

Appendix A

Chemical Data Quality Assessment Report

For Northwest Alleged Disposal Area

Hamilton Army Airfield, California

Northwest Alleged Disposal Area
Chemical Data Quality Assessment Report

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Table of Acronyms

APCL	Applied P & Ch Laboratory
CDQAR	Chemical Data Quality Assessment Report
DRO	Diesel Range Organics
GRO	Gasoline Range Organics
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
MB	Method Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SVOC	Semivolatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compounds

1. Introduction

This Chemical Data Quality Assessment Report (CDQAR) presents the evaluation of the quality of the analytical results from soil samples collected by the U.S. Army Corps of Engineers (USACE), Sacramento District, Environmental Engineering Branch, Environmental Design Section personnel on November 18 and 19, 2003. All data were evaluated against the requirements in the Final Northwest Alleged Disposal Area Quality Assurance Project Plan (QAPP), USACE Sacramento District, November 2003.

For this field effort, soil samples were collected from 12 direct push locations. Two samples were collected from each core location with the maximum depth being 14 feet. An environmental investigator representing the Friends of Novato Creek determined the sample collection depths. Collected soil samples were analyzed for the analytical parameters listed in the table below.

Summary of Analytical Methods

Parameters	Preparatory Methods	Analytical Methods
CAM 17 Metals (aka Title 22 Metals)	SW3050B / Method	SW6010B / SW7471A
Pesticides	SW3550B	SW8081A ¹
TPH Purgeable GRO	SW5035	SW8015B
TPH Extractable DRO	SW3550B	SW8015B
Volatile Organic Compounds	SW5035	SW8260B
Semi-Volatile Organic Compounds	SW3550B	SW8270C
Gross Alpha and Beta	Laboratory SOP	SW9310

¹ Samples HAAF-ADA-206-01, HAAF-ADA-203-00, HAAF-ADA-202-02, and HAAF-ADA-210-02 were not analyzed for SW8081A. Please refer to the Northwest Alleged Disposal Area Sampling Report for discussion.

All samples were properly packaged in ice coolers and shipped to Applied P & Ch Laboratory (APCL) in Chino, California for chemical analyses. APCL contracted samples for Gross Alpha and Beta analysis to General Engineering Laboratories in Charleston, South Carolina. As an additional means of evaluating overall data quality, two quality assurance (QA) split samples were collected and shipped to EMAX Laboratories in Torrance, California for

chemical analysis. All laboratories maintain current certification with the State of California and have been validated by the USACE Center of Expertise.

2. Project Objectives and Data Quality Objectives

The primary purpose of this investigation is to address concerns identified by Mr. Robert T. Foley in a letter dated May 2001. Mr. Foley is a retired military member and a former U.S. Army hazardous materials inspector. In his letters, Mr. Foley claims that during his inspection period of hazardous materials at Hamilton Army Airfield (1984 to 1986), he was told that the open land located immediately northwest of the end of the former runway was the location of an improper disposal area of hazardous materials. The types of materials identified in his letter include paints, cleaning solvents, bleach, petroleum products, radioactive calibration samples, and medical supplies.

The data collected from this field effort were used to either close the issue by proving the claims are inaccurate, or to validate the claims by finding contamination and/or materials consistent with the issues identified in the letters. If evidence existed to support the claims, a subsequent investigation would likely be initiated at a later date to characterize the nature and extent of contamination, as the intent of the investigation described herein is simply to evaluate the validity of the claims. A secondary purpose of this investigation is to identify the location of a historic slough that passed through the Northwest Alleged Disposal Area. This slough is indicated on topographic maps from 1914 and may have presented a preferential pathway for contaminant transport through the area. The investigation findings are presented in Northwest Alleged Disposal Area Sampling Report.

3. Data Adequacy and Completeness Goals

The following sections provide an assessment of data quality, data usability and completeness goals by analytical method.

3.1 Volatile Organic Compounds By Method SW8260B

Twenty-three (23) soil samples were collected for the determination of volatile organic compounds (VOC) by Gas Chromatography/Mass Spectroscopy Method SW8260B.

Preservation and Holding Time. All samples were collected in the proper container and stored within 4–6 degrees Celsius as specified in the Northwest Alleged Disposal Area Quality Assurance Project Plan (QAPP). The samples were analyzed within the method prescribed holding time of 14 days from date of collection.

