APPENDIX C
CHEMICAL DATA QUALITY REVIEW AND ANALYTICAL DATA

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CHEMICAL DATA QUALITY REVIEW FOR SOIL SAMPLES

Seventy-four soil samples and eight field duplicates were collected from the Van Stone Mine site in October 2011 and June 2012. The samples were submitted to TestAmerica Seattle (TAS) in Tacoma, Washington, for chemical analysis. Six samples were subcontracted to EMLab P&K in San Bruno, California, for bulk asbestos testing. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table C-1 of the report.

The soil samples were analyzed for one or more of the following:

- Total metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc) by EPA Methods 6010B/6020;
- Total mercury by EPA Method 7471A;
- Percent solids and percent moisture by ASTM D2216;
- Bulk asbestos by California Air Resources Board (CARB) Method 435;
- Volatile organic compounds (VOCs) by EPA Method 8260B;
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C-SIM;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082;
- Total petroleum hydrocarbons (TPH) as diesel and motor oil by Washington State Department of Ecology (Ecology) method NWTPH-Dx.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures are performed on an ongoing basis by the laboratory. Hart Crowser performed the data review using laboratory quality control results summary sheets and raw data as required to ensure they met data quality objectives for the project. Data review generally followed the format outlined in the National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008) and the National Functional Guidelines for Inorganic Superfund Data Review (EPA 2010), and was modified as needed to include criteria of the individual analytical methods.

The following criteria were evaluated in the standard data quality review process, where applicable:

- Holding times;
- Method blanks;

- Surrogate recoveries;
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs) and laboratory replicate relative standard deviations (RSDs);
- Post spike recoveries;
- Standard reference material (SRM) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews organized by analysis class follow this section.

Laboratory Detection Limits

Sample detections between the Method Detection Limit (MDL) and Reporting Limit (RL) were qualified by the laboratory as "estimated" (J). The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Sample Receiving Discrepancies

Sample Delivery Group (SDG) 580-29235-1:
Samples BG-9-SS, BG-9-SS2, BG-15-SS, BG-12-SS, and BG-11-SS: The laboratory analyzed and reported lead by both EPA Method 6010B and EPA Method 6020. The results were comparable (within 35 percent) between the two analyses.

SDG 580-29735-1:
The laboratory indicated there were no custody seals on the coolers.

Sample T10-SS-750: No sample date or time was written on the sample label. The laboratory used the date and time from the COC to log the sample in.

SDG 580-29929-1:
The sample receipt checklist incorrectly indicated that there were no custody seals on the cooler. The laboratory sample receiver noted on the COC that custody seals were indeed present.

The cooler temperature was measured as 13.6°C upon receipt at the laboratory. The samples were analyzed for total metals. EPA SW-846 does not have temperature requirements for total metals except for mercury, which is $\leq$6°C; therefore, the mercury results were qualified as estimated (J) in samples

SWR-COMP, MS-1-COMP, MS-2-COMP, MS-3-COMP, LT-0C ROAD-CULVERT, UT-LT-4000', TAILINGS BOX, UT-LT-2000', and LT-DP-1.

SDG 580-29929-2:
Samples SWR-COMP, MS-1-COMP, MS-2-COMP, and MS-3-COMP: The samples were subcontracted by TAS to EMLab P&K in San Bruno, California, for bulk asbestos testing. The cooler temperature was measured as 13.6°C upon receipt at the TAS laboratory. Bulk asbestos testing has no temperature requirements, and sample results were not qualified.

SDG 580-33588-1:
Sample MS-1: The sampling time on the sample label did not match the sampling time on the COC. The laboratory used the time from the COC to log the sample in.

Samples MS-6, MS-7, and MS-8: Water leaked into the ziplock bags, bubble wrap, and soil containers before these samples arrived at the laboratory. Due to the possibility of cross-contamination, the results for metals, PAHs, TPH, and PCBs were qualified as estimated (J).

SDG 580-33656-1:
Samples LT-20, LT-21, LT-22, LT-23, and LT-90: The jars were not labeled but sample information was written on the container lids, and that information matched the COC.

Samples LT-6, UT-2, and UT-5: Water leaked into the ziplock bags and sample jars before these samples arrived at the laboratory. Due to the possibility of cross-contamination, the results were qualified as estimated (J).

Sample LT-3: The sample time on the label did not match the sample time on the COC. The time from the COC was used to log the sample into the laboratory.

SDG 580-33781-1:
Samples PL-6, PL-10, PL-14, and PL-15: The samples were received at the laboratory with some water inside the containers. Water leaked into sample collection bags before transferring to sample jars. Sample results were qualified as estimated (J).

Laboratory Data Issues

SDG 580-29442-1:
During data validation, it was determined that the laboratory had used a diluted analysis to calculate the MS/MSD and PS recoveries for sample UT-2-SS by EPA

6010B. The laboratory then recalculated the results for the MS and MSD using an undiluted analysis and issued a revised report. The laboratory did not recalculate the results for the PS. The PS recoveries were calculated by the data validator and evaluated.

Metals

Composite Sample Preparation

Samples SWR-COMP, MS-1-COMP, MS-2-COMP, and MS-3-COMP: These samples were 30-point composite samples. Thirty subsamples at each location were collected, air dried, and sieved through a No. 10 mesh sieve. Equal amounts of each subsample were then combined and homogenized. Aliquots of the composite sample were submitted to the laboratory for chemical analysis and for bulk asbestos analysis.

The "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA SW-846), does not include temperature requirements for total metals except for mercury, which is <6°C. Mercury results were qualified as estimated (J) for the composite samples SWR-COMP, MS-1-COMP, MS-2-COMP, and MS-3-COMP.

Total Metals

Analytical Methods

The samples were prepared by EPA Method 3050B and analyzed following either EPA Method 6020 or EPA Method 6010B.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and required dilution factors. Reported detection limits were acceptable.

Blank Contamination

Several method blanks had detections for metals between the MDL and the RL. The detections were evaluated and the results modified as described below.

- MB-580-100478/21-A (11/19/11): Beryllium was detected in the MB between the MDL and the RL. The associated samples with Be detections above the MDL were qualified as B by the laboratory (T15-SS-200, T15-SS-750, T15-SS-1000, T4-SS-500, T14-SS-750, T14-SS-500, T7-SS-500, T14-SS-300, T9-SS-500, T10-SS-750, T11-SS-1200, T2-SS-300, T13-SS-500, T7-SS-300, T7-SS-100, T9-SS-300, and T9-SS-100).

  - If Be was detected above the RL at greater than ten times the amount in the method blank, then the results were not qualified and the B qualifier was removed. (T15-SS-200, T15-SS-750, T15-SS-1000, T4-SS-500, T14-SS-750, T14-SS-500, T7-SS-500, T14-SS-300, T9-SS-500, T10-SS-750, T11-SS-1200, T13-SS-500, T9-SS-300, and T9-SS-100).

  - If Be was detected between the MDL and the RL, then the result was changed to the appropriate RL and the B qualifier was changed to U (non-detect) (T2-SS-300, T7-SS-300, and T7-SS-100).

- MB-580-100480/23-A (11/19/11): Beryllium and cadmium were detected in the MB between the MDL and the RL. The associated samples with Be and Cd detections above the MDL were qualified as B by the laboratory (T4-SS-100, T4-SS-300, T13SS-150, T13-SS-300, T11-SS-300, T11-SS-900, T10-SS-500, T10-SS-150, T8-SS-100, T8-SS-300, T8-SS-500, T5-SS-300, T5-SS-500, T5-SS-100, T1-SS-100, T1-SS-300, T1-SS-500, T2-SS-100, T2-SS-500).

  - If Be or Cd was detected above the RL at greater than ten times the amount in the method blank, then the results were not qualified and the B qualifier was removed.

    - T4-SS-100 [Cd]
    - T4-SS-300 [Cd, Be]
    - T13SS-150 [Cd, Be]
    - T13-SS-300 [Cd, Be]
    - T11-SS-300 [Cd]
    - T11-SS-900[Cd, Be]
    - T10-SS-500 [Cd, Be]
    - T10-SS-150 [Cd, Be]
    - T8-SS-100 [Cd, Be]
    - T8-SS-300 [Cd]
    - T8-SS-500 [Cd, Be]
    - T5-SS-300 [Cd]
    - T5-SS-500 [Cd, Be]
    - T5-SS-100 [Cd]

- T1-SS-100 [Cd, Be]
- T1-SS-300 [Cd, Be]
- T1-SS-500 [Cd, Be]
- T2-SS-100 [Cd, Be]
- T2-SS-500 [Cd, Be]

- If Be or Cd was detected between the MDL and the RL, then the result was changed to the appropriate RL and the B qualifier was changed to U (non-detect).

  - T4-SS-100 [Be]
  - T11-SS-300 [Be]
  - T8-SS-300 [Be]
  - T5-SS-100 [Be]

- If Be or Cd was detected above the RL but less than ten times the amount in the method blank, then the B qualifier was changed to U (non-detect):

  - T5-SS-300 [Be]

■ MB-580-115086/23-B (07/11/12): Copper and nickel were detected in the MB between the MDL and the RL. The associated samples with detections for Cu and Ni above the MDL were qualified as B by the laboratory. The samples were analyzed at a ten-fold dilution, and sample detections were evaluated at the instrument (LT-18, LT-16, LT-17, LT-180, LT-19, LT-190, T17-SS-0, T17-SS-500, T18-SS-0, T18-SS-350, T16-SS-0, T16-SS-315, T16-SS-770, MS-11, MS-12, MS-13, MS-14, MS-15, and MS-16).

- If Cu or Ni was detected between the MDL and the RL, then the result was changed to the appropriate RL and the B qualifier was changed to U (non-detect).

  - MS-11 [Ni]
  - MS-13 [Ni]
  - MS-14 [Cu, Ni]
  - MS-15 [Ni]
  - MS-16 [Ni]
  - LT-18 [Ni]
  - LT-16 [Ni]
  - LT-17 [Ni]
  - LT-180 [Ni]
  - LT-19 [Cu]

- LT-190 [Ni]
- T17-SS-0 [Ni]
- T17-SS-500 [Ni]
- T18-SS-350 [Ni]
- T16-SS-0 [Ni]
- T16-SS-315 [Ni]

- If Cu or Ni was detected at less than ten times the amount in the method blank at the instrument, then the B qualifier was changed to U (non-detect).

  - MS-11 [Cu]
  - MS-12 [Cu]
  - MS-13 [Cu]
  - MS-15 [Cu]
  - MS-16 [Cu]
  - LT-18 [Cu]
  - LT-16 [Cu]
  - LT-17 [Cu]
  - LT-180 [Cu]
  - LT-190 [Cu]
  - T17-SS-0 [Cu]
  - T17-SS-500 [Cu]
  - T18-SS-0 [Cu, Ni]
  - T18-SS-350 [Cu]
  - T16-SS-0 [Cu]
  - T16-SS-315 [Cu]

- If Cu or Ni was detected at greater than ten times the amount in the method blank at the instrument, then the B qualifier was removed.

  - LT-19 [Ni]
  - T16-SS-750 [Ni]

- MB-580-115171-18-B (07/12/12): Nickel was detected in the MB between the MDL and the RL. The associated samples (LT-1, LT-2, LT-3, LT-4, and LT-5) with Ni detections above the MDL were qualified as B by the laboratory. The samples were analyzed at a ten-fold dilution, and sample detections were evaluated at the instrument.

  - If Ni was detected between the MDL and the RL, then the result was changed to the appropriate RL and the B qualifier was changed to U (non-detect).

- LT-1 [Ni]
- LT-2 [Ni]
- LT-3 [Ni]

- MB-580-115303/22-A (07/14/12): Zinc was detected in the MB between the MDL and the RL. The associated samples (LT-6, LT-7, LT-8, LT-9, LT-10, LT-11, LT-20, LT-21, LT-22, LT-23, LT-90, UT-1, UT-2, UT-3, UT-4, UT-20, UT-6, and UT-5) with Zn and Ni detections above the MDL were qualified as B by the laboratory. The samples were analyzed at a ten-fold dilution, and sample detections were evaluated at the instrument.

  - If Zn was detected between the MDL and the RL, then the result was changed to the appropriate RL and the B qualifier was changed to U (non-detect).

    - UT-6 [Zn]

  - If Zn was detected at less than ten times the amount in the method blank at the instrument, then the B qualifier was changed to U (non-detect).

    - LT-8 [Zn]
    - LT-9 [Zn]
    - LT-21 [Zn]
    - LT-23 [Zn]
    - LT-90 [Zn]
    - UT-1 [Zn]
    - UT-5 [Zn]

  - If Zn was detected at greater than ten times the amount in the method blank at the instrument, then the B qualifier was removed.

