

**Appendix E -
Yellowstone Cutthroat Trout
Adult Laboratory Reproduction Studies**

**Technical Support Document:
Proposed Site-Specific Selenium Criterion,
Sage and Crow Creeks, Idaho**

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LIST OF ACRONYMS

| | |
|-------|---|
| AOC | Administrative Order on Consent |
| CAS | Columbia Analytical Services |
| CF | Cranio-Facial |
| DO | Dissolved Oxygen |
| dw | Dry Weight |
| EC | Effect Concentration |
| ED | Edematous Tissue |
| FD | Finfold |
| GSI | Graduated Severity Index |
| IDEQ | Idaho Department of Environmental Quality |
| NCSS | Number Cruncher Statistical System |
| ODAs | Overburden Disposal Areas |
| OLS | Ordinary Least Squares |
| RI/FS | Remedial Investigation/Feasibility Study |
| SFSC | South Fork Sage Creek |
| SI | Site Investigation |
| SK | Skeletal |
| SSSC | Site-Specific Selenium Criterion |
| TRAP | Toxicity Relationship Analysis Program |
| USFS | U.S. Forest Service |
| USEPA | U.S. Environmental Protection Agency |
| YCT | Yellowstone Cutthroat Trout |

1.0 INTRODUCTION

A chronic site-specific selenium criterion (SSSC) is being developed for Hoopes Spring and South Fork Sage Creek (SFSC) and the downstream receiving waters including Sage Creek and Crow Creek upstream of the Idaho and Wyoming State Line. Hoopes Spring is located in Sage Valley near the J.R. Simplot Company (Simplot) Smoky Canyon phosphate mine in Southeastern Idaho (Figure 1). In accordance with the Administrative Order on Consent (AOC) entered into by Simplot, Idaho Department of Environmental Quality (IDEQ), the U.S. Forest Service (USFS), and the U.S. Environmental Protection Agency (USEPA), a Site Investigation (SI) was conducted at the mine site in 2003 and 2004. Investigations to date have identified elevated concentrations of selenium in surface water being discharged via Hoopes Spring and South Fork Sage Creek Springs, which ultimately discharges to lower Sage Creek. Selenium released from overburden disposal areas (ODAs) at the mine has the potential to migrate vertically downward into the Wells Formation aquifer. Groundwater from the Wells Formation aquifer discharges at Hoopes Spring and South Fork Sage Creek Springs.

Source control actions implemented at the ODAs will limit infiltration and reduce selenium transport to the Wells Formation, but they will not immediately reduce selenium concentrations in groundwater discharged at Hoopes Spring and South Fork Sage Creek springs. In the interim, modification of the selenium surface water quality standard is being investigated. Source controls have already been implemented at the Pole Canyon ODA and at Panel E. The effects of the Pole Canyon actions are anticipated to be observable at Hoopes Spring approximately 10 years after the diversion of Pole Canyon Creek diversion (NewFields 2007a). The effects of recent backfilling, covering, and reclamation at Panel E are anticipated to take place within a shorter time period; however, the time frame for observable reductions in the selenium concentrations in Hoopes Spring and South Fork Sage Creek springs due to these actions is not certain. The groundwater investigation being conducted for the Remedial Investigation/Feasibility Study (RI/FS) will provide additional information needed to refine previous estimates of the selenium transport times from these different source areas to the springs. The need for and types of additional source controls are also being evaluated through the RI/FS project.

Field monitoring studies were conducted to characterize the exposure environment, the aquatic community, and the physical habitat of the site. Methods for the field monitoring studies are documented in the April 2007 *Work Plan - Field Monitoring Studies for Developing a Site-Specific Selenium Criterion* (NewFields 2007b). Results of the field monitoring studies are documented in the May 2009 *Final Data Report – Fall 2006 - Fall 2008 Field Monitoring Studies for Developing a Site-Specific Selenium Criterion* (NewFields and HabiTech 2009).

This report, for the study of Yellowstone cutthroat trout (YCT) (*Oncorhynchus clarki*) reproduction, is presented as the second of two laboratory studies to evaluate the effects of bioaccumulated ambient selenium concentrations on reproductive success of trout from the Site. The first study involved a similar scope, but used brown trout (*Salmo trutta*). Results of the brown trout study were reported in the June 2009 *Draft Final Brown Trout Report Laboratory Reproduction Studies Conducted in Support of Development of a Site-Specific Selenium Criterion* (NewFields 2009)¹. The laboratory studies were developed to complement information available from literature and the extensive field monitoring program for the study area. The laboratory studies were designed to assess potential effects of selenium accumulated in tissues of wild-caught, adult YCT on reproductive success, especially the development of young fish, from fertilization through swim-up stages of development. The study design was presented in the May 2008 *Revised Draft Work Plan – Laboratory Toxicity Tests for Developing a Site-Specific Selenium Threshold for Trout* (NewFields 2008a) (Appendix A).

1.1 Background

The approach for the YCT laboratory reproduction studies was based in part on the following published and unpublished works:

- Kennedy et al. (2000). The effect of bioaccumulated selenium on mortalities and deformities in the eggs, larvae, and fry of a wild population of cutthroat trout (*Oncorhynchus clarki lewisii*);
- Holm et al. (2003). An assessment of the development and survival of rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) exposed to elevated selenium in an area of active coal mining;
- Holm et al. (2005). Developmental effects of bioaccumulated selenium in eggs and larvae of two salmonid species;
- Hardy (2005). Effects of dietary selenium on cutthroat trout (*Oncorhynchus clarki*) growth and reproductive performance; and,
- Formation (2011). Final Brown Trout Report Laboratory Reproduction Studies Conducted in Support of Development of a Site-Specific Selenium Criterion.

¹ This report has been finalized and is presented in the 2012 Technical Support Document as Appendix D.

Based on these and other works, the reproductive success of fish exposed to selenium via diet and water was identified as a highly sensitive endpoint. The approach also reflects the following understanding of the current state of the science regarding selenium toxicity:

- Chronic effects of selenium exposure to fish are due primarily to diet. Chronic toxicity is based on the magnitude and duration of exposure, as well as bio-uptake in the food web. The USEPA (2004) draft criteria document for selenium did not consider or use tests in which aqueous only exposure was tested. EPA states, “[b]ecause diet controls selenium chronic toxicity in the environment and water-only exposures require unrealistic aqueous concentrations in order to elicit a chronic response, only studies in which test organisms were exposed to selenium in their diet alone or in their diet and water were considered in the derivation of a chronic value.”
- Fish appear to be the most sensitive aquatic biota in the area of interest to chronic exposure and toxicity from selenium (Coyle et al. 1993; Hamilton et al. 1990; Hermanutz et al. 1996) (as cited in USEPA 2004).
- Reproductive success is the most sensitive biological end point for assessing selenium toxicity to fish (Lemly 1985a,b, 1992; Gillespie and Baumann 1986; Schultz and Hermanutz 1990; Coyle et al. 1993) (as cited in Lemly 1993).
- Selenium impacts on reproductive success in fish are strongly correlated to selenium content in eggs (Parametrix 2009)². Selenium in eggs is derived from maternal tissues, and is well correlated with whole body tissue selenium concentrations in maternal adults.
- To date, three species of trout (i.e., brook, rainbow, and cutthroat) have been tested for bioaccumulation in adults and effects on development of young (Holm et al. 2003, 2005; Kennedy et al. 2000; Hardy 2005; Rudolph et al. 2008). Two species of cutthroat trout (westslope cutthroats and Yellowstone cutthroats) have been tested based on published literature.

Because of the site-specific nature of selenium exposure and toxicity, wild-caught, reproducing fish from the study and reference areas are the best measure of current and potential impacts within this watershed. Yellowstone cutthroat trout (YCT) from this site have not previously been tested, and as the native trout species for these streams, as well as being a recreationally-important species, YCT are being evaluated to assess their sensitivity to maternal transfer of selenium to eggs and the resulting effects.

The YCT adult reproduction testing used gravid adult wild fish captured at various locations from the study area (Figure 2), as well as Henry’s Lake natural run hatchery fish for laboratory method controls. Maternal transfer is believed to be one of the key factors influencing reproductive toxicity. Wild, pre-spawn YCT were collected from locations that represent a range

² Parametrix 2009 is a compilation document that reviews a number of important studies in the selenium literature. The conclusions drawn are based on the scientific evidence from numerous studies suggesting ovary or egg concentrations are the best tissue to correlate to effects. This position is also supported by USEPA in their revision of the National Selenium Criteria as relayed to the SSSC Workgroup by Dr. Charles Delos.

of observed surface water selenium concentrations (NewFields 2007c). Aqueous and dietary selenium concentrations translate into a range of exposure conditions resulting in different body-burden loadings for parental fish, specifically adult female trout. It was anticipated that tissue concentrations in parental fish would confirm this. Gametes from the adult wild fish were collected and fertilized to evaluate reproduction. Although young were not exposed to aqueous selenium, they consumed any protein-bound organic selenium that was present in the yolk and passed on to the egg via parental exposure. The range and gradient of the selenium exposures, well-defined source area, exceedence of water quality standards and observations of thriving fish populations present a unique situation to examine selenium exposure and effects.

1.2 Objectives

The objectives of the testing presented herein are as follows:

- Document the range of selenium concentrations in wild parental fish due to in-situ integrated exposure of diet and water;
- Document the selenium concentrations in eggs produced by adults from different locations in the study area;
- Develop a relationship between selenium concentrations in maternal whole body tissues and egg tissues; and
- Develop dose-response relationships between egg tissue concentrations and measures of reproductive success and viability of young.

2.0 METHODS

The approach for testing adult YCT reproductive success, including the study design plan and analysis details for the assessment of selenium exposure, were presented in a SSSC Workgroup–reviewed Revised Draft Work Plan – Laboratory Toxicity Tests for Developing a Site-Specific Selenium Threshold for Trout (May 2008) (NewFields 2008a) (Appendix A). Study methods and results are reported in the 2009 Data Report - Reproductive Success Study with Yellowstone Cutthroat Trout (*Oncorhynchus clarki*) (Appendix B).

The methods for fish collection, egg collection and fertilization, and laboratory methods are briefly summarized below along with any deviations from the planned methods. Laboratory portions of this testing were carried out at AECOM's environmental toxicology laboratory in Ft. Collins, Colorado by Dr. Rami Naddy. The deformities assessment was performed by Dr. Kevin Bestgen at Colorado State University's Larval Fish Laboratory. Columbia Analytical Services (CAS) (Kelso, Washington) conducted the analytical chemistry for selenium concentrations in tissues.

2.1 Target Number of Wild Fish

To address whether the number of fish used in the laboratory study would adequately cover the range of parental tissue concentrations expected in the system, YCT tissue data for selenium were compiled for the stream segments of interest to examine the range of variability (n=123). The mean and its confidence intervals suggest that the YCT data are less variable (mean [CI] = 5.57± [0.631]) than the brown trout tissue data (mean = 13.27 ± 1.995), likely due to the larger sample size. Using these summary statistics, the goal was to identify the number of fish for collection that would provide a reasonably high probability of spanning the tissue concentration range of interest. The representativeness of the study is ultimately determined by capturing the range of effects and not the total number of fish. Next, the sample size to capture the range of tissue variability was estimated. How many samples are needed to cover the range of population of data (i.e., tissue concentrations), including at least one or more sample(s) that represent the upper 10th percentile? The following formula from Gilbert (1987) was used:

$$\alpha = 1-(1-p)^n$$

When rearranged to solve for n, it looks as follows:

$$n = \ln(1-\alpha)/\ln(1-p)$$

where:

α = Probability of at least one sample representing the upper p^{th} percentile;

p = target percent in number format; and

n = number of samples.

For this assessment, alpha was set at 0.05 and 0.1, while p was set at a range of percentile values. The upper 10th percentile was chosen because there will naturally be extremes in any environmental data, thus attempting to capture the entire range is not practical. Use of the 90th percentile (i.e., upper 10th percentile) captures a large proportion of the data.

At a 95 percent confidence level (i.e., $\alpha = 0.05$), 29 samples would be needed to confidently ensure that at least one or more samples would represent the upper 10th percentile (i.e., 90th).

The 90th percentile (or upper 10th percentile) for YCT tissue data is 9.7 mg/kg dry weight (dw) with upper and lower confidence limits around this percentile of 12.4 and 8.5 mg/kg dw, respectively. Thus, collection of approximately 30 female fish across the five exposure areas that include the approximate ranges of high, moderate, low, background and reference should provide a sample size that allows for at least one of the fish captured to have a tissue residue representative of the upper 10th percentile or higher. Unlike the brown trout assessment of sample size, data evaluated in this assessment include tissue residue data from Deer Creek and South Fork Tincup Creek.

Figure 3 further clarify that fish size, based on length, is not a predetermining factor of the body burden it carries, and the location of its exposure is more important.

2.2 Field Collection of Wild YCT

In mid-May 2008, the field crew completed its annual spring monitoring. During that time, collected YCT were examined for spawning condition. Only two ripe females were found, suggesting that the primary spawning period was still pending. In late May, Dr. Tom Wesche coordinated with personnel on the ground in the vicinity of Crow Creek to closely monitor the river stage. David Teuscher at IDFG was contacted to assess the status of YCT spawning runs at their traps on the Blackfoot River. Collectively, sufficient information gathered during this time indicated that the predominant spawning period was in progress. Therefore, from June 3 to June 10, 2008, sampling was conducted by the field crew to collect ripe and running YCT. Electrofishing was conducted at multiple locations (Table 1 and Appendix C), including Crow Creek upstream and downstream of Sage Creek, Sage Creek, Deer Creek and South Fork Tincup Creek. Other areas within these locations where YCT might be expected to congregate

and spawn due to favorable conditions, such as water depth, velocity, and substrate were also included (see locations fished in Appendix C). Capture locations of YCT that were ultimately used for the reproduction study included: Sage Creek (LSV-2C), Crow Creek (CC-150 and 350), Deer Creek (downstream of DC-600 near Crow Creek), and South Fork Tincup Creek (SFTC-1).

Electrofishing was conducted during two separate periods, with the primary effort being done over a 7 day period from June 3 to June 10, 2008 at multiple locations. A second event was conducted over two days from June 26 to June 27, 2008, where locations were re-sampled for evidence of spawning. Throughout the effort, a total of 469 YCT were collected with 127 of those being considered under sized and under age (Table 1). More than 300 YCT greater than 230 mm were captured. Of these, only 73 showed evidence of potential spawning condition, with 43 being identified as males and 30 being potentially ripe females. Of the females, only 15 were sufficiently ripe to produced eggs. Most of these ripe females were captured either in Deer Creek (near its mouth) or in Crow Creek (just downstream of Deer Creek). Several fish were also captured in Sage Creek (between South Fork Sage Creek and Hoopes Spring). Only one ripe female was collected at the reference location on South Fork Tincup Creek.

The target age of fish for use in this study was 3+ years old. Fish of this age are typically larger than approximately 200 mm in length (Kruse et al. 1997). Due to the large area sampled, fish were graded and sorted as the field crew progressed through a reach. Initially, all fish were checked for ripeness, and adjustments to the size class were made based on the size of females that were most frequently ripe. Preference was given to use of tagged fish over non-tagged fish because data had previously been collected on that fish's location of capture, weight, and length. Lengths were checked using graduated marks on the handles of the dip nets. Running counts of trout below target size ranges were made and those fish were returned immediately to the stream. Running counts of unripe fish within the target size range were also maintained. Appropriately sized fish were checked for ripeness immediately upon collection. If the male or female was ripe, it was retained and held on-site in a holding pen while other locations were fished and until eggs (from adult female fish) and milt (from adult male fish) could be stripped from the adults. Fish were typically held from 1 to 2 days in stream to minimize stress. When sufficient numbers of males and females had been collected to make a shipment to the laboratory, electrofishing was suspended and the field crew began the process of stripping eggs and milt.

2.3 Egg Collection and Fertilization

Eggs (from adult female trout) and milt (from adult male trout) were collected in the field for conduct of the reproduction tests. Fish were anesthetized using tricaine methanesulfonate (MS-222) to loss of equilibrium. Fish weight and length were measured to the nearest 0.1 g and 1 mm, respectively. Trout were blotted dry, particularly the area around the urogenital opening to remove excess water that might contribute to premature water hardening of the eggs. The milt

from several males at each location was expressed using a downward squeezing force, ventrally. Milt from several males was collected into a single plastic bag and stored on ice until added to individual egg batches from all females collected from that location. Eggs from each female were stripped from the vent in a similar fashion as the milt was collected from the males. Eggs from a single female were stripped into a pre-cleaned stainless steel bowl. Any blood, dirt or extraneous material was then removed from the bowl.

Eggs were fertilized in the field to reduce egg loss due to incomplete fertilization by adding approximately 1 ml (depending on relative volume of eggs) of milt to the eggs from a single female in the bowl. The egg / milt mixture was swirled gently to ensure adequate mixing of gametes. The eggs and milt were allowed to sit undisturbed for ~1 minute. Then ~100 ml of local stream water (enough to just cover the eggs) was added to the bowl. The gametes were gently swirled for three minutes. Afterward, an additional 500 ml of stream water was added to water harden the fertilized eggs. The entire content of the bowl was then poured into a labeled plastic bag and sealed. Each bag was labeled according to the female from which the eggs came, as well as the location. Prior to transport to AECOM, the bag containing the fertilized gametes was partially inflated with oxygen, placed into a separate bag (double bagged), and returned to storage on ice (@ 4°C). The fertilized gametes were placed in a cooler for storage and transfer to the laboratory to protect them from sunlight and to keep them cold. A transponder that recorded temperature at 1 minute intervals was placed in each cooler prior to shipment to monitor the temperature during transport. Transport of fertilized eggs from the site was completed via arranged transport directly to AECOM to reduce transport stress and delays using a commercial overnight carrier. Eggs were collected from 15 females, but only 14 sets of eggs were included in the test, as one set of eggs (SFTC-1) arrived at AECOM dead.

Adult fish were sacrificed for whole body selenium analysis. The adult fish carcasses were packaged in double plastic Ziploc® bags and stored on ice or frozen prior to shipment to AECOM along with the final egg batches. Because egg batches had to be delivered to AECOM within a narrow time window, and because AECOM had a large walk-in cooler/freezer, adult carcasses were initially shipped to AECOM. Once all carcasses were at AECOM and thoroughly frozen, a single shipment which included a subsample of eggs and all the adult fish carcasses for selenium tissue concentration analysis was sent on dry ice to CAS. Total selenium analysis and percent solids content were performed on all the submitted samples according to the methods described in the Work Plan (NewFields 2007b).

The adult fish that were sacrificed for tissue analysis were packaged in double plastic Ziploc bags and stored on ice or frozen prior to shipment to the analytical laboratory for tissue residue analyses according to the methods in the Field Studies Work Plan (NewFields 2007b). Adult fish carcasses and residual eggs not included in the study were shipped to CAS in Kelso, Washington following standard operating procedures identified in the Field Studies Work Plan (NewFields 2007b).

Water quality data were collected during the spring monitoring period approximately 2 weeks prior to the adult YCT collection effort. In-situ field parameters, including water temperature, pH, conductivity, and dissolved oxygen were recorded. A single water quality grab sample was also collected from each of the SSSC monitoring locations for analysis of dissolved and total selenium.

2.4 Henry's Lake YCT

Hatchery fish were used as method controls. Hatchery fish and gametes were obtained from Henry's Lake Fish Hatchery, Henry's Lake, Idaho (courtesy of Damon Keen, Idaho Fish and Game) on April 7, 2008. Unlike traditional hatchery fish, those from Henry's Lake comprise a natural run of cutthroat trout that move into the river from the lake to spawn. The trap is setup near the lake outlet to the river and pre-spawn trout are captured from this location as a hatchery source for other areas. ENSR staff was on site at Henry's Lake to fertilize eggs consistent with the methods used in the field for wild-caught YCT. Because hatchery fish were obtained when they were ripe, which occurred prior to when fish were spawning in the field, the hatchery fish were obtained approximately 2 months prior to the first field-collected fish. In addition, hatchery fish were at the tail end of the spawning season so additional organisms were included in this batch of organisms to account for the possibility of low fertilization success.

Aqueous water samples were also collected at the hatchery location for analysis of total and dissolved selenium so background levels of selenium at the hatchery could be compared with selenium levels from field locations. The samples were collected in May 2008 and sent to ACZ for analysis. Maternal fish were sacrificed to obtain whole body selenium tissue concentrations that corresponded to egg clutches from each female, consistent with the methods utilized for the wild fish.

The Henry's Lake fish obtained were large, wild fish that were older than the range of fish collected during the wild fish survey in Crow Creek and tributaries. Unlike the brown trout hatchery fish used as method controls, Henry's Lake method controls do experience environmental stressors, but in a lentic (still water) environment. Comparisons of Henry's Lake fish endpoints may be appropriate, but differences in adult size and resultant egg clutch sizes may skew comparisons, although they may be investigated.

Henry's Lake fish may be used to qualitatively assess effects endpoints, but data from these fish are more likely to illustrate the range of method variability that can and does occur in larval fish survival, growth, and deformities when no selenium exposure has occurred. The data for these hatchery fish, and the measured response, are included alongside the field-collected fish to illustrate that variability.

2.5 Laboratory Test Methods

The reproduction portions of this testing were carried out by AECOM's environmental toxicology laboratory in Ft. Collins, Colorado. The methods are presented in detail in Appendix B. The study plan design was initially developed based on exposure areas and grouping of fish from the same collection areas. However, the study design was modified to collect trout at several different locations (exposure areas) and raise eggs from each maternal fish as an independent unit (i.e., paired data). The collection of paired data for individual fish is expected to provide better insight on the relationships between tissue concentrations and reproductive success.

Adult reproduction tests began with a target egg number equal to 600 eggs per test chamber. The number of eggs placed into each study was counted manually. For all of the treatments, the remaining number of eggs was estimated using a volume technique to develop a number of eggs/volume ratio for that particular female. The technique consisted of counting the number of eggs that filled a graduated cylinder to a particular volume (e.g., 50 mL) to determine the number of eggs per mL for that female. In the past, two separate counts were conducted by two different staff personnel. Based on the agreement of these counted numbers for the particular volume, counts were only made once per female. Using this ratio, the total number of remaining eggs for the total volume of eggs measured in a graduated cylinder were calculated. The total number of eggs used to initiate the studies (e.g., 600) was then added to the estimated number of remaining eggs to determine the total number of eggs for that particular female trout.

Adult trout carcasses and a subsample of eggs were sent to CAS for analysis of total selenium and percent solids. Tissues for selenium were analyzed using Gaseous Hydride Atomic Absorption Spectroscopy (GH-AAS) Method 7742. Percent solids were measured via freeze drying. Appendix D includes the raw data for selenium concentrations in whole body and egg tissue.

2.6 Deformity Assessment

Dr. Kevin Bestgen, at Colorado State University's Larval Fish Laboratory, was contracted to conduct the deformity assessment. He evaluated over 10,000 individuals and each individual fish was evaluated for up to four different deformities and four possible levels of deformity. Dr. Bestgen developed a process for assessing deformities which gives specific scores to each ranking, thereby allowing for some measure of repeatability and accuracy. He received samples essentially as blinds because he did not know what the sample locations were or their locations relative to selenium concentrations.

The general criteria were adopted from Holm et al. (2003), and included assessments of craniofacial deformities (mostly of the head, eyes, and jaw), vertebral deformities, fin deformities, and edema. The original publication showed pictures of some deformities but

others, particularly the intermediate categories, were not illustrated or were poorly described. More specific definitions for each of the assessment categories were developed to give better repeatability and consistency across studies, and to aid others in learning the range of deformities possible.

Deformities in each of the categories described above were given a score from 0-3, with 0 being a normal condition and 3 being the most deformed. Some range finding was conducted over the first several samples to find background and severe levels of deformities in each category. Initial samples were re-scored as necessary to bring them into compliance with the standards that were used throughout the assessment.

The protocol for assessing damage was to place several fish, head to the left, in a Petri dish and examine them under a dissecting microscope and 10X magnification. The lateral side was examined for spinal deformities (e.g., lordosis, kyphosis), appearance of the eye, head and snout shape, edema, and fin deformities. The fish was turned ventrally to look for mouth deformities and further spinal deformities (scoliosis), turned laterally again for the same criteria as the other side, and then dorsally for issues associated with eyes, head size, spinal deformities.

Craniofacial deformities included shortening of the jaw, snout, and missing or poorly developed eye or eyes, and head shape abnormalities. A slightly shortened lower jaw (≤ 1 lip width) received a 1, a shortened jaw = 2 lip widths or a slightly shortened and slightly disfigured jaw = 2, and a flat lower jaw or much disfigured (non-functional) jaw = 3. An assessment of fish independent of this study revealed that other brown trout of the same size and developmental state did not have the slight deformity that was assessed as CF = 1 for the jaw (J). Thus, the CF = 1 score where the J was concerned was deemed real. A slightly blunted snout (about 50 percent eye diameter, usually is > than that) = 1, very blunt or flat = 2, deformed or bulbous = 3. Eye deformities were scored as one eye blind or poorly pigmented or poorly developed = 1, both poorly developed = 2, both blind = 3. Skulls that were slightly bulbous ($1/3 >$ normal) = 1, moderately bulbous ($2/3 >$ normal) = 2, and bulbous ($1x$ or > than normal) = 3.

Skeletal deformities included any deformity of the vertebrae or spines. A slight bend of less than 45 degrees (but > than body width off of straight) or a minor body constriction (e.g., a tight rubber band about the body effect) was given a score of 1, 2 slight bends or constrictions anywhere, or bend of > 45-90 degrees was scored a 2, and multi-directional bends > 90 degrees were given a 3.

Fin deformities included variation in fin or finfold morphology and a slightly smaller or missing fin (in thin fish, the adipose fin was often absent, indicating fat absorption, not uncommon and scored 1) or one with a bend or incomplete ray development (in older fish) was given a 1, 2 fins

damaged or malformed = 2, and > 2 fins malformed or if fins were missing (except adipose) was = 3.

Edema was detected by an obvious swelling and fluid buildup, usually abdominally, and ventrally, which often displaced the gut, and was usually clear fluid that was slightly soft when touched with a blunt probe. Slight edema = 1 was for a fish with up to 1X swelling of the normal body width or depth, up to 2x = 2, and > 2x = 3.

2.6.1 Data Reduction of Deformity Rankings

Individual files, representing scoring sheets, were received for each sample evaluated. All files were combined in Excel to form a master file. Data were summarized using the Pivot table function in Excel to produce counts and percentages of normal fish, deformed fish, and total number of fish evaluated. Similar to the method of Holm et al. (2005), a Graduated Severity Index (GSI) was derived based on the deformity rankings and counts for progeny from each parent. A total score was computed as follows:

$$[(\# \text{ fish for CF}=1) \times (1)] + [(\# \text{ fish for CF}=2) \times (2)] + [(\# \text{ fish for CF}=3) \times (3)].$$

This method differs slightly from Holm et al. (2005), as it weights each ranking with more weight given to more severe deformities. Fish scored as 0 (normal) observations did not enter into this calculation of total score. The final GSI score was computed as the sum score/total # fish including those ranked as "0". The total scores were summed and divided by the number of categories of deformities assessed (usually 4) to derive a mean GSI score.

Because the USEPA's Toxicity Relationship Analysis Program (TRAP) version 1.2 (Erickson 2008) logistic functions were designed to derive an inverse sigmoidal curve, commonly used to illustrate the dose-response curve of increasing exposure concentration and declining biological observation (e.g., survival, growth, etc.), deformities were evaluated as the sum fraction of normal fish (sum of normal fish/ total number of fish) for each deformity. This approach did not take into account severity of deformity, simply the frequency of normal fish relative to the total number of fish which is consistent with USEPA's (2004) approach to analysis of similar data. The percentage of normal fish (based on the total number) will be low if high numbers of fish are present with some level of deformity, and conversely, the percentage of normal fish will be high if low numbers of fish are present with some level of deformity.

2.7 Statistical Analysis

Multiple test-effects endpoints were measured at different times during the test including: fecundity, hatching success, deformities, length, weight, survival (at different times during the study), and tissue concentrations (egg and whole body). These endpoints were consistent with

those of Holm et al. (2005), Hardy (2005), and Kennedy et al. (2000). Feeding success was added as a test endpoint to evaluate the change from endogenous to exogenous feeding post swim up.

Scatter plots and best-fit ordinary least squares (OLS) regressions were used as an exploratory tool to evaluate the potential for meaningful relationships. Ordinary least squares regression analysis was used as a preliminary method to assess if relationships existed between individual exposure assessment endpoints (i.e., parental selenium body burdens or egg selenium concentrations) and test-effects endpoints measured in the study. The dose-response relationships for exposure and effects endpoints were evaluated further using USEPA regression-analysis software (TRAP version 1.20; Erickson 2008) for the effects endpoints showing the strongest relationships to the exposure endpoints. USEPA's TRAP software provides a number of statistical analysis tools, including logistic regression³, to evaluate the presence of dose-response relationships. The logistic regression approach is consistent with the methods utilized by the USEPA in their assessment of dose-response data for the 2004 Draft Criterion. USEPA's TRAP software also allows for prediction of effect concentration (EC) values to estimate thresholds for potential effects for YCT. Both EC₁₀ and EC₂₀ values were derived for each relevant relationship developed. While logistic regression was the primary non-linear analysis utilized, these data were also subjected to each of two additional analyses as well, including piecewise linear and threshold sigmoidal analyses to evaluate the best fit model fit to the data distribution. Data transformations were also utilized to achieve the best model fit.

³ Unlike traditional linear regression models, which assume equality of variance and normal distributions, the logistic regression model does not require nor have the same assumptions which can lead to Type I and Type II errors. Logistic regression has many analogies to OLS regression: logit coefficients correspond to b coefficients in the logistic regression equation, the standardized logit coefficients correspond to beta weights, and a pseudo R² statistic is available to summarize the strength of the relationship. Logistic regression does not assume linearity of relationship between the independent variables and the dependent, does not require normally distributed variables, does not assume homoscedasticity, and in general has less stringent requirements. Logistic regression finds the equation that best predicts the value of the Y variable for each value of the X variable. The Y variable is not directly measured; it is instead the probability of obtaining a particular value of a nominal variable.

3.0 RESULTS

3.1 Surface Water Quality

Surface water quality data, collected in mid-May prior to the adult YCT collection effort, are displayed on Tables 2 through 4. Spring flows in May 2008 were high with upstream Crow Creek location flows ranging from 15.3 to 36 cfs and downstream Crow Creek flows ranging from 61 to 65 cfs. Deer Creek had a flow measured at 20 cfs, while Hoopes Spring ranged from 1.6 at the spring to 6.8 cfs at the channel mouth. Sage Creek downstream of Hoopes Spring had a flow of 12.4 cfs. South Fork Tincup Creek was not wadable or fishable in May, thus flows were measured in June at 21 cfs.

At all locations, pH was on the alkaline side of neutral with the lowest value for pH measured at Hoopes Spring (7.3 SU) at HS and the highest pH value measured at CC-150 (8.5 SU) upstream of Sage Creek. Specific conductivity ranged from 208 umhos/cm at DC-600 to 631 umhos/cm at SFTC-1. Locations on Crow Creek and Deer Creek upstream of Sage Creek were more variable (ranging between 208 and 431 umhos/cm) than Hoopes Spring and Sage Creek locations, which ranged from 283 to 302 umhos/cm. Water temperatures were variable due to the time of day when samples were collected. Dissolved oxygen (DO) was generally higher at locations upstream of Sage Creek due to lower water temperatures and higher gradient (DO range was 9.05 at CC-350 to 13.31 mg/L at DC-600). Dissolved oxygen in Hoopes Spring and Sage Creek ranged from 6.08 mg/L at HS to 9.01 mg/L at HS-3. Crow Creek locations downstream of Sage Creek had DOs of 9.8 and 10.49 mg/L at CC-1A and CC-3A, respectively.

The DO concentration measured at the reference location, SFTC-1, was 13.7 mg/L (the highest DO concentration measured for Spring 2008). Turbidity ranged from 0.5 NTU at HS to 21.07 NTU at SFTC-1. Turbidity values for the Spring 2008 sampling event were higher than other sampling events due to higher flows experienced at the time of sampling. Nitrate-nitrogen ranged from 0 mg/L (CC-350) to 0.04 (CC-150).

Analytical data for conventional water quality parameters and limited nutrients are shown on Table 3. These parameters included alkalinity, hardness, sulfate, nitrate, phosphorus, and DOC. Generally, these data indicate that Site waters are hard, nutrient concentrations are relatively low, and sulfate concentrations are variable depending upon the locations sampled. Sulfate tends to be highest in Hoopes Spring and Sage Creek below Hoopes Spring, and decreases in Crow Creek downstream of Sage Creek. The lowest sulfate levels are found in Deer Creek and South Fork Tincup Creek. These data were collected as accompanying parameters; however, the primary focus is on selenium concentrations.

Total and dissolved selenium concentrations in surface water samples are shown on Table 4 for the Spring 2008 sampling effort. Total selenium data are also illustrated on Figure 4. Concentrations of total selenium at upstream Crow Creek locations, as well as at the South Fork Tincup Creek reference location, were higher during Spring 2008 monitoring as compared to previous monitoring events. Total selenium ranged from 0.00058 to 0.0018 mg/L. Total selenium at the upstream Deer Creek location, DC-600, was 0.0015 mg/L. The total selenium concentration at Hoopes Spring (HS) was 0.0296 mg/L, while at HS-3, the total selenium concentration was 0.0223 mg/L. At the Sage Creek location downstream of Hoopes Spring (LSV-2C), the total selenium concentration was 0.0145 mg/L. At Crow Creek locations downstream of Sage Creek, the total selenium concentrations were 0.0032 mg/L and 0.0036 mg/L at CC-1A and CC-3A, respectively.

3.2 Wild Pre-Spawn Adult YCT

A total of 15 fertilized egg batches were sent to the laboratory for the adult reproduction study. Data for adult fish size, number of eggs produced, and selenium concentrations in whole body parental fish and eggs are presented in Table 5. Transport of eggs occurred at three time periods, with the bulk of eggs shipped during the first two periods, about 3 days apart. The last egg shipment was for a single egg batch from SFTC-1, which had to be fished later in the month due to high water.

3.2.1 Adult Size and Selenium Concentrations -Whole Body and Eggs

Eggs from fifteen adult wild females were collected, ranging in size from 263 mm to 491 mm and averaged 350 mm (Figure 5). The two largest (based on length) fish caught were from Deer Creek and SFTC-1 (Table 5). Fish weight ranged from 180 g to 1,131 g and averaged 402 g. Deer Creek parental fish were on average larger (mean weight = 452 g) than parents from Sage Creek (mean = 349 g) and Crow Creek upstream of Sage Creek (mean = 282 g) (Figure 6).

YCT adult female tissue selenium concentrations from within the study area ranged from 8.17 (DC-001) to 25.7 mg/kg dw (CC-350) (Table 5, Figure 7). Females captured in Sage Creek had selenium concentrations in whole body tissues that ranged from 18.6 to 22.5 mg/kg dw, while selenium concentrations in fish collected in lower Deer Creek ranged from 8.17 to 16.6 mg/kg dw. Only one fish was retained for this study from Crow Creek upstream of Deer Creek and it had a whole body selenium concentration of 16.3 mg/kg dw, while Crow Creek females found downstream of Deer Creek had whole body selenium concentrations ranging from 16.7 to 25.7 mg/kg dw. The largest fish caught based on length was in South Fork Tincup Creek, where the female had a whole body tissue concentration of 2.56 mg/kg dw.

Selenium in egg tissues ranged from a low of 3.43 mg/kg at SFTC-1 to 47.6 mg/kg dw at CC-350 (Table 5 and Figure 7). Females captured in Sage Creek had selenium concentrations in egg tissues that ranged from 30 to 40.1 mg/kg dw, while fish collected in lower Deer Creek ranged from 11.4 to 22 mg/kg dw. Only one female was retained for this study from Crow Creek upstream of Deer Creek and its eggs had a selenium concentration of 17.6 mg/kg dw, while Crow Creek females found downstream of Deer Creek had egg selenium concentrations ranging from 14.6 to 47.6 mg/kg dw. Only one female was collected from South Fork Tincup Creek and its eggs had a selenium concentration of 3.43 mg/kg dw.

Of the 15 females from which eggs were extracted, only 14 egg sets were utilized in the reproduction test. Eggs from the female collected at SFTC-1 were noticeably different from eggs previously spawned from other females. Many of the eggs were opaque when expressed prior to the addition of milt, suggesting that these eggs were non-viable. However, the field crew completed the field fertilization of these eggs and transported them to the laboratory.

3.3 Henry's Lake Fish

3.3.1 Adult Size and Selenium Concentrations – Whole Body and Eggs

Sixteen Henry's Lake females were selected for method controls in the adult reproduction study. Adult females ranged in size from 387 mm to 527 mm and averaged 455 mm (Figure 5). Weight ranged from 667 g to 1,945 g and averaged 1,274 g (Table 6, and Figure 6). Compared to wild-collected females, Henry's Lake fish were more robust and larger fish.

Selenium in whole body YCT from Henry's Lake ranged from 0.23 to 0.91 mg/kg dw (Figure 7). With selenium concentrations in whole body less than 1 mg/kg, it is clear that no selenium exposure was present in Henry's Lake females. Egg concentrations of selenium ranged from 0.83 to 3.23 mg/kg dw. By comparison, Henry's Lake egg selenium concentrations averaged about 10x lower than the lowest egg selenium concentration measured in wild fish from Sage Creek, Deer Creek, and Crow Creek.

3.4 Endpoints for Reproduction Testing

Appendix B details all laboratory results of the reproduction study. The following test endpoints were utilized at different times during the test: fecundity, hatch, deformities, length, weight, survival (at different times during the study), tissue concentrations (egg and whole body), and feeding success.

3.4.1 Fecundity

Total egg production for each female was counted as a measure of fecundity. The total number of eggs from field-collected organisms ranged from 242 (DC-004) to 1,539 (DC-002). By contrast, egg abundance from the Henry's Lake hatchery fish ranged from 1,597 (HL-002) to 4,668 (HL-011) (Tables 5 and 6 and Figure 8).

3.4.2 Egg Mortality

Egg mortality was determined based on the number of surviving fish at hatch. For wild-collected fish, only one group of the field-collected fish did not survive to hatch (SFTC1-FT0012). The range of egg mortality for the remainder of egg batches ranged from 0.8 percent to 59.5 percent. Egg mortality appeared to be lower in wild-collected fish versus those from Henry's Lake (Table 7 and Figure 9).

There were several Henry's Lake egg batches that suffered complete mortality prior to hatch, including HL-001, HL-005, HL-009, HL-014, and HL-016. Only four eggs from the HL-010 treatment hatched. These organisms were maintained throughout the study and survived until test termination (day 64). They were not saved for either deformity assessment or length and growth determinations. Excluding those egg batches listed above, egg mortality ranged from 12 percent to 90 percent. One half (i.e., 8 samples) had egg mortality of 44 percent or less.

3.4.3 Percent Hatch

Percent hatch was determined as the number of live fish and alevins at day of first hatch compared to the number of eggs at test initiation. Percent hatch and percent survival at hatch were synonymous endpoints for all treatments. The day of first hatch for wild-collected fish ranged from 20 to 21 days (Table 7). Percent hatch for the field-collected eggs (excluding SFTC-1) ranged from 40.5 – 99.2 percent (Figure 9). Eggs collected from DC locations ranged from 54.2 – 97.6 percent, with an average of 75.2 percent. Average hatch for the eggs collected from fish at CC-350 was 76.2 percent, while the average hatch for the eggs from LSV-2C locations was 92.0 percent. The one batch from CC-150 had 78.3 percent hatch.

The day of first hatch for the Henry's Lake hatchery fish ranged from 24 to 28 days (Table 7). The percent hatch for the Henry's Lake treatments (excluding the six treatments with complete mortality) ranged from 10.3 – 87.7 percent (average of 59.5%). Percent hatch for two of these egg batches, HL-002 and HL-015, were low at 10.3 and 11.5 percent, respectively. Without these two egg batches, the percent hatch for the remaining Henry's Lake treatments ranged from 56.3 – 87.7 percent and averaged 71.7 percent.

3.4.4 Survival

Survival was determined based on the number of surviving fish at hatch, swim-up, and at test termination compared to the number of eggs at test initiation. Generally, there was a 1:1 relationship of eggs that hatched that subsequently resulted in swim-up fry. There was however, one wild egg batch that had a high hatch rate that resulted in zero percent survival at swim-up (Figure 10). Survival was assessed at several different periods during the test, including:

- at swim-up ($[\text{number of fish surviving to swim up} / \text{total number of eggs at beginning of test}] * 100$);
- from hatch to test termination ($[\text{percent survival at hatch} - \text{percent survival at test end}]$);
- at test termination as overall survival ($[\text{total number of fish at the end of the test} / \text{total number of eggs at beginning of test}] * 100$);
- at the end of the 15-day post-swim-up feeding success trial ($[\text{number of fish used to begin the post-swim-up feeding trial, usually } n = 100 - \text{number of fish at the end of the feeding trial at 15 days} / \text{total number of fish used to begin the test}] * 100$); and
- At test termination as total survival ($[\text{number of fish surviving to the end of the test} / \text{total number of eggs at beginning of test}] * 100$).

3.4.4.1 Survival at Swim-Up

The day of swim-up for the Henry's Lake hatchery fish was at 49 days (Table 7). For the majority of the field treatments, the day of swim-up was between 40 to 41 days, regardless of the collection location. The percentage of organisms that reached the swim-up stage and the percent survival at the swim-up stage (i.e., on the day of swim-up) were very similar endpoints. Because the fry on the day of swim-up had already absorbed their yolk sac, these values were the same for all treatments at this point in the study (Table 7).

Fish from the study area hatched and swam up sooner than fish from Henry's Lake. There was one treatment (LSV-2C) where all the alevins died while in the swim-up stage (i.e., while absorbing their yolk sac) (Table 7). Of the thirteen remaining treatments (recall that 15 egg batches were submitted, but eggs from SFTC-1 were dead within 24 hours of arrival at the laboratory), survival at swim up ranged from 35.8 percent to 95.3 percent (Figure 11). For the locations where adults were collected, survival at swim-up ranged from 0 to 85.5 percent at LSV-2C, 50-95.3 percent at Deer Creek, and 35.8 to 85.2 percent at upstream Crow Creek locations.

For Henry's Lake method controls, survival at swim-up was highly variable. Excluding HL001, HL005, 009, 014, and 016, which experienced 100 percent egg mortality, survival at swim-up ranged from 0.7 to 83.8 percent. Three egg batches (HL002, 010, and 015) experienced particularly low survival at swim up (i.e., <10%), while the remaining egg batches had swim-up survival ranging from 44 to 83.8 percent (Figure 11).

3.4.4.2 Survival – Hatch to Test End

Survival, as measured from egg hatch to test end, eliminates the early mortality that occurs due to eggs that don't hatch. Survival from hatch to test end ranged from 30 percent to 96.8 percent (Table 7). Figure 10 shows the relationship for percent hatch and percent swim-up where for all but one treatment, if eggs hatched they generally had good swim-up survival. Excluding the two wild fish egg batches that did not produce swim-up fry, survival ranged from 30 to 97 percent, with Sage Creek survival ranging from 79 to 87.5 percent, Deer Creek Survival ranging from 77 to 96 percent, and Crow Creek upstream of Sage Creek survival ranging from 30 to 97 percent (Figure 11).

For eggs from Henry's Lake fish, survival from hatch to test end ranged from 71.9 percent to 100 percent (excluding those egg batches that did not hatch) (Figure 11). However, some egg batches had high mortality, resulting in a very low number of fish post-hatch. Excluding those egg batches (e.g., HL002, HL010, and HL015), survival ranged from 71.9 to 95.9 percent. Fifty percent of the 16 original egg batches from Henry's Lake fish experienced either complete egg mortality or had high egg mortality resulting in low numbers of swim-up alevins.

3.4.4.3 Survival - 15-Day Post-Swim-Up

For this phase, each treatment was initiated with ~100 (± 5) fry per chamber and maintained for 15-days to monitor growth and survival and assess whether there were any latent effects post-swim-up. The following treatments were initiated with fewer than 100 fry: HL-002 (n=45), HL-015 (n=37), and DC-004 (n=60). Survival for most field-collected fish was greater than 75 percent, except for the following treatments: CC-350-001, LSV2C-002, DC-003, and DC-004. Survival for the four mentioned treatments ranged from 1.9 percent (CC-350-001) to 70.4 percent (DC-003).

Survival during the 15-day post-swim-up stage for the Henry's Lake treatments ranged from 98 to 100 percent survival (Table 7). Eliminating those treatments with poor hatch survival, did not alter the range shown above.

3.4.4.4 Survival - Total

Total survival throughout the study was also calculated and presented for all treatments (Table 7). The day of test termination for Henry's Lake treatments was on day 64 and was either on day 55 or 56 for the field-collected organisms. Test termination was determined as a period of 15 days post-swim-up, during which time exogenous feeding began (Table 7).

For field-collected fish, total survival ranged from 0 to 88.9 percent. For all but the one sample that experienced complete mortality prior to swim-up, total survival ranged from 10.5 percent to 88.9 percent. Eggs from Sage Creek parents had total survival ranging from 0 to 82.7 percent, while eggs from Deer Creek parents ranged from 49 to 88.9 percent. Eggs from Crow Creek upstream of Sage Creek ranged from 10.5 to 83 percent survival.

Survival for the Henry's Lake treatment ranged from 0.7 – 83.7 percent. Eliminating those treatments with poor hatch survival changed the low end of the range to 43.8 percent.

3.4.5 Growth

Growth (dry weight) was measured in the post-swim-up feeding trial fish at the end of the 15-day period. These fish were carried through the test to the swim-up stage. Twenty fish (or fewer if 20 were not available), for each sample, were fed for another 15 days to examine if there might be differences in the ability of swim-ups to transition from endogenous to exogenous feeding. Morphological or physiological impairments could arise in young fish exposed to elevated selenium that may limit successful growth.

As illustrated in Figure 12, Henry's Lake alevins tended to be larger, both in terms of length and weight, when compared to wild YCT alevins. Henry's Lake 15-day post-swim-up fry weights ranged from 15.63 to 26.6 mg, whereas weights for wild fish ranged from 6.02 to 14.35 mg (Table 7). For all Henry's Lake fish, the average dry weight was 21.2 mg, whereas for all wild fish the average dry weight was 9.5 mg. Fry from Deer Creek parents were overall larger than those from Sage Creek or Crow Creek upstream of Sage Creek. Size and age of parents may lead to larger and stronger young, as evidenced by the Henry's Lake and Deer Creek growth data.

For both groups of fish (i.e., wild fish and Henry's Lake fish) growth (dry weight) data show average (\pm SD) growth and that Henry's Lake fish are larger post-swim-up and feeding than are wild-collected fish (Figure 13).

3.4.6 Deformities

Table 8 and Appendix E provide summary data for each sample and a series of graphics illustrating the types of deformities. Observations made during scoring that resulted in defining a level of severity for the fish being examined are reported below:

- **Cranio-Facial Deformities** - Usually factors occurred together so a combination of two “1” conditions = 2, three “1” conditions = 3, or a 1 and a 2 = 3, and so on. For example, a deformed jaw and a blind eye = 2, two blind eyes = 2, but a badly deformed jaw (= 2 alone) plus a blind eye (= 1 alone), = 3.
- **Skeletal Deformities** - Bends caused by skeletal deformities were usually detectable from normal bending of the body during preservation (these fish were usually well preserved, very straight) by presence of a slight or greater bump below the surface of the epidermis on the outside of the bend. However, some fish with SD = 1 had just a very slight bend in the range the deformity described but could be due to preservation or the poor condition of the fish. This was sometimes especially true in larger fish, which may be more muscular and undergo stronger contraction during preservation and thus, bend slightly. A score “SD = 1” was a slight deformity, if at all. The scores of SD = 1 involving kyphosis or lordosis were deemed real because that is an unusual preservation deformity.
- **Fin and Finfold Deformities** - Often fins were malformed associated with vertebral deformities that did not permit proper development. Folded finfolds as a result of preservation were not counted.
- **Edema** - Edema was not originally scheduled for assessment because it was thought sometimes not a teratogenic effect and may be transitory as fish develop. However, it was assessed because it was common in one early sample and not others, and because it was thought a condition that could affect emergence, mobility, and other factors that may limit survival of fish in the wild. The yolk, which was present in some quantity in some study specimens, also created some swelling but was typically yellowish, opaque, and small, and hard to the touch in preservation.

For Henry’s Lake fish, over 3,000 alevins were examined for deformities (n=3,086). Alevins from 10 separate egg batches were submitted, with 2 of the 8 having 40 or fewer organisms for analysis. The remaining 8 samples averaged 376 organisms/sample. For field-collected fish, over 4,700 alevins were examined for deformities (n=4,764). Alevins from 14 different egg batches were submitted, with only one of the 14 having 40 or fewer organisms. The remaining 13 samples averaged 363 organisms/sample. Resulting graphics displaying percentages of organisms within a sample (Appendix E) and within a location (Figure 14 through 17) with varying levels of deformities are, therefore, based on a large sample size. The results of the

deformity assessment by location (i.e., all sample combined) are visually displayed in Figures 14 through 17. The results of the cranio-facial (CF), skeletal (SK), finfold (FD), and edematous tissue (ED) deformity frequency are depicted separately. Each of these figures is similar for the remaining deformity assessment and presents the data on a percent basis for each of the rankings used in the assessment.

3.4.6.1 Cranio-Facial Deformities

On a location basis, the percentage of normal alevins from wild-collect adults was greater than 80 percent. The LSV-2C location had a higher percentage of Level 3 (severe/many) deformities and also had some of the higher egg selenium concentrations (40.1 mg/kg dw). Henry's Lake samples averaged nearly 90 percent normal (Figure 14).

On average, the percentage of normal fish from eggs of parents from upper Crow Creek (CC-150, CC-350, and Deer Creek) ranged from 76 to 96 percent for the craniofacial endpoint, 18.5 to 95.7 percent for fish from Sage Creek, and 69.2 to 96 percent for Henry's Lake fish (Figure 14).

3.4.6.2 Skeletal Deformities

The percentage of YCT that scored normal for skeletal deformities from the upper Crow Creek locations averaged from 17.6 to 35 percent, while for Sage Creek normal fish averaged from 7 to 35.7 percent of the sample. Henry's Lake fish that were normal averaged from 5.6 to 52 percent of the sample. While the percentage of normal fish was lower in all samples as compared to the craniofacial endpoint, the severity of skeletal deformities was not high. A number of fish that were not ranked as normal were ranked as having only slight or few skeletal abnormalities (Figure 15).

Skeletal deformities in both wild-collected fish and Henry's Lake fish were high, although a large proportion of fish from both groups were categorized as level 1 (slight/few) deformities (Figure 15). As indicated above in the scoring criteria, many of the level 1 rankings may have been due to preservation. For wild-collected fish, no more than 34 percent of fish were categorized as normal, while for Henry's Lake fish, 41 percent of the fish were categorized as normal. Level 3 deformities were highest in the sample from CC-150 (~ 8%) and lowest in Deer Creek fish (1%).

3.4.6.3 Fin or Finfold Deformities

Finfold deformities were infrequent, resulting in high numbers of fish that ranked, on average as normal. Upper Crow Creek fish ranked as 95 percent or greater normal. Similarly, fish from

Sage Creek were ranked as having high numbers of normal fish in three of the four samples (>95%). One sample however, only had 85 percent normal fish. Henry's Lake fish ranged from 55.6 to 98 percent normal fish for finfold deformities (Figure 16).

Fin or finfold deformities were low across all locations with normal fish accounting for 95 percent or more of each location's samples. Level 3 deformities were nearly absent from wild-collected fish and accounted for 2.5 percent of the total for Henry's Lake fish (Figure 16).

3.4.6.4 Edema Deformities

Edema was variable across the board for all YCT evaluated. In upper Crow Creek samples, fish ranked as normal ranged from 61.5 to 95.8 percent. Sage Creek fish ranged from 50.5 to 95 percent normal and Henry's Lake fish ranged from 33.3 to 82.3 percent normal (Figure 17).

Low levels of edema were present in fish from all locations. For wild-collected fish, the lowest percentage of normal fish were found at LSV-2C at 60% normal, while the highest percentage of normal fish was from the CC-350 location samples (>80%). For Henry's Lake fish, edema was also present with normal fish comprising 72 percent of all fish samples evaluated. Level 1 (slight/few) edema accounted for most of the non-normal rankings from both wild-collected and Henry's Lake fish samples (Figure 17).

3.4.6.5 Graduated Severity Index (GSI)

The GSI summed and weighted deformities based on their severity for each sample from each location. Because four different deformities were evaluated for each fish, a total GSI score was derived by summing the individual GSI scores for each deformity for a sample. The higher the GSI score, the higher the number and severity of the deformities. Figures 18 through 21 show the GSI scores for each deformity by location arranged from lowest egg selenium concentration to highest egg selenium concentration. Discernable trends of increasing GSI scores with increasing egg selenium concentrations are not evident.

4.0 ANALYSIS OF RESULTS

This section presents analyses of the YCT study data. A focus of these analyses is the relationship between maternal tissue concentrations and various reproductive effects identified in the literature.

4.1 Surface Water Quality

Total recoverable and dissolved selenium concentrations in the water from the Henry's Lake Fish Hatchery were less than 0.1 µg/L.

Total and dissolved selenium measured in May 2008 varied by location. At Crow Creek locations upstream of Sage Creek as well as Deer Creek, total selenium was between 1 and 2 µg/L, slightly higher than had been typically measured during previous events, particularly in Crow Creek upstream of Sage Creek where total selenium had always been measured at less than 1 µg/L. At Hoopes Spring, total selenium concentrations were higher than previously reported measured selenium concentrations. Selenium concentrations were diluted in Sage Creek downstream of Hoopes Spring to 14.5 µg/L, a concentration slightly higher than previously measured total selenium (range: 9.5 to 14.4 µg/L). At the two Crow Creek locations downstream of Sage Creek, selenium concentrations ranged from 3.2 to 3.6 µg/L. During Spring 2008, these concentrations were higher than concentrations previously measured at either location (typically 3 µg/L or less).

Bioaccumulation into the maternal tissues is not a function of a single exposure, but integration of dietary and aqueous exposure over a period of time. The surface water selenium concentrations provide an indicator of selenium trends in other environmental media. However, the most direct measure is selenium concentrations in the fish tissues of interest.

4.2 Relationship of Maternal Whole Body to Egg Selenium Concentrations

Egg selenium concentrations in YCT showed a strong positive relationship to whole body maternal selenium concentrations (Figure 22). Using a 1:1 line to estimate whole body to egg selenium indicates that egg selenium concentrations are typically higher than corresponding parental whole body selenium concentrations, not unlike the findings for brown trout and other species. Henry's Lake fish, with low whole body selenium, also had low egg selenium. Likewise, the single tissue reference location sample also had low whole body selenium and correspondingly low egg selenium. As whole body concentrations increase, the relationship does not remain 1:1 whole body to egg. It appears that at whole body concentrations greater than about 17 mg/kg dw, YCT egg concentrations increase relative to whole body selenium

concentrations. A more quantitative evaluation of the strength of the relationship reveals that log-transformed whole body and egg selenium concentrations for wild fish are fit well by a linear equation ($R^2 = 0.76$) (Figure 23). Henry's Lake fish tissue data were added to evaluate if the additional sample data improved the relationship. While the egg and whole body tissue data from Henry's Lake have much lower selenium concentrations, the data fit in terms of uptake and accumulation in whole body and what is found in eggs. The improved relationship takes the form of a linear equation ($R^2 = 0.92$) using log-transformed data.

4.3 Relationship of Egg Selenium Concentrations to Specific Effect Endpoints

4.3.1 Fecundity, Egg Mortality, and Percent Hatch

Maternal fecundity was examined relative to egg selenium concentrations to evaluate if higher egg selenium concentrations (an indication of higher selenium exposure of the parent female) translated into lower egg production (Figure 24). In wild-collected fish, no trend of reduced fecundity was observed, despite egg selenium concentrations greater than 45 mg/kg dw. Higher egg production was noted in Henry's Lake fish, but spanned a large range between the lowest egg production and highest (a factor of 2.5x). This range occurred despite less than a 3 mg/kg difference in selenium concentration.

For both wild-collected and Henry's Lake fish, fecundity does appear to be influenced by adult size (as measured by total length). Higher egg production occurred with increasing size of the adult female (Figure 25). The relationship of adult size versus egg production was more pronounced with the Henry's Lake fish versus the wild-caught fish. Other factors, such as overall health of the female and availability and quality of food resources, likely play a role in fecundity; however, no apparent effects were noted for egg production relative to wild-collected fish despite the high range in egg selenium concentrations.

Another endpoint investigated relative to egg selenium concentrations was egg mortality. Figure 26 shows the percentage of eggs that died for both wild-collected fish and Henry's Lake fish. Wild-collected fish had 60 percent or less egg mortality while Henry's Lake fish had some egg batches that experienced complete mortality. Egg mortality can be due to incomplete fertilization, fungus growth, genetic deficiencies that do not allow the egg to develop properly, and/or outside environmental factors that may physically or biologically affect egg development. Use of females from a no- or low-selenium environment, such as Henry's Lake, clearly indicates that one or more factors are affecting egg mortality, but selenium content of the egg is not a likely factor. Likewise, the range of egg mortality over a varied range of egg selenium concentrations for wild-collected fish does not appear to be related to egg mortality.

Percent hatch, as shown in Figure 27, shows the inverse of egg mortality (i.e., survival of eggs) for both wild-collected fish and Henry's Lake fish. In addition, percent hatch from the Hardy

(2005) and Hardy et al. (2009) studies that used Henry's Lake YCT are included for comparison. Comparing the three different YCT datasets indicates that percent hatch for wild-collected fish was within the range of percent hatch of Hardy's YCT fish study, and about 50 percent of the Henry's Lake method controls used for this YCT study. Again, similar findings indicate that selenium concentrations in eggs do not result in lower hatch of eggs.

4.3.2 Survival

4.3.2.1 Survival – Swim-Up

Survival at swim-up is simply the number of fish that swim-up relative to the total number of eggs that were used to begin the test. This endpoint is clearly affected by egg mortality that may occur, but does differentiate between egg mortality or percent hatch and survival from hatch to swim-up. A prime example is for eggs from the LSV-2C-001 sample which had a high hatch rate, but complete mortality (i.e., 0% survival) at swim-up. Overall, for wild-collected fish there is a relationship between increasing egg selenium and decreasing percent survival at swim-up (Figure 28). This relationship is improved by removal of a single data point where high egg selenium also resulted in high survival.

As noted above, survival at swim-up is affected by egg survival, thus the results observed for Henry's Lake fish survival at swim-up resemble the percent hatch data (i.e., if eggs hatched, then alevins generally survived to swim-up).

4.3.2.2 Survival - Hatch to Test End

Percent survival (hatch to test end) ranged from 0 to 96.8 percent in YCT from the study area. For one sample, egg hatch was high (92.7 percent), but all of these died prior to swim-up. This particular treatment had an egg selenium concentration of 40.1 mg/kg dw. The highest egg selenium concentration was measured in eggs from an adult fish collected near CC-350 (47.6 mg/kg dw). However, eggs from this treatment had a high survival rate at swim-up (70.3 percent) and at hatch to test end (88.2 percent). The lowest survival at hatch to test end was associated with high egg selenium (27.9 mg/kg dw). but higher egg selenium concentrations were measured which had higher survival rates (Figure 29). In comparison, the lowest survival percentage for brown trout was associated with the highest egg selenium concentration (40.3 mg/kg dw) and the next highest egg selenium concentration (38.8 mg/kg dw) had a survival rate of 24 percent (Table 7).

Henry's Lake YCT percent survival (hatch to test end) ranged from 71.9 to 95 percent. In this range of survival, percent hatch for eggs from Henry's Lake ranged from 10.3 to 87.8 percent.

Hatchery brown trout had survival ranging from 95.8 to 100 percent, but hatch ranged from 11.7 to 100 percent.

Examination of the YCT survival data showed two data points where egg selenium concentrations were high (>40 mg/kg dw) and corresponded to very different survival rates (i.e., high egg selenium low survival, and high egg selenium high survival). No evidence suggested that either data point was wrong. However, when the YCT data were plotted together with the brown trout data, the high egg selenium high survival data point was inconsistent with the two data sets and observed trends (Figure 30). The high egg selenium high survival data point was removed and relationships were re-evaluated as a conservative measure (Figure 31). Removal of this data point improved the relationship ($R^2 = 0.58$) over the relationship where it was included ($R^2 = 0.36$) (Figure 30 and 31).

Percent survival measured from hatch to test end proves to be a valuable threshold as it eliminates the variability of egg mortality and focuses on eggs that actually hatched and produced swim-up fry.

4.3.2.3 Survival - 15-Day Post-Swim-Up

Survival during the 15-day post-swim-up feeding trial is a limited endpoint that measures survival for a short duration period. For wild YCT, survival during this period ranged from 1.9 to 99 percent, with all but one egg clutch having a survival rate during this trial of 66 percent or higher (Table 7). The lowest survival rates for YCT were not necessarily associated with the highest egg selenium concentrations. For example, the highest egg selenium concentration measured (47.6 mg/kg dw) had an associated survival rate during this post-swim-up period of 89.6 percent. Henry's Lake fish had survival during this period ranging from 98 to 100 percent. However, for both wild and Henry's Lake fish, this endpoint is somewhat misleading, because it only evaluates the survival from swim-up to the end of the test. For example, one Henry's Lake egg batch had a 9.8 percent survival at swim-up, yet a 100 percent survival at 15-days post-swim-up. The survival endpoint (hatch to test end) incorporates this short period and eliminates mortality due to eggs that do not hatch, and thus is deemed a more environmentally relevant endpoint. This endpoint will not be evaluated further.

4.3.2.4 Survival – Total

Total survival incorporates egg mortality and subsequent mortalities through the duration of the test. The relationship of total survival to egg selenium concentrations was poor, likely due to the high survival rate of alevins resulting from some of the higher egg selenium concentrations (Figure 32). For wild-collected fish, total survival appeared very similar to total survival observed for Henry's Lake fish. Figure 32 illustrates total survival for both groups of fish, with

both having some level of low or no survival, despite egg selenium concentrations. The wide range of survival found in both wild-collected fish and Henry's Lake fish provides little insight on egg selenium effects. This is likely due to the incorporation of egg mortality into the total survival term. As indicated previously, egg mortality can result from a number of factors other than selenium exposure, creating high variability in the total survival estimates.

4.3.3 Growth

Growth (in terms of dry weight) was evaluated relative to total length of alevins following 15 days of feeding after swim-up. Henry's Lake swim-ups post-feeding are clearly larger than swim-ups from wild fish. Lower growth rates were observed in YCT where egg selenium concentrations were highest, but both low and high growth rates were exhibited where egg selenium concentrations were much lower. The expected relationship of decreasing growth relative to increasing egg selenium concentration was present, but exploratory regression analysis yielded a weak relationship ($R^2 = 0.21$), due to the variability of growth at the lower end of the egg selenium concentration range (Figure 33).

4.3.4 Deformities

The four deformities that were scored and ranked for those YCT examined were compared to egg selenium concentrations to evaluate if increasing rates of deformities were correlated to increasing egg selenium concentrations. Figures 34 to 37 show the percentage of normal fish for each deformity using the percentage normal as the metric (i.e., decreased percentage of normal fish would indicate an increase in deformed fish). Using the percent normal fish as a metric does not distinguish between the severities of deformity. Except for edema, each of the deformities indicated a slight decreasing trend in normal fish as egg selenium concentrations increased. Individually, however, none of the deformities appeared to provide a definitive decrease in percentage of normal fish with increasing egg selenium that suggested a dose response was evident.

The fractions of each deformity (as percentage normal) were also summed and divided by four to derive a mean fraction normal value which was compared to egg selenium concentrations. Using this cumulative metric, the preliminary regression showed the expected response of decreasing percentage of normal fish with increasing egg selenium concentrations ($R^2 = 0.59$) (Figure 38). Given that this metric provided the best overall screening relationship, the mean fraction normal will be used in a more definitive dose-response analysis in the following section.

4.4 Dose-Response Analyses

Based on the results of the preliminary regression analyses described above for each endpoint, a subset of effect endpoints was selected for additional dose-response analyses. Logistic, threshold sigmoidal, and piecewise linear regression analyses were run to determine dose-response relationships relative to egg selenium concentrations. USEPA's TRAP software was used to derive a best fit dose-response regression model for each effect endpoint distribution. Summary statistics for each regression run, a graphic of the curve plotting the actual data and predicted curve, and effect concentrations (EC_x) for egg selenium residues based on the endpoint effect distribution are included in Appendix F for each of the models run.

4.4.1 Survival

Four survival metrics were preliminarily evaluated for potential relationships to egg selenium concentrations for YCT. Screening of the YCT survival data found that percent survival (hatch to test end) provided the best relationship to egg selenium concentrations. Survival (hatch to test end) was selected as the best effect endpoint to evaluate against egg selenium exposure because it eliminated the variability of pre-hatch egg mortality, included survival through the end of the test, and included the 15 day post-swim-up feeding trial.

Initially, all of the fourteen usable data points for survival were utilized in the dose-response regression analysis. Recall that for one data point, high egg selenium was accompanied by high survival (e.g., 47.6 mg/kg dw egg selenium and survival = 88.2 percent [hatch to test end]). Using all of these data, TRAP is unable to quantify parameter estimates. None of the available dose-response modeling functions (i.e., logistic, sigmoidal, or piecewise linear) are capable of modeling the data.

Using a piecewise linear regression model with no data transformations yielded estimated EC_x values (Figure 39) with a model R^2 of 0.64. No errors were reported as part of the output. The EC_{20} for YCT percent survival (hatch to test end) is 36.3 mg/kg dw egg selenium, while the EC_{10} is 35.8 mg/kg dw egg selenium. The slope of this response is steep due to the single response of zero survival at ~ 40 mg/kg dw egg selenium. While this response is not unrealistic, there is adequate variability in the response at the upper egg selenium concentrations to consider that the EC_x values predicted may be overestimating or underestimating effects at a certain level relative to background. Note that in their assessment of Dolly Varden char, Golder Associates (2009) noted a high selenium threshold for this species with consistent no effects observed up until about 50 mg/kg dw egg selenium with an abrupt transition to effects at greater than 50 mg/kg dw.

Effect concentrations derived for these YCT data can only be derived at the cost of removing a data point that could be a real and probable response. Each fish responds differently to

selenium exposure and some fish may tolerate higher exposure and resulting bioaccumulation better than others. A “response” of zero survival is the primary driving variable that results in the model to force a sharp dose response, where one may not actually exist.

It is important to examine the data and the model that results from the use of these data. Henry’s Lake percent survival (hatch to test end) response data were evaluated for those fish with greater than 50 percent hatch to assess the low egg selenium response for survival. Median survival of Henry’s Lake eggs was 94.5 percent. Examination of the wild-collected YCT indicates a break in the survival data between 22.3 and 27.9 mg/kg dw egg selenium. For those eggs at or below 22.3 mg/kg dw selenium (n=7 egg batches), median survival was 91.1 percent, a difference of less than 2 percent between wild-caught fish and Henry’s Lake eggs. For eggs with selenium concentrations equal to or greater than 27.9 mg/kg dw (n=7 egg batches), median survival was 80.9 percent (Figure 40). Compared to the wild fish with lower egg selenium concentration, the higher egg selenium fish survival rate was 11.9 percent lower. A non-parametric Kruskal Wallis one-way analysis of variance (Number Cruncher Statistical System [NCSS] 2007) verified that the medians are significantly different ($p = 0.015$, $\alpha = 0.05$). Median values were used here due to the extremes of the higher egg selenium survival rates (range = 0 to 88.2 percent). Using the mean or median value (equivalent for $n = 2$) of the egg selenium concentrations for these two groups of wild-collected fish indicates a value of 25.1 mg/kg dw egg selenium, suggesting that an EC_{10} for survival is greater than 25 mg/kg dw.

4.4.2 Growth

Growth, as measured by dry weight of 15-day post-swim-up larvae, proved to be variable. Henry’s Lake larvae were clearly larger than wild-collected fish, both as maternal fish, and as alevins from those maternal fish. The growth data from these method controls provide a good estimate of the range of growth likely for healthy fish with abundant food and likely low competition. Distribution of the growth data did not lend itself to useful dose response modeling. The dose response for growth of wild-collected fish provided a poor fit using a piecewise linear model with no data transformations (Figure 41) ($R^2 = -0.2$). Model runs using TRAP’s other non-linear routines together with and without transformations did not improve the model fit. Despite the poor model fit, the EC_{10} value was predicted to be 28.9 mg/kg dw, but the reliability of this estimate is uncertain.

The data distribution illustrates a shift in the growth response at the egg selenium levels identified for the survival data. As noted above for survival, there is a clear break in the egg selenium concentrations and a corresponding break in survival responses. For growth, the median growth of alevins from eggs with less than 22.3 mg/kg dw selenium was 12.3 mg dw, while median growth of alevins from eggs with 27.9 mg/kg dw selenium or more was 8.1 mg dw.

A parametric one-way analysis of variance found that growth was significantly different between the low egg selenium group and the high egg selenium group ($p = 0.03$, $\alpha = 0.05$). Similar to the survival data, a growth EC_{10} likely lies between the “no effect” and “effect” concentration observed in these data which would result in a value likely >25 mg/kg dw egg selenium.

4.4.3 Deformities

A threshold sigmoidal regression performed using the TRAP software allowed for the best overall model fit with no errors in prediction of EC_x values (Figure 42). For this model run, the egg selenium data were log transformed, and the high egg selenium, high normal percentage data point was deleted (shown as open diamond on the figure). The predicted dose-response model had a R^2 of 0.57 and confidence intervals about the predicted EC_x values that were fairly tight. The EC_{20} for fraction normal fish was 37.6 mg/kg dw egg selenium, while the EC_{10} was 32.7 mg/kg dw egg selenium. The dose response was re-evaluated using a piecewise linear model using the same variable transformation listed previously, and revealed a model with a lower R^2 (0.51). Brown trout logistic regressions, described previously, found a significant relationship of increasing egg selenium concentrations and decreasing fraction of normal fish.

Similar to the survival response data, there is a separation in the response data at egg selenium concentrations equal to 22.3 and 27.9 mg/kg dw. For the seven egg batches equal to or less than 22.3 mg/kg dw, the mean percentage of normal fish was 75 percent. To put these data in perspective, mean percent normal alevins for the eight egg batches from Henry’s Lake with $>50\%$ survival at hatch was 74 percent. Thus, data for wild-caught YCT with egg selenium concentrations at or less than 22.3 have nearly identical percentages of normal fish as those from a reference lake. For egg batches greater than 27.9 mg/kg dw, the mean percentage of normal fish is 68 percent (including all seven egg batches) and 66 percent excluding the single highest egg selenium egg batch. This apparent difference was evaluated using a one-way analysis of variance. Lack of normality prompted use of the Kruskal-Wallis non-parametric ANOVA that found the medians were not significantly different between the two wild-collected groups ($p=0.074$, $\alpha = 0.05$). Similarity of the response for data less than 22.3 and greater than 27.9 mg/kg dw egg selenium suggests that the deformity EC_{10} value is higher than 27.9 mg/kg dw, however, by how much is not clear as the upper end potential threshold is not bounded.

5.0 DISCUSSION

5.1 Effect Concentration for YCT

USEPA (2004) opted to use logistic regression analysis to define the dose-response relationship to derive its Draft chronic tissue-based value. The EC₂₀ was used and defined as a reduction of 20 percent in the response observed at control. As presented above, both EC₂₀ and EC₁₀ values were derived using the TRAP software. In its 2004 Draft criterion document, USEPA provides the rationale for selection of the EC₂₀ as the chronic value. USEPA states that the EC₂₀ represents a low level of effect that is generally significantly different from the control (USEPA 1999). Smaller reductions in growth, survival, or other endpoints only rarely can be detected statistically. Effect concentrations associated with such small reductions have wide uncertainty bands, making them unreliable for criteria derivation (USEPA 2004). In his work to develop a screening benchmark, Suter (1996) indicates that “the 20 percent figure was chosen because it is a little lower than the mean level of effect on individual response parameters observed at CVs, and it is a minimum detectable difference in population characteristics in the field.” In its revision of the 2004 Draft Selenium Criterion, USEPA is contemplating the use of EC₁₀s for long-term exposure criteria for tissues. The rationale for this shift is that selenium is a bioaccumulative pollutant, and accumulates in fish tissues. Tissue levels are more stable over time than water concentrations, and may be steady at levels that are just below the criterion for extended periods of time. This is in converse to water concentrations, which tend to be more variable as they are highly influenced by both the discharge characteristics (i.e., water volume, concentration, and periodicity) and receiving waters characteristics (i.e., waterbody type and size), as well as climatological variables (i.e., rainfall and drought) (USEPA 2010). Arguments can be made on the validity of an EC₁₀ or an EC₂₀ being an appropriate value for criterion development, but ultimately it becomes a policy decision. For the purpose of the analyses presented as part of this Site-specific laboratory study, both the EC₁₀ and EC₂₀ values are reported.

Initially, analyses consistent with the approach utilized by EPA for the 2004 draft criterion were utilized for this study. For these analyses, “controls” are the response of fish from background locations. Using wild-collected YCT egg selenium concentrations (dw) as the exposure endpoint, the three primary endpoints of survival: hatch to test end; growth; and percentage/fraction of normal fish were evaluated using the TRAP software logistic regression function. Additional statistical routines, including piecewise linear and sigmoidal dose response models, were also evaluated. Despite the use of multiple approaches and data transformations, clear dose response models using these effects endpoints were few. YCT data showed highly variable responses to egg selenium concentrations. Observations, however, were made for these data of no effects and some level of effects between 22.3 and 27.9 mg/kg dw egg selenium. Averaging these two values results in a value of 25.1 mg/kg dw, which is expected to

be lower than a derived EC₁₀. Without a true EC_x value derived from the dose-response modeling, effects for egg selenium exposure on survival and deformities are at some concentration > 25 mg/kg.

5.2 Consistency with Literature

The endpoint for survival, based on hatch to test end, is consistent with the findings of Rudolph et al. (2008), who found a significant relationship of alevin mortality to egg selenium concentration. It has been suggested that selenium does not exert its toxic effects until a developing fish absorbs its yolk and accumulated selenium (Lemly 1997 and Holm et al. 2005, as cited in Rudolph et al. 2008). Hatchability of eggs is not affected by elevated selenium even though there may be a high incidence of deformities in resultant larvae and fry, and many may fail to survive (Gillespie and Baumann 1986; Coyle et al. 1993).

Data for YCT presented in this study showed a highly variable mortality rate prior to hatch, which may have been due to several factors, including incomplete fertilization, disease, or reduced egg viability due to elevated selenium concentrations. However, the latter is not consistent with the review by Holm et al. (2005) who reports that although egg selenium is present in the yolk throughout development, it may affect larval development rather than egg development because it is mobilized to a greater degree after hatch.

Deformity frequency, as measured in this study based on fraction normal fish relative to the total number of fish assessed for deformities, provides an endpoint that is consistent with the studies of Holm et al. (2005), Kennedy et al. (2000), Hardy (2005), Rudolph et al. (2008), Muscatello et al. (2006), and de Rosemond et al. (2005) in terms of cited developmental effects due to increased egg selenium concentrations. Table 9 shows the range of effect concentrations for the varying endpoints evaluated.

Hodson and Hilton (1983) and Lemly (1997) both suggest that developmental malformations are reliable indicators of chronic selenium toxicity to fish. Lemly (1997) described the sequence of selenium toxicity to larval fish: parental exposure, maternal deposition of selenium into eggs during vitellogenesis, and subsequent exposure during yolk resorption in developing larvae. Both the literature and the results of this study indicate that survival and developmental malformations of larval fish are clear and supportable endpoints for developing effect concentrations for fish.

5.3 Extrapolating Selenium Concentrations in Egg Tissue to Whole Body Tissue

In Section 4.2, the relationship of maternal whole body selenium concentrations to egg selenium concentrations was derived using wild YCT collected for this study. Henry's Lake tissue data were added to the wild tissue data set to examine whether or not the relationship was improved.

The R^2 for only the wild-collected fish was 0.76, while the R^2 for the wild-collected fish plus the Henry's Lake fish was 0.92. A linear regression was used to relate whole body to egg selenium using both the Henry's Lake data and the wild-collected fish data; however, the data were clustered at two ends of the distribution and the straight line connected the two populations of data. Alternate relationships were also explored. For both datasets, the relationship was best described via a linear regression equation using log-transformed data (Figure 43).

Although the combined dataset allows for a greater range of whole body and egg selenium concentrations, which reduces the need to extrapolate beyond the confines of the data, the combined relationship appears to represent two data populations. For the purpose of this report, the translation from eggs to whole body is best represented by the population of data from the field collected fish.

The regression relationship has the form:

$$\text{Log}(y) = 0.962(\text{Log } x) + 0.2007$$

where y = egg selenium concentration (mg/kg dw)

and x = whole body selenium concentration (mg/kg dw)

Solving for x (which is the whole body concentration), the equation is rewritten as:

$$\text{Log}(x) = (\text{Log}(y) - 0.2007) / 0.962$$

Using the above equation, and an egg selenium threshold of 25 mg/kg dw egg selenium, the resulting whole body selenium concentration is 17.6 mg/kg dw. As stated previously, this relationship becomes important in order to relate effect concentrations (EC_x) derived for selenium concentrations in egg tissue back to selenium concentrations in whole body fish for past and future monitoring data. Outside of this specific reproduction study, the larger body of data available for this site is for whole body tissues. Furthermore, whole body tissue concentration is a more practical endpoint to measure throughout the year than is egg tissue.

In another study using YCT, Hardy (2005) reported a whole body NOEC of greater than 11.4 mg/kg dw based on an egg selenium NOEC of greater than 16 mg/kg dw. Rudolph et al. (2008) cutthroat data indicate that the muscle selenium concentration would be 16.8 mg/kg dw based on the egg selenium relationship at an egg selenium concentration equal to the EC_{10} (24.1 mg/kg dw). The egg to whole body relationship for Dolly Varden char indicates a whole body concentration of greater than 40 mg/kg dw at an EC_{10} of 54 mg/kg dw selenium in eggs. Conversion of the Holm (2002) and Holm et al. (2003) ovary tissue selenium concentrations presented as chronic values from ovary to whole body using USEPA (2004) equations yields the

following values: 19.96 mg/kg dw (rainbow trout), 16.06 mg/kg dw (rainbow trout), and 12.24 mg/kg dw (brook trout). Currently, the Draft National criterion recommends a value of 7.91 mg/kg dw. Based on the literature reviewed, the YCT whole body value falls within the range of whole body tissue concentrations reported for other cold water species.

5.4 Data Adequacy

The critical question to be addressed for this study is whether or not the data adequately address the range of tissue concentrations in maternal parents which ultimately affects the offspring produced. Four key points address the adequacy of the data utilized for this study:

1. The goal was to capture adult YCT with tissue selenium concentrations greater than 9.7 mg/kg dw, which represented the upper 90th percentile of the tissue selenium data for YCT available when this study commenced. That goal was met as shown in the data presented earlier in this document (whole body tissues ranged from 8.17 to 25.17 mg/kg dw).
2. Studies carried out with the collected YCT maternal females and eggs yielded results that spanned a range of effects, including no or low effects and high and adverse levels of effects. In any toxicity study, being able to define the upper thresholds of effects is a critical component of the study. While exact EC_x values were derived, variability at the high end of the egg selenium range may have overestimated the derived effects values, although clear effects were observed in survival, growth, and deformities which are consistent endpoints defined in the literature for other trout species.
3. The distribution of effects and exposure data indicates that at the upper egg selenium range, YCT responses are variable. Examination of the data indicate there are no large gaps in the data in terms of egg selenium concentrations used as part of the exposure analysis, however, the relationships between effects and egg selenium concentrations were variable enough to suggest YCT effects values may be over-predicted via the dose-response models.
4. As the second species utilized to define the effects of maternal selenium accumulation on resulting offspring, YCT indicate that they are less sensitive than the brown trout evaluated as part of the first maternal transfer study. Despite not being able to identify an exact effect concentration, the data do provide a clear break between background and a level of egg selenium concentrations. A more precise effects threshold may be desirable, however, as part of this study, being able to define that YCT are less sensitive than brown trout is adequate for the purpose of defining a site-specific criteria since the criterion will be based on the more sensitive species of the two evaluated.

6.0 SUMMARY AND CONCLUSIONS

The effects of maternal selenium transfer in wild YCT were evaluated as part of this study. Eggs from wild female YCT collected from different locations with varying selenium exposure levels were used to assess a number of reproductive endpoints. Initially, the data were plotted and reviewed for any obvious relationships and patterns. Effects endpoints for survival, growth, and deformities appeared to be candidates for further dose-response modeling. Both EC₁₀ and EC₂₀ egg selenium concentrations were derived relative to the survival endpoint with the exclusion of a single data point. The EC₂₀ for YCT percent survival (hatch to test end) is 36.3 mg/kg dw egg selenium while the EC₁₀ is 35.8 mg/kg dw egg selenium. Derived effects concentrations may be over-estimated, due to the variability of the response at the higher egg selenium concentrations. Visual examination of these data showed that obvious breaks were present between an egg selenium concentration of 22.3 and 27.9 mg/kg dw and analysis of variance further verified a significant difference in survival between data grouped as either less than or greater than these break points. Averaging these values resulted in a value of 25 mg/kg dw and the EC₁₀ is theorized to be greater than this value. Growth data showed a similar trend to that observed for survival, while the deformity data did not (i.e., no significant difference between percentage normal fish <22.3 and >27.9 mg/kg dw). Using the data available, a true EC₁₀ likely lies between 25 and 35.8 mg/kg dw selenium in eggs.

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TABLES

Table 1

Monitoring Locations and Counts for Spring 2008 Sampling in Support of the Yellowstone Cutthroat Trout Laboratory Toxicity Studies

| Location | Date | Reach Length (miles) | Shocking Time (s) | Total # YCT captured | # YCT <230 mm | Caught and Released | Checked | | Ripe YCT, Eggs Collected | | |
|--|-----------|----------------------|-------------------|--|---------------|---------------------|------------|-----------|--------------------------|-----------|-------------------------------------|
| | | | | | | # YCT > 230 mm | # males | # females | | | |
| Deer Creek - lower (d/s CC road) | 6/3/2008 | 0.18 | 1397 | 11 | 3 | | 1 | 7 | 0 | | |
| Crow Creek (CC-150 Nate) | 6/3/2008 | 1.09 | 3825 | 45 | 15 | 22 | 7 | 1 | 0 | | |
| Crow Creek (CC-150 Alleman) | 6/3/2008 | 0.21 | 600 | 16 | 3 | 13 | | | 0 | | |
| Crow Creek (CC-75) & upstream | 6/3/2008 | 0.32 | | 23 | 15 | 7 | 1 | | 0 | | |
| Crow Creek (CC-350) | 6/4/2008 | Too high to sample | | | | | | | | | |
| Sage Creek (LSV-2C) Upper | 6/4/2008 | | 2888 | 19 | 3 | 14 | 1 | 1 | 1 | | |
| Hoopes (HS-3 and Upstream) | 6/4/2008 | 0.26 | | 7 | 2 | 3 | 1 | 1 | 0 | | |
| Crow Creek (CC-150 upper) | 6/4/2008 | | 2318 | 24 | 15 | 9 | | | 0 | | |
| Sage Creek (LSV-2C) lower | 6/5/2008 | | 4807 | 7 | 2 | 2 | 1 | 2 | 3 | | |
| Crow Creek (CC-350) | 6/5/2008 | 0.67 | 4092 | 48 | 12 | 24 | 8 | 4 | 3 | | |
| Crow Creek (CC-350) (just upper section) | 6/7/2008 | minus CC-350 reach | 2902 | 41 | 7 | 26 | 4 | 4 | 3 | | |
| Deer Creek - lower (d/s CC road) | 6/7/2008 | 0.18 | 1369 | 27 | 3 | 16 | 4 | 4 | 3 | | |
| Crow Creek (CC-1A) | 6/7/2008 | | 671 | 2 | 0 | 2 | | | 0 | | |
| Crow Creek (CC-150 upper Nate) | 6/7/2008 | 0.41 | 3090 | 30 | 9 | 18 | 2 | 1 | 1 | | |
| Deer Creek (DC-600 and US) | 6/8/2008 | 1.55 | 4068 | 14 | 6 | | 6 | 2 | 0 | | |
| Sage Creek (LSV-2C) all | 6/9/2008 | | 4842 | 46 | 6 | 39 | 1 | | 0 | | |
| Sage Creek u/s of Hoopes | 6/9/2008 | | 557 | 12 | 0 | 12 | | | 0 | | |
| SFTC-1 and Upstream | 6/9/2008 | | 1168 | 0 | 0 | | | 1 | 0 | | |
| Deer Creek - lower (d/s CC road) | 6/10/2008 | | 724 | 4 | 0 | 2 | 1 | 1 | 0 | | |
| SFTC-1 and Upstream | 6/26/2009 | 0.73 | 4135 | 24 | 10 | 10 | 3 | 1 | 1 | | |
| Deer Creek - lower (d/s CC road) | 6/26/2009 | | 1334 | 12 | 6 | 5 | 1 | | 0 | | |
| Crow Creek (CC-350) (just upper section) | 6/26/2009 | minus CC-350 reach | 2230 | 37 | 9 | 28 | | | 0 | | |
| Crow Creek (CC-3A) | 6/27/2008 | Too high to sample | | | | | | | | | |
| Sage Creek (LSV-2C) lower and HS-3 | 6/27/2008 | | 3439 | 20 | 1 | 18 | 1 | | 0 | | |
| Deer Creek (u/s of FS 102) | 6/27/2008 | | 1227 | 0 | | | | | 0 | | |
| | | | | Total # YCT >230 mm Checked for Spawning | 469 | 127 | 270 | 43 | 30 | 15 | Total # Egg Sets Sent to Lab |

Table 2
Summary of Flow and Field-Measured Water Quality Parameters Collected in Spring 2008
in Support of the Yellowstone Cutthroat Trout Laboratory Toxicity Studies

| Stream | Location | Date | Flow (cfs) | pH (SU) | Specific Conductance (umhos/cm) | Temp. (°C) | Dissolved Oxygen (mg/L) | Turbidity (NTU) | Nitrate (measured w/ Colorimeter - mg/L) | ORP (mV) |
|-------------------------------------|----------|-----------|------------|---------|---------------------------------|------------|-------------------------|-----------------|--|----------|
| Reference | | | | | | | | | | |
| SF Tincup Creek | SFTC-1 | 6/9/2008 | 21.0 | 8.07 | 631 | 5.01 | 13.70 | 21.07 | NM | 220.3 |
| Upstream of Sage Creek | | | | | | | | | | |
| Crow Creek | CC-75 | 5/12/2008 | 15.3 | 8.05 | 397 | 6.31 | 10.55 | 15.85 | 0.01 | 161.2 |
| | CC-150 | 5/12/2008 | 27.5 | 8.53 | 361 | 10.44 | 10.00 | 16.47 | 0.04 | 164.3 |
| | CC-350 | 5/13/2008 | 36.0 | 8.44 | 431 | 15.04 | 9.05 | 7.59 | 0 | 202.9 |
| Deer Creek | DC-600 | 5/18/2008 | 20.0 | 8.24 | 208 | 5.41 | 13.31 | 9.46 | 0.01 | 208.6 |
| Hoopes Spring and Sage Creek | | | | | | | | | | |
| Hoopes Spring | HS | 5/17/2008 | 1.6 | 7.33 | 302 | 12.02 | 6.08 | 0.47 | 0.02 | 201.1 |
| | HS-3 | 5/17/2008 | 6.8 | 8.38 | 289 | 17.05 | 9.01 | 2.16 | 0.02 | 152.7 |
| Sage Creek | LSV-2C | 5/17/2008 | 12.4 | 8.40 | 283 | 18.72 | 8.92 | 12.58 | 0.01 | 188.6 |
| Downstream of Sage Creek | | | | | | | | | | |
| Crow Creek | CC-1A | 5/14/2008 | 61.0 | 8.09 | 358 | 7.39 | 9.80 | 16.82 | 0.02 | 161.2 |
| | CC-3A | 5/15/2008 | 65.2 | 8.42 | 370 | 13.42 | 10.49 | 17.61 | 0.02 | 219.6 |

NM- Not Measured

Table 3
Summary of Laboratory-Measured Water Quality Parameters Collected in Spring 2008
in Support of the Yellowstone Cutthroat Trout Laboratory Toxicity Studies

| Stream | Location | Date | Alkalinity (mg/L) | Dissolved Organic Carbon (mg/L) | Hardness (mg/L as CaCO ₃) | Sulfate, SO ₄ (mg/L) | Nitrate-N (mg/L) | Phosphorus-Total (mg/L) |
|-------------------------------------|----------|---------------|-------------------|---------------------------------|---------------------------------------|---------------------------------|------------------|-------------------------|
| Reference | | | | | | | | |
| SF Tincup Creek | SFTC-1 | 6/9/2008 | 221 | 2.97 | 211 | 10.2 | 0.05UJ | 0.03 |
| Upstream of Sage Creek | | | | | | | | |
| Crow Creek | CC-75 | 5/12/2008 | 196 | 4.70 | 208 | 24.7 | 0.05UJ | 0.04 |
| | | 5/12/2008-dup | 195 | 4.76 | 205 | 24.7 | 0.05UJ | 0.05 |
| | CC-150 | 5/12/2008 | 192 | 3.42 | 199 | 17.8 | 0.05UJ | 0.03 |
| | CC-350 | 5/13/2008 | 197 | 2.66 | 211 | 23.7 | 0.05UJ | 0.02 |
| Deer Creek | DC-600 | 5/18/2008 | 158 | 1.79J | 154 | 9.0 | 0.06J | 0.05 |
| Hoopes Spring and Sage Creek | | | | | | | | |
| Hoopes Spring | HS | 5/17/2008 | 196 | 1.00U | 232 | 49.8 | 0.175J | 0.01U |
| | HS-3 | 5/17/2008 | 197 | 1.00U | 223 | 43.2 | 0.05UJ | 0.01U |
| Sage Creek | LSV-2C | 5/17/2008 | 199 | 2.14 | 218 | 38.7 | 0.05UJ | 0.02 |
| Downstream of Sage Creek | | | | | | | | |
| Crow Creek | CC-1A | 5/14/2008 | 202 | 2.37 | 221 | 31.4 | 0.05UJ | 0.03 |
| | CC-3A | 5/15/2008 | 197 | 2.27 | 216 | 32.1 | 0.05UJ | 0.04 |

J - Estimated

U - Less than detection at the stated value

UJ - Estimated, Not detected

Table 4
Summary of Selenium Concentrations Measured in Surface Waters and Sediment
in Support of the Yellowstone Cutthroat Trout Laboratory Toxicity Studies

| Stream | Location | Date | Surface Water | | Sediment | |
|-------------------------------------|-----------|---------------|-----------------------|---------------------------|---------------------|----------|
| | | | Total Selenium (mg/L) | Dissolved Selenium (mg/L) | Selenium (mg/kg dw) | % Solids |
| Reference | | | | | | |
| SF Tincup Creek | SFTC-1 | 6/9/2008 | 0.00058 | 0.00044 | 0.27 | 69.8 |
| Upstream of Sage Creek | | | | | | |
| Crow Creek | CC-75 | 5/12/2008 | 0.0012 | 0.0012 | 0.54 | 57.9 |
| | | 5/12/2008-dup | 0.0012 | 0.0011 | NM | NM |
| | CC-150 | 5/12/2008 | 0.0018 | 0.0014 | 0.63 | 56.4 |
| | | 5/12/2008-dup | NM | NM | 0.63 | 58.5 |
| CC-350 | 5/13/2008 | 0.001 | 0.00089 | 0.7 | 63.4 | |
| Deer Creek | DC-600 | 5/18/2008 | 0.0015 | 0.0014 | 0.98J- | 51.3 |
| Hoopes Spring and Sage Creek | | | | | | |
| Hoopes Spring | HS | 5/17/2008 | 0.0296 | 0.0273 | 1.8J- | 60.3 |
| | HS-3 | 5/17/2008 | 0.0223 | 0.026 | 2.1J- | 66.9 |
| Sage Creek | LSV-2C | 5/17/2008 | 0.0145 | 0.0141 | 1.1J- | 62.9 |
| Downstream of Sage Creek | | | | | | |
| Crow Creek | CC-1A | 5/14/2008 | 0.0032 | 0.0029 | 1.2 | 59.9 |
| | CC-3A | 5/15/2008 | 0.0036 | 0.0026 | 0.66J- | 70.2 |

J - Estimated, NM-Not measured, Bold concentrations are those currently exceeding the state standard for total selenium (0.005 mg/L).

Table 5

Number of Eggs, Length, Weight, and Selenium Concentrations in Eggs and Whole Body of Wild-Collected Yellowstone Cutthroat Trout

| Location | Treatment | # Eggs in Study | Total # Eggs | Adult Fish Total Length (mm) | Adult Fish Wt (g) | Selenium Whole-Body (mg/kg dw) | Selenium Egg (mg/kg dw) |
|-----------------|------------------|------------------------|---------------------|-------------------------------------|--------------------------|---------------------------------------|--------------------------------|
| SF Tincup Creek | SFTC1-FT0012 | 300 | 1,472 | 491 | 1131 | 2.56 | 3.43 |
| Crow Creek | CC-150-Nates-001 | 300 | 600 | 263 | 180.2 | 16.3 | 17.6 |
| | CC-350-001 | 400 | 748 | 284 | 194.5 | 20.7 | 27.9 |
| | CC-350-002 | 750 | 1,209 | 325 | 343.6 | 19.4 | 29.7 |
| | CC-350-003 | 500 | 929 | 348 | 326 | 17.0 | 22.3 |
| | CC-350-004 | 600 | 1,294 | 345 | 357.7 | 16.7 | 14.6 |
| | CC-350-005 | 600 | 1,160 | 316 | 292.5 | 25.7 | 47.6 |
| Deer Creek | DC001 | 600 | 1,017 | 343 | 461.9 | 8.17 | 22 |
| | DC002 | 600 | 1,539 | 360 | 293 | 9.07 | 15.4 |
| | DC003 | 450 | 846 | 458 | 684.5 | 8.63 | 11.4 |
| | DC004 | 100 | 242 | 343 | 369 | 16.6 | 12.7 |
| Sage Creek | LSV2C-001 | 600 | 1,290 | 362 | 428.8 | 19.4 | 40.1 |
| | LSV2C-002 | 550 | 1,068 | 322 | 256.5 | 21.0 | 30.0 |
| | LSV2C-003 | 650 | 1,358 | 340 | 363.3 | 18.6 | 35.6 |
| | LSV2C-004 | 600 | 1,072 | 345 | 347.1 | 22.5 | 30.5 |

Table 6
Number of Eggs, Length, Weight, and Selenium Concentrations in Eggs and
Whole Body of Henry's Lake Hatchery
Yellowstone Cutthroat Trout

| Treatment | # eggs in study | Total # eggs | Adult Fish Total Length (mm) | Adult Fish Wt (g) | Selenium Whole-Body (mg/kg dw) | Selenium Egg (mg/kg dw) |
|------------------|------------------------|---------------------|-------------------------------------|--------------------------|---------------------------------------|--------------------------------|
| HL001 | 600 | 2,114 | 489 | 1,329 | 0.4 | 1.65 |
| HL002 | 600 | 1,597 | 387 | 667 | 0.45 | 2.03 |
| HL003 | 600 | 2,999 | 400 | 770 | 0.44 | 2.48 |
| HL004 | 600 | 2,452 | 438 | 1,160 | 0.36 | 1.36 |
| HL005 | 600 | 2,108 | 451 | 1,165 | 0.5 | 2.33 |
| HL006 | 600 | 2,162 | 368 | 674 | 0.36 | 0.83 |
| HL007 | 600 | 2,734 | 470 | 1,528 | 0.44 | 2.26 |
| HL008 | 600 | 2,985 | 476 | 1,265 | 0.28 | 1.87 |
| HL009 | 600 | 1,906 | 406 | 775 | 0.44 | 1.98 |
| HL010 | 600 | 3,791 | 527 | 1,945 | 0.43 | 1.34 |
| HL011 | 600 | 4,668 | 476 | 1,468 | 0.31 | 3.23 |
| HL012 | 600 | 2,735 | 470 | 1,500 | 0.23 | 1.58 |
| HL013 | 600 | 2,420 | 457 | 1,340 | 0.72 | 1.93 |
| HL014 | 600 | 3,676 | 508 | 1,650 | 0.73 | 1.79 |
| HL015 | 600 | 2,322 | 445 | 1,580 | 0.91 | 2.06 |
| HL016 | 600 | 3,876 | 508 | 1,560 | 0.85 | 1.74 |

Highlighted treatments had egg clutches that did not hatch.

Table 7
Yellowstone Cutthroat Trout Endpoint Data from Laboratory Studies on Adult Reproduction and Egg Survival and Growth

| Location | Treatment | Se - Egg (mg/kg dwt) | % Hatch | % Egg Mortality | % Swim-up | Survival at swim- up (%) | Survival in 15-d PSU study (%) | Total Survival (%) | Survival (hatch-test end) (%) | Day of Test Term. | Day of 1st hatch | Day of swim-up | Avg Std Length (mm) | Avg Dry wt (mg) |
|-----------------|------------------|-------------------------|---------|--------------------|-----------|--------------------------------|--------------------------------------|--------------------------|--|----------------------|---------------------|-------------------|---------------------------|--------------------|
| Henry's | HL001 | 1.65 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | HL002 | 2.03 | 11.5 | 88.5 | 9.8 | 9.8 | 100 | 9.8 | 85.5 | 64 | 28 | 49 | 24.65 | 19.31 |
| | HL003 | 2.48 | 56.8 | 43.2 | 54.0 | 54.0 | 97.9 | 53.7 | 94.4 | 64 | 24 | 49 | 25.70 | 20.74 |
| | HL004 | 1.36 | 76.0 | 24.0 | 72.8 | 72.8 | 99 | 72.7 | 95.6 | 64 | 26 | 49 | 27.85 | 26.62 |
| | HL005 | 2.33 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | HL006 | 0.83 | 61.0 | 39.0 | 44.0 | 44.0 | 99 | 43.8 | 71.9 | 64 | 27 | 49 | 24.50 | 15.63 |
| | HL007 | 2.26 | 73.7 | 26.3 | 70.7 | 70.7 | 100 | 70.7 | 95.9 | 64 | 27 | 49 | 28.15 | 26.41 |
| | HL008 | 1.87 | 78.2 | 21.8 | 72.2 | 72.2 | 99 | 72.0 | 92.1 | 64 | 28 | 49 | 24.60 | 16.12 |
| | HL009 | 1.98 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | HL010 | 1.34 | 0.7 | 99.3 | 0.7 | 0.7 | 100 | 0.7 | 100 | 64 | 27 | 49 | --- | --- |
| | HL011 | 3.23 | 56.3 | 43.7 | 52.8 | 52.8 | 99 | 52.7 | 93.5 | 64 | 25 | 49 | 26.85 | 25.08 |
| | HL012 | 1.58 | 83.5 | 16.5 | 79.3 | 79.3 | 98 | 79.0 | 94.6 | 64 | 26 | 49 | 26.50 | 25.74 |
| | HL013 | 1.93 | 87.8 | 12.2 | 83.8 | 83.8 | 100 | 83.8 | 95.4 | 64 | 28 | 49 | 25.45 | 20.63 |
| | HL014 | 1.79 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | HL015 | 2.06 | 10.3 | 89.7 | 9.3 | 9.3 | 100 | 9.3 | 90.3 | 64 | 27 | 49 | 22.60 | 15.79 |
| | HL016 | 1.74 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SF Tincup Creek | SFTC1-FT0012 | 3.43 | 0 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Crow Creek | CC-150-Nates-001 | 17.6 | 78.3 | 21.7 | 74.7 | 74.7 | 77.6 | 67.3 | 89 | 56 | 21 | 41 | 20.40 | 7.55 |
| | CC-350-001 | 27.9 | 40.5 | 59.5 | 35.8 | 35.8 | 1.9 | 10.5 | 30 | 55 | 21 | 40 | 20.50 | 6.03 |
| | CC-350-002 | 29.7 | 94.3 | 5.7 | 85.1 | 85.1 | 85.6 | 83.2 | 89 | 55 | 20 | 40 | 20.00 | 8.65 |
| | CC-350-003 | 22.3 | 77.2 | 22.8 | 73.8 | 73.8 | 80.4 | 70.0 | 92.8 | 56 | 20 | 41 | 22.00 | 12.27 |
| | CC-350-004 | 14.6 | 86.5 | 13.5 | 85.2 | 85.2 | 88.8 | 83.3 | 96.8 | 56 | 21 | 41 | 22.30 | 8.07 |
| | CC-350-005 | 47.6 | 80.5 | 19.5 | 70.3 | 70.3 | 89.6 | 68.7 | 88.2 | 56 | 20 | 41 | 19.35 | 8.43 |
| Deer Creek | DC001 | 22 | 54.2 | 45.8 | 50.2 | 50.2 | 93.9 | 49.2 | 95 | 56 | 20 | 41 | 23.85 | 14.36 |
| | DC002 | 15.4 | 85.2 | 14.8 | 81.0 | 81.0 | 99.0 | 80.8 | 95.6 | 56 | 22 | 41 | 23.75 | 12.65 |
| | DC003 | 11.4 | 97.6 | 2.4 | 95.3 | 95.3 | 70.4 | 88.9 | 91.3 | 56 | 20 | 41 | 21.10 | 7.39 |
| | DC004 | 12.7 | 64.0 | 36 | 60.0 | 60.0 | 68.3 | 41.0 | 77 | 56 | 20 | 41 | 23.15 | 14.28 |
| Sage Creek | LSV2C-001 | 40.1 | 92.7 | 7.3 | 0 | 0 | --- | 0 | 0 | --- | 21 | --- | --- | --- |
| | LSV2C-002 | 30.0 | 80.7 | 19.3 | 67.8 | 67.8 | 66.0 | 61.6 | 80.9 | 55 | 20 | 40 | 20.35 | 7.66 |
| | LSV2C-003 | 35.6 | 99.2 | 0.8 | 80.6 | 80.6 | 83.2 | 78.0 | 78.8 | 55 | 21 | 40 | 20.05 | 8.70 |
| | LSV2C-004 | 30.5 | 95.2 | 4.8 | 85.5 | 85.5 | 83.0 | 82.7 | 87.5 | 55 | 20 | 40 | 21.10 | 8.12 |

Highlighted treatments had egg clutches that did not hatch.

Table 8
Summary Data for the Severity and Number of Deformities for Yellowstone Cutthroat Trout Larvae

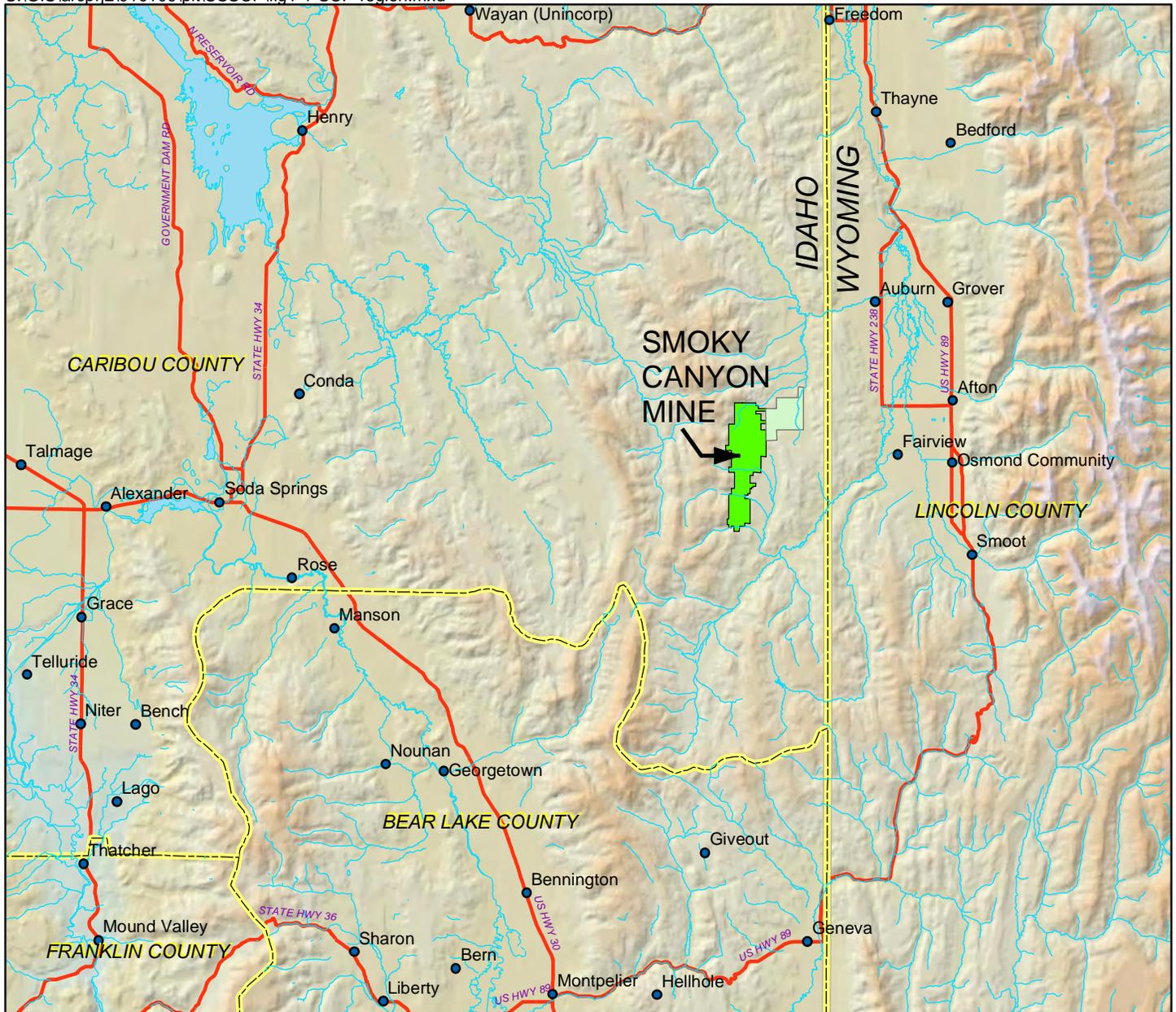
| Location/ Field Sample ID | Grand Total | Cranio-Facial | | | | | | | Skeletal | | | | | | | Fin or Finfold | | | | | | | Edematous Tissue | | | | | | |
|---------------------------------|----------------|---------------|----|----|----|--------|---------------|-----------------------|----------|-----|----|----|--------|---------------|-----------------------|----------------|----|---|----|--------|---------------|--------------------|------------------|-----|----|----|--------|---------------|--------------------|
| | | 0 | 1 | 2 | 3 | normal | not normal | % deform/ total | 0 | 1 | 2 | 3 | normal | not normal | % deform/ total | 0 | 1 | 2 | 3 | normal | not normal | % deform/ total | 0 | 1 | 2 | 3 | normal | not normal | % deform/ total |
| HL/002 | 39 | 27 | 8 | 2 | 2 | 27 | 12 | 30.77% | 6 | 15 | 4 | 14 | 6 | 33 | 84.62% | 27 | 1 | 2 | 9 | 27 | 12 | 30.77% | 32 | 7 | | | 32 | 7 | 17.95% |
| HL/003 | 302 | 287 | 9 | 2 | 4 | 287 | 15 | 4.97% | 157 | 120 | 20 | 5 | 157 | 145 | 48.01% | 293 | 2 | 6 | 1 | 293 | 9 | 2.98% | 218 | 78 | 5 | 1 | 218 | 84 | 27.81% |
| HL/004 | 416 | 394 | 13 | 3 | 6 | 394 | 22 | 5.29% | 199 | 196 | 17 | 4 | 199 | 217 | 52.16% | 409 | 4 | | 3 | 409 | 7 | 1.68% | 341 | 69 | 4 | 2 | 341 | 75 | 18.03% |
| HL/006 | 244 | 200 | 30 | 7 | 7 | 200 | 44 | 18.03% | 52 | 107 | 34 | 51 | 52 | 192 | 78.69% | 174 | 23 | 8 | 39 | 174 | 70 | 28.69% | 152 | 56 | 23 | 13 | 152 | 92 | 37.70% |
| HL/007 | 404 | 349 | 48 | 5 | 2 | 349 | 55 | 13.61% | 167 | 224 | 7 | 6 | 167 | 237 | 58.66% | 396 | 6 | 1 | 1 | 396 | 8 | 1.98% | 297 | 97 | 8 | 2 | 297 | 107 | 26.49% |
| HL/008 | 412 | 356 | 49 | 3 | 4 | 356 | 56 | 13.59% | 195 | 191 | 21 | 5 | 195 | 217 | 52.67% | 407 | 2 | 1 | 2 | 407 | 5 | 1.21% | 339 | 66 | 5 | 2 | 339 | 73 | 17.72% |
| HL/011 | 296 | 255 | 15 | 7 | 19 | 255 | 41 | 13.85% | 98 | 157 | 25 | 16 | 98 | 198 | 66.89% | 280 | 4 | 4 | 8 | 280 | 16 | 5.41% | 209 | 76 | 11 | | 209 | 87 | 29.39% |
| HL/012 | 454 | 437 | 12 | | 5 | 437 | 17 | 3.74% | 163 | 259 | 22 | 10 | 163 | 291 | 64.10% | 442 | 8 | 3 | 1 | 442 | 12 | 2.64% | 274 | 154 | 23 | 3 | 274 | 180 | 39.65% |
| HL/013 | 483 | 416 | 62 | 1 | 4 | 416 | 67 | 13.87% | 223 | 226 | 30 | 4 | 223 | 260 | 53.83% | 480 | 1 | | 2 | 480 | 3 | 0.62% | 353 | 119 | 9 | 2 | 353 | 130 | 26.92% |
| HL/015 | 36 | 26 | 5 | 2 | 3 | 26 | 10 | 27.78% | 2 | 9 | 6 | 19 | 2 | 34 | 94.44% | 20 | 3 | 2 | 11 | 20 | 16 | 44.44% | 12 | 14 | 7 | 3 | 12 | 24 | 66.67% |
| CC-150/001 | 182 | 162 | 20 | | | 162 | 20 | 10.99% | 32 | 99 | 37 | 14 | 32 | 150 | 82.42% | 182 | | | | 182 | 0 | 0.00% | 112 | 62 | 8 | | 112 | 70 | 38.46% |
| CC-350/001 | 138 | 105 | 19 | 5 | 9 | 105 | 33 | 23.91% | 24 | 48 | 34 | 32 | 24 | 114 | 82.61% | 137 | 1 | | | 137 | 1 | 0.72% | 88 | 33 | 7 | 10 | 88 | 50 | 36.23% |
| CC-350/002 | 602 | 548 | 52 | 2 | | 548 | 54 | 8.97% | 212 | 342 | 43 | 5 | 212 | 390 | 64.78% | 575 | 25 | 1 | 1 | 575 | 27 | 4.49% | 434 | 159 | 8 | 1 | 434 | 168 | 27.91% |
| CC-350/003 | 330 | 304 | 25 | | 1 | 304 | 26 | 7.88% | 105 | 204 | 20 | 1 | 105 | 225 | 68.18% | 329 | 1 | | | 329 | 1 | 0.30% | 263 | 66 | 1 | | 263 | 67 | 20.30% |
| CC-350/004 | 480 | 462 | 18 | | | 462 | 18 | 3.75% | 154 | 308 | 16 | 2 | 154 | 326 | 67.92% | 472 | 8 | | | 472 | 8 | 1.67% | 460 | 19 | 1 | | 460 | 20 | 4.17% |
| CC-350/005 | 392 | 345 | 45 | 2 | | 345 | 47 | 11.99% | 108 | 212 | 56 | 16 | 108 | 284 | 72.45% | 384 | 5 | 2 | 1 | 384 | 8 | 2.04% | 343 | 43 | 5 | 1 | 343 | 49 | 12.50% |
| DC/001 | 275 | 252 | 11 | | 12 | 252 | 23 | 8.36% | 103 | 137 | 28 | 7 | 103 | 172 | 62.55% | 264 | 7 | 3 | 1 | 264 | 11 | 4.00% | 253 | 21 | 1 | | 253 | 22 | 8.00% |
| DC/002 | 465 | 432 | 32 | 1 | | 432 | 33 | 7.10% | 193 | 229 | 41 | 2 | 193 | 272 | 58.49% | 458 | 6 | 1 | | 458 | 7 | 1.51% | 358 | 98 | 9 | | 358 | 107 | 23.01% |
| DC/003 | 380 | 354 | 25 | 1 | | 354 | 26 | 6.84% | 88 | 241 | 48 | 3 | 88 | 292 | 76.84% | 373 | 5 | 1 | 1 | 373 | 7 | 1.84% | 247 | 125 | 8 | | 247 | 133 | 35.00% |
| DC/004 | 38 | 33 | 1 | 3 | 1 | 33 | 5 | 13.16% | 9 | 17 | 12 | | 9 | 29 | 76.32% | 37 | 1 | | | 37 | 1 | 2.63% | 30 | 6 | 1 | 1 | 30 | 8 | 21.05% |
| LSV2C/001 | 200 | 37 | 38 | 64 | 61 | 37 | 163 | 81.50% | 14 | 69 | 76 | 41 | 14 | 186 | 93.00% | 169 | 20 | 9 | 2 | 169 | 31 | 15.50% | 190 | 9 | 1 | | 190 | 10 | 5.00% |
| LSV2C/002 | 319 | 282 | 31 | 3 | 3 | 282 | 37 | 11.60% | 71 | 165 | 69 | 14 | 71 | 248 | 77.74% | 310 | 6 | 2 | 1 | 310 | 9 | 2.82% | 207 | 102 | 7 | 3 | 207 | 112 | 35.11% |
| LSV2C/003 | 487 | 466 | 21 | | | 466 | 21 | 4.31% | 174 | 239 | 68 | 6 | 174 | 313 | 64.27% | 481 | 5 | 1 | | 481 | 6 | 1.23% | 246 | 182 | 52 | 7 | 246 | 241 | 49.49% |
| LSV2C/004 | 476 | 455 | 21 | | | 455 | 21 | 4.41% | 167 | 266 | 42 | 1 | 167 | 309 | 64.92% | 475 | | 1 | | 475 | 1 | 0.21% | 249 | 173 | 44 | 10 | 249 | 227 | 47.69% |

Severity Score: 0 = normal, 1 = slight or few, 2 = moderate or several, 3 = severe or many.

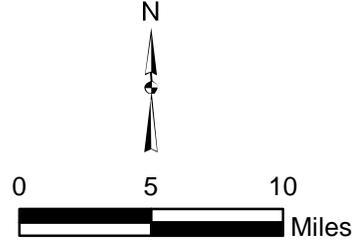
Table 9
Effect Concentration (EC_x) Values for Egg Selenium Tissue Residues Versus
Different Biological Endpoints for Yellowstone Cutthroat Trout

| Biological Endpoints | Effect Concentration (EC _x) | | R ² |
|--------------------------|---|-------|----------------|
| | 20 | 10 | |
| Growth | 31.93 | 28.99 | -0.2 |
| 95% LCL | 21.13 | 16.47 | |
| 95% UCL | 42.74 | 41.51 | |
| Survival Hatch -Test End | 36.26 | 35.78 | 0.64 |
| 95% LCL | 34.09 | 33.37 | |
| 95% UCL | 38.43 | 38.19 | |
| Fraction normal | 37.60 | 32.68 | 0.57 |
| 95% LCL | 32.62 | 27.52 | |
| 95% UCL | 43.34 | 38.80 | |

FIGURES



Smoky Canyon Mine



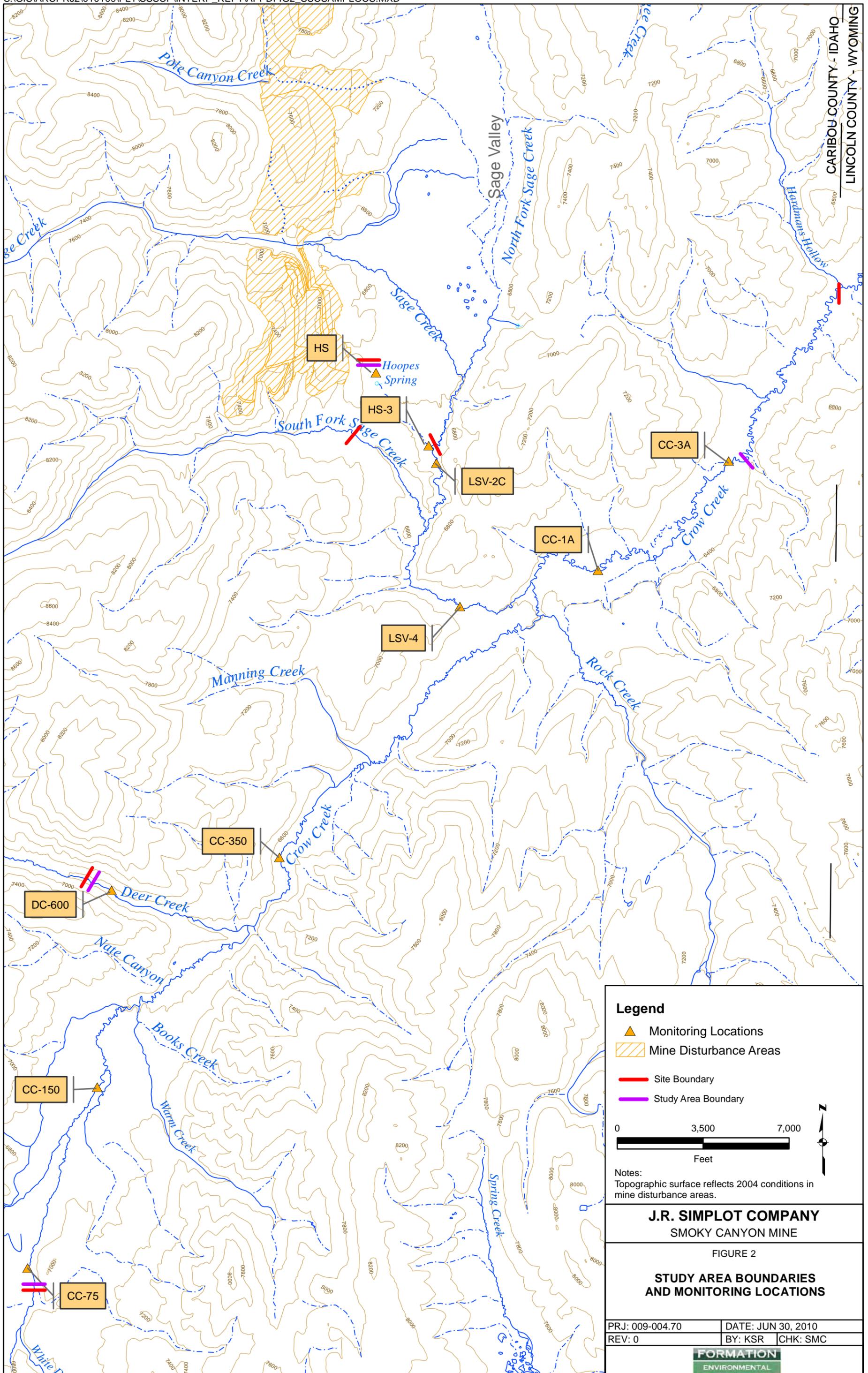
J.R. SIMPLOT COMPANY
SMOKY CANYON MINE

FIGURE 1

LOCATION OF THE SMOKY CANYON MINE

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: MAY. 05, 2011 |
| REV: 0 | BY: RCR CHK: SMC |





CARIBOU COUNTY - IDAHO
LINCOLN COUNTY - WYOMING

Whole Body Selenium in Cutthroat Trout (2004 to 2008) vs. Length

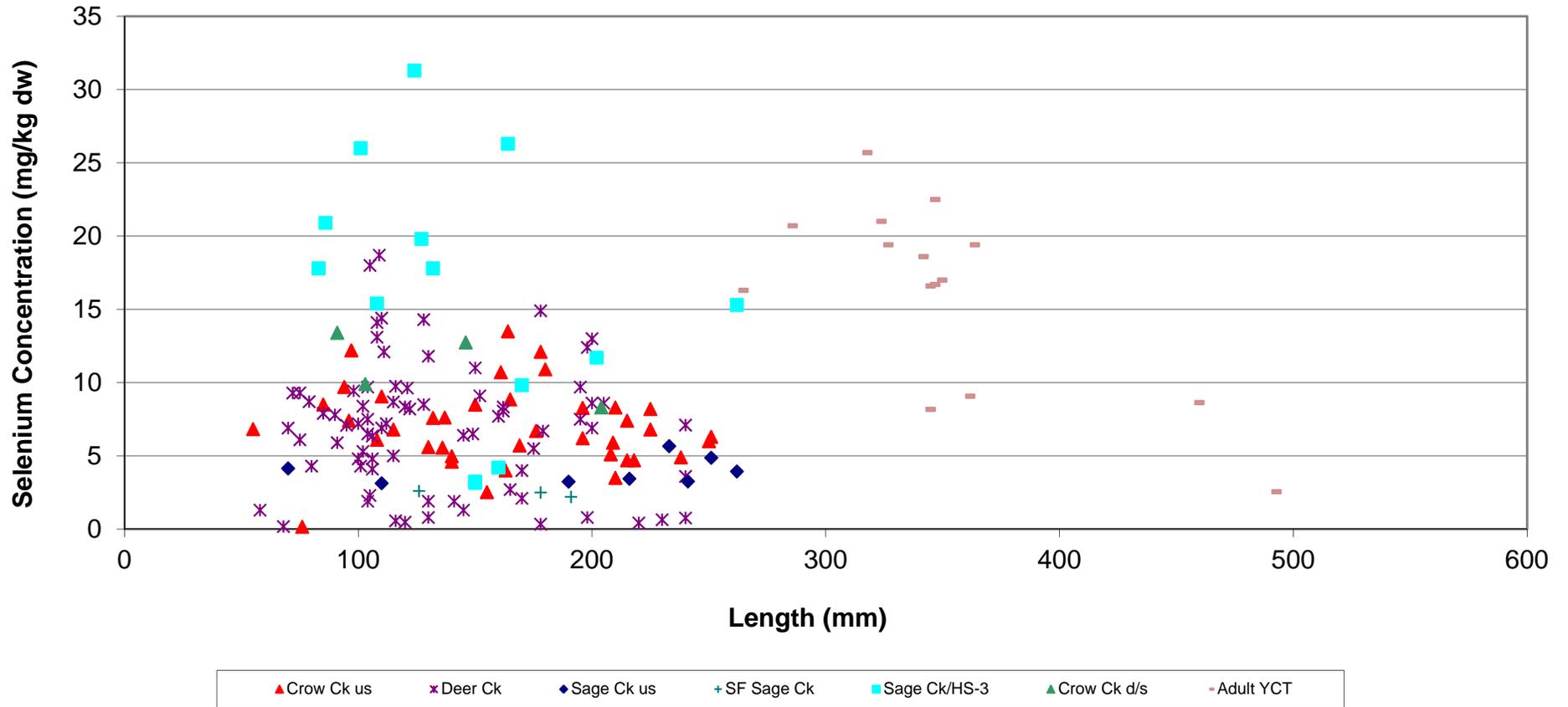


Figure 3
Whole Body Selenium Concentration Versus Fish Length

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Total Selenium in Surface Water

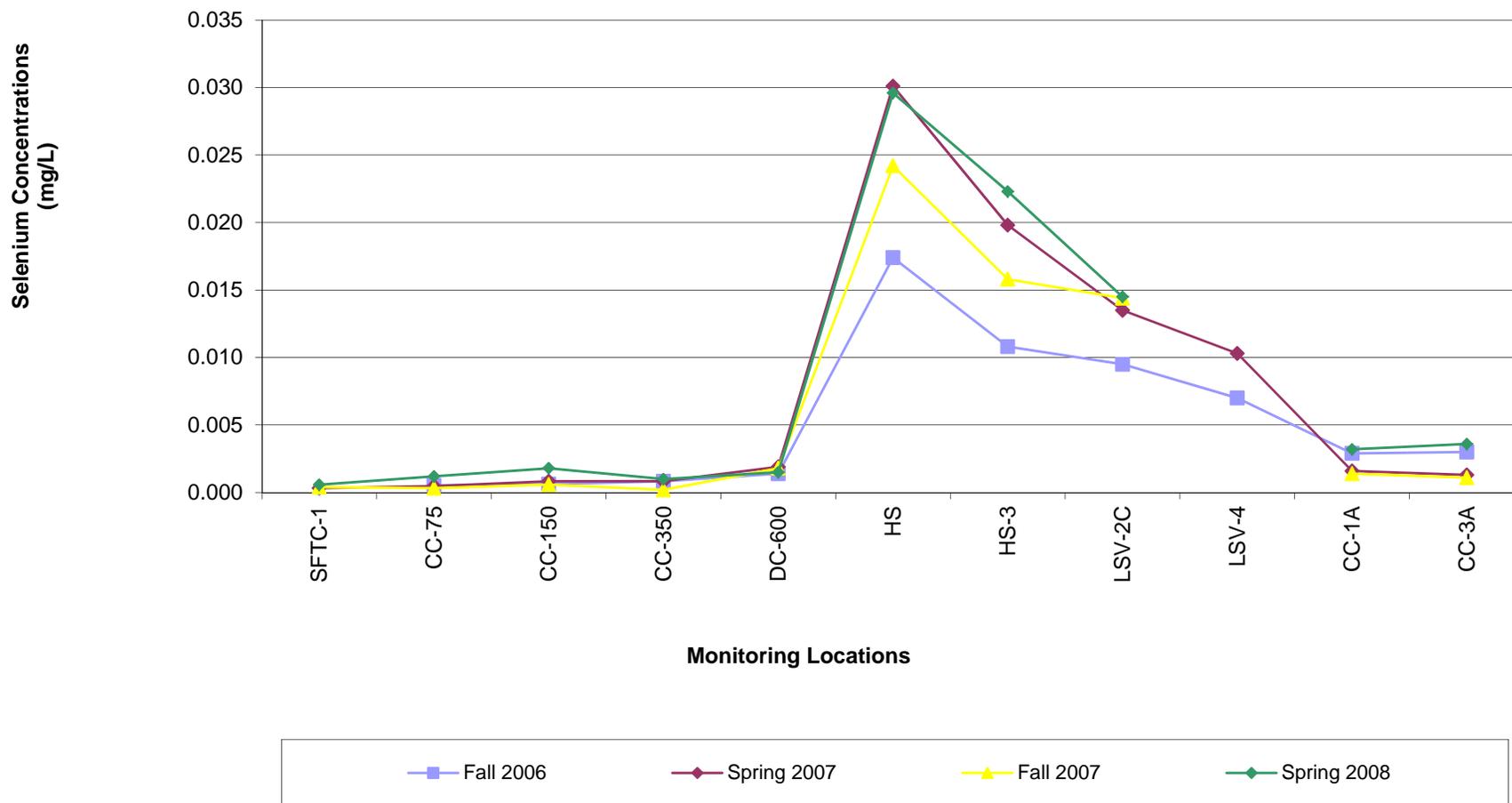


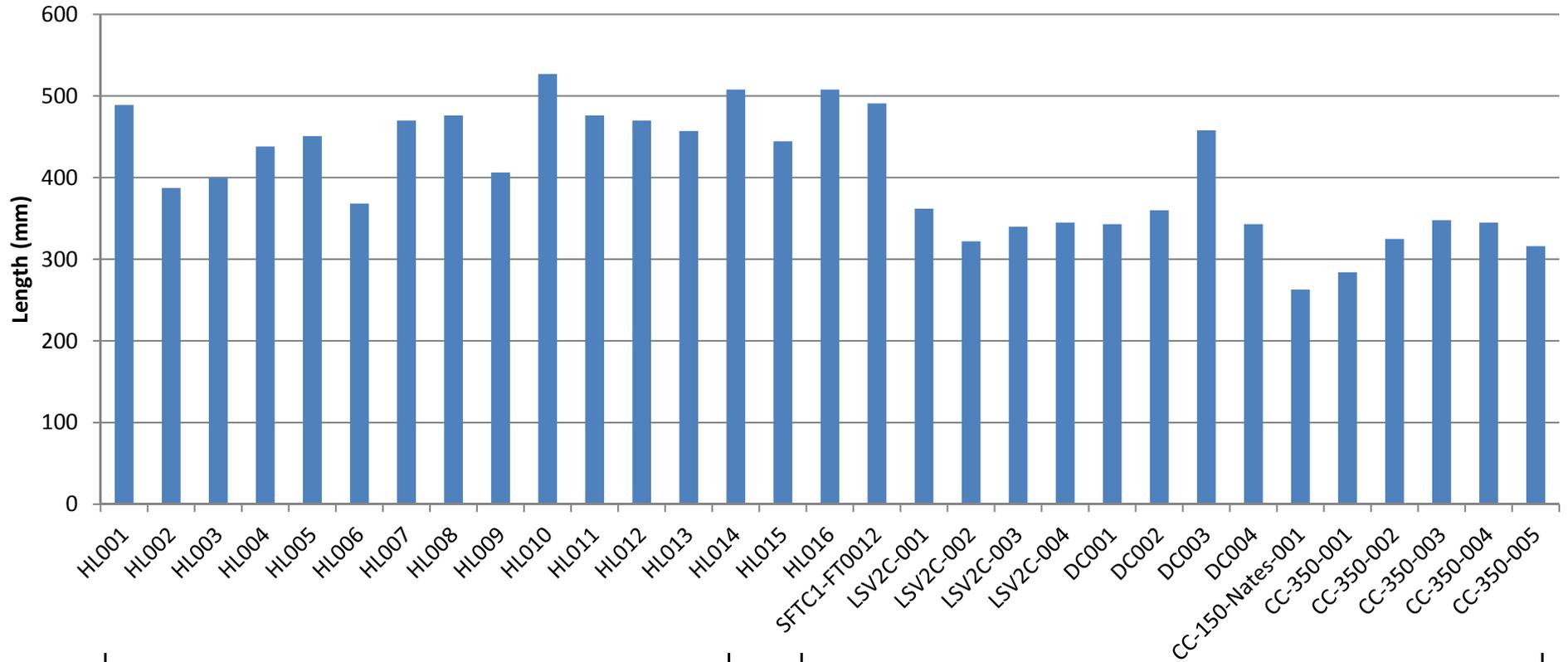
Figure 4
Total Selenium Concentrations in Spring 2008 Surface Water
Samples

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | | |
|----------------------|--------------------|----------|
| PRJ: 0442-004-900.70 | DATE: January 2012 | |
| REV: 1 | BY: SMC | CHK: SMC |



adult fish length



Henry's Lake Hatchery Fish

Wild Fish

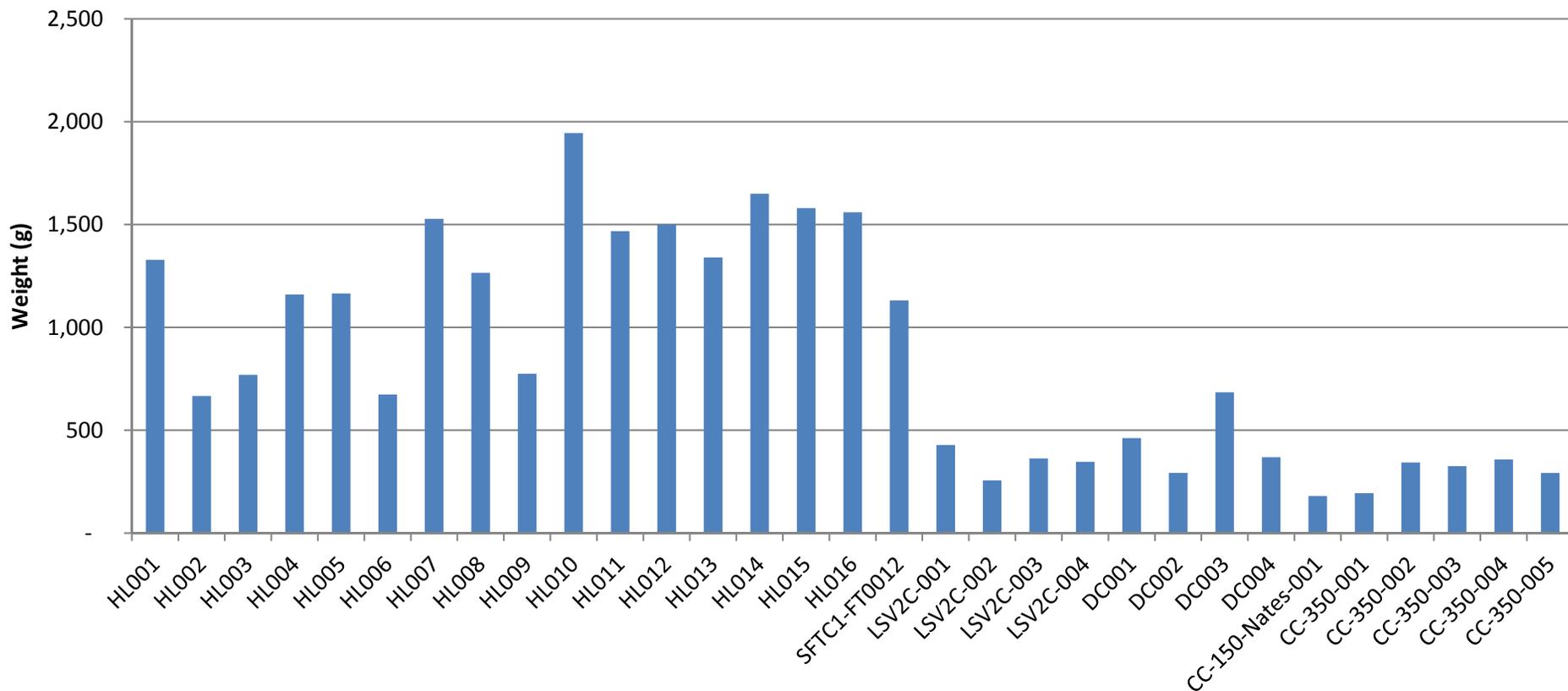
Figure 5
Adult Fish Length by Location

J.R. Simplot Company
Site-Specific Selenium Criterion

| | | |
|----------------------|--------------------|----------|
| PRJ: 0442-004-900.70 | DATE: January 2012 | |
| REV: 1 | BY: SMC | CHK: SMC |



adult fish weight



Henry's Lake Hatchery Fish

Wild Fish

Figure 6
Adult Fish Weight by Location

J.R. Simplot Company
Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |

FORMATION
ENVIRONMENTAL

Adult Whole Body and Egg Selenium Concentrations in Henry's Lake and Wild-Caught YCT

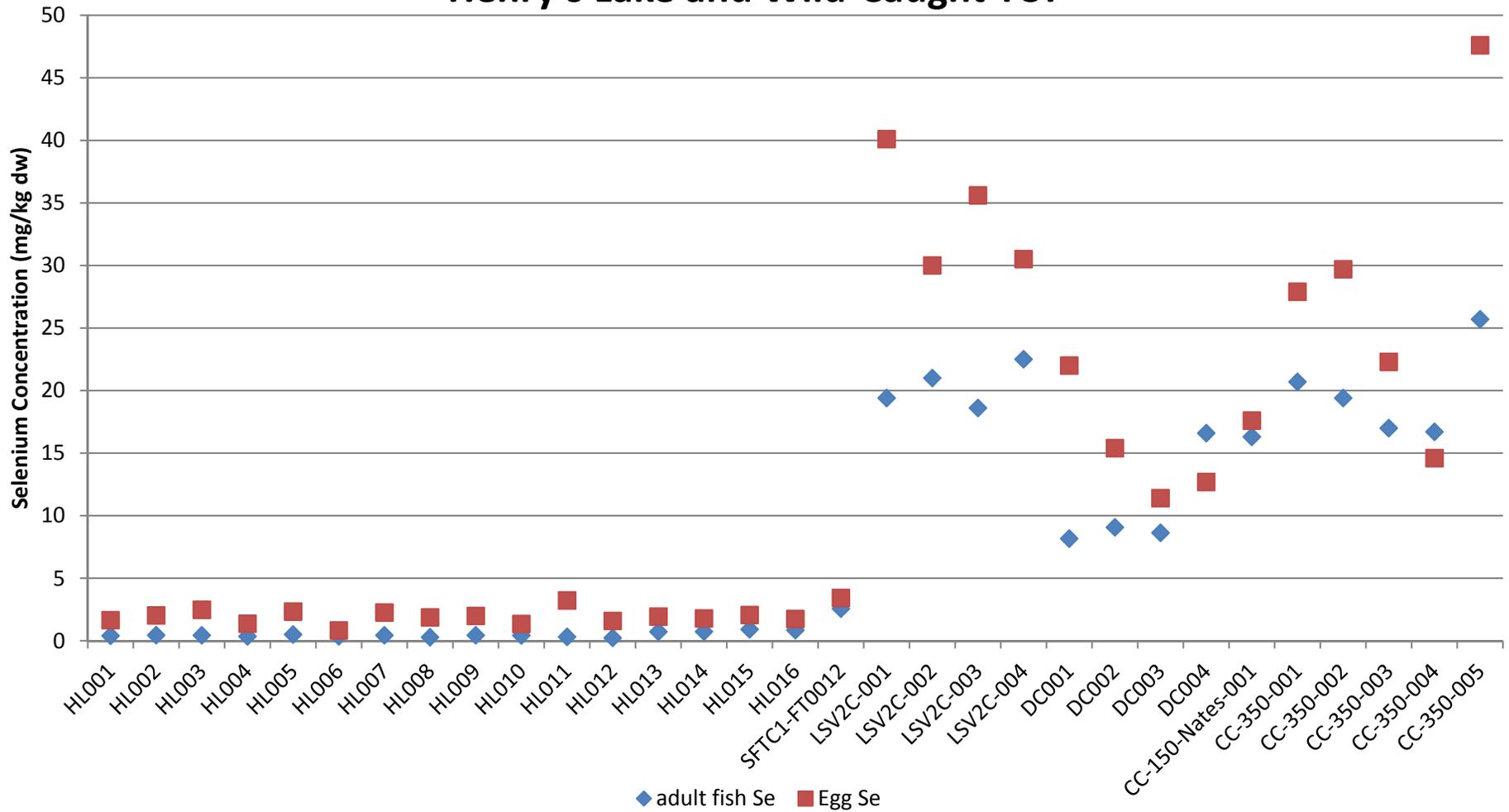


Figure 7
Adult Whole Body and Egg Selenium Concentrations in Henry's Lake and Wild-Caught YCT by Location

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Fecundity

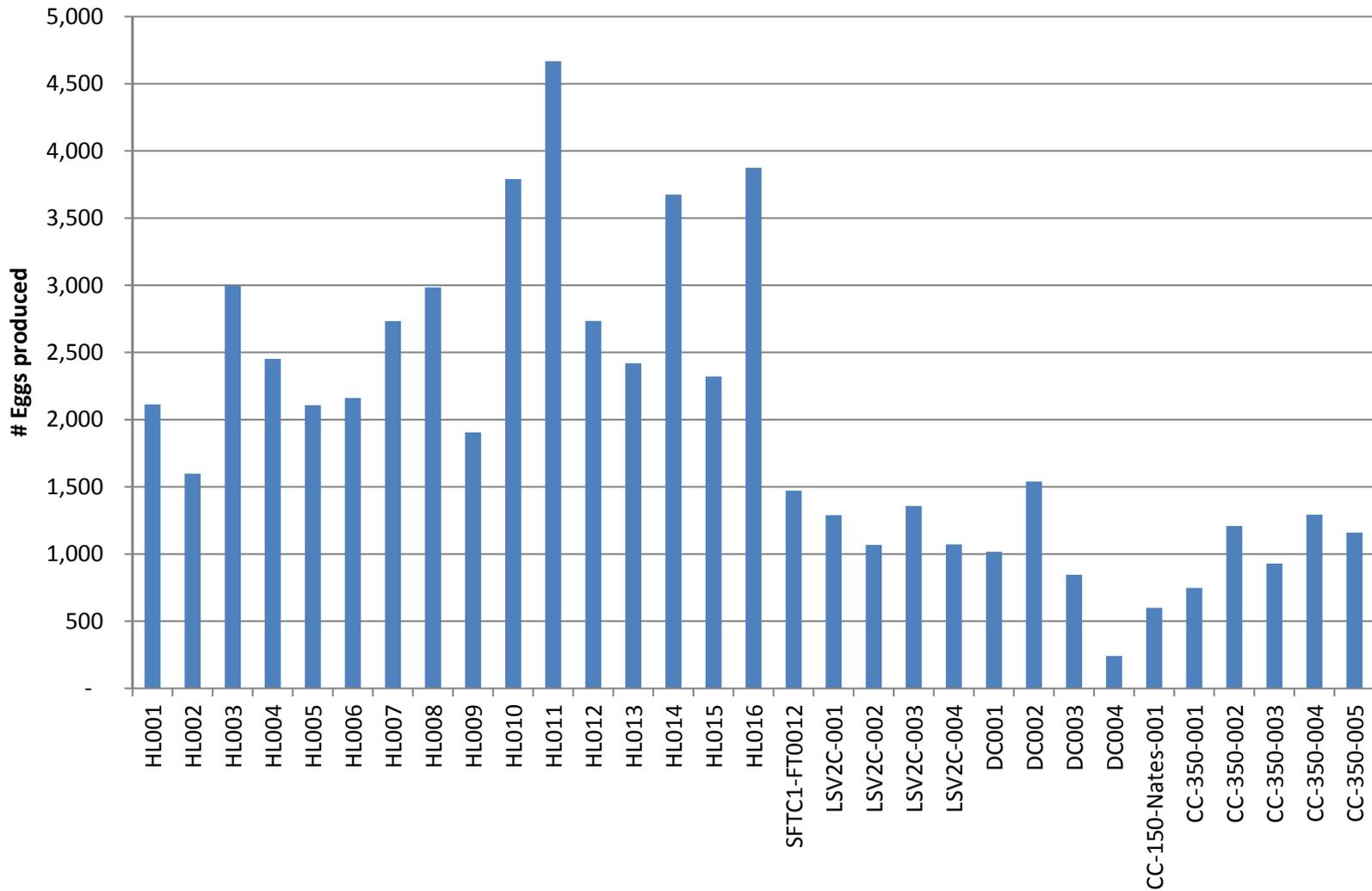


Figure 8
Number of Eggs Produced by Location

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | | |
|----------------------|--------------------|----------|
| PRJ: 0442-004-900.70 | DATE: January 2012 | |
| REV: 1 | BY: SMC | CHK: SMC |



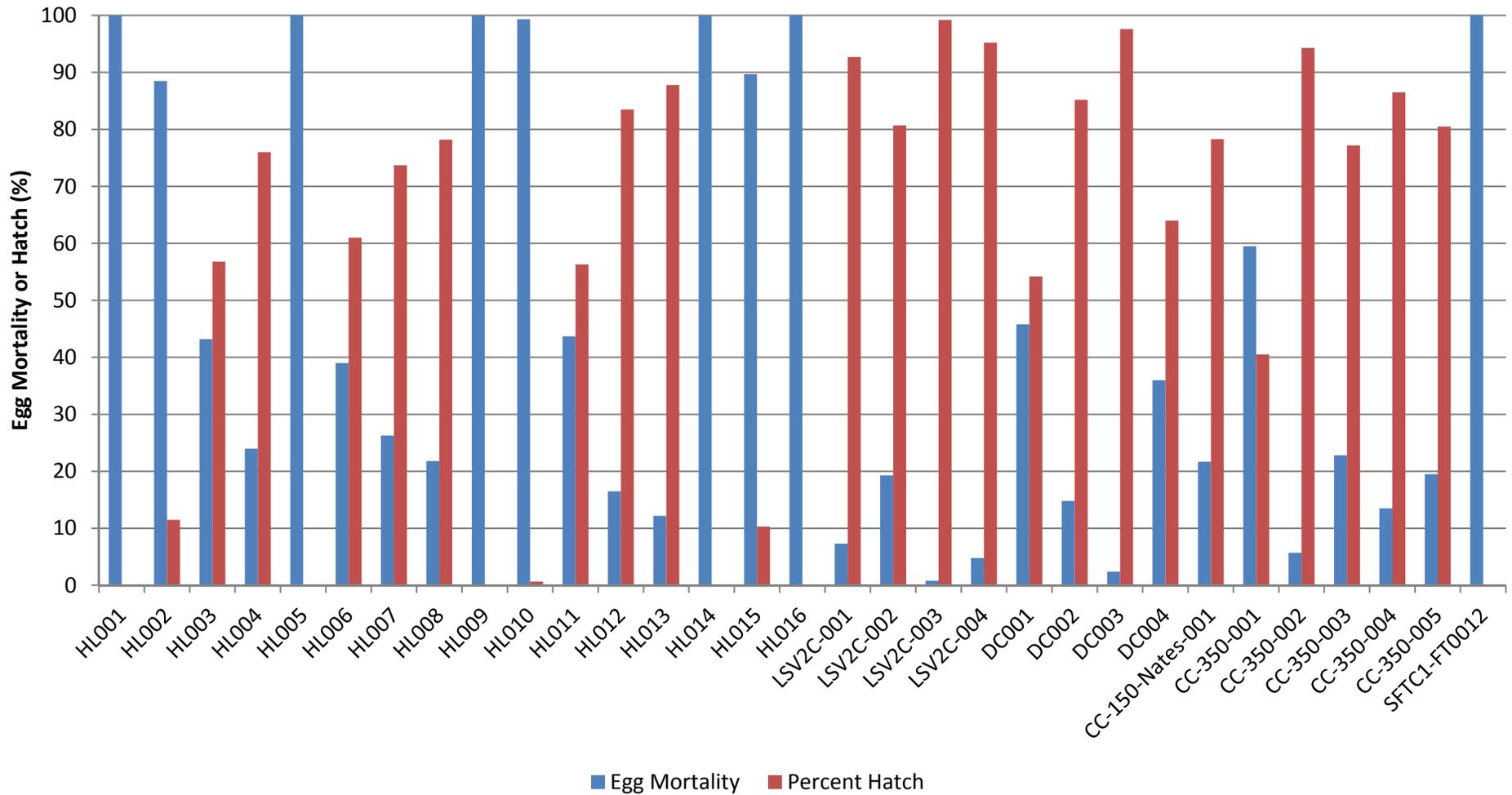
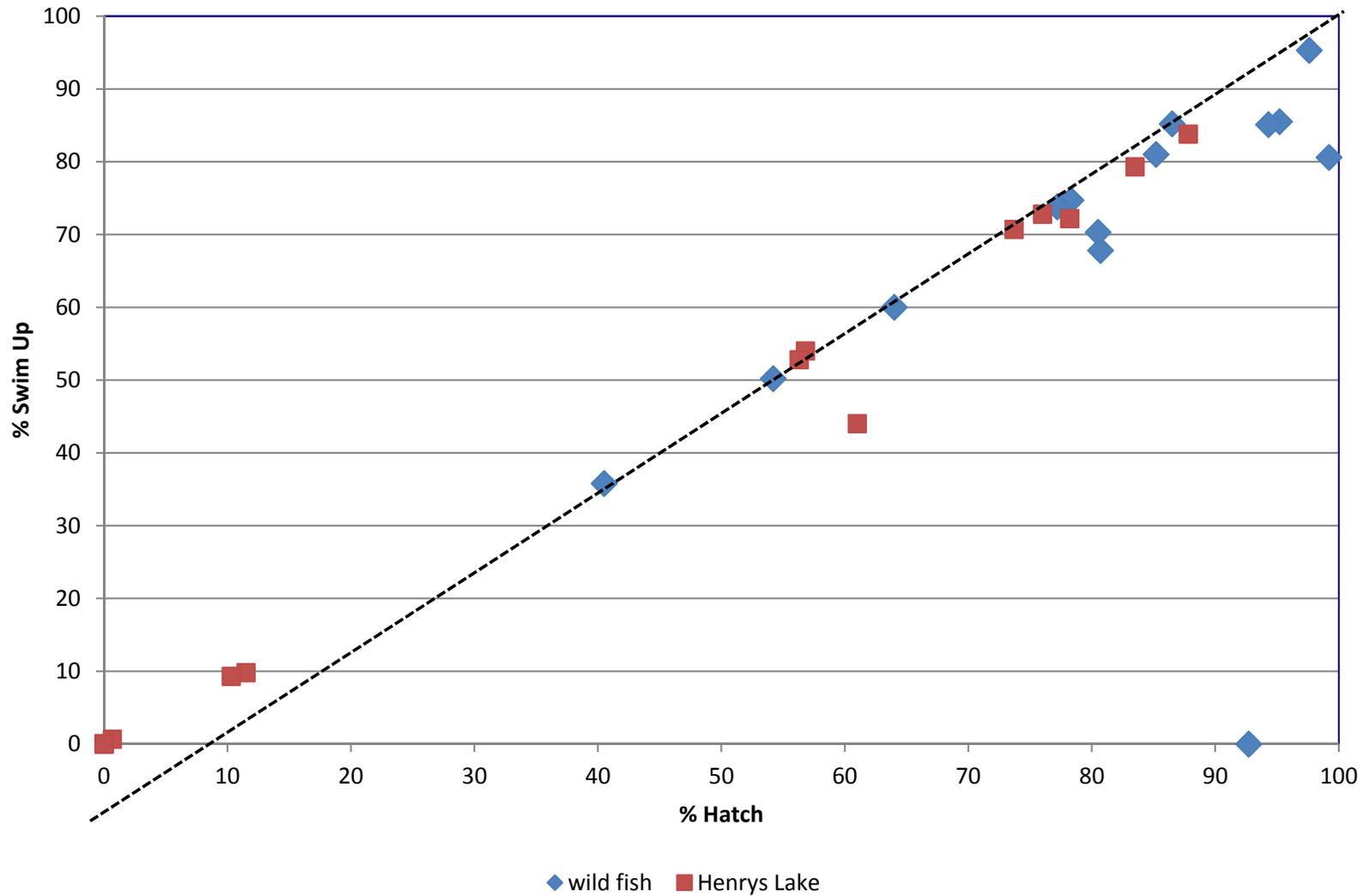


Figure 9
Percent of Egg Mortality or Percent Hatch by Location

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |





Note: the dashed line indicates a 1:1 agreement.