Method Blanks. Method blanks (MB) were analyzed with each analytical batch of 20 or fewer samples. A total of three MBs are associated with the project samples. In two of MBs, acetone and methylene chloride were detected at trace concentrations. In the third MB, only methylene chloride was detected. Both acetone and methylene chloride are considered common laboratory contaminants. All methylene chloride and acetone sample results within five times the blank concentration were *qualified as estimated non-detects* at an elevated reporting limit due to blank contamination.

Surrogates. Surrogates were added to each sample to measure sample specific matrix interferences and laboratory performance. All surrogate recoveries were within acceptance criteria.

Internal Standards. Internal standards were added to each sample to ensure the stability of instrument sensitivity and response during each analysis. All internal standard data were within acceptance criteria.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits.

Matrix Spike Samples. One sample was designated for matrix spike (MS)/matrix spike duplicate (MSD) analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable analyte recovery by the laboratory at the time of

sample analysis. All MS/MSD recoveries and relative percent difference (RPD) values were within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. All analytes detected in the primary sample were also detected in the field duplicate sample within the 50 RPD criteria.

Instrument Calibration. Instrument tune data were reviewed to ensure mass resolution, identification, and sensitivity throughout the analytical sequence. All tune data were within method acceptance criteria. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within method acceptance criteria.

Overall Assessment and Completeness. All VOC data met the requirements of the method and the project QAPP, and are considered usable for its intended purpose. The minor quality control (QC) deficiencies noted above are typically observed in data sets and do not impact the data usability. A limited number of acetone and methylene chloride results were qualified as estimated non-detects at an elevated reporting limit due to method blank contamination. There were no rejected data. Analytical and technical completeness goals of 90 percent were met.

3.2 Semi-Volatile Organic Compounds By Method SW8270C

Twenty-three (23) soil samples were collected for the determination of semi-volatile organic compounds (SVOC) by Gas Chromatography/Mass Spectroscopy Method SW8270C.

Preservation and Holding Time. All samples were collected in the proper container and stored within 4-6 degrees Celsius. All samples were extracted and analyzed within the method prescribed holding time period.

Method Blanks. MBs were analyzed with each preparation batch of 20 or fewer samples. A total of two MBs are associated with the project samples. The MBs were free of any detectable SVOC analytes indicating that the analytical process did not introduce any target analytes.

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Surrogates. Surrogates were added to each sample to measure sample specific matrix interferences and laboratory performance. For sample HAAF-ADA-201-14, one acid surrogate was recovered slightly below the lower acceptance limit. The acid analyte results in sample HAAF-ADA-201-14 were *qualified as estimated* due to a low surrogate recovery. All other surrogate recoveries were within acceptance criteria.

Internal Standards. Internal standards were added to each sample to ensure the stability of instrument sensitivity and response during each analysis. For sample HAAF-ADA-212-06, the area for one internal standard was slightly below the lower acceptance limit. The difference is considered insignificant because all other QC parameters and all other internal standards were within acceptance criteria. No data were qualified due to the outlier.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits and the analytical precision data between spiked pairs were within the acceptance criterion.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. All MS/MSD recoveries and RPD values were within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. The field duplicate results confirmed the primary sample results. No target analytes were detected in both samples; therefore precision was not calculable.

Instrument Calibration. Instrument tune data were reviewed to ensure mass resolution, identification, and sensitivity throughout the analytical sequence. All tune data were within acceptance criteria. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within acceptance criteria.

Overall Assessment and Completeness. All SVOC data met the requirements of the method and the project QAPP, and are considered usable for its intended purpose. The minor QC deficiencies noted above are typically observed in analytical data sets and do not impact the data usability. The acid analyte results in sample HAAF-ADA-201-14 were qualified as estimated due to a low surrogate recovery. There were no rejected data. Analytical and technical completeness goals of 90 percent were met.

3.3 Organochlorine Pesticides By Method SW8081

Nineteen (19) soil samples were collected for the determination of organochlorine pesticides by Gas Chromatography Method SW8081.

Preservation and Holding Time. All samples were collected in the proper container and stored within 4-6 degrees Celsius. All samples were extracted and analyzed within the method prescribed time period.

Method Blanks. MBs were analyzed with each preparation batch of 20 or fewer samples. A total of two MBs are associated with the project samples. The MBs were free of any detectable pesticides indicating that the analytical process did not introduce any target analytes.

Surrogates. Surrogates were added to each sample to measure sample specific matrix interferences and laboratory performance. For sample HAAF-ADA-212-06, one surrogate was recovered above the upper acceptance limit indicating a possible high bias. However, all samples results were non-detect; therefore, no data were qualified. All other surrogate recoveries were within acceptance criteria.