    - LT-6 [Zn]
    - LT-7 [Zn]
    - LT-10 [Zn]
    - LT-11 [Zn]
    - LT-20 [Zn]
    - LT-22 [Zn]
    - UT-2 [Zn]
    - UT-3 [Zn]
    - UT-4 [Zn]
    - UT-20 [Zn]

- MB-580-115749/20-A (07/19/12): Cadmium was detected in the MB between the MDL and the RL. The associated samples (PL-1, PL-2, PL-3, PL-4, and PL-5) with Cd detections above the MDL were qualified as B by the laboratory. The samples were analyzed at a ten-fold dilution, and sample detections were evaluated to the instrument.

  - If Cd was detected at greater than ten times the amount in the method blank at the instrument, then the B qualifier was removed.

    - PL-1 [Cd]
    - PL-2 [Cd]
    - PL-3 [Cd]
    - PL-4 [Cd]
    - PL-5 [Cd]

- MB-580-115714/23-A (07/19/12): Lead and zinc were detected in the MB between the MDL and the RL. The associated samples (SWR-1 COMP, SWR-2 COMP, SWR-3 COMP, DR-1, DR-2, DR-3, DR-4, DR-5, UT-7, UT-9, UT-10, UT-11, UT-12, UT-13, UT-14, UT-15, UT-16, UT-17, and UT-160) with Pb or Zn detections above the MDL were qualified as B by the laboratory. The samples were analyzed undiluted and at a 100-fold dilution, and sample detections were evaluated to the instrument. The method blank was reanalyzed on July 24, 2012 and all metal results were below the RL. No samples were analyzed in association with that method blank; therefore, sample results were evaluated to the initial analysis of the method blank.

  - If Pb or Zn was detected at greater than ten times the amount in the method blank at the instrument, then the B qualifier was removed.

    - SWR-1 COMP [Pb, Zn]
    - SWR-2 COMP [Pb, Zn]
    - SWR-3 COMP [Pb, Zn]
    - DR-1 [Pb,Zn]
    - DR-2 [Pb,Zn]
    - DR-3 [Pb,Zn]
    - DR-4 [Pb,Zn]
    - DR-5 [Pb,Zn]
    - UT-7 [Pb, Zn]
    - UT-9 [Pb,Zn]
    - UT-10 [Pb,Zn]
    - UT-11 [Pb, Zn]
    - UT-12 [Pb, Zn]
    - UT-13 [Pb, Zn]

- UT-14 [Pb, Zn]
- *UT-15 [Pb]
- UT-16 [Pb,Zn]
- UT-17 [Pb, Zn]
- UT-160 [Pb,Zn]

*Zn was detected in the 100-fold dilution at less than ten times the amount in the method blank at the instrument. The zinc value reported is from the undiluted analysis and qualified as estimated (J).

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

MS recoveries were within laboratory and QAPP control limits, except for the following cases:

- BG-8-SS MS/MSD: The recoveries for antimony were below the laboratory and QAPP control limits in the MS and MSD. The result for antimony in the source sample (BG-8-SS) was qualified as estimated (J).

- BG-9-SS MS/MSD: The recoveries for antimony were below the laboratory and QAPP control limits in the MS and MSD. The recovery for lead exceeded the laboratory control limits in the MSD, but was within the method and QAPP control limits. The results for antimony in samples BG-9-SS and BG-9-SS2 were qualified as estimated (J). The results for lead were not qualified.

- UT-2-SS MS/MSD: The recovery for copper exceeded both laboratory and QAPP control limits in the MS, but fell within control limits in the MSD. The recoveries for lead and cadmium were below the laboratory and QAPP control limits in the MSD, but passed in the MS. The recoveries for zinc were outside the laboratory and QAPP control limits in both the MS and MSD. The concentrations of lead and zinc in the source sample were greater than four times the amount spiked; therefore, MS criteria were not applicable, and the results were not qualified for lead or zinc. The PS for copper was within control limits. The PS for cadmium was below the control

limits. Because both the MSD and PS for copper were within control limits, the results for copper were not qualified. The results for cadmium in UT-2-SS were qualified as estimated (J).

- T15-SS-200 MS/MSD: The recoveries for antimony and zinc were below both laboratory and QAPP control limits in the MS and MSD. The concentration of zinc in the source sample was greater than four times the amount spiked; therefore, MS criteria were not applicable, and sample results were not qualified for zinc. The results for antimony in T15-SS-200 were qualified as estimated (J).

- T4-SS-100 MS/MSD: The recovery for cadmium exceeded the laboratory and QAPP limits in the MS and was within limits in the MSD. The recovery for copper exceeded the laboratory control limits in the MS, but was within the QAPP control limits. The recoveries for lead and zinc exceeded both laboratory and QAPP control limits in the MS and MSD. The concentrations of lead and zinc in the source sample were greater than four times the amount spiked, therefore MS criteria were not applicable, and sample results were not qualified for lead or zinc. As the recovery for copper was within the QAPP limits, copper results were not qualified. Because the recovery for cadmium was within the QAPP limits in the MSD, cadmium results were not qualified.

- T3-SS-100 MS/MSD: The recoveries for thallium exceeded the laboratory control limits in the MS and MSD, but were within the QAPP control limits. Associated sample results were not qualified.

- SWR-COMP MS/MSD: The recovery for arsenic exceeded the laboratory control limits in the MSD, but was within the control limits for the QAPP and the MS. The recovery for silver exceeded the laboratory and QAPP control limits in the MSD, but was within control limits in the MS. The recoveries for cadmium, lead, and zinc exceeded both laboratory and QAPP control limits in the MS and MSD. The concentrations of cadmium, lead, and zinc in the source sample were greater than four times the amount spiked, therefore MS criteria were not applicable, and sample results were not qualified for cadmium, lead, or zinc. Because recoveries for silver and arsenic were within control limits in the MS, sample results were not qualified for those metals.

- MS-1 MS/MSD: The recoveries for copper and chromium were below the laboratory control limits in the MSD, but were within the QAPP control limits. The recovery for cadmium exceeded the laboratory and QAPP control limits in the MS, but was within limits in the MSD. The recoveries for

lead and zinc were outside the laboratory and QAPP control limits in the MS and MSD. The concentrations of lead and zinc in the source sample were greater than four times the amount spiked; therefore, MS criteria were not applicable, and sample results were not qualified for lead or zinc. Because recoveries for copper and chromium were within QAPP control limits, sample results for those metals were not qualified. The concentration of cadmium in the source sample was greater than the amount spiked, and because the recovery for cadmium was within limits in the MSD, sample results were not qualified.

- MS-17 MS/MSD: The recoveries for chromium were below the laboratory and QAPP control limits in the MS, and below the laboratory limits in the MSD. The recovery for copper was below laboratory and QAPP control limits in the MS, but within limits in the MSD. The RPD for copper exceeded laboratory control limits, but was within QAPP control limits. The results for chromium and copper were not qualified because recoveries were within control limits in the MSD.

- MS-11 MS/MSD: The recoveries for lead were below the laboratory control limits, but were within the QAPP control limits in the MS and MSD. The recoveries for copper and zinc were below the laboratory and QAPP control limits in the MS and MSD. Because the recoveries for lead were within the QAPP limits, sample results for lead were not qualified. The results for copper and zinc were qualified as estimated (J) in MS-11.

- LT-1 MS/MSD: The recoveries for beryllium and copper exceeded the laboratory and QAPP control limits in the MS and MSD. The results for chromium and zinc exceeded the laboratory and QAPP control limits in the MSD, but were within limits in the MS. The recoveries for lead and nickel exceeded the laboratory control limits in the MSD, but were within the QAPP control limits. The results for lead, nickel, chromium, and zinc were not qualified because they were within QAPP control limits in at least one spiked sample. The results for beryllium and copper were qualified as estimated (J) in LT-1.

- LT-6 MS/MSD: The recoveries for antimony and zinc were below the laboratory and QAPP control limits in the MS and MSD. The concentration of zinc in the source sample was greater than the amount spiked, and sample results were not qualified for zinc. The result for antimony in LT-6 was qualified as estimated (J).

- DR-6 MS/MSD: The recovery for lead was below the laboratory and QAPP control limits in the MS and MSD. The recovery for zinc was below the

laboratory and QAPP control limits in the MSD, but was within control limits in the MS. The concentration of zinc in the source sample was greater than the amount spiked, and sample results were not qualified for zinc. The result for lead in DR-6 was qualified as estimated (J).

- PL-1 MS/MSD: The recovery for cadmium exceeded the laboratory control limits in the MS, and exceeded the laboratory and QAPP control limits in the MSD. The recoveries for lead and zinc were outside the laboratory and QAPP control limits. The concentrations of lead and zinc in the source sample were greater than four times the amount spiked, therefore MS criteria were not applicable, and sample results were not qualified for lead or zinc. The concentration of cadmium in the source sample was greater than the amount spiked, and sample results were not qualified for cadmium.

- PL-6 MS/MSD: The recoveries for antimony were below the laboratory control limits in the MS and MSD, but were within the QAPP control limits. The recoveries for lead and zinc were outside the laboratory and QAPP control limits. The concentrations of lead and zinc in the source sample were greater than four times the amount spiked; therefore, MS criteria were not applicable, and sample results were not qualified for lead or zinc. The result for antimony was not qualified.

- SWR-1-COMP MS/MSD: The recoveries for zinc were outside the laboratory and QAPP control limits in the MS and MSD. The recovery for lead exceeded the laboratory and QAPP control limits in the MSD, but were within control in the MS. The recoveries for cadmium exceeded the laboratory and QAPP control limits in the MS and MSD. The concentrations of cadmium, lead, and zinc in the source sample were greater than four times the amount spiked, therefore MS criteria were not applicable, and sample results were not qualified for those metals.

- SWR-4-COMP MS/MSD: The recoveries for zinc exceeded the laboratory and QAPP control limits in the MS and MSD. The recovery for lead was below the laboratory and QAPP control limits in the MS, but within control in the MSD. The recoveries for cadmium exceeded the laboratory and QAPP control limits in the MS and MSD. The concentrations of cadmium, lead, and zinc in the source sample were greater than four times the amount spiked, therefore MS criteria were not applicable, and sample results were not qualified for those metals.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL, with the following exceptions:

- MS-1: The RPD for copper exceeded the laboratory control limits, but was within the QAPP limits. No sample results were qualified.

- MS-11: The RPD for copper exceeded the laboratory control limits, but was within the QAPP limits. The RPDs for lead and zinc exceeded the QAPP control limits. The results for lead and zinc in MS-11 were qualified as estimated (J).

- DR-6: The RPDs for lead and zinc exceeded the QAPP control limits. The results for lead and zinc in LT-6 were qualified as estimated (J).

- PL-1: The RPD for beryllium exceeded the laboratory control limits, but was within the QAPP limits. No sample results were qualified.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL, with the following exceptions:

- T4-SS-100/T4-SS-120: The RPDs for copper and zinc exceeded the QAPP limits. The results for Cr and Zn were qualified as estimated (J) in T4-SS-100 and T4-SS-120.

- UT-2/UT-20: The RPD for zinc exceeded the QAPP control limit. The results for Zn were qualified as estimated (J) in UT-2 and UT-20.

- LT-9/LT-90: The RPD for arsenic exceeded the QAPP control limit. The results for As were qualified as estimated (J) in LT-9 and LT-90.

Post Spike Recovery

Post spike recoveries were within control limits with the following exception:

- UT-2-SS: The recovery for copper exceeded the control limits, while the recoveries for cadmium, lead, and zinc were below the control limits. The PS criteria were not applicable to lead and zinc due to the high levels of lead

and zinc in the source sample, and results for those metals were not qualified. The laboratory used a diluted value to calculate the PS recovery for copper. When the correct, undiluted result was used, the PS recovery for copper was within control, and sample results for copper were not qualified. The result for cadmium in UT-2-SS was qualified as estimated (J).

- T4-SS-100: The recovery for lead was below the control limits, while the recovery for zinc was not calculated. The PS criteria were not applicable to lead and zinc due to the high levels of lead and zinc in the source sample, and results for those metals were not qualified.

- T15-SS-200: The recovery for zinc was not calculated. The PS criteria were not applicable to zinc due to the high levels of zinc in the source sample, and the result for that metal was not qualified.

- SWR-COMP: The recoveries for lead and zinc were not calculated. The PS criteria were not applicable to lead and zinc due to the high levels of lead and zinc in the source sample, and results for those metals were not qualified.

- MS-1: The recoveries for lead and zinc were not calculated. The recovery for copper was below the control limits. The PS criteria were not applicable to lead and zinc due to the high levels of lead and zinc in the source sample, and results for those metals were not qualified. The result for copper in MS-1 was qualified as estimated (J).

- SWR-1-COMP: The recoveries for lead and zinc were not calculated. The recovery for cadmium was below the control limit. The PS criteria were not applicable to cadmium, lead, or zinc due to the high levels of those metals in the source sample, and results for those metals were not qualified.