Figure 10
Relationship Between the Percentage of Eggs that Hatched and the Percentage of Fish that Reached Swim-Up

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



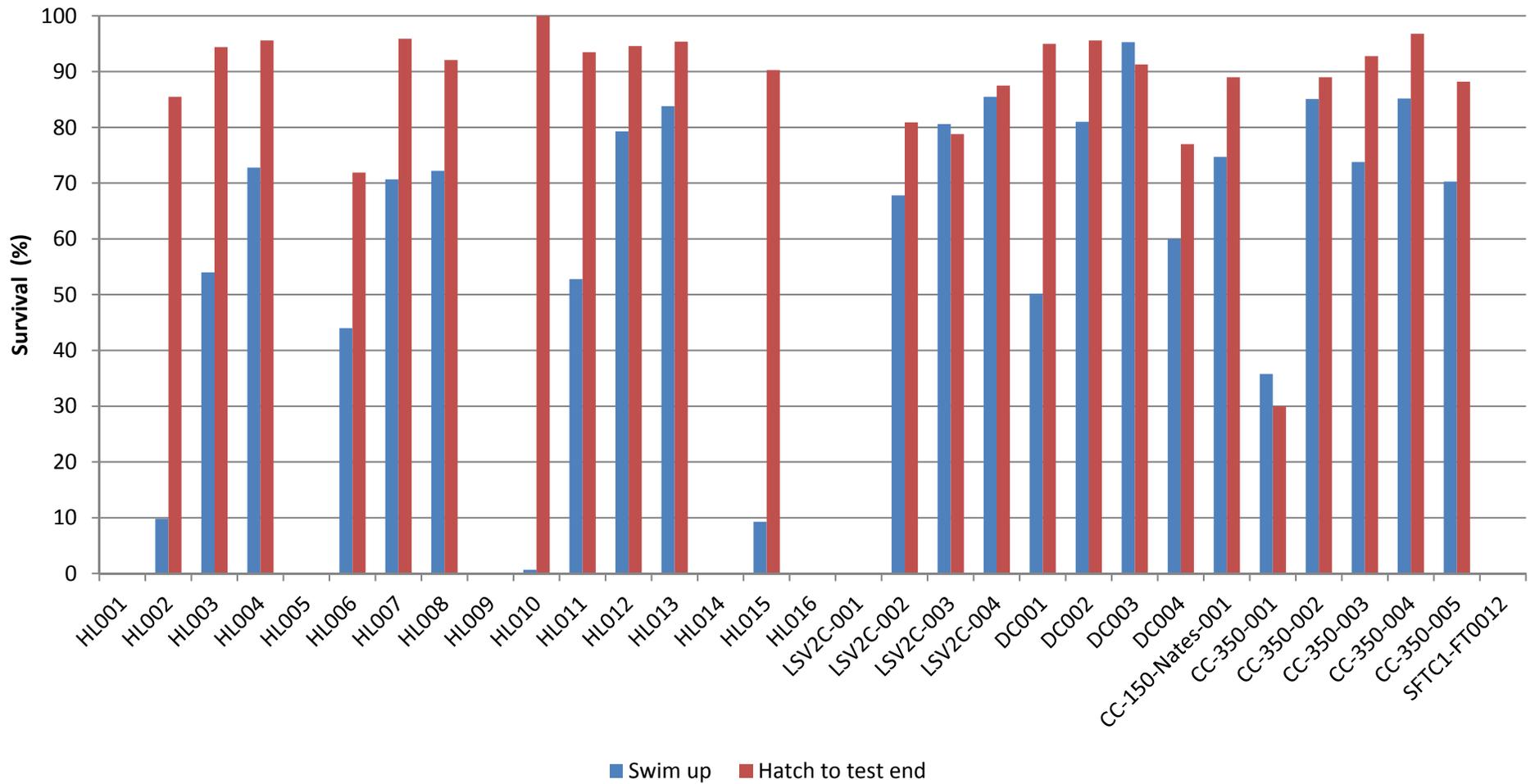


Figure 11
Percent Survival at Swim-Up and
Percent Survival at Hatch to Test End

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | | |
|----------------------|--------------------|----------|
| PRJ: 0442-004-900.70 | DATE: January 2012 | |
| REV: 1 | BY: SMC | CHK: SMC |



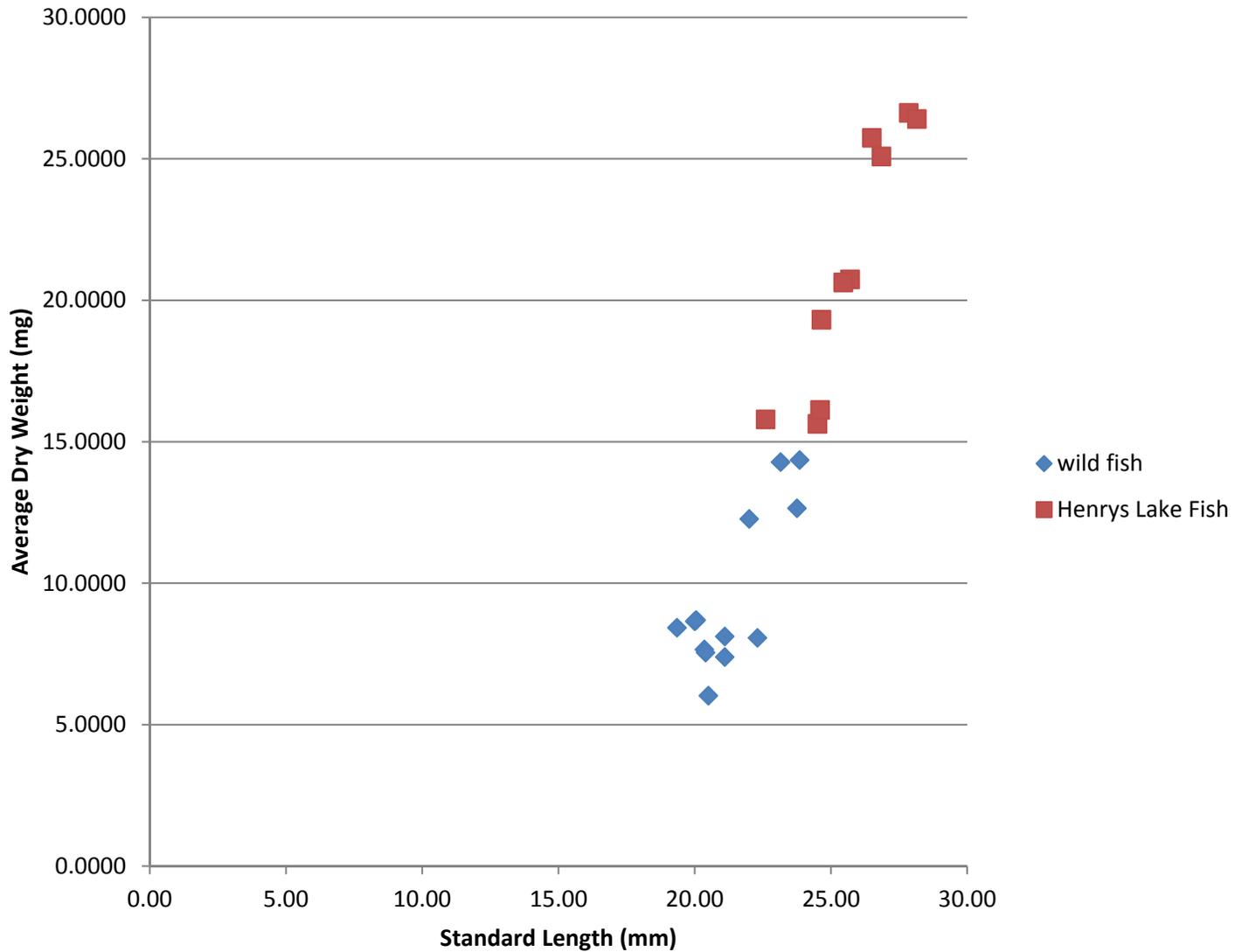


Figure 12
YCT Growth based on Larval Fish Length and Weight for
Wild Fish and Henry's Lake Fish

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Average Dry Weight 15-Day Post Swimup

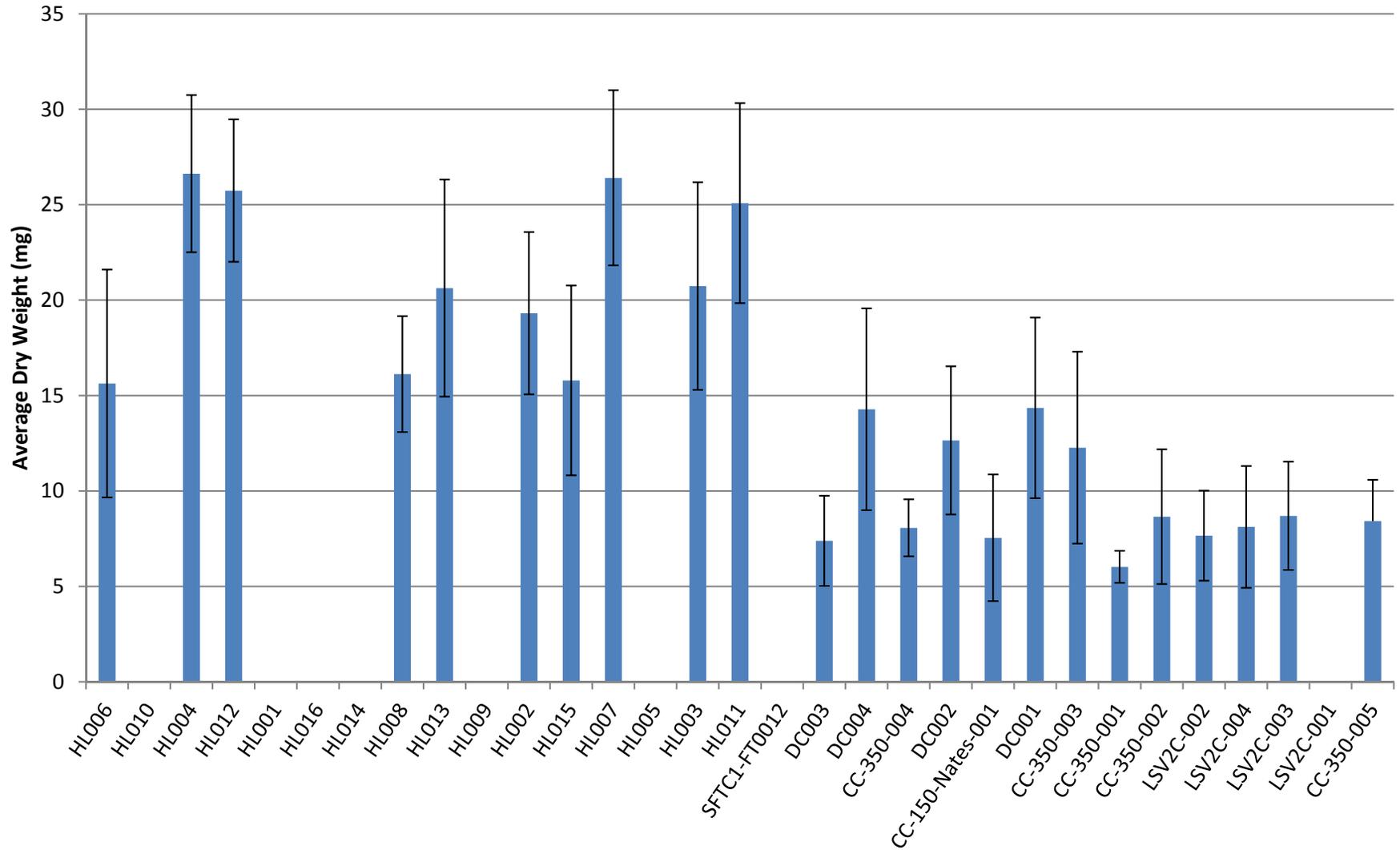


Figure 13
YCT Growth based on Larval Fish Dry Weight

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Cranio-Facial

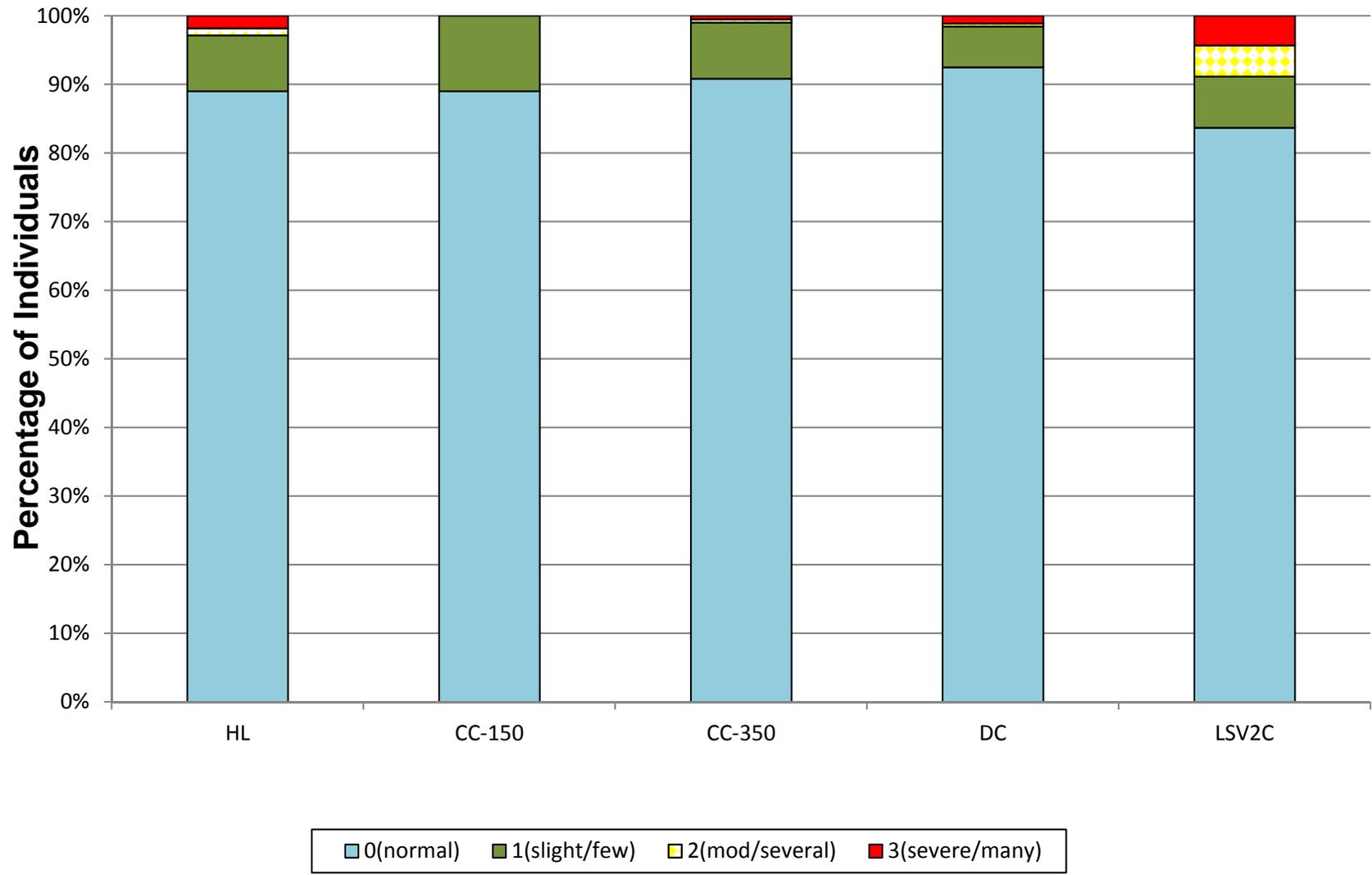


Figure 14
Percent Cranio-Facial Deformities for Larval YCT

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Skeletal

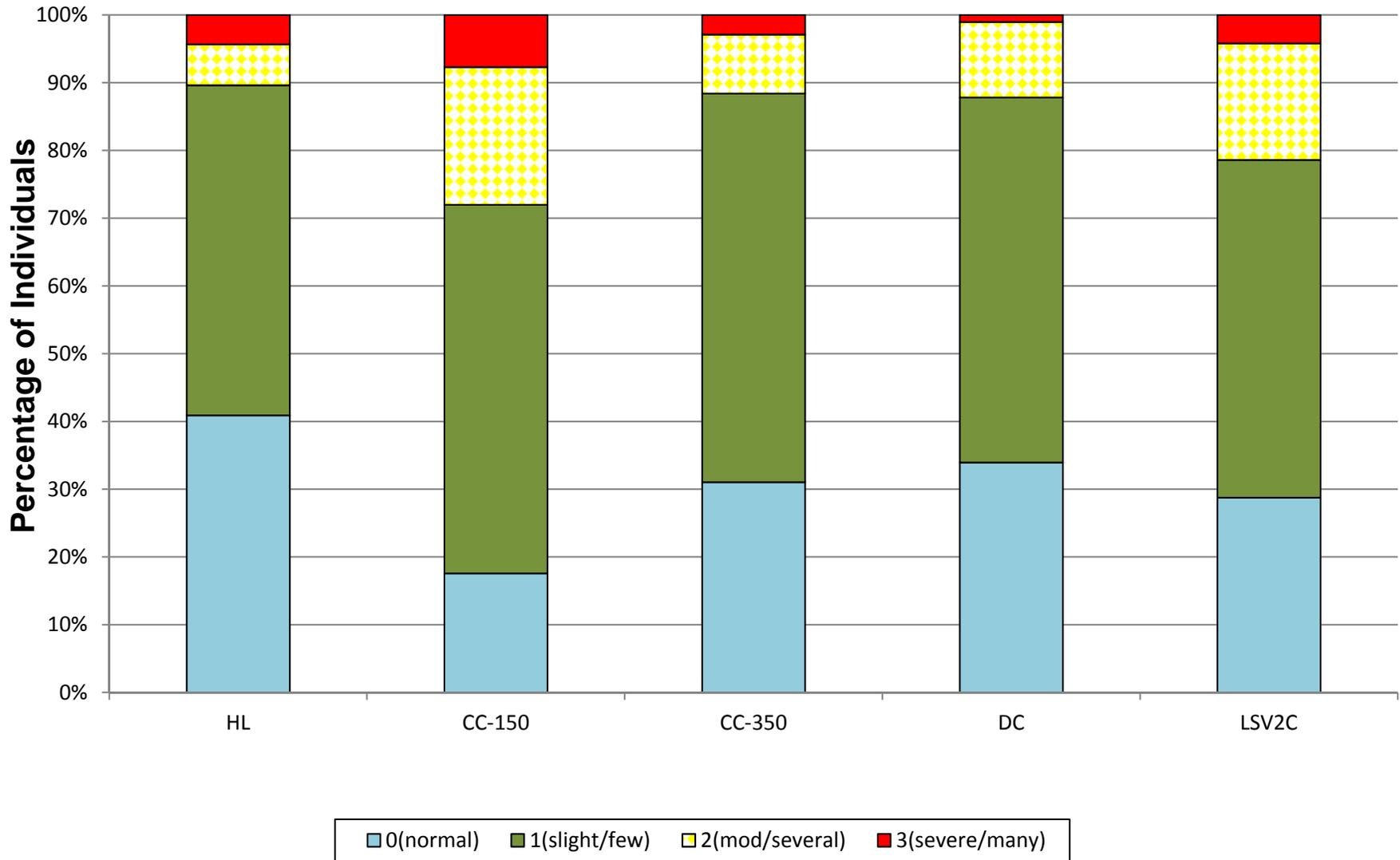


Figure 15
Percent Skeletal Deformities for Larval YCT

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Fin Fold

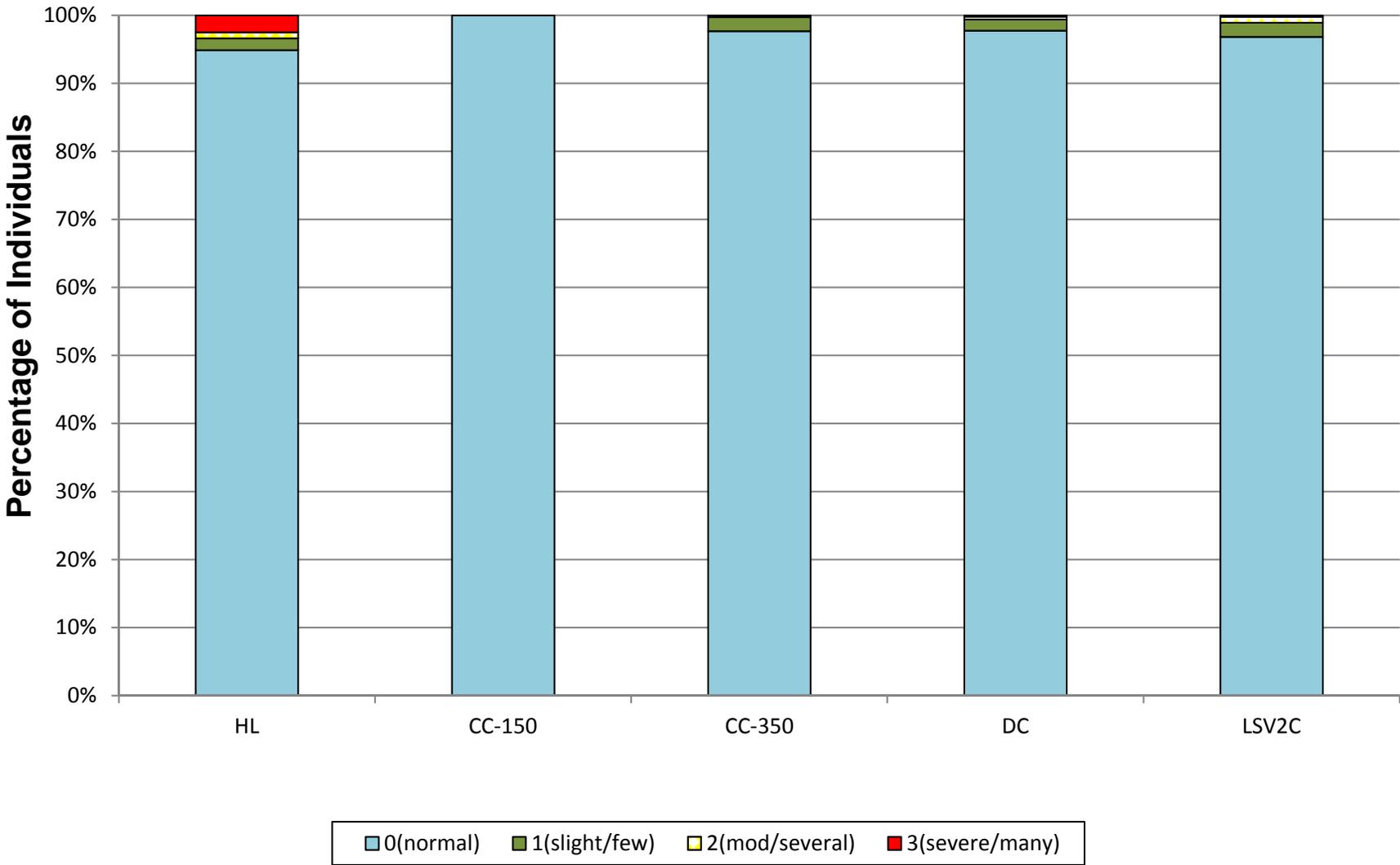


Figure 16
Percent Fin or Finfold Deformities for Larval YCT

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



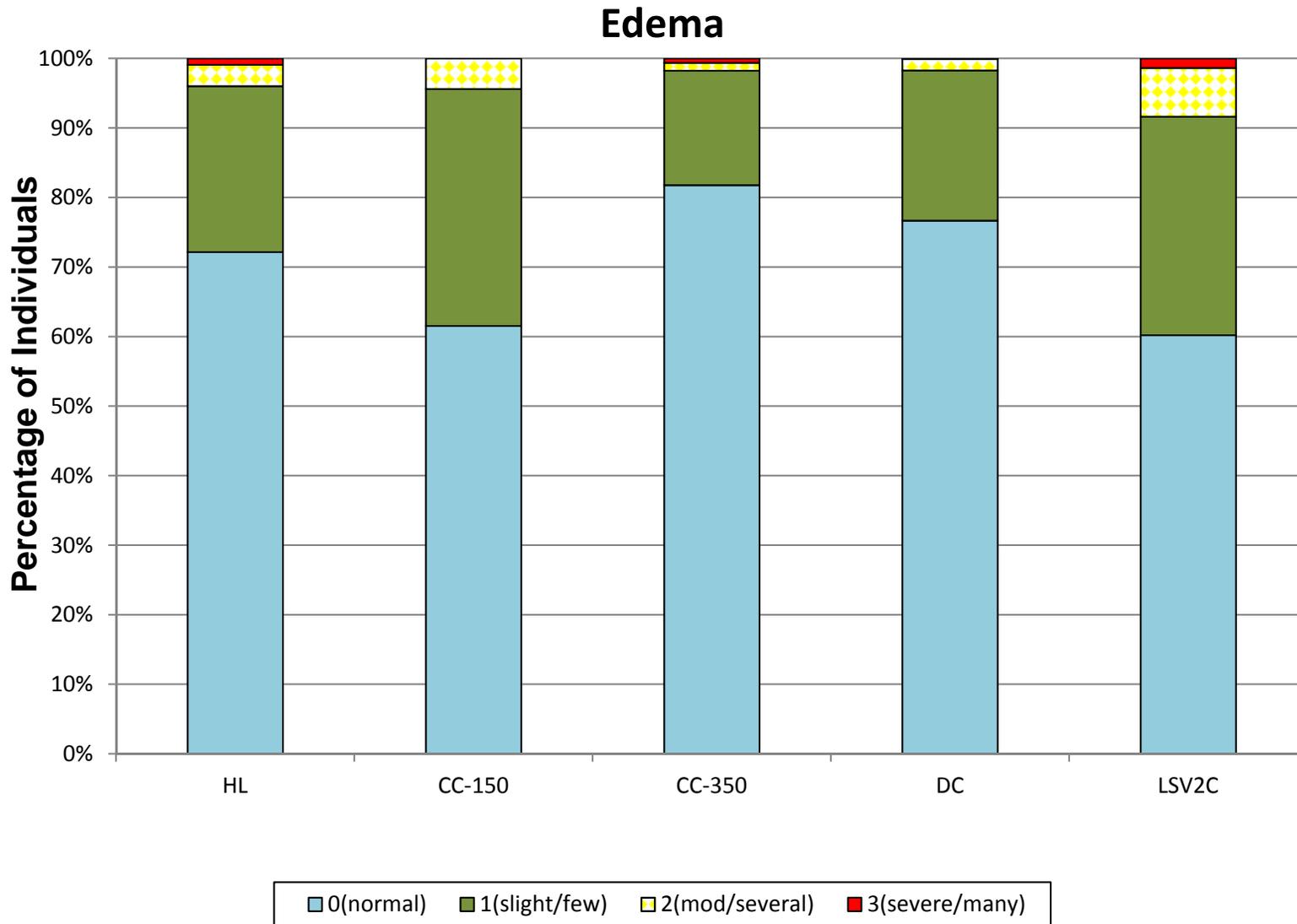


Figure 17
Percent Edematous Tissue Frequency for Larval YCT

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | | |
|----------------------|--------------------|----------|
| PRJ: 0442-004-900.70 | DATE: January 2012 | |
| REV: 1 | BY: SMC | CHK: SMC |



GSI Scores CF - YCT

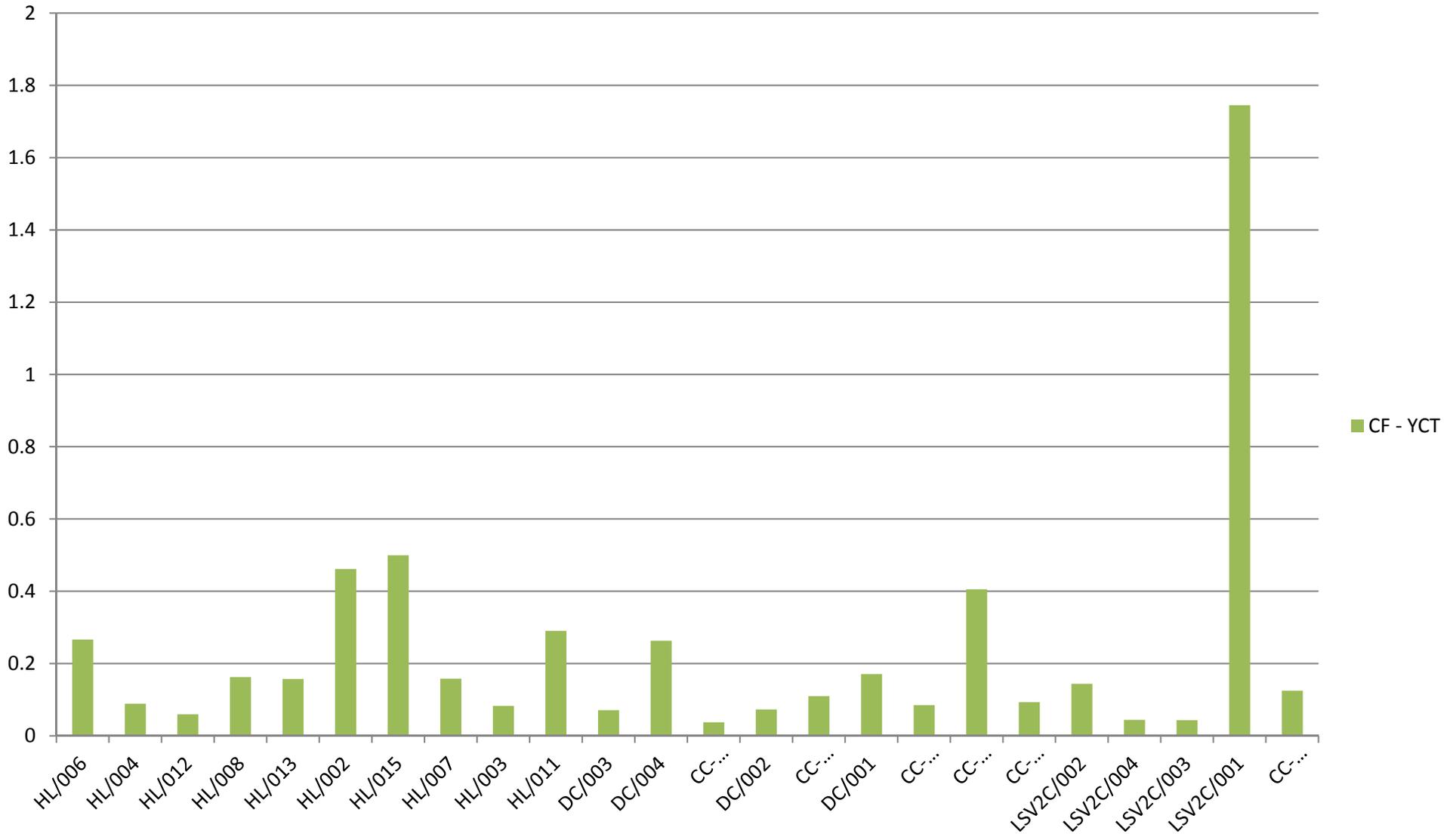


Figure 18
GSI Scores for Cranio-Facial Deformities Evaluated by Location and Sample ID
Ranked by Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



GSI SD - YCT

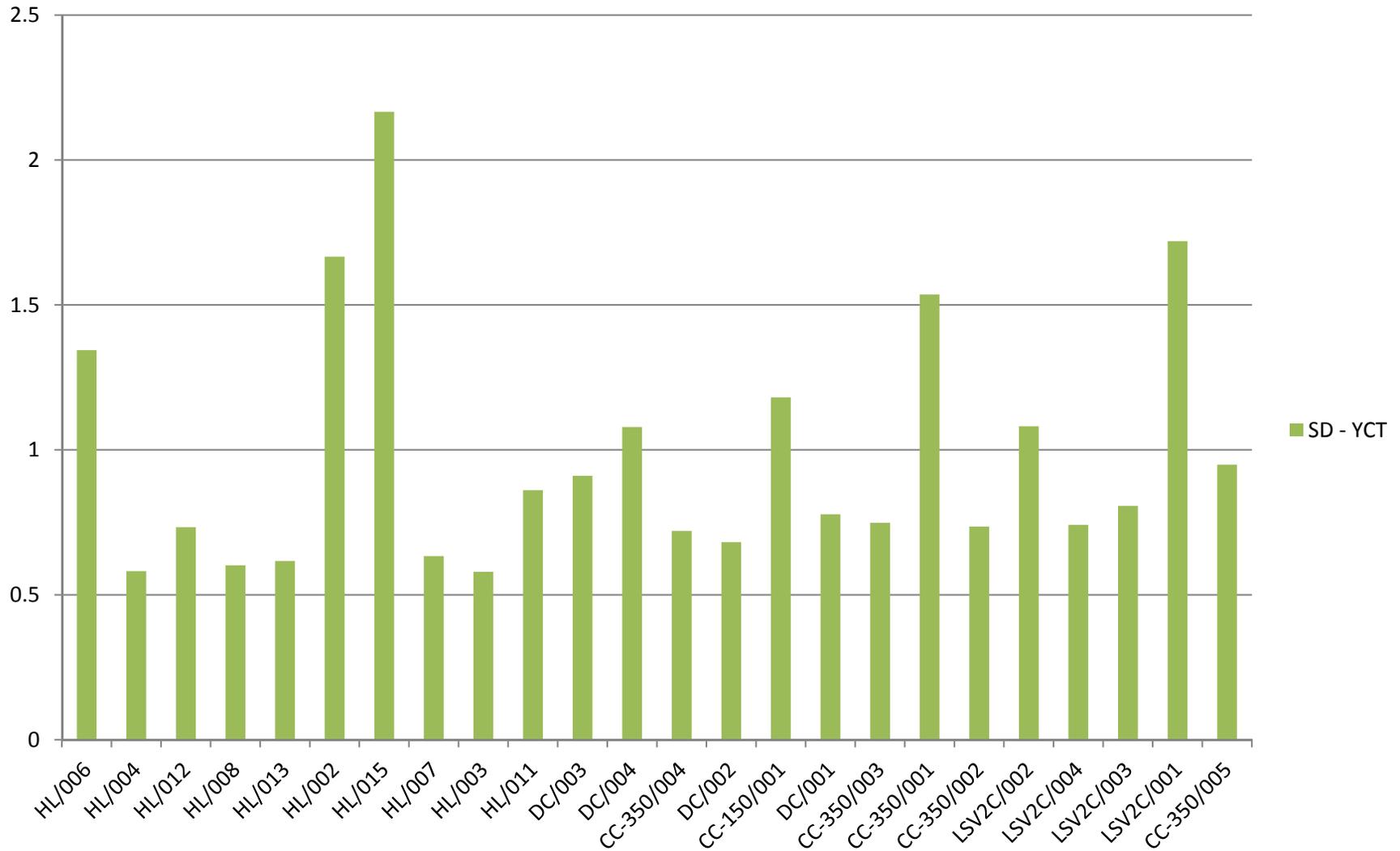


Figure 19
GSI Scores for Skeletal Deformities Evaluated by Location and Sample ID
Ranked by Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



GSI FD - YCT

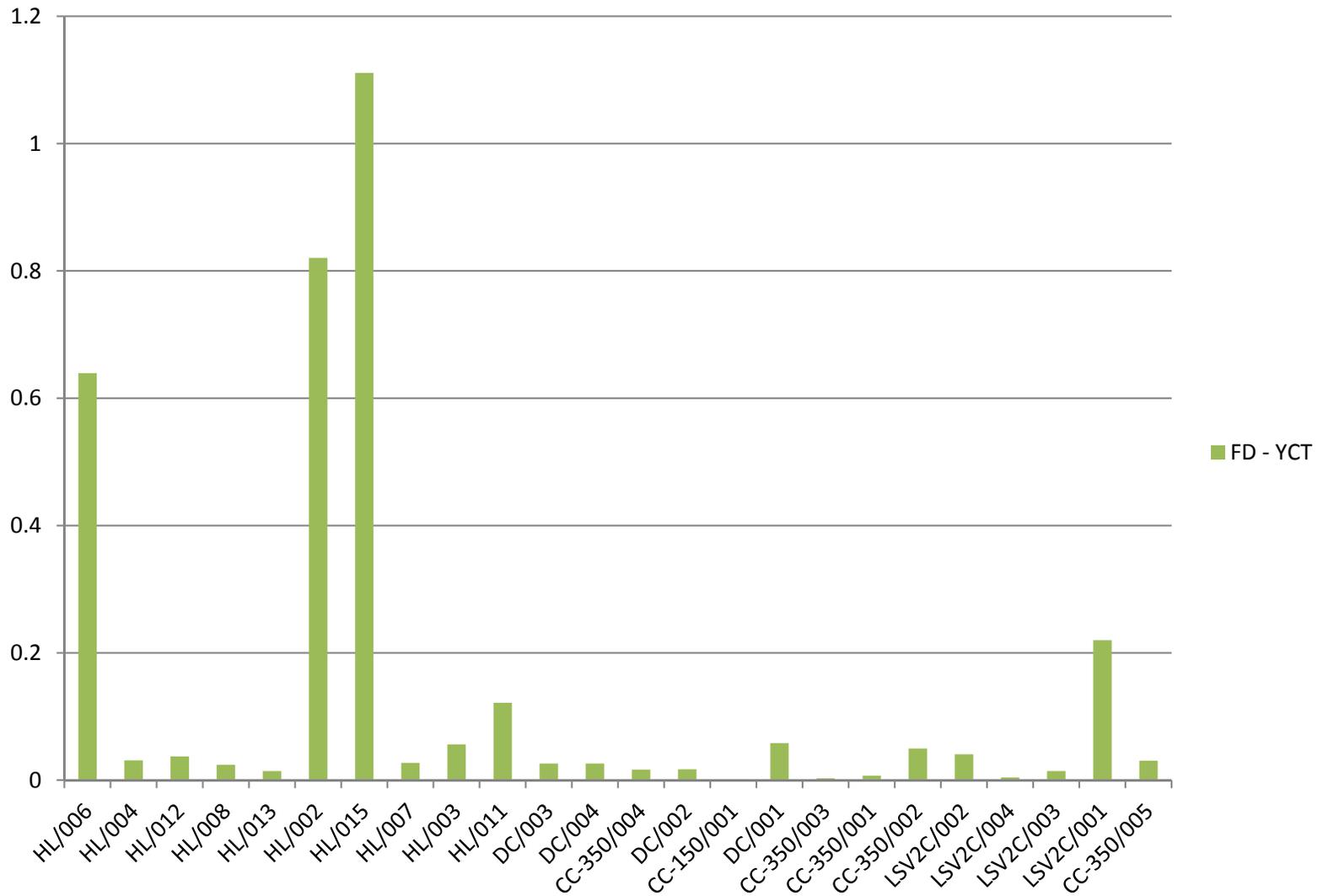


Figure 20
GSI Scores for Fin or Fin-Fold Deformities Evaluated by Location and Sample ID
Ranked by Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



GSI ED - YCT

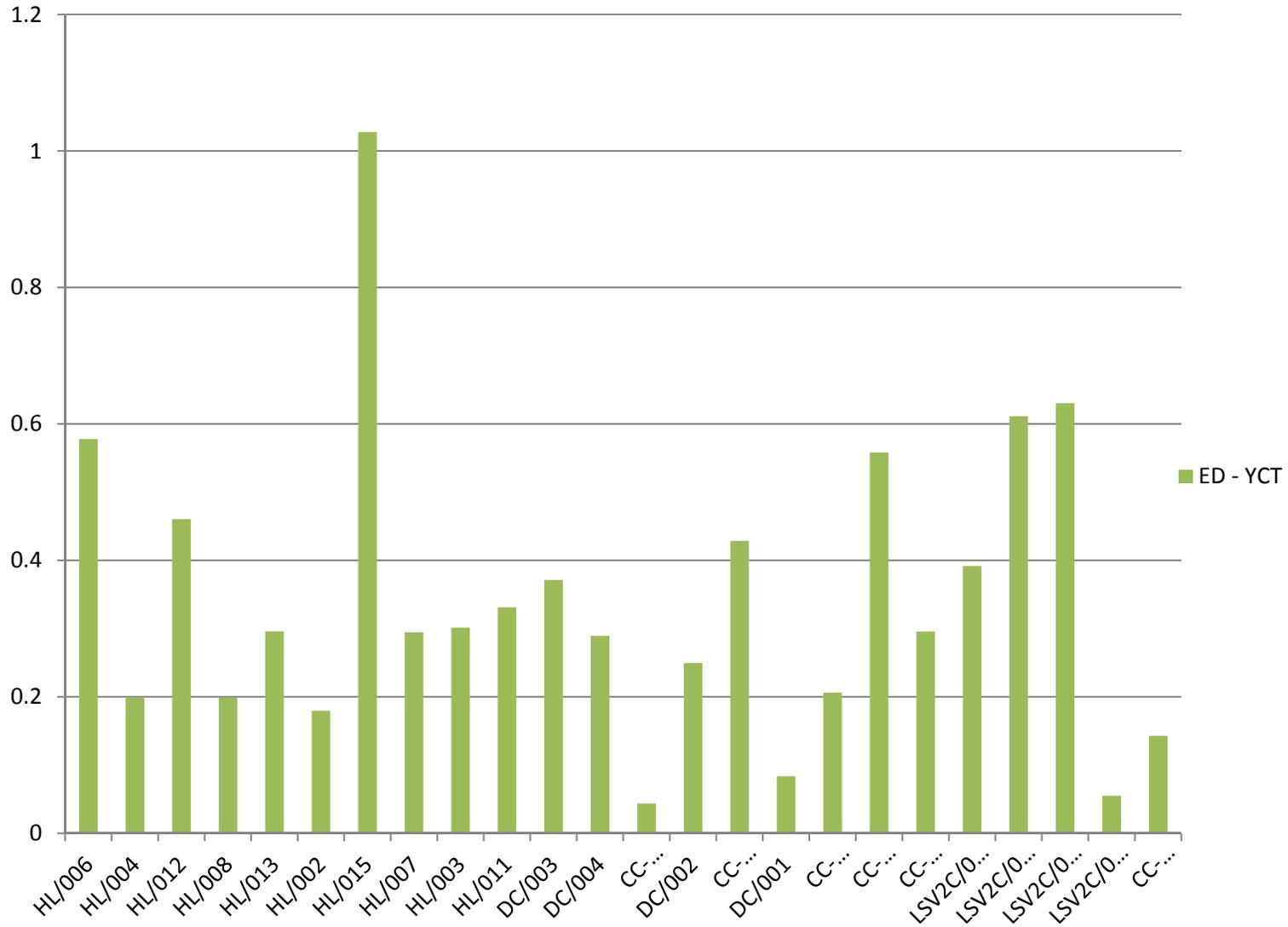


Figure 21
GSI Scores for Edematous Tissue Frequency Evaluated by Location and Sample ID Ranked by Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



YCT - Whole Body and Egg Selenium Relationship

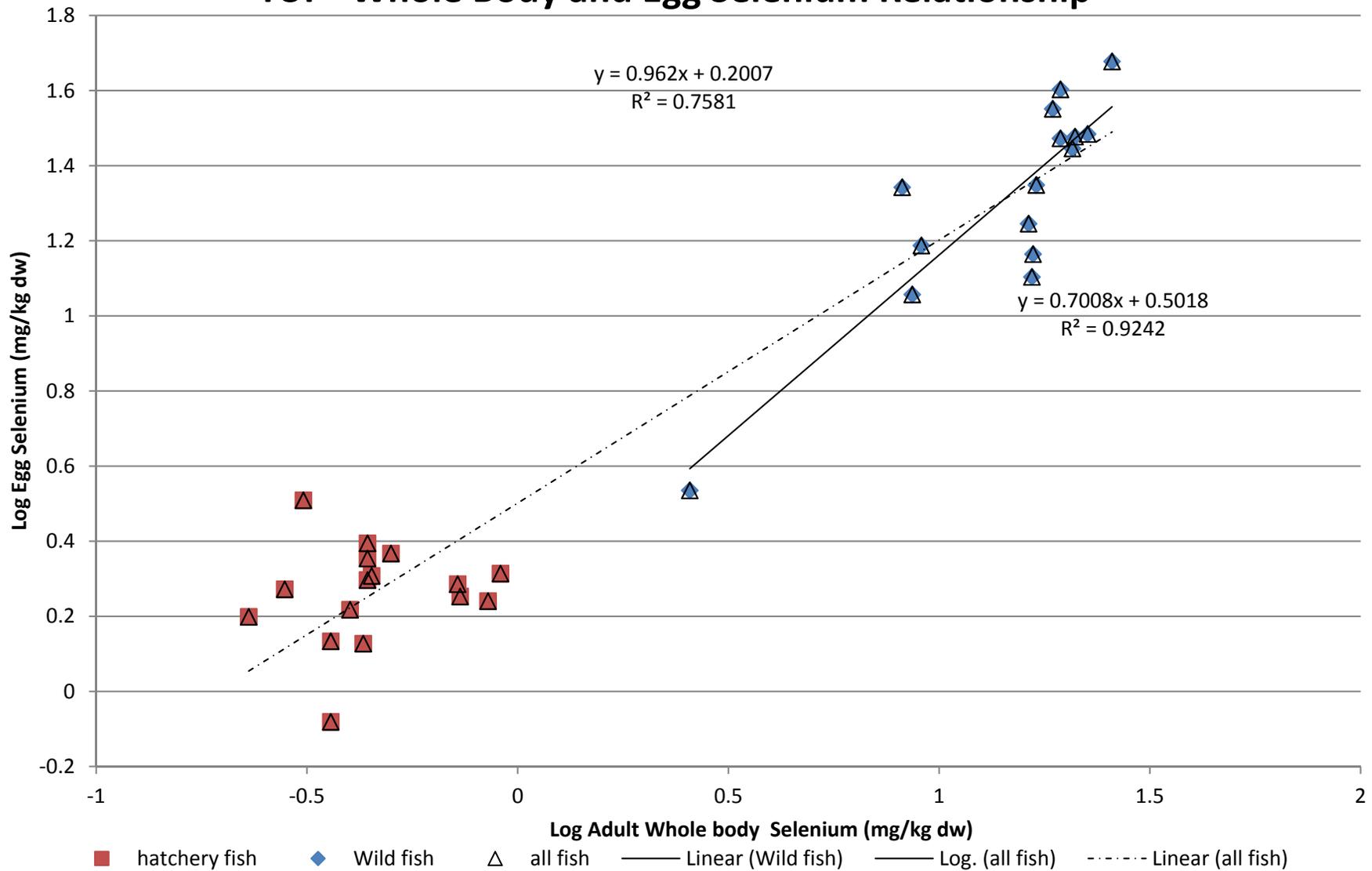


Figure 23
Log Egg Selenium Concentration Versus
Log Adult Whole Body Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Fecundity vs. Egg Selenium Concentration

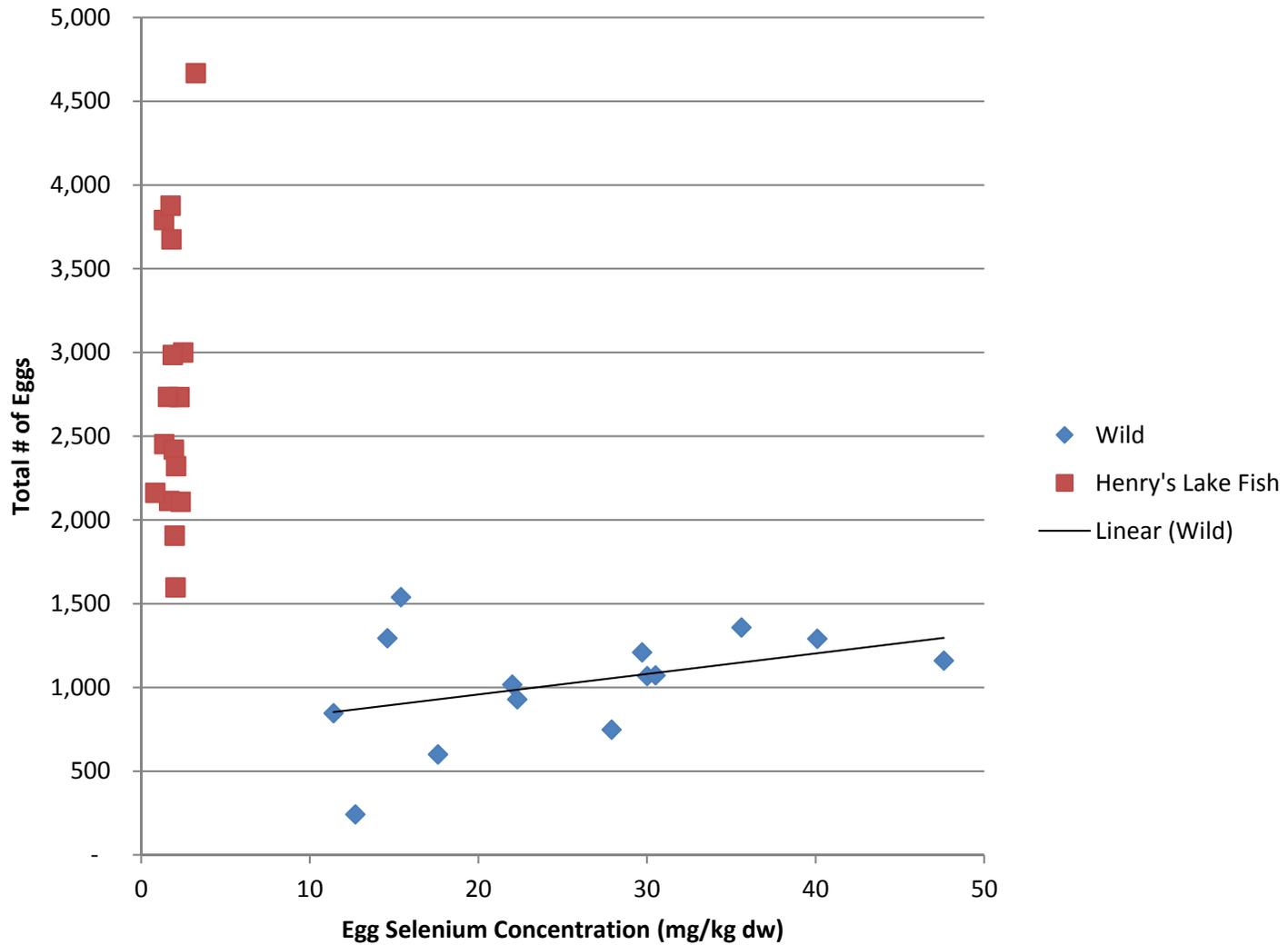


Figure 24
Total Egg Abundance Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Fecundity vs. Adult Female Length

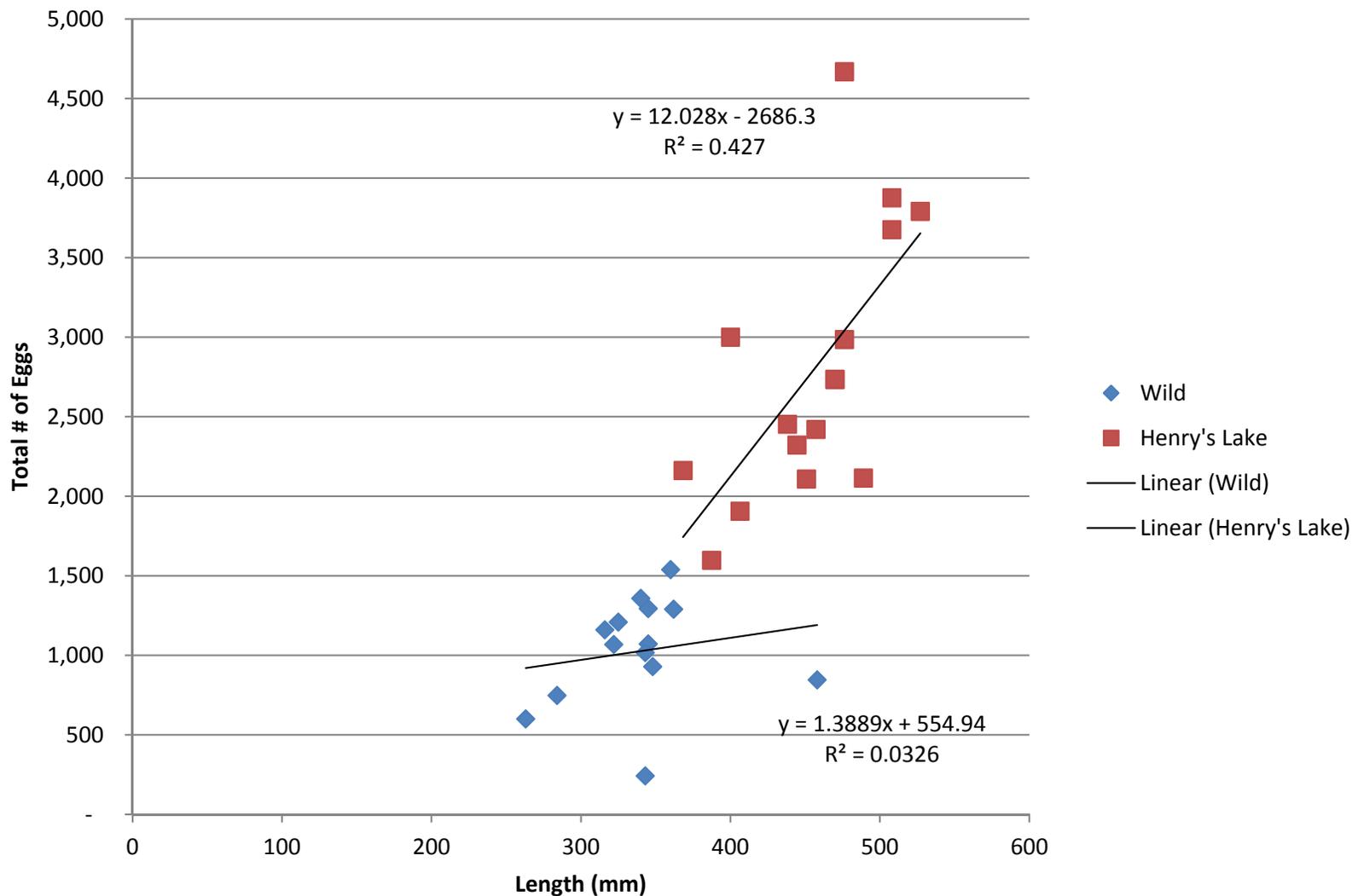


Figure 25
Egg Abundance Versus
Adult Female Length

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



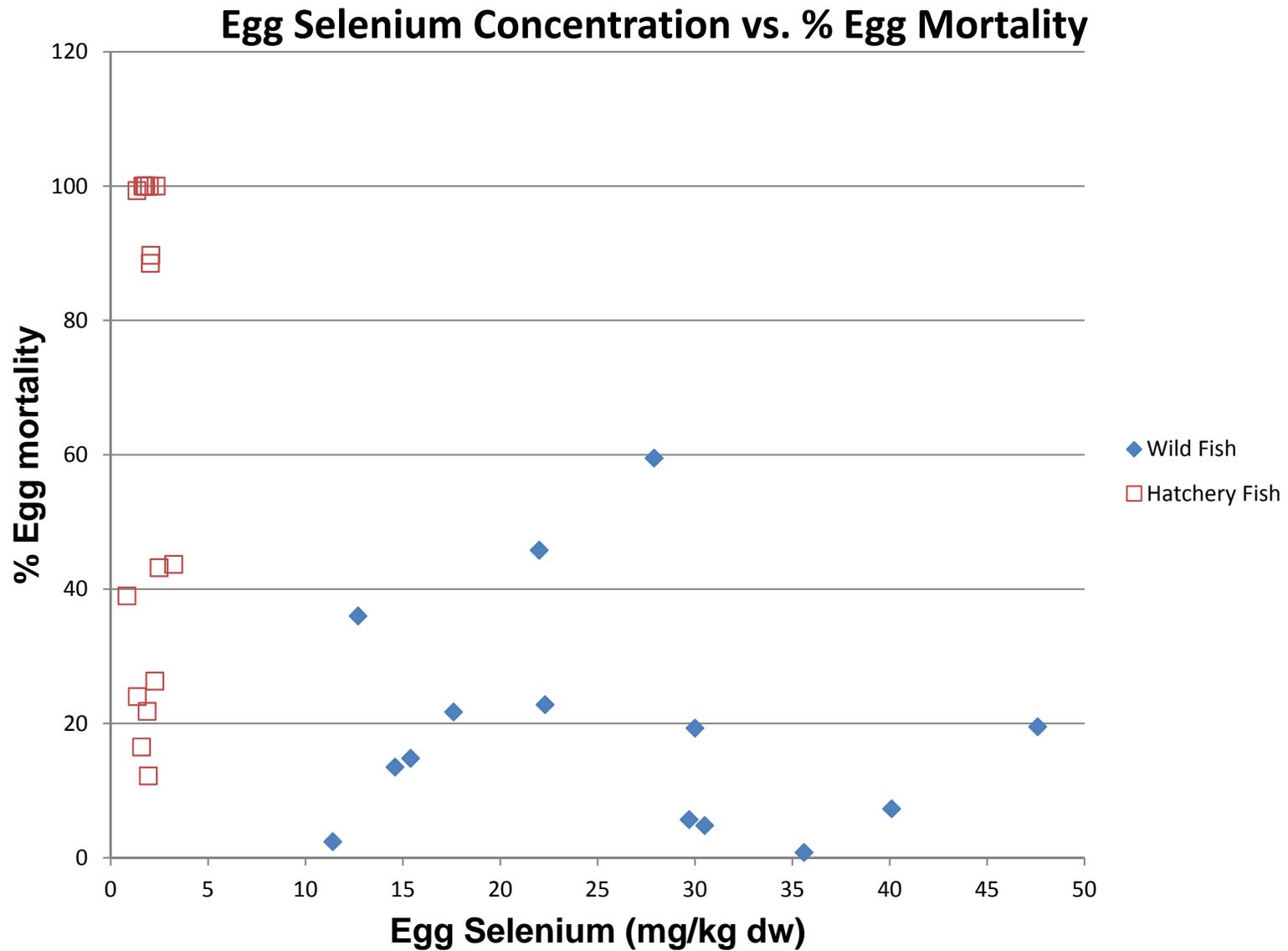


Figure 26
Percent Mortality of Eggs Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Egg Selenium Concentration vs. % Hatch

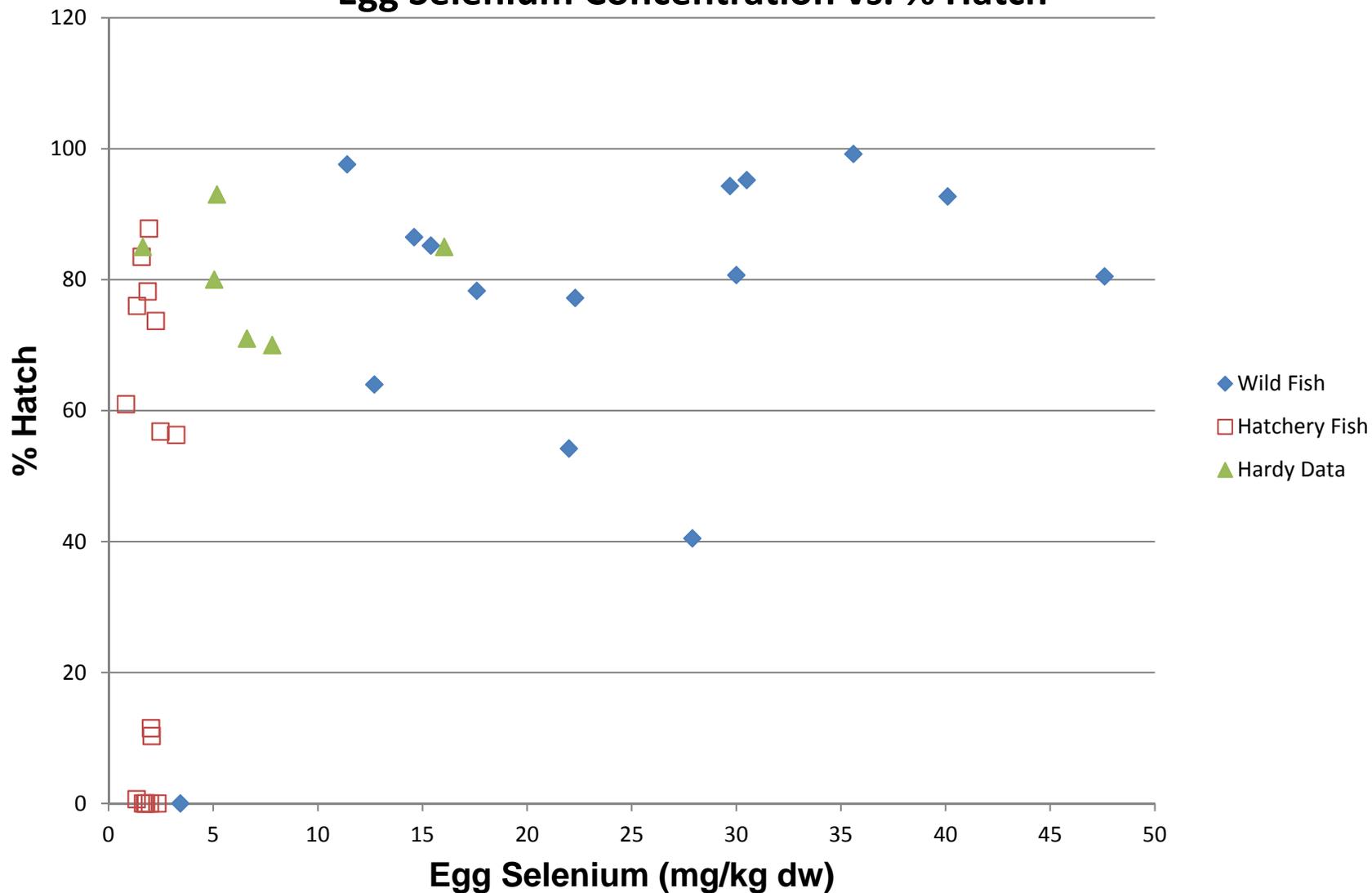


Figure 27
Percent of Fry that Hatched Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Egg Selenium Concentration vs. % Survival at Swim-Up

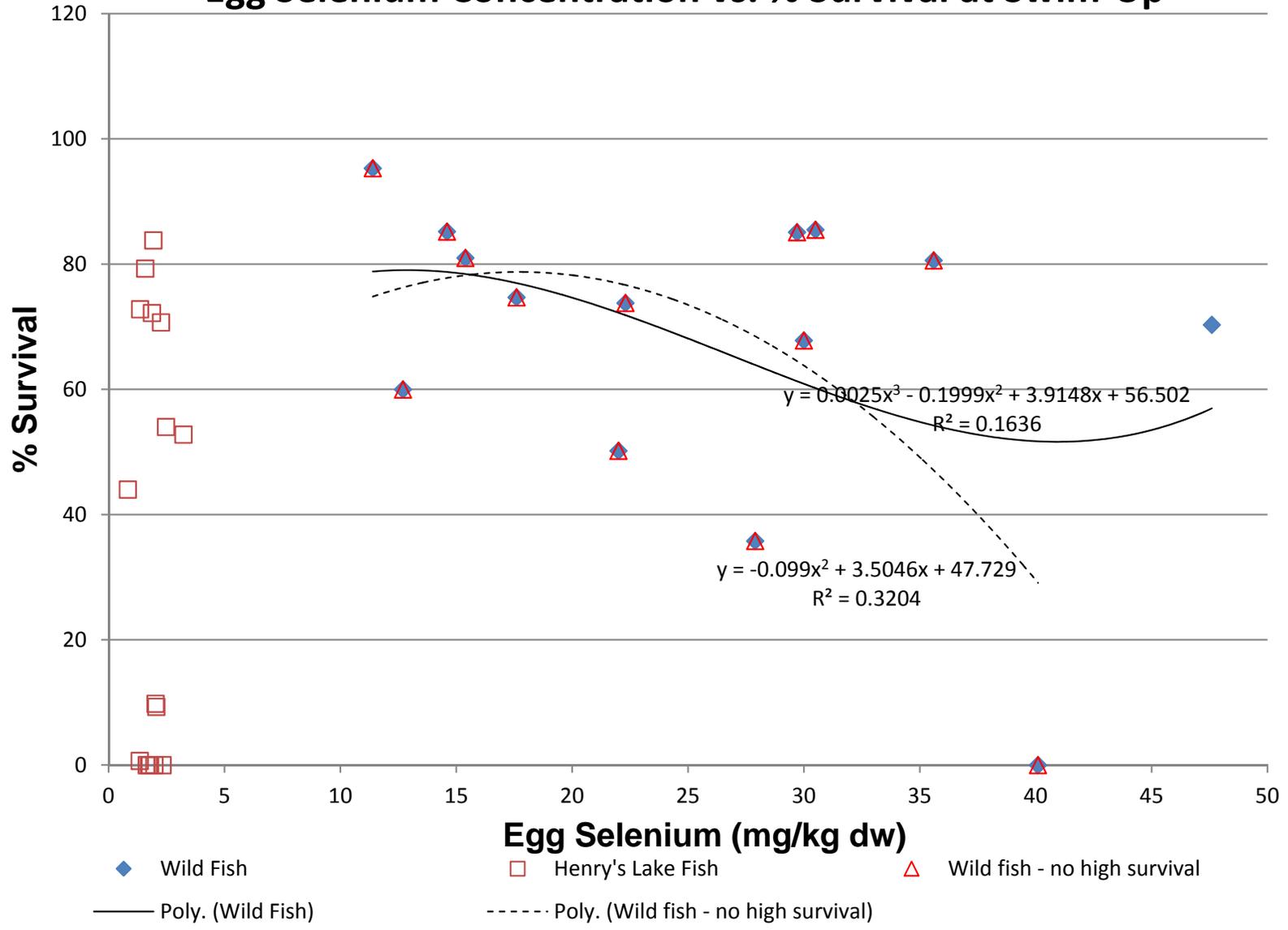


Figure 28
Percent Survival at Swim-Up Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Egg Selenium Concentration vs. Percent Survival (hatch to test end)

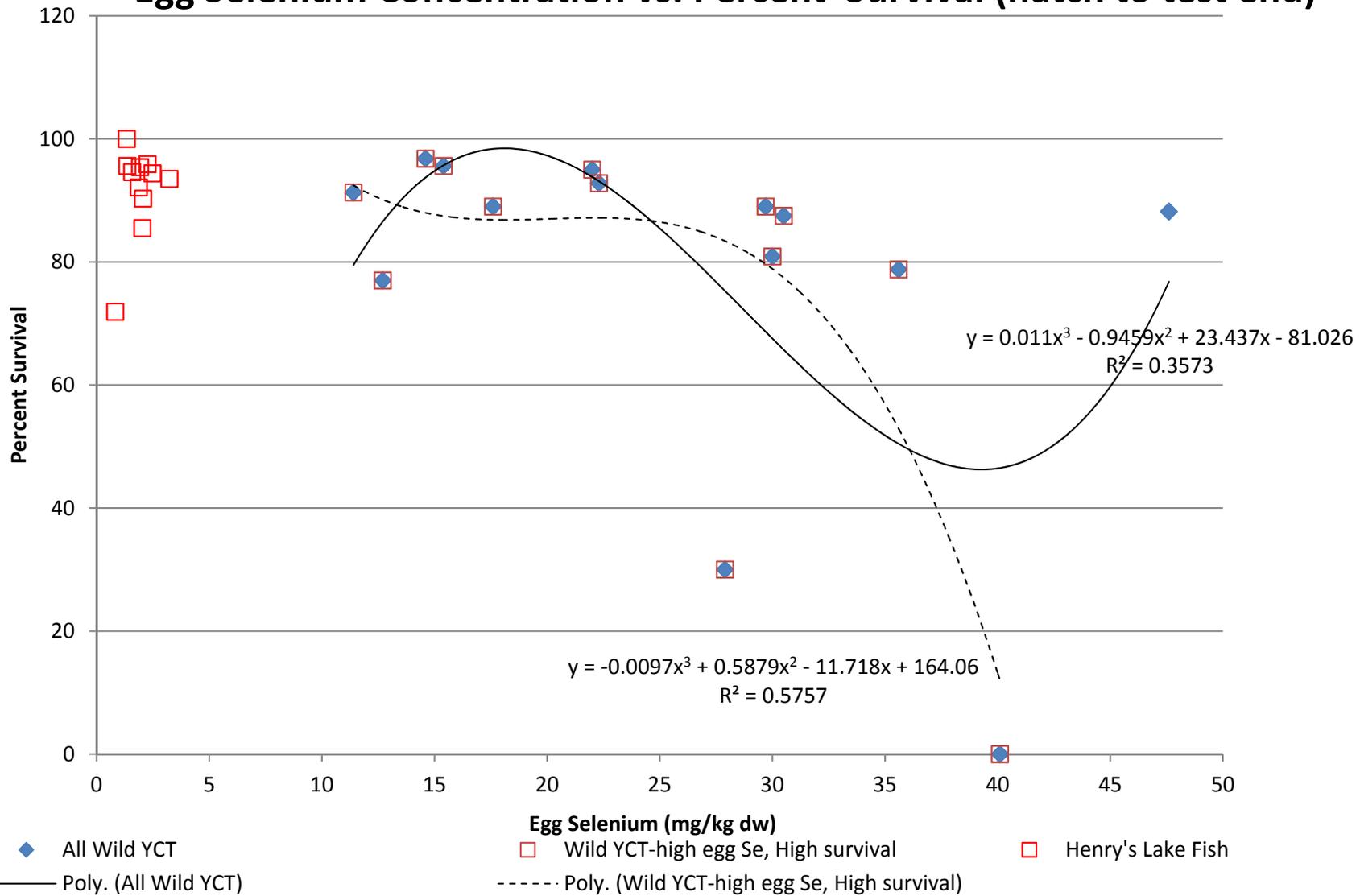


Figure 29
Percent Survival (Hatch to Test End) Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



BT & YCT data

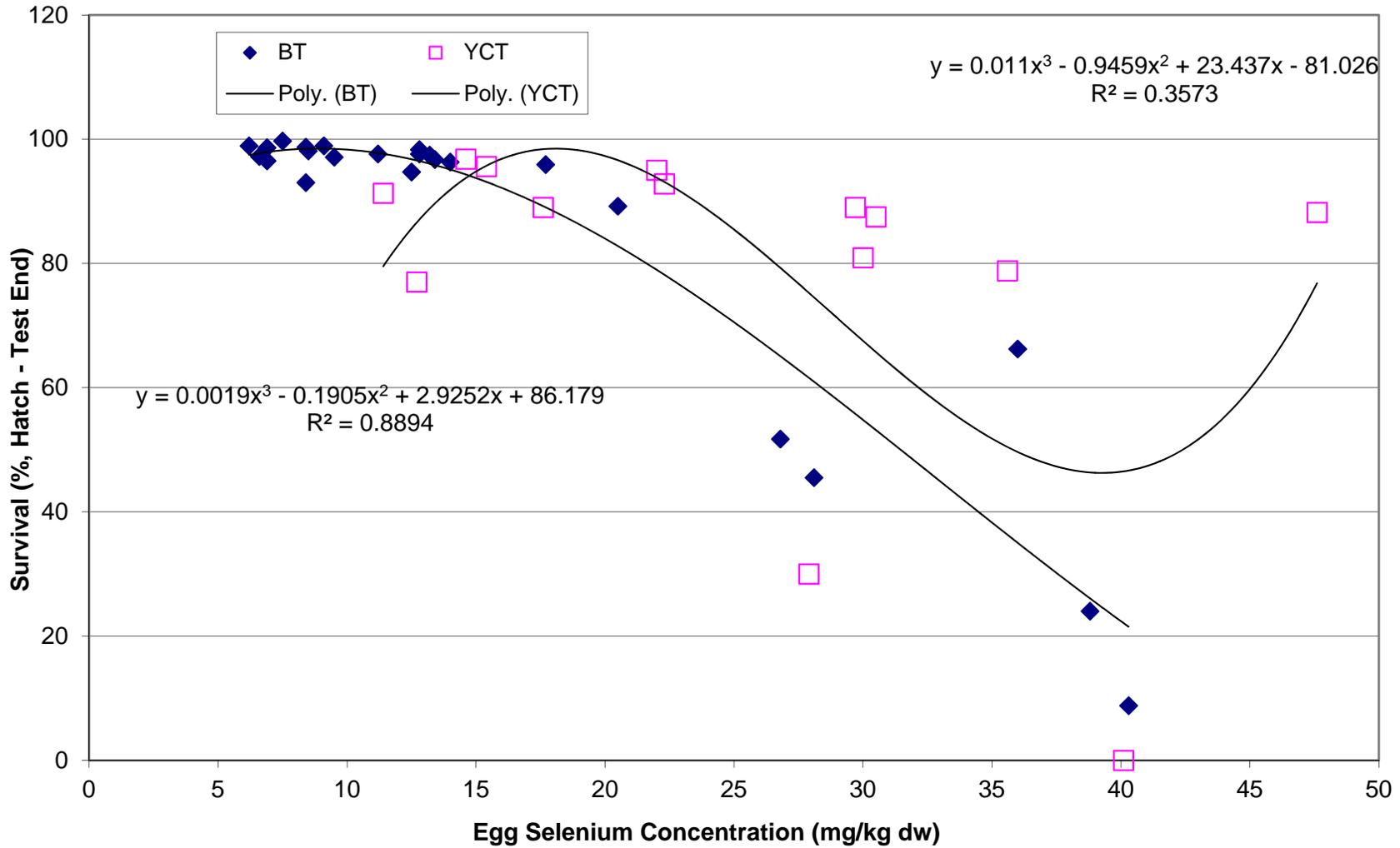


Figure 30
Percent Survival (Hatch to Test End) Versus
Egg Selenium Concentration for Brown Trout and YCT (All Data)

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



BT & YCT data

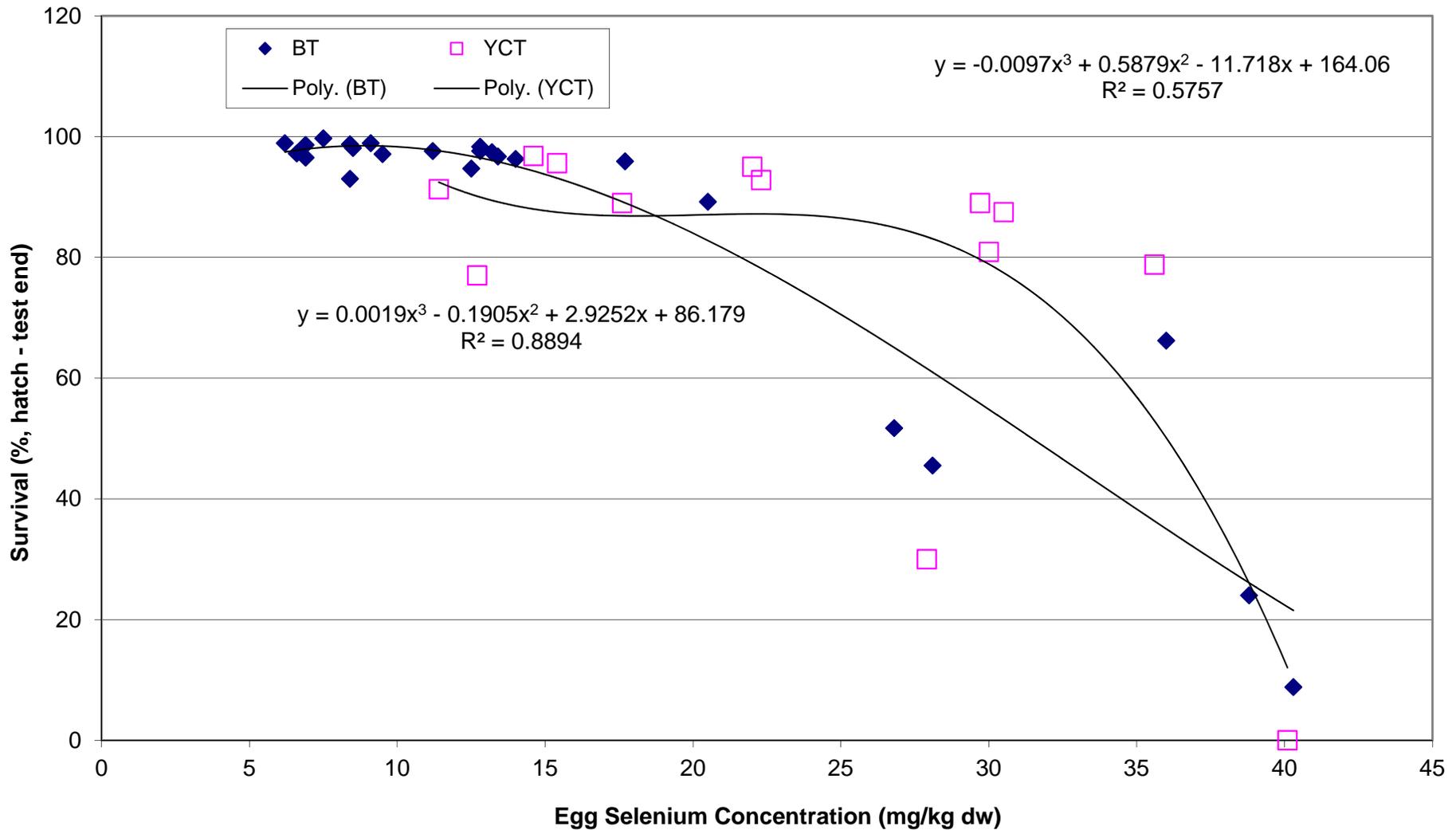


Figure 31
Percent Survival (Hatch to Test End) Versus
Egg Selenium Concentration for Brown Trout and YCT
(High Egg Selenium High Survival Data Point Removed)

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Egg Selenium Concentration vs. % Total Survival

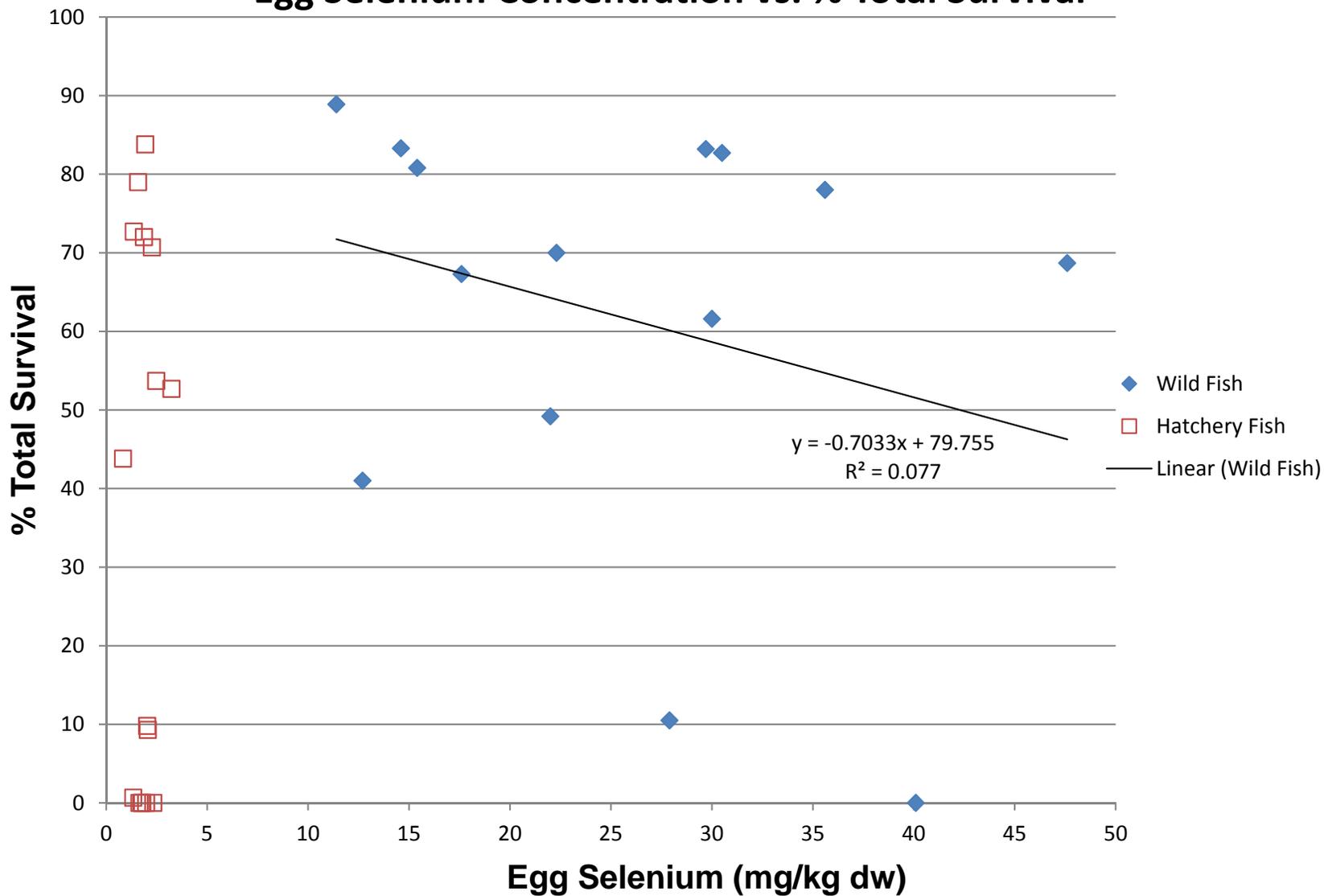


Figure 32
Percent Total Survival Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Egg Selenium Concentration vs. Growth

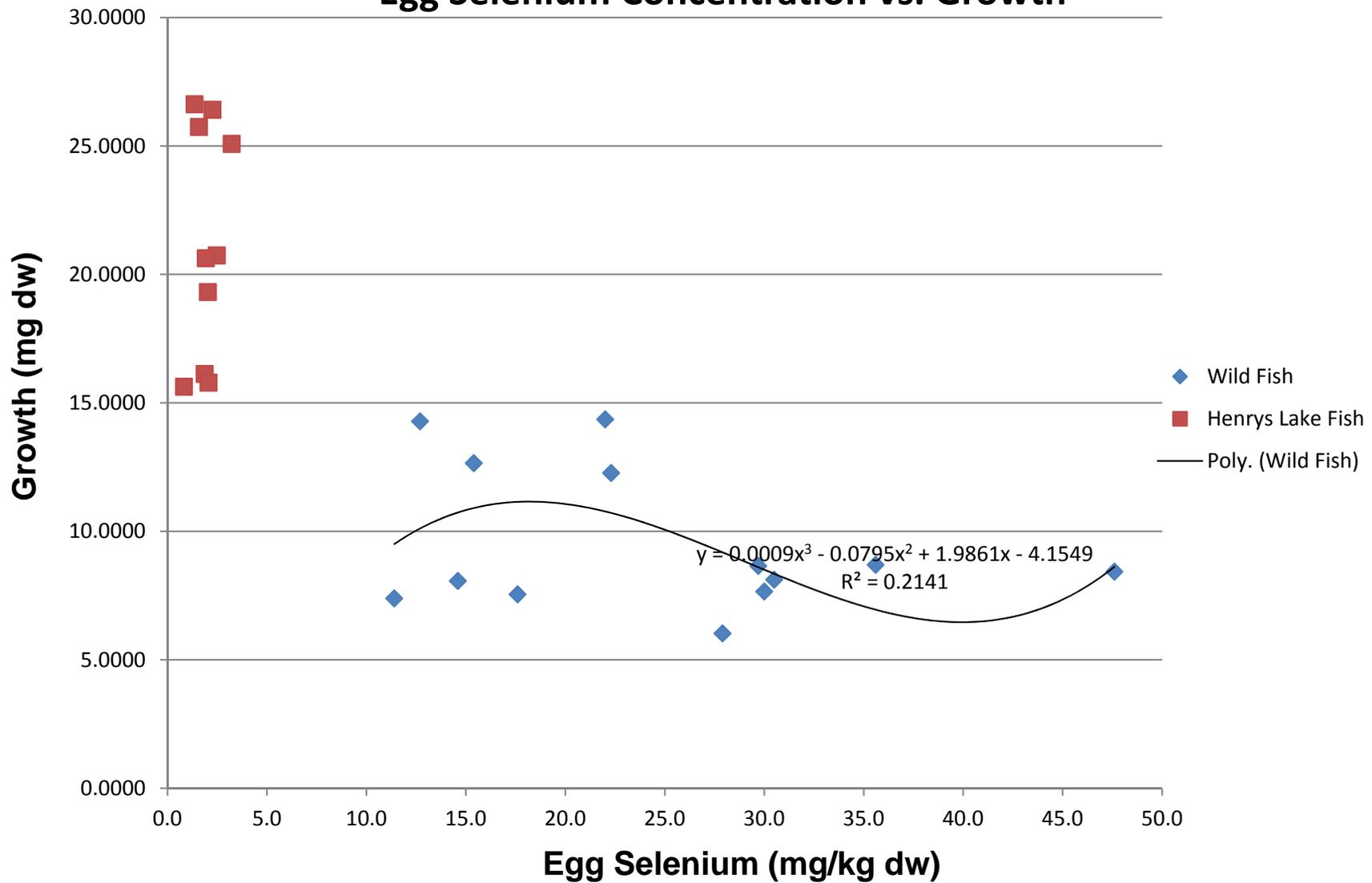


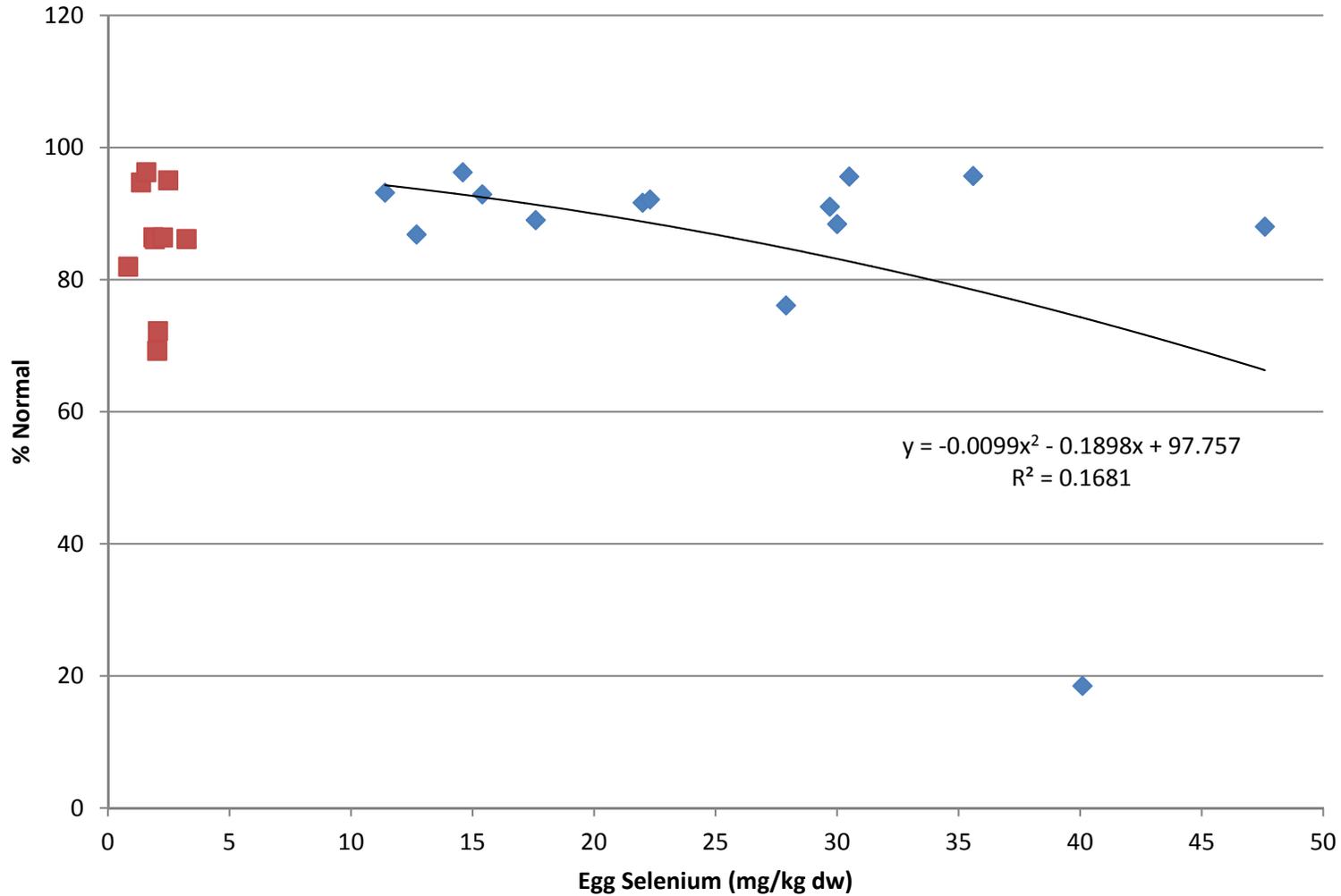
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Growth Versus
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J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Cranio Facial % Normal



◆ Wild fish ■ Henrys Lake Fish — Poly. (Wild fish)

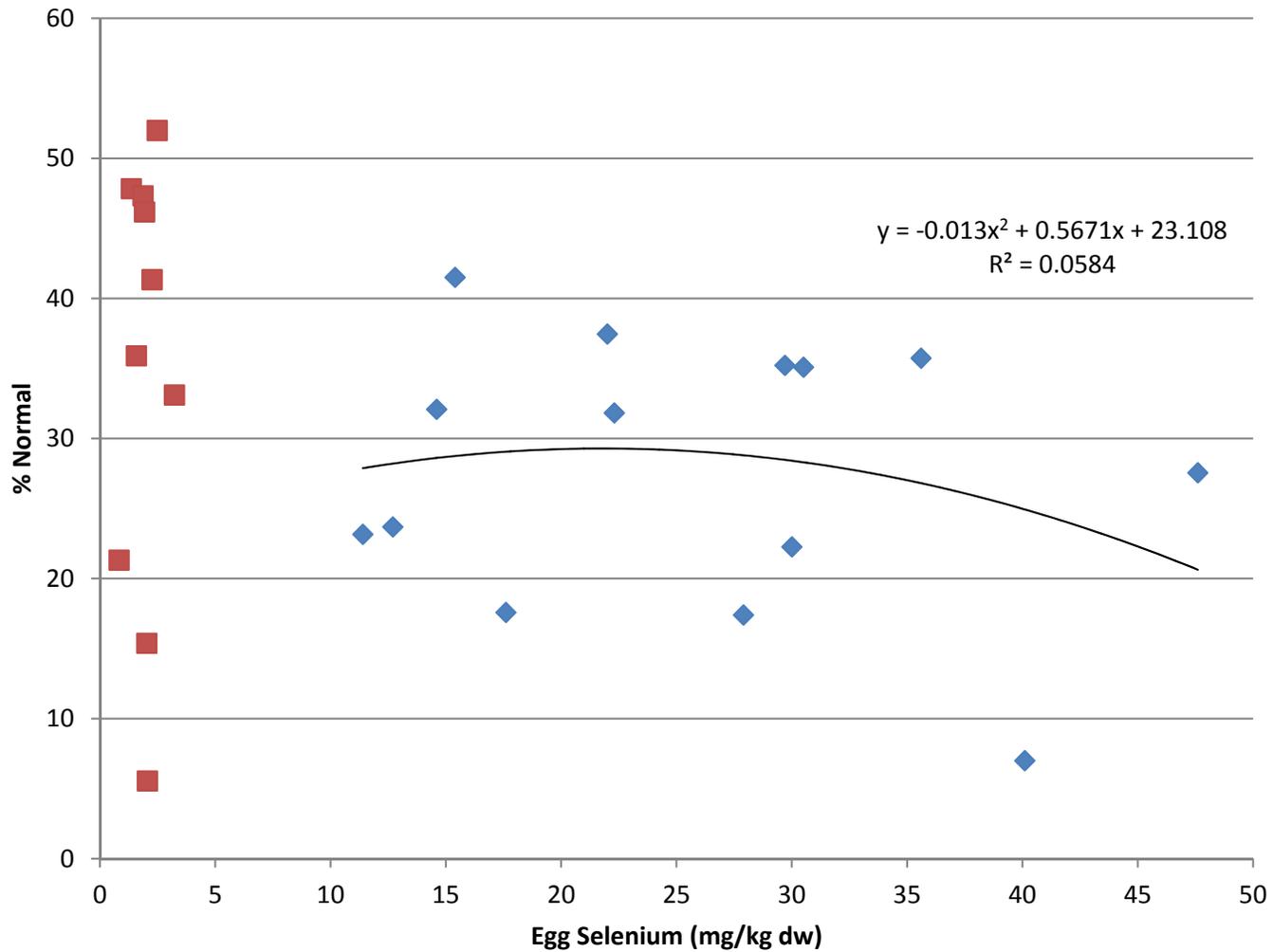
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J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Skeletal % Normal



◆ Wild fish ■ Henrys Lake Fish — Poly. (Wild fish)

Figure 35
Percent Normal of Skeletal Deformities Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Finfold % Normal

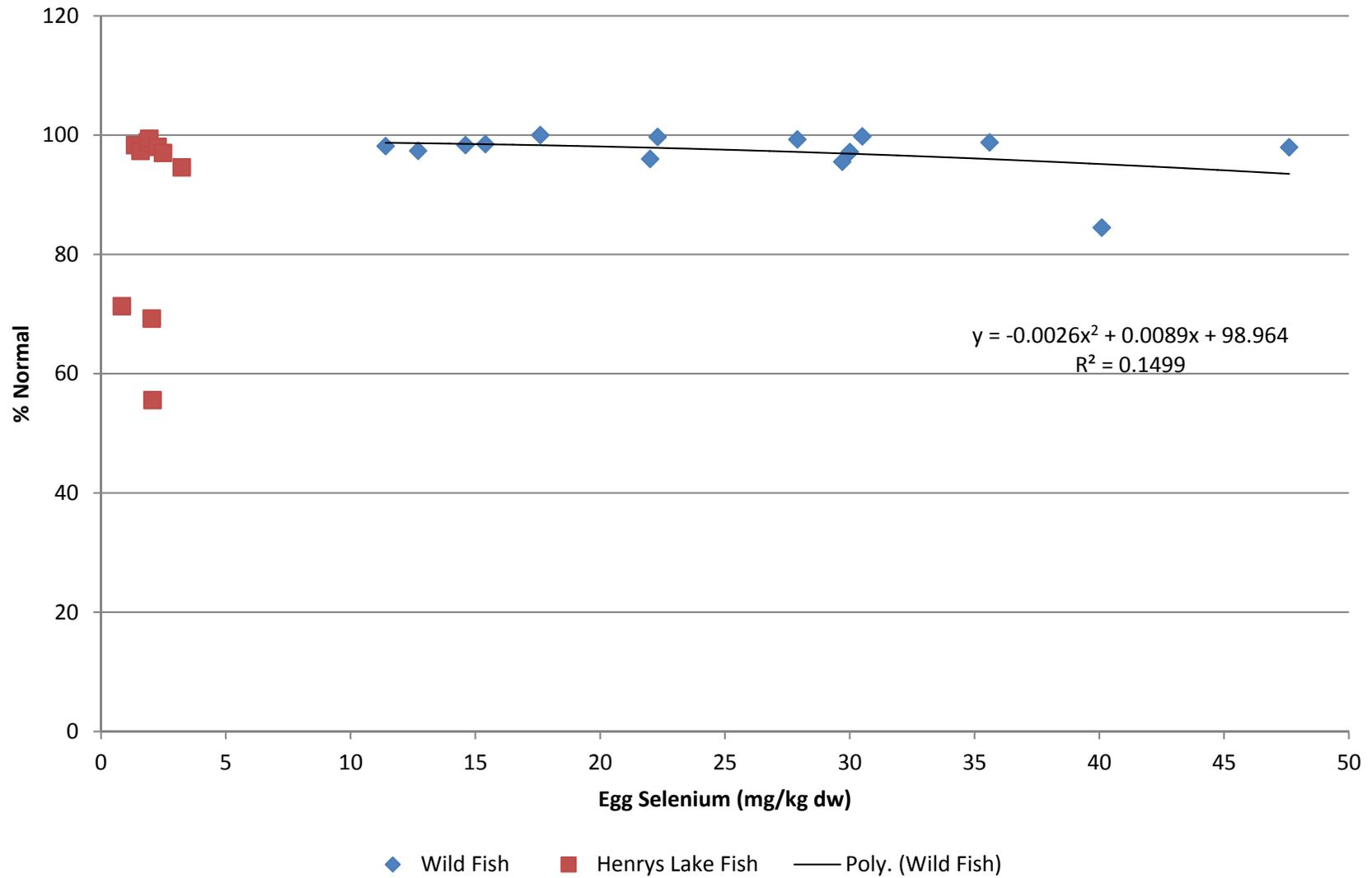


Figure 36
Percent Normal of Fin or Finfold Deformities Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
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| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Edema % Normal

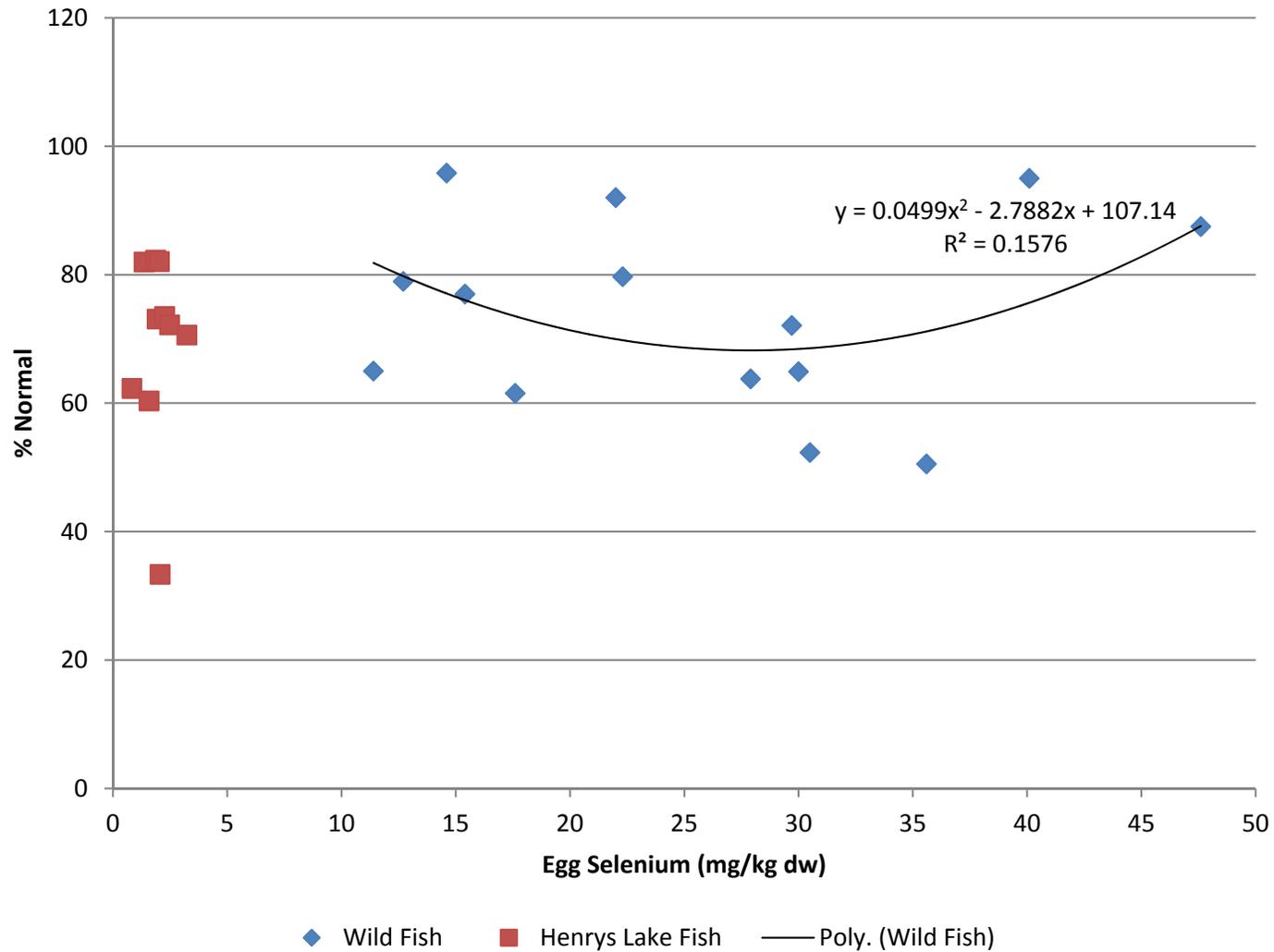


Figure 37
Percent Normal of Edematous Tissue Deformities
Versus Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



Mean Fraction Normal

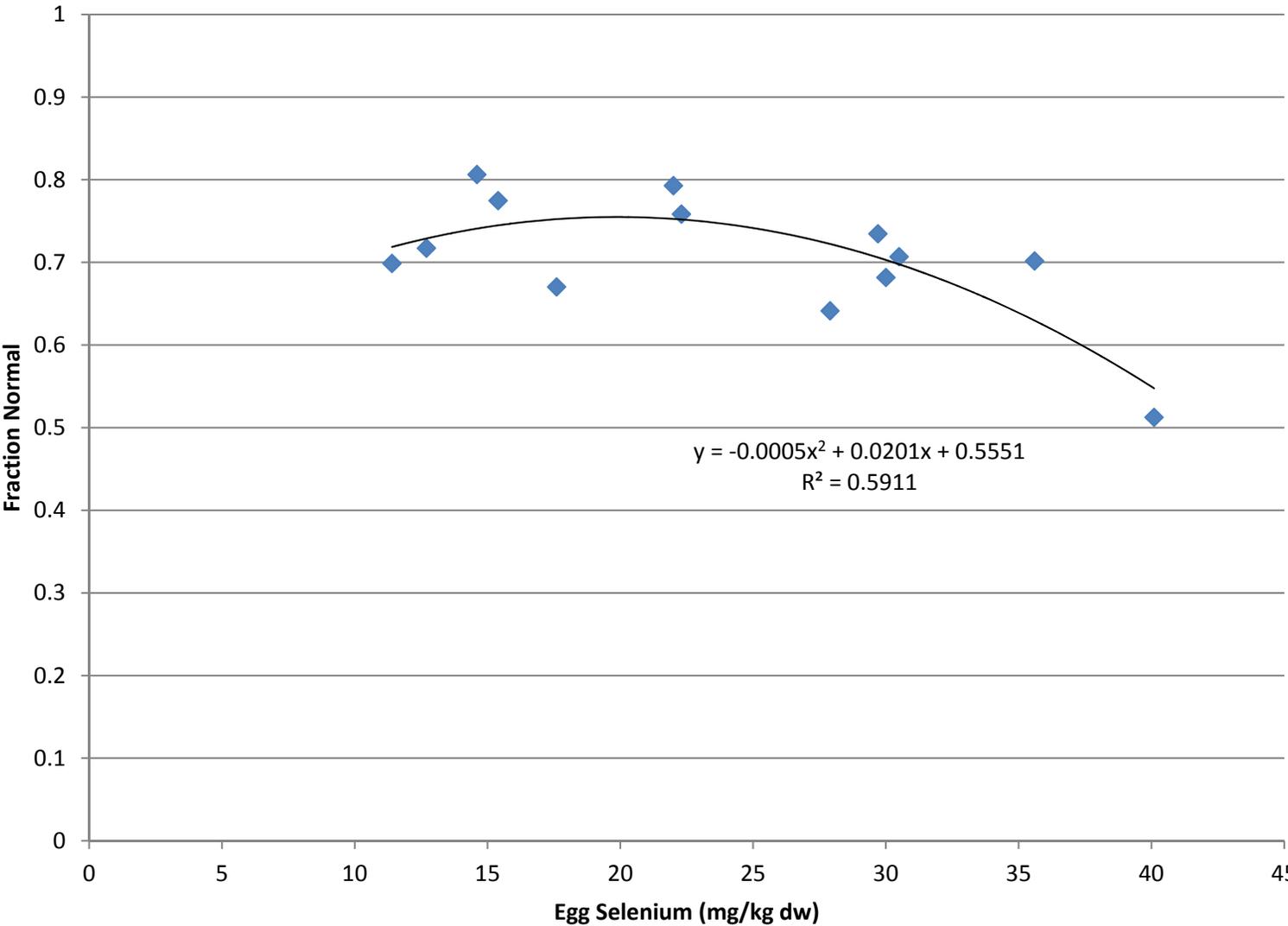


Figure 38
Mean Fraction Normal Versus
Egg Selenium Concentration

J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |

YCT Egg Selenium Versus % Survival (hatch to test end)

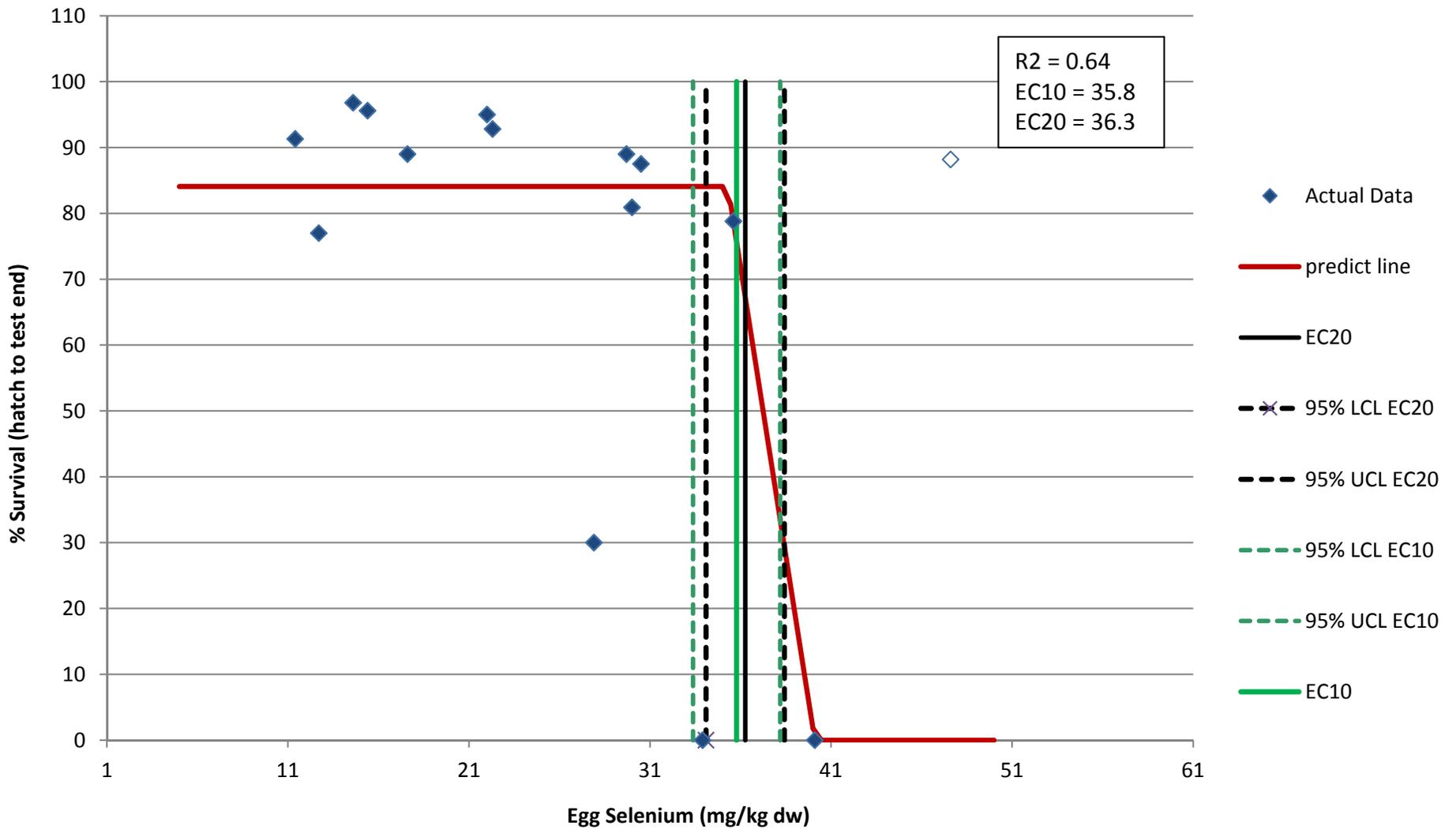


Figure 39
TRAP Model – Piece-wise Linear Regression
Percent Survival (Hatch to Test End) Versus
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J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



YCT Egg Selenium Versus % Survival (hatch to test end)

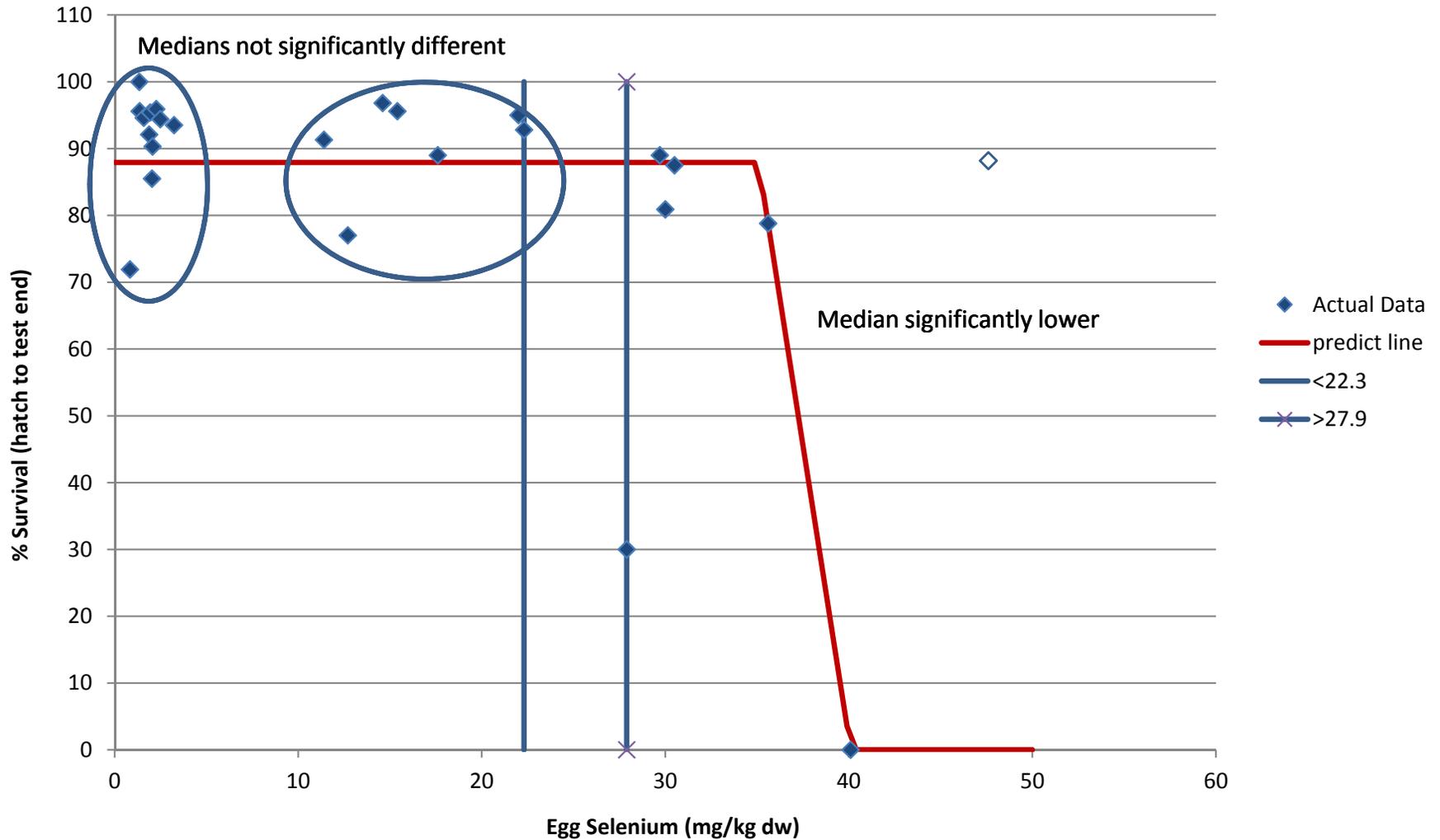


Figure 40
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J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



YCT Egg Selenium Versus Larval Growth 15 days Post Swim-Up

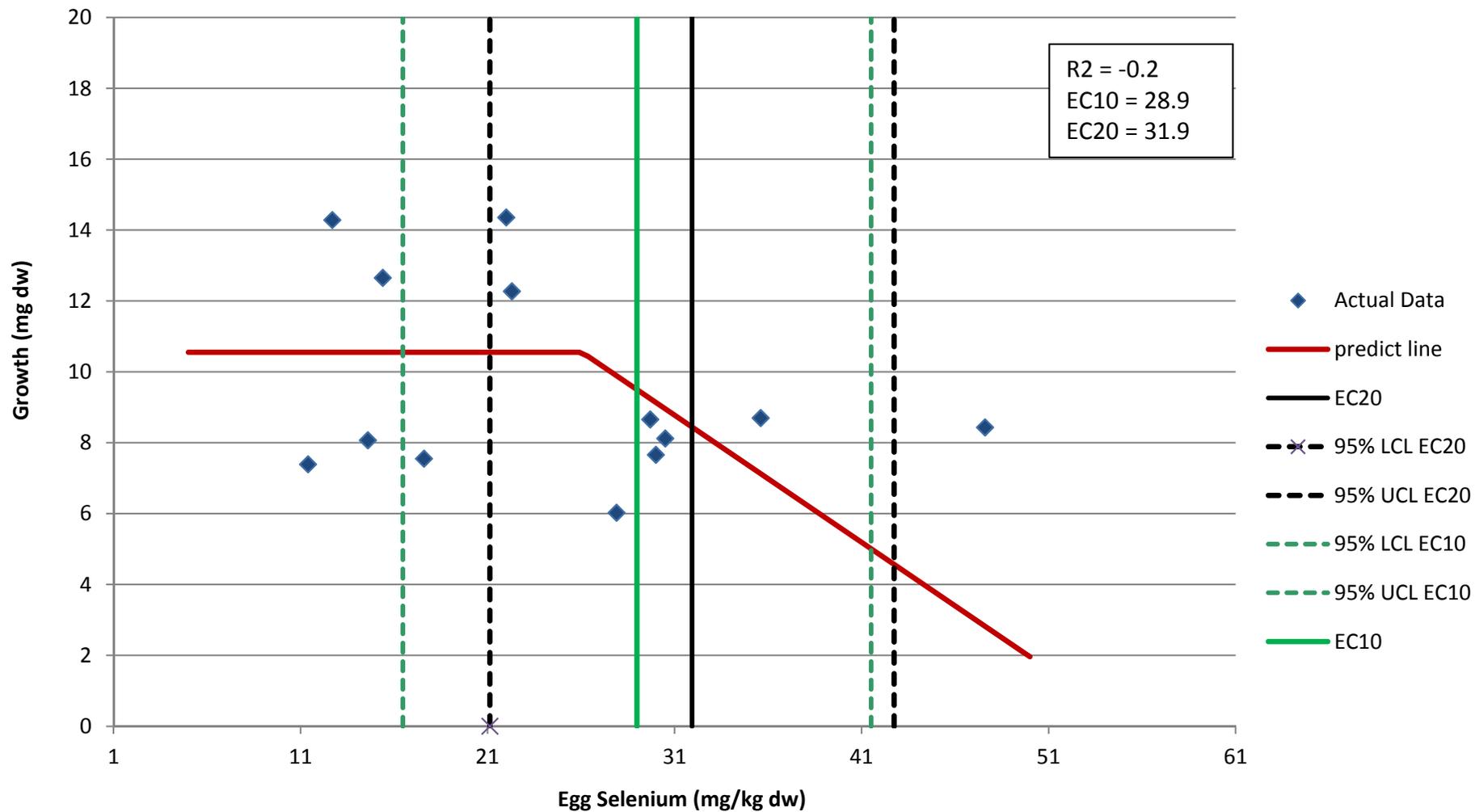


Figure 41
TRAP Model - Piece-wise Linear Regression
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J.R. Simplot Company
 Site-Specific Selenium Criterion

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|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



YCT Egg Selenium Versus Mean Percentage Normal

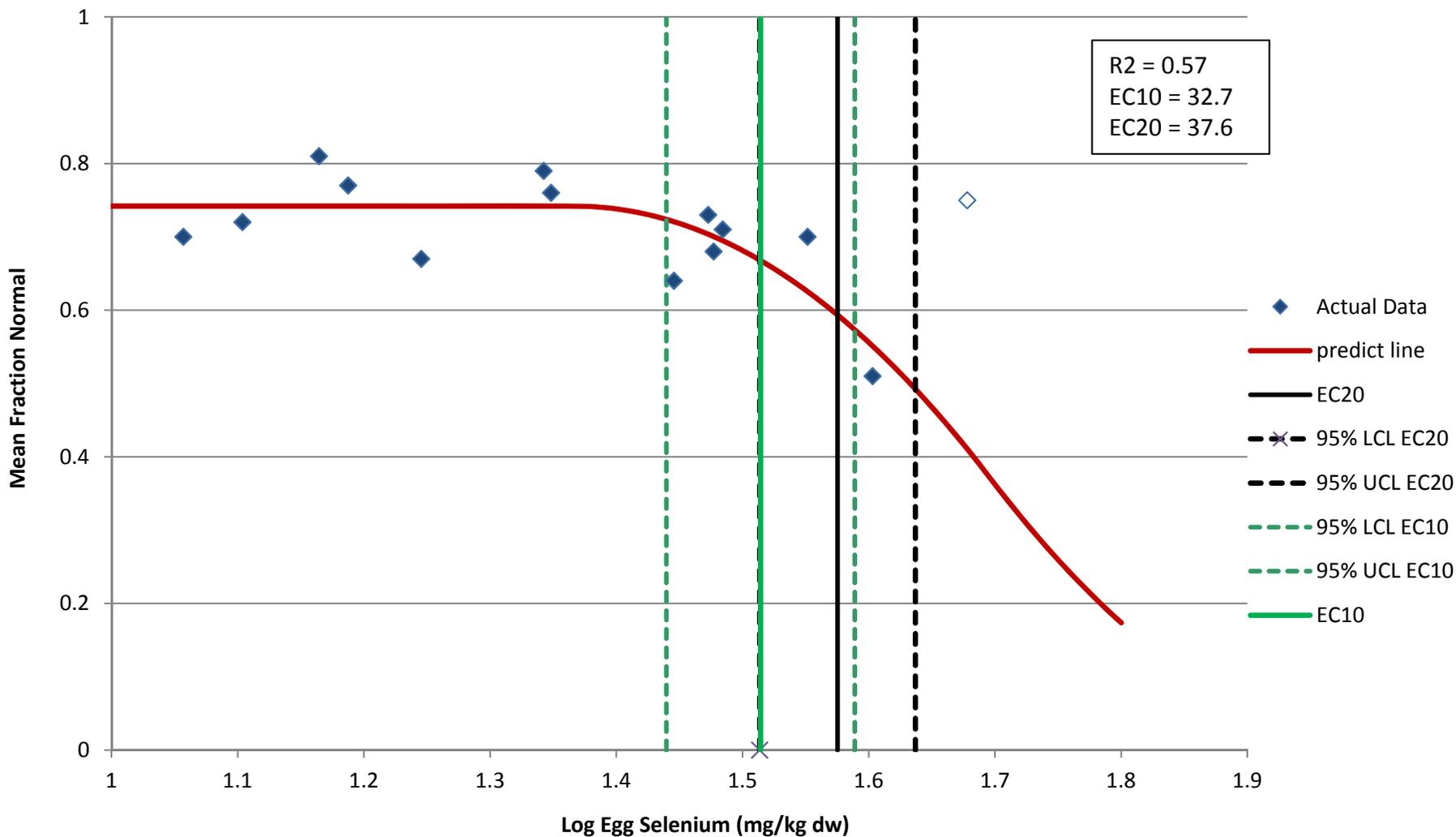


Figure 42
TRAP Model - Threshold Sigmoidal Regression
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J.R. Simplot Company
 Site-Specific Selenium Criterion

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|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



YCT - Whole Body and Egg Selenium Relationship

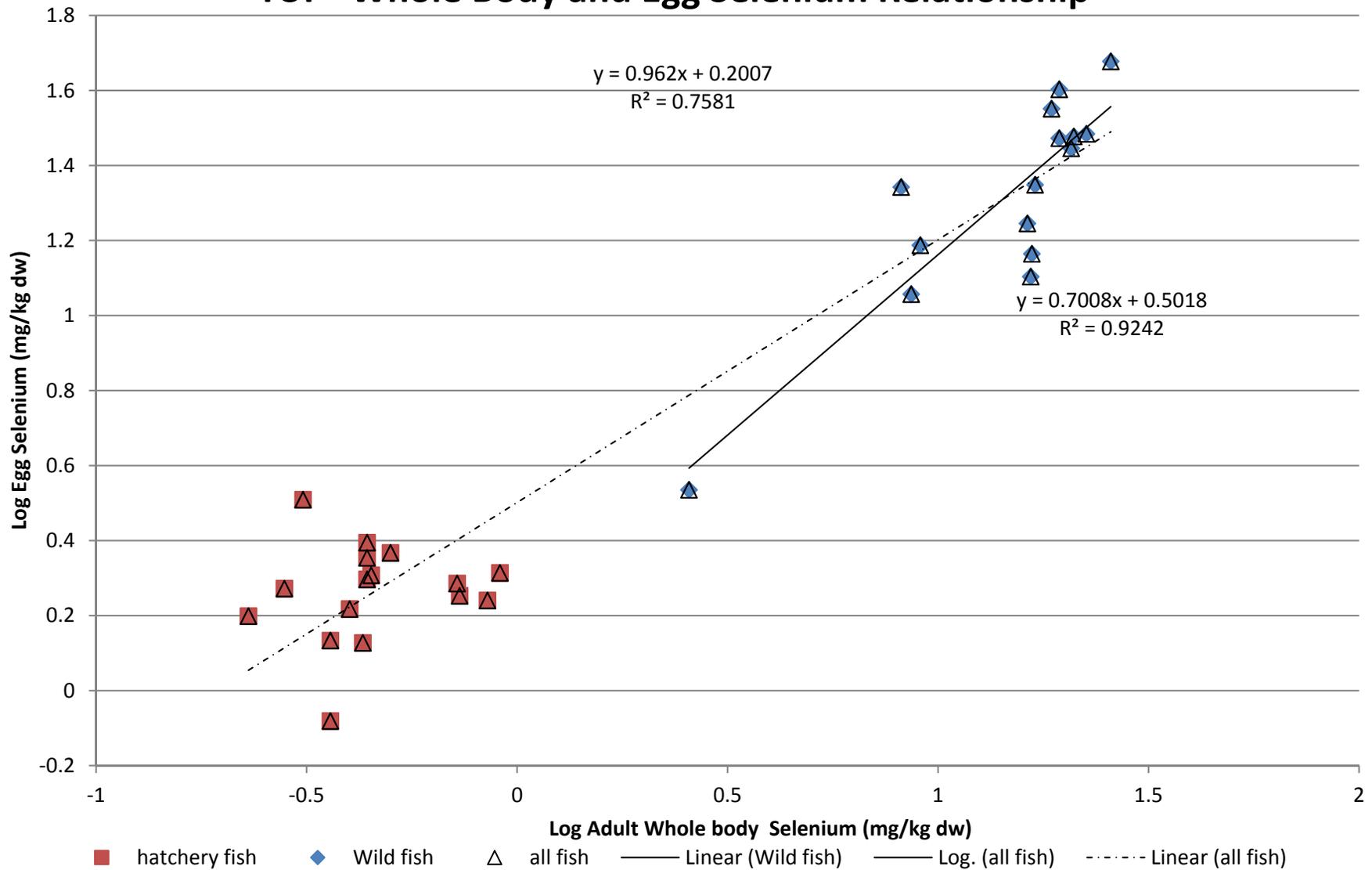


Figure 43
Relationship of Egg Selenium Concentrations to
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J.R. Simplot Company
 Site-Specific Selenium Criterion

| | |
|----------------------|--------------------|
| PRJ: 0442-004-900.70 | DATE: January 2012 |
| REV: 1 | BY: SMC CHK: SMC |



APPENDIX A

REVISED DRAFT

**Work Plan –
Laboratory Toxicity Tests for Developing a
Site-Specific Selenium Threshold for Trout**

May 9, 2008

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LIST OF ACRONYMS

dw – Dry Weight
ELS – Early Life Stage
IDEQ – Idaho Department of Environmental Quality
IDFG – Idaho Department of Fish and Game
MATC-Maximum Acceptable Toxic Concentration
SSSC – Site-Specific Selenium Criterion
USFS – United States Forest Service
USEPA – United States Environmental Protection Agency
WDEQ – Wyoming Department of Environmental Quality
YCT – Yellowstone Cutthroat Trout

1.0 INTRODUCTION

A toxicity studies Work Plan for trout is presented herein in support of the J.R. Simplot Company's (Simplot) proposal to develop a site-specific chronic criterion for selenium for consideration by state and federal agencies. It follows the Revised Draft Technical Memorandum: Methods for Testing Adult Brown Trout Reproductive Success (10/17/07) (Appendix A), which described studies that were implemented in November 2007. This Technical Memorandum was submitted to the agencies participating in the collaborative Site-Specific Selenium Criterion (SSSC) Workgroup for review and comment. These agencies include: Idaho Department of Environmental Quality (IDEQ), US Forest Service (USFS), US Environmental Protection Agency (USEPA) Headquarters and Region 10, Idaho Department of Fish and Game (IDFG), and Wyoming Department of Environmental Quality (WDEQ).

As of this draft, the adult brown trout reproduction studies that began in November are completed and the data are being compiled and analyzed. Toxicity studies described in this Work Plan include (1) adult reproductive success for Yellowstone cutthroat trout (YCT), similar to those conducted for brown trout, and (2) early life stage (ELS) studies for YCT. Based on the adult reproduction studies conducted for brown trout, some modifications to the approach are presented for adult reproduction studies for YCT.

This Work Plan focuses on upcoming toxicity studies. Background information and species selection rationale, the locations from which fish will be collected, and more detailed methods for field data collection are presented in the following documents:

- Work Plan - Field Monitoring Studies for Developing a SSSC (April 2007); and
- Summary of Approach for Developing a SSSC (February 2008).

Both of these documents were reviewed by the SSSC Workgroup agencies as part of the collaborative effort.

1.1 Purpose and Objectives

Data collected to date for Hoopes Spring, Sage Creek, and Crow Creek indicate that Hoopes Spring and Lower Sage Creek exceed the water quality standard for selenium. While concentrations of selenium exceed the surface water standard, there is no explicit indication that the aquatic community is impaired. National surface water quality criteria adopted by states as standards, as is the case for the current State of Idaho water quality standard for selenium, do not always take into account site-specific conditions. Many factors influence the in-stream toxicity of selenium, including the bioavailability of the dominant form of selenium present,

tolerance of resident species (e.g., acclimation), and/or other factors that may enhance or ameliorate toxicity.

The purpose of this Work Plan is to provide details for the conduct of laboratory studies to produce data that can be used in developing a chronic selenium criterion that is protective of the aquatic community for consideration by the agencies. Field monitoring studies will characterize the exposure environment, the aquatic community, and the physical habitat. Activities for the field monitoring studies are documented in the Work Plan - Field Monitoring Studies for Developing a Site-Specific Selenium Criterion (April 2007).

This Work Plan provides study design plans and analysis details for the assessment of statistically-based differences of effects due to selenium exposure. The laboratory tests presented here examine two very important linkages in the life cycle of trout exposed to selenium: (1) adult reproduction and viability of the young produced, and (2) survival and growth of ELS trout.

The objectives of laboratory testing presented herein are as follows:

- Document the selenium concentrations in parental fish due to in-situ integrated exposure of diet and water that may adversely affect successful reproduction.
- Document the selenium concentrations in parental fish due to in-situ integrated exposure of diet and water that may adversely affect the viability of young.
- Document the selenium concentrations in eggs produced by adults from different locations in the study area.
- Develop relationships between selenium concentrations in parental whole body tissues to egg tissues.
- Document concentrations of selenium in dietary and aqueous media that affect growth and survival of young trout.

Data derived from these laboratory studies will be used in conjunction with other site-specific data collected as part of the overall investigation, as well as relevant information from the literature, to address the following objectives:

- Develop relationships between selenium concentrations in parental whole body tissues to ambient exposure media (i.e., water and diet).
- Define a selenium concentration for each species evaluated where an acceptable level of effects to reproductive success and viability of young occur.
- Define a selenium concentration for each species evaluated where an acceptable level of effects to ELS fish occurs based on aqueous and dietary intake.

2.0 OVERVIEW

The adult reproduction study for brown trout provides the basis for the approach used to assess adult reproduction for YCT with some slight modifications, as described below in Section 2.1. Methods for the adult brown trout reproduction study are presented in Appendix A. The majority of this section is focused on the ELS studies for YCT. It is important to note that while this Work Plan provides detail on the ELS studies, and only references the brown trout methods as they are modified to fit the YCT studies, this does not indicate relative importance of these tests. Based on review of relevant literature, including those reports supporting the current federal criterion, adult reproductive success of young produced as a result of parental exposure to selenium from dietary and aqueous media is the priority study for this site-specific criterion effort. The ELS studies provide an alternative exposure and life stage to evaluate species sensitivity, in this case YCT.

2.1 Adult Reproduction

The adult reproduction studies examine chronic toxicity through the long-term exposure of parents to aqueous selenium conditions as well as bioaccumulated selenium in prey items. Effects of maternal transfer of selenium to the eggs will depend upon the parental exposure concentrations in water and diet. Adult reproduction testing will use adult wild fish ready to spawn captured at various locations from the study area that represent differing levels of selenium exposure as well as field and laboratory controls (Figure 1). Figure 2 illustrates locations of different selenium exposure and their relationship within the drainage to one another. Mean total selenium concentrations measured in surface waters from site-specific criterion monitoring locations, as well as from past monitoring at nearby locations, are shown in Figure 3.

Eggs fertilized from adults from different exposure areas will be collected to evaluate reproduction. Although young will not be exposed to aqueous selenium, they will have absorbed any protein-bound organic selenium that was present in the yolk and passed on to the egg via parental exposure. Exposure history of the adults will be documented through selenium tissue residue analysis of the female adult fish from which eggs were collected. Because the eggs from each fish are an experimental unit, eggs from each female will be reared separately.

Fish collected from Hoopes Spring (HS, HS-3) or Sage Creek immediately downstream of Hoopes Spring (LSV-2C) are expected to represent the high exposure condition, fish from Lower Sage Creek (LSV-4) and Crow Creek downstream of Sage Creek (CC-1A, CC-3A) are expected to represent the moderate exposure condition, and fish from Crow Creek upstream of the Sage Creek and Deer Creek confluences (CC-75, CC-150) are expected to represent the

background exposure conditions (Figure 2). Naturally elevated concentrations of selenium in Deer Creek (DC-600) represent a slightly elevated natural background of selenium for YCT. No brown trout have been found in this drainage. The other low exposure condition location will be on Crow Creek downstream of Deer Creek but upstream of the Sage Creek confluence (CC-350). The reference condition will include fish from South Fork Tincup Creek (SFTC-1) or other suitable locations defined as reference. Similar to Deer Creek, South Fork Tincup Creek is dominated by YCT, so it is an appropriate reference location for that species. As noted previously, the maternal fish tissue selenium concentration will ultimately be used to categorize exposure conditions.

Fertilized eggs will be reared in the laboratory in clean water with no selenium exposure other than the parental exposure. Hatch, survival, swimup, and transition to exogenous feeding are just a few of the endpoints to be measured. Selenium in female parent carcasses (minus the eggs), eggs, and collection location ambient water are measured. Data analysis consists of a regression of parent and/or egg selenium concentrations against the various endpoints.

2.2 Early Life Stage Toxicity Testing

For the ELS toxicity testing studies, two study design scenarios were initially presented based on the availability of eggs from two different sources (Figures 4 and 5). Study Design A would utilize gametes from wild collected parents from moderate exposure conditions to include pre-parental exposure, similar to the adult reproduction study. Study Design B would utilize gametes from hatchery supplied fish (i.e., no pre-parental exposure). Study Design A is the preferred alternative as it more closely mimics likely field conditions.

The potential cumulative effects of maternal transfer, as well as continued aqueous exposure through the early pre- and post-hatch stages, combined with the post-swim-up exposure via the dietary pathway is a likely exposure scenario. However, due to the size of the adult reproduction study, space limitations at the laboratory, combined with the uncertainty of collecting enough wild fish to fulfill both the adult reproduction study and the ELS study, the decision was made to commit all wild fish to the adult reproduction study.

Although Design B does not include pre-exposed parents, it will provide information on potential toxicity to YCT due to diet and aqueous exposures for the sensitive early life stage. Design B is the study that will be implemented during Spring 2008. ELS toxicity testing studies are designed to evaluate the concentrations of selenium in diet and aqueous exposures that may adversely affect young developing trout. Therefore, the reproduction studies identified above will be terminated at 15 days post swim up to evaluate the transition from endogenous to exogenous feeding. The ELS studies extend into the post swim-up stage to 30 days post hatch. The objective of this testing approach will be to evaluate the combined effects of dietary and aqueous exposure concentrations of selenium that affect growth and survival of young trout.

2.3 Source of Test Organisms

Both the adult reproduction study and the ELS toxicity testing study begin with fertilized eggs. Eggs for controls in both of these studies will be obtained from State, National or private hatcheries. Adult fish for controls in both of these studies will come from several potential sources:

- Brown Trout – Saratoga National Fish Hatchery, Wyoming; and Spring Creek Hatchery, Montana
- YCT – Henry's Lake Fish Hatchery, Idaho

Adult pre-spawn trout will be collected during their respective spawning periods (spring for YCT and fall for brown trout). The Field Monitoring Studies Work Plan (NewFields 2007) documents the methods used for fish collection and identification of locations where each species has been observed spawning. The locations where wild pre-spawn trout are to be collected represent high, moderate, low, background and reference concentrations of aqueous selenium in the environment.

2.4 Sample Size

2.4.1 Adult Reproduction Study

It is important to note that the estimated sample size is a target. The recommended number of fish from each location may not be available for capture. If more ripe females are captured from one location versus another, then those females/eggs will be included in the study. The intent is to best represent the range of potential tissue concentrations, and the approach described below provides a target based on statistical principals.

The Technical Memorandum for brown trout reproduction studies (Appendix A) identified a target sample size for field-collected fish based on a derivation of sample size needed to address the question:

- How many fish samples are needed to cover the range of the population (i.e., fish tissue data), including at least one or more sample(s) that represent the upper 10th percentile of tissue residue selenium?

The technical basis for this approach is presented in Appendix A. To develop a similar goal for YCT, tissue data for selenium were compiled for the stream segments of interest to examine the range of variability (n=123 samples). Summary statistics are shown in Tables 1 and 2. For YCT, the mean and its confidence intervals suggest that the data are less variable (mean [CI] = $5.57 \pm [0.631]$) than the brown trout tissue data (mean = 13.27 ± 1.995), likely due to the larger

sample size. Next, the sample size required to capture an upper percentile (i.e., upper tissue residue concentration) with a confidence of alpha was estimated using the same approach identified for brown trout adult reproduction studies. The upper 10th percentile was chosen because there will naturally be extremes in any environmental data, thus attempting to capture the entire range is not practical. Use of the 90th percentile (i.e., upper 10th percentile) captures a large proportion of the data.

At a 95 percent confidence level (i.e., alpha = 0.05), 29 samples would be needed to confidently ensure that at least one or more samples would represent the upper 10th percentile (i.e., 90th). The 90th percentile (or upper 10th percentile) for YCT tissue data is 9.7 mg/kg dry weight (dw) with upper and lower confidence limits around this percentile of 12.4 and 8.5 mg/kg dw, respectively. Thus collection of approximately 30 female fish across the five exposure areas that include the approximate ranges of high, moderate, low, background and reference should provide a sample size that allows for at least one of the fish captured to have a tissue residue representative of the upper 10th percentile or higher. Unlike the brown trout assessment of sample size, data evaluated in this assessment include tissue residue data from Deer Creek and South Fork Tincup Creek.

Based on the data currently available, the range of concentrations is such that capturing the 90th percentile, or upper 10th percentile, yields a YCT tissue residue of 9.7 mg/kg dw selenium. Figures 6, 7, and 8 further clarify that fish size, based on length, is not a predetermining factor of the body burden it carries, and the location of its exposure is more important.

In order to increase the probability of capturing fish that are representative of the upper tissue residue concentrations, up to eight wild female YCT will be targeted per exposure area. Six will be considered the minimum number of adult female YCT to be collected from each location, if available (Table 3). Six to eight fish times five locations equals 30-40 wild female fish for the YCT study. Males are not included in this derivation of sample size since the unit for testing is eggs/female.

