

**TO19 DATA VERIFICATION SUMMARY REPORT**  
**for samples collected from**  
**CAMP STANLEY STORAGE ACTIVITY**  
**BOERNE, TEXAS**

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**INTRODUCTION**

The following data verification summary report covers soil and rock samples collected from Camp Stanley Storage Activity (CSSA) under Task Order 0019 on February 17, 18 & 19, 2004. The samples in the following Sample Delivery Group (SDG) were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, perchlorate and explosives:

43809

The field quality control (QC) samples collected in association with this SDG included one field duplicate and one trip blank. No ambient blanks were collected. During the initiation of this project, it was determined that ambient blanks were not necessary due to the absence of a source at these sites.

All samples were collected by Parsons. All analyses (except explosives) were performed by APPL Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, version 1.0. The cooler associated with this SDG was received by APPL at a temperature of 3.0<sup>0</sup> C which is within the 2-6<sup>0</sup> C range recommended by the QAPP. The explosives analyses were subcontracted by APPL to EMAX Laboratories in Torrance, California. The samples were shipped from APPL to EMAX in a single cooler. The cooler was received by EMAX at a temperature of 3.6<sup>0</sup> C which is within the 2-6<sup>0</sup> C range recommended by the QAPP.

The samples in this SDG consisted of two matrices, rock and soil, as follows:

**SOIL**

AOC56SW01  
AOC56-SW03  
AOC56-SW04  
B23-JATO01  
AOC50-BOT04  
AOC50-SW07 (+FD)  
AOC50-SW08

**ROCK**

AOC56-SW02  
AOC56-SW05  
AOC56-SW06  
AOC56-BOT01  
AOC56-BOT02

The samples were divided into these two matrix groups for the purposes of flagging.

## **EVALUATION CRITERIA**

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, version 1.0. Information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; cooler receipt form and COC forms. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the CSSA QAPP, version 1.0, were met.

## **VOLATILES**

### **General**

The VOC portion of this SDG consisted of nine (9) samples, including eight (8) environmental soil and rock samples and one trip blank. Only the samples collected from AOC56 required analysis for VOCs. The samples were collected on February 19, 2004 and were analyzed for the full list of VOCs as specified in the CSSA QAPP.

The VOC analyses were performed according to the United States Environmental Protection Agency (USEPA) SW846 Method 8260B. All samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) and LCS duplicate (LCSD) samples and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC.

The soil batch contained an LCS only. The water batch contained both an LCS and LCSD. All LCS and LCSD recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the relative percent difference (RPD) obtained from the LCS/LCSD samples for waters. Precision could not be assessed for soils since no duplicate analyses were performed.

All LCS/LCSD RPDs were within acceptance criteria for waters.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and

- Examining field and laboratory blanks for cross contamination of samples during sample transit and analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All instrument tune criteria were met.
- All initial calibration criteria were met. There were two ICALs associated with this SDG, one for soils and one for waters.
- All second source verification criteria were met. The LCS and LCSD samples were prepared using a secondary source.
- All calibration verification criteria were met, except for the following:

ICV ID	Analyte	%D	Criteria
Vol Std 03-01-04D@50ug/L	Chloromethane	20.8	%D = 20

This ICV was run at the beginning of the soil batch. The chloromethane results for all soil samples were flagged “R” in accordance with the CSSA QAPP. However, because the %D failed by less than 1% and all samples were non-detect for chloromethane, the data was considered usable for the purposes of this study.

- All internal standard criteria were met, except for the following:

Method Blank	Matrix	Internal Standard	Area Counts	Lower AC Criteria
040301A BLK-1SC	Soil	1,4-Dichlorobenzene-d4	119359	125571

A low internal standard area count results in a high bias. Since all analytes were below the RL in this method blank, no corrective action was necessary.

- All manual integrations were reviewed and approved.

Two method blanks (one soil and one water) and one Trip Blank were analyzed in association with the VOC analyses in this SDG. The soil method blank was free of all target analytes at or above the RL. The water method blank was free of all target analytes at or above the RL, except for the following:

Analyte	Conc.	RL
1,2,3-Trichlorobenzene	0.60 µg/L	0.3 µg/L
Naphthalene	0.40 µg/L	0.3 µg/L

No corrective action was necessary because only the Trip Blank was associated with the water method blank and the Trip Blank was non-detect for all target analytes.

## **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All VOC results for the samples in this SDG were considered usable. The completeness of the VOC portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **SEMIVOLATILES**

### **General**

The SVOC portion of this SDG consisted of eight (8) environmental soil and rock samples. Only the samples collected from AOC56 required analysis for SVOCs. The samples were collected on February 19, 2004 and were analyzed for the full list of semivolatiles as specified in the CSSA QAPP

The SVOC analyses were performed according to the United States Environmental Protection Agency (USEPA) SW846 Method 8270C. All samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC.

All LCS recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria.

### **Precision**

Precision could not be evaluated for the SVOC portion of this SDG because no duplicate analyses were performed.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All instrument tune criteria were met.

