Susitna-Watana Hydroelectric Project

(FERC No. 14241)

Water Quality and Mercury Monitoring Program

Data Validation Technical Memo

Prepared for

Alaska Energy Authority



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ATTACHMENTS

Attachment A: Analytical Results with Hand-entered Data Qualifiers for SDG 1134637

Attachment B: Chain-of-Custody Documentation for SDG 1134637

List of Acronyms, Abbreviations, and definitions

|  |  |
| --- | --- |
| Abbreviation | Definition |
| ADEC | Alaska Department of Environmental Conservation |
| CLP | C**ontract Laboratory Program** |
| COC | Chain of Custody |
| DOC | Dissolved Organic Carbon |
| EPA | Environmental Protection Agency |
| ICP | Inductively coupled plasma |
| LCS | Laboratory control sample |
| LL | Low level |
| MDL | Minimum detection limit |
| MS | Matrix spike |
| MSD | Matrix spike duplicate |
| NFG | National Functional Guidelines |
| QAPP | Quality assurance project plan |
| QC | Quality control |
| RL | Reporting limit |
| RPD | Relative percent difference |
| SDG | Sample delivery group |
| SM | Standard Method |
| TDS | Total dissolved solids |
| TKN | Total Kjeldahl nitrogen |
| TOC | Total organic carbon |
| TSS | Total suspended solids |

# Introduction

Tetra Tech, Inc. conducted data validation of the analytical results for seven water samples (including one trip blank) collected at project river miles (PRM) 174 (above Watana Dam, point sample), 187.2 (Susitna at Watana Dam), and 235.2 (Oshetna Creek) on September 20, 2013. Analytical results from these samples were provided in sample delivery group (SDG) 116437 (Table 1.1-1). Data were collected as part of the Susitna-Watana Hydroelectric Project (Project). SGS North American, Inc. (an ADEC certified and ISO17025 and DOD ELAP accredited laboratory) conducted all analyses.

# Parameters Measured

The samples were analyzed for alkalinity by Standard Methods 21st Edition (SM21) 2320B, ammonia (NH3) by SM21 4500-NH3 G, dissolved hardness by SM21 2340B, total and dissolved low-level (LL) mercury by EPA 1631E, dissolved organic carbon (DOC) by SM 5310B, total and dissolved LL metals by EPA 200.8, nitrate/nitrite by 4500NO3-F, total phosphorus (TP) and soluble reactive phosphorus (SRP) by 4500P-B,E, total Kjeldahl nitrogen (TKN) by 4500-N D, total dissolved solids (TDS) by SM21 2540C, total suspended solids (TSS) by SM21 2540D, turbidity by SM21 2130B, 625 semivolatiles (PAHs) by EPA 625M SIMS, fecal coliforms by SM21 9222D, and Volatile Organic Compounds (BTEX)by EPA 624.

# Laboratory Performance Evaluation

## Data Qualifiers

Analytical data were evaluated in general accordance with the EPA C**ontract Laboratory Program (CLP) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2010)** data validation guidance document and the *Quality Assurance Project Plan for Water Quality and Mercury Monitoring Program for the Susitna-Watana Hydroelectric Project Water Quality Study Susitna River, Southcentral Alaska* (the QAPP) (March 2014)**.** Table 3.1-1 summarizes a list of qualifiers that may have been used for the validation of this data package:

# Data Evaluation

Data were evaluated based on parameters including in the following sections.

## Data Completeness

SDG No. 1134637 was complete as submitted.

## Sample Preservation, Receipt, and Holding Times

Sample preservation, receipt, and holding times were acceptable with the following exceptions. All samples for fecal coliform were analyzed past the ADEC hold time of 8 hours; however fecal coliform samples were not assigned qualifiers.

## Laboratory and Field Blanks

Method blanks associated with nitrate and nitrite analysis, total manganese, and total zinc, total phosphorus, and DOC all had results greater than the minimum detection limit (MDL) and the reporting limit (RL). If results were less than 10x the method blank concentration than they were qualified as estimated and biased high (J+). These results applied to samples WQSWB187.2L for nitrate/nitrite and TP, WQSWB235.2L, for nitrate/nitrite, TP, and zinc, and WQSWB174RT for zinc and TP. Method blanks associated with total aluminum and total chromium had results greater than the MDL but less than the RL, and were qualified as non-detects (U), however all associated sample results were above the RL, so were not qualified. All other method blank analyses had results less than the MDL and were qualified as non-detects (U).

No field blanks were collected in this SDG.

The trip blank associated with the low level mercury analysis contained mercury below the RL but above the MDL. Associated detected mercury results less than the RL were qualified as estimates (J).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS for total nitrate/nitrite is outside of the quality control (QC) criteria and biased low (J-). All nitrate/nitrite samples in this SDG were qualified with as estimated with a J-. The MS for total metals analysis of aluminum, barium, iron, calcium, chromium, magnesium, manganese, and vanadium are also outside of the QAPP specified QC criteria (higher than the QAPP, MS/MSD percent accuracy limits). Samples for the total metals mentioned above associated with this SDG were qualified with a J+ and biased high. The MSD results for aluminum, iron and barium are outside of the QC criteria as well (higher than the MS/MSD limits).