2.4.2 Early Life Stage Testing

Design B will include 6 treatments and a control, using four replicates of 20 organisms each per treatment. Thus 560 organisms would be needed to fill the replicates for implementation of this test. An additional batch replicate per treatment would be used to cull organisms at intermediate stages for tissue residue analysis. The entire clutch of eggs from a female will be utilized initially for rearing as in the adult reproduction studies under either Design A or Design B described in Sections 4.2.1 and 4.2.2 below. Eggs not used in the remainder of the investigation will be utilized for selenium tissue residue analysis. Table 4 shows a matrix of the design layouts for Designs A and B.

Design A includes 3 treatments and a control for two exposure groups, wild parents from moderate exposure conditions at the Crow Creek drainage and parents from the Henry's Lake Hatchery. Under this scenario, 640 eggs would be required for the test. An additional batch replicate per treatment would include extra eggs to be reared from which organisms could be culled for tissue residue analysis. Because Design A will not be implemented this Spring (2008), adjustments to the number of treatments may be made for subsequent testing, if needed, in Spring 2009. Table 4 shows a matrix of the design layouts for Designs A and B.

3.0 FIELD COLLECTION METHODS

Appendix A includes field methods utilized to collect brown trout for the adult reproduction study. Based on experience in the field, the following modifications will be made to the field collection methods.

- Gravid female and male trout in pre-spawn condition will be collected during their respective spawning periods, late October-early November for brown trout and late April –mid May for cutthroat trout. The Field Monitoring Studies Work Plan (NewFields 2007) documents the methods used for fish collection. Fish collection will be conducted via electrofishing methods.
- Due to the large area to be sampled, fish will be graded and sorted as the field crew progresses through a reach. Initially, all fish will be checked for ripeness, and as it becomes more apparent of the size of females that are most frequently ripe, that size class will then be targeted. Fish collected for these studies will be of similar age and size. Target age for testing is 3+ or 4+ year old trout based on fish sizes ranging from approximately 200 mm or greater (Kruse et al. 1997). Preference will be given to use of tagged fish over non-tagged fish¹. Sizes are checked using graduated marks on the handles of the dip nets.
- Running counts of trout below target size ranges will be maintained for each location fished. Running counts of unripe fish within the target size range will also be maintained.
- Appropriately sized fish will be checked for ripeness immediately upon collection. If the male or female is ripe it will be retained; if it is not, it will be returned to the stream. Ripe fish will be held at their collection locations in on-site holding pens while other locations are fished and until eggs (from adult female fish) and milt (from adult male fish) can be stripped from the adults.
- The target number of females per exposure condition is between six and eight. If fewer than the proposed number of fish are collected at a target exposure location, the field team will move to a location either upstream or downstream and adjacent to the specified reach and continue fishing.
- Eggs and milt will be collected in the field to conduct the reproduction test. Eggs will be fertilized in the field to reduce egg loss due to incomplete fertilization.

¹ Tagged fish have at least one additional season's worth of information on weight and length.

- Egg fertilization is the same as described in Appendix A, with the following exception: An additional 500 ml of stream water will be added to water harden the fertilized eggs. These will be covered to avoid direct sunlight and left undisturbed for 1-hour to maximize water hardening.
- Adult fish will be sacrificed for tissue analysis and packaged in double plastic Ziploc bags and stored on ice or frozen prior to shipment to the analytical laboratory for tissue residue analyses according to the methods in the Field Studies Work Plan (NewFields 2007). Adult fish carcasses and residual eggs not included in the study will be shipped to Columbia Analytical Services in Kelso, Washington following standard operating procedures identified in the Field Studies Work Plan (NewFields 2007).
- Transport of fertilized eggs from the site will be completed via arranged transport directly to the laboratory, which should reduce transport stress and delays using a commercial overnight carrier.

4.0 LABORATORY TEST METHODS

4.1 Adult Reproduction Tests

The adult reproduction test is designed to include individual female trout representing a range of exposure conditions. Because the female fish and its eggs are the experimental unit in this design, eggs from each fish will be reared separately. In addition, a laboratory control using females and males from a hatchery will also be utilized. The sources of control fish and eggs for each species are described in Section 2.3 above.

Methods for the adult reproduction study are presented in Appendix A. Appendix B shows photographs of the setup utilized for the brown trout studies. Modifications to those methods for the purpose of testing YCT are included below. Table 5 illustrates the exposure conditions to be utilized in the laboratory. Figure 9 shows an example exposure scenario. While the figure illustrates only 8 parental fish, the adult reproduction study will include eggs from a number of fish, from 6 to 8 per exposure area if available.

Initially, eggs from each female will be divided into 10 replicates with 60 eggs per replicate. Eggs from each female are randomly selected and placed in the incubation trays. The brown trout studies were planned to include a rocker arm that gently moved the eggs back and forth through the incubation chamber. This method had been used for previous trout studies, using fewer numbers of eggs. Laboratory communications with hatchery personnel indicated that the rocker arm assembly was not needed, and that the flow rates were adequate to keep the eggs aerated. The rocker arm assembly was not used in the brown trout study and will not be used in the YCT study.

At hatch, alevins become mobile and are able to swim out of the replicate chambers, thus the replication is terminated at hatch and the hatched fish are reared as a batch per female. At swimup, the total number of fish surviving is thinned to 100 fry. This is done to reduce biomass loading on the system. If space and loading allows, more replicates will be continued to post swim up. Fry will be randomly selected for this final stage of the test. Fry from each female will be maintained separately.

Eggs will be left undisturbed until the eyed stage. Non-viable eggs will not be removed so that disturbance to developing eggs is minimized. This was also the protocol for the brown trout study, however, due to fungus growth on some eggs and to prevent it from spreading, non viable eggs with fungus growth were removed prior to the egg stage. For the adult YCT study, every effort will be made to leave eggs undisturbed until the eyed stage. When eyed stages are observed, unfertilized or dead eggs will be removed and counted. Again at hatching, dead eggs

will be removed. At hatch and thereafter, dead fry are removed as they appear. Survival will be determined based on the number of fish surviving to swim up. After young hatch, any dead fry culled from the test chambers will be counted, and placed into Davidson's solution to preserve the fish for deformities analysis. At swimup, when fish are thinned for the 15-day post feeding trial, all remaining fish not selected will be preserved for deformities analysis.

At test termination, following length and weight measurements, fish will be preserved for deformities analysis. All fry samples preserved for a parental fish will be submitted to Dr. Kevin Bestgen at the CSU Larval fish Laboratory for a deformities analysis.

4.2 Early Life Stage Toxicity Testing

For ELS toxicity testing, two designs were presented, with Design B being the approach utilized for Spring 2008 ELS testing. Figures 4 and 5 diagram these study designs. Table 4 shows a matrix of the design layouts for Designs A and B. The subsections below discuss in more detail how each of these designs will be implemented.

4.2.1 Design B

This design for ELS trout toxicity testing begins with fertilized eggs from Henry's Lake hatchery. Figure 10 illustrates the design. Henry's Lake fish, with limited pre-parental exposure, will be used for controls as well as be subjected to 6 treatments of aqueous and dietary selenium exposure. Aqueous and dietary selenium exposures will target nominal concentrations ranging from 40, 20, 15, 10, 5, 2.5 and control for water (ug/l) and diet (mg/kg). The obvious limitation for this test is the lack of pre-parental exposure. Nonetheless, this study design will still provide useful information relative to the effects of aqueous and dietary selenium exposure to early life stages of YCT.

Eggs from adults will initially be reared in the laboratory in clean water. During this portion of the study, rearing would be conducted as described above for the adult reproduction studies except replicates and batch eggs per treatment will be maintained for selenium tissue residue analysis. Between the eyed stage and hatching, aqueous exposures will begin. Fish eggs are relatively impermeable, while there appears to be some limited exchange between the egg and the outside environment after eggs eye up. Kazlauskienė and Stasiūnaitė (1999) demonstrated that rainbow trout egg sensitivity to a heavy metal mixture was more pronounced between the eyed stage and hatch. Newly hatched fish feed endogenously on yolk sac materials, thus there is no need for feeding at this stage. Aqueous exposure to young trout would include three levels of treatments and controls as described below.

At swim-up, the period when young fish begin to feed, dietary exposures will begin. Once the yolk is nearly completely absorbed, exogenous feeding begins. Nominal dietary selenium concentration targets will be the same as for the aqueous targets (Figure 10).

4.2.2 Design A

Design A uses eggs from wild parent fish from the moderate exposure conditions for the ELS study. Design A includes two parallel exposures with targeted treatments (Figure 4). One egg group will include wild collected parents exposed to aqueous treatments of 5, 10, and 15 ug/l selenate. This treatment range may be expanded as needed. This group also includes a wild collected parent with previous exposure to serve as a laboratory control (i.e., no diet or water exposure).

Similarly, Henry's Lake control eggs will be subjected to similar treatments and also serve as a control. This approach isolates the diet and water pathway in an attempt to understand if there are differences between pre-parental exposure and successive aqueous and dietary exposure versus no parental exposure and aqueous and dietary exposure.

4.2.3 Allocation of Eggs

Design B will be implemented, which includes eggs from hatchery parents. Eggs will be randomly distributed to the treatments prior to the commencement of aqueous exposures. Because parental exposure and body burdens should be at control or background levels, eggs from these fish will be compiled and randomly distributed to the treatments such that eggs from a single fish do not make up all of the eggs utilized for a single treatment or its replicates.

If Design A, which includes eggs from pre-exposed wild parents and eggs from Henry's Lake control parents, is implemented in Spring 2009, eggs from each fish would be reared separately until the parental body burdens of selenium could be determined via tissue analysis. Tissue selenium burdens would determine the allocation of eggs to the different treatment levels, with the eggs from the highest parental tissue burdens being allocated to the highest treatment levels, and likewise, the lowest tissue burdens being allocated to the lower treatment levels. Once the eggs are allocated to a treatment, they would be subject to the specified treatment of aqueous and dietary exposure for the treatment level.

4.2.4 Aqueous Exposure

For the ELS tests, aqueous exposure begins as described in the adult reproduction tests. Table 6 shows the test exposure conditions regardless of design implemented. Fertilized eggs will be

held in incubation trays which are maintained at a constant temperature water bath with no selenium exposure. Selenium exposure begins following the eyed stage of eggs.

Nominal treatment concentrations for Design B will include the following: 2.5, 5, 10, 15, 20, 40 ug/l and control ≤ 1 ug/l. Selenium will be introduced to the aqueous system as sodium selenate, which will result in a predominantly selenate exposure, the form which is predominant in Site streams. Laboratory staff will test the treatment delivery system prior to the beginning of the aqueous exposures to ensure that the expected nominal range of selenium is being achieved in the test chambers. Aqueous exposure will continue throughout the life of the test. Water samples will be collected weekly from each treatment and the control for selenium analysis according to ASTM protocols.

Horsetooth Reservoir water will be used in a flow through containment vessel where incubation trays are held. The laboratory maintains a direct pipeline to the reservoir, thus water is brought into the facility unchlorinated with selenium concentrations < 0.2 ug/l. Source water is soft with low alkalinity and sulfate (Table 7). Water chemistry of the incoming source water will be adjusted to more closely simulate Crow Creek drainage water. Simulation of all of the site water characteristics is not possible. Target parameters for simulation will be sulfate, sodium, pH, and chloride. Using these parameters as targets, hardness, and to a lesser extent alkalinity, of the Horsetooth Reservoir source water will increase, but not to the levels observed for Crow or Sage Creek. Typically, soluble salts are used to increase hardness and alkalinity; however, use of these salts would result in increasing sodium and sulfate levels beyond the range of the Crow Creek drainage water characteristics. Use of less soluble salts such as calcium bicarbonate is also not practical due to low solubility and the high water usage requirements per day (~1800-2000 gallons) for this test. Water quality conditions of the exposure water will be reported.

Daily pH and dissolved oxygen measurements will be made. As stated previously, temperature is monitored automatically. ASTM (2005) also requires that a suite of water quality characterization parameters be made twice a year on source waters. The laboratory maintains records for these analyses. Aqueous selenium concentrations in flow through water will be measured at the beginning and end of the test, and periodically in the interim.

4.2.5 Dietary Exposure

Dietary exposure to young trout will be from bioaccumulated selenium in invertebrate feedstocks. Table 8 shows the exposure conditions for Lumbriculus exposure to develop the feedstock. Lumbriculus will be fed selenized yeast similar to the methods developed by Besser et al. (2006) and McIntyre et al. (2007). Using the methods of Besser et al. (2006), McIntyre et al. (2007) fed Lumbriculus 3.2 g selenized yeast per day diluted with a nutritional yeast supplement to obtain the nominal concentrations. Selenized yeast was obtained in bulk from Selenosource AF 600; Diamond V Mills (Cedar Rapids, Iowa). Nutritional yeast was obtained

from Red Star™. Yeast cultures for each treatment were found to bioaccumulate yeast to equilibrium concentration of selenium body burden from between 30-45 days with 45 day exposures producing the most reproducible results. In addition to being fed selenized yeast, Lumbriculus were also exposed to the nominal aqueous selenium concentrations targeted for the fish exposure. Methods described above will be adopted for the dietary exposure for this study. Aqueous selenium exposure for Lumbriculus will be in the form of sodium selenate, similar to the aqueous exposure for YCT.

Concentrations of selenium introduced to the feedstock will be similar to the nominal concentrations described above for the aqueous exposure treatments. These concentrations bracket the selenium residues in periphyton and benthic invertebrate tissues measured to date from field monitoring at various locations. Exposed feedstock would then be fed live to young trout. Exposures would continue for approximately 60 days post hatch.

Overall, these ELS tests will be conducted according to ASTM standards. Feeding regimes, water dosing, water exchange, and associated details of the exposure are illustrated in Tables 6 and 8. Selenium concentrations will be measured in fish tissue, diet feedstock, and water at the beginning, middle, and end of the test.

4.3 Test Endpoints

4.3.1 Adult Reproduction Studies

Test endpoints for the adult reproduction study for YCT are the same as those identified for brown trout in Appendix A, including: fecundity, fertilization success, hatch, deformities, length, weight, survival, tissue concentrations, and feeding success. These endpoints are consistent with those of Holm et al. (2003; 2005), Hardy (2005), and Kennedy et al. (2000) on which the test described herein is based.

Total egg production for each female will be counted as a measure of fecundity. Fertilization success will be measured at a point during the test when clear signs of fertilization have occurred. Successfully fertilized eggs will be counted based on visual signs of cleavage. Eggs will be left undisturbed until the eyed stage. Non-viable eggs will not be removed so that disturbance of developing eggs is minimized. When eyed stages are observed, unfertilized or dead eggs will be removed and counted. Survival will be determined based on the number of fish surviving to swim up versus the number of eggs or fry that died. Time to hatch will be recorded for each treatment group and individual.

Dead or deformed fry will be removed and preserved for later microscopic examination of the type of deformity. Colorado State University's Larval Fish Laboratory has been contacted to

conduct the assessment of deformities. Length, weight, and any deformities (craniofacial, finfold, skeletal and yolk sac malformations, among others) will be recorded for each fish at the swim up stage. A graduated severity index (GSI) for ranking deformities will be used because this approach measures both the magnitude and the frequency of the deformity. Holm et al. 2003 and 2005 and Kennedy et al. 2000 describe the GSI deformities measured and ranking. Briefly, larval fish are rated as “0” for normal, “1” for slight defect of size or structure, “2” for moderate defect or multiple defects, and “3” for severe defect or multiple moderate defects. Although edema can be considered a teratogenic effect, it is reversible and thus is not considered a true teratogenic effect. For the purpose of this investigation, edema will be measured and independently considered as a measure of potential deformity.

Scoring Criteria for Deformities Assessment (GSI)

The general criteria were adopted from Holm et al. (2003) and included assessments of craniofacial deformities, mostly of the head, eyes, and jaw, vertebral deformities, fin deformities, and edema. The original publication showed pictures of some deformities, but others, particularly the intermediate categories, were not illustrated or were poorly described. More specific definitions for each of the assessment categories were developed to give better repeatability and consistency across studies, and to aid others in learning the range of deformities possible.

Deformities in each of the categories described above were given a score from 0-3, with “0” being a normal condition and “3” being the most deformed. Some range finding was conducted over the first several samples to find background and severe levels of deformities in each category. Initial samples were re-scored as necessary to bring them into compliance with the standards that were used throughout the assessment.

The protocol for assessing damage was to place several fish, head to the left, in a Petri dish and examine them under a dissecting microscope and 10X magnification. The lateral side was examined for spinal deformities (lordosis), appearance of the eye, head and snout shape, edema, and fin deformities. The fish was turned ventrally to look for mouth deformities and further spinal deformities (scoliosis), turned laterally again for the same criteria as the other side, and then dorsally for issues associated with eyes, head size, spinal deformities.

Craniofacial deformities included shortening of the jaw, snout, and missing or poorly developed eye or eyes, and head shape abnormalities. A slightly shortened lower jaw (≤ 1 lip width) = 1, a shortened jaw (≤ 2 lip widths) or a slightly shortened and slightly disfigured jaw = 2, and a flat lower jaw or much disfigured (non-functional) jaw = 3. A slightly blunted snout (about 50% eye diameter, usually is $>$ than that) = 1, very blunt or flat = 2, deformed or bulbous = 3. Eye deformities were scored as one eye blind or poorly pigmented or poorly developed = 1, both poorly developed = 2, both blind = 3. Skulls that were slightly bulbous ($1/3 >$ normal) = 1,

moderately bulbous (2/3 > normal) = 2, and bulbous (1x or > than normal) = 3. Usually factors occurred together so a combination of two "1" conditions = 2, three "1" conditions = 3, or a 1 and a 2 = 3, and so on. For example, a deformed jaw and a blind eye = 2, two blind eyes = 2, but a badly deformed jaw (= 2 alone) plus a blind eye (= 1 alone), = 3.

Skeletal deformities included any deformity of the vertebrae or spines. A slight bend of less than 45 degrees or a minor body constriction (e.g., a tight rubberband effect) was given a score of 1, 2 slight bends or constrictions anywhere, or bend of > 45-90 degrees was scored a 2, and multi-directional bends > 90 degrees were given a 3. Bends caused by skeletal deformities were detectable from normal bending of the body during preservation (these fish were very well preserved, very straight) by presence of a slight or greater bump below the surface of the epidermis on the outside of the bend.

Fin deformities included variation in fin or finfold morphology and a slightly smaller fin or one with a bend or incomplete ray development (in older fish) was given a 1, 2 fins damaged or malformed = 2, and > 2 fins malformed or if fins were missing was = 3. Often fins were malformed associated with vertebral deformities that did not permit proper development. Folded finfolds as a result of preservation were not counted.

Edema was not originally scheduled for assessment because it was thought sometimes not a teratogenic effect and may be transitory as fish develop. However, it was assessed because it was common in one early sample and not others, and because it was thought a condition that could affect emergence, mobility, and other factors that may limit survival of fish in the wild. Edema was detected by an obvious swelling and fluid buildup, usually abdominally, and ventrally, which often displaced the gut, and was usually clear fluid that was slightly soft when touched with a blunt probe. The yolk, which was usually present in some quantity in the study specimens, also created some swelling but was typically yellowish, opaque, and small, and hard to the touch in preservation. Slight edema = 1 was for a fish with up to 1X swelling of the normal body width or depth, up to 2x = 2, and > 2x = 3.

4.3.2 ELS Studies

Multiple test endpoints will be measured at different times during the study. Fertilization success, percent hatch, deformities, length, weight, survival, tissue concentrations, and feeding success are proposed test endpoints. These endpoints are consistent with those of Holm et al. (2003; 2005), Hardy (2005), and Kennedy et al. (2000) on which the test described herein is based. Methods described for the brown trout study (Appendix A) apply these measurement endpoints as well.

Because the ELS study is primarily focused on diet, interim tissue residue samples will also be collected for each treatment. Initially, a subset of eggs will be collected for selenium residue

analysis. At hatch or prior to swimup before feeding begins, another subset of fry will be collected for analysis, and finally, at test termination the final subset of fry will be collected for selenium residue analysis.

4.4 Data Analysis

4.4.1 Adult Reproduction Studies

Initially, the adult reproduction studies were conducted by dividing eggs from a single female in to replicate of 10 with 60 eggs per replicate. As the study for brown trout progressed, the replication was lost as hatched fry began to swim out and then back into the egg cups. While each parental fish eggs were maintained separately, it was clear that the replication could not be maintained. Further, after considering that eggs from one fish were not independent, but rather interdependent since they all originated from one female, it was concluded that true replication was not achieved, but rather pseudo replication had occurred. Thus, by rearing eggs from a single female as a batch of eggs, a mean and summary statistics generated for each testing unit (i.e., eggs from each fish) would not compromise the analysis of these data given the regression approach selected for these data.

Using the reproduction endpoint data derived from these tests, and the parental tissue and egg tissue selenium residue data, several types of analyses will be investigated. Logistic regression analysis will be used to develop relationships between individual parental selenium body burdens and effects endpoints. It is expected that a dose response curve will be generated for one or more endpoints via this approach. Individual parental selenium tissue residues will be paired with reproduction endpoint data to determine if significant relationships exist. In this analysis, the exposure unit is parental tissue body burden (independent variable), while the dependent variables are reproduction endpoints, including:

- fecundity;
- percent fertilization;
- survival at the swim-up stage;
- incidence of deformities or other physical abnormalities using the GSI;
- growth (based on weight and length); and
- selenium tissue residues.

Total egg production for each female will be counted as a measure of fecundity. Fertilization success will be measured at a point during the test when clear signs of fertilization have occurred, typically when signs of cleavage are visible. Survival will be determined based on the number of fish surviving to swim up versus the number of eggs or fry that died. Time to hatch will be recorded for each individual batch of fish eggs. Typically, the test endpoints selected are those that are biologically relevant, such as survival, growth, or reproduction, and which indicate the most sensitive response. For selenium, a key test endpoint is larval deformities, thus it may be found to be the most sensitive endpoint, as found in Holm et al. (2005). Section 4.3.1 describes the deformities analysis using a GSI approach. Growth, particularly at the late stage of the test is being used here as a measure of feeding success. This portion of the study is addressing whether or not young fish with parents having a varied history of exposure to selenium exhibit differences in their ability to successfully transition over from endogenous to exogenous feeding.

For statistical analyses, a number of endpoints will be measured. Sample size for the endpoints, despite the number of eggs, is based on the number of fish utilized in the test. For example, if eggs from 25 fish are used in a regression analysis of endpoint y versus parental or egg tissue burden x , then n for this analysis is 25. Because of the number of eggs included in the test per female could number in the hundreds, summary statistics will be derived for the response. A mean and confidence intervals or other measures of central tendency and variability will be derived for the endpoints of interest for eggs or fry from each fish. Regardless of the number of eggs used from each female, n for the regression analysis is the number of parent fish utilized.

USEPA (2004) opted to use the logistic regression analysis to define the dose-response relationship to derive a chronic value. The EC20 was used and defined as a reduction of 20 percent in the response observed at control. Rationale for use of the EC20 as the chronic value, rather than for example an EC10, was that it represents a low level of effect that is generally significantly different from the control (US EPA 1999). Smaller reductions in growth, survival, or other endpoints only rarely can be detected statistically. Effect concentrations associated with such small reductions have wide uncertainty bands, making them unreliable for criteria derivation (USEPA 2004). This site-specific laboratory study will likewise develop EC20s for test endpoints. In its revision of the 2004 Draft Selenium Criterion, USEPA is contemplating the use of EC10s for long-term exposure criteria for tissues. Merits of the different effects level endpoints will be evaluated in terms of the effects levels found in laboratory tests and how those levels relate to the site-specific conditions.

Analysis of variance procedures and appropriate post hoc tests will be used to identify significant differences between individuals and exposure groups. Analysis of groups can only be facilitated if parental selenium concentrations in tissues fall within the expected range of concentrations based on the exposure groups from where they were collected. This holds true

because brown trout may be transient during spawning and move from one area to another in search of suitable spawning gravels. Thus, a fish from a lower or higher exposure area may move into an area inconsistent with their current body burden.

Based on this analysis approach, it is likely that several EC20s will be derived. These EC20s will be considered as chronic values for the species tested. In terms of developing a chronic criterion, the EC20s from the brown trout testing will be evaluated in terms of sensitivity relative to test results for other species. Typically, the test endpoints selected are those that are biologically relevant, such as survival, growth, or reproduction, and which indicate the most sensitive response. For selenium, a key test endpoint is larval deformities, thus it may be found to be the most sensitive endpoint, as found in Holm et al. (2005).

4.4.2 ELS Studies

Using the endpoint data derived from these tests, effects to fish due to aqueous exposure of eggs to selenium and fry hatched from those eggs fed bioaccumulated selenium should be discernable. Fish used in this test will, however, have only limited background pre-parental exposure to selenium. Sample size (n) for the ELS studies is four per treatment, since there are four replicates per treatment. Mean and summary statistics will be derived from each replicate within a treatment allowing for derivation of sample variability within each treatment.

Data analysis will focus on assessing significant differences of endpoints measured in treatments to those measured in controls. Discerning the potential effect of diet from aqueous exposure may not be practical. In this analysis, the exposure unit is the treatment (independent variable), while the dependent variables are reproduction endpoints, including:

- number of eggs that hatch;
- survival at the swim-up stage and overall survival ;
- incidence of deformities or other physical abnormalities using the GSI;
- growth (based on weight and length); and
- selenium tissue residues.

Analysis of variance procedures and appropriate post hoc tests will be used to identify significant differences between independent and dependent variables. The primary endpoints tested will include survival, incidence of deformities, and growth. Differences in selenium tissue residue relative to the exposure treatment will also be evaluated.

USEPA (2004) applied the logistic regression analysis to define the dose-response relationship to derive a chronic value for fish tissue selenium concentration criteria. The EC20 was used and defined as a reduction of 20 percent in the response observed at control. Rationale for use of the EC20 as the chronic value, rather than for example an EC10, was that it represents a low level of effect that is generally significantly different from the control (USEPA 1999). Smaller reductions in growth, survival, or other endpoints only rarely can be detected statistically. Effect concentrations associated with such small reductions have wide uncertainty bands, making them unreliable for criteria derivation (USEPA 2004). This site-specific laboratory study will likewise develop EC20s for test endpoints. In its revision of the 2004 Draft Selenium Criterion, USEPA is contemplating the use of EC10s for long-term exposure criteria for tissues. Merits of the different effects level endpoints will be evaluated in terms of the effects levels found in laboratory tests and how those levels relate to the site-specific conditions.

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TABLES

Table 1
Summary Statistics for Selenium in
Whole Body Tissues of YCT
(mg/kg dw)

| Parameter | Value |
|-------------------------|--------------|
| Count | 123.00 |
| Mean | 5.57 |
| Median | 5.30 |
| Minimum | 0.16 |
| Maximum | 18.00 |
| Range | 17.84 |
| Standard Deviation | 3.53 |
| Standard Error | 0.32 |
| Distinct Values | 92.00 |
| Total Sum of Squares | 5344.35 |
| Adjusted Sum of Squares | 1522.60 |
| 95% LCL | 4.94 |
| 95% UCL | 6.20 |
| T-Value | 17.50 |
| Prob Level | 0.00 |
| Count | 123.00 |

Table 2
Percentiles of Selenium in Whole Body Tissues of YCT (mg/kg dw)

| Percentile | Value | 95% LCL | 95% UCL | Exact Conf. Level |
|-------------------|--------------|----------------|----------------|--------------------------|
| 99 | 17.952 | | | |
| 95 | 12.28 | 9.7 | 17.8 | 96.58 |
| 90 | 9.7 | 8.5 | 12.4 | 96.67 |
| 85 | 8.6 | 8.2 | 9.82 | 95.80 |
| 80 | 8.302 | 7.4 | 9.1 | 95.83 |
| 75 | 7.7 | 6.9 | 8.35 | 95.27 |
| 70 | 7.18 | 6.5 | 8.2 | 95.06 |
| 65 | 6.8 | 6 | 7.4 | 95.01 |
| 60 | 6.34 | 5.5 | 6.9 | 95.73 |
| 55 | 5.92 | 4.8 | 6.7 | 95.42 |
| 50 | 5.3 | 4.3 | 6.2 | 95.31 |
| 45 | 4.78 | 4 | 5.9 | 95.42 |
| 40 | 4.26 | 3.26 | 5.1 | 95.73 |
| 35 | 3.736 | 3 | 4.7 | 95.34 |
| 30 | 3.242 | 2.5 | 4.1 | 95.06 |
| 25 | 2.8 | 2.1 | 3.44 | 95.27 |
| 20 | 2.18 | 1.9 | 3.1 | 95.83 |
| 15 | 1.96 | 1.3 | 2.5 | 95.80 |
| 10 | 1.5 | 0.57 | 2 | 96.67 |
| 5 | 0.584 | 0.18 | 1.3 | 96.58 |

Table 3

Monitoring Locations, Coordinates, and Sampling Activity for Sampling in Support of Deriving a Site-Specific Selenium Criterion

| Location | Exposure Condition | Reach | Reach Boundary | Easting | Northing | # Parental Fish to be Collected |
|----------|--------------------|---|----------------|---------|----------|---------------------------------|
| SFTC-1 | Reference | South Fork Tincup Creek u/s of confluence with Tincup Creek | Downstream | 486372 | 4758414 | 6 to 8 |
| | | | Upstream | 486376 | 4758324 | |
| CC-75 | Background | Crow Creek u/s of Wells Canyon | Downstream | 486291 | 4710432 | 6 to 8 |
| Upstream | | | 486267 | 4710376 | | |
| CC-150 | | Crow Creek u/s of Deer Creek | Downstream | 487193 | 4712682 | |
| | | | Upstream | 487113 | 4712612 | |
| CC-350 | Low | Crow Creek d/s of Deer Creek | Downstream | 489397 | 4715486 | 6 to 8 |
| Upstream | | | 489410 | 4715422 | | |
| DC-600 | | Deer Creek u/s of Crow Creek | Downstream | 487309 | 4715077 | |
| | | | Upstream | 487231 | 4715120 | |
| HS-3 | High | Hoopes Spring (Discharge Channel) | Downstream | 491238 | 4720612 | 6 to 8 |
| Upstream | | | 491187 | 4720674 | | |
| LSV-2C | | Lower Sage Creek d/s Hoopes Spring | Downstream | 491340 | 4720392 | |
| | | | Upstream | 491332 | 4720463 | |
| LSV-4 | Moderate | Lower Sage Sage Creek u/s Crow Creek | Downstream | 491663 | 4718584 | 6 to 8 |
| Upstream | | | 491599 | 4718642 | | |
| CC-1A | | Crow Creek d/s Sage Creek | Downstream | 493395 | 4719100 | |
| | | | Upstream | 493345 | 4719057 | |
| CC-3A | | Crow Creek d/s Sage Creek and CC-1A | Downstream | 494968 | 4720417 | |
| | | | Upstream | 494874 | 4720281 | |

Coordinates are UTM's, NAD83, UTM zone 12T

d/s = downstream

u/s = upstream

Table 4
Study Design Matrices for ELS Studies

| Study Design B | | | | | | | |
|----------------|--|-------|-------|-------|-------|-------|-------|
| Egg Source | Treatments - water (ug/L) and diet (mg/kg) | | | | | | |
| Henry's Lake | control | 2.5 | 5 | 10 | 15 | 20 | 40 |
| | xxxxX | xxxxX | xxxxX | xxxxX | xxxxX | xxxxX | xxxxX |

| Study Design A | | | | |
|---|--|-------|-------|-------|
| Egg Source | Treatments - water (ug/L) and diet (mg/kg) | | | |
| | control | 5 | 10 | 15 |
| Henry's Lake | xxxxX | xxxxX | xxxxX | xxxxX |
| Moderate (Crow, Lower Sage, Deer Creek) | xxxxX | xxxxX | xxxxX | xxxxX |

xxxxX - 4 replicates +batch for intermediate tissue samples
 20 eggs/replicate (batch chamber to include more eggs)
 100 set aside in a batch chamber for selenium residue analysis

Table 5
Exposure Conditions for Adult Trout Reproductive Success Study

| Parameter | Test Conditions |
|--|--|
| | <i>Oncorhynchus clarki</i> or <i>Salmo trutta</i> |
| Test type: | Flow Through |
| Test duration: | 60 days to swimup, 75 to post swimup |
| Temperature: | 10 ± 1 C |
| Salinity: | Freshwater |
| Light intensity during egg incubation: | <215 lux or total darkness/ambient lighting following swimup |
| Photoperiod: | 24 h dark or low light to swim up, 16 light 8 dark post swimup |
| Test chamber size: | based on laboratory protocols and equipment |
| Test solution volume: | based on laboratory protocols and equipment |
| Age of test organisms: | fertilized embryo |
| Size of test organisms: | eggs |
| Organisms per treatment: | 8 parental fish, 60 eggs/replicate, density of 1-3 embryos/cm ² |
| Replicates per sample/dilution: | 10 per parental fish |
| Feeding regime: | None until swim up, standardized ASTM feeding regimen thereafter |
| Aeration: | Renewal water >=60% DO saturation |
| Holding water: | Horsetooth reservoir - simulated site conditions |
| Test concentrations: | No aqueous exposure - Parental fish exposure is the experimental unit |
| Water quality: | Daily temp, pH, DO |
| Observations: | Fecundity, fertilization success, hatch, GSI, length, weight, survival, tissue concentrations, feeding success |
| Control validity: | ≤ 30 % mortality |
| Source of organisms: | Wild collected parents, hatchery fish for controls |
| Effect calculated: | EC10s and/or EC20s for survival, growth, hatch, GSI, feeding success |

Table 6
Exposure Conditions for ELS Trout Study

| Parameter | Test Conditions |
|---------------------------------|---|
| | <i>Oncorhynchus clarki</i> or <i>Salmo trutta</i> |
| Test type: | Flow Through |
| Test Duration: | ~60 days to swimup, 30 days to post swimup |
| Temperature: | 10 ± 2 C |
| Salinity: | Freshwater |
| Light intensity: | <215 lux or total darkness/ambient lighting following swimup |
| Photoperiod: | 24 h dark or low light to swim up, 16 light 8 dark post swimup |
| Test chamber size: | based on laboratory protocols and equipment |
| Test solution volume: | based on laboratory protocols and equipment |
| Age of test organisms: | fertilized embryo |
| Size of test organisms: | egg |
| Organisms per test chamber: | 20 per replicate |
| Replicates per sample/dilution: | 4 replicates per treatment with 1 bulk replicate for tissue samples |
| Feeding regime: | > 4% food wt/body wet wt/d |
| Aeration: | Renewal water >=60% DO saturation |
| Dilution water: | Horsetooth Reservoir |
| Test concentrations: | Dependent upon design implemented: Design B - 2.5, 5, 10, 15, 20, 40 and control |
| Water quality: | Daily temp, pH, DO |
| Observations: | Mortality, growth, deformities |
| Control validity: | ≤ 30 % mortality |
| Sample requirements: | Se analysis of stock solution and treatments, Se analysis of tissue residues for eggs, fish at intermediate steps, and lumbricolous |
| Source of organisms: | Henry's Lake eggs |
| Other information: | Measure stock concentration |
| Effect calculated: | EC10s and/or EC20s for survival, growth, hatch, GSI, feeding success |

Table 7
Horsetooth Reservoir and Crow Creek Drainage Water Quality Conditions

| Parameter | Horsetooth Reservoir ¹ | | Crow Creek ² | |
|-------------------|-----------------------------------|-------------|-------------------------|-------------|
| | Average | Range | Average | Range |
| Hardness (mg/l) | 33 | 26.5 - 41.8 | 171 | 129 - 220 |
| Sodium (mg/l) | 3.5 | 2.7 - 5.5 | 3.3 | 1 - 6.5 |
| Potassium (mg/l) | <1 | --- | <1 | ND - 1.8 |
| Sulfate (mg/l) | 5.6 | 3.4 - 10 | 27 | 7.5 - 48.7 |
| Chloride (mg/l) | 1.9 | 0.5 - 3.6 | 7.3 | 0.2 - 89 |
| Alkalinity (mg/l) | 28.8 | 25 - 33 | 197 | 140-231 |
| DOC (mg/l) | 2.4 | 2.1 - 2.9 | 1 | 0.34 - 2.18 |

(1) Horsetooth Reservoir (Ft Collins, CO) water quality characteristics at ENSR's Environmental Toxicology Laboratory (Ft. Collins) from 2000 to 2004.

(2) Crow Creek Drainage as characterized by surface water from Crow Creek, Sage Creek and Hoopes Spring surface water quality data.

Table 8
Exposure Conditions for Lumbriculus Used as Feedstock for Trout ELS Testing

| | Conditions |
|------------------------|---|
| Parameter | <i>Lumbriculus variegatus</i> |
| Temperature: | 23 ± 1 C |
| Salinity: | Freshwater |
| Light intensity: | 500-1000 lux (wide spectrum fluorescent lights) |
| Photoperiod: | 16 h light, 8 h dark |
| Culture chamber size: | 57- to 80-L aquaria with stainless steel screens or glass standpipes |
| Culture water volume: | 45 to 50 L |
| Substrate: | unbleached shredded paper towels |
| Renewal water rate: | 1 volume addition/day |
| Age of test organisms: | Adults |
| Organisms per culture: | 500-1000 |
| Feeding regime: | 3.2 g day selenized yeast augmented with nutritional yeast to desired Se concentrations. |
| Aeration: | None |
| Culture water: | Horsetooth Reservoir water |
| Test concentrations: | Control, 2.5, 5, 10, 15, 20, and 40 ug/L aqueous; control, 2.5, 5, 10, 15, 20, and 40 mg/kg dietary |
| Water quality: | Daily temp, pH, DO |
| Observations: | survival and growth |
| Control validity: | ≤ 30 % mortality |
| Sample requirements: | Total and dissolved selenium in aqueous treatments, total Se in organisms, protein and lipid content in organisms |
| Source of organisms: | In-house culture |

FIGURES

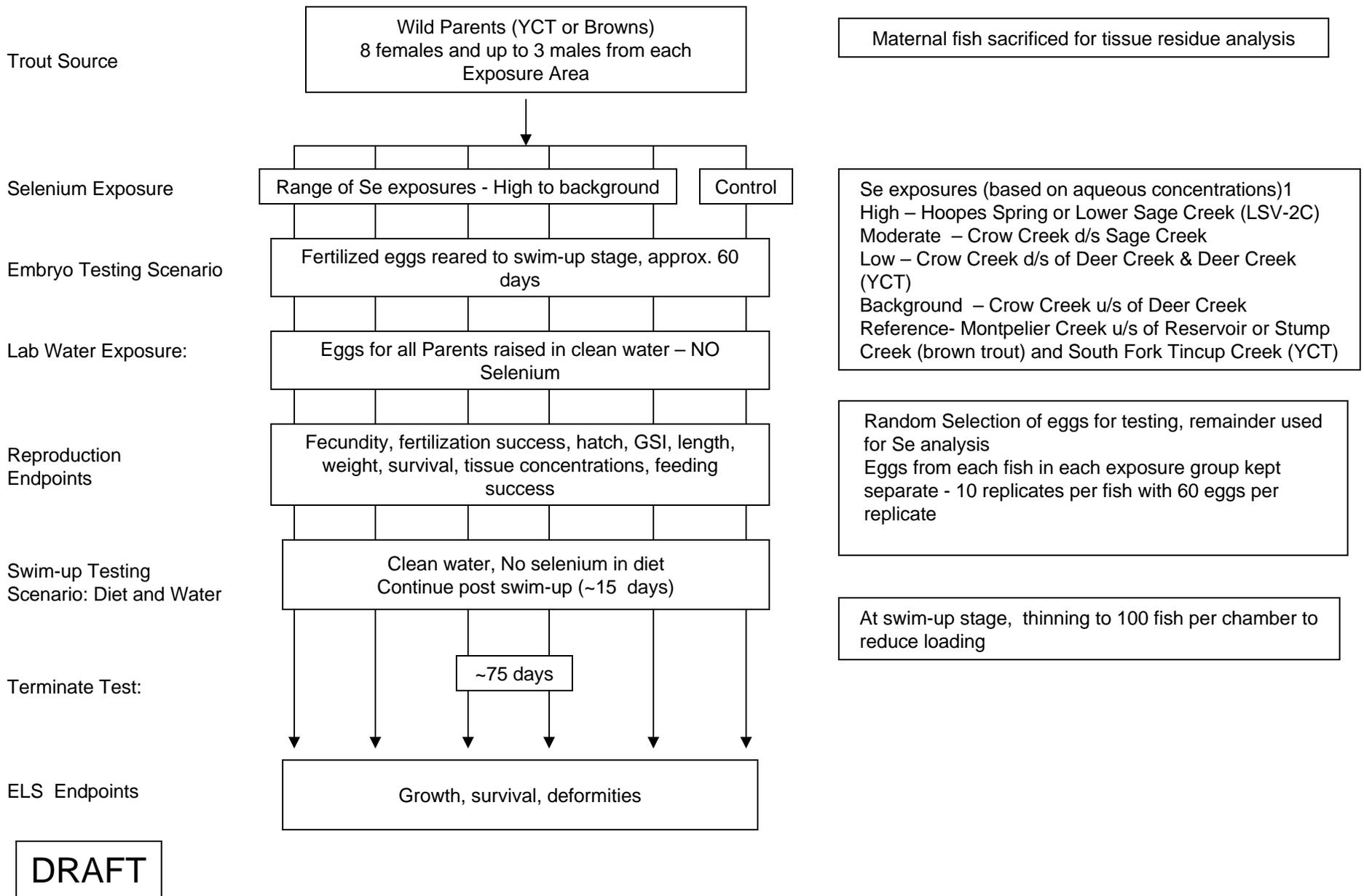
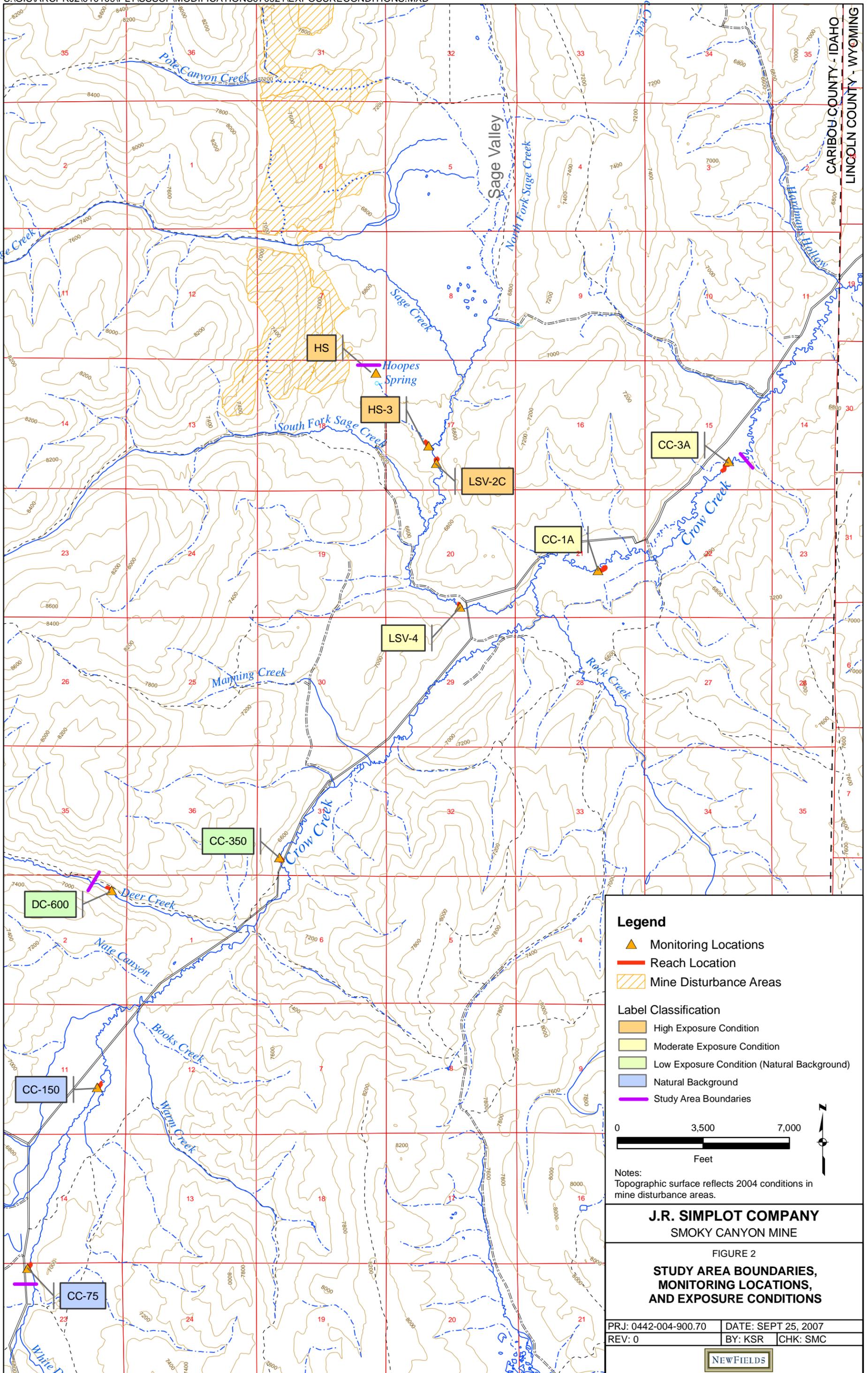


Figure 1. Flow Diagram of Laboratory Testing Methods to Assess Reproduction of Wild-Collected Parents Exposed to a Range of Selenium Concentrations

¹ Objective is to capture trout from as many of the exposure areas as possible to provide a representative sample of different exposures. Fish are not grouped by exposure area.

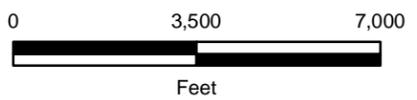


Legend

- Monitoring Locations
- Reach Location
- Mine Disturbance Areas

Label Classification

- High Exposure Condition
- Moderate Exposure Condition
- Low Exposure Condition (Natural Background)
- Natural Background
- Study Area Boundaries



Notes:
Topographic surface reflects 2004 conditions in mine disturbance areas.

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SMOKY CANYON MINE

FIGURE 2
**STUDY AREA BOUNDARIES,
MONITORING LOCATIONS,
AND EXPOSURE CONDITIONS**

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.70 | DATE: SEPT 25, 2007 |
| REV: 0 | BY: KSR CHK: SMC |

NEWFIELDS

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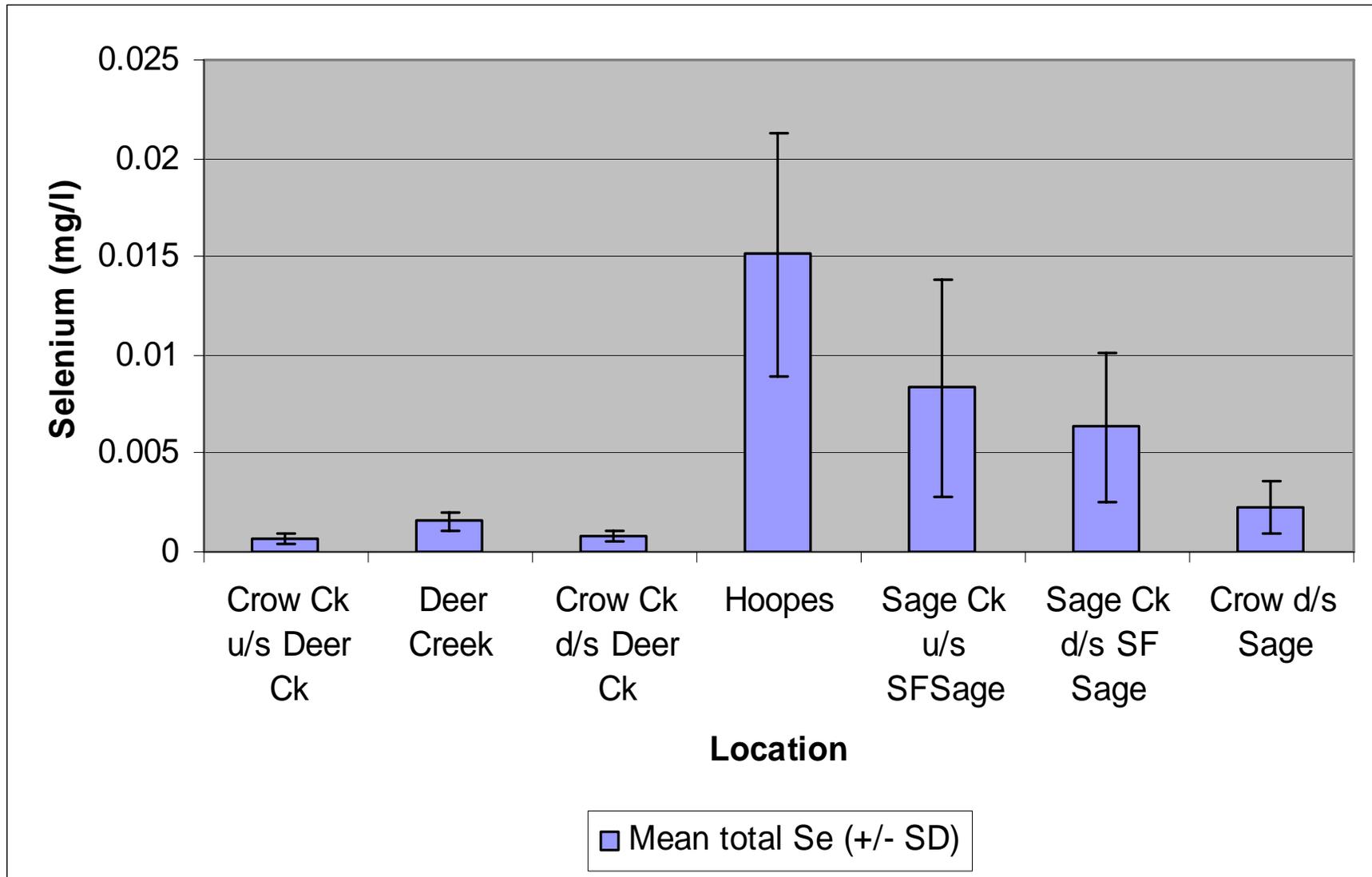


Figure 3. Mean Total Selenium in Surface Waters from Locations Upstream and Downstream of Hoopes Spring

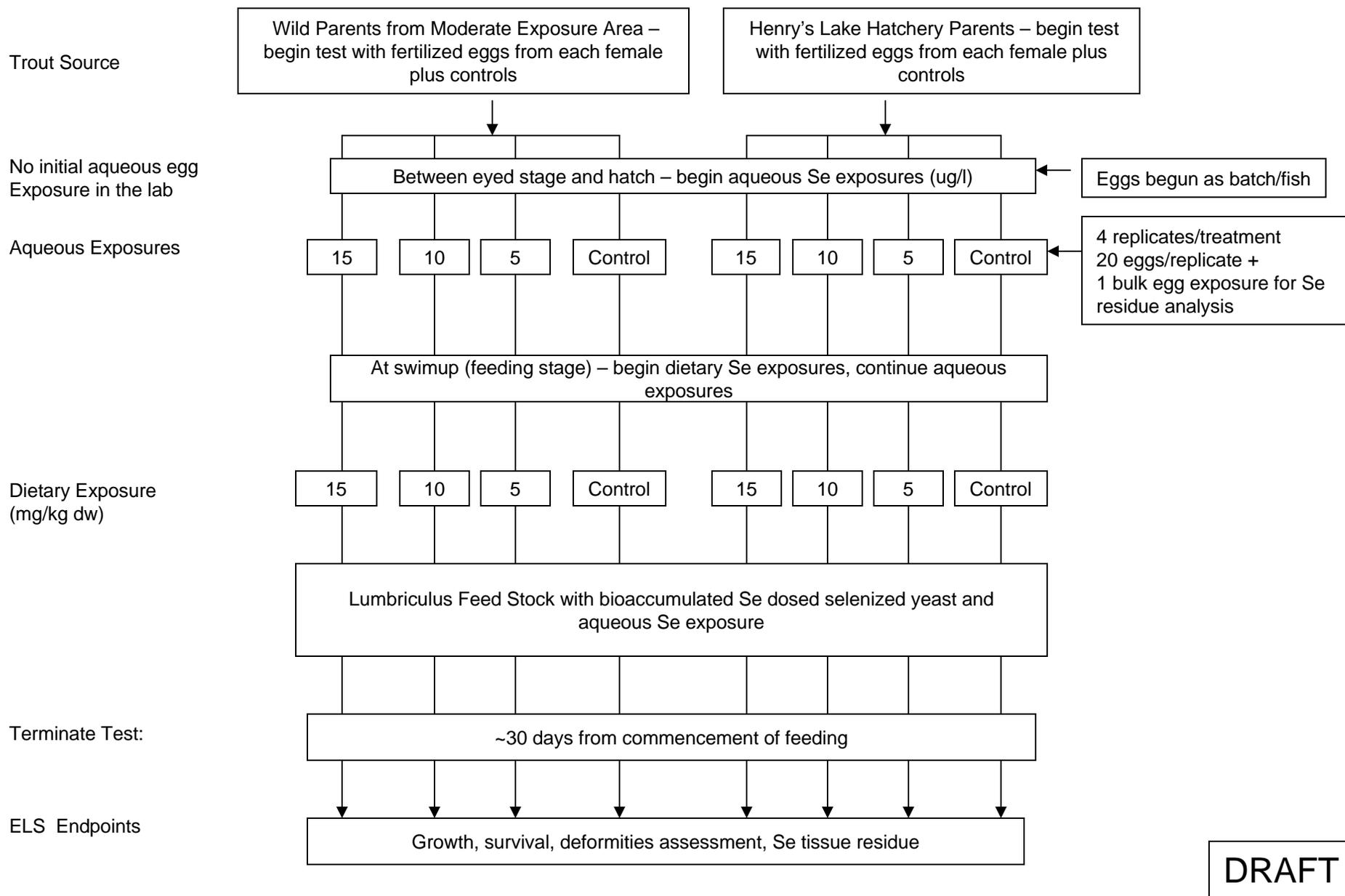
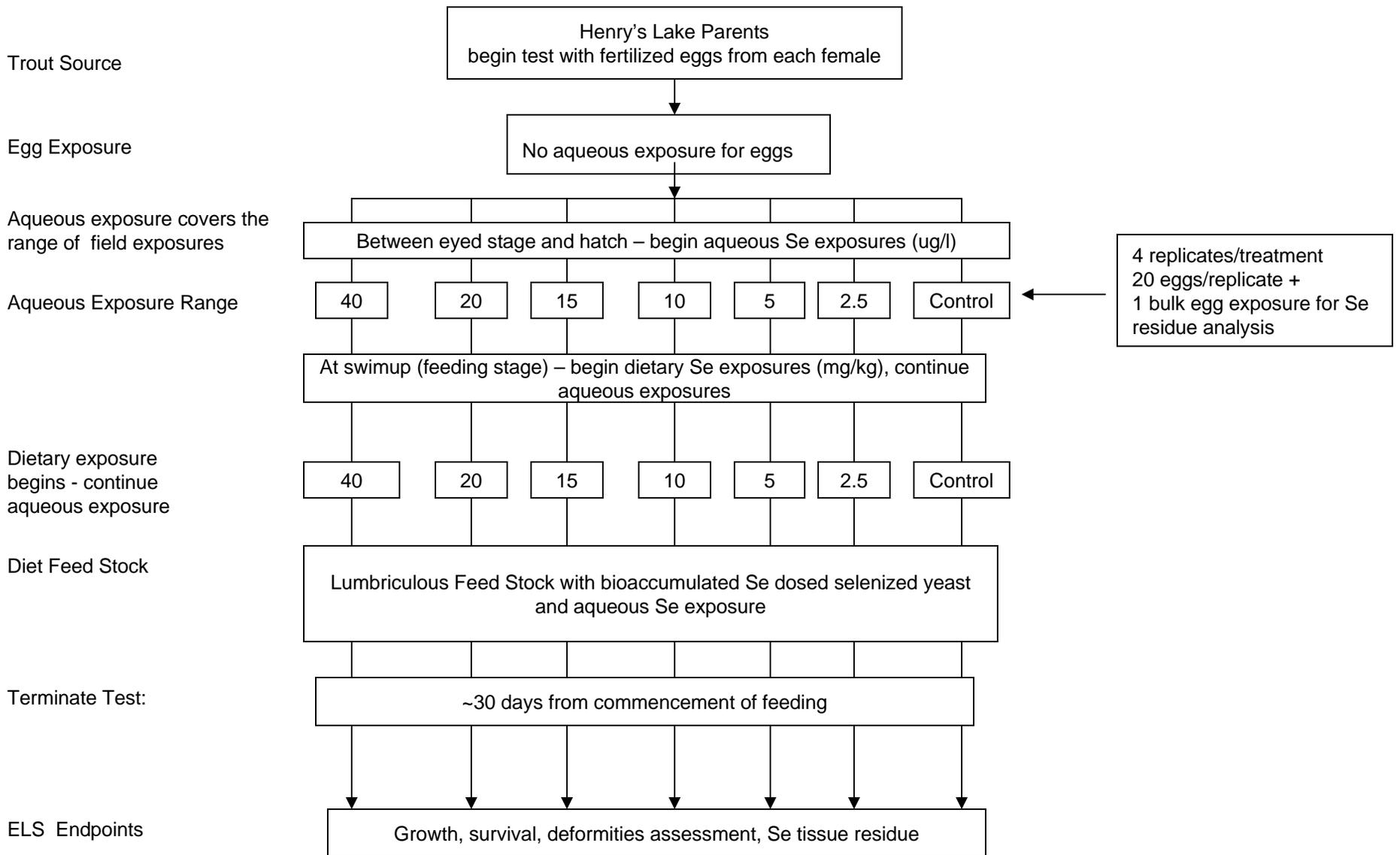
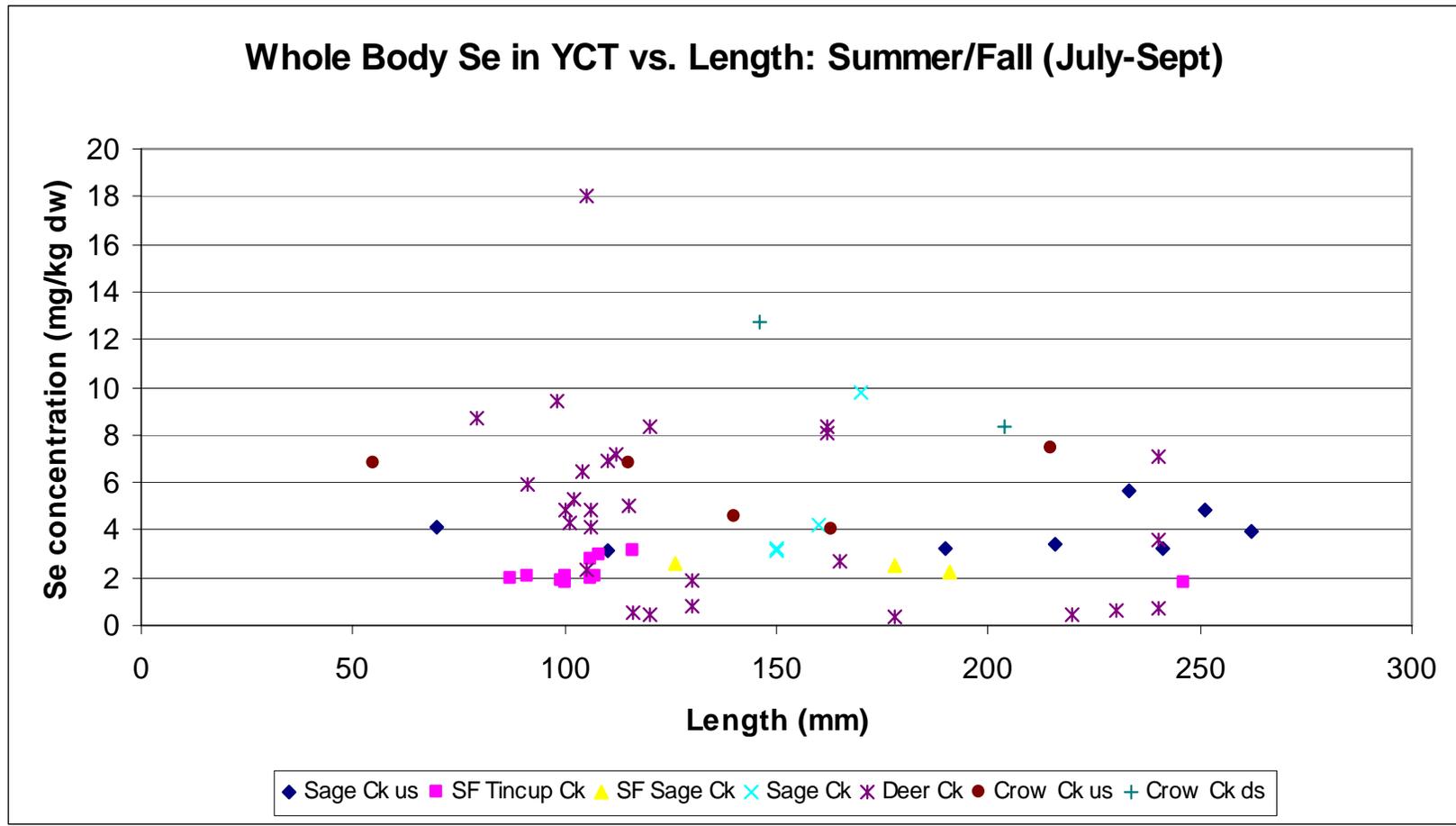


Figure 4. Study Design A - Flow Diagram of Laboratory Testing Methods to Assess Trout ELS Survival, Growth, and Deformities



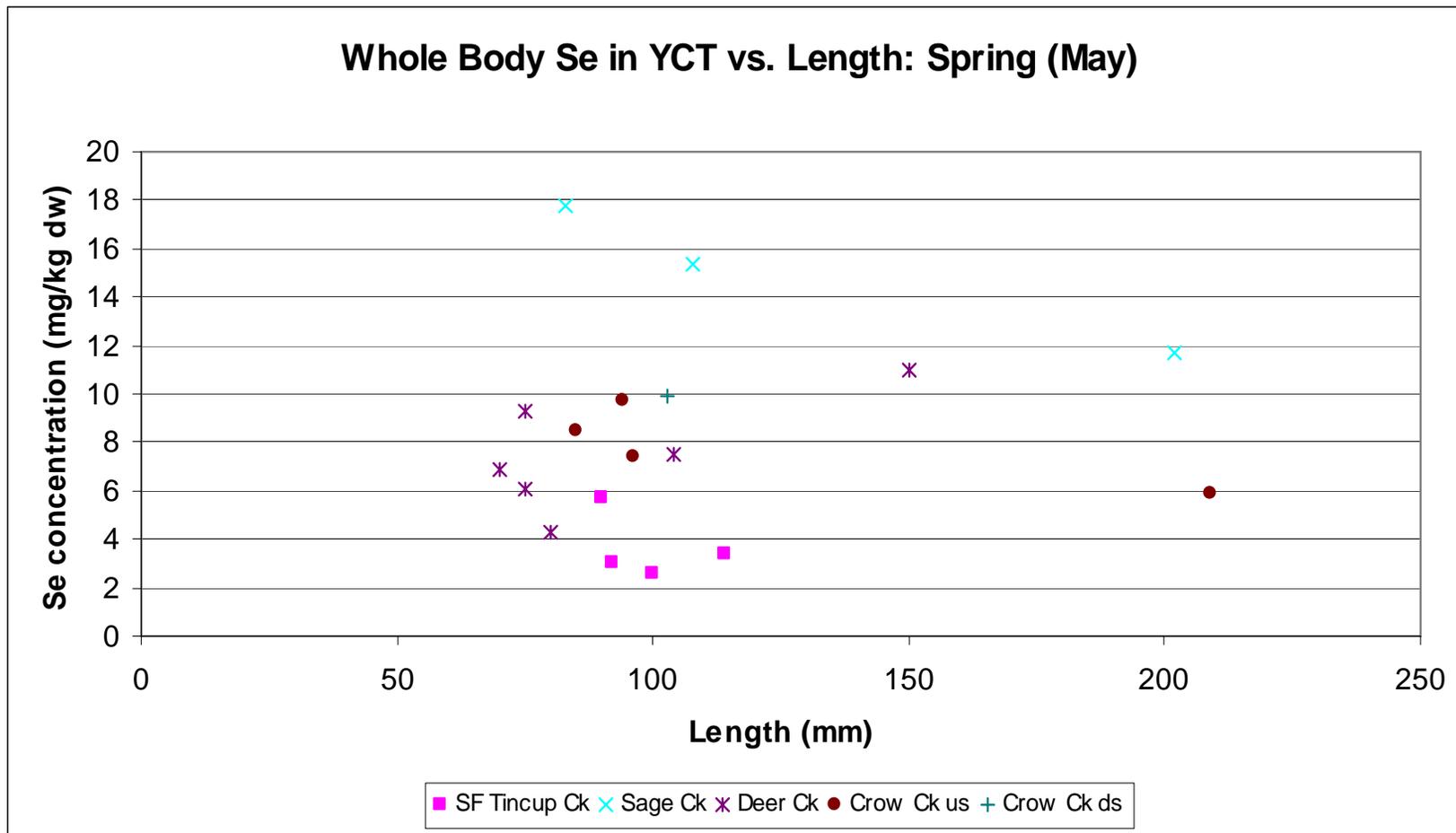
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Figure 5. Study Design B - Flow Diagram of Laboratory Testing Methods to Assess Trout ELS Survival, Growth, and Deformities



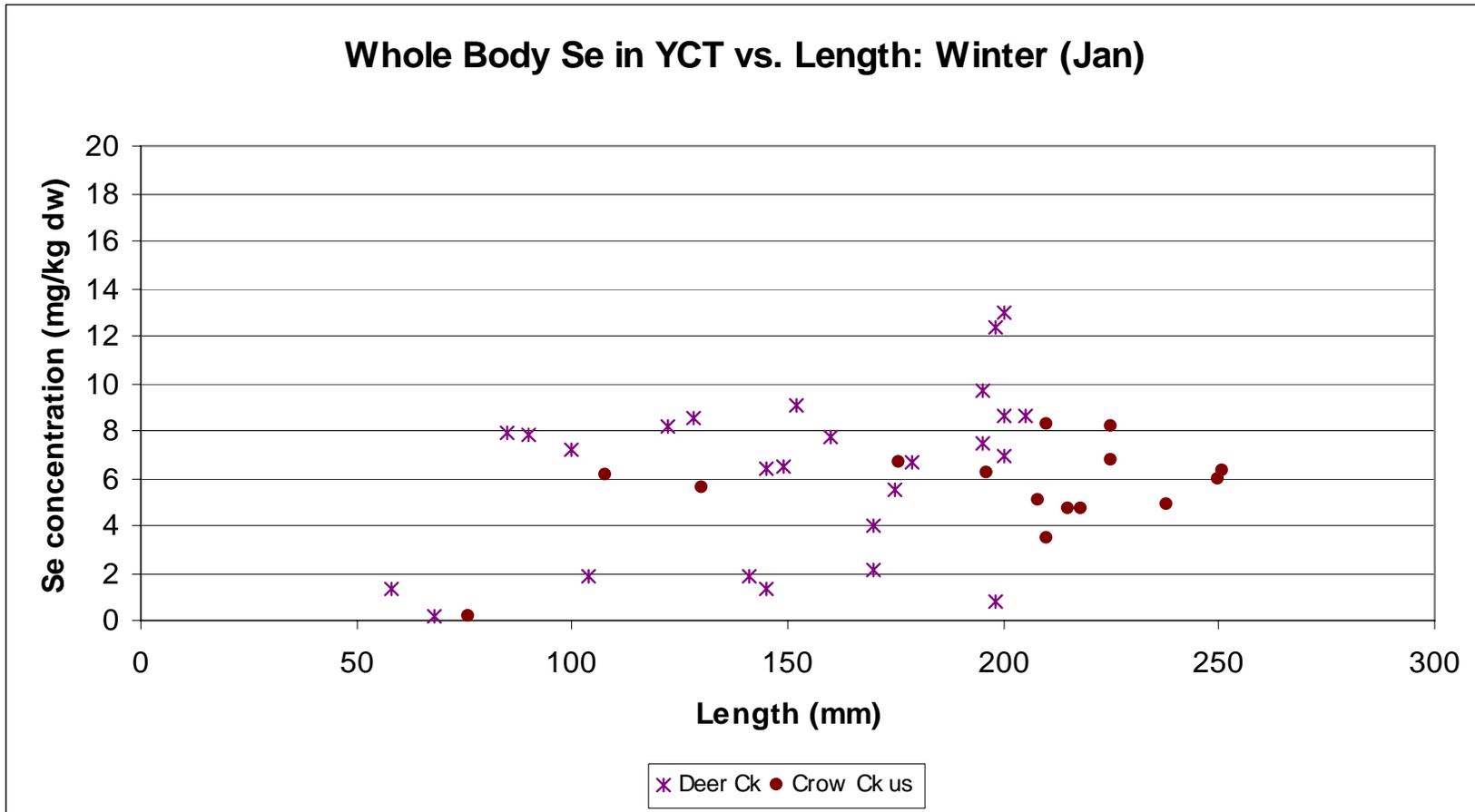
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Figure 6. Selenium in YCT versus Size for Fish Collected During the Summer



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Figure 7. Selenium in YCT versus Size for Fish Collected During the Spring



DRAFT

Figure 8. Selenium in YCT versus Size for Fish Collected During the Winter

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Selenium Exposure n = total number of parent fish

Parent fish

Eggs from 8 females
From each exposure group

10 replicates/ 60 eggs/replicate

~ 60 days to swim up stage

Feeding begins at swim-up –
No added Se in diet

Thin to 100 fish/chamber
(n = 100 fry/per original
parent egg clutch)

Test termination ~
75 days, 15 days
post swim up

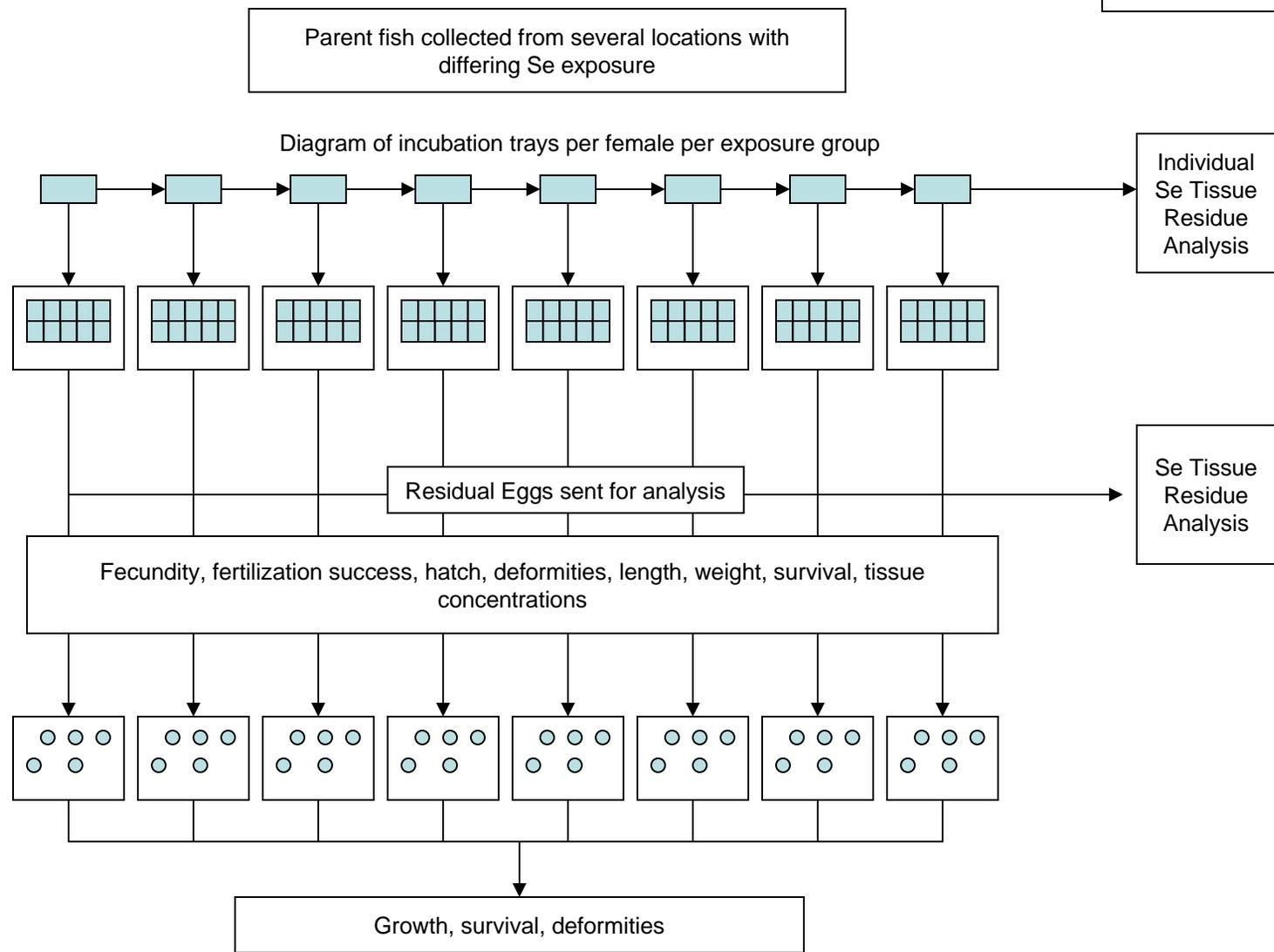


Figure 9. Example Diagram of Laboratory Testing Regime per Exposure Group For Adult Reproduction

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Parent fish

Henry's Lake Fish – Fertilized Eggs
Allocated to each treatment

Selenium Exposure Group

4 replicates/ 20 eggs/replicate
1 bulk egg batch for interim
Se analysis

Between eyed stage and
hatch aqueous Se exposure
begins

Rear to Hatch

Interim endpoints

~ 60 days to swim up stage

Feeding begins at swim-up
Lumbriculous with
bioaccumulated Se

Test termination ~
75 days, 15 days
post swim up

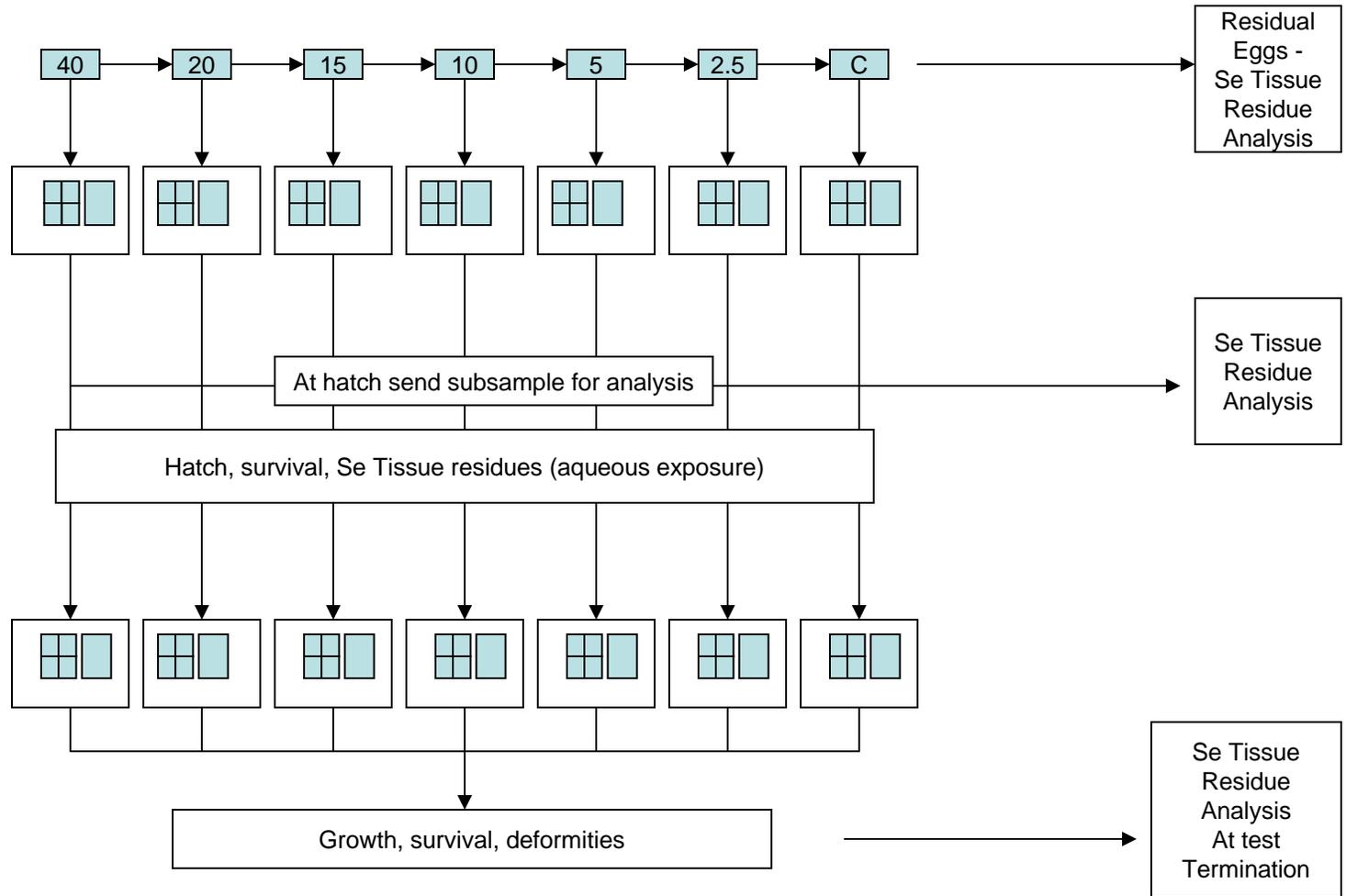


Figure 10. Example Diagram of Laboratory Testing Regime For ELS Study – Design B

APPENDIX A



**REVISED
ATTACHMENT 1
TECHNICAL MEMORANDUM**

TO: Don Essig –Idaho DEQ

FROM: Sean Covington and Steve Werner - NewFields

CC: Monty Johnson – J.R. Simplot Company

DATE: October 17, 2007

SUBJECT: Methods for Testing Adult Brown Trout Reproductive Success

A study of brown trout reproduction is proposed as the first of a series of tests to evaluate the effects of ambient selenium concentrations in aqueous and dietary media to assess the potential developmental effects to offspring. This Technical Memorandum outlines the study design plan and analysis details for the assessment of statistically-based differences of effects due to selenium exposure. These studies are designed to assess potential effects of bioaccumulated selenium in adults on their reproductive success and the development effects to their offspring in a laboratory setting where egg incubation can be more controlled. Laboratory portions of this testing will be carried out by ENSR's environmental toxicology laboratory in Ft. Collins, CO. Dr. Rami Naddy will be the primary contact and project lead for these studies at ENSR. A laboratory qualifications package was submitted under separate cover on October 3, 2007. The investigative approach is similar to that presented in the following published works:

- Kennedy et al. (2000). The effect of bioaccumulated selenium on mortalities and deformities in the eggs, larvae, and fry of a wild population of cutthroat trout (*Oncorhynchus clarki lewisi*);
- Holm et al. (2003). An assessment of the development and survival of rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) exposed to elevated selenium in an area of active coal mining;
- Holm et al. (2005). Developmental effects of bioaccumulated selenium in eggs and larvae of two salmonid species; and

- Hardy (2005). Effects of dietary selenium on cutthroat trout (*Oncorhynchus clarki*) growth and reproductive performance.

The approach described by these published works takes advantage of real world exposure conditions of the adult wild fish. Integration of selenium concentrations in diet and water, as well as the various selenium species that may occur in natural diets will play a key role in exposure and ultimately in observations of potential effects.

Reproductive success of fish exposed to selenium via diet and water is a highly sensitive endpoint. The current state of the science regarding selenium toxicity indicates that:

- Chronic effects of selenium exposure to fish are due primarily to diet. Chronic toxicity is manifested slowly in fish, and is based on magnitude and duration of exposure, as well as biouptake in the food web. The USEPA (2004) draft criteria document for selenium did not consider or use tests in which aqueous only exposures were tested in its consideration of acceptable data for developing a chronic criterion. It states, “[b]ecause diet controls selenium chronic toxicity in the environment and water-only exposures require unrealistic aqueous concentrations in order to elicit a chronic response, only studies in which test organisms were exposed to selenium in their diet alone or in their diet and water were considered in the derivation of a chronic value.”
- Of aquatic biota, fish appear to be the most sensitive to chronic exposure and toxicity from selenium (Coyle et al. 1993; Hamilton et al. 1990; Hermanutz et al. 1996) (as cited in USEPA 2004).
- Reproductive success is the most sensitive biological end point for assessing selenium poisoning in fish (Lemly 1985a,b, 1992; Gillespie and Baumanti 1986; Schultz and Hermanutz 1990; Coyle et al. 1993) (as cited in Lemly 1993).
- To date, three species of trout (i.e., brook, rainbow, and cutthroats) have been tested for bioaccumulation in adults and effects on development of young (Holm et al. 2005; 2003; Kennedy et al. 2000; Hardy 2005). No published literature has been found that indicates brown trout have undergone such testing to assess potential effects.

Adult reproduction testing will use adult wild fish ready to spawn captured at various locations from the study area that represent differing levels of selenium exposure as well as field and laboratory controls (Figure 1). Gametes from these adults will be collected and fertilized to

evaluate reproduction. Although young will not be exposed to aqueous selenium, they will have absorbed any protein-bound organic selenium that was present in the yolk and passed on to the egg via parental exposure.

The objectives of toxicity testing presented herein are as follows:

- Document the selenium concentrations in parental fish due to in-situ integrated exposure of diet and water that may adversely affect successful reproduction;
- Document the selenium concentrations in parental fish due to in-situ integrated exposure of diet and water that may adversely affect the viability of young;
- Document the selenium concentrations in eggs produced by adults from different locations in the study area;
- Characterize relationships between selenium concentrations in parental whole body tissues and egg tissues;
- Characterize relationships between selenium concentrations in parental whole body tissues and ambient exposure media (i.e., water and diet); and
- Define selenium concentrations for each endpoint evaluated where an acceptable level of effects to reproductive success and viability of young occur.

FIELD METHODS

Gravid female and male brown trout in pre-spawn condition will be collected during the spawning period (late October). The Field Monitoring Studies Work Plan (NewFields 2007) documents the methods used for fish collection and identification of locations where brown trout have been observed spawning. Fish collection will be conducted via electrofishing methods. Collected fish will be assessed for ripeness. Ripe fish will be held at their collection locations in on-site holding pens while other sites are fished.

Wild pre-spawn brown trout will be collected from locations that represent a range of surface water selenium concentrations that have been observed during field testing (Figure 2). Aqueous selenium concentrations are expected to translate into a range of exposure conditions. Tissue concentrations in parental fish will confirm this. However, the study is being conducted

on individuals despite the location they are collected from, so the range will ultimately be determined based on the individual body burden concentrations.

It is expected that fish collected, if available, from Hoopes Spring or Sage Creek immediately downstream of Hoopes Spring will represent the high exposure condition, fish from Crow Creek downstream of Sage Creek will represent the moderate exposure condition, and fish from Crow Creek downstream of the Deer Creek confluence will represent the low exposure condition (Note: Deer Creek has been shown to have a higher natural background of selenium, although the area is not affected by mining). The background condition will include fish from Crow Creek locations upstream of Deer Creek. The reference condition will include fish from Montpelier Creek upstream of Montpelier Reservoir. Numbers of males and females used from each site will be dependent upon the number of fish collected from each site as well as the age and size of fish; however, the target number of females per exposure condition is eight. If less than the proposed number of fish are collected at a target exposure location, the field team will move to the next downstream site. In the event a downstream site is unavailable within the exposure area, the field team will continue electrofishing in a reach immediately adjacent to the reach designated.

Because milt is highly concentrated, only a single male is needed per site, but to simulate real world conditions, which indicate that more than one male may fertilize a nest, composite milt from 2-4 males will be collected.

Fish collected for these studies will be of similar age and size. Target age for testing is 3+ or 4+ year old trout based on fish sizes ranging from approximately 230 to 300 mm or 270 to 350 mm. Depending upon the majority of ripe fish collected from each site, a decision will be made in the field regarding what size range will be used for testing. Because fish collected will be held in on-site holding pens, the length data can be examined prior to selection of the fish for testing. Preference will be given to use of tagged fish over non-tagged fish.

Eggs (from adult female fish) and milt (from adult male fish) will be collected in the field for conduct of the reproduction tests. Fish will be anesthetized using MS-222 to loss of equilibrium. Fish weight and length will be measured. Fish will be blotted dry particularly the area around the urogenital opening. Eggs from each female will be stripped using a downward pressure to extrude the eggs from the vent and placed into plastic bags. Eggs will be labeled according to the female from which they came, as well as the location. Males will be similarly expressed for milt which will be collected into plastic bags and identified based on location of capture since a composite milt sample will fertilize all eggs from all females from a given location.

Gametes will be shipped on ice in separate sealed bags filled with oxygen and protected from sunlight via same day carrier to the laboratory consistent with the methods of Holm et al. (2005) and Hardy (2005). Gametes will be shielded from direct contact with ice to prevent freezing. A spacer of ¼" foam or other suitable material will be used to prevent direct contact of ice with gametes. To ensure the transport container will maintain a uniform temperature, either temperature blanks or temperature loggers will be utilized and sealed in transport containers. Transport from the site will be completed via arranged transport directly to the laboratory which should reduce transport stress and delays using a commercial overnight carrier.

Adult fish will be sacrificed for tissue analysis and packaged in double plastic Ziploc bags and stored on ice or frozen prior to shipment to the analytical laboratory for tissue residue analyses according to the methods in the Field Studies Work Plan (NewFields 2007).

ADULT REPRODUCTION TESTS

The adult reproduction test is designed to include individual female trout from several aqueous exposure conditions, including high, moderate, low, and background concentrations. In addition, a laboratory control using females and males from a hatchery will also be utilized. The Saratoga National Fish hatchery, in Saratoga, WY is the expected source of brown trout for the controls in this study.

Once received in the laboratory, eggs from each female will be fertilized using the methods described by Holm et al. (2005). The method entails placing eggs into a stainless steel bowl. Milt from a composite of male fish from a location will be combined with the eggs at a rate of 10ul/50ml. The eggs and milt will be gently stirred and allowed to stand for 60 seconds. The egg/milt mixture will be covered with dechlorinated water and allowed to water harden for approximately five minutes. Following water hardening, eggs from each female will be randomly distributed into incubation trays or cups. These will either be individual cups constructed of plastic (approximately 7 cm OD and 2 cm depth) with a nitex screen bottom or larger rectangular trays with ten compartments with similar depth and screened bottoms. For each female, ten replicates, with an egg density of 60 eggs per replicate will be used.

Egg trays are held in a water bath with the temperature of the water bath controlled by Remcor units. Temperature is measured continuously (every 30 min) by on-line monitoring systems. Test chambers are ~4.5-L (nominal volume) aquaria constructed of plate glass and silicone adhesive covered with a glass plate to minimize possible contamination. Each test chamber drain consists of a piece of 5-mm ID glass tubing inserted through a silicone stopper which is pressed into a small hole drilled in the side of the aquarium; the test solution volume is maintained at the level of the top of the drain.

Spent test solution overflows into glass standpipes and is discharged directly to a waste conduit within the water bath. After swim-up occurs, the drain openings are covered with a small piece of nylon mesh. With the test solution volume of 4 L and a flow rate of 20 ml/min, each test vessel receives ~ 7 volume additions per day, or approximately 1.5 turnovers (99% molecular replacement) per day.

A 2 rpm rocker arm apparatus is used to gently oscillate eggs in the water bath. Trays are oscillated 2.5 to 4.0 cm vertically in test water until all eggs hatch or are noted as dead. When all eggs hatch, larvae are gently removed to the bottom of the surrounding test chamber. The trays and rocker arms are removed after all living eggs hatch. Exposure containers will be of sufficient size to maintain a loading rate of < 5 g of fish per L of water in each test chamber.

Eggs from each female from each exposure condition will be reared separately to the swim-up stage (that point at which young fish would begin to feed ~60 days). A laboratory control group will also be included using hatchery raised adults subjected to a similar egg extraction and fertilization sequence as described above.

A subsample of eggs will be collected for tissue analysis. All of the adult fish will be sacrificed for analysis of selenium residue in tissues. Table 1 illustrates the exposure conditions to be utilized in the laboratory.

At the swimup stage, incubation trays will be thinned to 20 fry per tray and reduced to a minimum of 5 replicates per female. This is done to reduce biomass loading on the system. If space and loading allows, more replicates will be continued to post swim up. Fry will be randomly selected for this final stage of the test. Fry from each female will be maintained separately.

Horsetooth Reservoir water will be used in a flow through containment vessel where incubation trays are held. The laboratory maintains a direct pipeline to the reservoir, thus water is brought into the facility unchlorinated with selenium concentrations <0.2 ug/l. Source water is soft with low alkalinity and sulfate (Table 2). Water chemistry of the incoming source water will be adjusted to more closely simulate Crow Creek drainage water. Simulation of all of the site water characteristics is not possible. Target parameters for simulation will be sulfate, sodium, pH, and chloride. Using these parameters as targets, hardness, and to a lesser extent alkalinity of the Horsetooth Reservoir source water will be increased. Typically, soluble salts are used to increase hardness and alkalinity, however, use of these salts would result in increasing sodium and sulfate levels beyond the range of the Crow Creek drainage water characteristics. Use of less soluble salts such as calcium bicarbonate is also not practical due to low solubility and the

high water usage requirements per day (~1800-2000 gallons) for this test. Water quality conditions of the exposure water will be reported.

Daily pH and dissolved oxygen measurement will be made. As stated previously, temperature is monitored automatically. ASTM (2005) also requires that a suite of water quality characterization parameters be made twice a year on source waters. The laboratory maintains records for these analyses. Aqueous selenium concentrations in flow through water will be measured at the beginning and end of the test, and periodically in the interim.

Acceptability of toxicity tests is typically based on control mortalities. If control mortality is high, tests are believed to be invalid due to one or more factors unrelated to the exposure condition. A review of control mortalities from a number of studies where wild fish reproduction was used to evaluate selenium exposure shows that the embryo mortality in selenium reproductive toxicity tests were variable, ranging from 2.8 to 55.8 % in Kennedy et al. (2000) and 18.1 to 37.3 % in Holm et al. (2005). Hamilton and Palace (2001) concluded that embryo mortality rates of greater than 15% were unacceptably high; however, these estimates were based on embryo mortality rates in hatchery populations that are not exposed to the same types of environmental stressors. Due to the variability and the environmental factors affecting wild collected parents, an absolute control mortality criterion will be set at $\leq 30\%$ (ASTM 2005), however, this criterion will not be applied to the reference condition based on the data presented above. The laboratory conducting these tests is accredited and proficient in conducting embryo toxicity testing.

TEST ENDPOINTS AND DATA COLLECTION

Multiple test endpoints will be utilized for this test. Endpoints will be measured at different times during the test. Fecundity, fertilization success, hatch, deformities, length, weight, survival, tissue concentrations, and feeding success are proposed test endpoints. These endpoints are consistent with those of Holm et al. (2003; 2005), Hardy (2005), and Kennedy et al. (2000) on which the test described herein is based.

Total egg production for each female will be counted as a measure of fecundity. Fertilization success will be measured at a point during the test when clear signs of fertilization have occurred. Successfully fertilized eggs will be counted based on visual signs of cleavage. Eggs will be left undisturbed until the eyed stage. Non-viable eggs will not be removed so that disturbance of developing eggs is minimized. When eyed stages are observed, unfertilized or dead eggs will be removed and counted. Again at hatching, dead eggs or fry, and deformed fry will be removed. Survival will be determined based on the number of fish surviving to swim up

versus the number of eggs or fry that died. Time to hatch will be recorded for each treatment group and individual.

Dead or deformed fry will be removed and preserved for later microscopic examination of the type of deformity. Colorado State University's Larval Fish Laboratory has been contacted to conduct the assessment of deformities. Length, weight, and any deformities (craniofacial, finfold, skeletal and yolk sac malformations, among others) will be recorded for each fish at the swim up stage. A graduated severity index (GSI) for ranking deformities will be used because this approach measures both the magnitude and the frequency of the deformity. Holm et al 2003 and 2005 and Kennedy et al. 2000 describe the GSI deformities measured and ranking. Briefly, larval fish are rated as "0" for normal, "1" for slight defect of size or structure, "2" for moderate defect or multiple defects, and "3" for severe defect or multiple moderate defects. Although edema can be considered a teratogenic effect, it is reversible and thus is not considered a true teratogenic effect. For the purpose of this investigation, edema will not be evaluated.

Fry length and weight will be measured and counts of survival to this stage will be conducted. Again at this stage, any deformed fish will be preserved for later examination. A subsample of swim ups will be collected for selenium tissue residue analysis.

The test will continue for approximately another 15 days to further assess survival, feeding success, length, and weight. Fry will be transferred to flow through aquaria and feeding will begin according to ASTM E 1241-05 Standard Guide for Conducting Early Life-Stage Toxicity Tests with Fishes (2005). The test will be terminated at approximately 75 days and all fish will be weighed, measured for length, and preserved for a final assessment of deformities. Feeding success will be based on growth and is included to evaluate the success of swim ups to switch from endogenous to exogenous feeding.

DATA ANALYSIS

Using the reproduction endpoint data derived from these tests, and the parental tissue body burden data, several types of analyses will be investigated. Because eggs from parental fish will be reared separately, two types of analysis are possible. Logistic regression analysis will be used to develop relationships between individual parental selenium body burdens and effects endpoints. It is expected that a dose response curve will be generated for one or more endpoints via this approach. Individual parental selenium tissue residues will be paired with reproduction endpoint data to determine if significant relationships exist. In this analysis, the exposure unit is parental tissue body burden (independent variable) while the dependent variables are reproduction endpoints, including:

- fecundity (total eggs produced);
- numbers of successfully fertilized eggs;
- survival at the swim-up stage;
- incidence of deformities or other physical abnormalities using the GSI;
- growth (based on weight and length); and
- selenium tissue residues.

USEPA (2004) opted to use the logistic regression analysis to define the dose-response relationship to derive a chronic value. The EC20 was used and defined as a reduction of 20 percent in the response observed at control. Rationale for use of the EC20 as the chronic value, rather than for example an EC10, was that it represents a low level of effect that is generally significantly different from the control (U.S. EPA 1999). Smaller reductions in growth, survival, or other endpoints only rarely can be detected statistically. Effect concentrations associated with such small reductions have wide uncertainty bands, making them unreliable for criteria derivation (USEPA 2004). This Site-specific laboratory study will likewise develop EC20s for test endpoints.

Analysis of variance procedures and appropriate post hoc tests will be used to identify significant differences between individuals and exposure groups. Analysis of groups can only be facilitated if parental selenium concentrations in tissues fall within the expected range of concentrations based on the exposure groups from where they were collected. This holds true because brown trout may be transient during spawning and move from one area to another in search of suitable spawning gravels. Thus, a fish from a lower or higher exposure area may move into an area inconsistent with their current body burden.

Based on this analysis approach, it is likely that several EC20s will be derived. These EC20s will be considered as chronic values for the species tested. In terms of developing a chronic criterion, the EC20s from the brown trout testing will be evaluated in terms of sensitivity relative to test results for other species. Typically, the test endpoints selected are those that are biologically relevant such as survival, growth, or reproduction and which indicate the most sensitive response. For selenium, a key test endpoint is larval deformities, thus it may be found to be the most sensitive endpoint, as found in Holm et al. (2005).

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APPENDIX B



Photo 1: Eggs cups used for initial rearing of eggs using 10 replicates and 60 eggs/replicate

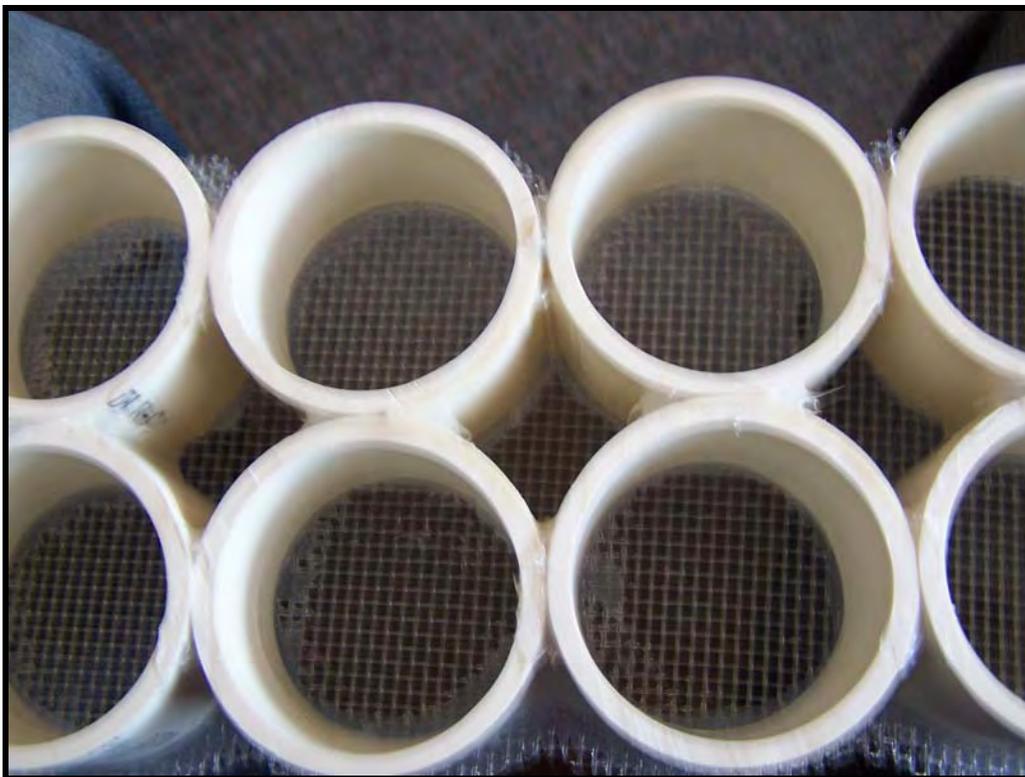


Photo 2: Close up of egg cups



Photo 3: Water bath and test chambers setup to maintain temperature for rearing

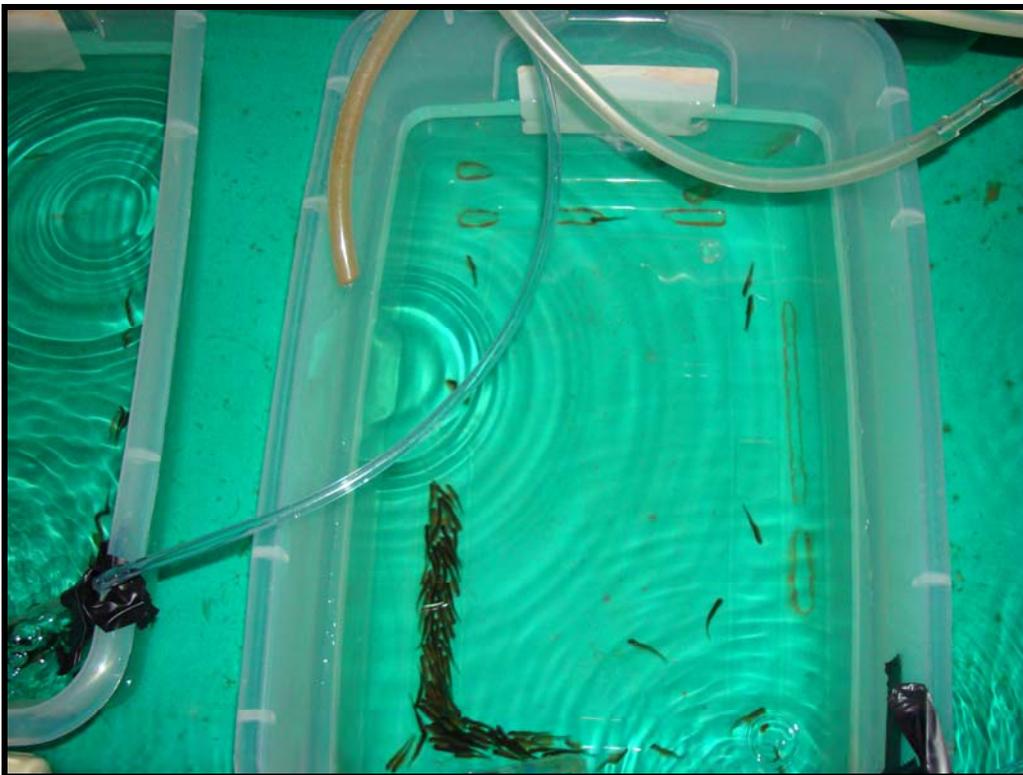


Photo 4: Test chamber containing hatched brown trout



Photo 5: Diluter panel used to feed water to each testing chamber



Photo 6: Water baths and black curtain used to keep eggs in the dark during initial rearing



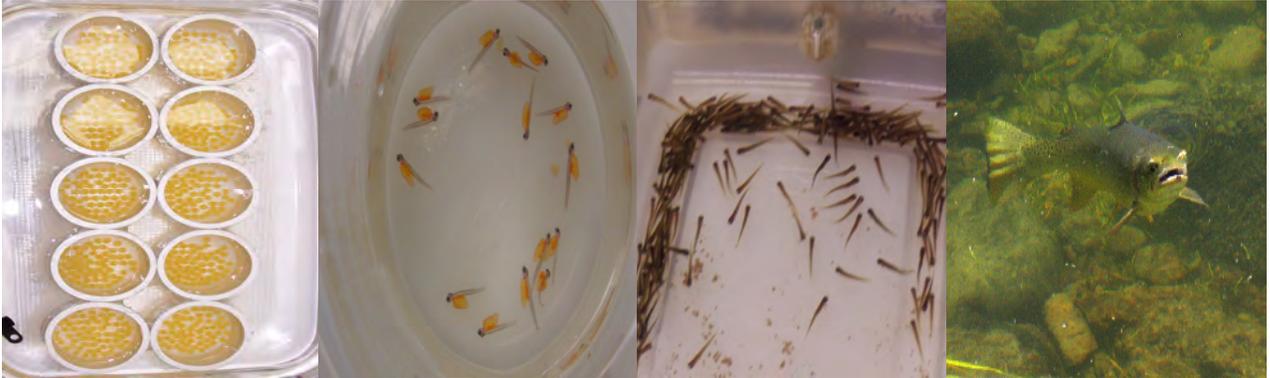
Photo 7: Test chamber for brown trout in post swimup 15-day feeding trial



Photo 8: Separation of feeding trial swim ups into light conditions and pre swimup yolk sac fry into dark conditions

APPENDIX B

Prepared for:
JR Simplot Company and Newfields Company, LLC.
Pocatello, Idaho



Data Report

Reproductive Success Study with Yellowstone Cutthroat Trout (*Oncorhynchus clarki*)

December 2009

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1.0 Introduction

A study of Yellowstone cutthroat trout (*Oncorhynchus clarki*) reproduction was conducted by Newfields for the JR Simplot Company to evaluate the parental transfer of selenium on the potential effects to offspring. ENSR's Fort Collins Environmental Toxicology Laboratory (FECTL), Fort Collins, CO was retained to conduct the laboratory biological exposure portions of this study according to the study design plan outlined in the *Technical Memorandum – Laboratory Toxicity Tests for Developing a Site-Specific Selenium threshold for Trout* (Newfields 2008). An assessment of larval trout deformities was performed under the direction of Dr. Kevin Bestgen at Colorado State University's Larval Fish Laboratory, which is described in a separate document. This report presents the results / data from the laboratory portion of this work.

2.0 Methods

Newfields' field team (under the supervision of Sean Covington) collected and fertilized all the field fish for this project. Because of the time sensitive nature of this project, a courier service was employed to deliver fertilized eggs from near the study sites in Idaho to the laboratory in Fort Collins, CO, USA.

Hatchery fish and gametes were obtained from Henry's Lake Fish Hatchery (Henry's Lake, ID).

Photographs taken at various points during the study are included in Appendix A.

2.1 Spawning of Yellowstone Cutthroat Trout

Fertilization techniques for hatchery fish were similar to those of the field collected fish, which were refined in the reproductive study conducted with brown trout in fall of 2008. All eggs were fertilized in the field instead of bringing the individually collected gametes back to the laboratory and mixing them to achieve fertilization.

Hatchery fish and gametes were obtained from Henry's Lake Fish Hatchery, Henry's Lake, ID (courtesy of Damon Keen, Idaho Fish and Game) on April 7, 2008. Unlike traditional hatchery fish, those from Henry's Lake comprise a natural run of cutthroat trout that move into the river from the lake to spawn. The trap is setup near the lake outlet to the river and prespawn trout are captured as a hatchery source for other areas from this location. Throughout this study, fish from this hatchery are identified as HL. Because hatchery fish were obtained when they were ripe, which occurred prior to when fish were spawning in the field, the hatchery fish were obtained approximately 2 months prior to the first field collected fish. In addition, hatchery fish were at the tail end of the spawning season so additional organisms were included in this batch of organisms to account for the possibility of low fertilization success.

Fertilization techniques for the hatchery fish (HL) and field fish were similar. Sixteen adult female and male trout were anesthetized using tricaine methanesulfonate (MS-222) and stripped for gametes. Eggs from a given female were collected directly into a cleaned plastic pan. Milt from a single male was then added directly into the same plastic pan. The eggs and milt were gently mixed by swirling the container and allowed to stand for ~60 seconds. The egg/milt mixture was covered with ~200 ml of local water (i.e., water from either the hatchery or local stream), swirled for approximately three minutes, after which an additional amount of water was added to the chamber (~500 ml). The eggs were then allowed to water harden for approximately five minutes to an hour prior to transferring them to a pre-labeled plastic bag.

Bags were labeled with the individual identifications for each fish and the collection location and date. Prior to transport to the laboratory, all bags with gametes were partially filled with oxygen, sealed, double bagged, and placed on ice (~4 °C) in a cooler to keep gametes cold and out of direct sunlight. A min-max thermometer (Taylor® Digital Wireless Temperature System) or transponder (field fish) was placed into the cooler with eggs to monitor temperature during transit to ENSR. The

temperature range during transport of the hatchery (HL) and field eggs from the respective sites to the FCETL is provided in the table below.

Table 2-1. Temperature measured in coolers holding fertilized Yellowstone cutthroat trout eggs in transport from field to ENSR.

| Egg batches | Temperature range during transport (°C) |
|-------------|--|
| HL | 001 – 008: 1 – 3°C 009 – 016: 1 – 5°C |
| Green | 1 – 4°C |
| Purple | 4 – 5°C |
| Orange | 2 – 8°C |

All female fish from the hatchery and field were measured for determination of total length, weight, percent solids, and whole-body selenium analysis. Sacrificed adult female trout were placed in large plastic bags, double bagged, and then stored on ice for transport to ENSR.

2.2 Laboratory Reproduction Tests

On the day eggs were received at ENSR's FCETL, a target of 600 eggs per treatment were collected from each batch of eggs using egg pickers and placed in prepared egg cups under low light conditions. Egg cups were then placed in individual test chambers in the water baths in the dark. Remaining eggs not used for the test were then counted to determine the total number of eggs produced per female and frozen until they could be sent to Columbia Analytical Services (CAS), Inc. (Kelso, WA) for total selenium and percent solids analysis.

Because the number of eggs for the hatchery fish was rather large the egg counts were estimated using an egg counting technique developed during the previous brown trout reproductive study. Briefly, we counted the number of eggs for a given female that would fill a graduated cylinder to a particular volume (50 ml). Then we poured all the eggs into a graduated cylinder to measure the total egg volume for that female. Using the number of eggs in 50 ml, we determined the number of eggs in the total volume of eggs for that female. Since eggs from different females were of different size, this method was completed separately for each egg batch (Appendix B). Eggs for field collected fish were not as numerous and therefore all eggs for these treatments were counted. A list of the different locations from which fish were collected (i.e., treatments) and the individual identifications for each are provided in the table below (Table 2-2).

Table 2-2. Yellowstone cutthroat trout treatments and sample identifications for individual lots of fish eggs used in the reproductive study.

| Henry's Lake Hatchery (HL) | Deer Creek (DC) | Background Se Field Location (CC-150) | Low Se Field Location (CC-350) | High Se Field Location (LSV2C) | South Fork Tin Cup - 1 (SFTC) |
|----------------------------|-----------------|---------------------------------------|--------------------------------|--------------------------------|-------------------------------|
| HL-001 | DC-001 | CC-150-Nates-001 | CC-350-001 | LSV2C-001 | SFTC-FT0012 |
| HL-002 | DC-002 | | CC-350-002 | LSV2C-002 | |
| HL-003 | DC-003 | | CC-350-003 | LSV2C-003 | |
| HL-004 | DC-004 | | CC-350-004 | LSV2C-004 | |
| HL-005 | | | CC-350-005 | | |
| HL-006 | | | | | |
| HL-007 | | | | | |
| HL-008 | | | | | |
| HL-009 | | | | | |
| HL-010 | | | | | |
| HL-011 | | | | | |
| HL-012 | | | | | |
| HL-013 | | | | | |
| HL-014 | | | | | |
| HL-015 | | | | | |
| HL-016 | | | | | |

Note: CC – Crow Creek; LSV – Lower Sage Creek

Egg cups were constructed of polyvinyl chloride (PVC) schedule 40 pipe (approximately 5 cm ID and 3.8 cm depth) with a nitex screen bottom. Ten individual units were attached in a 2 x 5 layout design using silicon, so that each egg cup consisted of 10 individual cells (Figure 2-1). Eggs were evenly distributed into all 10 of the cells of the egg cups. For instance, the treatments initiated with 600 eggs had 60 eggs placed into each egg cup cell. While the original intent was to maintain the ten replicates for a given fish throughout the study, this was not feasible due to the water demands and space limitations. Therefore, organisms from all replicates were combined in the test chamber at hatch out.

Egg cups were hung with clips and fishing line in Sterilite® plastic test chambers (11.4 L). Each chamber was aerated for the duration of the test to maintain the dissolved oxygen concentration at sufficient levels (>60%). The volume in each test chamber was approximately 5 L maintained at the level of the top of the drain pipe which consisted of a piece of 5-mm ID glass tubing inserted through a silicone stopper which is pressed into a small hole drilled in the side of the chamber. Chambers and water volume were of sufficient size to maintain a loading rate of < 5 g of fish per L of water in each test chamber. Spent water overflowed out of the glass standpipes and into the water bath before being discharged directly to a waste conduit. This water was treated with an ultraviolet light disinfection unit prior to discharge into the laboratory waste water system. After swim-up occurred, the drain openings were covered with a small piece of nylon mesh to prevent loss of organisms. In general, methods employed for this study followed ASTM (2006) standard guidance for conducting early life stage tests with fish, although modifications were made to account for study-specific hypotheses and test design criteria (e.g., number of eggs).

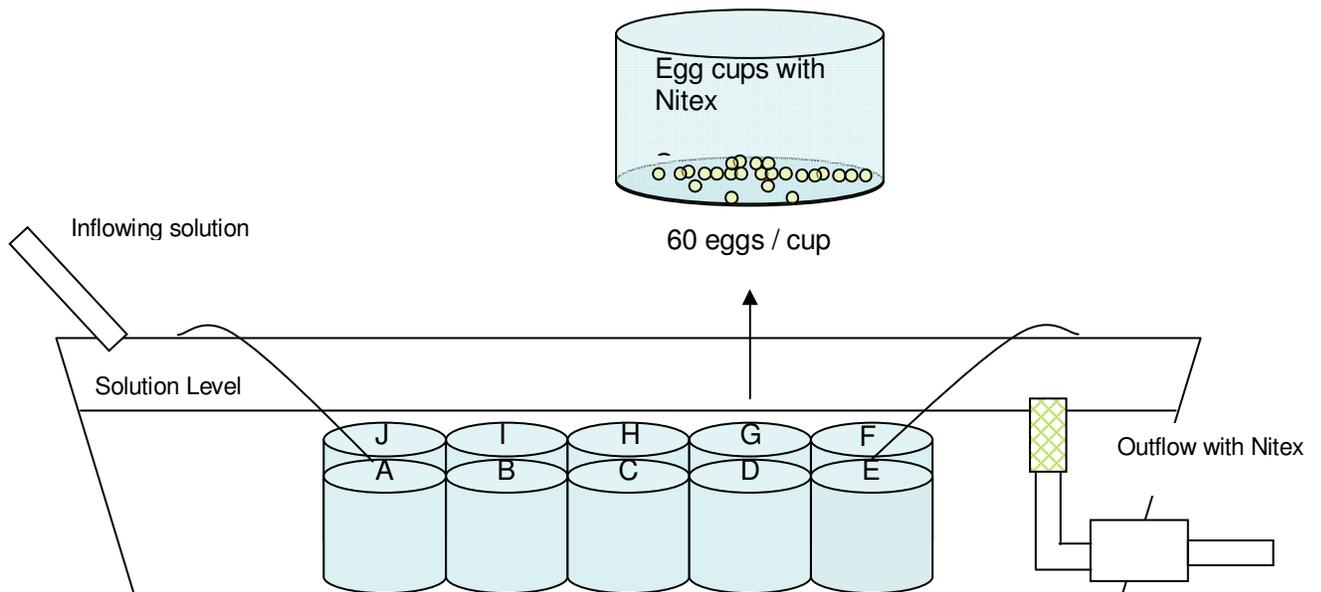


Figure 2-1. Schematic diagram of the test chamber and egg cups for Yellowstone cutthroat trout reproductive study. Inset shows individual cells of egg cups ($n = 10$) within a chamber. Aeration tube not shown.

With the test solution volume of ~5 L and a flow rate of 20 ml/min, each test vessel received ~ 5.7 volume additions per day. Test chambers were held in one water bath with the temperature controlled by a chiller. Since Yellowstone cutthroat trout treatments were received in batches of fish from different sites it was not possible to randomize the location of all treatments. Instead, treatments were randomly placed into empty locations within the bath as they were received. The second batch of eggs was initiated on the day the hatchery fish were terminated (June 11, 2008), therefore, not all treatments were up at the same time.

Table 2-3. Batch groupings for Yellowstone cutthroat trout treatments used in the reproductive study.

| Henry's Lake Hatchery (HL) Batch (Received April 8) | Green batch (Received June 7) | Purple batch (Received June 11) | Orange batch (Received June 29) |
|--|--------------------------------------|--|--|
| HL-001 | CC-350-001 | CC-350-003 | SFTC-FT0012 |
| HL-002 | CC-350-002 | CC-350-004 | |
| HL-003 | LSV2C-001 | CC-350-005 | |
| HL-004 | LSV2C-002 | DC-001 | |
| HL-005 | LSV2C-003 | DC-002 | |
| HL-006 | LSV2C-004 | DC-003 | |
| HL-007 | | DC-004 | |
| HL-008 | | CC-150-Nates-001 | |
| HL-009 | | | |
| HL-010 | | | |
| HL-011 | | | |
| HL-012 | | | |
| HL-013 | | | |
| HL-014 | | | |
| HL-015 | | | |
| HL-016 | | | |

The exposure chambers were housed in temperature-controlled water baths. Target temperature in the test chambers was $10 \pm 2^\circ\text{C}$. Dissolved oxygen concentrations were maintained at ≥ 60 percent of saturation (5.6 mg/L at 5,200 feet elevation and 10°C). Embryos and fry were maintained under dim lighting (approximately 0.8 foot-candles) until swim-up occurred, after which they were held in ambient lighting (approximately 16 ft-c) with 16 hours of light per 24-hour period.

Egg cups were maintained submerged in each test chamber until all eggs hatched or were noted as dead. Dead eggs were removed 2-3 days after test initiation in order not to disturb them during their sensitive stage. However, in some instances dead eggs or fungused eggs were removed to keep this from spreading. Care was taken when removing the eggs from the egg cups prior to the eyed up stage. The number of dead eggs removed each day was recorded for each test chamber. Eggs or embryos were considered dead if they appeared opaque and/or developed visible fungal infections. As hatching occurred, the number of dead alevins or eggs that were removed, were recorded on a daily basis. When eggs hatched, alevins were gently removed to the bottom of the surrounding test chamber using a large bore glass pipette and the remaining egg shell was removed. Organisms that died as eggs or while hatching were recorded and preserved in Stockard's solution. Eggs that had the amniotic fluid (e.g., yolk) leak out during the time of hatching or just prior were termed, 'dead while hatching' (DWH). Any organisms that were not found during the test were considered dead, except during the 15-d swim-up study. For the last phase of the study it was easier to keep up with the number of fish that died and therefore total counts were based on the number of fish preserved at the end of the study, number used for dry weights, and the number recorded dead during the study. The number of missing / extra trout did not exceed five. Fish were considered dead if no gill movement or visible response was observed in response to gentle prodding. Egg cups were removed after all living eggs hatched or all remaining eggs were

determined to be unfertilized or dead. Test initiation and termination dates for each treatment are provided below (Table 2-4).

Table 2-4. Test initiation dates and termination dates for Yellowstone cutthroat trout treatments in the reproduction study.

| Fish Treatment / Batch | Test Initiation Date | Test Termination Date(s) |
|-------------------------------|-----------------------------|---------------------------------|
| HL | April 8, 2008 | June 11, 2008 |
| Batch 1 (green) | June 7, 2008 | August 1, 2008 |
| Batch 2 (purple) | June 11, 2008 | August 6, 2008 |
| SFTC (orange) | June 29, 2008 | --- ^a |

^aAll eggs for this treatment died prior to eye-up stage.

Eggs (primarily HL treatments) were treated using formalin in an attempt to reduce fungal growth. Days and type of treatment are located in Appendix C. Fungus appeared to affect the HL treatments more than later field-collected (i.e., wild) eggs as there were typically more eggs and the success rate for some of these treatments were lower than anticipated.

After the hatching phase, alevins (recently hatched young with yolk sacs) were monitored daily for mortality. Dead organisms were removed and placed in Davidson's solution. As alevins approached swim-up, trout chow was offered to the organisms to determine if they were actively feeding. The swim-up date was set based on when at least 80% of the alevins had absorbed their yolk sac and were actively feeding. At the swimup stage, organisms were thinned down to a target of 100 organisms per test chamber, preserving all the extra organisms in Davidson's solution for the deformities assessment. If there were less than 100 organisms in the test chamber then organisms were counted and left in the test chamber; however, few to no organisms were preserved at this stage for deformities analysis. All living larval fish were then maintained for the 15-d post swim-up stage of the study. Dead organisms were counted and removed daily, saved by placing them in Davidson's solution. Swim-up trout were started on a 4% body weight ration of salmon starter #1 (purchased from Aquatic Biosystems, Fort Collins, CO) over three feedings daily (i.e., morning, noon, evening). Weight of a swim-up fry was based on wet weights of brown trout larvae from the previous study (i.e., 0.105 g; therefore, daily feeding was ~0.4 g trout chow assuming 100 fry).

At initiation of the swim-up stage the flow rate into each chamber was altered to 40 ml/min and taller stand pipes were added to adjust the total volume to ~9 L to account for loading requirements based on the anticipated growth of the organisms. Loading for the hatchery fish was < 2.5 g/L (assumes a wet wt of 0.2 g for 100 fish in 8 L of water). Once feeding started, test chambers were siphoned daily (in p.m. prior to feeding) to remove remaining food and fecal material.

At the end of the 15-d post swim-up study, all organisms were sacrificed via immersion in isopropyl alcohol. A sub-set of 20 organisms was rinsed with deionized water, blotted dry and measured for

standard length (tip of snout to caudal peduncle). All remaining organisms were preserved in Davidson's solution and saved for deformities assessment. For the organisms saved for length and weight determinations, two groups (CC350-003 and CC350-005) were monitored for total and standard length to determine the relationship between these two measures (Appendix D). The standard and total lengths for CC350-003 were 22.0 ± 2.1 mm and 24.6 ± 2.2 mm, respectively. The standard and total lengths for CC350-005 were 19.4 ± 1.3 mm and 21.2 ± 1.3 mm, respectively. Length measurements were taken on the day of test termination.

Following length measurements, organisms were preserved in isopropyl alcohol until dry weight determinations could be made. The only exception to this was the DC-003 fish which were inadvertently not saved in isopropyl alcohol after length determinations. This was determined on Nov. 15, 2008 when fish were placed on the pre tared pans for weight determination. This deviation could have affected the dry weight measurements for this treatment. For dry weight analysis, each fish was transferred to a tared weight boat and dried at 100 °C for at least 48 hours. After removal from the drying oven, the weigh boats were placed in a dessicator to prevent absorption of moisture from the air, until weighed (dry weight) to the nearest 0.01 mg.

2.3 Dilution Water

The dilution/control water used in this study was FCETL process water obtained from Horsetooth Reservoir. The ambient incoming water is coarse-filtered (through a sand filter and polypropylene core filters [10 and 1 micron]) to remove indigenous organisms, particulate matter, and contaminants. Water then passes through an ultraviolet light disinfection system before being stored in large holding tanks. This water is periodically analyzed for contaminants. Horsetooth Reservoir process water is very soft to soft water according to USEPA (2002), with both hardness and alkalinity typically 20 - 30 mg/L as CaCO₃ (Table 2-5). Background sulfate levels in unaltered Horsetooth water are ~5.0 mg/L.

Ambient (unheated) laboratory Horsetooth reservoir water was passed through a 1 µm filter (to reduce the potential for fungal problems) into a head tank at a target rate of 1,000 ml/min. A super hardness stock (described below) was metered from a 5-gallon Marriotte bottle into the head tank (Figure 2-2). Our laboratory Horsetooth water was adjusted to increase the hardness and sulfate so that it would be higher than ambient levels and more similar to the field conditions (Table 2-3). Given the soft water conditions of the laboratory Horsetooth water and the volume of water used on a daily basis, it was impractical to match the water quality characteristics of the site.

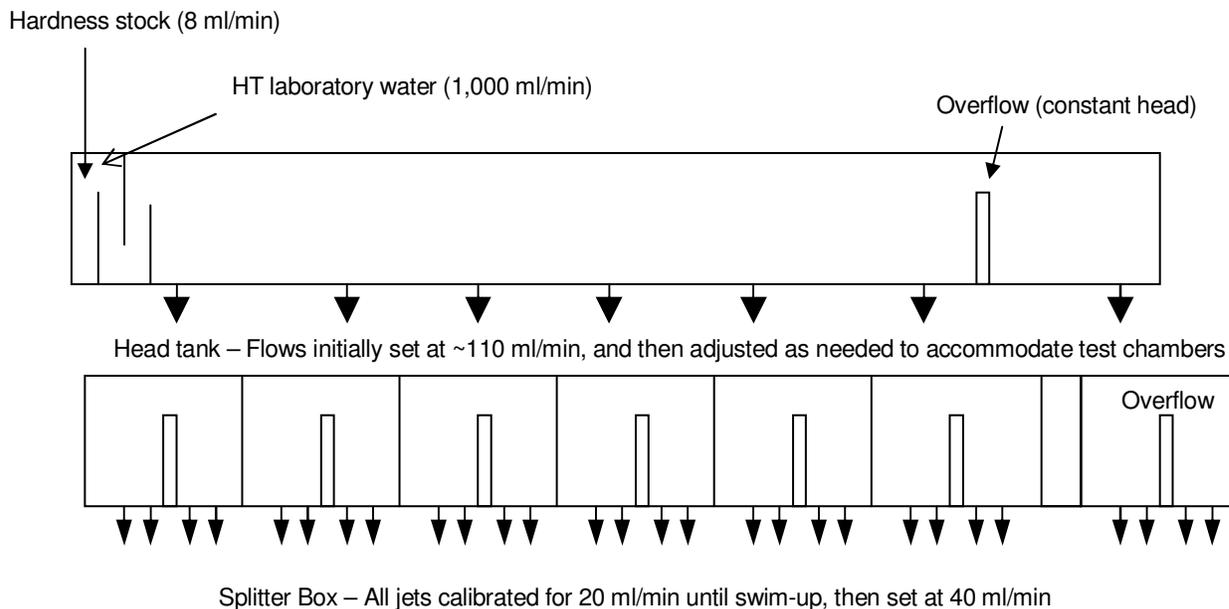


Figure 2-2. Schematic diagram of the dilutor system used for the Yellowstone cutthroat trout reproductive study.

Table 2-5. Water quality measurements for Horsetooth Reservoir process water (unamended) and Crow Creek Drainage.

| Parameter | Horsetooth Reservoir ¹ | | Crow Creek ² | |
|-------------------|-----------------------------------|-------------|-------------------------|-------------|
| | Average | Range | Average | Range |
| Hardness (mg/L) | 33 | 26.5 – 41.8 | 171 | 129 – 220 |
| Alkalinity (mg/L) | 28.8 | 25 – 33 | 197 | 140 – 231 |
| Sodium (mg/L) | 3.5 | 2.7 – 5.5 | 3.3 | 1.0 – 6.5 |
| Potassium (mg/L) | <1 | --- | <1 | <1 – 1.8 |
| Sulfate (mg/L) | 5.6 | 3.4 – 10 | 27 | 7.5 – 48.7 |
| Chloride (mg/L) | 1.9 | 0.5 – 3.6 | 7.3 | 0.2 – 89 |
| DOC (mg/L) | 2.4 | 2.1 – 2.9 | 1.0 | 0.34 – 2.18 |

¹Horsetooth Reservoir laboratory process water (Fort Collins, CO) from 2000 to 2004 measured at ENSR's FCETL.

²Crow Creek drainage as characterized by surface water from Crow Creek, Sage Creek, and Hoopes Spring surface water quality data (Newfield 2008)

Calcium sulfate (CaSO₄·2H₂O; Ben Franklin® Aquacal™, Plaster City, CA) and magnesium sulfate (MgSO₄·7H₂O; The PQ Corporation, Valley Forge, PA) were added at a ratio of 1.82:1 calcium:magnesium (molar basis) to deionized water to prepare a super hardness stock solution of ~2,000 mg/L as CaSO₃. This super stock was metered into the head tank (~ 8 ml/min) to achieve a target

hardness of ~50 mg/L as CaCO₃ and sulfate concentration of ~20 mg/L. Water hardness was measured daily during the study, while sulfate concentration was monitored periodically.

Batches of the super hard stock solution were prepared as needed which was approximately every three days, while the Mariotte bottle was filled daily throughout the study. Flows on the main dilution water (unadjusted Horsetooth water) and the hardness stock solution drip flowing from the head tank (Mariotte bottle fed this tank) were measured at least once daily throughout the study.

The head tank flowed into diluter panels constructed out of glass, silicone adhesive, and silicone stoppers. Adjusted Horsetooth process water was delivered to the test chambers through (3/8 I.D. x 1/2 O.D. x 1/16 thickness, inch) polyethylene tubing. The diluter panel delivered modified Horsetooth water to up to a maximum of 24 test chambers. Flow rate into each chamber was adjusted in the splitter box to deliver a target rate of 20 ml of test solution per minute to each chamber. After swim-up had occurred and the 15-d post swim-up study was underway, the flow rates were adjusted to a target of 40 ml of test solution per minute per chamber.

2.4 Water Chemistry

Temperature (°C), pH (s.u.), dissolved oxygen (mg/L) concentrations, and conductivity (µS/cm) were measured and recorded in one chamber for each test treatment daily. Hardness (as mg/L CaCO₃) was measured from the diluter panel or from a test chamber daily during the study. Total ammonia (mg/L as N) was measured in selected test chambers once feeding was initiated in the 15-d post swim-up study. Sulfate concentration was measured from water collected from the diluter panel or from test chambers. Determinations of waterborne sulfate concentrations were made at Paragon Analytics, Inc. (Fort Collins, Colorado, USA) using ion chromatography (EPA Method 300.0).

Water samples for total recoverable and “dissolved” selenium analyses were collected, prepared, and preserved from selected test chambers during the course of the study. Briefly, approximately 50 to 250 ml of test solution was collected for analysis of either dissolved or total selenium analysis. Aqueous analytical samples were analyzed at ACZ Laboratories (Steamboat Springs, CO). Dissolved selenium samples were filtered through 0.45 µm filters (GHP Acrodisc Syringe Filters, Pall Gelman Scientific, Ann Arbor, MI, USA) prior to placing in the polypropylene sample containers and preserved with 1% nitric acid. Samples were analyzed using an ICP-MS (EPA Method 200.8).

Aqueous water samples were also collected at the hatchery site (Henry’s Lake) for analysis of total and dissolved selenium so background levels of selenium at the hatchery could be compared with selenium levels from field sites. The samples were collected in May 2008 and sent to ACZ for analysis. Total recoverable and dissolved Se concentrations in the water from the Henry’s Lake Fish Hatchery was <0.1 µg/L (Appendix E).

2.5 Deformities Assessment

Extra fry (excluding the target of 100 fry kept for the post swim-up phase of the study) were removed and preserved in Davidson’s Solution at swim-up for deformity examination. Any deformed fry were removed at this point and preserved as part of the extra fry. Upon test termination (i.e., after the 15-d post swim-up study), an additional batch of fish (per treatment) were preserved similarly and

saved for deformity assessment. Of the 100 organisms included in the 15-d post swim-up phase of the study, the target was to save 80 of these fry for deformity assessment (the other 20 were assessed for length and dry weight analysis).

Dead fish and alevins were removed during the study and preserved for deformity assessment as well. However, many of these organisms did not preserve well because they were in various states of decay. Because of the poor tissue condition of these dead organisms they were not originally evaluated (i.e., necrotic tissue conditions and/or presence of fungus made analysis and observations difficult). A subsequent analysis was conducted on all or some of these fish (per batch) for three samples in which there was no or little data. These additional samples were from LSV2C -001, DC-004, and CC-350-001. See the results section for more detail on these samples. All samples for deformity analysis were sent to Dr. Kevin Bestgen at CSU. Data from these samples were incorporated in the deformity assessment performed.

2.6 Endpoints

Multiple test endpoints were utilized for this test at different times during the test. Fecundity, hatch, deformities, length, weight, survival (different times during the study), tissue concentrations (egg and whole body), and feeding success were proposed test endpoints. These endpoints were similar with those from the brown trout reproductive study as well as those of Holm et al. 2005, Hardy 2005, and Kennedy et al. 2000 on which the test described herein was based.

Total egg production for each female was counted as a measure of fecundity. Survival was determined based on the number of surviving fish at hatch, swim-up, and at test termination compared to the number of eggs at test initiation. Percent hatch was determined as the number of live fish and alevins at day of first hatch compared to the number of eggs at test initiation. Other endpoints included day of swim-up, day of test termination, and measurements on survival larval fry at test termination (length and dry weight).

3.0 Results

3.1 Egg Analyses

The number of eggs used from a given female depended on the total number of eggs provided by that female. While the target was 600 eggs per female, certain organisms did not provide that many total eggs, and for two groups (CC-350-002 and LSV2C-003), we accounted for more than the target. The goal was to maximize the number of eggs used in the reproduction study while leaving a sufficient number for selenium analysis. For treatments with fewer eggs (e.g., DC-004), eggs were added to each replicate of the egg cup in small numbers (10 at a time) to ensure equal numbers in each replicate. Once that target number was added to each replicate egg cup cell, the number of eggs remaining was evaluated to see whether more eggs could be added to the egg cup. This process was repeated until no fewer than 142 eggs remained for Se analysis. The number of eggs used in the study from a particular female, the total number of eggs the female produced, and the percent egg mortality are presented (Table 3-1).

The total number of eggs from field collected organisms ranged from 242 (DC-004) to 1,539 (DC-002). By contrast, the range of eggs collected from the HL hatchery fish ranged from 1,597 (HL-002) to 4,668 (HL-011).

Table 3-1. Estimated number of total Yellowstone cutthroat trout eggs from adult female organisms used in the reproductive success study and percent egg mortality.

| Location | Sample ID | #Eggs placed in study | Total # of eggs from fish | Egg Mortality (%) | |
|-----------------|------------------|-----------------------|---------------------------|-------------------|------|
| <i>Hatchery</i> | HL-001 | 600 | 2,114 | 100 | |
| | HL-002 | 600 | 1,597 | 88.5 | |
| | HL-003 | 600 | 2,999 | 43.0 | |
| | HL-004 | 600 | 2,452 | 23.8 | |
| | HL-005 | 600 | 2,108 | 100 | |
| | HL-006 | 600 | 2,162 | 39.0 | |
| <i>Fish</i> | HL-007 | 600 | 2,734 | 26.3 | |
| | HL-008 | 600 | 2,985 | 21.8 | |
| | HL-009 | 600 | 1,906 | 100 | |
| | HL-010 | 600 | 3,791 | 99.3 | |
| | HL-011 | 600 | 4,668 | 43.7 | |
| | HL-012 | 600 | 2,735 | 16.5 | |
| | HL-013 | 600 | 2,420 | 12.3 | |
| | HL-014 | 600 | 3,676 | 100 | |
| | HL-015 | 600 | 2,322 | 89.7 | |
| | HL-016 | 600 | 3,876 | 100 | |
| <i>Wild</i> | CC-150-Nates-001 | 300 | 600 | 21.7 | |
| | DC-001 | 600 | 1,017 | 45.8 | |
| | DC-002 | 600 | 1,539 | 14.8 | |
| | DC-003 | 450 | 846 | 2.4 | |
| | DC-004 | 100 | 242 | 36.0 | |
| | CC-350-001 | 400 | 748 | 59.5 | |
| | CC-350-002 | 750 | 1,209 | 3.5 | |
| | CC-350-003 | 500 | 929 | 22.8 | |
| | CC-350-004 | 600 | 1,294 | 13.5 | |
| | CC-350-005 | 600 | 1,160 | 19.5 | |
| | <i>Fish</i> | LSV2C-001 | 600 | 1,290 | 7.3 |
| | | LSV2C-002 | 550 | 1,068 | 19.3 |
| | | LSV2C-003 | 650 | 1,358 | 0.8 |
| LSV2C-004 | | 600 | 1,072 | 4.8 | |
| SFTC1-FT0012 | | 300 | 1,472 | 100 | |

3.2 Laboratory Study

3.2.1 Water Chemistry

The water quality parameters (pH, temperature and dissolved oxygen [DO]) monitored daily during the study were within acceptable ranges for the survival of Yellowstone cutthroat trout (Table 3-2).

Table 3-2. Water hardness (avg \pm SD), dissolved oxygen (low and % saturation), pH (range), temperature, and conductivity measured in each treatment or batch during the reproductive study using Yellowstone cutthroat trout (*Oncorhynchus clarki*).

| Fish Treatment | Water Hardness (mg/L) | Minimum Dissolved Oxygen (mg/L) & % Saturation | pH (s.u.) | Avg \pm SD Temp ($^{\circ}$ C) | Temp. Range ($^{\circ}$ C) | Conductivity (μ S/cm) |
|----------------|-----------------------|--|-----------|-----------------------------------|-----------------------------|----------------------------|
| HL | 44.4 \pm 3.4 | 7.0 / | 7.4 – 8.1 | 10.5 \pm 0.8 | 8.9 – 12.5 | 94 – 148 |
| Green Batch | 45.6 \pm 2.1 | 7.0 / 79 | 7.4 – 8.0 | 12.4 \pm 1.4 | 9.0 – 15.0 | 102 – 135 |
| Purple Batch | 45.4 \pm 2.0 | 6.4 / 72 | 7.4 – 7.9 | 12.2 \pm 1.1 | 10.0 – 14.7 | 101 – 138 |
| SFTC-001 | 45.2 \pm 2.1 | 7.3 / | 7.6 – 7.9 | 12.9 \pm 1.3 | 9.7 – 14.9 | 105 – 124 |

Note: At 5,200 feet elevation and 10 $^{\circ}$ C, 60% dissolved oxygen saturation is 5.63 mg/L

Alkalinity was measured at least weekly in the laboratory Horsetooth dilution water and it averaged 28.3 \pm 5.9 mg/L (as CaCO₃) between April 8, 2008 and August 6, 2008. Ammonia was measured in select treatments (LSV2C-001 [7/14/08], CC-350-001 and DC-004 [7/28/08], LSV2C-003 and CC150-Nates-001 [7/30/08], LSV2C-004 and CC-350-004 [8/1/08]) during the 15-d post-swim-up feeding portion of the study and was <1.0 mg/L in all test chambers. Sulfate, measured three times over the course of the study, averaged 16 (range 15 – 17) mg/L (Appendix E). Water temperature measured in the chambers for each batch is presented graphically over the course of the study (Appendix E).

Aqueous selenium measured in the hardness adjusted Horsetooth water or in specific test chambers from May 8, 2008 to July 18, 2008 were \leq 0.2 μ g/L (12 total measurements; Appendix E).

3.2.2 Biological Endpoints

The day of first hatch for the HL hatchery fish ranged from 24 to 28 days (Table 3-3). The field collected fish hatched slightly faster from 20 to 21 days. The slightly lower temperatures for the HL hatchery fish likely explain the slightly longer day to first hatch. Through hatch the temperature averaged 10.5 $^{\circ}$ C for the HL treatments but averaged 12.1 $^{\circ}$ C for both the green and purple batches.

There were several HL egg batches that completely died prior to hatch, including HL-001, HL-005, HL-009, HL-014, and HL-016. Only four eggs from the HL-010 treatment hatched. These organisms were maintained throughout the study and survived until test termination (day 64). They were not saved for either deformity assessment or length and growth determinations.

Only one group of the field collected fish did not survive to hatchout, SFTC1-FT0012.

Table 3-3. Day of first hatch, percent hatch, day of swim-up, percent swim-up, and percent survival at swim-up for Yellowstone cutthroat trout fry from the reproductive success study.

| Location | Sample ID | Day of 1 st hatch | % hatch ^a | Day of swim-up | % Swim-up | Survival (%) at Swim-up Stage | |
|-----------------|--------------|------------------------------|----------------------|----------------|-----------|-------------------------------|------|
| <i>Hatchery</i> | HL-001 | -- | 0 | -- | -- | -- | |
| | HL-002 | 28 | 11.5 | 49 | 9.8 | 9.8 | |
| | HL-003 | 24 | 57.0 | 49 | 54.2 | 54.2 | |
| | HL-004 | 26 | 76.2 | 49 | 73.0 | 73.0 | |
| | HL-005 | -- | 0 | -- | -- | -- | |
| | HL-006 | 27 | 61.0 | 49 | 44.0 | 44.0 | |
| | HL-007 | 27 | 73.7 | 49 | 70.7 | 70.7 | |
| | <i>Fish</i> | HL-008 | 28 | 78.2 | 49 | 72.2 | 72.2 |
| | | HL-009 | -- | 0 | -- | -- | -- |
| | | HL-010 ^b | 27 | 0.7 | 49 | 0.7 | 0.7 |
| | | HL-011 | 25 | 56.3 | 49 | 52.8 | 52.8 |
| | | HL-012 | 26 | 83.5 | 49 | 79.3 | 79.3 |
| | | HL-013 | 28 | 87.7 | 49 | 83.7 | 83.7 |
| | | HL-014 | -- | 0 | -- | -- | -- |
| | | HL-015 | 27 | 10.3 | 49 | 9.3 | 9.3 |
| | | HL-016 | -- | 0 | -- | -- | -- |
| <i>Wild</i> | | CC-150-Nates-001 | 21 | 78.3 | 41 | 74.7 | 74.7 |
| | DC-001 | 20 | 54.2 | 41 | 50.2 | 50.2 | |
| | DC-002 | 22 | 85.2 | 41 | 81.0 | 81.0 | |
| | DC-003 | 20 | 97.6 | 41 | 95.3 | 95.3 | |
| | DC-004 | 20 | 64.0 | 41 | 60.0 | 60.0 | |
| <i>Fish</i> | CC-350-001 | 21 | 40.5 | 40 | 35.8 | 35.8 | |
| | CC-350-002 | 20 | 96.5 | 40 | 85.1 | 85.1 | |
| | CC-350-003 | 20 | 77.2 | 41 | 73.8 | 73.8 | |
| | CC-350-004 | 21 | 86.5 | 41 | 85.2 | 85.2 | |
| | CC-350-005 | 20 | 80.5 | 41 | 70.3 | 70.3 | |
| | LSV2C-001 | 21 | 92.7 | -- | 0 | 0 | |
| | LSV2C-002 | 20 | 80.7 | 40 | 67.8 | 67.8 | |
| | LSV2C-003 | 21 | 99.2 | 40 | 80.6 | 80.6 | |
| | LSV2C-004 | 20 | 95.2 | 40 | 85.5 | 85.5 | |
| | SFTC1-FT0012 | -- | 0 | -- | -- | -- | |

^a Percent hatch and percent survival at hatch were synonymous endpoints.

^b Only four organisms survived past hatch; these organisms were maintained for the duration of the study but no remaining endpoints were included given the low hatch-out success.

Percent hatch and percent survival at hatch were synonymous endpoints for all treatments. The percent hatch for the HL treatments (outside of the six treatments discussed above) ranged from 10.3 – 87.7% (average of 59.5%). Hatchout for two of these groups, HL-002 and HL-015 were rather low, 10.3 and 11.5%, respectively. Without these two groups, the percent hatch for the remaining HL treatments ranged from 56.3 – 87.7% and averaged 71.7%.

The percent hatch for the field collected eggs (excluding SFTC1) ranged from 40.5 – 99.2%. Eggs collected from DC treatments ranged from 54.2 – 97.6%, with an average of 75.2%. Average hatch out for the eggs collected from fish at CC-350 was 76.2%, while that for the eggs from LSV2C was 92.0%. The one batch from CC-150 had 78.3% hatch.

The day of swim-up for the HL hatchery fish was at 49 days (Table 3-3). For the majority of the field treatments, the day of swim-up was between 40 to 41 days, regardless of the collection location. As with hatch, the slightly higher temperature measured in the chambers with the field collected fish are the likely cause of this. Through swim-up the water temperature averaged 10.4 °C for the HL treatments; however it averaged 12.7 °C for the treatments in the green batch and averaged 12.5 °C for treatments in the purple batch (Appendix E).

There was one treatment where all the alevins died while in the swim-up stage (i.e., while absorbing their yolk sac) – LSV2C-001 (Table 3-3). Organisms were observed on day 30 as being weak and all but 19 alevins were found dead on test day 31. The dissolved oxygen in this chamber on days 30 and 31 were 7.5 and 7.6 mg/L, respectively. The remaining alevins died prior to swim-up. A subsample of 20 alevins that had died were pulled and frozen for Se analysis. The concentration of selenium in this batch of alevins was 42.9 mg/kg dwt – similar to the concentration measured in the eggs (40.1 mg/kg dwt).

The next two endpoints were very similar, the percentage of organisms that reached the swim-up stage and percent survival at the swim-up stage (i.e., on the day of swim-up). Because the fry on the day of swim-up had already absorbed their yolk sac, these values were the same for all treatments at this point in the study (Table 3-3).

The last phase of the studies consisted of the 15-d post swim-up study. The first three endpoints for this phase of the study consisted of survival in the 15-d study, total survival for the entire study, and day of test termination. For this phase, each treatment was initiated with a target of 100 of the surviving fry and maintained for 15-d to monitor growth to assess whether there were any latent effects post swim-up. All treatments were initiated with ~100 (± 5) fry per chamber except the following listed below. The number of organisms at initiation of this phase is listed in parenthesis:

- HL-002 (45) & HL-015 (37)
- DC-004 (60)

For these treatments, there were fewer fish alive at this point in the study (HL-002 and HL-015) or there were fewer eggs when the study was initiated (DC-004). Since these were below the target of 100, either fewer organisms were preserved for deformities at this stage (HL-002 and HL-015) or none were saved (DC-004), and all the remaining live organisms were saved for the duration of the study (see deformity section below).

