A72 50%	4	25	10	10	10	10	10	
A68/A72 75%	1	23	9	9	9	9	9	
A68/A72 75%	2	6	9	9	9	9	9	
A68/A72 75%	3	13	10	10	10	10	10	
A68/A72 75%	4	9	10	10	10	10	10	
A68/A72 100%	1	7	10	10	3	2	0	
A68/A72 100%	2	21	10	10	5	4	1	
A68/A72 100%	3	18	10	10	5	4	0	
A68/A72 100%	4	19	10	10	5	3	0	

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID: 12-0049-8676 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.0
Analyzed: 14 Mar-13 14:38 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Sample Code	Sample Comments
A68/A72 Control	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 5%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 10%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 25%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 50%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 75%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).
A68/A72 100%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (A72 DILUTED w/A68).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					9.79%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
A68/A72 Control		A68/A72 5%	14	10	6	1	0.3760	Non-Significant Effect
		A68/A72 10%	14	10	6	1	0.3760	Non-Significant Effect
		A68/A72 25%	14	10	6	1	0.3760	Non-Significant Effect
		A68/A72 50%	18	10	6	1	0.8571	Non-Significant Effect
		A68/A72 75%	18	10	6	1	0.8571	Non-Significant Effect
		A68/A72 100%	10	10	6	0	0.0480	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.657713	0.7762855	6	91.43	<0.0001	Significant Effect
Error	0.1782962	0.008490295	21			
Total	4.836009	0.7847758	27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	5.219	3.812	0.0020	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9013	0.8975	0.0123	Normal Distribution

96h Survival Rate Summary

Conc-NA	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/A72 Control	4	1	1	1	1	1	0	0	0.0%	0.0%
A68/A72 5%	4	0.925	0.8886	0.9614	0.8	1	0.04787	0.09574	10.35%	7.5%
A68/A72 10%	4	0.9472	0.924	0.9705	0.8889	1	0.03056	0.06111	6.45%	5.28%
A68/A72 25%	4	0.9222	0.8854	0.9591	0.8	1	0.04843	0.09686	10.5%	7.78%
A68/A72 50%	4	1	1	1	1	1	0	0	0.0%	0.0%
A68/A72 75%	4	1	1	1	1	1	0	0	0.0%	0.0%
A68/A72 100%	4	0.025	0.005981	0.04402	0	0.1	0.025	0.05	200.0%	97.5%

Angular (Corrected) Transformed Summary

Conc-NA	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/A72 Control	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
A68/A72 5%	4	1.295	1.239	1.351	1.107	1.412	0.07348	0.147	11.35%	8.28%
A68/A72 10%	4	1.321	1.285	1.357	1.231	1.412	0.04723	0.09445	7.15%	6.43%
A68/A72 25%	4	1.291	1.234	1.347	1.107	1.412	0.07455	0.1491	11.55%	8.6%
A68/A72 50%	4	1.41	1.408	1.412	1.403	1.412	0.002171	0.004341	0.31%	0.15%
A68/A72 75%	4	1.408	1.406	1.41	1.403	1.412	0.002505	0.00501	0.36%	0.31%
A68/A72 100%	4	0.1995	0.1685	0.2305	0.1588	0.3218	0.04074	0.08149	40.84%	85.87%

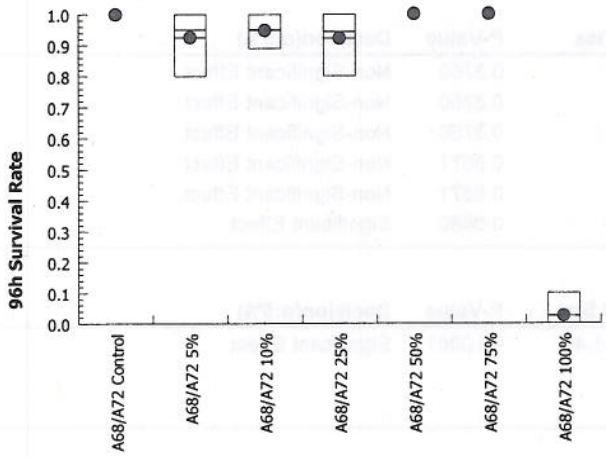
Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