Serial Dilution

Percent difference was within control limits or was not applicable due to low levels of target metals with the following exceptions:

- BG-9-SS and BG-9-SS2: The percent difference for lead exceeded the control limits and, therefore, the results for lead were qualified as estimated (J).

- T3-SS-100: The percent difference for cadmium exceeded the control limits and, therefore, the result for cadmium was qualified as estimated (J).

- PL-1: The percent difference for copper exceeded the control limits and, therefore, the result for copper was qualified as estimated (J).

- SWR-1-COMP: The percent difference for zinc exceeded the control limits and, therefore, the result for zinc was qualified as estimated (J).

- SWR-4-COMP: The percent difference for nickel exceeded the control limits and therefore, the result for nickel was qualified as estimated (J).

Continuing Calibration Verification Checks

The Continuing Calibration Verification Checks (CCVs) were within acceptance criteria.

Total Mercury

Analytical Methods

Mercury was prepared and analyzed following EPA Method 7471A.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and required dilution factors. Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits with the following exceptions:

- Batch QC (580-29465-4) MS/MSD: The recovery for mercury in the MSD failed low, but was within control limits in the MS. The associated project sample results were not qualified.

- T4-SS-300 MS/MSD: The recovery for mercury exceeded the laboratory control limits for the MS and MSD, but was within the QAPP control limits. The associated sample results were not qualified.

- SWR-COMP MS/MSD: The recoveries for mercury were outside laboratory and QAPP control limits in the MS and MSD. The concentration of mercury in the source sample was greater than four times the amount spiked; therefore, MS criteria were not applicable, and sample results were not qualified.

- SWR-1-COMP MS/MSD: The recoveries for mercury were below laboratory and QAPP control limits in the MS, but were within control in the MSD. The concentration of mercury in the source sample was greater than the amount spiked, and sample results were not qualified.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL, with the following exceptions:

- Batch QC (580-29465-4): The RPD for mercury exceeded the laboratory and QAPP control limits. The associated project sample results were not qualified.

- T15-SS-200: The RPD for mercury exceeded the laboratory and QAPP control limits. The result for mercury in T15-SS-200 was qualified as estimated (J).

- SWR-COMP: The RPD for mercury exceeded the laboratory control limits, but were within the QAPP control limits. Sample results were not qualified.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL.

Initial Calibration Curves and Continuing Calibration Verification Checks

The initial calibration curves and CCVs were within acceptance criteria.

Physical/Chemical Parameters

Percent Solids and Percent Moisture

Analytical Methods

For samples collected and analyzed in 2011, the laboratory referenced "EPA Moisture" as a method. For samples collected and analyzed in 2012, the laboratory referenced method ASTM D2216. The laboratory confirmed that the two methods were comparable.

Sample Holding Times

The samples met QAPP holding time limits with the following exceptions:

- Samples PL-1, PL-2, PL-3, PL-4, PL-5, PL-6, PL-7, PL-8, PL-9, PL-10, PL-11, PL-12, PL-13, PL-14, PL-15, SWR-1 COMP, SWR-2 COMP, SWR-3 COMP, SWR-4-COMP, MS-4-COMP, DR-1, DR-2, DR-3, DR-4, DR-5, UT-7, UT-9, UT-10, UT-11, UT-12, UT-13, UT-14, UT-15, UT-16, UT-17, UT-160, DR-6, DR-7, DR-8, DR-9, DR-10, DR-11, DR-12, DR-13, DR-14, DR-15, LT-12, LT-13, LT-14, LT-15, LT-1, LT-2, LT-3, LT-4, LT-5, LT-6, LT-7, LT-8, LT-9, LT-10, LT-11, LT-20, LT-21, LT-22, LT-23, LT-90, UT-1, UT-2, UT-3, UT-4, UT-20, UT-6, and UT-5: The 14 day holding time criteria from the QAPP was exceeded. ASTM D2216 has no holding time requirements. Other percent solids determination methods have holding times equivalent to the associated analytical test holding time. Sample results were not qualified.

Laboratory Detection Limits

Reported detection limits were acceptable.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits with the following exceptions:

- MS-1: The RPD was within control limits for percent solids, but exceeded laboratory control limits for percent moisture. Because the percent solids were within control limits, no sample results were qualified.

- DR-12: The RPD was within control limits for percent solids, but exceeded laboratory control limits for percent moisture. Because the percent solids were within control limits, no sample results were qualified.

Field Duplicate RPDs

The field duplicate RPDs were within control limits with the following exception:

- UT-2/UT-20: The RPD was within control limits for percent solids, but exceeded laboratory control limits for percent moisture. Sample UT-2 had water leakage into the sample container during shipment, and sample results were qualified as estimated (J).

Asbestos

Analytical Methods

Bulk asbestos was measured following CARB Method 435. The laboratory counted 400 visible points.

Sample Holding Times

There are no holding time requirements for bulk asbestos.

Laboratory Detection Limits

Reported detection limits were acceptable.

Organics

Volatile Organic Compounds

Analytical Methods

The samples were prepared following EPA Method 5035 and analyzed following EPA Method 8260B.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and required dilution factors. Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits with the following exception:

- LCS-580-113945/2-A (06/25/12): The recovery for 1,2-Dichloropropane exceeded laboratory control limits. The associated samples (MS-1, MS-2, MS-3, MS-4, MS-5, MS-6, MS-7, MS-8, MS-9, and MS-10) were non-detect for that analyte, and results were not qualified.

Matrix Spike Recovery

The MS recoveries were not reported.

Internal Standard Recovery

The internal standards were within acceptance criteria.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curve was within acceptance criteria. The CCVs were within laboratory control limits. The recoveries for dichlorodifluoromethane and chloroethane exceeded 20 percent in the CCV analyzed on June 25, 2012. Results for those analytes in the associated samples were non-detect and not qualified.

Polycyclic Aromatic Hydrocarbons

Analytical Methods

The PAHs were prepared by EPA Method 3550B and analyzed following EPA Method 8270C with Selected Ion Monitoring (SIM).

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and required dilution factors. Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory control limits with the following exception:

- MS-1 MS/MSD: The recoveries for chrysene and benzo(b)fluoranthene were below the laboratory control limits in the MSD, but were within the control limits in the MS. Associated sample results were not qualified.

Internal Standard Recovery

The IS recoveries were within acceptance criteria with the following exception:

- MS-5: The recovery for 1,4-Dichlorobenzene-d4 was below the acceptance criteria for the analysis on July 17, 2012 at 1133. No PAHs are associated with that IS, and no sample results were qualified.

Initial Calibration Curves and Continuing Calibration Verification Checks

The initial calibration curve was within acceptance criteria. The CCVs were within laboratory and QAPP control limits with the following exception:

- CCV-07/17/12: The recoveries of the target analytes were within laboratory control limits. The recovery for benzo(k)fluoranthene was below the QAPP control limit. The result for benzo(k)fluoranthene in the associated sample, MS-5, was qualified as estimated (J).

Polychlorinated Biphenyls

Analytical Methods

The PCBs were extracted following EPA Method 3550B and analyzed by EPA Method 8082.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and required dilution factors. The reporting limits exceeded the

Practical Quantitation Limit (PQL) as listed in the SAP, but the MDL was below the PQL.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recoveries

Surrogate recoveries were within laboratory control limits with the following exceptions:

- MS-3: The recovery of the surrogates Tetrachloro-m-xylene (TCMX) and Decachlorobiphenyl (DCBP) was below the control limits. Results for PCBs in MS-3 were qualified as estimated (J).

- MS-5: The recovery of the surrogate DCBP was below the laboratory control limits, while the recovery of the surrogate TCMX was within control limits. Because one surrogate was within control, the sample results were not qualified.

- MS-6: The recovery of the surrogate DCBP was below the laboratory control limits, while the recovery of the surrogate TCMX was within control limits. Because one surrogate was within control, the sample results were not qualified.

- MS-7: The recovery of the surrogate DCBP was below the laboratory control limits, while the recovery of the surrogate TCMX was within control limits. Because one surrogate was within control, the sample results were not qualified.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curve was within acceptance criteria. The CCVs were within control limits with the following exceptions:

- Opening CCV-07/02/12 at 0810: The recoveries for Aroclor 1242 failed high on both chromatographic columns. The laboratory qualified associated

samples with "^". The associated samples MS-1, MS-2, MS-3, MS-4, and MS-5 were non-detect for Aroclor 1242, and the qualifier was removed.

- Bracketing CCV-07/07/12 at 1040: The recoveries for Aroclor 1260 failed low on both chromatographic columns. As the combined Aroclor 1016/1260 CCV standard passed the technical criteria for the method, the laboratory reported the samples without qualification. Results for Aroclor 1260 in the associated samples MS-1, MS-2, MS-3, MS-4, MS-5, MS-6, MS-7, MS-8, MS-9, and MS-10 were qualified as estimated (J).

Total Petroleum Hydrocarbons

Analytical Methods

TPH were extracted following EPA Method 3550B. The samples were analyzed for diesel and motor oil range organics by Ecology Method NWTPH-Dx. Silica gel cleanup was not performed on these samples.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Reported detection limits were acceptable.

Blank Contamination

Diesel and motor oil was detected in the MB between the MDL and the RL. The associated samples (MS-1, MS-2, MS-3, MS-4, MS-5, MS-6, MS-7, MS-8, MS-9, and MS-10) with results for those analytes above the MDL were qualified as B by the laboratory. The detections in the associated samples were evaluated and the results were modified as follows:

- If diesel or motor oil was detected above the RL at greater than five times the amount in the method blank, then the results were not qualified, and the B qualifier was removed.

    - MS-1 [diesel, motor oil]
    - MS-4 [motor oil]
    - MS-5 [diesel, motor oil]

- MS-7 [diesel, motor oil]
- MS-8 [diesel, motor oil]
- MS-9 [diesel, motor oil]
- MS-10 [diesel, motor oil]

- If diesel or motor oil was detected between the MDL and the RL, then the result was changed to the RL and the B qualifier was changed to U (non-detect).

  - MS-2 [diesel, motor oil]
  - MS-3 [diesel, motor oil]
  - MS-4 [diesel]
  - MS-6 [diesel]

- If diesel or motor oil was detected above the RL at less than five times the amount in the method blank, then the B qualifier was changed to U (non-detect):

  - MS-6 [motor oil]

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The RPDs were within laboratory control limits.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curve and CCVs were within acceptance criteria.

Sample Qualifiers

Sample MS-1: The laboratory noted that the results in the #2 Diesel (C10-C24) and Motor Oil (>C24-C36) ranges were due primarily to a complex mixture of a gasoline/kerosene range product, heavily weathered/degraded diesel fuel, a

mineral/transformer oil range product, a transformer/hydraulic oil range product, motor oil, and possible biogenic interference.

Samples MS-5, MS-7, MS-8, and MS-9: The laboratory noted that the results in the #2 Diesel (C10-C24) ranges were due primarily to overlap with motor oil.

Sample MS-10: The laboratory noted that the results in the #2 Diesel (C10-C24) and Motor Oil (>C24-C36) ranges were due primarily to a complex mixture of a gasoline/kerosene range product, weathered diesel fuel, motor oil, and the overlapping results of motor oil into the diesel range.

CHEMICAL DATA QUALITY REVIEW FOR SEDIMENT SAMPLES

Thirty-five sediment samples and two field duplicates were collected from the Van Stone Mine site in October 2011 and June 2012. The samples were submitted to TestAmerica – Seattle (TAS) in Tacoma, Washington, for chemical analysis. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table C-1 of the RI report.

The sediment samples were analyzed for one or more of the following:

- Total metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc) by EPA Methods 6010B/6020;
- Total mercury by EPA Method 7471A;
- Total organic carbon (TOC) by EPA Method 9060 Modified; and
- Percent solids and percent moisture by ASTM D2216.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures are performed on an ongoing basis by the laboratory. Hart Crowser performed the data review using laboratory quality control results summary sheets and raw data as required to ensure they met data quality objectives for the project. Data review generally followed the format outlined in the USEPA National Functional Guidelines for Inorganic Superfund Data Review (EPA 2010) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process, where applicable:

- Holding times;
- Method blanks;
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs) and laboratory replicate relative standard deviations (RSDs);
- Post spike recoveries;
- Standard reference material (SRM) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

Laboratory Detection Limits

Sample detections between the Method Detection Limit (MDL) and Reporting Limit (RL) were qualified by the laboratory as estimated (J). The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Sample Receiving Discrepancies

Sample Delivery Group (SDG) 580-29235-1:
Sample BG-9-SD2: The sample was received at the laboratory, but was not listed on the chain of custody (COC). The sample was logged into the laboratory and analyzed for total metals and TOC following discussion with Hart Crowser.

Samples BG-9-SD, BG-15-SD, BG-12-SD, BG-11-SD, OC-1-SD, OC-2-SD, OC-13-SD, OC-13-SD2, and BG-9-SD2: The laboratory analyzed and reported lead by both EPA Method 6010B and EPA Method 6020. The results were comparable (within 35 percent) between the two analyses.

