

**MINUTES FOR REGULATORY MEETING  
CAMP STANLEY STORAGE ACTIVITY  
CONTRACT NO. W912G-07-D-0028, DO11  
Parsons Project Nos. 746545 (FFP) and 746546 (T&M)**

Date: December 11, 2008  
 Time: 9:30 A.M. – 3:00 P.M.  
 Place: Parsons - Austin, Texas  
 Subject: Environmental Project Status Meeting  
 Attendees:

<b>Attendee</b>	<b>Organization</b>	<b>Phone</b>
Wayne Elliott	U.S. Army Corps of Engineers, Fort Worth District	871-886-1666
Glare Sanchez	Camp Stanley	321-662-3718
Greg Lyssy	United States Environmental Protection Agency	214-665-8317
Sonny Rayos	Texas Commission on Environmental Quality	512-239-2371
Jorge Salazar	Texas Commission on Environmental Quality	210-403-4059
Chris Beal	Portage	210-336-1171
Julie Burdey	Parsons	512-719-6062
Ken Rice	Parsons	512-719-6050
Samantha Elliott	Parsons	210-347-6012
Kimberly Vaughn	Parsons	512-719-6816
Bob Edwards	Noblis	210-408-5552
Mike Chapa	Weston Solutions, Inc.	210-248-2428
Jeff Wormser	Weston Solutions, Inc.	

*\*Minutes prepared by Kimberly Vaughn, Parsons.*

The sign-in sheet from the meeting is shown in Attachment 1. The presentations given at the meeting are in Attachment 2.

**SITE INVESTIGATION STATUS**

The status of ongoing site investigations was reviewed. There were reports submitted for three sites that are currently under review: I-1 (Release Investigation Report (RIR) submitted July 2008), area of concern (AOC) 73 (RIR submitted September 2008) and AOC 63 (no further action Affected Property Assessment Report (APAR) submitted on October 2008). Contaminated soils were removed from AOC 67/68 in November 2008 and it is anticipated that an RIR will be submitted in January 2009. There were also recent soil removals conducted at AOC 69 and an RIR will be submitted for this site in about February 2009.

## WESTON SUMMARY OF B-71 AND AOC 64

Results of investigations and interim removal actions at SWMU B-71 were described. Mr. Chapa asked the question that if we need to clean up to Tier 1 protective concentration levels (PCL), additional excavation will be needed, he would like to ask if the Tier 2 methodology as submitted in the APAR currently under review is acceptable. Mr. Rayos answered he can look at the Tier 2 PCL calculations submitted for AOC 63 in the APAR and possibly provide a review. Mr. Rayos requested preliminary PCL calculations for B-71 be submitted for review. There was a discussion of the quantity of soil anticipated to be excavated and the levels of benzene and lead that were detected.

### **Action Item: Submit preliminary PCL calculations for B-71**

Mr. Chapa summarized AOC 64 investigations to date. Mr. Chapa questioned whether soils generated can be used as backfill. Mr. Rayos and Mr. Lyssy indicated “yes” as long as results show the soil is clean. There was a discussion of the usage of TCLP methods for sampling. The Waste Management Plan governs the sampling methods.

Mr. Beal noted that there are other locations at CSSA that have generated soils, usually from building or road construction, and could that soil be used as fill? Mr. Rayos has no problem with that if the sampling has been performed. Mr. Rayos agreed that one sample per 1,000 cubic yards would be acceptable. Mr. Lyssy and Mr. Rayos agreed that a composite sample is allowed. Mr. Lyssy also agreed that these soils could be used for berm. Mr. Lyssy agrees that it is preferable not send soils to the landfill, if possible. Mr. Rayos asked about how the rocket motors are disposed. Mr. Chapa answered that they are rendered unable to be used, demilitarized, and disposed. Mr. Rayos asked if perchlorate was sampled and Mr. Chapa confirmed that perchlorate was sampled underneath the location where the rocket flares were found and none was found.

## GROUNDWATER MONITORING SUMMARY

Ms. Burdey began a summary of the groundwater monitoring program. She summarized the history of monitoring since 1999. An update to the long-term monitoring optimization (LTMO) is currently planned. The results can be presented at the public meeting planned for fall 2009. The LTMO could be implemented for off-post sampling.

A discussion of the status of well access agreements was held. Mr. Rayos noted that if CSSA sends a letter to TCEQ with the names and addresses of well owners, the TCEQ can send a letter to the landowner to assist in obtaining the right-of-entry. Well I10-4 was discussed, and the possibility that the landowner did not properly plug and abandon that well.

### **Action Item: Parsons will research and prepare a list of landowners for which right-of-access is needed that have been unresponsive to repeated requests.**

There was a discussion of the aerial currently used as imagery in the GIS. It is possible that newer imagery may be available that better represents the changing demographics near CSSA and the new subdivisions and construction nearby.

### **Action Item: Parsons will research commercially available aerials that could be used.**

Ms. Burdey summarized that VOC concentrations have not significantly changed since the previous groundwater program update. One point of discussion from the last meeting were the metals concentrations in the six new monitoring wells installed. The detections of lead have decreased to below the action level. Ms. Sanchez noted that CSSA will continue to sample these wells for lead.

## **NORTH PASTURE SITE INVESTIGATIONS**

Ms. Burdey began a summary of the North Pasture sites planned for investigation and closure under the Texas Risk Reduction Program (TRRP). Currently the plan was to combine the four sites into one APAR. Parsons recommends an RIR be prepared for B-2 and the remaining three sites (B-8, B-20, and B-24) be investigated further prior to submittal of an APAR. Mr. Rayos asked if the three sites could be combined into one APAR in the future. Ms. Burdey agreed that is still a possibility. Ms. Burdey summarized the history of previous investigations for all four North Pasture sites. The most important part of the remaining investigations at B-20 and B-24 are the UXO surveys that should be performed. Prior UXO investigations were done with the technology available at that time and should be conducted with current technology.

Mr. Lyssy noted the multi-incremental (MI) sampling method should be used for explosives and metals.

Ms. Burdey reviewed the prioritization for completion of tasks necessary to move toward site closure for these sites (Slide 26, Attachment 1). Mr. Lyssy and Mr. Rayos agreed to the prioritization.

## **LUNCH BREAK**

### **TREATABILITY STUDIES AT B-3 AND AOC 56**

Ken Rice discussed the current status at the B-3 bioreactor pilot study and the AOC 65 Soil Vapor Extraction (SVE) pilot study. Mr. Rice and Mr. Edwards discussed the degradation pathways that are active at the B-3 bioreactor. Mr. Edwards described the various isotope signatures and the complex fractured system present in the subsurface. Mr. Rice listed the three recommendations that CSSA is making at this time:

- additional extraction wells within B-3 and/or near the former O-1;
- additional shallow monitoring wells surrounding B-3 for additional characterization;
- in addition to another year of monitoring at the B-3 bioreactor, perform a tracer study to evaluate flow pathways.

Mr. Lyssy and Mr. Rayos asked whether a location for an additional extraction well should be within B-3. Mr. Rice explained that the well will be cased to 150 or 200 feet to remove water from deeper than the bioreactor. CSSA is currently funded to install this well. An additional well, that is not currently funded, is planned at O-1. Mr. Rice asked whether the O-1 extraction well could be installed through the cap at the O-1 site, which has been approved for closure for soils only. Mr. Lyssy agrees that the well can go through the cap if it is properly cased. Mr. Beal noted these extraction wells will be completed in the Lower Glen Rose formation only and will not penetrate through the Bexar Shale.

Mr. Rice described the shallow monitoring wells surrounding the bioreactor will be completed to about 50' or possibly 100' below ground surface to monitor the influence of the bioreactor. Ms. Burdey noted it is probably premature to prepare the Corrective Measures Study (CMS) currently planned; Mr. Lyssy agreed.

Mr. Rice described the fresh water tracer study planned using the Westbay wells with Mosdax transducers installed. The options for rotamine, bromine or fluorescence tracers were discussed. It was agreed that a fresh water tracer study can be done using the new water supply well as the source water first.

**Action Item: Parsons will prepare cost estimate for shallow monitoring wells and fresh water tracer study.**

Mr. Rice began the discussion of the AOC 65 SVE study. A review of the current conditions was presented. Mr. Rice described the extensive soil gas study done around Building 90 and the two indoor air monitoring studies that were conducted in 2002. These previous studies indicate that there is not an indoor air issue at Building 90 in the area of highest contamination levels. Mr. Salazar asked for confirmation on what solvents are currently used in the building. Mr. Rice noted that the indoor air monitoring studies were in 2002 when the building was using a vat system and mineral spirits. Ms. Sanchez confirmed that in 2004, SafetyKleen products began being used. Mr. Lyssy agreed that the 2002 data is probably a "worst case" study. Mr. Salazar and Mr. Lyssy agreed that if the data shows no vapor issue in Building 90 then there is probably not an issue across the road ½ mile away. Mr. Rice noted that a summary of the existing indoor air data can be submitted to address vapor intrusion concerns.

**Action Item: Parsons will summarize vapor data from Building 90 previous studies.**

Mr. Rayos asked what other technologies have been evaluated for AOC 65. A discussion of a bioreactor, dual phase extraction, heating of the subsurface soils, etc., was held. Mr. Lyssy and Mr. Rice noted that, near the boundary, we must be careful not to mobilize contaminants.

## **PUBLIC MEETING 2009**

Ms. Vaughn described the preliminary planning for the public meetings next fall in 2009. Previous meetings were held in 2001, 2002, and 2006. For the 2009 meetings, the topics proposed include:

- Mission and history of CSSA
- Groundwater monitoring both on and off-post, history and results
- Sampling rationale, well installations, *introduce long term monitoring optimization for off-post program*
- Status of AOC 65 and B-3 investigations, *description of treatability studies and future plans*
- How CSSA identifies sites for cleanup, investigation methods, and status of sites being remediated

Mr. Rayos noted that for the public's perception of the LTMO, we need to carefully present the facts so that any reductions in monitoring are not perceived incorrectly.

A one-time mail out will send a topical fact sheet to residents within a one mile boundary of Camp Stanley (including new residents in the Centex subdivisions) and announce the meeting date and times. A newspaper announcement will also be published. Mr. Lyssy and Mr. Elliott noted that we need to be sure and capture new residents in the area and give them an opportunity to “opt in” to the mailing list.

Two meetings were preliminarily scheduled for November 3<sup>rd</sup> and November 5<sup>th</sup>, 2009, one at the Fair Oaks Ranch elementary school and one at the Leon Springs elementary school.

A tentative date for the next regulatory meeting was planned for March or April 2009. Mr. Rayos will be on vacation the last week in April 2009.

The meeting was adjourned.

Attachment 1, Sign in Sheet

December 11, 2008

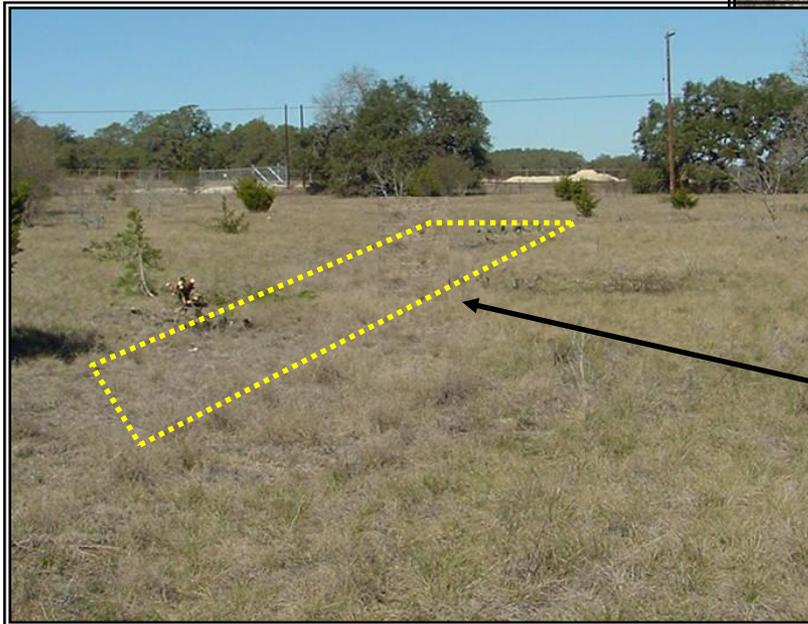
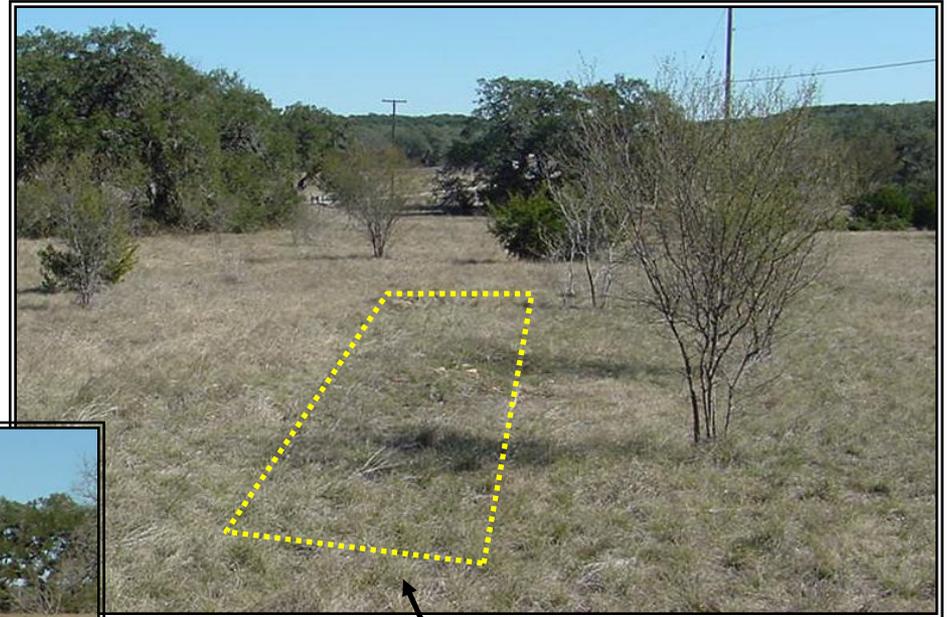
CSSA Status Meeting

Name	Organization	Email
<del>CSSA</del>		
Glare Sanchez	CSSA	glaresanchez@netzero.net Sanchezg@envirodept.net
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Bob Edwards	Nobli's	robert.edwards@nobli's.org

## Attachment 2, Slide Presentations

# Site Background: SWMU B-71

- Munitions Debris (MD) Disposal Area: Spent Small Arms Casings and Bullets Identified Circa 1990
- Surface Litter and Depressed Areas
- Bordered on three sides by AOC 38
- (Closed Sep 2004)
- Located Within Floodplain of Salado Creek
- Investigation Area Approximately 2.5 Acres



Surface Depressions with  
MD Litter



# Interim Removal Areas – SWMU B-71

Anomaly Area B

Legend:

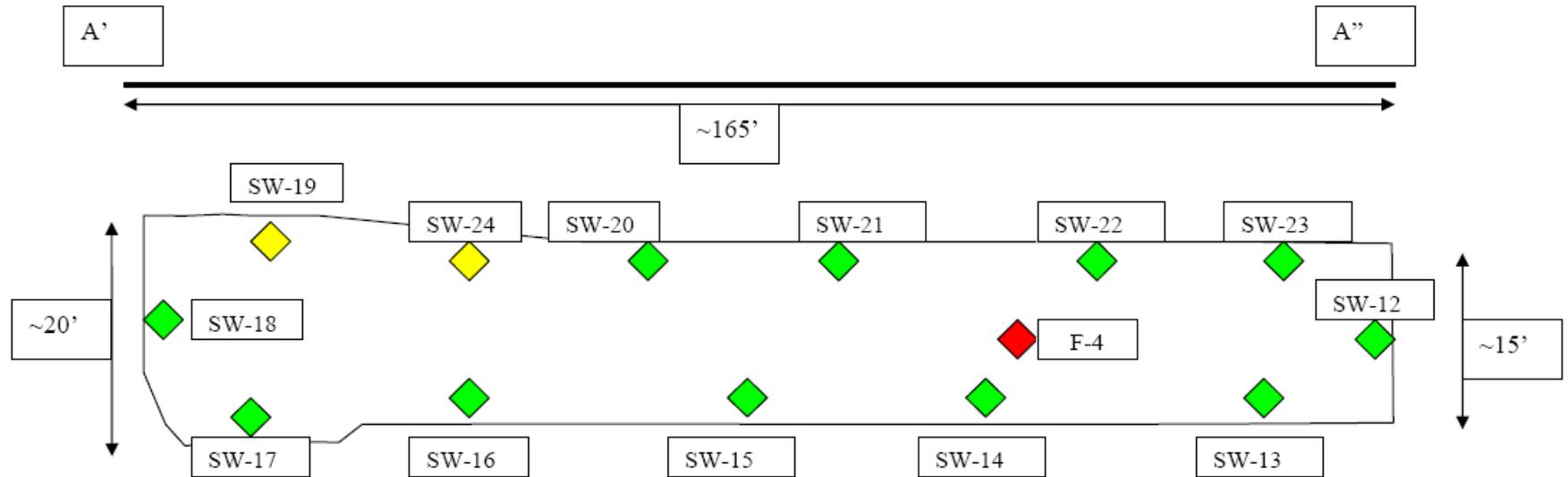
- ▲ Exploratory Trench Sample Point
- Exploratory Trench Observation Point
- Geophysical Survey Anomaly Feature

