

RELEASE INVESTIGATION REPORT

SOLID WASTE MANAGEMENT UNIT B-28 CAMP STANLEY STORAGE ACTIVITY



Prepared for:

**Camp Stanley Storage Activity
Boerne, Texas**

Prepared by:

PARSONS
Austin, Texas

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EXECUTIVE SUMMARY

Solid Waste Management Unit (SWMU) B-28 is located near the northeast corner of the Inner Cantonment area of Camp Stanley Storage Activity (CSSA), and was used as a landfill area for the disposal of small arms ammunition, metal ammunition parts, aerial flares, and other metal debris. The site is approximately 1.3 acres in size, and consisted of two trenches less than five feet deep. The north trench measured approximately 300 feet long and 15 feet wide, and the southern trench measured approximately 100 feet long and 15 feet wide. Samples collected from soil borings drilled in 1995 showed no protective concentration limit (PCL) exceedances. In 1997, approximately 1,300 cubic yards (CY) of waste material from the trenches was removed, sifted, and properly disposed. Soil samples collected of the sifted material in 2000 showed PCL-exceedances for barium, copper, and zinc. Surface and subsurface soil sampling was conducted across the site in 2005 to determine the extent of remaining barium, copper, and zinc soil contamination. Between November and December 2010, approximately six inches of contaminated soil was excavated and removed from the site. Confirmation sampling following the initial excavation indicated areas of remaining metal (barium) contamination. In February 2011, further excavation of soil in areas of elevated barium concentrations was conducted.

Confirmation sampling conducted at the site following final excavation activities indicated that copper and zinc concentrations were below Tier 1 residential PCLs across the site. All barium concentrations, with the exception of one (B28-BOT13 with 490 mg/kg barium) were also below the Tier 1 residential PCLs. Per Texas Administrative Code (TAC) §350.79(2)(A), a 95% UCL of 136.5 mg/kg was calculated for the barium concentrations remaining in site soils, which does not exceed the Tier 1 PCL of 222 mg/kg. Therefore, per TAC §350.79(2)(A), further response action for barium is not required at SWMU B-28.

From the information summarized above and presented in this report, the results of the investigations at SWMU B-28 meet the three criteria as described in Texas Commission on Environmental Quality (TCEQ) (2003) guidance *Determining Which Releases are Subject to the Texas Risk Reduction Program (TRRP)*. Thus, the following criteria were met:

- Soils found to have COC concentrations above the Tier 1 PCLs were either excavated from the site or were used to calculate a 95% UCL per TAC §350.79(2)(A) that does not exceed the Tier 1 PCL.
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at SWMU B-28. Soils that were found to have concentrations of metals above their PCLs were excavated and removed, so there will be no future impact to groundwater, surface water, or sediment from SWMU B-28.
- SWMU B-28 passes the Tier 1 Ecological Exclusion Criteria Checklist (Appendix B).

Because these three criteria are met, SWMU B-28 is not subject to TRRP. Therefore, this RIR was prepared to document the results and a No Further Action (NFA) decision is requested from the TCEQ.

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
APPL	Agriculture & Priority Pollutants Laboratory, Inc.
BCVI	black-capped vireo
bgs	below ground surface
BS	Bexar Shale
BTOC	below top of casing
CC	Cow Creek
COC	contaminant of concern
CSSA	Camp Stanley Storage Activity
CY	cubic yard
DQO	Data Quality Objective
ERA	ecological risk assessment
FSP	Field Sampling Plan
ft	feet
GCWA	golden-cheeked warbler
^{GW} Soil _{Ing}	soil to groundwater ingestion pathway (PCL)
IM	Interim Measures
LGR	Lower Glen Rose
MD	munitions debris
MCL	Maximum Contaminant Level
MEC	munitions or explosives of concern
mg/kg	milligrams per kilogram
MQL	method quantitation limit
NFA	no further action
PCE	tetrachloroethene
PCL	Protective Concentration Level
ppbv	parts per billion by volume
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RIR	Release Investigation Report
RL	reporting limit
RMU	Range Management Unit
SAP	Sampling and Analysis Plan
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit

T& E	threatened and endangered
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
^{Tot} Soil _{Comb}	combined soil (PCL)
TRRP	Texas Risk Reduction Program
UGR	Upper Glen Rose
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WC	waste characterization
XRF	x-ray fluorescence

1.0 INTRODUCTION

Parsons is under contract to provide investigations and environmental services for waste sites located at Camp Stanley Storage Activity (CSSA) in Boerne, Texas (**Figure 1**). This contract includes characterization of selected waste disposal sites and preparation of appropriate documentation, including a Release Investigation Report (RIR) for Solid Waste Management Unit (SWMU) B-28 (**Figure 2**). SWMU B-28 consisted of two waste disposal trenches - the northern trench measured approximately 300 feet long and 15 feet wide, and the southern trench measured approximately 100 feet long and 15 feet wide. The trenches were found to contain buried munitions, various metal ammunition parts, and fragments of metal to a depth of approximately 5 feet (ft) and exposed at the surface. This work has been performed in accordance with requirements of the Resource Conservation and Recovery Act (RCRA) 3008(h) Order in effect for CSSA and in accordance with 30 Texas Administrative Code (TAC) §350, the Texas Risk Reduction Program (TRRP) of the Texas Commission on Environmental Quality (TCEQ). This RIR has been prepared following TCEQ reporting and documentation requirements for releases that do not trigger applicability of the TRRP rule.

This report describes environmental investigation activities at SWMU B-28. Work has included environmental sampling; excavation and removal of waste and impacted soil; waste characterization and confirmatory sampling and analysis; and proper documentation of all activities, including preparation of a closure report such as this RIR. All work was performed according to applicable federal, state, and local rules and regulations.

For this report, Section 1 provides the introduction and the documentation to support this RIR. Section 2 provides historical background information for CSSA and for SWMU B-28. Section 3 describes the objectives and rationale for preparing an RIR for SWMU B-28 and the findings from environmental investigations for the site. The groundwater and surface water for CSSA and the area near SWMU B-28 are also described in Section 3. Section 4 summarizes the findings from completing the Tier 1 Ecological Exclusion Criteria Checklist, which is included as an appendix to this RIR. Section 5 summarizes the overall findings and recommendations for the site. All figures and tables are provided at the end of this RIR (pages 11 through 18). References cited in this report can be found in the CSSA Environmental Encyclopedia (EE) ([Volume 1-1, Bibliography](#)).

2.0 HISTORICAL BACKGROUND

2.1 CAMP STANLEY STORAGE ACTIVITY

Camp Stanley Storage Activity is located in northwestern Bexar County, about 19 miles northwest of downtown San Antonio. The installation consists of approximately 4,004 acres immediately east of Ralph Fair Road, and approximately 0.5 mile east of Interstate Highway 10 (Figure 1). Camp Bullis borders CSSA on the north, east, and south.

The land where CSSA is located was used for ranching and agriculture until the early 1900s. During 1906 and 1907, six tracts of land were purchased by the U.S. Government and designated the Leon Springs Military Reservation. The land included campgrounds and cavalry shelters.

In October 1917, the installation was re-designated Camp Stanley. Extensive construction was started during World War I to provide housing for temporary cantonments and support facilities. In 1931, the installation was selected as an ammunition depot, and construction of standard magazines and igloo magazines began in 1938. Land was also used to test, fire and overhaul ammunition components. As a result of these historic activities, CSSA has several historical waste sites, including SWMUs, areas of concern (AOCs), and range management units (RMUs).

The present mission of CSSA is the receipt, storage, issue, and maintenance of ordnance as well as quality assurance testing and maintenance of military weapons and ammunition. Because of its mission, CSSA has been designated a restricted access facility. No changes to the CSSA mission and/or military activities are expected in the future.

2.2 SWMU B-28

2.2.1 Overview

The exact dates of use at SWMU B-28 are unknown; however, aerial photo review indicates it was likely used for waste disposal sometime between the late 1960s and early 1970s. A series of historical aerial photos of the sites are shown on **Figure 3**. The 1957 photo shows some ground disturbance in the southeast corner of the site. In 1966, a gravel road is shown leading to the site from the main road to the east that is no longer visible on the 1973 photo. Two linear trench-like features are barely visible in the 1973 aerial photo, indicating that the waste management and burial had occurred prior to that date.

2.2.2 Setting, Size, and Description

SWMU B-28 is located near the northeast corner of the Inner Cantonment area of CSSA (Figure 1). The site is approximately 1.3 acres in size and is situated in an area where there are numerous other SWMUs. Small arms ammunition, metal ammunition parts, aerial flares, and other metal debris were disposed of in two trenches at the site. The north trench measured approximately 300 ft long and 15 ft wide, and the southern trench measured approximately 100 ft long and 15 ft wide. Both trenches were less than five feet deep. Additional background information on SWMU B-28 can be found in the CSSA EE ([Volume 3-1, SWMU B-28](#)).

2.2.3 Potential Contaminant Sources, Chemicals of Concern, and Previous Investigations

Six soil borings (SB01 through SB06) were drilled within the trench boundaries in 1995 and sampled for volatile organic compounds (VOCs) (SW-8260), semi-volatile compounds (SVOCs) (SW-8270), and metals (SW-6010) (sample holding times were exceeded for samples from SB01

and SB02 so these were re-drilled) (Figure 2). The soil/rock samples were collected at depths of 0 to 3 ft below ground surface (bgs), 14-16 ft bgs, and at the boring terminus (approximately 29-30 ft bgs). Low levels of phthalates (350 to 4,200 mg/kg) indicative of laboratory contamination were detected. All other contaminants of concern (COCs) detected were at values below TRRP Tier 1 residential Protective Concentration Levels (PCLs). In addition, a grab groundwater sample was collected from SB03 (depicted on Figure 2) and analyzed for VOCs (SW-8270), SVOCs (SW-8260), and metals (SW-6010). No COCs were detected above Tier 1 critical PCLs in the groundwater sample. Results of this investigation are included in **Appendix E** of this RIR and discussed in detail in the CSSA EE, ([Volume 1-2, SWMU B-28 Soil Boring Investigation](#)).

A soil gas survey of SWMU B-28 was conducted in June and July 1995. The results of this survey are included in Appendix E. Tetrachloroethene (PCE) was detected at very low levels (2.89 to 101.31 parts per billion by volume [ppbv]) in some of the soil gas samples. Based on the concentrations and locations of the low-level PCE detections, the nearby SWMUs B-3 and O-1 with known PCE contamination, not SWMU B-28, were considered the sources of VOCs in soil gas.

Nine munitions-related items (including one 20 millimeter [mm] projectile, one 0.75mm projectile, five 0.37mm projectiles, one 4.50 caliber round, and one 60mm mortar) were recovered from the trenches. Numerous munitions debris (MD) items, such as 0.30 caliber stripper clips, spent cartridges, empty rifle grenades and practice hand grenades were also found during a 1997 investigation of the area.

All anomalies discovered in the 1997 survey were excavated, which included the complete excavation of the two trenches resulting in the removal of approximately 1,300 cubic yards (CY) of material. All soils excavated from the trenches and the top six to twelve inches of the entire site were sifted. Soil sifting operations yielded 86,700 pounds of metal debris, which were removed and recycled. Samples collected from the sifted soils were analyzed for VOCs, SVOCs, explosives, and metals. VOCs and explosives were not detected in the sifted soils, but barium, copper, and zinc exceeded background concentrations for CSSA soils. Arsenic, cadmium, chromium, lead, and nickel were all detected at levels below background. The SVOC di-n-butylphthalate was detected above the reporting limit in two subsurface soil samples. However, the presence of phthalates in these samples is believed to be associated with laboratory or field sampling equipment and not representative of site conditions. Di-n-butylphthalate is not known to have been used at CSSA and therefore is not a contaminant of concern at the site. In an April 1999 memorandum from USEPA, these analytical results were deemed unsuitable for closure verification due to laboratory quality issues. Therefore, these data were used only as screening data to determine if additional investigations were needed at the site.

In April 2000, the sifted soil stockpiles (totaling approximately 730 CY) were re-sampled and the analytical results are included in **Appendix F**. Five samples were collected from the on-site stockpiles and analyzed for metals, and one sample was analyzed for explosives. VOC and SVOC analyses were not included based on the results of the 1995 soil boring and soil gas survey results. No explosives were detected. Barium, copper, and zinc concentrations exceeded

background in each of the sifted soil sample results. Approximately 730 CY of contaminated media were disposed of off-post at the Covel Gardens landfill in San Antonio, TX.

In 2005, fifteen surface soil samples were collected and analyzed for barium, copper, and zinc based on the results from the 2000 sifted soil samples. Barium and copper were detected above TRRP Tier 1 critical PCLs at ten locations within and immediately adjacent to the SWMU B-28 boundary. In June 2010, a hand-held x-ray fluorescence (XRF) analyzer was used to further delineate metals levels within SWMU B-28 (**Figure 4**). Of the metals detected, the results for zinc were shown to have a strong statistical correlation with laboratory verified samples. Zinc was detected above the TRRP Tier 1 critical PCL at several sample locations within or immediately adjacent to the boundary of SWMU B-28. Soil samples were collected in November 2010 in order to define an extent of excavation are described in Section 3.1.2.

3.0 OBJECTIVES OF RIR FOR SWMU B-28

In accordance with TCEQ (2003) guidance, *Determining Which Releases are Subject to TRRP* (www.tceq.state.tx.us/assets/public/remediation/trrp/releasesTRRPprev.pdf), an RIR can be performed for a site when results of an investigation lead to the following conclusions:

- Concentrations of chemicals detected at the site do not exceed Tier 1 residential soil action levels;
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at the site; and
- The site passes the Tier 1 Ecological Exclusion Criteria Checklist (the completed checklist is provided in **Appendix B**).

When these three criteria are met for a site, the release is not subject to TRRP. For such sites, an RIR can be submitted to document the results and an NFA decision can be requested from the TCEQ.

As referred to in the criteria listed above, the Tier 1 residential soil action levels are provided by TCEQ and were selected following TCEQ guidance (TCEQ, 2007). The most current action levels were used (March 2010). These action levels are referred to as PCLs and are selected for each chemical detected at the site (i.e., COC). The PCLs are based on the general size of the site, which is also referred to as the “source area” size. If the source area is greater than 0.5 acre, then the source area is assumed to be 30 acres. Thus, the soil action levels for SWMU B-28 are based on a 30-acre source area. The PCL is then selected based on the lower of the two PCLs listed for either (1) the total soil combined pathway ($^{Tot}Soil_{Comb}$) (i.e., exposure to a COC from incidental ingestion, dermal contact, inhalation of volatiles and particulates, and vegetable consumption); or (2) the soil to groundwater pathway ($^{GW}Soil_{Ing}$) (i.e., soil-to-groundwater leaching of a COC to groundwater, where the PCL is the highest concentration of COC allowed in soil to be protective of Class 1 or Class 2 groundwater).

Also based on the TCEQ guidance, if the background level or the method quantification limit (MQL) is a higher concentration than the PCL, then the higher of the background or MQL is used as the action level. Based on the metals that are most common to past activities at CSSA, TCEQ has approved background concentrations for nine metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc) at CSSA (Parsons, 2002). The statistically calculated and TCEQ-approved background metal concentrations are shown in **Table 1**, and are also available in the CSSA EE ([Volume 2, Background Metals Levels](#)).