Metals

Total Metals

Analytical Methods

The samples were prepared by EPA Method 3050B and analyzed following either EPA Method 6020 or EPA Method 6010B.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Reported detection limits were acceptable.

Blank Contamination

Cadmium was detected in one method blank between the MDL and the RL. The associated sample, NT-SD-1, had a detection for Cd between the MDL and the RL, and was qualified by the laboratory with B. The result for Cd in NT-SD-1 was raised to the RL and the B qualifier was changed to U.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits with the following exceptions:

- OC-SD-12 MS/MSD: The recovery for zinc exceeded the control limits in the MS, but was within control limits in the MSD. Associated sample results were not qualified.

- OC-7-SD MS/MSD: The recovery for zinc was below the laboratory and QAPP control limits in the MS, and exceeded the control limits in the MSD. The recovery for lead was below the laboratory limits in the MSD, but was within the QAPP control limits. The recovery for lead was within the laboratory and QAPP control limits in the MS. The recovery for cadmium exceeded the laboratory control limits in the MSD, but was within the QAPP control limits. The recovery for cadmium was within the laboratory and QAPP control limits in the MS. The RPD for zinc exceeded the control limits. Because the concentration of zinc in the source sample exceeded the spiking amount, the criteria do not apply, and sample results were not qualified for zinc. Because lead and cadmium recoveries were within QAPP control limits, sample results for lead and cadmium were not qualified due to matrix spike exceedances.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits or were not applicable when sample and duplicate results were less than five times the RL, with the following exceptions:

- OC-12-SD: The RPDs for beryllium, copper, and lead exceeded the laboratory control limits, but were within the QAPP control limits. The results were not qualified.

- OC-7-SD: The RPDs for nickel, copper, and lead exceeded the laboratory control limits. The RPDs for copper and lead exceeded the QAPP control

limits. The results for copper and lead were qualified as estimated (J) in sample OC-7-SD. Because nickel was within the QAPP control limits, the nickel results were not qualified.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL with the following exceptions:

- BG-9-SD/BG-9-SD2: The RPDs for antimony, arsenic, cadmium, copper, lead, nickel, selenium, and zinc exceeded the QAPP control limits. The results for antimony, arsenic, cadmium, copper, selenium, and nickel were less than five times the reporting limit, and were not qualified. The results for lead and zinc in samples BG-9-SD and BG-9-SD2 were qualified as estimated (J) due to sample heterogeneity.

Post Spike Recovery

Post spike recoveries were within control limits with the following exception:

- OC-7-SD: The PS recovery for zinc exceeded the control limits. The result for zinc in OC-7-SD was qualified as estimated (J).

Serial Dilution

Percent differences were within control limits or were not applicable due to low levels of target metals with the following exception:

- OC-7-SD: The percent differences for lead and zinc exceeded the control limits. The results for lead and zinc in OC-7-SD were qualified as estimated (J).

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Total Mercury

Analytical Methods

Mercury was prepared and analyzed following EPA Method 7471A.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits with the following exceptions:

- OC-12-SD MS/MSD: The MSD exceeded laboratory control limits, but were within QAPP control limits. The MS was within laboratory and QAPP control limits. Associated sample results were not qualified.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits, or were not applicable when the sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits, or were not applicable when the sample and duplicate results were less than five times the RL.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curves and CCVs were within acceptance criteria.

Physical/Chemical Parameters

Total Organic Carbon (TOC)

Analytical Methods

Total organic carbon was prepared and analyzed by modified EPA Method 9060.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits and analytical results for TOC were adjusted for moisture content and any required dilution factors. Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries for TOC were within control limits.

Standard Reference Material Recovery

The SRM recoveries for TOC were within control limits.

Matrix Spike Recovery

The MS recoveries for TOC were within control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The laboratory duplicate RPDs were within QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL.

Continuing Calibration Verification Checks (CCVs)

The CCVs for TOC were within acceptance criteria.

Percent Solids and Percent Moisture

Analytical Methods

For samples collected and analyzed in 2011, the laboratory referenced "EPA Moisture" as a method. For samples collected and analyzed in 2012, the laboratory referenced method ASTM D2216. The laboratory was contacted, and confirmed that the methods referenced were comparable.

Sample Holding Times

The samples met QAPP holding time limits with the following exception:

- Sample NT-SD-1: The 14-day holding time criterion from the QAPP was exceeded. ASTM D2216 has no holding time requirements. Other percent solids determination methods have holding times equivalent to the associated analytical test holding time. The sample results were not qualified.

Laboratory Detection Limits

Reported detection limits were acceptable.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

CHEMICAL DATA QUALITY REVIEW FOR SURFACE WATER SAMPLES

Forty surface water samples and three field duplicates were collected from the Van Stone Mine site in October 2011 and June 2012. The samples were submitted to TestAmerica – Seattle (TAS) in Tacoma, Washington, for chemical analysis. Low-level mercury samples were subcontracted to TestAmerica-Portland, in Portland, Oregon. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table C-1 of the RI report.

The surface water samples were analyzed for one or more of the following:

- Dissolved metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc) by EPA Method 6020;
- Dissolved mercury by EPA Method 7470A;
- Dissolved low level mercury by EPA Method 1631E;
- Total low level mercury by EPA Method 1631E;
- Alkalinity by EPA Method 310.1;
- Hardness by EPA Method 130.2;
- Total dissolved solids (TDS) by EPA Method 160.1; and
- Total suspended solids (TSS) by EPA Method 160.2;

Quality assurance/quality control (QA/QC) reviews of laboratory procedures are performed on an ongoing basis by the laboratory. Hart Crowser performed the data review using laboratory quality control results summary sheets and raw data as required to ensure they met data quality objectives for the project. Data review generally followed the format outlined in the USEPA National Functional Guidelines for Inorganic Superfund Data Review (EPA 2010) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process, where applicable:

- Holding times;
- Method blanks;
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs) and laboratory replicate relative standard deviations (RSDs);
- Post spike recoveries;
- Standard reference material (SRM) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

Laboratory Detection Limits

Sample detections between the Method Detection Limit (MDL) and Reporting Limit (RL) were qualified by the laboratory as estimated (J). The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Sample Receiving Discrepancies

Sample Delivery Group (SDG) 580-29235-1:
Samples BG-9-SW, BG-9-SW2, BG-15-SW, BG-12-SW, BG-11-SW, OC-1-SW, OC-2-SW, OC-13-SW, and OC-13-SW2: The samples were analyzed and reported for dissolved barium, but the metal was not requested on the COC.

SDG 580-29310-1:
Samples OC-3-SW, OC-4-SW, OC-5-SW, OC-6-SW, OC-8-SW, OC-9-SW, OC-10-SW, OC-11-SW, OC-12-SW, and OC-14-SW: The samples were analyzed and reported for dissolved barium, but the metal was not requested on the COC.

SDG 580-29344-1:
Samples OC-7-SW, OC-15-SW, OC-16-SW, OC-17-SW, OC-18-SW, and OC-19-SW: The samples were analyzed and reported for dissolved barium, but the metal was not requested on the COC.

SDG 580-29647-1:
Samples WP-SW-1 and NP-SW-1: Sample collection dates and times were not provided on the label of one container for each of these samples. The samples were logged into the laboratory and labeled according to the COC.

SDG 580-29762-1:
Sample UT-SW-1: The sample was field-filtered and submitted to TAS. The sample was subcontracted by TAS to TestAmerica-Portland for low-level mercury analysis. The sample was labeled for dissolved mercury on the associated plastic bag, but TAS did not indicate on the internal laboratory COC that the sample had been field filtered. The TA-Portland laboratory subsequently filtered the sample and noted that this was completed after the two-day holding time. The sample was, therefore, double filtered but sample results were not qualified.

SDG 580-33740-1:
Sample UT-SW-3: The sample was submitted to the laboratory as UT-SW-1. It was determined after the report was received that the sample identification had already been used for a sample collected in October 2011. The sample was renamed to UT-SW-3 and the report was corrected.

Samples UT-SW-2 and UT-SW-3: The samples were filtered and preserved at the laboratory. Sample results were not qualified.

Metals

Dissolved Metals by EPA 6020

Analytical Methods

The samples were filtered and preserved in the field with the exception of samples UT-SW-2 and UT-SW-3, which were filtered at the laboratory. The samples were prepared by EPA Method 3005A and analyzed following EPA Method 6020.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks with the following exceptions:

- MB-580-100266/17-A (11/16/11): Antimony was detected in the MB between the MDL and the RL. The laboratory qualified the results for antimony in the associated samples (WP-SW-1, NP-SW-1, and SP-SW-1) with "B." The concentrations for antimony in the associated samples were below the RL, so the results were changed to the RL, the B qualifier was removed, and the samples were qualified as non-detect (U).

- MB-580-115605/13-A (07/18/12): Beryllium was detected in the MB between the MDL and the RL. The associated samples (UT-SW-2 and UT-SW-3) were non-detect for Be and were not qualified.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

MS recoveries were within laboratory and QAPP control limits with the following exceptions:

- OC-12-SW MS/MSD: The recoveries for antimony were below laboratory and QAPP control limits in the MS and MSD, and the post spike recoveries failed low. The LCS recoveries were within control limits, indicating a matrix effect. The results for antimony were qualified as estimated in associated samples (OC-3-SW, OC-4-SW, OC-5-SW, OC-6-SW, OC-8-SW, OC-9-SW, OC-10-SW, OC-11-SW, OC-12-SW, and OC-14-SW).

- OC-7-SW MS/MSD: The recovery for antimony was below laboratory control limits in the MS and MSD, and was below QAPP control limits in the MS. The sample results were not qualified because antimony results were within QAPP control limits in the MSD, and within control limits in the LCS and PS.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits or were not applicable when sample and duplicate results were less than five times the RL, with the following exception:

- WP-SW-1: The RPD for zinc exceeded the laboratory and QAPP control limits. The results for zinc in WP-SW-1 were qualified as estimated (J).

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits, or were not applicable when sample and duplicate results were less than five times the RL.

Post Spike Recovery

Post spike recoveries were within control limits with the following exception:

- OC-12-SW: The recovery for antimony failed low in the MS and MSD, and the results for antimony in the associated samples were qualified as estimated (J) (OC-3-SW, OC-4-SW, OC-5-SW, OC-6-SW, OC-8-SW, OC-9-SW, OC-10-SW, OC-11-SW, OC-12-SW, and OC-14-SW).

Serial Dilutions

Serial dilution percent differences were within control limits or were not applicable due to low levels of target metals, with the following exception:

- BG-9-SW: The percent difference for barium exceeded the control limits. Barium was not a target analyte, and sample results were not qualified.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Dissolved Mercury by EPA 7470A

Analytical Methods

The samples were filtered and preserved in the laboratory. The samples were prepared and analyzed following EPA Method 7470A for mercury.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reporting limits exceeded screening level criteria for mercury in surface water. The MDL were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

The MS recoveries were not reported.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were not reported.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Dissolved Mercury by EPA 1631E

Analytical Methods

The samples were filtered and preserved in the field. The samples were prepared and analyzed following EPA Method 1631E for low-level mercury.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Sample UT-SW-1: The sample was filtered at the TA-Portland laboratory due to incomplete COC documentation from TAS. Because the filtering was completed after the two-day holding time, the laboratory qualified the sample with "H3." The sample had been field-filtered within holding times, and the laboratory qualifier was removed.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits, or were not applicable when the sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Total Mercury by EPA 1631E

Analytical Methods

The samples were prepared and analyzed following EPA Method 1631E for low-level mercury.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits or were not applicable when sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Physical/Chemical Parameters

Alkalinity

Analytical Methods

Alkalinity was determined by EPA Method 310.1.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits, or were not applicable when sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Total Suspended Solids (TSS)

Analytical Methods

The TSS was determined by EPA Method 160.2.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in the laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits or were not applicable when sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were not applicable because the sample and duplicate were non-detect.

Total Dissolved Solids (TDS)

Analytical Methods

The TDS was determined by EPA Method 160.1.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks, with the following exception:

- MB-10/13/11 (MB580-98595/1): TDS was detected in the method above the RL. The laboratory qualified all associated samples with B (BG-9-SW, BG-15-SW, BG-12-SW, and BG-11-SW). Associated samples BG-9-SW, BG-12-SW, BG-11-SW, and BG-15-SW had detections greater than five times the value detected in the MB, and the B flag was removed.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Hardness

Analytical Methods

Hardness was determined by EPA Method 130.2.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

CHEMICAL DATA QUALITY REVIEW FOR GROUNDWATER SAMPLES

Fourteen groundwater samples and one field duplicate were collected from the Van Stone Mine site in October 2011. The samples were submitted to TestAmerica – Seattle (TAS) in Tacoma, Washington, for chemical analysis. Low-level mercury samples were subcontracted to TestAmerica-Portland, in Portland, Oregon. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table C-1 of the RI report.