Surface Litter Cleanup Area



Anomaly Area A

# SWMU B-71: Anomaly Area A Plan View



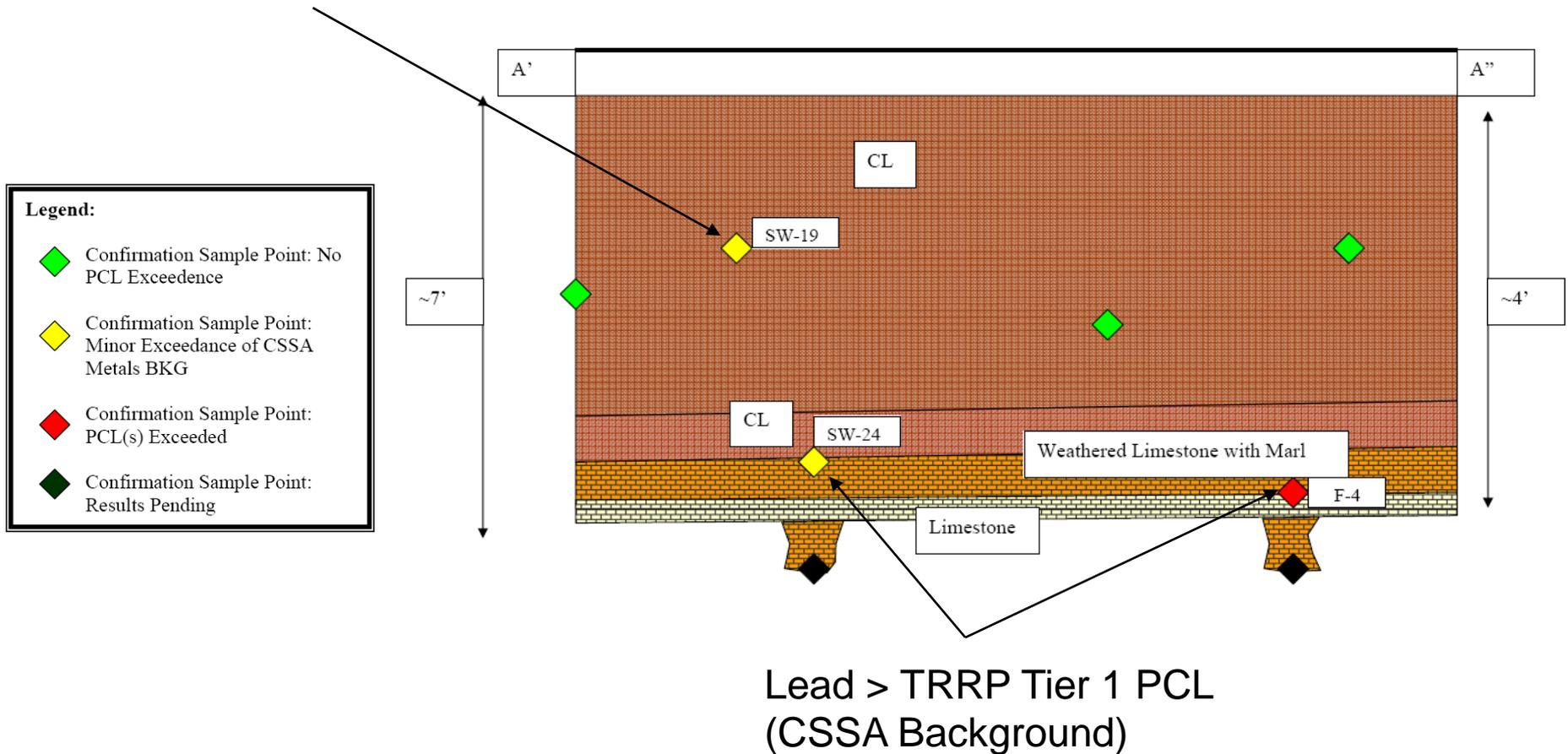
## Legend:

-  Confirmation Sample Point: No PCL Exceedance
-  Confirmation Sample Point: Minor Exceedance of CSSA Metals BKG
-  Confirmation Sample Point: PCL(s) Exceeded
-  Confirmation Sample Point: Results Pending

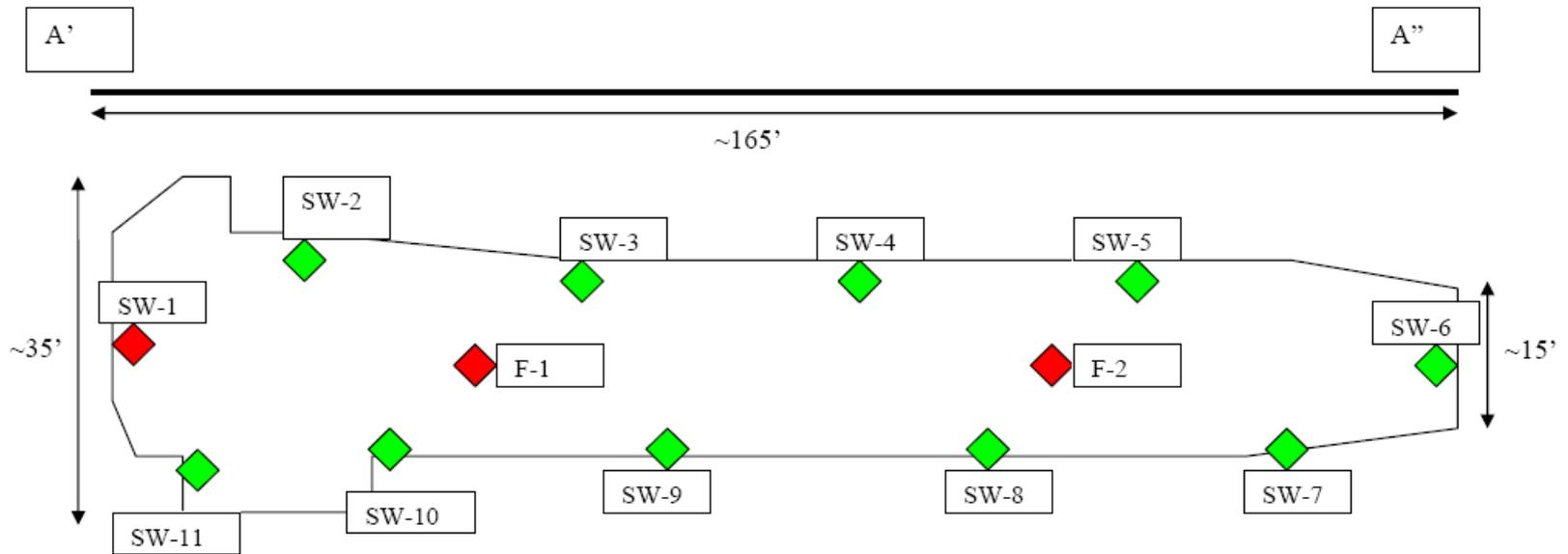


# SWMU B-71: Anomaly Area A Soil Profile

Lead and 2,4 Dinitrotoluene > TRRP Tier 1 PCL



# SWMU B-71: Anomaly Area B Plan View



## Legend:

- Green diamond: Confirmation Sample Point: No PCL Exceedance
- Yellow diamond: Confirmation Sample Point: Minor Exceedance of CSSA Metals BKG
- Red diamond: Confirmation Sample Point: PCL(s) Exceeded
- Dark green diamond: Confirmation Sample Point: Results Pending

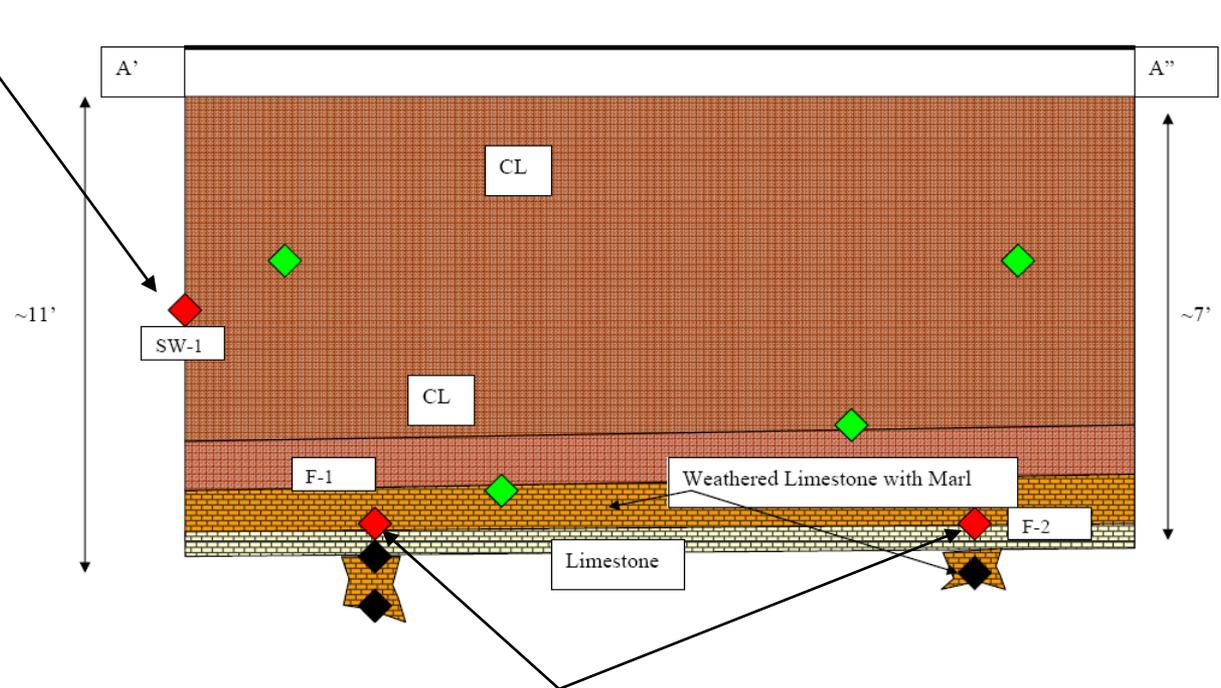


# SWMU B-71: Anomaly Area B Soil Profile

Lead and Benzene > TRRP Tier 1 PCL

**Legend:**

- ◆ Confirmation Sample Point: No PCL Exceedence
- ◆ Confirmation Sample Point: Minor Exceedence of CSSA Metals BKG
- ◆ Confirmation Sample Point: PCL(s) Exceeded
- ◆ Confirmation Sample Point: Results Pending



Lead > TRRP Tier 1 PCL  
(CSSA Background)

# SWMU B-71: Anomaly Area A Post Removal

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Residual  
Staining at  
F-3 and F-4



# SWMU B-71: Anomaly Area B Post Removal

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Penetration of  
Limestone for  
Sample F-2



# Site Background: AOC 64

Explosive Ordnance Disposal (EOD) Burn Area

Buried MD and Surface Litter

Soil Mounds with Rubble and Refuse

Large “Kick-Out” Area with Shrapnel and Other Debris

Surface Water Drainage Feature through South End of Site

Bedrock Outcrop at North Side of Site

Investigation Area Approximately 1.5 Acres



Surface Drainage Feature





# AOC 64 –Anomaly Area A Post Removal

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# AOC 64: Anomaly Area B Post Removal

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# AOC 64 Munitions Debris and Refuse

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# AOC 64 Cobble/Boulder Pile

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# IRA General Technical Approach

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## **Remove Munitions Debris and Impacted Soil**

- Delineations from geophysical survey and trenching Investigations
- Final excavations defined by depth to bedrock, visual observations, and confirmation sampling

## **Excavation, On-Site Stabilization of Metals Debris and Impacted Soil, Interim Staging**

- Segregation during removal; clean overburden, visually non-impacted soils, MD and visually impacted soil
- Waste characterization sampling: one per 200 cubic yards (cy): Toxicity Characteristic Leaching Procedure (TCLP) Metals, TPH
- Additional treatment if results exceed TCLP non-hazardous threshold for any COC

## **Large Munitions Debris Demilitarization**

- Large MD (e.g., Rocket Motors at AOC 64) manually dismantled and certified safe for disposal by UXO technicians prior to transport for disposal or recycling

## **Disposal/Recycling**

- All impacted materials disposed as non-hazardous Class 1 Industrial or Special Waste at Subtitle D landfill
- Recycling options under evaluation

# Confirmation Sampling

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## **Excavation Bottom**

- One grab sample per 2,500 square feet (sf) for unconsolidated soil
- Weathered bedrock sampled for vertical delineation purposes
- Additional excavation if GWP standard not achieved for all COCs

## **Sidewalls**

- One grab sample per 33 linear feet (lf)
- Additional excavation if GWP standards not achieved for all COCs

## **On-site Sources of Backfill Material**

- One composite sample per source location

## **Analytical Suite**

- VOC, SVOC, CSSA metals suite, and explosives concentrations by applicable EPA methodology

# Soil Treatment, Potential On-Post Uses

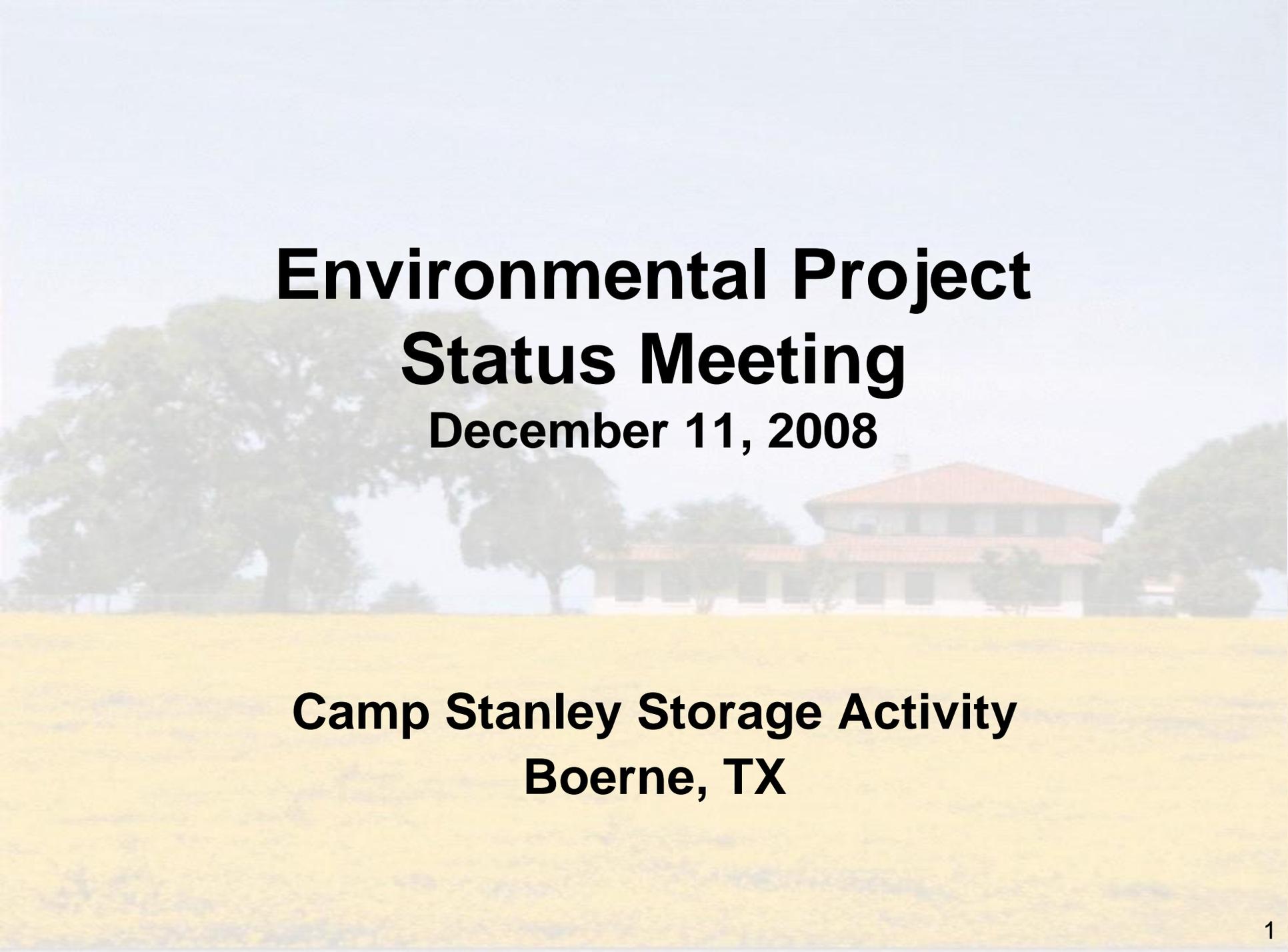
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**On-site Use of Non-Haz Soil: East Pasture Firing Range Berms (no stabilization)?**

