

6 DATA REDUCTION, VERIFICATION, AND REPORTING

This section describes the process for generating and checking data, as well as the process for producing reports for field and analytical laboratory data.

6.1 DATA REDUCTION

6.1.1 DEFINITION

Data reduction is the process of converting raw data to final results. Project-specific data reduction methods are designed to ensure that data are accurately and systematically reduced into a usable form. The data generated for this investigation will be used to support tiered risk screening in a qualitative and, where appropriate, quantitative manner using a judgment-based approach. Therefore, data reduction for the RI may include computation of summary statistics (e.g., means, geometric means, and medians) and their standard errors (standard deviations), calculation of confidence intervals, testing of hypotheses relative to the parameters, and model validation. Statistically acceptable procedures for the above will be implemented as defined in any one of several standard texts (e.g., Zar, 1974; Freund, 1973).

6.1.2 DATA USAGE

The data generated at site and/or in the laboratory will be used to support the professional judgment-based decisions and the risk evaluations. The laboratories will provide their standard report package format. These data will be detailed in tabular form (e.g., a summary spreadsheet format), identifying all “hits” (detections greater than detection limit) by specific site areas as defined in the SAP (Volume II) so the information can be entered into the appropriate risk models, or plotted to illustrate level and extent of contamination.

6.1.3 SUPPLEMENTARY DATA

Supplementary data produced for internal records and not reported as part of the analytical data may include laboratory worksheets, laboratory notebooks, sample tracking system forms, instrument logs, standards records, maintenance records, calibration records, and associated quality control records. These data will be available for inspection during audits and when needed to determine the validity of data.

Data from other sources will not be used in project analysis or reports until the QC Manager can be assured that the data were collected and analyzed according to procedures and protocols specified in this QAPP and associated SAP. The source of outside data will be included in project reports where these data are used.

6.1.4 REVIEW OF DATA REDUCTION

In order to verify the accuracy of data reduction, the following procedures will be implemented:

- Technical staff will document and review their own work and will be accountable for the accuracy of that work.
- Major calculations will be subject to an independent technical review by a Technical Lead or other suitably experienced party (internal to Foster Wheeler) to ensure that both the methods and the calculations are correct (i.e., check the formula and the math) and consistent with the approved work plan and applicable policies in the Corporate Reference Library.
- The Project Manager will be responsible for ensuring that data reduction is conducted in a manner that produces high quality data via review and approval of concepts, methods, assumptions, and calculations.

6.2 DATA VERIFICATION

All project decisions, conclusions, and recommendations will be based upon verified (validated) data. The purpose of data verification is to ensure that all data used for subsequent evaluations and calculations are scientifically valid, of known and documented quality, and legally defensible. Field data verification will be used to eliminate data not collected or documented in accordance with the protocols specified in the approved sampling plans. Laboratory data verification will be used to eliminate data not obtained using prescribed laboratory procedures.

The Project QA Manager and/or QC Manager will conduct a systems audit of field and laboratory documentation as necessary during the RI (see Section 10), in order to ensure that data is valid and usable. The following items will be reviewed to verify the data as applicable:

- Sampling procedures employed at site;
- Sample holding times;
- Documentation that the analytical results are within the control limits;
- Documentation that data and calculations were checked by the supervisor who was not involved in the performance of sampling, analysis, or data reduction;
- Documentation that a final review of the data was made by the laboratory manager for correctness and validity of the data;
- Calibration of methods and instruments;
- Routine instrument checks (noise levels, drift, linearity, etc.);
- Documentation on traceability of instrument standards, samples, and data;
- Documentation on analytical methodology and QC methodology;
- Results of performance audits with appropriate audit materials;

- The control for interference contaminants in analytical methods (use of reference blanks and check standards for method accuracy and precision);
- Documentation of routine maintenance activity to ensure analytical reliability;
- Documentation of sample preservation and transport; and
- Documentation of inventory control of chemicals and items used for testing (e.g., shelf life).

In addition, as appropriate, selected data packages may be validated following a procedure similar to EPA Functional Guidelines for validation of data under the Contract Laboratory Program (CLP). Note that CLP protocols have not been proposed; therefore, validation is only similar, not identical, to CLP. Given the desired detection limits, and the investigation level (RI), the protocols specified in this QAPP with the DQOs (Tables 3-2 to 3-5) are the most appropriate for this site.

6.3 REPORTING

6.3.1 LABORATORY REPORT

At a minimum, the laboratory report will contain the following information for samples:

- Title and location of the project;
- Project identification number;
- Name of the report;
- Date report was prepared;
- Name, address, and telephone number of the subcontractor;
- Sample identification number;
- Name and location of sample;
- Type of sample (i.e., water, soil, or sediment);
- Date on which analysis was performed and date sample was prepared;
- Any special observations, circumstances, or comments relevant for interpretation of the data;
- Signature of the Laboratory QA Manager; and
- CLP-like deliverables where applicable. At a minimum, a Resource Conservation and Recovery Act (RCRA)-type data summary package will be generated.

Each parameter tested will include at a minimum, name of parameter, EPA or Ecology approved (or other) testing procedure references, results of analysis, and the units of the reported results.

6.3.2 PROJECT RECORDS

Project records will be maintained as follows:

- The Project Manager will be responsible for maintaining records in accordance with the requirements of this section until such time as those records are turned over to Rayonier for storage. All records will be accessible to Rayonier personnel until such time that they are turned over.
- The Project Manager will determine the records to be generated before the start of work.
- Field activity records, which will support the integrity of samples, will be entered in a bound notebook with numbered pages. Such records will be dated and signed or otherwise authenticated on the day of entry.
- Records retained on file will be indexed. The indexing system includes, at a minimum, the location of records within the indexing system (which shall be in alphabetical, chronological, or numerical order, or as otherwise indicated in written procedures).
- There will be sufficient information in the records to permit identification between the record and the item(s) or activity to which it applies. Identification of records will be by means that permit traceability.
- The records storage system will provide for accurate retrieval of records without undue delay.

6.4 CORRECTION TO DOCUMENTATION

If an error is made during data reduction, analysis, or reporting, the error will be corrected by lining through the error so as not to obscure the original entry, entering the correct information, and initialing and dating the entry.