3.1 FIELD ACTIVITIES AND INVESTIGATIONS

Prior to the 2010 and 2011 excavation activities, 25 surface soil samples and 6 subsurface soil samples were collected to delineate the horizontal and vertical extent of contamination. Based on analytical data from previous sifted stockpile samples, all of the 2010 and 2011 samples were analyzed for barium, copper, and zinc. A summary of the cleanup confirmation results at the sites are shown in Table 1 and the confirmation soil sampling locations are shown on **Figure 5**. As shown on Figure 5, excavation at the site occurred within the original boundary of SWMU B-28, as well as extending to areas where the pre-excavation sampling showed elevated metals concentrations.

3.1.1 Sampling and Analytical Procedures

For all sampling and analytical activities at CSSA, Parsons follows TCEQ-approved Quality Assurance (QA) and Quality Control (QC) procedures as described in the post-wide CSSA Quality Assurance Project Plan (QAPP) which can be found in the CSSA EE ([Volume 1-4, QAPP](#)). The detailed CSSA QAPP presents specific policies, organization, functions, and QA/QC requirements for environmental programs at CSSA, including TCEQ-approved analytical methods, reporting limits (RL), and QA/QC procedures.

The CSSA QAPP (1) was prepared for use by contractors that perform environmental services at CSSA to ensure that the data are scientifically valid and defensible; (2) establishes the analytical protocols and documentation requirements to ensure that the samples are collected and analyzed and that the data are reviewed and validated in a specified manner; and (3) provides detailed guidance for using the Data Quality Objective (DQO) process for specific investigations. The CSSA QAPP and delivery/task order specific Field Sampling Plans (FSP) constitute the CSSA Sampling and Analysis Plan (SAP). The SAP defines data quality for a specific project. Information regarding post-wide and site-specific plans and TCEQ correspondence can be found in the CSSA EE ([Volume 1-1, Correspondence](#)).

Following the CSSA-specific plans, the investigative soil analyses for SWMU B-28 were performed using U.S. Environmental Protection Agency (USEPA) *Test Methods for Evaluating Solid Waste* (SW-846): Method 6020 (barium, copper, and zinc). Prior to soil/waste disposal, waste characterization samples were collected from the excavated material and analyzed for toxicity characteristic leaching procedure (TCLP) metals (Methods SW1311/6010B and

SW1311/7470A). All samples were sent to Agriculture & Priority Pollutants Laboratory, Inc. (APPL) for analyses.

3.1.2 SWMU B-28 Sampling, Excavation, and Removal Activities

The list of the analytical results for soils remaining at the site is provided in Table 1. Sample locations for soils remaining at the site are shown on Figure 5. The clearance areas where soils were excavated and removed are also shown on Figure 5. Waste characterization (WC) sampling and off-post removal activities are described in Section 3.1.2.3. The waste characterization results are provided in **Appendix H**. The data verification summary report for the sampling and analytical results is provided in **Appendix D**. Additional information about past activities and investigations at the sites can be found in the CSSA EE ([Volume 1-2, SWMU B-28](#)). Photos 1 through 6 in **Appendix A** show the excavation and removal activities for SWMU B-28.

3.1.2.1 Recent Soil Investigations at SWMU B-28

In June 2010, a hand-held XRF meter was used to help further delineate metals levels within the SWMU (Figure 4). Twenty-four surface soil samples (SS16 through SS40) were collected on November 15, 2010 to delineate the horizontal extent of contamination prior to excavation. Some of the samples exceeded the Tier 1 PCLs so the proposed excavation boundary was altered to include these samples with exceedances. Additional surface soil samples (SS41 through SS46) were collected on November 22, 2010 to ensure the horizontal extent of contamination was defined and that the new proposed excavation boundary was adequate. None of these samples exceeded Tier 1 PCLs. Additionally, three subsurface soil locations (TP01, TP02, and TP03) were also sampled on November 15, 2010 to a depth of five feet (at intervals of 1 ft bgs, 3 ft bgs, and 5 ft bgs) in order to delineate the possible vertical extent of contamination. However, none of these samples exceeded Tier 1 PCLs. Figure 5 shows the locations of confirmation surface and subsurface soil samples. Excavated sample locations are not shown on Figure 5 unless data from the sample were used to confirm the absence of a COC at that location. Sample results from all confirmation samples are shown in Table 1.

3.1.2.2 Excavation, Removal, and Confirmation Sampling at SWMU B-28

The second round of excavation activities at SWMU B-28 was initiated on November 29, 2010. Approximately six inches of soil were initially removed from the proposed excavation area (Initial Excavation Boundary shown on Figure 5). XRF analysis was used to collect measurements following excavation of a portion of the site. The initial excavation activities were completed and confirmation samples were collected on December 27, 2010.

Based on the confirmation sample results, further excavation of 1 to 2 feet of soil in four separate areas was completed in February 2011 (Figure 5, center map) in order to remove soils with barium concentrations above the Tier 1 PCL of 222 mg/kg. Samples that were removed due to barium exceedances during the February 2011 excavation work are noted as “EXCAVATED” on Table 1. Note that the copper and zinc results from these locations were below their respective Tier 1 PCLs.

Further confirmation sampling and analysis was performed on February 24, 2011 following the additional excavation for barium only. One location (BOT13) still exceeded the Tier 1 PCL for barium with a “J-flagged” (i.e., estimated) concentration of 490 mg/kg. Per TAC §350.79(2)(A), a 95% upper confidence limit (UCL) may be calculated to determine if there is a statistical basis for no further action on a particular COC. Using USEPA’s ProUCL 4.1 software, a 95% UCL of 136.5 mg/kg was calculated for the barium concentrations remaining in site soils, which does not exceed the Tier 1 PCL of 222 mg/kg. Therefore, per TAC §350.79(2)(A), further response action for barium is not required at SWMU B-28. The ProUCL calculation output summary is included as **Appendix G**.

All excavated soil and metal debris were stockpiled on-site until waste characterization could be completed. The remaining soil and metal debris were disposed of as described in Section 3.1.2.4. Based on the dimensions of stockpiled soil, it is estimated that a total of approximately 4,500 CY of soil was excavated.

MD items encountered during the excavation effort included three unfused 37mm projectiles, one unfused 75mm projectile, and several miscellaneous flare pieces. All MD was found at a depth of less than 1 foot. A large piece of slag, or metal debris fused together during heating, was also found during the excavation effort. No MEC were encountered during the excavation effort. All MD was segregated from other metal debris, removed from the site, and stored at CSSA for future management at the discretion of CSSA (e.g., disposal, de-milling, or recycling).

3.1.2.4 Waste Characterization and Disposal Activities

Waste characterization efforts were performed in accordance with requirements of CSSA’s *RFI and Interim Measures (IM) Waste Management Plan – Revised*, dated May 2006 (approved by TCEQ in August 2006). Results of waste characterization (Appendix H) showed that the impacted media from SWMU B-28 met State of Texas Class 2 non-hazardous criteria (30 TAC §335 Subchapter R). Approximately 4,500 CY of Class 2 non-hazardous soils were transported to the East Pasture Berm and Grenade Pit for reuse, as per TCEQ approval April 19, 2006 (**Appendix C**). Additionally, approximately 1,400 pounds of metal debris collected from SWMU B-28 in 2011 was added to metal debris removed from other sites. CSSA intends to recycle the metal debris in the future.

3.2 SITE GEOLOGY/HYDROGEOLOGY

Based on the sampling results and the geological and hydrogeological characteristics of the site, surface water and groundwater have not been affected by historical activities at SWMU B-28. A description of the geology and hydrogeology of the area is provided below. Additional information on geology, hydrology and physiography at CSSA are also available in the CSSA EE ([Volume 1-1, Background Information Report](#)).

3.2.1 CSSA Geology/Hydrogeology

The Lower Glen Rose (LGR) is the uppermost geologic stratum in the CSSA area. The LGR is a massive, fossiliferous, vuggy limestone that grades upward into thin beds of limestone, marl, and shale. The LGR is approximately 300-330 feet thick in the CSSA area and is underlain by the Bexar Shale (BS) facies of the Hensell Sand, which is estimated to be from 60 to 150 feet thick under the CSSA area. The BS consists of silty dolomite, marl, calcareous shale, and shaley limestone. The geologic strata dip approximately 1 to 2 degrees to the south-southeast at CSSA.

The uppermost hydrogeologic layer at CSSA is the unconfined Upper Trinity aquifer, which consists of the Upper Glen Rose (UGR) Limestone. Locally at CSSA, very low-yielding perched zones of groundwater can exist in the UGR; however, it is very sporadic and seasonal. Transmissivity values are not available for the UGR. Regionally, groundwater flow is thought to be enhanced along the bedding contacts between marl and limestone; however, the hydraulic conductivity between beds is thought to be poor. This interpretation is based on the observation of discordant static water levels in adjacent wells completed in different beds. Principal development of solution channels is limited to evaporite layers in the UGR Limestone.

The Middle Trinity aquifer functions as the primary source of groundwater at CSSA. It consists of the LGR Limestone, the BS, and the Cow Creek (CC) Limestone. The LGR Limestone outcrops north of CSSA, along Cibolo Creek, and within the central and southwestern portions of CSSA. As such, principal recharge into the Middle Trinity aquifer is via precipitation infiltration at outcrops and along creek beds during flood events. At CSSA, the BS is interpreted as a confining layer, except where it is fractured and faulted, allowing vertical flow from the up-dip CC Limestone into the overlying, down-dip LGR. Fractures and faults within the BS may allow hydraulic communication between the LGR and CC Limestones. Regional groundwater flow within the Middle Trinity aquifer is toward the south and southeast and the average transmissivity coefficient is 1,700 gallons per day per foot (CSSA EE, [Volume 5, Hydrogeologic Report](#)). In general, groundwater at CSSA flows in a northeast to southwest direction. However, local flow gradient may vary depending on rainfall, recharge, and possibly well pumping.

3.2.2 SWMU B-28 Groundwater

During the February and March 1995 soil boring activities, one groundwater grab sample was collected from a 30-foot-deep boring (SB-03) and analyzed for VOCs (SW-8260), SVOCs (SW-8270), and metals (SW-6010). Analytical results for the groundwater sample indicated that all constituents were either not detected or were present at concentrations below their respective RRS2 standards. Additionally, none of the groundwater results were exceeding the TRRP Tier 1 Groundwater Residential or Commercial/Industrial PCLs. Although lead was not detected, the detection limit (0.03 mg/L) was greater than the RRS2 (and PCL) criteria (0.015 mg/L). Results of the groundwater sampling are presented in the CSSA EE ([Volume 1-2, SWMU B-28](#)).

In June 1995, two additional soil borings were drilled and one additional groundwater sample was collected at SWMU B-28 due to exceedances of sample holding times for samples

collected during the earlier sampling event. Two soil borings were drilled in close proximity to the original sample locations to a depth of 30 ft bgs, and one groundwater sample was collected from boring for VOC analysis (SW-8260). Results from the groundwater sample were below the detection limits for all constituents. Results of the resampling activities are presented in the CSSA EE ([Volume 3-1, Soil Boring Addendum](#)).

No site-specific information regarding groundwater is available. However, between April 1996 and March 2011, measured water levels at Well CS-MW2-LGR, which is located approximately 920 feet downgradient of the site (Figure 2), have ranged from 61.0 feet below top of casing (ft BTOC) (December 2004) to 283.2 ft BTOC (March 2009). Groundwater samples have been collected from this well and analyzed for metals and VOCs since November 1998. No inorganic analytes have exceeded MCLs. Sporadic low-level tetrachloroethene (PCE) detections at CS-MW2-LGR are associated with the SWMU B-3 plume.

3.2.3 SWMU B-28 Surface Water

Surface waters drain to the west into an unnamed tributary to Salado Creek immediately adjacent on the west side of the site (**Figure 6**). Salado Creek approximately is 250 ft downgradient of the site (Figure 2). The northwest-southeast trending creek exits the CSSA boundary approximately 7,500 feet southeast of the site. Groundwater samples were not collected from this intermittent creek because, other than immediately after a rain even, remained dry throughout the removal action. Furthermore, no contamination is likely due to the lack of COCs above background or PCLs at the site itself.

4.0 TIER 1 ECOLOGICAL EXCLUSION CRITERIA CHECKLIST

In accordance with TCEQ (2003) guidance, an RIR is submitted when the results of an investigation lead to a conclusion that COCs do not exceed Tier 1 residential soil action levels and there is no evidence of other affected media. The site must also pass the Tier 1 Ecological Exclusion Criteria Checklist. The checklist must be completed as part of the RIR for a site. The completed checklist is provided in Appendix B. Results show that the site passes the checklist and that there are no ecological exposure pathways of concern at SWMU B-28. Thus, based on the absence of any complete or significant ecological exposure pathways, SWMU B-28 may be excluded from further ecological assessment.

5.0 SUMMARY AND RECOMMENDATIONS

SWMU B-28 is located near the northeast corner of the Inner Cantonment area of CSSA, and was used as a landfill area for the disposal of small arms ammunition, metal ammunition parts, aerial flares, and other metal debris. The site is approximately 1.3 acres in size, and consisted of two trenches less than five feet deep. The north trench measured approximately 300 feet long and 15 feet wide, and the southern trench measured approximately 100 feet long and 15 feet wide. Samples collected from soil borings drilled in 1995 showed no PCL exceedances. In 1997, approximately 1,300 CY of waste material from the trenches and surrounding surface soil was removed, sifted, and properly disposed. Soil samples collected of the sifted material in 2000

showed PCL-exceedances for barium, copper, and zinc. Surface and subsurface soil sampling was conducted across the site in 2005 to determine the extent of remaining barium, copper, and zinc soil contamination. Between November and December 2010, approximately six inches of contaminated soil was excavated and removed from the site. Confirmation sampling following the initial excavation indicated areas of remaining metal (barium) contamination. In February 2011, further excavation of soil in areas of elevated barium concentrations was conducted.