**Screened gravel and cobble use as backfill?**

## **Stabilization Process for Off-Post Disposal**

- Munitions debris affected soil mixed with water and Portland Cement
- Mixed to a homogenous consistency and allowed to cure
- Post Treatment Characterization Sampling



**Environmental Project  
Status Meeting  
December 11, 2008**

**Camp Stanley Storage Activity  
Boerne, TX**

# Agenda

Status of Site Investigations (I-1, AOC-73, AOC-62,  
AOC-67/68, AOC-69,  
AOC-64, B-71)

Groundwater Monitoring Update

North Pasture sites

SWMU B-3 Future Plans

AOC-65 SVE/Vapor Intrusion

Initial Planning for Public Meeting

# Status of Site Investigations

## **Reports submitted:**

**I-1:** RIR submitted July 9, 2008.

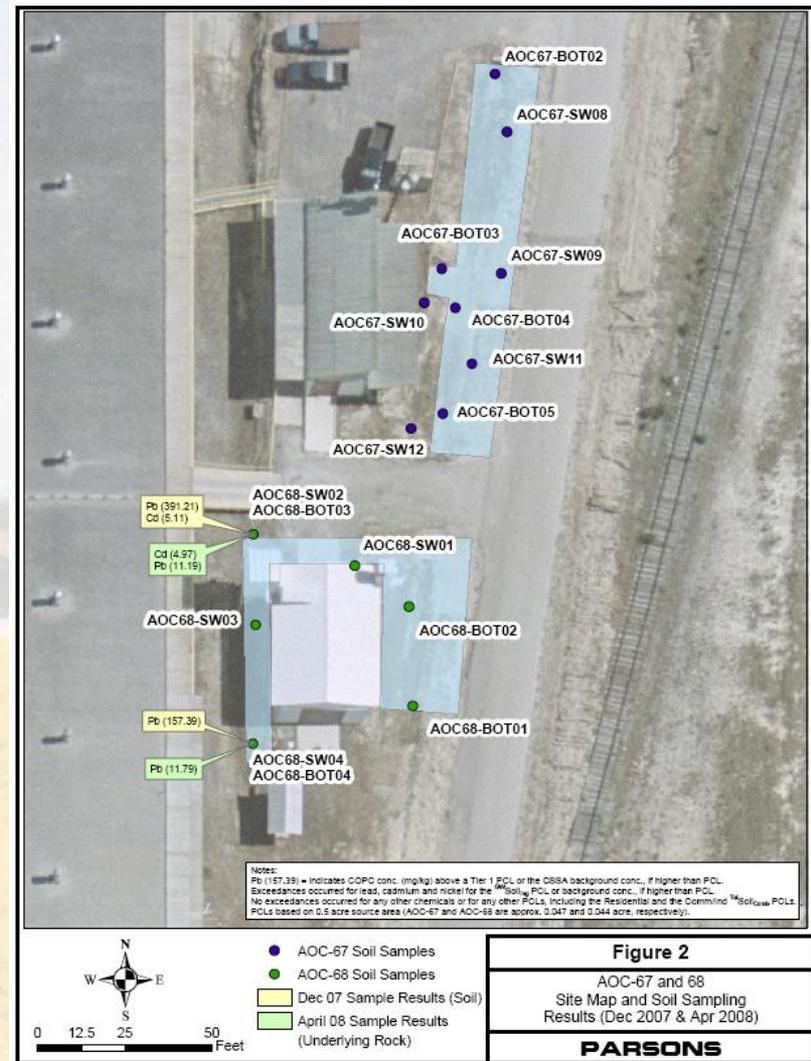
**AOC-73:** RIR submitted Sept. 30, 2008.

**AOC-62:** No Further Action APAR submitted on Oct. 8, 2008.

# Status of Site Investigations

## AOC-67/68

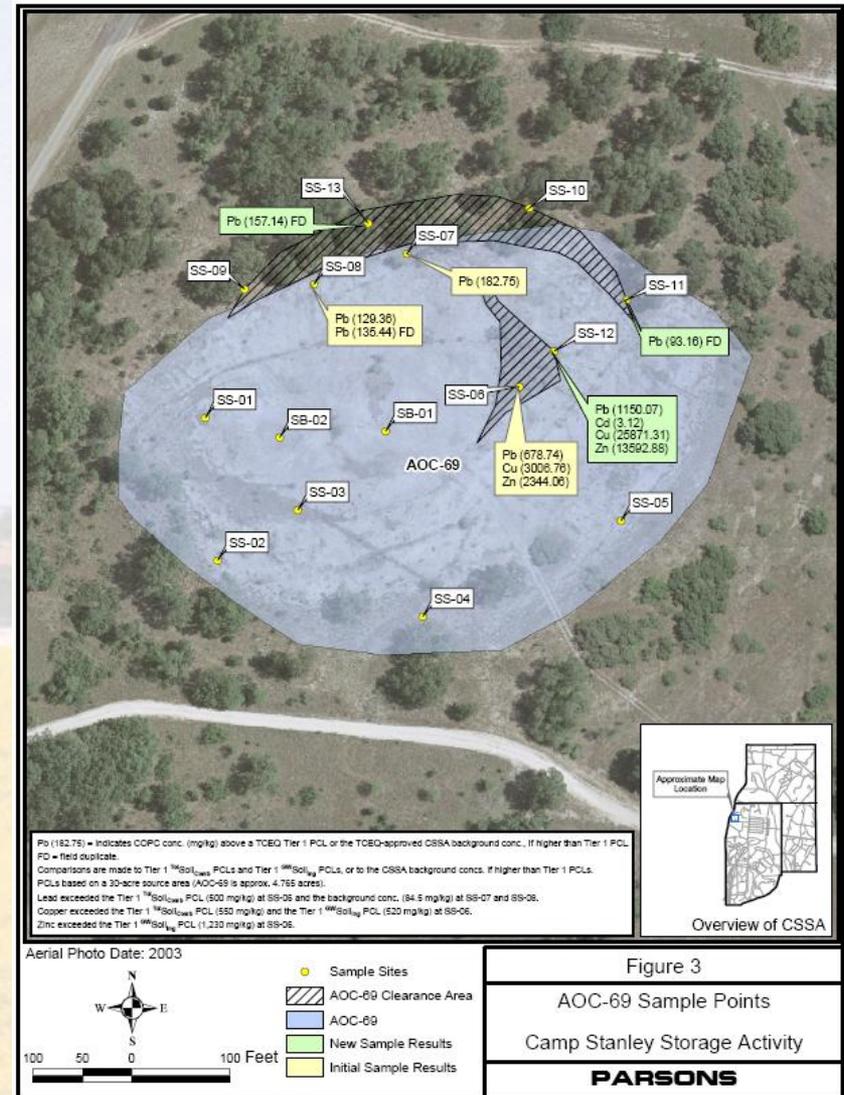
- Additional contaminated soils removed in November.
- Awaiting analytical results for confirmation samples.
- Intend to submit RIR in January 2009.



# Status of Site Investigations

## AOC-69

- Additional contaminated soils removed in November 2008.
- Awaiting analytical results for confirmation samples.
- Intend to submit RIR in February 2009.





# **GROUNDWATER MONITORING UPDATE**

# Groundwater Monitoring Program

## Overview

- Quarterly Monitoring Program:
  - On-post since December 1999: 37 events
  - Off-post since September 2001: 30 events
- Wells included:
  - 43 On-post monitoring wells
  - 3 On-post drinking water supply wells
  - 4 Westbay<sup>®</sup>-equipped wells
  - 44 Off-post private and public supply wells
- 5 off-post wells have GAC units due to past exceedances



# Groundwater Monitoring Program

## Recent Changes

- New GAC enclosures are scheduled to be installed on off-post GACed wells in May 2009. In conjunction with the routine semi annual carbon exchange.
- One new drinking water supply well to be installed. Engineering Report was submitted to the TCEQ November 20, 2008.
- Difficulties with access agreements.
- We did locate off-post well I10-4, it has not been plugged (see handout).



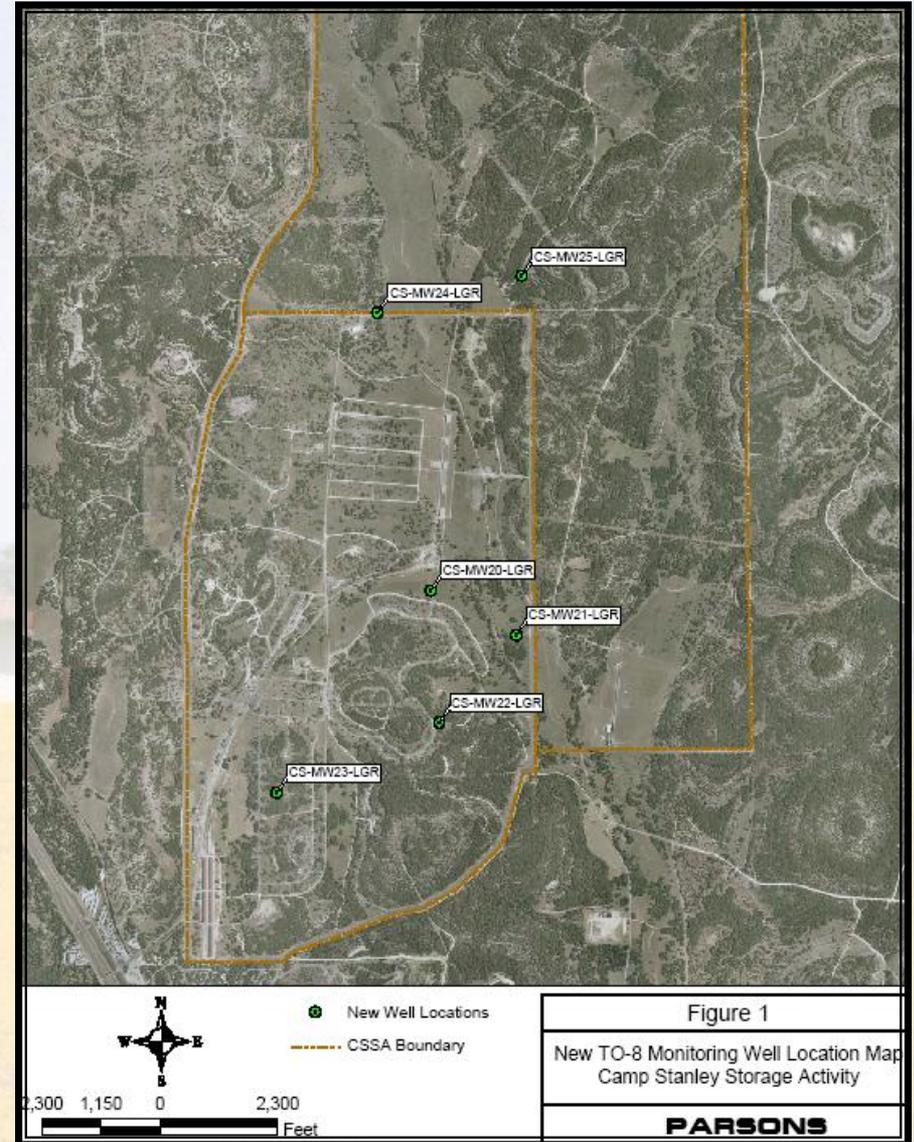
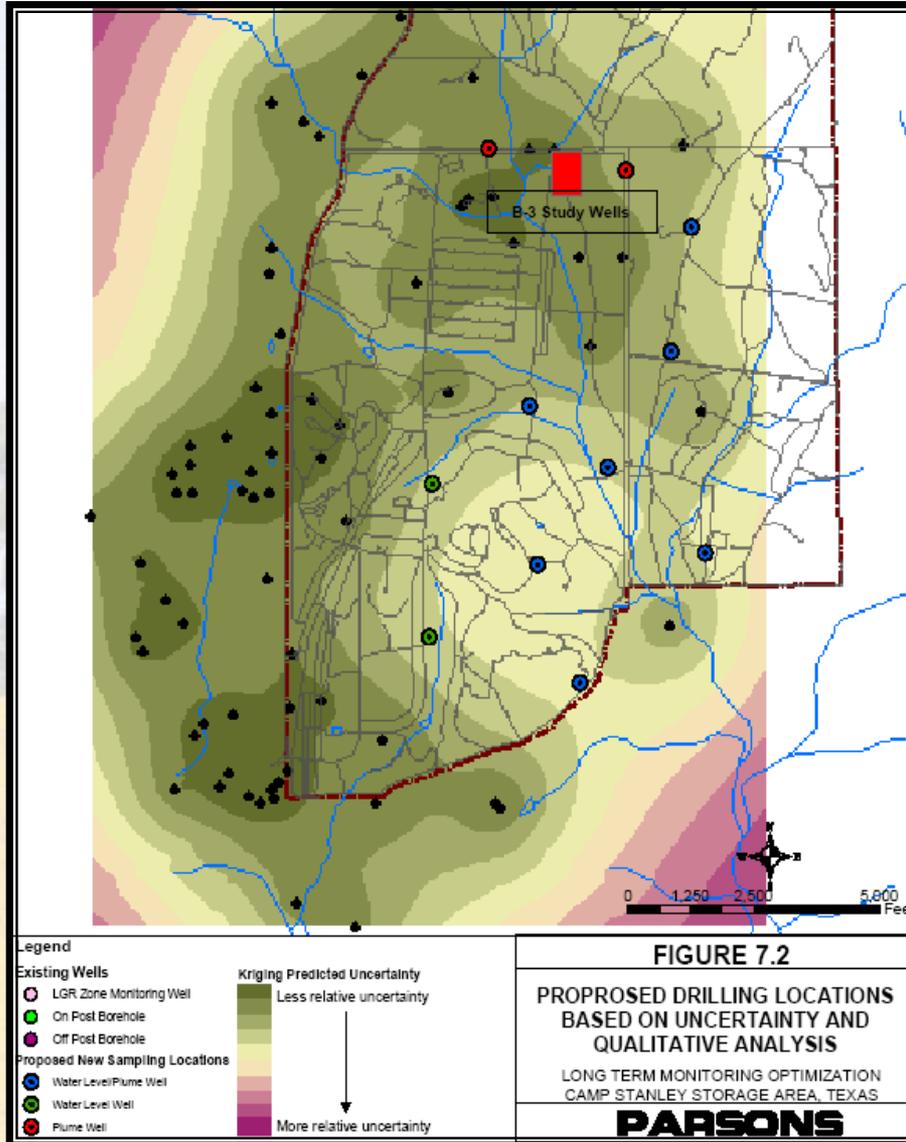
# Groundwater Monitoring Program

## Recent Results

- No significant changes in VOC levels (drought conditions)
- New wells CS-MW22-LGR & CS-MW25-LGR initially reported Lead above the AL, the last 2 quarters (June & Sept. 08) have dropped back below the AL.