Internal Standards. Internal standards were added to each sample to ensure the stability of instrument sensitivity and response during each analysis. All internal standard data were within acceptance criteria.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery

limits and the analytical precision data between spiked pairs were within the acceptance criterion.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. All MS/MSD recoveries and RPD values were within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. The field duplicate results confirmed the primary sample results. No target analytes were detected above the reporting limits; therefore precision was not calculable.

Instrument Calibration. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within acceptance criteria.

Overall Assessment and Completeness. All pesticide data met the requirements of the method and the project QAPP, and are considered usable for its intended purpose. The minor QC deficiencies noted above are typically observed in data sets and do not impact the data usability. There were no estimated or rejected data. Analytical and technical completeness goals of 90 percent were met.

3.4 Total Petroleum Hydrocarbons (TPH) Purgeable Gasoline Range Organics (GRO) By Method SW8015B

Twenty-three (23) soil samples were collected for the determination of TPH Purgeable GRO by Gas Chromatography Method SW8015B.

Preservation and Holding Time. All samples were collected using Encore Samplers®, shipped on ice, and analyzed within the method prescribed holding time of 14 days from date of collection.

Method Blanks. MBs were analyzed with each preparation batch of 20 or fewer samples. A total of two MBs are associated with the project samples. In both MBs, trace concentrations of

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TPH Purgeable GRO were detected. The range of concentrations detected in the associated samples was within 10 times the blank concentration indicating a possible false positive value. All TPH Purgeable GRO results were *qualified as estimated non-detects* at an elevated reporting limit due to possible laboratory contamination.

Surrogates. A surrogate was added to each sample to measure sample specific matrix interferences and laboratory performance. All surrogate recoveries were within acceptance criteria.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits and the analytical precision data between spiked pairs were within the acceptance criterion.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. All MS/MSD recoveries and RPD values were within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. The field duplicate results confirmed the primary sample results. TPH Purgeable GRO were not detected above the reporting limits; therefore precision was not calculable.

Instrument Calibration. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within acceptance criteria.

Overall Assessment and Completeness. Trace concentrations of TPH Purgeable GRO were detected in all method blanks indicating a possible laboratory contamination source. The range of concentrations detected in the associated samples was within 10 times the blank concentration. All TPH Purgeable GRO results were qualified as estimated non-detects at an elevated reporting

limit. The data is considered usable at elevated reporting limits. There were no rejected data. Analytical and technical completeness goals of 90 percent were met.

3.5 TPH Extractable Diesel Range Organics (DRO) By Method SW8015B

Twenty-three (23) soil samples were collected for the determination of TPH Extractable DRO by Gas Chromatography Method SW8015B.

Preservation and Holding Time. All samples were collected in the proper container and stored within 4-6 degrees Celsius. All samples were extracted and analyzed within the method prescribed time period.

Method Blanks. MBs were analyzed with each preparation batch of 20 or fewer samples. A total of two MBs are associated with the project samples. The MBs were free of any detectable TPH Extractable DRO indicating that the analytical process did not introduce any target analytes.

Surrogates. A surrogate was added to each sample to measure sample specific matrix interferences and laboratory performance. All other surrogate recoveries were within acceptance criteria.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits and the analytical precision data between spiked pairs were within the acceptance criterion.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. The laboratory performed an additional MS/MSD spike. All MS/MSD recoveries and RPD values were within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. The field

duplicate results confirmed the primary sample results. TPH Extractable DRO were not detected above the reporting limits; therefore precision was not calculable.

Instrument Calibration. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within acceptance criteria.

Overall Assessment and Completeness. The TPH Extractable DRO data met the requirements of the method and the project QAPP, and are considered usable for its intended purpose. There were no estimated or rejected data. Analytical and technical completeness goals of 90 percent were met.

3.6 Gross Alpha and Beta By Method SW9310

Twenty-three (23) soil samples were collected for the determination of Gross Alpha and Beta by Gas Flow Proportional Counting Method SW9310.

Preservation and Holding Time. All samples were collected in the proper container and analyzed within the method prescribed holding time of 180 days from date of collection.

Method Blanks. MBs were analyzed with each sample batch. A total of two MBs are associated with the project samples. Gross Alpha and Beta were not detected above the uncertainty values indicating that the analytical process did not introduce any target analytes.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each sample batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. The Gross Alpha MS/MSD recoveries (73 and 74 percent, respectively) were slightly below the acceptance criteria of 75-125 percent. For sample HAAF-ADA-209-14, the Gross Alpha result was *qualified as estimated* due to low MS/MSD recoveries. The Gross Beta MS/MSD recoveries and RPD were within acceptance criteria.