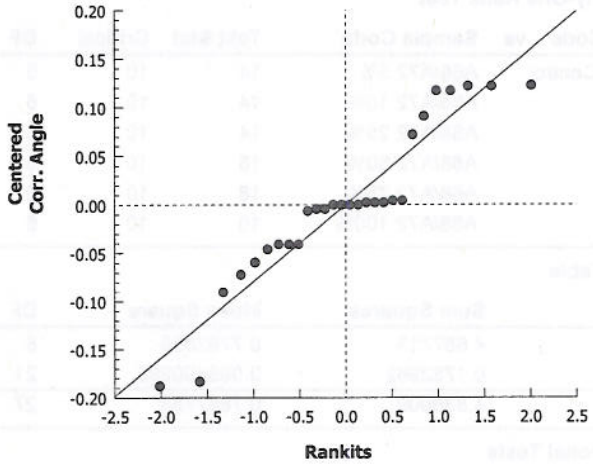
Analysis ID:	12-0049-8676	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 14:38	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Conc-NA	Rep 1	Rep 2	Rep 3	Rep 4
A68/A72 Control	1	1	1	1
A68/A72 5%	1	0.8	1	0.9
A68/A72 10%	0.8889	1	0.9	1
A68/A72 25%	0.8	1	0.8889	1
A68/A72 50%	1	1	1	1
A68/A72 75%	1	1	1	1
A68/A72 100%	0	0.1	0	0

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date: 02 Nov-12 **Species:** Oncorhynchus mykiss **Sample Code:** A68/CC48 Con
End Date: 06 Nov-12 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Upper Animas River
Sample Date: 02 Nov-12 **Material:** Mining Discharge/Runoff **Sample Station:** A68/CC48 Control

Batch Note: R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68)

Conc-NA	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
A68/CC48 Con	1	25	9	9	9	9	9	
A68/CC48 Con	2	23	10	10	10	10	10	
A68/CC48 Con	3	28	10	10	10	10	10	
A68/CC48 Con	4	22	10	10	10	10	10	
A68/CC48 1%	1	18	10	10	9	9	9	
A68/CC48 1%	2	16	10	10	9	9	9	
A68/CC48 1%	3	15	10	10	10	10	10	
A68/CC48 1%	4	14	10	10	8	6	6	
A68/CC48 3%	1	9	10	10	10	10	10	
A68/CC48 3%	2	3	9	9	9	9	9	
A68/CC48 3%	3	2	10	10	9	9	9	
A68/CC48 3%	4	27	10	10	10	10	10	
A68/CC48 6%	1	6	10	10	9	9	9	
A68/CC48 6%	2	4	10	10	10	10	10	
A68/CC48 6%	3	5	10	10	10	10	10	
A68/CC48 6%	4	13	10	10	10	10	10	
A68/CC48 12%	1	24	10	10	10	9	9	
A68/CC48 12%	2	17	10	10	10	10	10	
A68/CC48 12%	3	20	10	10	10	10	10	
A68/CC48 12%	4	21	10	10	8	7	7	
A68/CC48 25%	1	7	10	10	10	6	6	
A68/CC48 25%	2	1	10	10	10	10	10	
A68/CC48 25%	3	10	10	10	10	10	10	
A68/CC48 25%	4	8	10	10	10	10	10	
A68/CC48 50%	1	26	10	0	0	0	0	
A68/CC48 50%	2	12	10	0	0	0	0	
A68/CC48 50%	3	19	10	0	0	0	0	
A68/CC48 50%	4	11	10	0	0	0	0	

Fish 96-h Acute Survival Test

U.S. EPA Region 8 Lab

Analysis ID: 15-7164-8232 Endpoint: 96h Survival Rate CETIS Version: CETISv1.8.0
Analyzed: 14 Mar-13 11:42 Analysis: Nonparametric-Control vs Treatments Official Results: Yes

Sample Code	Sample Comments
A68/CC48 Con	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 1%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 3%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 6%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 12%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 25%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).
A68/CC48 50%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48 DILUTED w/A68).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					17.5%

