

CSSA Meeting Sign-In

January 24, 2012


Julie Burdey, Parsons	
Greg Lyssy	USEPA
Jessica Hubley	USG
Jennifer Davis	DoD
Ken Rice	Parsons
Shannon Schoepflin	Parsons
GABRIEL NERO-TERGUSSEN	CSSA
Scott Pearson	CSSA
Laura Marbury	Parsons
Teresa Benavides	CSSA
Tim Cannizzo	CSSA
Bob Edwards	Noblis
Stacey Cepers	DoD
Jon Thomas	USGS
Cheryl Blome	USGS
Allan Clark	USGS
David R. Smith	USGS
Jose Salazar	TCEQ
Christina Williams	USFWS

A background image of Camp Stanley, featuring a large, two-story building with a red roof and white walls, surrounded by trees and a grassy field. The image is slightly faded to allow text to be read.

Camp Stanley Storage Activity Status Update

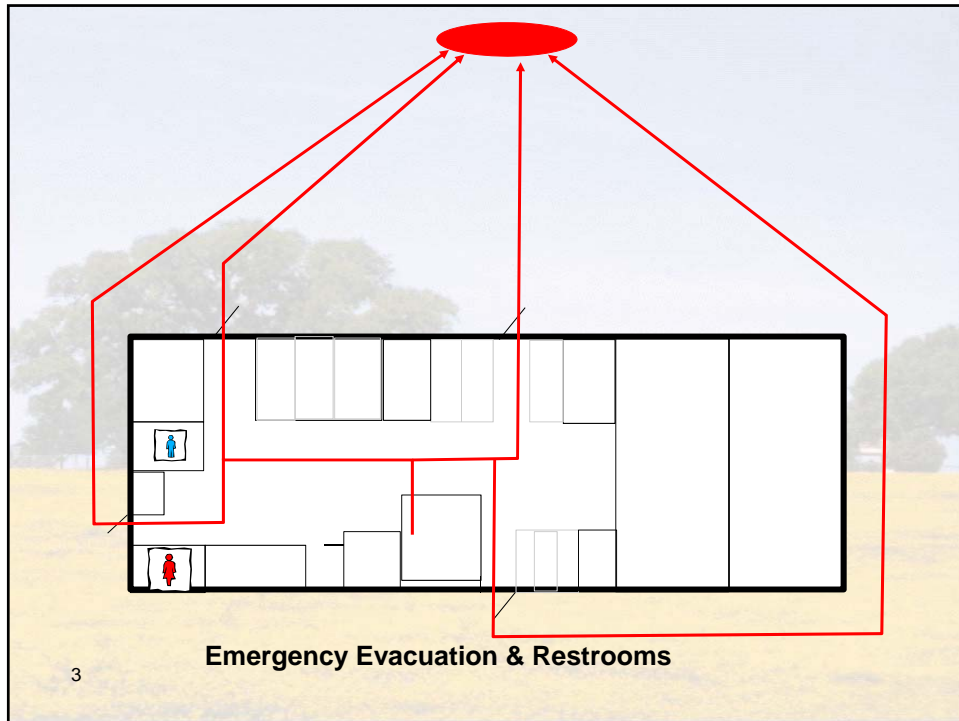
January 24, 2012

1

A background image of Camp Stanley, featuring a large, two-story building with a red roof and white walls, surrounded by trees and a grassy field. The image is slightly faded to allow text to be read.

INTRODUCTIONS AND WELCOME

2



Agenda

9:00	Introductions and Welcome
9:10	SWMU B-3 and AOC-65
	<ul style="list-style-type: none"> • B-3 <ul style="list-style-type: none"> ◦ Bioreactor Performance/Status Update ◦ Isotope Analysis/Noblis ◦ Upcoming Construction • AOC-65 <ul style="list-style-type: none"> ◦ Steam Injection Study Results ◦ Water Line Repair ◦ Trenching/ISCO Injection ◦ Vapor Intrusion
10:00	Groundwater
	<ul style="list-style-type: none"> • Parsons Hydrology Study • USGS 3D Mapping • Updated AOC-65 Plume Maps • Groundwater Monitoring Program • Installation of CS-13 (East Pasture Well)
11:00	Working Lunch