# Groundwater Monitoring Program

## LTMO Process and Well Selection





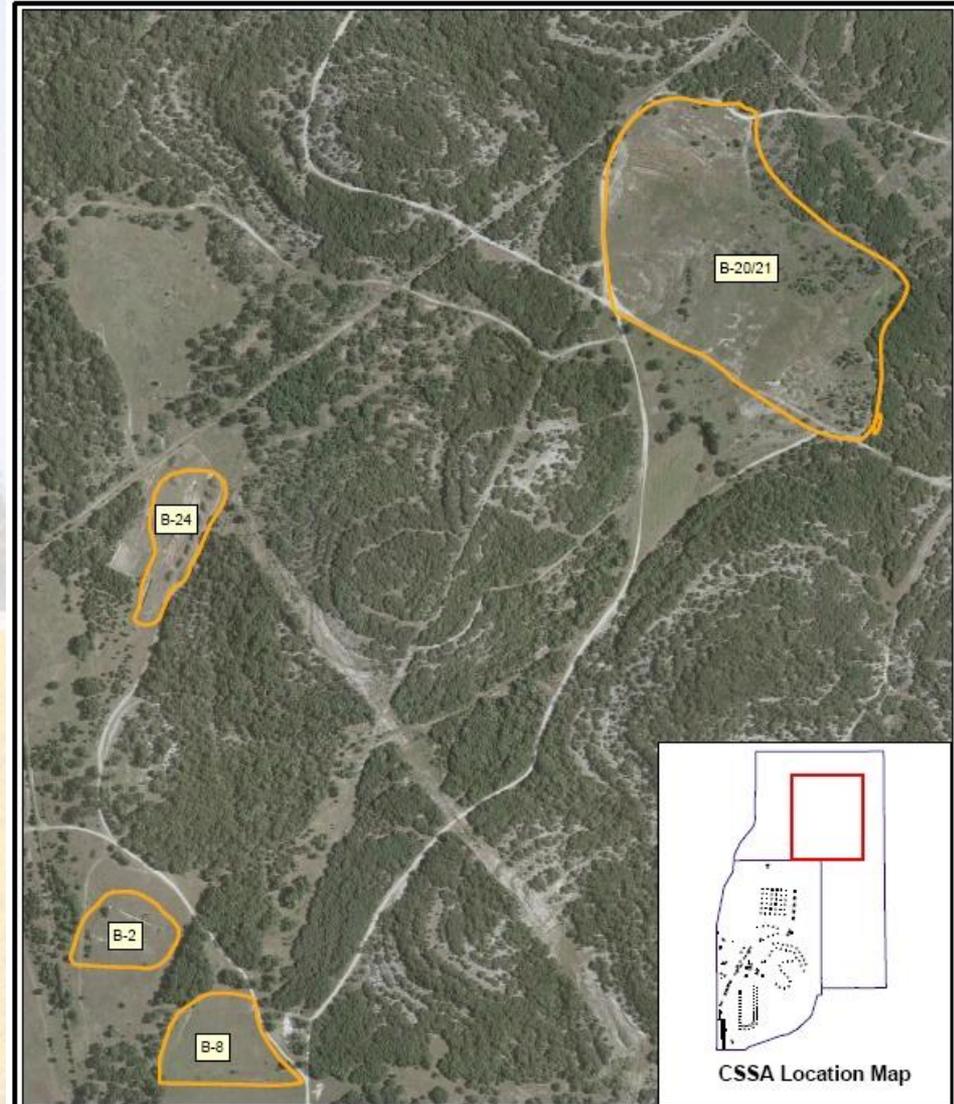
# Groundwater Monitoring Program Summary

- Seven years of quarterly off-post monitoring.
- Almost 10 years of quarterly on-post monitoring.
- New subdivisions supplied by SAWS.
- LTMO update planned – hope for off-post implementation following public meeting.

# North Pasture Current Plan

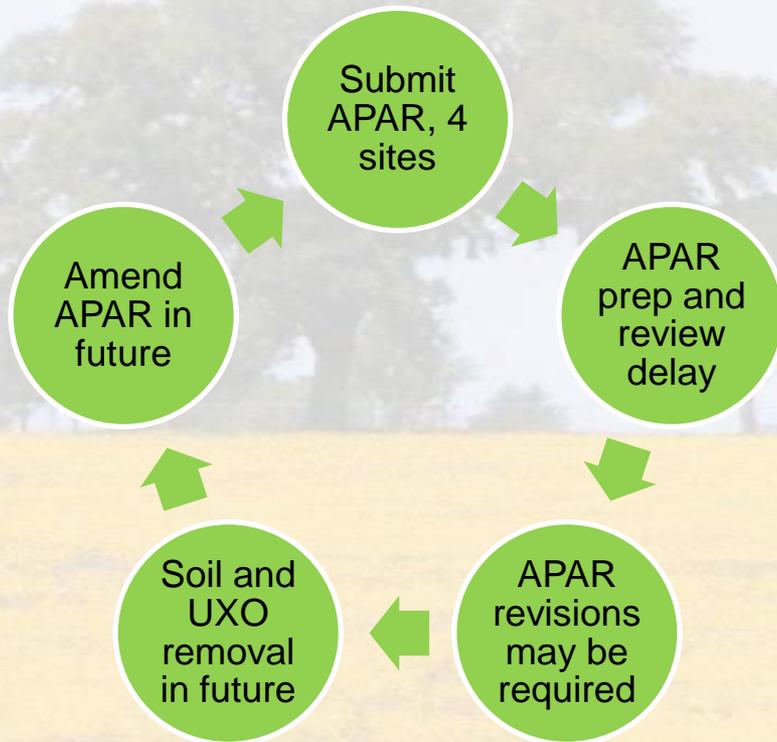
## (SWMUs B-2, B-8, B-20/21, and B-24)

- Combined Affected Property Assessment Report (APAR) under Texas Risk Reduction Program (TRRP)
- APAR for four sites
- 2008 investigations show metals impacted soils at 3 sites
- APAR would describe current conditions and recommend future cleanup
- Soil removals (B-8, B-20, B-24) and ordnance removal (B-20, B-24) would still be necessary

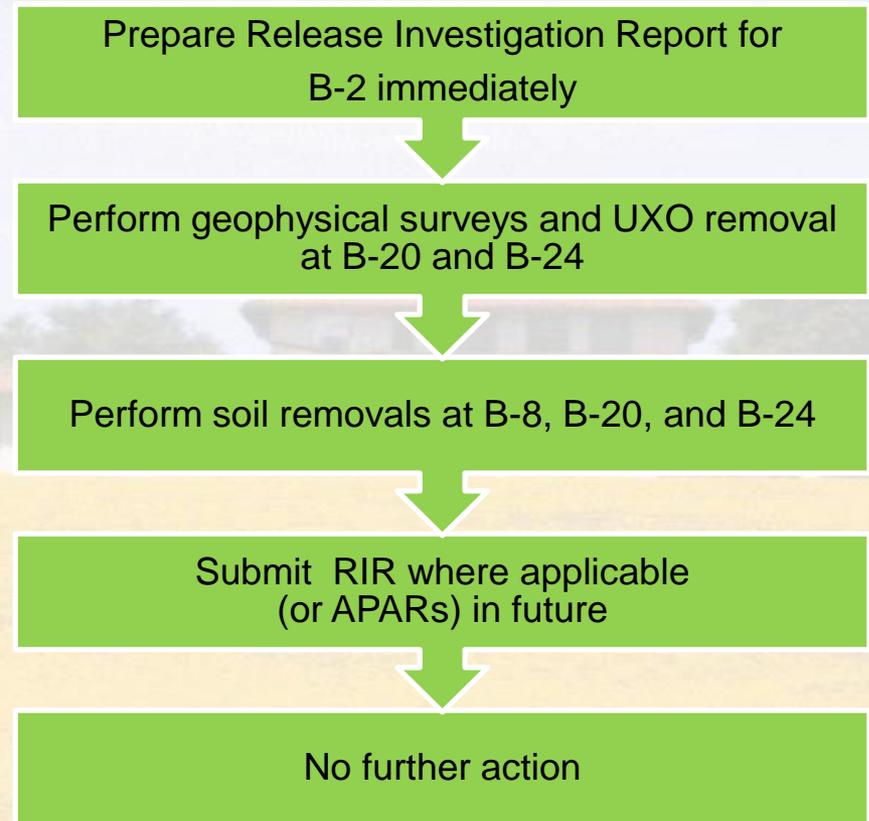


# Options

## Continue with 4-site combined APAR



## Perform remediation activities needed



# Revised Recommendation

## Outstanding Issues to Obtain Closures

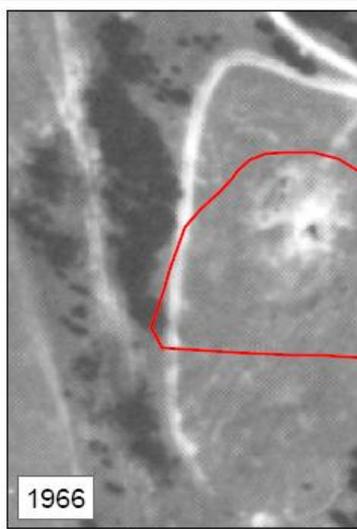
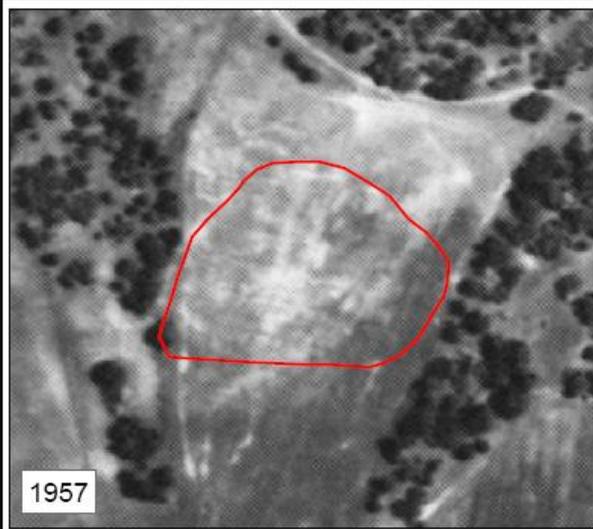
- B-2 Release Investigation Report
- (All) Ecological risk assessment
- B-8 Soil removal above human health criteria  
Soil removal above ecological risk criteria
- B-20 UXO removal  
Soil removal above human health criteria  
Soil removal above ecological risk criteria
- B-24 Remove stockpiles  
UXO removal  
Soil removal above human health criteria  
Soil removal above ecological risk criteria
- (All) Submit APAR(s) when removals are complete



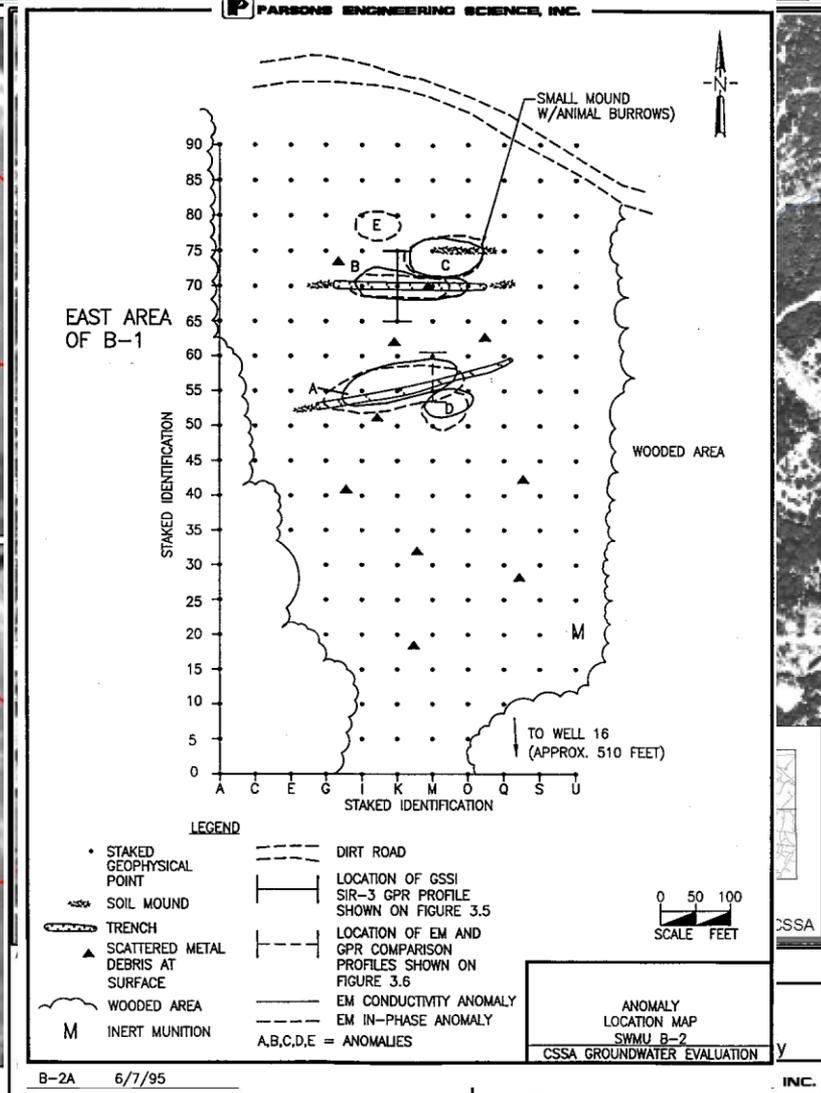
A history of the four North Pasture sites currently under investigation including sampling efforts conducted in 2008.

# **NORTH PASTURE SITE HISTORIES AND CURRENT CONDITIONS**

# SWMU B-



200 100 0 200 Feet  
Scalebar for Aerial Photographs.



# SWMU B-2 Recommendations

- No COCs remain above Tier 1 PCLs
- No ordnance is present.
- Individual site closure is possible under a Release Investigation Report

## RELEASE INVESTIGATION REPORT SOLID WASTE MANAGEMENT UNIT B-2 CAMP STANLEY STORAGE ACTIVITY

Contract No.  
Task Order No.



Prepared for:  
**Camp Stanley Storage Activity**  
Boerne, Texas

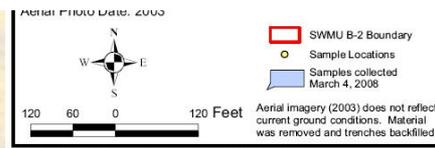
Prepared by:  
**PARSONS**  
Austin, Texas



Figure 1

B-2 Samples  
Camp Stanley Storage Activity

**PARSONS**



# SWMU B-8 History

- ?**

  - Small arms ammunition disposal area
  - Ammunition burned on concrete platform
- 1995**  
**1996**

  - Geophysical survey identified two anomalies
  - Soil borings sampled
- 1997**

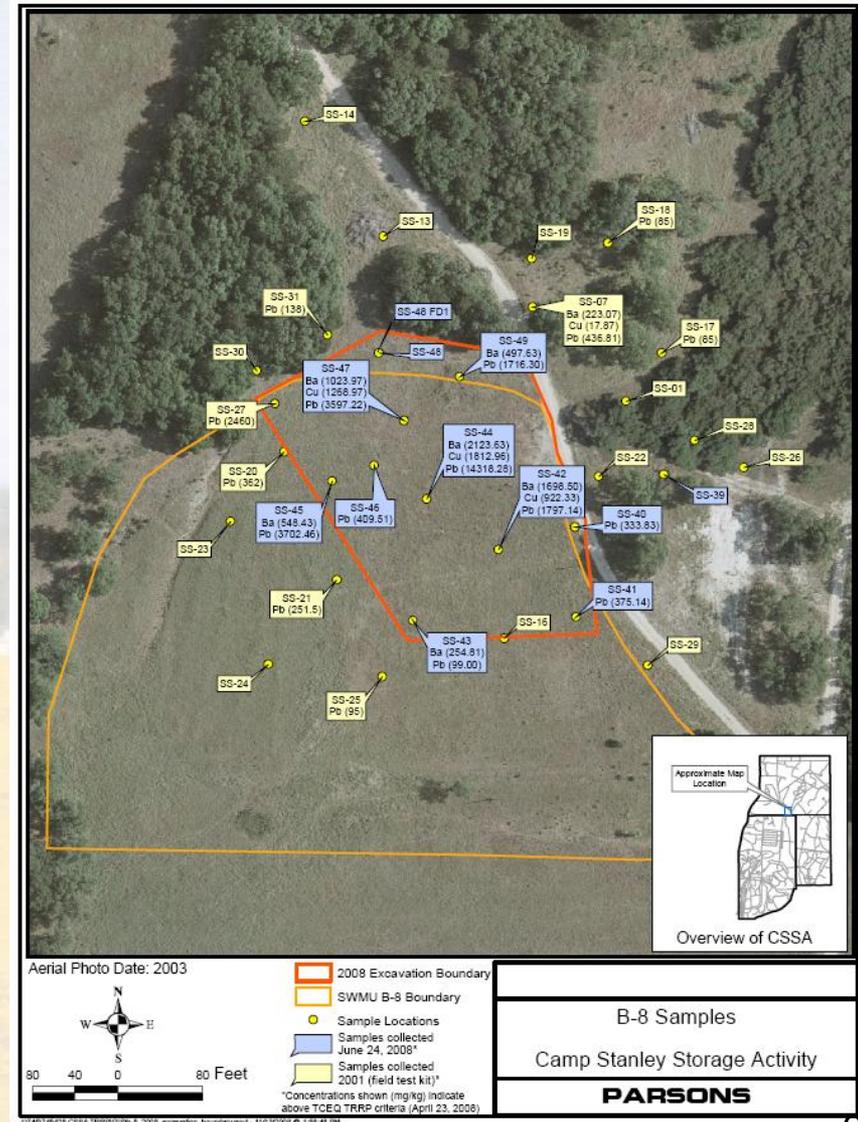
  - Excavated one anomaly
  - Removed concrete and stockpiled soils
- 2000**