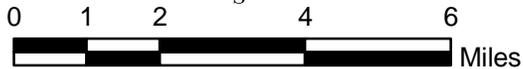
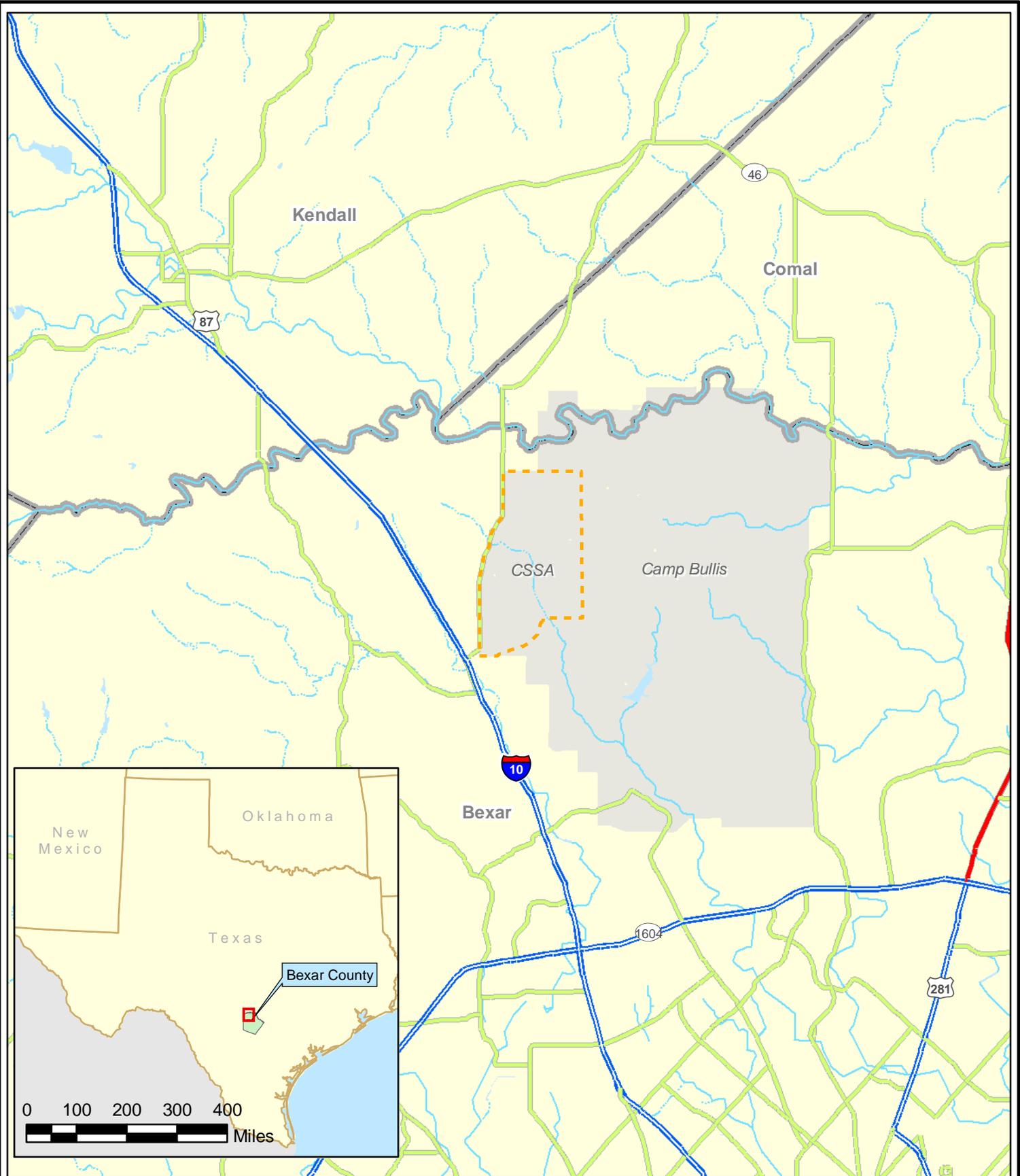
Confirmation sampling conducted at the site following excavation activities indicated that copper and zinc concentrations were below Tier 1 residential PCLs across the site. All barium concentrations, with the exception of one (B28-BOT13 with 490 mg/kg barium) were also below the Tier 1 residential PCLs. Per TAC §350.79(2)(A), a 95% UCL of 136.5 mg/kg was calculated for the barium concentrations remaining in site soils, which does not exceed the Tier 1 PCL of 222 mg/kg. Therefore, per TAC §350.79(2)(A), further response action for barium is not required at SWMU B-28.

From the information summarized above and presented in this report, the results of the investigations at SWMU B-28 meet the three criteria as described in TCEQ (2003) guidance *Determining Which Releases are Subject to the TRRP*. Thus, the following criteria were met:

- Soils found to have COC concentrations above the Tier 1 PCLs were either excavated from the site or were used to calculate a 95% UCL per TAC §350.79(2)(A) that does not exceed the Tier 1 PCL.
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at SWMU B-28. Inorganic groundwater contamination has not been reported in the closest well to SWMU B-28 (well CS-MW2-LGR located approximately 920 feet downgradient). Since soils that were found to have concentrations of metals above their PCLs were excavated and removed, there will be no impact to groundwater, surface water, or sediment from SWMU B-28.
- SWMU B-28 passes the Tier 1 Ecological Exclusion Criteria Checklist (Appendix B).

Because these three criteria are met, SWMU B-28 is not subject to TRRP. Therefore, this RIR was prepared to document the results and an NFA decision is requested from the TCEQ.

TABLES AND FIGURES

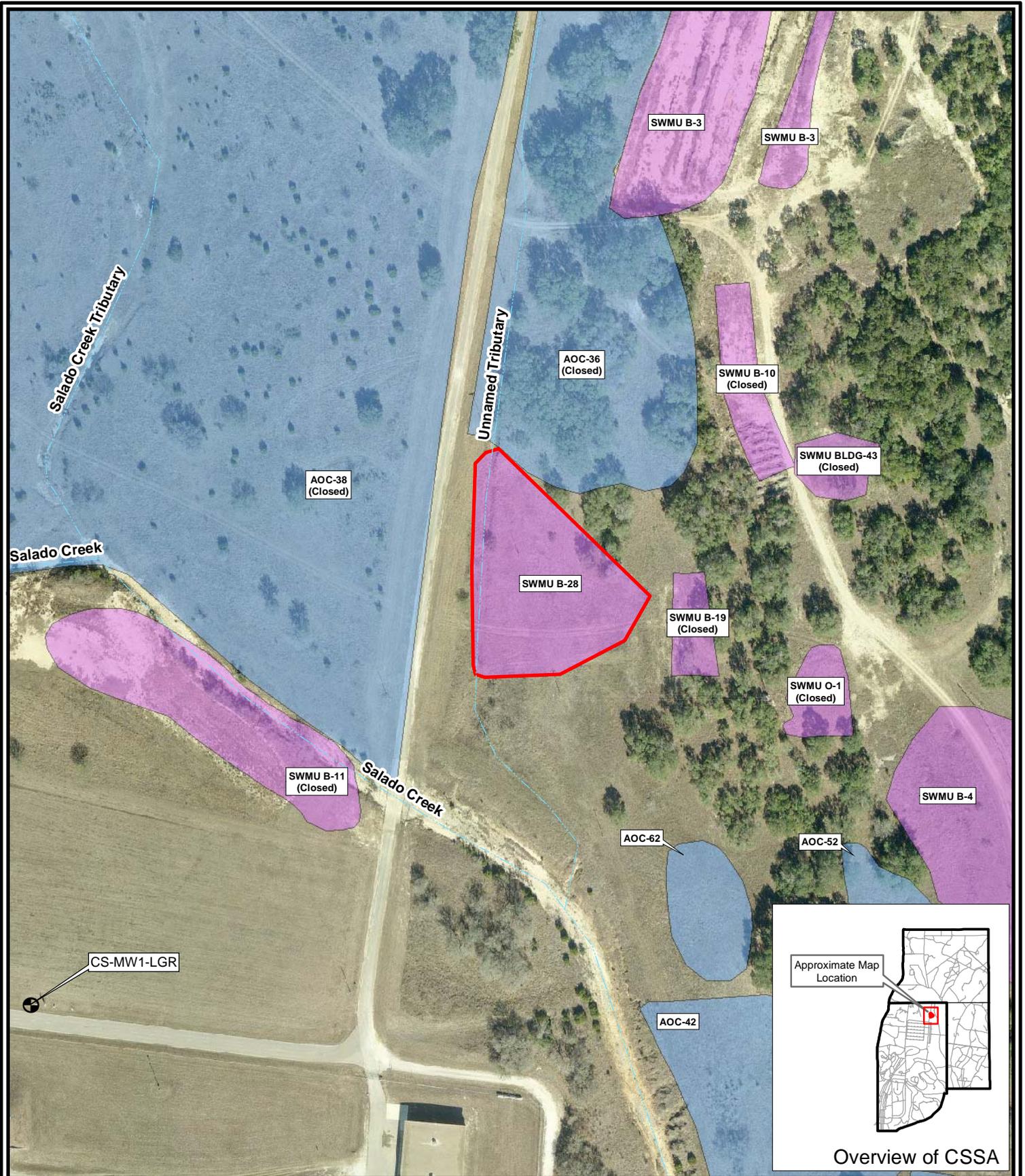


-  CSSA
-  Freeway
-  Highway
-  Major Road
-  County Boundary
-  Military Installation

Figure 1

CSSA Location Map
Camp Stanley Storage Activity

PARSONS



Aerial Photo Date: 2009

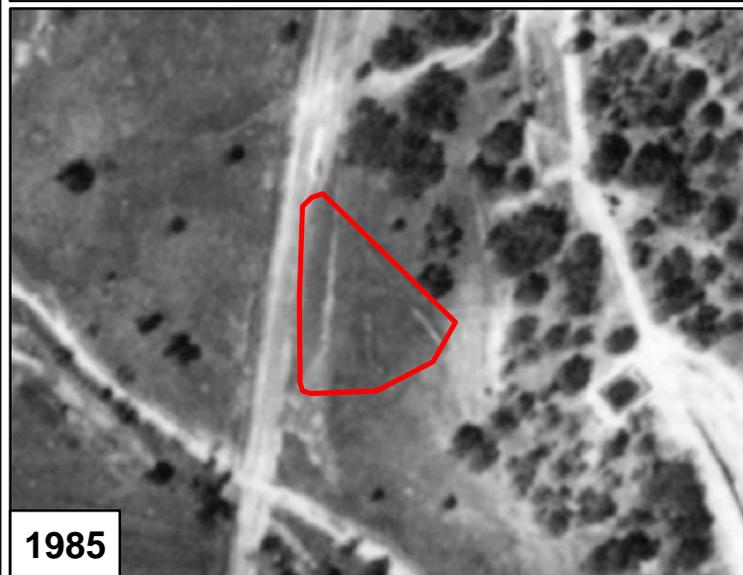
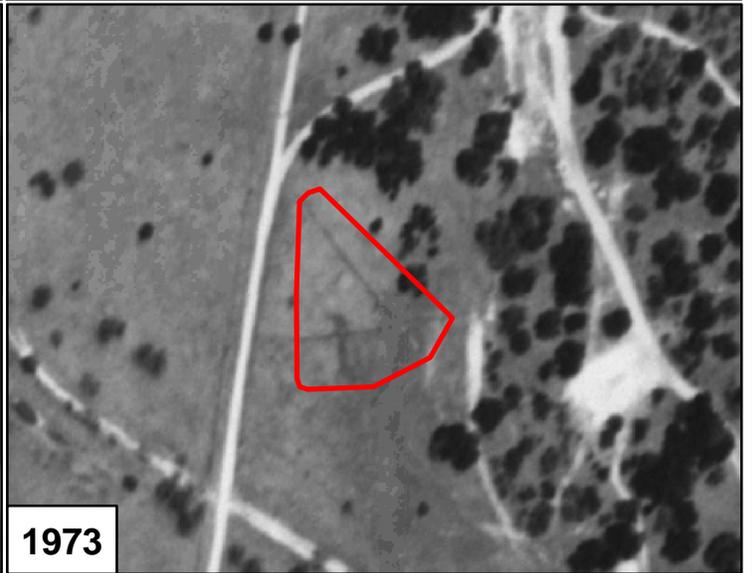
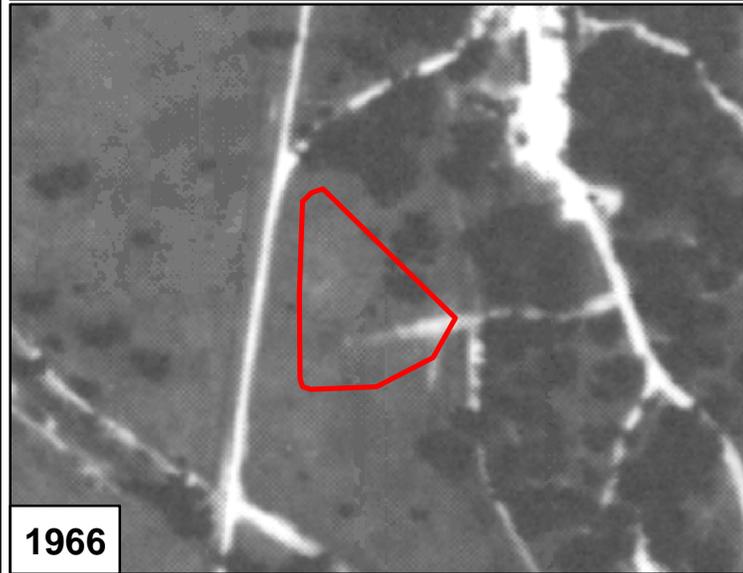
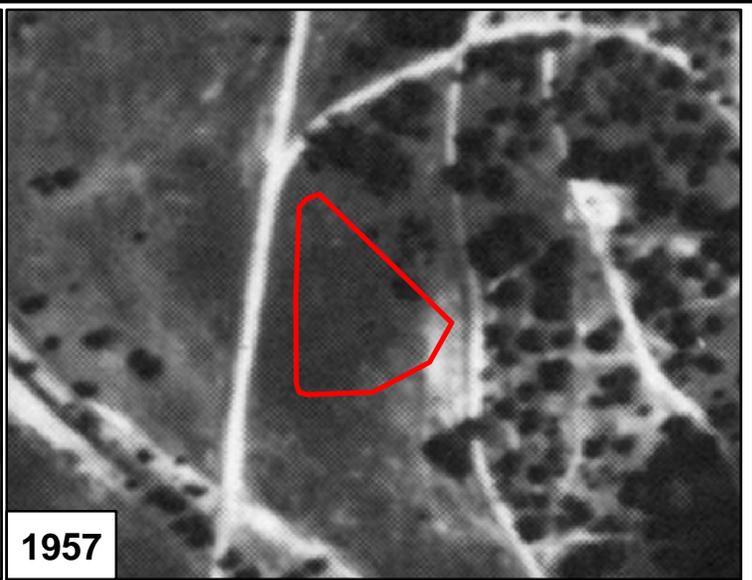
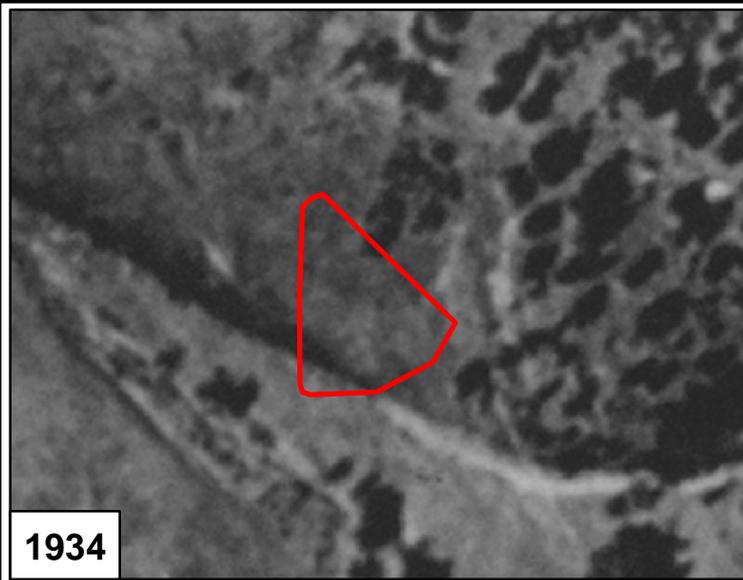