Survival during the 15-d post swim-up stage was relatively high for the HL treatments, ranging from 98 – 100% survival (Table 3-4). Survival in most field collected fish was >75% except for the following treatments: CC-350-001, LSV2C-002, DC-003, and DC-004. Survival for the four mentioned treatments ranged from 1.9% (CC-350-001) to 70.4% (DC-003) (Appendix F).

Total survival throughout the study was also calculated and presented for all treatments (Table 3-4). Survival for the HL treatment ranged from 9.3 – 83.7%, and ranged from 0 – 88.9% for the field collected organisms.

Day of test termination for HL treatments was on day 64 and was either on day 55 or 56 for the field collected organisms (Table 3-4).

Table 3-4. Percent survival in the 15-d post swim-up phase of the study, total survival for the entire study, percent survival from hatch until test termination, and day of test termination for the Yellowstone cutthroat trout reproductive study.

| Location | Sample ID | Survival (%) in 15-d Post swim-up stage | Total Survival (%) | Survival (%) from Hatch until test term. | Day of test termination | |
|----------------------|------------|--|--------------------------|---|----------------------------|----|
| <i>Hatchery Fish</i> | HL-002 | 100 | 9.8 | 85.5 | 64 | |
| | HL-003 | 98.0 | 53.8 | 94.4 | 64 | |
| | HL-004 | 99.0 | 72.8 | 95.6 | 64 | |
| | HL-006 | 99.0 | 44.0 | 71.9 | 64 | |
| | HL-007 | 100 | 70.7 | 95.9 | 64 | |
| | HL-008 | 99.0 | 72.0 | 92.1 | 64 | |
| | HL-011 | 99.0 | 52.7 | 93.5 | 64 | |
| | HL-012 | 98.0 | 79.0 | 94.6 | 64 | |
| | HL-013 | 100 | 83.7 | 95.4 | 64 | |
| | HL-015 | 100 | 9.3 | 90.3 | 64 | |
| | | CC-150-Nates-001 | 77.6 | 67.3 | 86.0 | 56 |
| | Wild | DC-001 | 93.9 | 49.2 | 90.8 | 56 |
| | | DC-002 | 99.0 | 80.8 | 94.9 | 56 |
| | | DC-003 | 70.4 | 88.9 | 91.1 | 56 |
| | | DC-004 | 68.3 | 41.0 | 64.1 | 56 |
| | | CC-350-001 | 1.9 | 10.5 | 25.9 | 55 |
| Fish | CC-350-002 | 85.6 | 83.2 | 88.3 | 55 | |
| | CC-350-003 | 80.4 | 70.0 | 90.7 | 56 | |
| | CC-350-004 | 88.8 | 83.3 | 96.3 | 56 | |
| | CC-350-005 | 89.6 | 68.7 | 85.3 | 56 | |
| | LSV2C-001 | -- ^a | 0 | 0 | -- | |
| | LSV2C-002 | 66.0 | 61.6 | 76.4 | 55 | |
| | LSV2C-003 | 83.2 | 78.0 | 78.6 | 55 | |
| | LSV2C-004 | 83.0 | 82.7 | 86.9 | 55 | |

^aall organisms had died prior to the swim-up stage of the test.

Note: HL treatments (-001, -005, -009, -010, -014, and -016) and SFTC1 treatment were excluded from this table due to low hatch.

For most of these treatments, there was not a substantial difference between the survival rate at swim-up and the number of organisms that hatched (Figure 3-1). For most of the treatments, the number of organisms that hatched reached the swim-up stage. One group had substantial hatch but did not reach swim-up (LSV2C-001). Percent survival, from hatch until test termination was included in Table 3-4. This technique allowed us to re-evaluate the data, accounting for poor hatching success that occurred for some treatments (e.g., HL-002 and HL-016).

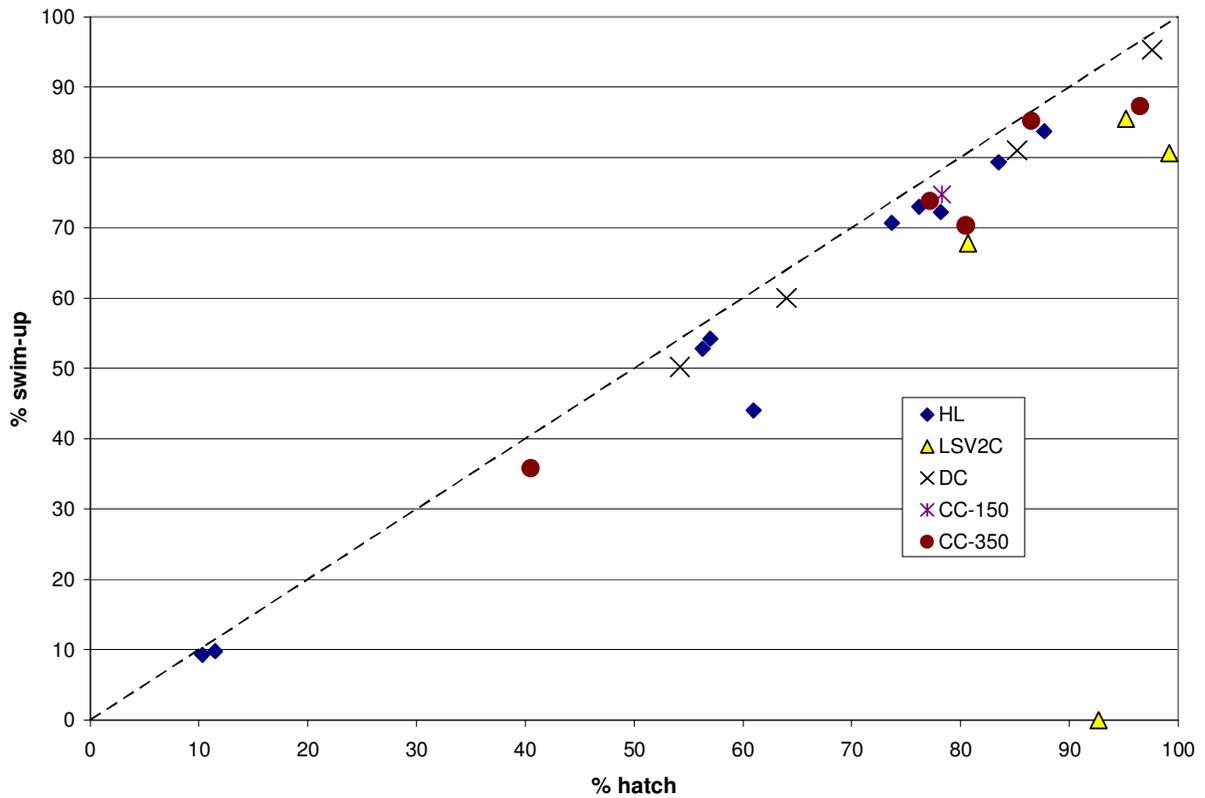


Figure 3-1. Relationship between the percentage of organisms that hatched and the percentage of organisms that reached swim-up in the Yellowstone cutthroat trout reproductive study. Note, the dashed line indicates a 1:1 agreement.

The results of length and dry weight analysis for the target of 20 organisms at the end of the 15-d post swim-up phase of the study are provided below (Table 3-5). Raw data are in Appendix D.

Table 3-5. Standard length and dry weight (avg \pm SD) of larval Yellowstone cutthroat trout at test termination. The number of larval fish measured for each treatment is included (n).

| Location | Sample ID | n | Average Standard Length (mm) | Average Dry Weight (mg) |
|----------------------|------------------|----------------------|------------------------------|------------------------------|
| <i>Hatchery Fish</i> | HL-002 | 20 | 24.6 \pm 1.9 | 19.312 \pm 4.2 |
| | HL-003 | 20 / 19 ^a | 25.7 \pm 1.9 | 20.737 \pm 5.4 |
| | HL-004 | 20 | 27.8 \pm 1.2 | 26.624 \pm 4.1 |
| | HL-006 | 20 | 24.5 \pm 2.1 | 15.631 \pm 6.0 |
| | HL-007 | 20 | 28.2 \pm 1.3 | 26.408 \pm 4.6 |
| | HL-008 | 20 | 24.6 \pm 0.88 | 16.124 \pm 3.0 |
| | HL-011 | 20 | 26.8 \pm 1.3 | 25.082 \pm 5.2 |
| | HL-012 | 20 | 26.5 \pm 1.0 | 25.738 \pm 3.7 |
| | HL-013 | 20 | 25.4 \pm 1.7 | 20.631 \pm 5.7 |
| | HL-015 | 20 | 22.6 \pm 1.5 | 15.791 \pm 5.0 |
| <i>Wild</i> | CC-150-Nates-001 | 20 | 20.4 \pm 1.7 | 7.548 \pm 3.3 |
| | DC-001 | 20 | 23.8 \pm 1.6 | 14.356 \pm 4.7 |
| | DC-002 | 20 | 23.8 \pm 1.9 | 12.650 \pm 3.9 |
| | DC-003 | 20 | 21.1 \pm 1.6 | 7.389 \pm 2.4 ^c |
| | DC-004 | 20 | 23.2 \pm 2.0 | 14.283 \pm 5.3 |
| <i>Fish</i> | CC-350-001 | 2 | 20.5 \pm 0.71 | 6.025 \pm 0.84 |
| | CC-350-002 | 20 | 20.0 \pm 2.3 | 8.654 \pm 3.5 |
| | CC-350-003 | 20 | 22.0 \pm 2.1 ^b | 12.269 \pm 5.0 |
| | CC-350-004 | 20 | 22.3 \pm 0.92 | 8.069 \pm 1.5 |
| | CC-350-005 | 20 | 19.4 \pm 1.3 ^b | 8.430 \pm 2.2 |
| | LSV2C-001 | 0 | -- | -- |
| | LSV2C-002 | 20 / 19 ^a | 20.4 \pm 1.3 | 7.658 \pm 2.4 |
| | LSV2C-003 | 20 | 20.0 \pm 1.8 | 8.696 \pm 2.8 |
| LSV2C-004 | 20 | 21.1 \pm 1.7 | 8.120 \pm 3.2 | |

^a One organism was lost prior to weight determination.

^b total lengths were measured for two sets of samples (CC-350-003 = 24.6 mm; CC-350-005 = 21.2 mm)

^c organisms were not preserved due to a technician error.

3.2.3 Deformity Assessment

Below is a list of the number of specimens preserved and analyzed at either swim-up or test termination for deformities (Table 3-6). The majority of fish that had died during the test were preserved but were not evaluated because of the poor state that they were in by the time death had occurred. As mentioned, a subset of these dead organisms were evaluated for deformities and included with the results of the assessment conducted on organisms that were alive when preserved.

Table 3-6. Number of Yellowstone cutthroat trout fry preserved and assessed for deformities. Samples were preserved at swim-up, at test termination, or upon death. All organisms preserved at swim-up and test termination were assessed for deformities; however, only select samples from organisms that died during the study were evaluated.

| Location | Field Sample ID | Number of fish assessed that were preserved at swim-up | Number of fish assessed that were preserved at test termination | Number of fish assessed that had died during the study |
|----------------------|-----------------|--|---|--|
| <i>Hatchery Fish</i> | HL-002 | 14 | 25 | |
| | HL-003 | 227 | 75 | |
| | HL-004 | 338 | 78 | |
| | HL-006 | 167 | 77 | |
| | HL-007 | 327 | 77 | |
| | HL-008 | 332 | 80 | |
| | HL-011 | 212 | 84 | |
| | HL-012 | 374 | 80 | |
| | HL-013 | 402 | 81 | |
| | HL-015 | 19 | 17 | |
| | Wild | CC-150-Nates-001 | 126 | 56 |
| DC-001 | | 203 | 72 | |
| DC-002 | | 386 | 79 | |
| DC-003 | | 331 | 49 | 21 |
| DC-004 | | 0 | 21 | 115 |
| Fish | CC-350-001 | 40 | 0 | |
| | CC-350-002 | 541 | 63 | |
| | CC-350-003 | 272 | 58 | |
| | CC-350-004 | 413 | 67 | |
| | CC-350-005 | 326 | 66 | |
| | LSV2C-001 | 0 | 0 | 200 ^a |
| | LSV2C-002 | 273 | 46 | |
| | LSV2C-003 | 423 | 64 | |
| | LSV2C-004 | 413 | 63 | |

^aA subset of the organisms that died during the study were evaluated for deformity metrics (i.e., 200) because scoring criteria were not possible on all 536 organisms due to the poor physical state at preservation.

For this assessment, the scoring criteria results of the fry preserved at swim-up, the fry preserved at test termination, and the fry (alveins) preserved upon death (select samples) were combined. A summary of the raw data is reported in Appendix D of the main YCT report.

4.0 References

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Appendix A

Select photographs of different phases of the Yellowstone cutthroat trout reproductive study



Photo 1: Adding milt (sperm) to unfertilized Yellowstone cutthroat trout eggs (Henry's Lake Hatchery, ID).



Photo 2: Adding a little local water to add in fertilization step for Yellowstone cutthroat trout eggs after milt was added (Henry's Lake Hatchery, ID).



Photo 3: Washing Yellowstone cutthroat trout eggs after fertilization (Henry's Lake Hatchery, ID).



Photo 4: Filling basin with local water to water harden Yellowstone cutthroat trout eggs after fertilization (Henry's Lake Hatchery, ID).



Photo 5: Yellowstone cutthroat trout used for parental study (collected from Henry's Lake Hatchery, ID).



Photo 6: Yellowstone cutthroat trout eggs after fertilization. Some eggs already bad (i.e., white) during water hardening step (Henry's Lake Hatchery, ID).

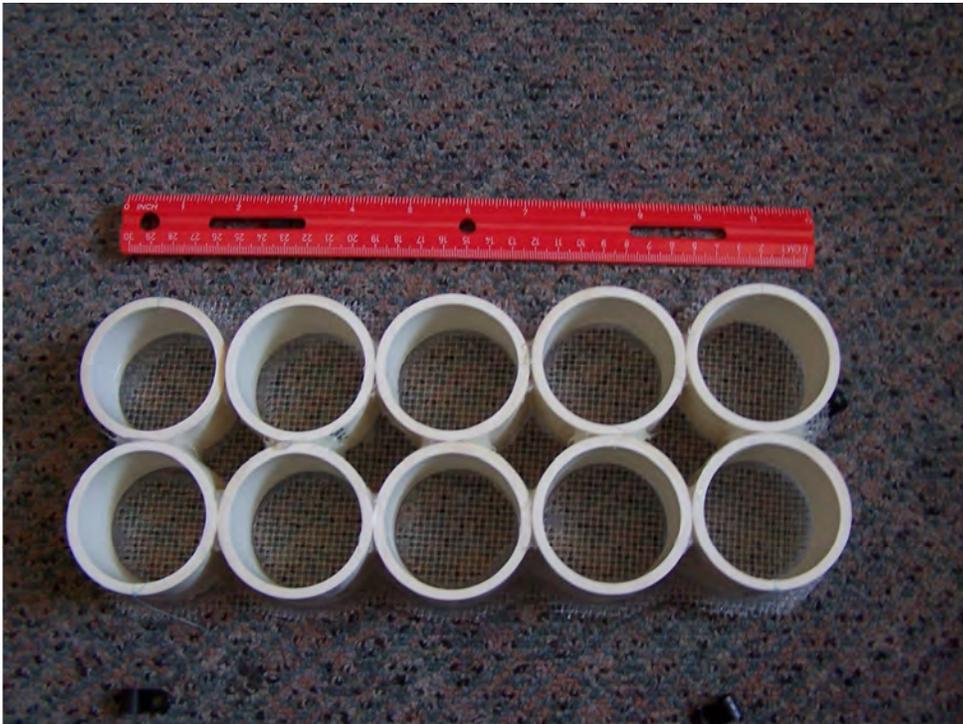


Photo 7: Egg cups used for hatching of Yellowstone cutthroat trout eggs; 10 replicates with 60 (target) eggs / replicate. (600 per treatment)

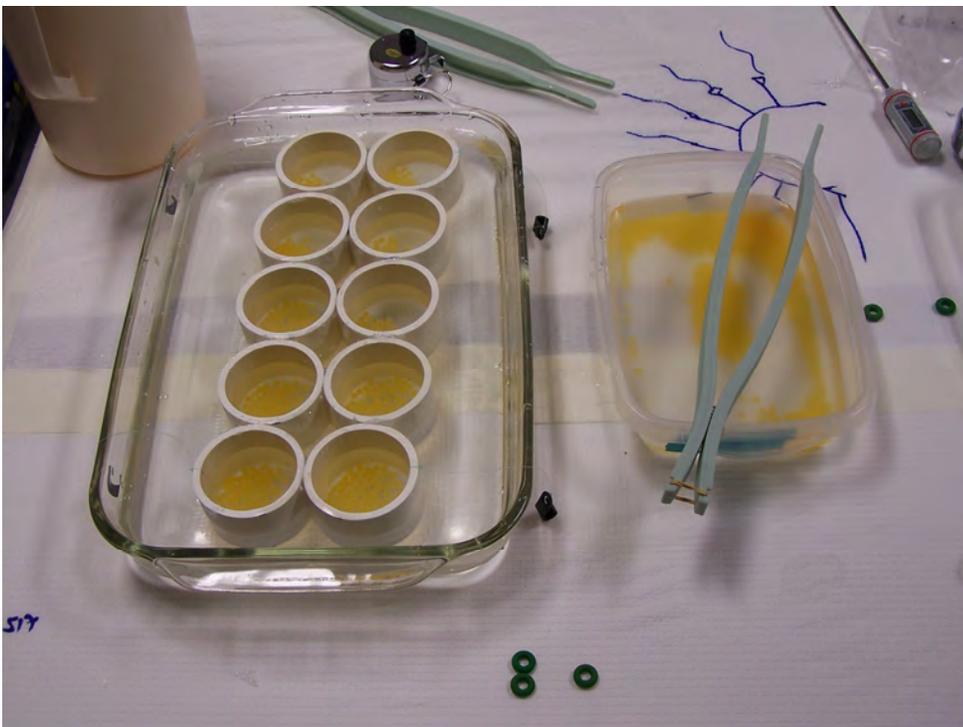


Photo 8: Egg cup with (Brown trout) eggs at test initiation. Photo includes egg pickers, container of remaining eggs for analytical, and counter. Similar setup was used for Yellowstone cutthroat trout.

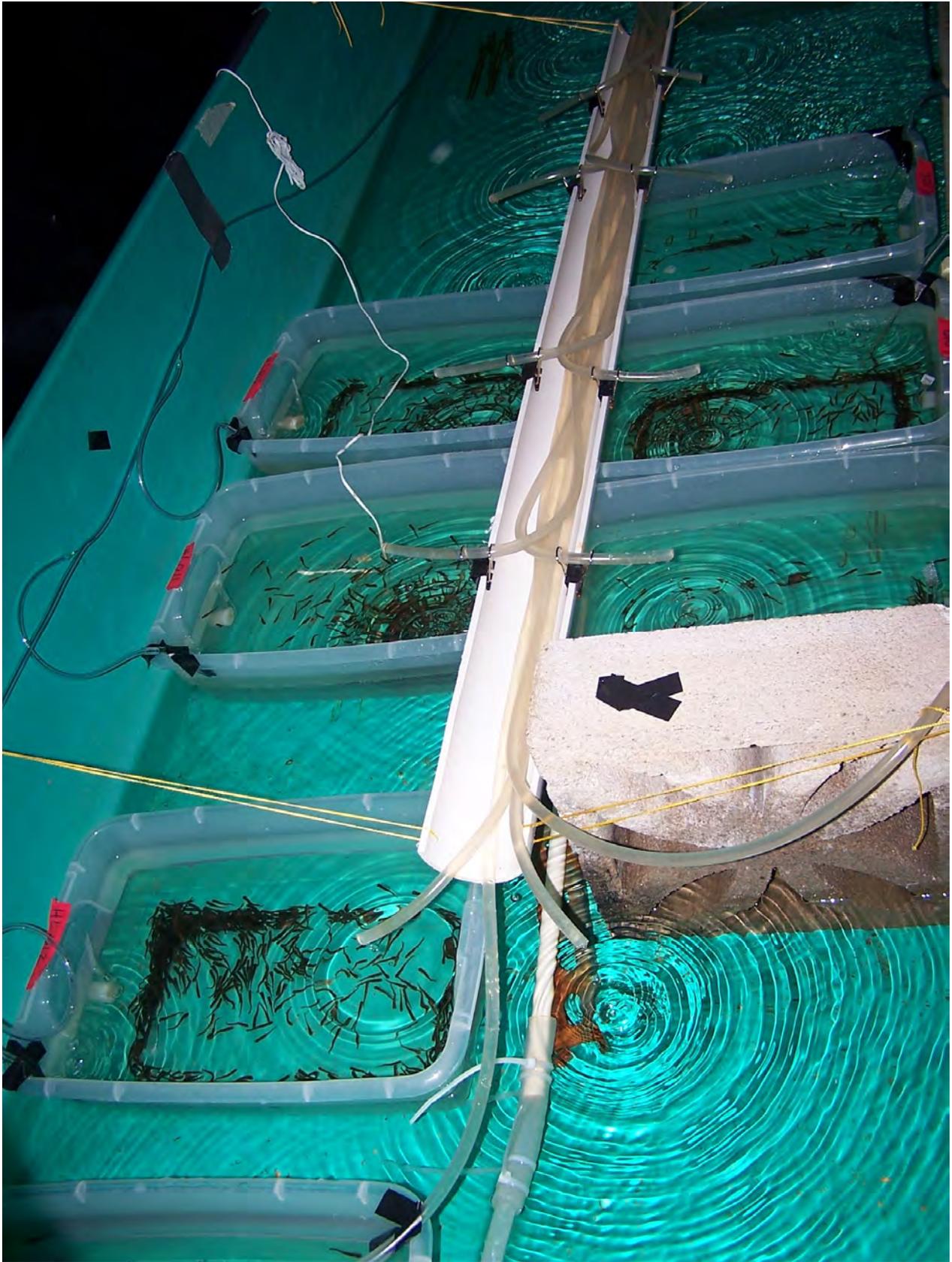


Photo 9: Yellowstone cutthroat trout larvae at swim-up stage in parental study.

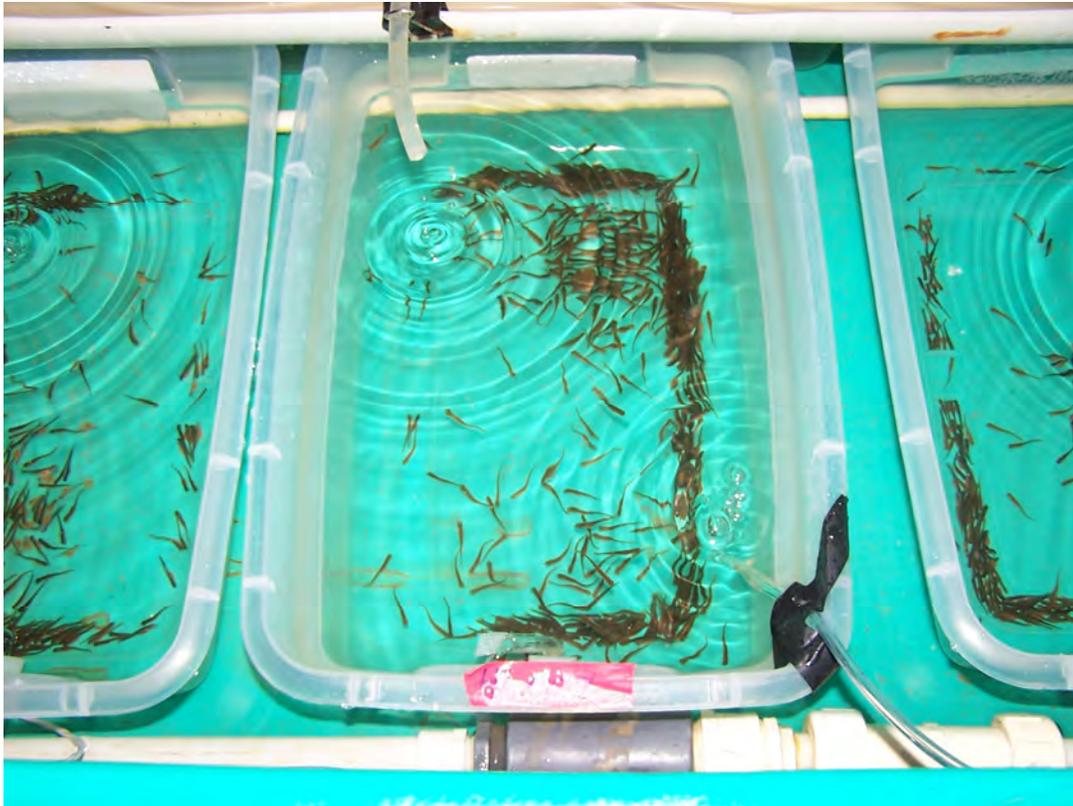


Photo 10: Yellowstone cutthroat trout larvae at swim-up stage in parental study (pre-thinning).

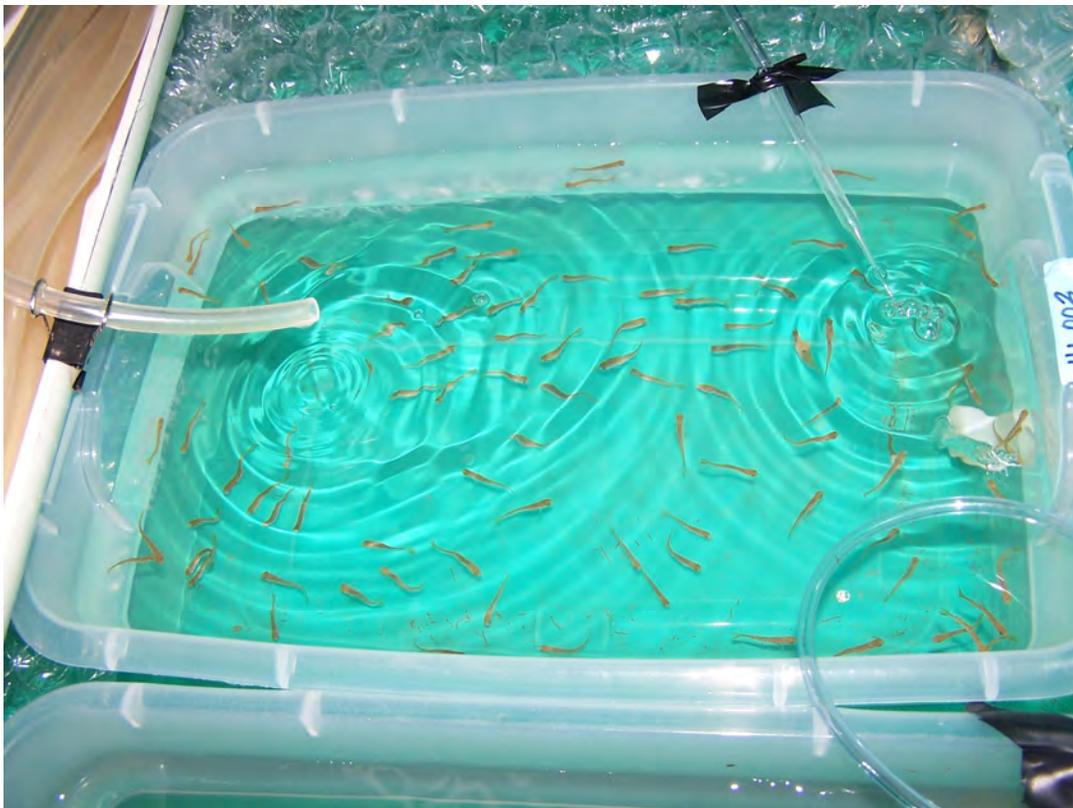


Photo 11: Yellowstone cutthroat trout larvae after thinning stage in parental study.



Photo 12: Yellowstone cutthroat trout larvae at test termination (preserved for lengths and weights). Remaining preserved fish for this treatment are in cup to right, while storage containers are above.



Photo 13: Measuring length for Yellowstone cutthroat trout larvae at test end.

Appendix B

Egg counts for hatchery and field collected fish

Estimation of Yellowstone cutthroat trout eggs numeration using volume-estimating technique, 12699-002

April 11-13, 2008

Control Eggs from Henry's Lake (HL, Henry's Lake, ID)

*122) 7/11/08
 AB: A209/12/08*

The number of eggs placed into each study was counted manually. For all of the treatments, the remaining number of eggs was estimated using a volume technique to develop a #egg/volume ratio for that particular female. The technique consisted of counting the number of eggs that filled a graduated cylinder to a particular volume (e.g., 50 mL) to determine the # of eggs per mL for that female. In the past, we conducted two separate counts by two different staff personnel. Based on the agreement of these counted numbers for the particular volume, we subsequently only conducted counts once per female. Using this ratio, we then calculated the total number of remaining eggs for the total volume of eggs measured in a graduated cylinder. The total number of eggs used to initiate the studies (e.g., 600) was then added to the estimated number of remaining eggs to determine the total number of eggs for that particular female trout.

| Treatment | # Eggs placed in study | Count# | # eggs counted to est. #eggs/vol | Avg # eggs counted | Vol of eggs counted (ml) | Avg # eggs/mL | Total vol (ml) of eggs | Total # eggs |
|-----------|------------------------|--------|----------------------------------|--------------------|--------------------------|---------------|------------------------|--------------|
| HL001 | 600 | 1 | 479 | 479 | 50 | 9.58 | 158 | 2,114 |
| HL002 | 600 | 1 | 608 | 608 | 50 | 12.16 | 82 | 1,597 |
| HL003 | 600 | 1 | 645 | 645 | 50 | 12.9 | 186 | 2,999 |
| HL004 | 600 | 1 | 421 | 421 | 50 | 8.42 | 220 | 2,452 |
| HL005 | 600 | 1 | 531 | 531 | 50 | 10.62 | 142 | 2,108 |
| HL006 | 600 | 1 | 640 | 640 | 50 | 12.8 | 122 | 2,162 |
| HL007 | 600 | 1 | 412 | 412 | 50 | 8.24 | 259 | 2,734 |
| HL008 | 600 | 1 | 501 | 501 | 50 | 10.02 | 238 | 2,985 |
| HL009 | 600 | 1 | 563 | 563 | 50 | 11.26 | 116 | 1,906 |
| HL010 | 600 | 1 | 371 | 371 | 50 | 7.42 | 430 | 3,791 |
| HL011 | 600 | 1 | 452 | 452 | 50 | 9.04 | 450 | 4,668 |
| HL012 | 600 | 1 | 427 | 427 | 50 | 8.54 | 250 | 2,735 |
| HL013 | 600 | 1 | 455 | 455 | 50 | 9.1 | 200 | 2,420 |
| HL014 | 600 | 1 | 466 | 466 | 50 | 9.32 | 330 | 3,676 |
| HL015 | 600 | 1 | 473 | 473 | 50 | 9.46 | 182 | 2,322 |
| HL016 | 600 | 1 | 585 | 585 | 50 | 11.7 | 280 | 3,876 |
| | | | | | | | Avg | 2,784 |
| | | | | | | | Geomean | 2,674 |
| | | | | | | | SD | 839 |
| | | | | | | | CV | 30% |

Temp range in transport overnight
 CHL009-HL016
 D-20 1-5°C

(HL-001-HL008)
 D-2 1-3°C

4/8/08

SUBJECT: DAILY LOG

ALL ENTRIES MUST BE INITIALED WITH DATE AND TIME: 12699-002 Henry's LAKE control

| I.D. | Total length | Standard length |
|--------|--------------|-----------------|
| HL 001 | 19.25" | 18.00" |
| HL 002 | 15.25" | 13.75" |
| HL 003 | 15.75" | 14.25" |
| HL 004 | 17.25" | 16.00" |
| HL 005 | 17.75" | 16.25" |
| HL 006 | 14.50" | 13.50" |
| HL 007 | 18.50" | 17.00" |
| HL 008 | 18.75" | 17.25" |
| HL 009 | 16.00" | 14.75" |
| HL 010 | 20.75" | 19.25" |
| HL 011 | 18.75" | 17.25" |
| HL 012 | 18.50" | 17.00" |
| HL 013 | 18.00" | 16.50" |
| HL 014 | 20.00" | 18.25" |
| HL 015 | 17.50" | 16.00" |
| HL 016 | 20.00" | 18.00" |

| | | | |
|-------|-------------------------|-----------------------------------|------------------------|
| | no dead eggs at sorting | - 600 eggs placed in all egg cups | (60 ea, w) 10 = 600 |
| HL001 | ~20% | RBN/ES | larger eggs |
| 002 | <1% | TD/MM | |
| 003 | 1% | RBN/ES | small eggs |
| 004 | <2% | RBN/ES | |
| 005 | ~30% - 50% | TD/MM | |
| 006 | <1% | ES/RBN | |
| 007 | <1% | ES/RBN | |
| 008 | <1% | TD/MM | |
| 009 | <1% | RBN/ES | |
| 010 | 4% | MM/TD | |
| 011 | <1% | MM/TD | |
| 012 | +2 couple (1-2) | RBN/ES | |
| 013 | couple dead | TD/MM | |
| 014 | <1% | RBN/ES | |
| 015 | 5-10% | RBN/ES | med |
| 016 | 15% | TD/MM | smaller eggs |

6/11/08 receipt of 8 more lot eggs (catulus) & fish

SUBJECT: DAILY LOG

ALL ENTRIES MUST BE INITIALED WITH DATE AND TIME:

opened cooler
 @ 1020am
 cooler temp: 6.8°C

eggs collected 6/10/08

| Site Name | egg color | # eggs for test | extra eggs | % dead eggs |
|------------------|---------------|-----------------|--------------------|-------------|
| CC-350-004 | yellow | 600 | 694 | 1 (count) |
| CC-350-008 | orange | 500 | 694 429 | 3% |
| DC-004 | yellow/orange | 100 | 142 | 10 (count) |
| DC-002 | yellow | 600 | 939 | |
| CC-150-Nites-001 | yellow | 300 | 300 | |
| Dear Creek-001 | orange | 600 | 417 | |
| CC-350-005 | Yellow | 600 | 560 | 4 (count) |
| DC-003 | Yellow/orange | 400 | 396 | 24 (count) |

6/29 opened cooler @ 1140

SFTC-1 eggs received yesterday

site note 300 eggs for test ~ 50% dead eggs

extra eggs

1172

① AZO 6/10/08
 ② AK WP 6/13/08

6/7/08 receipt of 6 more egg (PCT) batches

NSN, KT, AL

SUBJECT: DAILY LOG

ALL ENTRIES MUST BE INITIALED WITH DATE AND TIME:

opened cooler

Egg batches - 6

P. 0930

Names:

Samples collected

CC-350-002

6/6/08

temp = 7.2°C

1. smaller

| | # eggs for test | extra eggs | % dead eggs | eggs (count) |
|------------|-----------------|------------|-------------|----------------------------|
| CC-350-001 | 350 | 248 | 2 | (count) |
| CC-350-002 | 600 | 459 | 2 | (count) |
| LSV-2L-002 | 550 | 518 | 2 | integrate up dead eggs low |
| -004 | 600 | 472 | 0 | |
| -001 | 600 | 690 | 2 | (count) |
| -003 | 600 | 708 | 1 | (count) |

extra eggs counted and put in ziploc freezer bags on 6/8 + 6/9 (AL)

DN3N 6/9/08 E

Appendix C

Summary of fungal treatment methods for hatchery and field collected eggs

April 9, 2008

Attached 0.5 µm filter to horsetooth line prior to water entering diluter panel (Rogard graded density polypropylene media filter, product of Siemens Water Technology). Eventually a 1.0 µm filter replaced the 0.5 µm filter in order to prevent the flow from being backed up.

April 20, 2008

Noticed fungal growth and dead eggs and decided to treat HL 010 with 8.5 ml formalin. Added formalin directly into test chamber (assumes ~5L so target is ~1700 ppm). Let 40 ml flow into chamber and flush out formalin. After 5 and ½ hours, put second drip into tank to help flush out formalin further.

April 21, 2008

Treated chamber HL 016 with 8.5 ml formalin. Added formalin directly into test chamber (assumes ~5L so target is ~1700 ppm). Let normal flow flush out formalin.

April 23, 2008

Added 200 µl of formalin to all egg cups (2 ml of formalin total for every chamber) that had live eggs, except chambers HL010 and HL 016.

May 1, 2008

Added 200 µl of formalin to all egg cups that had live eggs (2 ml of formalin total for every chamber).

May 22, 2008

Egg cup for HL 006 was very dirty so it was changed out with clean egg cup

July 8, 2008

Exchanged test chamber for DC 001 with clean one due to fungal growth.

SUBJECT: DAILY LOG

ALL ENTRIES MUST BE INITIALED WITH DATE AND TIME:

4/20/08

noticed fungal growth on eggs
treat with formalin

@ 1000hrs add 8.5 ml into test chamber (assumes 5 L vol)
and let 40 ml flow remove it
try on HLO10

@ 1730 put 3rd dip in tank HLO10 to help
flush out formalin

4/21/08

1720 added 8.5 ml formalin to HLO16
normal flow (had eggs already present in chamber
prior to treatment)

4/23/08

1430 added 200 µl of formalin to all chambers, except
HLO10 and HLO16, that had live eggs.

5/1/08

1600 added 200 µl of formalin to all chambers that
had live eggs. Es

Appendix D

Length and dry weight measurements for juvenile Yellowstone cutthroat trout from reproductive study

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

RSN 3/12/09

| | HL-002 | HL-002 | HL-003 | HL-004 | HL-006 | HL-007 | HL-008 | HL-008 |
|-----|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|
| | std length (mm) | dry wt (mg) |
| A | 24 | 13.400 | 27 | 12.190 | 24 | 14.500 | 29 | 19.540 |
| B | 25 | 7.400 | 28 | TE ☺ | 26 | 19.770 | 26 | 30.550 |
| C | 25 | 21.490 | 25 | 20.830 | 21 | 5.440 | 28 | 23.320 |
| D | 28 | 22.980 | 27 | 17.190 | 22 | 7.580 | 26 | 25.460 |
| E | 20 | 19.930 | 25 | 20.280 | 21 | 7.500 | 28 | 30.430 |
| F | 27 | 19.910 | 26 | 21.100 | 28 | 11.960 | 30 | 27.290 |
| G | 24 | 17.580 | 25 | 23.280 | 23 | 12.750 | 29 | 32.320 |
| H | 27 | 23.210 | 27 | 23.590 | 23 | 23.280 | 30 | 25.170 |
| I | 26 | 16.580 | 27 | 24.930 | 24 | 15.170 | 28 | 30.530 |
| J | 26 | 18.910 | 25 | 22.810 | 27 | 14.610 | 29 | 36.100 |
| K | 25 | 18.850 | 26 | 16.870 | 26 | 24.260 | 30 | 19.200 |
| L | 25 | 24.510 | 27 | 26.640 | 25 | 16.490 | 28 | 26.870 |
| M | 23 | 16.570 | 22 | 28.540 | 22 | 11.640 | 28 | 29.590 |
| N | 25 | 18.750 | 23 | 10.520 | 27 | 21.970 | 28 | 18.660 |
| O | 25 | 19.190 | 27 | 23.360 | 25 | 5.970 | 28 | 29.240 |
| P | 21 | 18.710 | 28 | 25.280 | 25 | 19.360 | 27 | 26.250 |
| Q | 24 | 18.860 | 24 | 21.730 | 26 | 19.250 | 27 | 26.470 |
| R | 26 | 23.650 | 27 | 8.350 | 24 | 19.490 | 30 | 21.450 |
| S | 23 | 18.310 | 21 | 23.110 | 27 | 17.520 | 26 | 24.200 |
| T | 24 | 27.440 | 27 | 23.410 | 24 | 24.110 | 28 | 25.510 |
| Avg | 24.65 | 19.3115 | 25.70 | 20.7374 | 24.50 | 15.6310 | 28.15 | 26.4075 |
| Std | 1.927 | 4.250 | 1.949 | 5.438 | 2.065 | 5.968 | 1.309 | 4.587 |
| n | 20 | | 20 | 19 | 20 | | 20 | |

1 organism lost due to tech error, was excluded from wt determination RSN

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

Pass 2/12/09

| HL-011 std length (mm) | HL-011 dry wt (mg) | HL-012 std length (mm) | HL-012 dry wt (mg) | HL-013 std length (mm) | HL-013 dry wt (mg) | HL-015 std length (mm) | HL-015 dry wt (mg) |
|---------------------------------|--------------------------|---------------------------------|--------------------------|---------------------------------|--------------------------|---------------------------------|--------------------------|
| 28 | 30.260 | 28 | 20.270 | 24 | 24.04 | 22 | 18.380 |
| 27 | 27.790 | 27 | 30.320 | 25 | 24.24 | 22 | 16.920 |
| 26 | 17.580 | 27 | 24.300 | 25 | 21.55 | 21 | 18.990 |
| 29 | 21.830 | 26 | 30.030 | 22 | 23.27 | 24 | 25.340 |
| 28 | 22.670 | 28 | 31.470 | 23 | 19.47 | 22 | 23.410 |
| 28 | 22.060 | 27 | 24.560 | 26 | 16.02 | 26 | 7.100 |
| 26 | 26.440 | 25 | 27.970 | 27 | 24.17 | 22 | 18.440 |
| 28 | 27.020 | 27 | 28.020 | 26 | 8.61 | 21 | 13.330 |
| 26 | 20.530 | 27 | 27.070 | 27 | 23.92 | 23 | 10.270 |
| 27 | 27.340 | 25 | 23.720 | 27 | 23.45 | 24 | 10.620 |
| 25 | 27.820 | 25 | 29.630 | 27 | 8.36 | 23 | 8.460 |
| 26 | 20.500 | 25 | 22.540 | 22 | 30.33 | 24 | 19.100 |
| 24 | 15.070 | 27 | 29.160 | 25 | 24.65 | 24 | 10.990 |
| 26 | 34.570 | 27 | 26.660 | 27 | 20.89 | 22 | 15.520 |
| 26 | 18.470 | 28 | 22.240 | 25 | 24.94 | 21 | 19.560 |
| 28 | 23.590 | 26 | 21.040 | 27 | 24.85 | 23 | 13.670 |
| 28 | 30.480 | 27 | 29.460 | 27 | 16.7 | 21 | 21.450 |
| 28 | 32.680 | 25 | 25.080 | 26 | 12.31 | 21 | 13.270 |
| 25 | 25.070 | 27 | 19.160 | 24 | 21.2 | 25 | 17.880 |
| 28 | 29.870 | 26 | 22.070 | 27 | 19.65 | 21 | 13.120 |
| 26.85 | 25.0820 | 26.50 | 25.7385 | 25.45 | 20.6310 | 22.60 | 15.7910 |
| 1.348 | 5.241 | 1.051 | 3.734 | 1.701 | 5.685 | 1.501 | 4.972 |
| 20 | | 20 | | 20 | | 20 | |

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

12699 3/12/07

| | CC150-001 std length (mm) | CC150-001 dry wt (mg) |
|-----|---------------------------------|--------------------------|
| A | 18 | 8.600 |
| B | 19 | 7.010 |
| C | 19 | 10.580 |
| D | 22 | 15.450 |
| E | 20 | 9.150 |
| F | 22 | 2.940 |
| G | 21 | 7.920 |
| H | 19 | 4.970 |
| I | 21 | 10.030 |
| J | 22 | 12.510 |
| K | 22 | 6.330 |
| L | 17 | 2.940 |
| M | 20 | 3.900 |
| N | 20 | 6.240 |
| O | 22 | 9.350 |
| P | 19 | 8.480 |
| Q | 24 | 5.020 |
| R | 19 | 10.020 |
| S | 21 | 6.350 |
| T | 21 | 3.170 |
| Avg | 20.40 | 7.5480 |
| Std | 1.698 | 3.319 |
| n | 20 | |

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

LSN 3/12/09

| | LSV2C-002 std length (mm) | LSV2C-002 dry wt (mg) | LSV2C-003 std length (mm) | LSV2C-003 dry wt (mg) | LSV2C-004 std length (mm) | LSV2C-004 dry wt (mg) |
|-----|---------------------------------|--------------------------|---------------------------------|--------------------------|---------------------------------|--------------------------|
| A | 21 | 7.350 | 21 | 14.070 | 24 | 7.620 |
| B | 19 | 9.390 | 23 | 8.490 | 22 | 7.630 |
| C | 23 | 7.090 | 19 | 9.760 | 22 | 5.830 |
| D | 19 | 7.680 | 18 | 14.150 | 21 | 9.000 |
| E | 22 | 6.120 | 22 | 6.650 | 19 | 14.240 |
| F | 21 | 3.760 | 23 | 8.420 | 19 | 5.340 |
| G | 20 | 3.200 | 20 | 10.070 | 21 | 4.140 |
| H | 21 | 10.680 | 21 | 8.920 | 22 | 10.590 |
| I | 19 | 9.840 | 20 | 3.940 | 19 | 3.600 |
| J | 20 | 8.280 | 20 | 7.350 | 20 | 3.390 |
| K | 19 | - (U) | 21 | 8.600 | 24 | 11.550 |
| L | 21 | 7.690 | 20 | 8.780 | 23 | 6.900 |
| M | 21 | 7.760 | 18 | 5.090 | 24 | 10.230 |
| N | 19 | 3.860 | 20 | 9.330 | 21 | 12.550 |
| O | 20 | 6.600 | 23 | 5.850 | 20 | 13.260 |
| P | 22 | 6.900 | 18 | 8.090 | 19 | 6.780 |
| Q | 22 | 7.080 | 19 | 8.840 | 19 | 4.860 |
| R | 20 | 10.650 | 19 | 12.270 | 21 | 8.190 |
| S | 20 | 10.770 | 19 | 4.060 | 20 | 8.910 |
| T | 18 | 10.810 | 17 | 11.200 | 22 | 7.780 |
| Avg | 20.35 | 7.6584 | 20.05 | 8.6965 | 21.10 | 8.1195 |
| Std | 1.309 | 2.359 | 1.761 | 2.837 | 1.744 | 3.190 |
| n | 20 | 19 | 20 | | 20 | |

U organism was lost prior to wt determination, excluded from wt determination due to a tech error LSN
 Note: All organisms in LSV2C-001 died prior to swim-up

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

0213 3/12/09

| | DC-001 std length (mm) | DC-001 dry wt (mg) | DC-002 std length (mm) | DC-002 dry wt (mg) | DC-003 std length (mm) | DC-003 dry wt (mg) | DC-004 std length (mm) | DC-004 dry wt (mg) |
|-----|------------------------|--------------------|------------------------|--------------------|------------------------|--------------------|------------------------|--------------------|
| A | 24 | 10.630 | 25 | 7.250 | 21 | 8.420 | 27 | 21.120 |
| B | 23 | 12.990 | 25 | 16.420 | 22 | 3.970 | 22 | 13.030 |
| C | 23 | 6.310 | 26 | 17.710 | 20 | 9.670 | 25 | 23.740 |
| D | 26 | 15.980 | 24 | 7.590 | 21 | 11.140 | 26 | 13.990 |
| E | 23 | 24.330 | 24 | 12.220 | 22 | 7.410 | 20 | 5.540 |
| F | 26 | 19.280 | 25 | 11.320 | 23 | 4.250 | 21 | 20.080 |
| G | 23 | 17.180 | 23 | 7.760 | 21 | 4.090 | 24 | 9.530 |
| H | 21 | 14.640 | 24 | 14.760 | 23 | 4.520 | 24 | 7.540 |
| I | 23 | 11.660 | 23 | 14.460 | 24 | 6.000 | 23 | 20.120 |
| J | 22 | 10.710 | 22 | 13.880 | 19 | 8.600 | 25 | 18.880 |
| K | 22 | 8.880 | 24 | 17.700 | 19 | 10.880 | 20 | 8.430 |
| L | 24 | 15.090 | 21 | 6.310 | 21 | 6.410 | 22 | 10.610 |
| M | 24 | 23.430 | 21 | 17.810 | 18 | 8.340 | 24 | 10.600 |
| N | 27 | 9.210 | 20 | 12.600 | 19 | 7.800 | 25 | 15.520 |
| O | 23 | 18.780 | 26 | 16.290 | 22 | 9.530 | 22 | 11.710 |
| P | 25 | 16.700 | 26 | 13.950 | 21 | 11.080 | 23 | 21.500 |
| Q | 24 | 14.300 | 25 | 16.430 | 21 | 8.050 | 25 | 10.120 |
| R | 25 | 13.180 | 26 | 7.660 | 21 | 6.160 | 21 | 10.950 |
| S | 26 | 14.370 | 21 | 10.930 | 24 | 6.670 | 22 | 15.590 |
| T | 23 | 9.470 | 24 | 9.960 | 20 | 4.790 | 22 | 17.060 |
| Avg | 23.85 | 14.3560 | 23.75 | 12.6505 | 21.10 | 7.3990 | 23.15 | 14.2830 |
| Std | 1.565 | 4.730 | 1.888 | 3.882 | 1.651 | 2.362 | 1.981 | 5.284 |
| n | 20 | | 20 | | 20 | | 20 | |

Note: DC-003 fish were not preserved due to a technician error. This likely resulted in the lower weights.

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
 12699-002-300

filename: length & weight.xls

12/09

| | CC350-001 std length (mm) | CC350-001 dry wt (mg) | CC350-002 std length (mm) | CC350-002 dry wt (mg) | CC350-003 std length (mm) | CC350-003 total length (mm) | CC350-003 dry wt (mg) | CC350-004 std length (mm) | CC350-004 dry wt (mg) |
|-----|---------------------------------|--------------------------|---------------------------------|--------------------------|---------------------------------|-----------------------------------|--------------------------|---------------------------------|--------------------------|
| A | 20 | 6.620 | 22 | 10.330 | 19 | 21 | 7.660 | 23 | 10.210 |
| B | 21 | 5.430 | 22 | 11.840 | 20 | 22 | 9.760 | 22 | 7.030 |
| C | | | 21 | 11.350 | 20 | 22 | 17.740 | 21 | 6.280 |
| D | | | 19 | 5.190 | 25 | 27 | 16.360 | 23 | 8.860 |
| E | | | 17 | 9.690 | 23 | 26 | 11.650 | 22 | 5.870 |
| F | | | 22 | 7.840 | 21 | 24 | 11.100 | 23 | 7.880 |
| G | | | 17 | 10.470 | 22 | 25 | 12.350 | 23 | 9.140 |
| H | | | 17 | 5.340 | 22 | 25 | 8.400 | 21 | 9.820 |
| I | | | 24 | 16.360 | 24 | 27 | 13.140 | 24 | 8.690 |
| J | | | 19 | 10.940 | 23 | 25 | 19.820 | 22 | 11.210 |
| K | | | 19 | 6.140 | 21 | 25 | 17.580 | 22 | 7.960 |
| L | | | 18 | 8.680 | 21 | 23 | 7.170 | 23 | 7.240 |
| M | | | 18 | 11.420 | 24 | 27 | 5.860 | 23 | 8.990 |
| N | | | 21 | 4.320 | 20 | 22 | 9.020 | 21 | 7.940 |
| O | | | 17 | 4.330 | 26 | 28 | 9.010 | 22 | 5.980 |
| P | | | 23 | 5.210 | 20 | 22 | 11.940 | 22 | 5.470 |
| Q | | | 22 | 8.320 | 26 | 28 | 20.800 | 22 | 7.740 |
| R | | | 19 | 14.770 | 20 | 23 | 21.050 | 21 | 8.050 |
| S | | | 23 | 5.240 | 21 | 24 | 10.550 | 22 | 8.060 |
| T | | | 20 | 5.310 | 22 | 25 | 4.420 | 24 | 8.960 |
| Avg | 20.50 | 6.0250 | 20.00 | 8.6545 | 22.00 | 24.55 | 12.2690 | 22.30 | 8.0690 |
| Std | 0.707 | 0.841 | 2.294 | 3.528 | 2.103 | 2.164 | 5.025 | 0.923 | 1.494 |
| n | 2 | | 20 | | 20 | | | 20 | |

Length and dry weight (dwt) data for (n = 20) Yellowstone cutthroat trout for this treatment
12699-002-300

NSJ 3/12/09

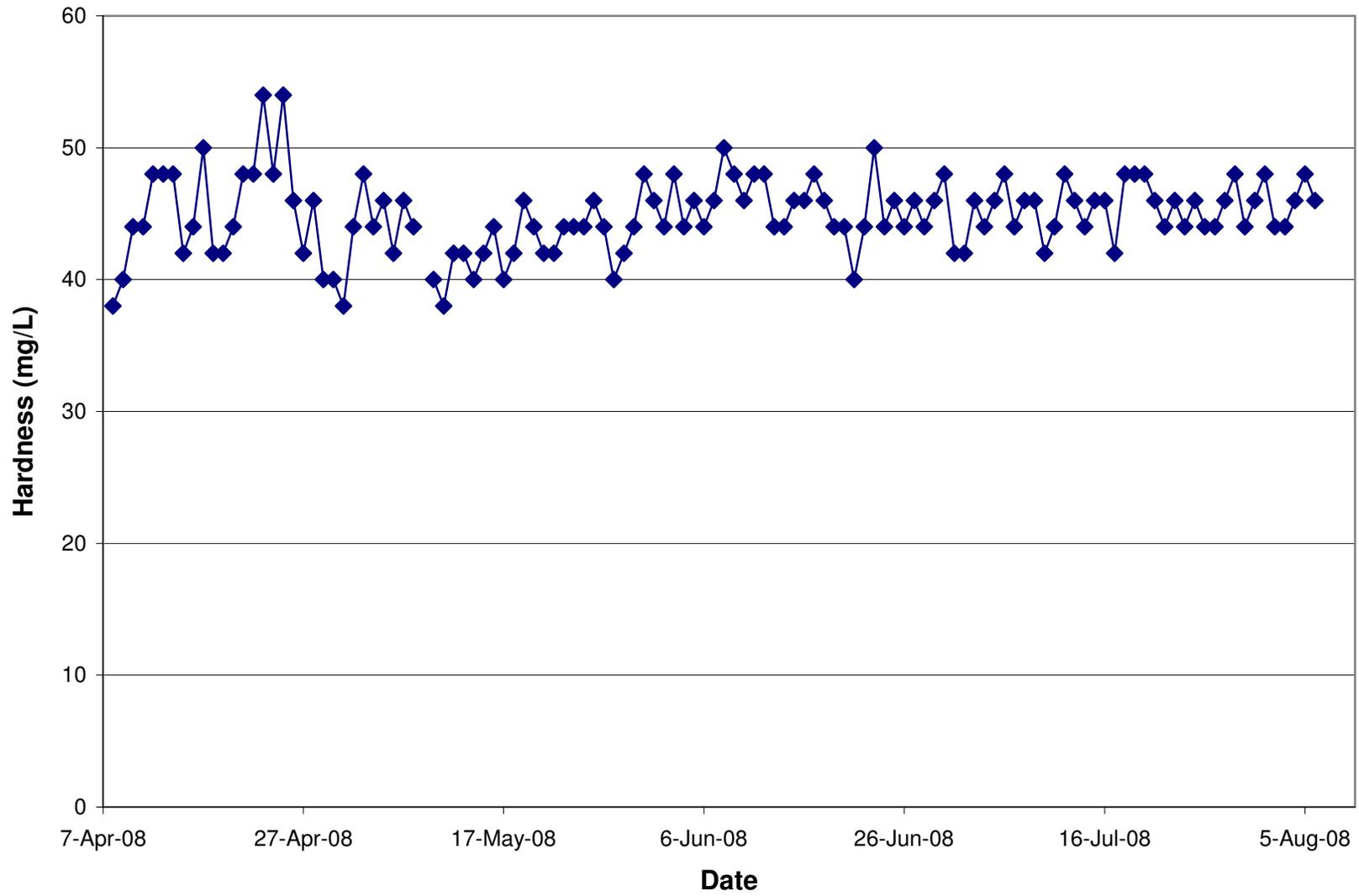
filename: length & weight.xls

| CC350-005 std length (mm) | CC350-005 total length (mm) | CC350-005 dry wt (mg) |
|---------------------------------|-----------------------------------|--------------------------|
| 18 | 20 | 10.700 |
| 19 | 20 | 10.920 |
| 20 | 21 | 6.680 |
| 19 | 22 | 8.590 |
| 19 | 21 | 9.020 |
| 18 | 20 | 5.930 |
| 21 | 22 | 5.530 |
| 20 | 21 | 7.360 |
| 20 | 21 | 7.030 |
| 21 | 22 | 11.060 |
| 18 | 20 | 9.140 |
| 21 | 23 | 8.210 |
| 18 | 20 | 10.550 |
| 21 | 24 | 6.590 |
| 18 | 20 | 7.760 |
| 20 | 22 | 4.890 |
| 20 | 22 | 10.280 |
| 21 | 23 | 13.190 |
| 17 | 19 | 7.880 |
| 18 | 21 | 7.300 |
| 19.35 | 21.20 | 8.4305 |
| 1.309 | 1.281 | 2.159 |
| 20 | | |

Appendix E

Summary of water quality data selenium and sulfate analysis in water measured during reproductive study

Hardness graph - YTC

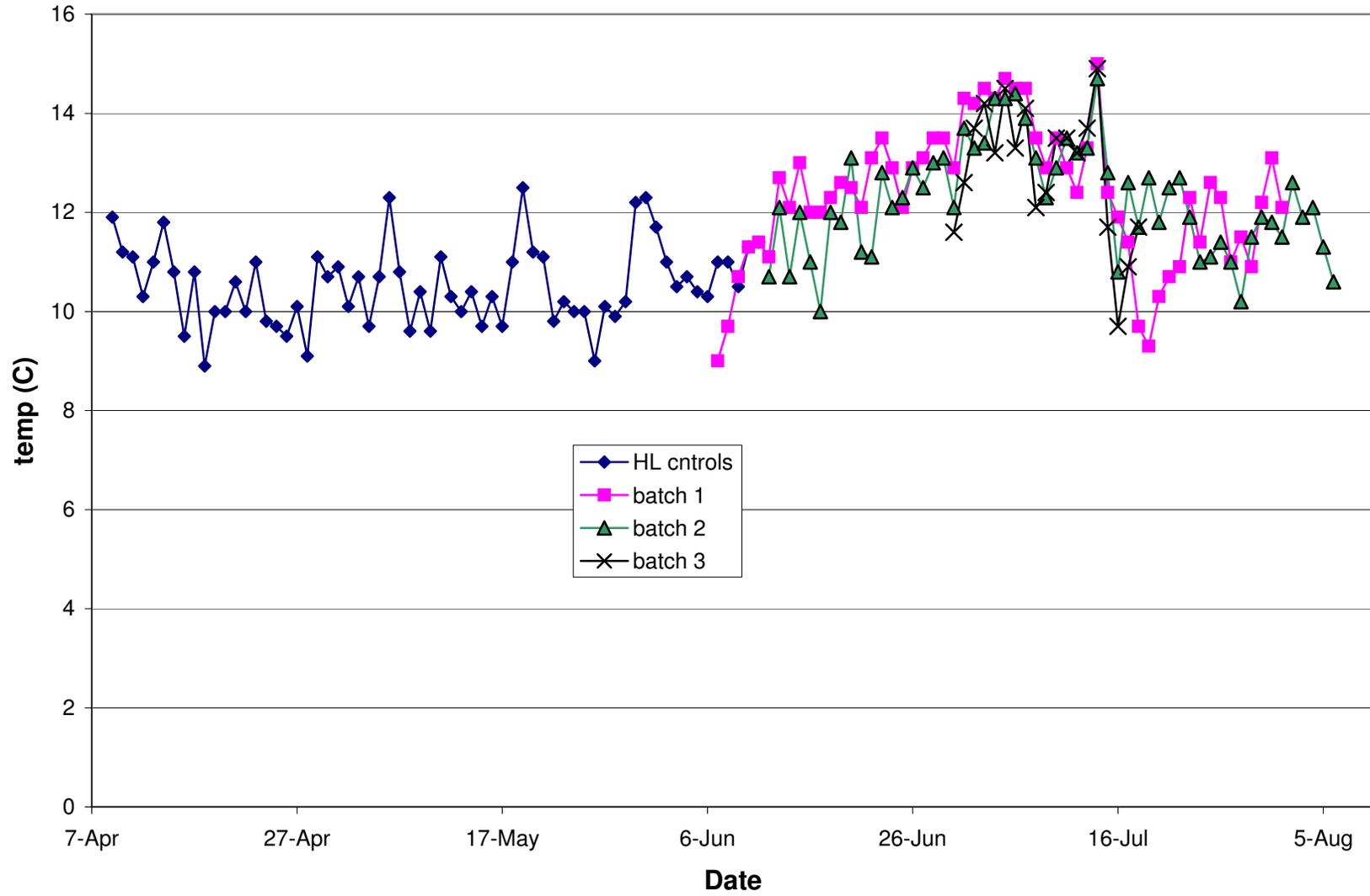


| Water hardness (mg/L) measurements in Yellowstone Cutthroat trout study (12699-002) | | | | | | |
|--|----------|----------------|--|--------------|------------|------------|
| filename: temp.xls | | | | | | |
| | | Water hardness | | | | |
| Date | Test Day | (mg/L) | | | | |
| 8-Apr-08 | D0 | 38 | HL Controls (April 8 - June 11) | | | |
| 9-Apr-08 | D1 | 40 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 10-Apr-08 | D2 | 44 | 44.41 | 3.44 | 38 | 54 |
| 11-Apr-08 | D3 | 44 | | | | |
| 12-Apr-08 | D4 | 48 | Green Tape (June 7 - Aug. 1) | | | |
| 13-Apr-08 | D5 | 48 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 14-Apr-08 | D6 | 48 | 45.57 | 2.08 | 40 | 50 |
| 15-Apr-08 | D7 | 42 | | | | |
| 16-Apr-08 | D8 | 44 | Purple Tape (June 11 - Aug. 6) | | | |
| 17-Apr-08 | D9 | 50 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 18-Apr-08 | D10 | 42 | 45.44 | 1.99 | 40 | 50 |
| 19-Apr-08 | D11 | 42 | | | | |
| 20-Apr-08 | D12 | 44 | Orange Tape (June 29 - July 18) | | | |
| 21-Apr-08 | D13 | 48 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 22-Apr-08 | D14 | 48 | 45.20 | 2.09 | 42 | 48 |
| 23-Apr-08 | D15 | 54 | | | | |
| 24-Apr-08 | D16 | 48 | | | | |
| 25-Apr-08 | D17 | 54 | | | | |
| 26-Apr-08 | D18 | 46 | | | | |
| 27-Apr-08 | D19 | 42 | | | | |
| 28-Apr-08 | D20 | 46 | | | | |
| 29-Apr-08 | D21 | 40 | | | | |
| 30-Apr-08 | D22 | 40 | | | | |
| 1-May-08 | D23 | 38 | | | | |
| 2-May-08 | D24 | 44 | | | | |
| 3-May-08 | D25 | 48 | | | | |
| 4-May-08 | D26 | 44 | | | | |
| 5-May-08 | D27 | 46 | | | | |
| 6-May-08 | D28 | 42 | | | | |
| 7-May-08 | D29 | 46 | | | | |
| 8-May-08 | D30 | 44 | | | | |
| 9-May-08 | D31 | | | | | |
| 10-May-08 | D32 | 40 | | | | |
| 11-May-08 | D33 | 38 | | | | |
| 12-May-08 | D34 | 42 | | | | |
| 13-May-08 | D35 | 42 | | | | |
| 14-May-08 | D36 | 40 | | | | |
| 15-May-08 | D37 | 42 | | | | |
| 16-May-08 | D38 | 44 | | | | |
| 17-May-08 | D39 | 40 | | | | |
| 18-May-08 | D40 | 42 | | | | |
| 19-May-08 | D41 | 46 | | | | |
| 20-May-08 | D42 | 44 | | | | |
| 21-May-08 | D43 | 42 | | | | |
| 22-May-08 | D44 | 42 | | | | |
| 23-May-08 | D45 | 44 | | | | |
| 24-May-08 | D46 | 44 | | | | |
| 25-May-08 | D47 | 44 | | | | |
| 26-May-08 | D48 | 46 | | | | |
| 27-May-08 | D49 | 44 | | | | |
| 28-May-08 | D50 | 40 | | | | |
| 29-May-08 | D51 | 42 | | | | |
| 30-May-08 | D52 | 44 | | | | |
| 31-May-08 | D53 | 48 | | | | |
| 1-Jun-08 | D54 | 46 | | | | |
| 2-Jun-08 | D55 | 44 | | | | |
| 3-Jun-08 | D56 | 48 | | | | |
| 4-Jun-08 | D57 | 44 | | | | |
| 5-Jun-08 | D58 | 46 | | | | |
| 6-Jun-08 | D59 | 44 | | | | |
| 7-Jun-08 | D60 | 46 | | | | |
| 8-Jun-08 | D61 | 50 | | | | |
| 9-Jun-08 | D62 | 48 | | | | |
| 10-Jun-08 | D63 | 46 | | | | |

| Water hardness (mg/L) measurements in Yellowstone Cutthroat trout study (12699-002) | | | | | | |
|--|-----------------|----------------|--|--|--|--|
| filename: temp.xls | | | | | | |
| | | Water hardness | | | | |
| <u>Date</u> | <u>Test Day</u> | <u>(mg/L)</u> | | | | |
| 11-Jun-08 | D64 | 48 | | | | |
| 12-Jun-08 | D65 | 48 | | | | |
| 13-Jun-08 | D66 | 44 | | | | |
| 14-Jun-08 | D67 | 44 | | | | |
| 15-Jun-08 | D68 | 46 | | | | |
| 16-Jun-08 | D69 | 46 | | | | |
| 17-Jun-08 | D70 | 48 | | | | |
| 18-Jun-08 | D71 | 46 | | | | |
| 19-Jun-08 | D72 | 44 | | | | |
| 20-Jun-08 | D73 | 44 | | | | |
| 21-Jun-08 | D74 | 40 | | | | |
| 22-Jun-08 | D75 | 44 | | | | |
| 23-Jun-08 | D76 | 50 | | | | |
| 24-Jun-08 | D77 | 44 | | | | |
| 25-Jun-08 | D78 | 46 | | | | |
| 26-Jun-08 | D79 | 44 | | | | |
| 27-Jun-08 | D80 | 46 | | | | |
| 28-Jun-08 | D81 | 44 | | | | |
| 29-Jun-08 | D82 | 46 | | | | |
| 30-Jun-08 | D83 | 48 | | | | |
| 1-Jul-08 | D84 | 42 | | | | |
| 2-Jul-08 | D85 | 42 | | | | |
| 3-Jul-08 | D86 | 46 | | | | |
| 4-Jul-08 | D87 | 44 | | | | |
| 5-Jul-08 | D88 | 46 | | | | |
| 6-Jul-08 | D89 | 48 | | | | |
| 7-Jul-08 | D90 | 44 | | | | |
| 8-Jul-08 | D91 | 46 | | | | |
| 9-Jul-08 | D92 | 46 | | | | |
| 10-Jul-08 | D93 | 42 | | | | |
| 11-Jul-08 | D94 | 44 | | | | |
| 12-Jul-08 | D95 | 48 | | | | |
| 13-Jul-08 | D96 | 46 | | | | |
| 14-Jul-08 | D97 | 44 | | | | |
| 15-Jul-08 | D98 | 46 | | | | |
| 16-Jul-08 | D99 | 46 | | | | |
| 17-Jul-08 | D100 | 42 | | | | |
| 18-Jul-08 | D101 | 48 | | | | |
| 19-Jul-08 | D102 | 48 | | | | |
| 20-Jul-08 | D103 | 48 | | | | |
| 21-Jul-08 | D104 | 46 | | | | |
| 22-Jul-08 | D105 | 44 | | | | |
| 23-Jul-08 | D106 | 46 | | | | |
| 24-Jul-08 | D107 | 44 | | | | |
| 25-Jul-08 | D108 | 46 | | | | |
| 26-Jul-08 | D109 | 44 | | | | |
| 27-Jul-08 | D110 | 44 | | | | |
| 28-Jul-08 | D111 | 46 | | | | |
| 29-Jul-08 | D112 | 48 | | | | |
| 30-Jul-08 | D113 | 44 | | | | |
| 31-Jul-08 | D114 | 46 | | | | |
| 1-Aug-08 | D115 | 48 | | | | |
| 2-Aug-08 | D116 | 44 | | | | |
| 3-Aug-08 | D117 | 44 | | | | |
| 4-Aug-08 | D118 | 46 | | | | |
| 5-Aug-08 | D119 | 48 | | | | |
| 6-Aug-08 | D120 | 46 | | | | |
| Average (overall) | | 44.87 | | | | |
| | StDev | 2.884 | | | | |
| | Min | 38 | | | | |
| | Max | 54 | | | | |

| Alkalinity (mg/L) measurements in HT water for Yellowstone Cutthroat trout study (12699-002) | | | | | | |
|---|----------|--------------|--|--------------|------------|------------|
| filename: temp.xls | | | | | | |
| | | Alkalinity | | | | |
| Date | Test Day | (mg/L) | | | | |
| 9-Apr-08 | D1 | 18 | HL Controls (April 8 - June 11) | | | |
| 15-Apr-08 | D7 | 29 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 22-Apr-08 | D14 | 21 | 25.44 | 3.75 | 18 | 29 |
| 6-May-08 | D28 | 25 | | | | |
| 13-May-08 | D35 | 25 | Green Tape (June 7 - Aug. 1) | | | |
| 20-May-08 | D42 | 27 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 27-May-08 | D49 | 27 | 31.50 | 6.41 | 27 | 47 |
| 3-Jun-08 | D56 | 28 | | | | |
| 10-Jun-08 | D63 | 29 | Purple Tape (June 11 - Aug. 6) | | | |
| 17-Jun-08 | D70 | 28 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 24-Jun-08 | D77 | 47 | 31.50 | 6.41 | 27 | 47 |
| 4-Jul-08 | D87 | 29 | | | | |
| 8-Jul-08 | D91 | 31 | Orange Tape (June 29 - July 18) | | | |
| 15-Jul-08 | D98 | 31 | <u>Avg</u> | <u>StDev</u> | <u>Min</u> | <u>Max</u> |
| 22-Jul-08 | D110 | 27 | 30.33 | 1.15 | 29 | 31 |
| 29-Jul-08 | D112 | 30 | | | | |
| 5-Aug-08 | D119 | 29 | | | | |
| Average (overall) | | 28.29 | | | | |
| | StDev | 5.892 | | | | |
| | Min | 18 | | | | |
| | Max | 47 | | | | |

Temperature graph - YTC (PT)



**Temperature measurement for YTC Parental Se transfer study (HL treatment)
12699-002-300**

filename: temp.xls

| <u>Date</u> | <u>Test Day</u> | <u>Temp</u> | | |
|-------------|-----------------|-----------------------------------|--------------|--------------|
| 8-Apr | 0 | | | |
| 9-Apr | 1 | 11.9 | | |
| 10-Apr | 2 | 11.2 | | |
| 11-Apr | 3 | 11.1 | | |
| 12-Apr | 4 | 10.3 | | |
| 13-Apr | 5 | 11 | | |
| 14-Apr | 6 | 11.8 | | |
| 15-Apr | 7 | 10.8 | | |
| 16-Apr | 8 | 9.5 | | |
| 17-Apr | 9 | 10.8 | | |
| 18-Apr | 10 | 8.9 | | |
| 19-Apr | 11 | 10 | | |
| 20-Apr | 12 | 10 | | |
| 21-Apr | 13 | 10.6 | | |
| 22-Apr | 14 | 10 | | |
| 23-Apr | 15 | 11 | | |
| 24-Apr | 16 | 9.8 | | |
| 25-Apr | 17 | 9.7 | | |
| 26-Apr | 18 | 9.5 | | |
| 27-Apr | 19 | 10.1 | | |
| 28-Apr | 20 | 9.1 | | |
| 29-Apr | 21 | 11.1 | | |
| 30-Apr | 22 | 10.7 | | |
| 1-May | 23 | 10.9 | | |
| 2-May | 24 | 10.1 | | |
| 3-May | 25 | 10.7 | | |
| 4-May | 26 | 9.7 | | |
| 5-May | 27 | 10.7 | | |
| 6-May | 28 | 12.3 | | |
| <hr/> | | | thru hatch | |
| 7-May | 29 | 10.8 | Avg | 10.475 |
| 8-May | 30 | 9.6 | std | 0.8267 |
| 9-May | 31 | 10.4 | | |
| 10-May | 32 | 9.6 | | |
| 11-May | 33 | 11.1 | | |
| 12-May | 34 | 10.3 | | |
| 13-May | 35 | 10 | | |
| 14-May | 36 | 10.4 | | |
| 15-May | 37 | 9.7 | | |
| 16-May | 38 | 10.3 | | |
| 17-May | 39 | 9.7 | | |
| 18-May | 40 | 11 | | |
| 19-May | 41 | 12.5 | | |
| 20-May | 42 | 11.2 | | |
| 21-May | 43 | 11.1 | | |
| 22-May | 44 | 9.8 | | |
| 23-May | 45 | 10.2 | | |
| 24-May | 46 | 10 | | |
| 25-May | 47 | 10 | | |
| 26-May | 48 | 9 | | |
| 27-May | 49 | 10.1 | thru swim-up | |
| <hr/> | | | Avg | 10.410 |
| 28-May | 50 | 9.9 | std | 0.7954 |
| 29-May | 51 | 10.2 | | |
| 30-May | 52 | 12.2 | | |
| 31-May | 53 | 12.3 | | |
| 1-Jun | 54 | 11.7 | | |
| 2-Jun | 55 | 11 | | |
| 3-Jun | 56 | 10.5 | | |
| 4-Jun | 57 | 10.7 | | |
| 5-Jun | 58 | 10.4 | | |
| 6-Jun | 59 | 10.3 | | |
| 7-Jun | 60 | 11 | | |
| 8-Jun | 61 | 11 | | |
| 9-Jun | 62 | 10.5 | | |
| 10-Jun | 63 | 11.3 | | |
| 11-Jun | 64 | 11.4 (measured in Batch #1 study) | | |
| <hr/> | | | Avg | 10.54 |
| | | | std | 0.81 |
| | | | Min | 8.9 |
| | | | Max | 12.5 |

Temperature measurement for YTC Parental Se transfer study (Purple group)

12699-002-300

filename: temp.xls

| <u>Date</u> | <u>Test Day</u> | <u>Temp</u> | |
|-------------|-----------------|-----------------------------------|---------------------------------|
| 11-Jun-08 | 0 | | |
| 12-Jun-08 | 1 | 10.7 | |
| 13-Jun-08 | 2 | 12.1 | Purple treatments consisted of: |
| 14-Jun-08 | 3 | 10.7 | 1)CC350-004 |
| 15-Jun-08 | 4 | 12 | 2) CC350-003 |
| 16-Jun-08 | 5 | 11 | 3) DC-004 |
| 17-Jun-08 | 6 | 10 | 4) DC-002 |
| 18-Jun-08 | 7 | 12 | 5) CC150-NATES-001 |
| 19-Jun-08 | 8 | 11.8 | 6) DC-001 |
| 20-Jun-08 | 9 | 13.1 | 7) CC350-005 |
| 21-Jun-08 | 10 | 11.2 | 8) DC-003 |
| 22-Jun-08 | 11 | 11.1 | |
| 23-Jun-08 | 12 | 12.8 | |
| 24-Jun-08 | 13 | 12.1 | |
| 25-Jun-08 | 14 | 12.3 | |
| 26-Jun-08 | 15 | 12.9 | |
| 27-Jun-08 | 16 | 12.5 | |
| 28-Jun-08 | 17 | 13 | |
| 29-Jun-08 | 18 | 13.1 | |
| 30-Jun-08 | 19 | 12.1 | |
| 1-Jul-08 | 20 | 13.7 | |
| 2-Jul-08 | 21 | 13.3 | thru hatch |
| 3-Jul-08 | 22 | 13.4 | Avg 12.071 |
| 4-Jul-08 | 23 | 14.3 | std 0.9895 |
| 5-Jul-08 | 24 | 14.3 | |
| 6-Jul-08 | 25 | 14.4 | |
| 7-Jul-08 | 26 | 13.9 | |
| 8-Jul-08 | 27 | 13.1 | |
| 9-Jul-08 | 28 | 12.3 | |
| 10-Jul-08 | 29 | 12.9 | |
| 11-Jul-08 | 30 | 13.5 | |
| 12-Jul-08 | 31 | 13.2 | |
| 13-Jul-08 | 32 | 13.3 | |
| 14-Jul-08 | 33 | 14.7 | |
| 15-Jul-08 | 34 | 12.8 | |
| 16-Jul-08 | 35 | 10.8 | |
| 17-Jul-08 | 36 | 12.6 | |
| 18-Jul-08 | 37 | 11.7 | |
| 19-Jul-08 | 38 | 12.7 | |
| 20-Jul-08 | 39 | 11.8 | |
| 21-Jul-08 | 40 | 12.5 | |
| 22-Jul-08 | 41 | 12.7 | thru swim-up |
| 23-Jul-08 | 42 | 11.9 | Avg 12.546 |
| 24-Jul-08 | 43 | 11 | std 1.0948 |
| 25-Jul-08 | 44 | 11.1 | |
| 26-Jul-08 | 45 | 11.4 | |
| 27-Jul-08 | 46 | 11 | |
| 28-Jul-08 | 47 | 10.2 | |
| 29-Jul-08 | 48 | 11.5 | |
| 30-Jul-08 | 49 | 11.9 | |
| 31-Jul-08 | 50 | 11.8 | |
| 1-Aug-08 | 51 | 11.5 | |
| 2-Aug-08 | 52 | 12.6 | |
| 3-Aug-08 | 53 | 11.9 | |
| 4-Aug-08 | 54 | 12.1 | |
| 5-Aug-08 | 55 | 11.3 | |
| 6-Aug-08 | 56 | 10.6 (measured in Batch #3 study) | |
| | Avg | 12.25 | |
| | std | 1.10 | |
| | Min | 10 | |
| | Max | 14.7 | |

Temperature measurement for YTC Parental Se transfer study (Orange group)

12699-002-300

filename: temp.xls

| <u>Date</u> | <u>Test Day</u> | <u>Temp</u> |
|-------------|-----------------|-----------------------------------|
| 29-Jun-08 | 0 | |
| 30-Jun-08 | 1 | 11.6 |
| 1-Jul-08 | 2 | 12.6 |
| 2-Jul-08 | 3 | 13.7 |
| 3-Jul-08 | 4 | 14.2 |
| 4-Jul-08 | 5 | 13.2 |
| 5-Jul-08 | 6 | 14.5 |
| 6-Jul-08 | 7 | 13.3 |
| 7-Jul-08 | 8 | 14.1 |
| 8-Jul-08 | 9 | 12.1 |
| 9-Jul-08 | 10 | 12.4 |
| 10-Jul-08 | 11 | 13.5 |
| 11-Jul-08 | 12 | 13.5 |
| 12-Jul-08 | 13 | 13.2 |
| 13-Jul-08 | 14 | 13.7 |
| 14-Jul-08 | 15 | 14.9 |
| 15-Jul-08 | 16 | 11.7 |
| 16-Jul-08 | 17 | 9.7 |
| 17-Jul-08 | 18 | 10.9 |
| 18-Jul-08 | 19 | 11.7 (measured in Batch #4 study) |
| | Avg | 12.87 |
| | std | 1.33 |
| | Min | 9.7 |
| | Max | 14.9 |

Orange treatment consisted of:

1) SFTC-001

Naddy, Rami

From: Sadler, Emily
Sent: Friday, March 13, 2009 5:19 PM
To: Naddy, Rami
Subject: RE: charge #

I finished entering the data into the excel spreadsheet and I double checked my entries make sure it was correct. When I double checked the HL temp data that was previously entered I noticed that it went from April 8- June 11th. All of the paperwork I have says it ends on June 10th. Didn't know if it should have that extra day or not. Here are the ranges for each group (and I'll also leave a hard copy on your chair). Let me know what else I can do.

HL Control
pH: 7.4 - 8.1
Cond: 97-148
D.O.: 7.0 min

Temp
Avg: 10.5 ± 0.81
8.9-12.5

Green
pH: 7.4 - 8.0
Cond: 102-135
D.O.: 7.0 min

avg 12.37 ± 1.39
9-15

Purple
pH: 7.4 - 7.9
Cond: 101-138
D.O.: 6.4 min

avg 12.25 ± 1.10
10-14.7

Orange
pH: 7.6 - 7.9
Cond: 105-124
D.O.: 7.3 min

avg 12.87 ± 1.33
9.7-14.9

Emily

From: Naddy, Rami
Sent: Friday, March 13, 2009 3:46 PM
To: Sadler, Emily
Subject: charge #

Emily,

Charge your time to 12699-002-500

Thanks.

May 30, 2008

Report to:

Rami Naddy

ENSR

4304 W. Laporte

Fort Collins, CO 80521

Bill to:

Rami Naddy

ENSR

4304 W. Laporte

Fort Collins, CO 80521

Project ID: 12699-001-002

ACZ Project ID: L69233

Rami Naddy:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 15, 2008. This project has been assigned to ACZ's project number, L69233. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L69233. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after June 30, 2008. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



ENSRProject ID: 12699-001-002
Sample ID: HL-TOTACZ Sample ID: **L69233-03**
Date Sampled: 05/08/08 17:10
Date Received: 05/15/08
Sample Matrix: Surface Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 05/23/08 11:38 | nek/rac |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 05/29/08 4:58 | msh |

ENSRProject ID: 12699-001-002
Sample ID: HL-DISSACZ Sample ID: **L69233-04**
Date Sampled: 05/08/08 17:10
Date Received: 05/15/08
Sample Matrix: Surface Water

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|---------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, dissolved | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 05/21/08 10:06 | msh |

ENSR

Project ID: 12699-001-002
 Sample ID: 12699-002-300 BKD SE

ACZ Sample ID: **L69233-05**
 Date Sampled: 05/08/08 16:30
 Date Received: 05/15/08
 Sample Matrix: Surface Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 05/23/08 12:07 | nek/rac |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 05/29/08 5:15 | msh |

ENSR

Project ID: 12699-001-002
Sample ID: 12699-002-300 BKD SE

ACZ Sample ID: **L69233-06**
Date Sampled: 05/08/08 16:30
Date Received: 05/15/08
Sample Matrix: Surface Water

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|---------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, dissolved | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 05/21/08 10:12 | msh |

Report Header Explanations

| | |
|----------------|---|
| <i>Batch</i> | A distinct set of samples analyzed at a specific time |
| <i>Found</i> | Value of the QC Type of interest |
| <i>Limit</i> | Upper limit for RPD, in %. |
| <i>Lower</i> | Lower Recovery Limit, in % (except for LCSS, mg/Kg) |
| <i>MDL</i> | Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations. |
| <i>PCN/SCN</i> | A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis |
| <i>PQL</i> | Practical Quantitation Limit, typically 5 times the MDL. |
| <i>QC</i> | True Value of the Control Sample or the amount added to the Spike |
| <i>Rec</i> | Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg) |
| <i>RPD</i> | Relative Percent Difference, calculation used for Duplicate QC Types |
| <i>Upper</i> | Upper Recovery Limit, in % (except for LCSS, mg/Kg) |
| <i>Sample</i> | Value of the Sample of interest |

QC Sample Types

| | | | |
|--------------|--|--------------|--|
| <i>AS</i> | Analytical Spike (Post Digestion) | <i>LCSWD</i> | Laboratory Control Sample - Water Duplicate |
| <i>ASD</i> | Analytical Spike (Post Digestion) Duplicate | <i>LFB</i> | Laboratory Fortified Blank |
| <i>CCB</i> | Continuing Calibration Blank | <i>LFM</i> | Laboratory Fortified Matrix |
| <i>CCV</i> | Continuing Calibration Verification standard | <i>LFMD</i> | Laboratory Fortified Matrix Duplicate |
| <i>DUP</i> | Sample Duplicate | <i>LRB</i> | Laboratory Reagent Blank |
| <i>ICB</i> | Initial Calibration Blank | <i>MS</i> | Matrix Spike |
| <i>ICV</i> | Initial Calibration Verification standard | <i>MSD</i> | Matrix Spike Duplicate |
| <i>ICSAB</i> | Inter-element Correction Standard - A plus B solutions | <i>PBS</i> | Prep Blank - Soil |
| <i>LCSS</i> | Laboratory Control Sample - Soil | <i>PBW</i> | Prep Blank - Water |
| <i>LCSSD</i> | Laboratory Control Sample - Soil Duplicate | <i>PQV</i> | Practical Quantitation Verification standard |
| <i>LCSW</i> | Laboratory Control Sample - Water | <i>SDL</i> | Serial Dilution |

QC Sample Type Explanations

| | |
|-------------------------|---|
| Blanks | Verifies that there is no or minimal contamination in the prep method or calibration procedure. |
| Control Samples | Verifies the accuracy of the method, including the prep procedure. |
| Duplicates | Verifies the precision of the instrument and/or method. |
| Spikes/Fortified Matrix | Determines sample matrix interferences, if any. |
| Standard | Verifies the validity of the calibration. |

ACZ Qualifiers (Qual)

| | |
|---|---|
| B | Analyte concentration detected at a value between MDL and PQL. |
| H | Analysis exceeded method hold time. pH is a field test with an immediate hold time. |
| U | Analyte was analyzed for but not detected at the indicated MDL |

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

ENSR

ACZ Project ID: **L69233**

| ACZ ID | WORKNUM | PARAMETER | METHOD | QUAL | DESCRIPTION |
|--------|---------|-----------|--------|------|-------------|
|--------|---------|-----------|--------|------|-------------|

No extended qualifiers associated with this analysis

ENSR

ACZ Project ID: **L69233**

No certification qualifiers associated with this analysis

ENSR
 12699-001-002

ACZ Project ID: L69233
 Date Received: 5/15/2008
 Received By:
 Date Printed: 5/16/2008

Receipt Verification

| | YES | NO | NA |
|--|-----|----|----|
| 1) Does this project require special handling procedures such as CLP protocol? | | | X |
| 2) Are the custody seals on the cooler intact? | X | | |
| 3) Are the custody seals on the sample containers intact? | | | X |
| 4) Is there a Chain of Custody or other directive shipping papers present? | X | | |
| 5) Is the Chain of Custody complete? | X | | |
| 6) Is the Chain of Custody in agreement with the samples received? | X | | |
| 7) Is there enough sample for all requested analyses? | X | | |
| 8) Are all samples within holding times for requested analyses? | X | | |
| 9) Were all sample containers received intact? | X | | |
| 10) Are the temperature blanks present? | | | X |
| 11) Are the trip blanks (VOA and/or Cyanide) present? | | | X |
| 12) Are samples requiring no headspace, headspace free? | | | X |
| 13) Do the samples that require a Foreign Soils Permit have one? | | | X |

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

| Cooler Id | Temp (°C) | Rad (µR/hr) |
|-----------|-----------|-------------|
| NA6022 | 2.6 | 15 |
| | | |
| | | |

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ENSR
 12699-001-002

ACZ Project ID: L69233
 Date Received: 5/15/2008
 Received By:

Sample Container Preservation

| SAMPLE | CLIENT ID | R < 2 | G < 2 | BK < 2 | Y < 2 | YG < 2 | B < 2 | O < 2 | T > 12 | N/A | RAD | ID |
|-----------|----------------------|-------|-------|--------|-------|--------|-------|-------|--------|-----|-----|--------------------------|
| L69233-01 | SNFH-TOT | Y | | | | | | | | | | <input type="checkbox"/> |
| L69233-02 | SNFH-DISS | | Y | | | | | | | | | <input type="checkbox"/> |
| L69233-03 | HL-TOT | Y | | | | | | | | | | <input type="checkbox"/> |
| L69233-04 | HL-DISS | | Y | | | | | | | | | <input type="checkbox"/> |
| L69233-05 | 12699-002-300 BKD SE | Y | | | | | | | | | | <input type="checkbox"/> |
| L69233-06 | 12699-002-300 BKD SE | | Y | | | | | | | | | <input type="checkbox"/> |

Sample Container Preservation Legend

| Abbreviation | Description | Container Type | Preservative/Limits |
|--------------|------------------------|----------------|---------------------|
| R | Raw/Nitric | RED | pH must be < 2 |
| B | Filtered/Sulfuric | BLUE | pH must be < 2 |
| BK | Filtered/Nitric | BLACK | pH must be < 2 |
| G | Filtered/Nitric | GREEN | pH must be < 2 |
| O | Raw/Sulfuric | ORANGE | pH must be < 2 |
| P | Raw/NaOH | PURPLE | pH must be > 12 * |
| T | Raw/NaOH_Zinc Acetate | TAN | pH must be > 12 |
| Y | Raw/Sulfuric | YELLOW | pH must be < 2 |
| YG | Raw/Sulfuric | YELLOW GLASS | pH must be < 2 |
| N/A | No preservative needed | Not applicable | |
| RAD | Gamma/Beta dose rate | Not applicable | must be < 250 µR/hr |

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

June 16, 2008

Report to:
Rami Naddy
ENSR
4304 W. Laporte
Fort Collins, CO 80521

Bill to:
Rami Naddy
ENSR
4304 W. Laporte
Fort Collins, CO 80521

Project ID: 12699-002-300
ACZ Project ID: L69503

Rami Naddy:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 29, 2008. This project has been assigned to ACZ's project number, L69503. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L69503. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 16, 2008. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



ENSRProject ID: 12699-002-300
Sample ID: HL006ACZ Sample ID: **L69503-01**
Date Sampled: 05/28/08 11:40
Date Received: 05/29/08
Sample Matrix: Surface Water

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|---------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, dissolved | M200.8 ICP-MS | 0.0001 | B | | mg/L | 0.0001 | 0.0005 | 06/07/08 7:03 | msh |

ENSR

Project ID: 12699-002-300
Sample ID: HL006

ACZ Sample ID: **L69503-02**
Date Sampled: 05/28/08 11:40
Date Received: 05/29/08
Sample Matrix: Surface Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 06/05/08 14:14 | scp |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | 0.0002 | B | | mg/L | 0.0001 | 0.0005 | 06/14/08 2:22 | gme |

Report Header Explanations

| | |
|----------------|---|
| <i>Batch</i> | A distinct set of samples analyzed at a specific time |
| <i>Found</i> | Value of the QC Type of interest |
| <i>Limit</i> | Upper limit for RPD, in %. |
| <i>Lower</i> | Lower Recovery Limit, in % (except for LCSS, mg/Kg) |
| <i>MDL</i> | Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations. |
| <i>PCN/SCN</i> | A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis |
| <i>PQL</i> | Practical Quantitation Limit, typically 5 times the MDL. |
| <i>QC</i> | True Value of the Control Sample or the amount added to the Spike |
| <i>Rec</i> | Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg) |
| <i>RPD</i> | Relative Percent Difference, calculation used for Duplicate QC Types |
| <i>Upper</i> | Upper Recovery Limit, in % (except for LCSS, mg/Kg) |
| <i>Sample</i> | Value of the Sample of interest |

QC Sample Types

| | | | |
|--------------|--|--------------|--|
| <i>AS</i> | Analytical Spike (Post Digestion) | <i>LCSWD</i> | Laboratory Control Sample - Water Duplicate |
| <i>ASD</i> | Analytical Spike (Post Digestion) Duplicate | <i>LFB</i> | Laboratory Fortified Blank |
| <i>CCB</i> | Continuing Calibration Blank | <i>LFM</i> | Laboratory Fortified Matrix |
| <i>CCV</i> | Continuing Calibration Verification standard | <i>LFMD</i> | Laboratory Fortified Matrix Duplicate |
| <i>DUP</i> | Sample Duplicate | <i>LRB</i> | Laboratory Reagent Blank |
| <i>ICB</i> | Initial Calibration Blank | <i>MS</i> | Matrix Spike |
| <i>ICV</i> | Initial Calibration Verification standard | <i>MSD</i> | Matrix Spike Duplicate |
| <i>ICSAB</i> | Inter-element Correction Standard - A plus B solutions | <i>PBS</i> | Prep Blank - Soil |
| <i>LCSS</i> | Laboratory Control Sample - Soil | <i>PBW</i> | Prep Blank - Water |
| <i>LCSSD</i> | Laboratory Control Sample - Soil Duplicate | <i>PQV</i> | Practical Quantitation Verification standard |
| <i>LCSW</i> | Laboratory Control Sample - Water | <i>SDL</i> | Serial Dilution |

QC Sample Type Explanations

| | |
|-------------------------|---|
| Blanks | Verifies that there is no or minimal contamination in the prep method or calibration procedure. |
| Control Samples | Verifies the accuracy of the method, including the prep procedure. |
| Duplicates | Verifies the precision of the instrument and/or method. |
| Spikes/Fortified Matrix | Determines sample matrix interferences, if any. |
| Standard | Verifies the validity of the calibration. |

ACZ Qualifiers (Qual)

| | |
|---|---|
| B | Analyte concentration detected at a value between MDL and PQL. |
| H | Analysis exceeded method hold time. pH is a field test with an immediate hold time. |
| U | Analyte was analyzed for but not detected at the indicated MDL |

Method References

| | |
|-----|--|
| (1) | EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983. |
| (2) | EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993. |
| (3) | EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994. |
| (5) | EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996. |
| (6) | Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995. |

Comments

| | |
|-----|--|
| (1) | QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations. |
| (2) | Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis. |
| (3) | Animal matrices for Inorganic analyses are reported on an "as received" basis. |

ENSR

ACZ Project ID: **L69503**

| ACZ ID | WORKNUM | PARAMETER | METHOD | QUAL | DESCRIPTION |
|--------|---------|-----------|--------|------|-------------|
|--------|---------|-----------|--------|------|-------------|

No extended qualifiers associated with this analysis

ENSR

ACZ Project ID: **L69503**

No certification qualifiers associated with this analysis

ENSR
 12699-002-300

ACZ Project ID: L69503
 Date Received: 5/29/2008
 Received By:
 Date Printed: 5/29/2008

Receipt Verification

| | YES | NO | NA |
|--|-----|----|----|
| 1) Does this project require special handling procedures such as CLP protocol? | | | X |
| 2) Are the custody seals on the cooler intact? | X | | |
| 3) Are the custody seals on the sample containers intact? | | | X |
| 4) Is there a Chain of Custody or other directive shipping papers present? | X | | |
| 5) Is the Chain of Custody complete? | X | | |
| 6) Is the Chain of Custody in agreement with the samples received? | X | | |
| 7) Is there enough sample for all requested analyses? | X | | |
| 8) Are all samples within holding times for requested analyses? | X | | |
| 9) Were all sample containers received intact? | | | |
| 10) Are the temperature blanks present? | | | X |
| 11) Are the trip blanks (VOA and/or Cyanide) present? | | | X |
| 12) Are samples requiring no headspace, headspace free? | | | X |
| 13) Do the samples that require a Foreign Soils Permit have one? | | | X |

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

| Cooler Id | Temp (°C) | Rad (µR/hr) |
|-----------|-----------|-------------|
| 1769 | 8.3 | 14 |
| | | |
| | | |

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ENSR
 12699-002-300

ACZ Project ID: L69503
 Date Received: 5/29/2008
 Received By:

Sample Container Preservation

| SAMPLE | CLIENT ID | R < 2 | G < 2 | BK < 2 | Y < 2 | YG < 2 | B < 2 | O < 2 | T > 12 | N/A | RAD | ID |
|-----------|-----------|-------|-------|--------|-------|--------|-------|-------|--------|-----|-----|--------------------------|
| L69503-01 | HL006 | | Y | | | | | | | | | <input type="checkbox"/> |
| L69503-02 | HL006 | Y | | | | | | | | | | <input type="checkbox"/> |

Sample Container Preservation Legend

| Abbreviation | Description | Container Type | Preservative/Limits |
|--------------|------------------------|----------------|---------------------|
| R | Raw/Nitric | RED | pH must be < 2 |
| B | Filtered/Sulfuric | BLUE | pH must be < 2 |
| BK | Filtered/Nitric | BLACK | pH must be < 2 |
| G | Filtered/Nitric | GREEN | pH must be < 2 |
| O | Raw/Sulfuric | ORANGE | pH must be < 2 |
| P | Raw/NaOH | PURPLE | pH must be > 12 * |
| T | Raw/NaOH Zinc Acetate | TAN | pH must be > 12 |
| Y | Raw/Sulfuric | YELLOW | pH must be < 2 |
| YG | Raw/Sulfuric | YELLOW GLASS | pH must be < 2 |
| N/A | No preservative needed | Not applicable | |
| RAD | Gamma/Beta dose rate | Not applicable | must be < 250 µR/hr |

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

ENSRProject ID: 12699-002-610
Sample ID: HL011T63ACZ Sample ID: **L69778-05**
Date Sampled: 06/10/08 10:25
Date Received: 06/11/08
Sample Matrix: Ground Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 08/16/08 13:21 | rac |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 06/19/08 21:37 | gme |

ENSRProject ID: 12699-002-610
Sample ID: HL011D63ACZ Sample ID: **L69778-06**
Date Sampled: 06/10/08 10:25
Date Received: 06/11/08
Sample Matrix: *Ground Water*

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|---------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, dissolved | M200.8 ICP-MS | | U | * | mg/L | 0.0001 | 0.0005 | 06/20/08 9:27 | msh |

ENSRProject ID: 12699-002-610
Sample ID: HL006T63ACZ Sample ID: **L69778-07**
Date Sampled: 06/10/08 10:25
Date Received: 06/11/08
Sample Matrix: Ground Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 06/16/08 13:31 | rac |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 06/19/08 21:43 | gme |

ENSR

Project ID: 12699-002-610
Sample ID: HL006D63

ACZ Sample ID: **L69778-08**
Date Sampled: 06/10/08 10:25
Date Received: 06/11/08
Sample Matrix: Ground Water

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|---------------------|---------------|--------|------|----|-------|--------|--------|---------------|---------|
| Selenium, dissolved | M200.8 ICP-MS | | U | * | mg/L | 0.0001 | 0.0005 | 06/20/08 9:33 | msh |

ENSRProject ID: 12699-002-610
Sample ID: LSV-2C-001ACZ Sample ID: **L70654-18**
Date Sampled: 07/14/08 12:00
Date Received: 07/23/08
Sample Matrix: Ground Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 07/29/08 14:44 | jws |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 07/31/08 12:28 | msh |

ENSRProject ID: 12699-002-610
Sample ID: SFTC-1ACZ Sample ID: **L70654-19**
Date Sampled: 07/18/08 14:10
Date Received: 07/23/08
Sample Matrix: Ground Water

Inorganic Prep

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|-----|-----|----------------|---------|
| Total Recoverable Digestion | M200.2 ICP-MS | | | | | | | 07/29/08 14:55 | jws |

Metals Analysis

| Parameter | EPA Method | Result | Qual | XQ | Units | MDL | PQL | Date | Analyst |
|-----------------------------|---------------|--------|------|----|-------|--------|--------|----------------|---------|
| Selenium, total recoverable | M200.8 ICP-MS | | U | | mg/L | 0.0001 | 0.0005 | 07/31/08 12:34 | msh |

Ion Chromatography

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0805079

Client Name: ENSR Consulting and Engineering

ClientProject ID: YCT 12699-002-300

| | |
|-----------|-----------|
| Field ID: | HT + hand |
| Lab ID: | 0805079-1 |

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 08-May-08

Date Extracted: 09-May-08

Date Analyzed: 09-May-08

Prep Method: NONE

Prep Batch: IC080509-1

QCBatchID: IC080509-1-1

Run ID: ic080509-1a

Cleanup: NONE

Basis: As Received

File Name: 80509_016.DXD

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: mg/l

Clean DF: 1

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|------------|----------------|-----------------|--------|-----------------|------------------|---------------|
| 14808-79-8 | SULFATE | 1 | 16 | 1 | | |

Data Package ID: ic0805079-1

Date Printed: Thursday, May 15, 2008

Paragon Analytics

LIMS Version: 6.141A

Page 1 of 1

SULFATE

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: Paragon Analytics
Client Name: ENSR Consulting and Engineering
Client Project ID: Simplot 12699-002
Work Order Number: 0805158 Final Volume: 5 ml
Reporting Basis: As Received Matrix: WATER
Prep Method: NONE Result Units: mg/l

| Client Sample ID | Lab ID | Date Collected | Date Prepared | Date Analyzed | Percent Moisture | Dilution Factor | Result | Reporting Limit | Flag | Sample Allquot |
|------------------|-----------|----------------|---------------|---------------|------------------|-----------------|--------|-----------------|------|----------------|
| 12699-002-300 | 0805158-1 | 05/20/2008 | 05/21/2008 | 05/21/2008 | N/A | 1 | 15 | 1 | | 5 ml |
| 12699-002-610 | 0805158-2 | 05/20/2008 | 05/21/2008 | 05/21/2008 | N/A | 1 | 16 | 1 | | 5 ml |

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *ic0805158-1*

Appendix F

Number of organisms and survival rates at different stages during the Yellowstone cutthroat trout reproduction study

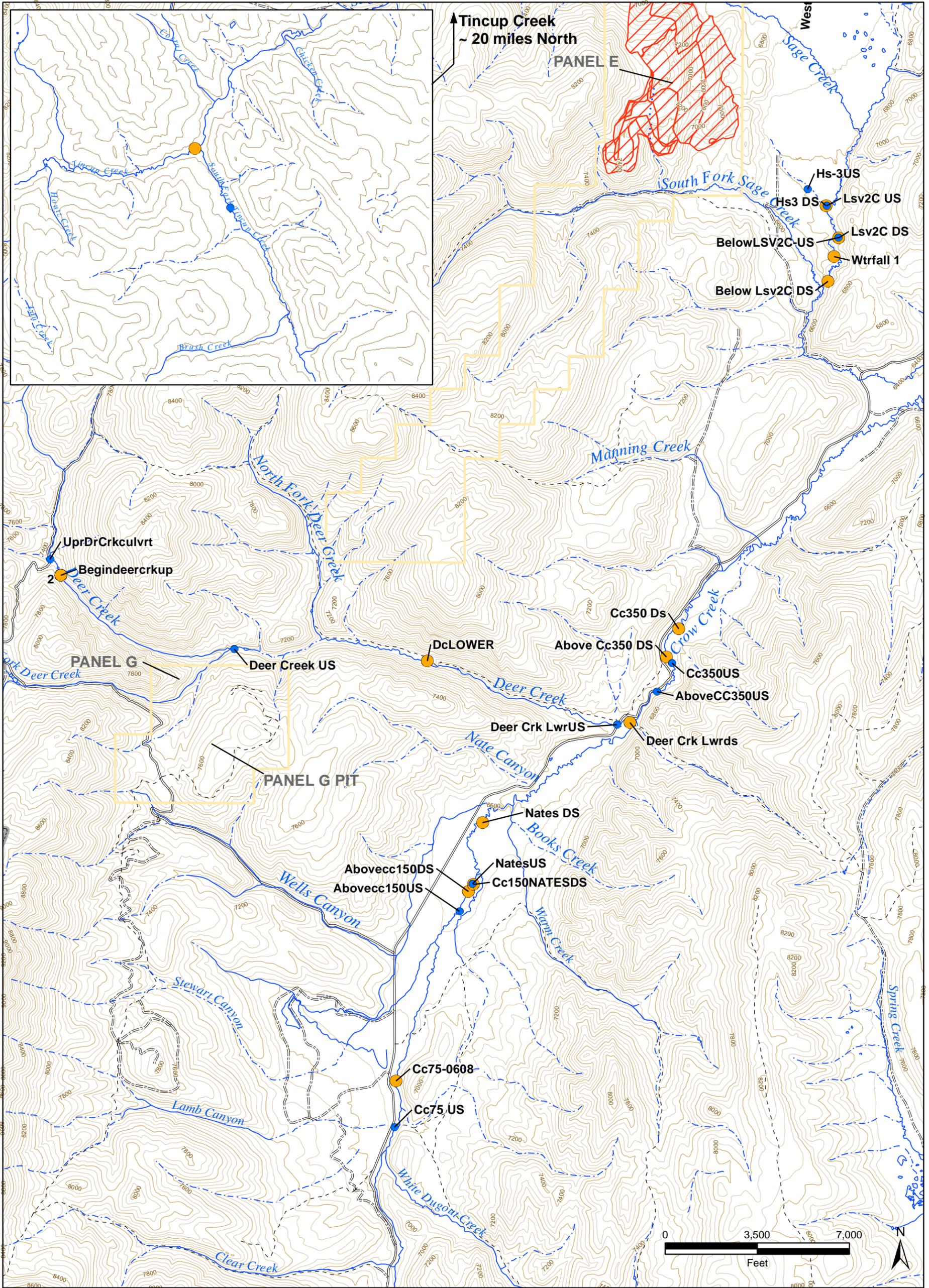
| Number of Organisms and Survival Rates at Different Stages During Yellowstone Cutthroat Trout Reproductive Study (12699-002) | | | | | | | | | | | | | | | | | | | | | |
|--|--------------|-----------------------------|-------------|-------|---------|------------------|----------------|----------------|-------|-----------------|------------------------|-------------------|-----------------|---------|-----|-------------------|-------------------|-------|--------------------|----------------------|----------------------|
| filename: survival data.xls | | | | | | | | | | | | | | | | | | | | | |
| Treatment | Initial eggs | #s prior to hatch | | | | #s at swimup | | | | | #s at test termination | | | | | #s for whole test | | | | | |
| | | # dead alevins (hatch - su) | sub-sampled | Total | % hatch | # preserved @ su | 15d PSU target | 15d PSU actual | Total | % survival @ su | # preserved @ end | # for wts/lengths | Dead in 15d PSU | Missing | TE | Total | % survival @ term | Total | % survival (total) | % mort. (hatch-term) | % surv. (hatch-term) |
| HL001 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL002 | 600 | 10 | 0 | 69 | 11.5% | 14 | 41 | 45 | 59 | 9.8% | 25 | 20 | 0 | | 45 | 100.0% | 59 | 9.8% | 14.5% | 85.5% | 100.0% |
| HL003 | 600 | 17 | 0 | 341 | 56.8% | 227 | 100 | 97 | 324 | 54.0% | 75 | 20 | 2 | | 95 | 97.9% | 322 | 53.7% | 5.6% | 94.4% | 100.0% |
| HL004 | 600 | 19 | 0 | 456 | 76.0% | 338 | 100 | 99 | 437 | 72.8% | 78 | 20 | 1 | | 98 | 99.0% | 436 | 72.7% | 4.4% | 95.6% | 100.0% |
| HL005 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL006 | 600 | 102 | 0 | 367 | 61.2% | 167 | 100 | 98 | 265 | 44.2% | 77 | 20 | 1 | | 97 | 99.0% | 264 | 44.0% | 28.1% | 71.9% | 100.0% |
| HL007 | 600 | 18 | 0 | 442 | 73.7% | 327 | 100 | 97 | 424 | 70.7% | 77 | 20 | 0 | | 97 | 100.0% | 424 | 70.7% | 4.1% | 95.9% | 100.0% |
| HL008 | 600 | 36 | 0 | 469 | 78.2% | 332 | 100 | 101 | 433 | 72.2% | 80 | 20 | 1 | | 100 | 99.0% | 432 | 72.0% | 7.9% | 92.1% | 100.0% |
| HL009 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL010 | 600 | 0 | 0 | 4 | 0.7% | 0 | 4 | 4 | 4 | 0.7% | 0 | 0 | 0 | | 4 | 100.0% | 4 | 0.7% | 0.0% | 100.0% | 100.0% |
| HL011 | 600 | 21 | 0 | 338 | 56.3% | 212 | 100 | 105 | 317 | 52.8% | 84 | 20 | 1 | | 104 | 99.0% | 316 | 52.7% | 6.5% | 93.5% | 100.0% |
| HL012 | 600 | 25 | 0 | 501 | 83.5% | 374 | 100 | 102 | 476 | 79.3% | 80 | 20 | 2 | | 100 | 98.0% | 474 | 79.0% | 5.4% | 94.6% | 100.0% |
| HL013 | 600 | 24 | 0 | 527 | 87.8% | 402 | 100 | 101 | 503 | 83.8% | 81 | 20 | 0 | | 101 | 100.0% | 503 | 83.8% | 4.6% | 95.4% | 100.0% |
| HL014 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL015 | 600 | 6 | 0 | 62 | 10.3% | 19 | 36 | 37 | 56 | 9.3% | 17 | 20 | 0 | | 37 | 100.0% | 56 | 9.3% | 9.7% | 90.3% | 100.0% |
| HL016 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| LSV2C-001 | 600 | 536 | 20 | 556 | 92.7% | 0 | 0 | 0 | 0 | 0.0% | 0 | 0 | 0 | | 0 | 0% | 0 | 0.0% | 100.0% | 0.0% | 100.0% |
| LSV2C-002 | 550 | 71 | 0 | 444 | 80.7% | 273 | 100 | 100 | 373 | 67.8% | 46 | 20 | 34 | | 66 | 66.0% | 339 | 61.6% | 23.6% | 76.4% | 100.0% |
| LSV2C-003 | 650 | 121 | 0 | 645 | 99.2% | 423 | 100 | 101 | 524 | 80.6% | 64 | 20 | 17 | | 84 | 83.2% | 507 | 78.0% | 21.4% | 78.6% | 100.0% |
| LSV2C-004 | 600 | 58 | 0 | 571 | 95.2% | 413 | 100 | 100 | 513 | 85.5% | 63 | 20 | 17 | | 83 | 83.0% | 496 | 82.7% | 13.1% | 86.9% | 100.0% |
| DC001 | 600 | 24 | 0 | 325 | 54.2% | 203 | 100 | 98 | 301 | 50.2% | 72 | 20 | 6 | | 92 | 93.9% | 295 | 49.2% | 9.2% | 90.8% | 100.0% |
| DC002 | 600 | 25 | 0 | 511 | 85.2% | 386 | 100 | 100 | 486 | 81.0% | 79 | 20 | 1 | | 99 | 99.0% | 485 | 80.8% | 5.1% | 94.9% | 100.0% |
| DC003 | 450 | 10 | 0 | 439 | 97.6% | 331 | 100 | 98 | 429 | 95.3% | 49 | 20 | 29 | | 69 | 70.4% | 400 | 88.9% | 8.9% | 91.1% | 100.0% |
| DC004 | 100 | 4 | 0 | 64 | 64.0% | 0 | 60 | 60 | 60 | 60.0% | 21 | 20 | 19 | | 41 | 68.3% | 41 | 41.0% | 35.9% | 64.1% | 100.0% |
| CC-150-Nates-001 | 300 | 11 | 0 | 235 | 78.3% | 126 | 100 | 98 | 224 | 74.7% | 56 | 20 | 22 | | 76 | 77.6% | 202 | 67.3% | 14.0% | 86.0% | 100.0% |
| CC-350-001 | 400 | 19 | 0 | 162 | 40.5% | 40 | 100 | 103 | 143 | 35.8% | 0 | 2 | 101 | | 2 | 1.9% | 42 | 10.5% | 74.1% | 25.9% | 100.0% |
| CC-350-002 | 750 | 69 | 0 | 707 | 94.3% | 541 | 100 | 97 | 638 | 85.1% | 63 | 20 | 14 | | 83 | 85.6% | 624 | 83.2% | 11.7% | 88.3% | 100.0% |
| CC-350-003 | 500 | 17 | 0 | 386 | 77.2% | 272 | 100 | 97 | 369 | 73.8% | 58 | 20 | 19 | | 78 | 80.4% | 350 | 70.0% | 9.3% | 90.7% | 100.0% |
| CC-350-004 | 600 | 8 | 0 | 519 | 86.5% | 413 | 100 | 98 | 511 | 85.2% | 67 | 20 | 11 | | 87 | 88.8% | 500 | 83.3% | 3.7% | 96.3% | 100.0% |
| CC-350-005 | 600 | 61 | 0 | 483 | 80.5% | 326 | 100 | 96 | 422 | 70.3% | 66 | 20 | 10 | | 86 | 89.6% | 412 | 68.7% | 14.7% | 85.3% | 100.0% |
| SFTIC1-FT0012 | 300 | 0 | 0 | 0 | 0% | | | | | | | | | | | | | | | | |
| Note: treatments highlighted (by row) had poor or no egg survival and were typically excluded from any further evaluation. | | | | | | | | | | | | | | | | | | | | | |
| There may be slight rounding differences between values in the report and similar values in this table. | | | | | | | | | | | | | | | | | | | | | |

Appendix F

Number of organisms and survival rates at different stages during the Yellowstone cutthroat trout reproduction study

| Number of Organisms and Survival Rates at Different Stages During Yellowstone Cutthroat Trout Reproductive Study (12699-002) | | | | | | | | | | | | | | | | | | | | | |
|--|--------------|-----------------------------|-------------|-------|---------|------------------|----------------|----------------|-------|-----------------|------------------------|-------------------|-----------------|---------|-----|--------|-------------------|-------|--------------------|----------------------|----------------------|
| filename: survival data.xls | | | | | | | | | | | | | | | | | | | | | |
| Treatment | Initial eggs | #s prior to hatch | | | | #s at swimup | | | | | #s at test termination | | | | | | #s for whole test | | | | |
| | | # dead alevins (hatch - su) | sub-sampled | Total | % hatch | # preserved @ su | 15d PSU target | 15d PSU actual | Total | % survival @ su | # preserved @ end | # for wts/lengths | Dead in 15d PSU | Missing | TE | Total | % survival @ term | Total | % survival (total) | % mort. (hatch-term) | % surv. (hatch-term) |
| HL001 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL002 | 600 | 10 | 0 | 69 | 11.5% | 14 | 41 | 45 | 59 | 9.8% | 25 | 20 | 0 | | 45 | 100.0% | 59 | 9.8% | 14.5% | 85.5% | 100.0% |
| HL003 | 600 | 17 | 0 | 341 | 56.8% | 227 | 100 | 97 | 324 | 54.0% | 75 | 20 | 2 | | 95 | 97.9% | 322 | 53.7% | 5.6% | 94.4% | 100.0% |
| HL004 | 600 | 19 | 0 | 456 | 76.0% | 338 | 100 | 99 | 437 | 72.8% | 78 | 20 | 1 | | 98 | 99.0% | 436 | 72.7% | 4.4% | 95.6% | 100.0% |
| HL005 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL006 | 600 | 102 | 0 | 367 | 61.2% | 167 | 100 | 98 | 265 | 44.2% | 77 | 20 | 1 | | 97 | 99.0% | 264 | 44.0% | 28.1% | 71.9% | 100.0% |
| HL007 | 600 | 18 | 0 | 442 | 73.7% | 327 | 100 | 97 | 424 | 70.7% | 77 | 20 | 0 | | 97 | 100.0% | 424 | 70.7% | 4.1% | 95.9% | 100.0% |
| HL008 | 600 | 36 | 0 | 469 | 78.2% | 332 | 100 | 101 | 433 | 72.2% | 80 | 20 | 1 | | 100 | 99.0% | 432 | 72.0% | 7.9% | 92.1% | 100.0% |
| HL009 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL010 | 600 | 0 | 0 | 4 | 0.7% | 0 | 4 | 4 | 4 | 0.7% | 0 | 0 | 0 | | 4 | 100.0% | 4 | 0.7% | 0.0% | 100.0% | 100.0% |
| HL011 | 600 | 21 | 0 | 338 | 56.3% | 212 | 100 | 105 | 317 | 52.8% | 84 | 20 | 1 | | 104 | 99.0% | 316 | 52.7% | 6.5% | 93.5% | 100.0% |
| HL012 | 600 | 25 | 0 | 501 | 83.5% | 374 | 100 | 102 | 476 | 79.3% | 80 | 20 | 2 | | 100 | 98.0% | 474 | 79.0% | 5.4% | 94.6% | 100.0% |
| HL013 | 600 | 24 | 0 | 527 | 87.8% | 402 | 100 | 101 | 503 | 83.8% | 81 | 20 | 0 | | 101 | 100.0% | 503 | 83.8% | 4.6% | 95.4% | 100.0% |
| HL014 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| HL015 | 600 | 6 | 0 | 62 | 10.3% | 19 | 36 | 37 | 56 | 9.3% | 17 | 20 | 0 | | 37 | 100.0% | 56 | 9.3% | 9.7% | 90.3% | 100.0% |
| HL016 | 600 | | | | 0% | | | | | | | | | | | | | | | | |
| LSV2C-001 | 600 | 536 | 20 | 556 | 92.7% | 0 | 0 | 0 | 0 | 0.0% | 0 | 0 | 0 | | 0 | 0% | 0 | 0.0% | 100.0% | 0.0% | 100.0% |
| LSV2C-002 | 550 | 71 | 0 | 444 | 80.7% | 273 | 100 | 100 | 373 | 67.8% | 46 | 20 | 34 | | 66 | 66.0% | 339 | 61.6% | 23.6% | 76.4% | 100.0% |
| LSV2C-003 | 650 | 121 | 0 | 645 | 99.2% | 423 | 100 | 101 | 524 | 80.6% | 64 | 20 | 17 | | 84 | 83.2% | 507 | 78.0% | 21.4% | 78.6% | 100.0% |
| LSV2C-004 | 600 | 58 | 0 | 571 | 95.2% | 413 | 100 | 100 | 513 | 85.5% | 63 | 20 | 17 | | 83 | 83.0% | 496 | 82.7% | 13.1% | 86.9% | 100.0% |
| DC001 | 600 | 24 | 0 | 325 | 54.2% | 203 | 100 | 98 | 301 | 50.2% | 72 | 20 | 6 | | 92 | 93.9% | 295 | 49.2% | 9.2% | 90.8% | 100.0% |
| DC002 | 600 | 25 | 0 | 511 | 85.2% | 386 | 100 | 100 | 486 | 81.0% | 79 | 20 | 1 | | 99 | 99.0% | 485 | 80.8% | 5.1% | 94.9% | 100.0% |
| DC003 | 450 | 10 | 0 | 439 | 97.6% | 331 | 100 | 98 | 429 | 95.3% | 49 | 20 | 29 | | 69 | 70.4% | 400 | 88.9% | 8.9% | 91.1% | 100.0% |
| DC004 | 100 | 4 | 0 | 64 | 64.0% | 0 | 60 | 60 | 60 | 60.0% | 21 | 20 | 19 | | 41 | 68.3% | 41 | 41.0% | 35.9% | 64.1% | 100.0% |
| CC-150-Nates-001 | 300 | 11 | 0 | 235 | 78.3% | 126 | 100 | 98 | 224 | 74.7% | 56 | 20 | 22 | | 76 | 77.6% | 202 | 67.3% | 14.0% | 86.0% | 100.0% |
| CC-350-001 | 400 | 19 | 0 | 162 | 40.5% | 40 | 100 | 103 | 143 | 35.8% | 0 | 2 | 101 | | 2 | 1.9% | 42 | 10.5% | 74.1% | 25.9% | 100.0% |
| CC-350-002 | 750 | 69 | 0 | 707 | 94.3% | 541 | 100 | 97 | 638 | 85.1% | 63 | 20 | 14 | | 83 | 85.6% | 624 | 83.2% | 11.7% | 88.3% | 100.0% |
| CC-350-003 | 500 | 17 | 0 | 386 | 77.2% | 272 | 100 | 97 | 369 | 73.8% | 58 | 20 | 19 | | 78 | 80.4% | 350 | 70.0% | 9.3% | 90.7% | 100.0% |
| CC-350-004 | 600 | 8 | 0 | 519 | 86.5% | 413 | 100 | 98 | 511 | 85.2% | 67 | 20 | 11 | | 87 | 88.8% | 500 | 83.3% | 3.7% | 96.3% | 100.0% |
| CC-350-005 | 600 | 61 | 0 | 483 | 80.5% | 326 | 100 | 96 | 422 | 70.3% | 66 | 20 | 10 | | 86 | 89.6% | 412 | 68.7% | 14.7% | 85.3% | 100.0% |
| SFTIC1-FT0012 | 300 | 0 | 0 | 0 | 0% | | | | | | | | | | | | | | | | |
| Note: treatments highlighted (by row) had poor or no egg survival and were typically excluded from any further evaluation. | | | | | | | | | | | | | | | | | | | | | |
| There may be slight rounding differences between values in the report and similar values in this table. | | | | | | | | | | | | | | | | | | | | | |

APPENDIX C



Legend

| | | |
|---|---------------------|----------------------|
| Lease Area/Active Mineral Extraction Area | Roads | Upstream Reach Start |
| Mine Disturbance Areas (Panels A-E) | Unimproved Roads | Downstream Reach End |
| | Trail / 4WD | |
| | Perennial Stream | |
| | Intermittent Stream | |

Notes:

- Mine disturbance area boundary includes a 50-foot buffer.
- Topographic surface reflects 2004 conditions in mine disturbance areas.

J.R. SIMPLOT COMPANY
SMOKY CANYON MINE

FIGURE 1
YELLOWSTONE CUTTHROAT TROUT SURVEY LOCATIONS 2008

| | |
|----------------------|---------------------|
| PRJ: 0442-004-900.44 | DATE: OCT. 13, 2011 |
| REV: 1 | BY: CRL FOR: FLC |

APPENDIX D

June 9, 2008

Analytical Report for Service Request No: K0803855

Kathy Tegtmeyer
New Fields Environmental
2500 55th Street
Boulder, CO 80301

RE: Se in Tissue

Dear Kathy:

Enclosed are the results of the samples submitted to our laboratory on May 06, 2008. For your reference, these analyses have been assigned our service request number K0803855.

All analyses were performed according to our laboratory's quality assurance program. Where applicable, the methods cited conform to the Methods Update Rule (effective 4/11/2007), which relates to the use of analytical methods for the drinking water and waste water programs. The test results meet requirements of the NELAC standards. Exceptions are noted in the case narrative report where applicable. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3316. You may also contact me via Email at JChristian@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Jeff Christian
Laboratory Director

JC/lb

Page 1 of 121

Acronyms

| | |
|------------|--|
| ASTM | American Society for Testing and Materials |
| A2LA | American Association for Laboratory Accreditation |
| CARB | California Air Resources Board |
| CAS Number | Chemical Abstract Service registry Number |
| CFC | Chlorofluorocarbon |
| CFU | Colony-Forming Unit |
| DEC | Department of Environmental Conservation |
| DEQ | Department of Environmental Quality |
| DHS | Department of Health Services |
| DOE | Department of Ecology |
| DOH | Department of Health |
| EPA | U. S. Environmental Protection Agency |
| ELAP | Environmental Laboratory Accreditation Program |
| GC | Gas Chromatography |
| GC/MS | Gas Chromatography/Mass Spectrometry |
| LUFT | Leaking Underground Fuel Tank |
| M | Modified |
| MCL | Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA. |
| MDL | Method Detection Limit |
| MPN | Most Probable Number |
| MRL | Method Reporting Limit |
| NA | Not Applicable |
| NC | Not Calculated |
| NCASI | National Council of the Paper Industry for Air and Stream Improvement |
| ND | Not Detected |
| NIOSH | National Institute for Occupational Safety and Health |
| PQL | Practical Quantitation Limit |
| RCRA | Resource Conservation and Recovery Act |
| SIM | Selected Ion Monitoring |
| TPH | Total Petroleum Hydrocarbons |
| tr | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL. |

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

| Program | Number |
|------------------------|---------------|
| Alaska DEC UST | UST-040 |
| Arizona DHS | AZ0339 |
| Arkansas - DEQ | 88-0637 |
| California DHS | 2286 |
| Colorado DPHE | - |
| Florida DOH | E87412 |
| Hawaii DOH | - |
| Idaho DHW | - |
| Indiana DOH | C-WA-01 |
| Louisiana DEQ | 3016 |
| Louisiana DHH | LA050010 |
| Maine DHS | WA0035 |
| Michigan DEQ | 9949 |
| Minnesota DOH | 053-999-368 |
| Montana DPHHS | CERT0047 |
| Nevada DEP | WA35 |
| New Jersey DEP | WA005 |
| New Mexico ED | - |
| North Carolina DWQ | 605 |
| Oklahoma DEQ | 9801 |
| Oregon - DHS | WA200001 |
| South Carolina DHEC | 61002 |
| Utah DOH | COLU |
| Washington DOE | C1203 |
| Wisconsin DNR | 998386840 |
| Wyoming (EPA Region 8) | - |



Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client: New Fields Environmental
Project: Tissue – Se
Sample Matrix: Tissue

Service Request No.: K0803855
Date Received: 5/6-8/08

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Tissue samples were received for analysis at Columbia Analytical Services on 5/6-8/08. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at -20°C upon receipt at the laboratory.

Total Metals

General Comments:

The samples were freeze-dried to determine moisture and to allow complete homogenization of the dry material. The dried material was milled to a fine meal, and then sub-sampled for digestion. A thorough digestion was performed prior to instrumental analysis to convert all Selenium species to Selenate. Prior to hydride formation, the valence was adjusted by reduction to Selenite.

No anomalies associated with the analysis of these samples were observed.

Approved by _____



Date _____

6/10/08

Chain of Custody Documentation

Chain of Custody Page 1 of 1

Project Contact: Sean Covington/Kathy Tegtmeyer PO 0442-004-900.70
 Courier/Airbill: Columbia Analytical Services, Inc.

Shipped to: 1317 South 13th Ave
 Kelso, WA 98626

Telephone: (360) 430-7733



4720 Walnut St., Suite 200
 Boulder, CO 80301
 Phone: 303-442-0267
 Fax: 303-442-3679

COC #:

10863855

| Sample ID | Sample Date | Sample Time | Matrix | Tot/Dis | Analysis | Preservative | Lab QC | Comments |
|------------------|-------------|-------------|--------|---------|--------------------|--------------|--------|------------|
| SM0408-HL-FT0001 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0002 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0003 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0004 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0005 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0006 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0007 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0008 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Total Number of Containers: 8 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

Sampler Signature: _____

Relinquished by: *Erin McManis* Date/Time: *5/5/08 2:44:10 PM*
 Received by: *Debra Smith* Date/Time: *05/06/08 09:30*

LAB USE ONLY - Sample condition on Receipt

Debra

Chain of Custody



Project Contact: Sean Covington/Kathy Tegtmeyer PO 0442-004-900.70
 Courier/Airbill: 7905 0151 5817

Shipped to: Columbia Analytical Services, Inc.

1317 South 13th Ave
 Kelso, WA 98626

Telephone: (360) 430-7733

4720 Walnut St., Suite 200

Boulder, CO 80301
 Phone: 303-442-0267

Fax: 303-442-3679

COC #:

| Sample ID | Sample Date | Sample Time | Matrix | Tot/Diss | Analysis | Preservative | Lab QC | Comments |
|------------------|-------------|-------------|--------|----------|--------------------|--------------|--------|------------|
| SM0408-HL-FT0009 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0010 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0011 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0012 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0013 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0014 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0015 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0408-HL-FT0016 | 4/7/2008 | | tissue | tot | selenium, % solids | none | | whole body |

Total Number of Containers: 8 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

Sampler Signature: _____

Relinquished by: EMM Norey Date/Time: 5/7/08 @ 1410 Received by: Shawy Balkin LMS Date/Time: 5/8/08 @ 0900

LAB USE ONLY - Sample condition on Receipt

**Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form**

PC *JChru*

Client / Project: New Fields Service Request K08 03855
 Received: 05/02/08 Opened: 05/02/08 By: Karla

1. Samples were received via? US Mail Fed Ex UPS DHL GH GS PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other _____ NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? one, front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Is shipper's air-bill filed? If not, record air-bill number: _____ NA Y N
5. Temperature of cooler(s) upon receipt (°C): -12.2
 Temperature Blank (°C): no temp
6. If applicable, list Chain of Custody Numbers: _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Packing material used. Inserts Baggies Bubble Wrap Gel Packs Wet Ice Sleeves Other dry ice
9. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? Y N
11. Did all sample labels and tags agree with custody papers? Indicate in the table below Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles tested* received at the appropriate pH? Indicate in the table below NA Y N
14. Were VOA vials and 1631 Mercury bottles received without headspace? Indicate in the table below. NA Y N
15. Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection? NA Y N
16. Was C12/Res negative? NA Y N

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
| | | | |
| | | | |
| | | | |
| | | | |

| Sample ID | Bottle Count | Bottle Type | Out of Temp | Head-space | Broken | pH | Reagent | Volume added | Reagent Lot Number | Initials |
|-----------|--------------|-------------|-------------|------------|--------|----|---------|--------------|--------------------|----------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

*Does not include all pH preserved sample aliquots received. See sample receiving SOP (SMO-GEN).