  - Soil borings re-sampled
  - Stockpile sampling performed
- 2002**

  - RFI Report Submitted
- 2003**

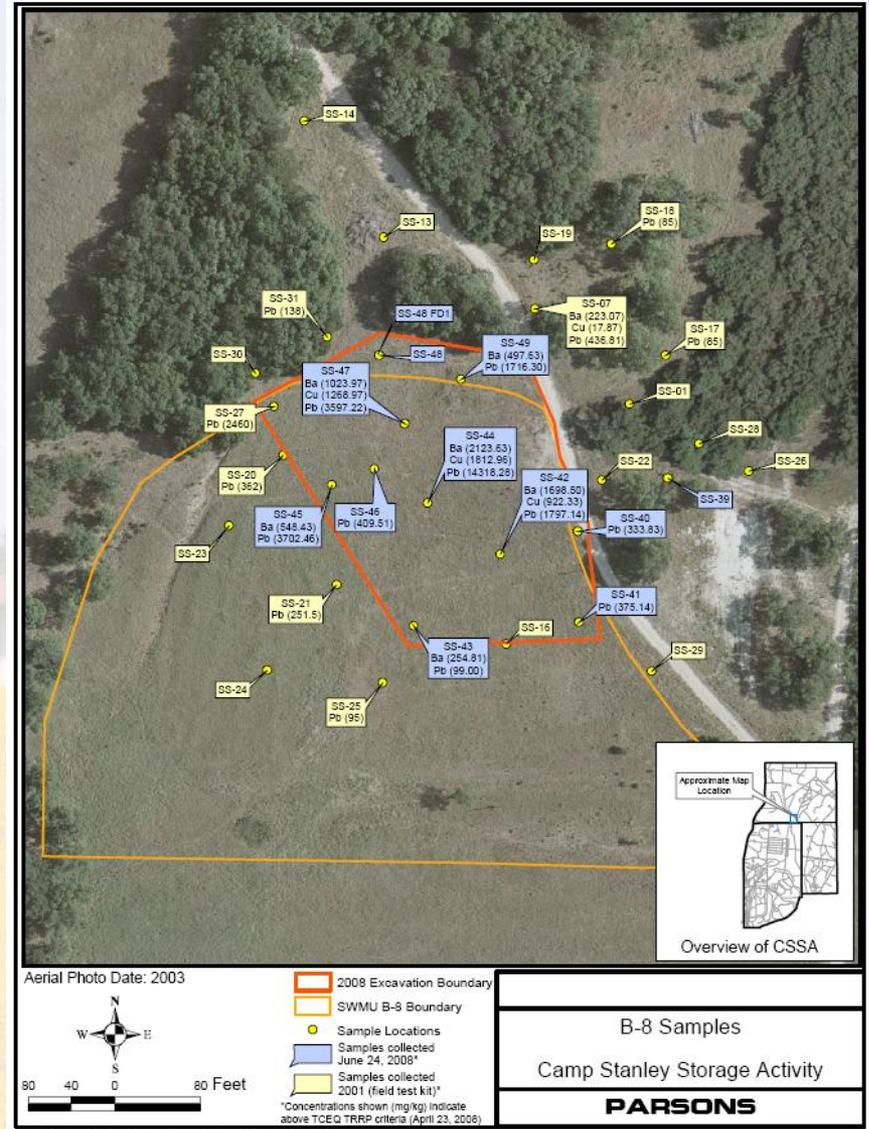
  - Surface soil samples collected
  - Geophysical survey conducted
  - RFI Report Addendum Submitted
- 2008**

  - **Excavation and sampling**
  - **Soils moved to East Pasture range; PIMS treatment**
  - **Additional investigation needed**



# SWMU B-8 Recommendations

- Current stockpile soils PIMS treatment and soil removal
- Impacted soils remain
- Conduct soil removal to Tier 1 PCLs and ecological PCLs (avoid bird breeding season)
- Perform confirmation soil sampling
- Delay APAR (group or individual site) until further removal



# SWMU B-20 History

1946 - ?

- Open burn/open detonation area

1994

- Geophysical surveys performed at craters
- UXO removal, northern portion
- Soil, surface water and sediment sampled

1995  
1996

- Remedial Investigation Report Submitted
- Soil sampling and UXO removal conducted
- Addendum to Remedial Investigation Report submitted

1997

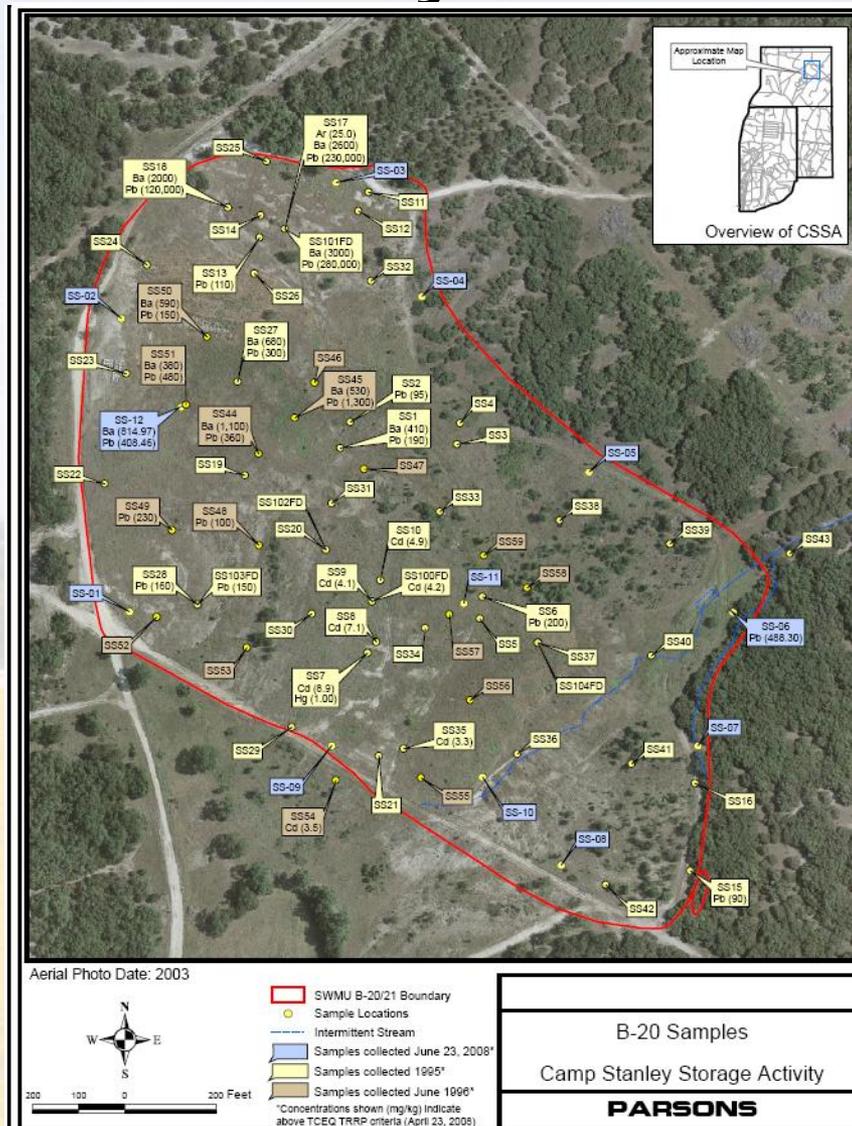
- Additional UXO removal
- Northern area sifted for UXO removal
- Treatability studies conducted

2000  
2002

- Soils re-sampled
- Conducted PIMS treatability study
- Submitted RFI Report in July 2002

2008

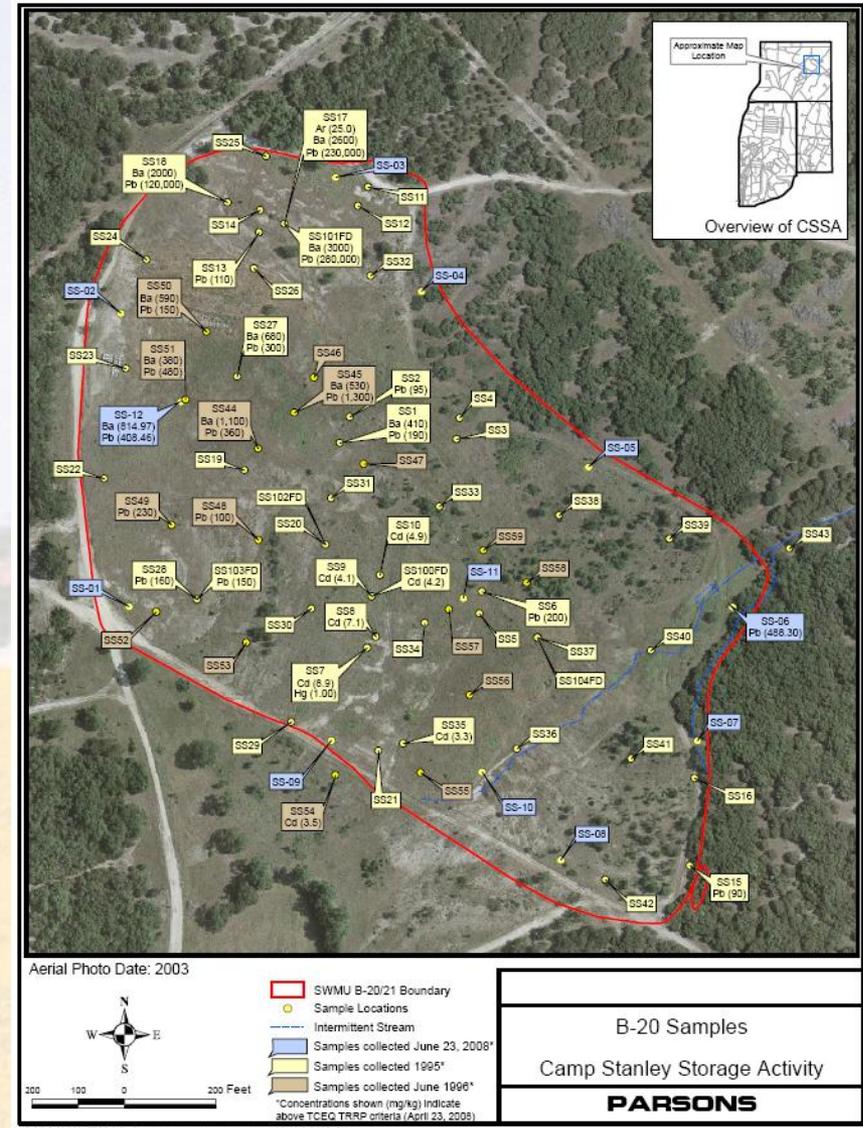
- Surface soil samples collected
- **Additional soil and UXO investigation needed**



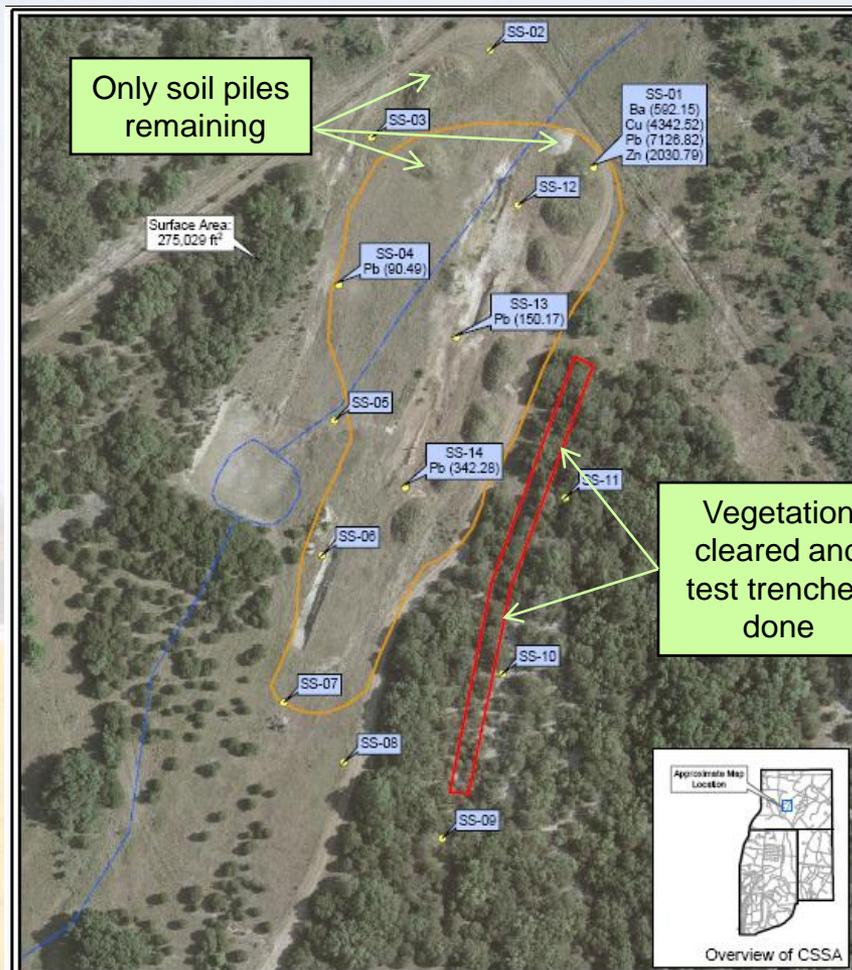
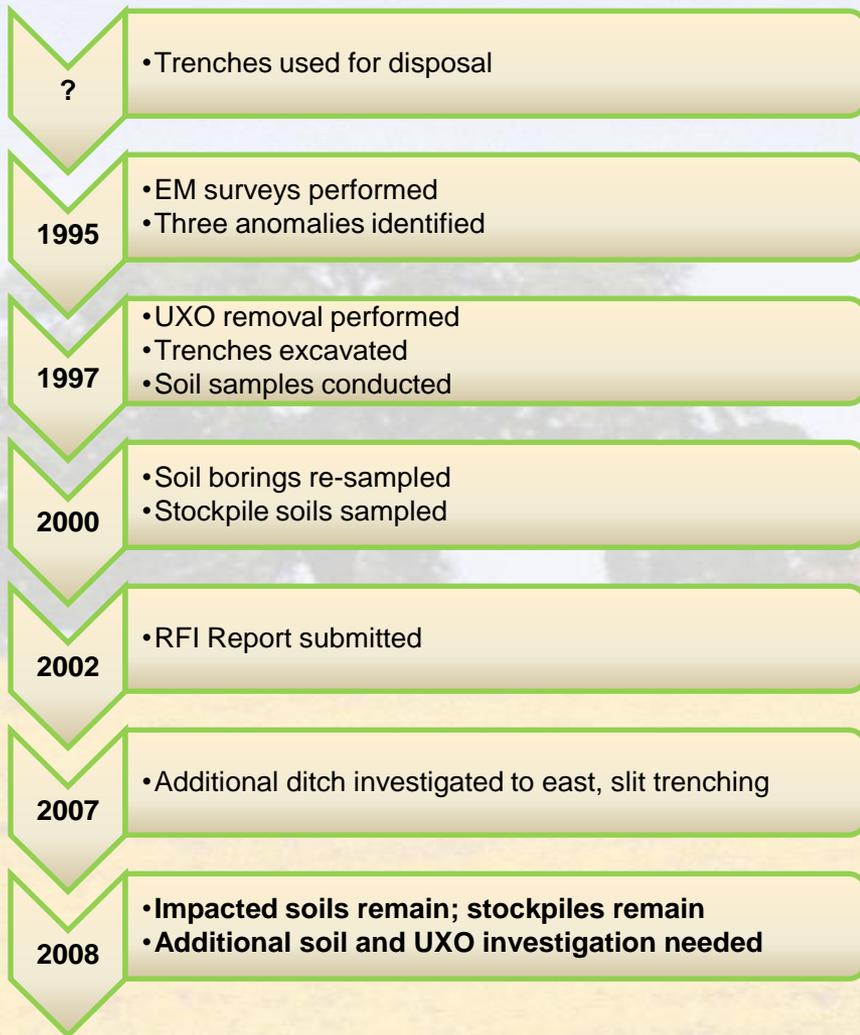
1:70450-6428 CSSA TRRP0206-20\_samples\_proposal\_revised.mxd - 11/13/2008 @ 2:22:21 PM

# SWMU B-20 Recommendations

- Move PIMS treated soil piles to berm face
- Conduct geophysical survey
- Conduct soil removal to Tier 1 PCLs and ecological PCLs
- UXO removal
- Perform confirmation soil sampling
- Surface sweep (vacuum) for small arms/MD to southeast
- Delay APAR (group or individual site) until future removals complete



# SWMU B-24 History



Aerial Photo Date: 2003

Legend:

- SWMU B-24 Boundary
- 2007 Excavation Trench
- Sample Locations
- Intermittent Stream
- Samples collected June 25, 2008\*

Scale: 120 60 0 120 Feet

\*Concentrations shown (mg/kg) indicate above TCEQ TRRP criteria (April 23, 2008)

