

## **ATTACHMENT 1: QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**

A comprehensive QA/QC plan for groundwater monitoring is described in detail in the Quality Assurance Project Plan for the *Work Plan for Performing a Remedial Investigation/Feasibility Study*<sup>1</sup>. Groundwater Monitoring Plan (Ebasco, 1993c). QC checks, including both field and laboratory, are the specific operational techniques and activities used to fulfill the QA requirements. Proper sample acquisition and handling procedures are necessary to ensure the integrity of the analytical results.

### **Field Quality Assurance/Quality Control.**

The field QA/QC samples collected for JPL groundwater monitoring included duplicate samples, equipment rinsate blanks, trip blanks and source blanks. These QC sample results were used as part of a qualitative evaluation of the aquifer recovery.

Duplicate samples were used to evaluate the precision of the laboratory analyses. Duplicate samples for VOCs, metals, and/or perchlorate analyses were collected from monitoring wells MW-3 (Screen 4), MW-4 (Screen 4), MW-7, MW-7, MW-11 (Screen 5), MW-14 (Screen 1), MW-17 (Screen 3), MW-19 (Screen 5) and MW-26 (Screen 2). All of the analytical results for the duplicate samples were comparable to the results of the original groundwater samples (Tables 1 and 2).

Equipment rinsate blanks were collected each day non-dedicated sampling equipment was used. The equipment rinsate blanks, which consisted of distilled water run through the sampling equipment after decontamination, were analyzed for all contaminants of concern to monitor possible cross-contamination of samples due to inadequate decontamination. Total Cr was detected at low concentrations in 5 of 15 equipment blanks. Methylene chloride was detected at low concentrations in 2 of 15 equipment blanks.

Trip blanks which consisted of reagent-grade water placed in a vial and transported with the sample bottles to and from the field, were submitted to the laboratory with each daily shipment of groundwater samples. Trip blanks were used to help identify cross-contamination of groundwater samples during transport and/or deficiencies in the laboratory bottle cleaning and sample handling procedures. No contaminants were detected in the trip blanks.

A source blank consists of distilled water used by sampling personnel for equipment decontamination. The source blank is collected at the sampling site and is preserved, as appropriate. This QC sample serves as a check on reagent (preservative) and environmental contamination. One source blank was collected during the October - November 2005 sampling event. Total Cr was detected in the source blank at a low concentration.

Table 1-1 presents a summary of contaminants detected in quality control samples collected during the October - November 2005 sampling event.

## **Laboratory Quality Assurance/Quality Control**

Laboratory QC samples included surrogate compounds (for VOC analyses), matrix spike samples, blank spike samples, and method blanks. The results of the laboratory QC samples were used by the laboratory to determine the accuracy and precision of the analytical techniques with respect to the JPL groundwater matrix, and to identify anomalous results due to laboratory contamination or instrument malfunction.

### **DATA VERIFICATION AND VALIDATION**

The purpose of data verification and validation is to assure that the data collected meet the data quality objectives (DQOs) outlined in the Quality Assurance Project Plan of the Groundwater Monitoring Plan (Ebasco, 1993c). The process was intended to ensure that the data are of sufficient quality for use in meeting the objectives outlined in the Groundwater Monitoring Plan. Data verification and validation indicated that all of the sample results obtained from the October – November 2005 event were acceptable for their intended use of characterizing aquifer quality.

#### **Data Verification**

All data collected were subjected to data verification. Data verification included confirming that the sample identification numbers on laboratory reports matched those on the chain-of-custody records. Data verification also included reviewing analytical data reports to assure that all samples were analyzed and all required analytes were quantified for each sample.

#### **Data Validation**

Data validation is a systematic process that is used to determine the compliance of the analytical data with established method performance criteria and determine whether the data quality is sufficient to support the data quality objectives. Validation of a data package included review of the technical holding time requirements, review of sample preparation, review of the initial and continuing calibration data, review and recalculation of the laboratory QC sample data, review of the equipment performance, reconciliation of the raw data with the reduced results, identification of data anomalies, and qualification of data to identify data usability limitations.

Data validation was performed by an independent subcontractor, Laboratory Data Consultants, Inc. (LDC), Carlsbad, CA. One hundred percent of all data analyzed by a fixed-base analytical laboratory (APCL) were validated. Ninety percent of the data were subjected to Level III validation and ten percent of the data were subjected to Level IV validation in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review (EPA, 1999 and 2004). The data were evaluated to ensure suitability and usability for the purpose of the groundwater monitoring report.

#### **Data Validation Qualifiers**

Analytical data were qualified based on data validation reviews. For chemical data, qualifiers were assigned in accordance with the EPA guidelines. Individual laboratory data flags can be found in Attachment 2 (Data Validation Reports). No data were rejected for non-compliance with method requirements during the course of validation.

<sup>1</sup> Ebasco. 1993. *Work Plan for Performing a Remedial Investigation/Feasibility Study*, National Aeronautics and Space Administration Jet Propulsion Laboratory, Pasadena, California. December.