Additional Notes, Discrepancies, & Resolutions: _____

Total Solids

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0803855
Date Collected: 04/07/08
Date Received: 05/06/08

Solids, Total

Prep Method: NONE
Analysis Method: Freeze Dry
Test Notes:

Units: PERCENT
Basis: Wet

| Sample Name | Lab Code | Date Analyzed | Result | Result Notes |
|------------------|--------------|---------------|--------|--------------|
| SM0408-HL-FT0001 | K0803855-001 | 05/13/08 | 26.2 | |
| SM0408-HL-FT0002 | K0803855-002 | 05/13/08 | 27.1 | |
| SM0408-HL-FT0003 | K0803855-003 | 05/13/08 | 26.7 | |
| SM0408-HL-FT0004 | K0803855-004 | 05/13/08 | 27.7 | |
| SM0408-HL-FT0005 | K0803855-005 | 05/13/08 | 29.9 | |
| SM0408-HL-FT0006 | K0803855-006 | 05/13/08 | 26.4 | |
| SM0408-HL-FT0007 | K0803855-007 | 05/13/08 | 27.9 | |
| SM0408-HL-FT0008 | K0803855-008 | 05/13/08 | 27.3 | |
| SM0408-HL-FT0009 | K0803855-009 | 05/13/08 | 24.7 | |
| SM0408-HL-FT0010 | K0803855-010 | 05/13/08 | 27.4 | |
| SM0408-HL-FT0011 | K0803855-011 | 05/13/08 | 27.6 | |
| SM0408-HL-FT0012 | K0803855-012 | 05/13/08 | 31.1 | |
| SM0408-HL-FT0013 | K0803855-013 | 05/13/08 | 29.6 | |
| SM0408-HL-FT0014 | K0803855-014 | 05/13/08 | 29.6 | |
| SM0408-HL-FT0015 | K0803855-015 | 05/13/08 | 27.1 | |
| SM0408-HL-FT0016 | K0803855-016 | 05/13/08 | 26.0 | |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0803855
Date Collected: 04/07/08
Date Received: 05/06/08
Date Extracted: NA
Date Analyzed: 05/13/08

Duplicate Summary
Total Metals

Sample Name: SM0408-HL-FT0007
Lab Code: K0803855-007D
Test Notes:

Units: PERCENT
Basis: Wet

| Analyte | Prep Method | Analysis Method | Sample Result | Duplicate Sample Result | Average | Relative Percent Difference | Result Notes |
|---------------|-------------|-----------------|---------------|-------------------------|---------|-----------------------------|--------------|
| Solids, Total | NA | Freeze Dry | 27.9 | 27.9 | 27.9 | <1 | |

| | |
|--------------------------------|--|
| Sample Number(s): As Listed | Service Request Number(s): K0803855 |
|--------------------------------|--|

TISSUE COMPOSITION DATA

| Laboratory ID | Weight (g) | Tare (g) | | | Matrix | Length |
|---------------|------------|----------|-------|--|----------------|--------|
| K0803855-01 | 537.01 | 476.90 | | | fish | |
| -02 | 808.63 | 478.88 | jar 1 | | | |
| -03 | 550.56 | 478.62 | | | | |
| -04 | 945.85 | 477.12 | | | | |
| -05 | 809.12 | 478.64 | jar 1 | | | |
| -06 | 539.47 | 477.52 | | | | |
| -07 | 826.04 | 478.29 | jar 1 | | | |
| -08 | 826.36 | 477.55 | jar 1 | | | |
| -09 | 1035.15 | 489.36 | | | | |
| -10 | 759.22 | 477.55 | jar 1 | | | |
| -11 | 822.64 | 477.45 | | | | |
| -12 | 816.56 | 464.75 | jar 1 | | | |
| -13 | 817.44 | 465.06 | jar 1 | | | |
| -14 | 802.31 | 461.39 | jar 1 | | | |
| -15 | 830.82 | 467.29 | jar 1 | | | |
| -16 | 845.94 | 465.21 | jar 1 | | | |
| I 01 | 295.60 | 276.00 | jar 2 | | Fish # 5/22/08 | |
| 05 | 154.77 | 208.01 | jar 2 | | | |
| -07 | 426.38 | 479.50 | jar 2 | | | |
| -08 | 179.00 | 208.21 | jar 2 | | | |
| -10 | 797.71 | 465.29 | jar 2 | | | |
| -11 | 237.76 | 275.60 | jar 2 | | | |
| -12 | 385.42 | 275.79 | jar 2 | | | |
| -13 | 149.32 | 208.06 | jar 2 | | | |
| -14 | 493.80 | 468.01 | jar 2 | | | |

Comments: Balance: 23

| | |
|--------------------------|------------------|
| Analyst: Angeia Prack | Date: 5/12/08 |
| Reviewed: | Date: 5/22/08 |

Metals

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

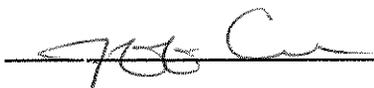
Client: New Fields Environmental
Project Name: Se in Tissue
Project No.:

Service Request: K0803855

| <u>Sample Name:</u> | <u>Lab Code:</u> |
|---------------------|------------------|
| SM0408-HL-FT0001 | K0803855-001 |
| SM0408-HL-FT0002 | K0803855-002 |
| SM0408-HL-FT0003 | K0803855-003 |
| SM0408-HL-FT0005 | K0803855-005 |
| SM0408-HL-FT0006 | K0803855-006 |
| SM0408-HL-FT0007 | K0803855-007 |
| SM0408-HL-FT0007D | K0803855-007D |
| SM0408-HL-FT0007S | K0803855-007S |
| SM0408-HL-FT0008 | K0803855-008 |
| SM0408-HL-FT0009 | K0803855-009 |
| SM0408-HL-FT0010 | K0803855-010 |
| SM0408-HL-FT0011 | K0803855-011 |
| SM0408-HL-FT0012 | K0803855-012 |
| SM0408-HL-FT0013 | K0803855-013 |
| SM0408-HL-FT0014 | K0803855-014 |
| SM0408-HL-FT0015 | K0803855-015 |
| SM0408-HL-FT0016 | K0803855-016 |
| Method Blank | K0803855-MB |

Comments:

Approved By: _____



Date: _____



Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0803855
Project No.: NA Date Collected: 4/7/08
Project Name: Se in Tissue Date Received: 5/6/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0002 Lab Code: K0803855-002

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 06/02/08 | 06/04/08 | 0.45 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0803855
Project No.: NA Date Collected: 4/7/08
Project Name: Se in Tissue Date Received: 5/6/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0003 Lab Code: K0803855-003

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 06/02/08 | 06/04/08 | 0.44 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0803855
Project No.: NA Date Collected: 4/7/08
Project Name: Se in Tissue Date Received: 5/6/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0007 Lab Code: K0803855-007

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 06/02/08 | 06/04/08 | 0.44 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Date Collected: 4/7/08

Project Name: Se in Tissue

Date Received: 5/8/08

Matrix: TISSUE

Units: mg/Kg

Basis: DRY

Sample Name: SM0408-HL-FT0009

Lab Code: K0803855-009

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 06/02/08 | 06/04/08 | 0.44 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Date Collected: 4/7/08

Project Name: Se in Tissue

Date Received: 5/8/08

Matrix: TISSUE

Units: mg/Kg

Basis: DRY

Sample Name: SM0408-HL-FT0011

Lab Code: K0803855-011

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 06/02/08 | 06/04/08 | 0.31 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Date Collected: 4/7/08

Project Name: Se in Tissue

Date Received: 5/8/08

Matrix: TISSUE

Units: mg/Kg

Basis: DRY

Sample Name: SM0408-HL-FT0013

Lab Code: K0803855-013

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.04 | 5.0 | 06/02/08 | 06/05/08 | 0.72 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Date Collected:

Project Name: Se in Tissue

Date Received:

Matrix: TISSUE

Units: mg/Kg

Basis: DRY

Sample Name: Method Blank

Lab Code: K0803855-MB

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 06/02/08 | 06/06/08 | 0.05 | U | |

Comments:

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 10.0 | 9.75 | 98 | 10.0 | 9.72 | 97 | 9.26 | 93 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 9.45 | 94 | 9.44 | 94 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 10.0 | 10.61 | 106 | 10.0 | 10.20 | 102 | 9.84 | 98 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 10.09 | 101 | 10.19 | 102 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 9.98 | 100 | 10.10 | 101 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 10.41 | 104 | | | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 10.0 | 9.90 | 99 | 10.0 | 9.70 | 97 | 9.66 | 97 | 7742 |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.5 | 0.65 | 130.0 | | | | | |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.5 | 0.70 | 140.0 | | | | | |

Metals
- 2b -
CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.5 | 0.38 | 76.0 | | | | | |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | C | U | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | Continuing Calibration Blank (ug/L) | | | | | | Method | |
|----------|-----------------------------|-------------------------------------|------|---|---|---|---|--------|------|
| | | C | 1 | C | 2 | C | 3 | | C |
| Selenium | | | -0.1 | B | | | | | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | B | 0.1 | U | 0.1 | B | 0.2 | B | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|-----|---|-----|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | B | 0.1 | B | 0.1 | U | 7742 |

Metals

-3-

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|---|---|---|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | | | | | 7742 |

Metals

-3-

BLANKS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|------|---|---|---|--------|
| | | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | U | -0.1 | B | -0.1 | B | | | 7742 |

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0408-HL-FT0007S

Lab Code: K0803855-007S

| Analyte | Control Limit %R | Spike Result C | Sample Result C | Spike Added | %R | Q | Method |
|----------|------------------|----------------|-----------------|-------------|-------|---|--------|
| Selenium | 60 - 130 | 5.07 | 0.44 | 3.83 | 120.9 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 6 -

DUPLICATES

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0408-HL-FT0007D

Lab Code: K0803855-007D

| Analyte | Control Limit | Sample (S) | C | Duplicate (D) | C | RPD | Q | Method |
|----------|---------------|------------|---|---------------|---|-----|---|--------|
| Selenium | | 0.44 | | 0.43 | | 2.3 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Aqueous LCS Source:

Solid LCS Source: NRCC TORT

| Analyte | Aqueous (ug/L) | | | Solid (mg/kg) | | | | |
|----------|----------------|-------|----|---------------|-------|---|-------------|------|
| | True | Found | %R | True | Found | C | Limits | %R |
| Selenium | | | | 5.63 | 5.11 | | 3.97 7.56 | 90.8 |

Metals

- 10 -

DETECTION LIMITS

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02

AA ID #:

| Analyte | Wave-length (nm) | Back-ground | MRL ug/L | MDL ug/L | M |
|----------|------------------|-------------|----------|----------|---|
| Selenium | | | 0.2 | 0.1 | H |

Comments:

Metals
-13-
PREPARATION LOG

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Method: F

| Sample ID | Preparation Date | Initial Volume | Final Volume (mL) |
|---------------|------------------|----------------|-------------------|
| K0803855-001 | 6/2/08 | 0.3060 | 30.0 |
| K0803855-002 | 6/2/08 | 0.3180 | 30.0 |
| K0803855-003 | 6/2/08 | 0.3150 | 30.0 |
| K0803855-005 | 6/2/08 | 0.3450 | 30.0 |
| K0803855-006 | 6/2/08 | 0.3440 | 30.0 |
| K0803855-007 | 6/2/08 | 0.3240 | 30.0 |
| K0803855-007D | 6/2/08 | 0.3090 | 30.0 |
| K0803855-007S | 6/2/08 | 0.3130 | 30.0 |
| K0803855-008 | 6/2/08 | 0.3080 | 30.0 |
| K0803855-009 | 6/2/08 | 0.3090 | 30.0 |
| K0803855-010 | 6/2/08 | 0.3120 | 30.0 |
| K0803855-011 | 6/2/08 | 0.3280 | 30.0 |
| K0803855-012 | 6/2/08 | 0.3040 | 30.0 |
| K0803855-013 | 6/2/08 | 0.3420 | 30.0 |
| K0803855-014 | 6/2/08 | 0.3170 | 30.0 |
| K0803855-015 | 6/2/08 | 0.3260 | 30.0 |
| K0803855-016 | 6/2/08 | 0.3030 | 30.0 |
| K0803855-MB | 6/2/08 | 0.3000 | 30.0 |
| LCSS TORT | 6/2/08 | 0.3270 | 30.0 |

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 6/4/08

End Date: 6/4/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| ZZZZZZ | 5 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV3 | 1 | 16:27 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB3 | 1 | 16:29 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| K0803855-008 | 5 | 16:32 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 5 | 16:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-009 | 5 | 16:36 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 5 | 16:39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-010 | 5 | 16:41 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 5 | 16:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-011 | 5 | 16:46 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 5 | 16:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-012 | 5 | 16:50 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 5 | 16:53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV4 | 1 | 16:55 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| CCB4 | 1 | 16:57 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 6/5/08

End Date: 6/5/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | |
| CAL BLK | 1 | 14:05 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| STD 0.5 | 1 | 14:07 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| STD 1.0 | 1 | 14:09 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| STD 5.0 | 1 | 14:12 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| STD 10.0 | 1 | 14:14 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| STD 15.0 | 1 | 14:17 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ICV2 | 1 | 14:19 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ICB2 | 1 | 14:21 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CRA2 | 1 | 14:24 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCV1 | 1 | 14:26 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCB1 | 1 | 14:28 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| K0803855-013 | 5 | 14:31 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 5 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-014 | 5 | 14:35 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 5 | 14:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-015 | 5 | 14:40 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 5 | 14:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0803855-016 | 5 | 14:45 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 5 | 14:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 10 | 14:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV2 | 1 | 14:54 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCB2 | 1 | 14:57 | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 5 | 14:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:02 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:07 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 15:21 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 6/5/08

End Date: 6/5/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| ZZZZZZ | 5 | 15:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV3 | 1 | 15:27 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB3 | 1 | 15:29 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 15:53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV4 | 1 | 15:55 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB4 | 1 | 15:57 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV5 | 1 | 16:10 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB5 | 1 | 16:12 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 5 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 25 | 16:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV6 | 1 | 16:41 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB6 | 1 | 16:43 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0803855

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 6/6/08

End Date: 6/6/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| CAL BLK | 1 | 19:10 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 0.5 | 1 | 19:12 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 1.0 | 1 | 19:14 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 5.0 | 1 | 19:17 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 10.0 | 1 | 19:19 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 15.0 | 1 | 19:22 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICV3 | 1 | 19:24 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICB3 | 1 | 19:26 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CRA3 | 1 | 19:29 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCV1 | 1 | 19:31 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB1 | 1 | 19:33 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| K0803855-MB | 5 | 19:36 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| LCSS TORT | 10 | 19:38 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 5 | 19:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 10 | 19:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 19:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV2 | 1 | 19:59 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB2 | 1 | 20:02 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Service Request Number(s): K08D3855 Rediox St

Star Lims Run No.: _____ Analysis for: ICP ICP-MS GFAA
Method: Tissue other: Hand

| Sample | Initial Weight (g) | freeze Dry | Wet | Final Volume (ml) | Matrix |
|--------------------|--------------------|------------|----------|-------------------|---------------|
| <u>1B</u> | | | <u>X</u> | <u>30MS</u> | <u>15/HND</u> |
| <u>12 Tort</u> | <u>0.327</u> | | <u>I</u> | | |
| <u>K08D3855-01</u> | <u>0.306</u> | <u>*</u> | | | |
| <u>-02</u> | <u>0.318</u> | | | | |
| <u>-03</u> | <u>0.315</u> | | | | |
| <u>-04</u> | <u>0.356</u> | | | | |
| <u>-05</u> | <u>0.345</u> | | | | |
| <u>-06</u> | <u>0.344</u> | | | | |
| <u>-07</u> | <u>0.324</u> | | | | |
| <u>-07D</u> | <u>0.309</u> | | | | |
| <u>-07S</u> | <u>0.313</u> | | | | |
| <u>-08</u> | <u>0.308</u> | | | | |
| <u>-09</u> | <u>0.309</u> | | | | |
| <u>-10</u> | <u>0.312</u> | | | | |
| <u>-11</u> | <u>0.328</u> | | | | |
| <u>-12</u> | <u>0.304</u> | | | | |
| <u>-13</u> | <u>0.342</u> | | | | |
| <u>-14</u> | <u>0.317</u> | | | | |
| <u>-15</u> | <u>0.326</u> | | | | |
| <u>-16</u> | <u>0.303</u> | | | | |

AB 6/2/08

AB
5/21/08

Time Digestion Started: 4:00pm 6/2/08 Oven Temp: 107°C
Lot # Acids Used: HNO3 MS11-64°C

Time Digestion Ended: 6/4/08
Oven Temp: _____

LCS: Dorm-2, Dolt-3

Balance I.D.: 21B

QCP CICV-1, MET1-63-A, _____ mls. added
QCP CICV-2, MET1-63-B, _____ mls. added
QCP CICV-3, MET1-63-C, _____ mls. Added
SS6, MET1-65-F, _____ mls. Added

SPIKE INFO

SS1-MET1-65-D, _____ mls added
SS5-MET1-63-E, _____ mls added
SS6-MET1-66-B, _____ mls added

Additional spikes: *0.3MS SS4-MET1-03-D

Comments: _____

| | |
|-----------------------------|--------------------|
| Analyst <u>Angela Black</u> | Date <u>6/2/08</u> |
| Reviewer <u>[Signature]</u> | Date <u>6/4/08</u> |

METALS SPIKE FORM

Service Request # K0803855 Redigest
 Q.C. Sample # K0803855-1

Circle type of digest: GFAA ICP FAA ICP-MS Other: Hydride Initials/Date: AB, 10/2/08
 Circle type of sample: Soil Water Misc. Sludge Oil Other: _____

| Solution Name | Element | mLs of 1000ppm Solution | Final Volume | Solution Conc. mg/L | Enter mLs Added |
|------------------------|-------------------|-------------------------|--------------|---------------------|-----------------|
| SS1-MET1-65-D | HNO3 | 50.0 | 1000ml | - | |
| | Al | 100 | 1000ml | 200 | |
| | Ag | 100 | 1000ml | 5 | |
| | Ba | 100 | 1000ml | 200 | |
| | Be | 100 | 1000ml | 5 | |
| | Cd | 100 | 1000ml | 5 | |
| | Co | 100 | 1000ml | 50 | |
| | Cr | 100 | 1000ml | 20 | |
| | Cu | 100 | 1000ml | 25 | |
| | Fe | 100 | 1000ml | 100 | |
| | Pb | 100 | 1000ml | 50 | |
| | Mn | 100 | 1000ml | 50 | |
| | Ni | 100 | 1000ml | 50 | |
| | Sb | 50* | 1000ml | 50 | |
| V | 100 | 1000ml | 50 | | |
| Zn | 100 | 1000ml | 50 | | |
| SS4-MET1-63-D | HNO3 | 25.0 | 500ml | - | |
| | As | 2.0 | 500ml | 4 | |
| | Cd | 2.0 | 500ml | 4 | |
| | Pb | 2.0 | 500ml | 4 | |
| | Se | 2.0 | 500ml | 4 | |
| | Tl | 2.0 | 500ml | 4 | |
| | Cu | 2.0 | 500ml | 4 | |
| SS5-MET1-66-A | HNO3 | 25.0 | 500ml | - | |
| | As | 50.0 | 500ml | 100 | |
| | Se | 50.0 | 500ml | 100 | |
| | Tl | 50.0 | 500ml | 100 | |
| SS6-MET1-66-B | HNO3 | 25 | 500ml | - | |
| | B | 50 | 500ml | 100 | |
| | Mo | 50 | 500ml | 100 | |
| SS7-AA1-B-G | HNO3 | 10.0 | 200ml | - | |
| | K | 20 | 200ml | 1000 | |
| | Na | 20 | 200ml | 1000 | |
| | Mg | 20 | 200ml | 1000 | |
| | Ca | 20 | 200ml | 1000 | |
| GFLCSW (MET1-64-R) | HNO3 | 10.0 | 1000ml | - | |
| | As, Pb, Se, Tl | 5.0 | 1000ml | 2.5 | |
| | Cd | - | - | 1.25 | |
| | Cu | 2.5 | 1000ml | 2.5 | |
| QCP-CICV-1 (MET1-63-A) | Ca, Mg, Na, K | no dilution | - | 2500 | |
| | Al, Ba | no dilution | - | 1000 | |
| | Fe | no dilution | - | 500 | |
| | Co, Mn, Ni, V, Zn | no dilution | - | 250 | |
| | Cu, Ag | no dilution | - | 125 | |
| | Cr | no dilution | - | 100 | |
| Be | no dilution | - | 25 | | |
| QCP-CICV-2 (MET1-63-B) | Sb | no dilution | - | 500 | |
| QCP-CICV-3 (MET1-63-C) | As, Pb, Se, Tl | no dilution | - | 500 | |
| | Cd | no dilution | - | 250 | |

Expires: 4/1/09

Expires: 7/1/08

Expires: 8/1/08

Expires: 1/2/09

Expires: 8/2/08

Expires: 1/1/09

Expires: 1/1/09

Expires: 1/1/09

Expires: 1/1/09

* Denotes volume of 1000 ppm stock standard.

| Standard | mLs of standard | ppm | Logbook # | Exp. Date |
|----------|-----------------|-----|-----------|-----------|
| | | | | |
| | | | | |
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| | | | | |
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| | | | | |
| | | | | |
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| | | | | |

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0803855 (1-12)

Batch QC SR's # _____

Calibration Std. AA1-8-E
Starlims # 116782

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

Review PBT + TORI

Primary Reviewed by JMS Date 6/4/08

Secondary Reviewed by * Date 6/4/08

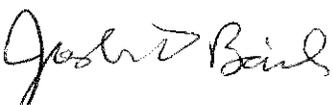
COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|----------------------------|
| Method: (Circle Method Used) (7742) 7062 Other: _____ Element: As <u>Se</u> | Service Request # : |
|---|----------------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------------|--------------------|-------------------|--|----------------------|
| ICV | - | 9.751 | 98% | |
| ICB | - | 0.080 | | |
| CRA | - | 0.646 | 129% | |
| CCV | - | 9.722 | 97% | |
| CCB | - | 0.036 | | |
| PBT K0803855 | 1/5 | -0.308 | | Rerun |
| TORT K0803855 | 1/5+1/2 | 3.932 | | JB 6/6/08 |
| K0803855-001 | 1/5 | 0.693 | | Cx=0.815 |
| K0803855-001A | 1/5 | 4.948 | 85% | |
| K0803855-002 | 1/5 | 0.831 | | Cx=0.955 |
| K0803855-002A | 1/5 | 5.185 | 87% | |
| K0803855-003 | 1/5 | 0.787 | | Cx=0.926 |
| K0803855-003A | 1/5 | 5.054 | 85% | |
| K0803855-004 | 1/5 | 0.716 | | Cx=0.842 |
| K0803855-004A | 1/5 | 4.962 | 85% | |
| CCV | - | 9.261 | 93% | |
| CCB | - | -0.024 | | |
| K0803855-005 | 1/5 | 1.018 | | Cx=1.157 |
| K0803855-005A | 1/5 | 5.402 | 88% | |
| K0803855-006 | 1/5 | 0.731 | | Cx=0.821 |
| K0803855-006A | 1/5 | 5.206 | 89% | |
| K0803855-007 | 1/5 | 0.821 | | Cx=0.944 |
| K0803855-007A | 1/5 | 5.148 | 87% | |
| K0803855-007D | 1/5 | 0.770 | | Cx=0.885 |
| K0803855-007DA | 1/5 | 5.142 | 87% | |
| K0803855-007S | 1/5 | 7.613 | 120% | Cx=10.574 |
| K0803855-007SA | 1/5 | 11.223 | 72% | |
| CCV | - | 9.449 | 95% | |
| CCB | - | -0.072 | | |
| K0803855-008 | 1/5 | 0.502 | 78% | Cx=0.564 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|---|------------------------|--------------------------|
| Analyst  | Date: 6/4/08 | Page Number: 1 |
|---|------------------------|--------------------------|

**Columbia Analytical Services
K-FLAA-02 Se by Hydride
Josh Bailey 8/11/07**

| SampleID | Analyte | Mean |
|---------------------|--|-------------|
| Cal Blk | Se 196.03 Se 196.03 | |
| Std 0.5 | Se 196.03 | [0.5] ug/L |
| 2008/06/04 15:01:16 | No calibration curve because standard absorbance and concentration values are not in the | |
| Std 1.0 | Se 196.03 | [1.0] ug/L |
| 2008/06/04 15:03:36 | No calibration curve because standard absorbance and concentration values are not in the | |
| Std 5.0 | Se 196.03 | [5.0] ug/L |
| 2008/06/04 15:05:58 | No calibration curve because standard absorbance and concentration values are not in the | |
| Std 10.0 | Se 196.03 | [10.0] ug/L |
| Cal Blk | Se 196.03 | |
| Std 0.5 | Se 196.03 | [0.5] ug/L |
| Std 1.0 | Se 196.03 | [1.0] ug/L |
| Std 5.0 | Se 196.03 | [5.0] ug/L |
| Std 10.0 | Se 196.03 | [10.0] ug/L |
| Std 15.0 | Se 196.03 | [15.0] ug/L |
| 2008/06/04 15:23:21 | The calibration curve may not be linear. | |
| ICV | | |
| 2008/06/04 15:25:45 | All analyte(s) passed QC. | |
| | Se 196.03 | 9.8 ug/L |
| 2008/06/04 15:25:45 | QC value within limits for Se 196.03 Recovery = 97.51% | |
| ICB | | |
| 2008/06/04 15:28:07 | All analyte(s) passed QC. | |
| | Se 196.03 | 0.1 ug/L |
| 2008/06/04 15:28:07 | QC value within limits for Se 196.03 Recovery = Not calculated | |
| CRA | | |
| 2008/06/04 15:30:26 | All analyte(s) passed QC. | |
| | Se 196.03 | 0.6 ug/L |
| 2008/06/04 15:30:26 | QC value within limits for Se 196.03 Recovery = 129.16% | |
| CCV | | |
| 2008/06/04 15:32:46 | All analyte(s) passed QC. | |
| | Se 196.03 | 9.7 ug/L |
| 2008/06/04 15:32:46 | QC value within limits for Se 196.03 Recovery = 97.22% | |
| CCB | | |
| 2008/06/04 15:35:08 | All analyte(s) passed QC. | |
| | Se 196.03 | 0.0 ug/L |
| 2008/06/04 15:35:08 | QC value within limits for Se 196.03 Recovery = Not calculated | |

JS 6/6/08

| SampleID | Analyte | Mean |
|--|-----------|-------------|
| PBT K0803855 | Se 196.03 | -0.308 ug/L |
| TORT K0803855 1/2 | Se 196.03 | 3.932 ug/L |
| K0803855-001 | Se 196.03 | 0.693 ug/L |
| K0803855-001A | Se 196.03 | 4.948 ug/L |
| K0803855-002 | Se 196.03 | 0.831 ug/L |
| K0803855-002A | Se 196.03 | 5.185 ug/L |
| K0803855-003 | Se 196.03 | 0.787 ug/L |
| K0803855-003A | Se 196.03 | 5.054 ug/L |
| K0803855-004 | Se 196.03 | 0.716 ug/L |
| K0803855-004A | Se 196.03 | 4.962 ug/L |
| CCV | | |
| 2008/06/04 16:01:10 All analyte(s) passed QC. | | |
| | Se 196.03 | 9.3 ug/L |
| 2008/06/04 16:01:10 QC value within limits for Se 196.03 Recovery = 92.61% | | |
| CCB | | |
| 2008/06/04 16:03:31 All analyte(s) passed QC. | | |
| | Se 196.03 | 0.0 ug/L |
| 2008/06/04 16:03:31 QC value within limits for Se 196.03 Recovery = Not calculated | | |
| K0803855-005 | Se 196.03 | 1.018 ug/L |
| K0803855-005A | Se 196.03 | 5.402 ug/L |
| K0803855-006 | Se 196.03 | 0.731 ug/L |
| K0803855-006A | Se 196.03 | 5.206 ug/L |
| K0803855-007 | Se 196.03 | 0.821 ug/L |
| K0803855-007A | Se 196.03 | 5.148 ug/L |
| K0803855-007D | Se 196.03 | 0.770 ug/L |
| K0803855-007DA | Se 196.03 | 5.142 ug/L |
| K0803855-007S | Se 196.03 | 7.613 ug/L |
| K0803855-007SA | Se 196.03 | 11.22 ug/L |

JB 6/6/08

| SampleID | Analyte | Mean |
|--|-----------|------------|
| CCV ----- | | |
| 2008/06/04 16:29:24 All analyte(s) passed QC. | | |
| | Se 196.03 | 9.4 ug/L |
| 2008/06/04 16:29:24 QC value within limits for Se 196.03 Recovery = 94.49% | | |
| CCB ----- | | |
| 2008/06/04 16:31:45 All analyte(s) passed QC. | | |
| | Se 196.03 | -0.1 ug/L |
| 2008/06/04 16:31:45 QC value within limits for Se 196.03 Recovery = Not calculated | | |
| K0803855-008 | Se 196.03 | 0.502 ug/L |
| K0803855-008A | Se 196.03 | 4.966 ug/L |
| K0803855-009 | Se 196.03 | 0.790 ug/L |
| K0803855-009A | Se 196.03 | 5.169 ug/L |
| K0803855-010 | Se 196.03 | 0.734 ug/L |
| K0803855-010A | Se 196.03 | 4.904 ug/L |
| K0803855-011 | Se 196.03 | 0.562 ug/L |
| K0803855-011A | Se 196.03 | 4.718 ug/L |
| K0803855-012 | Se 196.03 | 0.422 ug/L |
| K0803855-012A | Se 196.03 | 4.934 ug/L |
| CCV ----- | | |
| 2008/06/04 16:57:32 All analyte(s) passed QC. | | |
| | Se 196.03 | 9.4 ug/L |
| 2008/06/04 16:57:32 QC value within limits for Se 196.03 Recovery = 94.45% | | |
| CCB ----- | | |
| 2008/06/04 16:59:52 All analyte(s) passed QC. | | |
| | Se 196.03 | -0.1 ug/L |
| 2008/06/04 16:59:52 QC value within limits for Se 196.03 Recovery = Not calculated | | |
| K0803855-013 | Se 196.03 | 0.643 ug/L |
| K0803855-013A | Se 196.03 | 4.718 ug/L |
| K0803855-014 | Se 196.03 | 0.500 ug/L |
| K0803855-014A | Se 196.03 | 4.738 ug/L |
| K0803855-015 | Se 196.03 | 0.804 ug/L |
| K0803855-015A | Se 196.03 | 5.117 ug/L |

*LUB fails Low
(neg)
JB 6/6/08*

Columbia Analytical Services
 K-FLAA-02 Se by Hydride
 Josh Bailey 8/11/07

| Seq. No. | 1 | AS Loc: | 1 | Date: | 2008/06/04 | | | | |
|------------|------------|--------------|---------------|------------------|------------|---------|--------|-------|-------------|
| Sample ID: | Cal Blk | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [0.00]ug/L | | | 0.0226 | 0.0578 | | 0.0226 | | 14:55:30.00 |
| | [0.00]ug/L | | | 0.0022 | 0.0066 | | 0.0022 | | 14:56:04.00 |
| Mean: | ug/L | | | 0.0124 | | | | | |
| SD: | 0.01 | | | | | | | | |
| %RSD: | 116.56 | | | | | | | | |

| Seq. No. | 2 | AS Loc: | 1 | Date: | 2008/06/04 | | | | |
|------------|------------|--------------|---------------|------------------|------------|---------|--------|-------|-------------|
| Sample ID: | Cal Blk | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [0.00]ug/L | | | 0.0028 | 0.0093 | | 0.0028 | | 14:57:15.00 |
| | [0.00]ug/L | | | 0.0009 | -0.0035 | | 0.0009 | | 14:57:49.00 |
| | [0.00]ug/L | | | 0.0017 | 0.0000 | | 0.0017 | | 14:58:24.00 |
| Mean: | ug/L | | | 0.0018 | 0.0019 | | 0.0018 | | |
| SD: | 0.00 | | | | | | | | |
| %RSD: | 52.10 | | | | | | | | |

*JB
6/10/08*

| Seq. No. | 3 | AS Loc: | 2 | Date: | 2008/06/04 | | | | |
|------------|-----------|--------------|---------------|------------------|------------|---------|--------|-------|-------------|
| Sample ID: | Std 0.5 | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [0.5]ug/L | | | 0.0004 | 0.0086 | | 0.0022 | | 14:59:35.00 |
| | [0.5]ug/L | | | -0.0005 | 0.0037 | | 0.0013 | | 15:00:10.00 |
| | [0.5]ug/L | | | -0.0007 | -0.0015 | | 0.0011 | | 15:00:44.00 |
| Mean: | ug/L | | | -0.0003 | 0.0036 | | 0.0016 | | |
| SD: | 0.00 | | | | | | | | |
| %RSD: | 202.44 | | | | | | | | |

2008/06/04 15:01:16 No calibration curve because standard absorbance and concentration values are not in the same order

| Seq. No. | AS Loc: | Date: | | | | | | |
|------------|--------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 4 | 3 | 2008/06/04 | | | | | | |
| Sample ID: | Std 1.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [1.0]ug/L | | -0.0005 | -0.0046 | | 0.0013 | | 15:01:56.00 |
| | [1.0]ug/L | | 0.0006 | 0.0005 | | 0.0024 | | 15:02:30.00 |
| | [1.0]ug/L | | -0.0005 | 0.0017 | | 0.0014 | | 15:03:04.00 |
| Mean: | ug/L | | -0.0001 | -0.0008 | | 0.0017 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 406.46 | | | | | | | |

2008/06/04 15:03:36 No calibration curve because standard absorbance and concentration values are not in the same order

| Seq. No. | AS Loc: | Date: | | | | | | |
|------------|--------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 5 | 4 | 2008/06/04 | | | | | | |
| Sample ID: | Std 5.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [5.0]ug/L | | -0.0009 | -0.0047 | | 0.0009 | | 15:04:17.00 |
| | [5.0]ug/L | | 0.0001 | 0.0039 | | 0.0020 | | 15:04:51.00 |
| | [5.0]ug/L | | 0.0011 | 0.0066 | | 0.0030 | | 15:05:26.00 |
| Mean: | ug/L | | 0.0001 | 0.0019 | | 0.0019 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 873.77 | | | | | | | |

2008/06/04 15:05:58 No calibration curve because standard absorbance and concentration values are not in the same order

| Seq. No. | AS Loc: | Date: | | | | | | |
|------------|--------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 6 | 5 | 2008/06/04 | | | | | | |
| Sample ID: | Std 10.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | [10.0]ug/L | | -0.0008 | -0.0049 | | 0.0010 | | 15:06:40.00 |
| | [10.0]ug/L | | 0.0331 | -0.4544 | | 0.0350 | | 15:07:14.00 |
| Mean: | ug/L | | 0.0162 | | | | | |
| SD: | 0.02 | | | | | | | |
| %RSD: | 148.80 | | | | | | | |

JB 6/6/08

| Seq. No. | 7 | AS Loc: | 1 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Cal Blk | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [0.00]ug/L | | 0.0282 | 0.1402 | | 0.0282 | | 15:09:57.00 |
| | [0.00]ug/L | | 0.0277 | 0.1247 | | 0.0277 | | 15:10:31.00 |
| | [0.00]ug/L | | 0.0264 | 0.1168 | | 0.0264 | | 15:11:05.00 |
| Mean: | ug/L | | 0.0274 | 0.1272 | | 0.0274 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 3.44 | | | | | | | |

| Seq. No. | 8 | AS Loc: | 2 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Std 0.5 | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [0.5]ug/L | | 0.0129 | 0.1882 | | 0.0404 | | 15:12:15.00 |
| | [0.5]ug/L | | 0.0132 | 0.1839 | | 0.0406 | | 15:12:48.00 |
| | [0.5]ug/L | | 0.0138 | 0.1999 | | 0.0412 | | 15:13:23.00 |
| Mean: | ug/L | | 0.0133 | 0.1907 | | 0.0407 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 3.43 | | | | | | | |

| Seq. No. | 9 | AS Loc: | 3 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Std 1.0 | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [1.0]ug/L | | 0.0226 | 0.2403 | | 0.0500 | | 15:14:35.00 |
| | [1.0]ug/L | | 0.0237 | 0.2339 | | 0.0511 | | 15:15:09.00 |
| | [1.0]ug/L | | 0.0218 | 0.2293 | | 0.0492 | | 15:15:43.00 |
| Mean: | ug/L | | 0.0227 | 0.2345 | | 0.0501 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 4.19 | | | | | | | |

| Seq. No. | 10 | AS Loc: | 4 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Std 5.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [5.0]ug/L | | 0.1060 | 0.6278 | | 0.1334 | | 15:16:56.00 |
| | [5.0]ug/L | | 0.1014 | 0.6282 | | 0.1289 | | 15:17:30.00 |
| | [5.0]ug/L | | 0.1040 | 0.6238 | | 0.1315 | | 15:18:04.00 |
| Mean: | ug/L | | 0.1038 | 0.6266 | | 0.1313 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 2.20 | | | | | | | |

| Seq. No. | 11 | AS Loc: | 5 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Std 10.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [10.0]ug/L | | 0.1927 | 1.0790 | | 0.2202 | | 15:19:17.00 |
| | [10.0]ug/L | | 0.1928 | 1.0637 | | 0.2202 | | 15:19:51.00 |
| | [10.0]ug/L | | 0.1916 | 1.0693 | | 0.2191 | | 15:20:26.00 |
| Mean: | ug/L | | 0.1924 | 1.0707 | | 0.2198 | | |
| SD: | 0.00 | | | | | | | |
| %RSD: | 0.33 | | | | | | | |

| Seq. No. | 12 | AS Loc: | 6 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | Std 15.0 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | [15.0]ug/L | | 0.2901 | 1.5771 | | 0.3176 | | 15:21:40.00 |
| | [15.0]ug/L | | 0.2928 | 1.5508 | | 0.3202 | | 15:22:15.00 |
| | [15.0]ug/L | | 0.3172 | 1.5769 | | 0.3446 | | 15:22:49.00 |
| Mean: | ug/L | | 0.3000 | 1.5683 | | 0.3275 | | |
| SD: | 0.01 | | | | | | | |
| %RSD: | 4.97 | | | | | | | |

2008/06/04 15:23:21 The calibration curve may not be linear.

| Seq. No. | 13 | AS Loc: | 7 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | ICV | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 9.821ug/L | 9.821 ug/L | 0.1951 | 1.1039 | | 0.2225 | | 15:24:04.00 |
| | 9.596ug/L | 9.596 ug/L | 0.1906 | 1.0717 | | 0.2181 | | 15:24:39.00 |
| | 9.836ug/L | 9.836 ug/L | 0.1954 | 1.0838 | | 0.2228 | | 15:25:13.00 |
| Mean: | ug/L | ug/L | 0.1937 | 1.0865 | | 0.2211 | | |
| SD: | 0.1343 | | | | | | | |
| %RSD: | 1.38 | | | | | | | |

2008/06/04 15:25:45 QC value within limits for Se 196.03 Recovery = 97.51%

| Seq. No. | 14 | AS Loc: | 1 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | ICB | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.081ug/L | 0.081 ug/L | 0.0016 | 0.1397 | | 0.0291 | | 15:26:26.00 |
| | 0.067ug/L | 0.067 ug/L | 0.0013 | 0.1368 | | 0.0288 | | 15:27:00.00 |
| | 0.093ug/L | 0.093 ug/L | 0.0019 | 0.1335 | | 0.0293 | | 15:27:35.00 |
| Mean: | ug/L | ug/L | 0.0016 | 0.1367 | | 0.0290 | | |
| SD: | 0.0132 | | | | | | | |
| %RSD: | 16.42 | | | | | | | |

2008/06/04 15:28:07 QC value within limits for Se 196.03 Recovery = Not calculated

| Seq. No. | 15 | AS Loc: | 2 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CRA | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.661ug/L | 0.661 ug/L | 0.0131 | 0.2052 | | 0.0406 | | 15:28:46.00 |
| | 0.612ug/L | 0.612 ug/L | 0.0122 | 0.1883 | | 0.0396 | | 15:29:20.00 |
| | 0.664ug/L | 0.664 ug/L | 0.0132 | 0.1923 | | 0.0406 | | 15:29:54.00 |
| Mean: | ug/L | ug/L | 0.0128 | 0.1953 | | 0.0403 | | |
| SD: | 0.0293 | | | | | | | |
| %RSD: | 4.53 | | | | | | | |

2008/06/04 15:30:26 QC value within limits for Se 196.03 Recovery = 129.16%

| Seq. No. | 16 | AS Loc: | 5 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCV | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 9.761ug/L | 9.761 ug/L | 0.1939 | 1.0806 | | 0.2213 | | 15:31:07.00 |
| | 9.657ug/L | 9.657 ug/L | 0.1918 | 1.0626 | | 0.2193 | | 15:31:41.00 |
| | 9.749ug/L | 9.749 ug/L | 0.1936 | 1.0812 | | 0.2211 | | 15:32:15.00 |
| Mean: | ug/L | ug/L | 0.1931 | 1.0748 | | 0.2206 | | |
| SD: | 0.0571 | | | | | | | |
| %RSD: | 0.59 | | | | | | | |

2008/06/04 15:32:46 QC value within limits for Se 196.03 Recovery = 97.22%

| Seq. No. | 17 | AS Loc: | I | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCB | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.078ug/L | 0.078 ug/L | 0.0015 | 0.1328 | | 0.0290 | | 15:33:27.00 |
| | 0.042ug/L | 0.042 ug/L | 0.0008 | 0.1386 | | 0.0283 | | 15:34:01.00 |
| | -0.011ug/L | -0.011 ug/L | -0.0002 | 0.1249 | | 0.0272 | | 15:34:36.00 |
| Mean: | ug/L | ug/L | 0.0007 | 0.1321 | | 0.0282 | | |
| SD: | 0.0446 | | | | | | | |
| %RSD: | 122.69 | | | | | | | |

2008/06/04 15:35:08 QC value within limits for Se 196.03 Recovery = Not calculated

| Seq. No. | 18 | AS Loc: | 9 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | PBT K0803855 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | -0.261ug/L | -0.261 ug/L | -0.0052 | 0.1133 | | 0.0223 | | 15:35:46.00 |
| | -0.365ug/L | -0.365 ug/L | -0.0072 | 0.0836 | | 0.0202 | | 15:36:20.00 |
| | -0.298ug/L | -0.298 ug/L | -0.0059 | 0.1023 | | 0.0215 | | 15:36:54.00 |
| Mean: | ug/L | ug/L | -0.0061 | 0.0998 | | 0.0213 | | |
| SD: | 0.0527 | 0.0527 | | | | | | |
| %RSD: | 17.10 | | | | | | | |

JB 4/4/08

| Seq. No. | 19 | AS Loc: | 10 | Date: | 2008/06/04 | | | |
|------------|-------------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | TORT K0803855 1/2 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 4.089ug/L | 4.089 ug/L | 0.0812 | 0.5655 | | 0.1087 | | 15:38:12.00 |
| | 3.798ug/L | 3.798 ug/L | 0.0755 | 0.5340 | | 0.1029 | | 15:38:47.00 |
| | 3.910ug/L | 3.910 ug/L | 0.0777 | 0.5417 | | 0.1051 | | 15:39:21.00 |
| Mean: | ug/L | ug/L | 0.0781 | 0.5471 | | 0.1056 | | |
| SD: | 0.1469 | 0.1469 | | | | | | |
| %RSD: | 3.73 | | | | | | | |

JB 6/6/08

| Seq. No. | 20 | AS Loc: | 11 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-001 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.690ug/L | 0.690 ug/L | 0.0137 | 0.2296 | | 0.0411 | | 15:40:32.00 |
| | 0.670ug/L | 0.670 ug/L | 0.0133 | 0.2206 | | 0.0407 | | 15:41:07.00 |
| | 0.719ug/L | 0.719 ug/L | 0.0143 | 0.2107 | | 0.0417 | | 15:41:41.00 |
| Mean: | ug/L | ug/L | 0.0138 | 0.2203 | | 0.0412 | | |
| SD: | 0.0245 | 0.0245 | | | | | | |
| %RSD: | 3.54 | | | | | | | |

| Seq. No. | 21 | AS Loc: | 12 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-001A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 5.089ug/L | 5.089 ug/L | 0.1011 | 0.6922 | | 0.1285 | | 15:42:53.00 |
| | 4.846ug/L | 4.846 ug/L | 0.0963 | 0.6593 | | 0.1237 | | 15:43:28.00 |
| | 4.910ug/L | 4.910 ug/L | 0.0975 | 0.6584 | | 0.1250 | | 15:44:02.00 |
| Mean: | ug/L | ug/L | 0.0983 | 0.6700 | | 0.1257 | | |
| SD: | 0.1260 | 0.1260 | | | | | | |
| %RSD: | 2.55 | | | | | | | |

| Seq. No. | 22 | | AS Loc: | 13 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-002 | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 0.878ug/L | 0.878 ug/L | 0.0174 | 0.2489 | | 0.0449 | | 15:45:15.00 | |
| | 0.793ug/L | 0.793 ug/L | 0.0158 | 0.2345 | | 0.0432 | | 15:45:49.00 | |
| | 0.822ug/L | 0.822 ug/L | 0.0163 | 0.2288 | | 0.0438 | | 15:46:24.00 | |
| Mean: | ug/L | ug/L | 0.0165 | 0.2374 | | 0.0440 | | | |
| SD: | 0.0430 | 0.0430 | | | | | | | |
| %RSD: | 5.17 | | | | | | | | |

| Seq. No. | 23 | | AS Loc: | 14 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-002A | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 5.452ug/L | 5.452 ug/L | 0.1083 | 0.7041 | | 0.1357 | | 15:47:39.00 | |
| | 4.923ug/L | 4.923 ug/L | 0.0978 | 0.6627 | | 0.1252 | | 15:48:13.00 | |
| | 5.179ug/L | 5.179 ug/L | 0.1029 | 0.6833 | | 0.1303 | | 15:48:47.00 | |
| Mean: | ug/L | ug/L | 0.1030 | 0.6834 | | 0.1304 | | | |
| SD: | 0.2644 | 0.2644 | | | | | | | |
| %RSD: | 5.10 | | | | | | | | |

| Seq. No. | 24 | | AS Loc: | 15 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-003 | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 0.802ug/L | 0.802 ug/L | 0.0159 | 0.2366 | | 0.0434 | | 15:50:03.00 | |
| | 0.772ug/L | 0.772 ug/L | 0.0153 | 0.2257 | | 0.0428 | | 15:50:38.00 | |
| | 0.788ug/L | 0.788 ug/L | 0.0157 | 0.2211 | | 0.0431 | | 15:51:12.00 | |
| Mean: | ug/L | ug/L | 0.0156 | 0.2278 | | 0.0431 | | | |
| SD: | 0.0149 | 0.0149 | | | | | | | |
| %RSD: | 1.89 | | | | | | | | |

| Seq. No. | 25 | | AS Loc: | 16 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-003A | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 4.961ug/L | 4.961 ug/L | 0.0985 | 0.6867 | | 0.1260 | | 15:52:29.00 | |
| | 4.930ug/L | 4.930 ug/L | 0.0979 | 0.6691 | | 0.1254 | | 15:53:04.00 | |
| | 5.271ug/L | 5.271 ug/L | 0.1047 | 0.6794 | | 0.1321 | | 15:53:38.00 | |
| Mean: | ug/L | ug/L | 0.1004 | 0.6784 | | 0.1278 | | | |
| SD: | 0.1885 | 0.1885 | | | | | | | |
| %RSD: | 3.73 | | | | | | | | |

| Seq. No. | 26 | | AS Loc: | 17 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-004 | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 0.732ug/L | 0.732 ug/L | 0.0145 | 0.2199 | | 0.0420 | | 15:54:50.00 | |
| | 0.722ug/L | 0.722 ug/L | 0.0143 | 0.2223 | | 0.0418 | | 15:55:24.00 | |
| | 0.693ug/L | 0.693 ug/L | 0.0138 | 0.2223 | | 0.0412 | | 15:55:59.00 | |
| Mean: | ug/L | ug/L | 0.0142 | 0.2215 | | 0.0417 | | | |
| SD: | 0.0202 | 0.0202 | | | | | | | |
| %RSD: | 2.82 | | | | | | | | |

| Seq. No. | 27 | | AS Loc: | 18 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|---------|------------|-------|-------------|--|
| Sample ID: | K0803855-004A | | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time | |
| Se 196.03 | 5.034ug/L | 5.034 ug/L | 0.1000 | 0.6933 | | 0.1274 | | 15:57:08.00 | |
| | 4.969ug/L | 4.969 ug/L | 0.0987 | 0.6685 | | 0.1261 | | 15:57:43.00 | |
| | 4.883ug/L | 4.883 ug/L | 0.0970 | 0.6620 | | 0.1244 | | 15:58:18.00 | |
| Mean: | ug/L | ug/L | 0.0986 | 0.6746 | | 0.1260 | | | |
| SD: | 0.0755 | 0.0755 | | | | | | | |
| %RSD: | 1.52 | | | | | | | | |

| Seq. No. | 28 | AS Loc: | 5 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCV | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 9.376ug/L | 9.376 ug/L | 0.1862 | 1.0680 | | 0.2137 | | 15:59:30.00 |
| | 9.209ug/L | 9.209 ug/L | 0.1829 | 1.0476 | | 0.2104 | | 16:00:04.00 |
| | 9.198ug/L | 9.198 ug/L | 0.1827 | 1.0648 | | 0.2101 | | 16:00:38.00 |
| Mean: | ug/L | ug/L | 0.1840 | 1.0601 | | 0.2114 | | |
| SD: | 0.1000 | | | | | | | |
| %RSD: | 1.08 | | | | | | | |

2008/06/04 16:01:10 QC value within limits for Se 196.03 Recovery = 92.61%

| Seq. No. | 29 | AS Loc: | I | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCB | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.014ug/L | 0.014 ug/L | 0.0003 | 0.1353 | | 0.0277 | | 16:01:51.00 |
| | -0.036ug/L | -0.036 ug/L | -0.0007 | 0.1323 | | 0.0267 | | 16:02:25.00 |
| | -0.048ug/L | -0.048 ug/L | -0.0010 | 0.1231 | | 0.0265 | | 16:02:59.00 |
| Mean: | ug/L | ug/L | -0.0005 | 0.1302 | | 0.0270 | | |
| SD: | 0.0327 | | | | | | | |
| %RSD: | 138.59 | | | | | | | |

2008/06/04 16:03:31 QC value within limits for Se 196.03 Recovery = Not calculated

| Seq. No. | 30 | AS Loc: | 19 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-005 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 1.046ug/L | 1.046 ug/L | 0.0208 | 0.2646 | | 0.0482 | | 16:04:09.00 |
| | 1.020ug/L | 1.020 ug/L | 0.0203 | 0.2523 | | 0.0477 | | 16:04:44.00 |
| | 0.987ug/L | 0.987 ug/L | 0.0196 | 0.2441 | | 0.0470 | | 16:05:18.00 |
| Mean: | ug/L | ug/L | 0.0202 | 0.2537 | | 0.0477 | | |
| SD: | 0.0297 | 0.0297 | | | | | | |
| %RSD: | 2.92 | | | | | | | |

| Seq. No. | 31 | AS Loc: | 20 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-005A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 5.432ug/L | 5.432 ug/L | 0.1079 | 0.7239 | | 0.1353 | | 16:06:29.00 |
| | 5.404ug/L | 5.404 ug/L | 0.1073 | 0.7031 | | 0.1348 | | 16:07:03.00 |
| | 5.369ug/L | 5.369 ug/L | 0.1067 | 0.7401 | | 0.1341 | | 16:07:37.00 |
| Mean: | ug/L | ug/L | 0.1073 | 0.7224 | | 0.1347 | | |
| SD: | 0.0313 | 0.0313 | | | | | | |
| %RSD: | 0.58 | | | | | | | |

| Seq. No. | 32 | AS Loc: | 21 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-006 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.735ug/L | 0.735 ug/L | 0.0146 | 0.2296 | | 0.0420 | | 16:08:48.00 |
| | 0.703ug/L | 0.703 ug/L | 0.0140 | 0.2159 | | 0.0414 | | 16:09:22.00 |
| | 0.756ug/L | 0.756 ug/L | 0.0150 | 0.2307 | | 0.0425 | | 16:09:56.00 |
| Mean: | ug/L | ug/L | 0.0145 | 0.2254 | | 0.0420 | | |
| SD: | 0.0268 | 0.0268 | | | | | | |
| %RSD: | 3.66 | | | | | | | |

| Seq. No. | 33 | AS Loc: | 22 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-006A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 5.701ug/L | 5.701 ug/L | 0.1132 | 0.7171 | | 0.1407 | | 16:11:08.00 |
| | 4.951ug/L | 4.951 ug/L | 0.0983 | 0.6688 | | 0.1258 | | 16:11:44.00 |
| | 4.964ug/L | 4.964 ug/L | 0.0986 | 0.6757 | | 0.1260 | | 16:12:18.00 |
| Mean: | ug/L | ug/L | 0.1034 | 0.6872 | | 0.1308 | | |
| SD: | 0.4292 | 0.4292 | | | | | | |
| %RSD: | 8.24 | | | | | | | |

| Seq. No. | 34 | AS Loc: | 23 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-007 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.933ug/L | 0.933 ug/L | 0.0185 | 0.2512 | | 0.0460 | | 16:13:31.00 |
| | 0.756ug/L | 0.756 ug/L | 0.0150 | 0.2168 | | 0.0425 | | 16:14:04.00 |
| | 0.775ug/L | 0.775 ug/L | 0.0154 | 0.2242 | | 0.0428 | | 16:14:38.00 |
| Mean: | ug/L | ug/L | 0.0163 | 0.2307 | | 0.0438 | | |
| SD: | 0.0970 | 0.0970 | | | | | | |
| %RSD: | 11.82 | | | | | | | |

| Seq. No. | 35 | AS Loc: | 24 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-007A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 5.067ug/L | 5.067 ug/L | 0.1006 | 0.6857 | | 0.1281 | | 16:15:50.00 |
| | 5.099ug/L | 5.099 ug/L | 0.1013 | 0.6972 | | 0.1287 | | 16:16:25.00 |
| | 5.278ug/L | 5.278 ug/L | 0.1048 | 0.7158 | | 0.1323 | | 16:16:59.00 |
| Mean: | ug/L | ug/L | 0.1023 | 0.6996 | | 0.1297 | | |
| SD: | 0.1135 | 0.1135 | | | | | | |
| %RSD: | 2.20 | | | | | | | |

| Seq. No. | 36 | AS Loc: | 25 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-007D | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.861ug/L | 0.861 ug/L | 0.0171 | 0.2500 | | 0.0445 | | 16:18:12.00 |
| | 0.685ug/L | 0.685 ug/L | 0.0136 | 0.2064 | | 0.0411 | | 16:18:46.00 |
| | 0.764ug/L | 0.764 ug/L | 0.0152 | 0.2301 | | 0.0426 | | 16:19:20.00 |
| Mean: | ug/L | ug/L | 0.0153 | 0.2288 | | 0.0427 | | |
| SD: | 0.0881 | 0.0881 | | | | | | |
| %RSD: | 11.44 | | | | | | | |

| Seq. No. | 37 | | AS Loc: | 26 | Date: | 2008/06/04 | | |
|------------|----------------|---------------|------------------|---------|---------|------------|-------|-------------|
| Sample ID: | K0803855-007DA | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 5.173ug/L | 5.173 ug/L | 0.1027 | 0.7139 | | 0.1302 | | 16:20:34.00 |
| | 5.065ug/L | 5.065 ug/L | 0.1006 | 0.6889 | | 0.1281 | | 16:21:08.00 |
| | 5.187ug/L | 5.187 ug/L | 0.1030 | 0.6981 | | 0.1305 | | 16:21:43.00 |
| Mean: | ug/L | ug/L | 0.1021 | 0.7003 | | 0.1296 | | |
| SD: | 0.0667 | 0.0667 | | | | | | |
| %RSD: | 1.30 | | | | | | | |

| Seq. No. | 38 | | AS Loc: | 27 | Date: | 2008/06/04 | | |
|------------|---------------|---------------|------------------|---------|---------|------------|-------|-------------|
| Sample ID: | K0803855-007S | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 7.729ug/L | 7.729 ug/L | 0.1535 | 0.9782 | | 0.1810 | | 16:22:57.00 |
| | 7.564ug/L | 7.564 ug/L | 0.1502 | 0.9666 | | 0.1777 | | 16:23:31.00 |
| | 7.546ug/L | 7.546 ug/L | 0.1499 | 0.9600 | | 0.1773 | | 16:24:06.00 |
| Mean: | ug/L | ug/L | 0.1512 | 0.9682 | | 0.1787 | | |
| SD: | 0.1010 | 0.1010 | | | | | | |
| %RSD: | 1.33 | | | | | | | |

| Seq. No. | 39 | | AS Loc: | 28 | Date: | 2008/06/04 | | |
|------------|----------------|---------------|------------------|---------|---------|------------|-------|-------------|
| Sample ID: | K0803855-007SA | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 11.28ug/L | 11.28 ug/L | 0.2241 | 1.3899 | | 0.2515 | | 16:25:20.00 |
| | 11.10ug/L | 11.10 ug/L | 0.2205 | 1.3438 | | 0.2480 | | 16:25:54.00 |
| | 11.28ug/L | 11.28 ug/L | 0.2241 | 1.3604 | | 0.2516 | | 16:26:29.00 |
| Mean: | ug/L | ug/L | 0.2229 | 1.3647 | | 0.2504 | | |
| SD: | 0.105 | 0.105 | | | | | | |
| %RSD: | 0.94 | | | | | | | |

| Seq. No. | 40 | AS Loc: | 5 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCV | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 9.430ug/L | 9.430 ug/L | 0.1873 | 1.1133 | | 0.2147 | | 16:27:43.00 |
| | 9.522ug/L | 9.522 ug/L | 0.1891 | 1.0979 | | 0.2166 | | 16:28:17.00 |
| | 9.396ug/L | 9.396 ug/L | 0.1866 | 1.0798 | | 0.2141 | | 16:28:52.00 |
| Mean: | ug/L | ug/L | 0.1877 | 1.0970 | | 0.2151 | | |
| SD: | 0.0652 | | | | | | | |
| %RSD: | 0.69 | | | | | | | |

2008/06/04 16:29:24 QC value within limits for Se 196.03 Recovery = 94.49%

| Seq. No. | 41 | AS Loc: | I | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCB | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.002ug/L | 0.002 ug/L | 0.0000 | 0.1464 | | 0.0275 | | 16:30:05.00 |
| | -0.104ug/L | -0.104 ug/L | -0.0021 | 0.1149 | | 0.0254 | | 16:30:39.00 |
| | -0.115ug/L | -0.115 ug/L | -0.0023 | 0.1282 | | 0.0251 | | 16:31:13.00 |
| Mean: | ug/L | ug/L | -0.0014 | 0.1299 | | 0.0260 | | |
| SD: | 0.0649 | | | | | | | |
| %RSD: | 89.70 | | | | | | | |

2008/06/04 16:31:45 QC value within limits for Se 196.03 Recovery = Not calculated

| Seq. No. | 42 | AS Loc: | 29 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-008 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.547ug/L | 0.547 ug/L | 0.0109 | 0.2127 | | 0.0383 | | 16:32:26.00 |
| | 0.471ug/L | 0.471 ug/L | 0.0094 | 0.1937 | | 0.0368 | | 16:33:01.00 |
| | 0.488ug/L | 0.488 ug/L | 0.0097 | 0.2061 | | 0.0371 | | 16:33:35.00 |
| Mean: | ug/L | ug/L | 0.0100 | 0.2042 | | 0.0374 | | |
| SD: | 0.0402 | 0.0402 | | | | | | |
| %RSD: | 8.01 | | | | | | | |

| Seq. No. | 43 | AS Loc: | 30 | Date: | 2008/06/04 | | | |
|------------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-008A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 4.870ug/L | 4.870 ug/L | 0.0967 | 0.6671 | | 0.1242 | | 16:34:50.00 |
| | 4.739ug/L | 4.739 ug/L | 0.0941 | 0.6490 | | 0.1216 | | 16:35:24.00 |
| | 5.290ug/L | 5.290 ug/L | 0.1051 | 0.6783 | | 0.1325 | | 16:35:58.00 |
| Mean: | ug/L | ug/L | 0.0986 | 0.6648 | | 0.1261 | | |
| SD: | 0.2875 | 0.2875 | | | | | | |
| %RSD: | 5.79 | | | | | | | |

| Seq. No. | 44 | AS Loc: | 31 | Date: | 2008/06/04 | | | |
|------------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-009 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 0.806ug/L | 0.806 ug/L | 0.0160 | 0.2318 | | 0.0434 | | 16:37:16.00 |
| | 0.781ug/L | 0.781 ug/L | 0.0155 | 0.2224 | | 0.0430 | | 16:37:50.00 |
| | 0.781ug/L | 0.781 ug/L | 0.0155 | 0.2107 | | 0.0430 | | 16:38:24.00 |
| Mean: | ug/L | ug/L | 0.0157 | 0.2216 | | 0.0431 | | |
| SD: | 0.0142 | 0.0142 | | | | | | |
| %RSD: | 1.80 | | | | | | | |

| Seq. No. | 45 | AS Loc: | 32 | Date: | 2008/06/04 | | | |
|------------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-009A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 5.104ug/L | 5.104 ug/L | 0.1014 | 0.7131 | | 0.1288 | | 16:39:36.00 |
| | 5.235ug/L | 5.235 ug/L | 0.1040 | 0.6910 | | 0.1314 | | 16:40:11.00 |
| | 5.169ug/L | 5.169 ug/L | 0.1027 | 0.6815 | | 0.1301 | | 16:40:45.00 |
| Mean: | ug/L | ug/L | 0.1027 | 0.6952 | | 0.1301 | | |
| SD: | 0.0656 | 0.0656 | | | | | | |
| %RSD: | 1.27 | | | | | | | |

| Seq. No. | 46 | AS Loc: | 33 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-010 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.847ug/L | 0.847 ug/L | 0.0168 | 0.2297 | | 0.0443 | | 16:41:55.00 |
| | 0.683ug/L | 0.683 ug/L | 0.0136 | 0.2123 | | 0.0410 | | 16:42:29.00 |
| | 0.673ug/L | 0.673 ug/L | 0.0134 | 0.2160 | | 0.0408 | | 16:43:04.00 |
| Mean: | ug/L | ug/L | 0.0146 | 0.2193 | | 0.0420 | | |
| SD: | 0.0976 | 0.0976 | | | | | | |
| %RSD: | 13.30 | | | | | | | |

| Seq. No. | 47 | AS Loc: | 34 | Date: | 2008/06/04 | | | |
|------------|---------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-010A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 4.924ug/L | 4.924 ug/L | 0.0978 | 0.6885 | | 0.1253 | | 16:44:13.00 |
| | 5.033ug/L | 5.033 ug/L | 0.1000 | 0.6716 | | 0.1274 | | 16:44:48.00 |
| | 4.755ug/L | 4.755 ug/L | 0.0945 | 0.6481 | | 0.1219 | | 16:45:22.00 |
| Mean: | ug/L | ug/L | 0.0974 | 0.6694 | | 0.1249 | | |
| SD: | 0.1399 | 0.1399 | | | | | | |
| %RSD: | 2.85 | | | | | | | |

| Seq. No. | 48 | AS Loc: | 35 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-011 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.591ug/L | 0.591 ug/L | 0.0117 | 0.2173 | | 0.0392 | | 16:46:32.00 |
| | 0.532ug/L | 0.532 ug/L | 0.0106 | 0.2024 | | 0.0380 | | 16:47:07.00 |
| | 0.564ug/L | 0.564 ug/L | 0.0112 | 0.2077 | | 0.0386 | | 16:47:41.00 |
| Mean: | ug/L | ug/L | 0.0112 | 0.2092 | | 0.0386 | | |
| SD: | 0.0292 | 0.0292 | | | | | | |
| %RSD: | 5.20 | | | | | | | |

| Seq. No. | AS Loc: | | Date: | | | | | |
|------------------|---------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 49 | 36 | | 2008/06/04 | | | | | |
| Sample ID: | K0803855-011A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 4.711ug/L | 4.711 ug/L | 0.0936 | 0.6789 | | 0.1210 | | 16:48:52.00 |
| | 4.672ug/L | 4.672 ug/L | 0.0928 | 0.6602 | | 0.1202 | | 16:49:26.00 |
| | 4.772ug/L | 4.772 ug/L | 0.0948 | 0.6534 | | 0.1222 | | 16:50:00.00 |
| Mean: | ug/L | ug/L | 0.0937 | 0.6642 | | 0.1212 | | |
| SD: | 0.0504 | 0.0504 | | | | | | |
| %RSD: | 1.07 | | | | | | | |

| Seq. No. | AS Loc: | | Date: | | | | | |
|------------------|--------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 50 | 37 | | 2008/06/04 | | | | | |
| Sample ID: | K0803855-012 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 0.459ug/L | 0.459 ug/L | 0.0091 | 0.2023 | | 0.0366 | | 16:51:11.00 |
| | 0.455ug/L | 0.455 ug/L | 0.0090 | 0.1994 | | 0.0365 | | 16:51:45.00 |
| | 0.354ug/L | 0.354 ug/L | 0.0070 | 0.1885 | | 0.0345 | | 16:52:20.00 |
| Mean: | ug/L | ug/L | 0.0084 | 0.1967 | | 0.0358 | | |
| SD: | 0.0597 | 0.0597 | | | | | | |
| %RSD: | 14.14 | | | | | | | |

| Seq. No. | AS Loc: | | Date: | | | | | |
|------------------|---------------|---------------|------------------|---------|---------|--------|-------|-------------|
| 51 | 38 | | 2008/06/04 | | | | | |
| Sample ID: | K0803855-012A | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | | | | | | | | |
| | 5.166ug/L | 5.166 ug/L | 0.1026 | 0.6826 | | 0.1301 | | 16:53:31.00 |
| | 4.802ug/L | 4.802 ug/L | 0.0954 | 0.6715 | | 0.1228 | | 16:54:06.00 |
| | 4.833ug/L | 4.833 ug/L | 0.0960 | 0.6671 | | 0.1234 | | 16:54:40.00 |
| Mean: | ug/L | ug/L | 0.0980 | 0.6737 | | 0.1254 | | |
| SD: | 0.2016 | 0.2016 | | | | | | |
| %RSD: | 4.09 | | | | | | | |

| Seq. No. | 52 | AS Loc: | 5 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCV | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 9.305ug/L | 9.305 ug/L | 0.1848 | 1.1026 | | 0.2123 | | 16:55:52.00 |
| | 9.567ug/L | 9.567 ug/L | 0.1900 | 1.0633 | | 0.2175 | | 16:56:26.00 |
| | 9.462ug/L | 9.462 ug/L | 0.1880 | 1.0771 | | 0.2154 | | 16:57:01.00 |
| Mean: | ug/L | ug/L | 0.1876 | 1.0810 | | 0.2150 | | |
| SD: | 0.1322 | | | | | | | |
| %RSD: | 1.40 | | | | | | | |

2008/06/04 16:57:32 QC value within limits for Se 196.03 Recovery = 94.45%

| Seq. No. | 53 | AS Loc: | 1 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | CCB | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | -0.106ug/L | -0.106 ug/L | -0.0021 | 0.1307 | | 0.0253 | | 16:58:12.00 |
| | -0.187ug/L | -0.187 ug/L | -0.0037 | 0.1097 | | 0.0237 | | 16:58:46.00 |
| | -0.130ug/L | -0.130 ug/L | -0.0026 | 0.1268 | | 0.0249 | | 16:59:20.00 |
| Mean: | ug/L | ug/L | -0.0028 | 0.1224 | | 0.0246 | | |
| SD: | 0.0415 | | | | | | | |
| %RSD: | 29.43 | | | | | | | |

2008/06/04 16:59:52 QC value within limits for Se 196.03 Recovery = Not calculated

| Seq. No. | 54 | AS Loc: | 39 | Date: | 2008/06/04 | | | |
|------------|--------------|---------------|------------------|---------|------------|--------|-------|-------------|
| Sample ID: | K0803855-013 | | | | | | | |
| Analyte | Conc (Calib) | Conc (Sample) | Corr. Absorbance | Pk Area | BG Area | Pk Ht | BG Ht | Time |
| Se 196.03 | 0.593ug/L | 0.593 ug/L | 0.0118 | 0.2106 | | 0.0392 | | 17:00:31.00 |
| | 0.656ug/L | 0.656 ug/L | 0.0130 | 0.2118 | | 0.0405 | | 17:01:06.00 |
| | 0.680ug/L | 0.680 ug/L | 0.0135 | 0.2257 | | 0.0409 | | 17:01:41.00 |
| Mean: | ug/L | ug/L | 0.0128 | 0.2160 | | 0.0402 | | |
| SD: | 0.0445 | 0.0445 | | | | | | |
| %RSD: | 6.92 | | | | | | | |

*CCB fails Low (neg)
JB 6/6/08*

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0803855 (13-16), K0804253

Batch QC SR's # _____

Calibration Std. AA1-8-E
Starlims # 116783

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>x</u> | _____ | _____ |
| 2. Calibration data included | <u>x</u> | _____ | _____ |
| 3. CCV's in control | <u>x</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>x</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>x</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>x</u> | _____ | _____ |

Comments

K4253 - Double spiked confirm by GFAA, data at end of package.

Primary Reviewed by JDB Date 6/5/08

Secondary Reviewed by ~~A~~ Date 6/6/08

COLUMBIA ANALYTICAL SERVICES, INC.
GFAA Run Log

| | |
|--|----------------------------|
| Method: (Circle Method Used) <u>7742</u> 7062 Other: _____ Element: <u>As Se</u> | Service Request # : |
|--|----------------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|---------------------------|-----------------|-------------------|--|--------------------------|
| ICV | - | 10.609 | 107% | |
| ICB | - | 0.133 | | |
| CRA | - | 0.702 | 140% | |
| CCV | - | 10.203 | 102% | |
| CCB | - | 0.086 | | |
| K0803855-013 | 1/5 | 1.482 | | Cx=1.647 |
| K0803855-013A | 1/5 | 5.965 | 90% | |
| K0803855-014 | 1/5 | 1.334 | | Cx=1.551 |
| K0803855-014A | 1/5 | 5.615 | 86% | |
| K0803855-015 | 1/5 | 1.626 | | Cx=1.983 |
| K0803855-015A | 1/5 | 5.720 | 82% | |
| K0803855-016 | 1/5 | 1.402 | | Cx=1.710 |
| K0803855-016A | 1/5 | 5.496 | 82% | |
| PBT K0804253 | 1/5 | 0.421 | | <i>See Run JB 6/5/08</i> |
| TORT K0804253 | 1/5+1/2 | 5.777 | 108% | |
| CCV | - | 9.836 | 98% | |
| CCB | - | 0.107 | | |
| K0804253-001 | 1/5 | 11.787 | | Rerun |
| K0804253-001A | 1/5 | 15.402 | | Rerun |
| K0804253-001D | 1/5 | 11.337 | | Rerun |
| K0804235-001DA | 1/5 | 14.686 | | Rerun |
| K0804253-001S | 1/5 | 20.079 | | Rerun |
| K0804253-001SA | 1/5 | 22.623 | | Rerun |
| K0804253-002 | 1/5 | 19.893 | | Rerun |
| K0804253-002A | 1/5 | 22.517 | | Rerun |
| K0804253-003 | 1/5 | 17.056 | | Rerun |
| K0804253-003A | 1/5 | 19.283 | | Rerun |
| CCV | - | 10.086 | 101% | |
| CCB | - | 0.197 | | |
| K0804253-004 | 1/5+1/5 | 2.195 | | Cx=2.131 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|--|-------------------------------|---------------------------------|
| Analyst <i>John D. Baird</i> | Date: <i>6/5/08</i> | Page Number: <i>1</i> |
|--|-------------------------------|---------------------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|--|----------------------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As/Se | Service Request # : _____ |
|--|----------------------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------|-----------------|-----------------|--|-----------|
| K0804253-004A | 1/5+1/5 | 7.366 | 103% | |
| K0804253-005 | 1/5+1/5 | 2.287 | | Cx=2.264 |
| K0804253-005A | 1/5+1/5 | 7.353 | 101% | |
| K0804253-006 | 1/5+1/5 | 6.379 | | Cx=7.417 |
| K0804253-006A | 1/5+1/5 | 10.699 | 86% | |
| K0804253-007 | 1/5+1/5 | 3.575 | | Cx=3.505 |
| K0804253-007A | 1/5+1/5 | 8.651 | 102% | |
| K0804253-008 | 1/5+1/5 | 8.106 | | Cx=10.007 |
| K0804253-008A | 1/5+1/5 | 12.154 | 81% | |
| CCV | - | 10.189 | 102% | |
| CCB | - | 0.146 | | |
| K0804253-009 | 1/5+1/5 | 10.254 | | Rerun |
| K0804253-009A | 1/5+1/5 | 13.895 | | Rerun |
| K0804253-010 | 1/5+1/5 | 12.032 | | Rerun |
| K0804253-010A | 1/5+1/5 | 15.114 | | Rerun |
| CCV | - | 9.977 | 100% | |
| CCB | - | 0.137 | | |
| PBT K0804253 | | 0.006 | | |
| K0804253-001 1/5 | 1/5+1/5 | 2.715 | | Cx=2.951 |
| K0804253-001 1/5A | 1/5+1/5 | 7.327 | 92% | |
| K0804253-001D 1/5 | 1/5+1/5 | 2.502 | | Cx=2.553 |
| K0804253-001D 1/5A | 1/5+1/5 | 7.411 | 98% | |
| K0804253-001S 1/5 | 1/5+1/5 | 5.476 | 96% | Cx=6.018 |
| K0804253-001S 1/5A | 1/5+1/5 | 10.041 | 91% | |
| K0804253-002 1/5 | 1/5+1/5 | 5.681 | | Cx=6.383 |
| K0804253-002 1/5A | 1/5+1/5 | 10.112 | 89% | |
| CCV | - | 10.099 | 101% | |
| CCB | - | 0.055 | | |
| K0804253-003 1/5 | 1/5+1/5 | 4.307 | | Cx=4.631 |
| K0804253-003 1/5A | 1/5+1/5 | 8.952 | 93% | |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-------------------------------|------------------------|--------------------------|
| Analyst [Signature] | Date: 6/5/08 | Page Number: 2 |
|-------------------------------|------------------------|--------------------------|

Sample ID: Std 5.0

Date Collected: 6/5/2008 2:12:15 PM

Analyst:

Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.137 | 0.642 | 0.145 | | | 14:12:37 | Yes |
| 2 | | [5.0] | 0.128 | 0.622 | 0.137 | | | 14:13:12 | Yes |
| 3 | | [5.0] | 0.130 | 0.623 | 0.139 | | | 14:13:47 | Yes |
| Mean: | | [5.0] | 0.132 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |

Standard number 3 applied. [5.0]
Correlation Coef.: 0.999378 Slope: 0.02653 Intercept: 0.00000

===== Sequence No.: 5

Autosampler Location: 5

Sample ID: Std 10.0

Date Collected: 6/5/2008 2:14:37 PM

Analyst:

Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10.0] | 0.243 | 1.171 | 0.251 | | | 14:15:00 | Yes |
| 2 | | [10.0] | 0.238 | 1.141 | 0.246 | | | 14:15:34 | Yes |
| 3 | | [10.0] | 0.237 | 1.151 | 0.246 | | | 14:16:09 | Yes |
| Mean: | | [10.0] | 0.239 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |

Standard number 4 applied. [10.0]
Correlation Coef.: 0.997848 Slope: 0.02452 Intercept: 0.00000

===== Sequence No.: 6

Autosampler Location: 6

Sample ID: Std 15.0

Date Collected: 6/5/2008 2:17:00 PM

Analyst:

Data Type: Original

Replicate Data: Std 15.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [15.0] | 0.358 | 1.725 | 0.366 | | | 14:17:23 | Yes |
| 2 | | [15.0] | 0.350 | 1.696 | 0.358 | | | 14:17:57 | Yes |
| 3 | | [15.0] | 0.361 | 1.699 | 0.369 | | | 14:18:32 | Yes |
| Mean: | | [15.0] | 0.356 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |

Standard number 5 applied. [15.0]
Correlation Coef.: 0.998910 Slope: 0.02403 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03

Equation: Linear Through Zero

| ID | Mean Signal (Abs) | Entered Conc. ug/L | Calculated Conc. ug/L | Standard Deviation | %RSD |
|----------|-------------------|--------------------|-----------------------|--------------------|------|
| Cal Blk | 0.0000 | 0 | 0.000 | 0.00 | 5.3 |
| Std 0.5 | 0.0160 | 0.5 | 0.667 | 0.00 | 4.6 |
| Std 1.0 | 0.0282 | 1.0 | 1.172 | 0.00 | 1.3 |
| Std 5.0 | 0.1320 | 5.0 | 5.493 | 0.00 | 3.4 |
| Std 10.0 | 0.2393 | 10.0 | 9.959 | 0.00 | 1.3 |
| Std 15.0 | 0.3562 | 15.0 | 14.824 | 0.01 | 1.6 |

Correlation Coef.: 0.998910 Slope: 0.02403 Intercept: 0.00000

Sequence No.: 7
 Sample ID: ICV
 Analyst:

Autosampler Location: 7
 Date Collected: 6/5/2008 2:19:25 PM
 Data Type: Original

Replicate Data: ICV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.82 | 10.82 | 0.260 | 1.209 | 0.268 | | | 14:19:49 | Yes |
| 2 | 10.69 | 10.69 | 0.257 | 1.179 | 0.265 | | | 14:20:24 | Yes |
| 3 | 10.32 | 10.32 | 0.248 | 1.185 | 0.256 | | | 14:20:57 | Yes |
| Mean: | 10.61 | 10.61 | 0.255 | | | | | | |
| SD: | 0.258 | 0.258 | 0.0062 | | | | | | |
| %RSD: | 2.434 | 2.434 | 2.43 | | | | | | |

QC value within limits for Se 196.03 Recovery = 106.09%
 All analyte(s) passed QC.

Sequence No.: 8
 Sample ID: ICB
 Analyst:

Autosampler Location: 1
 Date Collected: 6/5/2008 2:21:50 PM
 Data Type: Original

Replicate Data: ICB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.211 | 0.211 | 0.005 | 0.065 | 0.013 | | | 14:22:11 | Yes |
| 2 | 0.101 | 0.101 | 0.002 | 0.049 | 0.011 | | | 14:22:45 | Yes |
| 3 | 0.088 | 0.088 | 0.002 | 0.046 | 0.010 | | | 14:23:20 | Yes |
| Mean: | 0.133 | 0.133 | 0.003 | | | | | | |
| SD: | 0.068 | 0.068 | 0.0016 | | | | | | |
| %RSD: | 50.83 | 50.83 | 50.83 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 9
 Sample ID: CRA
 Analyst:

Autosampler Location: 2
 Date Collected: 6/5/2008 2:24:09 PM
 Data Type: Original

Replicate Data: CRA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.719 | 0.719 | 0.017 | 0.120 | 0.025 | | | 14:24:31 | Yes |
| 2 | 0.675 | 0.675 | 0.016 | 0.103 | 0.024 | | | 14:25:05 | Yes |
| 3 | 0.712 | 0.712 | 0.017 | 0.120 | 0.025 | | | 14:25:39 | Yes |
| Mean: | 0.702 | 0.702 | 0.017 | | | | | | |
| SD: | 0.024 | 0.024 | 0.0006 | | | | | | |
| %RSD: | 3.367 | 3.367 | 3.37 | | | | | | |

QC value within limits for Se 196.03 Recovery = 140.39%
 All analyte(s) passed QC.

Sequence No.: 10
 Sample ID: CCV
 Analyst:

Autosampler Location: 5
 Date Collected: 6/5/2008 2:26:28 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.57 | 10.57 | 0.254 | 1.191 | 0.262 | | | 14:26:51 | Yes |
| 2 | 10.08 | 10.08 | 0.242 | 1.177 | 0.250 | | | 14:27:26 | Yes |
| 3 | 9.955 | 9.955 | 0.239 | 1.170 | 0.247 | | | 14:28:00 | Yes |
| Mean: | 10.20 | 10.20 | 0.245 | | | | | | |

SD: 0.323 0.323 0.0078
 %RSD: 3.171 3.171 3.17

QC value within limits for Se 196.03 Recovery = 102.03%
 All analyte(s) passed QC.

Sequence No.: 11

Autosampler Location: 1

Sample ID: CCB

Date Collected: 6/5/2008 2:28:51 PM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.155 | 0.155 | 0.004 | 0.052 | 0.012 | | | 14:29:12 | Yes |
| 2 | 0.070 | 0.070 | 0.002 | 0.041 | 0.010 | | | 14:29:46 | Yes |
| 3 | 0.033 | 0.033 | 0.001 | 0.040 | 0.009 | | | 14:30:21 | Yes |
| Mean: | 0.086 | 0.086 | 0.002 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0015 | | | | | | |
| %RSD: | 72.83 | 72.83 | 72.83 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 12

Autosampler Location: 9

Sample ID: K0803855-013

Date Collected: 6/5/2008 2:31:09 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-013

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.495 | 1.495 | 0.036 | 0.231 | 0.044 | | | 14:31:30 | Yes |
| 2 | 1.434 | 1.434 | 0.034 | 0.222 | 0.043 | | | 14:32:04 | Yes |
| 3 | 1.516 | 1.516 | 0.036 | 0.216 | 0.045 | | | 14:32:39 | Yes |
| Mean: | 1.482 | 1.482 | 0.036 | | | | | | |
| SD: | 0.043 | 0.043 | 0.0010 | | | | | | |
| %RSD: | 2.869 | 2.869 | 2.87 | | | | | | |

Sequence No.: 13

Autosampler Location: 10

Sample ID: K0803855-013A

Date Collected: 6/5/2008 2:33:28 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-013A

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.365 | 6.365 | 0.153 | 0.779 | 0.161 | | | 14:33:50 | Yes |
| 2 | 5.703 | 5.703 | 0.137 | 0.737 | 0.145 | | | 14:34:25 | Yes |
| 3 | 5.826 | 5.826 | 0.140 | 0.729 | 0.148 | | | 14:34:59 | Yes |
| Mean: | 5.965 | 5.965 | 0.143 | | | | | | |
| SD: | 0.352 | 0.352 | 0.0085 | | | | | | |
| %RSD: | 5.896 | 5.896 | 5.90 | | | | | | |

Sequence No.: 14

Autosampler Location: 11

Sample ID: K0803855-014

Date Collected: 6/5/2008 2:35:49 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-014

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.370 | 1.370 | 0.033 | 0.208 | 0.041 | | | 14:36:11 | Yes |
| 2 | 1.370 | 1.370 | 0.033 | 0.192 | 0.041 | | | 14:36:46 | Yes |
| 3 | 1.263 | 1.263 | 0.030 | 0.177 | 0.038 | | | 14:37:20 | Yes |

Mean: 1.334 1.334 0.032
 SD: 0.062 0.062 0.0015
 %RSD: 4.640 4.640 4.64

Sequence No.: 15
 Sample ID: K0803855-014A
 Analyst:

Autosampler Location: 12
 Date Collected: 6/5/2008 2:38:10 PM
 Data Type: Original

Replicate Data: K0803855-014A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.574 | 5.574 | 0.134 | 0.733 | 0.142 | | | 14:38:34 | Yes |
| 2 | 5.590 | 5.590 | 0.134 | 0.708 | 0.142 | | | 14:39:08 | Yes |
| 3 | 5.682 | 5.682 | 0.137 | 0.712 | 0.145 | | | 14:39:42 | Yes |
| Mean: | 5.615 | 5.615 | 0.135 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 1.035 | 1.035 | 1.04 | | | | | | |

Sequence No.: 16
 Sample ID: K0803855-015
 Analyst:

Autosampler Location: 13
 Date Collected: 6/5/2008 2:40:32 PM
 Data Type: Original

Replicate Data: K0803855-015

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.676 | 1.676 | 0.040 | 0.260 | 0.048 | | | 14:40:55 | Yes |
| 2 | 1.592 | 1.592 | 0.038 | 0.234 | 0.046 | | | 14:41:30 | Yes |
| 3 | 1.611 | 1.611 | 0.039 | 0.242 | 0.047 | | | 14:42:04 | Yes |
| Mean: | 1.626 | 1.626 | 0.039 | | | | | | |
| SD: | 0.044 | 0.044 | 0.0011 | | | | | | |
| %RSD: | 2.720 | 2.720 | 2.72 | | | | | | |

Sequence No.: 17
 Sample ID: K0803855-015A
 Analyst:

Autosampler Location: 14
 Date Collected: 6/5/2008 2:42:56 PM
 Data Type: Original

Replicate Data: K0803855-015A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.725 | 5.725 | 0.138 | 0.766 | 0.146 | | | 14:43:22 | Yes |
| 2 | 5.734 | 5.734 | 0.138 | 0.744 | 0.146 | | | 14:43:56 | Yes |
| 3 | 5.701 | 5.701 | 0.137 | 0.746 | 0.145 | | | 14:44:31 | Yes |
| Mean: | 5.720 | 5.720 | 0.137 | | | | | | |
| SD: | 0.017 | 0.017 | 0.0004 | | | | | | |
| %RSD: | 0.298 | 0.298 | 0.30 | | | | | | |

Sequence No.: 18
 Sample ID: K0803855-016
 Analyst:

Autosampler Location: 15
 Date Collected: 6/5/2008 2:45:22 PM
 Data Type: Original

Replicate Data: K0803855-016

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.457 | 1.457 | 0.035 | 0.214 | 0.043 | | | 14:45:46 | Yes |
| 2 | 1.376 | 1.376 | 0.033 | 0.203 | 0.041 | | | 14:46:20 | Yes |
| 3 | 1.372 | 1.372 | 0.033 | 0.207 | 0.041 | | | 14:46:55 | Yes |
| Mean: | 1.402 | 1.402 | 0.034 | | | | | | |
| SD: | 0.048 | 0.048 | 0.0011 | | | | | | |
| %RSD: | 3.397 | 3.397 | 3.40 | | | | | | |

Sequence No.: 19
Sample ID: K0803855-016A
Analyst:

Autosampler Location: 16
Date Collected: 6/5/2008 2:47:46 PM
Data Type: Original

Replicate Data: K0803855-016A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.549 | 5.549 | 0.133 | 0.739 | 0.141 | | | 14:48:13 | Yes |
| 2 | 5.441 | 5.441 | 0.131 | 0.716 | 0.139 | | | 14:48:48 | Yes |
| 3 | 5.499 | 5.499 | 0.132 | 0.718 | 0.140 | | | 14:49:22 | Yes |
| Mean: | 5.496 | 5.496 | 0.132 | | | | | | |
| SD: | 0.054 | 0.054 | 0.0013 | | | | | | |
| %RSD: | 0.978 | 0.978 | 0.98 | | | | | | |

Sequence No.: 20
Sample ID: PBT K0804253
Analyst:

Autosampler Location: 17
Date Collected: 6/5/2008 2:50:15 PM
Data Type: Original

Replicate Data: PBT K0804253

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.484 | 0.484 | 0.012 | 0.104 | 0.020 | | | 14:50:36 | Yes |
| 2 | 0.420 | 0.420 | 0.010 | 0.088 | 0.018 | | | 14:51:10 | Yes |
| 3 | 0.358 | 0.358 | 0.009 | 0.078 | 0.017 | | | 14:51:44 | Yes |
| Mean: | 0.421 | 0.421 | 0.010 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0015 | | | | | | |
| %RSD: | 15.09 | 15.09 | 15.09 | | | | | | |

*JB 6/5/08
See Run*

Sequence No.: 21
Sample ID: TORT K0804253
Analyst:

Autosampler Location: 18
Date Collected: 6/5/2008 2:52:33 PM
Data Type: Original

Replicate Data: TORT K0804253

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.897 | 5.897 | 0.142 | 0.705 | 0.150 | | | 14:52:54 | Yes |
| 2 | 5.658 | 5.658 | 0.136 | 0.687 | 0.144 | | | 14:53:31 | Yes |
| 3 | 5.776 | 5.776 | 0.139 | 0.697 | 0.147 | | | 14:54:06 | Yes |
| Mean: | 5.777 | 5.777 | 0.139 | | | | | | |
| SD: | 0.119 | 0.119 | 0.0029 | | | | | | |
| %RSD: | 2.064 | 2.064 | 2.06 | | | | | | |

Sequence No.: 22
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/5/2008 2:54:55 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.890 | 9.890 | 0.238 | 1.184 | 0.246 | | | 14:55:17 | Yes |
| 2 | 9.831 | 9.831 | 0.236 | 1.154 | 0.244 | | | 14:55:52 | Yes |
| 3 | 9.787 | 9.787 | 0.235 | 1.145 | 0.243 | | | 14:56:26 | Yes |
| Mean: | 9.836 | 9.836 | 0.236 | | | | | | |
| SD: | 0.052 | 0.052 | 0.0012 | | | | | | |
| %RSD: | 0.525 | 0.525 | 0.53 | | | | | | |

QC value within limits for Se 196.03 Recovery = 98.36%
All analyte(s) passed QC.

Sequence No.: 23
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/5/2008 2:57:17 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.163 | 0.163 | 0.004 | 0.053 | 0.012 | | | 14:57:38 | Yes |
| 2 | 0.077 | 0.077 | 0.002 | 0.040 | 0.010 | | | 14:58:13 | Yes |
| 3 | 0.082 | 0.082 | 0.002 | 0.050 | 0.010 | | | 14:58:48 | Yes |
| Mean: | 0.107 | 0.107 | 0.003 | | | | | | |
| SD: | 0.048 | 0.048 | 0.0012 | | | | | | |
| %RSD: | 44.80 | 44.80 | 44.80 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 24
Sample ID: K0804253-001
Analyst:

Autosampler Location: 19
Date Collected: 6/5/2008 2:59:40 PM
Data Type: Original

Replicate Data: K0804253-001

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 11.77 | 11.77 | 0.283 | 1.480 | 0.291 | | | 15:00:02 | Yes |
| 2 | 11.63 | 11.63 | 0.280 | 1.424 | 0.289 | | | 15:00:36 | Yes |
| 3 | 11.96 | 11.96 | 0.287 | 1.437 | 0.296 | | | 15:01:11 | Yes |
| Mean: | 11.79 | 11.79 | 0.283 | | | | | | |
| SD: | 0.167 | 0.167 | 0.0040 | | | | | | |
| %RSD: | 1.417 | 1.417 | 1.42 | | | | | | |

Sequence No.: 25
Sample ID: K0804253-001A
Analyst:

Autosampler Location: 20
Date Collected: 6/5/2008 3:02:00 PM
Data Type: Original

Replicate Data: K0804253-001A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 15.77 | 15.77 | 0.379 | 1.933 | 0.387 | | | 15:02:21 | Yes |
| 2 | 15.19 | 15.19 | 0.365 | 1.858 | 0.373 | | | 15:02:56 | Yes |
| 3 | 15.25 | 15.25 | 0.367 | 1.904 | 0.375 | | | 15:03:33 | Yes |
| Mean: | 15.40 | 15.40 | 0.370 | | | | | | |
| SD: | 0.317 | 0.317 | 0.0076 | | | | | | |
| %RSD: | 2.057 | 2.057 | 2.06 | | | | | | |

*See dilutions
JTB 6/5/08*

Sequence No.: 26
Sample ID: K0804253-001D
Analyst:

Autosampler Location: 21
Date Collected: 6/5/2008 3:04:56 PM
Data Type: Original

Replicate Data: K0804253-001D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 11.85 | 11.85 | 0.285 | 1.405 | 0.293 | | | 15:05:18 | Yes |
| 2 | 11.14 | 11.14 | 0.268 | 1.331 | 0.276 | | | 15:05:52 | Yes |
| 3 | 11.02 | 11.02 | 0.265 | 1.329 | 0.273 | | | 15:06:26 | Yes |
| Mean: | 11.34 | 11.34 | 0.272 | | | | | | |
| SD: | 0.451 | 0.451 | 0.0108 | | | | | | |
| %RSD: | 3.975 | 3.975 | 3.98 | | | | | | |

Sequence No.: 27
Sample ID: K0804235-001DA
Analyst:

Autosampler Location: 22
Date Collected: 6/5/2008 3:07:16 PM
Data Type: Original

Replicate Data: K0804235-001DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 14.76 | 14.76 | 0.355 | 1.806 | 0.363 | | | 15:07:37 | Yes |
| 2 | 14.39 | 14.39 | 0.346 | 1.749 | 0.354 | | | 15:08:12 | Yes |
| 3 | 14.91 | 14.91 | 0.358 | 1.772 | 0.366 | | | 15:08:47 | Yes |
| Mean: | 14.69 | 14.69 | 0.353 | | | | | | |
| SD: | 0.269 | 0.269 | 0.0065 | | | | | | |
| %RSD: | 1.834 | 1.834 | 1.83 | | | | | | |

Sequence No.: 28
Sample ID: K0804253-001S
Analyst:

Autosampler Location: 23
Date Collected: 6/5/2008 3:09:36 PM
Data Type: Original

Replicate Data: K0804253-001S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 20.37 | 20.37 | 0.490 | 2.610 | 0.498 | | | 15:09:58 | Yes |
| 2 | 20.00 | 20.00 | 0.481 | 2.477 | 0.489 | | | 15:10:33 | Yes |
| 3 | 19.87 | 19.87 | 0.477 | 2.494 | 0.485 | | | 15:11:07 | Yes |
| Mean: | 20.08 | 20.08 | 0.482 | | | | | | |
| SD: | 0.262 | 0.262 | 0.0063 | | | | | | |
| %RSD: | 1.303 | 1.303 | 1.30 | | | | | | |

Sequence No.: 29
Sample ID: K0804253-001SA
Analyst:

Autosampler Location: 24
Date Collected: 6/5/2008 3:12:31 PM
Data Type: Original

Replicate Data: K0804253-001SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 22.95 | 22.95 | 0.551 | 2.904 | 0.560 | | | 15:12:53 | Yes |
| 2 | 22.53 | 22.53 | 0.541 | 2.816 | 0.550 | | | 15:13:31 | Yes |
| 3 | 22.39 | 22.39 | 0.538 | 2.817 | 0.546 | | | 15:14:06 | Yes |
| Mean: | 22.62 | 22.62 | 0.544 | | | | | | |
| SD: | 0.292 | 0.292 | 0.0070 | | | | | | |
| %RSD: | 1.292 | 1.292 | 1.29 | | | | | | |

*See dilutions
JB 6/5/08*

Sequence No.: 30
Sample ID: K0804253-002
Analyst:

Autosampler Location: 25
Date Collected: 6/5/2008 3:15:30 PM
Data Type: Original

Replicate Data: K0804253-002

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 20.17 | 20.17 | 0.485 | 2.524 | 0.493 | | | 15:15:53 | Yes |
| 2 | 19.74 | 19.74 | 0.474 | 2.463 | 0.482 | | | 15:16:27 | Yes |

Sample concentration is greater than that of the highest standard.
 3 19.78 19.78 0.475 2.478 0.483 15:17:01 Yes
 Sample concentration is greater than that of the highest standard.
 Mean: 19.89 19.89 0.478
 SD: 0.238 0.238 0.0057
 %RSD: 1.195 1.195 1.20
 Sample concentration is greater than that of the highest standard.

Sequence No.: 31 Autosampler Location: 26
 Sample ID: K0804253-002A Date Collected: 6/5/2008 3:18:26 PM
 Analyst: Data Type: Original

Replicate Data: K0804253-002A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 22.98 | 22.98 | 0.552 | 2.903 | 0.560 | | | 15:18:48 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 2 | 22.25 | 22.25 | 0.535 | 2.792 | 0.543 | | | 15:19:25 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 3 | 22.32 | 22.32 | 0.536 | 2.777 | 0.544 | | | 15:19:59 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| Mean: 22.52 22.52 0.541 | | | | | | | | | |
| SD: 0.402 0.402 0.0097 | | | | | | | | | |
| %RSD: 1.787 1.787 1.79 | | | | | | | | | |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |

Sequence No.: 32 Autosampler Location: 27
 Sample ID: K0804253-003 Date Collected: 6/5/2008 3:21:23 PM
 Analyst: Data Type: Original

Replicate Data: K0804253-003

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 16.64 | 16.64 | 0.400 | 2.107 | 0.408 | | | 15:21:46 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 2 | 16.32 | 16.32 | 0.392 | 2.058 | 0.400 | | | 15:22:20 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 3 | 18.20 | 18.20 | 0.437 | 2.059 | 0.445 | | | 15:22:54 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| Mean: 17.06 17.06 0.410 | | | | | | | | | |
| SD: 1.004 1.004 0.0241 | | | | | | | | | |
| %RSD: 5.887 5.887 5.89 | | | | | | | | | |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |

*See Dilutions
 JS 6/5/08*

Sequence No.: 33 Autosampler Location: 28
 Sample ID: K0804253-003A Date Collected: 6/5/2008 3:24:21 PM
 Analyst: Data Type: Original

Replicate Data: K0804253-003A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 19.40 | 19.40 | 0.466 | 2.443 | 0.474 | | | 15:24:44 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 2 | 18.92 | 18.92 | 0.455 | 2.396 | 0.463 | | | 15:25:19 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 3 | 19.53 | 19.53 | 0.469 | 2.385 | 0.477 | | | 15:25:53 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| Mean: 19.28 19.28 0.463 | | | | | | | | | |
| SD: 0.321 0.321 0.0077 | | | | | | | | | |
| %RSD: 1.665 1.665 1.66 | | | | | | | | | |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |

Sequence No.: 34
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/5/2008 3:27:18 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.28 | 10.28 | 0.247 | 1.240 | 0.255 | | | 15:27:41 | Yes |
| 2 | 10.04 | 10.04 | 0.241 | 1.189 | 0.249 | | | 15:28:15 | Yes |
| 3 | 9.936 | 9.936 | 0.239 | 1.192 | 0.247 | | | 15:28:49 | Yes |
| Mean: | 10.09 | 10.09 | 0.242 | | | | | | |
| SD: | 0.177 | 0.177 | 0.0042 | | | | | | |
| %RSD: | 1.753 | 1.753 | 1.75 | | | | | | |

QC value within limits for Se 196.03 Recovery = 100.86%
All analyte(s) passed QC.

Sequence No.: 35
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/5/2008 3:29:40 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.243 | 0.243 | 0.006 | 0.063 | 0.014 | | | 15:30:01 | Yes |
| 2 | 0.184 | 0.184 | 0.004 | 0.046 | 0.013 | | | 15:30:36 | Yes |
| 3 | 0.163 | 0.163 | 0.004 | 0.063 | 0.012 | | | 15:31:10 | Yes |
| Mean: | 0.197 | 0.197 | 0.005 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 21.01 | 21.01 | 21.01 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 36
Sample ID: K0804253-004 1/5
Analyst:

Autosampler Location: 29
Date Collected: 6/5/2008 3:31:59 PM
Data Type: Original

Replicate Data: K0804253-004

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.242 | 2.242 | 0.054 | 0.286 | 0.062 | | | 15:32:22 | Yes |
| 2 | 2.213 | 2.213 | 0.053 | 0.289 | 0.061 | | | 15:32:57 | Yes |
| 3 | 2.130 | 2.130 | 0.051 | 0.272 | 0.059 | | | 15:33:34 | Yes |
| Mean: | 2.195 | 2.195 | 0.053 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 2.653 | 2.653 | 2.65 | | | | | | |

Sequence No.: 37
Sample ID: K0804253-004A 1/5
Analyst:

Autosampler Location: 30
Date Collected: 6/5/2008 3:34:26 PM
Data Type: Original

Replicate Data: K0804253-004A

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.436 | 7.436 | 0.179 | 0.907 | 0.187 | | | 15:34:50 | Yes |
| 2 | 7.350 | 7.350 | 0.177 | 0.891 | 0.185 | | | 15:35:24 | Yes |
| 3 | 7.312 | 7.312 | 0.176 | 0.864 | 0.184 | | | 15:35:59 | Yes |
| Mean: | 7.366 | 7.366 | 0.177 | | | | | | |
| SD: | 0.064 | 0.064 | 0.0015 | | | | | | |
| %RSD: | 0.863 | 0.863 | 0.86 | | | | | | |

Sequence No.: 38
Sample ID: K0804253-005 1/5
Analyst:

Autosampler Location: 31
Date Collected: 6/5/2008 3:36:51 PM
Data Type: Original

Replicate Data: K0804253-005

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.422 | 2.422 | 0.058 | 0.328 | 0.066 | | | 15:37:15 | Yes |
| 2 | 2.227 | 2.227 | 0.054 | 0.273 | 0.062 | | | 15:37:49 | Yes |
| 3 | 2.212 | 2.212 | 0.053 | 0.276 | 0.061 | | | 15:38:23 | Yes |
| Mean: | 2.287 | 2.287 | 0.055 | | | | | | |
| SD: | 0.117 | 0.117 | 0.0028 | | | | | | |
| %RSD: | 5.126 | 5.126 | 5.13 | | | | | | |

Sequence No.: 39
Sample ID: K0804253-005A 1/5
Analyst:

Autosampler Location: 32
Date Collected: 6/5/2008 3:39:16 PM
Data Type: Original

Replicate Data: K0804253-005A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.647 | 7.647 | 0.184 | 0.894 | 0.192 | | | 15:39:36 | Yes |
| 2 | 7.197 | 7.197 | 0.173 | 0.855 | 0.181 | | | 15:40:11 | Yes |
| 3 | 7.215 | 7.215 | 0.173 | 0.856 | 0.182 | | | 15:40:45 | Yes |
| Mean: | 7.353 | 7.353 | 0.177 | | | | | | |
| SD: | 0.255 | 0.255 | 0.0061 | | | | | | |
| %RSD: | 3.470 | 3.470 | 3.47 | | | | | | |

Sequence No.: 40
Sample ID: K0804253-006 1/5
Analyst:

Autosampler Location: 33
Date Collected: 6/5/2008 3:41:34 PM
Data Type: Original

Replicate Data: K0804253-006

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.421 | 6.421 | 0.154 | 0.768 | 0.162 | | | 15:41:54 | Yes |
| 2 | 6.489 | 6.489 | 0.156 | 0.762 | 0.164 | | | 15:42:29 | Yes |
| 3 | 6.226 | 6.226 | 0.150 | 0.747 | 0.158 | | | 15:43:03 | Yes |
| Mean: | 6.379 | 6.379 | 0.153 | | | | | | |
| SD: | 0.136 | 0.136 | 0.0033 | | | | | | |
| %RSD: | 2.138 | 2.138 | 2.14 | | | | | | |

Sequence No.: 41
Sample ID: K0804253-006A 1/5
Analyst:

Autosampler Location: 34
Date Collected: 6/5/2008 3:43:51 PM
Data Type: Original

Replicate Data: K0804253-006A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 11.00 | 11.00 | 0.264 | 1.305 | 0.272 | | | 15:44:12 | Yes |
| 2 | 10.58 | 10.58 | 0.254 | 1.268 | 0.262 | | | 15:44:47 | Yes |
| 3 | 10.52 | 10.52 | 0.253 | 1.272 | 0.261 | | | 15:45:20 | Yes |
| Mean: | 10.70 | 10.70 | 0.257 | | | | | | |
| SD: | 0.260 | 0.260 | 0.0062 | | | | | | |
| %RSD: | 2.428 | 2.428 | 2.43 | | | | | | |

Sequence No.: 42

Autosampler Location: 35

Sample ID: K0804253-007 1/5
Analyst:

Date Collected: 6/5/2008 3:46:09 PM
Data Type: Original

Replicate Data: K0804253-007

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.621 | 3.621 | 0.087 | 0.452 | 0.095 | | | 15:46:30 | Yes |
| 2 | 3.483 | 3.483 | 0.084 | 0.429 | 0.092 | | | 15:47:04 | Yes |
| 3 | 3.622 | 3.622 | 0.087 | 0.439 | 0.095 | | | 15:47:39 | Yes |
| Mean: | 3.575 | 3.575 | 0.086 | | | | | | |
| SD: | 0.080 | 0.080 | 0.0019 | | | | | | |
| %RSD: | 2.234 | 2.234 | 2.23 | | | | | | |

Sequence No.: 43
Sample ID: K0804253-007A 1/5
Analyst:

Autosampler Location: 36
Date Collected: 6/5/2008 3:48:28 PM
Data Type: Original

Replicate Data: K0804253-007A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.820 | 8.820 | 0.212 | 1.037 | 0.220 | | | 15:48:50 | Yes |
| 2 | 8.543 | 8.543 | 0.205 | 1.016 | 0.213 | | | 15:49:24 | Yes |
| 3 | 8.589 | 8.589 | 0.206 | 1.012 | 0.215 | | | 15:49:58 | Yes |
| Mean: | 8.651 | 8.651 | 0.208 | | | | | | |
| SD: | 0.148 | 0.148 | 0.0036 | | | | | | |
| %RSD: | 1.715 | 1.715 | 1.72 | | | | | | |

Sequence No.: 44
Sample ID: K0804253-008 1/5
Analyst:

Autosampler Location: 37
Date Collected: 6/5/2008 3:50:47 PM
Data Type: Original

Replicate Data: K0804253-008

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.554 | 8.554 | 0.206 | 0.977 | 0.214 | | | 15:51:09 | Yes |
| 2 | 7.887 | 7.887 | 0.190 | 0.934 | 0.198 | | | 15:51:43 | Yes |
| 3 | 7.879 | 7.879 | 0.189 | 0.931 | 0.197 | | | 15:52:17 | Yes |
| Mean: | 8.106 | 8.106 | 0.195 | | | | | | |
| SD: | 0.387 | 0.387 | 0.0093 | | | | | | |
| %RSD: | 4.779 | 4.779 | 4.78 | | | | | | |

Sequence No.: 45
Sample ID: K0804253-008A 1/5
Analyst:

Autosampler Location: 38
Date Collected: 6/5/2008 3:53:07 PM
Data Type: Original

Replicate Data: K0804253-008A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 12.28 | 12.28 | 0.295 | 1.461 | 0.303 | | | 15:53:29 | Yes |
| 2 | 12.04 | 12.04 | 0.289 | 1.422 | 0.297 | | | 15:54:03 | Yes |
| 3 | 12.15 | 12.15 | 0.292 | 1.453 | 0.300 | | | 15:54:37 | Yes |
| Mean: | 12.15 | 12.15 | 0.292 | | | | | | |
| SD: | 0.121 | 0.121 | 0.0029 | | | | | | |
| %RSD: | 0.997 | 0.997 | 1.00 | | | | | | |

Sequence No.: 46
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/5/2008 3:55:27 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.70 | 10.70 | 0.257 | 1.239 | 0.265 | | | 15:55:49 | Yes |
| 2 | 9.911 | 9.911 | 0.238 | 1.179 | 0.246 | | | 15:56:24 | Yes |
| 3 | 9.954 | 9.954 | 0.239 | 1.178 | 0.247 | | | 15:56:58 | Yes |
| Mean: | 10.19 | 10.19 | 0.245 | | | | | | |
| SD: | 0.444 | 0.444 | 0.0107 | | | | | | |
| %RSD: | 4.363 | 4.363 | 4.36 | | | | | | |

QC value within limits for Se 196.03 Recovery = 101.89%

All analyte(s) passed QC.

Sequence No.: 47

Autosampler Location: 1

Sample ID: CCB

Date Collected: 6/5/2008 3:57:50 PM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.215 | 0.215 | 0.005 | 0.061 | 0.013 | | | 15:58:11 | Yes |
| 2 | 0.140 | 0.140 | 0.003 | 0.050 | 0.012 | | | 15:58:45 | Yes |
| 3 | 0.084 | 0.084 | 0.002 | 0.047 | 0.010 | | | 15:59:19 | Yes |
| Mean: | 0.146 | 0.146 | 0.004 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0016 | | | | | | |
| %RSD: | 44.65 | 44.65 | 44.65 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 48

Autosampler Location: 39

Sample ID: K0804253-009

Date Collected: 6/5/2008 4:00:08 PM

Analyst:

Data Type: Original

Replicate Data: K0804253-009

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.42 | 10.42 | 0.250 | 1.265 | 0.259 | | | 16:00:30 | Yes |
| 2 | 10.14 | 10.14 | 0.244 | 1.252 | 0.252 | | | 16:01:04 | Yes |
| 3 | 10.20 | 10.20 | 0.245 | 1.246 | 0.253 | | | 16:01:39 | Yes |
| Mean: | 10.25 | 10.25 | 0.246 | | | | | | |
| SD: | 0.147 | 0.147 | 0.0035 | | | | | | |
| %RSD: | 1.432 | 1.432 | 1.43 | | | | | | |

Sequence No.: 49

Autosampler Location: 40

Sample ID: K0804253-009A

Date Collected: 6/5/2008 4:02:28 PM

Analyst:

Data Type: Original

*See dilution log
JB 6/5/08*

Replicate Data: K0804253-009A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 14.02 | 14.02 | 0.337 | 1.729 | 0.345 | | | 16:02:50 | Yes |
| 2 | 13.73 | 13.73 | 0.330 | 1.664 | 0.338 | | | 16:03:25 | Yes |
| 3 | 13.93 | 13.93 | 0.335 | 1.689 | 0.343 | | | 16:03:59 | Yes |
| Mean: | 13.89 | 13.89 | 0.334 | | | | | | |
| SD: | 0.146 | 0.146 | 0.0035 | | | | | | |
| %RSD: | 1.047 | 1.047 | 1.05 | | | | | | |

Sequence No.: 50

Autosampler Location: 41

Sample ID: K0804253-010

Date Collected: 6/5/2008 4:04:50 PM

Analyst:

Data Type: Original

Replicate Data: K0804253-010

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 12.08 | 12.08 | 0.290 | 1.493 | 0.298 | | | 16:05:12 | Yes |
| 2 | 11.87 | 11.87 | 0.285 | 1.432 | 0.293 | | | 16:05:47 | Yes |
| 3 | 12.15 | 12.15 | 0.292 | 1.432 | 0.300 | | | 16:06:20 | Yes |
| Mean: | 12.03 | 12.03 | 0.289 | | | | | | |
| SD: | 0.147 | 0.147 | 0.0035 | | | | | | |
| %RSD: | 1.225 | 1.225 | 1.23 | | | | | | |

See dilutions JB 6/5/08

Sequence No.: 51
Sample ID: K0804253-010A
Analyst:

Autosampler Location: 42
Date Collected: 6/5/2008 4:07:11 PM
Data Type: Original

Replicate Data: K0804253-010A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 15.19 | 15.19 | 0.365 | 1.862 | 0.373 | | | 16:07:33 | Yes |
| 2 | 14.98 | 14.98 | 0.360 | 1.850 | 0.368 | | | 16:08:08 | Yes |
| 3 | 15.17 | 15.17 | 0.365 | 1.844 | 0.373 | | | 16:08:42 | Yes |
| Mean: | 15.11 | 15.11 | 0.363 | | | | | | |
| SD: | 0.114 | 0.114 | 0.0027 | | | | | | |
| %RSD: | 0.754 | 0.754 | 0.75 | | | | | | |

Sequence No.: 52
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/5/2008 4:10:06 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.01 | 10.01 | 0.240 | 1.223 | 0.249 | | | 16:10:29 | Yes |
| 2 | 9.931 | 9.931 | 0.239 | 1.201 | 0.247 | | | 16:11:03 | Yes |
| 3 | 9.992 | 9.992 | 0.240 | 1.185 | 0.248 | | | 16:11:37 | Yes |
| Mean: | 9.977 | 9.977 | 0.240 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 0.411 | 0.411 | 0.41 | | | | | | |

QC value within limits for Se 196.03 Recovery = 99.77%
All analyte(s) passed QC.

Sequence No.: 53
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/5/2008 4:12:29 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.201 | 0.201 | 0.005 | 0.062 | 0.013 | | | 16:12:50 | Yes |
| 2 | 0.070 | 0.070 | 0.002 | 0.041 | 0.010 | | | 16:13:24 | Yes |
| 3 | 0.140 | 0.140 | 0.003 | 0.059 | 0.012 | | | 16:13:58 | Yes |
| Mean: | 0.137 | 0.137 | 0.003 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0016 | | | | | | |
| %RSD: | 47.81 | 47.81 | 47.81 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Analysis Begun

%RSD: 1.353 1.353 1.35

Sequence No.: 62
Sample ID: K0804253-002 1/5A
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:38:47 PM
Data Type: Original

Replicate Data: K0804253-002 1/5A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.13 | 10.13 | 0.243 | 1.261 | 0.252 | | | 16:39:03 | Yes |
| 2 | 10.17 | 10.17 | 0.244 | 1.185 | 0.252 | | | 16:39:38 | Yes |
| 3 | 10.04 | 10.04 | 0.241 | 1.176 | 0.249 | | | 16:40:13 | Yes |
| Mean: | 10.11 | 10.11 | 0.243 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0016 | | | | | | |
| %RSD: | 0.649 | 0.649 | 0.65 | | | | | | |

Sequence No.: 63
Sample ID: CCV
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:41:12 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.29 | 10.29 | 0.247 | 1.251 | 0.256 | | | 16:41:28 | Yes |
| 2 | 10.04 | 10.04 | 0.241 | 1.206 | 0.249 | | | 16:42:03 | Yes |
| 3 | 9.962 | 9.962 | 0.239 | 1.184 | 0.248 | | | 16:42:36 | Yes |
| Mean: | 10.10 | 10.10 | 0.243 | | | | | | |
| SD: | 0.173 | 0.173 | 0.0042 | | | | | | |
| %RSD: | 1.715 | 1.715 | 1.72 | | | | | | |

Sequence No.: 64
Sample ID: CCB
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:43:45 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.008 | 0.008 | 0.000 | 0.031 | 0.008 | | | 16:44:01 | Yes |
| 2 | 0.047 | 0.047 | 0.001 | 0.041 | 0.009 | | | 16:44:36 | Yes |
| 3 | 0.111 | 0.111 | 0.003 | 0.058 | 0.011 | | | 16:45:10 | Yes |
| Mean: | 0.055 | 0.055 | 0.001 | | | | | | |
| SD: | 0.052 | 0.052 | 0.0013 | | | | | | |
| %RSD: | 94.24 | 94.24 | 94.24 | | | | | | |

Sequence No.: 65
Sample ID: K0804253-003 1/5
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:46:11 PM
Data Type: Original

Replicate Data: K0804253-003 1/5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.301 | 4.301 | 0.103 | 0.530 | 0.111 | | | 16:46:27 | Yes |
| 2 | 4.337 | 4.337 | 0.104 | 0.521 | 0.112 | | | 16:47:01 | Yes |
| 3 | 4.283 | 4.283 | 0.103 | 0.545 | 0.111 | | | 16:47:35 | Yes |
| Mean: | 4.307 | 4.307 | 0.103 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 0.639 | 0.639 | 0.64 | | | | | | |

Sequence No.: 66
Sample ID: K0804253-003 1/5A
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:49:04 PM
Data Type: Original

Replicate Data: K0804253-003 1/5A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.921 | 8.921 | 0.214 | 1.065 | 0.223 | | | 16:49:20 | Yes |
| 2 | 9.018 | 9.018 | 0.217 | 1.085 | 0.225 | | | 16:49:54 | Yes |
| 3 | 8.916 | 8.916 | 0.214 | 1.059 | 0.222 | | | 16:50:28 | Yes |
| Mean: | 8.952 | 8.952 | 0.215 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 0.646 | 0.646 | 0.65 | | | | | | |

Sequence No.: 67
Sample ID: K0804253-009 1/5+1/5
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:51:35 PM
Data Type: Original

Replicate Data: K0804253-009 1/5+1/5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.758 | 2.758 | 0.066 | 0.351 | 0.074 | | | 16:51:52 | Yes |
| 2 | 2.692 | 2.692 | 0.065 | 0.326 | 0.073 | | | 16:52:26 | Yes |
| 3 | 2.735 | 2.735 | 0.066 | 0.350 | 0.074 | | | 16:52:59 | Yes |
| Mean: | 2.728 | 2.728 | 0.066 | | | | | | |
| SD: | 0.033 | 0.033 | 0.0008 | | | | | | |
| %RSD: | 1.217 | 1.217 | 1.22 | | | | | | |

Sequence No.: 68
Sample ID: K0804253-009 1/5+1/5A
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:54:12 PM
Data Type: Original

Replicate Data: K0804253-009 1/5+1/5A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.161 | 8.161 | 0.196 | 0.942 | 0.204 | | | 16:54:28 | Yes |
| 2 | 8.413 | 8.413 | 0.202 | 0.922 | 0.210 | | | 16:55:03 | Yes |
| 3 | 7.897 | 7.897 | 0.190 | 0.909 | 0.198 | | | 16:55:37 | Yes |
| Mean: | 8.157 | 8.157 | 0.196 | | | | | | |
| SD: | 0.258 | 0.258 | 0.0062 | | | | | | |
| %RSD: | 3.159 | 3.159 | 3.16 | | | | | | |

Sequence No.: 69
Sample ID: K0804253-010 1/5+1/5
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:56:39 PM
Data Type: Original

Replicate Data: K0804253-010 1/5+1/5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.996 | 2.996 | 0.072 | 0.365 | 0.080 | | | 16:56:55 | Yes |
| 2 | 2.918 | 2.918 | 0.070 | 0.356 | 0.078 | | | 16:57:29 | Yes |
| 3 | 2.816 | 2.816 | 0.068 | 0.331 | 0.076 | | | 16:58:03 | Yes |
| Mean: | 2.910 | 2.910 | 0.070 | | | | | | |
| SD: | 0.090 | 0.090 | 0.0022 | | | | | | |
| %RSD: | 3.107 | 3.107 | 3.11 | | | | | | |

Sequence No.: 70
Sample ID: K0804253-010 1/5+1/5A
Analyst:

Autosampler Location:
Date Collected: 6/5/2008 4:59:07 PM
Data Type: Original

Replicate Data: K0804253-010 1/5+1/5A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.410 | 8.410 | 0.202 | 0.979 | 0.210 | | | 16:59:23 | Yes |
| 2 | 8.151 | 8.151 | 0.196 | 0.949 | 0.204 | | | 16:59:58 | Yes |
| 3 | 8.203 | 8.203 | 0.197 | 0.950 | 0.205 | | | 17:00:32 | Yes |
| Mean: | 8.255 | 8.255 | 0.198 | | | | | | |
| SD: | 0.137 | 0.137 | 0.0033 | | | | | | |
| %RSD: | 1.654 | 1.654 | 1.65 | | | | | | |

=====

Sequence No.: 71

Autosampler Location:

Sample ID: CCV

Date Collected: 6/5/2008 5:01:28 PM

Analyst:

Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.19 | 10.19 | 0.245 | 1.229 | 0.253 | | | 17:01:44 | Yes |
| 2 | 9.941 | 9.941 | 0.239 | 1.194 | 0.247 | | | 17:02:18 | Yes |
| 3 | 11.09 | 11.09 | 0.267 | 1.187 | 0.275 | | | 17:02:52 | Yes |
| Mean: | 10.41 | 10.41 | 0.250 | | | | | | |
| SD: | 0.604 | 0.604 | 0.0145 | | | | | | |
| %RSD: | 5.802 | 5.802 | 5.80 | | | | | | |

=====

Sequence No.: 72

Autosampler Location:

Sample ID: CCB

Date Collected: 6/5/2008 5:04:08 PM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.104 | 0.104 | 0.002 | 0.053 | 0.011 | | | 17:04:24 | Yes |
| 2 | 0.000 | 0.000 | 0.000 | 0.023 | 0.008 | | | 17:04:58 | Yes |
| 3 | 0.033 | 0.033 | 0.001 | 0.056 | 0.009 | | | 17:05:32 | Yes |
| Mean: | 0.046 | 0.046 | 0.001 | | | | | | |
| SD: | 0.053 | 0.053 | 0.0013 | | | | | | |
| %RSD: | 116.0 | 116.0 | 116.03 | | | | | | |

| Sample ID | Conc µg/L | %RSD | Mean Abs | BG Abs | Readings | | | |
|---------------|---|------|----------|--------|----------|---------|----------|----------|
| ~CCV | 32.822 | 0.0 | 0.1970 | 0.0604 | 0.1970 | 0.1970 | /05/2008 | 38:10 PM |
| | QC Test: CCB Concentration 0.124 less than limit | | | | | | | |
| ~CCB | 0.124 | 8.7 | 0.0007 | 0.0172 | 0.0007 | 0.0008 | /05/2008 | 42:00 PM |
| CAL ZERO | 0.000 | 26.9 | 0.0021 | 0.0095 | 0.0025 | 0.0017 | /05/2008 | 49:08 PM |
| STANDARD 1 | 2.000 | 1.9 | 0.0136 | 0.0192 | 0.0135 | 0.0138 | /05/2008 | 52:54 PM |
| STANDARD 2 | 10.000 | 1.0 | 0.0614 | 0.0207 | 0.0610 | 0.0618 | /05/2008 | 56:44 PM |
| STANDARD 3 | 20.000 | 0.7 | 0.1259 | 0.0396 | 0.1265 | 0.1253 | /05/2008 | 00:32 PM |
| STANDARD 4 | 30.000 | 0.4 | 0.1952 | 0.0611 | 0.1947 | 0.1957 | /05/2008 | 04:22 PM |
| | QC Test: Correlation coefficient 0.9997 within 0.9950 limit | | | | | | | |
| STANDARD 5 | 50.000 | 0.5 | 0.3129 | 0.0845 | 0.3119 | 0.3140 | /05/2008 | 08:10 PM |
| | Curve Fit = Linear Origin | | | | | | | |
| | Characteristic Conc = 0.697 µg/L | | | | | | | |
| | r = 0.9997 | | | | | | | |
| | Calculated Conc = 0.333 2.160 9.721 19.935 30.893 49.540 | | | | | | | |
| | Residuals = -0.333 -0.160 0.279 0.065 -0.893 0.460 | | | | | | | |
| | QC Test: ICV recovery 100.8%R - within limits | | | | | | | |
| ~ICV | 25.206 | 0.6 | 0.1592 | 0.0517 | 0.1599 | 0.1586 | /05/2008 | 11:58 PM |
| | QC Test: ICB Concentration -0.060 less than limit | | | | | | | |
| ~ICB | -0.060 | 32.0 | -0.0004 | 0.0129 | -0.0003 | -0.0005 | /05/2008 | 15:48 PM |
| | QC Test: CRDL recovery 103.3%R - within limits | | | | | | | |
| ~CRDL | 2.067 | 0.0 | 0.0131 | 0.0190 | 0.0131 | 0.0131 | /05/2008 | 19:36 PM |
| | QC Test: CCV recovery 102.4%R - within limits | | | | | | | |
| ~CCV | 30.732 | 0.5 | 0.1941 | 0.0593 | 0.1934 | 0.1949 | /05/2008 | 23:24 PM |
| | QC Test: CCB Concentration -0.036 less than limit | | | | | | | |
| ~CCB | -0.036 | >100 | -0.0002 | 0.0148 | 0.0006 | -0.0011 | /05/2008 | 27:14 PM |
| CAL ZERO | 0.000 | 46.6 | 0.0017 | 0.0105 | 0.0023 | 0.0012 | /05/2008 | 13:00 PM |
| STANDARD 1 | 2.000 | 0.1 | 0.0148 | 0.0175 | 0.0148 | 0.0148 | /05/2008 | 16:48 PM |
| STANDARD 2 | 10.000 | 3.8 | 0.0667 | 0.0257 | 0.0649 | 0.0685 | /05/2008 | 20:38 PM |
| STANDARD 3 | 20.000 | 0.6 | 0.1320 | 0.0450 | 0.1314 | 0.1326 | /05/2008 | 24:26 PM |
| STANDARD 4 | 30.000 | 0.4 | 0.2078 | 0.0546 | 0.2072 | 0.2083 | /05/2008 | 28:14 PM |
| | QC Test: Correlation coefficient 0.9996 within 0.9950 limit | | | | | | | |
| STANDARD 5 | 50.000 | 0.1 | 0.3321 | 0.0882 | 0.3324 | 0.3319 | /05/2008 | 32:02 PM |
| | Curve Fit = Linear Origin | | | | | | | |
| | Characteristic Conc = 0.656 µg/L | | | | | | | |
| | r = 0.9996 | | | | | | | |
| | Calculated Conc = 0.257 2.207 9.945 19.685 30.985 49.537 | | | | | | | |
| | Residuals = -0.257 -0.207 0.055 0.315 -0.985 0.463 | | | | | | | |
| | QC Test: ICV recovery 99.1%R - within limits | | | | | | | |
| ~ICV | 24.778 | 1.2 | 0.1661 | 0.0512 | 0.1648 | 0.1675 | /05/2008 | 35:52 PM |
| | QC Test: ICB Concentration 0.045 less than limit | | | | | | | |
| ~ICB | 0.045 | 63.6 | 0.0003 | 0.0093 | 0.0002 | 0.0004 | /05/2008 | 39:40 PM |
| | QC Test: CRDL recovery 108.3%R - within limits | | | | | | | |
| ~CRDL | 2.166 | 1.4 | 0.0145 | 0.0118 | 0.0147 | 0.0144 | /05/2008 | 43:28 PM |
| | QC Test: CCB Concentration -0.124 less than limit | | | | | | | |
| ~CCB | -0.124 | 82.5 | -0.0008 | 0.0225 | -0.0013 | -0.0003 | /05/2008 | 47:18 PM |
| | QC Test: CCV recovery 103.6%R - within limits | | | | | | | |
| ~CCV | 31.072 | 0.8 | 0.2083 | 0.0628 | 0.2071 | 0.2095 | /05/2008 | 51:06 PM |
| K0804142-004 | 2.878 | 0.7 | 0.0193 | 0.0288 | 0.0194 | 0.0192 | /05/2008 | 54:54 PM |
| K0804142-005 | 0.328 | 19.5 | 0.0022 | 0.0194 | 0.0019 | 0.0025 | /05/2008 | 58:42 PM |
| K0804381-001 | 0.405 | 6.6 | 0.0027 | 0.1235 | 0.0026 | 0.0028 | /05/2008 | 02:30 PM |
| K0804381-001A | 20.138 | 0.7 | 0.1350 | 0.1791 | 0.1344 | 0.1357 | /05/2008 | 06:20 PM |
| K0804381-001D | 0.527 | 18.4 | 0.0035 | 0.1253 | 0.0031 | 0.0040 | /05/2008 | 10:10 PM |
| K0804381-001S | 38.684 | 0.1 | 0.2594 | 0.2164 | 0.2593 | 0.2594 | /05/2008 | 14:00 PM |
| K0804579-MB | 0.086 | 54.4 | 0.0006 | 0.0230 | 0.0004 | 0.0008 | /05/2008 | 17:52 PM |

| Sample ID | Conc µg/L | %RSD | Mean Abs | BG Abs | Readings | | | |
|-------------------|--|------|----------|--------|----------|--------|----------|----------|
| LCSW K0804579 | 21.922 | 2.3 | 0.1470 | 0.0577 | 0.1494 | 0.1446 | /05/2008 | 21:44 PM |
| K0804579-001 | 0.230 | 65.2 | 0.0015 | 0.0776 | 0.0023 | 0.0008 | /05/2008 | 25:32 PM |
| K0804579-001A | 20.206 | 3.2 | 0.1355 | 0.1035 | 0.1324 | 0.1386 | /05/2008 | 29:22 PM |
| | QC Test: CCV recovery 103.7%R - within limits | | | | | | | |
| ~CCV | 31.098 | 5.1 | 0.2085 | 0.0645 | 0.2161 | 0.2009 | /05/2008 | 33:10 PM |
| | QC Test: CCB Concentration 0.102 less than limit | | | | | | | |
| ~CCB | 0.102 | >100 | 0.0007 | 0.0165 | 0.0000 | 0.0014 | /05/2008 | 37:02 PM |
| K0804579-001D | 0.014 | >100 | 0.0001 | 0.0643 | 0.0000 | 0.0002 | /05/2008 | 40:50 PM |
| K0804579-001S | 37.653 | 0.6 | 0.2525 | 0.1243 | 0.2514 | 0.2535 | /05/2008 | 44:38 PM |
| K0804579-002 | 0.191 | 95.9 | 0.0013 | 0.0522 | 0.0022 | 0.0004 | /05/2008 | 48:24 PM |
| K0804438-001 | 1.275 | 5.5 | 0.0085 | 0.0335 | 0.0082 | 0.0089 | /05/2008 | 52:12 PM |
| K0804438-001A | 20.387 | 2.6 | 0.1367 | 0.0721 | 0.1342 | 0.1392 | /05/2008 | 55:58 PM |
| K0804142-001 | 3.327 | 3.9 | 0.0223 | 0.0285 | 0.0229 | 0.0217 | /05/2008 | 59:44 PM |
| K0804142-001A | 22.107 | 3.7 | 0.1482 | 0.0633 | 0.1521 | 0.1443 | /05/2008 | 03:30 PM |
| K0804253-001 1/10 | 1.474 | 3.5 | 0.0099 | 0.0229 | 0.0101 | 0.0096 | /05/2008 | 07:16 PM |
| | <i>ex = 1.675</i> | | | | | | | |
| K0804253-001A | 18.986 | 2.0 | 0.1273 | 0.0367 | 0.1291 | 0.1255 | /05/2008 | 11:04 PM |
| K0804253-001S | 7.374 | 2.4 | 0.0494 | 0.0327 | 0.0503 | 0.0486 | /05/2008 | 14:50 PM |
| | <i>LA = 7.225</i> | | | | | | | |
| | QC Test: CCV recovery 99.9%R - within limits | | | | | | | |
| ~CCV | 29.979 | 0.8 | 0.2010 | 0.0550 | 0.1998 | 0.2022 | /05/2008 | 18:38 PM |
| | QC Test: CCB Concentration 0.117 less than limit | | | | | | | |
| ~CCB | 0.117 | >100 | 0.0008 | 0.0176 | 0.0014 | 0.0001 | /05/2008 | 22:30 PM |
| K0804253-001SA | 25.198 | 3.6 | 0.1690 | 0.0556 | 0.1733 | 0.1646 | /05/2008 | 26:18 PM |
| | QC Test: CRDL recovery 110.7%R - within limits | | | | | | | |
| ~CRDL | 2.215 | 3.1 | 0.0149 | 0.0150 | 0.0152 | 0.0145 | /05/2008 | 30:04 PM |
| | QC Test: CCV recovery 99.7%R - within limits | | | | | | | |
| ~CCV | 29.910 | 0.6 | 0.2005 | 0.0538 | 0.1997 | 0.2014 | /05/2008 | 33:54 PM |
| | QC Test: CCB Concentration 0.148 less than limit | | | | | | | |
| ~CCB | 0.148 | 12.9 | 0.0010 | 0.0064 | 0.0009 | 0.0011 | /05/2008 | 37:44 PM |

~70 ppb

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0803855, K0804806, K0804803

Batch QC SR's # _____

Calibration Std. AA1-8-E
Starlims # _____

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

PB + Test

Primary Reviewed by JDB Date 6/9/08

Secondary Reviewed by [Signature] Date 6/9/08

Sample ID: Std 5.0
Analyst:

Date Collected: 6/6/2008 7:17:16 PM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.128 | 0.668 | 0.139 | | | 19:17:39 | Yes |
| 2 | | [5.0] | 0.128 | 0.655 | 0.140 | | | 19:18:14 | Yes |
| 3 | | [5.0] | 0.125 | 0.657 | 0.136 | | | 19:18:48 | Yes |
| Mean: | | [5.0] | 0.127 | | | | | | |
| SD: | | 0.0 | 0.0017 | | | | | | |
| %RSD: | | 0.0 | 1.34 | | | | | | |

Standard number 3 applied. [5.0]
Correlation Coef.: 0.998881 Slope: 0.02528 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 10.0
Analyst:

Autosampler Location: 5
Date Collected: 6/6/2008 7:19:39 PM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10.0] | 0.270 | 1.246 | 0.281 | | | 19:20:01 | Yes |
| 2 | | [10.0] | 0.240 | 1.193 | 0.251 | | | 19:20:35 | Yes |
| 3 | | [10.0] | 0.248 | 1.234 | 0.260 | | | 19:21:09 | Yes |
| Mean: | | [10.0] | 0.253 | | | | | | |
| SD: | | 0.0 | 0.0152 | | | | | | |
| %RSD: | | 0.0 | 6.01 | | | | | | |

Standard number 4 applied. [10.0]
Correlation Coef.: 0.999766 Slope: 0.02527 Intercept: 0.00000

Sequence No.: 6
Sample ID: Std 15.0
Analyst:

Autosampler Location: 6
Date Collected: 6/6/2008 7:22:01 PM
Data Type: Original

Replicate Data: Std 15.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [15.0] | 0.357 | 1.857 | 0.369 | | | 19:22:24 | Yes |
| 2 | | [15.0] | 0.408 | 1.880 | 0.420 | | | 19:22:58 | Yes |
| 3 | | [15.0] | 0.351 | 1.800 | 0.362 | | | 19:23:32 | Yes |
| Mean: | | [15.0] | 0.372 | | | | | | |
| SD: | | 0.0 | 0.0315 | | | | | | |
| %RSD: | | 0.0 | 8.46 | | | | | | |

Standard number 5 applied. [15.0]
Correlation Coef.: 0.999819 Slope: 0.02497 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03

Equation: Linear Through Zero

| ID | Mean Signal (Abs) | Entered Conc. ug/L | Calculated Conc. ug/L | Standard Deviation | %RSD |
|----------|-------------------|--------------------|-----------------------|--------------------|------|
| Cal Blk | 0.0000 | 0 | 0.000 | 0.00 | 28.7 |
| Std 0.5 | 0.0094 | 0.5 | 0.375 | 0.00 | 9.3 |
| Std 1.0 | 0.0228 | 1.0 | 0.913 | 0.00 | 3.0 |
| Std 5.0 | 0.1271 | 5.0 | 5.088 | 0.00 | 1.3 |
| Std 10.0 | 0.2527 | 10.0 | 10.118 | 0.02 | 6.0 |
| Std 15.0 | 0.3721 | 15.0 | 14.898 | 0.03 | 8.5 |

Correlation Coef.: 0.999819 Slope: 0.02497 Intercept: 0.00000

Sequence No.: 7
 Sample ID: ICV
 Analyst:

Autosampler Location: 7
 Date Collected: 6/6/2008 7:24:24 PM
 Data Type: Original

Replicate Data: ICV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.06 | 10.06 | 0.251 | 1.279 | 0.263 | | | 19:24:48 | Yes |
| 2 | 9.958 | 9.958 | 0.249 | 1.369 | 0.260 | | | 19:25:22 | Yes |
| 3 | 9.693 | 9.693 | 0.242 | 1.191 | 0.253 | | | 19:25:56 | Yes |
| Mean: | 9.903 | 9.903 | 0.247 | | | | | | |
| SD: | 0.189 | 0.189 | 0.0047 | | | | | | |
| %RSD: | 1.912 | 1.912 | 1.91 | | | | | | |

QC value within limits for Se 196.03 Recovery = 99.03%

All analyte(s) passed QC.

Sequence No.: 8
 Sample ID: ICB
 Analyst:

Autosampler Location: 1
 Date Collected: 6/6/2008 7:26:49 PM
 Data Type: Original

Replicate Data: ICB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.051 | -0.051 | -0.001 | 0.021 | 0.010 | | | 19:27:10 | Yes |
| 2 | -0.062 | -0.062 | -0.002 | 0.038 | 0.010 | | | 19:27:44 | Yes |
| 3 | -0.159 | -0.159 | -0.004 | 0.032 | 0.007 | | | 19:28:18 | Yes |
| Mean: | -0.091 | -0.091 | -0.002 | | | | | | |
| SD: | 0.060 | 0.060 | 0.0015 | | | | | | |
| %RSD: | 65.85 | 65.85 | 65.85 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 9
 Sample ID: CRA
 Analyst:

Autosampler Location: 2
 Date Collected: 6/6/2008 7:29:07 PM
 Data Type: Original

Replicate Data: CRA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.368 | 0.368 | 0.009 | 0.100 | 0.021 | | | 19:29:29 | Yes |
| 2 | 0.423 | 0.423 | 0.011 | 0.098 | 0.022 | | | 19:30:03 | Yes |
| 3 | 0.341 | 0.341 | 0.009 | 0.088 | 0.020 | | | 19:30:37 | Yes |
| Mean: | 0.377 | 0.377 | 0.009 | | | | | | |
| SD: | 0.042 | 0.042 | 0.0010 | | | | | | |
| %RSD: | 11.00 | 11.00 | 11.00 | | | | | | |

QC value within limits for Se 196.03 Recovery = 75.49%

All analyte(s) passed QC.

Sequence No.: 10
 Sample ID: CCV
 Analyst:

Autosampler Location: 5
 Date Collected: 6/6/2008 7:31:27 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.996 | 9.996 | 0.250 | 1.246 | 0.261 | | | 19:31:50 | Yes |
| 2 | 9.629 | 9.629 | 0.240 | 1.219 | 0.252 | | | 19:32:24 | Yes |
| 3 | 9.467 | 9.467 | 0.236 | 1.192 | 0.248 | | | 19:32:59 | Yes |
| Mean: | 9.697 | 9.697 | 0.242 | | | | | | |

SD: 0.271 0.271 0.0068
%RSD: 2.799 2.799 2.80

QC value within limits for Se 196.03 Recovery = 96.97%
All analyte(s) passed QC.

Sequence No.: 11
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/6/2008 7:33:49 PM
Data Type: Original

Replicate Data: CCB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 12
Sample ID: PBT K0803855
Analyst:

Autosampler Location: 9
Date Collected: 6/6/2008 7:36:07 PM
Data Type: Original

Replicate Data: PBT K0803855

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 13
Sample ID: TORT K0803855 1/2
Analyst:

Autosampler Location: 10
Date Collected: 6/6/2008 7:38:25 PM
Data Type: Original

Replicate Data: TORT K0803855 1/2

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 14
Sample ID: PBT K0804806
Analyst:

Autosampler Location: 11
Date Collected: 6/6/2008 7:40:45 PM
Data Type: Original

Replicate Data: PBT K0804806

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Mean: -0.216 -0.216 -0.005
SD: 0.028 0.028 0.0007
%RSD: 13.05 13.05 13.05

Sequence No.: 15
Sample ID: TORT K0804806 1/2
Analyst:

Autosampler Location: 12
Date Collected: 6/6/2008 7:43:06 PM
Data Type: Original

Replicate Data: TORT K0804806 1/2

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 16
Sample ID: K0804806-001 1/5
Analyst:

Autosampler Location: 13
Date Collected: 6/6/2008 7:45:29 PM
Data Type: Original

Replicate Data: K0804806-001 1/5

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 17
Sample ID: K0804806-001 1/5A
Analyst:

Autosampler Location: 14
Date Collected: 6/6/2008 7:47:51 PM
Data Type: Original

Replicate Data: K0804806-001 1/5A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics. Includes handwritten note 'JS 6/7/08'.

Sequence No.: 18
Sample ID: K0804806-001 1/5D
Analyst:

Autosampler Location: 15
Date Collected: 6/6/2008 7:50:18 PM
Data Type: Original

Replicate Data: K0804806-001 1/5D

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 19
Sample ID: K0804806-001 1/5DA
Analyst:

Autosampler Location: 16
Date Collected: 6/6/2008 7:52:42 PM
Data Type: Original

Replicate Data: K0804806-001 1/5DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.237 | 3.237 | 0.081 | 0.443 | 0.092 | | | 19:53:06 | Yes |
| 2 | 2.885 | 2.885 | 0.072 | 0.402 | 0.083 | | | 19:53:42 | Yes |
| 3 | 2.831 | 2.831 | 0.071 | 0.408 | 0.082 | | | 19:54:16 | Yes |
| Mean: | 2.984 | 2.984 | 0.075 | | | | | | |
| SD: | 0.220 | 0.220 | 0.0055 | | | | | | |
| %RSD: | 7.387 | 7.387 | 7.39 | | | | | | |

Sequence No.: 20
Sample ID: K0804806-001 1/5S
Analyst:

Autosampler Location: 17
Date Collected: 6/6/2008 7:55:09 PM
Data Type: Original

Replicate Data: K0804806-001 1/5S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.798 | 0.798 | 0.020 | 0.156 | 0.031 | | | 19:55:29 | Yes |
| 2 | 0.728 | 0.728 | 0.018 | 0.160 | 0.030 | | | 19:56:04 | Yes |
| 3 | 0.762 | 0.762 | 0.019 | 0.139 | 0.030 | | | 19:56:39 | Yes |
| Mean: | 0.763 | 0.763 | 0.019 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0009 | | | | | | |
| %RSD: | 4.589 | 4.589 | 4.59 | | | | | | |

Sequence No.: 21
Sample ID: K0804806-001 1/5SA
Analyst:

Autosampler Location: 18
Date Collected: 6/6/2008 7:57:27 PM
Data Type: Original

Replicate Data: K0804806-001 1/5SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.742 | 2.742 | 0.068 | 0.432 | 0.080 | | | 19:57:48 | Yes |
| 2 | 2.950 | 2.950 | 0.074 | 0.419 | 0.085 | | | 19:58:22 | Yes |
| 3 | 2.761 | 2.761 | 0.069 | 0.410 | 0.080 | | | 19:58:56 | Yes |
| Mean: | 2.818 | 2.818 | 0.070 | | | | | | |
| SD: | 0.115 | 0.115 | 0.0029 | | | | | | |
| %RSD: | 4.083 | 4.083 | 4.08 | | | | | | |

Sequence No.: 22
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/6/2008 7:59:45 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.694 | 9.694 | 0.242 | 1.187 | 0.253 | | | 20:00:08 | Yes |
| 2 | 9.515 | 9.515 | 0.238 | 1.182 | 0.249 | | | 20:00:43 | Yes |
| 3 | 9.764 | 9.764 | 0.244 | 1.338 | 0.255 | | | 20:01:17 | Yes |
| Mean: | 9.658 | 9.658 | 0.241 | | | | | | |
| SD: | 0.129 | 0.129 | 0.0032 | | | | | | |
| %RSD: | 1.331 | 1.331 | 1.33 | | | | | | |

QC value within limits for Se 196.03 Recovery = 96.58%
All analyte(s) passed QC.

Sequence No.: 23
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/6/2008 8:02:08 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.044 | -0.044 | -0.001 | 0.038 | 0.010 | | | 20:02:29 | Yes |
| 2 | -0.113 | -0.113 | -0.003 | 0.031 | 0.009 | | | 20:03:04 | Yes |
| 3 | -0.167 | -0.167 | -0.004 | 0.030 | 0.007 | | | 20:03:38 | Yes |
| Mean: | -0.108 | -0.108 | -0.003 | | | | | | |
| SD: | 0.062 | 0.062 | 0.0015 | | | | | | |
| %RSD: | 57.19 | 57.19 | 57.19 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 24
Sample ID: K0804806-002 1/5
Analyst:

Autosampler Location: 19
Date Collected: 6/6/2008 8:04:28 PM
Data Type: Original

Replicate Data: K0804806-002 1/5

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.252 | 0.252 | 0.006 | 0.095 | 0.018 | | | 20:04:49 | Yes |
| 2 | 0.240 | 0.240 | 0.006 | 0.087 | 0.017 | | | 20:05:23 | Yes |
| 3 | 0.187 | 0.187 | 0.005 | 0.075 | 0.016 | | | 20:05:57 | Yes |
| Mean: | 0.226 | 0.226 | 0.006 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0009 | | | | | | |
| %RSD: | 15.25 | 15.25 | 15.25 | | | | | | |

Sequence No.: 25
Sample ID: K0804806-002 1/5A
Analyst:

Autosampler Location: 20
Date Collected: 6/6/2008 8:06:46 PM
Data Type: Original

JB
6/9/08

June 5, 2008

Analytical Report for Service Request No: K0804217

Kathy Tegtmeyer
New Fields Environmental
2500 55th Street
Boulder, CO 80301

RE: Se in Tissue

Dear Kathy:

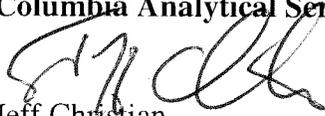
Enclosed are the results of the samples submitted to our laboratory on May 15, 2008. For your reference, these analyses have been assigned our service request number K0804217.

All analyses were performed according to our laboratory's quality assurance program. Where applicable, the methods cited conform to the Methods Update Rule (effective 4/11/2007), which relates to the use of analytical methods for the drinking water and waste water programs. The test results meet requirements of the NELAC standards. Exceptions are noted in the case narrative report where applicable. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3316. You may also contact me via Email at JChristian@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.



Jeff Christian
Laboratory Director

JC/lb

Page 1 of 97

Acronyms

| | |
|------------|--|
| ASTM | American Society for Testing and Materials |
| A2LA | American Association for Laboratory Accreditation |
| CARB | California Air Resources Board |
| CAS Number | Chemical Abstract Service registry Number |
| CFC | Chlorofluorocarbon |
| CFU | Colony-Forming Unit |
| DEC | Department of Environmental Conservation |
| DEQ | Department of Environmental Quality |
| DHS | Department of Health Services |
| DOE | Department of Ecology |
| DOH | Department of Health |
| EPA | U. S. Environmental Protection Agency |
| ELAP | Environmental Laboratory Accreditation Program |
| GC | Gas Chromatography |
| GC/MS | Gas Chromatography/Mass Spectrometry |
| LUFT | Leaking Underground Fuel Tank |
| M | Modified |
| MCL | Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA. |
| MDL | Method Detection Limit |
| MPN | Most Probable Number |
| MRL | Method Reporting Limit |
| NA | Not Applicable |
| NC | Not Calculated |
| NCASI | National Council of the Paper Industry for Air and Stream Improvement |
| ND | Not Detected |
| NIOSH | National Institute for Occupational Safety and Health |
| PQL | Practical Quantitation Limit |
| RCRA | Resource Conservation and Recovery Act |
| SIM | Selected Ion Monitoring |
| TPH | Total Petroleum Hydrocarbons |
| tr | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL. |

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

| Program | Number |
|------------------------|---------------|
| Alaska DEC UST | UST-040 |
| Arizona DHS | AZ0339 |
| Arkansas - DEQ | 88-0637 |
| California DHS | 2286 |
| Colorado DPHE | - |
| Florida DOH | E87412 |
| Hawaii DOH | - |
| Idaho DHW | - |
| Indiana DOH | C-WA-01 |
| Louisiana DEQ | 3016 |
| Louisiana DHH | LA050010 |
| Maine DHS | WA0035 |
| Michigan DEQ | 9949 |
| Minnesota DOH | 053-999-368 |
| Montana DPHHS | CERT0047 |
| Nevada DEP | WA35 |
| New Jersey DEP | WA005 |
| New Mexico ED | - |
| North Carolina DWQ | 605 |
| Oklahoma DEQ | 9801 |
| Oregon - DHS | WA200001 |
| South Carolina DHEC | 61002 |
| Utah DOH | COLU |
| Washington DOE | C1203 |
| Wisconsin DNR | 998386840 |
| Wyoming (EPA Region 8) | - |



Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request No.: K0804217
Date Received: 5/15/08

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Tissue samples were received for analysis at Columbia Analytical Services on 5/15/08. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at -20°C upon receipt at the laboratory.

Total Metals

General Comments:

The samples were freeze-dried to determine moisture and to allow complete homogenization of the dry material. The dried material was milled to a fine meal, and then sub-sampled for digestion. A thorough digestion was performed prior to instrumental analysis to convert all Selenium species to Selenate. Prior to hydride formation, the valence was adjusted by reduction to Selenite.

No anomalies associated with the analysis of these samples were observed.

Approved by _____

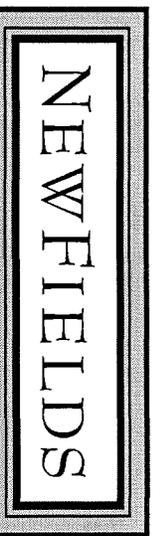


Date _____



Chain of Custody Documentation

Chain of Custody



Project Contact: Sean Covington/Kathy Tegmeyer PO 0442-004-900.70

Courier/Airbill:

Shipped to: Columbia Analytical Services, Inc.

1317 South 13th Ave
Kelso, WA 98626

Telephone: (360) 430-7733

4720 Walnut St., Suite 200

Boulder, CO 80301

Phone: 303-442-0267

Fax: 303-442-3679

K0804217

COC #: 40946

| Sample ID | Sample Date | Sample Time | Matrix | Tox/ Diss | Analysis | Preservative | Lab QC | Comments |
|------------------|-------------|-------------|-------------|--------------|--------------------|--------------|--------|----------|
| SMD408-HL-FT0017 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0018 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0019 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0020 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0021 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0022 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0023 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0024 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0025 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0026 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0027 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0028 | 4/12/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0029 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0030 | 4/13/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0031 | 4/11/2008 | | Fish tissue | tot | selenium, % solids | none | | |
| SMD408-HL-FT0032 | 04/11/08 | | Fish tissue | tot | selenium, % solids | none | | |

Total Number of Containers: 10 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

Sampler Signature: _____

LAB USE ONLY - Sample condition on Receipt

Relinquished by

[Signature]

Date/Time

5/14/08 @ 1430

Received by

[Signature]

Date/Time

5/15/08 1030

**Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form**

PC UH

Client / Project: ENSR / NEWFIELDS Service Request K08 04217
 Received: 5/15/08 Opened: 5/15/08 By: [Signature]

1. Samples were received via? US Mail Fed Ex UPS DHL GH GS PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other _____ NA
3. Were custody seals on coolers? NA N If yes, how many and where? 1 F
- If present, were custody seals intact? Y N If present, were they signed and dated? _____ Y N
4. Is shipper's air-bill filed? If not, record air-bill number: _____ NA N
5. Temperature of cooler(s) upon receipt (°C): 5.6
- Temperature Blank (°C): N/A
6. If applicable, list Chain of Custody Numbers: _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Packing material used. Inserts Baggies Bubble Wrap Gel Packs Wet Ice Sleeves Other _____
9. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? Y N
11. Did all sample labels and tags agree with custody papers? Indicate in the table below. Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles tested* received at the appropriate pH? Indicate in the table below. ~~NA~~ Y N
14. Were VOA vials and I631 Mercury bottles received without headspace? Indicate in the table below. ~~NA~~ Y N
15. Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection? ~~NA~~ Y N
16. Was C12/Res negative? NA Y N

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
| | | | |
| | | | |
| | | | |
| | | | |

| Sample ID | Bottle Count | Bottle Type | Out of Temp | Head-space | Broken | pH | Reagent | Volume added | Reagent Lot Number | Initials |
|-----------|--------------|-------------|-------------|------------|--------|----|---------|--------------|--------------------|----------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |

*Does not include all pH preserved sample aliquots received. See sample receiving SOP (SMO-GEN).
 Additional Notes, Discrepancies, & Resolutions: _____

Total Solids

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0804217
Date Collected: 04/12/08
Date Received: 05/15/08

Solids, Total

Prep Method: NONE
Analysis Method: Freeze Dry
Test Notes:

Units: PERCENT
Basis: Wet

| Sample Name | Lab Code | Date Analyzed | Result | Result Notes |
|------------------|--------------|---------------|--------|--------------|
| SM0408-HL-FT0017 | K0804217-001 | 05/21/08 | 31.9 | |
| SM0408-HL-FT0018 | K0804217-002 | 05/21/08 | 28.6 | |
| SM0408-HL-FT0019 | K0804217-003 | 05/21/08 | 29.4 | |
| SM0408-HL-FT0020 | K0804217-004 | 05/21/08 | 29.8 | |
| SM0408-HL-FT0021 | K0804217-005 | 05/21/08 | 29.2 | |
| SM0408-HL-FT0022 | K0804217-006 | 05/21/08 | 29.1 | |
| SM0408-HL-FT0023 | K0804217-007 | 05/21/08 | 30.4 | |
| SM0408-HL-FT0024 | K0804217-008 | 05/21/08 | 28.7 | |
| SM0408-HL-FT0025 | K0804217-009 | 05/21/08 | 28.4 | |
| SM0408-HL-FT0026 | K0804217-010 | 05/21/08 | 27.6 | |
| SM0408-HL-FT0027 | K0804217-011 | 05/21/08 | 29.3 | |
| SM0408-HL-FT0028 | K0804217-012 | 05/21/08 | 29.1 | |
| SM0408-HL-FT0029 | K0804217-013 | 05/21/08 | 28.1 | |
| SM0408-HL-FT0030 | K0804217-014 | 05/21/08 | 28.8 | |
| SM0408-HL-FT0031 | K0804217-015 | 05/21/08 | 28.6 | |
| SM0408-HL-FT0032 | K0804217-016 | 05/21/08 | 29.4 | |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0804217
Date Collected: 04/12/08
Date Received: 05/15/08
Date Extracted: NA
Date Analyzed: 05/21/08

Duplicate Summary
Total Metals

Sample Name: SM0408-HL-FT0017
Lab Code: K0804217-001D
Test Notes:

Units: PERCENT
Basis: Wet

| Analyte | Prep Method | Analysis Method | Sample Result | Duplicate Sample Result | Average | Relative Percent Difference | Result Notes |
|---------------|-------------|-----------------|---------------|-------------------------|---------|-----------------------------|--------------|
| Solids, Total | NA | Freeze Dry | 31.9 | 32.0 | 31.9 | <1 | |

COLUMBIA ANALYTICAL SERVICES, INC.