- CS-MW1-LGR
- B-28
- AOC Boundary
- SWMU Boundary
- Stream
- CSSA Outer Fence Line

Figure 2

SWMU B-28
Site Location Map
Camp Stanley Storage Activity

PARSONS



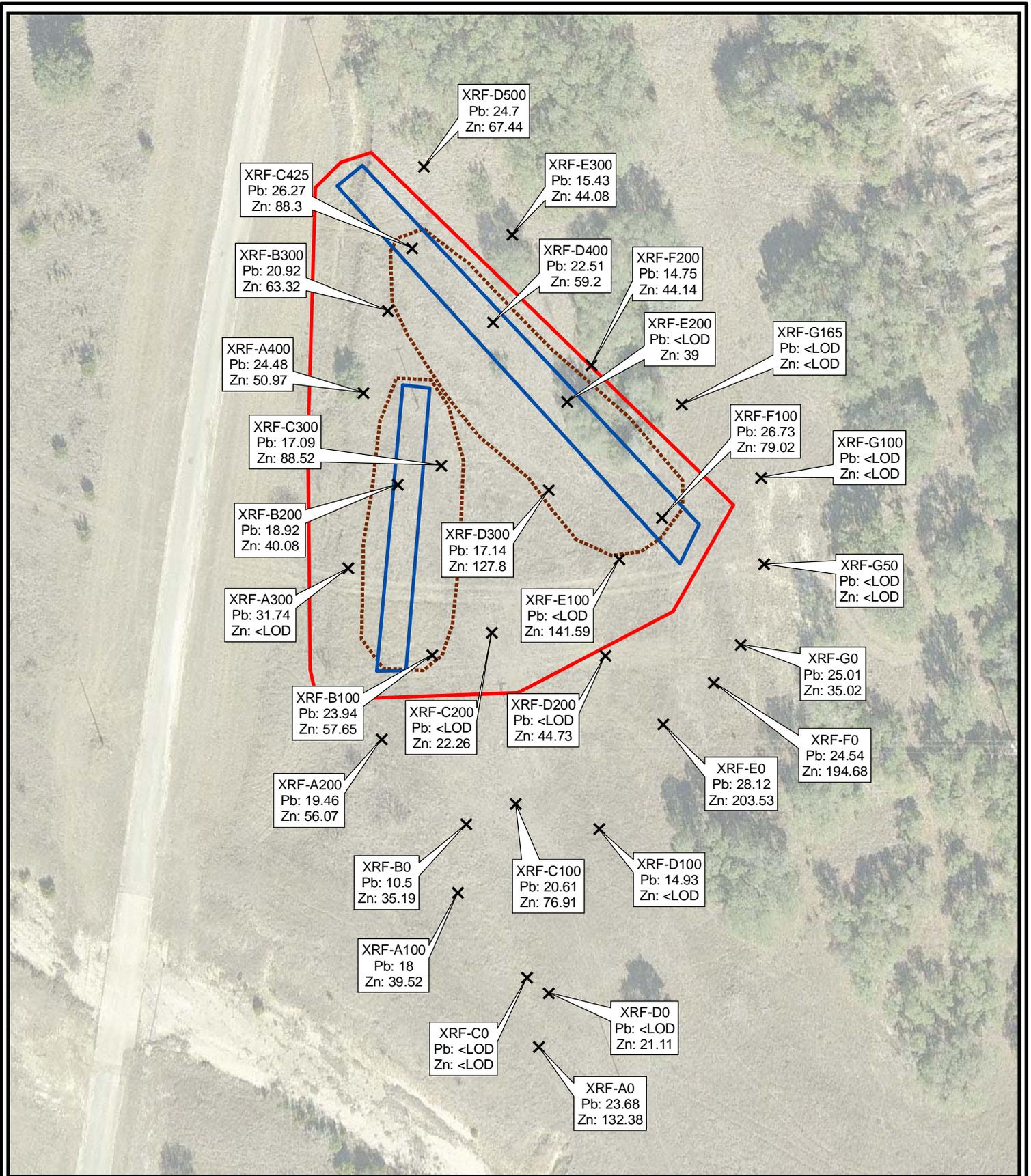
 SWMU B-28

0 150 300 600
Feet

Figure 3

SWMU B-28
Aerial Photographs
Camp Stanley Storage Activity

PARSONS



Aerial Photo Date: 2009

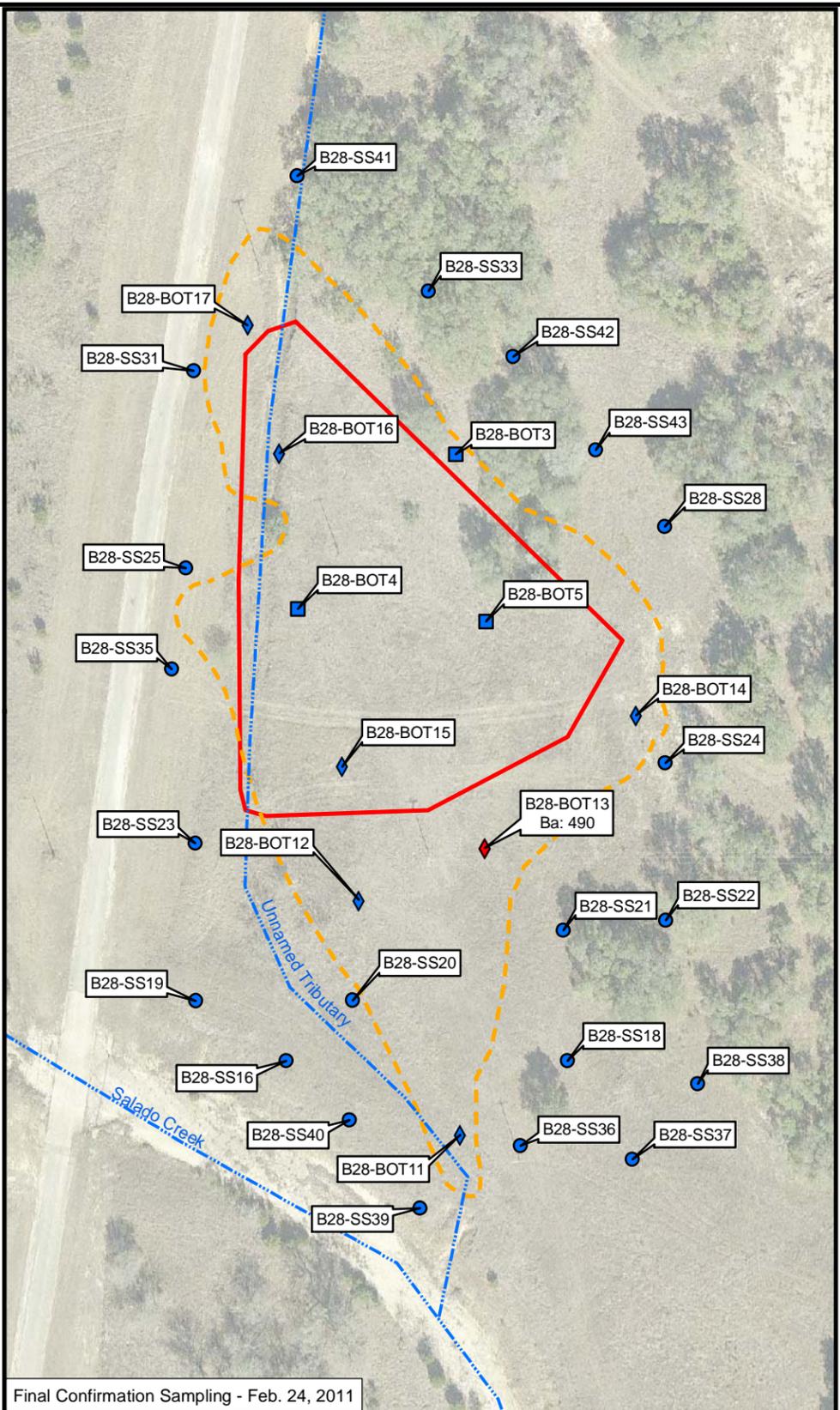
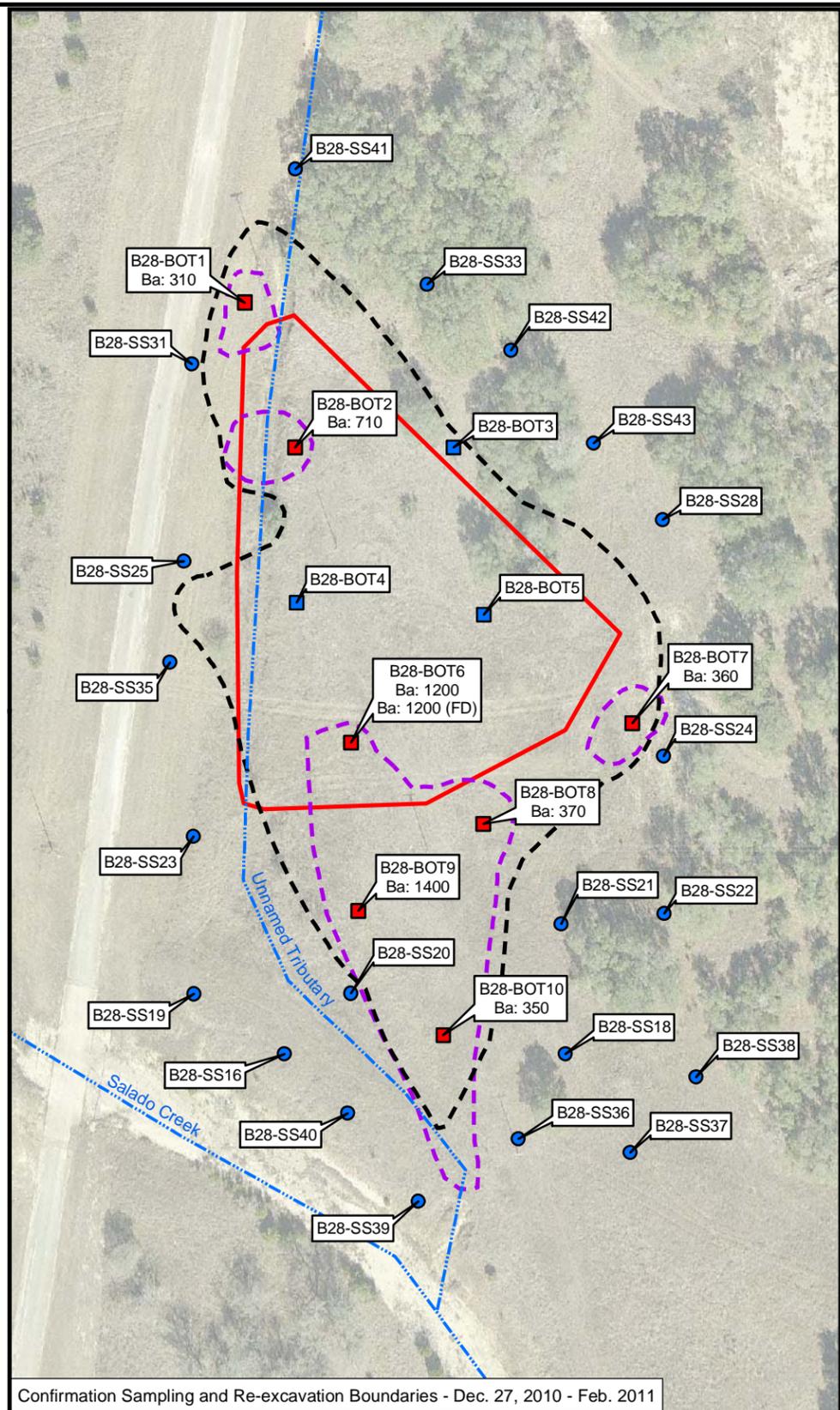
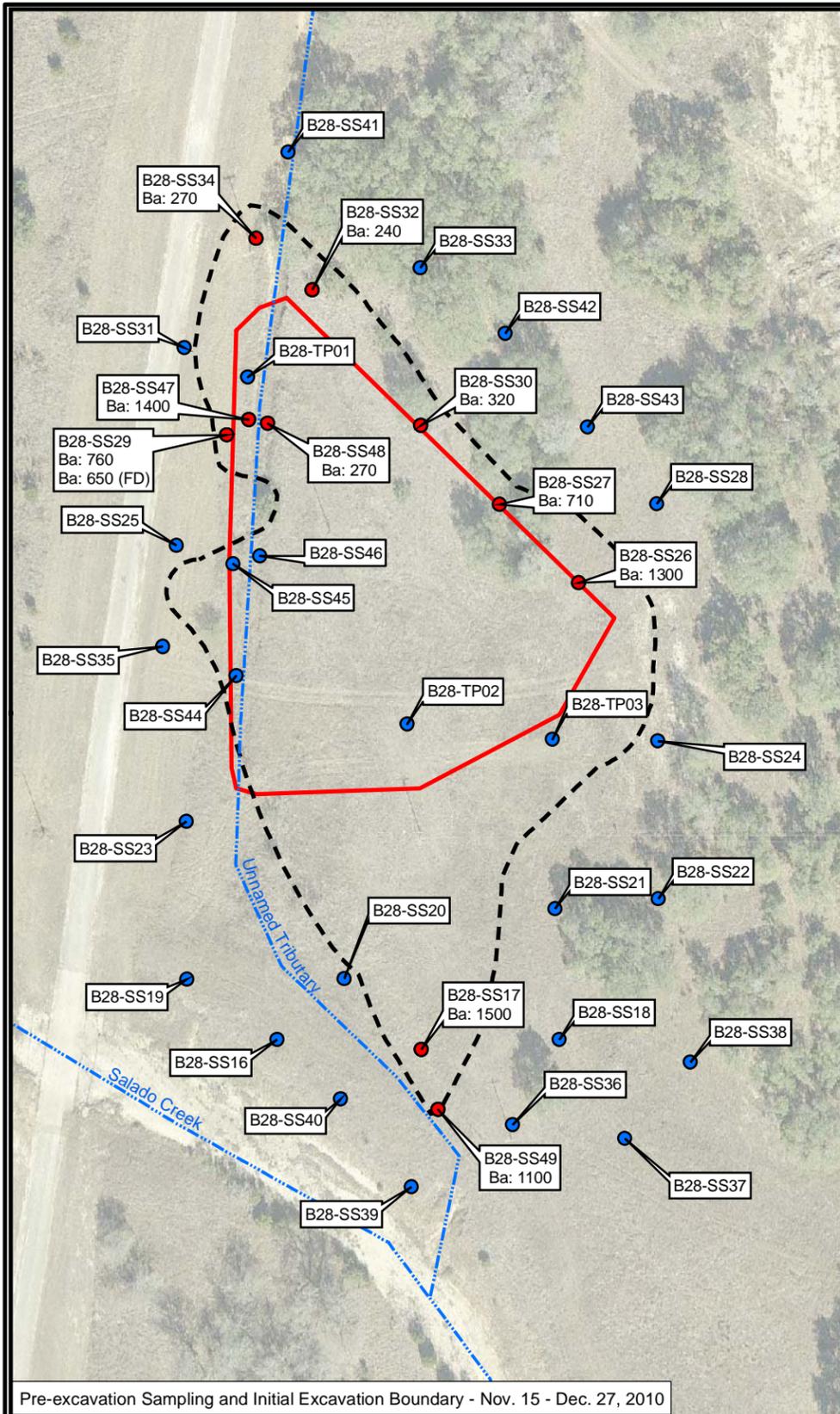


