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APPENDIX G

2009 DATA QUALITY REVIEW
Santa Cruz Branch Line
Santa Cruz and Monterey Counties, California

1.0 INTRODUCTION

This appendix presents the results of the data quality review for the chemical analysis of soil samples collected during the February through April 2009 Phase II investigation. The samples were analyzed by Test America Laboratories, Inc. of Pleasanton, California, a California-certified analytical laboratory under AMEC chain-of-custody procedures. This appendix includes a summary of the data quality review. The results of the review are reflected in the respective data summary tables (Tables 7 through 9) of the report. The laboratory analytical reports are included in Appendix D of the report.

2.0 ANALYTICAL METHODS

Soil samples were analyzed according to the sample collection and analysis summary presented in Table 2 of the report. The analytical program included the following methods:

- Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270C-SIM;
- Total petroleum hydrocarbons (TPH) quantified as diesel (TPHd) and motor oil (TPMmo) classified by the analytical laboratory as diesel range organics (DRO) and motor oil range organics (MORO), by EPA Method 8015B; and
- Select metals including arsenic, cadmium, chromium, lead, nickel, and zinc using EPA Method 6010B (LUFT 5 metals).

3.0 DATA QUALITY REVIEW PROCEDURES

The purpose of the quality assurance/quality control (QA/QC) procedures is to assess the quality of the data by evaluating the accuracy, precision, and completeness of the data. The field QC samples included matrix spike/matrix spike duplicate (MS/MSD) samples. The laboratory analyzed method blanks, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and surrogate spike samples to provide internal quality control. All of the data generated were assessed for accuracy, precision, and completeness in accordance with the National Functional Guidelines for Organic Data Review (U.S. EPA, 1999) and the National Functional Guidelines for Inorganic Data Review (U.S. EPA, 2004).
3.1 TECHNICAL HOLDING TIMES

The technical holding time of a sample is the maximum time suggested to elapse from the time of sample collection to the time of sample extraction and analysis. The technical holding times established for EPA Methods 8270C and 8015 are 14 days from the time of sample collection until the extraction and 40 days from the time of the extraction until the analysis. All holding times were met, except for sample SB-71-1.5 analyzed for PAHs, and samples SB-98-0.5, SB-99-0.5, SB-100-10.0, SB-101-0.5, SB101-4.5, SB-101-20.0, SB-102-0.5, SB-102-4.5, and SB-102-12.0 analyzed for TPHd and TPHmo. In accordance with the National Functional Guidelines for Organic Data Review (U.S. EPA, 1999), associated results greater than the laboratory detection limit are flagged with a “J” indicating the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. All associated non-detect results are flagged with a “UJ” indicating the analyte was not detected above the reported sample quantitation limit; however, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

3.2 DATA ACCURACY

Data accuracy is assessed by the analysis of LCS and MS samples, based on recoveries, and expressed as a percentage of the true or known concentration. Surrogate recoveries and blank results may also be used to assess accuracy.

3.2.1 Laboratory Method Blanks

Laboratory method blanks are laboratory-prepared samples of de-ionized and/or organic free water that are carried through the analytical procedure and are used to measure laboratory data accuracy. The blank serves as a check for laboratory contamination during preparation and analysis of the samples. At least one method blank was prepared and analyzed for each analytical batch. The laboratory internal QA/QC data for method blank sample analysis were within criteria.

3.2.2 Laboratory Control Samples

Laboratory control samples contain known concentrations of the analytes of concern and are prepared by the laboratory or a reliable source. They are subject to the same preparation/ extraction procedures as the project samples and are prepared independently of calibration standards. LCS recovery results are used to check the accuracy of the analytical methods and equipment. LCS analyses were conducted at least once per each analytical batch. LCS recovery results are compared to laboratory-specified limits. The laboratory internal QA/QC data for laboratory control sample analysis were within criteria with the exception of the LCS associated with sample SB-71-0.5 where the percent recovery for
anthracene, benzo(b)fluoranthene, and fluoranthene were outside QC limits. In accordance with the National Functional Guidelines for Organic Data Quality Review (U.S. EPA, 1999), the results for these compounds in sample SB-71-0.5 that were detected above laboratory detection limits are flagged with a “J” indicating the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

3.2.3 Matrix Spike Samples
A matrix spike (MS) is an aliquot of a project sample to which the analytical laboratory adds a known quantity of a compound prior to extraction/digestion and analysis. The reported percent recovery of the known compound in the sample indicates the presence or absence of matrix effects on the analytical results. MS analyses were performed at least once per analytical batch, with a minimum of one for every 20 samples. The sample spike recoveries were outside of criteria for several compounds for select samples, including chromium, nickel, and PAHs. The MS analyses associated with the exceedences were performed on samples not associated with this project; therefore, associated project samples are not qualified.

3.2.4 Laboratory Surrogate Compounds
A surrogate spike is an addition of a known concentration of an organic compound to a sample that is not expected to be a compound of concern in the sample. Every blank, QC sample, and project sample was spiked as specified by the analytical method. The recovery of the surrogate is used to indicate the possible presence of systematic extraction problems and to evaluate laboratory data accuracy. Surrogate recoveries should fall within the limits set by the laboratory in accordance with the procedures specified by the analytical method. Surrogate sample recoveries were within criteria with the exception of p-terphenyl in the 8015B analysis. The laboratory noted low recovery due to sample dilution. The remaining samples with surrogate recovery outside QC limits are already qualified due to hold time exceedance. As a result, no additional qualification is required.

3.3 DATA PRECISION
The laboratory analyzed LCS/LCSD samples and prepared and analyzed MS/MSD samples from laboratory batch samples to evaluate the precision of the analytical methods. The evaluation is based on calculating the relative percent difference (RPD) between LCS/LCSD results and MS/MSD results. All RPDs calculated from the analyses of these samples were within method control limits.

3.4 EQUIPMENT BLANKS
One equipment blank sample was analyzed for each day of sampling performed. An AMEC field geologist collected the equipment blank sample by decanting laboratory provided deionized water over decontaminated sampling equipment and into laboratory provided
sample bottles. Equipment blanks were analyzed for the same analyses as the primary samples. Napthalene, arsenic and chromium were detected in at least one equipment blank. All associated primary sample results were either below the laboratory detection limit or greater than ten times the blank sample result. In accordance with the National Functional Guidelines for Organic and Inorganic Data Review (U.S. EPA 1999 and 2004), data qualification was not necessary.

4.0 SUMMARY OF DATA QUALITY REVIEW

The data quality review was performed as noted above. Where data qualification was required, the appropriate data qualifier was included in the analytical result summary tables (Table 7 through 9) of the report. The EPA data qualifier definitions are defined in each of the summary tables.

The majority of the analytical issues resulting in data qualification were related to samples analyzed outside of their respective hold times and laboratory control spike recoveries outside of acceptance criteria. Overall, the results of the laboratory quality control sample analyses indicate that the test results in this report are of sufficient quality to support the conclusions presented.

5.0 REFERENCES