- All initial calibration criteria were met.
- All second source verification criteria were met.
- No continuing calibration verification was necessary for this SDG since the samples were analyzed immediately following the ICAL.
- All internal standard criteria were met.
- All manual integrations were reviewed and approved.

One method blank was analyzed in association with the SVOC analyses in this SDG. The method blank was free of all target analytes at or above the RL.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All SVOC results for the samples in this SDG were considered usable. The completeness of the SVOC portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **ICP METALS**

### **General**

The ICP metals portion of this SDG consisted of nine (9) environmental soil and rock samples. The samples were collected on February 18 & 19, 2004 and were analyzed for a reduced list of ICP metals. The samples collected from AOC56 required analysis for barium, chromium, copper, nickel and zinc. Sample AOC50-SW08 required analysis for copper and zinc only.

The ICP metals analyses were performed using USEPA SW846 Method 6010B. The samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD. No sample was designated for MS/MSD analysis on the COC.

All LCS/LCSD recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the RPD obtained from the LCS/LCSD samples.

All LCS/LCSD RPDs were within acceptance criteria.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All initial and continuing calibration verification criteria were met.
- All second source calibration criteria were met. The ICV was prepared using a secondary source.
- All interference check criteria were met.
- A dilution test was analyzed on a sample from a different SDG.
- The laboratory also analyzed a post digestion spike (PDS) on a sample from a different SDG.

One method blank and several calibration blanks were analyzed in association with the ICP analyses in this SDG. All blanks were free of target metals at or above the RL.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All ICP metals results for the samples in this SDG were considered usable. The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **ARSENIC**

### **General**

The arsenic portion of this SDG consisted of eight (8) environmental soil and rock samples. Only samples collected from AOC56 required analysis for arsenic. The samples were collected on February 19, 2004 and were analyzed for arsenic using USEPA SW846 Method 7060A.

The samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. The samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD samples. No sample was designated for MS/MSD analysis on the COC.

Both LCS/LCSD recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the RPD obtained from the LCS/LCSD samples.

The LCS/LCSD RPD was within acceptance criteria.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All initial and continuing calibration verification criteria were met.
- All second source calibration criteria were met. The ICV was prepared using a secondary source.
- The dilution test was analyzed on sample AOC56-SW02. Arsenic met criteria with a %D of 0.5.

One method blank and several calibration blanks were analyzed in association with the arsenic analyses in this SDG. All blanks were free of arsenic at or above the RL.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All arsenic results for the samples in this SDG were considered usable. The completeness for the arsenic portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **CADMIUM**

### **General**

The cadmium portion of this SDG consisted of ten (10) samples, including nine environmental soil and rock samples and one field duplicate. The samples were collected on February 18 & 19, 2004 and were analyzed for cadmium using USEPA SW846 Method 7421.

The samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. The samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD samples. No sample was designated for MS/MSD analysis on the COC.

Both LCS/LCSD recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the RPD obtained from the LCS/LCSD samples and the field duplicate analyte concentrations. Sample AOC50-SW07 was collected in duplicate. The second sample from this location was submitted and analyzed as a field duplicate.

The LCS/LCSD RPD was within acceptance criteria.

The field duplicate RPD met criteria at 14.9%.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All initial and continuing calibration verification criteria were met.
- All second source calibration criteria were met. The ICV was prepared using a secondary source.



- The dilution test was analyzed on rock sample AOC56-SW02. The DT failed to meet criteria as follows:

Sample ID	Metal	%D	Criteria
AOC56-SW02	Cadmium	122.4	%D = 10

No MS/MSD was analyzed for cadmium, so all rock samples were flagged “M” for cadmium, in accordance with the CSSA QAPP.

- The laboratory also analyzed a PDS on sample AOC56-SW02. Cadmium met criteria in the PDS with a recovery of 103.7%.

One method blank and several calibration blanks were analyzed in association with the cadmium analyses in this SDG. All blanks were free of cadmium at or above the RL.

## Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All cadmium results for the samples in this SDG were considered usable. The completeness for the cadmium portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## LEAD

### General

The lead portion of this SDG consisted of twelve (12) samples, including eleven (11) environmental soil and rock samples and one field duplicate. The samples were collected on February 18 & 19, 2004 and were analyzed for lead using USEPA SW846 Method 7421.

The samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. The samples were prepared and analyzed within the holding time required by the method.

It should be noted that all of the samples required a dilution due to the high levels of lead present.

### Accuracy

Accuracy was evaluated using the %R obtained from the LCS/LCSD samples. No sample was designated for MS/MSD analysis on the COC.

Both LCS/LCSD recoveries were within acceptance criteria.

### Precision

Precision was evaluated using the RPD obtained from the LCS/LCSD samples and the field duplicate analyte concentrations. Sample AOC50-SW07 was collected in duplicate. The second sample from this location was submitted and analyzed as a field duplicate.

The LCS/LCSD RPD was within acceptance criteria.

The field duplicate RPD met criteria at 16.3%.

## Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met. There were two ICALs analyzed for the Lead portion of this SDG.
- All initial and continuing calibration verification criteria were met.
- All second source calibration criteria were met. The ICV was prepared using a secondary source.
- The dilution test was analyzed on rock sample AOC56-SW02. The DT failed to meet criteria as follows:

Metal	%D	Criteria
Lead	24.2	%D = 10

No MS/MSD was analyzed for lead, so all rock samples were flagged “M” for lead, in accordance with the CSSA QAPP.