- X XRF Sample Location
- SWMU B-28 Boundary
- EM Anomaly
- Approximate Trench Location



Figure 4
SWMU B-28
Initial XRF Survey Results
Camp Stanley Storage Activity

PARSONS



Aerial Photo Date: 2009



J:\CSSA\GIS\B28\Maps\B28_RIR_sample_location_map_3view.mxd - 8/2/2011 @ 12:22:54 PM

- SWMU B-28 Boundary
 - Intermittent Stream
 - Initial Excavation Boundary, Nov. 29 - Dec. 27, 2010
 - Re-excavation Boundaries, February 2011
 - Total Excavated Area
- B-28 Soil Samples**
- Collected Nov. 15 - Dec. 1, 2010
 - Collected Dec. 27, 2010
 - ◆ Collected Feb. 24, 2011
- (Red indicates an exceedance of the Tier 1 PCL. Exceeding concentrations are indicated above.)*

Figure 5
SWMU B-28
Sample & Excavation Locations
Camp Stanley Storage Activity

PARSONS

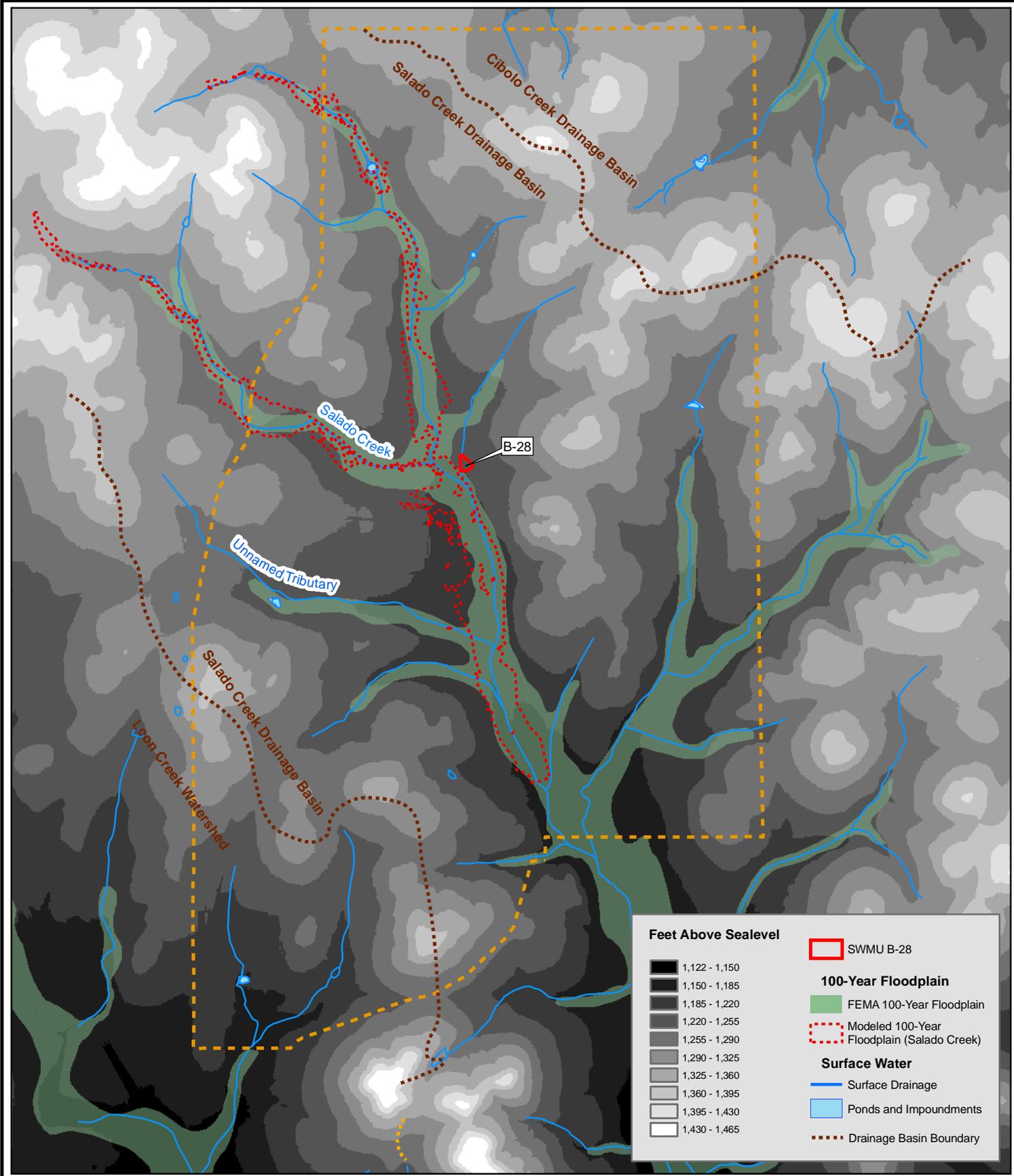
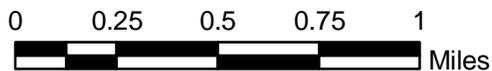


Figure 6

SWMU B-28 Topography,
Surface Water, and Floodplains
Camp Stanley Storage Activity

PARSONS



APPENDIX A
Site Photographs



Photo 1. Initial excavation, scraping the top 6 inches of soil from SWMU B-28, facing northwest (November 2010).



Photo 2. Stock-piling excavated soil, facing north (December 2010).



Photo 3. Large piece of slag taken from SWMU B-28, facing northeast (November 2010).



Photo 4. Showing initial excavation and stock-piled soil at SWMU B-28, facing south (December 2010).



Photo 5. Transporting excavated soil to the East Pasture, facing southeast (December 2010).



Photo 6. Transported soil placed on the firing berm in the East Pasture, facing east (December 2010).

APPENDIX B

Tier 1 Ecological Exclusion Criteria Checklist

Figure: 30 TAC §350.77(b)

TIER 1: Exclusion Criteria Checklist

This exclusion criteria checklist is intended to aid the person and the TNRCC in determining whether or not further ecological evaluation is necessary at an affected property where a response action is being pursued under the Texas Risk Reduction Program (TRRP). Exclusion criteria refer to those conditions at an affected property which preclude the need for a formal ecological risk assessment (ERA) because there are **incomplete or insignificant ecological exposure pathways** due to the nature of the affected property setting and/or the condition of the affected property media. This checklist (and/or a Tier 2 or 3 ERA or the equivalent) must be completed by the person for all affected property subject to the TRRP. The person should be familiar with the affected property but need not be a professional scientist in order to respond, although some questions will likely require contacting a wildlife management agency (i.e., Texas Parks and Wildlife Department or U.S. Fish and Wildlife Service). The checklist is designed for general applicability to all affected property; however, there may be unusual circumstances which require professional judgement in order to determine the need for further ecological evaluation (e.g., cave-dwelling receptors). In these cases, the person is strongly encouraged to contact TNRCC before proceeding.

Besides some preliminary information, the checklist consists of three major parts, **each of which must be completed unless otherwise instructed**. PART I requests affected property identification and background information. PART II contains the actual exclusion criteria and supportive information. PART III is a qualitative summary statement and a certification of the information provided by the person. **Answers should reflect existing conditions and should not consider future remedial actions at the affected property**. Completion of the checklist should lead to a logical conclusion as to whether further evaluation is warranted. Definitions of terms used in the checklist have been provided and users are strongly encouraged to familiarize themselves with these definitions before beginning the checklist.

Name of Facility:

Camp Stanley Storage Activity (CSSA), Boerne, Texas.

Affected Property Location:

SWMU B-28 is located near the northeast corner of the Inner Cantonment area of CSSA (see Figure 1 of the RIR). The site is approximately 1.3 acres in size. Records indicated that small arms ammunition, metal ammunition parts, aerial flares, and other metal debris were disposed in two trenches at the site. The north trench measured approximately 300 feet long and 15 feet wide, and the southern trench measured approximately 100 feet long and 15 feet wide. Both trenches were less than five feet deep.

Mailing Address:

**Camp Stanley Storage Activity
25800 Ralph Fair Road
Boerne, TX 78015**

TNRCC Case Tracking #s:

**Water Customer No.: CN602728206.
Air Customer No.: CN600126262.**

Solid Waste Registration #s:

Texas Solid Waste Registration No.: 69026.

Voluntary Cleanup Program #: **Not applicable.**

EPA I.D. #s:

USEPA Identification No.: TX2210020739.

Figure: 30 TAC §350.77(b)

Definitions¹

Affected property - The entire area (i.e., on-site and off-site; including all environmental media) which contains releases of chemicals of concern at concentrations equal to or greater than the assessment level applicable for residential land use and groundwater classification.

Assessment level - A critical protective concentration level for a chemical of concern used for affected property assessments where the human health protective concentration level is established under a Tier 1 evaluation as described in §350.75(b) of this title (relating to Tiered Human Health Protective Concentration Level Evaluation), except for the protective concentration level for the soil-to-groundwater exposure pathway which may be established under Tier 1, 2, or 3 as described in §350.75(i)(7) of this title, and ecological protective concentration levels which are developed, when necessary, under Tier 2 and/or 3 in accordance with §350.77(c) and/or (d), respectively, of this title (relating to Ecological Risk Assessment and Development of Ecological Protective Concentration Levels).

Bedrock - The solid rock (i.e., consolidated, coherent, and relatively hard naturally formed material that cannot normally be excavated by manual methods alone) that underlies gravel, soil or other surficial material.

Chemical of concern - Any chemical that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity. Depending on the program area, chemicals of concern may include the following: solid waste, industrial solid waste, municipal solid waste, and hazardous waste as defined in Texas Health and Safety Code, §361.003, as amended; hazardous constituents as listed in 40 Code of Federal Regulations Part 261, Appendix VIII, as amended; constituents on the groundwater monitoring list in 40 Code of Federal Regulations Part 264, Appendix IX, as amended; constituents as listed in 40 CFR Part 258 Appendices I and II, as amended; pollutant as defined in Texas Water Code, §26.001, as amended; hazardous substance as defined in Texas Health and Safety Code, §361.003, as amended, and the Texas Water Code §26.263, as amended; regulated substance as defined in Texas Water Code §26.342, as amended and §334.2 of this title (relating to Definitions), as amended; petroleum product as defined in Texas Water Code §26.342, as amended and §334.122(b)(12) of this title (relating to Definitions for ASTs), as amended; other substances as defined in Texas Water Code §26.039(a), as amended; and daughter products of the aforementioned constituents.

Community - An assemblage of plant and animal populations occupying the same habitat in which the various species interact via spatial and trophic relationships (e.g., a desert community or a pond community).

Complete exposure pathway - An exposure pathway where a human or ecological receptor is exposed to a chemical of concern via an exposure route (e.g., incidental soil ingestion, inhalation of volatiles and particulates, consumption of prey, etc).

De minimus - The description of an area of affected property comprised of one acre or less where the ecological risk is considered to be insignificant because of the small extent of contamination, the absence of protected species, the availability of similar unimpacted habitat nearby, and the lack of adjacent sensitive environmental areas.

Ecological protective concentration level - The concentration of a chemical of concern at the point of exposure within an exposure medium (e.g., soil, sediment, groundwater, or surface water) which is determined in accordance with §350.77(c) or (d) of this title (relating to Ecological Risk Assessment and Development of Ecological Protective Concentration Levels) to be protective for ecological receptors. These concentration levels are primarily intended to be protective for more mobile or wide-ranging ecological receptors and, where appropriate, benthic invertebrate communities within the waters in the state. These concentration levels are not intended to be directly protective of receptors with limited mobility or range (e.g., plants, soil invertebrates, and small rodents), particularly those residing within active areas of a facility, unless these receptors are threatened/endangered species or unless impacts to these receptors result in disruption of the ecosystem or other unacceptable consequences for the more

¹These definitions were taken from 30 TAC §350.4 and may have both ecological and human health applications. For the purposes of this checklist, it is understood that only the ecological applications are of concern.

mobile or wide-ranging receptors (e.g., impacts to an off-site grassland habitat eliminate rodents which causes a desirable owl population to leave the area).

Ecological risk assessment - The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors; however, as used in this context, only chemical stressors (i.e., COCs) are evaluated.

Environmental medium - A material found in the natural environment such as soil (including non-waste fill materials), groundwater, air, surface water, and sediments, or a mixture of such materials with liquids, sludges, gases, or solids, including hazardous waste which is inseparable by simple mechanical removal processes, and is made up primarily of natural environmental material.

Exclusion criteria - Those conditions at an affected property which preclude the need to establish a protective concentration level for an ecological exposure pathway because the exposure pathway between the chemical of concern and the ecological receptors is not complete or is insignificant.

Exposure medium - The environmental medium or biologic tissue in which or by which exposure to chemicals of concern by ecological or human receptors occurs.

Facility - The installation associated with the affected property where the release of chemicals of concern occurred.

Functioning cap - A low permeability layer or other approved cover meeting its design specifications to minimize water infiltration and chemical of concern migration, and prevent ecological or human receptor exposure to chemicals of concern, and whose design requirements are routinely maintained.

Landscaped area - An area of ornamental, or introduced, or commercially installed, or manicured vegetation which is routinely maintained.

Off-site property (off-site) - All environmental media which is outside of the legal boundaries of the on-site property.

On-site property (on-site) - All environmental media within the legal boundaries of a property owned or leased by a person who has filed a self-implementation notice or a response action plan for that property or who has become subject to such action through one of the agency's program areas for that property.

Physical barrier - Any structure or system, natural or manmade, that prevents exposure or prevents migration of chemicals of concern to the points of exposure.

Point of exposure - The location within an environmental medium where a receptor will be assumed to have a reasonable potential to come into contact with chemicals of concern. The point of exposure may be a discrete point, plane, or an area within or beyond some location.

Protective concentration level - The concentration of a chemical of concern which can remain within the source medium and not result in levels which exceed the applicable human health risk-based exposure limit or ecological protective concentration level at the point of exposure for that exposure pathway.

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, with the exception of:

- (A) A release that results in an exposure to a person solely within a workplace, concerning a claim that the person may assert against the person's employer;
- (B) An emission from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;
- (C) A release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined by the Atomic Energy Act of 1954, as amended (42 U.S.C. §2011 et seq.), if the release is subject to requirements concerning financial protection established by the Nuclear Regulatory Commission under §170 of that Act;

(D) For the purposes of the environmental response law §104, as amended, or other response action, a release of source, by-product, or special nuclear material from a processing site designated under §102(a)(1) or §302(a) of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. §7912 and §7942), as amended; and

(E) The normal application of fertilizer.

Sediment - Non-suspended particulate material lying below surface waters such as bays, the ocean, rivers, streams, lakes, ponds, or other similar surface water body (including intermittent streams). Dredged sediments which have been removed from below surface water bodies and placed on land shall be considered soils.

Sensitive environmental areas - Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young, and overwintering. Examples include critical habitat for threatened and endangered species, wilderness areas, parks, and wildlife refuges.