Steel Many-One Rank Test

Sample Code vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
A68/CC48 Con	A68/CC48 1%	12	10	6	1	0.1598	Non-Significant Effect
	A68/CC48 3%	16	10	6	1	0.6450	Non-Significant Effect
	A68/CC48 6%	16	10	6	1	0.6450	Non-Significant Effect
	A68/CC48 12%	14	10	6	1	0.3760	Non-Significant Effect
	A68/CC48 25%	16	10	6	1	0.6450	Non-Significant Effect
	A68/CC48 50%	10	10	6	0	0.0480	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.719674	0.7866123	6	32.17	<0.0001	Significant Effect
Error	0.5134777	0.02445132	21			
Total	5.233151	0.8110636	27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.8895	3.812	0.5201	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8407	0.8975	0.0006	Non-normal Distribution

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/CC48 Con	4	1	1	1	1	1	0	0	0.0%	0.0%
A68/CC48 1%	4	0.85	0.7841	0.9159	0.6	1	0.0866	0.1732	20.38%	15.0%
A68/CC48 3%	4	0.975	0.956	0.994	0.9	1	0.025	0.05	5.13%	2.5%
A68/CC48 6%	4	0.975	0.956	0.994	0.9	1	0.025	0.05	5.13%	2.5%
A68/CC48 12%	4	0.9	0.8462	0.9538	0.7	1	0.07071	0.1414	15.71%	10.0%
A68/CC48 25%	4	0.9	0.8239	0.9761	0.6	1	0.1	0.2	22.22%	10.0%
A68/CC48 50%	4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/CC48 Con	4	1.41	1.408	1.412	1.403	1.412	0.002171	0.004341	0.31%	0.0%
A68/CC48 1%	4	1.199	1.114	1.284	0.8861	1.412	0.1112	0.2223	18.54%	14.95%
A68/CC48 3%	4	1.369	1.339	1.4	1.249	1.412	0.04007	0.08015	5.85%	2.89%
A68/CC48 6%	4	1.371	1.34	1.402	1.249	1.412	0.04074	0.08149	5.94%	2.74%
A68/CC48 12%	4	1.266	1.19	1.342	0.9912	1.412	0.09936	0.1987	15.7%	10.2%
A68/CC48 25%	4	1.281	1.181	1.381	0.8861	1.412	0.1315	0.263	20.54%	9.17%
A68/CC48 50%	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.74%

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID:	15-7164-8232	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 11:42	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
A68/CC48 Con	1	1	1	1
A68/CC48 1%	0.9	0.9	1	0.6
A68/CC48 3%	1	1	0.9	1
A68/CC48 6%	0.9	1	1	1
A68/CC48 12%	0.9	1	1	0.7
A68/CC48 25%	0.6	1	1	1
A68/CC48 50%	0	0	0	0

CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Start Date: 02 Nov-12 **Species:** Oncorhynchus mykiss **Sample Code:** A68/CC48/M34CON
End Date: 06 Nov-12 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Upper Animas River
Sample Date: 02 Nov-12 **Material:** Mining Discharge/Runoff **Sample Station:** A68/CC48/M34 Control

Batch Note: R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68)

Sample Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
A68/CC48/M34CON	1	2	10	10	10	10	10	
A68/CC48/M34CON	2	16	10	10	10	10	10	
A68/CC48/M34CON	3	27	10	10	10	10	10	
A68/CC48/M34CON	4	21	10	10	10	10	10	
68/48/34 4%	1	5	10	10	10	10	10	
68/48/34 4%	2	26	9	9	9	9	9	
68/48/34 4%	3	19	10	10	10	10	10	
68/48/34 4%	4	17	10	10	10	9	9	
68/48/34 9%	1	12	10	10	10	10	10	
68/48/34 9%	2	6	10	10	9	9	9	
68/48/34 9%	3	8	10	10	10	10	10	
68/48/34 9%	4	10	10	10	10	9	9	
68/48/34 20%	1	22	10	10	10	10	10	
68/48/34 20%	2	15	10	10	10	10	10	
68/48/34 20%	3	4	10	10	10	10	10	
68/48/34 20%	4	11	10	10	10	10	10	
68/48/34 40%	1	9	10	10	10	10	9	
68/48/34 40%	2	13	10	10	10	10	10	
68/48/34 40%	3	18	10	10	10	10	8	
68/48/34 40%	4	24	10	10	10	10	10	
68/48/34 65%	1	7	10	7	3	1	0	
68/48/34 65%	2	14	10	9	3	1	0	
68/48/34 65%	3	25	10	9	2	2	0	
68/48/34 65%	4	23	10	10	4	4	0	
68/48/34 85%	1	1	10	0	0	0	0	
68/48/34 85%	2	20	10	0	0	0	0	
68/48/34 85%	3	3	10	0	0	0	0	
68/48/34 85%	4	28	10	0	0	0	0	

Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

Analysis ID:	19-2177-9212	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 15:03	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Sample Code	Sample Comments
A68/CC48/M34CON	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 4%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 9%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 20%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 40%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 65%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).
68/48/34 85%	R8: November 2012 Upper Animas RBT Acute SW Tox Test (CC48/M34 DILUTED with A68).