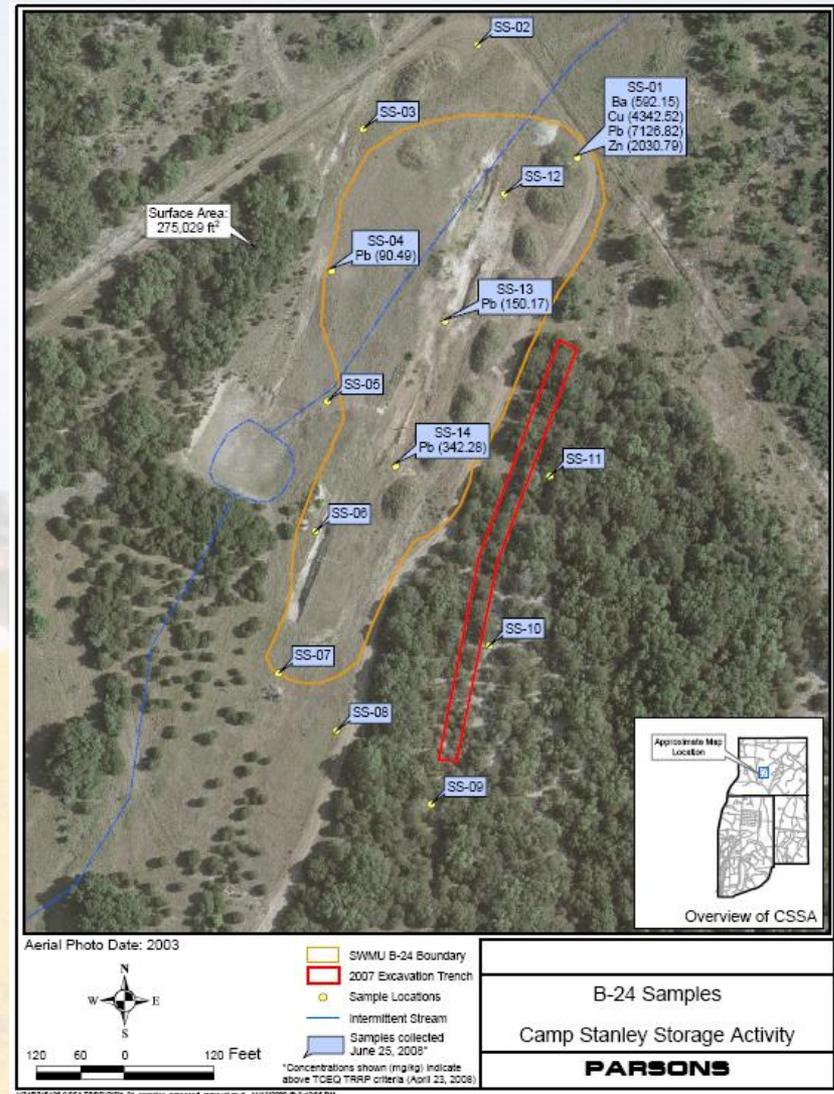
Overview of CSSA

B-24 Samples  
Camp Stanley Storage Activity

**PARSONS**

# SWMU B-24 Recommendations

- Non-hazardous soils moved to range berm (approx. 2000 CY)
- Munitions scrap and rock pile removal
- Geophysical survey
- Conduct soil removal to Tier 1 PCLs and ecological PCLs
- Conduct UXO removal
- Perform confirmation soil sampling
- Delay APAR (group or individual site) until future removals complete



# Tasks to Complete for Closure

*Prioritization for completion*

<b><u>Priority</u></b>	<b><u>Site</u></b>	<b><u>Activity</u></b>
1	B-2	Submit RIR
2	All	Ecological risk assessment
3	B-8	PIMS treated soils removal
4	B-20/B-24	Vegetation removal
5	B-20/B-24	Geophysical Surveys
6	B-24	Stockpile removals
7	B-20	PIMS treated soil removal
8	B-20/B-24	Intrusive investigations
Future	B-8/B-20/B-24	Soils and UXO removal, soil sampling, APAR submittal

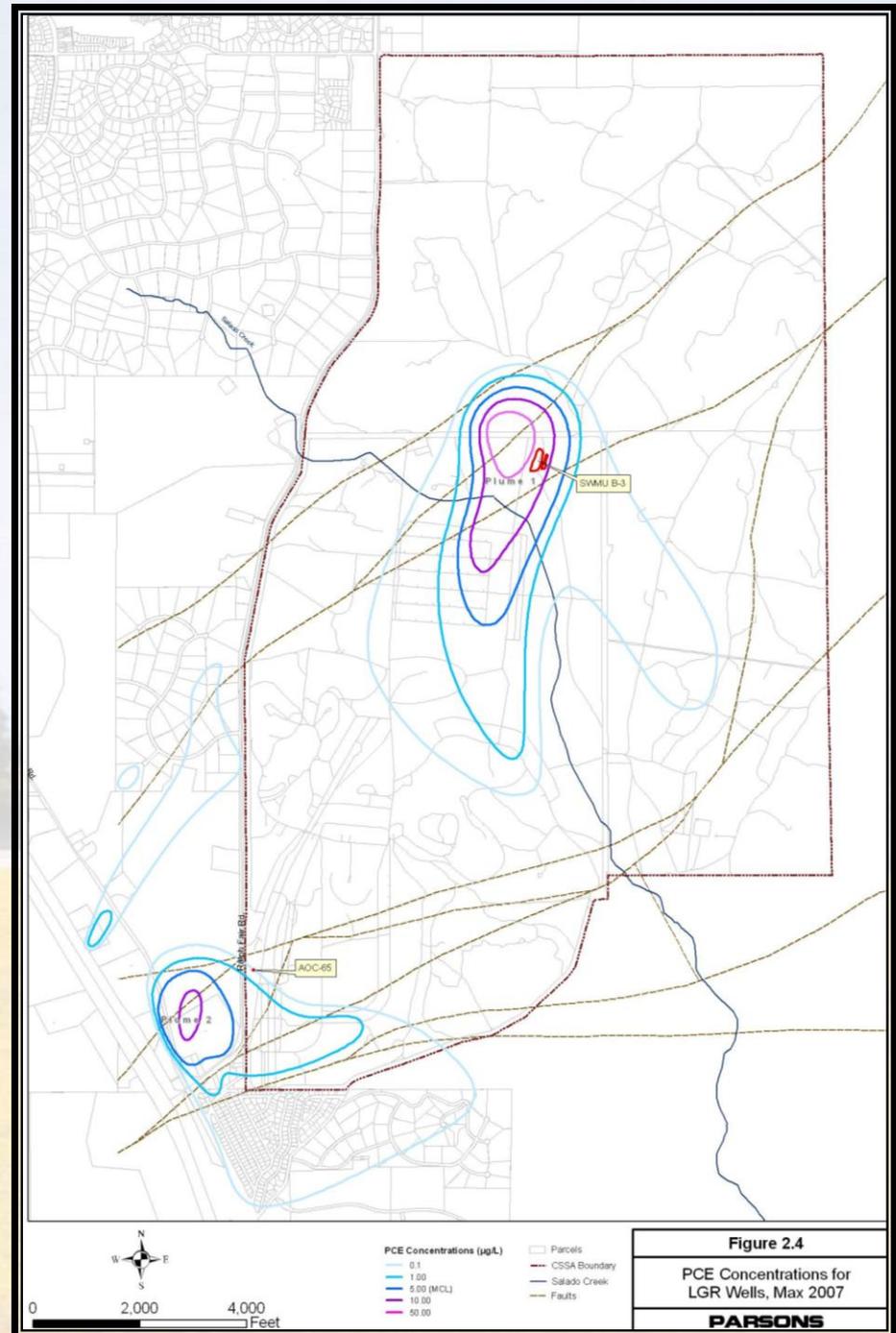


# **TREATABILITY STUDIES (B-3 AND AOC 65)**

# CSSA Pilot Studies

## Description

- 1. SWMU B-3 Bioreactor Pilot Study** - designed for an enhanced anaerobic bioremediation of chlorinated hydrocarbons within the underlying fracture limestone in the area of Plume 1.
- 2. AOC-65 Soil Vapor Extraction Pilot Study** - designed for removal of chlorinated hydrocarbons within the underlying fracture limestone in the area of Plume 2.



# Bioreactor Pilot Study Objectives

## Review

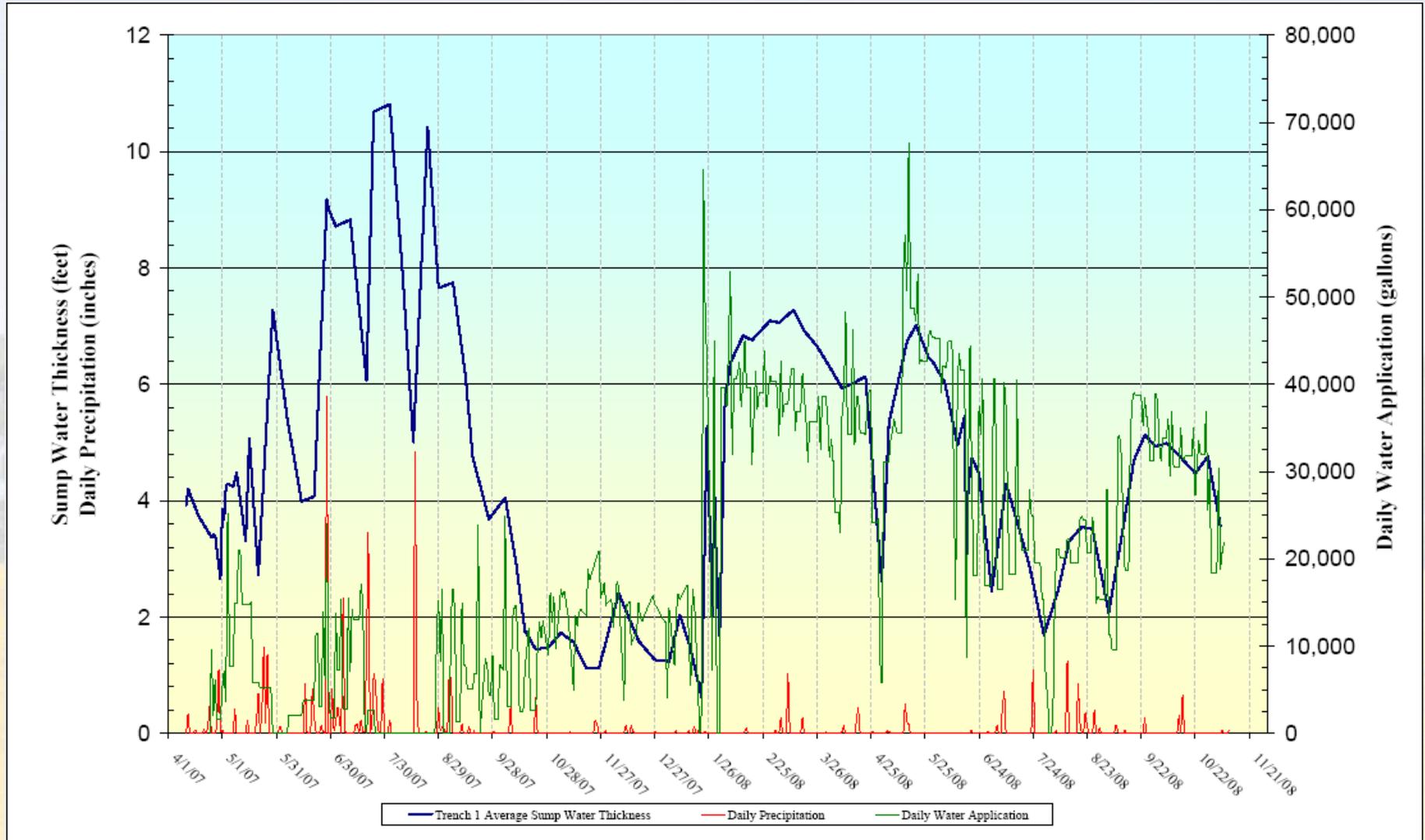
- Determine if the bioreactor is an effective approach for treatment of groundwater at SWMU B-3 (Plume 1).
- Evaluate the extent of bioreactor influence on the effectiveness of treatment in the surrounding fractured media.
- Evaluate the migration of contaminants through the underlying formations and into the underlying aquifer.

# Bioreactor Pilot Study

## General Observations

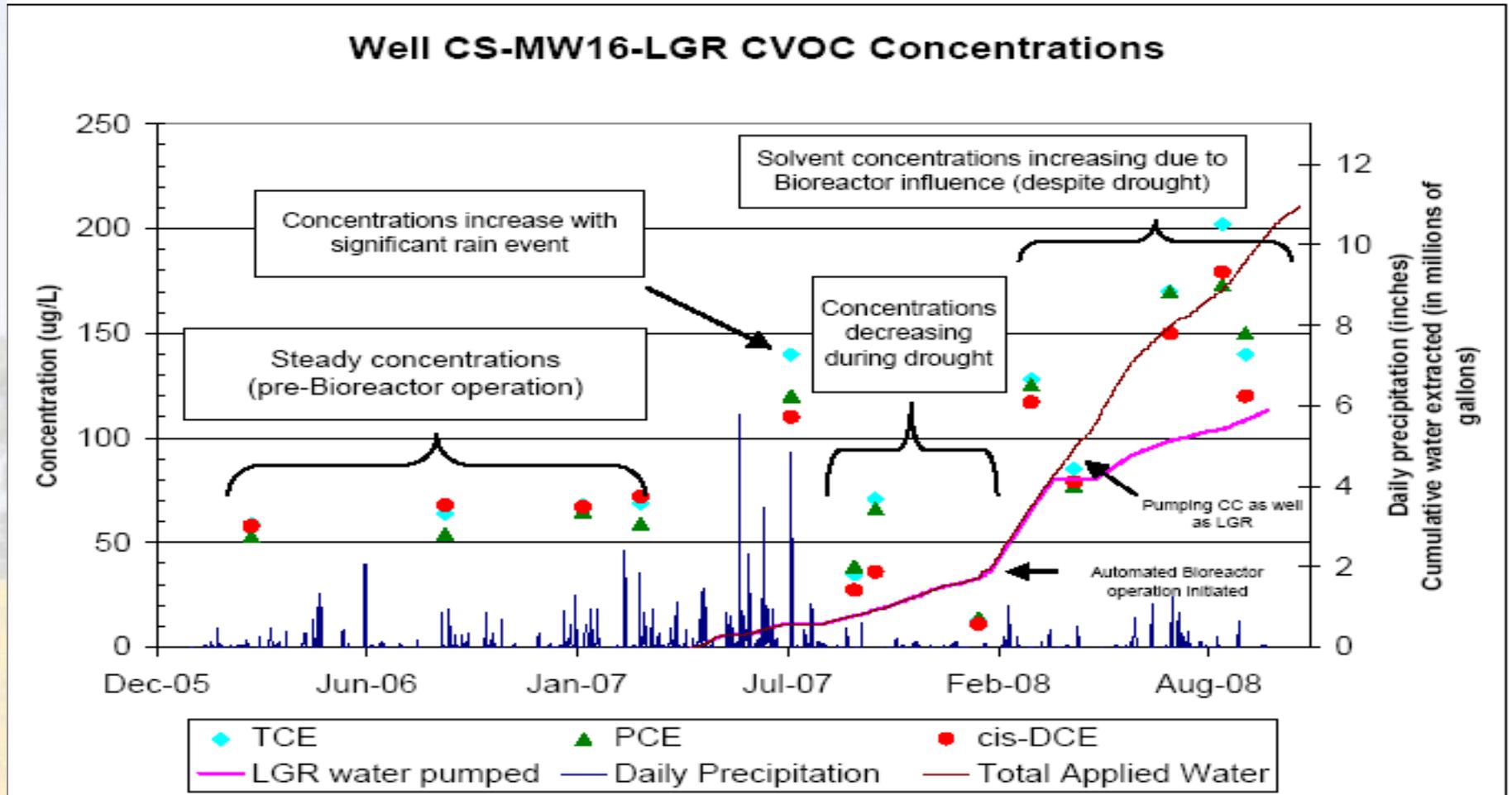
- Bioreactor is effectively treating injected contaminated groundwater, but having trouble keeping bioreactor saturated.
- Significant contaminant concentrations likely remain in the fractured bedrock formation. Data indicates underlying CVOCs are being flushed.
- Biotic and abiotic degradation is occurring.
- Isotope data suggest water surrounding bioreactor comes from several different sources.

# Bioreactor Trench 1 Water Thickness



- Bioreactor is effectively treating injected contaminated groundwater, but having trouble keeping bioreactor saturated.

# Well 16 CVOOC Concentrations



- Significant contaminant concentrations likely remain in the fractured bedrock formation. Data indicates underlying CVOCs are being flushed.