Source medium - An environmental medium containing chemicals of concern which must be removed, decontaminated and/or controlled in order to protect human health and the environment. The source medium may be the exposure medium for some exposure pathways.

Stressor - Any physical, chemical, or biological entity that can induce an adverse response; however, as used in this context, only chemical entities apply.

Subsurface soil - For human health exposure pathways, the portion of the soil zone between the base of surface soil and the top of the groundwater-bearing unit(s). For ecological exposure pathways, the portion of the soil zone between 0.5 feet and 5 feet in depth.

Surface cover - A layer of artificially placed utility material (e.g., shell, gravel).

Surface soil - For human health exposure pathways, the soil zone extending from ground surface to 15 feet in depth for residential land use and from ground surface to 5 feet in depth for commercial/industrial land use; or to the top of the uppermost groundwater-bearing unit or bedrock, whichever is less in depth. For ecological exposure pathways, the soil zone extending from ground surface to 0.5 feet in depth.

Surface water - Any water meeting the definition of surface water in the state as defined in §307.3 of this title (relating to Abbreviations and Definitions), as amended.

PART I. Affected Property Identification and Background Information

1) Provide a description of the specific area of the response action and the nature of the release. Include estimated acreage of the affected property and the facility property, and a description of the type of facility and/or operation associated with the affected property. Also describe the location of the affected property with respect to the facility property boundaries and public roadways.

Camp Stanley Storage Activity: CSSA is located in northwestern Bexar County, about 19 miles northwest of downtown San Antonio. The installation consists of approximately 4,004 acres immediately east of Ralph Fair Road, and approximately 0.5 mile east of Interstate Highway 10 (see Figure 1 of the RIR). CSSA has several historical waste sites, including SWMUs, AOCs, and RMUs. The present mission of CSSA is the receipt, storage, issue, and maintenance of ordnance as well as quality assurance testing and maintenance of military weapons and ammunition. Because of its mission, CSSA has been designated a restricted access facility. No changes to the CSSA mission and/or military activities are expected in the future.

SWMU B-28: SWMU B-28 is an area where small arms ammunition, metal ammunition parts, aerial flares, and other metal debris was disposed of in two trenches located near the northeast corner of the inner cantonment of CSSA. The exact dates of usage are unknown. Aerial photographs of CSSA dated 1934, 1957, 1966, 1973, 1985, and 2008 were reviewed in an effort to better determine when the site was used. In 1934, the site area was wooded, but in 1966, there were few trees at the site, and a gravel road led to the site from the east. There were no ground scars until 1966. This suggests that the site may have been used sometime between 1957 and 1966. In addition, the 1973 aerial photograph shows an area of bare soil in a linear pattern parallel to the road to the west of the site was visible. This may be representative of additional use of the site between 1966 and 1973.

Over the course of the RCRA Facility Investigation (RFI) activities at this unit, two trenches were identified. The trenches were found to contain buried munitions and various metal ammunition parts. The northern trench measures approximately 300 feet long and 15 feet wide, and the southern trench measures approximately 100 feet long and 15 feet wide.

The site is mostly level and covered with sparse vegetation and a thin soil profile. No activities currently take place at this unit. One overhead utility line trends southeast to northwest across the site. Moyer Road is located immediately west of the unit.

Attach available USGS topographic maps and/or aerial or other affected property photographs to this form to depict the affected property and surrounding area. Indicate attachments:

- Topo map Aerial photo Other

Aerial photos of the site and land adjacent to the site are shown on Figure 3 of the RIR. Figures 1 and 2 of the RIR show the general location of SWMU B-28.

2) Identify environmental media known or suspected to contain chemicals of concern (COCs) at the present time. Check all that apply:

<u>Known/Suspected COC Location</u>	<u>Based on sampling data?</u>	
<input type="checkbox"/> NO – Soil ≤ 5 ft below ground surface	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> NO – Soil >5 ft below ground surface	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> NO – Groundwater	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

NO – Surface Water/Sediments Yes No

Explain (previously submitted information may be referenced):

Based on soil samples collected at SWMU B-28, there are no VOCs or SVOCs at the sites (see Section 2.2.4 of this RIR). Metals with concentrations exceeding Tier 1 PCLs at the site were excavated and removed. Inorganic groundwater contamination has not been reported in the closest well to SWMU B-28, which is well CS-MW2-LGR (located approximately 920 feet downgradient). Since soils that were found to have concentrations of metals above their PCLs were excavated and removed, there will be no impact to groundwater from SWMU B-28. There is no evidence of affected surface water, or sediment, as a result of metals at SWMU B-28. Additionally, since soils found to have concentrations of metals above their PCLs were excavated and removed, there will be no impact to groundwater, surface water, or sediment from SWMU B-28.

3) Provide the information below for the nearest surface water body which has become or has the potential to become impacted from migrating COCs via surface water runoff, air deposition, groundwater seepage, etc. Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

- a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

The nearest surface water body, **Salado Creek**, is **approximately 250 feet** downstream from the affected property (**south of SWMU B-28**) and is an. The water body is best described as a:

- freshwater stream: _____ perennial (has water all year)
- _____ intermittent (dries up completely for at least 1 week a year) **[only has water during and immediately after rain events]**
- _____ intermittent with perennial pools
- freshwater swamp/marsh/wetland
- saltwater or brackish marsh/swamp/wetland
- reservoir, lake, or pond; approximate surface acres:
- drainage ditch
- tidal stream bay estuary
- other; specify

Is the water body listed as a State classified segment in Appendix C of the current Texas Surface Water Quality Standards; §§307.1 - 307.10?

Yes Segment # _____ Use Classification:

No

If the water body is not a State classified segment, identify the first downstream classified segment.

Name:

Salado Creek Drainage Basin

Segment #:

SWMU B-28 is located by an unnamed tributary to Salado Creek; thence to Salado Creek in Segment No. 1910 of the San Antonio River Basin (Salado Creek – from the confluence with the San Antonio River in Bexar County to Rocking Horse Lane west of Camp Bullis in Bexar County).

Use Classification:

The unclassified receiving waters of Salado Creek have no significant aquatic life use. The designated uses for Segment No. 1910 are high aquatic life use, contact recreation, public water supply, and aquifer protection – no degradation of high quality receiving waters is anticipated.

All creeks at CSSA are intermittent and only have water during and immediately following rain events. Refer to Section 3.2.3 of the RIR.

As necessary, provide further description of surface waters in the vicinity of the affected property:

Closest portion of Salado Creek to SWMU B-28 is approximately 250 feet downgradient.

PART II. Exclusion Criteria and Supportive Information

Subpart A. Surface Water/Sediment Exposure

1) Regarding the affected property where a response action is being pursued under the TRRP, have COCs migrated and resulted in a release or imminent threat of release to either surface waters or to their associated sediments via surface water runoff, air deposition, groundwater seepage, etc.? Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

- a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

Yes

No

Explain:

Inorganic groundwater contamination has not been reported in the closest well to SWMU B-28, which is well CS-MW2-LGR (located approximately 920 feet downgradient). Since soils that were found to have concentrations of metals above their PCLs were excavated and removed, there will be no impact to groundwater from SWMU B-28. There is no evidence of affected surface water, or sediment, as a result of metals at SWMU B-28.

The closest surface water body to SWMU B-28 is an unnamed tributary to Salado Creek, immediately adjacent on the west side of the site. Salado Creek is approximately 250 feet south of SWMU B-28. Salado Creek and its tributary, and all other streams at CSSA, are intermittent and only contain water during and immediately following rain events.

If the answer is Yes to Subpart A above, the affected property does not meet the exclusion criteria. However, complete the remainder of Part II to determine if there is a complete and/or significant soil exposure pathway, then complete PART III - Qualitative Summary and Certification. If the answer is No, go to Subpart B.

Subpart B. Affected Property Setting

In answering “Yes” to the following question, it is understood that the affected property is not attractive to wildlife or livestock, including threatened or endangered species (i.e., the affected property does not serve as valuable habitat, foraging area, or refuge for ecological communities). (May require consultation with wildlife management agencies.)

1) Is the affected property wholly contained within contiguous land characterized by: pavement, buildings, landscaped area, functioning cap, roadways, equipment storage area, manufacturing or process area, other surface cover or structure, or otherwise disturbed ground?

Yes No

Explain:

Concentrations of chemicals detected in soil samples at SWMU B-28 do not exceed Tier 1 residential soil action levels. Soils found to have metals concentrations above their PCLs were excavated and removed from the site. If the ecological benchmark value for a detected compound was lower than the human health PCL but higher than the CSSA background value, the ecological benchmark value was used as the criterion for impacted soil removal.

There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at SWMU B-28. Since soils found to have concentrations of metals above their PCLs were excavated/removed, there will be no impact to groundwater, surface water, or sediment in the area. Inorganic groundwater contamination has not been reported in the closest well to SWMU B-28 (well CS-MW2-LGR located approximately 920 feet downgradient).

Additionally, several surveys have been conducted at CSSA for threatened and endangered (T&E) species. The only T&E species that have been documented at CSSA are the black-capped vireo (*Vireo atricapillus*) [BCVI] and golden-cheeked warbler (*Dendroica chrysoparia*) [GCWA]. SWMU B-28 is not located within BCVI or GCWA habitat. The nearest potential habitats for local endangered species are approximately 1,000 feet east (Golden-Cheeked Warbler). Additional information can be found in the following references:

- **Parsons, 2007. *Final Integrated Natural Resource Management Plan*. Prepared for Camp Stanley Storage Activity, Boerne, Texas. October 2007. Available online: [CSSA EE \(Volume 1.6, Other Plans and Approaches\)](#)**
- **Parsons, 2009. *Final Species and Habitat Distributions of Black-Capped Vireos and Golden-Cheeked Warblers, 2009 Breeding/Nesting Season*. Prepared for Camp Stanley Storage Activity, Boerne, Texas. September 2009. Available online: [CSSA EE \(Volume 1.6, Other Plans and Approaches\)](#)**

If the answer to Subpart B above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subparts C and D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart B above is No, go to Subpart C.

Subpart C. Soil Exposure

1) Are COCs which are in the soil of the affected property solely below the first 5 feet beneath ground surface or does the affected property have a physical barrier present to prevent exposure of receptors to COCs in surface soil?

Yes **See explanation** No

Explain:

What contaminated soil horizon that was present at the site was removed during excavation activities.

Subpart D. De Minimus Land Area Subpart D skipped based on answers to Subpart C.

In answering “Yes” to the question below, it is understood that all of the following conditions apply:

The affected property is not known to serve as habitat, foraging area, or refuge to threatened/endangered or otherwise protected species. (Will likely require consultation with wildlife management agencies.)

Similar but unimpacted habitat exists within a half-mile radius.

The affected property is not known to be located within one-quarter mile of sensitive environmental areas (e.g., rookeries, wildlife management areas, preserves). (Will likely require consultation with wildlife management agencies.)

There is no reason to suspect that the COCs associated with the affected property will migrate such that the affected property will become larger than one acre.

1) Using human health protective concentration levels as a basis to determine the extent of the COCs, does the affected property consist of one acre or less and does it meet all of the conditions above?

Yes

No

Explain how conditions are met/not met:

If the answer to Subpart D above is Yes, then no further ecological evaluation is needed at this affected property, assuming the answer to Subpart A was No. Complete PART III - Qualitative Summary and Certification. If the answer to Subpart D above is No, proceed to Tier 2 or 3 or comparable ERA.

PART III. Qualitative Summary and Certification (Complete in all cases).

Attach a brief statement (not to exceed 1 page) summarizing the information you have provided in this form. This summary should include sufficient information to verify that the affected property meets or does not meet the exclusion criteria. The person should make the initial decision regarding the need for further ecological evaluation (i.e., Tier 2 or 3) based upon the results of this checklist. After review, TNRCC will make a final determination on the need for further assessment. **Note that the person has the continuing obligation to re-enter the ERA process if changing circumstances result in the affected property not meeting the Tier 1 exclusion criteria.**

Completed by: Laura Marbury, P.G. (Typed/Printed Name)

Principal Geologist (Title)

August 3, 2011 (Date)

I believe that the information submitted is true, accurate, and complete, to the best of my knowledge.

Julie Burdey, P.G. (Typed/Printed Name of Person)

Project Manager (Title of Person)


 (Signature of Person)

August 3, 2011 (Date Signed)

APPENDIX C

TCEQ Approval for Non-Hazardous Soils Reuse, April 19, 2006



DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, RRAD
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

December 3, 2010

U-029-10

Mr. Kirk Coulter, P.G., Project Manager
Texas Commission on Environmental Quality
Corrective Action Team 1, VCP-CA Section
Remediation Division
PO Box 13087 (MC-127)
Austin, TX 78711-3087

SUBJECT: Movement of Non-Hazardous Metals Impacted Soils from SWMU/AOC Closure Efforts to East Pasture Firing Range, Camp Stanley Storage Activity, Boerne, Texas
TCEQ Industrial Solid Waste Registration #69026, EPA Identification Number TX2210020739

Dear Mr. Coulter:

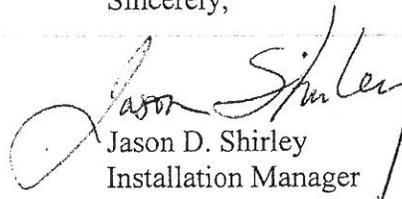
The Camp Stanley Storage Activity (CSSA), McAlester Army Ammunition Plant, U.S. Army Field Support Command, Army Material Command, U.S. Army, is providing this letter to notify the TCEQ of CSSA's plan to move and manage non-hazardous metals-impacted soils generated during remedial actions at CSSA's Solid Waste Management Units (SWMU) and Area of Concerns (AOC) to CSSA's East Pasture Firing Range Berm located in Range Management Unit 1 (RMU-1).

CSSA currently has a need for additional soils on the small arms firing range berm in the east pasture. In recent years, this berm has been modified with non-hazardous soils generated from various SWMUs and AOCs remedial actions. The non-hazardous soil movement and management within the east pasture RMU-1 was authorized by TCEQ and USEPA during a Technical Interchange Meeting held on April 19, 2006 and subsequent letter by Mr. Sonny Rayos, TCEQ Project Manager, dated May 7, 2008. This letter is provided to TCEQ to reaffirm regulatory agreement with this practice.

To verify the generated remediation soils are non-hazardous prior to movement to the east pasture, soil samples will be collected and analyzed for TCLP metals in accordance with CSSA's approved RFI/IM Waste Management Plan dated May 2006. Movement of the non-hazardous metals-impacted soils from CSSA SWMUs and AOCs to the East Pasture Firing Range Berm is expected to occur on an as needed basis as determined by CSSA.

If you have any questions regarding this notification, please contact Gabriel Moreno-Fergusson at (210) 698-5208 or Mr. Ken Rice, Parsons, at (512) 719-6050.

Sincerely,


Jason D. Shirley
Installation Manager

cc: Mr. Greg Lyssy, EPA Region 6
Mr. Jorge Salazar, TCEQ Region 13
Ms. Julie Burdey, Parsons

Schoepflin, Shannon

From: Kirk Coulter [KCoulter@tceq.state.tx.us]
Sent: Monday, December 20, 2010 2:40 PM
To: Rice, Ken R
Subject: Re: Revised workplan fo Vapor Intrusion Survey Investigation at AOC-65

Hi Ken

On the movement of non-haz waste letter. I am sending this E-Mail to you as an informal approval of the letter sent to me on December 3, 2010. I understand that this procedure was approved during Technical meeting held on April 19, 2006 between Camp Stanley, Mr. Sonny Rayos (TCEQ), Parsons Engineering and Mr. Greg Lyssy (EPA).