- The laboratory also analyzed a PDS on sample AOC56-SW02. Lead met criteria in the PDS with a recovery of 96.8%.

One method blank and several calibration blanks were analyzed in association with the lead analyses in this SDG. All blanks were free of lead at or above the RL.

## Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All lead results for the samples in this SDG were considered usable. The completeness for the lead portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **MERCURY**

### **General**

The mercury portion of this SDG consisted of eight (8) environmental soil and rock samples. Only the samples collected from AOC56 required analysis for mercury. The samples were collected on February 19, 2004 and were analyzed for mercury using USEPA SW846 Method 7471A.

The samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD samples. No sample was designated for MS/MSD analysis on the COC.

Both LCS/LCSD recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the RPD obtained from the LCS/LCSD samples.

The LCS/LCSD RPD was within acceptance criteria.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. The samples were prepared and analyzed within the holding times required by the method.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.

One method blank and several calibration blanks were analyzed in association with the mercury analyses in this SDG. All blanks were free of mercury at or above the RL.

## **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All mercury results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **PERCHLORATE**

### **General**

The perchlorate portion of this SDG consisted of one (1) environmental soil sample. Only sample B23-JATO01 required analysis for perchlorate. The sample was collected on February 17, 2004 and was analyzed for perchlorate using USEPA Method 314.0.

The sample in this SDG was analyzed following the procedures outlined in the CSSA QAPP. The sample was analyzed within the holding time required by the method.

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD and MS samples. No sample was designated for MS/MSD analysis on the COC. However, the laboratory analyzed an MS only on sample B23-JATO01.

All LCS/LCSD and MS recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the RPD obtained from the LCS/LCSD samples.

The LCS/LCSD RPD was within acceptance criteria.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The sample in this SDG was analyzed following the COC and the analytical procedures described in the CSSA QAPP. The sample was analyzed within the holding time required by the method.

- All instrument performance check criteria were met.
- All initial calibration criteria were met.

- All calibration verification criteria were met.
- All second source verification criteria were met.

There was one method blank associated with the perchlorate analyses in this SDG. The method blank was non-detect for perchlorate.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All perchlorate results for the samples in this SDG were considered usable. The completeness for the perchlorate portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

## **EXPLOSIVES**

### **General**

The explosives portion of this SDG consisted of eight (8) environmental soil and rock samples. The samples were collected on February 19, 2004 and were analyzed for the full list of explosives as specified in the CSSA QAPP. The explosives analyses were performed in accordance with USEPA SW846 Method 8330.

All samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP, with the exceptions noted in this report. All samples were prepared and analyzed within the holding time required by the method.

It should be noted that the EMAX data was reported with RLs for several analytes that exceeded those listed in the CSSA QAPP. Details regarding the elevated RLs can be found in the following table. All RLs listed below are in mg/kg:

<b>Analyte</b>	<b>Lab RL</b>	<b>QAPP RL</b>
1,3,5-TNB	0.4	0.25
1,3-DNB	0.4	0.25
2,4,6-TNT	0.4	0.25
2,6-DNT	0.4	0.26
Nitrobenzene	0.4	0.26
o-Nitrotoluene	0.4	0.25

### **Accuracy**

Accuracy was evaluated using the %R obtained from the LCS/LCSD samples and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC.

All LCS/LCSD recoveries were within acceptance criteria.

All surrogate spike recoveries were within criteria. The lab used 3,4-Dinitrotoluene as the surrogate. The laboratory tolerances for surrogate recoveries were 54-154%. However, the surrogate recoveries for all samples and QC associated with this ARF were within 93-111%.

### Precision

Precision was evaluated using the RPD obtained from the LCS/LCSD samples.

All LCS/LCSD RPDs were within acceptance criteria.

### Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All samples were non-detect for explosives, so no secondary column analysis was required.
- All initial calibration criteria were met for the Primary column.
- All second source verification criteria were met for the Primary column. The ICV was analyzed using a secondary source.
- All calibration verification criteria were met, except for the following:

CCV Date & Time	Analyte	%D	Criteria
3/1/2004 21:55	Tetryl	17	%D = 15
3/2/2004 02:15	Tetryl	17	%D = 15
3/2/2004 10:40	Tetryl	18	%D = 15
	2,4,6-TNT	17	

The average %D for all analytes in the CCVs met method criteria. However, because the CSSA QAPP specifies that all analytes must be recovered within  $\pm 15\%$ , the analytes listed in the table above failed the QAPP criteria. The results for Tetryl and 2,4,6-TNT were flagged "R" as rejected for all samples associated with the CCVs listed above. However, because the %D for these analytes were only 2% to 3% outside of tolerance and these analytes were not detected in any samples, the data was considered usable for the purposes of this study.

There was one method blank associated with the Explosives analyses in this SDG. The method blank was non-detect for all target analytes.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All Explosives results for the samples in this SDG were considered usable. The completeness for the Explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.