4

Agenda

- 12:00 North/East Pasture Update
- Endangered Species
 - MEC / MD Findings
 - MC Findings
 - Historical Map/Fire/Current SDZ/Fish and Wildlife Issue with Habitat and Remediation
- 14:00 Break
- 14:15 Status of Remaining Sites
- Field Efforts Complete or Nearly Complete
 - Field Efforts Funded
 - Field Efforts Not Funded
- 15:00 Year in Review
- 15:30 Adjourn

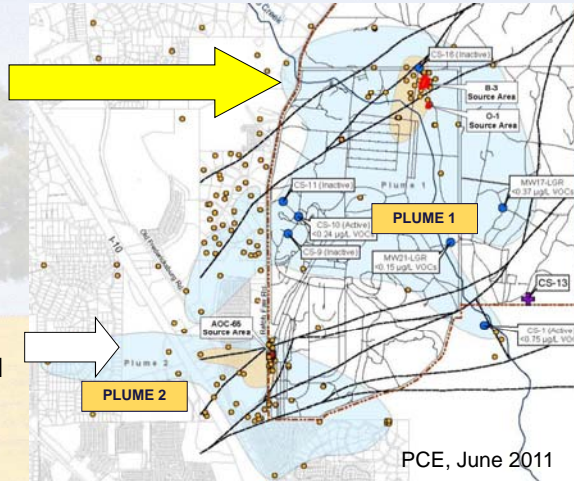
5

TREATABILITY STUDY UPDATES

SWMU B-3 and AOC-65 Description

1. **SWMU B-3 Bioreactor:**
Enhanced anaerobic bioremediation of chlorinated hydrocarbons in underlying fractured limestone at Plume 1.

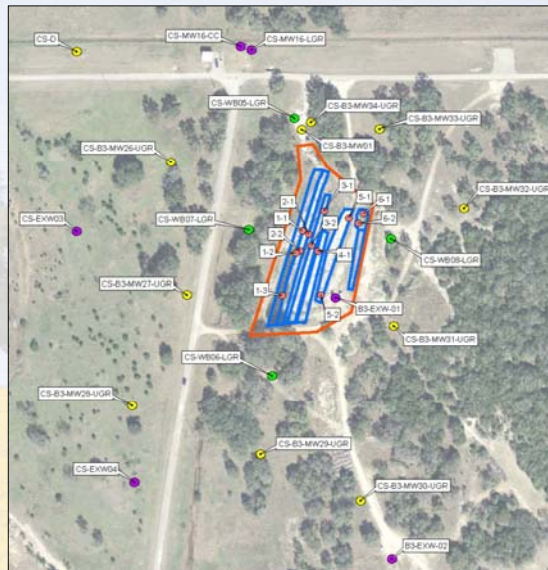
2. **AOC-65 Soil Vapor Extraction and Interim Removal Action:**
Removal of chlorinated hydrocarbons in underlying fractured limestone at Plume 2.



7

SWMU B-3 Background

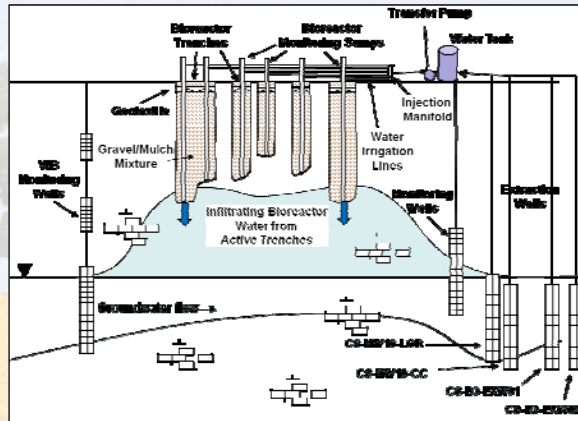
- SWMU B-3 consists of 6 trenches operating from 1970's through the 1980's.
- Identified in 1995 as potential source of groundwater contamination at nearby supply well (CS-16).
- ~15,200 CY waste excavated from SWMU B-3 and disposed off-post in 2006.
- Bioreactor initiated operations in 2007 under TCEQ UIC Authorization No. 5X26004321.