The surface water samples were analyzed for one or more of the following:

- Total metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc) by EPA Method 6020;
- Total mercury by EPA Method 7470A;
- Alkalinity by EPA Method 310.1;
- Hardness by EPA Method 130.2;
- Total dissolved solids (TDS) by EPA Method 160.1; and
- Total suspended solids (TSS) by EPA Method 160.2;

Quality assurance/quality control (QA/QC) reviews of laboratory procedures are performed on an ongoing basis by the laboratory. Hart Crowser performed the data review using laboratory quality control results summary sheets and raw data as required to ensure they met data quality objectives for the project. Data review generally followed the format outlined in the USEPA National Functional Guidelines for Inorganic Superfund Data Review (EPA 2010), modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process, where applicable:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs) and laboratory replicate relative standard deviations (RSDs);
- Post spike recoveries;
- Standard reference material (SRM) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

Laboratory Detection Limits

Sample detections between the Method Detection Limit (MDL) and Reporting Limit (RL) were qualified by the laboratory as estimated (J). The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Sample Receiving Discrepancies

Sample Delivery Group (SDG) 580-29762-1:
Sample MW-2: The sampling time on the container label did not match the sampling time on the COC. The laboratory used the time from the COC to log the sample in.

Metals

Total Metals by EPA 6020

Analytical Methods

The samples were prepared by EPA Method 3005A and analyzed following EPA Method 6020.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference Material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits with the following exceptions:

- RW-5 MS/MSD: The recoveries for lead and thallium exceeded the laboratory control limits in the MS and MSD, but were within the QAPP control limits. Sample results were not qualified.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits or were not applicable when sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits or were not applicable when sample and duplicate results were less than five times the RL.

Post Spike Recovery

Post spike recoveries were within control limits.

Serial Dilutions

Serial dilution percent differences were within control limits or were not applicable due to low levels of target metals.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Total Mercury by EPA 7470A

Analytical Methods

The samples were prepared and analyzed following EPA Method 7470A.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

The reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory and QAPP control limits.

Standard Reference material Recovery

The SRM recoveries were within control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory and QAPP control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within laboratory and QAPP control limits or were not applicable when the sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits or were not applicable when the sample and duplicate results were less than five times the RL.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Physical/Chemical Parameters

Alkalinity

Analytical Methods

Alkalinity was determined by EPA Method 310.1.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

The reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Continuing Calibration Verification Checks (CCVs)

The CCVs were within acceptance criteria.

Total Suspended Solids (TSS)

Analytical Methods

The TSS was determined by EPA Method 160.2.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

Reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits or were not applicable when sample and duplicate results were less than five times the RL.

Field Duplicate RPDs

The field duplicate RPDs were not applicable because the sample and duplicate were non-detect.

Total Dissolved Solids (TDS)

Analytical Methods

The TDS was determined by EPA Method 160.1.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

The reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

Hardness

Analytical Methods

Hardness was determined by EPA Method 130.2.

Sample Holding Times

The samples were prepared and analyzed within method holding times.

Laboratory Detection Limits

The reported detection limits were acceptable.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Laboratory Duplicate RPDs

The laboratory duplicate RPDs were within control limits.

Field Duplicate RPDs

The field duplicate RPDs were within QAPP control limits.

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Table C-1 - Sample Analysis Summary

Sample Name	Area of Interest (BG, RW, AOI-1, AOI-2, AOI-3, AOI-4, AOI-5)	Media (Soil, Sediment, Surface Water, Groundwater)	Sample Type (DUP, COMP or DISC)	Field Event (FE1, FE2, FE3)	Sample Date	Sample Time	Sample Location		Laboratory Analysis																Lab SDG No.	Location-Notes
							Latitude	Longitude	XRF	Total Metals	Total Mercury	Dissolved Metals	Dissolved LL Mercury	Total LL Mercury	TOC	TDS	TSS	Hardness	Alkalinity	PCBs	TPH	VOCs	PAHs	Bulk Asbestos		
BG-1-SW	BG	Surface Water	DISC	FE1	10/6/11	9:45	48.781017	-117.791617				X	X	X		X	X	X	X						580-29160-1	
BG-2-SW	BG	Surface Water	DISC	FE1	10/4/11	11:34	48.781083	-117.78335				X	X	X		X	X	X	X						580-29160-1	
BG-3-SW	BG	Surface Water	DISC	FE1	10/6/11	11:28	48.781	-117.762517				X	X	X		X	X	X	X						580-29160-1	
BG-4-SW	BG	Surface Water	DISC	FE1	10/6/11	13:06	48.785167	-117.754983				X	X	X		X	X	X	X						580-29160-1	
BG-4-SW2	BG	Surface Water	DUP	FE1	10/6/11	13:36	48.785167	-117.754983					X	X		X	X								580-29160-1	Sample BG-4-SW2 is a field duplicate of Sample BG-4-SW
BG-5-SW	BG	Surface Water	DISC	FE1	10/5/11	10:50	48.761783	-117.73365				X	X	X		X	X	X	X						580-29160-1	
BG-6-SW	BG	Surface Water	DISC	FE1	10/4/11	14:33	48.75475	-117.742883				X	X	X		X	X	X	X						580-29160-1	
BG-7-SW	BG	Surface Water	DISC	FE1	10/5/11	9:52	48.746917	-117.750017				X	X	X		X	X	X	X						580-29160-1	
BG-8-SW	BG	Surface Water	DISC	FE1	10/3/11	14:43	48.7659	-117.751483				X	X	X		X	X	X	X						580-29160-1	
BG-9-SW	BG	Surface Water	DISC	FE1	10/7/11	14:35	48.74555	-117.792217				X	X	X		X	X	X	X						580-29235-1	
BG-9-SW2	BG	Surface Water	DUP	FE1	10/7/11	15:00	48.74555	-117.792217				X						X	X						580-29235-1	Sample BG-9-SW2 is a field duplicate of Sample BG-9-SW
BG-10-SW	BG	Surface Water	DISC	FE1	10/5/11	13:30	48.755417	-117.77345				X	X	X		X	X	X	X						580-29160-1	
BG-11-SW	BG	Surface Water	DISC	FE1	10/8/11	14:55	48.759267	-117.7446				X	X	X		X	X	X	X						580-29235-1	
BG-13-SW	BG	Surface Water	DISC	FE1	10/5/11	16:25	48.7592	-117.802817				X	X	X		X	X	X	X						580-29160-1	
BG-14-SW	BG	Surface Water	DISC	FE1	10/6/11	15:10	48.764883	-117.801933				X	X	X		X	X	X	X						580-29160-1	
BG-15-SW	BG	Surface Water	DISC	FE1	10/7/11	16:20	48.7483	-117.782067				X	X	X		X	X	X	X						580-29235-1	
SP-SW-1	AOI-1	Surface Water	DISC	FE2	11/3/11	11:21	48.757315	-117.760968				X				X	X	X	X						580-29647-1	
WP-SW-1	AOI-1	Surface Water	DISC	FE2	11/2/11	16:25	48.760062	-117.762045				X				X	X	X	X						580-29647-1	
NP-SW-1	AOI-1	Surface Water	DISC	FE2	11/2/11	17:00	48.760123	-117.762254				X				X	X	X	X						580-29647-1	
UT-SW-1	AOI-2	Surface Water	DISC	FE2	11/9/11	13:45	48.760654	-117.777806				X	X	X		X	X	X	X						580-29762-1	
UT-SW-3	AOI-2	Surface Water	DISC	FE3	6/26/12	15:17	48.76061396	-117.7797883				X													580-33740-1	
UT-SW-2	AOI-2	Surface Water	DISC	FE3	6/26/12	15:27	48.76046635	-117.7795927				X													580-33740-1	
BG-12-SW	AOI-5	Surface Water	DISC	FE1	10/7/11	17:45	48.7659	-117.796683				X	X	X		X	X	X	X						580-29235-1	Sample located on Onion Creek (AOI-5)
OC-1-SW	AOI-5	Surface Water	DISC	FE1	10/9/11	13:28	48.780117	-117.807567				X	X	X		X		X	X						580-29235-1	
OC-2-SW	AOI-5	Surface Water	DISC	FE1	10/9/11	14:15	48.77955	-117.8058				X	X	X		X		X	X						580-29235-1	
OC-3-SW	AOI-5	Surface Water	DISC	FE1	10/12/11	16:40	48.779017	-117.794833				X	X	X		X		X	X						580-29310-1	
OC-4-SW	AOI-5	Surface Water	DISC	FE1	10/13/11	10:00	48.77445	-117.805				X	X	X		X		X	X						580-29310-1	
OC-5-SW	AOI-5	Surface Water	DISC	FE1	10/13/11	12:25	48.767867	-117.80125				X	X	X		X		X	X						580-29310-1	
OC-6-SW	AOI-5	Surface Water	DISC	FE1	10/13/11	11:05	48.766183	-117.7982				X	X	X		X		X	X						580-29310-1	
OC-7-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	9:40	48.761517	-117.781233				X	X	X		X		X	X						580-29344-1	
OC-8-SW	AOI-5	Surface Water	DISC	FE1	10/13/11	15:30	48.762033	-117.778433				X	X	X		X		X	X						580-29310-1	
OC-9-SW	AOI-5	Surface Water	DISC	FE1	10/12/11	15:20	48.76435	-117.76875				X	X	X		X		X	X						580-29310-1	
OC-10-SW	AOI-5	Surface Water	DISC	FE1	10/12/11	9:45	48.7673	-117.7639				X	X	X		X		X	X						580-29310-1	
OC-11-SW	AOI-5	Surface Water	DISC	FE1	10/12/11	12:00	48.7603	-117.762317				X	X	X		X		X	X						580-29310-1	
OC-12-SW	AOI-5	Surface Water	DISC	FE1	10/11/11	14:35	48.767333	-117.755667				X	X	X		X		X	X						580-29310-1	
OC-13-SW	AOI-5	Surface Water	DISC	FE1	10/9/11	11:30	48.7839	-117.813367				X	X	X		X		X	X						580-29235-1	
OC-13-SW2	AOI-5	Surface Water	DUP	FE1	10/9/11	12:00	48.7839	-117.813367				X	X	X				X	X						580-29235-1	Sample OC-13-SW2 is a field duplicate of Sample OC-13-SW
OC-14-SW	AOI-5	Surface Water	DISC	FE1	10/12/11	14:00	48.75855	-117.7612				X	X	X		X		X	X						580-29310-1	
OC-15-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	12:25	48.7654	-117.7694				X	X	X		X		X	X						580-29344-1	
OC-16-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	13:10	48.765767	-117.768633				X	X	X		X		X	X						580-29344-1	
OC-17-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	14:35	48.763417	-117.79135				X	X	X		X		X	X						580-29344-1	
OC-18-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	15:50	48.761767	-117.785167				X	X	X		X		X	X						580-29344-1	
OC-19-SW	AOI-5	Surface Water	DISC	FE1	10/14/11	16:45	48.777583	-117.777583				X	X	X		X		X	X						580-29344-1	
BG-1-SD	BG	Sediment	DISC	FE1	10/6/11	10:17	48.781017	-117.791617		X	X				X										580-29160-1	
BG-2-SD	BG	Sediment	DISC	FE1	10/4/11	11:59	48.781083	-117.78335		X	X				X										580-29160-1	
BG-3-SD	BG	Sediment	DISC	FE1	10/6/11	11:55	48.781	-117.762517		X	X				X										580-29160-1	
BG-4-SD	BG	Sediment	DISC	FE1	10/6/11	13:35	48.785167	-117.754983		X	X				X										580-29160-1	
BG-5-SD	BG	Sediment	DISC	FE1	10/5/11	11:16	48.761783	-117.73365		X	X				X										580-29160-1	
BG-6-SD	BG	Sediment	DISC	FE1	10/4/11	15:04	48.75475	-117.742883		X	X				X										580-29160-1	
BG-7-SD	BG	Sediment	DISC	FE1	10/4/11	16:33	48.746917	-117.750017		X	X				X										580-29160-1	
BG-8-SD	BG	Sediment	DISC	FE1	10/3/11	15:15	48.7659	-117.751483		X	X				X										580-29160-1	
BG-9-SD	BG	Sediment	DISC	FE1	10/7/11	15:18	48.74555	-117.792217		X	X				X										580-29235-1	
BG-9-SD2	BG	Sediment	DUP	FE1	10/7/11	15:48	48.74555	-117.792217		X	X				X										580-29235-1	Sample BG-9-SD2 is a field duplicate of Sample BG-9-SD
BG-10-SD	BG	Sediment	DISC	FE1	10/5/11	13:56	48.755417	-117.77345		X	X				X										580-29160-1	
BG-11-SD	BG	Sediment	DISC	FE1	10/8/11	15:23	48.759267	-117.7446		X	X				X										580-29235-1	
BG-13-SD	BG	Sediment	DISC	FE1	10/5/11	16:45	48.7592	-117.802817		X	X				X										580-29160-1	
BG-14-SD	BG	Sediment	DISC	FE1	10/6/11	15:29	48.764883	-117.801933		X	X				X										580-29160-1	
BG-15-SD	BG	Sediment	DISC	FE1	10/7/11	16:46	48.7483	-117.782067		X	X				X										580-29235-1	
BG-12-SD	AOI-5	Sediment	DISC	FE1	10/7/11	17:57	48.7659	-117.796683		X	X				X										580-29235-1	Sample located on Onion Creek (AOI-5)
OC-1-SD	AOI-5	Sediment	DISC	FE1	10/9/11	13:35	48.780117	-117.807567		X	X				X										580-29235-1	