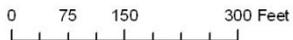
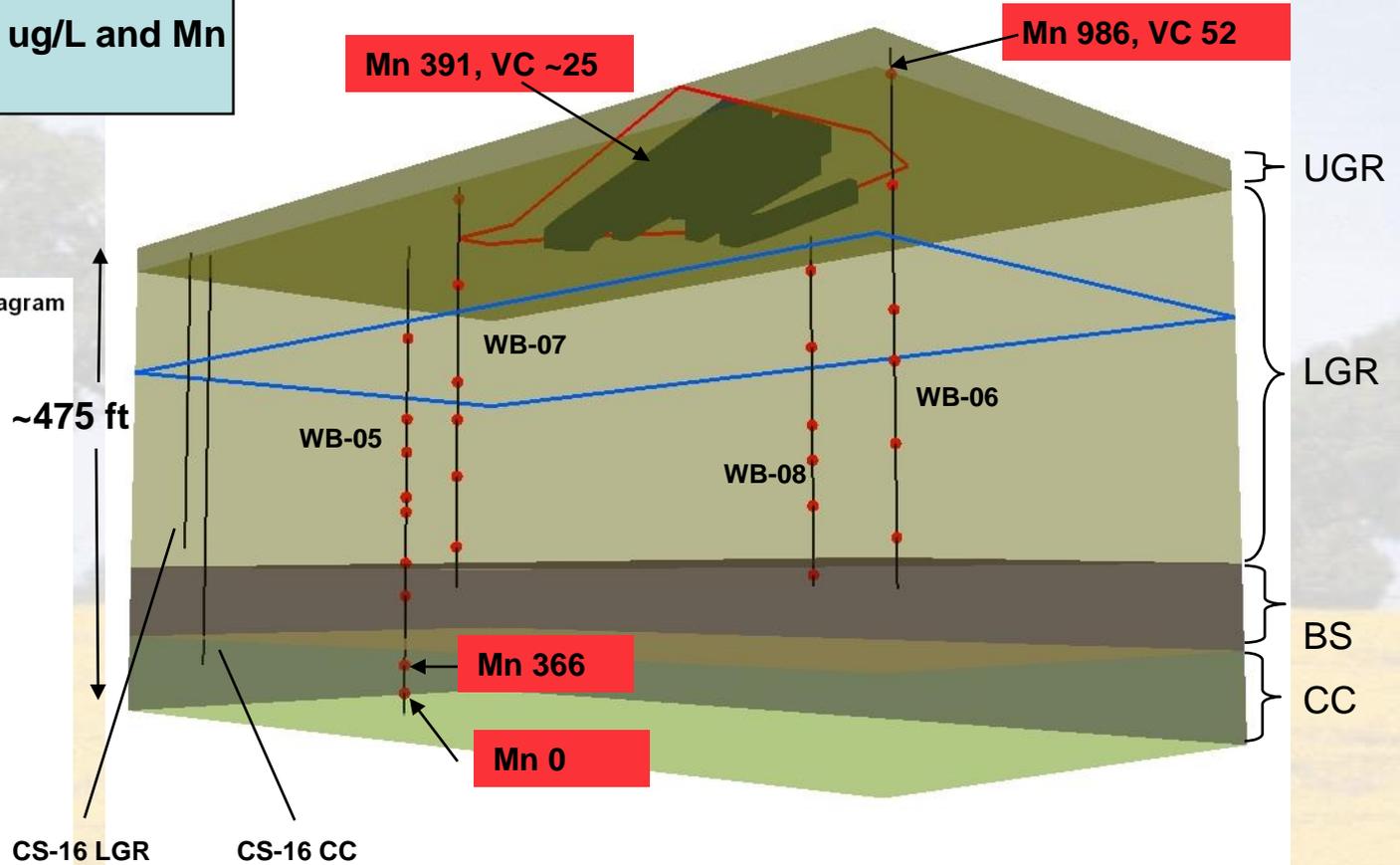
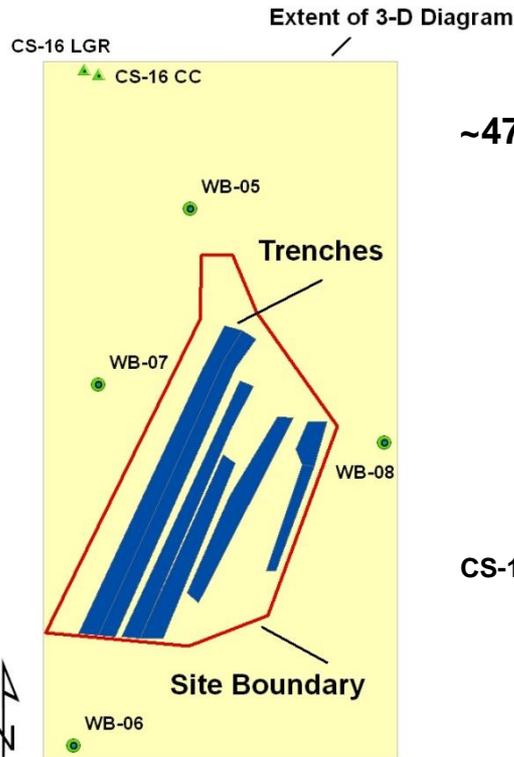
# Additional *In Situ* Degradation Pathways

- Abiotic
  - PCE  $\longrightarrow$  Ethene catalyzed by Fe[0] under reducing conditions
- Biotic
  - Anaerobic Oxidation  
$$\text{VC} + \text{Mn[IV]} \xrightarrow{\text{microbial}} \text{CO}_2 + \text{Cl}^{-1} + \text{Mn[II]}$$

- What is the evidence for either pathway?

# SWMU B-3 Transport Pathways From Trenches

Concentrations of Mn[II] and VC, ug/L  
 Unless indicated VC is 0 ug/L and Mn  
 Is <10 ug/L



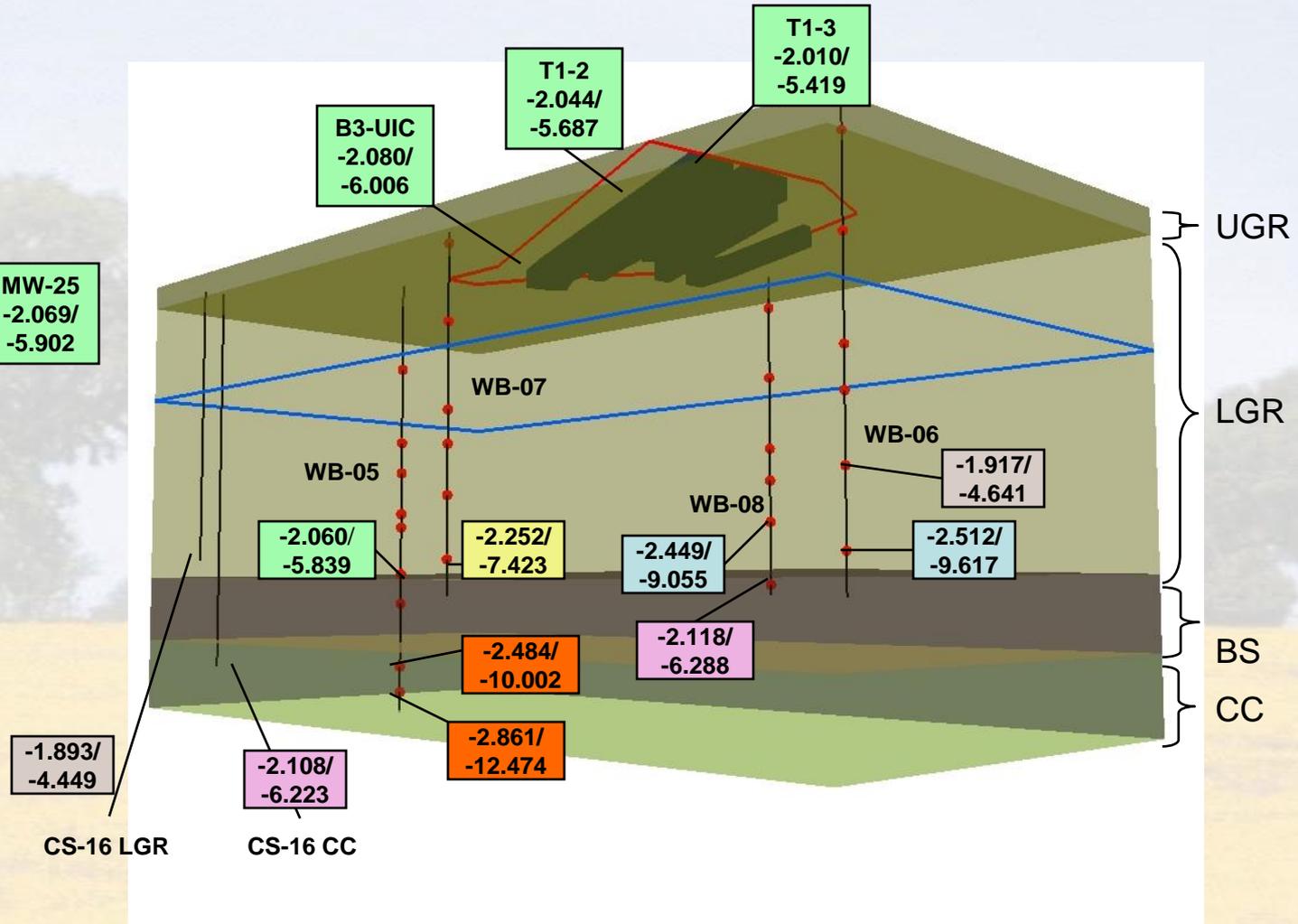
# SWMU B3 - $\delta^{18}\text{O}$ & $\delta^2\text{H}$ – October 2008

Legend  
 $\delta^{18}\text{O}/$   
 $\delta^2\text{H}$   
 ‰

MW9-CC	MW9-LGR
-2.788/ -11.855	-2.229/ -7.066

MW-25
-2.069/ -5.902

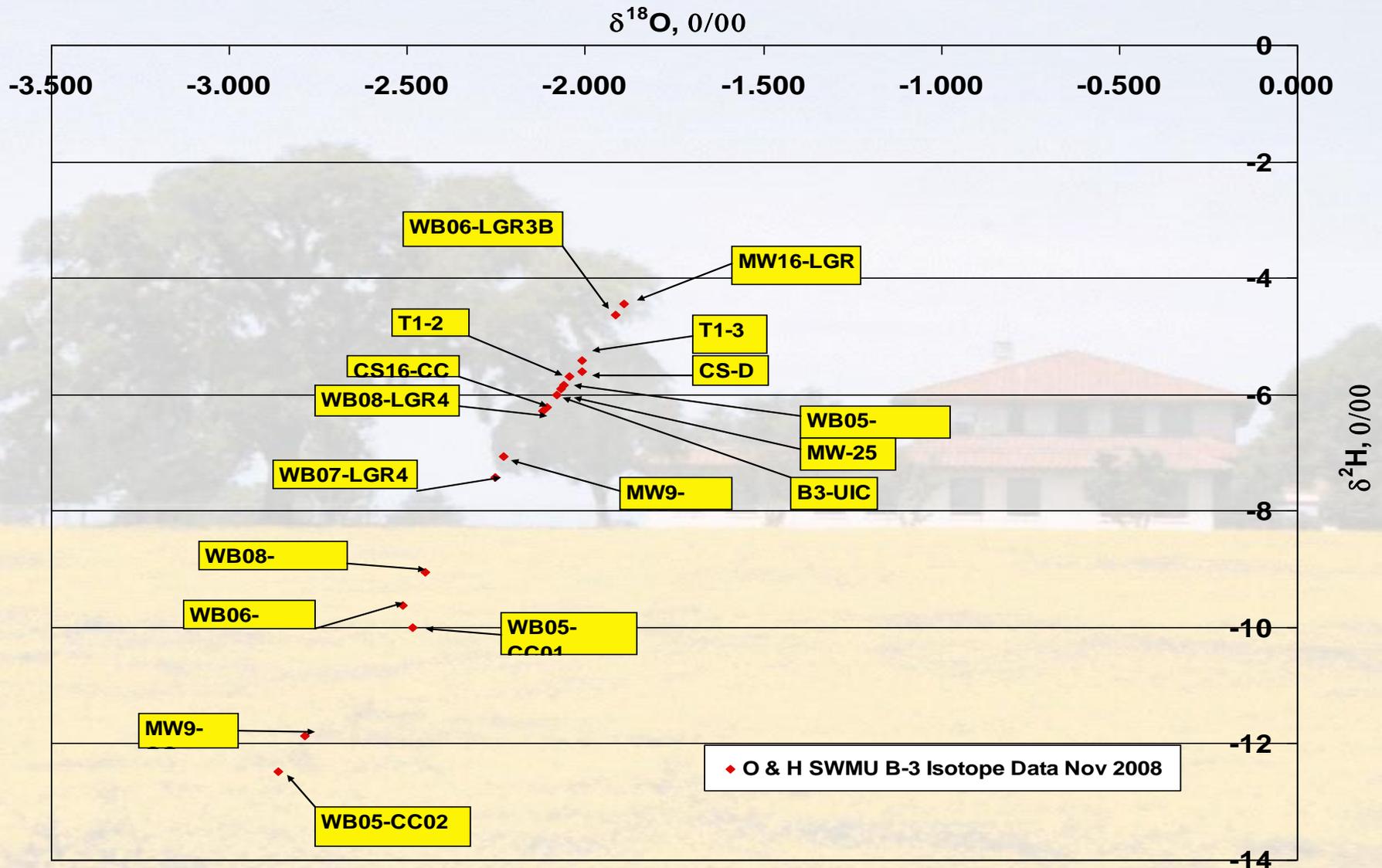
CS-D
-2.010/ -5.611



— Water level based on June 2005 measurements from the Lower Glen Rose

 West Bay® Well Sample Port

# SWMU B-3 O & H Isotope Data – November 2008



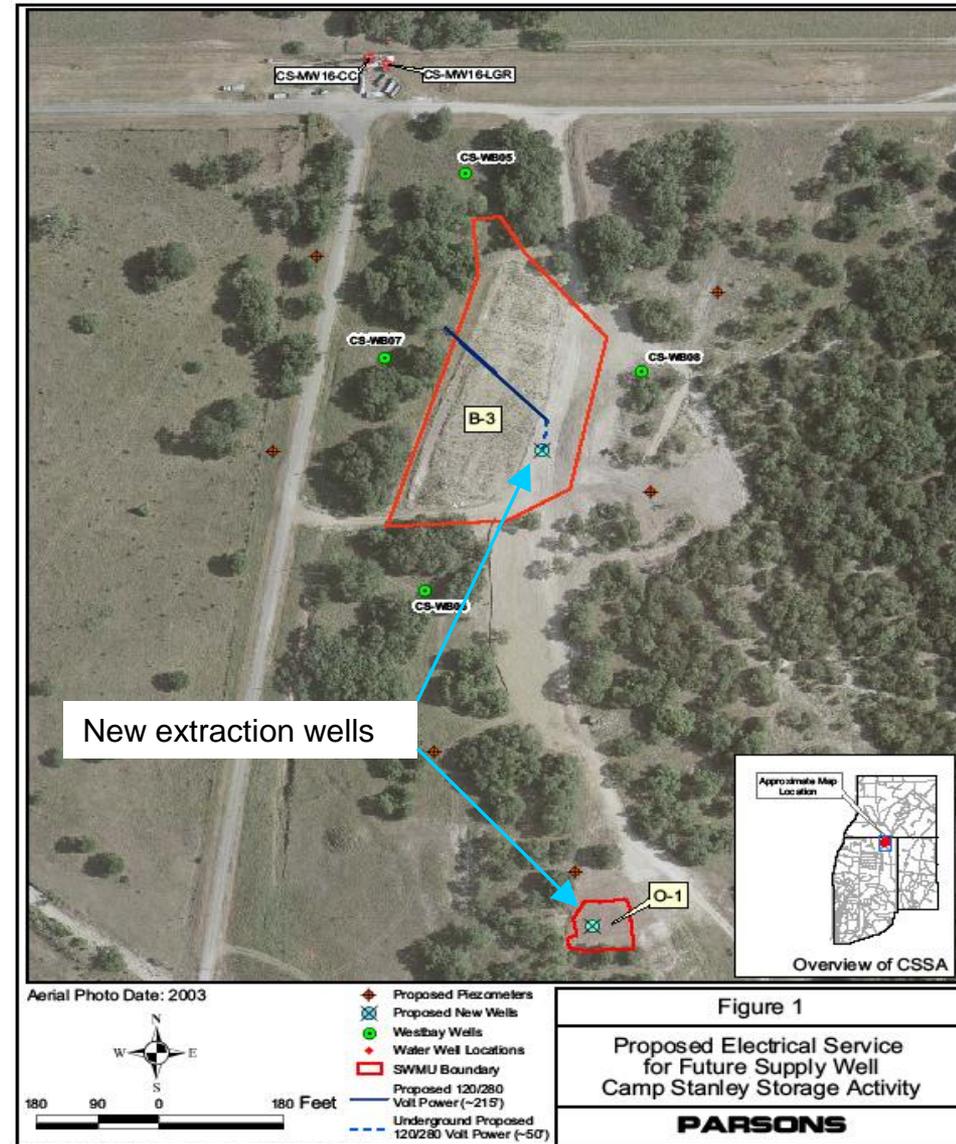
# Bioreactor Pilot Study Data

## Recommendation 1: More Water

**Objective** - Obtain data necessary to determine if the bioreactor is an effective approach for treatment of groundwater at SWMU B-3 (Plume 1). Due to drought conditions only one trench is currently operational. Aquifer water is optimum source of water to increase volume of injection into trench.