If you have any questions, please call me

Thanks

Kirk

>>> "Rice, Ken R" <Ken.R.Rice@parsons.com> 12/7/2010 4:48 PM >>>
Greg,

I was preparing for our upcoming meeting in January and realized I have not set you the attached revised vapor intrusion survey work plan you requested from our last meeting. This was revised to include that three additional soil gas samples within AOC-65 southwest of building 90 for TO-15 PCE SIM analysis. We have collected soil gas samples directly west of building 90 (at CSSA's fence line) and indoor air samples within building 90. The remaining effort is to collect soil gas data similar to what may be present off-post. That is, the groundwater PCE concentrations within the LGR aquifer in the southern portion of AOC-65 are conservatively similar in off-post groundwater PCE concentrations. Therefore soil gas samples collected in the southern portion of AOC-65 may be more representative of the off-post soil gas present above similar LGR contaminated groundwater. We intend to take the soil gas samples for TO-15 PCE SIM analysis prior to our meeting so that all results may be discussed and finalization of the Vapor Intrusion Survey Report initiated. If you have any questions or concerns please do not hesitate to call or contact me.

Regards,

Ken Rice
Parsons
512-719-6050 (Austin)
512-497-0075 (mobile)

Safety - Make it Personal !

APPENDIX D

Data Verification Summary Report

DATA VERIFICATION SUMMARY REPORT

for samples collected from B-28

CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers soil samples and the associated field quality control (QC) sample collected from Camp Stanley Storage Activity (CSSA) under BRAC 50 on December 27, 2010. The samples in the following Sample Delivery Group (SDG) were analyzed for barium, copper and zinc:

63552

The field QC sample collected in association with this SDG was one field duplicate (FD) sample.

All samples were collected by Parsons and analyzed by Agriculture & Priority Pollutants Laboratories, Inc. (APPL) in Clovis, California, following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0.

The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 2.5° C which was within the 2-6° C range recommended by the CSSA QAPP.

There were five waste characterization samples shipped to the lab in this SDG, however, the data validation discussion does not include results of those waste characterization samples.

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; COC forms and the cooler receipt checklist. 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.

ICP METALS

General

The ICP metals portion of this SDG consisted of eleven (11) samples, including ten (10) environmental soil samples and one (1) FD. The samples were collected on December 27, 2010 and were analyzed for barium, chromium, and zinc. The ICP metals analyses were performed using USEPA SW846 Method 6010B. 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.

The ICP metals samples were digested in one batch. Some digestates were diluted 10 times for Barium.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the laboratory control sample (LCS).

All LCS recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the parent and FD analyte results. Two sets of samples were collected from B28-BOT06. The second set of was submitted to the laboratory as a field duplicate.

All target metals detected above the RL in both the parent and field duplicate are listed below:

B28-BOT06				
Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Barium	1198	1243	3.7	RPD ≤ 20
Copper	14	19	30	
Zinc	61	72	17	

“J” flags were applied to all copper results in this DG.

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 times required by the method.

- All instrument tune criteria were met.
- 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.
- All interference check criteria were met.
- All internal standard criteria were met.
- Dilution test (DT) was analyzed on sample B28-BOT01. The DT was applicable for all metals detected in the parent sample at a concentration of 50 times the MDL or greater. Copper and zinc failed to meet criteria in the DT, as follows:

Metal	%D	Criteria
Barium	3.6	%D ≤ 10
Copper	34	
Zinc	37	

- A post digestion spike (PDS) was analyzed on the same sample as the DT. Both copper and zinc met criteria in the PDS, as follows:

Metal	%R	Criteria
Copper	87	75-125%
Zinc	78	

There were one method blank and several calibration blanks associated with the ICP analyses in this SDG. All blanks were free of any 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 results for the samples in this SDG were considered usable. The completeness for the ICP portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

DATA VERIFICATION SUMMARY REPORT**for samples collected from****CAMP STANLEY STORAGE ACTIVITY****BOERNE, TEXAS**Data Verification by: Tammy Chang
Parsons - Austin**INTRODUCTION**

The following data verification summary report covers soil samples and the associated field quality control (QC) samples collected from Camp Stanley Storage Activity (CSSA) under Environmental Protection Support, Investigations, and Treatability Studies on February 24, 2011. The samples in the following Sample Delivery Group (SDG) included samples collected from B28, B24, and RMU3:

63998

The field QC sample collected in association with this SDG were two field duplicate (FD) samples, two sets of matrix spike/matrix spike duplicate (MS/MSD), and one equipment blank (EB).

All samples were collected by Parsons and analyzed by Agriculture & Priority Pollutants Laboratories, Inc. (APPL) in Clovis, California, following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0.

The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 2.5° C which was within the 2-6° C range recommended by the CSSA QAPP.

There were five waste characterization samples shipped to the lab in this SDG, however, the data validation discussion does not include results of those waste characterization samples.

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; COC forms and the cooler receipt checklist. 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.

ICP METALS

General

The ICP metals portion of this SDG consisted of twenty-five (25) samples, including eighteen (18) environmental soil samples, two (2) pairs of MS/MSD, two (2) FDs, and one (1) EB. The samples were collected on February 24, 2011. Samples collected from B28 were analyzed for barium only, sample collected from B24 was analyzed for TX 11 metals, sample from RMU3 were analyzed for CSSA-9 metals which include arsenic, barium, cadmium, chromium, copper, lead, nickel, and zinc. . The ICP metals analyses were performed using USEPA SW846 Method 6010B. 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.

The ICP metals samples were digested in four batches, one for the EB and three for soil. All digetates were analyzed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the four laboratory control samples (LCS) and MS/MSD. Samples B28-BOT17 and RMU3-SS06 were designated as parent samples for MS/MSD analyses.

All LCS, MS, and MSD recoveries were within acceptance criteria.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD results and two sets of parent and FD analyte results. Two sets of samples were collected from B28-BOT11 and RMU3-SS05. The second set of was submitted to the laboratory as a field duplicate.

All RPDs were compliant in the two pairs of MS/MSD analyses.

All target metals detected above the RL in both the parent and field duplicate are listed below:

B28-BOT11

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Barium	19.1	17.7	7.6	RPD \leq 20

RUM3-SS05

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Barium	29.4	29.3	0.3	RPD \leq 20
Copper	13.19	11.97	9.7	
Lead	44.57	48.96	9.4	
Nickel	5.62	5.60	0.4	
Zinc	15.4	13.7	12	

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 times required by the method.

- All instrument tune criteria were met.
- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. All three ICV were prepared using a secondary source.
- All interference check criteria were met.
- All internal standard criteria were met.
- Dilution test (DT) was analyzed on sample B28-BOT17 for barium:

B28-BOT17

Metal	%D	Criteria
Barium	87	%D ≤ 10

- A post digestion spike (PDS) was analyzed on the same sample as the DT.

B28-BOT17

Metal	%R	Criteria
Barium	166	75-125%

“J” flags were applied to all barium results of samples collected from B28.

- Another DT was performed on sample RMU3-SS06 for barium, copper and lead:

RMU3-SS06

Metal	%D	Criteria
Barium	45	%D ≤ 10
Copper	46	
Lead	54	

- A post digestion spike (PDS) was analyzed on the same sample as the DT.

B28-BOT17

Metal	%R	Criteria
Arsenic	88	75-125%
Barium	86	
Cadmium	78	
Chromium	83	
Copper	108	
Nickel	82	
Lead	88	
Zinc	76	

There were three method blanks and several calibration blanks associated with the ICP analyses in this SDG. All blanks were free of any 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 results for the samples in this SDG were considered usable. The completeness for the ICP portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

Mercury**General**

The mercury portion of this SDG consisted of fifteen (15) samples which consisted of eleven (11) field soil samples, one (1) EB, one (1) pair of MS/MSD and one (FD). Samples were collected on February 24, 2011 and were analyzed for mercury. The mercury metals analyses were performed using USEPA SW846 Method 7470A for the EB and 7471A for all soil. 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.

The mercury samples were extracted, digested, and analyzed in three batches, one for the EB and the other two for soil.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the three LCSs.

All LCS recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the RPD of MS/MSD and parent/FD results.

RPD of the MS/MSD was compliant.

RPD of the parent and FD set of sample RMU3-SS05 could not be calculated, since both results are less than the reporting limit.

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 times required by the method.

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

There were three method blanks and several calibration blanks associated with the mercury 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.

The mercury results of 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%.

APPENDIX E

Summary of 1995 Soil, Groundwater, and Soil Gas Data for SWMU B-28

Table B28-1 Summary of Chemical Constituents Detected in Soil, February 1995
Solid Waste Management Unit B-28

Constituent	Soil Comparison Criteria						Soil Sample Analytical Results ^a										
	Lab MDL	Lab PQL	Back-ground ^b Glen Rose	Back-ground ^b Soil	RRS2-GWP ^c (Ind.)	RRS2-SAI ^c (Ind.)	B28-SB01 Depth (ft) Soil (Kr) Date Collected	B28-SB01 14.0-15.0 Glen Rose 2/27/1995	B28-SB01 29.0-30.0 Glen Rose 2/27/1995	B28-SB02 2.0-3.0 Soil (Kr) 2/27/1995	B28-SB02 14.0-15.0 Glen Rose 2/27/1995	B28-SB02 29.0-30.0 Glen Rose 2/27/1995	B28-SB03 0.0-2.0 Soil (Kr) 2/28/1995	B28-SB03 14.0-15.0 Glen Rose 2/28/1995	B28-SB03 ^d 14.0-15.0 Glen Rose 2/28/1995	B28-SB03 29.5-30.0 Glen Rose 2/28/1995	
VOCs, SW8260 (ug/kg):							-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁
No analytes detected	NA	--	--	--	--	--	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁
SVOCs, SW8270 (ug/kg)^e:							350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	333 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁
Bis(2-ethylhexyl)phthalate	NA	1,000	--	--	600	65,000	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	333 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁
Butylbenzylphthalate	NA	1,000	--	--	2,000,000	200,000,000	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	333 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁
Di-n-butylphthalate	NA	1,000	--	--	1,000,000	100,000,000	350 U ₁	350 U ₁	350 U ₁	350 U ₁	350 U ₁	333 U ₁	470	350 U ₁	720	750	750
Metals, SW6010 (mg/kg):							0.62 U ₂	0.59 U ₂	0.56	2.7 U ₂	0.36 U ₂	0.91 U ₂	2.90 U ₂	0.48 U ₂	0.53 U ₂	0.42 U ₂	0.42 U ₂
Cadmium	NA	0.25	0.10	3.00	0.50	410	0.62 U ₂	0.59 U ₂	0.56	2.7 U ₂	0.36 U ₂	0.91 U ₂	2.90 U ₂	0.48 U ₂	0.53 U ₂	0.42 U ₂	0.42 U ₂
Calcium	NA	25	--	--	--	--	182,000	271,000	252,000	69,200	283,000	252,000	17,000	204,000	199,000	227,000	227,000
Chromium	NA	0.5	8.1	40.2	10	240,000	2.1 U ₂	3.3	2.2 U ₂	16	1.2 U ₂	1.8 U ₂	15	2.0 U ₂	2.6 U ₂	1.6 U ₂	1.6 U ₂
Copper	NA	0.5	13.1	23.2	130	74,000	1.6	1.3	1.4	7.7	2.2	0.95	28	1.5	1.6	1.4	1.4
Iron	NA	2.5	--	--	--	--	3,400	3,100	1,500	17,400	1,600	3,200	15,700	2,400	2,700	1,900	1,900
Lead ^f	NA	1.5	5.50	85	1.5	1,000	2.3	1.6	1.5 U ₁	16	1.5 U ₁	1.5 U ₁	20	1.6	2.5	1.7	1.7
Magnesium	NA	25	--	--	--	--	2,200	2,800	12,100	2,400	2,200	2,900	2,900	2,200	2,200	5,600	5,600
Manganese	NA	0.5	--	--	1,400	81,000	50	46	31	310	60	39	510	38	37	44	44
Nickel	NA	0.5	6.80	35.5	200	12,000	3.1	3.2	4.6	11	2.2	6.5	13	4.4	4.2	2.5	2.5
Potassium	NA	25	--	--	--	--	650	920	760	2,800	300	610	3,400	520	780	540	540

Constituent	Soil Sample Analytical Results (Continued) ^a									
	B28-SB04 Depth (ft) Soil (Kr) Date Collected	B28-SB04 14.0-15.0 Glen Rose 2/28/1995	B28-SB04 29.5-30.0 Glen Rose 2/28/1995	B28-SB05 0.0-2.0 Soil (Kr) 3/1/1995	B28-SB05 14.0-15.0 Glen Rose 3/1/1995	B28-SB05 29.0-30.0 Glen Rose 3/1/1995	B28-SB06 0.0-2.0 Soil (Kr) 3/1/1995	B28-SB06 15.0-16.0 Glen Rose 3/1/1995	B28-SB06 29.0-30.0 Glen Rose 3/1/1995	B28-SB06 29.5-30.0 Glen Rose 3/1/1995
VOCs, SW8260 (ug/kg):										
No analytes detected	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁	-- U ₁
SVOCs, SW8270 (ug/kg)^e:										
Bis(2-ethylhexyl)phthalate	350 U ₁	350 U ₁	350 U ₁	4,200	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁
Butylbenzylphthalate	350 U ₁	350 U ₁	350 U ₁	3,000	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁
Di-n-butylphthalate	350 U ₁	350 U ₁	590	3,400	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁	1,000 U ₁
Metals, SW6010 (mg/kg):										
Cadmium	0.93 U ₂	0.37 U ₂	0.34 U ₂	1.9 U ₂	0.25 U ₁	0.78 U ₂	1.8 U ₂	0.73 U ₂	0.5 U ₂	0.5 U ₂
Calcium	142,000	306,000	271,000	343,000	348,000	184,000	128,000	238,000	221,000	221,000
Chromium	6.0	1.0 U ₂	1.0 U ₂	12	0.79 U ₂	4.0	11	3.6	2.5 U ₂	2.5 U ₂
Copper	2.9	0.95	0.59	7.1	1.2	2.0	5.7	1.5	2.3	2.3
Iron	5,100	1,600	1,400	14,000	520	4,600	12,100	4,400	2,900	2,900
Lead ^f	5.0	1.5 U ₁	1.5 U ₁	12	1.5 U ₁	3.4	11	2.9	1.5 U ₁	1.5 U ₁
Magnesium	1,500	7,300	7,500	4,600	2,200	28,400	2,000	18,000	41,100	41,100
Manganese	130	5.3	28	270	49	63	200	82	69	69
Nickel	4.7	2.4	2.8	8.6	0.95	4.1	8.3	3.7	2.8	2.8
Potassium	930	290	220	2,200	150	1,600	2,300	1,100	1,400	1,400

Notes:

^a All samples were analyzed by Chemron, Inc., San Antonio, Texas. All results reported on a wet-weight basis.

