

DATA REVIEW REPORT
Residential Well Groundwater
Sampling
Former Camp Butner, NC

Prepared for:

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Data Review Report

1.0 Introduction

The following discussion provides a summary of the review performed on the data collected during the August 2004 residential well groundwater sampling event conducted at Former Camp Butner, North Carolina. The review was facilitated by the use of the U.S. Army Corps of Engineers Automated Data Review (ADR) software in conjunction with the electronic Project Library developed for this project and the laboratory electronic data deliverables (EDDs). The ADR reports generated during the review are provided as an attachment to this report.

During the review, data were assessed against pre-established criteria for the following parameters:

- Sample holding times,
- Spiked samples, including laboratory control samples (LCSs) and matrix spikes,
- Method blanks,
- Laboratory duplicates, including LSC/LCS duplicates and matrix spike/matrix spike duplicates (MS/MSD),
- Surrogates,
- Reporting limits, and
- Field quality control (QC) samples (i.e., field duplicates and trip blanks).

Following comparison of the data to the established criteria, data were either accepted without qualification, qualified as estimated (assigned a "J" flag), or rejected ("R"). Data qualifying protocols and flags were based on U.S. EPA validation guidelines.

The review covered all data collected during the August 2004 sampling event. The parameters analyzed are shown in the following table:

<u>Analyses</u>	<u>Method</u>
Volatile organic compounds (VOCs)	SW-846 8260B
Semivolatile organic compounds (SVOCs)	SW-846 8270C
Organochlorine pesticides	SW-846 8081A
Polychlorinated biphenyls (PCBs)	SW-846 8082
Herbicides and Pentachlorophenol	SW-846 8151A
Explosives	SW-846 8330
Nitroglycerine	SW-846 8332
Perchlorates	SW-846 8321, modified
Metals	SW-846 6010B, 7470A, and 6020
Cyanide	SW-846 9012A

2.0 Data Review

2.1 Sample Holding Times and Preservation

Holding times were met for all analyses, with the exception of one batch of samples submitted for explosives analyses by SW-846 Methods 8330 and 8332 (samples RW0804-191-FALCONLANE, RW0804-4051-RANGERD, RW0804-4149-RANGERD, RW0804-750-LITTLEMOUNTAIN, RW0804-CAMPBARHAM, and RW0804-CAMPEASON). These samples were extracted three days outside the method-specified holding time. Non-detects were reported for all compounds in all affected samples; these results were considered biased low and were qualified as estimated (flagged "UJ"). No data rejected on the basis of holding times.

All samples were properly preserved in the field and were transported to the laboratory under the appropriate conditions ($4^{\circ} \pm 2^{\circ}\text{C}$).

2.2 Spiked Samples

Spiked samples included matrix spikes and/or LCSs. Spiked sample results are expressed as recoveries, which demonstrate the relationship between the amount spiked into the sample and the amount measured or "recovered". The majority of LCSs demonstrated acceptable recoveries (i.e., within the control criteria), indicating acceptable method performance. The recoveries of select SVOCs and pentachlorophenol were above the QC criteria in the LCSs associated with the following samples: RW0804-191-FALCONLANE, RW0804-4051-RANGERD, RW0804-4149-RANGERD, RW0804-652-LAKEVIEWDR, RW0804-653-LAKEVIEWDR, RW0804-658-LAKEVIEWDR, RW0804-750-LITTLEMOUNTAIN, RW0804-CAMPBARHAM, RW0804-CAMPEASON, RW-0804-FIELDDUP1, RW0804-NCNG, and RWB0804-3536-FLETCHERSWAY. The associated sample results for the noncompliant compounds were nondetects and therefore not affected by the high bias indicated by the LCS recoveries; these results were accepted unqualified. No data was rejected on the basis of LCS recoveries.

The majority of matrix spike samples also demonstrated recoveries within the pre-established control limits. Exceptions are shown in the following table. No data was rejected on the basis of matrix spike recoveries.

Compounds	Affected Sample	Recovery	Actions
Method 8330: All compounds	RW0804-3536-FLETCHERSWAY	Less than lower control limit, greater than 10%	Flagged as estimated (UJ)
Method 8330: 2-nitrotoluene and nitrobenzene	RW0804-6305-ISHAMCHAMBERS	Less than lower control limit, greater than 10%	Flagged as estimated (UJ)
Method 8321: Perchlorate	RW0804-6305-CAMPBARHAM	Less than lower control limit, greater than 10%	Flagged as estimated (J)

Compounds	Affected Sample	Recovery	Actions
Method 8270C: Phenol	RW0804-6305-ISHAMCHAMBERS	Less than lower control limit, greater than 10%	Flagged as estimated (UJ)

2.3 Blanks

Blank samples provide a measure of accuracy by monitoring contaminants potentially introduced in the laboratory or in the field. Laboratory blanks included method blanks and were prepared and analyzed at the frequencies specified in the analytical methodologies. Field blanks were limited to trip blanks.

No target analytes were detected in the method blanks associated with the VOC, SVOC, pesticide, PCB, herbicide, explosive, nitroglycerine, perchlorate, or cyanide analyses. Select metals were detected in the laboratory method blanks. In all cases, the analytes in the method blanks were detected at concentrations below the reporting limits, meeting the requirement stated in the QAPP that no contaminants be present above the reporting limits. Detected compounds present in one or more method blanks indicate the possibility of false positives in the associated samples. In accordance with U.S. EPA validation protocols, associated sample results that were less than 5x (10x for common laboratory contaminants) the blank amount were qualified as nondetected (U). The constituents detected in the blanks, and the affected samples, are summarized below. The amount of data affected by blank contamination was limited, indicating that contamination within the laboratories was sporadic and did not significantly impact data quality.