Table C-1 - Sample Analysis Summary

Sample Name	Area of Interest (BG, RW, AOI-1, AOI-2, AOI-3, AOI-4, AOI-5)	Media (Soil, Sediment, Surface Water, Groundwater)	Sample Type (DUP, COMP or DISC)	Field Event (FE1, FE2, FE3)	Sample Date	Sample Time	Sample Location		Laboratory Analysis																Lab SDG No.	Location-Notes
							Latitude	Longitude	XRF	Total Metals	Total Mercury	Dissolved Metals	Dissolved LL Mercury	Total LL Mercury	TOC	TDS	TSS	Hardness	Alkalinity	PCBs	TPH	VOCs	PAHs	Bulk Asbestos		
OC-2-SD	AOI-5	Sediment	DISC	FE1	10/9/11	14:20	48.77955	-117.8058		X	X				X										580-29235-1	
OC-3-SD	AOI-5	Sediment	DISC	FE1	10/12/11	16:45	48.779017	-117.794833		X	X				X										580-29310-1	
OC-4-SD	AOI-5	Sediment	DISC	FE1	10/13/11	10:05	48.77445	-117.805		X	X				X										580-29310-1	
OC-5-SD	AOI-5	Sediment	DISC	FE1	10/13/11	12:35	48.767867	-117.80125		X	X				X										580-29310-1	
OC-6-SD	AOI-5	Sediment	DISC	FE1	10/13/11	11:20	48.766183	-117.7982		X	X				X										580-29310-1	
OC-7-SD	AOI-5	Sediment	DISC	FE1	10/14/11	9:45	48.761517	-117.781233		X	X				X										580-29344-1	
OC-8-SD	AOI-5	Sediment	DISC	FE1	10/13/11	15:40	48.762033	-117.778433		X	X				X										580-29310-1	
OC-9-SD	AOI-5	Sediment	DISC	FE1	10/12/11	15:30	48.76435	-117.76875		X	X				X										580-29310-1	
OC-10-SD	AOI-5	Sediment	DISC	FE1	10/12/11	9:51	48.7673	-117.7639		X	X				X										580-29310-1	
OC-11-SD	AOI-5	Sediment	DISC	FE1	10/12/11	12:12	48.7603	-117.762317		X	X				X										580-29310-1	
OC-12-SD	AOI-5	Sediment	DISC	FE1	10/11/11	15:00	48.767333	-117.755667		X	X				X										580-29310-1	
OC-13-SD	AOI-5	Sediment	DISC	FE1	10/9/11	12:05	48.7839	-117.813367		X	X				X										580-29235-1	
OC-13-SD2	AOI-5	Sediment	DUP	FE1	10/9/11	12:35	48.7839	-117.813367		X	X				X										580-29235-1	Sample OC-13-SD2 is a field duplicate of Sample OC-13-SD
OC-14-SD	AOI-5	Sediment	DISC	FE1	10/12/11	14:10	48.75855	-117.7612		X	X				X										580-29310-1	
OC-15-SD	AOI-5	Sediment	DISC	FE1	10/14/11	12:35	48.7654	-117.7694		X	X				X										580-29344-1	
OC-16-SD	AOI-5	Sediment	DISC	FE1	10/14/11	13:20	48.765767	-117.768633		X	X				X										580-29344-1	
OC-17-SD	AOI-5	Sediment	DISC	FE1	10/14/11	14:45	48.763417	-117.79135		X	X				X										580-29344-1	
OC-18-SD	AOI-5	Sediment	DISC	FE1	10/14/11	16:00	48.761767	-117.785167		X	X				X										580-29344-1	
OC-19-SD	AOI-5	Sediment	DISC	FE1	10/14/11	16:55	48.777583	-117.777583		X	X				X										580-29344-1	
NT-SD-1	AOI-5	Sediment	DISC	FE3	6/22/12	14:38	48.77931226	-117.79963		X	X				X										580-33659-1	
MW-4	AOI-2	Groundwater	DISC	FE2	11/11/11	8:45	48.762427	-117.776082		X	X					X	X	X	X						580-29791-1	
MW-5	AOI-2	Groundwater	DISC	FE2	11/11/11	10:40	48.761007	-117.777492		X	X					X	X	X	X						580-29791-1	
DH-2	AOI-3	Groundwater	DISC	FE2	11/8/11	13:50	48.777547	-117.802507		X	X					X	X	X	X						580-29731-1	
MW-2	AOI-3	Groundwater	DISC	FE2	11/9/11	12:55	48.775271	-117.802482		X	X					X	X	X	X						580-29762-1	
MW-3	AOI-3	Groundwater	DISC	FE2	11/10/11	12:58	48.777115	-117.796329		X	X					X	X	X	X						580-29791-1	
W-1	AOI-3	Groundwater	DISC	FE2	11/10/11	15:09	48.778518	-117.80165		X	X					X	X	X	X						580-29791-1	
W-2	AOI-3	Groundwater	DISC	FE2	11/9/11	14:40	48.774149	-117.801535		X	X					X	X	X	X						580-29762-1	
RW-1	RW	Groundwater	DISC	FE2	11/5/11	16:00	NA	NA		X	X					X	X	X	X						580-29734-1	
RW-2	RW	Groundwater	DISC	FE2	11/6/11	13:05	NA	NA		X	X					X	X	X	X						580-29733-1	
RW-3	RW	Groundwater	DISC	FE2	11/6/11	15:50	NA	NA		X	X					X	X	X	X						580-29732-1	
RW-4	RW	Groundwater	DISC	FE2	11/9/11	16:12	NA	NA		X	X					X	X	X	X						580-29763-1	
RW-5	RW	Groundwater	DISC	FE2	11/10/11	10:25	NA	NA		X	X					X	X	X	X						580-29794-1	
RW-50	RW	Groundwater	DUP	FE2	11/10/11	10:55	NA	NA		X	X					X	X	X	X						580-29794-1	Sample RW-50 is a field duplicate of Sample RW-5
RW-6	RW	Groundwater	DISC	FE2	11/11/11	15:21	NA	NA		X	X					X	X	X	X						580-29793-1	
RW-7	RW	Groundwater	DISC	FE2	11/11/11	17:05	NA	NA		X	X					X	X	X	X						580-29790-1	
BG-1-SS	BG	Soil	COMP	FE1	10/6/11	10:15	48.781017	-117.791617	X	X	X														580-29160-1	5-point composite sample.
BG-2-SS	BG	Soil	COMP	FE1	10/4/11	12:17	48.781083	-117.78335	X	X	X														580-29160-1	5-point composite sample.
BG-3-SS	BG	Soil	COMP	FE1	10/6/11	11:54	48.781	-117.762517	X	X	X														580-29160-1	5-point composite sample.
BG-4-SS	BG	Soil	COMP	FE1	10/6/11	14:03	48.761783	-117.754983	X	X	X														580-29160-1	5-point composite sample.
BG-5-SS	BG	Soil	COMP	FE1	10/5/11	11:32	48.761783	-117.73365	X	X	X														580-29160-1	5-point composite sample.
BG-6-SS	BG	Soil	COMP	FE1	10/4/11	15:19	48.75475	-117.742883	X	X	X														580-29160-1	5-point composite sample.
BG-7-SS	BG	Soil	COMP	FE1	10/4/11	16:37	48.746917	-117.750017	X	X	X														580-29160-1	5-point composite sample.
BG-8-SS	BG	Soil	COMP	FE1	10/3/11	15:40	48.7659	-117.751483	X	X	X														580-29160-1	5-point composite sample.
BG-9-SS	BG	Soil	COMP	FE1	10/7/11	15:16	48.74555	-117.792217		X	X														580-29235-1	5-point composite sample.
BG-9-SS2	BG	Soil	DUP	FE1	10/7/11	15:46	48.74555	-117.792217		X	X														580-29235-1	Sample BG-9-SS2 is a field duplicate of Sample BG-9-SS
BG-10-SS	BG	Soil	COMP	FE1	10/5/11	14:15	48.755417	-117.77345	X	X	X														580-29160-1	5-point composite sample.
BG-11-SS	BG	Soil	COMP	FE1	10/8/11	15:22	48.759267	-117.7446		X	X														580-29235-1	5-point composite sample.
BG-13-SS	BG	Soil	COMP	FE1	10/5/11	16:43	48.7592	-117.802817	X	X	X														580-29160-1	5-point composite sample.
BG-14-SS	BG	Soil	COMP	FE1	10/6/11	15:30	48.764883	-117.801933	X	X	X														580-29160-1	5-point composite sample.
BG-15-SS	BG	Soil	COMP	FE1	10/7/11	16:49	48.7483	-117.782067		X	X														580-29235-1	5-point composite sample.
NP-1-SS	AOI-1	Soil	DISC	FE1	10/14/11	13:00	48.762733	-117.761567	X	X															580-29442-1	
NP-3-SS	AOI-1	Soil	DISC	FE1	10/14/11	13:45	48.765817	-117.76035	X	X															580-29442-1	
T11-SS-300	AOI-1	Soil	DISC	FE2	11/2/11	13:20	48.7605655643556	-117.763629574298	X	X	X														580-29735-1	
T11-SS-900	AOI-1	Soil	DISC	FE2	11/2/11	12:53	48.7613775295139	-117.76594159464	X	X	X														580-29735-1	
T11-SS-1200	AOI-1	Soil	DISC	FE2	11/2/11	12:35	48.7618800939518	-117.766966783926	X	X	X														580-29735-1	
T12-SS-150	AOI-1	Soil	DISC	FE2	11/8/11	15:00	48.7622976164093	-117.764409443809	X	X	X														580-29764-1	
T12-SS-450	AOI-1	Soil	DISC	FE2	11/8/11	14:38	48.7626748150257	-117.765536174598	X	X	X														580-29764-1	
T12-SS-750	AOI-1	Soil	DISC	FE2	11/2/11	16:00	48.7647669728679	-117.769955680203	X	X	X														580-29764-1	
T13-SS-150	AOI-1	Soil	DISC	FE2	10/31/11	16:19	48.76433618	-117.7631353	X	X	X														580-29735-1	
T13-SS-300	AOI-1	Soil	DISC	FE2	10/31/11	16:12	48.764476413943	-117.763712346465	X	X	X														580-29735-1	