## Laboratory Duplicate Sample Analysis

Laboratory duplicate relative percent differences (RPD) for the various analyses were within specified QC limits with the following exceptions. The soluble reactive phosphorus duplicate RPDs (43) exceeded the QAPP-specified QC limit of 20. Associated results (WQSWB174RT) were qualified as estimated as J. One of the TSS lab duplicates exceeded the QAPP specified limit of 5 (28.6); however the other did not. The associated TSS samples were qualified as estimated, J (WQSWF174.RT).

## Spike Sample Analysis

Post digestion spikes were performed for all samples in this SDG except for laboratory duplicates. All post digestion spikes were considered successful.

## ICP Serial Dilution

No inductively coupled plasma (ICP) serial dilution results were provided in the data package.

## Field Duplicates

There were no field duplicates in this SDG.

## Laboratory Control Sample (LCS) and LCS Duplicates (LCSD)

All LCS and LCSD percent recoveries and RPDs were within the QC limits.

## Sample Dilution

Some of the samples were diluted to place the results within the calibration range and/or to minimize matrix interferences. Dilutions are summarized on Table 4.10-1.

## Re-extraction and Re-analysis

No re-extraction or reanalysis was required for the samples analyzed within this SDG.

## Analyte Quantitation and Reported Detection Limit

Sample results below the calibration range, or less than the RL but greater than the MDL, were qualified as estimated (flagged J), unless previously qualified due to other QC exceedances.

## Overall Assessment of Data

The overall quality of this data package was acceptable with the following exceptions. No results specific to this SGD required rejection. The analytical results were qualified as indicated in the above sections for QC exceedances. All data can be used as qualified.

# Literature Cited

U.S. Environmental Protection Agency. 2010. National Functional Guidelines for Inorganic Superfund Data Review. Office of Superfund Remediation and Technology Innovation. Document USEPA-540-R-10-011.

# Tables

Table 1.1‑1. Sample and Laboratory IDs for SDG 1134637

|  |  |  |
| --- | --- | --- |
|  | **Sample ID** | **Laboratory ID** |
| **Samples:** | WQSWB174RT  WQSWB235.2LT  WQSWB187.2LT | 1134637001 and 1134637004  1134637002 and 1134637005  1134637003 and 1134637006 |
| **Trip Blank:** | Trip Blank | 1134637007 |

Table 3.1-1. Data Qualifier Definitions

|  |  |
| --- | --- |
| J = | The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample. |
| J+ = | The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased high. |
| J- = | The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased low. |
| NJ = | The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated value is the approximate concentration of the analyte in the sample. |
| R = | The sample result is rejected as unusable due to serious deficiencies in one or more quality control (QC) criteria. The analyte may or may not be present in the sample. |
| U = | The analyte was analyzed for, but was not detected at or above the associated value (reporting limit [RL]). |
| UJ = | The analyte was analyzed for, but was not detected at or above the associated value (RL), which is considered approximate due to deficiencies in one or more QC criteria. |

Table 4.3-1. Qualifiers Associated with Method Blanks

| **Analyte** | **Qualifier** | **Affected Samples** |
| --- | --- | --- |
| Nitrate/nitrite | J+ | WQSWB187.8L, WQSWB235.2L |
| Total Zinc | J+ | WQSWB174RT, WQSWB235.2L |
| Total Phosphorus | J+ | WQSWB174RT, WQSWB187.8L, WQSWB235.2L |

Table 4.4-1. Qualifiers Associated with MS/MSD Results

| **Analyte** | **Qualifier** | **Affected Samples** |
| --- | --- | --- |
| Nitrate/Nitrite | J- | WQSWB174RT |
| Total Aluminum, Barium, Iron, Calcium, Chromium, Magnesium, Manganese, and Vanadium | J+ | WQSWB174RT, WQSWB187.2L, WQSWB235.2L |

Table 4.10-1. Sample Dilutions

|  |  |  |
| --- | --- | --- |
| **Analysis** | **Dilution Factor** | **Samples** |
| Dissolved Metals | 2.5 | WQSWB174, WQSWB235.2, WQSWB187.2 |
| Total Nitrate/Nitrite | 5 | WQSWB174, WQSWB235.2, WQSWB187.2 |
| Total Metals | 25 | WQSWB174, WQSWB235.2, WQSWB187.2 |

ATTACHMENT A: Analytical results with Hand-Entered data qualifiers for SDG 1132615

[Insert Attachment A material.]

ATTACHMENT B: chain-of Custody DOCUMENTATION for sdg 1132615

[Insert Attachment B material.]