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					7.87%

Steel Many-One Rank Test

Sample Code	vs	Sample Code	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
A68/CC48/M34CO		68/48/34 4%	16	10	6	1	0.6450	Non-Significant Effect
		68/48/34 9%	14	10	6	1	0.3760	Non-Significant Effect
		68/48/34 20%	18	10	6	1	0.8571	Non-Significant Effect
		68/48/34 40%	14	10	6	1	0.3760	Non-Significant Effect
		68/48/34 65%	10	10	6	0	0.0480	Significant Effect
		68/48/34 85%	10	10	6	0	0.0480	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.338845	1.389808	6	263.9	<0.0001	Significant Effect
Error	0.1106143	0.005267348	21			
Total	8.449459	1.395075	27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	5.879	3.812	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8503	0.8975	0.0009	Non-normal Distribution

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/CC48/M34CON	4	1	1	1	1	1	0	0	0.0%	0.0%
68/48/34 4%	4	0.975	0.956	0.994	0.9	1	0.025	0.05	5.13%	2.5%
68/48/34 9%	4	0.95	0.928	0.972	0.9	1	0.02887	0.05773	6.08%	5.0%
68/48/34 20%	4	1	1	1	1	1	0	0	0.0%	0.0%
68/48/34 40%	4	0.925	0.8886	0.9614	0.8	1	0.04787	0.09574	10.35%	7.5%
68/48/34 65%	4	0	0	0	0	0	0	0		100.0%
68/48/34 85%	4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
A68/CC48/M34CON	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
68/48/34 4%	4	1.369	1.339	1.4	1.249	1.412	0.04007	0.08015	5.85%	3.04%
68/48/34 9%	4	1.331	1.295	1.366	1.249	1.412	0.04705	0.09409	7.07%	5.77%
68/48/34 20%	4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	0.0%
68/48/34 40%	4	1.295	1.239	1.351	1.107	1.412	0.07348	0.147	11.35%	8.28%
68/48/34 65%	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%
68/48/34 85%	4	0.1588	0.1588	0.1588	0.1588	0.1588	0	0	0.0%	88.76%

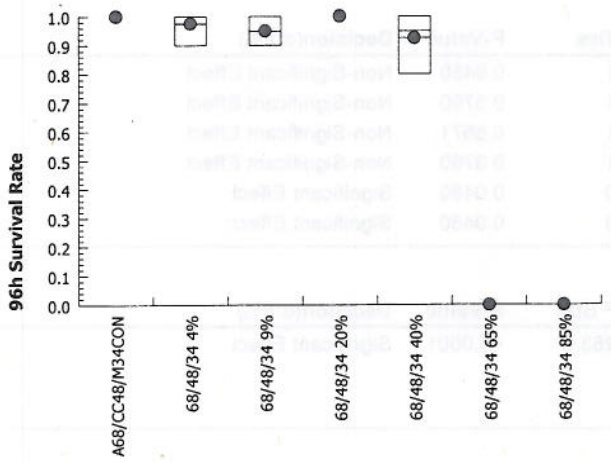
Fish 96-h Acute Survival Test — **U.S. EPA Region 8 Lab**

