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Procedures for Evaluation of Buckman Regional Water Treatment Plant TREAT Raw Data June 3, 2018

PURPOSE & SCOPE

The purpose and scope of this document is to describe the protocol utilized by Glorieta Geoscience, Inc. (GGI) to detect numeric value errors, incorrect data transformations or transcriptions, and other data quality issues related to a spreadsheet developed by the Buckman Regional Water Treatment Plant (BRWTP) staff that tabulates data collected and recorded during The Removal Efficiency and Assessment of Treatments (TREAT) study.

BACKGROUND

The purpose of the TREAT study is to investigate the efficiency of the treatment works at the BRWTP with respect to contaminants that may be present occur in the Rio Grande upstream from the Buckman Direct Diversion (BDD),diverted into the BDD and introduced into the treatment works.

Table 1. TREAT Sampling Station locations

Sampling Station	Location
Sampling Station RG	Rio Grande (RG); before treatment
Sampling Station 1	After sediment removal
Sampling Station 2	After conventional treatment
Sampling Station 3	After membrane filters
Sampling Station 3A*	After ozonation
Sampling Station 4	After granular activated carbon (GAC)

*Added before the fourth TREAT sampling event on 04/26/2017

Water samples were collected during four separate sampling events and were analyzed primarily by ALS Environmental and/or Hall Environmental Analysis Laboratory and their subcontractors (Table 2). No field notes, data quality objectives, or sampling and analysis plans were provided to GGI by BDD staff. GGI is unaware of submission of trip blanks, duplicates, or any other client-initiated QA/QC samples to the analytical laboratories.

Table 2. TREAT Investigation dates and primary analytical laboratories.

TREAT Investigation	Sampling Date(s)	Laboratory
TREAT 1	3/22 – 3/23/2016	Hall Environmental Analysis Laboratory
TREAT 2	5/9 – 5/10/2016	Hall Environmental Analysis Laboratory
TREAT 3	9/14 – 9/15/2016	ALS Environmental
TREAT 4	4/25 – 4/26/2017	Hall Environmental Analysis Laboratory (metals only) and ALS

METHODOLOGY

BDD staff provided Glorieta Geoscience, Inc. (GGI) with an Excel spreadsheet of raw data from the TREAT study (“Copy of TREAT_DKB”), sample result reports from the analytical laboratories, and

spreadsheets of sample results provided by the analytical laboratories. GGI was directed by BDD staff to ignore all worksheets except "Main Sheet."

No documentation was provided explaining how the table was created or how cell entries were made and values checked. GGI is unaware of any quality control/quality assurance (QA/QC) procedures used or conducted on the spreadsheet.

GGI was directed to conduct standard QA/QC procedures in an attempt to verify and validate the data presented in the spreadsheet. GGI adhered to the quality control system outlined in the GGI Quality Management Plan (2016), and conducted the evaluation as follows:

- 1) "Copy of TREAT_DKB" was resaved as a working file named "TREAT Raw with comments." All worksheets other than "Main Sheet" were deleted, and an additional worksheet created called "QAQC." The new file was reformatted to facilitate the QA/QC process.
- 2) Each data entry in the spreadsheet was evaluated for analyte, sampling station, and date.
- 3) Each data entry was compared to the results from the corresponding laboratory report for accuracy.
- 4) Each data entry was evaluated for correct color coding used by BDD staff in "Copy of TREAT_DKB" (detected, not detected, not tested) based upon the results in the corresponding laboratory report.
- 5) In the event that data from the TREAT spreadsheet were not consistent with laboratory reports, the cell was flagged by changing the fill color to red and a comment added to explain the discrepancy. The original data entry was not changed at this time.
- 6) The appropriate sample result was marked as "completed" on the "QAQC" worksheet once data were verified.
- 7) Data entries that were flagged for errors were checked by another GGI staff member, and appropriate corrections made.
- 8) Chemical yield results of laboratory standards, tracers, triggers, duplicates, and quality control samples (e.g., carriers/tracers for isotopic radionuclides such as Pu-242; Am-243) were removed.
- 9) The spreadsheet was further reformatted for ease of use and viewing, and saved as "TREAT Raw Final." The working spreadsheet with QA/QC worksheet was retained as "TREAT Raw with comments."
- 10) BDD staff reviewed a draft of the corrected spreadsheet ("TREAT Final Draft") and submitted comments to GGI.
- 11) GGI incorporated all comments it was able to verify into "TREAT Raw Final."
- 12) NOTE: "TREAT Raw Final" data have not been blank corrected, nor have the analytical methods been cross-referenced with those requested or appropriate, or for detection limits achieved, reported, requested, or required by the method.