APPENDIX F

2005 Data Quality Review

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2005 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 April 2005 Phase II investigation. The samples were analyzed by Test America Laboratories, Inc. (formerly Severn Trent Laboratories, Inc.), a state-certified laboratory located in Pleasanton, California. This appendix includes a summary of the data quality review. The results of the review are reflected in the respective data summary tables (Tables 3 through 6) 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 1 of the report. The analytical program included the following methods:

- Volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260B;
- Polynuclear aromatic hydrocarbons by EPA Method 8270C-SIM;
- Total petroleum hydrocarbons quantified as gasoline (TPHg), diesel (TPHd), and motor oil (TPHmo), by EPA Method 8015M;
- LUFT 5 Metals by EPA Method 6010B;
- CAM 17 Metals by EPA Methods 6010B and 7471A;
- Arsenic, cadmium, cobalt, and lead by EPA Method 6010B; and
- Organochlorine Pesticides by EPA Method 8081A.

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. Although, there are no technical holding times established by the EPA for soil matrices, it is recommended that it is the discretion of the data reviewer to apply water sample holding time criteria to soil samples. The samples analyzed for this project were evaluated using technical holding times established for water samples. All holding times were met, except for one sample (SB-30-1.5) analyzed for organochlorine pesticides. The sample was extracted 14 days past the hold time and analyzed 16 days past the hold time. In accordance with the National Functional Guidelines for Organic Data Review (USEPA, 1999), the organochlorine pesticide results for the sample SB-30-1.5 are qualified.

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.

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 the criteria for several compounds for select samples, including phenanthrene, pyrene, chrysene, TPHd, endrin, dieldrin, 4,4'-DDT, antimony, molybdenum, nickel, selenium, lead, zinc, arsenic, cadmium, barium, copper, thallium, mercury, and beryllium. In accordance with the National Functional Guidelines for Organic Data Review (USEPA, 1999) and the National Functional Guidelines for Inorganic Data Review (USEPA, 2002), sample results associated with MS recoveries outside of criteria, were 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. The laboratory internal QA/QC data for surrogate sample analysis were within criteria.

3.2.5 Internal Standards

Internal standard performance counts are evaluated by the laboratory to ensure that instrument sensitivity and response are stable during each analysis. Internal standard counts should fall within the limits set by the laboratory in accordance with the procedures specified by the analytical method. The internal standard counts were outside of the limits for two samples for VOCs in lab report 2005-04-0875, and the data were qualified in accordance with the National Functional Guidelines for Organic Data Review (USEPA, 1999).

3.2.6 Compound Identification

Compound identification is performed to limit the amount of erroneous identifications of compounds, particularly with total petroleum extractable hydrocarbons. An erroneous identification can either result from reporting a compound present when it is not or not reporting a compound that is present. The laboratory analyses relative retention times and mass spectra to analyze the compound identification. The compound identification analysis resulted in unknown quantities of TPHd and TPHmo for many samples, and the results were

qualified in accordance with the National Functional Guidelines for Organic Data Review (USEPA, 1999).

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.

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 (Tables 3 through 6) 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 matrix spike recoveries outside of acceptance criteria, internal standards and compound identification. 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.