Service Request #: K0804217

Analysis For: Freeze Dried Solids

| Lab Code | Wet Weight (g) | Tare (g) | Tare + Dry Wt.(g) | Dry Weight (g) | % Total Solids |
|--------------------|----------------|----------|-------------------|----------------|----------------|
| K0804217-01 | 21.322 | 78.894 | 85.695 | 6.801 | 31.9% |
| -01 | 20.137 | 79.271 | 85.714 | 6.443 | 32.0% |
| -02 | 20.488 | 78.886 | 84.730 | 5.850 | 28.6% |
| -03 | 22.531 | 79.400 | 86.021 | 6.621 | 29.4% |
| -04 | 25.957 | 79.010 | 86.756 | 7.746 | 29.8% |
| -05 | 20.451 | 79.426 | 85.396 | 5.970 | 29.2% |
| -06 | 20.308 | 79.449 | 85.359 | 5.910 | 29.1% |
| -07 | 22.869 | 79.439 | 86.385 | 6.946 | 30.4% |
| -08 | 19.727 | 79.218 | 84.870 | 5.652 | 28.7% |
| -09 | 20.653 | 79.210 | 85.069 | 5.859 | 28.4% |
| -10 | 33.128 | 78.642 | 87.781 | 9.139 | 27.6% |
| -11 | 21.102 | 78.946 | 85.132 | 6.186 | 29.3% |
| -12 | 21.808 | 79.607 | 85.971 | 6.354 | 29.1% |
| -13 | 23.967 | 78.642 | 85.376 | 6.734 | 28.1% |
| -14 | 21.904 | 79.002 | 85.308 | 6.306 | 28.8% |
| -15 | 19.861 | 78.977 | 84.661 | 5.684 | 28.6% |
| ✓ -16 | 20.805 | 79.417 | 85.543 | 6.126 | 29.4% |
| 5/21/08 | | | | | |

Time In: 2:15 Time Out: 2:20 5/22/08
 Comments: 5/21/08 Balance ID: 213

\bar{x} = RPD =

High - Low / Average = RPD

| | |
|---------------------------------|----------------------|
| Analyst: <u>[Signature]</u> | Date: <u>5/21/08</u> |
| Reviewed By: <u>[Signature]</u> | Date: <u>6/5/08</u> |

Metals

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental
Project Name: Se in Tissue
Project No.:

Service Request: K0804217

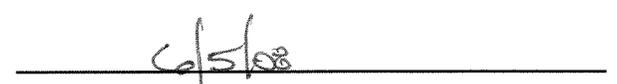
| <u>Sample Name:</u> | <u>Lab Code:</u> |
|--------------------------|----------------------|
| <u>SM0408-HL-FT0017</u> | <u>K0804217-001</u> |
| <u>SM0408-HL-FT0017D</u> | <u>K0804217-001D</u> |
| <u>SM0408-HL-FT0017S</u> | <u>K0804217-001S</u> |
| <u>SM0408-HL-FT0018</u> | <u>K0804217-002</u> |
| <u>SM0408-HL-FT0019</u> | <u>K0804217-003</u> |
| <u>SM0408-HL-FT0020</u> | <u>K0804217-004</u> |
| <u>SM0408-HL-FT0021</u> | <u>K0804217-005</u> |
| <u>SM0408-HL-FT0022</u> | <u>K0804217-006</u> |
| <u>SM0408-HL-FT0023</u> | <u>K0804217-007</u> |
| <u>SM0408-HL-FT0024</u> | <u>K0804217-008</u> |
| <u>SM0408-HL-FT0025</u> | <u>K0804217-009</u> |
| <u>SM0408-HL-FT0026</u> | <u>K0804217-010</u> |
| <u>SM0408-HL-FT0027</u> | <u>K0804217-011</u> |
| <u>SM0408-HL-FT0028</u> | <u>K0804217-012</u> |
| <u>SM0408-HL-FT0029</u> | <u>K0804217-013</u> |
| <u>SM0408-HL-FT0030</u> | <u>K0804217-014</u> |
| <u>SM0408-HL-FT0031</u> | <u>K0804217-015</u> |
| <u>SM0408-HL-FT0032</u> | <u>K0804217-016</u> |
| <u>Method Blank</u> | <u>K0804217-MB</u> |

Comments:

Approved By: _____



Date: _____



Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/12/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0021 Lab Code: K0804217-005

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 05/23/08 | 06/03/08 | 2.33 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/12/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0022 Lab Code: K0804217-006

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 05/23/08 | 06/04/08 | 0.83 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/13/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0025 Lab Code: K0804217-009

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 05/23/08 | 06/04/08 | 1.98 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/13/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0026 Lab Code: K0804217-010

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 05/23/08 | 06/04/08 | 1.34 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/12/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0028 Lab Code: K0804217-012

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.04 | 5.0 | 05/23/08 | 06/04/08 | 1.58 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0804217
Project No.: NA Date Collected: 4/11/08
Project Name: Se in Tissue Date Received: 5/15/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0408-HL-FT0032 Lab Code: K0804217-016

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.09 | 0.05 | 5.0 | 05/23/08 | 06/04/08 | 1.74 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Date Collected:

Project Name: Se in Tissue

Date Received:

Matrix: TISSUE

Units: mg/Kg

Basis: DRY

Sample Name: Method Blank

Lab Code: K0804217-MB

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 05/23/08 | 06/04/08 | 0.05 | U | |

Comments:

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 10.0 | 10.02 | 100 | 10.0 | 9.98 | 100 | 10.40 | 104 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 10.00 | 100 | 10.04 | 100 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 10.26 | 103 | 10.11 | 101 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 9.79 | 98 | 9.85 | 98 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 10.0 | 9.95 | 100 | 10.0 | 9.81 | 98 | 9.50 | 95 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 10.0 | 9.74 | 97 | | | 7742 |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.5 | 0.66 | 132.0 | | | | | |

Metals
- 2b -
CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | | | | True | Found | %R | Found | %R |
| Selenium | 0.5 | 0.55 | 110.0 | | | | | |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | 0.1 | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | B | 0.1 | B | 0.1 | B | 0.1 | B | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | Continuing Calibration Blank (ug/L) | | | | | | Method | |
|----------|-----------------------------|-------------------------------------|-----|---|-----|---|-----|--------|------|
| | | C | 1 | C | 2 | C | 3 | | C |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|-----|---|---|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | 0.1 | U | | | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | B | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 6 -

DUPLICATES

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0408-HL-FT0017D

Lab Code: K0804217-001D

| Analyte | Control Limit | Sample (S) | C | Duplicate (D) | C | RPD | Q | Method |
|----------|---------------|------------|---|---------------|---|-----|---|--------|
| Selenium | 30 | 1.65 | | 1.58 | | 4.3 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Aqueous LCS Source:

Solid LCS Source: NRCC TORT

| Analyte | Aqueous (ug/L) | | | Solid (mg/kg) | | | | | |
|----------|----------------|-------|----|---------------|-------|---|--------|------|------|
| | True | Found | %R | True | Found | C | Limits | %R | |
| Selenium | | | | 5.63 | 4.88 | | 3.97 | 7.56 | 86.7 |

Metals

- 10 -

DETECTION LIMITS

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02

AA ID #:

| Analyte | Wave-length (nm) | Back-ground | MRL ug/L | MDL ug/L | M |
|----------|------------------|-------------|----------|----------|---|
| Selenium | | | 0.2 | 0.1 | H |

Comments: _____

Metals
-13-
PREPARATION LOG

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Method: F

| Sample ID | Preparation Date | Initial Volume | Final Volume (mL) |
|---------------|------------------|----------------|-------------------|
| K0804217-001 | 5/23/08 | 0.3180 | 30.0 |
| K0804217-001D | 5/23/08 | 0.3500 | 30.0 |
| K0804217-001S | 5/23/08 | 0.3250 | 30.0 |
| K0804217-002 | 5/23/08 | 0.3140 | 30.0 |
| K0804217-003 | 5/23/08 | 0.3180 | 30.0 |
| K0804217-004 | 5/23/08 | 0.3470 | 30.0 |
| K0804217-005 | 5/23/08 | 0.3180 | 30.0 |
| K0804217-006 | 5/23/08 | 0.3150 | 30.0 |
| K0804217-007 | 5/23/08 | 0.3250 | 30.0 |
| K0804217-008 | 5/23/08 | 0.3110 | 30.0 |
| K0804217-009 | 5/23/08 | 0.3300 | 30.0 |
| K0804217-010 | 5/23/08 | 0.3160 | 30.0 |
| K0804217-011 | 5/23/08 | 0.3450 | 30.0 |
| K0804217-012 | 5/23/08 | 0.3380 | 30.0 |
| K0804217-013 | 5/23/08 | 0.3220 | 30.0 |
| K0804217-014 | 5/23/08 | 0.3460 | 30.0 |
| K0804217-015 | 5/23/08 | 0.3340 | 30.0 |
| K0804217-016 | 5/23/08 | 0.3220 | 30.0 |
| K0804217-MB | 5/23/08 | 0.3000 | 30.0 |
| LCSS | 5/23/08 | 0.3110 | 30.0 |

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0804217

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 6/3/08

End Date: 6/4/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N |
| ZZZZZZ | 5 | 00:27 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0804217-014 | 5 | 00:29 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 5 | 00:32 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 00:34 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 00:36 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 00:39 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV6 | 1 | 00:41 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB6 | 1 | 00:43 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 5 | 00:46 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV7 | 1 | 00:48 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB7 | 1 | 00:51 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 10 | 00:54 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 5 | 00:56 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0804217-006 | 5 | 00:58 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 5 | 01:01 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0804217-015 | 5 | 01:03 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| K0804217-016 | 5 | 01:06 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| LCSS | 10 | 01:08 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCV8 | 1 | 01:11 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB8 | 1 | 01:14 | | | | | | | | | | | | | | | | | | | X | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Columbia Analytical Services
Metals Tissue Digestion Sheet

Service Request Number(s): K0804217

Star Lims Run No.: _____ Analysis for: ICP - ICP-MS GFAA
Method: Tissue 1015100 other: Se hydride

| Sample | Initial Weight (g) | freeze Dry | Wet | Final Volume (ml) | Matrix |
|-------------|--------------------|------------|-----|-------------------|---------|
| WB Tort | 0.311 | | X | 30mls | 5% HNO3 |
| K0804217-01 | 0.318 | X | | | |
| - 01b | 0.350 | | | | |
| - 01s | 0.325 | | | | |
| - 02 | 0.314 | | | | |
| - 03 | 0.318 | | | | |
| - 04 | 0.347 | | | | |
| - 05 | 0.318 | | | | |
| - 06 | 0.315 | | | | |
| - 07 | 0.325 | | | | |
| - 08 | 0.311 | | | | |
| - 09 | 0.330 | | | | |
| - 10 | 0.316 | | | | |
| - 11 | 0.345 | | | | |
| - 12 | 0.338 | | | | |
| - 13 | 0.322 | | | | |
| - 14 | 0.346 | | | | |
| - 15 | 0.334 | | | | |
| - 16 | 0.322 | | | | |

~~LAB 5/23/08~~

Time Digestion Started: 4:00p.m. 5/23/08 Oven Temp: 97°C Time Digestion Ended: 11:30a.m. 5/23/08

Lot # Acids Used: HNO3 MS11-64C

Oven Temp: 99°C

LCS: Dorm-2, Dolt-3

Balance I.D.: 21-B

- QCP CICV-1, MET1-63-A, _____ mls. added
- QCP CICV-2, MET1-63-B, _____ mls. added
- QCP CICV-3, MET1-63-C, _____ mls. Added
- SS6, MET1-65-F, _____ mls. Added

SPIKE INFO

- SS1-MET1-65-D, _____ mls added
- SS5-MET1-63-E, _____ mls added
- SS6-MET1-65-F, _____ mls added

Additional spikes: _____

Comments: +0.3 mls SS4-MET1-63-D

| | |
|-----------------------------|---------------------|
| Analyst <u>Angela Black</u> | Date <u>5/23/08</u> |
| Reviewer <u>EMA</u> | Date <u>6/4/08</u> |

TissueDig.xls
3/28/2008

Service Request # K08054217
 Q.C. Sample # K0804217-1

Circle type of digest: GFAA ICP FAA ICP-MS Other: Schuynde AB, 5/23/08
 Circle type of sample: Soil Water Misc. Sludge Oil Other: _____

| Solution Name | Element | mLs of 1000ppm Solution | Final Volume | Solution Conc. mg/L | Enter mLs Added |
|------------------------|-------------------|-------------------------|--------------|---------------------|-----------------|
| SS1-MET1-65-D | HNO3 | 50.0 | 1000ml | - | |
| | Al | 100 | 1000ml | 200 | |
| | Ag | 100 | 1000ml | 5 | |
| | Ba | 100 | 1000ml | 200 | |
| | Be | 100 | 1000ml | 5 | |
| | Cd | 100 | 1000ml | 5 | |
| | Co | 100 | 1000ml | 50 | |
| | Cr | 100 | 1000ml | 20 | |
| | Cu | 100 | 1000ml | 25 | |
| | Fe | 100 | 1000ml | 100 | |
| | Pb | 100 | 1000ml | 50 | |
| | Mn | 100 | 1000ml | 50 | |
| | Ni | 100 | 1000ml | 50 | |
| | Sb | 50* | 1000ml | 50 | |
| V | 100 | 1000ml | 50 | | |
| Zn | 100 | 1000ml | 50 | | |
| SS4-MET1-63-D | HNO3 | 25.0 | 500ml | - | |
| | As | 2.0 | 500ml | 4 | |
| | Cd | 2.0 | 500ml | 4 | |
| | Pb | 2.0 | 500ml | 4 | |
| | Se | 2.0 | 500ml | 4 | |
| | Tl | 2.0 | 500ml | 4 | |
| | Cu | 2.0 | 500ml | 4 | |
| SS5-MET1-66-A | HNO3 | 25.0 | 500ml | - | |
| | As | 50.0 | 500ml | 100 | |
| | Se | 50.0 | 500ml | 100 | |
| | Tl | 50.0 | 500ml | 100 | |
| SS6-MET1-65-F | HNO3 | 25 | 500ml | - | |
| | B | 50 | 500ml | 100 | |
| | Mo | 50 | 500ml | 100 | |
| SS7-AA1-8-G | HNO3 | 10.0 | 200ml | - | |
| | K | 20 | 200ml | 1000 | |
| | Na | 20 | 200ml | 1000 | |
| | Mg | 20 | 200ml | 1000 | |
| | Ca | 20 | 200ml | 1000 | |
| GFLCSW (MET1-64-R) | HNO3 | 10.0 | 1000ml | - | |
| | As, Pb, Se, Tl | 5.0 | 1000ml | 2.5 | |
| | Cd | - | - | 1.25 | |
| | Cu | 2.5 | 1000ml | 2.5 | |
| QCP-CICV-1 (MET1-63-A) | Ca, Mg, Na, K | no dilution | - | 2500 | |
| | Al, Ba | no dilution | - | 1000 | |
| | Fe | no dilution | - | 500 | |
| | Co, Mn, Ni, V, Zn | no dilution | - | 250 | |
| | Cu, Ag | no dilution | - | 125 | |
| | Cr | no dilution | - | 100 | |
| | Be | no dilution | - | 25 | |
| QCP-CICV-2 (MET1-63-B) | Sb | no dilution | - | 500 | |
| QCP-CICV-3 (MET1-63-C) | As, Pb, Se, Tl | no dilution | - | 500 | |
| | Cd | no dilution | - | 250 | |

Expires: 4/1/09

Expires: 7/1/08

Expires: 8/1/08

Expires: 9/26/08

Expires: 8/2/08

Expires: 1/1/09

Expires: 1/1/09

Expires: 1/1/09

Expires: 1/1/09

* Denotes volume of 1000 ppm stock standard.

| Standard | mils of standard | ppm | Logbook # | Exp. Date |
|----------|------------------|-----|-----------|-----------|
| | | | | |
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| | | | | |

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0804217, Tissue MDL'S

Batch QC SR's # _____

Calibration Std. AA1-8-E

Starlims # 116567

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

Report → 0.2 @ inst

Primary Reviewed by JDB Date 6/4/08

Secondary Reviewed by *[Signature]* Date 6/4/08

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|---------------------------|-----------------|-------------------|--|--------------------------------|
| ICV | - | 10.020 | 100% | |
| ICB | - | 0.122 | | |
| CRA | - | 0.657 | 131% | |
| CCV | - | 9.980 | 100% | |
| CCB | - | 0.106 | | |
| MDL-1 | 1/5 | 0.641 | | |
| MDL-2 | 1/5 | 0.623 | | |
| MDL-3 | 1/5 | 0.580 | | |
| MDL-4 | 1/5 | 0.849 | | |
| MDL-5 | 1/5 | 0.787 | | |
| MDL-6 | 1/5 | 0.837 | | |
| MDL-7 | 1/5 | 0.807 | | |
| MDL-8 | 1/5 | 0.784 | | |
| MDL-9 | 1/5 | 0.833 | | |
| MDL-10 | 1/5 | 0.805 | | |
| CCV | - | 10.395 | 104% | |
| CCB | - | 0.104 | | |
| MDL-CHK 1/2 | 1/5 | 0.719 | | |
| MDL-CHK 1/4 | 1/5 | 0.660 | | |
| PBT K0804217 | 1/5 | 0.695 | | 2MA 4/5/08 |
| K0804217 TORT | 1/5 | 8.816 | | JB 4/1/08 |
| K0804217 TORTA | 1/5 | 12.150 | 67% | Redilute Not Needed |
| K0804217-001 | 1/5 | 2.802 | | |
| K0804217-001A | 1/5 | 6.817 | 80% | C _x = 3.503 |
| K0804217-001D | 1/5 | 2.879 | | |
| K0804217-001DA | 1/5 | 6.778 | 78% | C _x = 3.691 |
| K0804217-001S | 1/5 | 8.726 | 96% | C _x = 11.187 |
| CCV | - | 10.003 | 100% | |
| CCB | - | 0.110 | | |
| K0804217-001SA | 1/5 | 12.627 | 78% | C _x =11.187 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

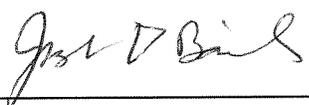
| | | |
|---------------------------------|------------------------|--------------------------|
| Analyst <i>Jose D. Baird</i> | Date: <i>4/4/08</i> | Page Number: <i>1</i> |
|---------------------------------|------------------------|--------------------------|

COLUMBIA ANALYTICAL SERVICES, INC.
GFAA Run Log

| | |
|---|----------------------------|
| Method: (Circle Method Used) (7742) 7062 Other: _____ Element: As <u>Se</u> | Service Request # : |
|---|----------------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------------|-----------------|------------------|--|------------------------------|
| K0804217-002 | 1/5 | 3.394 | | 4-6/5/08 Cx = 7.426 4.242 |
| K0804217-002A | 1/5 | 7.372 | 80% | Cx = 7.426 JB 6/4/08 |
| K0804217-003 | 1/5 | 2.316 | | Cx = 5.263 |
| K0804217-003A | 1/5 | 7.109 | | RERUN HIGH RSD |
| K0804217-004 | 1/5 | 2.631 | | JB 6/4/08 |
| K0804217-004A | 1/5 | 6.815 | 84% | Cx=3.144 |
| K0804217-005 | 1/5 | 3.209 | | |
| K0804217-005A | 1/5 | 6.455 | 65% | Cx=4.943 |
| K0804217-006 | 1/5 | 2.190 | | RERUN HIGH RSD |
| CCV | - | 10.037 | 100% | JB 6/4/08 |
| CCB | - | 0.008 | | |
| K0804217-006A | 1/5 | 6.666 | 99% | |
| K0804217-007 | 1/5 | 3.462 | | |
| K0804217-007A | 1/5 | 6.992 | 71% | Cx=4.904 |
| K0804217-008 | 1/5 | 2.955 | | |
| K0804217-008A | 1/5 | 6.764 | 76% | Cx=3.879 |
| K0804217-009 | 1/5 | 2.237 | | |
| K0804217-009A | 1/5 | 4.800 | 51% | Cx=4.364 |
| K0804217-010 | 1/5 | 1.811 | | Cx = 2.829 |
| K0804217-010A | 1/5 | 5.588 | | RERUN HIGH RSD |
| K0804217-011 | 1/5 | 2.822 | | JB 6/4/08 |
| CCV | - | 10.256 | 102% | |
| CCB | - | 0.066 | | |
| K0804217-011A | 1/5 | 4.725 | 38% | Cx=7.426 |
| K0804217-012 | 1/5 | 1.911 | | |
| K0804217-012A | 1/5 | 4.601 | 54% | Cx=3.550 |
| K0804217-013 | 1/5 | 2.583 | | |
| K0804217-013A | 1/5 | 5.697 | 62% | Cx=4.147 |
| K0804217-014 | 1/5 | 2.579 | | |
| K0804217-014A | 1/5 | 5.701 | 62% | Cx=4.129 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|---|------------------------|--------------------------|
| Analyst  | Date: 6/4/08 | Page Number: 2 |
|---|------------------------|--------------------------|

Sample ID: Std 5.0
Analyst:

Date Collected: 6/3/2008 10:04:04 PM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.128 | 0.596 | 0.135 | | | 22:04:26 | Yes |
| 2 | | [5.0] | 0.126 | 0.589 | 0.133 | | | 22:05:00 | Yes |
| 3 | | [5.0] | 0.126 | 0.594 | 0.133 | | | 22:05:35 | Yes |
| Mean: | | [5.0] | 0.127 | | | | | | |
| SD: | | 0.0 | 0.0009 | | | | | | |
| %RSD: | | 0.0 | 0.73 | | | | | | |

Standard number 3 applied. [5.0]
Correlation Coef.: 0.999626 Slope: 0.02547 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 10.0
Analyst:

Autosampler Location: 5
Date Collected: 6/3/2008 10:06:26 PM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10.0] | 0.232 | 1.091 | 0.238 | | | 22:06:48 | Yes |
| 2 | | [10.0] | 0.230 | 1.068 | 0.237 | | | 22:07:23 | Yes |
| 3 | | [10.0] | 0.230 | 1.068 | 0.237 | | | 22:07:57 | Yes |
| Mean: | | [10.0] | 0.231 | | | | | | |
| SD: | | 0.0 | 0.0009 | | | | | | |
| %RSD: | | 0.0 | 0.37 | | | | | | |

Standard number 4 applied. [10.0]
Correlation Coef.: 0.998093 Slope: 0.02362 Intercept: 0.00000

Sequence No.: 6
Sample ID: Std 15.0
Analyst:

Autosampler Location: 6
Date Collected: 6/3/2008 10:08:48 PM
Data Type: Original

Replicate Data: Std 15.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [15.0] | 0.336 | 1.622 | 0.343 | | | 22:09:11 | Yes |
| 2 | | [15.0] | 0.335 | 1.570 | 0.342 | | | 22:09:46 | Yes |
| 3 | | [15.0] | 0.335 | 1.566 | 0.342 | | | 22:10:20 | Yes |
| Mean: | | [15.0] | 0.335 | | | | | | |
| SD: | | 0.0 | 0.0007 | | | | | | |
| %RSD: | | 0.0 | 0.20 | | | | | | |

Standard number 5 applied. [15.0]
Correlation Coef.: 0.998464 Slope: 0.02282 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03

Equation: Linear Through Zero

| ID | Mean Signal (Abs) | Entered Conc. ug/L | Calculated Conc. ug/L | Standard Deviation | %RSD |
|----------|-------------------|--------------------|-----------------------|--------------------|------|
| Cal Blk | 0.0000 | 0 | 0.000 | 0.00 | 5.6 |
| Std 0.5 | 0.0145 | 0.5 | 0.636 | 0.00 | 3.0 |
| Std 1.0 | 0.0270 | 1.0 | 1.184 | 0.00 | 3.8 |
| Std 5.0 | 0.1268 | 5.0 | 5.556 | 0.00 | 0.7 |
| Std 10.0 | 0.2308 | 10.0 | 10.113 | 0.00 | 0.4 |
| Std 15.0 | 0.3353 | 15.0 | 14.692 | 0.00 | 0.2 |

Correlation Coef.: 0.998464 Slope: 0.02282 Intercept: 0.00000

Sequence No.: 7
 Sample ID: ICV
 Analyst:

Autosampler Location: 7
 Date Collected: 6/3/2008 10:11:11 PM
 Data Type: Original

Replicate Data: ICV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.05 | 10.05 | 0.229 | 1.094 | 0.236 | | | 22:11:35 | Yes |
| 2 | 10.00 | 10.00 | 0.228 | 1.056 | 0.235 | | | 22:12:09 | Yes |
| 3 | 10.01 | 10.01 | 0.228 | 1.050 | 0.235 | | | 22:12:43 | Yes |
| Mean: | 10.02 | 10.02 | 0.229 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0006 | | | | | | |
| %RSD: | 0.268 | 0.268 | 0.27 | | | | | | |

QC value within limits for Se 196.03 Recovery = 100.20%
 All analyte(s) passed QC.

Sequence No.: 8
 Sample ID: ICB
 Analyst:

Autosampler Location: 1
 Date Collected: 6/3/2008 10:13:37 PM
 Data Type: Original

Replicate Data: ICB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.178 | 0.178 | 0.004 | 0.042 | 0.011 | | | 22:13:58 | Yes |
| 2 | 0.110 | 0.110 | 0.003 | 0.019 | 0.009 | | | 22:14:32 | Yes |
| 3 | 0.078 | 0.078 | 0.002 | 0.040 | 0.008 | | | 22:15:06 | Yes |
| Mean: | 0.122 | 0.122 | 0.003 | | | | | | |
| SD: | 0.051 | 0.051 | 0.0012 | | | | | | |
| %RSD: | 41.77 | 41.77 | 41.77 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 9
 Sample ID: CRA
 Analyst:

Autosampler Location: 2
 Date Collected: 6/3/2008 10:15:56 PM
 Data Type: Original

Replicate Data: CRA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.639 | 0.639 | 0.015 | 0.093 | 0.021 | | | 22:16:17 | Yes |
| 2 | 0.670 | 0.670 | 0.015 | 0.094 | 0.022 | | | 22:16:51 | Yes |
| 3 | 0.662 | 0.662 | 0.015 | 0.094 | 0.022 | | | 22:17:25 | Yes |
| Mean: | 0.657 | 0.657 | 0.015 | | | | | | |
| SD: | 0.016 | 0.016 | 0.0004 | | | | | | |
| %RSD: | 2.481 | 2.481 | 2.48 | | | | | | |

QC value within limits for Se 196.03 Recovery = 131.40%
 All analyte(s) passed QC.

Sequence No.: 10
 Sample ID: CCV
 Analyst:

Autosampler Location: 5
 Date Collected: 6/3/2008 10:18:15 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.02 | 10.02 | 0.229 | 1.083 | 0.235 | | | 22:18:38 | Yes |
| 2 | 9.949 | 9.949 | 0.227 | 1.058 | 0.234 | | | 22:19:13 | Yes |
| 3 | 9.970 | 9.970 | 0.228 | 1.059 | 0.234 | | | 22:19:47 | Yes |
| Mean: | 9.980 | 9.980 | 0.228 | | | | | | |

SD: 0.037 0.037 0.0008
%RSD: 0.372 0.372 0.37

QC value within limits for Se 196.03 Recovery = 99.80%
All analyte(s) passed QC.

Sequence No.: 11
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/3/2008 10:20:38 PM
Data Type: Original

Replicate Data: CCB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 12
Sample ID: MDL-1
Analyst:

Autosampler Location: 9
Date Collected: 6/3/2008 10:22:55 PM
Data Type: Original

Replicate Data: MDL-1

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 13
Sample ID: MDL-2
Analyst:

Autosampler Location: 10
Date Collected: 6/3/2008 10:25:14 PM
Data Type: Original

Replicate Data: MDL-2

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics. Includes handwritten 'JIS' and '6/4/08'.

Sequence No.: 14
Sample ID: MDL-3
Analyst:

Autosampler Location: 11
Date Collected: 6/3/2008 10:27:32 PM
Data Type: Original

Replicate Data: MDL-3

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Mean: 0.580 0.580 0.013
 SD: 0.048 0.048 0.0011
 %RSD: 8.308 8.308 8.31

Sequence No.: 15
 Sample ID: MDL-4
 Analyst:

Autosampler Location: 12
 Date Collected: 6/3/2008 10:29:52 PM
 Data Type: Original

Replicate Data: MDL-4

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.785 | 0.785 | 0.018 | 0.101 | 0.025 | | | 22:30:15 | Yes |
| 2 | 0.834 | 0.834 | 0.019 | 0.116 | 0.026 | | | 22:30:49 | Yes |
| 3 | 0.927 | 0.927 | 0.021 | 0.124 | 0.028 | | | 22:31:23 | Yes |
| Mean: | 0.849 | 0.849 | 0.019 | | | | | | |
| SD: | 0.072 | 0.072 | 0.0016 | | | | | | |
| %RSD: | 8.502 | 8.502 | 8.50 | | | | | | |

Sequence No.: 16
 Sample ID: MDL-5
 Analyst:

Autosampler Location: 13
 Date Collected: 6/3/2008 10:32:14 PM
 Data Type: Original

Replicate Data: MDL-5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.828 | 0.828 | 0.019 | 0.120 | 0.026 | | | 22:32:37 | Yes |
| 2 | 0.782 | 0.782 | 0.018 | 0.109 | 0.025 | | | 22:33:13 | Yes |
| 3 | 0.751 | 0.751 | 0.017 | 0.106 | 0.024 | | | 22:33:47 | Yes |
| Mean: | 0.787 | 0.787 | 0.018 | | | | | | |
| SD: | 0.039 | 0.039 | 0.0009 | | | | | | |
| %RSD: | 4.922 | 4.922 | 4.92 | | | | | | |

Sequence No.: 17
 Sample ID: MDL-6
 Analyst:

Autosampler Location: 14
 Date Collected: 6/3/2008 10:34:37 PM
 Data Type: Original

Replicate Data: MDL-6

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.916 | 0.916 | 0.021 | 0.136 | 0.028 | | | 22:35:00 | Yes |
| 2 | 0.832 | 0.832 | 0.019 | 0.117 | 0.026 | | | 22:35:34 | Yes |
| 3 | 0.762 | 0.762 | 0.017 | 0.101 | 0.024 | | | 22:36:08 | Yes |
| Mean: | 0.837 | 0.837 | 0.019 | | | | | | |
| SD: | 0.077 | 0.077 | 0.0018 | | | | | | |
| %RSD: | 9.208 | 9.208 | 9.21 | | | | | | |

Sequence No.: 18
 Sample ID: MDL-7
 Analyst:

Autosampler Location: 15
 Date Collected: 6/3/2008 10:37:00 PM
 Data Type: Original

Replicate Data: MDL-7

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.805 | 0.805 | 0.018 | 0.118 | 0.025 | | | 22:37:24 | Yes |
| 2 | 0.827 | 0.827 | 0.019 | 0.122 | 0.026 | | | 22:37:58 | Yes |
| 3 | 0.789 | 0.789 | 0.018 | 0.098 | 0.025 | | | 22:38:32 | Yes |
| Mean: | 0.807 | 0.807 | 0.018 | | | | | | |
| SD: | 0.019 | 0.019 | 0.0004 | | | | | | |
| %RSD: | 2.387 | 2.387 | 2.39 | | | | | | |

Sequence No.: 19
Sample ID: MDL-8
Analyst:

Autosampler Location: 16
Date Collected: 6/3/2008 10:39:23 PM
Data Type: Original

Replicate Data: MDL-8

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.831 | 0.831 | 0.019 | 0.130 | 0.026 | | | 22:39:47 | Yes |
| 2 | 0.763 | 0.763 | 0.017 | 0.103 | 0.024 | | | 22:40:22 | Yes |
| 3 | 0.758 | 0.758 | 0.017 | 0.106 | 0.024 | | | 22:40:56 | Yes |
| Mean: | 0.784 | 0.784 | 0.018 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0009 | | | | | | |
| %RSD: | 5.229 | 5.229 | 5.23 | | | | | | |

Sequence No.: 20
Sample ID: MDL-9
Analyst:

Autosampler Location: 17
Date Collected: 6/3/2008 10:41:49 PM
Data Type: Original

Replicate Data: MDL-9

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.900 | 0.900 | 0.021 | 0.144 | 0.027 | | | 22:42:09 | Yes |
| 2 | 0.780 | 0.780 | 0.018 | 0.101 | 0.024 | | | 22:42:44 | Yes |
| 3 | 0.819 | 0.819 | 0.019 | 0.122 | 0.025 | | | 22:43:19 | Yes |
| Mean: | 0.833 | 0.833 | 0.019 | | | | | | |
| SD: | 0.061 | 0.061 | 0.0014 | | | | | | |
| %RSD: | 7.345 | 7.345 | 7.34 | | | | | | |

Sequence No.: 21
Sample ID: MDL-10
Analyst:

Autosampler Location: 18
Date Collected: 6/3/2008 10:44:08 PM
Data Type: Original

Replicate Data: MDL-10

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.809 | 0.809 | 0.018 | 0.115 | 0.025 | | | 22:44:28 | Yes |
| 2 | 0.838 | 0.838 | 0.019 | 0.123 | 0.026 | | | 22:45:03 | Yes |
| 3 | 0.766 | 0.766 | 0.017 | 0.098 | 0.024 | | | 22:45:39 | Yes |
| Mean: | 0.805 | 0.805 | 0.018 | | | | | | |
| SD: | 0.036 | 0.036 | 0.0008 | | | | | | |
| %RSD: | 4.484 | 4.484 | 4.48 | | | | | | |

Sequence No.: 22
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/3/2008 10:46:28 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.08 | 10.08 | 0.230 | 1.080 | 0.237 | | | 22:46:51 | Yes |
| 2 | 10.66 | 10.66 | 0.243 | 1.087 | 0.250 | | | 22:47:25 | Yes |
| 3 | 10.45 | 10.45 | 0.239 | 1.079 | 0.245 | | | 22:47:59 | Yes |
| Mean: | 10.40 | 10.40 | 0.237 | | | | | | |
| SD: | 0.294 | 0.294 | 0.0067 | | | | | | |
| %RSD: | 2.825 | 2.825 | 2.82 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.95%
All analyte(s) passed QC.

Sequence No.: 23
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/3/2008 10:48:50 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.133 | 0.133 | 0.003 | 0.049 | 0.010 | | | 22:49:11 | Yes |
| 2 | 0.109 | 0.109 | 0.002 | 0.049 | 0.009 | | | 22:49:45 | Yes |
| 3 | 0.071 | 0.071 | 0.002 | 0.044 | 0.008 | | | 22:50:19 | Yes |
| Mean: | 0.104 | 0.104 | 0.002 | | | | | | |
| SD: | 0.031 | 0.031 | 0.0007 | | | | | | |
| %RSD: | 30.05 | 30.05 | 30.05 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 24
Sample ID: MDL-CHK 1/2
Analyst:

Autosampler Location: 19
Date Collected: 6/3/2008 10:51:08 PM
Data Type: Original

Replicate Data: MDL-CHK 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.701 | 0.701 | 0.016 | 0.101 | 0.023 | | | 22:51:29 | Yes |
| 2 | 0.679 | 0.679 | 0.016 | 0.091 | 0.022 | | | 22:52:03 | Yes |
| 3 | 0.776 | 0.776 | 0.018 | 0.120 | 0.024 | | | 22:52:37 | Yes |
| Mean: | 0.719 | 0.719 | 0.016 | | | | | | |
| SD: | 0.051 | 0.051 | 0.0012 | | | | | | |
| %RSD: | 7.042 | 7.042 | 7.04 | | | | | | |

Sequence No.: 25
Sample ID: MDL-CHK 1/4
Analyst:

Autosampler Location: 20
Date Collected: 6/3/2008 10:53:29 PM
Data Type: Original

Replicate Data: MDL-CHK 1/4

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.634 | 0.634 | 0.014 | 0.094 | 0.021 | | | 22:53:50 | Yes |
| 2 | 0.688 | 0.688 | 0.016 | 0.114 | 0.022 | | | 22:54:24 | Yes |
| 3 | 0.659 | 0.659 | 0.015 | 0.104 | 0.022 | | | 22:54:59 | Yes |
| Mean: | 0.660 | 0.660 | 0.015 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0006 | | | | | | |
| %RSD: | 4.104 | 4.104 | 4.10 | | | | | | |

Sequence No.: 26
Sample ID: PBT K0804217
Analyst:

Autosampler Location: 21
Date Collected: 6/3/2008 10:55:48 PM
Data Type: Original

Replicate Data: PBT K0804217

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.663 | 0.663 | 0.015 | 0.088 | 0.022 | | | 22:56:09 | Yes |
| 2 | 0.710 | 0.710 | 0.016 | 0.106 | 0.023 | | | 22:56:44 | Yes |
| 3 | 0.711 | 0.711 | 0.016 | 0.104 | 0.023 | | | 22:57:18 | Yes |
| Mean: | 0.695 | 0.695 | 0.016 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0006 | | | | | | |
| %RSD: | 3.935 | 3.935 | 3.93 | | | | | | |

See run 45 6/5/08

Sequence No.: 27
Sample ID: K0804217 TORT
Analyst:

Autosampler Location: 22
Date Collected: 6/3/2008 10:58:07 PM
Data Type: Original

Replicate Data: K0804217 TORT

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.820 | 8.820 | 0.201 | 1.040 | 0.208 | | | 22:58:29 | Yes |
| 2 | 8.628 | 8.628 | 0.197 | 1.024 | 0.204 | | | 22:59:03 | Yes |
| 3 | 8.999 | 8.999 | 0.205 | 1.067 | 0.212 | | | 22:59:37 | Yes |
| Mean: | 8.816 | 8.816 | 0.201 | | | | | | |
| SD: | 0.186 | 0.186 | 0.0042 | | | | | | |
| %RSD: | 2.109 | 2.109 | 2.11 | | | | | | |

*See dilution
JB 6/4/08*

Sequence No.: 28
Sample ID: K0804217 TORTA
Analyst:

Autosampler Location: 23
Date Collected: 6/3/2008 11:00:27 PM
Data Type: Original

Replicate Data: K0804217 TORTA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 12.21 | 12.21 | 0.279 | 1.429 | 0.285 | | | 23:00:49 | Yes |
| 2 | 12.04 | 12.04 | 0.275 | 1.397 | 0.282 | | | 23:01:23 | Yes |
| 3 | 12.20 | 12.20 | 0.278 | 1.423 | 0.285 | | | 23:01:57 | Yes |
| Mean: | 12.15 | 12.15 | 0.277 | | | | | | |
| SD: | 0.092 | 0.092 | 0.0021 | | | | | | |
| %RSD: | 0.760 | 0.760 | 0.76 | | | | | | |

*JB
6/4/08*

Sequence No.: 29
Sample ID: K0804217-001
Analyst:

Autosampler Location: 24
Date Collected: 6/3/2008 11:02:47 PM
Data Type: Original

Replicate Data: K0804217-001

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.891 | 2.891 | 0.066 | 0.370 | 0.073 | | | 23:03:11 | Yes |
| 2 | 2.784 | 2.784 | 0.064 | 0.338 | 0.070 | | | 23:03:45 | Yes |
| 3 | 2.733 | 2.733 | 0.062 | 0.326 | 0.069 | | | 23:04:19 | Yes |
| Mean: | 2.802 | 2.802 | 0.064 | | | | | | |
| SD: | 0.081 | 0.081 | 0.0018 | | | | | | |
| %RSD: | 2.882 | 2.882 | 2.88 | | | | | | |

Sequence No.: 30
Sample ID: K0804217-001A
Analyst:

Autosampler Location: 25
Date Collected: 6/3/2008 11:05:10 PM
Data Type: Original

Replicate Data: K0804217-001A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.974 | 6.974 | 0.159 | 0.797 | 0.166 | | | 23:05:32 | Yes |
| 2 | 6.796 | 6.796 | 0.155 | 0.762 | 0.162 | | | 23:06:06 | Yes |
| 3 | 6.680 | 6.680 | 0.152 | 0.772 | 0.159 | | | 23:06:40 | Yes |
| Mean: | 6.817 | 6.817 | 0.156 | | | | | | |
| SD: | 0.148 | 0.148 | 0.0034 | | | | | | |
| %RSD: | 2.169 | 2.169 | 2.17 | | | | | | |

Sequence No.: 31
Sample ID: K0804217-001D
Analyst:

Autosampler Location: 26
Date Collected: 6/3/2008 11:07:31 PM
Data Type: Original

Replicate Data: K0804217-001D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.902 | 2.902 | 0.066 | 0.363 | 0.073 | | | 23:07:54 | Yes |
| 2 | 2.877 | 2.877 | 0.066 | 0.358 | 0.072 | | | 23:08:28 | Yes |
| 3 | 2.857 | 2.857 | 0.065 | 0.347 | 0.072 | | | 23:09:03 | Yes |
| Mean: | 2.879 | 2.879 | 0.066 | | | | | | |
| SD: | 0.023 | 0.023 | 0.0005 | | | | | | |
| %RSD: | 0.783 | 0.783 | 0.78 | | | | | | |

Sequence No.: 32
Sample ID: K0804217-001DA
Analyst:

Autosampler Location: 27
Date Collected: 6/3/2008 11:09:54 PM
Data Type: Original

Replicate Data: K0804217-001DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.874 | 6.874 | 0.157 | 0.793 | 0.164 | | | 23:10:17 | Yes |
| 2 | 6.674 | 6.674 | 0.152 | 0.781 | 0.159 | | | 23:10:51 | Yes |
| 3 | 6.786 | 6.786 | 0.155 | 0.778 | 0.162 | | | 23:11:25 | Yes |
| Mean: | 6.778 | 6.778 | 0.155 | | | | | | |
| SD: | 0.100 | 0.100 | 0.0023 | | | | | | |
| %RSD: | 1.481 | 1.481 | 1.48 | | | | | | |

Sequence No.: 33
Sample ID: K0804217-001S
Analyst:

Autosampler Location: 28
Date Collected: 6/3/2008 11:12:16 PM
Data Type: Original

Replicate Data: K0804217-001S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.862 | 8.862 | 0.202 | 1.055 | 0.209 | | | 23:12:39 | Yes |
| 2 | 8.633 | 8.633 | 0.197 | 1.001 | 0.204 | | | 23:13:15 | Yes |
| 3 | 8.684 | 8.684 | 0.198 | 1.001 | 0.205 | | | 23:13:51 | Yes |
| Mean: | 8.726 | 8.726 | 0.199 | | | | | | |
| SD: | 0.120 | 0.120 | 0.0027 | | | | | | |
| %RSD: | 1.377 | 1.377 | 1.38 | | | | | | |

Sequence No.: 34
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/3/2008 11:14:42 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.975 | 9.975 | 0.228 | 1.104 | 0.234 | | | 23:15:05 | Yes |
| 2 | 9.959 | 9.959 | 0.227 | 1.079 | 0.234 | | | 23:15:40 | Yes |
| 3 | 10.08 | 10.08 | 0.230 | 1.076 | 0.237 | | | 23:16:14 | Yes |
| Mean: | 10.00 | 10.00 | 0.228 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0014 | | | | | | |
| %RSD: | 0.632 | 0.632 | 0.63 | | | | | | |

QC value within limits for Se 196.03 Recovery = 100.03%
All analyte(s) passed QC.

Sequence No.: 35
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 6/3/2008 11:17:05 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.195 | 0.195 | 0.004 | 0.067 | 0.011 | | | 23:17:25 | Yes |
| 2 | 0.099 | 0.099 | 0.002 | 0.046 | 0.009 | | | 23:17:59 | Yes |
| 3 | 0.036 | 0.036 | 0.001 | 0.037 | 0.007 | | | 23:18:33 | Yes |
| Mean: | 0.110 | 0.110 | 0.003 | | | | | | |
| SD: | 0.080 | 0.080 | 0.0018 | | | | | | |
| %RSD: | 73.06 | 73.06 | 73.06 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 36
Sample ID: K0804217-001SA
Analyst:

Autosampler Location: 29
Date Collected: 6/3/2008 11:19:23 PM
Data Type: Original

Replicate Data: K0804217-001SA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 12.45 | 12.45 | 0.284 | 1.491 | 0.291 | | | 23:19:46 | Yes |
| 2 | 12.15 | 12.15 | 0.277 | 1.411 | 0.284 | | | 23:20:20 | Yes |
| 3 | 13.28 | 13.28 | 0.303 | 1.465 | 0.310 | | | 23:20:55 | Yes |
| Mean: | 12.63 | 12.63 | 0.288 | | | | | | |
| SD: | 0.583 | 0.583 | 0.0133 | | | | | | |
| %RSD: | 4.616 | 4.616 | 4.62 | | | | | | |

Sequence No.: 37
Sample ID: K0804217-002
Analyst:

Autosampler Location: 30
Date Collected: 6/3/2008 11:21:46 PM
Data Type: Original

Replicate Data: K0804217-002

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.484 | 3.484 | 0.080 | 0.426 | 0.086 | | | 23:22:09 | Yes |
| 2 | 3.437 | 3.437 | 0.078 | 0.401 | 0.085 | | | 23:22:45 | Yes |
| 3 | 3.260 | 3.260 | 0.074 | 0.375 | 0.081 | | | 23:23:19 | Yes |
| Mean: | 3.394 | 3.394 | 0.077 | | | | | | |
| SD: | 0.118 | 0.118 | 0.0027 | | | | | | |
| %RSD: | 3.477 | 3.477 | 3.48 | | | | | | |

Sequence No.: 38
Sample ID: K0804217-002A
Analyst:

Autosampler Location: 31
Date Collected: 6/3/2008 11:24:11 PM
Data Type: Original

Replicate Data: K0804217-002A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.432 | 7.432 | 0.170 | 0.859 | 0.176 | | | 23:24:35 | Yes |
| 2 | 7.244 | 7.244 | 0.165 | 0.818 | 0.172 | | | 23:25:09 | Yes |
| 3 | 7.441 | 7.441 | 0.170 | 0.831 | 0.176 | | | 23:25:43 | Yes |
| Mean: | 7.372 | 7.372 | 0.168 | | | | | | |
| SD: | 0.111 | 0.111 | 0.0025 | | | | | | |
| %RSD: | 1.505 | 1.505 | 1.50 | | | | | | |

Sequence No.: 39
Sample ID: K0804217-003
Analyst:

Autosampler Location: 32
Date Collected: 6/3/2008 11:26:36 PM
Data Type: Original

Replicate Data: K0804217-003

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.323 | 2.323 | 0.053 | 0.308 | 0.060 | | | 23:26:56 | Yes |
| 2 | 2.347 | 2.347 | 0.054 | 0.319 | 0.060 | | | 23:27:30 | Yes |
| 3 | 2.279 | 2.279 | 0.052 | 0.293 | 0.059 | | | 23:28:05 | Yes |
| Mean: | 2.316 | 2.316 | 0.053 | | | | | | |
| SD: | 0.034 | 0.034 | 0.0008 | | | | | | |
| %RSD: | 1.488 | 1.488 | 1.49 | | | | | | |

Sequence No.: 40
 Sample ID: K0804217-003A
 Analyst:

Autosampler Location: 33
 Date Collected: 6/3/2008 11:28:53 PM
 Data Type: Original

Replicate Data: K0804217-003A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.710 | 5.710 | 0.130 | 0.689 | 0.137 | | | 23:29:14 | Yes |
| 2 | 8.422 | 8.422 | 0.192 | 1.210 | 0.199 | | | 23:29:48 | Yes |
| 3 | 7.193 | 7.193 | 0.164 | 0.772 | 0.171 | | | 23:30:22 | Yes |
| Mean: | 7.109 | 7.109 | 0.162 | | | | | | |
| SD: | 1.358 | 1.358 | 0.0310 | | | | | | |
| %RSD: | 19.10 | 19.10 | 19.10 | | | | | | |

*See Run
 JS 6/4/08*

Sequence No.: 41
 Sample ID: K0804217-004
 Analyst:

Autosampler Location: 34
 Date Collected: 6/3/2008 11:31:10 PM
 Data Type: Original

Replicate Data: K0804217-004

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.618 | 2.618 | 0.060 | 0.324 | 0.066 | | | 23:31:31 | Yes |
| 2 | 2.566 | 2.566 | 0.059 | 0.320 | 0.065 | | | 23:32:06 | Yes |
| 3 | 2.708 | 2.708 | 0.062 | 0.318 | 0.068 | | | 23:32:40 | Yes |
| Mean: | 2.631 | 2.631 | 0.060 | | | | | | |
| SD: | 0.072 | 0.072 | 0.0016 | | | | | | |
| %RSD: | 2.733 | 2.733 | 2.73 | | | | | | |

Sequence No.: 42
 Sample ID: K0804217-004A
 Analyst:

Autosampler Location: 35
 Date Collected: 6/3/2008 11:33:29 PM
 Data Type: Original

Replicate Data: K0804217-004A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.961 | 6.961 | 0.159 | 0.791 | 0.166 | | | 23:33:50 | Yes |
| 2 | 6.741 | 6.741 | 0.154 | 1.008 | 0.161 | | | 23:34:24 | Yes |
| 3 | 6.742 | 6.742 | 0.154 | 0.799 | 0.161 | | | 23:34:59 | Yes |
| Mean: | 6.815 | 6.815 | 0.156 | | | | | | |
| SD: | 0.127 | 0.127 | 0.0029 | | | | | | |
| %RSD: | 1.864 | 1.864 | 1.86 | | | | | | |

Sequence No.: 43
 Sample ID: K0804217-005
 Analyst:

Autosampler Location: 36
 Date Collected: 6/3/2008 11:35:49 PM
 Data Type: Original

Replicate Data: K0804217-005

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 1 | 3.308 | 3.308 | 0.075 | 0.406 | 0.082 | 23:36:10 | Yes |
| 2 | 3.258 | 3.258 | 0.074 | 0.390 | 0.081 | 23:36:45 | Yes |
| 3 | 3.061 | 3.061 | 0.070 | 0.357 | 0.077 | 23:37:18 | Yes |
| Mean: | 3.209 | 3.209 | 0.073 | | | | |
| SD: | 0.131 | 0.131 | 0.0030 | | | | |
| %RSD: | 4.070 | 4.070 | 4.07 | | | | |

Sequence No.: 44 Autosampler Location: 37
 Sample ID: K0804217-005A Date Collected: 6/3/2008 11:38:07 PM
 Analyst: Data Type: Original

Replicate Data: K0804217-005A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.658 | 6.658 | 0.152 | 0.793 | 0.159 | | | 23:38:29 | Yes |
| 2 | 6.446 | 6.446 | 0.147 | 0.763 | 0.154 | | | 23:39:03 | Yes |
| 3 | 6.262 | 6.262 | 0.143 | 0.743 | 0.150 | | | 23:39:37 | Yes |
| Mean: | 6.455 | 6.455 | 0.147 | | | | | | |
| SD: | 0.198 | 0.198 | 0.0045 | | | | | | |
| %RSD: | 3.068 | 3.068 | 3.07 | | | | | | |

Sequence No.: 45 Autosampler Location: 38
 Sample ID: K0804217-006 Date Collected: 6/3/2008 11:40:27 PM
 Analyst: Data Type: Original

Replicate Data: K0804217-006

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.010 | 2.010 | 0.046 | 0.272 | 0.053 | | | 23:40:48 | Yes |
| 2 | 1.891 | 1.891 | 0.043 | 0.243 | 0.050 | | | 23:41:23 | Yes |
| 3 | 2.670 | 2.670 | 0.061 | 0.441 | 0.068 | | | 23:41:57 | Yes |
| Mean: | 2.190 | 2.190 | 0.050 | | | | | | |
| SD: | 0.420 | 0.420 | 0.0096 | | | | | | |
| %RSD: | 19.18 | 19.18 | 19.18 | | | | | | |

See Kevin JB 6/4/08

Sequence No.: 46 Autosampler Location: 5
 Sample ID: CCV Date Collected: 6/3/2008 11:42:47 PM
 Analyst: Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.08 | 10.08 | 0.230 | 1.105 | 0.237 | | | 23:43:12 | Yes |
| 2 | 9.919 | 9.919 | 0.226 | 1.050 | 0.233 | | | 23:43:46 | Yes |
| 3 | 10.11 | 10.11 | 0.231 | 1.083 | 0.237 | | | 23:44:20 | Yes |
| Mean: | 10.04 | 10.04 | 0.229 | | | | | | |
| SD: | 0.103 | 0.103 | 0.0023 | | | | | | |
| %RSD: | 1.022 | 1.022 | 1.02 | | | | | | |

QC value within limits for Se 196.03 Recovery = 100.37%
 All analyte(s) passed QC.

Sequence No.: 47 Autosampler Location: 1
 Sample ID: CCB Date Collected: 6/3/2008 11:45:11 PM
 Analyst: Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.767 | 0.767 | 0.018 | 0.220 | 0.024 | | | 23:45:32 | Yes |

JB 6/4/08

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 2 | 0.016 | 0.016 | 0.000 | 0.010 | 0.007 | 23:46:06 | Yes |
| 3 | 0.011 | 0.011 | 0.000 | 0.005 | 0.007 | 23:46:41 | Yes |
| Mean: | 0.265 | 0.265 | 0.006 | | | | |
| SD: | 0.435 | 0.435 | 0.0099 | | | | |
| %RSD: | 164.3 | 164.3 | 164.32 | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.
 User canceled analysis.

JB 6/4/08

=====
Analysis Begun

Logged In Analyst: acqmet10 Technique: AA FIAS-Flame
 Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\ACOMET10\Sample Information\060308-Se3.sif
 Batch ID: 060308-Se
 Results Data Set: 060308-Se3
 Results Library: R:\ICP\WIP\DATA\K-FLAA-02\Results.mdb

=====
 Sequence No.: 47 Autosampler Location: 1
 Sample ID: CCB Date Collected: 6/3/2008 11:47:30 PM
 Analyst: Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.010 | 0.010 | 0.000 | 0.035 | 0.007 | | | 23:47:51 | Yes |
| 2 | 0.021 | 0.021 | 0.000 | 0.030 | 0.007 | | | 23:48:25 | Yes |
| 3 | -0.008 | -0.008 | -0.000 | 0.030 | 0.006 | | | 23:49:00 | Yes |
| Mean: | 0.008 | 0.008 | 0.000 | | | | | | |
| SD: | 0.014 | 0.014 | 0.0003 | | | | | | |
| %RSD: | 190.0 | 190.0 | 189.96 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

=====
 Sequence No.: 48 Autosampler Location: 39
 Sample ID: K0804217-006A Date Collected: 6/3/2008 11:49:48 PM
 Analyst: Data Type: Original

Replicate Data: K0804217-006A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.700 | 6.700 | 0.153 | 0.776 | 0.160 | | | 23:50:10 | Yes |
| 2 | 6.634 | 6.634 | 0.151 | 0.759 | 0.158 | | | 23:50:45 | Yes |
| 3 | 6.663 | 6.663 | 0.152 | 0.764 | 0.159 | | | 23:51:19 | Yes |
| Mean: | 6.666 | 6.666 | 0.152 | | | | | | |
| SD: | 0.033 | 0.033 | 0.0008 | | | | | | |
| %RSD: | 0.494 | 0.494 | 0.49 | | | | | | |

=====
 Sequence No.: 49 Autosampler Location: 40
 Sample ID: K0804217-007 Date Collected: 6/3/2008 11:52:09 PM
 Analyst: Data Type: Original

Replicate Data: K0804217-007

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.677 | 3.677 | 0.084 | 0.430 | 0.091 | | | 23:52:31 | Yes |
| 2 | 3.418 | 3.418 | 0.078 | 0.419 | 0.085 | | | 23:53:06 | Yes |
| 3 | 3.291 | 3.291 | 0.075 | 0.402 | 0.082 | | | 23:53:42 | Yes |
| Mean: | 3.462 | 3.462 | 0.079 | | | | | | |

SD: 0.197 0.197 0.0045
 %RSD: 5.681 5.681 5.68

Sequence No.: 50
 Sample ID: K0804217-007A
 Analyst:

Autosampler Location: 41
 Date Collected: 6/3/2008 11:54:32 PM
 Data Type: Original

Replicate Data: K0804217-007A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.862 | 6.862 | 0.157 | 0.814 | 0.163 | | | 23:54:54 | Yes |
| 2 | 6.722 | 6.722 | 0.153 | 0.844 | 0.160 | | | 23:55:29 | Yes |
| 3 | 7.392 | 7.392 | 0.169 | 0.833 | 0.175 | | | 23:56:04 | Yes |
| Mean: | 6.992 | 6.992 | 0.160 | | | | | | |
| SD: | 0.354 | 0.354 | 0.0081 | | | | | | |
| %RSD: | 5.057 | 5.057 | 5.06 | | | | | | |

Sequence No.: 51
 Sample ID: K0804217-008
 Analyst:

Autosampler Location: 42
 Date Collected: 6/3/2008 11:56:54 PM
 Data Type: Original

Replicate Data: K0804217-008

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.989 | 2.989 | 0.068 | 0.361 | 0.075 | | | 23:57:17 | Yes |
| 2 | 3.085 | 3.085 | 0.070 | 0.362 | 0.077 | | | 23:57:51 | Yes |
| 3 | 2.791 | 2.791 | 0.064 | 0.336 | 0.070 | | | 23:58:26 | Yes |
| Mean: | 2.955 | 2.955 | 0.067 | | | | | | |
| SD: | 0.150 | 0.150 | 0.0034 | | | | | | |
| %RSD: | 5.064 | 5.064 | 5.06 | | | | | | |

Sequence No.: 52
 Sample ID: K0804217-008A
 Analyst:

Autosampler Location: 43
 Date Collected: 6/3/2008 11:59:17 PM
 Data Type: Original

Replicate Data: K0804217-008A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.859 | 6.859 | 0.157 | 0.798 | 0.163 | | | 23:59:39 | Yes |
| 2 | 6.709 | 6.709 | 0.153 | 0.761 | 0.160 | | | 00:00:14 | Yes |
| 3 | 6.724 | 6.724 | 0.153 | 0.766 | 0.160 | | | 00:00:48 | Yes |
| Mean: | 6.764 | 6.764 | 0.154 | | | | | | |
| SD: | 0.083 | 0.083 | 0.0019 | | | | | | |
| %RSD: | 1.221 | 1.221 | 1.22 | | | | | | |

Sequence No.: 53
 Sample ID: K0804217-009
 Analyst:

Autosampler Location: 44
 Date Collected: 6/4/2008 12:01:39 AM
 Data Type: Original

Replicate Data: K0804217-009

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.290 | 2.290 | 0.052 | 0.308 | 0.059 | | | 00:02:02 | Yes |
| 2 | 2.138 | 2.138 | 0.049 | 0.285 | 0.055 | | | 00:02:36 | Yes |
| 3 | 2.283 | 2.283 | 0.052 | 0.288 | 0.059 | | | 00:03:11 | Yes |
| Mean: | 2.237 | 2.237 | 0.051 | | | | | | |
| SD: | 0.086 | 0.086 | 0.0020 | | | | | | |
| %RSD: | 3.826 | 3.826 | 3.83 | | | | | | |

Sequence No.: 54
Sample ID: K0804217-009A
Analyst:

Autosampler Location: 45
Date Collected: 6/4/2008 12:04:03 AM
Data Type: Original

Replicate Data: K0804217-009A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.876 | 4.876 | 0.111 | 0.616 | 0.118 | | | 00:04:26 | Yes |
| 2 | 4.773 | 4.773 | 0.109 | 0.586 | 0.116 | | | 00:05:01 | Yes |
| 3 | 4.751 | 4.751 | 0.108 | 0.593 | 0.115 | | | 00:05:36 | Yes |
| Mean: | 4.800 | 4.800 | 0.110 | | | | | | |
| SD: | 0.067 | 0.067 | 0.0015 | | | | | | |
| %RSD: | 1.386 | 1.386 | 1.39 | | | | | | |

Sequence No.: 55
Sample ID: K0804217-010
Analyst:

Autosampler Location: 46
Date Collected: 6/4/2008 12:06:27 AM
Data Type: Original

Replicate Data: K0804217-010

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.830 | 1.830 | 0.042 | 0.248 | 0.048 | | | 00:06:51 | Yes |
| 2 | 1.802 | 1.802 | 0.041 | 0.233 | 0.048 | | | 00:07:25 | Yes |
| 3 | 1.801 | 1.801 | 0.041 | 0.243 | 0.048 | | | 00:08:00 | Yes |
| Mean: | 1.811 | 1.811 | 0.041 | | | | | | |
| SD: | 0.017 | 0.017 | 0.0004 | | | | | | |
| %RSD: | 0.921 | 0.921 | 0.92 | | | | | | |

Sequence No.: 56
Sample ID: K0804217-010A
Analyst:

Autosampler Location: 47
Date Collected: 6/4/2008 12:08:52 AM
Data Type: Original

Replicate Data: K0804217-010A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.642 | 4.642 | 0.106 | 0.562 | 0.113 | | | 00:09:16 | Yes |
| 2 | 4.518 | 4.518 | 0.103 | 0.549 | 0.110 | | | 00:09:50 | Yes |
| 3 | 7.603 | 7.603 | 0.174 | 1.109 | 0.180 | | | 00:10:24 | Yes |
| Mean: | 5.588 | 5.588 | 0.128 | | | | | | |
| SD: | 1.746 | 1.746 | 0.0399 | | | | | | |
| %RSD: | 31.25 | 31.25 | 31.25 | | | | | | |

See Kevin JB 6/4/08

Sequence No.: 57
Sample ID: K0804217-011
Analyst:

Autosampler Location: 48
Date Collected: 6/4/2008 12:11:17 AM
Data Type: Original

Replicate Data: K0804217-011

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.956 | 2.956 | 0.067 | 0.341 | 0.074 | | | 00:11:37 | Yes |
| 2 | 2.827 | 2.827 | 0.065 | 0.320 | 0.071 | | | 00:12:11 | Yes |
| 3 | 2.682 | 2.682 | 0.061 | 0.344 | 0.068 | | | 00:12:45 | Yes |
| Mean: | 2.822 | 2.822 | 0.064 | | | | | | |
| SD: | 0.137 | 0.137 | 0.0031 | | | | | | |
| %RSD: | 4.856 | 4.856 | 4.86 | | | | | | |

Sequence No.: 58
Sample ID: CCV

Autosampler Location: 5
Date Collected: 6/4/2008 12:13:33 AM

Analyst:

Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.23 | 10.23 | 0.233 | 1.294 | 0.240 | | | 00:13:56 | Yes |
| 2 | 10.63 | 10.63 | 0.243 | 1.069 | 0.249 | | | 00:14:30 | Yes |
| 3 | 9.906 | 9.906 | 0.226 | 1.074 | 0.233 | | | 00:15:05 | Yes |
| Mean: | 10.26 | 10.26 | 0.234 | | | | | | |
| SD: | 0.364 | 0.364 | 0.0083 | | | | | | |
| %RSD: | 3.546 | 3.546 | 3.55 | | | | | | |

QC value within limits for Se 196.03 Recovery = 102.56%
All analyte(s) passed QC.

Sequence No.: 59

Autosampler Location: 1

Sample ID: CCB

Date Collected: 6/4/2008 12:15:56 AM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.135 | 0.135 | 0.003 | 0.047 | 0.010 | | | 00:16:17 | Yes |
| 2 | 0.081 | 0.081 | 0.002 | 0.044 | 0.009 | | | 00:16:51 | Yes |
| 3 | -0.020 | -0.020 | -0.000 | 0.023 | 0.006 | | | 00:17:25 | Yes |
| Mean: | 0.066 | 0.066 | 0.001 | | | | | | |
| SD: | 0.079 | 0.079 | 0.0018 | | | | | | |
| %RSD: | 120.1 | 120.1 | 120.05 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 60

Autosampler Location: 49

Sample ID: K0804217-011A

Date Collected: 6/4/2008 12:18:14 AM

Analyst:

Data Type: Original

Replicate Data: K0804217-011A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.642 | 4.642 | 0.106 | 0.598 | 0.113 | | | 00:18:34 | Yes |
| 2 | 4.537 | 4.537 | 0.104 | 0.556 | 0.110 | | | 00:19:08 | Yes |
| 3 | 4.995 | 4.995 | 0.114 | 0.572 | 0.121 | | | 00:19:43 | Yes |
| Mean: | 4.725 | 4.725 | 0.108 | | | | | | |
| SD: | 0.240 | 0.240 | 0.0055 | | | | | | |
| %RSD: | 5.072 | 5.072 | 5.07 | | | | | | |

Sequence No.: 61

Autosampler Location: 50

Sample ID: K0804217-012

Date Collected: 6/4/2008 12:20:31 AM

Analyst:

Data Type: Original

Replicate Data: K0804217-012

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.911 | 1.911 | 0.044 | 0.257 | 0.050 | | | 00:20:52 | Yes |
| 2 | 1.911 | 1.911 | 0.044 | 0.248 | 0.050 | | | 00:21:26 | Yes |
| 3 | 1.910 | 1.910 | 0.044 | 0.240 | 0.050 | | | 00:22:01 | Yes |
| Mean: | 1.911 | 1.911 | 0.044 | | | | | | |
| SD: | 0.000 | 0.000 | 0.0000 | | | | | | |
| %RSD: | 0.021 | 0.021 | 0.02 | | | | | | |

Sequence No.: 62

Autosampler Location: 51

Sample ID: K0804217-012A
Analyst:

Date Collected: 6/4/2008 12:22:50 AM
Data Type: Original

Replicate Data: K0804217-012A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.667 | 4.667 | 0.107 | 0.576 | 0.113 | | | 00:23:14 | Yes |
| 2 | 4.591 | 4.591 | 0.105 | 0.555 | 0.111 | | | 00:23:48 | Yes |
| 3 | 4.546 | 4.546 | 0.104 | 0.556 | 0.110 | | | 00:24:22 | Yes |
| Mean: | 4.601 | 4.601 | 0.105 | | | | | | |
| SD: | 0.061 | 0.061 | 0.0014 | | | | | | |
| %RSD: | 1.326 | 1.326 | 1.33 | | | | | | |

=====
Sequence No.: 63
Sample ID: K0804217-013
Analyst:

Autosampler Location: 52
Date Collected: 6/4/2008 12:25:11 AM
Data Type: Original

Replicate Data: K0804217-013

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.580 | 2.580 | 0.059 | 0.325 | 0.066 | | | 00:25:33 | Yes |
| 2 | 2.590 | 2.590 | 0.059 | 0.308 | 0.066 | | | 00:26:07 | Yes |
| 3 | 2.579 | 2.579 | 0.059 | 0.323 | 0.066 | | | 00:26:41 | Yes |
| Mean: | 2.583 | 2.583 | 0.059 | | | | | | |
| SD: | 0.006 | 0.006 | 0.0001 | | | | | | |
| %RSD: | 0.235 | 0.235 | 0.23 | | | | | | |

=====
Sequence No.: 64
Sample ID: K0804217-013A
Analyst:

Autosampler Location: 53
Date Collected: 6/4/2008 12:27:31 AM
Data Type: Original

Replicate Data: K0804217-013A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.729 | 5.729 | 0.131 | 0.696 | 0.137 | | | 00:27:52 | Yes |
| 2 | 5.701 | 5.701 | 0.130 | 0.663 | 0.137 | | | 00:28:26 | Yes |
| 3 | 5.662 | 5.662 | 0.129 | 0.648 | 0.136 | | | 00:29:01 | Yes |
| Mean: | 5.697 | 5.697 | 0.130 | | | | | | |
| SD: | 0.034 | 0.034 | 0.0008 | | | | | | |
| %RSD: | 0.596 | 0.596 | 0.60 | | | | | | |

=====
Sequence No.: 65
Sample ID: K0804217-014
Analyst:

Autosampler Location: 54
Date Collected: 6/4/2008 12:29:50 AM
Data Type: Original

Replicate Data: K0804217-014

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.619 | 2.619 | 0.060 | 0.325 | 0.066 | | | 00:30:12 | Yes |
| 2 | 2.564 | 2.564 | 0.059 | 0.314 | 0.065 | | | 00:30:46 | Yes |
| 3 | 2.553 | 2.553 | 0.058 | 0.310 | 0.065 | | | 00:31:20 | Yes |
| Mean: | 2.579 | 2.579 | 0.059 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0008 | | | | | | |
| %RSD: | 1.375 | 1.375 | 1.37 | | | | | | |

=====
Sequence No.: 66
Sample ID: K0804217-014A
Analyst:

Autosampler Location: 55
Date Collected: 6/4/2008 12:32:10 AM
Data Type: Original

Replicate Data: K0804217-014A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.717 | 5.717 | 0.130 | 0.670 | 0.137 | | | 00:32:31 | Yes |
| 2 | 5.727 | 5.727 | 0.131 | 0.671 | 0.137 | | | 00:33:06 | Yes |
| 3 | 5.658 | 5.658 | 0.129 | 0.667 | 0.136 | | | 00:33:40 | Yes |
| Mean: | 5.701 | 5.701 | 0.130 | | | | | | |
| SD: | 0.038 | 0.038 | 0.0009 | | | | | | |
| %RSD: | 0.659 | 0.659 | 0.66 | | | | | | |

Sequence No.: 67
 Sample ID: K0804217-015
 Analyst:

Autosampler Location: 56
 Date Collected: 6/4/2008 12:34:29 AM
 Data Type: Original

Replicate Data: K0804217-015

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.444 | 2.444 | 0.056 | 0.324 | 0.062 | | | 00:34:51 | Yes |
| 2 | 2.382 | 2.382 | 0.054 | 0.314 | 0.061 | | | 00:35:26 | Yes |
| 3 | 5.499 | 5.499 | 0.126 | 0.997 | 0.132 | | | 00:36:00 | Yes |
| Mean: | 3.442 | 3.442 | 0.079 | | | | | | |
| SD: | 1.782 | 1.782 | 0.0407 | | | | | | |
| %RSD: | 51.78 | 51.78 | 51.78 | | | | | | |

See Run JB 6/4/08

Sequence No.: 68
 Sample ID: K0804217-015A
 Analyst:

Autosampler Location: 57
 Date Collected: 6/4/2008 12:36:50 AM
 Data Type: Original

Replicate Data: K0804217-015A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.639 | 6.639 | 0.152 | 0.805 | 0.158 | | | 00:37:12 | Yes |
| 2 | 6.546 | 6.546 | 0.149 | 0.788 | 0.156 | | | 00:37:46 | Yes |
| 3 | 6.122 | 6.122 | 0.140 | 0.737 | 0.146 | | | 00:38:21 | Yes |
| Mean: | 6.436 | 6.436 | 0.147 | | | | | | |
| SD: | 0.276 | 0.276 | 0.0063 | | | | | | |
| %RSD: | 4.283 | 4.283 | 4.28 | | | | | | |

Sequence No.: 69
 Sample ID: K0804217-016
 Analyst:

Autosampler Location: 58
 Date Collected: 6/4/2008 12:39:12 AM
 Data Type: Original

Replicate Data: K0804217-016

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.358 | 4.358 | 0.099 | 0.561 | 0.106 | | | 00:39:34 | Yes |
| 2 | 2.218 | 2.218 | 0.051 | 0.274 | 0.057 | | | 00:40:08 | Yes |
| 3 | 2.283 | 2.283 | 0.052 | 0.305 | 0.059 | | | 00:40:43 | Yes |
| Mean: | 2.953 | 2.953 | 0.067 | | | | | | |
| SD: | 1.217 | 1.217 | 0.0278 | | | | | | |
| %RSD: | 41.22 | 41.22 | 41.22 | | | | | | |

See Run JB 6/4/08

Sequence No.: 70
 Sample ID: CCV
 Analyst:

Autosampler Location: 5
 Date Collected: 6/4/2008 12:41:34 AM
 Data Type: Original

Replicate Data: CCV

| Repl | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|------|------------|----------|----------|------|------|-------|-------|------|------|
|------|------------|----------|----------|------|------|-------|-------|------|------|

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.163 | 0.163 | 0.004 | 0.045 | 0.010 | | | 00:51:24 | Yes |
| 2 | 0.090 | 0.090 | 0.002 | 0.038 | 0.009 | | | 00:51:58 | Yes |
| 3 | 0.028 | 0.028 | 0.001 | 0.030 | 0.007 | | | 00:52:32 | Yes |
| Mean: | 0.094 | 0.094 | 0.002 | | | | | | |
| SD: | 0.068 | 0.068 | 0.0015 | | | | | | |
| %RSD: | 72.22 | 72.22 | 72.22 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Analysis Begun

Logged In Analyst: acqmet10 Technique: AA FIAS-Flame
Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\ACQMET10\Sample Information\060308-Se3.sif
Batch ID: 060308-Se
Results Data Set: 060308-Se3
Results Library: R:\ICP\WIP\DATA\K-FLAA-02\Results.mdb

Sequence No.: 75 Autosampler Location:
Sample ID: K0804217 TORT 1/2 Date Collected: 6/4/2008 12:54:03 AM
Analyst: Data Type: Original

Replicate Data: K0804217 TORT 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.600 | 4.600 | 0.105 | 0.548 | 0.112 | | | 00:54:19 | Yes |
| 2 | 3.671 | 3.671 | 0.084 | 0.242 | 0.090 | | | 00:54:54 | Yes |
| Changing BOC | | | | | | | | | |
| 3 | 4.319 | 4.319 | 0.099 | 0.523 | 0.105 | | | 00:55:28 | Yes |
| Mean: | 4.196 | 4.196 | 0.096 | | | | | | |
| SD: | 0.476 | 0.476 | 0.0109 | | | | | | |
| %RSD: | 11.35 | 11.35 | 11.35 | | | | | | |
| Changing BOC | | | | | | | | | |

See Run JB 6/4/08

Sequence No.: 76 Autosampler Location:
Sample ID: K0804217-003A Date Collected: 6/4/2008 12:56:38 AM
Analyst: Data Type: Original

Replicate Data: K0804217-003A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.467 | 4.467 | 0.102 | 0.577 | 0.109 | | | 00:56:54 | Yes |
| 2 | 4.534 | 4.534 | 0.103 | 0.571 | 0.110 | | | 00:57:28 | Yes |
| 3 | 4.550 | 4.550 | 0.104 | 0.570 | 0.111 | | | 00:58:02 | Yes |
| Mean: | 4.517 | 4.517 | 0.103 | | | | | | |
| SD: | 0.044 | 0.044 | 0.0010 | | | | | | |
| %RSD: | 0.972 | 0.972 | 0.97 | | | | | | |

Sequence No.: 77 Autosampler Location:
Sample ID: K0804217-006 Date Collected: 6/4/2008 12:58:56 AM
Analyst: Data Type: Original

Replicate Data: K0804217-006

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

Mean: 4.638 4.638 0.106
 SD: 0.065 0.065 0.0015
 %RSD: 1.407 1.407 1.41

Sequence No.: 82
 Sample ID: CCV
 Analyst:

Autosampler Location:
 Date Collected: 6/4/2008 1:11:43 AM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.986 | 9.986 | 0.228 | 1.112 | 0.235 | | | 01:11:59 | Yes |
| 2 | 9.723 | 9.723 | 0.222 | 1.069 | 0.229 | | | 01:12:34 | Yes |
| 3 | 9.833 | 9.833 | 0.224 | 1.062 | 0.231 | | | 01:13:09 | Yes |
| Mean: | 9.847 | 9.847 | 0.225 | | | | | | |
| SD: | 0.132 | 0.132 | 0.0030 | | | | | | |
| %RSD: | 1.343 | 1.343 | 1.34 | | | | | | |

Sequence No.: 83
 Sample ID: CCB
 Analyst:

Autosampler Location:
 Date Collected: 6/4/2008 1:14:28 AM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.039 | 0.039 | 0.001 | 0.046 | 0.008 | | | 01:14:45 | Yes |
| 2 | 0.019 | 0.019 | 0.000 | 0.025 | 0.007 | | | 01:15:19 | Yes |
| 3 | 0.019 | 0.019 | 0.000 | 0.032 | 0.007 | | | 01:15:53 | Yes |
| Mean: | 0.026 | 0.026 | 0.001 | | | | | | |
| SD: | 0.012 | 0.012 | 0.0003 | | | | | | |
| %RSD: | 46.05 | 46.05 | 46.05 | | | | | | |

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0803855, K0804217 (PBT)

Batch QC SR's # _____

Calibration Std. AA1-8-E

Starlims # _____

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

Primary Reviewed by JDB Date 6/4/08

Secondary Reviewed by EMA Date 6/5/08

Sample ID: Std 5.0
Analyst:

Date Collected: 6/4/2008 3:16:33 PM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.106 | 0.628 | 0.133 | | | 15:16:56 | Yes |
| 2 | | [5.0] | 0.101 | 0.628 | 0.129 | | | 15:17:30 | Yes |
| 3 | | [5.0] | 0.104 | 0.624 | 0.131 | | | 15:18:04 | Yes |
| Mean: | | [5.0] | 0.104 | | | | | | |
| SD: | | 0.0 | 0.0023 | | | | | | |
| %RSD: | | 0.0 | 2.20 | | | | | | |

Standard number 3 applied. [5.0]
Correlation Coef.: 0.998891 Slope: 0.02091 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 10.0
Analyst:

Autosampler Location: 5
Date Collected: 6/4/2008 3:18:54 PM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10.0] | 0.193 | 1.079 | 0.220 | | | 15:19:17 | Yes |
| 2 | | [10.0] | 0.193 | 1.064 | 0.220 | | | 15:19:51 | Yes |
| 3 | | [10.0] | 0.192 | 1.069 | 0.219 | | | 15:20:26 | Yes |
| Mean: | | [10.0] | 0.192 | | | | | | |
| SD: | | 0.0 | 0.0006 | | | | | | |
| %RSD: | | 0.0 | 0.33 | | | | | | |

Standard number 4 applied. [10.0]
Correlation Coef.: 0.998461 Slope: 0.01961 Intercept: 0.00000

Sequence No.: 6
Sample ID: Std 15.0
Analyst:

Autosampler Location: 6
Date Collected: 6/4/2008 3:21:17 PM
Data Type: Original

Replicate Data: Std 15.0

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [15.0] | 0.290 | 1.577 | 0.318 | | | 15:21:40 | Yes |
| 2 | | [15.0] | 0.293 | 1.551 | 0.320 | | | 15:22:15 | Yes |
| 3 | | [15.0] | 0.317 | 1.577 | 0.345 | | | 15:22:49 | Yes |
| Mean: | | [15.0] | 0.300 | | | | | | |
| SD: | | 0.0 | 0.0149 | | | | | | |
| %RSD: | | 0.0 | 4.97 | | | | | | |

Standard number 5 applied. [15.0]
Correlation Coef.: 0.999310 Slope: 0.01986 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03

Equation: Linear Through Zero

| ID | Mean Signal (Abs) | Entered Conc. ug/L | Calculated Conc. ug/L | Standard Deviation | %RSD |
|----------|-------------------|--------------------|-----------------------|--------------------|------|
| Cal Blk | 0.0000 | 0 | 0.000 | 0.00 | 3.4 |
| Std 0.5 | 0.0133 | 0.5 | 0.670 | 0.00 | 3.4 |
| Std 1.0 | 0.0227 | 1.0 | 1.142 | 0.00 | 4.2 |
| Std 5.0 | 0.1038 | 5.0 | 5.226 | 0.00 | 2.2 |
| Std 10.0 | 0.1924 | 10.0 | 9.685 | 0.00 | 0.3 |
| Std 15.0 | 0.3000 | 15.0 | 15.105 | 0.01 | 5.0 |

Correlation Coef.: 0.999310 Slope: 0.01986 Intercept: 0.00000

Sequence No.: 7
Sample ID: ICV
Analyst:

Autosampler Location: 7
Date Collected: 6/4/2008 3:23:40 PM
Data Type: Original

Replicate Data: ICV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.821 | 9.821 | 0.195 | 1.104 | 0.223 | | | 15:24:04 | Yes |
| 2 | 9.596 | 9.596 | 0.191 | 1.072 | 0.218 | | | 15:24:39 | Yes |
| 3 | 9.836 | 9.836 | 0.195 | 1.084 | 0.223 | | | 15:25:13 | Yes |
| Mean: | 9.751 | 9.751 | 0.194 | | | | | | |
| SD: | 0.134 | 0.134 | 0.0027 | | | | | | |
| %RSD: | 1.377 | 1.377 | 1.38 | | | | | | |

QC value within limits for Se 196.03 Recovery = 97.51%
All analyte(s) passed QC.

Sequence No.: 8
Sample ID: ICB
Analyst:

Autosampler Location: 1
Date Collected: 6/4/2008 3:26:05 PM
Data Type: Original

Replicate Data: ICB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.081 | 0.081 | 0.002 | 0.140 | 0.029 | | | 15:26:26 | Yes |
| 2 | 0.067 | 0.067 | 0.001 | 0.137 | 0.029 | | | 15:27:00 | Yes |
| 3 | 0.093 | 0.093 | 0.002 | 0.134 | 0.029 | | | 15:27:35 | Yes |
| Mean: | 0.080 | 0.080 | 0.002 | | | | | | |
| SD: | 0.013 | 0.013 | 0.0003 | | | | | | |
| %RSD: | 16.42 | 16.42 | 16.42 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 9
Sample ID: CRA
Analyst:

Autosampler Location: 2
Date Collected: 6/4/2008 3:28:24 PM
Data Type: Original

Replicate Data: CRA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.661 | 0.661 | 0.013 | 0.205 | 0.041 | | | 15:28:46 | Yes |
| 2 | 0.612 | 0.612 | 0.012 | 0.188 | 0.040 | | | 15:29:20 | Yes |
| 3 | 0.664 | 0.664 | 0.013 | 0.192 | 0.041 | | | 15:29:54 | Yes |
| Mean: | 0.646 | 0.646 | 0.013 | | | | | | |
| SD: | 0.029 | 0.029 | 0.0006 | | | | | | |
| %RSD: | 4.531 | 4.531 | 4.53 | | | | | | |

QC value within limits for Se 196.03 Recovery = 129.16%
All analyte(s) passed QC.

Sequence No.: 10
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/4/2008 3:30:44 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.761 | 9.761 | 0.194 | 1.081 | 0.221 | | | 15:31:07 | Yes |
| 2 | 9.657 | 9.657 | 0.192 | 1.063 | 0.219 | | | 15:31:41 | Yes |
| 3 | 9.749 | 9.749 | 0.194 | 1.081 | 0.221 | | | 15:32:15 | Yes |
| Mean: | 9.722 | 9.722 | 0.193 | | | | | | |

SD: 0.057 0.057 0.0011

%RSD: 0.587 0.587 0.59

QC value within limits for Se 196.03 Recovery = 97.22%

All analyte(s) passed QC.

Sequence No.: 11

Autosampler Location: 1

Sample ID: CCB

Date Collected: 6/4/2008 3:33:06 PM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.078 | 0.078 | 0.002 | 0.133 | 0.029 | | | 15:33:27 | Yes |
| 2 | 0.042 | 0.042 | 0.001 | 0.139 | 0.028 | | | 15:34:01 | Yes |
| 3 | -0.011 | -0.011 | -0.000 | 0.125 | 0.027 | | | 15:34:36 | Yes |
| Mean: | 0.036 | 0.036 | 0.001 | | | | | | |
| SD: | 0.045 | 0.045 | 0.0009 | | | | | | |
| %RSD: | 122.7 | 122.7 | 122.69 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 12

Autosampler Location: 9

Sample ID: PBT K0803855

Date Collected: 6/4/2008 3:35:25 PM

Analyst:

Data Type: Original

Replicate Data: PBT K0803855

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.261 | -0.261 | -0.005 | 0.113 | 0.022 | | | 15:35:46 | Yes |
| 2 | -0.365 | -0.365 | -0.007 | 0.084 | 0.020 | | | 15:36:20 | Yes |
| 3 | -0.298 | -0.298 | -0.006 | 0.102 | 0.022 | | | 15:36:54 | Yes |
| Mean: | -0.308 | -0.308 | -0.006 | | | | | | |
| SD: | 0.053 | 0.053 | 0.0010 | | | | | | |
| %RSD: | 17.10 | 17.10 | 17.10 | | | | | | |

See Form JB 6/4/08

Sequence No.: 13

Autosampler Location: 10

Sample ID: TORT K0803855 1/2

Date Collected: 6/4/2008 3:37:51 PM

Analyst:

Data Type: Original

Replicate Data: TORT K0803855 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.089 | 4.089 | 0.081 | 0.565 | 0.109 | | | 15:38:12 | Yes |
| 2 | 3.798 | 3.798 | 0.075 | 0.534 | 0.103 | | | 15:38:47 | Yes |
| 3 | 3.910 | 3.910 | 0.078 | 0.542 | 0.105 | | | 15:39:21 | Yes |
| Mean: | 3.932 | 3.932 | 0.078 | | | | | | |
| SD: | 0.147 | 0.147 | 0.0029 | | | | | | |
| %RSD: | 3.734 | 3.734 | 3.73 | | | | | | |

Sequence No.: 14

Autosampler Location: 11

Sample ID: K0803855-001

Date Collected: 6/4/2008 3:40:10 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-001

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.690 | 0.690 | 0.014 | 0.230 | 0.041 | | | 15:40:32 | Yes |
| 2 | 0.670 | 0.670 | 0.013 | 0.221 | 0.041 | | | 15:41:07 | Yes |
| 3 | 0.719 | 0.719 | 0.014 | 0.211 | 0.042 | | | 15:41:41 | Yes |

Mean: 0.693 0.693 0.014
 SD: 0.025 0.025 0.0005
 %RSD: 3.539 3.539 3.54

Sequence No.: 15
 Sample ID: K0803855-001A
 Analyst:

Autosampler Location: 12
 Date Collected: 6/4/2008 3:42:31 PM
 Data Type: Original

Replicate Data: K0803855-001A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.089 | 5.089 | 0.101 | 0.692 | 0.129 | | | 15:42:53 | Yes |
| 2 | 4.846 | 4.846 | 0.096 | 0.659 | 0.124 | | | 15:43:28 | Yes |
| 3 | 4.910 | 4.910 | 0.098 | 0.658 | 0.125 | | | 15:44:02 | Yes |
| Mean: | 4.948 | 4.948 | 0.098 | | | | | | |
| SD: | 0.126 | 0.126 | 0.0025 | | | | | | |
| %RSD: | 2.546 | 2.546 | 2.55 | | | | | | |

Sequence No.: 16
 Sample ID: K0803855-002
 Analyst:

Autosampler Location: 13
 Date Collected: 6/4/2008 3:44:53 PM
 Data Type: Original

Replicate Data: K0803855-002

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.878 | 0.878 | 0.017 | 0.249 | 0.045 | | | 15:45:15 | Yes |
| 2 | 0.793 | 0.793 | 0.016 | 0.234 | 0.043 | | | 15:45:49 | Yes |
| 3 | 0.822 | 0.822 | 0.016 | 0.229 | 0.044 | | | 15:46:24 | Yes |
| Mean: | 0.831 | 0.831 | 0.017 | | | | | | |
| SD: | 0.043 | 0.043 | 0.0009 | | | | | | |
| %RSD: | 5.173 | 5.173 | 5.17 | | | | | | |

Sequence No.: 17
 Sample ID: K0803855-002A
 Analyst:

Autosampler Location: 14
 Date Collected: 6/4/2008 3:47:15 PM
 Data Type: Original

Replicate Data: K0803855-002A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.452 | 5.452 | 0.108 | 0.704 | 0.136 | | | 15:47:39 | Yes |
| 2 | 4.923 | 4.923 | 0.098 | 0.663 | 0.125 | | | 15:48:13 | Yes |
| 3 | 5.179 | 5.179 | 0.103 | 0.683 | 0.130 | | | 15:48:47 | Yes |
| Mean: | 5.185 | 5.185 | 0.103 | | | | | | |
| SD: | 0.264 | 0.264 | 0.0053 | | | | | | |
| %RSD: | 5.100 | 5.100 | 5.10 | | | | | | |

Sequence No.: 18
 Sample ID: K0803855-003
 Analyst:

Autosampler Location: 15
 Date Collected: 6/4/2008 3:49:39 PM
 Data Type: Original

Replicate Data: K0803855-003

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.802 | 0.802 | 0.016 | 0.237 | 0.043 | | | 15:50:03 | Yes |
| 2 | 0.772 | 0.772 | 0.015 | 0.226 | 0.043 | | | 15:50:38 | Yes |
| 3 | 0.788 | 0.788 | 0.016 | 0.221 | 0.043 | | | 15:51:12 | Yes |
| Mean: | 0.787 | 0.787 | 0.016 | | | | | | |
| SD: | 0.015 | 0.015 | 0.0003 | | | | | | |
| %RSD: | 1.889 | 1.889 | 1.89 | | | | | | |

Sequence No.: 19
Sample ID: K0803855-003A
Analyst:

Autosampler Location: 16
Date Collected: 6/4/2008 3:52:05 PM
Data Type: Original

Replicate Data: K0803855-003A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.961 | 4.961 | 0.099 | 0.687 | 0.126 | | | 15:52:29 | Yes |
| 2 | 4.930 | 4.930 | 0.098 | 0.669 | 0.125 | | | 15:53:04 | Yes |
| 3 | 5.271 | 5.271 | 0.105 | 0.679 | 0.132 | | | 15:53:38 | Yes |
| Mean: | 5.054 | 5.054 | 0.100 | | | | | | |
| SD: | 0.189 | 0.189 | 0.0037 | | | | | | |
| %RSD: | 3.730 | 3.730 | 3.73 | | | | | | |

Sequence No.: 20
Sample ID: K0803855-004
Analyst:

Autosampler Location: 17
Date Collected: 6/4/2008 3:54:29 PM
Data Type: Original

Replicate Data: K0803855-004

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.732 | 0.732 | 0.015 | 0.220 | 0.042 | | | 15:54:50 | Yes |
| 2 | 0.722 | 0.722 | 0.014 | 0.222 | 0.042 | | | 15:55:24 | Yes |
| 3 | 0.693 | 0.693 | 0.014 | 0.222 | 0.041 | | | 15:55:59 | Yes |
| Mean: | 0.716 | 0.716 | 0.014 | | | | | | |
| SD: | 0.020 | 0.020 | 0.0004 | | | | | | |
| %RSD: | 2.824 | 2.824 | 2.82 | | | | | | |

Sequence No.: 21
Sample ID: K0803855-004A
Analyst:

Autosampler Location: 18
Date Collected: 6/4/2008 3:56:48 PM
Data Type: Original

Replicate Data: K0803855-004A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.034 | 5.034 | 0.100 | 0.693 | 0.127 | | | 15:57:08 | Yes |
| 2 | 4.969 | 4.969 | 0.099 | 0.668 | 0.126 | | | 15:57:43 | Yes |
| 3 | 4.883 | 4.883 | 0.097 | 0.662 | 0.124 | | | 15:58:18 | Yes |
| Mean: | 4.962 | 4.962 | 0.099 | | | | | | |
| SD: | 0.076 | 0.076 | 0.0015 | | | | | | |
| %RSD: | 1.522 | 1.522 | 1.52 | | | | | | |

Sequence No.: 22
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 6/4/2008 3:59:07 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.376 | 9.376 | 0.186 | 1.068 | 0.214 | | | 15:59:30 | Yes |
| 2 | 9.209 | 9.209 | 0.183 | 1.048 | 0.210 | | | 16:00:04 | Yes |
| 3 | 9.198 | 9.198 | 0.183 | 1.065 | 0.210 | | | 16:00:38 | Yes |
| Mean: | 9.261 | 9.261 | 0.184 | | | | | | |
| SD: | 0.100 | 0.100 | 0.0020 | | | | | | |
| %RSD: | 1.080 | 1.080 | 1.08 | | | | | | |

QC value within limits for Se 196.03 Recovery = 92.61%
All analyte(s) passed QC.

Sequence No.: 23
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 6/4/2008 4:01:30 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.014 | 0.014 | 0.000 | 0.135 | 0.028 | | | 16:01:51 | Yes |
| 2 | -0.036 | -0.036 | -0.001 | 0.132 | 0.027 | | | 16:02:25 | Yes |
| 3 | -0.048 | -0.048 | -0.001 | 0.123 | 0.026 | | | 16:02:59 | Yes |
| Mean: | -0.024 | -0.024 | -0.000 | | | | | | |
| SD: | 0.033 | 0.033 | 0.0006 | | | | | | |
| %RSD: | 138.6 | 138.6 | 138.59 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 24
 Sample ID: K0803855-005
 Analyst:

Autosampler Location: 19
 Date Collected: 6/4/2008 4:03:48 PM
 Data Type: Original

Replicate Data: K0803855-005

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.046 | 1.046 | 0.021 | 0.265 | 0.048 | | | 16:04:09 | Yes |
| 2 | 1.020 | 1.020 | 0.020 | 0.252 | 0.048 | | | 16:04:44 | Yes |
| 3 | 0.987 | 0.987 | 0.020 | 0.244 | 0.047 | | | 16:05:18 | Yes |
| Mean: | 1.018 | 1.018 | 0.020 | | | | | | |
| SD: | 0.030 | 0.030 | 0.0006 | | | | | | |
| %RSD: | 2.923 | 2.923 | 2.92 | | | | | | |

Sequence No.: 25
 Sample ID: K0803855-005A
 Analyst:

Autosampler Location: 20
 Date Collected: 6/4/2008 4:06:07 PM
 Data Type: Original

Replicate Data: K0803855-005A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.432 | 5.432 | 0.108 | 0.724 | 0.135 | | | 16:06:29 | Yes |
| 2 | 5.404 | 5.404 | 0.107 | 0.703 | 0.135 | | | 16:07:03 | Yes |
| 3 | 5.369 | 5.369 | 0.107 | 0.740 | 0.134 | | | 16:07:37 | Yes |
| Mean: | 5.402 | 5.402 | 0.107 | | | | | | |
| SD: | 0.031 | 0.031 | 0.0006 | | | | | | |
| %RSD: | 0.579 | 0.579 | 0.58 | | | | | | |

Sequence No.: 26
 Sample ID: K0803855-006
 Analyst:

Autosampler Location: 21
 Date Collected: 6/4/2008 4:08:27 PM
 Data Type: Original

Replicate Data: K0803855-006

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.735 | 0.735 | 0.015 | 0.230 | 0.042 | | | 16:08:48 | Yes |
| 2 | 0.703 | 0.703 | 0.014 | 0.216 | 0.041 | | | 16:09:22 | Yes |
| 3 | 0.756 | 0.756 | 0.015 | 0.231 | 0.042 | | | 16:09:56 | Yes |
| Mean: | 0.731 | 0.731 | 0.015 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0005 | | | | | | |
| %RSD: | 3.658 | 3.658 | 3.66 | | | | | | |

Sequence No.: 27
 Sample ID: K0803855-006A
 Analyst:

Autosampler Location: 22
 Date Collected: 6/4/2008 4:10:46 PM
 Data Type: Original

 Replicate Data: K0803855-006A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.701 | 5.701 | 0.113 | 0.717 | 0.141 | | | 16:11:08 | Yes |
| 2 | 4.951 | 4.951 | 0.098 | 0.669 | 0.126 | | | 16:11:44 | Yes |
| 3 | 4.964 | 4.964 | 0.099 | 0.676 | 0.126 | | | 16:12:18 | Yes |
| Mean: | 5.206 | 5.206 | 0.103 | | | | | | |
| SD: | 0.429 | 0.429 | 0.0085 | | | | | | |
| %RSD: | 8.245 | 8.245 | 8.24 | | | | | | |

Sequence No.: 28
 Sample ID: K0803855-007
 Analyst:

Autosampler Location: 23
 Date Collected: 6/4/2008 4:13:08 PM
 Data Type: Original

 Replicate Data: K0803855-007

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.933 | 0.933 | 0.019 | 0.251 | 0.046 | | | 16:13:31 | Yes |
| 2 | 0.756 | 0.756 | 0.015 | 0.217 | 0.042 | | | 16:14:04 | Yes |
| 3 | 0.775 | 0.775 | 0.015 | 0.224 | 0.043 | | | 16:14:38 | Yes |
| Mean: | 0.821 | 0.821 | 0.016 | | | | | | |
| SD: | 0.097 | 0.097 | 0.0019 | | | | | | |
| %RSD: | 11.82 | 11.82 | 11.82 | | | | | | |

Sequence No.: 29
 Sample ID: K0803855-007A
 Analyst:

Autosampler Location: 24
 Date Collected: 6/4/2008 4:15:28 PM
 Data Type: Original

 Replicate Data: K0803855-007A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.067 | 5.067 | 0.101 | 0.686 | 0.128 | | | 16:15:50 | Yes |
| 2 | 5.099 | 5.099 | 0.101 | 0.697 | 0.129 | | | 16:16:25 | Yes |
| 3 | 5.278 | 5.278 | 0.105 | 0.716 | 0.132 | | | 16:16:59 | Yes |
| Mean: | 5.148 | 5.148 | 0.102 | | | | | | |
| SD: | 0.113 | 0.113 | 0.0023 | | | | | | |
| %RSD: | 2.205 | 2.205 | 2.20 | | | | | | |

Sequence No.: 30
 Sample ID: K0803855-007D
 Analyst:

Autosampler Location: 25
 Date Collected: 6/4/2008 4:17:50 PM
 Data Type: Original

 Replicate Data: K0803855-007D

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.861 | 0.861 | 0.017 | 0.250 | 0.045 | | | 16:18:12 | Yes |
| 2 | 0.685 | 0.685 | 0.014 | 0.206 | 0.041 | | | 16:18:46 | Yes |
| 3 | 0.764 | 0.764 | 0.015 | 0.230 | 0.043 | | | 16:19:20 | Yes |
| Mean: | 0.770 | 0.770 | 0.015 | | | | | | |
| SD: | 0.088 | 0.088 | 0.0017 | | | | | | |
| %RSD: | 11.44 | 11.44 | 11.44 | | | | | | |

Sequence No.: 31
 Sample ID: K0803855-007DA
 Analyst:

Autosampler Location: 26
 Date Collected: 6/4/2008 4:20:11 PM
 Data Type: Original

Replicate Data: K0803855-007DA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.173 | 5.173 | 0.103 | 0.714 | 0.130 | | | 16:20:34 | Yes |
| 2 | 5.065 | 5.065 | 0.101 | 0.689 | 0.128 | | | 16:21:08 | Yes |
| 3 | 5.187 | 5.187 | 0.103 | 0.698 | 0.130 | | | 16:21:43 | Yes |
| Mean: | 5.142 | 5.142 | 0.102 | | | | | | |
| SD: | 0.067 | 0.067 | 0.0013 | | | | | | |
| %RSD: | 1.297 | 1.297 | 1.30 | | | | | | |

Sequence No.: 32
 Sample ID: K0803855-007S
 Analyst:

Autosampler Location: 27
 Date Collected: 6/4/2008 4:22:34 PM
 Data Type: Original

Replicate Data: K0803855-007S

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.729 | 7.729 | 0.154 | 0.978 | 0.181 | | | 16:22:57 | Yes |
| 2 | 7.564 | 7.564 | 0.150 | 0.967 | 0.178 | | | 16:23:31 | Yes |
| 3 | 7.546 | 7.546 | 0.150 | 0.960 | 0.177 | | | 16:24:06 | Yes |
| Mean: | 7.613 | 7.613 | 0.151 | | | | | | |
| SD: | 0.101 | 0.101 | 0.0020 | | | | | | |
| %RSD: | 1.327 | 1.327 | 1.33 | | | | | | |

Sequence No.: 33
 Sample ID: K0803855-007SA
 Analyst:

Autosampler Location: 28
 Date Collected: 6/4/2008 4:24:57 PM
 Data Type: Original

Replicate Data: K0803855-007SA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 11.28 | 11.28 | 0.224 | 1.390 | 0.252 | | | 16:25:20 | Yes |
| 2 | 11.10 | 11.10 | 0.221 | 1.344 | 0.248 | | | 16:25:54 | Yes |
| 3 | 11.28 | 11.28 | 0.224 | 1.360 | 0.252 | | | 16:26:29 | Yes |
| Mean: | 11.22 | 11.22 | 0.223 | | | | | | |
| SD: | 0.105 | 0.105 | 0.0021 | | | | | | |
| %RSD: | 0.936 | 0.936 | 0.94 | | | | | | |

Sequence No.: 34
 Sample ID: CCV
 Analyst:

Autosampler Location: 5
 Date Collected: 6/4/2008 4:27:20 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.430 | 9.430 | 0.187 | 1.113 | 0.215 | | | 16:27:43 | Yes |
| 2 | 9.522 | 9.522 | 0.189 | 1.098 | 0.217 | | | 16:28:17 | Yes |
| 3 | 9.396 | 9.396 | 0.187 | 1.080 | 0.214 | | | 16:28:52 | Yes |
| Mean: | 9.449 | 9.449 | 0.188 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0013 | | | | | | |
| %RSD: | 0.690 | 0.690 | 0.69 | | | | | | |

QC value within limits for Se 196.03 Recovery = 94.49%
 All analyte(s) passed QC.

Sequence No.: 35
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 6/4/2008 4:29:44 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.002 | 0.002 | 0.000 | 0.146 | 0.027 | | | 16:30:05 | Yes |
| 2 | -0.104 | -0.104 | -0.002 | 0.115 | 0.025 | | | 16:30:39 | Yes |
| 3 | -0.115 | -0.115 | -0.002 | 0.128 | 0.025 | | | 16:31:13 | Yes |
| Mean: | -0.072 | -0.072 | -0.001 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0013 | | | | | | |
| %RSD: | 89.70 | 89.70 | 89.70 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 36
Sample ID: K0803855-008
Analyst:

Autosampler Location: 29
Date Collected: 6/4/2008 4:32:02 PM
Data Type: Original

Replicate Data: K0803855-008

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.547 | 0.547 | 0.011 | 0.213 | 0.038 | | | 16:32:26 | Yes |
| 2 | 0.471 | 0.471 | 0.009 | 0.194 | 0.037 | | | 16:33:01 | Yes |
| 3 | 0.488 | 0.488 | 0.010 | 0.206 | 0.037 | | | 16:33:35 | Yes |
| Mean: | 0.502 | 0.502 | 0.010 | | | | | | |
| SD: | 0.040 | 0.040 | 0.0008 | | | | | | |
| %RSD: | 8.013 | 8.013 | 8.01 | | | | | | |

Sequence No.: 37
Sample ID: K0803855-008A
Analyst:

Autosampler Location: 30
Date Collected: 6/4/2008 4:34:26 PM
Data Type: Original

Replicate Data: K0803855-008A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.870 | 4.870 | 0.097 | 0.667 | 0.124 | | | 16:34:50 | Yes |
| 2 | 4.739 | 4.739 | 0.094 | 0.649 | 0.122 | | | 16:35:24 | Yes |
| 3 | 5.290 | 5.290 | 0.105 | 0.678 | 0.133 | | | 16:35:58 | Yes |
| Mean: | 4.966 | 4.966 | 0.099 | | | | | | |
| SD: | 0.288 | 0.288 | 0.0057 | | | | | | |
| %RSD: | 5.789 | 5.789 | 5.79 | | | | | | |

Sequence No.: 38
Sample ID: K0803855-009
Analyst:

Autosampler Location: 31
Date Collected: 6/4/2008 4:36:52 PM
Data Type: Original

Replicate Data: K0803855-009

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.806 | 0.806 | 0.016 | 0.232 | 0.043 | | | 16:37:16 | Yes |
| 2 | 0.781 | 0.781 | 0.016 | 0.222 | 0.043 | | | 16:37:50 | Yes |
| 3 | 0.781 | 0.781 | 0.016 | 0.211 | 0.043 | | | 16:38:24 | Yes |
| Mean: | 0.790 | 0.790 | 0.016 | | | | | | |
| SD: | 0.014 | 0.014 | 0.0003 | | | | | | |
| %RSD: | 1.798 | 1.798 | 1.80 | | | | | | |

Sequence No.: 39
Sample ID: K0803855-009A
Analyst:

Autosampler Location: 32
Date Collected: 6/4/2008 4:39:16 PM
Data Type: Original

Replicate Data: K0803855-009A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.104 | 5.104 | 0.101 | 0.713 | 0.129 | | | 16:39:36 | Yes |
| 2 | 5.235 | 5.235 | 0.104 | 0.691 | 0.131 | | | 16:40:11 | Yes |
| 3 | 5.169 | 5.169 | 0.103 | 0.682 | 0.130 | | | 16:40:45 | Yes |
| Mean: | 5.169 | 5.169 | 0.103 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0013 | | | | | | |
| %RSD: | 1.268 | 1.268 | 1.27 | | | | | | |

Sequence No.: 40

Autosampler Location: 33

Sample ID: K0803855-010

Date Collected: 6/4/2008 4:41:34 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-010

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.847 | 0.847 | 0.017 | 0.230 | 0.044 | | | 16:41:55 | Yes |
| 2 | 0.683 | 0.683 | 0.014 | 0.212 | 0.041 | | | 16:42:29 | Yes |
| 3 | 0.673 | 0.673 | 0.013 | 0.216 | 0.041 | | | 16:43:04 | Yes |
| Mean: | 0.734 | 0.734 | 0.015 | | | | | | |
| SD: | 0.098 | 0.098 | 0.0019 | | | | | | |
| %RSD: | 13.30 | 13.30 | 13.30 | | | | | | |

Sequence No.: 41

Autosampler Location: 34

Sample ID: K0803855-010A

Date Collected: 6/4/2008 4:43:53 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-010A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.924 | 4.924 | 0.098 | 0.688 | 0.125 | | | 16:44:13 | Yes |
| 2 | 5.033 | 5.033 | 0.100 | 0.672 | 0.127 | | | 16:44:48 | Yes |
| 3 | 4.755 | 4.755 | 0.094 | 0.648 | 0.122 | | | 16:45:22 | Yes |
| Mean: | 4.904 | 4.904 | 0.097 | | | | | | |
| SD: | 0.140 | 0.140 | 0.0028 | | | | | | |
| %RSD: | 2.852 | 2.852 | 2.85 | | | | | | |

Sequence No.: 42

Autosampler Location: 35

Sample ID: K0803855-011

Date Collected: 6/4/2008 4:46:11 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-011

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.591 | 0.591 | 0.012 | 0.217 | 0.039 | | | 16:46:32 | Yes |
| 2 | 0.532 | 0.532 | 0.011 | 0.202 | 0.038 | | | 16:47:07 | Yes |
| 3 | 0.564 | 0.564 | 0.011 | 0.208 | 0.039 | | | 16:47:41 | Yes |
| Mean: | 0.562 | 0.562 | 0.011 | | | | | | |
| SD: | 0.029 | 0.029 | 0.0006 | | | | | | |
| %RSD: | 5.195 | 5.195 | 5.20 | | | | | | |

Sequence No.: 43

Autosampler Location: 36

Sample ID: K0803855-011A

Date Collected: 6/4/2008 4:48:30 PM

Analyst:

Data Type: Original

Replicate Data: K0803855-011A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

September 4, 2008

Analytical Report for Service Request No: K0807359

Kathy Tegtmeyer
New Fields Environmental
2500 55th Street
Suite 200
Boulder, CO 80301

Dear Kathy:

Enclosed are the results of the samples submitted to our laboratory on August 07, 2008. For your reference, these analyses have been assigned our service request number K0807359.

All analyses were performed according to our laboratory's quality assurance program. Where applicable, the methods cited conform to the Methods Update Rule (effective 4/11/2007), which relates to the use of analytical methods for the drinking water and waste water programs. The test results meet requirements of the NELAC standards. Exceptions are noted in the case narrative report where applicable. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3316. You may also contact me via Email at JChristian@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.



Jeff Christian
Laboratory Director

JC/II

Page 1 of 71

Acronyms

| | |
|------------|--|
| ASTM | American Society for Testing and Materials |
| A2LA | American Association for Laboratory Accreditation |
| CARB | California Air Resources Board |
| CAS Number | Chemical Abstract Service registry Number |
| CFC | Chlorofluorocarbon |
| CFU | Colony-Forming Unit |
| DEC | Department of Environmental Conservation |
| DEQ | Department of Environmental Quality |
| DHS | Department of Health Services |
| DOE | Department of Ecology |
| DOH | Department of Health |
| EPA | U. S. Environmental Protection Agency |
| ELAP | Environmental Laboratory Accreditation Program |
| GC | Gas Chromatography |
| GC/MS | Gas Chromatography/Mass Spectrometry |
| LUFT | Leaking Underground Fuel Tank |
| M | Modified |
| MCL | Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA. |
| MDL | Method Detection Limit |
| MPN | Most Probable Number |
| MRL | Method Reporting Limit |
| NA | Not Applicable |
| NC | Not Calculated |
| NCASI | National Council of the Paper Industry for Air and Stream Improvement |
| ND | Not Detected |
| NIOSH | National Institute for Occupational Safety and Health |
| PQL | Practical Quantitation Limit |
| RCRA | Resource Conservation and Recovery Act |
| SIM | Selected Ion Monitoring |
| TPH | Total Petroleum Hydrocarbons |
| tr | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL. |

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

| Program | Number |
|------------------------|---------------|
| Alaska DEC UST | UST-040 |
| Arizona DHS | AZ0339 |
| Arkansas - DEQ | 88-0637 |
| California DHS | 2286 |
| Colorado DPHE | - |
| Florida DOH | E87412 |
| Hawaii DOH | - |
| Idaho DHW | - |
| Indiana DOH | C-WA-01 |
| Louisiana DEQ | 3016 |
| Louisiana DHH | LA050010 |
| Maine DHS | WA0035 |
| Michigan DEQ | 9949 |
| Minnesota DOH | 053-999-368 |
| Montana DPHHS | CERT0047 |
| Nevada DEP | WA35 |
| New Jersey DEP | WA005 |
| New Mexico ED | - |
| North Carolina DWQ | 605 |
| Oklahoma DEQ | 9801 |
| Oregon - DHS | WA200001 |
| South Carolina DHEC | 61002 |
| Utah DOH | COLU |
| Washington DOE | C1203 |
| Wisconsin DNR | 998386840 |
| Wyoming (EPA Region 8) | - |



Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client: New Fields Environmental
Project: Se in Eggs
Sample Matrix: Tissue

Service Request No.: K0807359
Date Received: 8/07/08

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Tissue samples were received for analysis at Columbia Analytical Services on 8/07/08. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at -20°C upon receipt at the laboratory.

Total Metals

General Comments:

The samples were freeze-dried to determine moisture and to allow complete homogenization of the dry material. The dried material was milled to a fine meal, and then sub-sampled for digestion. A thorough digestion was performed prior to instrumental analysis to convert all Selenium species to Selenate. Prior to hydride formation, the valence was adjusted by reduction to Selenite.

No anomalies associated with the analysis of these samples were observed.

Approved by _____



Date _____

9/04/08

**Chain of Custody
Documentation**

Chain of Custody Page / of /

Project Contact
Courier/Airbill:

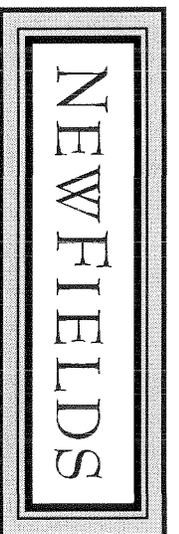
Sean Covington/Kathy Tegtmeyer

PO 0442-004-900.70

Shipped to: Columbia Analytical Services, Inc.

1317 South 13th Ave
Kelso, WA 98626

Telephone: (360) 430-7733



4720 Walnut St, Suite 200
Boulder, CO 80301
Phone: 303-442-0267
Fax: 303-442-3679

10107354

COC #: 91025

| Sample ID | Sample Date | Sample Time | Egg tissue | Tof/ Diss | Analysis | Preservative | Lab QC | Comments |
|-------------------------------|-------------|-------------|-------------|--------------|--------------------|--------------|--------|----------|
| SM0608-LSV2c-FT001-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-LSV2c-FT003-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-LSV2c-FT004-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-LSV2c-FT006-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC350-FT0010-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC350-FT011-Eggs | 6/6/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-DC-FT013-eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | QC |
| SM0608-DC-FT014-eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-DC-FT015-eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-DC-FT016-eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC150-FT017-eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC350-FT018-Eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC350-FT019-Eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-CC350-FT020-Eggs | 6/10/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-SFTC1-FT0012-Eggs | 6/28/2008 | | Egg tissue | tot | selenium, % solids | Dry ice | | |
| SM0608-LSV2c-FT001-sup larvae | 7/9/2008 | | Fish tissue | tot | selenium, % solids | Dry ice | | |

Sampler Signature: [Signature] Total Number of Containers: 16 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

LAB USE ONLY - Sample condition on Receipt:

Relinquished by [Signature] Date/Time 8/5/08 1500

Received by [Signature] Date/Time 5/7/08 0930

**Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form**

PC JL

Client / Project: Newfields Service Request K08 07359

Received: 8/17/08 Opened: 8/17/08 By: B.T

1. Samples were received via? US Mail Ed Ex UPS DHL GH GS PDX Courier Hand Delivered
2. Samples were received in: (circle) cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 front
If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Is shipper's air-bill filed? If not, record air-bill number: 7920 9274 5337 NA Y N

5. Temperature of cooler(s) upon receipt (°C): 4.2
Temperature Blank (°C): —

6. If applicable, list Chain of Custody Numbers: _____

7. Packing material used. Inserts Baggies Bubble Wrap Gel Packs Wet Ice Sleeves Other _____

8. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
9. **Did all bottles arrive in good condition (unbroken)?** *Indicate in the table below.* NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
11. Did all sample labels and tags agree with custody papers? *Indicate in the table below* NA Y N
12. **Were appropriate bottles/containers and volumes received for the tests indicated?** NA Y N
13. Were the pH-preserved bottles tested* received at the appropriate pH? *Indicate in the table below* NA Y N
14. Were VOA vials and 1631 Mercury bottles received without headspace? *Indicate in the table below.* NA Y N
15. **Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection?** NA Y N
16. Was C12/Res negative? NA Y N

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
| | | | |
| | | | |
| | | | |
| | | | |

| Sample ID | Bottle Count | Bottle Type | Out of Temp | Head-space | Broken | pH | Reagent | Volume added | Reagent Lot Number | Initials |
|-----------|--------------|-------------|-------------|------------|--------|----|---------|--------------|--------------------|----------|
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

*Does not include all pH preserved sample aliquots received. See sample receiving SOP (SMO-GEN).

Additional Notes, Discrepancies, & Resolutions: _____

Total Solids

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: New Fields Environmental
Project: Se in Eggs
Sample Matrix: Tissue

Service Request: K0807359
Date Collected: 06/06/08
Date Received: 08/07/08

Solids, Total

Prep Method: NONE
Analysis Method: Freeze Dry
Test Notes:

Units: PERCENT
Basis: Wet

| Sample Name | Lab Code | Date Analyzed | Result | Result Notes |
|--------------------------------|--------------|---------------|--------|--------------|
| SM0608-LSV2c-FT001-Eggs | K0807359-001 | 08/14/08 | 28.0 | |
| SM0608-LSV2c-FT003-Eggs | K0807359-002 | 08/14/08 | 14.6 | |
| SM0608-LSV2c-FT004-Eggs | K0807359-003 | 08/14/08 | 28.8 | |
| SM0608-LSV2c-FT006-Eggs | K0807359-004 | 08/14/08 | 24.9 | |
| SM0608-CC350-FT0010-Eggs | K0807359-005 | 08/14/08 | 23.6 | |
| SM0608-CC350-FT011-Eggs | K0807359-006 | 08/14/08 | 24.9 | |
| SM0608-DC-FT013-Eggs | K0807359-007 | 08/14/08 | 26.2 | |
| SM0608-DC-FT014-Eggs | K0807359-008 | 08/14/08 | 27.6 | |
| SM0608-DC-FT015-Eggs | K0807359-009 | 08/14/08 | 23.5 | |
| SM0608-DC-FT016-Eggs | K0807359-010 | 08/14/08 | 28.3 | |
| SM0608-CC150-FT017-eggs | K0807359-011 | 08/14/08 | 20.1 | |
| SM0608-CC350-FT018-Eggs | K0807359-012 | 08/14/08 | 29.0 | |
| SM0608-CC350-FT019-Eggs | K0807359-013 | 08/14/08 | 26.2 | |
| SM0608-CC350-FT020-Eggs | K0807359-014 | 08/14/08 | 20.4 | |
| SM0608-SFTC1-FT0012-Eggs | K0807359-015 | 08/14/08 | 35.2 | |
| SM0608-LSV2c-FT001- sup larvae | K0807359-016 | 08/14/08 | 24.4 | |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: New Fields Environmental
Project: Se in Eggs
Sample Matrix: Tissue

Service Request: K0807359
Date Collected: 06/10/08
Date Received: 08/07/08
Date Extracted: NA
Date Analyzed: 08/14/08

Duplicate Summary
Total Metals

Sample Name: SM0608-DC-FT014-Eggs
Lab Code: K0807359-008D
Test Notes:

Units: PERCENT
Basis: Wet

| Analyte | Prep Method | Analysis Method | Sample Result | Duplicate Sample Result | Average | Relative Percent Difference | Result Notes |
|---------------|-------------|-----------------|---------------|-------------------------|---------|-----------------------------|--------------|
| Solids, Total | NA | Freeze Dry | 27.6 | 27.8 | 27.7 | 1 | |

COLUMBIA ANALYTICAL SERVICES, INC.

Service Request #:

K0807359

Analysis For:

Freeze Dried Solids

20grams

| Lab Code | Wet Weight (g) | Tare (g) | Tare + Dry Wt.(g) | Dry Weight (g) | % Total Solids |
|-------------|-------------------------|--------------------------|---------------------------|----------------|----------------|
| K0807359-01 | 21.783 | 79.849 | 85.954 | 6.105 | 28.0 |
| - 02 | 20.764 | 78.621 | 81.655 | 3.034 | 14.6 |
| - 03 | 21.867 | 79.875 | 86.107 | 6.292 | 28.8 |
| - 04 | 20.724 | 79.782 | 84.940 | 5.158 | 24.9 |
| - 05 | 11.810 | 79.761 | 82.554 | 2.793 | 23.6 |
| - 06 | 19.006 | 78.540 | 83.266 | 4.726 | 24.9 |
| - 07 | 21.487 | 79.830 | 85.465 | 5.635 | 26.2 |
| - 08 | 22.264 | 79.791 | 85.945 | 6.154 | 27.6 |
| - 09 | 20.164 | 78.856 79.205 | 84.537 | 4.732 | 23.5 |
| - 10 | 6.355 | 79.791 | 81.590 | 1.799 | 28.3 |
| - 11 | 13.650 | 78.508 | 81.254 | 2.748 | 20.1 |
| - 12 | 15.428 | 78.409 | 82.879 | 4.470 | 29.0 |
| - 13 | 21.956 | 79.851 | 85.597 | 5.746 | 26.2 |
| - 14 | 22.226 | 78.679 | 83.176 | 4.541 | 20.4 |
| - 15 | 21.449 | 79.803 | 87.346 | 7.543 | 35.2 |
| - 16 | 20.27 27.347 | 78.597 | 78.680 78.6818 | 0.0848 | 24.4 |
| - 80 | 22.016 | 78.856 | 84.968 | 6.112 | 27.8 |
| ASB 8/14/08 | | | | | |

Balance I.D.: 21B, 18

Time In: 3:30p.m.

Time Out: 8:30a.m.

Comments: 8/14/08

Date In: 8/14/08

Date Out: 8/18/08

\bar{x} =

RPD =

| | |
|--|----------------------|
| Analyst: <u>Cedric Aberle / Angela Black</u> | Date: <u>8-14-08</u> |
| Reviewed By: <u>[Signature]</u> | Date: <u>8/24/08</u> |

Sample Number(s):

As Listed

Service Request Number(s):

K0807359

TISSUE COMPOSITION DATA

| Laboratory ID | Weight (g) | Tare (g) | | | Matrix | Length | |
|------------------------|------------|----------|--|--|--------|--------|--|
| K0807359.01 | 30.60 | 204.27 | | | fish | | |
| - 02 | 24.92 | 204.58 | | | | | |
| - 03 | 30.15 | 204.75 | | | | | |
| - 04 | 22.56 | 204.50 | | | | | |
| - 05 | 12.33 | 205.07 | | | | | |
| - 06 | 19.67 | 205.70 | | | | | |
| - 07 | 25.71 | 205.20 | | | | | |
| - 08 | 55.56 | 204.82 | | | | | |
| - 09 | 20.74 | 204.80 | | | | | |
| - 10 | 6.72 | 204.25 | | | | | |
| - 11 | 14.67 | 206.55 | | | | | |
| - 12 | 17.17 | 206.76 | | | | | |
| - 13 | 27.78 | 206.66 | | | | | |
| - 14 | 28.92 | 197.97 | | | | | |
| - 15 | 48.35 | 197.69 | | | | | |
| - 16 | 0.710 | 206.78 | | | | | |
| LAB 8/13/08 | | | | | | | |

Comments:

| | | | |
|-----------|------------------------------|-------|---------|
| Analyst: | Cedric Aberle / Angela Black | Date: | 8-13-08 |
| Reviewed: | | Date: | 8/22/08 |

Metals

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental
Project Name: Se in Eggs
Project No.:

Service Request: K0807359

| <u>Sample Name:</u> | <u>Lab Code:</u> |
|---------------------------------------|----------------------|
| <u>SM0608-LSV2c-FT001-Eggs</u> | <u>K0807359-001</u> |
| <u>SM0608-LSV2c-FT003-Eggs</u> | <u>K0807359-002</u> |
| <u>SM0608-LSV2c-FT004-Eggs</u> | <u>K0807359-003</u> |
| <u>SM0608-LSV2c-FT006-Eggs</u> | <u>K0807359-004</u> |
| <u>SM0608-CC350-FT0010-Eggs</u> | <u>K0807359-005</u> |
| <u>SM0608-CC350-FT011-Eggs</u> | <u>K0807359-006</u> |
| <u>SM0608-DC-FT013-Eggs</u> | <u>K0807359-007</u> |
| <u>SM0608-DC-FT014-Eggs</u> | <u>K0807359-008</u> |
| <u>SM0608-DC-FT014-EggsD</u> | <u>K0807359-008D</u> |
| <u>SM0608-DC-FT014-EggsS</u> | <u>K0807359-008S</u> |
| <u>SM0608-DC-FT015-Eggs</u> | <u>K0807359-009</u> |
| <u>SM0608-DC-FT016-Eggs</u> | <u>K0807359-010</u> |
| <u>SM0608-CC150-FT017-eggs</u> | <u>K0807359-011</u> |
| <u>SM0608-CC350-FT018-Eggs</u> | <u>K0807359-012</u> |
| <u>SM0608-CC350-FT019-Eggs</u> | <u>K0807359-013</u> |
| <u>SM0608-CC350-FT020-Eggs</u> | <u>K0807359-014</u> |
| <u>SM0608-SFTC1-FT0012-Eggs</u> | <u>K0807359-015</u> |
| <u>SM0608-LSV2c-FT001- sup larvae</u> | <u>K0807359-016</u> |
| <u>Method Blank</u> | <u>K0807359-MB</u> |

Comments:

Approved By: _____



Date: _____



Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0807359
Project No.: NA Date Collected: 6/6/08
Project Name: Se in Eggs Date Received: 8/7/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC350-FT0010-Eggs Lab Code: K0807359-005

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 1.73 | 0.87 | 100.0 | 08/19/08 | 09/03/08 | 27.9 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0807359
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Eggs Date Received: 8/7/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-DC-FT013-Eggs Lab Code: K0807359-007

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.83 | 0.41 | 50.0 | 08/19/08 | 09/03/08 | 22.0 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0807359
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Eggs Date Received: 8/7/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC350-FT018-Eggs Lab Code: K0807359-012

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.93 | 0.46 | 50.0 | 08/19/08 | 09/03/08 | 22.3 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: New Fields Environmental Service Request: K0807359
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Eggs Date Received: 8/7/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC350-FT019-Eggs Lab Code: K0807359-013

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.92 | 0.46 | 50.0 | 08/19/08 | 09/03/08 | 14.6 | | |

Comments:

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 7.5 | 7.76 | 103 | 7.5 | 7.68 | 102 | 7.77 | 104 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.72 | 103 | 7.74 | 103 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.69 | 103 | 7.59 | 101 | 7742 |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-----|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.2 | 0.27 | 135 | | | | | |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Units: MG/KG

Project Name: Se in Eggs

Basis: DRY

Matrix: TISSUE

Sample Name: SM0608-DC-FT014-EggsS

Lab Code: K0807359-008S

| Analyte | Control Limit %R | Spike Result | C | Sample Result | C | Spike Added | %R | Q | Method |
|----------|------------------|--------------|---|---------------|---|-------------|-------|---|--------|
| Selenium | 60 - 130 | 19.6 | | 15.4 | | 3.96 | 106.1 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Aqueous LCS Source:

Solid LCS Source: NRCC TORT

| Analyte | Aqueous (ug/L) | | | Solid (mg/kg) | | | | |
|----------|----------------|-------|----|---------------|-------|---|-------------|------|
| | True | Found | %R | True | Found | C | Limits | %R |
| Selenium | | | | 5.63 | 4.43 | | 3.97 7.56 | 78.7 |

Metals

- 10 -

DETECTION LIMITS

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02

AA ID #:

| Analyte | Wave-length (nm) | Back-ground | MRL ug/L | MDL ug/L | M |
|----------|------------------|-------------|----------|----------|---|
| Selenium | | | 0.2 | 0.1 | H |

Comments:

Metals
-13-
PREPARATION LOG

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Method: F

| Sample ID | Preparation Date | Initial Volume | Final Volume (mL) |
|---------------|------------------|----------------|-------------------|
| K0807359-001 | 08/19/08 | 0.3430 | 30.0 |
| K0807359-002 | 08/19/08 | 0.3060 | 30.0 |
| K0807359-003 | 08/19/08 | 0.3210 | 30.0 |
| K0807359-004 | 08/19/08 | 0.3380 | 30.0 |
| K0807359-005 | 08/19/08 | 0.3460 | 30.0 |
| K0807359-006 | 08/19/08 | 0.3170 | 30.0 |
| K0807359-007 | 08/19/08 | 0.3620 | 30.0 |
| K0807359-008 | 08/19/08 | 0.3060 | 30.0 |
| K0807359-008D | 08/19/08 | 0.3120 | 30.0 |
| K0807359-008S | 08/19/08 | 0.3030 | 30.0 |
| K0807359-009 | 08/19/08 | 0.3850 | 30.0 |
| K0807359-010 | 08/19/08 | 0.3270 | 30.0 |
| K0807359-011 | 08/19/08 | 0.3060 | 30.0 |
| K0807359-012 | 08/19/08 | 0.3240 | 30.0 |
| K0807359-013 | 08/19/08 | 0.3260 | 30.0 |
| K0807359-014 | 08/19/08 | 0.3140 | 30.0 |
| K0807359-015 | 08/19/08 | 0.3240 | 30.0 |
| K0807359-016 | 08/19/08 | 0.0848 | 10.0 |
| K0807359-MB | 08/19/08 | 0.3000 | 30.0 |
| LCSS TORT | 08/19/08 | 0.3070 | 30.0 |

Metals
- 14 -
ANALYSIS RUN LOG

Client: New Fields Environmental

Service Request: K0807359

Project No.: NA

Project Name: Se in Eggs

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 9/3/08

End Date: 9/3/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| CAL BLK | 1 | 09:01 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 0.2 | 1 | 09:03 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 0.5 | 1 | 09:05 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 1.0 | 1 | 09:08 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 5.0 | 1 | 09:10 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 7.5 | 1 | 09:12 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 10.0 | 1 | 09:15 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICV1 | 1 | 09:17 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICB1 | 1 | 09:20 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CRA | 1 | 09:22 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCV1 | 1 | 09:24 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB1 | 1 | 09:27 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| LCSS TORT | 10 | 09:29 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 10 | 09:31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-001 | 50 | 09:34 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 09:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-002 | 50 | 09:38 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 09:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-003 | 50 | 09:43 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 09:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-004 | 50 | 09:48 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 09:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV2 | 1 | 09:53 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB2 | 1 | 09:55 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 09:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-006 | 50 | 10:02 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 10:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-007 | 50 | 10:07 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 10:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0807359-008 | 50 | 10:11 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 50 | 10:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Columbia Analytical Services
Metals Tissue Digestion Sheet

| Service Request Number(s): <u>K0807359</u> | | | | | |
|--|--------------------|------------|-------------------------------|-------------------|----------------|
| Star Lims Run No.: <u>72513</u> | | | Analysis for: ICP ICP-MS GFAA | | |
| Method: Tissue | | | other: <u>Se Hydride</u> | | |
| Sample | Initial Weight (g) | freeze Dry | Wet | Final Volume (ml) | Matrix |
| PB | | | X | <u>30mls</u> | <u>15/HNO3</u> |
| TORT-2 | <u>0.307</u> | | <u>I</u> | | |
| K0807359-01 | <u>0.343</u> | X | | | |
| - 02 | <u>0.306</u> | | | | |
| - 03 | <u>0.321</u> | | | | |
| - 04 | <u>0.338</u> | | | | |
| - 05 | <u>0.346</u> | | | | |
| - 06 | <u>0.317</u> | | | | |
| - 07 | <u>0.362</u> | | | | |
| - 08 | <u>0.306</u> | | | | |
| - 08D | <u>0.312</u> | | | | |
| - 08S | <u>0.303</u> | | | | |
| - 09 | <u>0.385</u> | | | | |
| - 10 | <u>0.327</u> | | | | |
| - 11 | <u>0.306</u> | | | | |
| - 12 | <u>0.324</u> | | | | |
| - 13 | <u>0.326</u> | | | | |
| - 14 | <u>0.314</u> | | | | |
| - 15 | <u>0.324</u> | | | | |
| - 16 | <u>0.0848</u> | | | <u>10mls</u> | |
| <u>LAB 8/19/08</u> | | | | | |

Time Digestion Started: 12:30pm 8/19/08 Oven Temp: 106°C

Time Digestion Ended: 8:30a.m. 8/21/08

Lot # Acids Used: HNO3 MS12-24-J

Oven Temp: 129°C

LCS: Dorm-23 Tort-2

Balance I.D.: 21-B

QCP CICV-1, MET1-63-A, _____ mls. added
 QCP CICV-2, MET1-63-B, _____ mls. added
 QCP CICV-3, MET1-63-C, _____ mls. Added
 SS6, MET1-67-S, _____ mls. Added

SPIKE INFO

SS1-MET1-66-D, _____ mls added
 SS5-MET1-67-T, _____ mls added
 SS6-MET1-67-S, _____ mls added

Additional spikes: +0.3mls SS4-MET1-67-P

Comments:

| | |
|-----------------------------|---------------------|
| Analyst <u>Angela Brack</u> | Date <u>8/19/08</u> |
| Reviewer <u>[Signature]</u> | Date <u>8/21/08</u> |

TissueDig.xls
7/16/2008

Service Request # K0807359
 Q.C. Sample # K0807359 8

Circle type of digest: GFAA ICP FAA ICP-MS Other: De Hyundai Initials / Date: AD, 8/19/08
 Circle type of sample: Soil Water Misc. Sludge Oil Other: _____

| Solution Name | Element | mLs of 1000ppm Solution | Final Volume | Solution Conc. mg/L | Enter mls Added |
|---------------|---------|-------------------------|--------------|---------------------|-----------------|
| SS1-MET1-66-D | HNO3 | 50.0 | 1000ml | - | |
| | Al | 100* | 1000ml | 200 | |
| | Ag | 100* | 1000ml | 5 | |
| | Ba | 100* | 1000ml | 200 | |
| | Be | 100* | 1000ml | 5 | |
| | Cd | 100* | 1000ml | 5 | |
| | Co | 100* | 1000ml | 50 | |
| | Cr | 100* | 1000ml | 20 | |
| | Cu | 100* | 1000ml | 25 | |
| | Fe | 100* | 1000ml | 100 | |
| | Pb | 100* | 1000ml | 50 | |
| | Mn | 100* | 1000ml | 50 | |
| | Ni | 100* | 1000ml | 50 | |
| | Sb | 50 | 1000ml | 50 | |
| | V | 100* | 1000ml | 50 | |
| Zn | 100* | 1000ml | 50 | | |
| SS4-MET1-67-P | HNO3 | 25.0 | 500ml | - | |
| | As | 2.0 | 500ml | 4 | 0.3 |
| | Cd | 2.0 | 500ml | 4 | |
| | Pb | 2.0 | 500ml | 4 | |
| | Se | 2.0 | 500ml | 4 | |
| | Tl | 2.0 | 500ml | 4 | |
| | Cu | 2.0 | 500ml | 4 | |
| SS5-MET1-67-T | HNO3 | 25.0 | 500ml | - | |
| | As | 50.0 | 500ml | 100 | |
| | Se | 50.0 | 500ml | 100 | |
| | Tl | 50.0 | 500ml | 100 | |
| SS6-MET1-67-S | HNO3 | 25 | 500ml | - | |
| | B | 50 | 500ml | 100 | |
| | Mo | 50 | 500ml | 100 | |
| SS7-MET1-66-C | HNO3 | 10.0 | 200ml | - | |
| | K | 20 | 200ml | 1000 | |
| | Na | 20 | 200ml | 1000 | |
| | Mg | 20 | 200ml | 1000 | |
| | Ca | 20 | 200ml | 1000 | |

Expires: 4/1/09

Expires: 1/2/09

Expires: 1/6/09

Expires: 2/01/09

Expires: 11/16/08

| | | | | | |
|------------------------|-------------------|-------------|--------|------|--|
| GFLCSW (MET1-64-R) | HNO3 | 10.0 | 1000ml | - | |
| | As, Pb, Se, Tl | 5.0 | 1000ml | 2.5 | |
| | Cd | - | - | 1.25 | |
| | Cu | 2.5 | 1000ml | 2.5 | |
| QCP-CICV-1 (MET1-66-G) | Ca, Mg, Na, K | no dilution | - | 2500 | |
| | Al, Ba | no dilution | - | 1000 | |
| | Fe | no dilution | - | 500 | |
| | Co, Mn, Ni, V, Zn | no dilution | - | 250 | |
| | Cu, Ag | no dilution | - | 125 | |
| | Cr | no dilution | - | 100 | |
| | Be | no dilution | - | 25 | |
| QCP-CICV-2 (MET1-66-E) | Sb | no dilution | - | 500 | |
| QCP-CICV-3 (MET1-66-F) | As, Pb, Se, Tl | no dilution | - | 500 | |
| | Cd | no dilution | - | 250 | |

Expires: 1/1/09

Expires: 7/1/09

Expires: 7/1/09

Expires: 7/1/09

* Denotes volume of mixed stock standard.

| Standard | mls of standard | ppm | Logbook # | Exp. Date |
|----------|-----------------|-----|-----------|-----------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Element Analyzed ^{Se} ~~As~~ Hydride Instrument K-FLAA-2
 Service Request # ^{JOB} K0807359

Batch QC SR's # _____

Calibration Std. AA1-8-A Analytical Batch _____
 Starlims # _____ KA0630276
 Run # 090308-Se

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

Primary Reviewed by *JOB* Date 9/3/08
 Secondary Reviewed by JOB Date 9/3/08

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|--|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As, Se | Service Request # : |
|--|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------------|---------------------|-------------------|--|--------------------|
| | | | | Post Spike = 5 ppb |
| ICV | - | 7.756 | 103% | |
| ICB | - | 0.058 | | |
| CRA | - | 0.273 | 137% | |
| CCV | - | 7.684 | 102% | |
| CCB | - | 0.015 | | |
| TORT K0807359 | 1/5+1/2 | 2.704 | 79% | Cx = 4.200 |
| TORTA K0807359 | 1/5+1/2 | 5.923 | 64% | |
| K0807359-001 | 1/5+1/10 | 6.334 | | Cx = 9.180 |
| K0807359-001A | 1/5+1/10 | 9.786 | 69% | |
| K0807359-002 | 1/5+1/10 | 4.167 | | Cx = 6.128 |
| K0807359-002A | 1/5+1/10 | 7.566 | 68% | |
| K0807359-003 | 1/5+1/10 | 5.980 | | Cx = 7.628 |
| K0807359-003A | 1/5+1/10 | 9.899 | 78% | |
| K0807359-004 | 1/5+1/10 | 5.432 | | Cx = 6.867 |
| K0807359-004A | 1/5+1/10 | 9.389 | 79% | |
| CCV | - | 7.765 | 104% | |
| CCB | - | 0.050 | | |
| K0807359-005 | 1/5+1/10 | 6.515 | | Rerun |
| K0807359-005A | 1/5+1/10 | 10.393 | | Rerun |
| K0807359-006 | 1/5+1/10 | 4.923 | | Cx = 6.287 |
| K0807359-006A | 1/5+1/10 | 8.837 | 78% | |
| K0807359-007 | 1/5+1/10 | 3.846 | | Cx = 5.312 |
| K0807359-007A | 1/5+1/10 | 7.466 | 72% | |
| K0807359-008 | 1/5+1/10 | 2.616 | | Cx = 3.137 |
| K0807359-008A | 1/5+1/10 | 6.786 | 83% | |
| K0807359-008D | 1/5+1/10 | 2.663 | | Cx = 3.170 |
| K0807359-008DA | 1/5+1/10 | 6.861 | 84% | |
| CCV | - | 7.724 | 103% | |
| CCB | - | 0.246 | | Rerun |
| CCB | - | -0.082 | | |

9/3/08

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|------------------------------|-----------------|-------------------|
| Analyst <i>Jana Jurek</i> | Date: 9/3/08 | Page Number: 1 |
|------------------------------|-----------------|-------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As Se | Service Request # : _____ |
|---|---------------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------------|---------------------|-------------------|--|------------|
| K0807359-008S | 1/5+1/10 | 3.397 | 104% | Cx = 3.968 |
| K0807359-008SA | 1/5+1/10 | 7.679 | 86% | |
| K0807359-009 | 1/5+1/10 | 2.488 | | Cx = 2.937 |
| K0807359-009A | 1/5+1/10 | 6.722 | 85% | |
| K0807359-010 | 1/5+1/10 | 2.482 | | Cx = 2.758 |
| K0807359-010A | 1/5+1/10 | 6.977 | 90% | |
| K0807359-011 | 1/5+1/10 | 3.161 | | Cx = 3.592 |
| K0807359-011A | 1/5+1/10 | 7.563 | 88% | |
| K0807359-012 | 1/5+1/10 | 4.141 | | Cx = 4.821 |
| K0807359-012A | 1/5+1/10 | 8.438 | 86% | |
| CCV | - | 7.742 | 103% | |
| CCB | - | 0.003 | | |
| K0807359-013 | 1/5+1/10 | 2.706 | | Cx = 3.180 |
| K0807359-013A | 1/5+1/10 | 6.963 | 85% | |
| K0807359-014 | 1/5+1/10 | 7.253 | | Rerun |
| K0807359-014A | 1/5+1/10 | 10.916 | | Rerun |
| K0807359-015 | 1/5+1/10 | 0.333 | | Rerun |
| K0807359-015A | 1/5+1/10 | 4.869 | | Rerun |
| K0807359-016 | 1/5+1/10 | 5.584 | | Cx = 7.271 |
| K0807359-016A | 1/5+1/10 | 9.426 | 77% | |
| K0807359-MB | 1/5 | 0.657 | | Rerun |
| CCV | - | 7.691 | 103% | |
| CCB | - | 0.006 | | |
| K0807359-MB | 1/5 | 0.127 | | |
| K0807359-005 1/20 | 1/5+1/20 | 3.125 | | Cx = 3.222 |
| K0807359-005A 1/20 | 1/5+1/20 | 7.975 | 97% | |
| K0807359-0014 1/20 | 1/5+1/20 | 4.074 | | Cx = 4.980 |
| K0807359-014A 1/20 | 1/5+1/20 | 8.163 | 82% | |
| K0807359-0015 1/5 | 1/5+1/5 | 1.001 | | Cx = 1.485 |
| K0807359-015A 1/5 | 1/5+1/5 | 4.371 | 67% | |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-----------------------------|-----------------|-------------------|
| Analyst <i>Dena Just</i> | Date: 9/3/08 | Page Number: 2 |
|-----------------------------|-----------------|-------------------|

Sample ID: Std 1.0
Analyst:

Date Collected: 9/3/2008 9:08:08 AM
Data Type: Original

Replicate Data: Std 1.0

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [1.0] | 0.024 | 0.148 | 0.034 | | | 09:08:31 | Yes |
| 2 | | [1.0] | 0.026 | 0.152 | 0.036 | | | 09:09:05 | Yes |
| 3 | | [1.0] | 0.024 | 0.129 | 0.035 | | | 09:09:39 | Yes |
| Mean: | | [1.0] | 0.025 | | | | | | |
| SD: | | | 0.0 | 0.0008 | | | | | |
| %RSD: | | | 0.0 | 3.21 | | | | | |

Standard number 3 applied. [1.0]
Correlation Coef.: 0.999677 Slope: 0.02482 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 5.0
Analyst:

Autosampler Location: 5
Date Collected: 9/3/2008 9:10:30 AM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.121 | 0.572 | 0.131 | | | 09:10:53 | Yes |
| 2 | | [5.0] | 0.119 | 0.529 | 0.129 | | | 09:11:27 | Yes |
| 3 | | [5.0] | 0.121 | 0.552 | 0.131 | | | 09:12:02 | Yes |
| Mean: | | [5.0] | 0.120 | | | | | | |
| SD: | | | 0.0 | 0.0009 | | | | | |
| %RSD: | | | 0.0 | 0.71 | | | | | |

Standard number 4 applied. [5.0]
Correlation Coef.: 0.999953 Slope: 0.02411 Intercept: 0.00000

Sequence No.: 6
Sample ID: Std 7.5
Analyst:

Autosampler Location: 6
Date Collected: 9/3/2008 9:12:53 AM
Data Type: Original

Replicate Data: Std 7.5

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [7.5] | 0.177 | 0.824 | 0.187 | | | 09:13:16 | Yes |
| 2 | | [7.5] | 0.175 | 0.790 | 0.185 | | | 09:13:50 | Yes |
| 3 | | [7.5] | 0.172 | 0.773 | 0.182 | | | 09:14:24 | Yes |
| Mean: | | [7.5] | 0.175 | | | | | | |
| SD: | | | 0.0 | 0.0022 | | | | | |
| %RSD: | | | 0.0 | 1.28 | | | | | |

Standard number 5 applied. [7.5]
Correlation Coef.: 0.999731 Slope: 0.02356 Intercept: 0.00000

Sequence No.: 7
Sample ID: Std 10.0
Analyst:

Autosampler Location: 7
Date Collected: 9/3/2008 9:15:16 AM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10] | 0.221 | 1.043 | 0.231 | | | 09:15:40 | Yes |
| 2 | | [10] | 0.217 | 1.003 | 0.227 | | | 09:16:14 | Yes |
| 3 | | [10] | 0.222 | 0.984 | 0.232 | | | 09:16:48 | Yes |
| Mean: | | [10] | 0.220 | | | | | | |
| SD: | | | 0 | 0.0025 | | | | | |
| %RSD: | | | 0 | 1.15 | | | | | |

Standard number 6 applied. [10]
Correlation Coef.: 0.998597 Slope: 0.02273 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03 Equation: Linear Through Zero

Table with 7 columns: ID, Mean Signal (Abs), Entered Conc. ug/L, Calculated Conc. ug/L, Standard Deviation, %RSD. Rows include Cal Blk, Std 0.2, Std 0.5, Std 1.0, Std 5.0, Std 7.5, Std 10.0.

Correlation Coef.: 0.998597 Slope: 0.02273 Intercept: 0.00000

Sequence No.: 8 Autosampler Location: 8
Sample ID: ICV Date Collected: 9/3/2008 9:17:39 AM
Analyst: Data Type: Original

Replicate Data: ICV

Table with 10 columns: Repl #, Sample Conc ug/L, Stnd Conc ug/L, Blnk Corr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes Mean, SD, and %RSD values.

QC value within limits for Se 196.03 Recovery = 103.42%
All analyte(s) passed QC.

Sequence No.: 9 Autosampler Location: 1
Sample ID: ICB Date Collected: 9/3/2008 9:20:05 AM
Analyst: Data Type: Original

Replicate Data: ICB

Table with 10 columns: Repl #, Sample Conc ug/L, Stnd Conc ug/L, Blnk Corr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes Mean, SD, and %RSD values.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 10 Autosampler Location: 2
Sample ID: CRA Date Collected: 9/3/2008 9:22:23 AM
Analyst: Data Type: Original

Replicate Data: CRA

Table with 10 columns: Repl #, Sample Conc ug/L, Stnd Conc ug/L, Blnk Corr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Mean: 0.273 0.273 0.006
 SD: 0.022 0.022 0.0005
 %RSD: 8.238 8.238 8.24

QC value within limits for Se 196.03 Recovery = 136.56%
 All analyte(s) passed QC.

Sequence No.: 11
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 9/3/2008 9:24:43 AM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.628 | 7.628 | 0.173 | 0.802 | 0.183 | | | 09:25:06 | Yes |
| 2 | 7.697 | 7.697 | 0.175 | 0.803 | 0.185 | | | 09:25:41 | Yes |
| 3 | 7.727 | 7.727 | 0.176 | 0.801 | 0.186 | | | 09:26:15 | Yes |
| Mean: | 7.684 | 7.684 | 0.175 | | | | | | |
| SD: | 0.051 | 0.051 | 0.0012 | | | | | | |
| %RSD: | 0.662 | 0.662 | 0.66 | | | | | | |

QC value within limits for Se 196.03 Recovery = 102.46%
 All analyte(s) passed QC.

Sequence No.: 12
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 9/3/2008 9:27:08 AM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.042 | 0.042 | 0.001 | 0.049 | 0.011 | | | 09:27:29 | Yes |
| 2 | 0.016 | 0.016 | 0.000 | 0.050 | 0.010 | | | 09:28:03 | Yes |
| 3 | -0.013 | -0.013 | -0.000 | 0.019 | 0.010 | | | 09:28:37 | Yes |
| Mean: | 0.015 | 0.015 | 0.000 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0006 | | | | | | |
| %RSD: | 180.1 | 180.1 | 180.11 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 13
 Sample ID: TORT K0807359
 Analyst:

Autosampler Location: 9
 Date Collected: 9/3/2008 9:29:26 AM
 Data Type: Original

Replicate Data: TORT K0807359

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.743 | 2.743 | 0.062 | 0.334 | 0.072 | | | 09:29:47 | Yes |
| 2 | 2.662 | 2.662 | 0.061 | 0.335 | 0.071 | | | 09:30:22 | Yes |
| 3 | 2.706 | 2.706 | 0.062 | 0.324 | 0.072 | | | 09:30:56 | Yes |
| Mean: | 2.704 | 2.704 | 0.061 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0009 | | | | | | |
| %RSD: | 1.501 | 1.501 | 1.50 | | | | | | |

Sequence No.: 14
 Sample ID: TORTA K0807359
 Analyst:

Autosampler Location: 10
 Date Collected: 9/3/2008 9:31:45 AM
 Data Type: Original

Replicate Data: TORTA K0807359

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 1 | 5.764 | 5.764 | 0.131 | 0.658 | 0.141 | 09:32:07 | Yes |
| 2 | 5.935 | 5.935 | 0.135 | 0.653 | 0.145 | 09:32:42 | Yes |
| 3 | 6.070 | 6.070 | 0.138 | 0.666 | 0.148 | 09:33:17 | Yes |
| Mean: | 5.923 | 5.923 | 0.135 | | | | |
| SD: | 0.153 | 0.153 | 0.0035 | | | | |
| %RSD: | 2.589 | 2.589 | 2.59 | | | | |

Sequence No.: 15
 Sample ID: K0807359-001
 Analyst:

Autosampler Location: 11
 Date Collected: 9/3/2008 9:34:07 AM
 Data Type: Original

Replicate Data: K0807359-001

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.290 | 6.290 | 0.143 | 0.694 | 0.153 | | | 09:34:29 | Yes |
| 2 | 6.274 | 6.274 | 0.143 | 0.674 | 0.153 | | | 09:35:03 | Yes |
| 3 | 6.439 | 6.439 | 0.146 | 0.680 | 0.156 | | | 09:35:37 | Yes |
| Mean: | 6.334 | 6.334 | 0.144 | | | | | | |
| SD: | 0.091 | 0.091 | 0.0021 | | | | | | |
| %RSD: | 1.434 | 1.434 | 1.43 | | | | | | |

Sequence No.: 16
 Sample ID: K0807359-001A
 Analyst:

Autosampler Location: 12
 Date Collected: 9/3/2008 9:36:27 AM
 Data Type: Original

Replicate Data: K0807359-001A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.614 | 9.614 | 0.219 | 1.035 | 0.229 | | | 09:36:50 | Yes |
| 2 | 9.552 | 9.552 | 0.217 | 1.042 | 0.227 | | | 09:37:25 | Yes |
| 3 | 10.19 | 10.19 | 0.232 | 1.052 | 0.242 | | | 09:37:59 | Yes |
| Mean: | 9.786 | 9.786 | 0.222 | | | | | | |
| SD: | 0.354 | 0.354 | 0.0080 | | | | | | |
| %RSD: | 3.618 | 3.618 | 3.62 | | | | | | |

Sequence No.: 17
 Sample ID: K0807359-002
 Analyst:

Autosampler Location: 13
 Date Collected: 9/3/2008 9:38:49 AM
 Data Type: Original

Replicate Data: K0807359-002

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.220 | 4.220 | 0.096 | 0.462 | 0.106 | | | 09:39:12 | Yes |
| 2 | 4.163 | 4.163 | 0.095 | 0.454 | 0.105 | | | 09:39:46 | Yes |
| 3 | 4.119 | 4.119 | 0.094 | 0.445 | 0.104 | | | 09:40:20 | Yes |
| Mean: | 4.167 | 4.167 | 0.095 | | | | | | |
| SD: | 0.051 | 0.051 | 0.0012 | | | | | | |
| %RSD: | 1.217 | 1.217 | 1.22 | | | | | | |

Sequence No.: 18
 Sample ID: K0807359-002A
 Analyst:

Autosampler Location: 14
 Date Collected: 9/3/2008 9:41:12 AM
 Data Type: Original

Replicate Data: K0807359-002A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.587 | 7.587 | 0.172 | 0.820 | 0.183 | | | 09:41:35 | Yes |
| 2 | 7.493 | 7.493 | 0.170 | 0.792 | 0.180 | | | 09:42:10 | Yes |
| 3 | 7.619 | 7.619 | 0.173 | 0.805 | 0.183 | | | 09:42:44 | Yes |

Mean: 7.566 7.566 0.172
SD: 0.066 0.066 0.0015
%RSD: 0.869 0.869 0.87

Sequence No.: 19
Sample ID: K0807359-003
Analyst:

Autosampler Location: 15
Date Collected: 9/3/2008 9:43:35 AM
Data Type: Original

Replicate Data: K0807359-003

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.906 | 5.906 | 0.134 | 0.563 | 0.144 | | | 09:43:59 | Yes |
| 2 | 5.923 | 5.923 | 0.135 | 0.551 | 0.145 | | | 09:44:34 | Yes |
| 3 | 6.113 | 6.113 | 0.139 | 0.629 | 0.149 | | | 09:45:08 | Yes |
| Mean: | 5.980 | 5.980 | 0.136 | | | | | | |
| SD: | 0.115 | 0.115 | 0.0026 | | | | | | |
| %RSD: | 1.923 | 1.923 | 1.92 | | | | | | |

Sequence No.: 20
Sample ID: K0807359-003A
Analyst:

Autosampler Location: 16
Date Collected: 9/3/2008 9:45:59 AM
Data Type: Original

Replicate Data: K0807359-003A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.65 | 10.65 | 0.242 | 1.069 | 0.252 | | | 09:46:24 | Yes |
| 2 | 9.456 | 9.456 | 0.215 | 1.000 | 0.225 | | | 09:47:01 | Yes |
| 3 | 9.595 | 9.595 | 0.218 | 1.023 | 0.228 | | | 09:47:35 | Yes |
| Mean: | 9.899 | 9.899 | 0.225 | | | | | | |
| SD: | 0.650 | 0.650 | 0.0148 | | | | | | |
| %RSD: | 6.568 | 6.568 | 6.57 | | | | | | |

Sequence No.: 21
Sample ID: K0807359-004
Analyst:

Autosampler Location: 17
Date Collected: 9/3/2008 9:48:28 AM
Data Type: Original

Replicate Data: K0807359-004

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.462 | 5.462 | 0.124 | 0.589 | 0.134 | | | 09:48:49 | Yes |
| 2 | 5.459 | 5.459 | 0.124 | 0.595 | 0.134 | | | 09:49:24 | Yes |
| 3 | 5.374 | 5.374 | 0.122 | 0.585 | 0.132 | | | 09:49:58 | Yes |
| Mean: | 5.432 | 5.432 | 0.123 | | | | | | |
| SD: | 0.049 | 0.049 | 0.0011 | | | | | | |
| %RSD: | 0.911 | 0.911 | 0.91 | | | | | | |

Sequence No.: 22
Sample ID: K0807359-004A
Analyst:

Autosampler Location: 18
Date Collected: 9/3/2008 9:50:47 AM
Data Type: Original

Replicate Data: K0807359-004A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.447 | 9.447 | 0.215 | 1.017 | 0.225 | | | 09:51:08 | Yes |
| 2 | 9.309 | 9.309 | 0.212 | 0.994 | 0.222 | | | 09:51:42 | Yes |
| 3 | 9.411 | 9.411 | 0.214 | 0.988 | 0.224 | | | 09:52:16 | Yes |
| Mean: | 9.389 | 9.389 | 0.213 | | | | | | |
| SD: | 0.072 | 0.072 | 0.0016 | | | | | | |
| %RSD: | 0.762 | 0.762 | 0.76 | | | | | | |

Sequence No.: 23
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 9/3/2008 9:53:05 AM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.894 | 7.894 | 0.179 | 0.823 | 0.190 | | | 09:53:28 | Yes |
| 2 | 7.732 | 7.732 | 0.176 | 0.808 | 0.186 | | | 09:54:02 | Yes |
| 3 | 7.670 | 7.670 | 0.174 | 0.786 | 0.184 | | | 09:54:37 | Yes |
| Mean: | 7.765 | 7.765 | 0.176 | | | | | | |
| SD: | 0.115 | 0.115 | 0.0026 | | | | | | |
| %RSD: | 1.484 | 1.484 | 1.48 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.54%
 All analyte(s) passed QC.