^b Background values from Draft Second Revised Evaluation of Background Metals Concentrations in Soil Types at Camp Stanley Storage Activity (Parsons ES, February 2002).

^c Industrial risk reduction standards for groundwater protection (GWP), soil-air ingestion (SAI), and groundwater (GW).

^d Duplicate sample.

^e Sixteen semivolatile analytes were not detected, but the results were rejected due to deficiencies in quality control criteria. The presence or absence of the analytes cannot be verified.

^f The background concentration of lead is less than the groundwater protection (GWP) standard.

Sample concentrations are only highlighted if they also exceed the background concentration.

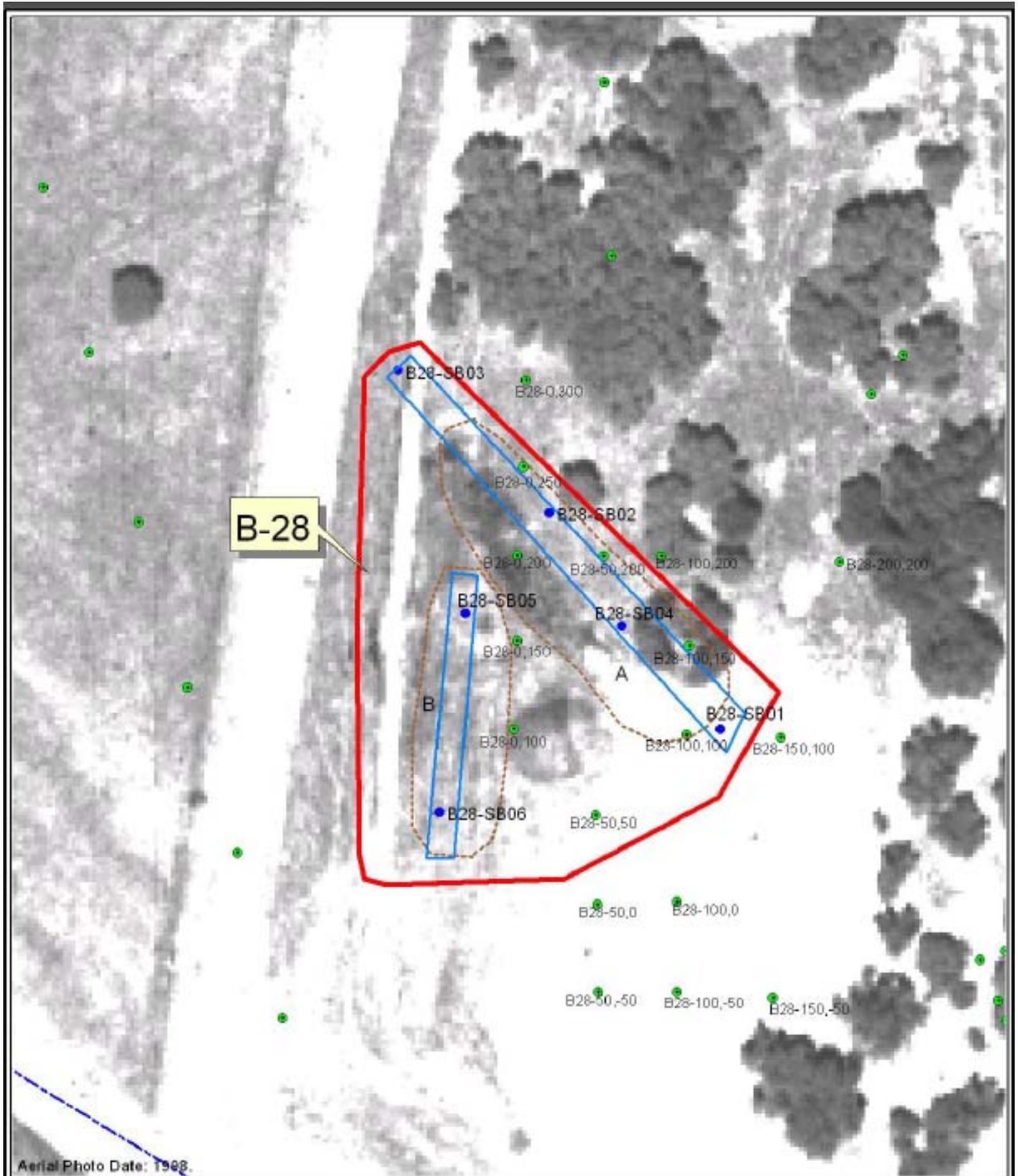
Concentrations exceeding RRS1 background levels are highlighted

Concentrations exceeding RRS2 standards are highlighted and are in a box.

CLP Data Qualifiers:

U₁ The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U₂ The sample contained less than five times the amount of the analyte in the corresponding method blank.



Aerial Photo Date: 1988.



75 0 75 Feet

- Soil Gas Survey Location
- Soil Boring Location
- + Water Well Location
- Creeks (Dashed where intermittent)
- A EM Anomaly
- B Approximate Trench Location

Figure B28-4

Sample Location Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

Due to different margins of error associated with the various methods utilized for data point collection, all sample locations are approximate. For more information see the 2001 amendment to the Field Sampling Plan, Vol. 1-4 of the Environmental Encyclopedia.

**Table B28-2 Summary of Chemical Constituents Detected Groundwater, March 1995
Solid Waste Management Unit B-28**

Constituent	Sample ID Date Collected				B28-SB3 3/1/1995
	Groundwater Comparison Criteria				Groundwater Sample Analytical Results ^a
	Lab MDL	Lab PQL	Back- ground	RRS2 GW ^b (Ind.)	
VOCs, SW8260 (ug/L): No analytes detected	--	--	NA	--	-- U ₁
SVOCs, SW8270 (ug/L): No analytes detected	--	--	NA	--	-- U ₁
Metals, SW6010 (mg/L):					
Cadmium	NA	0.005	NA	0.005	0.005 U ₁
Calcium	NA	0.5	NA	--	210
Chromium	NA	0.01	NA	0.1	0.01
Copper	NA	0.01	NA	1.3	0.01
Iron	NA	0.04	NA	--	3.4
Lead	NA	0.03	NA	0.015	0.03 U ₁
Magnesium	NA	0.5	NA	--	63
Manganese	NA	0.01	NA	14	0.07
Nickel	NA	0.01	NA	0.73	0.01 U ₁
Potassium	NA	0.5	NA	--	12

Notes:

^a All samples were analyzed by Chemron, Inc., San Antonio, Texas.

^b Industrial risk reduction standards for groundwater (GW).

Concentrations exceeding RRS1 background levels are highlighted.

Concentrations exceeding RRS2 standards are highlighted and in a box.

CLP Data Qualifiers:

U₁ The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

SUMMARY OF 1995 SOIL GAS SURVEY DATA FOR SWMU B-28

from Groundwater Investigation and Associated Source Characterization Appendix F -Technical Memorandum on Soil Gas Surveys

Date	Location	Depth (ft BGL)	Benzene	Toluene	Ethyl benzene	Total xylenes	Total Hydrocarbons	cis-1,2-DCE	TCE	PCE
29-Jun-95	0,300	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.03
29-Jun-95	50,200	5.5	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.42
29-Jun-95	0,200	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.02
29-Jun-95	0,100	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.02
29-Jun-95	50,200 Dup	5.5	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.41
29-Jun-95	0,250	6	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.05
29-Jun-95	100,150	4	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.16
29-Jun-95	100,150 Dup	4	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.16
29-Jun-95	150,100	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.02
29-Jun-95	0,150	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.04
29-Jun-95	100,200	5	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.01 U
29-Jun-95	100,100	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.08
29-Jun-95	50,0	6	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.24
29-Jun-95	100,0	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.18
29-Jun-95	50,50	5	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.7
29-Jun-95	50,50 Dup	5	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.7
30-Jun-95	50,-50	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.02
30-Jun-95	150,-50	2	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.02
30-Jun-95	100,-50	3	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.1
19-Jul-95	200,200	4.5	0.2 U	0.2 U	0.3 U	0.3 U	0.2 U	0.3 U	0.02 U	0.04

(all units in µg/L)

APPENDIX F

Summary of 2000 Sifted Soil Pile Sample Results for SWMU B-28

**ANALYTICAL RESULTS SUMMARY IN SIFTED SOIL AT SWMU B-28
FROM APPENDIX B OF SWMU B-28 RFI REPORT, APRIL 2002**

Sample ID	B28-SIFT03			B28-SIFT03			B28-SIFT04			B28-SIFT05			RW-B28-SIFT06			RW-B28-SIFT06			RW-B29-SIFT06			RW-B28-SIFT06					
Sample Date	4/21/2000			4/21/2000			4/21/2000			4/21/2000			4/21/2000			4/21/2000			4/21/2000			4/21/2000					
Sample Type	N1			N1			N1			N1			N1			FD1			N1			FD1					
Beginning Depth	1			1			8			5			0			0			0			0					
Ending Depth	1.5			1.5			8.5			5.5			0.5			0.5			0.5			0.5					
Lab ID	00C00901			AP91542			AP91543			AP91544			00C00910			OOC00911			Q3526			Q3527					
	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution												
D2216 (%)																											
Moisture				17.4		1	18.8		1	17.9		1															
Total Solids																			73.9		1	64		1			
SW6010B (mg/kg)																											
Barium				4406.8		20	7885.9		20	6927.9		20							4371.2	M	5	4644.1	M	5			
Chromium				31.7		1	34.9		1	30.3		1							27.3		1	28.3		1			
Copper				59.08		1	410.75		20	76.72		1							44.2	M	1	599.1	M	1			
Nickel				19.44		1	23.5		1	19.7		1							17.3		1	19		1			
Zinc				186.23		1	188.76		1	515.77		20							199.7	M	1	707.5	M	5			
SW7060A(mg/kg)																											
Arsenic				5.9		5	4.99	F	10	4.79		5							5	M	1	4.89	M	1			
SW7131A(mg/kg)																											
Cadmium				1.85		10	2.12		10	2.86		10							2.07	M	10	2.08	M	10			
SW7421(mg/kg)																											
Lead				21.13	J	10	21.98	J	10	44.1	J	10							31.98	M	10	25.35	M	10			
SW7471A(mg/kg)																											
Mercury				0.27	J	1	0.09	F	1	0.11	J	1							0.19	M	1	0.19	M	1			
SW8330(mg/kg)																											
Dinitrobenzene, 1,3-	0.008	U	1										0.008	U	1	0.008	U	1									
Dinitrotoluene, 2,4-	0.027	U	1										0.06	U	1	0.06	U	1									
Dinitrotoluene, 2,6-	0.06	U	1										0.06	U	1	0.06	U	1									
HMX	0.03	U	1										0.03	U	1	0.03	U	1									
Nitrobenzene	0.039	U	1										0.039	U	1	0.039	U	1									
Nitrotoluene, 2-	0.078	U	1										0.078	U	1	0.078	U	1									
Nitrotoluene, 3-	0.16	U	1										0.16	U	1	0.16	U	1									
Nitrotoluene, 4-	0.11	U	1										0.11	U	1	0.11	U	1									
RDX	0.02	U	1										0.02	U	1	0.02	U	1									
TETRYL	0.022	U	1										0.022	U	1	0.022	U	1									
Trinitrobenzene, 1,3,5-	0.011	U	1										0.011	U	1	0.011	U	1									
Trinitrotoluene, 2,4,6-	0.031	U	1										0.031	U	1	0.031	U	1									

F = The analyte was positively identified, but the associated value is below the RL.
M = A matrix effect was present.

J = The analyte was positively identified, but the quantitation is an estimation.
U = The analyte was analyzed for, but not detected. The associated numerical value is MDL.

APPENDIX G

ProUCL Statistical Calculation Summary for Barium in SWMU B-28 Soils

General UCL Statistics for Full Data Sets

User Selected Options

From File Worksheet.wst
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Result (mg/kg)

General Statistics

Number of Valid Observations 40
Number of Distinct Observations 31

Raw Statistics

Minimum 0.1
Maximum 490.4
Mean 103.8
Median 75
SD 92.72
Std. Error of Mean 14.66
Coefficient of Variation 0.893
Skewness 1.979

Log-transformed Statistics

Minimum of Log Data -2.303
Maximum of Log Data 6.195
Mean of log Data 4.133
SD of log Data 1.396

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.82
Shapiro Wilk Critical Value 0.94

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.793
Shapiro Wilk Critical Value 0.94

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 128.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 132.9
95% Modified-t UCL (Johnson-1978) 129.3

Assuming Lognormal Distribution

95% H-UCL 316.5

95% Chebyshev (MVUE) UCL 351.6
97.5% Chebyshev (MVUE) UCL 435.3
99% Chebyshev (MVUE) UCL 599.9

Gamma Distribution Test

k star (bias corrected) 1.051
Theta Star 98.8
MLE of Mean 103.8
MLE of Standard Deviation 101.3
nu star 84.08
Approximate Chi Square Value (.05) 63.94
Adjusted Level of Significance 0.044
Adjusted Chi Square Value 63.29

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 128
95% Jackknife UCL 128.5
95% Standard Bootstrap UCL 127.7
95% Bootstrap-t UCL 136
95% Hall's Bootstrap UCL 142.2
95% Percentile Bootstrap UCL 128
95% BCA Bootstrap UCL 132.5
95% Chebyshev(Mean, Sd) UCL 167.7
97.5% Chebyshev(Mean, Sd) UCL 195.4
99% Chebyshev(Mean, Sd) UCL 249.7

Assuming Gamma Distribution

95% Approximate Gamma UCL 136.5
95% Adjusted Gamma UCL 138

Potential UCL to Use

Use 95% Approximate Gamma UCL 136.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

APPENDIX H

Waste Characterization Sampling Results for SWMU B-28

Appendix H. Waste Characterization Sampling Results for SWMU B-28

SAMPLE ID:		B28-WC04		B28-WC05		B28-WC06		B28-WC07		B28-WC08	
DATE SAMPLED:		12/1/2010		12/1/2010		12/1/2010		12/8/2010		12/8/2010	
LAB SAMPLE ID:		AY28102		AY28103		AY28104		AY28807		AY28808	
		Units									
Metals - SW6010B/SW7470A											
Antimony	mg/L	0.0010	U	0.0010	U	0.0010	U	0.0090	F	0.0020	F
Arsenic	mg/L	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U
Barium	mg/L	5.2		36		14		4.1		2.4	
Beryllium	mg/L	0.00020	U	0.00020	U	0.00020	U	0.00020	U	0.00020	U
Cadmium	mg/L	0.0010	F	0.0061	F	0.0032	F	0.0038	F	0.00030	U
Chromium	mg/L	0.0010	U	0.0010	U	0.0010	U	0.0010	U	0.0030	F
Lead	mg/L	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0012	U
Mercury	mg/L	0.000100	U	0.000100	U	0.000100	U	0.000100	U	0.000100	U
Nickel	mg/L	0.0010	U	0.0050	F	0.0010	U	0.0010	U	0.0010	U
Selenium	mg/L	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U
Silver	mg/L	0.0069	F	0.016		0.017		0.00090	F	0.013	

QA NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.

U - Analyte was not detected above the indicated Method Detection Limit (MDL).

F - Analyte was positively identified, but the quantitation is an estimation above the MDL and below the Reporting Limit (RL).

Detections are bolded.