**Data Gap** - Need additional injection water to allow a greater bioreactor influence on vadose zone intervals.

**Recommendation** - Add additional extraction wells within SWMU B-3 (one well already funded) and at or near the former SWMU O-1.



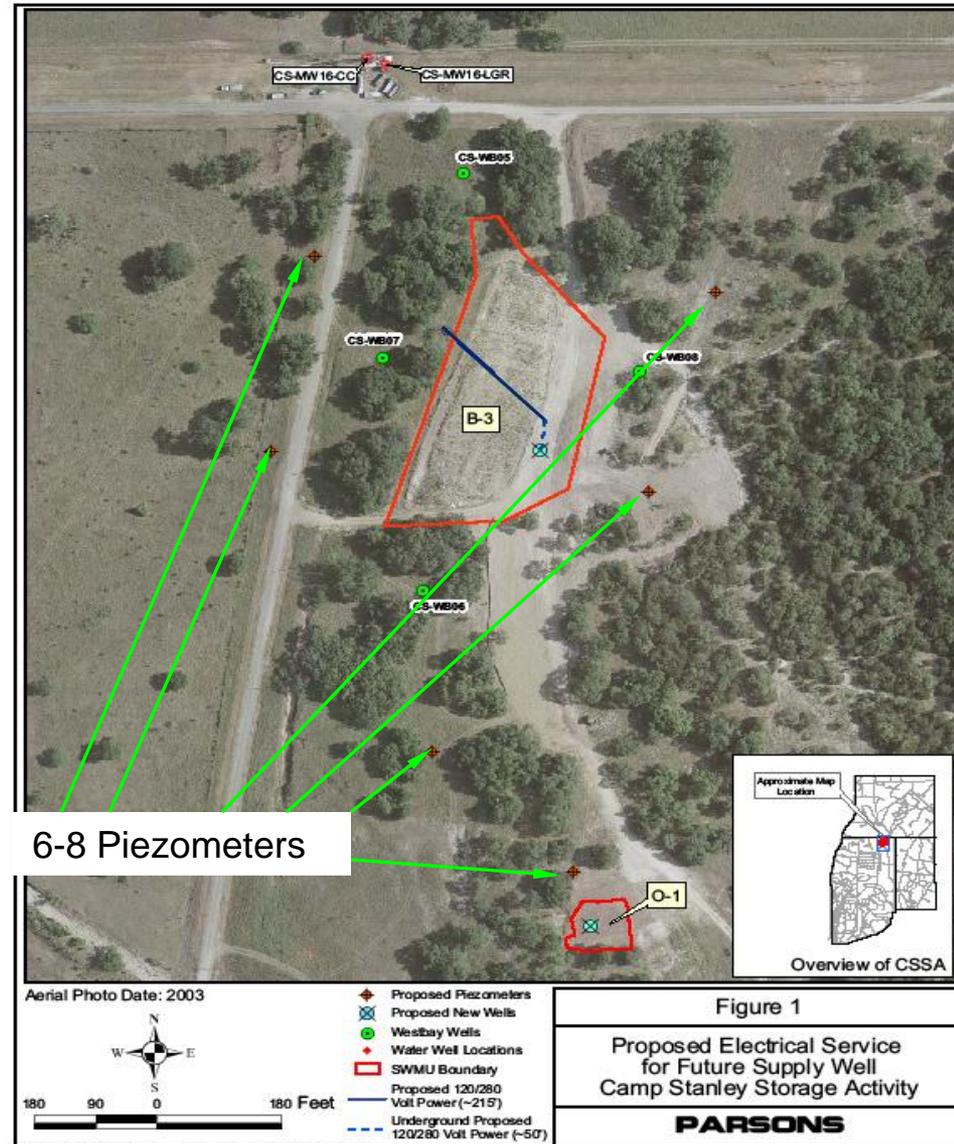
# Bioreactor Pilot Study

## Recommendation 2: More MWs

**Objective** - Evaluate the extent of bioreactor influence on the effectiveness of treatment in the vadose intervals.

**Data Gap** - Additional monitoring data needed to determine if Plume 1 is reducing in toxicity, mobility and volume. Current data indicates the extent of migrating intermediate contaminants such as vinyl chloride and manganese from the bioreactor are unknown. Need additional data in the upper formations underlying the bioreactor to determine extent of bioreactor influence.

**Recommendation** - Add six or eight additional shallow monitoring wells (complete to a depth of approximately 50 ft bgs) near former SWMU B-3 to monitor possible contaminants emanating from the bioreactor.



# Bioreactor Pilot Study

## Recommendation 3: Tracer Study

**Objective** - Evaluate the migration of contaminants through the underlying formations and into the underlying aquifer.

**Data Gap – (A)** Need additional monitoring data for determining migration of contaminants through the bioreactor's underlying formation and aquifer.

**(B)** Need tracer study to determine the potential migration pathways of contaminants from bioreactor.

**Recommendation – (A)** Continue monitoring of bioreactor for another one year and re-evaluate. **(B)** Perform water tracer study within bioreactor trench 6

# AOC-65 SVE Pilot Study

## Objectives

- Determine if SVE is an effective approach for removal of CVOC from the underlying limestone formation.
- Determine the effectiveness of SVE removal on groundwater concentrations within AOC-65 monitoring well network.
- Determine whether an indoor inhalation exposure potential exists.

# SVE Pilot Study Observations

## Review

- SVE appears to be removing significant amounts of CVOCs from the underlying limestone formation. The estimated removal rate of PCE (based on analytical data from average of sampling events) for the SVE system is:
  - AOC-65 SVE system = 5 to 700 lb/yr<sup>1</sup>
- Emissions continue to be within permit by rule (PBR) allowable emission limitations.
  - AOC-65 SVE permitted PCE emission allowance = 0.268 lb/hr
  - Actual AOC-65 SVE PCE emission rate = 0.075 lb/hr<sup>1</sup>

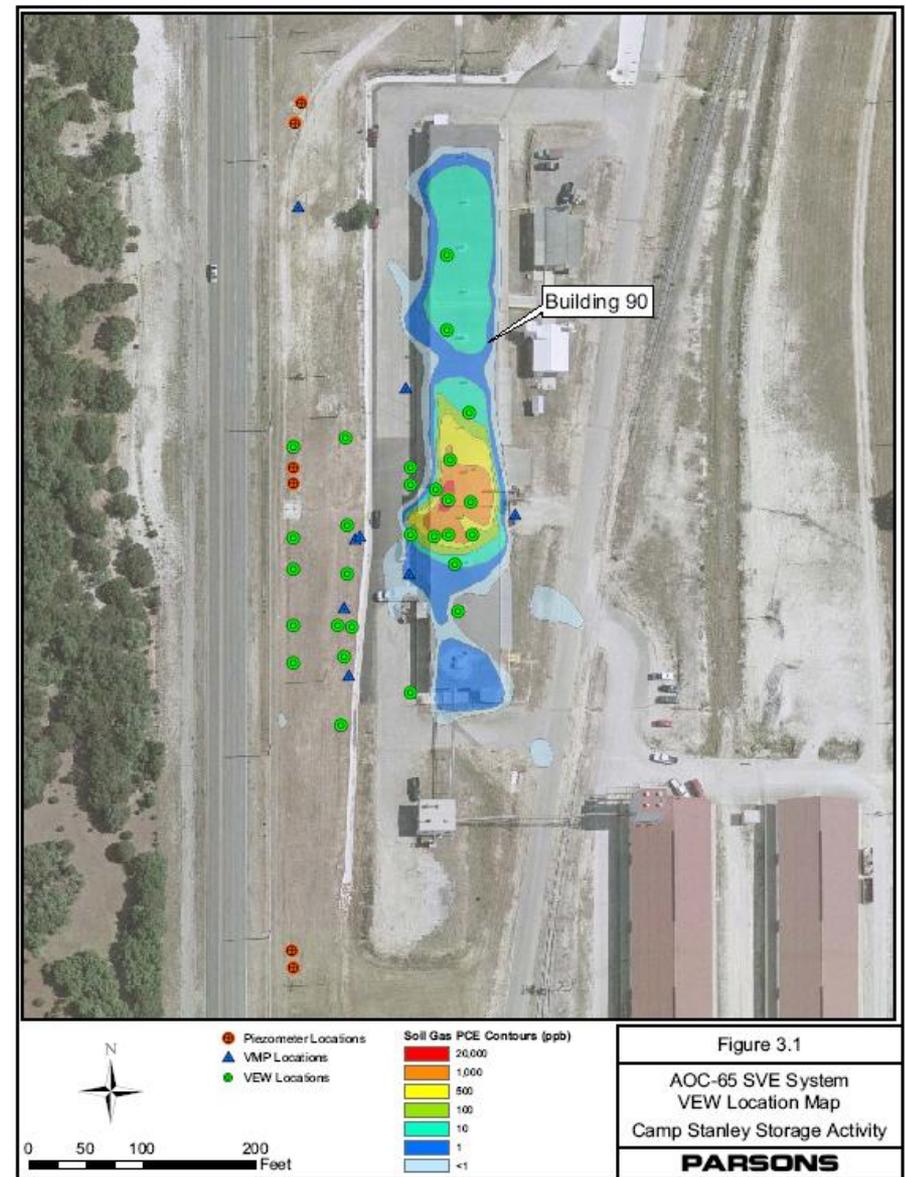
Note 1 – Estimated removal rate from initial sampling of newly installed SVE extraction wells.

# AOC-65 Soil Vapor Monitoring Results

Soil gas studies in 2002 show extent of PCE soil gas is mostly contained within the building 90 footprint.

Indoor air studies (Personal air monitors) from 2002 show no contaminants within building 90 breathing zone air.

**Right:** Aerial photograph showing the location of VEWs, VMPs, piezometers and monitoring wells, and soil gas vapor concentrations from 2002.



# AOC-65 SVE Pilot Study

## Recommendations

- Determine if SVE is an effective approach for removal of CVOC from the underlying limestone formation.
  - Continue monitoring to determine long term effectiveness of SVE
- Determine the effectiveness of SVE removal on groundwater concentrations within AOC-65 monitoring well network.
  - Continue monitoring to determine long term effectiveness of SVE
- Determine whether an indoor inhalation exposure potential exists.
  - Prepare white paper to address indoor inhalation exposure concerns.



**INITIAL PLANNING FOR  
PUBLIC MEETING – FALL 2009**

# Public Meetings

- Public Meetings are a portion of the Community Relations efforts at CSSA
  - Resident interviews
  - Newsletters / Fact Sheets
  - Maintenance of CSSA mailing list
  - Administrative Record (library and online)
  - Community Relations Plan (August 2006)
- Previous Public Meetings held in 2001, 2002, and 2006



**Camp Stanley Storage Activity  
Environmental Program  
FACT SHEET**  
No. 1 • August 2001

*The purpose of this fact sheet is to inform area residents about the mission, history, and environmental program at Camp Stanley Storage Activity (CSSA). Future fact sheets will contain more specific information about the installation's environmental programs and progress. Additional fact sheets will be printed as necessary to keep the community informed.*

**Background**  
Camp Stanley Storage Activity (CSSA) is a U.S. Army installation located in Bexar County, approximately 19 miles northwest of downtown San Antonio, Texas. Its higher headquarters is Red River Army Depot in Texasarkana, Texas.

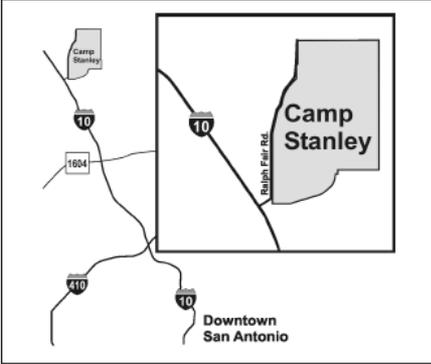
**Mission**  
The mission of CSSA is the receipt, storage, and issuance of ordnance materiel as well as quality assurance testing and maintenance of military weapons and ammunition. Because of its ordnance mission, CSSA is a restricted-access facility.

**History**  
The land on which 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 installation was renamed CSSA in 1917 and designated an ammunition depot in 1925. Since the early 1950s, federal and private land transfers and acquisitions have increased the installation to 4,000 acres.

**Geology and Aquifers**  
CSSA is located along a large southwest-to-northeast fault trend known as the Balcones Escarpment. Geologic investigations at CSSA have identified two fault zones running roughly southwest to northeast across the installation.

The upper and lower members of the Glen Rose formation underlie the surface of CSSA. The Glen Rose consists of alternating layers of dolomite, limestone, and marl of varying thickness and hardness. In general, soils are very thin and outcrops of the Glen Rose are common.

The Middle Trinity Aquifer supplies drinking water for CSSA and most of the surrounding area. The Middle Trinity includes the Lower



Glen Rose, Bexar Shale, Cow Creek Limestone, and Hammer Shale. Since CSSA has been keeping records, depth of water in the Middle Trinity Aquifer has ranged from 45 to 375 feet below ground surface. The highest reported level occurred after the flood in October 1998 and the lowest level during recent drought periods/conditions. Residential development surrounding CSSA over the last decade has greatly increased the demand for groundwater locally.

There are 13 water wells at CSSA. Currently two (as well as one on nearby Camp Bullis) are used for drinking water supply; the remainder are used for agricultural and monitoring purposes. CSSA is currently installing 15 additional wells to monitor conditions in the Lower Glen Rose, Bexar Shale, and Cow Creek units of the Middle Trinity Aquifer. CSSA plans to install another 24 wells in the fall of 2001.

*(continued on other side)*

Produced by Camp Stanley Storage Activity • 25800 Ralph Fair Road • Boerne, Texas 78015-4800 • 210-295-7416

# Public Meetings

## Previous Topics Presented

CAMP STANLEY - HISTORY AND MISSION

OFF-POST GROUNDWATER

SWMU B-3 CLEANUP

ON-POST GROUNDWATER

### 2001/2002

1. History and mission
2. Previous Investigations
3. SWMU B-3 Cleanup
4. AOC-65 Cleanup
5. On-post Groundwater
6. Off-post Groundwater

Attendance 2001 = 120, 2002 = 25

Held at elementary schools on two nights

### 2006

1. History and mission
2. Groundwater Program
3. Groundwater Sampling
4. Contamination Cleanup
5. Cleanup Efforts

Attendance 2006 = 12

Held at elementary schools on two nights

# 2009 Public Meeting Goals

- Provide timely and accurate information
- Present information to citizens at convenient locations and in non-technical formats
- Respond to community concerns
- Provide opportunity for citizen input

# Change in Community Demographics

- Development to the north, west and south of Camp Stanley
  - New neighborhoods
    - Centex development
  - Existing neighborhoods
    - Fair Oaks Ranch, Jackson Woods, Hidden Springs, Dominion, Leon Springs

Enclosed is Fact Sheet #10 concerning the Camp Stanley Storage Activity Environmental Program. At this time, Camp Stanley Storage Activity is providing you with the opportunity to be removed from its mailing list distributing information about its Environmental Program. If you wish to be removed from our mailing list indicate so below and return this postcard.

\_\_\_\_\_ *Yes, please remove my name and address from the CSSA mailing list. I understand that I will not receive further information in the mail concerning CSSA's Environmental Program.*

Information on CSSA's Environmental Program is available on the internet at: [www.stanley.army.mil](http://www.stanley.army.mil)  
 Copies of information on CSSA's Environmental Program is available at: San Antonio Public Library, 600 Soledad, San Antonio, TX 78205

For additional information contact:  
 CSSA Commander, LTC Jason D. Shirley (210) 295-7416

CAMP STANLEY OPEN HOUSE  
 Sign-In Sheet

Date: December 5, 2006					
Time: 7:00 pm – 9:00 pm					
Place: Fair Oaks Ranch Elementary					
Name	Organization	Address	Phone No.	E-mail	Add to Mailing List?

# Public Meetings 2009

## Proposed Topics

1. History and Mission
  2. Groundwater Program
  3. Groundwater Sampling
  4. Contamination Cleanup
  5. Cleanup Efforts
1. Mission and history of CSSA
  2. Groundwater monitoring both on and off-post, history and results
  3. Sampling rationale, well installations, *introduce long term monitoring optimization for off-post program*
  4. Status of AOC 65 and B-3 investigations, *description of treatability studies and future plans*
  5. How CSSA identifies sites for cleanup, investigation methods, and status of sites being remediated

# Public Meeting Logistics

- Poster format similar to previous meetings
- Open forum for citizens to view information and ask questions
- One meeting at Fair Oaks Ranch Elementary
- Possible date: November 10 or 17, 2009
- One-time mailed invitation to new neighborhoods and existing neighborhoods
- Publish announcement in newspaper