Sequence No.: 24
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 9/3/2008 9:55:29 AM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.109 | 0.109 | 0.002 | 0.056 | 0.013 | | | 09:55:50 | Yes |
| 2 | 0.056 | 0.056 | 0.001 | 0.043 | 0.011 | | | 09:56:24 | Yes |
| 3 | -0.015 | -0.015 | -0.000 | 0.038 | 0.010 | | | 09:56:58 | Yes |
| Mean: | 0.050 | 0.050 | 0.001 | | | | | | |
| SD: | 0.062 | 0.062 | 0.0014 | | | | | | |
| %RSD: | 125.4 | 125.4 | 125.38 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 25
 Sample ID: K0807359-005
 Analyst:

Autosampler Location: 19
 Date Collected: 9/3/2008 9:57:47 AM
 Data Type: Original

Replicate Data: K0807359-005

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.309 | 6.309 | 0.143 | 0.669 | 0.153 | | | 09:58:08 | Yes |
| 2 | 6.890 | 6.890 | 0.157 | 0.681 | 0.167 | | | 09:58:42 | Yes |
| 3 | 6.346 | 6.346 | 0.144 | 0.665 | 0.154 | | | 09:59:17 | Yes |
| Mean: | 6.515 | 6.515 | 0.148 | | | | | | |
| SD: | 0.325 | 0.325 | 0.0074 | | | | | | |
| %RSD: | 4.992 | 4.992 | 4.99 | | | | | | |

9/3/08

Sequence No.: 26
 Sample ID: K0807359-005A
 Analyst:

Autosampler Location: 20
 Date Collected: 9/3/2008 10:00:06 AM
 Data Type: Original

Replicate Data: K0807359-005A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.45 | 10.45 | 0.237 | 1.099 | 0.248 | | | 10:00:27 | Yes |
| 2 | 10.35 | 10.35 | 0.235 | 1.074 | 0.245 | | | 10:01:01 | Yes |
| 3 | 10.38 | 10.38 | 0.236 | 1.091 | 0.246 | | | 10:01:36 | Yes |
| Mean: | 10.39 | 10.39 | 0.236 | | | | | | |
| SD: | 0.050 | 0.050 | 0.0011 | | | | | | |

%RSD: 0.483 0.483 0.48

Sequence No.: 27
Sample ID: K0807359-006
Analyst:

Autosampler Location: 21
Date Collected: 9/3/2008 10:02:26 AM
Data Type: Original

Replicate Data: K0807359-006

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.076 | 5.076 | 0.115 | 0.563 | 0.125 | | | 10:02:47 | Yes |
| 2 | 4.830 | 4.830 | 0.110 | 0.535 | 0.120 | | | 10:03:21 | Yes |
| 3 | 4.863 | 4.863 | 0.111 | 0.509 | 0.121 | | | 10:03:56 | Yes |
| Mean: | 4.923 | 4.923 | 0.112 | | | | | | |
| SD: | 0.134 | 0.134 | 0.0030 | | | | | | |
| %RSD: | 2.719 | 2.719 | 2.72 | | | | | | |

Sequence No.: 28
Sample ID: K0807359-006A
Analyst:

Autosampler Location: 22
Date Collected: 9/3/2008 10:04:46 AM
Data Type: Original

Replicate Data: K0807359-006A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.805 | 8.805 | 0.200 | 0.944 | 0.210 | | | 10:05:08 | Yes |
| 2 | 8.838 | 8.838 | 0.201 | 0.946 | 0.211 | | | 10:05:43 | Yes |
| 3 | 8.869 | 8.869 | 0.202 | 0.924 | 0.212 | | | 10:06:17 | Yes |
| Mean: | 8.837 | 8.837 | 0.201 | | | | | | |
| SD: | 0.032 | 0.032 | 0.0007 | | | | | | |
| %RSD: | 0.362 | 0.362 | 0.36 | | | | | | |

Sequence No.: 29
Sample ID: K0807359-007
Analyst:

Autosampler Location: 23
Date Collected: 9/3/2008 10:07:07 AM
Data Type: Original

Replicate Data: K0807359-007

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.860 | 3.860 | 0.088 | 0.445 | 0.098 | | | 10:07:29 | Yes |
| 2 | 3.860 | 3.860 | 0.088 | 0.423 | 0.098 | | | 10:08:04 | Yes |
| 3 | 3.818 | 3.818 | 0.087 | 0.420 | 0.097 | | | 10:08:39 | Yes |
| Mean: | 3.846 | 3.846 | 0.087 | | | | | | |
| SD: | 0.024 | 0.024 | 0.0005 | | | | | | |
| %RSD: | 0.623 | 0.623 | 0.62 | | | | | | |

Sequence No.: 30
Sample ID: K0807359-007A
Analyst:

Autosampler Location: 24
Date Collected: 9/3/2008 10:09:29 AM
Data Type: Original

Replicate Data: K0807359-007A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.515 | 7.515 | 0.171 | 0.818 | 0.181 | | | 10:09:51 | Yes |
| 2 | 7.299 | 7.299 | 0.166 | 0.781 | 0.176 | | | 10:10:26 | Yes |
| 3 | 7.583 | 7.583 | 0.172 | 0.796 | 0.182 | | | 10:11:00 | Yes |
| Mean: | 7.466 | 7.466 | 0.170 | | | | | | |
| SD: | 0.148 | 0.148 | 0.0034 | | | | | | |
| %RSD: | 1.988 | 1.988 | 1.99 | | | | | | |

Sequence No.: 31
 Sample ID: K0807359-008
 Analyst:

Autosampler Location: 25
 Date Collected: 9/3/2008 10:11:50 AM
 Data Type: Original

 Replicate Data: K0807359-008

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.615 | 2.615 | 0.059 | 0.307 | 0.070 | | | 10:12:16 | Yes |
| 2 | 2.630 | 2.630 | 0.060 | 0.307 | 0.070 | | | 10:12:50 | Yes |
| 3 | 2.603 | 2.603 | 0.059 | 0.301 | 0.069 | | | 10:13:24 | Yes |
| Mean: | 2.616 | 2.616 | 0.059 | | | | | | |
| SD: | 0.014 | 0.014 | 0.0003 | | | | | | |
| %RSD: | 0.529 | 0.529 | 0.53 | | | | | | |

Sequence No.: 32
 Sample ID: K0807359-008A
 Analyst:

Autosampler Location: 26
 Date Collected: 9/3/2008 10:14:15 AM
 Data Type: Original

 Replicate Data: K0807359-008A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.675 | 6.675 | 0.152 | 0.722 | 0.162 | | | 10:14:38 | Yes |
| 2 | 6.793 | 6.793 | 0.154 | 0.718 | 0.165 | | | 10:15:12 | Yes |
| 3 | 6.889 | 6.889 | 0.157 | 0.723 | 0.167 | | | 10:15:46 | Yes |
| Mean: | 6.786 | 6.786 | 0.154 | | | | | | |
| SD: | 0.107 | 0.107 | 0.0024 | | | | | | |
| %RSD: | 1.584 | 1.584 | 1.58 | | | | | | |

Sequence No.: 33
 Sample ID: K0807359-008D
 Analyst:

Autosampler Location: 27
 Date Collected: 9/3/2008 10:16:37 AM
 Data Type: Original

 Replicate Data: K0807359-008D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.716 | 2.716 | 0.062 | 0.312 | 0.072 | | | 10:17:00 | Yes |
| 2 | 2.631 | 2.631 | 0.060 | 0.300 | 0.070 | | | 10:17:34 | Yes |
| 3 | 2.643 | 2.643 | 0.060 | 0.300 | 0.070 | | | 10:18:08 | Yes |
| Mean: | 2.663 | 2.663 | 0.061 | | | | | | |
| SD: | 0.046 | 0.046 | 0.0010 | | | | | | |
| %RSD: | 1.712 | 1.712 | 1.71 | | | | | | |

Sequence No.: 34
 Sample ID: K0807359-008DA
 Analyst:

Autosampler Location: 28
 Date Collected: 9/3/2008 10:18:59 AM
 Data Type: Original

 Replicate Data: K0807359-008DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.938 | 6.938 | 0.158 | 0.735 | 0.168 | | | 10:19:22 | Yes |
| 2 | 6.757 | 6.757 | 0.154 | 0.722 | 0.164 | | | 10:19:56 | Yes |
| 3 | 6.889 | 6.889 | 0.157 | 0.712 | 0.167 | | | 10:20:30 | Yes |
| Mean: | 6.861 | 6.861 | 0.156 | | | | | | |
| SD: | 0.094 | 0.094 | 0.0021 | | | | | | |
| %RSD: | 1.366 | 1.366 | 1.37 | | | | | | |

Sequence No.: 35
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 9/3/2008 10:21:21 AM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.709 | 7.709 | 0.175 | 0.808 | 0.185 | | | 10:21:45 | Yes |
| 2 | 7.708 | 7.708 | 0.175 | 0.789 | 0.185 | | | 10:22:20 | Yes |
| 3 | 7.753 | 7.753 | 0.176 | 0.799 | 0.186 | | | 10:22:54 | Yes |
| Mean: | 7.724 | 7.724 | 0.176 | | | | | | |
| SD: | 0.026 | 0.026 | 0.0006 | | | | | | |
| %RSD: | 0.334 | 0.334 | 0.33 | | | | | | |

QC value within limits for Se 196.03 Recovery = 102.98%
All analyte(s) passed QC.

Sequence No.: 36

Sample ID: CCB

Analyst:

Autosampler Location: 1

Date Collected: 9/3/2008 10:23:45 AM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.032 | 0.032 | 0.001 | 0.043 | 0.011 | | | 10:24:06 | Yes |
| 2 | 0.030 | 0.030 | 0.001 | 0.046 | 0.011 | | | 10:24:40 | Yes |
| 3 | 0.677 | 0.677 | 0.015 | 0.188 | 0.025 | | | 10:25:17 | Yes |
| Mean: | 0.246 | 0.246 | 0.006 | | | | | | |
| SD: | 0.373 | 0.373 | 0.0085 | | | | | | |
| %RSD: | 151.3 | 151.3 | 151.31 | | | | | | |

QC value greater than the upper limit for Se 196.03 Recovery = Not calculated
QC Failed. Stop the analysis.
User canceled analysis.

Analysis Begun

Logged In Analyst: ACOMET10

Technique: AA FIAS-Flame

Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\ACOMET10\Sample Information\090308-Se.sif

Batch ID: 090308-Se

Results Data Set: 090308-Se

Results Library: R:\ICP\WIP\DATA\K-FLAA-02\Results.mdb

Sequence No.: 36

Sample ID: CCB

Analyst:

Autosampler Location: 1

Date Collected: 9/3/2008 10:26:20 AM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.040 | -0.040 | -0.001 | 0.022 | 0.009 | | | 10:26:41 | Yes |
| 2 | -0.168 | -0.168 | -0.004 | -0.013 | 0.006 | | | 10:27:15 | Yes |
| 3 | -0.039 | -0.039 | -0.001 | 0.033 | 0.009 | | | 10:27:49 | Yes |
| Mean: | -0.082 | -0.082 | -0.002 | | | | | | |
| SD: | 0.074 | 0.074 | 0.0017 | | | | | | |
| %RSD: | 89.86 | 89.86 | 89.86 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 37

Sample ID: K0807359-008S

Analyst:

Autosampler Location: 29

Date Collected: 9/3/2008 10:28:38 AM

Data Type: Original

Replicate Data: K0807359-008S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.337 | 3.337 | 0.076 | 0.384 | 0.086 | | | 10:29:02 | Yes |
| 2 | 3.402 | 3.402 | 0.077 | 0.381 | 0.087 | | | 10:29:36 | Yes |
| 3 | 3.452 | 3.452 | 0.078 | 0.385 | 0.089 | | | 10:30:10 | Yes |
| Mean: | 3.397 | 3.397 | 0.077 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0013 | | | | | | |
| %RSD: | 1.706 | 1.706 | 1.71 | | | | | | |

Sequence No.: 38
Sample ID: K0807359-008SA
Analyst:

Autosampler Location: 30
Date Collected: 9/3/2008 10:31:02 AM
Data Type: Original

Replicate Data: K0807359-008SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.671 | 7.671 | 0.174 | 0.851 | 0.184 | | | 10:31:25 | Yes |
| 2 | 7.750 | 7.750 | 0.176 | 0.813 | 0.186 | | | 10:32:00 | Yes |
| 3 | 7.616 | 7.616 | 0.173 | 0.814 | 0.183 | | | 10:32:34 | Yes |
| Mean: | 7.679 | 7.679 | 0.175 | | | | | | |
| SD: | 0.067 | 0.067 | 0.0015 | | | | | | |
| %RSD: | 0.878 | 0.878 | 0.88 | | | | | | |

Sequence No.: 39
Sample ID: K0807359-009
Analyst:

Autosampler Location: 31
Date Collected: 9/3/2008 10:33:26 AM
Data Type: Original

Replicate Data: K0807359-009

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.486 | 2.486 | 0.057 | 0.295 | 0.067 | | | 10:33:50 | Yes |
| 2 | 2.493 | 2.493 | 0.057 | 0.278 | 0.067 | | | 10:34:24 | Yes |
| 3 | 2.485 | 2.485 | 0.056 | 0.299 | 0.067 | | | 10:34:58 | Yes |
| Mean: | 2.488 | 2.488 | 0.057 | | | | | | |
| SD: | 0.004 | 0.004 | 0.0001 | | | | | | |
| %RSD: | 0.168 | 0.168 | 0.17 | | | | | | |

Sequence No.: 40
Sample ID: K0807359-009A
Analyst:

Autosampler Location: 32
Date Collected: 9/3/2008 10:35:49 AM
Data Type: Original

Replicate Data: K0807359-009A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.588 | 6.588 | 0.150 | 0.717 | 0.160 | | | 10:36:09 | Yes |
| 2 | 6.772 | 6.772 | 0.154 | 0.705 | 0.164 | | | 10:36:44 | Yes |
| 3 | 6.806 | 6.806 | 0.155 | 0.709 | 0.165 | | | 10:37:19 | Yes |
| Mean: | 6.722 | 6.722 | 0.153 | | | | | | |
| SD: | 0.117 | 0.117 | 0.0027 | | | | | | |
| %RSD: | 1.747 | 1.747 | 1.75 | | | | | | |

Sequence No.: 41
Sample ID: K0807359-010
Analyst:

Autosampler Location: 33
Date Collected: 9/3/2008 10:38:07 AM
Data Type: Original

Replicate Data: K0807359-010

| Repl # | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|--------|------------|----------|----------|------|------|-------|-------|------|------|
|--------|------------|----------|----------|------|------|-------|-------|------|------|

Mean: 0.333 0.333 0.008
SD: 0.031 0.031 0.0007
%RSD: 9.416 9.416 9.42

Sequence No.: 54
Sample ID: K0807359-015A
Analyst:

Autosampler Location: 44
Date Collected: 9/3/2008 11:08:39 AM
Data Type: Original

Replicate Data: K0807359-015A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes handwritten note *9/3/08.

Sequence No.: 55
Sample ID: K0807359-016
Analyst:

Autosampler Location: 45
Date Collected: 9/3/2008 11:11:02 AM
Data Type: Original

Replicate Data: K0807359-016

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Sequence No.: 56
Sample ID: K0807359-016A
Analyst:

Autosampler Location: 46
Date Collected: 9/3/2008 11:13:24 AM
Data Type: Original

Replicate Data: K0807359-016A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Sequence No.: 57
Sample ID: K0807359-MB
Analyst:

Autosampler Location: 47
Date Collected: 9/3/2008 11:15:49 AM
Data Type: Original

Replicate Data: K0807359-MB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes handwritten note *9/3/08.

Sequence No.: 58
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 9/3/2008 11:18:14 AM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StdConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.715 | 7.715 | 0.175 | 0.812 | 0.185 | | | 11:18:38 | Yes |
| 2 | 7.647 | 7.647 | 0.174 | 0.800 | 0.184 | | | 11:19:12 | Yes |
| 3 | 7.711 | 7.711 | 0.175 | 0.804 | 0.185 | | | 11:19:46 | Yes |
| Mean: | 7.691 | 7.691 | 0.175 | | | | | | |
| SD: | 0.038 | 0.038 | 0.0009 | | | | | | |
| %RSD: | 0.491 | 0.491 | 0.49 | | | | | | |

QC value within limits for Se 196.03 Recovery = 102.54%
All analyte(s) passed QC.

Sequence No.: 59
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 9/3/2008 11:20:38 AM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StdConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.034 | 0.034 | 0.001 | 0.062 | 0.011 | | | 11:20:59 | Yes |
| 2 | -0.008 | -0.008 | -0.000 | 0.044 | 0.010 | | | 11:21:33 | Yes |
| 3 | -0.009 | -0.009 | -0.000 | 0.044 | 0.010 | | | 11:22:08 | Yes |
| Mean: | 0.006 | 0.006 | 0.000 | | | | | | |
| SD: | 0.025 | 0.025 | 0.0006 | | | | | | |
| %RSD: | 430.7 | 430.7 | 430.75 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Analysis Begun

Logged In Analyst: ACQMET10 Technique: AA FIAS-Flame
Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\ACQMET10\Sample Information\090308-Se.sif
Batch ID: 090308-Se
Results Data Set: 090308-Se
Results Library: R:\ICP\WIP\DATA\K-FLAA-02\Results.mdb

Sequence No.: 60
Sample ID: K0807359-MB
Analyst:

Autosampler Location:
Date Collected: 9/3/2008 11:23:38 AM
Data Type: Original

Replicate Data: K0807359-MB

| Repl # | SampleConc ug/L | StdConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.140 | 0.140 | 0.003 | 0.061 | 0.013 | | | 11:23:54 | Yes |
| 2 | 0.124 | 0.124 | 0.003 | 0.050 | 0.013 | | | 11:24:28 | Yes |
| 3 | 0.117 | 0.117 | 0.003 | 0.059 | 0.013 | | | 11:25:02 | Yes |
| Mean: | 0.127 | 0.127 | 0.003 | | | | | | |
| SD: | 0.012 | 0.012 | 0.0003 | | | | | | |
| %RSD: | 9.143 | 9.143 | 9.14 | | | | | | |

Sequence No.: 61
Sample ID: K0807359-005 1/20

Autosampler Location:
Date Collected: 9/3/2008 11:26:04 AM

Analyst:

Data Type: Original

Replicate Data: K0807359-005 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.157 | 3.157 | 0.072 | 0.347 | 0.082 | | | 11:26:21 | Yes |
| 2 | 3.087 | 3.087 | 0.070 | 0.340 | 0.080 | | | 11:26:55 | Yes |
| 3 | 3.130 | 3.130 | 0.071 | 0.354 | 0.081 | | | 11:27:30 | Yes |
| Mean: | 3.125 | 3.125 | 0.071 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0008 | | | | | | |
| %RSD: | 1.124 | 1.124 | 1.12 | | | | | | |

=====
Sequence No.: 62

Autosampler Location:

Sample ID: K0807359-005A 1/20

Date Collected: 9/3/2008 11:28:18 AM

Analyst:

Data Type: Original

Replicate Data: K0807359-005A 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.895 | 7.895 | 0.179 | 0.833 | 0.190 | | | 11:28:34 | Yes |
| 2 | 8.237 | 8.237 | 0.187 | 0.828 | 0.197 | | | 11:29:08 | Yes |
| 3 | 7.792 | 7.792 | 0.177 | 0.816 | 0.187 | | | 11:29:42 | Yes |
| Mean: | 7.975 | 7.975 | 0.181 | | | | | | |
| SD: | 0.233 | 0.233 | 0.0053 | | | | | | |
| %RSD: | 2.925 | 2.925 | 2.92 | | | | | | |

=====
Sequence No.: 63

Autosampler Location:

Sample ID: K0807359-0014 1/20

Date Collected: 9/3/2008 11:30:42 AM

Analyst:

Data Type: Original

Replicate Data: K0807359-0014 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.283 | 4.283 | 0.097 | 0.458 | 0.107 | | | 11:30:58 | Yes |
| 2 | 3.949 | 3.949 | 0.090 | 0.439 | 0.100 | | | 11:31:33 | Yes |
| 3 | 3.990 | 3.990 | 0.091 | 0.434 | 0.101 | | | 11:32:07 | Yes |
| Mean: | 4.074 | 4.074 | 0.093 | | | | | | |
| SD: | 0.182 | 0.182 | 0.0041 | | | | | | |
| %RSD: | 4.477 | 4.477 | 4.48 | | | | | | |

=====
Sequence No.: 64

Autosampler Location:

Sample ID: K0807359-014A 1/20

Date Collected: 9/3/2008 11:32:55 AM

Analyst:

Data Type: Original

Replicate Data: K0807359-014A 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.949 | 7.949 | 0.181 | 0.870 | 0.191 | | | 11:33:12 | Yes |
| 2 | 7.866 | 7.866 | 0.179 | 0.845 | 0.189 | | | 11:33:46 | Yes |
| 3 | 8.673 | 8.673 | 0.197 | 0.859 | 0.207 | | | 11:34:21 | Yes |
| Mean: | 8.163 | 8.163 | 0.186 | | | | | | |
| SD: | 0.444 | 0.444 | 0.0101 | | | | | | |
| %RSD: | 5.439 | 5.439 | 5.44 | | | | | | |

=====
Sequence No.: 65

Autosampler Location:

Sample ID: K0807359-0015 1/5

Date Collected: 9/3/2008 11:35:23 AM

Analyst:

Data Type: Original

Replicate Data: K0807359-0015 1/5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.053 | 1.053 | 0.024 | 0.168 | 0.034 | | | 11:35:39 | Yes |
| 2 | 0.994 | 0.994 | 0.023 | 0.143 | 0.033 | | | 11:36:14 | Yes |
| 3 | 0.956 | 0.956 | 0.022 | 0.145 | 0.032 | | | 11:36:48 | Yes |
| Mean: | 1.001 | 1.001 | 0.023 | | | | | | |
| SD: | 0.049 | 0.049 | 0.0011 | | | | | | |
| %RSD: | 4.886 | 4.886 | 4.89 | | | | | | |

Sequence No.: 66

Sample ID: K0807359-015A 1/5

Analyst:

Autosampler Location:

Date Collected: 9/3/2008 11:37:37 AM

Data Type: Original

Replicate Data: K0807359-015A 1/5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.331 | 4.331 | 0.098 | 0.504 | 0.109 | | | 11:37:53 | Yes |
| 2 | 4.394 | 4.394 | 0.100 | 0.498 | 0.110 | | | 11:38:29 | Yes |
| 3 | 4.388 | 4.388 | 0.100 | 0.500 | 0.110 | | | 11:39:03 | Yes |
| Mean: | 4.371 | 4.371 | 0.099 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0008 | | | | | | |
| %RSD: | 0.790 | 0.790 | 0.79 | | | | | | |

Sequence No.: 67

Sample ID: CCV

Analyst:

Autosampler Location:

Date Collected: 9/3/2008 11:40:06 AM

Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.595 | 7.595 | 0.173 | 0.803 | 0.183 | | | 11:40:22 | Yes |
| 2 | 7.583 | 7.583 | 0.172 | 0.797 | 0.182 | | | 11:40:57 | Yes |
| 3 | 7.599 | 7.599 | 0.173 | 0.786 | 0.183 | | | 11:41:31 | Yes |
| Mean: | 7.592 | 7.592 | 0.173 | | | | | | |
| SD: | 0.008 | 0.008 | 0.0002 | | | | | | |
| %RSD: | 0.107 | 0.107 | 0.11 | | | | | | |

Sequence No.: 68

Sample ID: CCB

Analyst:

Autosampler Location:

Date Collected: 9/3/2008 11:42:28 AM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.016 | -0.016 | -0.000 | 0.033 | 0.010 | | | 11:42:44 | Yes |
| 2 | -0.039 | -0.039 | -0.001 | 0.038 | 0.009 | | | 11:43:18 | Yes |
| 3 | -0.083 | -0.083 | -0.002 | 0.032 | 0.008 | | | 11:43:52 | Yes |
| Mean: | -0.046 | -0.046 | -0.001 | | | | | | |
| SD: | 0.034 | 0.034 | 0.0008 | | | | | | |
| %RSD: | 74.31 | 74.31 | 74.31 | | | | | | |

November 14, 2008

Analytical Report for Service Request No: K0808982

Karen Schneider
New Fields Environmental
2500 55th Street, Suite 200
Boulder, CO 80301

RE: Se in Tissue

Dear Karen:

Enclosed are the results of the samples submitted to our laboratory on September 16, 2008. For your reference, these analyses have been assigned our service request number K0808982.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3316. You may also contact me via Email at JChristian@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.



Jeff Christian
Laboratory Director

JC/ln

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Acronyms

| | |
|------------|--|
| ASTM | American Society for Testing and Materials |
| A2LA | American Association for Laboratory Accreditation |
| CARB | California Air Resources Board |
| CAS Number | Chemical Abstract Service registry Number |
| CFC | Chlorofluorocarbon |
| CFU | Colony-Forming Unit |
| DEC | Department of Environmental Conservation |
| DEQ | Department of Environmental Quality |
| DHS | Department of Health Services |
| DOE | Department of Ecology |
| DOH | Department of Health |
| EPA | U. S. Environmental Protection Agency |
| ELAP | Environmental Laboratory Accreditation Program |
| GC | Gas Chromatography |
| GC/MS | Gas Chromatography/Mass Spectrometry |
| LUFT | Leaking Underground Fuel Tank |
| M | Modified |
| MCL | Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA. |
| MDL | Method Detection Limit |
| MPN | Most Probable Number |
| MRL | Method Reporting Limit |
| NA | Not Applicable |
| NC | Not Calculated |
| NCASI | National Council of the Paper Industry for Air and Stream Improvement |
| ND | Not Detected |
| NIOSH | National Institute for Occupational Safety and Health |
| PQL | Practical Quantitation Limit |
| RCRA | Resource Conservation and Recovery Act |
| SIM | Selected Ion Monitoring |
| TPH | Total Petroleum Hydrocarbons |
| tr | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL. |

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

| Program | Number |
|------------------------|---------------|
| Alaska DEC UST | UST-040 |
| Arizona DHS | AZ0339 |
| Arkansas - DEQ | 88-0637 |
| California DHS | 2286 |
| Colorado DPHE | - |
| Florida DOH | E87412 |
| Hawaii DOH | - |
| Idaho DHW | - |
| Indiana DOH | C-WA-01 |
| Louisiana DEQ | 3016 |
| Louisiana DHH | LA050010 |
| Maine DHS | WA0035 |
| Michigan DEQ | 9949 |
| Minnesota DOH | 053-999-368 |
| Montana DPHHS | CERT0047 |
| Nevada DEP | WA35 |
| New Jersey DEP | WA005 |
| New Mexico ED | - |
| North Carolina DWQ | 605 |
| Oklahoma DEQ | 9801 |
| Oregon - DHS | WA200001 |
| South Carolina DHEC | 61002 |
| Utah DOH | COLU |
| Washington DOE | C1203 |
| Wisconsin DNR | 998386840 |
| Wyoming (EPA Region 8) | - |



Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client: New Fields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request No.: K0808982
Date Received: 9/16/08

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Tissue samples were received for analysis at Columbia Analytical Services on 9/16/08. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at -20°C upon receipt at the laboratory.

Total Metals

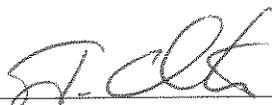
General Comments:

The samples were freeze-dried to determine moisture and to allow complete homogenization of the dry material. The dried material was milled to a fine meal, and then sub-sampled for digestion. A thorough digestion was performed prior to instrumental analysis to convert all Selenium species to Selenate. Prior to hydride formation, the valence was adjusted by reduction to Selenite.

Note that all samples were confirmed using a secondary procedure (Graphite Furnace Atomic Absorption – GFAAS).

No anomalies associated with the analysis of these samples were observed.

Approved by _____



Date _____

11/17/08

Chain of Custody Documentation

Chain of Custody

Page 1 of 2

NEW FIELDS

Sean Covington/Kathy Tegtmeyer
 Columbia Analytical Services, Inc.
 1317 South 13th Ave
 Kelso, WA 98626
 (360) 430-7733

4720 Walnut St., Suite 200
 Boulder, CO 80301
 Phone: 303-442-0267
 Fax: 303-442-3679

PO 0442-004-900.70

Project Contact
 Courier/Airbill:
 Shipped to:
 Telephone:

COC type # 4103 (ENSE)

COC #:

K0808982

| Sample ID | Sample Date | Sample Time | Matrix | Tox/Diss | Analysis | Preservative | Lab QC | Comments |
|--------------------|-------------|-------------|--------|----------|--------------------|--------------|--------|------------|
| SM0608-LSV2c-FT001 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT002 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT003 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT004 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT005 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT006 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT007 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT008 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-LSV2c-FT009 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT010 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT011 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT012 | 6/6/2008 | | tissue | tot | selenium, % solids | none | | whole body |

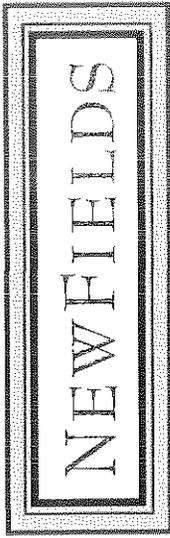
Total Number of Containers: 12 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

Sampler Signature: _____
 Relinquished by: George McVerney Date/Time: 9/15/08 09:430
 Received by: Agull cas Date/Time: 9/16/08 09:30

LAB USE ONLY - Sample condition on Receipt

Chain of Custody

Page 2 of 2



4720 Walnut St., Suite 200
 Boulder, CO 80301
 Phone: 303-442-0267
 Fax: 303-442-3679

COC tape # 4103 (ENX)
 COC #:

Project Contact: Sean Covington/Kathy Tegtmeyer PO 0442-004-900.70
 Courier/Airbill: Columbia Analytical Services, Inc.
 Shipped to: 1317 South 13th Ave
 Kelso, WA 98626
 Telephone: (360) 430-7733

| Sample ID | Sample Date | Sample Time | Matrix | Tot/Diss | Analysis | Preservative | Lab QC | Comments |
|---------------------|-------------|-------------|--------|----------|--------------------|--------------|--------|------------|
| SM0608-DC-FT013 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-DC-FT014 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-DC-FT015 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-DC-FT016 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC150-FT017 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT018 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT019 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-CC350-FT020 | 6/10/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-SFTC1-FT0012 | 6/28/2008 | | tissue | tot | selenium, % solids | none | | whole body |
| SM0608-SFTC1-FT0011 | 6/28/2008 | | tissue | tot | selenium, % solids | none | | whole body |

Total Number of Containers: 10 Individual Lines Reflect Single Containers, Except for Aqueous Analyses Assigned as Laboratory QC

LAB USE ONLY -- Sample condition on Receipt

Sampler Signature: _____
 Relinquished by: Gary Mackney Date/Time: 9/15/08 09:430
 Received by: A. J. Wells CAS Date/Time: 9/16/08 09:30

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC Schris

Client / Project: Newfields Service Request K08 08982

Received: 9/16/08 Opened: 9/16/08 By: A.J.

1. Samples were received via? US Mail ~~Fed-Ex~~ UPS DHL GM GS PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? 15
- If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Is shipper's air-bill filed? If not, record air-bill number: _____ NA Y N

5. Temperature of cooler(s) upon receipt (°C): 0.1

Temperature Blank (°C): 3.3

6. If applicable, list Chain of Custody Numbers: _____

7. Packing material used. Inserts Baggies Bubble Wrap Gel Packs Wet Ice Sleeves Other
8. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
9. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
11. Did all sample labels and tags agree with custody papers? Indicate in the table below. NA Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles tested* received at the appropriate pH? Indicate in the table below. NA Y N
14. Were VOA vials and 1631 Mercury bottles received without headspace? Indicate in the table below. NA Y N
15. Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection? NA Y N
16. Was C12/Res negative? NA Y N

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
| | | | |
| | | | |
| | | | |

| Sample ID | Bottle Count | Bottle Type | Out of Temp | Head-space | Broken | pH | Reagent | Volume added | Reagent Lot Number | Initials |
|-----------|--------------|-------------|-------------|------------|--------|----|---------|--------------|--------------------|----------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

*Does not include all pH preserved sample aliquots received. See sample receiving SOP (SMO-GEN).
Additional Notes, Discrepancies, & Resolutions: _____

Metals

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: NewFields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0808982
Date Collected: 06/06/08
Date Received: 09/16/08

Solids, Total

Prep Method: NONE
 Analysis Method: Freeze Dry
 Test Notes:

Units: PERCENT
 Basis: Wet

| Sample Name | Lab Code | Date Analyzed | Result | Result Notes |
|--------------------|--------------|---------------|--------|--------------|
| SM0608-LSV2c-FT001 | K0808982-001 | 10/21/08 | 23.2 | |
| SM0608-LSV2c-FT002 | K0808982-002 | 10/21/08 | 23.2 | |
| SM0608-LSV2c-FT003 | K0808982-003 | 10/21/08 | 23.5 | |
| SM0608-LSV2c-FT004 | K0808982-004 | 10/21/08 | 22.0 | |
| SM0608-LSV2c-FT005 | K0808982-005 | 10/21/08 | 21.0 | |
| SM0608-LSV2c-FT006 | K0808982-006 | 10/21/08 | 24.2 | |
| SM0608-LSV2c-FT007 | K0808982-007 | 10/21/08 | 24.9 | |
| SM0608-LSV2c-FT008 | K0808982-008 | 10/21/08 | 24.8 | |
| SM0608-LSV2c-FT009 | K0808982-009 | 10/21/08 | 23.1 | |
| SM0608-CC350-FT010 | K0808982-010 | 10/21/08 | 22.6 | |
| SM0608-CC350-FT011 | K0808982-011 | 10/21/08 | 24.4 | |
| SM0608-CC350-FT012 | K0808982-012 | 10/21/08 | 23.1 | |
| SM0608-DC-FT013 | K0808982-013 | 10/21/08 | 26.9 | |
| SM0608-DC-FT014 | K0808982-014 | 10/21/08 | 23.8 | |
| SM0608-DC-FT015 | K0808982-015 | 10/21/08 | 21.6 | |
| SM0608-DC-FT016 | K0808982-016 | 10/21/08 | 23.8 | |
| SM0608-CC150-FT017 | K0808982-017 | 10/21/08 | 23.6 | |
| SM0608-CC350-FT018 | K0808982-018 | 10/21/08 | 22.4 | |
| SM0608-CC350-FT019 | K0808982-019 | 10/21/08 | 22.1 | |
| SM0608-CC350-FT020 | K0808982-020 | 10/21/08 | 23.3 | |

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: NewFields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0808982
Date Collected: 06/28/08
Date Received: 09/16/08

Solids, Total

Prep Method: NONE
Analysis Method: Freeze Dry
Test Notes:

Units: PERCENT
Basis: Wet

| Sample Name | Lab Code | Date Analyzed | Result | Result Notes |
|---------------------|--------------|---------------|--------|--------------|
| SM0608-SFTCL-FT0012 | K0808982-021 | 10/21/08 | 22.9 | |
| SM0608-SFTCL-FT0011 | K0808982-022 | 10/21/08 | 19.5 | |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: NewFields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0808982
Date Collected: 06/06/08
Date Received: 09/16/08
Date Extracted: NA
Date Analyzed: 10/21/08

Duplicate Summary
 Total Metals

Sample Name: SM0608-LSV2c-FT007
Lab Code: K0808982-007D
Test Notes:

Units: PERCENT
Basis: Wet

| Analyte | Prep Method | Analysis Method | Sample Result | Duplicate Sample Result | Average | Relative Percent Difference | Result Notes |
|---------------|-------------|-----------------|---------------|-------------------------|---------|-----------------------------|--------------|
| Solids, Total | NA | Freeze Dry | 24.9 | 24.7 | 24.8 | 1 | |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: NewFields Environmental
Project: Se in Tissue
Sample Matrix: Tissue

Service Request: K0808982
Date Collected: 06/28/08
Date Received: 09/16/08
Date Extracted: NA
Date Analyzed: 10/21/08

Duplicate Summary
Total Metals

Sample Name: SM0608-SFTC1-FT0012
Lab Code: K0808982-021D
Test Notes:

Units: PERCENT
Basis: Wet

| Analyte | Prep Method | Analysis Method | Sample Result | Duplicate Sample Result | Average | Relative Percent Difference | Result Notes |
|---------------|-------------|-----------------|---------------|-------------------------|---------|-----------------------------|--------------|
| Solids, Total | NA | Freeze Dry | 22.9 | 22.6 | 22.8 | 1 | |

Service Request #:

K0808982

Analysis For:

Freeze Dried Solids

| Lab Code | Wet Weight (g) | Tare (g) | Tare + Dry Wt. (g) | Dry Weight (g) | % Total Solids |
|------------------------|----------------|----------|--------------------|----------------|----------------|
| 01 | 25.418 | 81.524 | 87.419 | 5.895 | 23.2 |
| 02 | 20.524 | 82.418 | 87.175 | 4.757 | 23.2 |
| 03 | 32.677 | 81.878 | 89.563 | 7.685 | 23.5 |
| 04 | 27.034 | 81.979 | 87.929 | 5.950 | 22.0 |
| 05 | 21.117 | 81.993 | 86.418 | 4.425 | 21.0 |
| 06 | 31.905 | 81.961 | 89.683 | 7.722 | 24.2 |
| 07 | 22.744 | 82.122 | 87.782 | 5.660 | 24.9 |
| 08 | 22.857 | 81.563 | 87.232 | 5.669 | 24.8 |
| 09 | 25.042 | 81.994 | 87.788 | 5.794 | 23.1 |
| 10 | 24.057 | 82.204 | 87.638 | 5.434 | 22.6 |
| 11 | 28.745 | 81.869 | 88.888 | 7.019 | 24.4 |
| 12 | 21.804 | 80.428 | 85.467 | 5.039 | 23.1 |
| 13 | 27.125 | 82.101 | 89.396 | 7.295 | 26.9 |
| 14 | 29.539 | 81.066 | 88.090 | 7.024 | 23.8 |
| 15 | 29.530 | 81.587 | 87.975 | 6.388 | 21.6 |
| 16 | 28.467 | 81.930 | 88.709 | 6.779 | 23.8 |
| 17 | 32.261 | 81.937 | 89.543 | 7.606 | 23.6 |
| 18 | 24.218 | 81.950 | 87.368 | 5.418 | 22.4 |
| 19 | 23.573 | 78.997 | 84.218 | 5.221 | 22.1 |
| 20 | 21.703 | 81.902 | 86.964 | 5.062 | 23.3 |
| 21 | 22.973 | 82.149 | 87.420 | 5.271 | 22.9 |
| 22 | 28.214 | 82.048 | 87.560 | 5.512 | 19.5 |
| 070 | 27.181 | 81.660 | 88.368 | 6.708 | 24.7 |
| 021 | 28.907 | 82.344 | 88.868 | 6.524 | 22.6 |
| AB 10/15/08 | | | | | |

Balance I.D.: 218

Time In: 1:00 p.m.

Time Out: 10:30 a.m.

Comments:

Date In: 10/21/08

Date Out: 10/23/08

\bar{x} =

RPD =

| | |
|---------------------------------|-----------------------|
| Analyst: <u>Angela Black</u> | Date: <u>10/15/08</u> |
| Reviewed By: <u>[Signature]</u> | Date: <u>11/6/08</u> |

Columbia Analytical Services

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

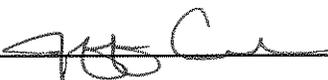
Client: NewFields Environmental
Project Name: Se in Tissue
Project No.:

Service Request: K0808982

| <u>Sample Name:</u> | <u>Lab Code:</u> |
|----------------------|------------------|
| SM0608-LSV2c-FT001 | K0808982-001 |
| SM0608-LSV2c-FT002 | K0808982-002 |
| SM0608-LSV2c-FT003 | K0808982-003 |
| SM0608-LSV2c-FT004 | K0808982-004 |
| SM0608-LSV2c-FT005 | K0808982-005 |
| SM0608-LSV2c-FT006 | K0808982-006 |
| SM0608-LSV2c-FT007 | K0808982-007 |
| SM0608-LSV2c-FT007D | K0808982-007D |
| SM0608-LSV2c-FT007S | K0808982-007S |
| SM0608-LSV2c-FT008 | K0808982-008 |
| SM0608-LSV2c-FT009 | K0808982-009 |
| SM0608-CC350-FT010 | K0808982-010 |
| SM0608-CC350-FT011 | K0808982-011 |
| SM0608-CC350-FT012 | K0808982-012 |
| SM0608-DC-FT013 | K0808982-013 |
| SM0608-DC-FT014 | K0808982-014 |
| SM0608-DC-FT015 | K0808982-015 |
| SM0608-DC-FT016 | K0808982-016 |
| SM0608-CC150-FT017 | K0808982-017 |
| SM0608-CC350-FT018 | K0808982-018 |
| SM0608-CC350-FT019 | K0808982-019 |
| SM0608-CC350-FT020 | K0808982-020 |
| SM0608-SFTC1-FT0012 | K0808982-021 |
| SM0608-SFTC1-FT0012D | K0808982-021D |
| SM0608-SFTC1-FT0012S | K0808982-021S |
| SM0608-SFTC1-FT0011 | K0808982-022 |
| K0808982-MB | K0808982-MB |
| K0808982-MB | K0808982-MB2 |

Comments:

Approved By:



Date:



Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/6/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-LSV2c-FT001 Lab Code: K0808982-001

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 1.98 | 0.99 | 100.0 | 11/03/08 | 11/10/08 | 19.4 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/6/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-LSV2c-FT002 Lab Code: K0808982-002

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.99 | 0.50 | 50.0 | 11/03/08 | 11/10/08 | 21.0 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/6/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-LSV2c-FT006 Lab Code: K0808982-006

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.91 | 0.45 | 50.0 | 11/03/08 | 11/10/08 | 23.0 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/6/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-LSV2c-FT007 Lab Code: K0808982-007

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.89 | 0.45 | 50.0 | 11/03/08 | 11/10/08 | 18.5 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-DC-FT015 Lab Code: K0808982-015

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.98 | 0.49 | 50.0 | 11/03/08 | 11/10/08 | 8.63 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-DC-FT016 Lab Code: K0808982-016

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.95 | 0.47 | 50.0 | 11/03/08 | 11/10/08 | 16.6 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC150-FT017 Lab Code: K0808982-017

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.95 | 0.48 | 50.0 | 11/03/08 | 11/10/08 | 16.3 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC350-FT019 Lab Code: K0808982-019

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.94 | 0.47 | 50.0 | 11/03/08 | 11/10/08 | 16.7 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/10/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-CC350-FT020 Lab Code: K0808982-020

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.98 | 0.49 | 50.0 | 11/03/08 | 11/10/08 | 25.7 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected: 6/28/08
Project Name: Se in Tissue Date Received: 9/16/08
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: SM0608-SFTC1-FT0012 Lab Code: K0808982-021

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.20 | 0.10 | 10.0 | 11/03/08 | 11/13/08 | 2.56 | | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected:
Project Name: Se in Tissue Date Received:
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: K0808982-MB Lab Code: K0808982-MB

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 11/03/08 | 11/10/08 | 0.05 | U | |

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: NewFields Environmental Service Request: K0808982
Project No.: NA Date Collected:
Project Name: Se in Tissue Date Received:
Matrix: TISSUE Units: mg/Kg
Basis: DRY

Sample Name: K0808982-MB Lab Code: K0808982-MB2

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|----------|-----------------|------|------|-----------------|----------------|---------------|--------|---|---|
| Selenium | 7742 | 0.10 | 0.05 | 5.0 | 11/03/08 | 11/10/08 | 0.05 | U | |

Comments:

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 7.5 | 7.97 | 106 | 7.5 | 7.69 | 103 | 8.02 | 107 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.76 | 103 | 7.75 | 103 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.84 | 105 | 7.72 | 103 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.74 | 103 | 7.77 | 104 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.82 | 104 | | | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | 7.5 | 7.31 | 97 | 7.5 | 7.68 | 102 | 7.59 | 101 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.63 | 102 | 7.78 | 104 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.88 | 105 | 7.86 | 105 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.77 | 104 | 7.96 | 106 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.36 | 98 | 7.34 | 98 | 7742 |

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICV Source: Inorganic Ventures

CCV Source: CAS MIXED

Concentration Units: ug/L

| Analyte | Initial Calibration | | | Continuing Calibration | | | | | Method |
|----------|---------------------|-------|-------|------------------------|-------|-------|-------|-------|--------|
| | True | Found | %R(1) | True | Found | %R(1) | Found | %R(1) | |
| Selenium | | | | 7.5 | 7.27 | 97 | 7.37 | 98 | 7742 |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.2 | 0.27 | 135.0 | | | | | |

Metals

- 2b -

CRDL STANDARD FOR AA AND ICP

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Concentration Units: ug/L

| Analyte | CRDL Standard for AA | | | CRDL Standard for ICP | | | | |
|----------|----------------------|-------|-------|-----------------------|-------|-------|-------|----|
| | True | Found | %R | Initial | | Final | | |
| | True | Found | %R | True | Found | %R | Found | %R |
| Selenium | 0.2 | 0.29 | 145.0 | | | | | |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | 1 | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

-3-

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | Continuing Calibration Blank (ug/L) | | | | | | Method | |
|----------|-----------------------------|-------------------------------------|-----|---|-----|---|-----|--------|------|
| | | C | 1 | C | 2 | C | 3 | | C |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | Continuing Calibration Blank (ug/L) | | | | | | Method | |
|----------|--------------------------------------|--|-----|---|-----|---|-----|--------|------|
| | | C | 1 | C | 2 | C | 3 | | C |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|-----------------------------|---|-------------------------------------|---|-----|---|-----|---|--------|
| | 1 | C | 1 | C | 2 | C | 3 | C | |
| Selenium | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|-----|---|-----|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|-----|---|-----|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 3 -

BLANKS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) | | | | | | Method |
|----------|--------------------------------------|---|--|---|-----|---|-----|---|--------|
| | | | 1 | C | 2 | C | 3 | C | |
| Selenium | | | 0.1 | U | 0.1 | U | 0.1 | U | 7742 |

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0608-LSV2c-FT007S

Lab Code: K0808982-007S

| Analyte | Control Limit %R | Spike Result C | Sample Result C | Spike Added | %R | Q | Method |
|----------|------------------|----------------|-----------------|-------------|------|---|--------|
| Selenium | 60 - 130 | 29.8 | 18.5 | 15.23 | 74.2 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0608-SFTC1-FT0012S

Lab Code: K0808982-021S

| Analyte | Control Limit %R | Spike Result | C | Sample Result | C | Spike Added | %R | Q | Method |
|----------|------------------|--------------|---|---------------|---|-------------|-------|---|--------|
| Selenium | 60 - 130 | 19.1 | | 2.56 | | 16.16 | 102.4 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 6 -

DUPLICATES

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0608-LSV2C-FT007D

Lab Code: K0808982-007D

| Analyte | Control Limit | Sample (S) | C | Duplicate (D) | C | RPD | Q | Method |
|----------|---------------|------------|---|---------------|---|-----|---|--------|
| Selenium | 30 | 18.5 | | 18.2 | | 1.6 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Units: MG/KG

Project Name: Se in Tissue

Basis: DRY

Matrix: TISSUE

Sample Name: SM0608-SFTC1-FT0012D

Lab Code: K0808982-021D

| Analyte | Control Limit | Sample (S) | C | Duplicate (D) | C | RPD | Q | Method |
|----------|---------------|------------|---|---------------|---|-----|---|--------|
| Selenium | 30 | 2.56 | | 2.55 | | 0.4 | | 7742 |

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Aqueous LCS Source:

Solid LCS Source: NRCC TORT

| Analyte | Aqueous (ug/L) | | | Solid (mg/kg) | | | | | |
|----------|----------------|-------|----|---------------|-------|---|--------|------|-------|
| | True | Found | %R | True | Found | C | Limits | %R | |
| Selenium | | | | 5.63 | 6.50 | | 3.97 | 7.56 | 115.5 |

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Aqueous LCS Source:

Solid LCS Source: NRCC TORT

| Analyte | Aqueous (ug/L) | | | Solid (mg/kg) | | | | |
|----------|----------------|-------|----|---------------|-------|---|-------------|-------|
| | True | Found | %R | True | Found | C | Limits | %R |
| Selenium | | | | 5.63 | 6.02 | | 3.97 7.56 | 106.9 |

Metals

- 10 -

DETECTION LIMITS

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02

AA ID #:

| Analyte | Wave-length (nm) | Back-ground | MRL ug/L | MDL ug/L | M |
|----------|------------------|-------------|----------|----------|---|
| Selenium | | | 0.2 | 0.1 | H |

Comments:

Metals
-13-
PREPARATION LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Method: F

| Sample ID | Preparation Date | Initial Volume | Final Volume (mL) |
|---------------|------------------|----------------|-------------------|
| K0808982-001 | 11/3/08 | 0.3030 | 30.0 |
| K0808982-002 | 11/3/08 | 0.3020 | 30.0 |
| K0808982-003 | 11/3/08 | 0.3040 | 30.0 |
| K0808982-004 | 11/3/08 | 0.3170 | 30.0 |
| K0808982-005 | 11/3/08 | 0.3050 | 30.0 |
| K0808982-006 | 11/3/08 | 0.3310 | 30.0 |
| K0808982-007 | 11/3/08 | 0.3370 | 30.0 |
| K0808982-007D | 11/3/08 | 0.3020 | 30.0 |
| K0808982-007S | 11/3/08 | 0.3290 | 30.0 |
| K0808982-008 | 11/3/08 | 0.3110 | 30.0 |
| K0808982-009 | 11/3/08 | 0.3070 | 30.0 |
| K0808982-010 | 11/3/08 | 0.3010 | 30.0 |
| K0808982-ME | 11/3/08 | 0.3000 | 30.0 |
| LCSS TORT | 11/3/08 | 0.3410 | 30.0 |

Metals
-13-
PREPARATION LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Method: F

| Sample ID | Preparation Date | Initial Volume | Final Volume (mL) |
|---------------|------------------|----------------|-------------------|
| K0808982-011 | 11/3/08 | 0.3200 | 30.0 |
| K0808982-012 | 11/3/08 | 0.3370 | 30.0 |
| K0808982-013 | 11/3/08 | 0.3170 | 30.0 |
| K0808982-014 | 11/3/08 | 0.3120 | 30.0 |
| K0808982-015 | 11/3/08 | 0.3050 | 30.0 |
| K0808982-016 | 11/3/08 | 0.3170 | 30.0 |
| K0808982-017 | 11/3/08 | 0.3150 | 30.0 |
| K0808982-018 | 11/3/08 | 0.3240 | 30.0 |
| K0808982-019 | 11/3/08 | 0.3210 | 30.0 |
| K0808982-020 | 11/3/08 | 0.3070 | 30.0 |
| K0808982-021 | 11/3/08 | 0.3020 | 30.0 |
| K0808982-021D | 11/3/08 | 0.3170 | 30.0 |
| K0808982-021S | 11/3/08 | 0.3100 | 30.0 |
| K0808982-022 | 11/3/08 | 0.3360 | 30.0 |
| K0808982-MB2 | 11/3/08 | 0.3000 | 30.0 |
| LCSS2 TORT | 11/3/08 | 0.3210 | 30.0 |

Metals
- 14 -
ANALYSIS RUN LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 11/10/08

End Date: 11/10/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N |
| K0808982-007 | 50 | 14:06 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:09 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV3 | 1 | 14:11 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| CCB3 | 1 | 14:13 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| K0808982-007D | 50 | 14:16 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 14:23 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 14:25 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 14:28 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-009 | 50 | 14:30 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:32 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-010 | 50 | 14:35 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:37 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV4 | 1 | 14:39 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| CCB4 | 1 | 14:42 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| K0808982-011 | 50 | 14:44 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:46 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-012 | 50 | 14:49 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:51 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-013 | 50 | 14:53 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 14:56 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 14:58 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 50 | 15:01 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-015 | 50 | 15:03 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV5 | 1 | 15:08 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| CCB5 | 1 | 15:10 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| K0808982-016 | 50 | 15:12 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-017 | 50 | 15:17 | | | | | | | | | | | | | | | | | | X | | | | | | | |
| ZZZZZZ | 50 | 15:19 | | | | | | | | | | | | | | | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
- 14 -
ANALYSIS RUN LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 11/13/08

End Date: 11/13/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| CAL BLK | 1 | 11:47 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 0.2 | 1 | 11:49 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 0.5 | 1 | 11:51 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 1.0 | 1 | 11:54 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 5.0 | 1 | 11:56 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 7.5 | 1 | 11:58 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| STD 10.0 | 1 | 12:01 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICV2 | 1 | 12:03 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ICB2 | 1 | 12:06 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CRA2 | 1 | 12:08 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCV1 | 1 | 12:10 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB1 | 1 | 12:13 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 1 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV2 | 1 | 12:39 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCB2 | 1 | 12:41 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 1 | 12:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 12:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
-14-
ANALYSIS RUN LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 11/13/08

End Date: 11/13/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-----|-------|-----|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|--|--|--|--|
| | | | | A L | S B | A S | B A | E A | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| ZZZZZZ | 1 | 13:02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV3 | 1 | 13:07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCB3 | 1 | 13:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV4 | 1 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCB4 | 1 | 13:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 13:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV5 | 1 | 14:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCB5 | 1 | 14:06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Metals
- 14 -
ANALYSIS RUN LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 11/13/08

End Date: 11/13/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N |
| ZZZZZZ | 1 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:22 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:25 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:27 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:29 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV6 | 1 | 14:32 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB6 | 1 | 14:34 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 1 | 14:36 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:39 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:41 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:44 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:46 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:48 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:51 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:53 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 14:58 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV7 | 1 | 15:00 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB7 | 1 | 15:02 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 1 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:07 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-021 | 10 | 15:09 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 10 | 15:12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-021D | 10 | 15:14 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 10 | 15:16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 10 | 15:19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 10 | 15:21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| K0808982-022 | 10 | 15:23 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| ZZZZZZ | 10 | 15:26 | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV8 | 1 | 15:28 | | | | | | | | | | | | | | | | | | | X | | | | | | |
| CCB8 | 1 | 15:31 | | | | | | | | | | | | | | | | | | | X | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
- 14 -
ANALYSIS RUN LOG

Client: NewFields Environmental

Service Request: K0808982

Project No.: NA

Project Name: Se in Tissue

Instrument ID Number: K-FLAA-02

Method: H

Start Date: 11/13/08

End Date: 11/13/08

| Sample No. | D/F | Time | % R | Analytes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-----|-------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--------|--------|--------|--------|---|--------|--------|--|--|--|--|
| | | | | A L | S B | A S | B A | B E | C D | C A | C R | C O | C U | F E | P B | M G | M N | H G | N I | K | S E | A G | N A | T L | V | Z N | C N | | | | |
| ZZZZZZ | 1 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV9 | 1 | 15:37 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| CCB9 | 1 | 15:40 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| ZZZZZZ | 1 | 15:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 15:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV10 | 1 | 16:07 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCB10 | 1 | 16:09 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 1 | 16:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCV11 | 1 | 16:37 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| CCB11 | 1 | 16:39 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| ZZZZZZ | 1 | 16:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZZZZZZ | 1 | 16:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Columbia Analytical Services
Metals Tissue Digestion Sheet

Service Request Number(s): K0808982 11-21

Star Lims Run No.: 77145 Analysis for: ICP ICP-MS GFAA
Method: Tissue other: Je Hydnd e

| Sample | Initial Weight (g) | freeze Dry | Wet | Final Volume (ml) | Matrix |
|--------------|--------------------|------------|-----|-------------------|---------|
| PB | | | X | 30mls | ES/HNO3 |
| TORT-2 | 0.321 | | J | | |
| K0808982-011 | 0.320 | X | | | |
| - 12 | 0.337 | | | | |
| - 13 | 0.317 | | | | |
| - 14 | 0.312 | | | | |
| - 15 | 0.305 | | | | |
| - 16 | 0.317 | | | | |
| - 17 | 0.315 | | | | |
| - 18 | 0.324 | | | | |
| - 19 | 0.321 | | | | |
| - 20 | 0.307 | | | | |
| - 21 | 0.302 | | | | |
| - 21A | 0.317 | | | | |
| - 21S | 0.310 | | | | |
| - 22 | 0.336 | | | | |

LAB 11/3/08

Time Digestion Started: 5:30 p.m. 11/3/08 Oven Temp: 104°C
 Lot # Acids Used: HNO3 MS12-24-J
 LCS: Dorm-3, Tort-2

Time Digestion Ended: 9:00 a.m. 11/5/08
 Oven Temp: 105°C
 Balance I.D.: 21-B

SPIKE INFO

SS1-MET1-70-V, _____ mls added
 SS5-MET1-70-W, 0.05 mls added
 SS6-MET1-69-D, _____ mls added

SS4-MET1-67-P, _____ mls added
 SS7-MET1-68-L, _____ mls added

Additional spikes: _____

Comments: _____

| | |
|-----------------------------|---------------------|
| Analyst <u>Angela Black</u> | Date <u>11/3/08</u> |
| Reviewer <u>[Signature]</u> | Date <u>11/6/08</u> |

TissueDig.xls
10/24/2008

METALS SPIKE FORM

Service Request # K0808982
 Q.C. Sample # K0808982 21
 Circle type of digest: GFAA ICP FAA ICP-MS Other: Je Hydride Initials: FB Date: 11/3/08
 Circle type of sample: Soil Water Mise Sludge Oil Other: _____

| Solution Name | Element | µLs of 1000ppm Solution | Final Volume | Solution Conc. mg/L | Filter mLs Added |
|---------------|---------|-------------------------|--------------|---------------------|------------------|
| SS1-MET1-70-V | HNO3 | 50.0 | 1000ml | - | |
| | Al | 100** | 1000ml | 200 | |
| | Ag | 100** | 1000ml | 5 | |
| | Ba | 100** | 1000ml | 200 | |
| | Bc | 100** | 1000ml | 5 | |
| | Cd | 100** | 1000ml | 5 | |
| | Co | 100** | 1000ml | 50 | |
| | Cr | 100** | 1000ml | 20 | |
| | Cu | 100** | 1000ml | 25 | |
| | Fe | 100** | 1000ml | 100 | |
| | Pb | 100** | 1000ml | 50 | |
| | Mn | 100** | 1000ml | 50 | |
| | Ni | 100** | 1000ml | 50 | |
| | Sb | 50 | 1000ml | 50 | |
| V | 100** | 1000ml | 50 | | |
| Zn | 100** | 1000ml | 50 | | |
| SS4-MET1-67-P | HNO3 | 25.0 | 500ml | - | |
| | As | 2.0 | 500ml | 4 | |
| | Cd | 2.0 | 500ml | 4 | |
| | Pb | 2.0 | 500ml | 4 | |
| | Se | 2.0 | 500ml | 4 | |
| | Tl | 2.0 | 500ml | 4 | |
| | Cu | 2.0 | 500ml | 4 | |
| SS5-MET1-70-W | HNO3 | 25.0 | 500ml | - | |
| | As | 50.0 | 500ml | 100 | 005 |
| | Se | 50.0 | 500ml | 100 | |
| | Tl | 50.0 | 500ml | 100 | |
| Cu | 50.0 | 500ml | 100 | | |
| SS6-MET1-70-X | HNO3 | 25 | 500ml | - | |
| | B | 50 | 500ml | 100 | |
| | Mn | 50 | 500ml | 100 | |
| SS7-MET1-69-J | HNO3 | 10.0 | 200ml | - | |
| | K** | 20 | 200ml | 1000 | |
| | Na** | 20 | 200ml | 1000 | |
| | Mg** | 20 | 200ml | 1000 | |
| | Ca** | 20 | 200ml | 1000 | |

Expires: 4/1/09

Expires: 1/2/09

Expires: 1/6/09

Expires: 2/01/09

Expires: 11/16/08

| | | | | | |
|------------------------|-------------------|-------------|--------|------|--|
| GFCLCSW (MET1-64-R) | HNO3 | 10.0 | 1000ml | - | |
| | As, Pb, Se, Tl | 5.0 | 1000ml | 2.5 | |
| | Cd | - | - | 1.25 | |
| | Cu | 2.5 | 1000ml | 2.5 | |
| QCP-CICV-1 (MET1-66-G) | Ca, Mg, Na, K | no dilution | - | 2500 | |
| | Al, Ba | no dilution | - | 1000 | |
| | Fe | no dilution | - | 500 | |
| | Co, Mn, Ni, V, Zn | no dilution | - | 250 | |
| | Cu, Ag | no dilution | - | 125 | |
| | Cr | no dilution | - | 100 | |
| | Bc | no dilution | - | 25 | |
| QCP-CICV-2 (MET1-66-E) | Sb | no dilution | - | 500 | |
| QCP-CICV-3 (MET1-66-F) | As, Pb, Se, Tl | no dilution | - | 500 | |
| | Cd | no dilution | - | 250 | |

Expires: 1/1/09

Expires: 7/1/09

Expires: 7/1/09

Expires: 7/1/09

* Denotes volume of mixed stock standard.
 ** Denotes 10,000 ppm individual stock standards.

| Standard | µLs of standard | ppm | Logbook # | Exp. Date |
|----------|-----------------|-----|-----------|-----------|
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Service Request Number(s): K0808982 (1-10)

Star Lims Run No.: 17144 Analysis for: ICP ICP-MS GFAA
Method: Tissue other: Je Hyande

| Sample | Initial Weight (g) | freeze Dry | Wet | Final Volume (ml) | Matrix |
|--------------------|--------------------|------------|----------|-------------------|-----------------|
| <u>PB TORT-2</u> | <u>0.341</u> | | <u>X</u> | <u>30mls</u> | <u>157 HNO3</u> |
| <u>K0808982-01</u> | <u>0.303</u> | <u>X</u> | | | |
| <u>- 02</u> | <u>0.302</u> | | | | |
| <u>- 03</u> | <u>0.304</u> | | | | |
| <u>- 04</u> | <u>0.317</u> | | | | |
| <u>- 05</u> | <u>0.305</u> | | | | |
| <u>- 06</u> | <u>0.331</u> | | | | |
| <u>- 07</u> | <u>0.337</u> | | | | |
| <u>- 07b</u> | <u>0.302</u> | | | | |
| <u>- 07S</u> | <u>0.329</u> | | | | |
| <u>- 08</u> | <u>0.311</u> | | | | |
| <u>- 09</u> | <u>0.307</u> | | | | |
| <u>- 10</u> | <u>0.301</u> | | | | |

LAB 11/3/08

Time Digestion Started: 5:30p.m. 11/3/08 Oven Temp: 104°C

Lot # Acids Used: HNO3 MS12-24-J

LCS: Dorm-3, Tort-2

Time Digestion Ended: 9:00a.m. 11/5/08

Oven Temp: 105°C

Balance I.D.: 21-B

SPIKE INFO

SS1-MET1-70-V, _____ mls added

SS5-MET1-70-W, 0.05 mls added

SS6-MET1-69-D, _____ mls added

SS4-MET1-67-P, _____ mls added

SS7-MET1-68-L, _____ mls added

Additional spikes: _____

Comments: _____

| | |
|-----------------------------|---------------------|
| Analyst <u>Angela Black</u> | Date <u>11/3/08</u> |
| Reviewer <u>[Signature]</u> | Date <u>11/6/08</u> |

TissueDig.xls
10/24/2008

METALS SPIKE FORM

Service Request # K0808982
 Q.C. Sample # K0808982-01
 Circle type of digest: GFAA ICP FAA ICP-MS Other Se Hydride Initials / Date: AB / 11/3/08
 Circle type of sample: Soil Water Misc. Sludge Oil Other: _____

| Solution Name | Element | mls of 1000ppm Solution | Final Volume | Solution Conc. mg/L | Enter mls Added |
|---------------|------------------|-------------------------|--------------|---------------------|-----------------|
| SS1-MET1-70 V | HNO3 | 50.0 | 1000ml | - | |
| | Al | 100* | 1000ml | 200 | |
| | Ag | 100* | 1000ml | 5 | |
| | Ba | 100* | 1000ml | 200 | |
| | Be | 100* | 1000ml | 5 | |
| | Cd | 100* | 1000ml | 5 | |
| | Cu | 100* | 1000ml | 50 | |
| | Cr | 100* | 1000ml | 20 | |
| | Cu | 100* | 1000ml | 25 | |
| | Fe | 100* | 1000ml | 100 | |
| | Pb | 100* | 1000ml | 50 | |
| | Mn | 100* | 1000ml | 50 | |
| | Ni | 100* | 1000ml | 50 | |
| | Sb | 50 | 1000ml | 50 | |
| | V | 100* | 1000ml | 50 | |
| Zn | 100* | 1000ml | 50 | | |
| SS4-MET1-67 P | HNO3 | 25.0 | 500ml | - | |
| | As | 2.0 | 500ml | 4 | |
| | Cd | 2.0 | 500ml | 4 | |
| | Pb | 2.0 | 500ml | 4 | |
| | Se | 2.0 | 500ml | 4 | |
| | Tl | 2.0 | 500ml | 4 | |
| SS5-MET1-70 W | HNO3 | 25.0 | 500ml | - | |
| | As | 50.0 | 500ml | 100 | |
| | Se | 50.0 | 500ml | 100 | 0.05 |
| | Tl | 50.0 | 500ml | 100 | |
| SS6-MET1-70 X | HNO3 | 25 | 500ml | - | |
| | B | 50 | 500ml | 100 | |
| | Mn | 50 | 500ml | 100 | |
| SS7-MET1-69 J | HNO3 | 10.0 | 200ml | - | |
| | K ⁺⁺ | 20 | 200ml | 1000 | |
| | Na ⁺⁺ | 20 | 200ml | 1000 | |
| | Mg ⁺⁺ | 20 | 200ml | 1000 | |
| | Ca ⁺⁺ | 20 | 200ml | 1000 | |

Expires: 4/1/09

Expires: 1/2/09

Expires: 1/6/09

Expires: 2/01/09

Expires: 11/16/08

| | | | | | |
|------------------------|-------------------|-------------|--------|------|--|
| GFCLSW (MET1-64-R) | HNO3 | 10.0 | 1000ml | - | |
| | As, Pb, Se, Tl | 5.0 | 1000ml | 2.5 | |
| | Cd | - | - | 1.25 | |
| | Cu | 2.5 | 1000ml | 2.5 | |
| QCP-CICV-1 (MET1-66-G) | Ca, Mg, Na, K | no dilution | - | 2500 | |
| | Al, Ba | no dilution | - | 1000 | |
| | Fe | no dilution | - | 500 | |
| | Co, Mn, Ni, V, Zn | no dilution | - | 250 | |
| | Cu, Ag | no dilution | - | 125 | |
| | Cr | no dilution | - | 100 | |
| | Be | no dilution | - | 25 | |
| QCP-CICV-2 (MET1-66-E) | Sb | no dilution | - | 500 | |
| QCP-CICV-3 (MET1-66-F) | As, Pb, Se, Tl | no dilution | - | 500 | |
| | Cd | no dilution | - | 250 | |

Expires: 1/1/09

Expires: 7/1/09

Expires: 7/1/09

Expires: 7/1/09

* Denotes volume of mixed stock standard.
 ** Denotes 10,000 ppm individual stock standards.

| Standard | mls of standard | ppm | Logbook # | Exp. Date |
|----------|-----------------|-----|-----------|-----------|
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Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0808982

Batch QC SR's # _____

Calibration Std. AA1-8-A

Starlims # 133459

Run # 111008-Se

Hydride Data Review Form

| | Yes | No | NA |
|---|----------|-------|-------|
| 1. ICV within 10% of true Value | <u>X</u> | _____ | _____ |
| 2. Calibration data included | <u>X</u> | _____ | _____ |
| 3. CCV's in control | <u>X</u> | _____ | _____ |
| 4. CCB's and/or ICB's below MRL | <u>X</u> | _____ | _____ |
| 5. All reported Results within Cal. Range | <u>X</u> | _____ | _____ |
| 6. All Calculations are Correct | <u>X</u> | _____ | _____ |

Comments

Rerun #21 & 22 due to over dilution.

Primary Reviewed by *A* Date 11/11/08

Secondary Reviewed by *JDR* Date 11/12/08

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: Ag Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|----------------------------|---------------------|-------------------|--|--------------------|
| ICV | - | 7.965 | 106% | Post Spike = 5 ppb |
| ICB | - | 0.007 | | |
| CRA | - | 0.270 | 135% | |
| CCV | - | 7.692 | 103% | |
| CCB | - | 0.024 | | |
| K0808982-MB 1 | 1/5 | 0.311 | | Rerun |
| K0808982-MB 2 | 1/5 | 0.064 | | |
| TORT K0808982 1 | 1/5x1/2 | 6.018 | | Rerun |
| TORTA K0808982 | 1/5x1/2 | 10.272 | | Rerun |
| TORT K0808982 2 | 1/5x1/2 | 5.475 | 115% | Cx = 6.441 |
| TORTA K0808982 | 1/5x1/2 | 9.723 | 85% | |
| K0808982-001 | 1/5x1/10 | 4.949 | | Rerun |
| K0808982-001A | 1/5x1/10 | 10.024 | | Rerun |
| K0808982-002 | 1/5x1/10 | 4.585 | | Cx = 4.238 |
| K0808982-002A | 1/5x1/10 | 9.996 | 108% | |
| CCV | - | 8.017 | 107% | |
| CCB | - | 0.010 | | |
| K0808982-003 | 1/5x1/10 | 3.999 | | Cx = 3.769 |
| K0808982-003A | 1/5x1/10 | 9.304 | 106% | |
| K0808982-004 | 1/5x1/10 | 4.707 | | Cx = 4.764 |
| K0808982-004A | 1/5x1/10 | 9.646 | 99% | |
| K0808982-005 | 1/5x1/10 | 5.024 | | Rerun |
| K0808982-005A | 1/5x1/10 | 10.054 | | Rerun |
| K0808982-006 | 1/5x1/10 | 4.893 | | Cx = 5.076 |
| K0808982-006A | 1/5x1/10 | 9.714 | 96% | |
| K0808982-007 | 1/5x1/10 | 4.189 | | Cx = 4.164 |
| K0808982-007A | 1/5x1/10 | 9.220 | 101% | |
| CCV | - | 7.756 | 103% | |
| CCB | - | 0.040 | | |
| K0808982-007D | 1/5x1/10 | 3.865 | | Cx = 3.670 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | | | | |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-----------------------------|-------------------|-------------------|
| Analyst <i>Jana Pius</i> | Date: 11/11/08 | Page Number: 1 |
|-----------------------------|-------------------|-------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|---------------------------|---------------------|-------------------|--|------------|
| K0808982-007DA | 1/5x1/10 | 9.132 | 105% | |
| K0808982-007S | 1/5x1/10 | 7.463 | | Rerun |
| K0808982-007SA | 1/5x1/10 | 11.958 | | Rerun |
| K0808982-008 | 1/5x1/10 | 5.895 | | Rerun |
| K0808982-008A | 1/5x1/10 | 10.599 | | Rerun |
| K0808982-009 | 1/5x1/10 | 2.600 | | Cx = 2.279 |
| K0808982-009A | 1/5x1/10 | 8.306 | 114% | |
| K0808982-010 | 1/5x1/10 | 4.415 | | Cx = 4.161 |
| K0808982-010A | 1/5x1/10 | 9.720 | 106% | |
| CCV | - | 7.753 | 103% | |
| CCB | - | 0.010 | | |
| K0808982-011 | 1/5x1/10 | 4.106 | | Cx = 4.139 |
| K0808982-011A | 1/5x1/10 | 9.065 | 99% | |
| K0808982-012 | 1/5x1/10 | 2.792 | | Cx = 2.627 |
| K0808982-012A | 1/5x1/10 | 8.105 | 106% | |
| K0808982-013 | 1/5x1/10 | 1.974 | | Cx = 1.726 |
| K0808982-013A | 1/5x1/10 | 7.694 | 114% | |
| K0808982-014 | 1/5x1/10 | 2.274 | | Rerun |
| K0808982-014A | 1/5x1/10 | 8.231 | | Rerun |
| K0808982-015 | 1/5x1/10 | 1.924 | | Cx = 1.754 |
| K0808982-015A | 1/5x1/10 | 7.411 | 110% | |
| CCV | - | 7.836 | 104% | |
| CCB | - | -0.013 | | |
| K0808982-016 | 1/5x1/10 | 3.534 | | Cx = 3.513 |
| K0808982-016A | 1/5x1/10 | 8.562 | 101% | |
| K0808982-017 | 1/5x1/10 | 3.319 | | Cx = 3.418 |
| K0808982-017A | 1/5x1/10 | 8.172 | 97% | |
| K0808982-018 | 1/5x1/10 | 3.503 | | Cx = 3.676 |
| K0808982-018A | 1/5x1/10 | 8.268 | 95% | |
| K0808982-019 | 1/5x1/10 | 3.527 | | Cx = 3.570 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-----------------------------|--------------------------|--------------------------|
| Analyst <i>Jana Jurs</i> | Date: <i>11/11/98</i> | Page Number: <i>2</i> |
|-----------------------------|--------------------------|--------------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|--|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: Element: As, Se | Service Request # : |
|--|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|---------------------|-----------------|-----------------|--|------------|
| K0808982-019A | 1/5x1/10 | 8.465 | 99% | |
| K0808982-020 | 1/5x1/10 | 4.856 | | Cx = 5.255 |
| K0808982-020A | 1/5x1/10 | 9.478 | 92% | |
| CCV | - | 7.716 | 103% | |
| CCB | | 0.306 | | Rerun |
| CCB | - | -0.017 | | |
| K0808982-021 | 1/5x1/20 | 0.253 | | Rerun |
| K0808982-021A | 1/5x1/20 | 5.659 | | Rerun |
| K0808982-021D | 1/5x1/10 | 0.385 | | Cx = 0.378 |
| K0808982-021DA | 1/5x1/10 | 5.477 | 102% | |
| K0808982-021S | 1/5x1/10 | 3.782 | 112% | Cx = 4.041 |
| K0808982-021SA | 1/5x1/10 | 8.463 | 94% | |
| K0808982-022 | 1/5x1/10 | 0.588 | | Cx = 0.594 |
| K0808982-022A | 1/5x1/10 | 5.537 | 99% | |
| CCV | - | 7.744 | 103% | |
| CCB | - | 0.016 | | |
| K0808982-MB | 1/5 | 0.058 | | |
| TORT #1 K0808982 | 1/5x1/2 | 3.726 | 107% | Cx = 6.337 |
| TORTA #1 K0808982 | 1/5x1/2 | 6.664 | 59% | |
| K0808982-001 1/20 | 1/5x1/20 | 2.126 | | Cx = 1.961 |
| K0808982-001A 1/20 | 1/5x1/20 | 7.545 | 108% | |
| K0808982-005 1/20 | 1/5x1/20 | 2.215 | | Cx = 2.003 |
| K0808982-005A 1/20 | 1/5x1/20 | 7.743 | 111% | |
| K0808982-007S 1/20 | 1/5x1/20 | 3.464 | 74% | Cx = 3.268 |
| K0808982-007SA 1/20 | 1/5x1/20 | 8.766 | 106% | |
| K0808982-008 1/20 | 1/5x1/20 | 2.598 | | Cx = 2.588 |
| CCV | - | 7.769 | 104% | |
| CCB | - | -0.016 | | |
| K0808982-008A 1/20 | 1/5x1/20 | 7.619 | 100% | |
| K0808982-014 1/10 | 1/5x1/10 | 1.866 | | Cx = 1.887 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|------------------------------|-------------------|-------------------|
| Analyst <i>Jana Jones</i> | Date: 11/11/08 | Page Number: 3 |
|------------------------------|-------------------|-------------------|

Sample ID: Std 1.0
Analyst:

Date Collected: 11/10/2008 12:58:05 PM
Data Type: Original

Replicate Data: Std 1.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [1.0] | 0.028 | 0.176 | 0.039 | | | 12:58:28 | Yes |
| 2 | | [1.0] | 0.028 | 0.168 | 0.039 | | | 12:59:02 | Yes |
| 3 | | [1.0] | 0.027 | 0.158 | 0.038 | | | 12:59:36 | Yes |
| Mean: | | [1.0] | 0.028 | | | | | | |
| SD: | | 0.0 | 0.0005 | | | | | | |
| %RSD: | | 0.0 | 1.70 | | | | | | |

Standard number 3 applied. [1.0]
Correlation Coef.: 0.997491 Slope: 0.02860 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 5.0
Analyst:

Autosampler Location: 5
Date Collected: 11/10/2008 1:00:27 PM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.131 | 0.623 | 0.142 | | | 13:00:50 | Yes |
| 2 | | [5.0] | 0.130 | 0.630 | 0.141 | | | 13:01:25 | Yes |
| 3 | | [5.0] | 0.130 | 0.635 | 0.141 | | | 13:01:59 | Yes |
| Mean: | | [5.0] | 0.131 | | | | | | |
| SD: | | 0.0 | 0.0008 | | | | | | |
| %RSD: | | 0.0 | 0.58 | | | | | | |

Standard number 4 applied. [5.0]
Correlation Coef.: 0.999582 Slope: 0.02625 Intercept: 0.00000

Sequence No.: 6
Sample ID: Std 7.5
Analyst:

Autosampler Location: 6
Date Collected: 11/10/2008 1:02:52 PM
Data Type: Original

Replicate Data: Std 7.5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [7.5] | 0.184 | 0.897 | 0.194 | | | 13:03:15 | Yes |
| 2 | | [7.5] | 0.182 | 0.879 | 0.192 | | | 13:03:50 | Yes |
| 3 | | [7.5] | 0.185 | 0.900 | 0.195 | | | 13:04:24 | Yes |
| Mean: | | [7.5] | 0.183 | | | | | | |
| SD: | | 0.0 | 0.0015 | | | | | | |
| %RSD: | | 0.0 | 0.80 | | | | | | |

Standard number 5 applied. [7.5]
Correlation Coef.: 0.998751 Slope: 0.02505 Intercept: 0.00000

Sequence No.: 7
Sample ID: Std 10.0
Analyst:

Autosampler Location: 7
Date Collected: 11/10/2008 1:05:17 PM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10] | 0.241 | 1.168 | 0.252 | | | 13:05:40 | Yes |
| 2 | | [10] | 0.237 | 1.132 | 0.248 | | | 13:06:14 | Yes |
| 3 | | [10] | 0.240 | 1.144 | 0.250 | | | 13:06:49 | Yes |
| Mean: | | [10] | 0.239 | | | | | | |
| SD: | | 0 | 0.0021 | | | | | | |
| %RSD: | | 0 | 0.89 | | | | | | |

Standard number 6 applied. [10]

Correlation Coef.: 0.998825 Slope: 0.02445 Intercept: 0.00000

The calibration curve may not be linear.

Calibration data for Se 196.03

Equation: Linear Through Zero

| ID | Mean Signal (Abs) | Entered Conc. ug/L | Calculated Conc. ug/L | Standard Deviation | %RSD |
|----------|-------------------|--------------------|-----------------------|--------------------|------|
| Cal Blk | 0.0000 | 0 | 0.000 | 0.00 | 5.0 |
| Std 0.2 | 0.0062 | 0.2 | 0.253 | 0.00 | 9.1 |
| Std 0.5 | 0.0152 | 0.5 | 0.621 | 0.00 | 1.2 |
| Std 1.0 | 0.0280 | 1.0 | 1.146 | 0.00 | 1.7 |
| Std 5.0 | 0.1306 | 5.0 | 5.341 | 0.00 | 0.6 |
| Std 7.5 | 0.1834 | 7.5 | 7.499 | 0.00 | 0.8 |
| Std 10.0 | 0.2394 | 10.0 | 9.789 | 0.00 | 0.9 |

Correlation Coef.: 0.998825 Slope: 0.02445 Intercept: 0.00000

Sequence No.: 8

Autosampler Location: 8

Sample ID: ICV

Date Collected: 11/10/2008 1:07:41 PM

Analyst:

Data Type: Original

Replicate Data: ICV

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.932 | 7.932 | 0.194 | 0.933 | 0.205 | | | 13:08:05 | Yes |
| 2 | 7.938 | 7.938 | 0.194 | 0.914 | 0.205 | | | 13:08:40 | Yes |
| 3 | 8.025 | 8.025 | 0.196 | 0.916 | 0.207 | | | 13:09:15 | Yes |
| Mean: | 7.965 | 7.965 | 0.195 | | | | | | |
| SD: | 0.052 | 0.052 | 0.0013 | | | | | | |
| %RSD: | 0.654 | 0.654 | 0.65 | | | | | | |

QC value within limits for Se 196.03 Recovery = 106.20%

All analyte(s) passed QC.

Sequence No.: 9

Autosampler Location: 1

Sample ID: ICB

Date Collected: 11/10/2008 1:10:07 PM

Analyst:

Data Type: Original

Replicate Data: ICB

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.041 | 0.041 | 0.001 | 0.050 | 0.012 | | | 13:10:28 | Yes |
| 2 | -0.001 | -0.001 | -0.000 | 0.039 | 0.011 | | | 13:11:02 | Yes |
| 3 | -0.019 | -0.019 | -0.000 | 0.048 | 0.010 | | | 13:11:37 | Yes |
| Mean: | 0.007 | 0.007 | 0.000 | | | | | | |
| SD: | 0.030 | 0.030 | 0.0007 | | | | | | |
| %RSD: | 435.7 | 435.7 | 435.72 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 10

Autosampler Location: 2

Sample ID: CRA

Date Collected: 11/10/2008 1:12:27 PM

Analyst:

Data Type: Original

Replicate Data: CRA

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.283 | 0.283 | 0.007 | 0.085 | 0.018 | | | 13:12:48 | Yes |
| 2 | 0.236 | 0.236 | 0.006 | 0.064 | 0.016 | | | 13:13:23 | Yes |
| 3 | 0.290 | 0.290 | 0.007 | 0.083 | 0.018 | | | 13:13:57 | Yes |

Mean: 0.270 0.270 0.007
SD: 0.029 0.029 0.0007
%RSD: 10.80 10.80 10.80

QC value within limits for Se 196.03 Recovery = 134.94%
All analyte(s) passed QC.

Sequence No.: 11
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/10/2008 1:14:47 PM
Data Type: Original

Replicate Data: CCV

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = 102.56%
All analyte(s) passed QC.

Sequence No.: 12
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/10/2008 1:17:10 PM
Data Type: Original

Replicate Data: CCB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 13
Sample ID: K0808982-MB
Analyst:

Autosampler Location: 9
Date Collected: 11/10/2008 1:19:30 PM
Data Type: Original

Replicate Data: K0808982-MB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Handwritten signature and date: A 11/11/08

Sequence No.: 14
Sample ID: K0808982-MB
Analyst:

Autosampler Location: 10
Date Collected: 11/10/2008 1:21:49 PM
Data Type: Original

Replicate Data: K0808982-MB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Mean: 9.723 9.723 0.238
SD: 0.024 0.024 0.0006
%RSD: 0.247 0.247 0.25

Sequence No.: 19
Sample ID: K0808982-001
Analyst:

Autosampler Location: 15
Date Collected: 11/10/2008 1:33:40 PM
Data Type: Original

Replicate Data: K0808982-001

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes handwritten signature and date 11/11/08.

Sequence No.: 20
Sample ID: K0808982-001A
Analyst:

Autosampler Location: 16
Date Collected: 11/10/2008 1:36:04 PM
Data Type: Original

Replicate Data: K0808982-001A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Sequence No.: 21
Sample ID: K0808982-002
Analyst:

Autosampler Location: 17
Date Collected: 11/10/2008 1:38:30 PM
Data Type: Original

Replicate Data: K0808982-002

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Sequence No.: 22
Sample ID: K0808982-002A
Analyst:

Autosampler Location: 18
Date Collected: 11/10/2008 1:40:47 PM
Data Type: Original

Replicate Data: K0808982-002A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Sequence No.: 23
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 11/10/2008 1:43:06 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.410 | 8.410 | 0.206 | 0.964 | 0.216 | | | 13:43:29 | Yes |
| 2 | 7.774 | 7.774 | 0.190 | 0.913 | 0.201 | | | 13:44:04 | Yes |
| 3 | 7.868 | 7.868 | 0.192 | 0.918 | 0.203 | | | 13:44:38 | Yes |
| Mean: | 8.017 | 8.017 | 0.196 | | | | | | |
| SD: | 0.343 | 0.343 | 0.0084 | | | | | | |
| %RSD: | 4.281 | 4.281 | 4.28 | | | | | | |

QC value within limits for Se 196.03 Recovery = 106.90%
 All analyte(s) passed QC.

Sequence No.: 24
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 11/10/2008 1:45:29 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.023 | 0.023 | 0.001 | 0.048 | 0.011 | | | 13:45:50 | Yes |
| 2 | 0.039 | 0.039 | 0.001 | 0.057 | 0.012 | | | 13:46:24 | Yes |
| 3 | -0.031 | -0.031 | -0.001 | 0.033 | 0.010 | | | 13:46:58 | Yes |
| Mean: | 0.010 | 0.010 | 0.000 | | | | | | |
| SD: | 0.037 | 0.037 | 0.0009 | | | | | | |
| %RSD: | 364.6 | 364.6 | 364.57 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
 All analyte(s) passed QC.

Sequence No.: 25
 Sample ID: K0808982-003
 Analyst:

Autosampler Location: 19
 Date Collected: 11/10/2008 1:47:47 PM
 Data Type: Original

Replicate Data: K0808982-003

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.030 | 4.030 | 0.099 | 0.490 | 0.109 | | | 13:48:09 | Yes |
| 2 | 3.997 | 3.997 | 0.098 | 0.475 | 0.108 | | | 13:48:43 | Yes |
| 3 | 3.970 | 3.970 | 0.097 | 0.479 | 0.108 | | | 13:49:17 | Yes |
| Mean: | 3.999 | 3.999 | 0.098 | | | | | | |
| SD: | 0.030 | 0.030 | 0.0007 | | | | | | |
| %RSD: | 0.744 | 0.744 | 0.74 | | | | | | |

Sequence No.: 26
 Sample ID: K0808982-003A
 Analyst:

Autosampler Location: 20
 Date Collected: 11/10/2008 1:50:07 PM
 Data Type: Original

Replicate Data: K0808982-003A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.334 | 9.334 | 0.228 | 1.104 | 0.239 | | | 13:50:28 | Yes |
| 2 | 9.307 | 9.307 | 0.228 | 1.063 | 0.238 | | | 13:51:02 | Yes |
| 3 | 9.270 | 9.270 | 0.227 | 1.062 | 0.237 | | | 13:51:37 | Yes |
| Mean: | 9.304 | 9.304 | 0.228 | | | | | | |
| SD: | 0.032 | 0.032 | 0.0008 | | | | | | |

%RSD: 0.344 0.344 0.34

Sequence No.: 27
Sample ID: K0808982-004
Analyst:

Autosampler Location: 21
Date Collected: 11/10/2008 1:52:30 PM
Data Type: Original

Replicate Data: K0808982-004

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.676 | 4.676 | 0.114 | 0.563 | 0.125 | | | 13:52:51 | Yes |
| 2 | 4.689 | 4.689 | 0.115 | 0.558 | 0.125 | | | 13:53:26 | Yes |
| 3 | 4.754 | 4.754 | 0.116 | 0.575 | 0.127 | | | 13:54:01 | Yes |
| Mean: | 4.707 | 4.707 | 0.115 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 0.880 | 0.880 | 0.88 | | | | | | |

Sequence No.: 28
Sample ID: K0808982-004A
Analyst:

Autosampler Location: 22
Date Collected: 11/10/2008 1:54:51 PM
Data Type: Original

Replicate Data: K0808982-004A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.745 | 9.745 | 0.238 | 1.168 | 0.249 | | | 13:55:12 | Yes |
| 2 | 9.549 | 9.549 | 0.234 | 1.134 | 0.244 | | | 13:55:47 | Yes |
| 3 | 9.643 | 9.643 | 0.236 | 1.134 | 0.246 | | | 13:56:21 | Yes |
| Mean: | 9.646 | 9.646 | 0.236 | | | | | | |
| SD: | 0.098 | 0.098 | 0.0024 | | | | | | |
| %RSD: | 1.016 | 1.016 | 1.02 | | | | | | |

Sequence No.: 29
Sample ID: K0808982-005
Analyst:

Autosampler Location: 23
Date Collected: 11/10/2008 1:57:11 PM
Data Type: Original

Replicate Data: K0808982-005

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.003 | 5.003 | 0.122 | 0.605 | 0.133 | | | 13:57:33 | Yes |
| 2 | 5.020 | 5.020 | 0.123 | 0.598 | 0.133 | | | 13:58:08 | Yes |
| 3 | 5.049 | 5.049 | 0.123 | 0.614 | 0.134 | | | 13:58:42 | Yes |
| Mean: | 5.024 | 5.024 | 0.123 | | | | | | |
| SD: | 0.024 | 0.024 | 0.0006 | | | | | | |
| %RSD: | 0.470 | 0.470 | 0.47 | | | | | | |

11/11/08

Sequence No.: 30
Sample ID: K0808982-005A
Analyst:

Autosampler Location: 24
Date Collected: 11/10/2008 1:59:33 PM
Data Type: Original

Replicate Data: K0808982-005A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.971 | 9.971 | 0.244 | 1.189 | 0.254 | | | 13:59:55 | Yes |
| 2 | 9.832 | 9.832 | 0.240 | 1.164 | 0.251 | | | 14:00:30 | Yes |
| 3 | 10.36 | 10.36 | 0.253 | 1.176 | 0.264 | | | 14:01:05 | Yes |
| Mean: | 10.05 | 10.05 | 0.246 | | | | | | |
| SD: | 0.274 | 0.274 | 0.0067 | | | | | | |
| %RSD: | 2.722 | 2.722 | 2.72 | | | | | | |

Sequence No.: 31
Sample ID: K0808982-006
Analyst:

Autosampler Location: 25
Date Collected: 11/10/2008 2:01:56 PM
Data Type: Original

Replicate Data: K0808982-006

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.932 | 4.932 | 0.121 | 0.608 | 0.131 | | | 14:02:18 | Yes |
| 2 | 4.867 | 4.867 | 0.119 | 0.580 | 0.130 | | | 14:02:52 | Yes |
| 3 | 4.881 | 4.881 | 0.119 | 0.592 | 0.130 | | | 14:03:26 | Yes |
| Mean: | 4.893 | 4.893 | 0.120 | | | | | | |
| SD: | 0.034 | 0.034 | 0.0008 | | | | | | |
| %RSD: | 0.694 | 0.694 | 0.69 | | | | | | |

Sequence No.: 32
Sample ID: K0808982-006A
Analyst:

Autosampler Location: 26
Date Collected: 11/10/2008 2:04:17 PM
Data Type: Original

Replicate Data: K0808982-006A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.756 | 9.756 | 0.239 | 1.173 | 0.249 | | | 14:04:40 | Yes |
| 2 | 9.646 | 9.646 | 0.236 | 1.144 | 0.247 | | | 14:05:14 | Yes |
| 3 | 9.740 | 9.740 | 0.238 | 1.157 | 0.249 | | | 14:05:48 | Yes |
| Mean: | 9.714 | 9.714 | 0.238 | | | | | | |
| SD: | 0.060 | 0.060 | 0.0015 | | | | | | |
| %RSD: | 0.615 | 0.615 | 0.61 | | | | | | |

Sequence No.: 33
Sample ID: K0808982-007
Analyst:

Autosampler Location: 27
Date Collected: 11/10/2008 2:06:39 PM
Data Type: Original

Replicate Data: K0808982-007

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.317 | 4.317 | 0.106 | 0.518 | 0.116 | | | 14:07:02 | Yes |
| 2 | 4.189 | 4.189 | 0.102 | 0.516 | 0.113 | | | 14:07:36 | Yes |
| 3 | 4.060 | 4.060 | 0.099 | 0.500 | 0.110 | | | 14:08:10 | Yes |
| Mean: | 4.189 | 4.189 | 0.102 | | | | | | |
| SD: | 0.128 | 0.128 | 0.0031 | | | | | | |
| %RSD: | 3.067 | 3.067 | 3.07 | | | | | | |

Sequence No.: 34
Sample ID: K0808982-007A
Analyst:

Autosampler Location: 28
Date Collected: 11/10/2008 2:09:01 PM
Data Type: Original

Replicate Data: K0808982-007A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.237 | 9.237 | 0.226 | 1.099 | 0.237 | | | 14:09:24 | Yes |
| 2 | 9.199 | 9.199 | 0.225 | 1.083 | 0.236 | | | 14:09:58 | Yes |
| 3 | 9.225 | 9.225 | 0.226 | 1.066 | 0.236 | | | 14:10:32 | Yes |
| Mean: | 9.220 | 9.220 | 0.225 | | | | | | |
| SD: | 0.020 | 0.020 | 0.0005 | | | | | | |
| %RSD: | 0.213 | 0.213 | 0.21 | | | | | | |

Sequence No.: 35
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/10/2008 2:11:24 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.831 | 7.831 | 0.192 | 0.940 | 0.202 | | | 14:11:47 | Yes |
| 2 | 7.720 | 7.720 | 0.189 | 0.921 | 0.199 | | | 14:12:22 | Yes |
| 3 | 7.716 | 7.716 | 0.189 | 0.921 | 0.199 | | | 14:12:57 | Yes |
| Mean: | 7.756 | 7.756 | 0.190 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0016 | | | | | | |
| %RSD: | 0.843 | 0.843 | 0.84 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.41%
All analyte(s) passed QC.

Sequence No.: 36

Sample ID: CCB

Analyst:

Autosampler Location: 1

Date Collected: 11/10/2008 2:13:49 PM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.094 | 0.094 | 0.002 | 0.065 | 0.013 | | | 14:14:10 | Yes |
| 2 | -0.020 | -0.020 | -0.000 | 0.039 | 0.010 | | | 14:14:45 | Yes |
| 3 | 0.047 | 0.047 | 0.001 | 0.061 | 0.012 | | | 14:15:19 | Yes |
| Mean: | 0.040 | 0.040 | 0.001 | | | | | | |
| SD: | 0.057 | 0.057 | 0.0014 | | | | | | |
| %RSD: | 142.5 | 142.5 | 142.49 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 37

Sample ID: K0808982-007D

Analyst:

Autosampler Location: 29

Date Collected: 11/10/2008 2:16:08 PM

Data Type: Original

Replicate Data: K0808982-007D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.947 | 3.947 | 0.097 | 0.472 | 0.107 | | | 14:16:31 | Yes |
| 2 | 3.756 | 3.756 | 0.092 | 0.456 | 0.102 | | | 14:17:05 | Yes |
| 3 | 3.891 | 3.891 | 0.095 | 0.473 | 0.106 | | | 14:17:40 | Yes |
| Mean: | 3.865 | 3.865 | 0.095 | | | | | | |
| SD: | 0.098 | 0.098 | 0.0024 | | | | | | |
| %RSD: | 2.535 | 2.535 | 2.54 | | | | | | |

Sequence No.: 38

Sample ID: K0808982-007DA

Analyst:

Autosampler Location: 30

Date Collected: 11/10/2008 2:18:31 PM

Data Type: Original

Replicate Data: K0808982-007DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.176 | 9.176 | 0.224 | 1.085 | 0.235 | | | 14:18:55 | Yes |
| 2 | 9.126 | 9.126 | 0.223 | 1.063 | 0.234 | | | 14:19:30 | Yes |
| 3 | 9.093 | 9.093 | 0.222 | 1.070 | 0.233 | | | 14:20:04 | Yes |
| Mean: | 9.132 | 9.132 | 0.223 | | | | | | |
| SD: | 0.042 | 0.042 | 0.0010 | | | | | | |
| %RSD: | 0.458 | 0.458 | 0.46 | | | | | | |

Sequence No.: 39

Sample ID: K0808982-007S

Autosampler Location: 31

Date Collected: 11/10/2008 2:20:56 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-007S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.640 | 7.640 | 0.187 | 0.900 | 0.197 | | | 14:21:21 | Yes |
| 2 | 7.361 | 7.361 | 0.180 | 0.883 | 0.191 | | | 14:21:55 | Yes |
| 3 | 7.389 | 7.389 | 0.181 | 0.881 | 0.191 | | | 14:22:33 | Yes |
| Mean: | 7.463 | 7.463 | 0.183 | | | | | | |
| SD: | 0.154 | 0.154 | 0.0038 | | | | | | |
| %RSD: | 2.060 | 2.060 | 2.06 | | | | | | |

11/11/08

Sequence No.: 40

Autosampler Location: 32

Sample ID: K0808982-007SA

Date Collected: 11/10/2008 2:23:25 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-007SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 11.93 | 11.93 | 0.292 | 1.430 | 0.302 | | | 14:23:46 | Yes |
| 2 | 11.97 | 11.97 | 0.293 | 1.413 | 0.303 | | | 14:24:20 | Yes |
| 3 | 11.98 | 11.98 | 0.293 | 1.402 | 0.304 | | | 14:24:55 | Yes |
| Mean: | 11.96 | 11.96 | 0.292 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0006 | | | | | | |
| %RSD: | 0.222 | 0.222 | 0.22 | | | | | | |

Sequence No.: 41

Autosampler Location: 33

Sample ID: K0808982-008

Date Collected: 11/10/2008 2:25:44 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-008

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.925 | 5.925 | 0.145 | 0.696 | 0.156 | | | 14:26:04 | Yes |
| 2 | 5.940 | 5.940 | 0.145 | 0.700 | 0.156 | | | 14:26:38 | Yes |
| 3 | 5.819 | 5.819 | 0.142 | 0.682 | 0.153 | | | 14:27:12 | Yes |
| Mean: | 5.895 | 5.895 | 0.144 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0016 | | | | | | |
| %RSD: | 1.114 | 1.114 | 1.11 | | | | | | |

11/11/08

Sequence No.: 42

Autosampler Location: 34

Sample ID: K0808982-008A

Date Collected: 11/10/2008 2:28:00 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-008A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 10.62 | 10.62 | 0.260 | 1.258 | 0.270 | | | 14:28:21 | Yes |
| 2 | 10.55 | 10.55 | 0.258 | 1.233 | 0.268 | | | 14:28:56 | Yes |
| 3 | 10.63 | 10.63 | 0.260 | 1.231 | 0.271 | | | 14:29:30 | Yes |
| Mean: | 10.60 | 10.60 | 0.259 | | | | | | |
| SD: | 0.047 | 0.047 | 0.0011 | | | | | | |
| %RSD: | 0.443 | 0.443 | 0.44 | | | | | | |

Sequence No.: 43

Autosampler Location: 35

Sample ID: K0808982-009
Analyst:

Date Collected: 11/10/2008 2:30:19 PM
Data Type: Original

Replicate Data: K0808982-009

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.661 | 2.661 | 0.065 | 0.341 | 0.076 | | | 14:30:40 | Yes |
| 2 | 2.590 | 2.590 | 0.063 | 0.305 | 0.074 | | | 14:31:15 | Yes |
| 3 | 2.548 | 2.548 | 0.062 | 0.318 | 0.073 | | | 14:31:49 | Yes |
| Mean: | 2.600 | 2.600 | 0.064 | | | | | | |
| SD: | 0.057 | 0.057 | 0.0014 | | | | | | |
| %RSD: | 2.195 | 2.195 | 2.19 | | | | | | |

Sequence No.: 44
Sample ID: K0808982-009A
Analyst:

Autosampler Location: 36
Date Collected: 11/10/2008 2:32:43 PM
Data Type: Original

Replicate Data: K0808982-009A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.299 | 8.299 | 0.203 | 0.961 | 0.214 | | | 14:33:04 | Yes |
| 2 | 8.348 | 8.348 | 0.204 | 0.945 | 0.215 | | | 14:33:38 | Yes |
| 3 | 8.271 | 8.271 | 0.202 | 0.956 | 0.213 | | | 14:34:12 | Yes |
| Mean: | 8.306 | 8.306 | 0.203 | | | | | | |
| SD: | 0.039 | 0.039 | 0.0010 | | | | | | |
| %RSD: | 0.468 | 0.468 | 0.47 | | | | | | |

Sequence No.: 45
Sample ID: K0808982-010
Analyst:

Autosampler Location: 37
Date Collected: 11/10/2008 2:35:01 PM
Data Type: Original

Replicate Data: K0808982-010

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.547 | 4.547 | 0.111 | 0.536 | 0.122 | | | 14:35:22 | Yes |
| 2 | 4.368 | 4.368 | 0.107 | 0.514 | 0.117 | | | 14:35:57 | Yes |
| 3 | 4.329 | 4.329 | 0.106 | 0.509 | 0.116 | | | 14:36:31 | Yes |
| Mean: | 4.415 | 4.415 | 0.108 | | | | | | |
| SD: | 0.116 | 0.116 | 0.0028 | | | | | | |
| %RSD: | 2.632 | 2.632 | 2.63 | | | | | | |

Sequence No.: 46
Sample ID: K0808982-010A
Analyst:

Autosampler Location: 38
Date Collected: 11/10/2008 2:37:21 PM
Data Type: Original

Replicate Data: K0808982-010A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.821 | 9.821 | 0.240 | 1.144 | 0.251 | | | 14:37:43 | Yes |
| 2 | 9.651 | 9.651 | 0.236 | 1.114 | 0.247 | | | 14:38:17 | Yes |
| 3 | 9.689 | 9.689 | 0.237 | 1.129 | 0.248 | | | 14:38:51 | Yes |
| Mean: | 9.720 | 9.720 | 0.238 | | | | | | |
| SD: | 0.089 | 0.089 | 0.0022 | | | | | | |
| %RSD: | 0.920 | 0.920 | 0.92 | | | | | | |

Sequence No.: 47
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/10/2008 2:39:42 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.728 | 7.728 | 0.189 | 0.937 | 0.200 | | | 14:40:05 | Yes |
| 2 | 7.778 | 7.778 | 0.190 | 0.938 | 0.201 | | | 14:40:40 | Yes |
| 3 | 7.753 | 7.753 | 0.190 | 0.927 | 0.200 | | | 14:41:14 | Yes |
| Mean: | 7.753 | 7.753 | 0.190 | | | | | | |
| SD: | 0.025 | 0.025 | 0.0006 | | | | | | |
| %RSD: | 0.324 | 0.324 | 0.32 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.38%
All analyte(s) passed QC.

Sequence No.: 48

Sample ID: CCB

Analyst:

Autosampler Location: 1

Date Collected: 11/10/2008 2:42:05 PM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.043 | 0.043 | 0.001 | 0.059 | 0.012 | | | 14:42:28 | Yes |
| 2 | 0.001 | 0.001 | 0.000 | 0.053 | 0.011 | | | 14:43:02 | Yes |
| 3 | -0.014 | -0.014 | -0.000 | 0.045 | 0.010 | | | 14:43:37 | Yes |
| Mean: | 0.010 | 0.010 | 0.000 | | | | | | |
| SD: | 0.030 | 0.030 | 0.0007 | | | | | | |
| %RSD: | 301.5 | 301.5 | 301.46 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 49

Sample ID: K0808982-011

Analyst:

Autosampler Location: 39

Date Collected: 11/10/2008 2:44:26 PM

Data Type: Original

Replicate Data: K0808982-011

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.146 | 4.146 | 0.101 | 0.520 | 0.112 | | | 14:44:49 | Yes |
| 2 | 4.086 | 4.086 | 0.100 | 0.508 | 0.111 | | | 14:45:23 | Yes |
| 3 | 4.085 | 4.085 | 0.100 | 0.498 | 0.111 | | | 14:45:57 | Yes |
| Mean: | 4.106 | 4.106 | 0.100 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0008 | | | | | | |
| %RSD: | 0.846 | 0.846 | 0.85 | | | | | | |

Sequence No.: 50

Sample ID: K0808982-011A

Analyst:

Autosampler Location: 40

Date Collected: 11/10/2008 2:46:47 PM

Data Type: Original

Replicate Data: K0808982-011A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.097 | 9.097 | 0.222 | 1.084 | 0.233 | | | 14:47:10 | Yes |
| 2 | 8.923 | 8.923 | 0.218 | 1.054 | 0.229 | | | 14:47:48 | Yes |
| 3 | 9.174 | 9.174 | 0.224 | 1.058 | 0.235 | | | 14:48:22 | Yes |
| Mean: | 9.065 | 9.065 | 0.222 | | | | | | |
| SD: | 0.129 | 0.129 | 0.0031 | | | | | | |
| %RSD: | 1.419 | 1.419 | 1.42 | | | | | | |

Sequence No.: 51

Sample ID: K0808982-012

Analyst:

Autosampler Location: 41

Date Collected: 11/10/2008 2:49:12 PM

Data Type: Original

Replicate Data: K0808982-012

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.851 | 2.851 | 0.070 | 0.356 | 0.080 | | | 14:49:35 | Yes |
| 2 | 2.749 | 2.749 | 0.067 | 0.344 | 0.078 | | | 14:50:10 | Yes |
| 3 | 2.776 | 2.776 | 0.068 | 0.350 | 0.079 | | | 14:50:44 | Yes |
| Mean: | 2.792 | 2.792 | 0.068 | | | | | | |
| SD: | 0.053 | 0.053 | 0.0013 | | | | | | |
| %RSD: | 1.894 | 1.894 | 1.89 | | | | | | |

Sequence No.: 52
Sample ID: K0808982-012A
Analyst:

Autosampler Location: 42
Date Collected: 11/10/2008 2:51:36 PM
Data Type: Original

Replicate Data: K0808982-012A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.145 | 8.145 | 0.199 | 0.974 | 0.210 | | | 14:51:58 | Yes |
| 2 | 8.103 | 8.103 | 0.198 | 0.932 | 0.209 | | | 14:52:32 | Yes |
| 3 | 8.068 | 8.068 | 0.197 | 0.942 | 0.208 | | | 14:53:07 | Yes |
| Mean: | 8.105 | 8.105 | 0.198 | | | | | | |
| SD: | 0.039 | 0.039 | 0.0009 | | | | | | |
| %RSD: | 0.478 | 0.478 | 0.48 | | | | | | |

Sequence No.: 53
Sample ID: K0808982-013
Analyst:

Autosampler Location: 43
Date Collected: 11/10/2008 2:53:57 PM
Data Type: Original

Replicate Data: K0808982-013

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.022 | 2.022 | 0.049 | 0.275 | 0.060 | | | 14:54:20 | Yes |
| 2 | 1.946 | 1.946 | 0.048 | 0.262 | 0.058 | | | 14:54:54 | Yes |
| 3 | 1.955 | 1.955 | 0.048 | 0.261 | 0.058 | | | 14:55:29 | Yes |
| Mean: | 1.974 | 1.974 | 0.048 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 2.096 | 2.096 | 2.10 | | | | | | |

Sequence No.: 54
Sample ID: K0808982-013A
Analyst:

Autosampler Location: 44
Date Collected: 11/10/2008 2:56:20 PM
Data Type: Original

Replicate Data: K0808982-013A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.790 | 7.790 | 0.191 | 0.926 | 0.201 | | | 14:56:43 | Yes |
| 2 | 7.708 | 7.708 | 0.188 | 0.910 | 0.199 | | | 14:57:17 | Yes |
| 3 | 7.584 | 7.584 | 0.185 | 0.917 | 0.196 | | | 14:57:55 | Yes |
| Mean: | 7.694 | 7.694 | 0.188 | | | | | | |
| SD: | 0.104 | 0.104 | 0.0025 | | | | | | |
| %RSD: | 1.347 | 1.347 | 1.35 | | | | | | |

Sequence No.: 55
Sample ID: K0808982-014
Analyst:

Autosampler Location: 45
Date Collected: 11/10/2008 2:58:46 PM
Data Type: Original

Replicate Data: K0808982-014

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 2 | 7.770 | 7.770 | 0.190 | 0.929 | 0.201 | 15:09:15 | Yes |
| 3 | 8.024 | 8.024 | 0.196 | 0.925 | 0.207 | 15:09:50 | Yes |
| Mean: | 7.836 | 7.836 | 0.192 | | | | |
| SD: | 0.165 | 0.165 | 0.0040 | | | | |
| %RSD: | 2.105 | 2.105 | 2.11 | | | | |

QC value within limits for Se 196.03 Recovery = 104.49%
All analyte(s) passed QC.

Sequence No.: 60

Sample ID: CCB

Analyst:

Autosampler Location: 1

Date Collected: 11/10/2008 3:10:41 PM

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.008 | -0.008 | -0.000 | 0.039 | 0.010 | | | 15:11:02 | Yes |
| 2 | -0.021 | -0.021 | -0.001 | 0.047 | 0.010 | | | 15:11:35 | Yes |
| 3 | -0.009 | -0.009 | -0.000 | 0.046 | 0.010 | | | 15:12:10 | Yes |
| Mean: | -0.013 | -0.013 | -0.000 | | | | | | |
| SD: | 0.007 | 0.007 | 0.0002 | | | | | | |
| %RSD: | 55.63 | 55.63 | 55.63 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 61

Sample ID: K0808982-016

Analyst:

Autosampler Location: 49

Date Collected: 11/10/2008 3:12:59 PM

Data Type: Original

Replicate Data: K0808982-016

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.595 | 3.595 | 0.088 | 0.428 | 0.099 | | | 15:13:19 | Yes |
| 2 | 3.530 | 3.530 | 0.086 | 0.422 | 0.097 | | | 15:13:54 | Yes |
| 3 | 3.476 | 3.476 | 0.085 | 0.434 | 0.096 | | | 15:14:28 | Yes |
| Mean: | 3.534 | 3.534 | 0.086 | | | | | | |
| SD: | 0.060 | 0.060 | 0.0015 | | | | | | |
| %RSD: | 1.691 | 1.691 | 1.69 | | | | | | |

Sequence No.: 62

Sample ID: K0808982-016A

Analyst:

Autosampler Location: 50

Date Collected: 11/10/2008 3:15:16 PM

Data Type: Original

Replicate Data: K0808982-016A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.499 | 8.499 | 0.208 | 1.028 | 0.218 | | | 15:15:37 | Yes |
| 2 | 8.629 | 8.629 | 0.211 | 1.013 | 0.222 | | | 15:16:12 | Yes |
| 3 | 8.559 | 8.559 | 0.209 | 1.006 | 0.220 | | | 15:16:46 | Yes |
| Mean: | 8.562 | 8.562 | 0.209 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0016 | | | | | | |
| %RSD: | 0.759 | 0.759 | 0.76 | | | | | | |

Sequence No.: 63

Sample ID: K0808982-017

Analyst:

Autosampler Location: 51

Date Collected: 11/10/2008 3:17:36 PM

Data Type: Original

Replicate Data: K0808982-017

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|------|-------------|

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 1 | 3.322 | 3.322 | 0.081 | 0.415 | 0.092 | 15:17:57 | Yes |
| 2 | 3.302 | 3.302 | 0.081 | 0.414 | 0.091 | 15:18:32 | Yes |
| 3 | 3.332 | 3.332 | 0.081 | 0.416 | 0.092 | 15:19:06 | Yes |
| Mean: | 3.319 | 3.319 | 0.081 | | | | |
| SD: | 0.015 | 0.015 | 0.0004 | | | | |
| %RSD: | 0.461 | 0.461 | 0.46 | | | | |

Sequence No.: 64
 Sample ID: K0808982-017A
 Analyst:

Autosampler Location: 52
 Date Collected: 11/10/2008 3:19:56 PM
 Data Type: Original

Replicate Data: K0808982-017A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.162 | 8.162 | 0.200 | 0.993 | 0.210 | | | 15:20:17 | Yes |
| 2 | 8.186 | 8.186 | 0.200 | 0.962 | 0.211 | | | 15:20:51 | Yes |
| 3 | 8.168 | 8.168 | 0.200 | 0.962 | 0.210 | | | 15:21:26 | Yes |
| Mean: | 8.172 | 8.172 | 0.200 | | | | | | |
| SD: | 0.012 | 0.012 | 0.0003 | | | | | | |
| %RSD: | 0.151 | 0.151 | 0.15 | | | | | | |

Sequence No.: 65
 Sample ID: K0808982-018
 Analyst:

Autosampler Location: 53
 Date Collected: 11/10/2008 3:22:15 PM
 Data Type: Original

Replicate Data: K0808982-018

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.503 | 3.503 | 0.086 | 0.443 | 0.096 | | | 15:22:36 | Yes |
| 2 | 3.478 | 3.478 | 0.085 | 0.441 | 0.096 | | | 15:23:11 | Yes |
| 3 | 3.529 | 3.529 | 0.086 | 0.441 | 0.097 | | | 15:23:46 | Yes |
| Mean: | 3.503 | 3.503 | 0.086 | | | | | | |
| SD: | 0.026 | 0.026 | 0.0006 | | | | | | |
| %RSD: | 0.730 | 0.730 | 0.73 | | | | | | |

Sequence No.: 66
 Sample ID: K0808982-018A
 Analyst:

Autosampler Location: 54
 Date Collected: 11/10/2008 3:24:35 PM
 Data Type: Original

Replicate Data: K0808982-018A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.418 | 8.418 | 0.206 | 1.018 | 0.216 | | | 15:24:57 | Yes |
| 2 | 8.232 | 8.232 | 0.201 | 0.971 | 0.212 | | | 15:25:31 | Yes |
| 3 | 8.154 | 8.154 | 0.199 | 0.980 | 0.210 | | | 15:26:05 | Yes |
| Mean: | 8.268 | 8.268 | 0.202 | | | | | | |
| SD: | 0.136 | 0.136 | 0.0033 | | | | | | |
| %RSD: | 1.642 | 1.642 | 1.64 | | | | | | |

Sequence No.: 67
 Sample ID: K0808982-019
 Analyst:

Autosampler Location: 55
 Date Collected: 11/10/2008 3:26:55 PM
 Data Type: Original

Replicate Data: K0808982-019

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.545 | 3.545 | 0.087 | 0.447 | 0.097 | | | 15:27:17 | Yes |
| 2 | 3.511 | 3.511 | 0.086 | 0.440 | 0.096 | | | 15:27:52 | Yes |
| 3 | 3.527 | 3.527 | 0.086 | 0.445 | 0.097 | | | 15:28:26 | Yes |

Mean: 3.527 3.527 0.086
 SD: 0.017 0.017 0.0004
 %RSD: 0.480 0.480 0.48

Sequence No.: 68
 Sample ID: K0808982-019A
 Analyst:

Autosampler Location: 56
 Date Collected: 11/10/2008 3:29:16 PM
 Data Type: Original

Replicate Data: K0808982-019A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.484 | 8.484 | 0.207 | 1.021 | 0.218 | | | 15:29:38 | Yes |
| 2 | 8.484 | 8.484 | 0.207 | 0.997 | 0.218 | | | 15:30:13 | Yes |
| 3 | 8.426 | 8.426 | 0.206 | 1.019 | 0.217 | | | 15:30:48 | Yes |
| Mean: | 8.465 | 8.465 | 0.207 | | | | | | |
| SD: | 0.033 | 0.033 | 0.0008 | | | | | | |
| %RSD: | 0.391 | 0.391 | 0.39 | | | | | | |

Sequence No.: 69
 Sample ID: K0808982-020
 Analyst:

Autosampler Location: 57
 Date Collected: 11/10/2008 3:31:38 PM
 Data Type: Original

Replicate Data: K0808982-020

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.948 | 4.948 | 0.121 | 0.606 | 0.132 | | | 15:32:00 | Yes |
| 2 | 4.802 | 4.802 | 0.117 | 0.588 | 0.128 | | | 15:32:37 | Yes |
| 3 | 4.819 | 4.819 | 0.118 | 0.598 | 0.128 | | | 15:33:11 | Yes |
| Mean: | 4.856 | 4.856 | 0.119 | | | | | | |
| SD: | 0.079 | 0.079 | 0.0019 | | | | | | |
| %RSD: | 1.635 | 1.635 | 1.64 | | | | | | |

Sequence No.: 70
 Sample ID: K0808982-020A
 Analyst:

Autosampler Location: 58
 Date Collected: 11/10/2008 3:34:02 PM
 Data Type: Original

Replicate Data: K0808982-020A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.432 | 9.432 | 0.231 | 1.139 | 0.241 | | | 15:34:25 | Yes |
| 2 | 9.430 | 9.430 | 0.231 | 1.106 | 0.241 | | | 15:34:59 | Yes |
| 3 | 9.574 | 9.574 | 0.234 | 1.125 | 0.245 | | | 15:35:34 | Yes |
| Mean: | 9.478 | 9.478 | 0.232 | | | | | | |
| SD: | 0.082 | 0.082 | 0.0020 | | | | | | |
| %RSD: | 0.870 | 0.870 | 0.87 | | | | | | |

Sequence No.: 71
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 11/10/2008 3:36:24 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.811 | 7.811 | 0.191 | 0.964 | 0.202 | | | 15:36:47 | Yes |
| 2 | 7.619 | 7.619 | 0.186 | 0.928 | 0.197 | | | 15:37:22 | Yes |
| 3 | 7.718 | 7.718 | 0.189 | 0.896 | 0.199 | | | 15:37:56 | Yes |
| Mean: | 7.716 | 7.716 | 0.189 | | | | | | |
| SD: | 0.096 | 0.096 | 0.0024 | | | | | | |
| %RSD: | 1.248 | 1.248 | 1.25 | | | | | | |

Sequence No.: 74
Sample ID: K0808982-021A
Analyst:

Autosampler Location: 60
Date Collected: 11/10/2008 3:46:04 PM
Data Type: Original

Replicate Data: K0808982-021A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.723 | 5.723 | 0.140 | 0.732 | 0.151 | | | 15:46:27 | Yes |
| 2 | 5.645 | 5.645 | 0.138 | 0.675 | 0.149 | | | 15:47:01 | Yes |
| 3 | 5.608 | 5.608 | 0.137 | 0.675 | 0.148 | | | 15:47:38 | Yes |
| Mean: | 5.659 | 5.659 | 0.138 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 1.032 | 1.032 | 1.03 | | | | | | |

Handwritten: 11/11/08

Sequence No.: 75
Sample ID: K0808982-021D
Analyst:

Autosampler Location: 61
Date Collected: 11/10/2008 3:48:28 PM
Data Type: Original

Replicate Data: K0808982-021D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.412 | 0.412 | 0.010 | 0.105 | 0.021 | | | 15:48:52 | Yes |
| 2 | 0.386 | 0.386 | 0.009 | 0.085 | 0.020 | | | 15:49:26 | Yes |
| 3 | 0.357 | 0.357 | 0.009 | 0.088 | 0.019 | | | 15:50:00 | Yes |
| Mean: | 0.385 | 0.385 | 0.009 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 7.154 | 7.154 | 7.15 | | | | | | |

Sequence No.: 76
Sample ID: K0808982-021DA
Analyst:

Autosampler Location: 62
Date Collected: 11/10/2008 3:50:53 PM
Data Type: Original

Replicate Data: K0808982-021DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.542 | 5.542 | 0.136 | 0.674 | 0.146 | | | 15:51:16 | Yes |
| 2 | 5.532 | 5.532 | 0.135 | 0.670 | 0.146 | | | 15:51:51 | Yes |
| 3 | 5.357 | 5.357 | 0.131 | 0.620 | 0.142 | | | 15:52:25 | Yes |
| Mean: | 5.477 | 5.477 | 0.134 | | | | | | |
| SD: | 0.104 | 0.104 | 0.0025 | | | | | | |
| %RSD: | 1.896 | 1.896 | 1.90 | | | | | | |

Sequence No.: 77
Sample ID: K0808982-021S
Analyst:

Autosampler Location: 63
Date Collected: 11/10/2008 3:53:16 PM
Data Type: Original

Replicate Data: K0808982-021S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.784 | 3.784 | 0.093 | 0.476 | 0.103 | | | 15:53:36 | Yes |
| 2 | 3.840 | 3.840 | 0.094 | 0.453 | 0.105 | | | 15:54:10 | Yes |
| 3 | 3.722 | 3.722 | 0.091 | 0.470 | 0.102 | | | 15:54:45 | Yes |
| Mean: | 3.782 | 3.782 | 0.092 | | | | | | |
| SD: | 0.059 | 0.059 | 0.0014 | | | | | | |
| %RSD: | 1.566 | 1.566 | 1.57 | | | | | | |

Sequence No.: 78
Sample ID: K0808982-021SA

Autosampler Location: 64
Date Collected: 11/10/2008 3:55:33 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-021SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.682 | 8.682 | 0.212 | 1.031 | 0.223 | | | 15:55:53 | Yes |
| 2 | 8.355 | 8.355 | 0.204 | 0.987 | 0.215 | | | 15:56:28 | Yes |
| 3 | 8.354 | 8.354 | 0.204 | 1.008 | 0.215 | | | 15:57:03 | Yes |
| Mean: | 8.463 | 8.463 | 0.207 | | | | | | |
| SD: | 0.189 | 0.189 | 0.0046 | | | | | | |
| %RSD: | 2.237 | 2.237 | 2.24 | | | | | | |

Sequence No.: 79
Sample ID: K0808982-022
Analyst:

Autosampler Location: 65
Date Collected: 11/10/2008 3:57:52 PM
Data Type: Original

Replicate Data: K0808982-022

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.584 | 0.584 | 0.014 | 0.109 | 0.025 | | | 15:58:12 | Yes |
| 2 | 0.649 | 0.649 | 0.016 | 0.134 | 0.027 | | | 15:58:46 | Yes |
| 3 | 0.529 | 0.529 | 0.013 | 0.104 | 0.024 | | | 15:59:20 | Yes |
| Mean: | 0.588 | 0.588 | 0.014 | | | | | | |
| SD: | 0.060 | 0.060 | 0.0015 | | | | | | |
| %RSD: | 10.24 | 10.24 | 10.24 | | | | | | |

Sequence No.: 80
Sample ID: K0808982-022A
Analyst:

Autosampler Location: 66
Date Collected: 11/10/2008 4:00:09 PM
Data Type: Original

Replicate Data: K0808982-022A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.586 | 5.586 | 0.137 | 0.707 | 0.147 | | | 16:00:29 | Yes |
| 2 | 5.497 | 5.497 | 0.134 | 0.668 | 0.145 | | | 16:01:04 | Yes |
| 3 | 5.527 | 5.527 | 0.135 | 0.689 | 0.146 | | | 16:01:38 | Yes |
| Mean: | 5.537 | 5.537 | 0.135 | | | | | | |
| SD: | 0.045 | 0.045 | 0.0011 | | | | | | |
| %RSD: | 0.817 | 0.817 | 0.82 | | | | | | |

Sequence No.: 81
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/10/2008 4:02:26 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.720 | 7.720 | 0.189 | 0.937 | 0.199 | | | 16:02:49 | Yes |
| 2 | 7.825 | 7.825 | 0.191 | 0.940 | 0.202 | | | 16:03:23 | Yes |
| 3 | 7.688 | 7.688 | 0.188 | 0.921 | 0.199 | | | 16:03:58 | Yes |
| Mean: | 7.744 | 7.744 | 0.189 | | | | | | |
| SD: | 0.072 | 0.072 | 0.0018 | | | | | | |
| %RSD: | 0.929 | 0.929 | 0.93 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.26%
All analyte(s) passed QC.

Sequence No.: 82
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/10/2008 4:04:49 PM
Data Type: Original

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 2 | 6.579 | 6.579 | 0.161 | 0.854 | 0.172 | 16:13:13 | Yes |
| 3 | 6.721 | 6.721 | 0.164 | 0.868 | 0.175 | 16:13:48 | Yes |
| Mean: | 6.664 | 6.664 | 0.163 | | | | |
| SD: | 0.075 | 0.075 | 0.0018 | | | | |
| %RSD: | 1.126 | 1.126 | 1.13 | | | | |

Sequence No.: 86

Autosampler Location:

Sample ID: K0808982-001 1/20

Date Collected: 11/10/2008 4:14:46 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-001 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.126 | 2.126 | 0.052 | 0.293 | 0.063 | | | 16:15:03 | Yes |
| 2 | 2.080 | 2.080 | 0.051 | 0.274 | 0.061 | | | 16:15:37 | Yes |
| 3 | 2.172 | 2.172 | 0.053 | 0.275 | 0.064 | | | 16:16:11 | Yes |
| Mean: | 2.126 | 2.126 | 0.052 | | | | | | |
| SD: | 0.046 | 0.046 | 0.0011 | | | | | | |
| %RSD: | 2.165 | 2.165 | 2.17 | | | | | | |

Sequence No.: 87

Autosampler Location:

Sample ID: K0808982-001A 1/20

Date Collected: 11/10/2008 4:17:04 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-001A 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.548 | 7.548 | 0.185 | 0.890 | 0.195 | | | 16:17:20 | Yes |
| 2 | 7.613 | 7.613 | 0.186 | 0.894 | 0.197 | | | 16:17:54 | Yes |
| 3 | 7.475 | 7.475 | 0.183 | 0.864 | 0.193 | | | 16:18:29 | Yes |
| Mean: | 7.545 | 7.545 | 0.185 | | | | | | |
| SD: | 0.069 | 0.069 | 0.0017 | | | | | | |
| %RSD: | 0.912 | 0.912 | 0.91 | | | | | | |

Sequence No.: 88

Autosampler Location:

Sample ID: K0808982-005 1/20

Date Collected: 11/10/2008 4:19:27 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-005 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.277 | 2.277 | 0.056 | 0.286 | 0.066 | | | 16:19:43 | Yes |
| 2 | 2.181 | 2.181 | 0.053 | 0.281 | 0.064 | | | 16:20:18 | Yes |
| 3 | 2.186 | 2.186 | 0.053 | 0.285 | 0.064 | | | 16:20:53 | Yes |
| Mean: | 2.215 | 2.215 | 0.054 | | | | | | |
| SD: | 0.054 | 0.054 | 0.0013 | | | | | | |
| %RSD: | 2.445 | 2.445 | 2.45 | | | | | | |

Sequence No.: 89

Autosampler Location:

Sample ID: K0808982-005A 1/20

Date Collected: 11/10/2008 4:21:40 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-005A 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.755 | 7.755 | 0.190 | 0.901 | 0.200 | | | 16:21:56 | Yes |
| 2 | 7.627 | 7.627 | 0.187 | 0.889 | 0.197 | | | 16:22:30 | Yes |
| 3 | 7.848 | 7.848 | 0.192 | 0.914 | 0.203 | | | 16:23:04 | Yes |
| Mean: | 7.743 | 7.743 | 0.189 | | | | | | |

SD: 0.111 0.111 0.0027
 %RSD: 1.436 1.436 1.44

Sequence No.: 90
 Sample ID: K0808982-007S 1/20
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:24:05 PM
 Data Type: Original

Replicate Data: K0808982-007S 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.484 | 3.484 | 0.085 | 0.435 | 0.096 | | | 16:24:21 | Yes |
| 2 | 3.399 | 3.399 | 0.083 | 0.414 | 0.094 | | | 16:24:56 | Yes |
| 3 | 3.509 | 3.509 | 0.086 | 0.440 | 0.096 | | | 16:25:30 | Yes |
| Mean: | 3.464 | 3.464 | 0.085 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 1.662 | 1.662 | 1.66 | | | | | | |

Sequence No.: 91
 Sample ID: K0808982-007SA 1/20
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:26:27 PM
 Data Type: Original

Replicate Data: K0808982-007SA 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.738 | 8.738 | 0.214 | 1.024 | 0.224 | | | 16:26:43 | Yes |
| 2 | 8.866 | 8.866 | 0.217 | 1.037 | 0.227 | | | 16:27:17 | Yes |
| 3 | 8.693 | 8.693 | 0.213 | 1.030 | 0.223 | | | 16:27:52 | Yes |
| Mean: | 8.766 | 8.766 | 0.214 | | | | | | |
| SD: | 0.090 | 0.090 | 0.0022 | | | | | | |
| %RSD: | 1.024 | 1.024 | 1.02 | | | | | | |

Sequence No.: 92
 Sample ID: K0808982-008 1/20
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:28:54 PM
 Data Type: Original

Replicate Data: K0808982-008 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.641 | 2.641 | 0.065 | 0.354 | 0.075 | | | 16:29:11 | Yes |
| 2 | 2.618 | 2.618 | 0.064 | 0.324 | 0.075 | | | 16:29:45 | Yes |
| 3 | 2.536 | 2.536 | 0.062 | 0.328 | 0.073 | | | 16:30:19 | Yes |
| Mean: | 2.598 | 2.598 | 0.064 | | | | | | |
| SD: | 0.056 | 0.056 | 0.0014 | | | | | | |
| %RSD: | 2.138 | 2.138 | 2.14 | | | | | | |

Sequence No.: 93
 Sample ID: CCV
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:31:50 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.799 | 7.799 | 0.191 | 0.945 | 0.201 | | | 16:32:06 | Yes |
| 2 | 7.698 | 7.698 | 0.188 | 0.913 | 0.199 | | | 16:32:41 | Yes |
| 3 | 7.812 | 7.812 | 0.191 | 0.919 | 0.202 | | | 16:33:15 | Yes |
| Mean: | 7.769 | 7.769 | 0.190 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0015 | | | | | | |
| %RSD: | 0.805 | 0.805 | 0.81 | | | | | | |

Sequence No.: 94
 Sample ID: CCB
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:34:23 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | -0.018 | -0.018 | -0.000 | 0.039 | 0.010 | | | 16:34:39 | Yes |
| 2 | 0.007 | 0.007 | 0.000 | 0.051 | 0.011 | | | 16:35:13 | Yes |
| 3 | -0.037 | -0.037 | -0.001 | 0.034 | 0.010 | | | 16:35:47 | Yes |
| Mean: | -0.016 | -0.016 | -0.000 | | | | | | |
| SD: | 0.022 | 0.022 | 0.0005 | | | | | | |
| %RSD: | 136.1 | 136.1 | 136.09 | | | | | | |

Sequence No.: 95
 Sample ID: K0808982-008A 1/20
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:36:55 PM
 Data Type: Original

Replicate Data: K0808982-008A 1/20

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.617 | 7.617 | 0.186 | 0.904 | 0.197 | | | 16:37:11 | Yes |
| 2 | 7.676 | 7.676 | 0.188 | 0.901 | 0.198 | | | 16:37:46 | Yes |
| 3 | 7.563 | 7.563 | 0.185 | 0.897 | 0.196 | | | 16:38:20 | Yes |
| Mean: | 7.619 | 7.619 | 0.186 | | | | | | |
| SD: | 0.056 | 0.056 | 0.0014 | | | | | | |
| %RSD: | 0.739 | 0.739 | 0.74 | | | | | | |

Sequence No.: 96
 Sample ID: K0808982-014 1/10
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:39:22 PM
 Data Type: Original

Replicate Data: K0808982-014 1/10

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.880 | 1.880 | 0.046 | 0.263 | 0.057 | | | 16:39:38 | Yes |
| 2 | 1.863 | 1.863 | 0.046 | 0.260 | 0.056 | | | 16:40:13 | Yes |
| 3 | 1.855 | 1.855 | 0.045 | 0.249 | 0.056 | | | 16:40:47 | Yes |
| Mean: | 1.866 | 1.866 | 0.046 | | | | | | |
| SD: | 0.013 | 0.013 | 0.0003 | | | | | | |
| %RSD: | 0.671 | 0.671 | 0.67 | | | | | | |

Sequence No.: 97
 Sample ID: K0808982-014 1/10
 Analyst:

Autosampler Location:
 Date Collected: 11/10/2008 4:41:34 PM
 Data Type: Original

Replicate Data: K0808982-014 1/10

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.898 | 6.898 | 0.169 | 0.815 | 0.179 | | | 16:41:50 | Yes |
| 2 | 6.783 | 6.783 | 0.166 | 0.787 | 0.177 | | | 16:42:24 | Yes |
| 3 | 6.747 | 6.747 | 0.165 | 0.802 | 0.176 | | | 16:42:59 | Yes |
| Mean: | 6.809 | 6.809 | 0.167 | | | | | | |
| SD: | 0.078 | 0.078 | 0.0019 | | | | | | |
| %RSD: | 1.151 | 1.151 | 1.15 | | | | | | |

Sequence No.: 98
 Sample ID: K0808982-0021 1/10

Autosampler Location:
 Date Collected: 11/10/2008 4:44:01 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-0021 1/10

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.312 | 0.312 | 0.008 | 0.081 | 0.018 | | | 16:44:19 | Yes |
| 2 | 0.235 | 0.235 | 0.006 | 0.061 | 0.016 | | | 16:44:54 | Yes |
| 3 | 0.302 | 0.302 | 0.007 | 0.079 | 0.018 | | | 16:45:28 | Yes |
| Mean: | 0.283 | 0.283 | 0.007 | | | | | | |
| SD: | 0.042 | 0.042 | 0.0010 | | | | | | |
| %RSD: | 14.87 | 14.87 | 14.87 | | | | | | |

Sequence No.: 99

Autosampler Location:

Sample ID: K0808982-021A 1/10

Date Collected: 11/10/2008 4:49:15 PM

Analyst:

Data Type: Original

Replicate Data: K0808982-021A 1/10

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.402 | 5.402 | 0.132 | 0.652 | 0.143 | | | 16:49:31 | Yes |
| 2 | 5.376 | 5.376 | 0.131 | 0.651 | 0.142 | | | 16:50:05 | Yes |
| 3 | 5.411 | 5.411 | 0.132 | 0.655 | 0.143 | | | 16:50:40 | Yes |
| Mean: | 5.396 | 5.396 | 0.132 | | | | | | |
| SD: | 0.018 | 0.018 | 0.0004 | | | | | | |
| %RSD: | 0.332 | 0.332 | 0.33 | | | | | | |

Sequence No.: 100

Autosampler Location:

Sample ID: CCV

Date Collected: 11/10/2008 4:53:30 PM

Analyst:

Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.755 | 7.755 | 0.190 | 0.942 | 0.200 | | | 16:53:46 | Yes |
| 2 | 7.807 | 7.807 | 0.191 | 0.933 | 0.202 | | | 16:54:21 | Yes |
| 3 | 7.899 | 7.899 | 0.193 | 0.936 | 0.204 | | | 16:54:54 | Yes |
| Mean: | 7.820 | 7.820 | 0.191 | | | | | | |
| SD: | 0.073 | 0.073 | 0.0018 | | | | | | |
| %RSD: | 0.932 | 0.932 | 0.93 | | | | | | |

Sequence No.: 101

Autosampler Location:

Sample ID: CCB

Date Collected: 11/10/2008 4:55:51 PM

Analyst:

Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.022 | 0.022 | 0.001 | 0.053 | 0.011 | | | 16:56:07 | Yes |
| 2 | -0.036 | -0.036 | -0.001 | 0.041 | 0.010 | | | 16:56:42 | Yes |
| 3 | -0.017 | -0.017 | -0.000 | 0.038 | 0.010 | | | 16:57:16 | Yes |
| Mean: | -0.010 | -0.010 | -0.000 | | | | | | |
| SD: | 0.030 | 0.030 | 0.0007 | | | | | | |
| %RSD: | 289.1 | 289.1 | 289.11 | | | | | | |

Element Analyzed Se Hydride Instrument K-FLAA-2
Service Request # K0807960 (152-174), K0808982-021 & 022

Batch QC SR's # _____

Calibration Std. AA1-10-E

Starlims # 133887

Run # 111308-Se

Hydride Data Review Form

| | Yes | No | NA |
|---|-------------------------------------|--------------------------|--------------------------|
| 1. ICV within 10% of true Value | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Calibration data included | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. CCV's in control | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. CCB's and/or ICB's below MRL | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. All reported Results within Cal. Range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. All Calculations are Correct | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Comments

Primary Reviewed by [Signature] Date 11/14/08

Secondary Reviewed by [Signature] Date 11/14/08

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

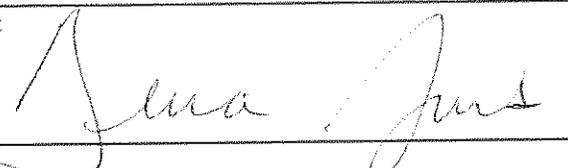
| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments Post Spike = 5 ppb |
|--------------------------|--------------------|------------------|--|--------------------------------|
| ICV | - | 7.306 | 97% | |
| ICB | - | 0.051 | | |
| CRA | - | 0.288 | 144% | |
| CCV | - | 7.681 | 104% | |
| CCB | - | 0.027 | | |
| TORT K0807960 | 1/5x1/2 | 2.339 | 77% | Cx = 4.292 |
| TORTA K0807960 | 1/5x1/2 | 5.065 | 55% | |
| LCS K08077960 | 1/5x1/20 | 1.830 | 92% | Cx = 1.725 |
| LCSA K0807960 | 1/5x1/20 | 7.137 | 106% | |
| K0807960-152 | 1/5x1/5 | 0.421 | | Cx = 0.563 |
| K0807960-152A | 1/5x1/5 | 4.163 | 75% | |
| K0807960-153 | 1/5x1/5 | 1.079 | | Cx = 1.580 |
| K0807960-153A | 1/5x1/5 | 4.492 | 68% | |
| K0807960-154 | 1/5x1/5 | 0.562 | | Cx = 0.752 |
| K0807960-154A | 1/5x1/5 | 4.296 | 75% | |
| CCV | - | 7.588 | 101% | |
| CCB | - | 0.035 | | |
| K0807960-155 | 1/5x1/5 | 0.270 | | Rerun |
| K0807960-155A | 1/5x1/5 | 4.672 | | Rerun |
| K0807960-156 | 1/5x1/5 | 0.855 | | Cx = 1.058 |
| K0807960-156A | 1/5x1/5 | 4.895 | 81% | |
| K0807960-156D | 1/5x1/5 | 0.852 | | Cx = 1.112 |
| K0807960-156DA | 1/5x1/5 | 4.680 | 77% | |
| K0807960-156S | 1/5x1/5 | 2.012 | 112% | Cx = 2.842 |
| K0807960-156SA | 1/5x1/5 | 5.551 | 71% | |
| K0807960-157 | 1/5x1/5 | 1.971 | | Cx = 2.757 |
| K0807960-157A | 1/5x1/5 | 5.548 | 72% | |
| CCV | - | 7.632 | 102% | |
| CCB | - | 0.034 | | |
| K0807960-158 | 1/5x1/5 | 0.676 | | Cx = 0.876 |

4
11/14/08

True Values/QC Limits:

Arsenic: 8ppb (80-120%) 8ppb (75-125%) 146.0mg/kg (80-120%) 10ppb (75-125%)
Selenium 8ppb (72-125%) 8ppb (66-128%) 73.0mg/kg (62-147%) 10ppb (64-131%)

| | | |
|--|-------------------|-------------------|
| Analyst  | Date: 11/14/08 | Page Number: 1 |
|--|-------------------|-------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------------|--------------------|------------------|--|------------|
| K0807960-158A | 1/5x1/5 | 4.534 | 77% | |
| K0807960-159 | 1/5x1/5 | 0.316 | | Rerun |
| K0807960-159A | 1/5x1/5 | 4.492 | | Rerun |
| K0807960-160 | 1/5x1/5 | 0.860 | | Cx = 1.078 |
| K0807960-160A | 1/5x1/5 | 4.851 | 80% | |
| K0807960-161 | 1/5x1/5 | 1.736 | | Rerun |
| K0807960-161A | 1/5x1/5 | 6.831 | 97% | |
| K0807960-162 | 1/5x1/5 | 0.717 | | Rerun |
| K0807960-162A | 1/5x1/5 | 5.349 | | Rerun |
| CCV | - | 7.782 | 104% | |
| CCB | - | 0.042 | | |
| K0807960-163 | 1/5x1/5 | 0.467 | | Rerun |
| K0807960-163A | 1/5x1/5 | 5.730 | | Rerun |
| K0807960-164 | 1/5x1/5 | 1.112 | | Cx = 0.993 |
| K0807960-164A | 1/5x1/5 | 6.702 | 112% | |
| K0807960-165 | 1/5x1/5 | 3.567 | | Cx = 4.003 |
| K0807960-165A | 1/5x1/5 | 8.021 | 89% | |
| K0807960-166 | 1/5x1/5 | 1.219 | | Cx = 1.199 |
| K0807960-166A | 1/5x1/5 | 6.303 | 102% | |
| K0807960-167 | 1/5x1/5 | 0.512 | | Rerun |
| K0807960-167A | 1/5x1/5 | 5.729 | | Rerun |
| CCV | - | 7.884 | 105% | |
| CCB | - | 0.015 | | |
| K0807960-168 | 1/5x1/5 | 0.644 | | Rerun |
| K0807960-168A | 1/5x1/5 | 6.159 | | Rerun |
| K0807960-169 | 1/5x1/5 | 1.736 | | Cx = 2.045 |
| K0807960-169A | 1/5x1/5 | 5.982 | 85% | |
| TORT #2 K0807960 | 1/5x1/2 | 4.749 | 108% | Cx = 5.892 |
| TORTA #2 K0807960 | 1/5x1/2 | 8.781 | 81% | |
| LCS K0807960 | 1/5x1/20 | 2.007 | 97% | Cx = 1.808 |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-----------------------------|--------------------------|--------------------------|
| Analyst <i>Sana Jure</i> | Date: <i>11/14/08</i> | Page Number: <i>2</i> |
|-----------------------------|--------------------------|--------------------------|

COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|---------------------------|--------------------|-------------------|--|------------|
| LCSA K0807960 | 1/5x1/20 | 7.558 | 111% | |
| K0807960-170 | 1/5x1/5 | 0.689 | | Rerun |
| K0807960-170A | 1/5x1/5 | 5.887 | | Rerun |
| CCV | - | 7.855 | 105% | |
| CCB | - | 0.022 | | |
| K0807960-171 | 1/5x1/5 | 0.395 | | Rerun |
| K0807960-171A | 1/5x1/5 | 9.288 | | Rerun |
| K0807960-171D | 1/5x1/5 | 0.401 | | Rerun |
| K0807960-171DA | 1/5x1/5 | 5.318 | | Rerun |
| K0807960-171S | 1/5x1/5 | 2.037 | | Rerun |
| K0807960-171SA | 1/5x1/5 | 6.788 | | Rerun |
| K0807960-172 | 1/5x1/5 | 0.789 | | Rerun |
| K0807960-172A | 1/5x1/5 | 5.769 | | Rerun |
| K0807960-173 | 1/5x1/5 | 2.323 | | Cx = 2.342 |
| K0807960-173A | 1/5x1/5 | 7.283 | 99% | |
| CCV | - | 7.767 | 104% | |
| CCB | - | -0.086 | | |
| K0807960-174 | 1/5x1/5 | 0.674 | | Rerun |
| K0807960-174A | 1/5x1/5 | 5.912 | | Rerun |
| K0808982-021 | 1/5x1/2 | 1.907 | | Cx = 2.577 |
| K0808982-021A | 1/5x1/2 | 5.605 | 74% | |
| K0808982-021D | 1/5x1/2 | 1.980 | | Cx = 2.698 |
| K0808982-021DA | 1/5x1/2 | 5.650 | 73% | |
| K0808982-021S | 1/5x1/2 | 12.075 | | Rerun |
| K0808982-021SA | 1/5x1/2 | 14.438 | | Rerun |
| K0808982-022 | 1/5x1/2 | 3.225 | | Cx = 3.933 |
| K0808982-022A | 1/5x1/2 | 7.325 | 82% | |
| CCV | - | 7.963 | 106% | |
| CCB | - | 0.039 | | |
| K0807960-MB #1 | 1/5 | 0.417 | | Rerun |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|-----------------------------|-------------------|-------------------|
| Analyst <i>Jana Jure</i> | Date: 11/14/08 | Page Number: 3 |
|-----------------------------|-------------------|-------------------|

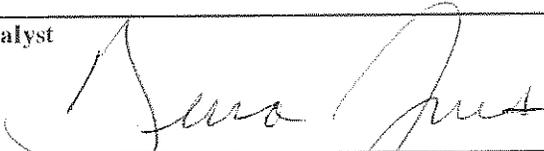
COLUMBIA ANALYTICAL SERVICES, INC.

