

ATTACHMENT 1: QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

This attachment contains a summary of the field quality assurance, laboratory quality assurance, data verification and data validation procedures utilized for the JPL groundwater monitoring program. Data validation was performed by an independent subcontractor, Laboratory Data Consultants, Inc. Carlsbad, California. Data verification and validation indicated that all of the sample results obtained from the third Quarter 2007 sampling event were acceptable for their intended use of characterizing aquifer quality.

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A comprehensive QA/QC plan for groundwater monitoring is described in detail in the Quality Assurance Project Plan for the Groundwater Monitoring Plan (Ebasco, 1993). QC checks, including both field and laboratory, are the specific operational techniques and activities used to fulfill QA requirements. Proper sample acquisition and handling procedures were 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 a source blank. These QC sample results were used as part of a qualitative evaluation of the aquifer recovery. Table 1-1 presents a summary of contaminants detected in quality control samples collected during the August/September 2007 sampling event.

Duplicate Field Samples. Duplicate samples were used to evaluate the precision of the laboratory analyses. Duplicate samples for volatile organic compounds (VOCs), total chromium, hexavalent chromium [Cr(VI)] and perchlorate were collected from monitoring wells MW-4 (Screen 1), MW-6, MW-8, MW-13, MW-15 and MW-16. Duplicate samples for chloride, sulfate, nitrate, nitrite and total orthophosphate were collected from monitoring wells MW-8, MW-13 and MW-16.

The analytical results for the duplicate samples were comparable to the results of the original groundwater samples for VOCs (Table 1) and Metals (Table 2).

Equipment Rinsate Blanks. Equipment rinsate blanks were collected each day that non-dedicated sampling equipment was used. The equipment rinsate blanks, consisting 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 in 1 of 11 equipment blanks. Methylene chloride was not detected in the equipment blanks. Two other VOCs were detected in equipment blank EB-1-8/21/07 as shown in Table 1-1. Detections in the equipment blank were compared to the sample results during the data validation process described below to determine the impact on the sample results.

Trip 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 shipment of groundwater samples. Trip blanks were used to help identify cross-contamination of groundwater samples during transport and sample handling procedures. No VOCs were detected in any of the sixteen trip blanks as shown in Table 1-1.

Source Blank. A source blank consists of distilled water used by sampling personnel for equipment decontamination. The source blank is collected at the sampling site and

preserved, as appropriate. This QC sample serves as a check on contamination present in the source water. No source blank was collected during the March/April 2007 sampling event; however, the same source of water has been used in previous groundwater monitoring events and only very low levels of chromium and VOCs, if any, were detected.

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, 1993). Data verification and validation indicated that all of the sample results obtained from the August/September 2007 event were acceptable for their intended use of characterizing aquifer quality.

Data Verification. All data collected were subjected to data verification. Data verification is a review of the analytical data that includes confirming that the sample identification numbers on the laboratory reports match those on the chain-of-custody records. Data verification also includes a review of the analytical data reports to confirm that all samples were analyzed and all required analytes were quantified for each sample.

Data Validation. Data validation is a systematic review of the analytical data that is used to determine the compliance of the 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) of Carlsbad, CA. One hundred percent of all data analyzed by the analytical laboratories, Laucks Testing Laboratory and Columbia Analytical Services, Inc. (CAS) 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 (U.S. EPA, 1999; 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. For chemical data, qualifiers were assigned in accordance with EPA guidelines.

There was one exception to the analytical criteria as noted in the data validation reports and summarized below:

- Methylene chloride was detected in the method blank associated with equipment blank EB-2-8/22/07, resulting in the equipment blank being changed to a non-detect.

No analytical data were rejected during the data validation. Data validation reports can be found in Attachment 2.

REFERENCES

- Ebasco. 1993. *Work Plan for Performing a Remedial Investigation/Feasibility Study*. National Aeronautics and Space Administration Jet Propulsion Laboratory, Pasadena, California. December.
- U.S. EPA. 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review*. February.
- U.S. EPA. 2004. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. December.