Table C-1 - Sample Analysis Summary

Sample Name	Area of Interest (BG, RW, AOI-1, AOI-2, AOI-3, AOI-4, AOI-5)	Media (Soil, Sediment, Surface Water, Groundwater)	Sample Type (DUP, COMP or DISC)	Field Event (FE1, FE2, FE3)	Sample Date	Sample Time	Sample Location		Laboratory Analysis																Lab SDG No.	Location-Notes
							Latitude	Longitude	XRF	Total Metals	Total Mercury	Dissolved Metals	Dissolved LL Mercury	Total LL Mercury	TOC	TDS	TSS	Hardness	Alkalinity	PCBs	TPH	VOCs	PAHs	Bulk Asbestos		
T13-SS-500	AOI-1	Soil	DISC	FE2	10/31/11	14:09	48.7646910560141	-117.76450740966	X	X	X														580-29735-1	
T14-SS-300	AOI-1	Soil	DISC	FE2	11/7/11	14:40	48.7661127794363	-117.761809382209	X	X	X														580-29735-1	
T14-SS-500	AOI-1	Soil	DISC	FE2	11/7/11	12:40	48.7663521464387	-117.762446236302	X	X	X														580-29735-1	
T14-SS-750	AOI-1	Soil	DISC	FE2	11/7/11	13:00	48.7667731167058	-117.763223351684	X	X	X														580-29735-1	
T15-SS-200	AOI-1	Soil	DISC	FE2	11/1/11	14:58	48.759995	-117.757368	X	X	X														580-29735-1	
T15-SS-750	AOI-1	Soil	DISC	FE2	11/1/11	13:21	48.7594018932475	-117.755067172561	X	X	X														580-29735-1	
T15-SS-1000	AOI-1	Soil	DISC	FE2	11/1/11	12:43	48.759041387878	-117.754145910632	X	X	X														580-29735-1	
T15-SS-1020	AOI-1	Soil	DUP	FE2	11/1/11	13:00	48.759041387878	-117.754145910632		X	X														580-29764-1	Sample T15-SS-1020 is a field duplicate of sample T15-SS-1000
MS-1-COMP	AOI-1	Soil	COMP	FE2	11/4/11	9:44	48.76216336	-117.7612629	X	X	X													X	580-29929-1 580-29929-2	Composite sample represents mine site and is comprised of 30 sub-samples.
MS-2-COMP	AOI-1	Soil	COMP	FE2	11/11/11	9:14	48.76505838	-117.7598871	X	X	X													X	580-29929-1 580-29929-2	Composite sample represents mine site and is comprised of 30 sub-samples.
MS-3-COMP	AOI-1	Soil	COMP	FE2	11/10/11	11:40	48.76297804	-117.7574263	X	X	X													X	580-29929-1 580-29929-2	Composite sample represents mine site and is comprised of 30 sub-samples.
MS-4-COMP	AOI-1	Soil	COMP	FE2	6/26/12	10:47	48.75879752	-117.7610151		X	X													X	580-33680-1	Composite sample represents mine site and is comprised of 30 sub-samples.
SWR-COMP	AOI-1	Soil	COMP	FE2	11/5/11	14:05	48.755883	-117.758564	X	X	X													X	580-29929-1 580-29929-2	Composite sample represents a south waste rock area and is comprised of 30 sub-samples.
SWR-1-COMP	AOI-1	Soil	COMP	FE2	6/20/12	14:34	48.75897938	-117.7632366		X	X														580-33742-1	Composite sample represents a south waste rock area and is comprised of 30 sub-samples.
SWR-2-COMP	AOI-1	Soil	COMP	FE2	6/20/12	16:51	48.75808066	-117.7645072		X	X														580-33742-1	Composite sample represents a south waste rock area and is comprised of 30 sub-samples.
SWR-3-COMP	AOI-1	Soil	COMP	FE2	6/19/12	14:43	48.75701416	-117.7615766		X	X														580-33742-1	Composite sample represents a south waste rock area and is comprised of 30 sub-samples.
SWR-4-COMP	AOI-1	Soil	COMP	FE2	6/26/12	9:33	48.7575493	-117.7574284		X	X													X	580-33680-1	Composite sample represents a south waste rock area and is comprised of 30 sub-samples.
MS-1	AOI-1	Soil	DISC	FE2	6/20/12	12:15	48.76308571	-117.7615678		X	X									X	X	X	X		580-33588-1	
MS-2	AOI-1	Soil	DISC	FE2	6/20/12	12:25	48.76324571	-117.7614799		X	X									X	X	X	X		580-33588-1	
MS-3	AOI-1	Soil	DISC	FE2	6/20/12	13:00	48.76403392	-117.7613203		X	X									X	X	X	X		580-33588-1	
MS-4	AOI-1	Soil	DISC	FE2	6/20/12	13:15	48.76427756	-117.7603882		X	X									X	X	X	X		580-33588-1	
MS-5	AOI-1	Soil	DISC	FE2	6/20/12	13:30	48.76472916	-117.7608528		X	X									X	X	X	X		580-33588-1	
MS-6	AOI-1	Soil	DISC	FE2	6/20/12	13:40	48.76601954	-117.7601117		X	X									X	X	X	X		580-33588-1	
MS-7	AOI-1	Soil	DISC	FE2	6/20/12	13:56	48.76576532	-117.7602424		X	X									X	X	X	X		580-33588-1	
MS-8	AOI-1	Soil	DISC	FE2	6/20/12	14:24	48.76576259	-117.7599818		X	X									X	X	X	X		580-33588-1	
MS-9	AOI-1	Soil	DISC	FE2	6/20/12	14:51	48.76577627	-117.7596263		X	X									X	X	X	X		580-33588-1	
MS-10	AOI-1	Soil	DISC	FE2	6/20/12	15:26	48.76567351	-117.7578101		X	X									X	X	X	X		580-33588-1	
MS-11	AOI-1	Soil	DISC	FE2	6/21/12	13:18	48.76134065	-117.7646967		X	X														580-33634-1	
MS-12	AOI-1	Soil	DISC	FE2	6/21/12	13:41	48.7618719	-117.7642278		X	X														580-33634-1	
MS-13	AOI-1	Soil	DISC	FE2	6/21/12	14:00	48.76324936	-117.764165		X	X														580-33634-1	
MS-14	AOI-1	Soil	DISC	FE2	6/21/12	14:09	48.76381981	-117.7639126		X	X														580-33634-1	
MS-15	AOI-1	Soil	DISC	FE2	6/21/12	14:30	48.76615128	-117.7626322		X	X														580-33634-1	
MS-16	AOI-1	Soil	DISC	FE2	6/21/12	15:13	48.76643284	-117.7611981		X	X														580-33634-1	
MS-17	AOI-1	Soil	DISC	FE3	6/20/12	15:54	48.7672376	-117.7589833		X	X														580-33591-1	
MS-18	AOI-1	Soil	DISC	FE3	6/20/12	16:19	48.76653859	-117.7563548		X	X														580-33591-1	
T16-SS-0	AOI-1	Soil	DISC	FE3	6/21/12	11:36	48.76405816	-117.7543566		X	X														580-33635-1	
T16-SS-315	AOI-1	Soil	DISC	FE3	6/21/12	12:01	48.76484276	-117.7537981		X	X														580-33635-1	
T16-SS-770	AOI-1	Soil	DISC	FE3	6/21/12	12:15	48.76587305	-117.7531209		X	X														580-33635-1	
T17-SS-0	AOI-1	Soil	DISC	FE3	6/21/12	14:37	48.75669956	-117.7657905		X	X														580-33635-1	
T17-SS-500	AOI-1	Soil	DISC	FE3	6/21/12	14:22	48.75746289	-117.7675937		X	X														580-33635-1	
T18-SS-0	AOI-1	Soil	DISC	FE3	6/21/12	15:00	48.75926243	-117.7645032		X	X														580-33635-1	
T18-SS-350	AOI-1	Soil	DISC	FE3	6/21/12	15:13	48.75997261	-117.7655458		X	X														580-33635-1	
UT-2-SS	AOI-2	Soil	DISC	FE1	10/14/11	10:55	48.761333	-117.776867	X	X															580-29442-1	
UT-3-SS	AOI-2	Soil	DISC	FE1	10/14/11	11:25	48.762517	-117.774683	X	X															580-29442-1	
T6-SS-100	AOI-2	Soil	DISC	FE2	11/6/11	13:10	48.7603001527118	-117.77772152287	X	X	X														580-29764-1	
T6-SS-300	AOI-2	Soil	DISC	FE2	11/6/11	12:46	48.7602978414307	-117.778608517659	X	X	X														580-29764-1	
T6-SS-500	AOI-2	Soil	DISC	FE2	11/6/11	11:16	48.7601418724566	-117.779473363465	X	X	X														580-29764-1	
T7-SS-100	AOI-2	Soil	DISC	FE2	11/7/11	13:22	48.7623272152144	-117.776430470871	X	X	X														580-29735-1	
T7-SS-300	AOI-2	Soil	DISC	FE2	11/7/11	13:32	48.7624624411494	-117.777262330016	X	X	X														580-29735-1	
T7-SS-500	AOI-2	Soil	DISC	FE2	11/7/11	11:14	48.7622998143243	-117.778110997706	X	X	X														580-29735-1	
T8-SS-100	AOI-2	Soil	DISC	FE2	11/5/11	14:45	48.763746791091	-117.774067279172	X	X	X														580-29735-1	
T8-SS-300	AOI-2	Soil	DISC	FE2	11/5/11	14:26	48.764253729725	-117.774354492491	X	X	X														580-29735-1	

Table C-1 - Sample Analysis Summary

Sample Name	Area of Interest (BG, RW, AOI-1, AOI-2, AOI-3, AOI-4, AOI-5)	Media (Soil, Sediment, Surface Water, Groundwater)	Sample Type (DUP, COMP or DISC)	Field Event (FE1, FE2, FE3)	Sample Date	Sample Time	Sample Location		Laboratory Analysis																Lab SDG No.	Location-Notes
							Latitude	Longitude	XRF	Total Metals	Total Mercury	Dissolved Metals	Dissolved LL Mercury	Total LL Mercury	TOC	TDS	TSS	Hardness	Alkalinity	PCBs	TPH	VOCs	PAHs	Bulk Asbestos		
T8-SS-500	AOI-2	Soil	DISC	FE2	11/5/11	12:55	48.764766369401	-117.774706111661	X	X	X														580-29735-1	
T9-SS-100	AOI-2	Soil	DISC	FE2	11/5/11	17:07	48.7622705804131	-117.774199567092	X	X	X														580-29735-1	
T9-SS-300	AOI-2	Soil	DISC	FE2	11/5/11	16:55	48.7619995777788	-117.773478267392	X	X	X														580-29735-1	
T9-SS-500	AOI-2	Soil	DISC	FE2	11/5/11	16:18	48.761740688357	-117.772766189181	X	X	X														580-29735-1	
T10-SS-150	AOI-2	Soil	DISC	FE2	11/6/11	16:24	48.7608497018412	-117.775225514523	X	X	X														580-29735-1	
T10-SS-500	AOI-2	Soil	DISC	FE2	11/6/11	15:02	48.7604021417578	-117.773938459131	X	X	X														580-29735-1	
T10-SS-750	AOI-2	Soil	DISC	FE2	11/6/11	15:20	48.76005843912	-117.773044695888	X	X	X														580-29735-1	
UT-1	AOI-2	Soil	DISC	FE2	6/24/12	11:32	48.75959893	-117.7770486		X	X														580-33656-1	
UT-2	AOI-2	Soil	DISC	FE2	6/24/12	11:49	48.75973278	-117.7767171		X	X														580-33656-1	
UT-20	AOI-2	Soil	DUP	FE2	6/24/12	12:00	48.75973278	-117.7767171		X	X														580-33656-1	Sample UT-20 is a field duplicate of sample UT-2
UT-3	AOI-2	Soil	DISC	FE2	6/24/12	12:05	48.75980435	-117.776031		X	X														580-33656-1	
UT-4	AOI-2	Soil	DISC	FE2	6/24/12	13:53	48.76388845	-117.7721312		X	X														580-33656-1	
UT-5	AOI-2	Soil	DISC	FE2	6/24/12	14:05	48.76375341	-117.7727573		X	X														580-33656-1	
UT-6	AOI-2	Soil	DISC	FE2	6/24/12	14:20	48.76361185	-117.77335		X	X														580-33656-1	
UT-7	AOI-2	Soil	DISC	FE2	6/26/12	14:30	48.76077959	-117.7779331		X	X														580-33742-1	
UT-9	AOI-2	Soil	DISC	FE2	6/26/12	14:50	48.76061721	-117.7788025		X	X														580-33742-1	
UT-10	AOI-2	Soil	DISC	FE2	6/26/12	15:04	48.76043093	-117.779454		X	X														580-33742-1	
UT-11	AOI-2	Soil	DISC	FE2	6/26/12	15:11	48.76046635	-117.7795927		X	X														580-33742-1	
UT-12	AOI-2	Soil	DISC	FE2	6/27/12	10:01	48.76138464	-117.7776694		X	X														580-33742-1	
UT-13	AOI-2	Soil	DISC	FE2	6/27/12	10:18	48.76145103	-117.777854		X	X														580-33742-1	
UT-14	AOI-2	Soil	DISC	FE2	6/27/12	10:29	48.76166411	-117.7777221		X	X														580-33742-1	
UT-15	AOI-2	Soil	DISC	FE2	6/27/12	10:50	48.7619216	-117.7784776		X	X														580-33742-1	
UT-16	AOI-2	Soil	DISC	FE2	6/27/12	11:07	48.76220946	-117.7779736		X	X														580-33742-1	
UT-160	AOI-2	Soil	DUP	FE2	6/27/12	12:02	48.76220946	-117.7779736		X	X														580-33742-1	Sample UT-160 is a field duplicate of sample UT-16
UT-17	AOI-2	Soil	DISC	FE2	6/27/12	11:27	48.76227275	-117.7765061		X	X														580-33742-1	
LT-DP-1	AOI-3	Soil	DISC	FE2	11/8/11	16:11	48.7782014248102	-117.802847344423	X	X	X														580-29929-1	
LT-OC ROAD-CULVERT	AOI-3	Soil	DISC	FE2	11/9/11	17:00	48.778037	-117.805617	X	X	X														580-29929-1	
LT-1-SS	AOI-3	Soil	DISC	FE1	10/14/11	14:02	48.7768344503	-117.799923402525	X	X															580-29442-1	
LT-2-SS	AOI-3	Soil	DISC	FE1	10/14/11	14:15	48.7780170001195	-117.800849999442	X	X															580-29442-1	
T1-SS-100	AOI-3	Soil	DISC	FE2	11/4/11	15:57	48.7773237630397	-117.796269122945	X	X	X														580-29735-1	
T1-SS-300	AOI-3	Soil	DISC	FE2	11/4/11	15:47	48.7769702308385	-117.795658967306	X	X	X														580-29735-1	
T1-SS-500	AOI-3	Soil	DISC	FE2	11/4/11	15:10	48.776598365399	-117.795012241953	X	X	X														580-29735-1	
T2-SS-100	AOI-3	Soil	DISC	FE2	11/4/11	14:28	48.7762004401409	-117.797863458291	X	X	X														580-29735-1	
T2-SS-300	AOI-3	Soil	DISC	FE2	11/4/11	14:15	48.7758138228398	-117.797296535149	X	X	X														580-29735-1	
T2-SS-500	AOI-3	Soil	DISC	FE2	11/4/11	13:24	48.7753832732187	-117.796765223711	X	X	X														580-29735-1	
T3-SS-100	AOI-3	Soil	DISC	FE2	11/3/11	14:48	48.7754149581248	-117.802027424797	X	X	X														580-29764-1	
T3-SS-300	AOI-3	Soil	DISC	FE2	11/3/11	14:34	48.7748630712105	-117.801968592123	X	X	X														580-29764-1	
T3-SS-320	AOI-3	Soil	DUP	FE2	11/3/11	15:00	48.7748630712105	-117.801968592123		X	X														580-29764-1	Sample T3-SS-320 is a field duplicate of sample T3-SS-300
T3-SS-500	AOI-3	Soil	DISC	FE2	11/3/11	13:45	48.7743237398181	-117.801861765157	X	X	X														580-29764-1	
T4-SS-100	AOI-3	Soil	DISC	FE2	11/3/11	17:12	48.7771888780128	-117.803179277417	X	X	X														580-29735-1	
T4-SS-120	AOI-3	Soil	DUP	FE2	11/3/11	17:30	48.7771888780128	-117.803179277417		X	X														580-29764-1	Sample T4-SS-120 is a field duplicate of sample T4-SS-120
T4-SS-300	AOI-3	Soil	DISC	FE2	11/3/11	16:57	48.7772551507015	-117.804009150724	X	X	X														580-29735-1	
T4-SS-500	AOI-3	Soil	DISC	FE2	11/3/11	15:50	48.7772330510843	-117.804821848718	X	X	X														580-29735-1	
T5-SS-100	AOI-3	Soil	DISC	FE2	11/4/11	11:55	48.7787462027768	-117.801936244963	X	X	X														580-29735-1	
T5-SS-300	AOI-3	Soil	DISC	FE2	11/4/11	11:34	48.7791876187197	-117.802460452459	X	X	X														580-29735-1	
T5-SS-500	AOI-3	Soil	DISC	FE2	11/4/11	11:00	48.7796387787761	-117.802957048704	X	X	X														580-29735-1	
LT-1	AOI-3	Soil	DISC	FE2	6/23/12	12:55	48.77878976	-117.7954093		X	X														580-33656-1	
LT-2	AOI-3	Soil	DISC	FE2	6/23/12	13:05	48.77912872	-117.7956033		X	X														580-33656-1	
LT-3	AOI-3	Soil	DISC	FE2	6/23/12	13:28	48.77891388	-117.7966106		X	X														580-33656-1	
LT-4	AOI-3	Soil	DISC	FE2	6/23/12	13:38	48.77898688	-117.7966631		X	X														580-33656-1	
LT-5	AOI-3	Soil	DISC	FE2	6/23/12	13:40	48.77916409	-117.7963549		X	X														580-33656-1	
LT-6	AOI-3	Soil	DISC	FE2	6/23/12	14:07	48.77929906	-117.7981191		X	X														580-33656-1	
LT-7	AOI-3	Soil	DISC	FE2	6/23/12	14:17	48.77920978	-117.7980536		X	X														580-33656-1	
LT-8	AOI-3	Soil	DISC	FE2	6/23/12	14:27	48.77908043	-117.798023		X	X														580-33656-1	
LT-9	AOI-3	Soil	DISC	FE2	6/23/12	14:47	48.77916255	-117.7985283		X	X														580-33656-1	
LT-90	AOI-3	Soil	DUP	FE2	6/23/12	15:00	48.77916255	-117.7985283		X	X														580-33656-1	Sample LT-90 is a field duplicate of sample LT-9
LT-10	AOI-3	Soil	DISC	FE2	6/23/12	15:20	48.77919493	-117.7990457		X	X														580-33656-1	
LT-11	AOI-3	Soil	DISC	FE3	6/23/12	16:47	48.77881198	-117.8015761		X	X														580-33741-1	
LT-12	AOI-3	Soil	DISC	FE3	6/26/12	10:16	48.77880522	-117.8012663		X	X														580-33741-1	
LT-13	AOI-3	Soil	DISC	FE3	6/26/12	10:31	48.77904228	-117.8010847		X	X														580-33741-1	