Laboratory Duplicate Precision. Duplicate sample analyses are performed to demonstrate acceptable method precision by the laboratory at the time of analysis. The Gross Alpha and Beta precision values met the 20 RPD limit.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples. Gross Alpha and Beta results were within the 50 RPD criteria, indicating acceptance overall precision.

Overall Assessment and Completeness. The Gross Alpha and Beta data met the requirements of the method and the project QAPP, and are considered usable for its intended purpose. The low Gross Alpha MS/MSD recovery is considered a minor QC deficiency and does not impact data usability. For sample HAAF-ADA-209-14, the Gross Alpha result was qualified as estimated. There were no rejected data. Analytical and technical completeness goals of 90 percent were met.

3.7 CAM 17 Metals (aka Title 22 Metals) By Methods SW6010B and SW7471A

Twenty-three (23) soil samples were collected for the determination of CAM 17 Metals by Inductively Coupled Plasma Spectroscopy (ICP) Method SW6010B and by Cold-Vapor Atomic Absorption Spectrometry Method SW7471A. Method SW6010B is for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Method SW7471A is for the determination of mercury.

Preservation and Holding Time. All samples were collected in the proper containers and analyzed within the method prescribed holding time of 180 days for Method SW6010B and 28 days for Method SW7471A.

Interference Check Samples. Interference check samples (ICS) were analyzed at the beginning and end of each analytical sequence to verify the laboratory's interelement and background correction factors. The recoveries for all ICS AB analytes were within the 80-120 percent recovery limits as required by the method.

Method Blanks. MBs were analyzed with each preparation batch of 20 or fewer samples. A total of two MBs are associated with the project samples. A trace concentration of copper was detected in one MB. In the associated samples, copper was detected at concentrations greater than 50 times the blank concentration. The detected blank concentration is insignificant and therefore, no copper data were qualified due to blank contamination. No other metals were detected in the MBs.

Laboratory Control Spike Samples. Laboratory control spikes were analyzed with each analytical batch to provide information on the accuracy of the analytical method and on the laboratory performance. All spiked analytes were recovered within the acceptable recovery limits and the analytical precision data between spiked pairs were within the acceptance criterion.

Matrix Spike Samples. One sample was designated for MS/MSD analysis to determine precision and accuracy of the analytical method on various matrices and to demonstrate acceptable recovery by the laboratory at the time of sample analysis. The mercury MSD recovery was slightly below the acceptance criteria. For sample HAAF-ADA-210-14, the mercury result was *qualified as estimated*. All other MS/MSD recoveries and RPD values were within acceptance criteria.

Post Digestion Spikes. Post-digestion spikes represent samples in which target analytes are added to the sample after completion of the digestion procedures and are typically analyzed when the MS/MSD criteria are not met. Since post-digestion spikes are not required for silver and mercury, no post-digestion spikes were necessary. As standard practice, the laboratory performed post-digestion spikes and provided the raw data. The data were reviewed and all recoveries were within acceptance criteria.

Laboratory Duplicate Precision. Duplicate sample analyses are performed to demonstrate acceptable method precision by the laboratory at the time of analysis. For all results detected above the reporting limit, the RPD was within acceptance criteria.

Field Duplicate Precision. Field duplicate samples were collected and analyzed as an indication of overall precision. One field duplicate sample was collected for the 23 samples and for all analytes detected above the reporting limit, the RPD was within acceptance criteria.

Serial Dilutions. The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to sample matrix. Serial dilutions were performed on two samples and all calculable results were within acceptance criteria.

Instrument Calibration. Initial calibration and continuing calibration data were reviewed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. All calibration data were within acceptance criteria.

Overall Assessment and Completeness. All metals data are considered usable for its intended purpose. The minor QC deficiencies noted above are typically observed in data sets and do not impact the data usability. There were no rejected data. Analytical and technical completeness goals of 90 percent were met.

4. Restrictions on Data Usability

The data addressed in this CDQAR are considered usable for its intended purpose. Several results were qualified as estimated due to minor QA/QC deficiencies that are typically observed in analytical data. All estimated data is considered useable for decision-making purposes for this project. There were no rejected data points and the analytical and technical completeness goals were met.

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References

The following references were used in assessing the quality and usability of this data.

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