Analyte	Affected Samples
Arsenic	RW0804-CAMPEASON (dissolved), RW0804-NCNG (dissolved), RWB0804-3536-FLETCHERSWAY (dissolved)
Barium	RW0804-4709-MORIAHRD (total)
Cadmium	RW0804-4535-UZZLERD (total), RW0804-4553-UZZLERD (dissolved)
Chromium	RW0804-CAMPEASON (total and dissolved), RW0804-CAMPBARHAM (dissolved)
Copper	RW0804-4710-MORIAHRD (dissolved)
Iron	RW0804-658-LAKEVIEWDR (total), RW0804-750-LITTLEMOUNTAIN (total)
Lead	RW0804-4573-UZZLERD (total), RW0804-HESTERFARM (total)
Manganese	RW0804-653-LAKEVIEWDR (total and dissolved), RW0804-CAMPEASON (total and dissolved), RW0804-FIELDDUP1 (total and dissolved), RW0804-NCNG (total and dissolved)

Analyte	Affected Samples
Nickel	RW0804-658-LAKEVIEWDR (dissolved), RW0804-750-LITTLEMOUNTAIN (dissolved), RW0804-CAMPBARHAM (dissolved), RW0804-FIELDDUP1 (total and dissolved), RW0804-3536-FLETCHERSWAY (total)
Thallium	RW0804-4535-UZZLERD (total), RW0804-HESTERFARM (total), RW0804-6305-ISHAMCHAMBERS (total), RW0804-191-FALCONLANE (total and dissolved), RW0804-4149-RANGERD (total)

Trip blanks were included with the shipment of VOC samples on three of the four days of sampling. No target analytes were detected in the trip blanks submitted during the sampling program.

A trip blank was inadvertently not included in the sample shipment on August 10, 2004. Only one VOC was detected in samples collected on August 10 (chloroform at 0.23J ug/L in RW0804-CAMPEASON); thus the impact of not having a trip blank with this sample set is considered to be insignificant.

2.4 Duplicates

Duplicate samples measure the precision, or variability, of the sample data. Field duplicates measure the variability associated with the both the sampling and analytical processes; laboratory duplicates measure only the variability associated with the sample analyses.

Three field duplicates were collected during the course of the sampling program and were analyzed for the same parameters as their associated samples. The field duplicates and their associated field samples are shown below:

- Duplicate #1: RW0804-653-LakeviewDr
- Duplicate #2: RW0804-4578-UzzleRd
- Duplicate #3: RW0804-2202-TilleyFarmRd

The results of the field duplicates demonstrated good agreement (expressed as relative percent difference [RPD]) and met the acceptance criteria of 50%.

Laboratory duplicates included both matrix spike duplicates and LCS duplicates (LCSDs). Overall, the results of the duplicates indicated good precision. Selected analytes exceeded the established QC criteria. Affected samples and compounds, and actions taken in terms of data qualification, are summarized below.

Compounds	Affected Sample	QC Sample Type	Actions
Method 8260B: Bromomethane and methyl- tert-butyl ether	RW0804-658-LAKEVIEWDR	MS/MSD	Flagged as estimated (J/UJ)
Method 8270C: 1,4-dioxane	RW0804-191-FALCONLANE, RW0804-4051-RANGERD, RW0804-4149-RANGERD, RW0804-652-LAKEVIEWDR, RW0804-653-LAKEVIEWDR, RW0804-658-LAKEVIEWDR, RW0804-750-LITTLEMOUNTAIN, RW0804-CAMPBARHAM, RW0804-CAMPEASON, RW-0804-FIELDDUP1, RW0804-NCNG, and RWB0804-3536-FLETCHERSWAY.	LCS/LCSD	Flagged as estimated (UJ)
Method 8081A: All compounds except Toxaphene	RW0804-191-FALCONLANE, RW0804-4051-RANGERD, RW0804-4149-RANGERD, RW0804-652-LAKEVIEWDR, RW0804-653-LAKEVIEWDR, RW0804-658-LAKEVIEWDR, RW0804-750-LITTLEMOUNTAIN, RW0804-CAMPBARHAM, RW0804-CAMPEASON, RW-0804-FIELDDUP1, RW0804-NCNG, and RWB0804-3536-FLETCHERSWAY.	LCS/LCSD	Flagged as estimated (UJ)
Method 8330: All compounds	RWB0804-3536-FLETCHERSWAY	MS/MSD	Flagged as estimated (UJ)

No data were rejected on the basis of precision.

2.5 Surrogates

Surrogate recoveries are applicable to organic analyses only and were within the acceptance criteria for all applicable analyses.

2.6 Analytical Sensitivity

Overall, the reporting limits stated in the Project Library were achieved. Actual reporting limits varied slightly from the target limits due to sample volume adjustments. No analytical dilutions were required to ensure that sample concentrations fell within the instrument calibration range.

For one batch of explosive data, the actual reporting limits were approximately five times the target limits because the analyses had to be performed by another laboratory within the network because of a hurricane-related power outage. The higher reporting limits did not exceed the project screening levels.

To maximize sensitivity, concentrations detected between the method detection limit and the reporting limit were reported. These values were qualified as estimated (J).

2.7 Completeness

Data completeness was evaluated in terms of the number of samples successfully analyzed and the amount of valid data obtained.

One hundred percent of the samples collected were successfully analyzed. Completeness of 100% was also achieved for valid data, with none of the data being rejected.

3.0 Summary

Overall, the data generated is valid and may be used with confidence for decision-making. No data was rejected or considered invalid. A limited number of detected and nondetected data points, indicated with a "J" qualifier, should be considered estimated because of non-conformance with criteria established for the project or because of detection below the reporting limit.