Table C-1 - Sample Analysis Summary

Sample Name	Area of Interest (BG, RW, AOI-1, AOI-2, AOI-3, AOI-4, AOI-5)	Media (Soil, Sediment, Surface Water, Groundwater)	Sample Type (DUP, COMP or DISC)	Field Event (FE1, FE2, FE3)	Sample Date	Sample Time	Sample Location		Laboratory Analysis																Lab SDG No.	Location-Notes
							Latitude	Longitude	XRF	Total Metals	Total Mercury	Dissolved Metals	Dissolved LL Mercury	Total LL Mercury	TOC	TDS	TSS	Hardness	Alkalinity	PCBs	TPH	VOCs	PAHs	Bulk Asbestos		
LT-14	AOI-3	Soil	DISC	FE3	6/26/12	10:43	48.77899241	-117.801507		X	X														580-33741-1	
LT-15	AOI-3	Soil	DISC	FE3	6/26/12	10:54	48.77890305	-117.8017636		X	X														580-33741-1	
LT-16	AOI-3	Soil	DISC	FE3	6/21/12	15:53	48.77617789	-117.8033607		X	X														580-33635-1	
LT-17	AOI-3	Soil	DISC	FE3	6/21/12	16:01	48.7757017	-117.8045634		X	X														580-33635-1	
LT-18	AOI-3	Soil	DISC	FE3	6/21/12	16:19	48.77429146	-117.7988708		X	X														580-33635-1	
LT-180	AOI-3	Soil	DUP	FE3	6/21/12	16:30	48.77429146	-117.7988708		X	X														580-33635-1	Sample LT-180 is a field duplicate of sample LT-18
LT-19	AOI-3	Soil	DISC	FE3	6/21/12	16:29	48.77436413	-117.8004563		X	X														580-33635-1	
LT-190	AOI-3	Soil	DUP	FE3	6/21/12	16:35	48.77436413	-117.8004563		X	X														580-33635-1	Sample LT-190 is a field duplicate of sample LT-19
LT-20	AOI-3	Soil	DISC	FE3	6/22/12	12:45	48.77832164	-117.7952196		X	X														580-33656-1	
LT-21	AOI-3	Soil	DISC	FE3	6/22/12	13:01	48.77855834	-117.7931689		X	X														580-33656-1	
LT-22	AOI-3	Soil	DISC	FE3	6/22/12	13:33	48.77799759	-117.8043524		X	X														580-33656-1	
LT-23	AOI-3	Soil	DISC	FE3	6/22/12	13:45	48.77792719	-117.8063729		X	X														580-33656-1	
TAILINGS BOX	AOI-4	Soil	DISC	FE2	11/6/11	12:50	48.765416	-117.76396	X	X	X														580-29929-1	
UT-LT-2000'	AOI-4	Soil	DISC	FE2	11/10/11	10:05	48.766364	-117.787599	X	X	X														580-29929-1	
UT-LT-4000'	AOI-4	Soil	DISC	FE2	11/10/11	10:50	48.76380614	-117.7813929	X	X	X														580-29929-1	
PL-1	AOI-4	Soil	DISC	FE2	6/25/12	12:00	48.76535723	-117.7643558		X	X														580-33780-1	
PL-2	AOI-4	Soil	DISC	FE2	6/25/12	12:30	48.76524756	-117.7656602		X	X														580-33780-1	
PL-3	AOI-4	Soil	DISC	FE2	6/25/12	13:15	48.76094775	-117.7623288		X	X														580-33780-1	
PL-4	AOI-4	Soil	DISC	FE2	6/25/12	16:40	48.76055868	-117.7651272		X	X														580-33780-1	
PL-5	AOI-4	Soil	DISC	FE2	6/25/12	17:20	48.76135262	-117.7688203		X	X														580-33780-1	
PL-6	AOI-4	Soil	DISC	FE3	6/26/12	12:35	48.76539468	-117.7717079		X	X														580-33781-1	
PL-7	AOI-4	Soil	DISC	FE3	6/26/12	11:10	48.76559367	-117.7687186		X	X														580-33781-1	
PL-8	AOI-4	Soil	DISC	FE3	6/25/12	17:36	48.76038176	-117.7733583		X	X														580-33781-1	
PL-9	AOI-4	Soil	DISC	FE3	6/25/12	16:23	48.76307388	-117.7726548		X	X														580-33781-1	
PL-10	AOI-4	Soil	DISC	FE3	6/26/12	13:55	48.7644818	-117.7820004		X	X														580-33781-1	
PL-11	AOI-4	Soil	DISC	FE3	6/26/12	14:52	48.76620184	-117.7876086		X	X														580-33781-1	
PL-12	AOI-4	Soil	DISC	FE3	6/27/12	9:25	48.76590383	-117.7890442		X	X														580-33781-1	
PL-13	AOI-4	Soil	DISC	FE3	6/27/12	9:50	48.76698863	-117.7889163		X	X														580-33781-1	
PL-14	AOI-4	Soil	DISC	FE3	6/27/12	11:15	48.77166587	-117.7933345		X	X														580-33781-1	
PL-15	AOI-4	Soil	DISC	FE3	6/27/12	11:40	48.7740834	-117.792347		X	X														580-33781-1	
DR-1	AOI-4	Soil	DISC	FE2	6/25/12	14:41	48.78521613	-117.8100735		X	X														580-33742-1	
DR-2	AOI-4	Soil	DISC	FE2	6/25/12	14:31	48.78236259	-117.8078813		X	X														580-33742-1	
DR-3	AOI-4	Soil	DISC	FE2	6/25/12	14:18	48.78006125	-117.8065006		X	X														580-33742-1	
DR-4	AOI-4	Soil	DISC	FE2	6/25/12	14:00	48.77676857	-117.8045946		X	X														580-33742-1	
DR-5	AOI-4	Soil	DISC	FE2	6/25/12	13:45	48.77380058	-117.8032251		X	X														580-33742-1	
DR-6	AOI-4	Soil	DISC	FE3	6/25/12	13:35	48.77394463	-117.7987404		X	X														580-33741-1	
DR-7	AOI-4	Soil	DISC	FE3	6/25/12	12:35	48.77111532	-117.7964917		X	X														580-33741-1	
DR-8	AOI-4	Soil	DISC	FE3	6/25/12	12:25	48.76821728	-117.7953903		X	X														580-33741-1	
DR-9	AOI-4	Soil	DISC	FE3	6/25/12	12:11	48.76647156	-117.7904695		X	X														580-33741-1	
DR-10	AOI-4	Soil	DISC	FE3	6/25/12	12:01	48.76523098	-117.7863154		X	X														580-33741-1	
DR-11	AOI-4	Soil	DISC	FE3	6/25/12	11:50	48.76305924	-117.7813101		X	X														580-33741-1	
DR-12	AOI-4	Soil	DISC	FE3	6/25/12	11:40	48.76488423	-117.7761929		X	X														580-33741-1	
DR-13	AOI-4	Soil	DISC	FE3	6/25/12	11:31	48.76695346	-117.7702461		X	X														580-33741-1	
DR-14	AOI-4	Soil	DISC	FE3	6/25/12	11:23	48.76825595	-117.7652378		X	X														580-33741-1	
DR-15	AOI-4	Soil	DISC	FE3	6/25/12	11:09	48.7679831	-117.7591893		X	X														580-33741-1	
BG-12-SS	AOI-5	Soil	COMP	FE1	10/7/11	18:00	48.7659	-117.796683		X	X														580-29235-1	

Notes:

AOI-1 - Mill Facility, Open Pits and Waste Rock
AOI-2 - Upper Tailings Pile
AOI-3 - Lower Tailings Pile
AOI-4 - Tailings Pipeline and Access Roads
AOI-5 - Onion Creek and Tributaries
BG - Background Sample
PAHs - Polycyclic aromatic hydrocarbons
PCBs - polychlorinated biphenyls
RW - Residential Well
SDG - Sample Delivery Group
TDS - Total Dissolved Solids
TOC - Total Organic Carbon
TPH - Total petroleum hydrocarbons
TSS - Total Suspended Solids
VOCs - Volatile organic compounds
XRF - X-ray fluorescence
NA - Not Available

TESTAMERICA
ANALYTICAL DATA
(SEE ATTACHED DVD)