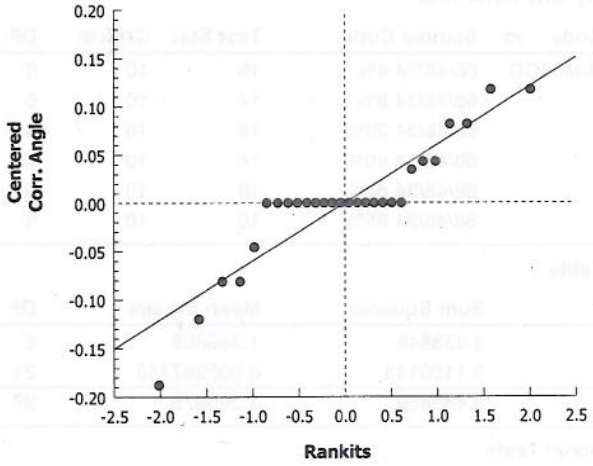
Analysis ID:	19-2177-9212	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 15:03	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
A68/CC48/M34CON	1	1	1	1
68/48/34 4%	1	1	1	0.9
68/48/34 9%	1	0.9	1	0.9
68/48/34 20%	1	1	1	1
68/48/34 40%	0.9	1	0.8	1
68/48/34 65%	0	0	0	0
68/48/34 85%	0	0	0	0

Graphics





CETIS Test Data Worksheet

Fish 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	02 Nov-12	**Species:**	Oncorhynchus mykiss	**Sample Code:**	1112OMARTT
End Date:	06 Nov-12	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	Reference Toxicant
Sample Date:	02 Nov-12	**Material:**	Zinc sulfate	**Sample Station:**	

Batch Note: Region 8: Acute RBT Ref Tox Test (concurrent to Nov 2012 Upper Animas SW Tox Test)

Sample Note: Region 8: Acute RBT Ref Tox Test (concurrent to Nov 2012 Upper Animas SW Tox Test)

Conc-µg/L	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	L	1	1	10	10	10	10	10	
0	L	2	6	10	10	10	10	10	
0	L	3	22	10	10	10	10	10	
0	L	4	3	10	10	10	10	10	
55.3		1	14	10	10	10	10	10	
55.3		2	17	10	10	10	10	10	
55.3		3	16	10	10	10	10	10	
55.3		4	10	10	10	10	10	10	
107		1	4	10	10	5	5	5	
107		2	15	10	10	9	8	8	
107		3	5	10	10	9	9	9	
107		4	8	10	9	9	8	8	
220		1	9	10	10	0	0	0	
220		2	13	10	9	1	0	0	
220		3	20	10	8	1	0	0	
220		4	7	10	10	2	0	0	
435		1	11	10	6	0	0	0	
435		2	21	10	10	0	0	0	
435		3	12	10	9	0	0	0	
435		4	18	9	6	0	0	0	
874		1	24	8	5	0	0	0	
874		2	2	10	5	0	0	0	
874		3	19	10	4	0	0	0	
874		4	23	9	5	0	0	0	

CETIS Analytical Report

Test Code: 1112OMARTT | 08-3088-5134

Fish 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Analysis ID:	12-5759-7385	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	14 Mar-13 12:01	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.111	0.02053	129.1	117.5	141.9

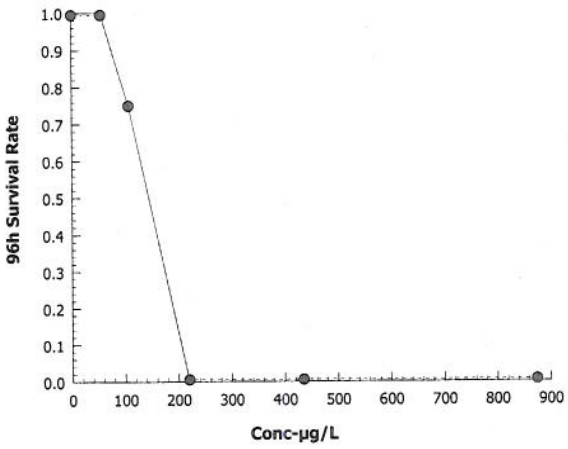
96h Survival Rate Summary — Calculated Variate(A/B)

Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Water	4	1	1	1	0	0	0.0%	0.0%	40	40
55.3		4	1	1	1	0	0	0.0%	0.0%	40	40
107		4	0.75	0.5	0.9	0.0866	0.1732	23.09%	25.0%	30	40
220		4	0	0	0	0	0		100.0%	0	40
435		4	0	0	0	0	0		100.0%	0	39
874		4	0	0	0	0	0		100.0%	0	37

96h Survival Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water	1	1	1	1
55.3		1	1	1	1
107		0.5	0.8	0.9	0.8
220		0	0	0	0
435		0	0	0	0
874		0	0	0	0

Graphics



Analyst: BGK QA: EC