GFAA Run Log

| | |
|---|---------------------|
| Method: (Circle Method Used) 7742 7062 Other: _____ Element: As Se | Service Request # : |
|---|---------------------|

| SAMPLE NUMBER | Dilution Factor | Measured (µg/L) | Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.) | Comments |
|--------------------|-----------------|-----------------|--|------------|
| K0807960-MB #2 | 1/5 | 0.132 | | |
| CCV | - | 7.360 | 98% | |
| CCB | - | 0.017 | | |
| K0807960-155 1/2 | 1/5x1/2 | 0.843 | | Cx = 1.034 |
| K0807960-155A 1/2 | 1/5x1/2 | 4.918 | 82% | |
| K08077960-159 1/2 | 1/5x1/2 | 0.963 | | Cx = 1.149 |
| K0807960-159A 1/2 | 1/5x1/2 | 5.154 | 84% | |
| K0807960-161 1/5 | 1/5x1/5 | 1.966 | | Cx = 2.021 |
| K0807960-162 1/2 | 1/5x1/2 | 1.633 | | Cx = 2.143 |
| K0807960-162A 1/2 | 1/5x1/2 | 5.442 | 76% | |
| K0807960-163 1/2 | 1/5x1/2 | 1.021 | | Cx = 1.288 |
| K0807960-163A 1/2 | 1/5x1/2 | 4.985 | 79% | |
| K0807960-167 1/2 | 1/5x1/2 | 0.924 | | Cx = 1.224 |
| CCV | - | 7.336 | 98% | |
| CCB | - | 0.013 | | |
| K0807960-167A 1/2 | 1/5x1/2 | 4.700 | 76% | |
| K0807960-168 1/2 | 1/5x1/2 | 1.522 | | Cx = 2.032 |
| K0807960-168A 1/2 | 1/5x1/2 | 5.266 | 75% | |
| K0807960-170 1/2 | 1/5x1/2 | 1.489 | | Cx = 1.857 |
| K0807960-170A 1/2 | 1/5x1/2 | 5.500 | 80% | |
| K0807960-171 1/2 | 1/5x1/2 | 0.844 | | Cx = 1.158 |
| K0807960-171A 1/2 | 1/5x1/2 | 4.489 | 73% | |
| K0807960-171D 1/2 | 1/5x1/2 | 0.855 | | Cx = 1.103 |
| K0807960-171DA 1/2 | 1/5x1/2 | 4.728 | 77% | |
| K0807960-171S 1/2 | 1/5x1/2 | 3.922 | 123% | Cx = 5.960 |
| CCV | - | 7.269 | 97% | |
| CCB | - | 0.012 | | |
| K0807960-171SA 1/2 | 1/5x1/2 | 7.213 | 66% | |
| K0807960-172 1/2 | 1/5x1/2 | 1.625 | | Cx = 2.241 |
| K0807960-172A 1/2 | 1/5x1/2 | 5.248 | 72% | |

| | | | | |
|-------------------------------|----------------|----------------|----------------------|-----------------|
| True Values/QC Limits: | LCSW | Water Spike | LCSS (ERA D045540) | Soil Spike |
| Arsenic: | 8ppb (80-120%) | 8ppb (75-125%) | 146.0mg/kg (80-120%) | 10ppb (75-125%) |
| Selenium | 8ppb (72-125%) | 8ppb (66-128%) | 73.0mg/kg (62-147%) | 10ppb (64-131%) |

| | | |
|--|-------------------|-------------------|
| Analyst  | Date: 11/14/08 | Page Number: 4 |
|--|-------------------|-------------------|

Sample ID: Std 1.0
Analyst:

Date Collected: 11/13/2008 11:54:02 AM
Data Type: Original

Replicate Data: Std 1.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|---|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [1.0] | 0.034 | 0.165 | 0.040 | | | 11:54:25 | Yes |
| 2 | | [1.0] | 0.031 | 0.140 | 0.037 | | | 11:54:59 | Yes |
| 3 | | [1.0] | 0.031 | 0.153 | 0.038 | | | 11:55:33 | Yes |
| Mean: | | [1.0] | 0.032 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |
| Standard number 3 applied. [1.0] | | | | | | | | | |
| Correlation Coef.: 0.992376 Slope: 0.03110 Intercept: 0.00000 | | | | | | | | | |

Sequence No.: 5
Sample ID: Std 5.0
Analyst:

Autosampler Location: 5
Date Collected: 11/13/2008 11:56:24 AM
Data Type: Original

Replicate Data: Std 5.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|---|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [5.0] | 0.130 | 0.566 | 0.137 | | | 11:56:47 | Yes |
| 2 | | [5.0] | 0.132 | 0.574 | 0.139 | | | 11:57:21 | Yes |
| 3 | | [5.0] | 0.134 | 0.576 | 0.141 | | | 11:57:56 | Yes |
| Mean: | | [5.0] | 0.132 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |
| Standard number 4 applied. [5.0] | | | | | | | | | |
| Correlation Coef.: 0.998598 Slope: 0.02671 Intercept: 0.00000 | | | | | | | | | |

Sequence No.: 6
Sample ID: Std 7.5
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 11:58:47 AM
Data Type: Original

Replicate Data: Std 7.5

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|---|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [7.5] | 0.192 | 0.832 | 0.199 | | | 11:59:10 | Yes |
| 2 | | [7.5] | 0.190 | 0.818 | 0.197 | | | 11:59:44 | Yes |
| 3 | | [7.5] | 0.191 | 0.846 | 0.198 | | | 12:00:18 | Yes |
| Mean: | | [7.5] | 0.191 | | | | | | |
| SD: | | | 0.0 | | | | | | |
| %RSD: | | | 0.0 | | | | | | |
| Standard number 5 applied. [7.5] | | | | | | | | | |
| Correlation Coef.: 0.999004 Slope: 0.02587 Intercept: 0.00000 | | | | | | | | | |

Sequence No.: 7
Sample ID: Std 10.0
Analyst:

Autosampler Location: 7
Date Collected: 11/13/2008 12:01:10 PM
Data Type: Original

Replicate Data: Std 10.0

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | | [10] | 0.244 | 1.085 | 0.251 | | | 12:01:34 | Yes |
| 2 | | [10] | 0.244 | 1.053 | 0.251 | | | 12:02:09 | Yes |
| 3 | | [10] | 0.249 | 1.076 | 0.256 | | | 12:02:43 | Yes |
| Mean: | | [10] | 0.246 | | | | | | |
| SD: | | | 0 | | | | | | |
| %RSD: | | | 0 | | | | | | |

Standard number 6 applied. [10]
Correlation Coef.: 0.998822 Slope: 0.02518 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Se 196.03 Equation: Linear Through Zero

Table with 7 columns: ID, Mean Signal (Abs), Entered Conc. (ug/L), Calculated Conc. (ug/L), Standard Deviation, %RSD. Rows include Cal Blk, Std 0.2, Std 0.5, Std 1.0, Std 5.0, Std 7.5, Std 10.0.

Sequence No.: 8 Autosampler Location: 8
Sample ID: ICV Date Collected: 11/13/2008 12:03:35 PM
Analyst: Data Type: Original

Replicate Data: ICV

Table with 10 columns: Repl #, SampleConc (ug/L), StndConc (ug/L), BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes Mean, SD, and %RSD values.

QC value within limits for Se 196.03 Recovery = 97.42%
All analyte(s) passed QC.

Sequence No.: 9 Autosampler Location: 1
Sample ID: ICB Date Collected: 11/13/2008 12:06:01 PM
Analyst: Data Type: Original

Replicate Data: ICB

Table with 10 columns: Repl #, SampleConc (ug/L), StndConc (ug/L), BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Includes Mean, SD, and %RSD values.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 10 Autosampler Location: 2
Sample ID: CRA Date Collected: 11/13/2008 12:08:19 PM
Analyst: Data Type: Original

Replicate Data: CRA

Table with 10 columns: Repl #, SampleConc (ug/L), StndConc (ug/L), BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored.

Mean: 0.288 0.288 0.007
SD: 0.008 0.008 0.0002
%RSD: 2.627 2.627 2.63

QC value within limits for Se 196.03 Recovery = 143.96%
All analyte(s) passed QC.

Sequence No.: 11
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 12:10:39 PM
Data Type: Original

Replicate Data: CCV

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = 102.41%
All analyte(s) passed QC.

Sequence No.: 12
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/13/2008 12:13:03 PM
Data Type: Original

Replicate Data: CCB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 13
Sample ID: TORT K0807960
Analyst:

Autosampler Location: 9
Date Collected: 11/13/2008 12:15:22 PM
Data Type: Original

Replicate Data: TORT K0807960

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 14
Sample ID: TORTA K0807960
Analyst:

Autosampler Location: 10
Date Collected: 11/13/2008 12:17:41 PM
Data Type: Original

Replicate Data: TORTA K0807960

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

%RSD: 2.537 2.537 2.54

Sequence No.: 15
Sample ID: LCS K08077960
Analyst:

Autosampler Location: 11
Date Collected: 11/13/2008 12:20:02 PM
Data Type: Original

Replicate Data: LCS K08077960

| Repl # | Sample Conc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|------------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.777 | 1.777 | 0.045 | 0.206 | 0.052 | | | 12:20:24 | Yes |
| 2 | 1.836 | 1.836 | 0.046 | 0.211 | 0.053 | | | 12:20:58 | Yes |
| 3 | 1.876 | 1.876 | 0.047 | 0.217 | 0.054 | | | 12:21:33 | Yes |
| Mean: | 1.830 | 1.830 | 0.046 | | | | | | |
| SD: | 0.050 | 0.050 | 0.0013 | | | | | | |
| %RSD: | 2.735 | 2.735 | 2.74 | | | | | | |

Sequence No.: 16
Sample ID: LCSA K0807960
Analyst:

Autosampler Location: 12
Date Collected: 11/13/2008 12:22:23 PM
Data Type: Original

Replicate Data: LCSA K0807960

| Repl # | Sample Conc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|------------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.176 | 7.176 | 0.181 | 0.785 | 0.187 | | | 12:22:46 | Yes |
| 2 | 7.162 | 7.162 | 0.180 | 0.775 | 0.187 | | | 12:23:20 | Yes |
| 3 | 7.072 | 7.072 | 0.178 | 0.763 | 0.185 | | | 12:23:54 | Yes |
| Mean: | 7.137 | 7.137 | 0.180 | | | | | | |
| SD: | 0.056 | 0.056 | 0.0014 | | | | | | |
| %RSD: | 0.790 | 0.790 | 0.79 | | | | | | |

Sequence No.: 17
Sample ID: K0807960-152
Analyst:

Autosampler Location: 13
Date Collected: 11/13/2008 12:24:45 PM
Data Type: Original

Replicate Data: K0807960-152

| Repl # | Sample Conc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|------------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.475 | 0.475 | 0.012 | 0.090 | 0.019 | | | 12:25:08 | Yes |
| 2 | 0.397 | 0.397 | 0.010 | 0.070 | 0.017 | | | 12:25:42 | Yes |
| 3 | 0.389 | 0.389 | 0.010 | 0.068 | 0.017 | | | 12:26:16 | Yes |
| Mean: | 0.421 | 0.421 | 0.011 | | | | | | |
| SD: | 0.047 | 0.047 | 0.0012 | | | | | | |
| %RSD: | 11.29 | 11.29 | 11.29 | | | | | | |

Sequence No.: 18
Sample ID: K0807960-152A
Analyst:

Autosampler Location: 14
Date Collected: 11/13/2008 12:27:07 PM
Data Type: Original

Replicate Data: K0807960-152A

| Repl # | Sample Conc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|------------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.172 | 4.172 | 0.105 | 0.506 | 0.112 | | | 12:27:30 | Yes |
| 2 | 4.139 | 4.139 | 0.104 | 0.506 | 0.111 | | | 12:28:04 | Yes |
| 3 | 4.177 | 4.177 | 0.105 | 0.495 | 0.112 | | | 12:28:39 | Yes |
| Mean: | 4.163 | 4.163 | 0.105 | | | | | | |
| SD: | 0.021 | 0.021 | 0.0005 | | | | | | |
| %RSD: | 0.503 | 0.503 | 0.50 | | | | | | |

Sequence No.: 19
Sample ID: K0807960-153
Analyst:

Autosampler Location: 15
Date Collected: 11/13/2008 12:29:31 PM
Data Type: Original

Replicate Data: K0807960-153

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.108 | 1.108 | 0.028 | 0.164 | 0.035 | | | 12:29:54 | Yes |
| 2 | 1.063 | 1.063 | 0.027 | 0.143 | 0.034 | | | 12:30:29 | Yes |
| 3 | 1.065 | 1.065 | 0.027 | 0.150 | 0.034 | | | 12:31:03 | Yes |
| Mean: | 1.079 | 1.079 | 0.027 | | | | | | |
| SD: | 0.025 | 0.025 | 0.0006 | | | | | | |
| %RSD: | 2.362 | 2.362 | 2.36 | | | | | | |

Sequence No.: 20
Sample ID: K0807960-153A
Analyst:

Autosampler Location: 16
Date Collected: 11/13/2008 12:31:55 PM
Data Type: Original

Replicate Data: K0807960-153A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.478 | 4.478 | 0.113 | 0.538 | 0.120 | | | 12:32:20 | Yes |
| 2 | 4.504 | 4.504 | 0.113 | 0.522 | 0.120 | | | 12:32:54 | Yes |
| 3 | 4.493 | 4.493 | 0.113 | 0.526 | 0.120 | | | 12:33:28 | Yes |
| Mean: | 4.492 | 4.492 | 0.113 | | | | | | |
| SD: | 0.013 | 0.013 | 0.0003 | | | | | | |
| %RSD: | 0.291 | 0.291 | 0.29 | | | | | | |

Sequence No.: 21
Sample ID: K0807960-154
Analyst:

Autosampler Location: 17
Date Collected: 11/13/2008 12:34:22 PM
Data Type: Original

Replicate Data: K0807960-154

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.584 | 0.584 | 0.015 | 0.099 | 0.021 | | | 12:34:43 | Yes |
| 2 | 0.545 | 0.545 | 0.014 | 0.099 | 0.021 | | | 12:35:18 | Yes |
| 3 | 0.559 | 0.559 | 0.014 | 0.089 | 0.021 | | | 12:35:52 | Yes |
| Mean: | 0.562 | 0.562 | 0.014 | | | | | | |
| SD: | 0.020 | 0.020 | 0.0005 | | | | | | |
| %RSD: | 3.508 | 3.508 | 3.51 | | | | | | |

Sequence No.: 22
Sample ID: K0807960-154A
Analyst:

Autosampler Location: 18
Date Collected: 11/13/2008 12:36:41 PM
Data Type: Original

Replicate Data: K0807960-154A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.267 | 4.267 | 0.107 | 0.515 | 0.114 | | | 12:37:02 | Yes |
| 2 | 4.331 | 4.331 | 0.109 | 0.514 | 0.116 | | | 12:37:36 | Yes |
| 3 | 4.290 | 4.290 | 0.108 | 0.509 | 0.115 | | | 12:38:11 | Yes |
| Mean: | 4.296 | 4.296 | 0.108 | | | | | | |
| SD: | 0.033 | 0.033 | 0.0008 | | | | | | |
| %RSD: | 0.757 | 0.757 | 0.76 | | | | | | |

Sequence No.: 23
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 12:39:00 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.579 | 7.579 | 0.191 | 0.831 | 0.198 | | | 12:39:23 | Yes |
| 2 | 7.635 | 7.635 | 0.192 | 0.835 | 0.199 | | | 12:39:57 | Yes |
| 3 | 7.548 | 7.548 | 0.190 | 0.839 | 0.197 | | | 12:40:32 | Yes |
| Mean: | 7.588 | 7.588 | 0.191 | | | | | | |
| SD: | 0.044 | 0.044 | 0.0011 | | | | | | |
| %RSD: | 0.585 | 0.585 | 0.59 | | | | | | |

QC value within limits for Se 196.03 Recovery = 101.17%
All analyte(s) passed QC.

Sequence No.: 24
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/13/2008 12:41:24 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.058 | 0.058 | 0.001 | 0.035 | 0.008 | | | 12:41:45 | Yes |
| 2 | 0.024 | 0.024 | 0.001 | 0.028 | 0.007 | | | 12:42:20 | Yes |
| 3 | 0.022 | 0.022 | 0.001 | 0.030 | 0.007 | | | 12:42:54 | Yes |
| Mean: | 0.035 | 0.035 | 0.001 | | | | | | |
| SD: | 0.020 | 0.020 | 0.0005 | | | | | | |
| %RSD: | 58.07 | 58.07 | 58.07 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 25
Sample ID: K0807960-155
Analyst:

Autosampler Location: 19
Date Collected: 11/13/2008 12:43:42 PM
Data Type: Original

Replicate Data: K0807960-155

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.281 | 0.281 | 0.007 | 0.062 | 0.014 | | | 12:44:05 | Yes |
| 2 | 0.266 | 0.266 | 0.007 | 0.054 | 0.013 | | | 12:44:39 | Yes |
| 3 | 0.262 | 0.262 | 0.007 | 0.053 | 0.013 | | | 12:45:13 | Yes |
| Mean: | 0.270 | 0.270 | 0.007 | | | | | | |
| SD: | 0.010 | 0.010 | 0.0003 | | | | | | |
| %RSD: | 3.757 | 3.757 | 3.76 | | | | | | |

Sequence No.: 26
Sample ID: K0807960-155A
Analyst:

Autosampler Location: 20
Date Collected: 11/13/2008 12:46:02 PM
Data Type: Original

Replicate Data: K0807960-155A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.664 | 4.664 | 0.117 | 0.526 | 0.124 | | | 12:46:24 | Yes |
| 2 | 4.716 | 4.716 | 0.119 | 0.524 | 0.126 | | | 12:46:58 | Yes |
| 3 | 4.636 | 4.636 | 0.117 | 0.517 | 0.124 | | | 12:47:33 | Yes |
| Mean: | 4.672 | 4.672 | 0.118 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 0.870 | 0.870 | 0.87 | | | | | | |

Sequence No.: 27
Sample ID: K0807960-156

Autosampler Location: 21
Date Collected: 11/13/2008 12:48:22 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-156

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.866 | 0.866 | 0.022 | 0.134 | 0.029 | | | 12:48:44 | Yes |
| 2 | 0.836 | 0.836 | 0.021 | 0.128 | 0.028 | | | 12:49:19 | Yes |
| 3 | 0.863 | 0.863 | 0.022 | 0.130 | 0.029 | | | 12:49:53 | Yes |
| Mean: | 0.855 | 0.855 | 0.022 | | | | | | |
| SD: | 0.017 | 0.017 | 0.0004 | | | | | | |
| %RSD: | 1.942 | 1.942 | 1.94 | | | | | | |

Sequence No.: 28

Autosampler Location: 22

Sample ID: K0807960-156A

Date Collected: 11/13/2008 12:50:49 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-156A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.902 | 4.902 | 0.123 | 0.586 | 0.130 | | | 12:51:14 | Yes |
| 2 | 4.910 | 4.910 | 0.124 | 0.577 | 0.130 | | | 12:51:49 | Yes |
| 3 | 4.873 | 4.873 | 0.123 | 0.584 | 0.129 | | | 12:52:24 | Yes |
| Mean: | 4.895 | 4.895 | 0.123 | | | | | | |
| SD: | 0.020 | 0.020 | 0.0005 | | | | | | |
| %RSD: | 0.400 | 0.400 | 0.40 | | | | | | |

Sequence No.: 29

Autosampler Location: 23

Sample ID: K0807960-156D

Date Collected: 11/13/2008 12:53:13 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-156D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.863 | 0.863 | 0.022 | 0.127 | 0.029 | | | 12:53:36 | Yes |
| 2 | 0.833 | 0.833 | 0.021 | 0.132 | 0.028 | | | 12:54:10 | Yes |
| 3 | 0.861 | 0.861 | 0.022 | 0.134 | 0.028 | | | 12:54:44 | Yes |
| Mean: | 0.852 | 0.852 | 0.021 | | | | | | |
| SD: | 0.017 | 0.017 | 0.0004 | | | | | | |
| %RSD: | 1.975 | 1.975 | 1.97 | | | | | | |

Sequence No.: 30

Autosampler Location: 24

Sample ID: K0807960-156DA

Date Collected: 11/13/2008 12:55:33 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-156DA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.649 | 4.649 | 0.117 | 0.563 | 0.124 | | | 12:55:56 | Yes |
| 2 | 4.682 | 4.682 | 0.118 | 0.578 | 0.125 | | | 12:56:30 | Yes |
| 3 | 4.707 | 4.707 | 0.119 | 0.570 | 0.125 | | | 12:57:04 | Yes |
| Mean: | 4.680 | 4.680 | 0.118 | | | | | | |
| SD: | 0.029 | 0.029 | 0.0007 | | | | | | |
| %RSD: | 0.622 | 0.622 | 0.62 | | | | | | |

Sequence No.: 31

Autosampler Location: 25

Sample ID: K0807960-156S

Date Collected: 11/13/2008 12:57:55 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-156S

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.027 | 2.027 | 0.051 | 0.271 | 0.058 | | | 12:58:17 | Yes |
| 2 | 1.976 | 1.976 | 0.050 | 0.245 | 0.057 | | | 12:58:51 | Yes |
| 3 | 2.032 | 2.032 | 0.051 | 0.275 | 0.058 | | | 12:59:26 | Yes |
| Mean: | 2.012 | 2.012 | 0.051 | | | | | | |
| SD: | 0.031 | 0.031 | 0.0008 | | | | | | |
| %RSD: | 1.541 | 1.541 | 1.54 | | | | | | |

Sequence No.: 32

Sample ID: K0807960-156SA

Analyst:

Autosampler Location: 26

Date Collected: 11/13/2008 1:00:16 PM

Data Type: Original

Replicate Data: K0807960-156SA

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.481 | 5.481 | 0.138 | 0.695 | 0.145 | | | 13:00:39 | Yes |
| 2 | 5.560 | 5.560 | 0.140 | 0.687 | 0.147 | | | 13:01:13 | Yes |
| 3 | 5.613 | 5.613 | 0.141 | 0.680 | 0.148 | | | 13:01:48 | Yes |
| Mean: | 5.551 | 5.551 | 0.140 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0017 | | | | | | |
| %RSD: | 1.195 | 1.195 | 1.20 | | | | | | |

Sequence No.: 33

Sample ID: K0807960-157

Analyst:

Autosampler Location: 27

Date Collected: 11/13/2008 1:02:39 PM

Data Type: Original

Replicate Data: K0807960-157

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.995 | 1.995 | 0.050 | 0.266 | 0.057 | | | 13:03:02 | Yes |
| 2 | 1.976 | 1.976 | 0.050 | 0.258 | 0.057 | | | 13:03:37 | Yes |
| 3 | 1.942 | 1.942 | 0.049 | 0.247 | 0.056 | | | 13:04:11 | Yes |
| Mean: | 1.971 | 1.971 | 0.050 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0007 | | | | | | |
| %RSD: | 1.357 | 1.357 | 1.36 | | | | | | |

Sequence No.: 34

Sample ID: K0807960-157A

Analyst:

Autosampler Location: 28

Date Collected: 11/13/2008 1:05:01 PM

Data Type: Original

Replicate Data: K0807960-157A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.518 | 5.518 | 0.139 | 0.660 | 0.146 | | | 13:05:25 | Yes |
| 2 | 5.537 | 5.537 | 0.139 | 0.653 | 0.146 | | | 13:05:59 | Yes |
| 3 | 5.589 | 5.589 | 0.141 | 0.668 | 0.148 | | | 13:06:34 | Yes |
| Mean: | 5.548 | 5.548 | 0.140 | | | | | | |
| SD: | 0.037 | 0.037 | 0.0009 | | | | | | |
| %RSD: | 0.664 | 0.664 | 0.66 | | | | | | |

Sequence No.: 35

Sample ID: CCV

Analyst:

Autosampler Location: 6

Date Collected: 11/13/2008 1:07:26 PM

Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 2 | 1.762 | 1.762 | 0.044 | 0.117 | 0.051 | 13:27:13 | Yes |
| 3 | 1.951 | 1.951 | 0.049 | 0.216 | 0.056 | 13:27:48 | Yes |
| Mean: | 1.736 | 1.736 | 0.044 | | | | |
| SD: | 0.230 | 0.230 | 0.0058 | | | | |
| %RSD: | 13.22 | 13.22 | 13.22 | | | | |

Changing BOC

A 11/14/08

Sequence No.: 44
 Sample ID: K0807960-161A
 Analyst:

Autosampler Location: 36
 Date Collected: 11/13/2008 1:28:37 PM
 Data Type: Original

Replicate Data: K0807960-161A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.707 | 6.707 | 0.169 | 0.772 | 0.176 | | | 13:28:58 | Yes |
| 2 | 6.993 | 6.993 | 0.176 | 0.798 | 0.183 | | | 13:29:32 | Yes |
| 3 | 6.793 | 6.793 | 0.171 | 0.781 | 0.178 | | | 13:30:07 | Yes |
| Mean: | 6.831 | 6.831 | 0.172 | | | | | | |
| SD: | 0.147 | 0.147 | 0.0037 | | | | | | |
| %RSD: | 2.146 | 2.146 | 2.15 | | | | | | |

Sequence No.: 45
 Sample ID: K0807960-162
 Analyst:

Autosampler Location: 37
 Date Collected: 11/13/2008 1:30:57 PM
 Data Type: Original

Replicate Data: K0807960-162

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.722 | 0.722 | 0.018 | 0.109 | 0.025 | | | 13:31:19 | Yes |
| 2 | 0.713 | 0.713 | 0.018 | 0.109 | 0.025 | | | 13:31:54 | Yes |
| 3 | 0.716 | 0.716 | 0.018 | 0.111 | 0.025 | | | 13:32:28 | Yes |
| Mean: | 0.717 | 0.717 | 0.018 | | | | | | |
| SD: | 0.004 | 0.004 | 0.0001 | | | | | | |
| %RSD: | 0.612 | 0.612 | 0.61 | | | | | | |

A 11/14/08

Sequence No.: 46
 Sample ID: K0807960-162A
 Analyst:

Autosampler Location: 38
 Date Collected: 11/13/2008 1:33:18 PM
 Data Type: Original

Replicate Data: K0807960-162A

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.375 | 5.375 | 0.135 | 0.641 | 0.142 | | | 13:33:39 | Yes |
| 2 | 5.399 | 5.399 | 0.136 | 0.625 | 0.143 | | | 13:34:14 | Yes |
| 3 | 5.274 | 5.274 | 0.133 | 0.623 | 0.140 | | | 13:34:49 | Yes |
| Mean: | 5.349 | 5.349 | 0.135 | | | | | | |
| SD: | 0.066 | 0.066 | 0.0017 | | | | | | |
| %RSD: | 1.236 | 1.236 | 1.24 | | | | | | |

Sequence No.: 47
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 11/13/2008 1:35:39 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StdConc ug/L | BlkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|--------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.811 | 7.811 | 0.197 | 0.881 | 0.203 | | | 13:36:02 | Yes |
| 2 | 7.794 | 7.794 | 0.196 | 0.871 | 0.203 | | | 13:36:36 | Yes |
| 3 | 7.740 | 7.740 | 0.195 | 0.857 | 0.202 | | | 13:37:10 | Yes |

Mean: 7.782 7.782 0.196
SD: 0.037 0.037 0.0009
%RSD: 0.478 0.478 0.48

QC value within limits for Se 196.03 Recovery = 103.76%
All analyte(s) passed QC.

Sequence No.: 48
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/13/2008 1:38:02 PM
Data Type: Original

Replicate Data: CCB

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 49
Sample ID: K0807960-163
Analyst:

Autosampler Location: 39
Date Collected: 11/13/2008 1:40:22 PM
Data Type: Original

Replicate Data: K0807960-163

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics. Includes handwritten note '11/14/08'.

Sequence No.: 50
Sample ID: K0807960-163A
Analyst:

Autosampler Location: 40
Date Collected: 11/13/2008 1:42:44 PM
Data Type: Original

Replicate Data: K0807960-163A

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 3 replicate rows and summary statistics.

Sequence No.: 51
Sample ID: K0807960-164
Analyst:

Autosampler Location: 41
Date Collected: 11/13/2008 1:45:06 PM
Data Type: Original

Replicate Data: K0807960-164

Table with 10 columns: Repl #, SampleConc ug/L, StndConc ug/L, BlnkCorr Signal, Peak Area, Peak Height, Bkgnd Area, Bkgnd Height, Time, Peak Stored. Contains 2 replicate rows and summary statistics.

| | | | | | | | | | |
|-------|-------|-------|--------|-------|-------|--|--|----------|-----|
| 3 | 1.087 | 1.087 | 0.027 | 0.142 | 0.034 | | | 13:46:40 | Yes |
| Mean: | 1.112 | 1.112 | 0.028 | | | | | | |
| SD: | 0.024 | 0.024 | 0.0006 | | | | | | |
| %RSD: | 2.164 | 2.164 | 2.16 | | | | | | |

```

=====
Sequence No.: 52                               Autosampler Location: 42
Sample ID: K0807960-164A                       Date Collected: 11/13/2008 1:47:30 PM
Analyst:                                         Data Type: Original
=====

```

Replicate Data: K0807960-164A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.671 | 6.671 | 0.168 | 0.777 | 0.175 | | | 13:47:53 | Yes |
| 2 | 6.766 | 6.766 | 0.170 | 0.775 | 0.177 | | | 13:48:27 | Yes |
| 3 | 6.669 | 6.669 | 0.168 | 0.755 | 0.175 | | | 13:49:01 | Yes |
| Mean: | 6.702 | 6.702 | 0.169 | | | | | | |
| SD: | 0.055 | 0.055 | 0.0014 | | | | | | |
| %RSD: | 0.826 | 0.826 | 0.83 | | | | | | |

```

=====
Sequence No.: 53                               Autosampler Location: 43
Sample ID: K0807960-165                       Date Collected: 11/13/2008 1:49:52 PM
Analyst:                                         Data Type: Original
=====

```

Replicate Data: K0807960-165

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.537 | 3.537 | 0.089 | 0.415 | 0.096 | | | 13:50:15 | Yes |
| 2 | 3.530 | 3.530 | 0.089 | 0.396 | 0.096 | | | 13:50:50 | Yes |
| 3 | 3.633 | 3.633 | 0.091 | 0.392 | 0.098 | | | 13:51:24 | Yes |
| Mean: | 3.567 | 3.567 | 0.090 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0015 | | | | | | |
| %RSD: | 1.614 | 1.614 | 1.61 | | | | | | |

```

=====
Sequence No.: 54                               Autosampler Location: 44
Sample ID: K0807960-165A                     Date Collected: 11/13/2008 1:52:15 PM
Analyst:                                         Data Type: Original
=====

```

Replicate Data: K0807960-165A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.019 | 8.019 | 0.202 | 0.915 | 0.209 | | | 13:52:38 | Yes |
| 2 | 7.957 | 7.957 | 0.200 | 0.903 | 0.207 | | | 13:53:12 | Yes |
| 3 | 8.088 | 8.088 | 0.204 | 0.900 | 0.210 | | | 13:53:47 | Yes |
| Mean: | 8.021 | 8.021 | 0.202 | | | | | | |
| SD: | 0.065 | 0.065 | 0.0016 | | | | | | |
| %RSD: | 0.814 | 0.814 | 0.81 | | | | | | |

```

=====
Sequence No.: 55                               Autosampler Location: 45
Sample ID: K0807960-166                       Date Collected: 11/13/2008 1:54:38 PM
Analyst:                                         Data Type: Original
=====

```

Replicate Data: K0807960-166

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.250 | 1.250 | 0.031 | 0.170 | 0.038 | | | 13:55:02 | Yes |
| 2 | 1.205 | 1.205 | 0.030 | 0.155 | 0.037 | | | 13:55:36 | Yes |
| 3 | 1.202 | 1.202 | 0.030 | 0.155 | 0.037 | | | 13:56:10 | Yes |
| Mean: | 1.219 | 1.219 | 0.031 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0007 | | | | | | |

%RSD: 2.200 2.200 2.20

Sequence No.: 56
Sample ID: K0807960-166A
Analyst:

Autosampler Location: 46
Date Collected: 11/13/2008 1:57:02 PM
Data Type: Original

Replicate Data: K0807960-166A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.277 | 6.277 | 0.158 | 0.741 | 0.165 | | | 13:57:26 | Yes |
| 2 | 6.357 | 6.357 | 0.160 | 0.729 | 0.167 | | | 13:58:00 | Yes |
| 3 | 6.275 | 6.275 | 0.158 | 0.717 | 0.165 | | | 13:58:35 | Yes |
| Mean: | 6.303 | 6.303 | 0.159 | | | | | | |
| SD: | 0.047 | 0.047 | 0.0012 | | | | | | |
| %RSD: | 0.746 | 0.746 | 0.75 | | | | | | |

Sequence No.: 57
Sample ID: K0807960-167
Analyst:

Autosampler Location: 47
Date Collected: 11/13/2008 1:59:27 PM
Data Type: Original

Replicate Data: K0807960-167

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.545 | 0.545 | 0.014 | 0.094 | 0.021 | | | 13:59:51 | Yes |
| 2 | 0.477 | 0.477 | 0.012 | 0.074 | 0.019 | | | 14:00:25 | Yes |
| 3 | 0.513 | 0.513 | 0.013 | 0.073 | 0.020 | | | 14:00:59 | Yes |
| Mean: | 0.512 | 0.512 | 0.013 | | | | | | |
| SD: | 0.034 | 0.034 | 0.0009 | | | | | | |
| %RSD: | 6.674 | 6.674 | 6.67 | | | | | | |

11/14/08

Sequence No.: 58
Sample ID: K0807960-167A
Analyst:

Autosampler Location: 48
Date Collected: 11/13/2008 2:01:52 PM
Data Type: Original

Replicate Data: K0807960-167A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.767 | 5.767 | 0.145 | 0.671 | 0.152 | | | 14:02:13 | Yes |
| 2 | 5.789 | 5.789 | 0.146 | 0.648 | 0.153 | | | 14:02:47 | Yes |
| 3 | 5.632 | 5.632 | 0.142 | 0.624 | 0.149 | | | 14:03:21 | Yes |
| Mean: | 5.729 | 5.729 | 0.144 | | | | | | |
| SD: | 0.085 | 0.085 | 0.0021 | | | | | | |
| %RSD: | 1.484 | 1.484 | 1.48 | | | | | | |

Sequence No.: 59
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 2:04:10 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.820 | 7.820 | 0.197 | 0.878 | 0.204 | | | 14:04:34 | Yes |
| 2 | 8.012 | 8.012 | 0.202 | 0.875 | 0.209 | | | 14:05:08 | Yes |
| 3 | 7.822 | 7.822 | 0.197 | 0.869 | 0.204 | | | 14:05:42 | Yes |
| Mean: | 7.884 | 7.884 | 0.199 | | | | | | |
| SD: | 0.110 | 0.110 | 0.0028 | | | | | | |
| %RSD: | 1.399 | 1.399 | 1.40 | | | | | | |

QC value within limits for Se 196.03 Recovery = 105.12%
All analyte(s) passed QC.

Sequence No.: 60
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/13/2008 2:06:33 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.060 | 0.060 | 0.002 | 0.033 | 0.008 | | | 14:06:54 | Yes |
| 2 | 0.004 | 0.004 | 0.000 | 0.029 | 0.007 | | | 14:07:28 | Yes |
| 3 | -0.020 | -0.020 | -0.001 | 0.023 | 0.006 | | | 14:08:03 | Yes |
| Mean: | 0.015 | 0.015 | 0.000 | | | | | | |
| SD: | 0.041 | 0.041 | 0.0010 | | | | | | |
| %RSD: | 278.4 | 278.4 | 278.37 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 61
Sample ID: K0807960-168
Analyst:

Autosampler Location: 49
Date Collected: 11/13/2008 2:08:52 PM
Data Type: Original

Replicate Data: K0807960-168

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.626 | 0.626 | 0.016 | 0.103 | 0.023 | | | 14:09:12 | Yes |
| 2 | 0.666 | 0.666 | 0.017 | 0.115 | 0.024 | | | 14:09:47 | Yes |
| 3 | 0.639 | 0.639 | 0.016 | 0.101 | 0.023 | | | 14:10:21 | Yes |
| Mean: | 0.644 | 0.644 | 0.016 | | | | | | |
| SD: | 0.021 | 0.021 | 0.0005 | | | | | | |
| %RSD: | 3.240 | 3.240 | 3.24 | | | | | | |

** 11/14/08*

Sequence No.: 62
Sample ID: K0807960-168A
Analyst:

Autosampler Location: 50
Date Collected: 11/13/2008 2:11:09 PM
Data Type: Original

Replicate Data: K0807960-168A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.534 | 6.534 | 0.165 | 0.836 | 0.171 | | | 14:11:30 | Yes |
| 2 | 5.978 | 5.978 | 0.151 | 0.719 | 0.157 | | | 14:12:04 | Yes |
| 3 | 5.965 | 5.965 | 0.150 | 0.696 | 0.157 | | | 14:12:39 | Yes |
| Mean: | 6.159 | 6.159 | 0.155 | | | | | | |
| SD: | 0.325 | 0.325 | 0.0082 | | | | | | |
| %RSD: | 5.275 | 5.275 | 5.27 | | | | | | |

Sequence No.: 63
Sample ID: K0807960-169
Analyst:

Autosampler Location: 51
Date Collected: 11/13/2008 2:13:28 PM
Data Type: Original

Replicate Data: K0807960-169

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.774 | 1.774 | 0.045 | 0.214 | 0.051 | | | 14:13:49 | Yes |
| 2 | 1.749 | 1.749 | 0.044 | 0.206 | 0.051 | | | 14:14:23 | Yes |
| 3 | 1.686 | 1.686 | 0.042 | 0.209 | 0.049 | | | 14:14:57 | Yes |
| Mean: | 1.736 | 1.736 | 0.044 | | | | | | |
| SD: | 0.045 | 0.045 | 0.0011 | | | | | | |
| %RSD: | 2.594 | 2.594 | 2.59 | | | | | | |

Sequence No.: 64
Sample ID: K0807960-169A
Analyst:

Autosampler Location: 52
Date Collected: 11/13/2008 2:15:46 PM
Data Type: Original

Replicate Data: K0807960-169A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.039 | 6.039 | 0.152 | 0.717 | 0.159 | | | 14:16:08 | Yes |
| 2 | 5.923 | 5.923 | 0.149 | 0.695 | 0.156 | | | 14:16:42 | Yes |
| 3 | 5.983 | 5.983 | 0.151 | 0.694 | 0.157 | | | 14:17:16 | Yes |
| Mean: | 5.982 | 5.982 | 0.151 | | | | | | |
| SD: | 0.058 | 0.058 | 0.0014 | | | | | | |
| %RSD: | 0.962 | 0.962 | 0.96 | | | | | | |

Sequence No.: 65
Sample ID: TORT #2 K0807960
Analyst:

Autosampler Location: 53
Date Collected: 11/13/2008 2:18:06 PM
Data Type: Original

Replicate Data: TORT #2 K0807960

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.730 | 4.730 | 0.119 | 0.566 | 0.126 | | | 14:18:28 | Yes |
| 2 | 4.736 | 4.736 | 0.119 | 0.555 | 0.126 | | | 14:19:02 | Yes |
| 3 | 4.782 | 4.782 | 0.120 | 0.560 | 0.127 | | | 14:19:36 | Yes |
| Mean: | 4.749 | 4.749 | 0.120 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 0.598 | 0.598 | 0.60 | | | | | | |

Sequence No.: 66
Sample ID: TORTA #2 K0807960
Analyst:

Autosampler Location: 54
Date Collected: 11/13/2008 2:20:26 PM
Data Type: Original

Replicate Data: TORTA #2 K0807960

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 8.805 | 8.805 | 0.222 | 1.040 | 0.229 | | | 14:20:48 | Yes |
| 2 | 8.644 | 8.644 | 0.218 | 1.020 | 0.224 | | | 14:21:22 | Yes |
| 3 | 8.893 | 8.893 | 0.224 | 1.016 | 0.231 | | | 14:21:57 | Yes |
| Mean: | 8.781 | 8.781 | 0.221 | | | | | | |
| SD: | 0.126 | 0.126 | 0.0032 | | | | | | |
| %RSD: | 1.436 | 1.436 | 1.44 | | | | | | |

Sequence No.: 67
Sample ID: LCS K0807960
Analyst:

Autosampler Location: 55
Date Collected: 11/13/2008 2:22:47 PM
Data Type: Original

Replicate Data: LCS K0807960

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.019 | 2.019 | 0.051 | 0.244 | 0.058 | | | 14:23:08 | Yes |
| 2 | 2.028 | 2.028 | 0.051 | 0.234 | 0.058 | | | 14:23:43 | Yes |
| 3 | 1.975 | 1.975 | 0.050 | 0.230 | 0.057 | | | 14:24:17 | Yes |
| Mean: | 2.007 | 2.007 | 0.051 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 1.404 | 1.404 | 1.40 | | | | | | |

Sequence No.: 68
Sample ID: LCSA K0807960

Autosampler Location: 56
Date Collected: 11/13/2008 2:25:07 PM

Analyst:

Data Type: Original

Replicate Data: LCSA K0807960

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.564 | 7.564 | 0.190 | 0.832 | 0.197 | | | 14:25:29 | Yes |
| 2 | 7.567 | 7.567 | 0.191 | 0.828 | 0.197 | | | 14:26:03 | Yes |
| 3 | 7.542 | 7.542 | 0.190 | 0.840 | 0.197 | | | 14:26:38 | Yes |
| Mean: | 7.558 | 7.558 | 0.190 | | | | | | |
| SD: | 0.014 | 0.014 | 0.0003 | | | | | | |
| %RSD: | 0.181 | 0.181 | 0.18 | | | | | | |

Sequence No.: 69
 Sample ID: K0807960-170
 Analyst:

Autosampler Location: 57
 Date Collected: 11/13/2008 2:27:29 PM
 Data Type: Original

Replicate Data: K0807960-170

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.688 | 0.688 | 0.017 | 0.104 | 0.024 | | | 14:27:51 | Yes |
| 2 | 0.691 | 0.691 | 0.017 | 0.097 | 0.024 | | | 14:28:25 | Yes |
| 3 | 0.689 | 0.689 | 0.017 | 0.104 | 0.024 | | | 14:29:00 | Yes |
| Mean: | 0.689 | 0.689 | 0.017 | | | | | | |
| SD: | 0.001 | 0.001 | 0.0000 | | | | | | |
| %RSD: | 0.175 | 0.175 | 0.18 | | | | | | |

11/14/08

Sequence No.: 70
 Sample ID: K0807960-170A
 Analyst:

Autosampler Location: 58
 Date Collected: 11/13/2008 2:29:50 PM
 Data Type: Original

Replicate Data: K0807960-170A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.890 | 5.890 | 0.148 | 0.671 | 0.155 | | | 14:30:13 | Yes |
| 2 | 5.857 | 5.857 | 0.148 | 0.650 | 0.154 | | | 14:30:47 | Yes |
| 3 | 5.914 | 5.914 | 0.149 | 0.652 | 0.156 | | | 14:31:23 | Yes |
| Mean: | 5.887 | 5.887 | 0.148 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 0.482 | 0.482 | 0.48 | | | | | | |

Sequence No.: 71
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 11/13/2008 2:32:15 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.987 | 7.987 | 0.201 | 0.893 | 0.208 | | | 14:32:38 | Yes |
| 2 | 7.888 | 7.888 | 0.199 | 0.889 | 0.205 | | | 14:33:13 | Yes |
| 3 | 7.691 | 7.691 | 0.194 | 0.872 | 0.200 | | | 14:33:47 | Yes |
| Mean: | 7.855 | 7.855 | 0.198 | | | | | | |
| SD: | 0.151 | 0.151 | 0.0038 | | | | | | |
| %RSD: | 1.918 | 1.918 | 1.92 | | | | | | |

QC value within limits for Se 196.03 Recovery = 104.74%
 All analyte(s) passed QC.

Sequence No.: 72
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 11/13/2008 2:34:38 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.048 | 0.048 | 0.001 | 0.029 | 0.008 | | | 14:34:59 | Yes |
| 2 | 0.021 | 0.021 | 0.001 | 0.023 | 0.007 | | | 14:35:33 | Yes |
| 3 | -0.004 | -0.004 | -0.000 | 0.017 | 0.007 | | | 14:36:08 | Yes |
| Mean: | 0.022 | 0.022 | 0.001 | | | | | | |
| SD: | 0.026 | 0.026 | 0.0007 | | | | | | |
| %RSD: | 120.1 | 120.1 | 120.11 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 73
Sample ID: K0807960-171
Analyst:

Autosampler Location: 59
Date Collected: 11/13/2008 2:36:57 PM
Data Type: Original

Replicate Data: K0807960-171

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.395 | 0.395 | 0.010 | 0.070 | 0.017 | | | 14:37:20 | Yes |
| 2 | 0.419 | 0.419 | 0.011 | 0.076 | 0.017 | | | 14:37:54 | Yes |
| 3 | 0.372 | 0.372 | 0.009 | 0.064 | 0.016 | | | 14:38:28 | Yes |
| Mean: | 0.395 | 0.395 | 0.010 | | | | | | |
| SD: | 0.023 | 0.023 | 0.0006 | | | | | | |
| %RSD: | 5.905 | 5.905 | 5.90 | | | | | | |

Sequence No.: 74
Sample ID: K0807960-171A
Analyst:

Autosampler Location: 60
Date Collected: 11/13/2008 2:39:19 PM
Data Type: Original

Replicate Data: K0807960-171A

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 9.297 | 9.297 | 0.234 | 1.079 | 0.241 | | | 14:39:42 | Yes |
| 2 | 9.159 | 9.159 | 0.231 | 1.049 | 0.237 | | | 14:40:17 | Yes |
| 3 | 9.407 | 9.407 | 0.237 | 1.060 | 0.244 | | | 14:40:51 | Yes |
| Mean: | 9.288 | 9.288 | 0.234 | | | | | | |
| SD: | 0.124 | 0.124 | 0.0031 | | | | | | |
| %RSD: | 1.337 | 1.337 | 1.34 | | | | | | |

11/14/08

Sequence No.: 75
Sample ID: K0807960-171D
Analyst:

Autosampler Location: 61
Date Collected: 11/13/2008 2:41:44 PM
Data Type: Original

Replicate Data: K0807960-171D

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.414 | 0.414 | 0.010 | 0.072 | 0.017 | | | 14:42:07 | Yes |
| 2 | 0.400 | 0.400 | 0.010 | 0.073 | 0.017 | | | 14:42:42 | Yes |
| 3 | 0.390 | 0.390 | 0.010 | 0.065 | 0.017 | | | 14:43:16 | Yes |
| Mean: | 0.401 | 0.401 | 0.010 | | | | | | |
| SD: | 0.012 | 0.012 | 0.0003 | | | | | | |
| %RSD: | 3.019 | 3.019 | 3.02 | | | | | | |

Sequence No.: 76
Sample ID: K0807960-171DA
Analyst:

Autosampler Location: 62
Date Collected: 11/13/2008 2:44:06 PM
Data Type: Original

Replicate Data: K0807960-171DA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.336 | 5.336 | 0.134 | 0.592 | 0.141 | | | 14:44:31 | Yes |
| 2 | 5.231 | 5.231 | 0.132 | 0.588 | 0.139 | | | 14:45:05 | Yes |
| 3 | 5.387 | 5.387 | 0.136 | 0.602 | 0.142 | | | 14:45:39 | Yes |
| Mean: | 5.318 | 5.318 | 0.134 | | | | | | |
| SD: | 0.079 | 0.079 | 0.0020 | | | | | | |
| %RSD: | 1.489 | 1.489 | 1.49 | | | | | | |

Sequence No.: 77

Autosampler Location: 63

Sample ID: K0807960-171S

Date Collected: 11/13/2008 2:46:33 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-171S

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 2.102 | 2.102 | 0.053 | 0.258 | 0.060 | | | 14:46:53 | Yes |
| 2 | 2.017 | 2.017 | 0.051 | 0.248 | 0.058 | | | 14:47:28 | Yes |
| 3 | 1.992 | 1.992 | 0.050 | 0.234 | 0.057 | | | 14:48:02 | Yes |
| Mean: | 2.037 | 2.037 | 0.051 | | | | | | |
| SD: | 0.057 | 0.057 | 0.0011 | | | | | | |
| %RSD: | 2.812 | 2.812 | 2.81 | | | | | | |

Sequence No.: 78

Autosampler Location: 64

Sample ID: K0807960-171SA

Date Collected: 11/13/2008 2:48:50 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-171SA

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 6.703 | 6.703 | 0.169 | 0.769 | 0.176 | | | 14:49:11 | Yes |
| 2 | 6.792 | 6.792 | 0.171 | 0.780 | 0.178 | | | 14:49:46 | Yes |
| 3 | 6.871 | 6.871 | 0.173 | 0.763 | 0.180 | | | 14:50:20 | Yes |
| Mean: | 6.788 | 6.788 | 0.171 | | | | | | |
| SD: | 0.084 | 0.084 | 0.0021 | | | | | | |
| %RSD: | 1.239 | 1.239 | 1.24 | | | | | | |

11/14/08

Sequence No.: 79

Autosampler Location: 65

Sample ID: K0807960-172

Date Collected: 11/13/2008 2:51:08 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-172

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.831 | 0.831 | 0.021 | 0.126 | 0.028 | | | 14:51:29 | Yes |
| 2 | 0.767 | 0.767 | 0.019 | 0.112 | 0.026 | | | 14:52:03 | Yes |
| 3 | 0.768 | 0.768 | 0.019 | 0.112 | 0.026 | | | 14:52:37 | Yes |
| Mean: | 0.789 | 0.789 | 0.020 | | | | | | |
| SD: | 0.036 | 0.036 | 0.0009 | | | | | | |
| %RSD: | 4.607 | 4.607 | 4.61 | | | | | | |

Sequence No.: 80

Autosampler Location: 66

Sample ID: K0807960-172A

Date Collected: 11/13/2008 2:53:26 PM

Analyst:

Data Type: Original

Replicate Data: K0807960-172A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|------|-------------|

| # | ug/L | ug/L | Signal | Area | Height | Area | Height | Time | Stored |
|-------|-------|-------|--------|-------|--------|------|--------|----------|--------|
| 1 | 5.755 | 5.755 | 0.145 | 0.672 | 0.152 | | | 14:53:46 | Yes |
| 2 | 5.703 | 5.703 | 0.144 | 0.655 | 0.150 | | | 14:54:20 | Yes |
| 3 | 5.848 | 5.848 | 0.147 | 0.657 | 0.154 | | | 14:54:55 | Yes |
| Mean: | 5.769 | 5.769 | 0.145 | | | | | | |
| SD: | 0.073 | 0.073 | 0.0019 | | | | | | |
| %RSD: | 1.267 | 1.267 | 1.27 | | | | | | |

Sequence No.: 81
 Sample ID: K0807960-173
 Analyst:

Autosampler Location: 67
 Date Collected: 11/13/2008 2:55:44 PM
 Data Type: Original

Replicate Data: K0807960-173

| Repl | SampleConc | StndConc | Blncorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|---------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 2.346 | 2.346 | 0.059 | 0.283 | 0.066 | | | 14:56:05 | Yes |
| 2 | 2.308 | 2.308 | 0.058 | 0.274 | 0.065 | | | 14:56:40 | Yes |
| 3 | 2.314 | 2.314 | 0.058 | 0.273 | 0.065 | | | 14:57:14 | Yes |
| Mean: | 2.323 | 2.323 | 0.058 | | | | | | |
| SD: | 0.021 | 0.021 | 0.0005 | | | | | | |
| %RSD: | 0.887 | 0.887 | 0.89 | | | | | | |

Sequence No.: 82
 Sample ID: K0807960-173A
 Analyst:

Autosampler Location: 68
 Date Collected: 11/13/2008 2:58:02 PM
 Data Type: Original

Replicate Data: K0807960-173A

| Repl | SampleConc | StndConc | Blncorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|---------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 6.997 | 6.997 | 0.176 | 0.797 | 0.183 | | | 14:58:24 | Yes |
| 2 | 6.980 | 6.980 | 0.176 | 0.797 | 0.183 | | | 14:58:58 | Yes |
| 3 | 7.873 | 7.873 | 0.198 | 0.851 | 0.205 | | | 14:59:32 | Yes |
| Mean: | 7.283 | 7.283 | 0.183 | | | | | | |
| SD: | 0.511 | 0.511 | 0.0129 | | | | | | |
| %RSD: | 7.011 | 7.011 | 7.01 | | | | | | |

Sequence No.: 83
 Sample ID: CCV
 Analyst:

Autosampler Location: 6
 Date Collected: 11/13/2008 3:00:21 PM
 Data Type: Original

Replicate Data: CCV

| Repl | SampleConc | StndConc | Blncorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|---------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 7.755 | 7.755 | 0.195 | 0.878 | 0.202 | | | 15:00:45 | Yes |
| 2 | 7.777 | 7.777 | 0.196 | 0.884 | 0.203 | | | 15:01:19 | Yes |
| 3 | 7.770 | 7.770 | 0.196 | 0.874 | 0.202 | | | 15:01:53 | Yes |
| Mean: | 7.767 | 7.767 | 0.196 | | | | | | |
| SD: | 0.011 | 0.011 | 0.0003 | | | | | | |
| %RSD: | 0.143 | 0.143 | 0.14 | | | | | | |

QC value within limits for Se 196.03 Recovery = 103.56%
 All analyte(s) passed QC.

Sequence No.: 84
 Sample ID: CCB
 Analyst:

Autosampler Location: 1
 Date Collected: 11/13/2008 3:02:44 PM
 Data Type: Original

Replicate Data: CCB

| Repl | SampleConc | StndConc | Blncorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|------|------------|----------|---------|------|--------|-------|--------|------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 14.51 | 14.51 | 0.365 | 1.839 | 0.372 | | | 15:21:54 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 2 | 14.41 | 14.41 | 0.363 | 1.767 | 0.370 | | | 15:22:29 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| 3 | 14.40 | 14.40 | 0.363 | 1.770 | 0.370 | | | 15:23:03 | Yes |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |
| Mean: | 14.44 | 14.44 | 0.364 | | | | | | |
| SD: | 0.059 | 0.059 | 0.0015 | | | | | | |
| %RSD: | 0.409 | 0.409 | 0.41 | | | | | | |
| Sample concentration is greater than that of the highest standard. | | | | | | | | | |

11/14/08

Sequence No.: 93
Sample ID: K0808982-022
Analyst:

Autosampler Location: 77
Date Collected: 11/13/2008 3:23:53 PM
Data Type: Original

Replicate Data: K0808982-022

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.327 | 3.327 | 0.084 | 0.411 | 0.091 | | | 15:24:17 | Yes |
| 2 | 3.184 | 3.184 | 0.080 | 0.389 | 0.087 | | | 15:24:51 | Yes |
| 3 | 3.162 | 3.162 | 0.080 | 0.383 | 0.086 | | | 15:25:25 | Yes |
| Mean: | 3.225 | 3.225 | 0.081 | | | | | | |
| SD: | 0.089 | 0.089 | 0.0023 | | | | | | |
| %RSD: | 2.773 | 2.773 | 2.77 | | | | | | |

Sequence No.: 94
Sample ID: K0808982-022A
Analyst:

Autosampler Location: 78
Date Collected: 11/13/2008 3:26:18 PM
Data Type: Original

Replicate Data: K0808982-022A

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.319 | 7.319 | 0.184 | 0.880 | 0.191 | | | 15:26:39 | Yes |
| 2 | 7.284 | 7.284 | 0.183 | 0.871 | 0.190 | | | 15:27:13 | Yes |
| 3 | 7.373 | 7.373 | 0.186 | 0.873 | 0.192 | | | 15:27:47 | Yes |
| Mean: | 7.325 | 7.325 | 0.184 | | | | | | |
| SD: | 0.045 | 0.045 | 0.0011 | | | | | | |
| %RSD: | 0.609 | 0.609 | 0.61 | | | | | | |

Sequence No.: 95
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 3:28:36 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.888 | 7.888 | 0.199 | 0.880 | 0.205 | | | 15:28:59 | Yes |
| 2 | 7.847 | 7.847 | 0.198 | 0.890 | 0.204 | | | 15:29:34 | Yes |
| 3 | 8.153 | 8.153 | 0.205 | 0.890 | 0.212 | | | 15:30:08 | Yes |
| Mean: | 7.963 | 7.963 | 0.201 | | | | | | |
| SD: | 0.167 | 0.167 | 0.0042 | | | | | | |
| %RSD: | 2.092 | 2.092 | 2.09 | | | | | | |

QC value within limits for Se 196.03 Recovery = 106.17%
All analyte(s) passed QC.

Sequence No.: 96
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/13/2008 3:31:00 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.080 | 0.080 | 0.002 | 0.046 | 0.009 | | | 15:31:21 | Yes |
| 2 | 0.004 | 0.004 | 0.000 | 0.028 | 0.007 | | | 15:31:55 | Yes |
| 3 | 0.034 | 0.034 | 0.001 | 0.032 | 0.008 | | | 15:32:30 | Yes |
| Mean: | 0.039 | 0.039 | 0.001 | | | | | | |
| SD: | 0.038 | 0.038 | 0.0010 | | | | | | |
| %RSD: | 96.65 | 96.65 | 96.65 | | | | | | |

QC value within limits for Se 196.03 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 97
Sample ID: K0807960-MB
Analyst:

Autosampler Location: 79
Date Collected: 11/13/2008 3:33:19 PM
Data Type: Original

Replicate Data: K0807960-MB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.422 | 0.422 | 0.011 | 0.085 | 0.017 | | | 15:33:40 | Yes |
| 2 | 0.406 | 0.406 | 0.010 | 0.063 | 0.017 | | | 15:34:14 | Yes |
| 3 | 0.422 | 0.422 | 0.011 | 0.067 | 0.017 | | | 15:34:48 | Yes |
| Mean: | 0.417 | 0.417 | 0.010 | | | | | | |
| SD: | 0.009 | 0.009 | 0.0002 | | | | | | |
| %RSD: | 2.257 | 2.257 | 2.26 | | | | | | |

11/14/08

Sequence No.: 98
Sample ID: K0807960-MB
Analyst:

Autosampler Location: 80
Date Collected: 11/13/2008 3:35:37 PM
Data Type: Original

Replicate Data: K0807960-MB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.134 | 0.134 | 0.003 | 0.041 | 0.010 | | | 15:35:57 | Yes |
| 2 | 0.110 | 0.110 | 0.003 | 0.026 | 0.010 | | | 15:36:32 | Yes |
| 3 | 0.153 | 0.153 | 0.004 | 0.049 | 0.011 | | | 15:37:06 | Yes |
| Mean: | 0.132 | 0.132 | 0.003 | | | | | | |
| SD: | 0.022 | 0.022 | 0.0006 | | | | | | |
| %RSD: | 16.64 | 16.64 | 16.64 | | | | | | |

Sequence No.: 99
Sample ID: CCV
Analyst:

Autosampler Location: 6
Date Collected: 11/13/2008 3:37:54 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.313 | 7.313 | 0.184 | 0.846 | 0.191 | | | 15:38:17 | Yes |
| 2 | 7.344 | 7.344 | 0.185 | 0.843 | 0.192 | | | 15:38:52 | Yes |
| 3 | 7.423 | 7.423 | 0.187 | 0.855 | 0.194 | | | 15:39:26 | Yes |
| Mean: | 7.360 | 7.360 | 0.185 | | | | | | |
| SD: | 0.057 | 0.057 | 0.0014 | | | | | | |
| %RSD: | 0.772 | 0.772 | 0.77 | | | | | | |

QC value within limits for Se 196.03 Recovery = 98.13%
All analyte(s) passed QC.

Sequence No.: 100
Sample ID: CCB

Autosampler Location: 1
Date Collected: 11/13/2008 3:40:18 PM

Mean: 5.442 5.442 0.137
 SD: 0.065 0.065 0.0016
 %RSD: 1.201 1.201 1.20

Sequence No.: 108
 Sample ID: K0807960-163 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 3:59:52 PM
 Data Type: Original

Replicate Data: K0807960-163 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.030 | 1.030 | 0.026 | 0.157 | 0.033 | | | 16:00:08 | Yes |
| 2 | 1.028 | 1.028 | 0.026 | 0.156 | 0.033 | | | 16:00:42 | Yes |
| 3 | 1.005 | 1.005 | 0.025 | 0.152 | 0.032 | | | 16:01:16 | Yes |
| Mean: | 1.021 | 1.021 | 0.026 | | | | | | |
| SD: | 0.014 | 0.014 | 0.0004 | | | | | | |
| %RSD: | 1.381 | 1.381 | 1.38 | | | | | | |

Sequence No.: 109
 Sample ID: K0807960-163A 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:02:11 PM
 Data Type: Original

Replicate Data: K0807960-163A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.982 | 4.982 | 0.125 | 0.637 | 0.132 | | | 16:02:27 | Yes |
| 2 | 4.951 | 4.951 | 0.125 | 0.630 | 0.131 | | | 16:03:01 | Yes |
| 3 | 5.021 | 5.021 | 0.126 | 0.635 | 0.133 | | | 16:03:36 | Yes |
| Mean: | 4.985 | 4.985 | 0.126 | | | | | | |
| SD: | 0.035 | 0.035 | 0.0009 | | | | | | |
| %RSD: | 0.706 | 0.706 | 0.71 | | | | | | |

Sequence No.: 110
 Sample ID: K0807960-167
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:04:29 PM
 Data Type: Original

Replicate Data: K0807960-167

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.992 | 0.992 | 0.025 | 0.152 | 0.032 | | | 16:04:45 | Yes |
| 2 | 0.916 | 0.916 | 0.023 | 0.145 | 0.030 | | | 16:05:20 | Yes |
| 3 | 0.865 | 0.865 | 0.022 | 0.132 | 0.029 | | | 16:05:55 | Yes |
| Mean: | 0.924 | 0.924 | 0.023 | | | | | | |
| SD: | 0.064 | 0.064 | 0.0016 | | | | | | |
| %RSD: | 6.890 | 6.890 | 6.89 | | | | | | |

Sequence No.: 111
 Sample ID: K0807960-167A 1/2
 Analyst:
 User canceled analysis.

Autosampler Location:
 Date Collected: 11/13/2008 4:06:50 PM
 Data Type: Original

Sequence No.: 112
 Sample ID: CCV
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:07:40 PM
 Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|------|-------------|

| | | | | | | | |
|-------|-------|-------|--------|-------|-------|----------|-----|
| 1 | 7.283 | 7.283 | 0.183 | 0.838 | 0.190 | 16:07:56 | Yes |
| 2 | 7.442 | 7.442 | 0.187 | 0.833 | 0.194 | 16:08:30 | Yes |
| 3 | 7.282 | 7.282 | 0.183 | 0.827 | 0.190 | 16:09:05 | Yes |
| Mean: | 7.336 | 7.336 | 0.185 | | | | |
| SD: | 0.092 | 0.092 | 0.0023 | | | | |
| %RSD: | 1.256 | 1.256 | 1.26 | | | | |

Sequence No.: 113
 Sample ID: CCB
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:09:53 PM
 Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.071 | 0.071 | 0.002 | 0.043 | 0.009 | | | 16:10:09 | Yes |
| 2 | -0.029 | -0.029 | -0.001 | 0.018 | 0.006 | | | 16:10:43 | Yes |
| 3 | -0.002 | -0.002 | -0.000 | 0.022 | 0.007 | | | 16:11:17 | Yes |
| Mean: | 0.013 | 0.013 | 0.000 | | | | | | |
| SD: | 0.052 | 0.052 | 0.0013 | | | | | | |
| %RSD: | 386.2 | 386.2 | 386.22 | | | | | | |

Sequence No.: 114
 Sample ID: K0807960-167A 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:12:11 PM
 Data Type: Original

Replicate Data: K0807960-167A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.665 | 4.665 | 0.117 | 0.609 | 0.124 | | | 16:12:27 | Yes |
| 2 | 4.780 | 4.780 | 0.120 | 0.603 | 0.127 | | | 16:13:01 | Yes |
| 3 | 4.655 | 4.655 | 0.117 | 0.589 | 0.124 | | | 16:13:36 | Yes |
| Mean: | 4.700 | 4.700 | 0.118 | | | | | | |
| SD: | 0.069 | 0.069 | 0.0017 | | | | | | |
| %RSD: | 1.474 | 1.474 | 1.47 | | | | | | |

Sequence No.: 115
 Sample ID: K0807960-168 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:14:30 PM
 Data Type: Original

Replicate Data: K0807960-168 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.519 | 1.519 | 0.038 | 0.208 | 0.045 | | | 16:14:46 | Yes |
| 2 | 1.502 | 1.502 | 0.038 | 0.211 | 0.045 | | | 16:15:20 | Yes |
| 3 | 1.545 | 1.545 | 0.039 | 0.207 | 0.046 | | | 16:15:54 | Yes |
| Mean: | 1.522 | 1.522 | 0.038 | | | | | | |
| SD: | 0.022 | 0.022 | 0.0005 | | | | | | |
| %RSD: | 1.429 | 1.429 | 1.43 | | | | | | |

Sequence No.: 116
 Sample ID: K0807960-168A 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:16:40 PM
 Data Type: Original

Replicate Data: K0807960-168A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.287 | 5.287 | 0.133 | 0.651 | 0.140 | | | 16:16:57 | Yes |
| 2 | 5.255 | 5.255 | 0.132 | 0.654 | 0.139 | | | 16:17:31 | Yes |
| 3 | 5.257 | 5.257 | 0.132 | 0.656 | 0.139 | | | 16:18:05 | Yes |

Mean: 5.266 5.266 0.133
 SD: 0.018 0.018 0.0005
 %RSD: 0.340 0.340 0.34

Sequence No.: 117
 Sample ID: K0807960-170 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:21:43 PM
 Data Type: Original

Replicate Data: K0807960-170 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.501 | 1.501 | 0.038 | 0.210 | 0.045 | | | 16:21:59 | Yes |
| 2 | 1.509 | 1.509 | 0.038 | 0.203 | 0.045 | | | 16:22:34 | Yes |
| 3 | 1.457 | 1.457 | 0.037 | 0.183 | 0.043 | | | 16:23:09 | Yes |
| Mean: | 1.489 | 1.489 | 0.037 | | | | | | |
| SD: | 0.028 | 0.028 | 0.0007 | | | | | | |
| %RSD: | 1.861 | 1.861 | 1.86 | | | | | | |

Sequence No.: 118
 Sample ID: K0807960-170A 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:23:55 PM
 Data Type: Original

Replicate Data: K0807960-170A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.552 | 5.552 | 0.140 | 0.679 | 0.147 | | | 16:24:11 | Yes |
| 2 | 5.517 | 5.517 | 0.139 | 0.653 | 0.146 | | | 16:24:45 | Yes |
| 3 | 5.431 | 5.431 | 0.137 | 0.645 | 0.144 | | | 16:25:20 | Yes |
| Mean: | 5.500 | 5.500 | 0.139 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0016 | | | | | | |
| %RSD: | 1.137 | 1.137 | 1.14 | | | | | | |

Sequence No.: 119
 Sample ID: K0807960-171 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:26:09 PM
 Data Type: Original

Replicate Data: K0807960-171 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.852 | 0.852 | 0.021 | 0.124 | 0.028 | | | 16:26:25 | Yes |
| 2 | 0.842 | 0.842 | 0.021 | 0.134 | 0.028 | | | 16:26:59 | Yes |
| 3 | 0.837 | 0.837 | 0.021 | 0.123 | 0.028 | | | 16:27:34 | Yes |
| Mean: | 0.844 | 0.844 | 0.021 | | | | | | |
| SD: | 0.007 | 0.007 | 0.0002 | | | | | | |
| %RSD: | 0.877 | 0.877 | 0.88 | | | | | | |

Sequence No.: 120
 Sample ID: K0807960-171A 1/2
 Analyst:

Autosampler Location:
 Date Collected: 11/13/2008 4:28:19 PM
 Data Type: Original

Replicate Data: K0807960-171A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.432 | 4.432 | 0.112 | 0.559 | 0.118 | | | 16:28:36 | Yes |
| 2 | 4.523 | 4.523 | 0.114 | 0.551 | 0.121 | | | 16:29:10 | Yes |
| 3 | 4.511 | 4.511 | 0.114 | 0.548 | 0.120 | | | 16:29:44 | Yes |
| Mean: | 4.489 | 4.489 | 0.113 | | | | | | |
| SD: | 0.050 | 0.050 | 0.0012 | | | | | | |
| %RSD: | 1.103 | 1.103 | 1.10 | | | | | | |

Sequence No.: 121
Sample ID: K0807960-171D 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:30:32 PM
Data Type: Original

Replicate Data: K0807960-171D 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.901 | 0.901 | 0.023 | 0.145 | 0.029 | | | 16:30:48 | Yes |
| 2 | 0.844 | 0.844 | 0.021 | 0.127 | 0.028 | | | 16:31:23 | Yes |
| 3 | 0.819 | 0.819 | 0.021 | 0.122 | 0.027 | | | 16:31:57 | Yes |
| Mean: | 0.855 | 0.855 | 0.022 | | | | | | |
| SD: | 0.042 | 0.042 | 0.0011 | | | | | | |
| %RSD: | 4.894 | 4.894 | 4.69 | | | | | | |

Sequence No.: 122
Sample ID: K0807960-171DA 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:32:48 PM
Data Type: Original

Replicate Data: K0807960-171DA 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 4.821 | 4.821 | 0.121 | 0.596 | 0.128 | | | 16:33:04 | Yes |
| 2 | 4.650 | 4.650 | 0.117 | 0.567 | 0.124 | | | 16:33:38 | Yes |
| 3 | 4.715 | 4.715 | 0.119 | 0.579 | 0.126 | | | 16:34:13 | Yes |
| Mean: | 4.728 | 4.728 | 0.119 | | | | | | |
| SD: | 0.086 | 0.086 | 0.0022 | | | | | | |
| %RSD: | 1.825 | 1.825 | 1.82 | | | | | | |

Sequence No.: 123
Sample ID: K0807960-171S 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:35:00 PM
Data Type: Original

Replicate Data: K0807960-171S 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 3.914 | 3.914 | 0.099 | 0.482 | 0.105 | | | 16:35:16 | Yes |
| 2 | 3.952 | 3.952 | 0.100 | 0.480 | 0.106 | | | 16:35:52 | Yes |
| 3 | 3.899 | 3.899 | 0.098 | 0.475 | 0.105 | | | 16:36:27 | Yes |
| Mean: | 3.922 | 3.922 | 0.099 | | | | | | |
| SD: | 0.027 | 0.027 | 0.0007 | | | | | | |
| %RSD: | 0.695 | 0.695 | 0.70 | | | | | | |

Sequence No.: 124
Sample ID: CCV
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:37:11 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.273 | 7.273 | 0.183 | 0.836 | 0.190 | | | 16:37:27 | Yes |
| 2 | 7.251 | 7.251 | 0.183 | 0.825 | 0.189 | | | 16:38:02 | Yes |
| 3 | 7.284 | 7.284 | 0.183 | 0.833 | 0.190 | | | 16:38:36 | Yes |
| Mean: | 7.269 | 7.269 | 0.183 | | | | | | |
| SD: | 0.017 | 0.017 | 0.0004 | | | | | | |
| %RSD: | 0.228 | 0.228 | 0.23 | | | | | | |

Sequence No.: 125

Autosampler Location:

Sample ID: CCB
Analyst:

Date Collected: 11/13/2008 4:39:20 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.041 | 0.041 | 0.001 | 0.026 | 0.008 | | | 16:39:37 | Yes |
| 2 | 0.005 | 0.005 | 0.000 | 0.023 | 0.007 | | | 16:40:11 | Yes |
| 3 | -0.009 | -0.009 | -0.000 | 0.028 | 0.007 | | | 16:40:46 | Yes |
| Mean: | 0.012 | 0.012 | 0.000 | | | | | | |
| SD: | 0.026 | 0.026 | 0.0007 | | | | | | |
| %RSD: | 210.8 | 210.8 | 210.78 | | | | | | |

Sequence No.: 126
Sample ID: K0807960-171SA 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:41:36 PM
Data Type: Original

Replicate Data: K0807960-171SA 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.265 | 7.265 | 0.183 | 0.873 | 0.190 | | | 16:41:52 | Yes |
| 2 | 7.228 | 7.228 | 0.182 | 0.866 | 0.189 | | | 16:42:27 | Yes |
| 3 | 7.146 | 7.146 | 0.180 | 0.873 | 0.187 | | | 16:43:01 | Yes |
| Mean: | 7.213 | 7.213 | 0.182 | | | | | | |
| SD: | 0.061 | 0.061 | 0.0015 | | | | | | |
| %RSD: | 0.842 | 0.842 | 0.84 | | | | | | |

Sequence No.: 127
Sample ID: K0807960-172 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:43:52 PM
Data Type: Original

Replicate Data: K0807960-172 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 1.680 | 1.680 | 0.042 | 0.238 | 0.049 | | | 16:44:08 | Yes |
| 2 | 1.574 | 1.574 | 0.040 | 0.218 | 0.046 | | | 16:44:43 | Yes |
| 3 | 1.621 | 1.621 | 0.041 | 0.224 | 0.048 | | | 16:45:17 | Yes |
| Mean: | 1.625 | 1.625 | 0.041 | | | | | | |
| SD: | 0.053 | 0.053 | 0.0013 | | | | | | |
| %RSD: | 3.264 | 3.264 | 3.26 | | | | | | |

Sequence No.: 128
Sample ID: K0807960-172A 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:46:04 PM
Data Type: Original

Replicate Data: K0807960-172A 1/2

| Repl # | SampleConc ug/L | StndConc ug/L | BlnkCorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|-----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 5.269 | 5.269 | 0.133 | 0.674 | 0.139 | | | 16:46:20 | Yes |
| 2 | 5.237 | 5.237 | 0.132 | 0.666 | 0.139 | | | 16:46:55 | Yes |
| 3 | 5.237 | 5.237 | 0.132 | 0.672 | 0.139 | | | 16:47:29 | Yes |
| Mean: | 5.248 | 5.248 | 0.132 | | | | | | |
| SD: | 0.018 | 0.018 | 0.0005 | | | | | | |
| %RSD: | 0.348 | 0.348 | 0.35 | | | | | | |

Sequence No.: 129
Sample ID: K0807960-174 1/2
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:48:17 PM
Data Type: Original

Replicate Data: K0807960-174 1/2

| Repl | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|----------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 1.382 | 1.382 | 0.035 | 0.201 | 0.042 | | | 16:48:33 | Yes |
| 2 | 1.281 | 1.281 | 0.032 | 0.182 | 0.039 | | | 16:49:08 | Yes |
| 3 | 1.265 | 1.265 | 0.032 | 0.172 | 0.039 | | | 16:49:42 | Yes |
| Mean: | 1.309 | 1.309 | 0.033 | | | | | | |
| SD: | 0.063 | 0.063 | 0.0016 | | | | | | |
| %RSD: | 4.828 | 4.828 | 4.83 | | | | | | |

=====

Sequence No.: 130
Sample ID: K0807960-174A 1/2
Analyst:Autosampler Location:
Date Collected: 11/13/2008 4:50:27 PM
Data Type: Original-----
Replicate Data: K0807960-174A 1/2

| Repl | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|----------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 5.174 | 5.174 | 0.130 | 0.637 | 0.137 | | | 16:50:44 | Yes |
| 2 | 5.131 | 5.131 | 0.129 | 0.624 | 0.136 | | | 16:51:18 | Yes |
| 3 | 5.133 | 5.133 | 0.129 | 0.629 | 0.136 | | | 16:51:52 | Yes |
| Mean: | 5.146 | 5.146 | 0.130 | | | | | | |
| SD: | 0.025 | 0.025 | 0.0006 | | | | | | |
| %RSD: | 0.477 | 0.477 | 0.48 | | | | | | |

=====

Sequence No.: 131
Sample ID: K0808982-021S 1/10
Analyst:
User canceled analysis.Autosampler Location:
Date Collected: 11/13/2008 4:53:09 PM
Data Type: Original

=====

Sequence No.: 132
Sample ID: K0808982-021S 1/10
Analyst:Autosampler Location:
Date Collected: 11/13/2008 4:53:32 PM
Data Type: Original-----
Replicate Data: K0808982-021S 1/10

| Repl | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|----------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 3.541 | 3.541 | 0.089 | 0.417 | 0.096 | | | 16:53:48 | Yes |
| 2 | 3.501 | 3.501 | 0.088 | 0.404 | 0.095 | | | 16:54:22 | Yes |
| 3 | 3.535 | 3.535 | 0.089 | 0.412 | 0.096 | | | 16:54:56 | Yes |
| Mean: | 3.526 | 3.526 | 0.089 | | | | | | |
| SD: | 0.022 | 0.022 | 0.0005 | | | | | | |
| %RSD: | 0.611 | 0.611 | 0.61 | | | | | | |

=====

Sequence No.: 133
Sample ID: K0808982-021SA 1/10
Analyst:Autosampler Location:
Date Collected: 11/13/2008 4:55:49 PM
Data Type: Original-----
Replicate Data: K0808982-021SA 1/10

| Repl | SampleConc | StndConc | BlnkCorr | Peak | Peak | Bkgnd | Bkgnd | Time | Peak |
|-------|------------|----------|----------|-------|--------|-------|--------|----------|--------|
| # | ug/L | ug/L | Signal | Area | Height | Area | Height | | Stored |
| 1 | 7.899 | 7.899 | 0.199 | 0.900 | 0.206 | | | 16:56:05 | Yes |
| 2 | 8.014 | 8.014 | 0.202 | 0.898 | 0.209 | | | 16:56:40 | Yes |
| 3 | 8.038 | 8.038 | 0.202 | 0.913 | 0.209 | | | 16:57:15 | Yes |
| Mean: | 7.984 | 7.984 | 0.201 | | | | | | |
| SD: | 0.074 | 0.074 | 0.0019 | | | | | | |
| %RSD: | 0.927 | 0.927 | 0.93 | | | | | | |

=====

Sequence No.: 134

Autosampler Location:

Sample ID: K0807960-MB #1
Analyst:

Date Collected: 11/13/2008 4:58:00 PM
Data Type: Original

Replicate Data: K0807960-MB #1

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.314 | 0.314 | 0.008 | 0.076 | 0.015 | | | 16:58:16 | Yes |

User canceled analysis.

11/14/08

Sequence No.: 135
Sample ID: K0807960-MB #1
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 4:59:47 PM
Data Type: Original

Replicate Data: K0807960-MB #1

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.066 | 0.066 | 0.002 | 0.038 | 0.008 | | | 17:00:03 | Yes |
| 2 | -0.012 | -0.012 | -0.000 | 0.021 | 0.006 | | | 17:00:37 | Yes |
| 3 | 0.071 | 0.071 | 0.002 | 0.051 | 0.009 | | | 17:01:11 | Yes |
| Mean: | 0.042 | 0.042 | 0.001 | | | | | | |
| SD: | 0.046 | 0.046 | 0.0012 | | | | | | |
| %RSD: | 111.0 | 111.0 | 111.00 | | | | | | |

Sequence No.: 136
Sample ID: CCV
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 5:01:56 PM
Data Type: Original

Replicate Data: CCV

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 7.358 | 7.358 | 0.185 | 0.844 | 0.192 | | | 17:02:12 | Yes |
| 2 | 7.308 | 7.308 | 0.184 | 0.840 | 0.191 | | | 17:02:46 | Yes |
| 3 | 7.441 | 7.441 | 0.187 | 0.849 | 0.194 | | | 17:03:21 | Yes |
| Mean: | 7.369 | 7.369 | 0.186 | | | | | | |
| SD: | 0.067 | 0.067 | 0.0017 | | | | | | |
| %RSD: | 0.907 | 0.907 | 0.91 | | | | | | |

Sequence No.: 137
Sample ID: CCB
Analyst:

Autosampler Location:
Date Collected: 11/13/2008 5:04:04 PM
Data Type: Original

Replicate Data: CCB

| Repl # | SampleConc ug/L | StndConc ug/L | Blncorr Signal | Peak Area | Peak Height | Bkgnd Area | Bkgnd Height | Time | Peak Stored |
|--------|-----------------|---------------|----------------|-----------|-------------|------------|--------------|----------|-------------|
| 1 | 0.024 | 0.024 | 0.001 | 0.026 | 0.007 | | | 17:04:21 | Yes |
| 2 | -0.010 | -0.010 | -0.000 | 0.029 | 0.007 | | | 17:04:55 | Yes |
| 3 | -0.010 | -0.010 | -0.000 | 0.020 | 0.007 | | | 17:05:29 | Yes |
| Mean: | 0.001 | 0.001 | 0.000 | | | | | | |
| SD: | 0.019 | 0.019 | 0.0005 | | | | | | |
| %RSD: | >999.9% | >999.9% | >999.9% | | | | | | |

APPENDIX E

Deformity Assessment

The general scoring criteria were adopted from Holm et al. (2003) and included assessments of craniofacial deformities, mostly of the head, eyes, and jaw, vertebral deformities, fin deformities, and edema. The original publication showed pictures of some deformities but others, particularly the intermediate categories were not illustrated or were poorly described. More specific definitions for each of the assessment categories were developed to give better repeatability and consistency across studies, and to aid others in learning the range of deformities possible.

Deformities in each of the categories described above were given a score from 0-3, with 0 being a normal condition and 3 being the most deformed. Some range finding was conducted over the first several samples to find background and severe levels of deformities in each category. Initial samples were rescored as necessary to bring them into compliance with the standards that were used throughout the assessment.

The protocol for assessing damage was to place several fish, head to the left, in a Petri dish and examine them under a dissecting microscope and 10X magnification. The lateral side was examined for spinal deformities (lordosis, kyphosis), appearance of the eye, head and snout shape, edema, and fin deformities. The fish was turned ventrally to look for mouth deformities and further spinal deformities (scoliosis), turned laterally again for the same criteria as the other side, and then dorsally for issues associated with eyes, head size, spinal deformities.

Craniofacial deformities included shortening of the jaw, snout, and missing or poorly developed eye or eyes, and head shape abnormalities. A slightly shortened lower jaw (≤ 1 lip width) received a 1, a shortened jaw = 2 lip widths or a slightly shortened and slightly disfigured jaw = 2, and a flat lower jaw or much disfigured (non-functional) jaw = 3. An assessment of fish independent of this study revealed that other Yellowstone cutthroat trout of the same size and developmental state did not have the slight deformity that was assessed as CF = 1 for the jaw (J). Thus, the CF = 1 score where the J was concerned were deemed real. A slightly blunted snout (about 50% eye diameter, usually is > than that) = 1, very blunt or flat = 2, deformed or bulbous = 3. Eye deformities were scored as one eye blind or poorly pigmented or poorly developed = 1, both poorly developed = 2, both blind = 3. Skulls that were slightly bulbous ($1/3 >$ normal) = 1, moderately bulbous ($2/3 >$ normal) = 2, and bulbous ($1x$ or $>$ than normal) = 3. Usually factors occurred together so a combination of two "1" conditions = 2, three "1" conditions = 3, or a 1 and a 2 = 3, and so on. For example, a deformed jaw and a blind eye = 2, two blind eyes = 2, but a badly deformed jaw (= 2 alone) plus a blind eye (= 1 alone), = 3.

Skeletal deformities included any deformity of the vertebrae or spines. A slight bend of less than 45 degrees (but $>$ than body width off of straight) or a minor body constriction (e.g. a tight rubber band about the body effect) was given a score of 1, 2 slight bends or constrictions anywhere, or bend of $> 45-90$ degrees was scored a 2, and multi-directional bends > 90 degrees were given a 3. Bends caused by skeletal deformities were usually detectable from normal bending of the body during preservation (these fish were usually well preserved, very straight) by presence of a slight or greater bump below the surface of

the epidermis on the outside of the bend. However, some fish with SD = 1 had just a very slight bend in the range the deformity described but could be due to preservation or the poor condition of the fish. This was sometimes especially true in larger fish, which may be more muscular and undergo stronger contraction during preservation and thus, bend slightly. A score "CF = 1" was a slight deformity, if at all. The scores of SD = 1 involving kyphosis or lordosis were deemed real because that is an unusual preservation deformity. Thin fish difficult to score, and often looked like they were underfed or starving.

Fin deformities included variation in fin or finfold morphology and a slightly smaller or missing fin (in thin fish, the adipose fin was often absent, indicating fat absorption, not uncommon and scored 1) or one with a bend or incomplete ray development (in older fish) was given a 1, 2 fins damaged or malformed = 2, and > 2 fins malformed or if fins were missing (except adipose) was = 3. Often fins were malformed associated with vertebral deformities that did not permit proper development. Folded finfolds as a result of preservation were not counted.

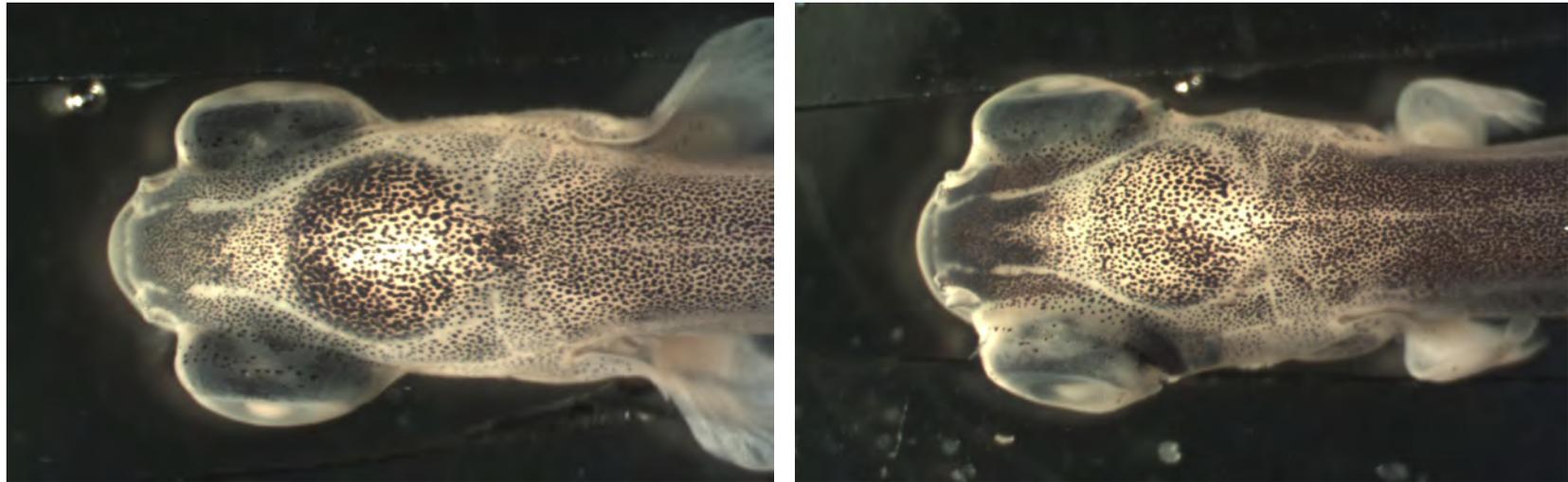
Edema was assessed because it was evaluated in the brown trout study and because it was considered a condition that could affect emergence, mobility, and other factors that may limit survival of fish in the wild. Edema was detected by an obvious swelling and fluid buildup, usually abdominally, and ventrally, which often displaced the gut, and was usually clear fluid that was slightly soft when touched with a blunt probe. The yolk, which was present in some quantity in some study specimens, also created some swelling but was typically yellowish, opaque, and small, and hard to the touch in preservation. Slight edema = 1 was for a fish with up to 1X swelling of the normal body width or depth, up to 2x = 2, and > 2x = 3.

A sample of 50 fish and a sample of 30 fish were scored twice, the same fish for each batch but not necessarily the same order. This sample was characterized by a low incidence of fin deformities (slow development) and a high incidence of jaw deformities. Those cranio-facial traits are difficult to score because they are additive, and subjective as to severity. Thus, the results may be a conservative view of what score replicability should be like for other traits in other samples that are easier to score.

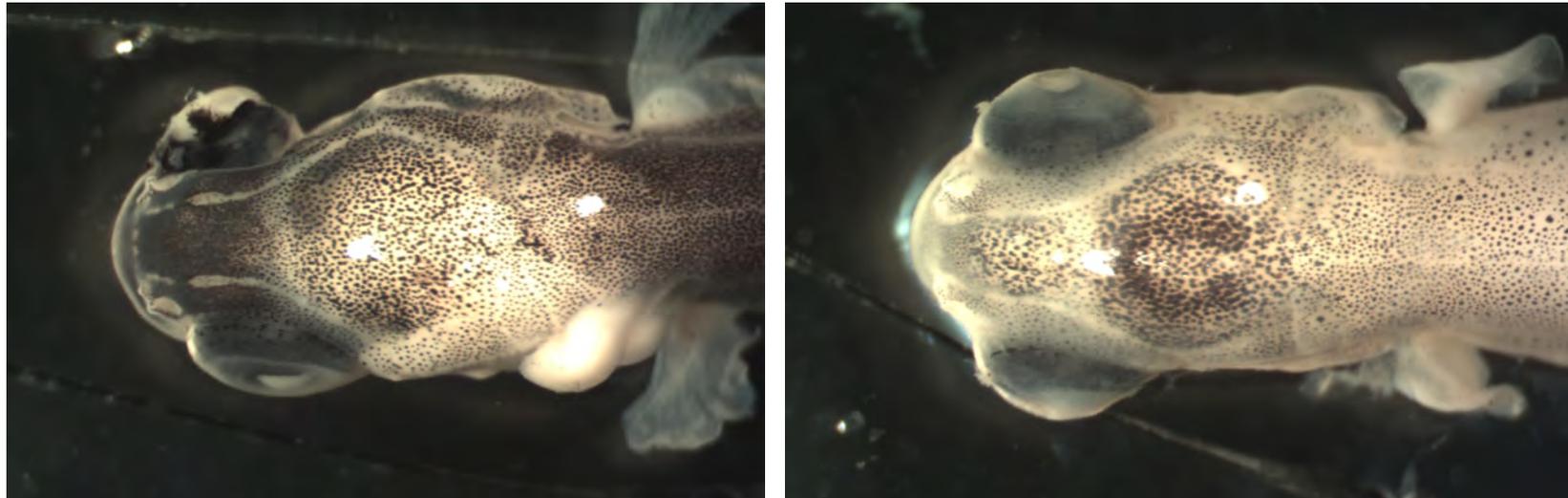
Replicability of frequency of cranio-facial abnormalities was high among assessments. The cumulative sums of the scores were also quite close, but reflecting variability in scoring for all three categories of severity in each sample. Replicability of fin ray development assessments for both frequency and the sum of the scores was similar.

Below we have included photographs of each of the deformities assessed described above, demonstrating scoring values of 0 – 3 for each of the deformities.

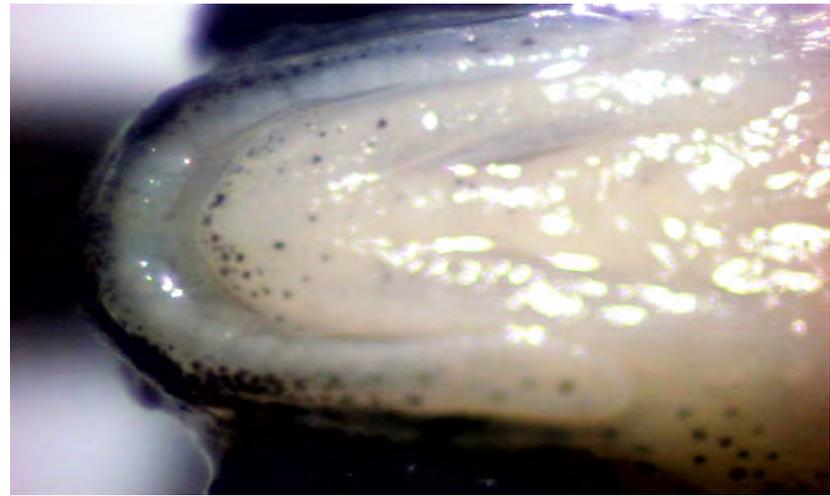
Photos 1 and 2: Example of normal Yellowstone cutthroat trout eyes (left) and an example of a cranio-facial eye deformity with a score of 1 (right).



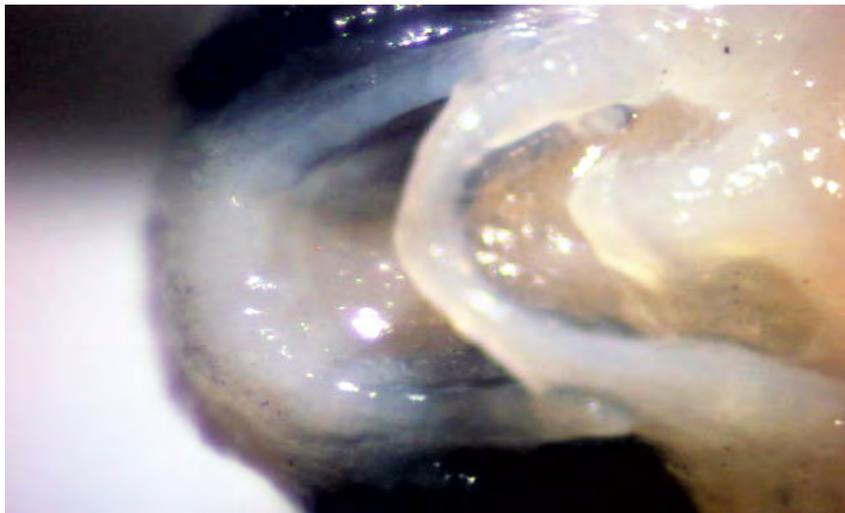
Photos 3 and 4: Examples of cranio-facial eye deformities with a score of 3 (both).



Photos 1 and 2: Example of a normal Yellowstone cutthroat trout jaw (left) and an example of a cranio-facial jaw deformity with a score of 1 (right).



Photos 3 and 4: Example of a cranio-facial jaw deformity with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of the spinal deformity constriction with a score of 1 (right).



Photo 3: Example of the spinal deformity constriction with a score of 1.



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of the skeletal deformity kyphosis with a score of 1 (right).



Photos 3 and 4: Example of the skeletal deformity kyphosis with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of the skeletal deformity lordosis with a score of 1 (right).



Photos 3 and 4: Example of the skeletal deformity lordosis with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of the spinal deformity scoliosis with a score of 1 (right).



Photos 3 and 4: Example of the spinal deformity scoliosis with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of a fin deformity with a score of 1 (right).



Photos 3 and 4: Example of a fin deformity with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of abdominal edema with a score of 1 (right).



Photos 3 and 4: Example of abdominal edema with a score of 2 (left) and 3 (right).



Photos 1 and 2: Example of a healthy Yellowstone cutthroat trout (left) and an example of cranial edema with a score of 1 (right).



Photos 3 and 4: Example of cranial edema with a score of 2 (left) and 3 (right).



Photos 1 and 2: Examples of Yellowstone cutthroat trout with unusual deformities (both having two heads).



Photos 3 and 4: Examples of unusual deformities.



Deformity assessment results for Yellowstone cutthroat trout in reproductive success study

Values represent the number of fish (at swim-up and test termination) in each scoring criterion (i.e., 0-3).

See below for a definition of scoring criteria.

filename: deform appendix.xls

| Count of fish # | | Craniofacial Deformities (CF) | | | | Grand Total |
|-----------------|-----------------|-------------------------------|-----|-----|-----|-------------|
| Location | Field Sample ID | 0 | 1 | 2 | 3 | |
| HL | 002 | 27 | 8 | 2 | 2 | 39 |
| | 003 | 287 | 9 | 2 | 4 | 302 |
| | 004 | 394 | 13 | 3 | 6 | 416 |
| | 006 | 200 | 30 | 7 | 7 | 244 |
| | 007 | 349 | 48 | 5 | 2 | 404 |
| | 008 | 356 | 49 | 3 | 4 | 412 |
| | 011 | 255 | 15 | 7 | 19 | 296 |
| | 012 | 437 | 12 | | 5 | 454 |
| | 013 | 416 | 62 | 1 | 4 | 483 |
| | 015 | 26 | 5 | 2 | 3 | 36 |
| | Total | 2747 | 251 | 32 | 56 | 3086 |
| CC-150 | 001 | 162 | 20 | 0 | 0 | 182 |
| | Total | 162 | 20 | 0 | 0 | 182 |
| CC-350 | 001 | 105 | 19 | 5 | 9 | 138 |
| | 002 | 548 | 52 | 2 | 0 | 602 |
| | 003 | 304 | 25 | 0 | 1 | 330 |
| | 004 | 462 | 18 | 0 | 0 | 480 |
| | 005 | 345 | 45 | 2 | 0 | 392 |
| | Total | 1764 | 159 | 9 | 10 | 1942 |
| DC | 001 | 252 | 11 | 0 | 12 | 275 |
| | 002 | 432 | 32 | 1 | 0 | 465 |
| | 003 | 354 | 25 | 1 | 0 | 380 |
| | 004 | 33 | 1 | 3 | 1 | 38 |
| | Total | 1071 | 69 | 5 | 13 | 1158 |
| LSV2C | 001 | 37 | 38 | 64 | 61 | 200 |
| | 002 | 282 | 31 | 3 | 3 | 319 |
| | 003 | 466 | 21 | 0 | 0 | 487 |
| | 004 | 455 | 21 | 0 | 0 | 476 |
| | Total | 1240 | 111 | 67 | 64 | 1482 |
| Grand Total | | 6984 | 610 | 113 | 143 | 7850 |

Craniofacial deformities included shortening of the jaw, snout, and missing or poorly developed eye or eyes, and head shape abnormalities. A slightly shortened lower jaw (≤ 1 lip width) received a 1, a shortened jaw = 2 lip widths or a slightly shortened and slightly disfigured jaw = 2, and a flat lower jaw or much disfigured (non-functional) jaw = 3. An assessment of fish independent of this study revealed that other trout of the same size and developmental state did not have the slight deformity that was assessed as CF = 1 for the jaw (J). Thus, the CF = 1 score where the J was concerned were deemed real. A slightly blunted snout (about 50% eye diameter, usually is > than that) = 1, very blunt or flat = 2, deformed or bulbous = 3. Eye deformities were scored as one eye blind or poorly pigmented or poorly developed = 1, both poorly developed = 2, both blind = 3. Skulls that were slightly bulbous ($1/3 >$ normal) = 1, moderately bulbous ($2/3 >$ normal) = 2, and bulbous ($1x$ or > than normal) = 3. Usually factors occurred together so a combination of two "1" conditions = 2, three "1" conditions = 3, or a 1 and a 2 = 3, and so on. For example, a deformed jaw and a blind eye = 2, two blind eyes = 2, but a badly deformed jaw (= 2 alone) plus a blind eye (= 1 alone), = 3.

Deformity assessment results for Yellowstone cutthroat trout in reproductive success study

Values represent the number of fish (at swim-up and test termination) in each scoring criterion (i.e., 0-3).

See below for a definition of scoring criteria.

filename: deform appendix.xls

| Count of fish # | | Skeletal Deformities (SD) | | | | Grand Total |
|-----------------|-----------------|---------------------------|------|-----|-----|-------------|
| Location | Field Sample ID | 0 | 1 | 2 | 3 | |
| HL | 002 | 6 | 15 | 4 | 14 | 39 |
| | 003 | 157 | 120 | 20 | 5 | 302 |
| | 004 | 199 | 196 | 17 | 4 | 416 |
| | 006 | 52 | 107 | 34 | 51 | 244 |
| | 007 | 167 | 224 | 7 | 6 | 404 |
| | 008 | 195 | 191 | 21 | 5 | 412 |
| | 011 | 98 | 157 | 25 | 16 | 296 |
| | 012 | 163 | 259 | 22 | 10 | 454 |
| | 013 | 223 | 226 | 30 | 4 | 483 |
| | 015 | 2 | 9 | 6 | 19 | 36 |
| | Total | 1262 | 1504 | 186 | 134 | 3086 |
| CC-150 | 001 | 32 | 99 | 37 | 14 | 182 |
| | Total | 32 | 99 | 37 | 14 | 182 |
| CC-350 | 001 | 24 | 48 | 34 | 32 | 138 |
| | 002 | 212 | 342 | 43 | 5 | 602 |
| | 003 | 105 | 204 | 20 | 1 | 330 |
| | 004 | 154 | 308 | 16 | 2 | 480 |
| | 005 | 108 | 212 | 56 | 16 | 392 |
| | Total | 603 | 1114 | 169 | 56 | 1942 |
| DC | 001 | 103 | 137 | 28 | 7 | 275 |
| | 002 | 193 | 229 | 41 | 2 | 465 |
| | 003 | 88 | 241 | 48 | 3 | 380 |
| | 004 | 9 | 17 | 12 | | 38 |
| | Total | 393 | 624 | 129 | 12 | 1158 |
| LSV2C | 001 | 14 | 69 | 76 | 41 | 200 |
| | 002 | 71 | 165 | 69 | 14 | 319 |
| | 003 | 174 | 239 | 68 | 6 | 487 |
| | 004 | 167 | 266 | 42 | 1 | 476 |
| | Total | 426 | 739 | 255 | 62 | 1482 |
| Grand Total | | 2716 | 4080 | 776 | 278 | 7850 |

Skeletal deformities included any deformity of the vertebrae or spines. A slight bend of less than 45 degrees (but > than body width off of straight) or a minor body constriction (e.g. a tight rubberband about the body effect) was given a score of 1, 2 slight bends or constrictions anywhere, or bend of > 45-90 degrees was scored a 2, and multi-directional bends > 90 degrees were given a 3. Bends caused by skeletal deformities were usually detectable from normal bending of the body during preservation (these fish were usually well preserved, very straight) by presence of a slight or greater bump below the surface of the epidermis on the outside of the bend. However, some fish with SD = 1 had just a very slight bend in the range the deformity described but could be due to preservation or the poor condition of the fish. This was sometimes especially true in larger fish, which may be more muscular and undergo stronger contraction during preservation and thus, bend slightly. A score "CF = 1" was a slight deformity, if at all. The scores of SD = 1 involving kyphosis or lordosis were deemed real because that is an unusual preservation deformity. Some samples were re-examined; most fish were very straight so some samples with higher SD scores (e.g., PSU samples) were determined accurate.

Deformity assessment results for Yellowstone cutthroat trout in reproductive success study

Values represent the number of fish (at swim-up and test termination) in each scoring criterion (i.e., 0-3).

See below for a definition of scoring criteria.

filename: deform appendix.xls

| Count of fish # | | Fin Deformities (FD) | | | | Grand Total |
|-----------------|-----------------|----------------------|-----|----|----|-------------|
| Location | Field Sample ID | 0 | 1 | 2 | 3 | |
| HL | 002 | 27 | 1 | 2 | 9 | 39 |
| | 003 | 293 | 2 | 6 | 1 | 302 |
| | 004 | 409 | 4 | 0 | 3 | 416 |
| | 006 | 174 | 23 | 8 | 39 | 244 |
| | 007 | 396 | 6 | 1 | 1 | 404 |
| | 008 | 407 | 2 | 1 | 2 | 412 |
| | 011 | 280 | 4 | 4 | 8 | 296 |
| | 012 | 442 | 8 | 3 | 1 | 454 |
| | 013 | 480 | 1 | 0 | 2 | 483 |
| | 015 | 20 | 3 | 2 | 11 | 36 |
| | Total | 2928 | 54 | 27 | 77 | 3086 |
| CC-150 | 001 | 182 | 0 | 0 | 0 | 182 |
| | Total | 182 | 0 | 0 | 0 | 182 |
| CC-350 | 001 | 137 | 1 | 0 | 0 | 138 |
| | 002 | 575 | 25 | 1 | 1 | 602 |
| | 003 | 329 | 1 | 0 | 0 | 330 |
| | 004 | 472 | 8 | 0 | 0 | 480 |
| | 005 | 384 | 5 | 2 | 1 | 392 |
| | Total | 1897 | 40 | 3 | 2 | 1942 |
| DC | 001 | 264 | 7 | 3 | 1 | 275 |
| | 002 | 458 | 6 | 1 | 0 | 465 |
| | 003 | 373 | 5 | 1 | 1 | 380 |
| | 004 | 37 | 1 | 0 | 0 | 38 |
| | Total | 1132 | 19 | 5 | 2 | 1158 |
| LSV2C | 001 | 169 | 20 | 9 | 2 | 200 |
| | 002 | 310 | 6 | 2 | 1 | 319 |
| | 003 | 481 | 5 | 1 | 0 | 487 |
| | 004 | 475 | 0 | 1 | 0 | 476 |
| | Total | 1435 | 31 | 13 | 3 | 1482 |
| Grand Total | | 7574 | 144 | 48 | 84 | 7850 |

Fin deformities included variation in fin or finfold morphology and a slightly smaller or missing fin (in thin fish, the adipose fin was often absent, indicating fat absorption, not uncommon and scored 1) or one with a bend or incomplete ray development (in older fish) was given a 1, 2 fins damaged or malformed = 2, and > 2 fins malformed or if fins were missing (except adipose) was = 3. Often fins were malformed associated with vertebral deformities that did not permit proper development. Folded finfolds as a result of preservation were not counted.

Deformity assessment results for Yellowstone cutthroat trout in reproductive success study

Values represent the number of fish (at swim-up and test termination) in each scoring criterion (i.e., 0-3).

See below for a definition of scoring criteria.

filename: deform appendix.xls

| Count of fish # | | Edema Deformities (ED) | | | | Grand Total |
|-----------------|-----------------|------------------------|------|-----|----|-------------|
| Location | Field Sample ID | 0 | 1 | 2 | 3 | |
| HL | 002 | 32 | 7 | 0 | 0 | 39 |
| | 003 | 218 | 78 | 5 | 1 | 302 |
| | 004 | 341 | 69 | 4 | 2 | 416 |
| | 006 | 152 | 56 | 23 | 13 | 244 |
| | 007 | 297 | 97 | 8 | 2 | 404 |
| | 008 | 339 | 66 | 5 | 2 | 412 |
| | 011 | 209 | 76 | 11 | 0 | 296 |
| | 012 | 274 | 154 | 23 | 3 | 454 |
| | 013 | 353 | 119 | 9 | 2 | 483 |
| | 015 | 12 | 14 | 7 | 3 | 36 |
| | Total | 2227 | 736 | 95 | 28 | 3086 |
| CC-150 | 001 | 112 | 62 | 8 | 0 | 182 |
| | Total | 112 | 62 | 8 | 0 | 182 |
| CC-350 | 001 | 88 | 33 | 7 | 10 | 138 |
| | 002 | 434 | 159 | 8 | 1 | 602 |
| | 003 | 263 | 66 | 1 | 0 | 330 |
| | 004 | 460 | 19 | 1 | 0 | 480 |
| | 005 | 343 | 43 | 5 | 1 | 392 |
| | Total | 1588 | 320 | 22 | 12 | 1942 |
| DC | 001 | 253 | 21 | 1 | 0 | 275 |
| | 002 | 358 | 98 | 9 | 0 | 465 |
| | 003 | 247 | 125 | 8 | 0 | 380 |
| | 004 | 30 | 6 | 1 | 1 | 38 |
| | Total | 888 | 250 | 19 | 1 | 1158 |
| LSV2C | 001 | 190 | 9 | 1 | 0 | 200 |
| | 002 | 207 | 102 | 7 | 3 | 319 |
| | 003 | 246 | 182 | 52 | 7 | 487 |
| | 004 | 249 | 173 | 44 | 10 | 476 |
| | Total | 892 | 466 | 104 | 20 | 1482 |
| Grand Total | | 5707 | 1834 | 248 | 61 | 7850 |

Edema was assessed because it was common in one early sample and not others, and because it was thought a condition that could affect emergence, mobility, and other factors that may limit survival of fish in the wild. Edema was detected by an obvious swelling and fluid buildup, usually abdominally, and ventrally, which often displaced the gut, and was usually clear fluid that was slightly soft when touched with a blunt probe. The yolk, which was present in some quantity in some study specimens, also created some swelling but was typically yellowish, opaque, and small, and hard to the touch in preservation. Slight edema = 1 was for a fish with up to 1X swelling of the normal body width or depth, up to 2x = 2, and > 2x = 3.

Figure 1. Craniofacial Deformity Frequency

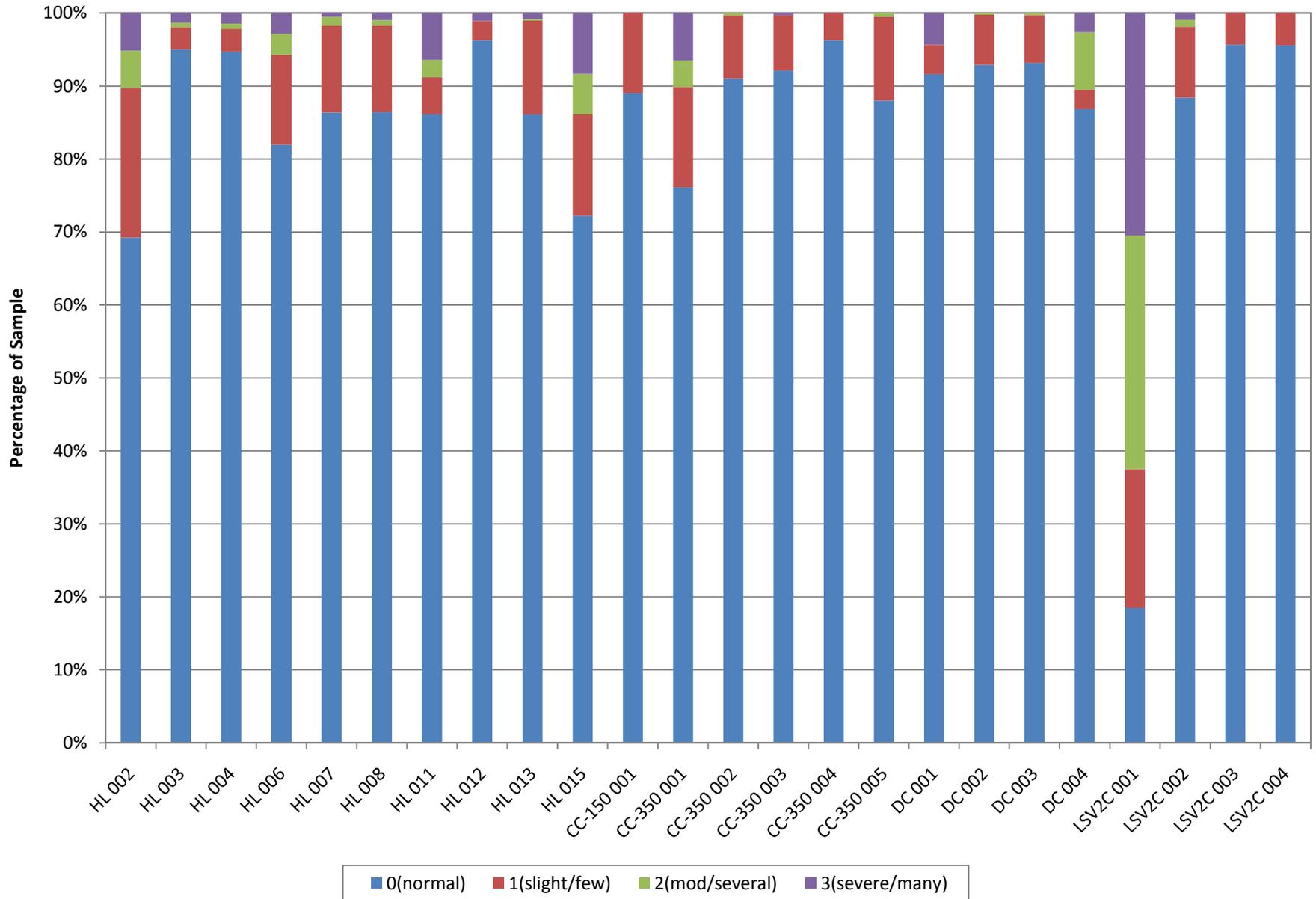


Figure 2. Skeletal Deformity Frequency

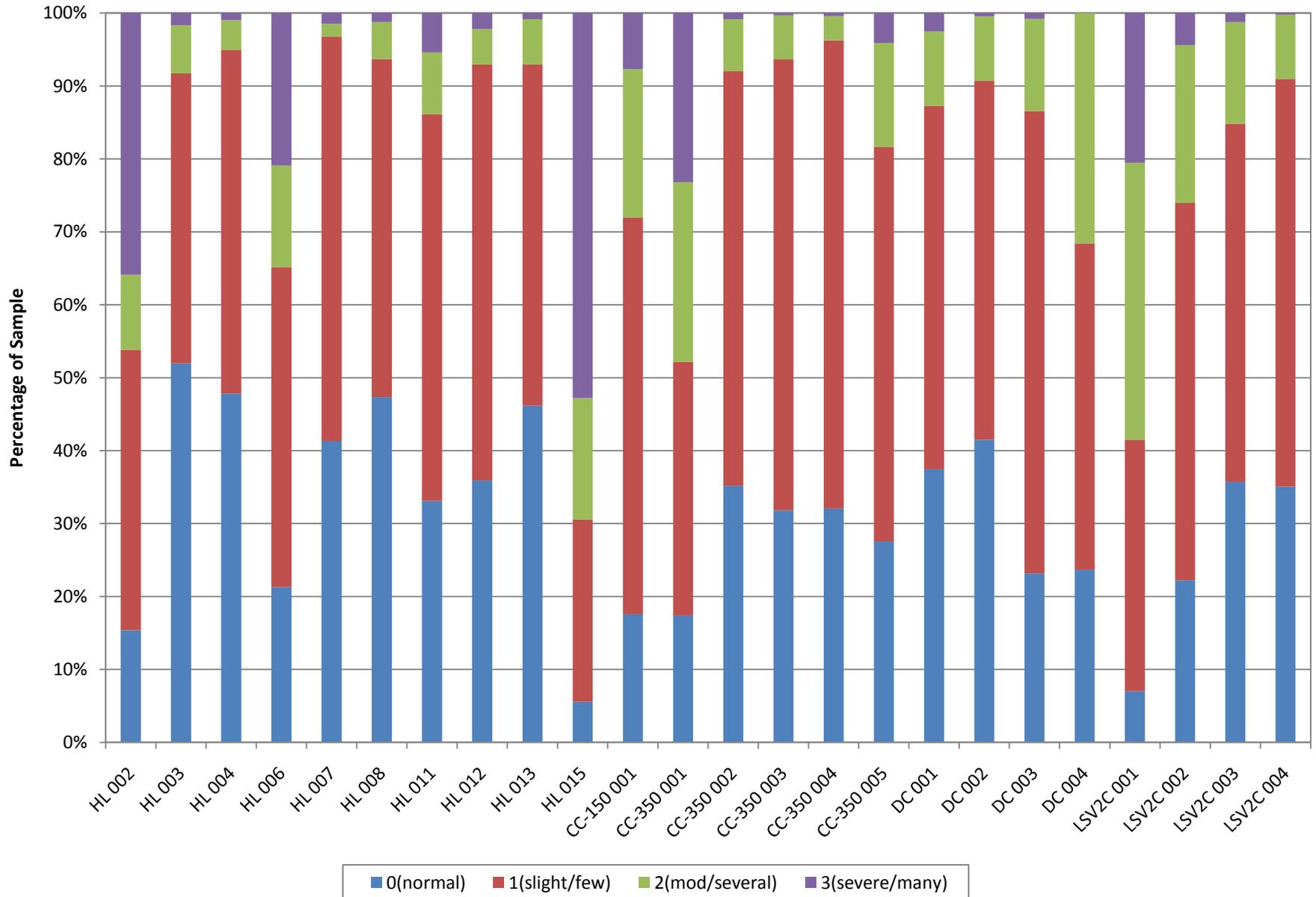


Figure 3. Fin or Finfold Deformity Frequency

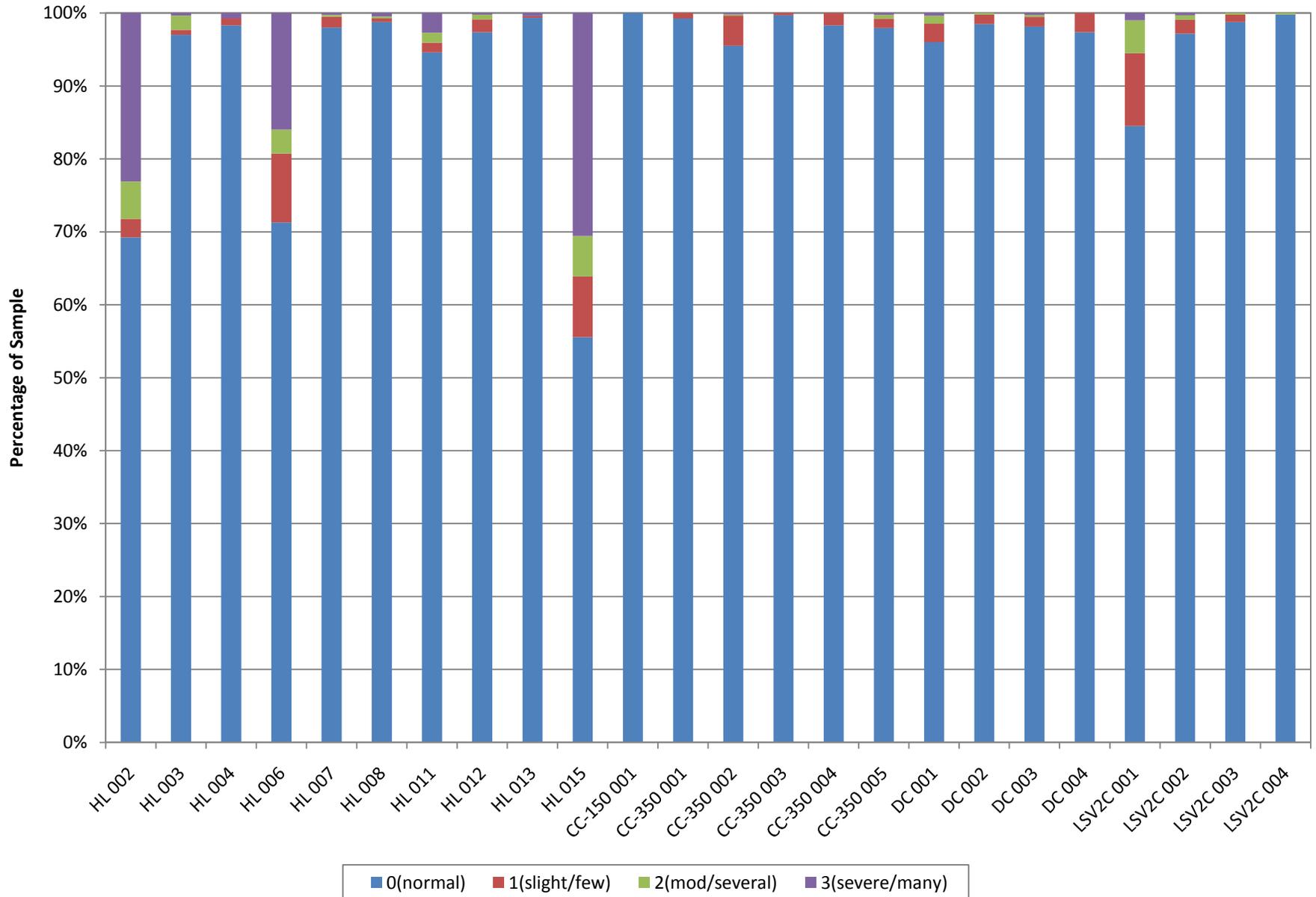
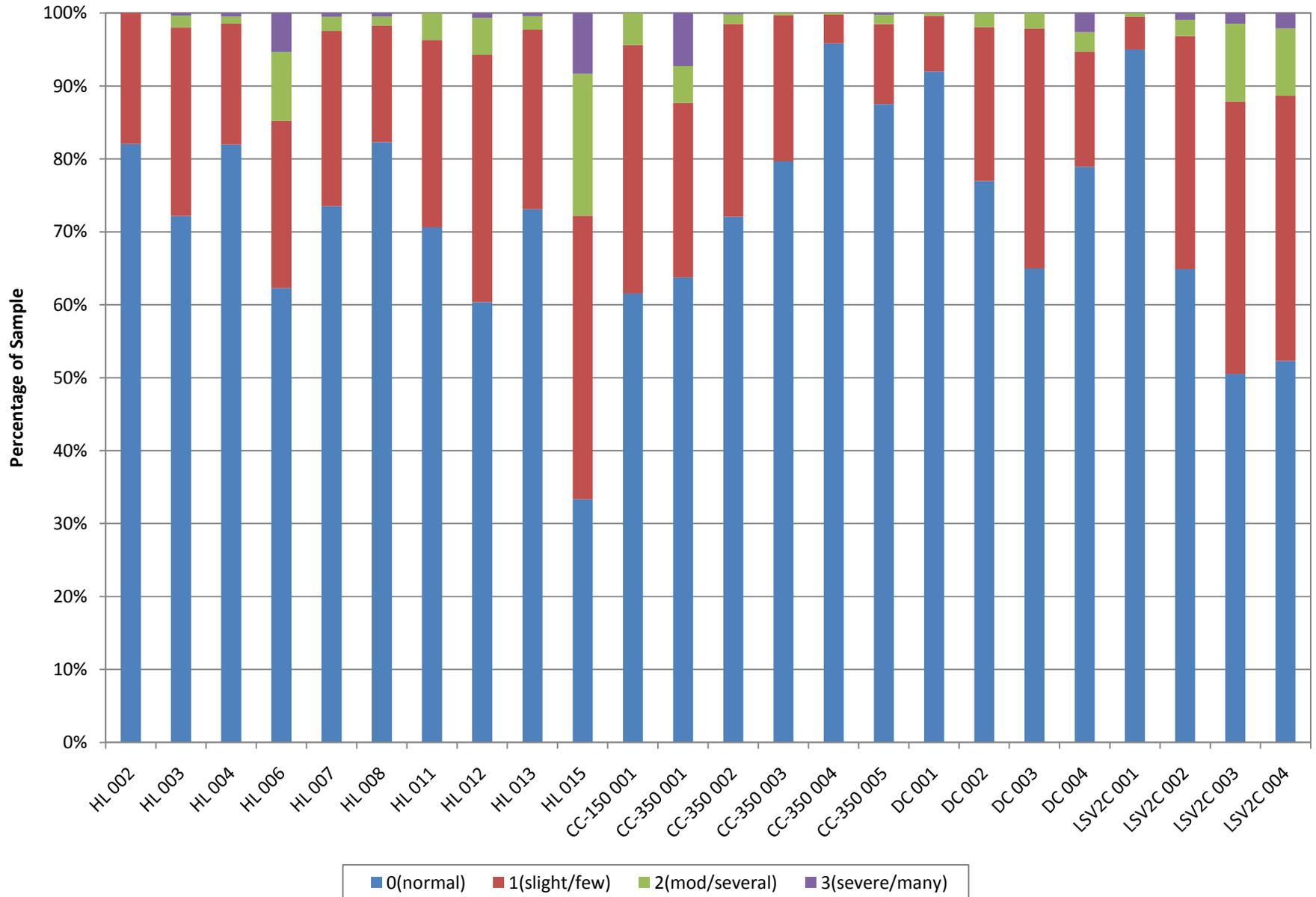
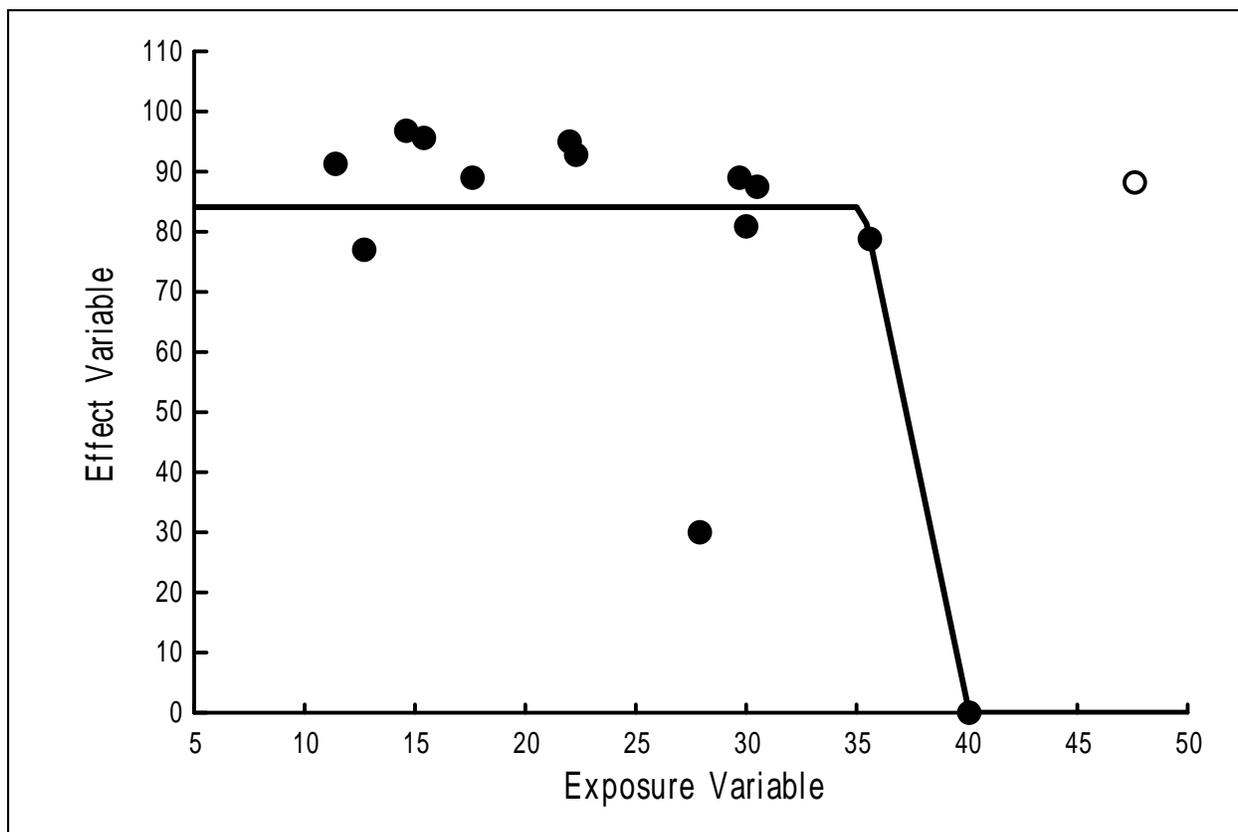


Figure 4. Edmatous Tissue Deformity Frequency



APPENDIX F



Parameter Summary (Piecewise Linear Regression Analysis)

| Parameter | Guess | FinalEst | StdError | 95%LCL | 95%UCL |
|-----------|---------|----------|----------|--------|--------|
| X 50 | 36.90 | 37.70 | 0.78 | 35.95 | 39.45 |
| S | 0.10645 | 0.2082 | 0.0722 | 0.0474 | 0.3690 |
| Y 0 | 84.08 | 84.09 | 5.71 | 71.37 | 96.81 |

Effect Concentration Summary

| %Effect | Xp Est | 95%LCL | 95%UCL |
|---------|--------|--------|--------|
| 50.0 | 37.70 | 35.95 | 39.45 |
| 20.0 | 36.26 | 34.09 | 38.43 |
| 10.0 | 35.78 | 33.37 | 38.19 |
| 5.0 | 35.54 | 33.00 | 38.08 |

Regression Analysis of Variance

| Source | df | SS | MS | F | Alpha |
|------------|----|--------|-------|------|--------|
| Total | 12 | 10070. | 839. | | |
| Regression | 2 | 6483. | 3242. | 9.04 | 0.0057 |
| Error | 10 | 3587. | 359. | | |

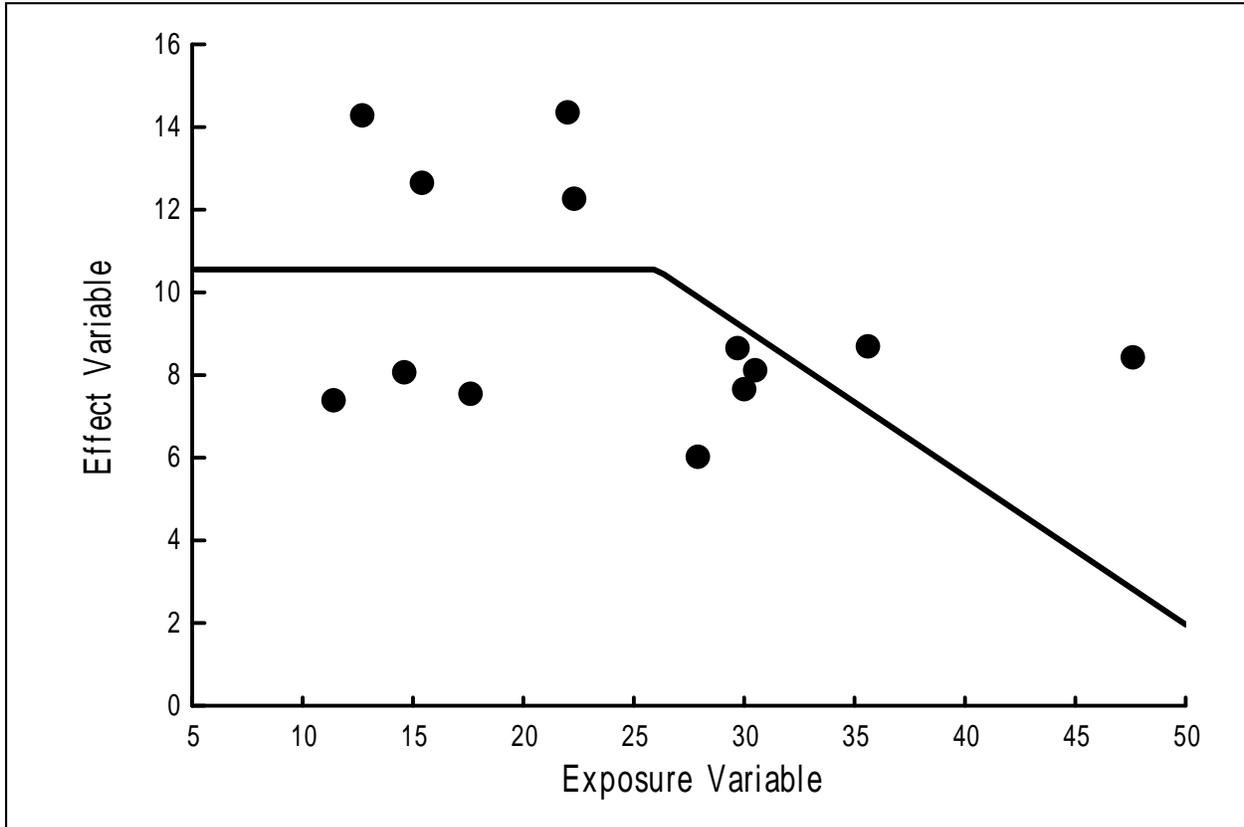
Data Summary

| Exposure | Obs Effects | Pred Effects | Residual | Weight |
|----------|-------------|--------------|----------|--------|
| 11.40 | 91.30 | 84.09 | -7.21 | 1. |
| 12.70 | 77.00 | 84.09 | 7.09 | 1. |
| 14.60 | 96.80 | 84.09 | -12.71 | 1. |
| 15.40 | 95.60 | 84.09 | -11.51 | 1. |
| 17.60 | 89.00 | 84.09 | -4.91 | 1. |
| 22.00 | 95.00 | 84.09 | -10.91 | 1. |
| 22.30 | 92.80 | 84.09 | -8.71 | 1. |
| 27.90 | 30.00 | 84.09 | 54.09 | 1. |
| 29.70 | 89.00 | 84.09 | -4.91 | 1. |
| 30.00 | 80.90 | 84.09 | 3.19 | 1. |
| 30.50 | 87.50 | 84.09 | -3.41 | 1. |
| 35.60 | 78.80 | 78.81 | 0.01 | 1. |
| 40.10 | 0.00 | 0.04 | 0.04 | 1. |

Error Summary

No Errors

YCT -Growth, Piecewise Linear



Parameter Summary (Piecewise Linear Regression Analysis)

| Parameter | Guess | FinalEst | StdError | 95%LCL | 95%UCL |
|-----------|---------|----------|----------|----------|---------|
| X 50 | 28.40 | 40.76 | 5.89 | 27.64 | 53.88 |
| S | 0.10194 | 0.03398 | 0.01980 | -0.01014 | 0.07810 |
| Y 0 | 10.938 | 10.553 | 1.270 | 7.723 | 13.384 |

Effect Concentration Summary

| %Effect | Xp Est | 95%LCL | 95%UCL |
|---------|--------|--------|--------|
| 50.0 | 40.76 | 27.64 | 53.88 |
| 20.0 | 31.93 | 21.12 | 42.74 |
| 10.0 | 28.99 | 16.47 | 41.51 |
| 5.0 | 27.52 | 13.82 | 41.22 |

YCT -Growth, Piecewise Linear

Regression Analysis of Variance

| Source | df | SS | MS | F | Alpha |
|------------|----|-------|-------|-------|--------|
| Total | 12 | 94.2 | 7.85 | | |
| Regression | 2 | -18.8 | -9.38 | -0.83 | 1.0000 |
| Error | 10 | 113.0 | 11.30 | | |

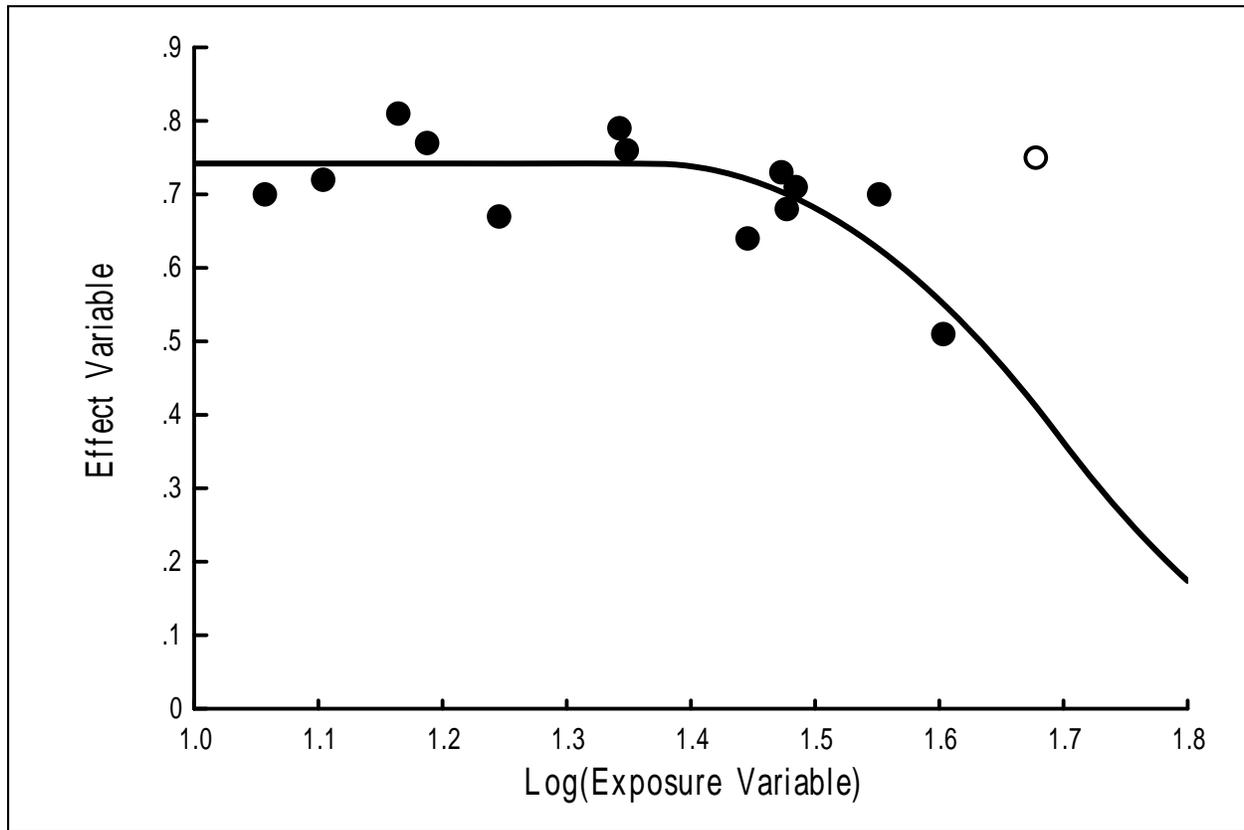
Data Summary

| Exposure | Obs Effects | Pred Effects | Residual | Weight |
|----------|-------------|--------------|----------|--------|
| 11.40 | 7.39 | 10.55 | 3.16 | 1. |
| 12.70 | 14.28 | 10.55 | -3.73 | 1. |
| 14.60 | 8.07 | 10.55 | 2.48 | 1. |
| 15.40 | 12.65 | 10.55 | -2.10 | 1. |
| 17.60 | 7.55 | 10.55 | 3.01 | 1. |
| 22.00 | 14.36 | 10.55 | -3.80 | 1. |
| 22.30 | 12.27 | 10.55 | -1.72 | 1. |
| 27.90 | 6.03 | 9.89 | 3.86 | 1. |
| 29.70 | 8.65 | 9.24 | 0.59 | 1. |
| 30.00 | 7.66 | 9.14 | 1.48 | 1. |
| 30.50 | 8.12 | 8.96 | 0.84 | 1. |
| 35.60 | 8.70 | 7.13 | -1.57 | 1. |
| 47.60 | 8.43 | 2.82 | -5.61 | 1. |

Error Summary

Maximum Iterations Reached Without Convergence
Steepness At Maximum or Minimum Limit
Large Standard Error for Steepness

YCT-Mean Fraction Normal, Threshold Sigmoidal



Parameter Summary (Threshold Sigmoid Regression Analysis)

| Parameter | Guess | FinalEst | StdError | 95%LCL | 95%UCL |
|-----------|--------|----------|----------|--------|--------|
| LogX50 | 1.7497 | 1.6962 | 0.0630 | 1.5558 | 1.8365 |
| S | 1.7659 | 3.039 | 1.280 | 0.186 | 5.892 |
| Y0 | 0.7322 | 0.7419 | 0.0208 | 0.6955 | 0.7883 |

Effect Concentration Summary

| %Effect | Xp Est | 95%LCL | 95%UCL |
|---------|--------|--------|--------|
| 50.0 | 49.68 | 35.96 | 68.63 |
| 20.0 | 37.60 | 32.62 | 43.34 |
| 10.0 | 32.68 | 27.52 | 38.80 |
| 5.0 | 29.59 | 23.30 | 37.57 |

YCT-Mean Fraction Normal, Threshold Sigmoidal

Regression Analysis of Variance

| Source | df | SS | MS | F | Alpha |
|------------|----|--------|---------|------|--------|
| Total | 12 | 0.0705 | 0.00587 | | |
| Regression | 2 | 0.0399 | 0.01995 | 6.52 | 0.0154 |
| Error | 10 | 0.0306 | 0.00306 | | |

Data Summary

| Exposure | Obs Effects | Pred Effects | Residual | Weight |
|----------|-------------|--------------|----------|--------|
| 1.0569 | 0.7000 | 0.7419 | 0.0419 | 1. |
| 1.1038 | 0.7200 | 0.7419 | 0.0219 | 1. |
| 1.1644 | 0.8100 | 0.7419 | -0.0681 | 1. |
| 1.1875 | 0.7700 | 0.7419 | -0.0281 | 1. |
| 1.2455 | 0.6700 | 0.7419 | 0.0719 | 1. |
| 1.3424 | 0.7900 | 0.7419 | -0.0481 | 1. |
| 1.3483 | 0.7600 | 0.7419 | -0.0181 | 1. |
| 1.4456 | 0.6400 | 0.7208 | 0.0808 | 1. |
| 1.4728 | 0.7300 | 0.7037 | -0.0263 | 1. |
| 1.4771 | 0.6800 | 0.7005 | 0.0205 | 1. |
| 1.4843 | 0.7100 | 0.6949 | -0.0151 | 1. |
| 1.5515 | 0.7000 | 0.6255 | -0.0745 | 1. |
| 1.6031 | 0.5100 | 0.5511 | 0.0411 | 1. |

Error Summary

No Errors