8

B-3 Bioreactor General Observations

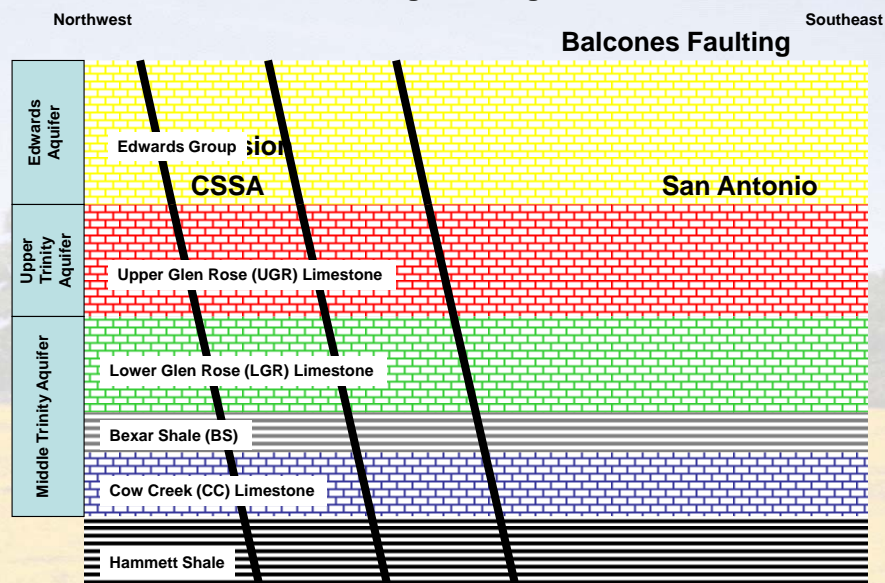
- Bioreactor is effectively treating approximately 20,000 gallons and 25,000 gallons of injected contaminated groundwater per day in Trenches 1 and 6, respectively.
- Biotic degradation is occurring with biological degradation end products ethylene, ethane, and CO₂ identified in surrounding UGR wells and LGR wells.
- Significant contamination likely remains in the fractured bedrock formation. Underlying VOC's are being mobilized.



Bioreactor Conceptual Diagram

9

Geologic Setting



Replacement of CS-WB07

- Westbay well was damaged in March 2011 when monitoring instrument and sampler tubes broke off the wireline.
- The instrument and samplers were successfully extracted.
- Camera survey showed that the casing has been compromised.
- Water level inside the WB well was equilibrated with 03B zone.
- Packers were deflated and all casing material was removed. A damaged coupling was discovered at 247' bgs.
- New well materials were installed and WB07 was returned to service in July 2011.

- Westbay well was damaged in March 2011 when monitoring instrument and sampler tubes broke off the wireline.
- The instrument and samplers were successfully extracted.
- Camera survey showed that the casing has been compromised.
- Water level inside the WB well was equilibrated with 03B zone.
- Packers were deflated and all casing material was removed. A damaged coupling was discovered at 247' bgs.
- New well materials were installed and WB07 was returned to service in July 2011.



B-3 Bioreactor

Current Sampling Efforts

Regulatory Sampling	Regulatory Sampling Locations
<ul style="list-style-type: none">• VOCs• TDS• pH at injection site (field)	<ul style="list-style-type: none">• Injection Manifold (UIC) - Monthly• Trench Sumps - Quarterly• WB-03B Zones - Quarterly
Performance Sampling	Performance Sampling Locations
<ul style="list-style-type: none">• MEE + CO₂• Ferrous Iron• Manganese• Arsenic• Total Organic Carbon• Dissolved Organic Carbon• Sulfide• Sulfate and Chloride• <i>Dehalococcoides</i>• Dissolved Hydrogen	<p style="text-align: center;">Frequency: Semi-Annual</p> <ul style="list-style-type: none">• Trench Sumps (5)• WB zones (27)• Extraction Wells (6)• LGR Monitoring Wells (4)• UGR Monitoring Wells (9) <p>Field Parameters Collected</p> <ul style="list-style-type: none">• pH• DO• Conductivity• ORP• Temp• Water Level

12

- ## Regulatory Sampling

- VOCs
- TDS
- pH at injection site (field)

- ## Regulatory Sampling Locations

- Injection Manifold (UIC) - Monthly
- Trench Sumps - Quarterly
- WB-03B Zones - Quarterly

- ## Performance Sampling

- MEE + CO₂
- Ferrous Iron
- Manganese
- Arsenic
- Total Organic Carbon
- Dissolved Organic Carbon
- Sulfide
- Sulfate and Chloride
- *Dehalococcoides*
- Dissolved Hydrogen

- ## Performance Sampling Locations

Frequency: Semi-Annual

- Trench Sumps (5)
- WB zones (27)
- Extraction Wells (6)
- LGR Monitoring Wells (4)
- UGR Monitoring Wells (9)

Field Parameters Collected

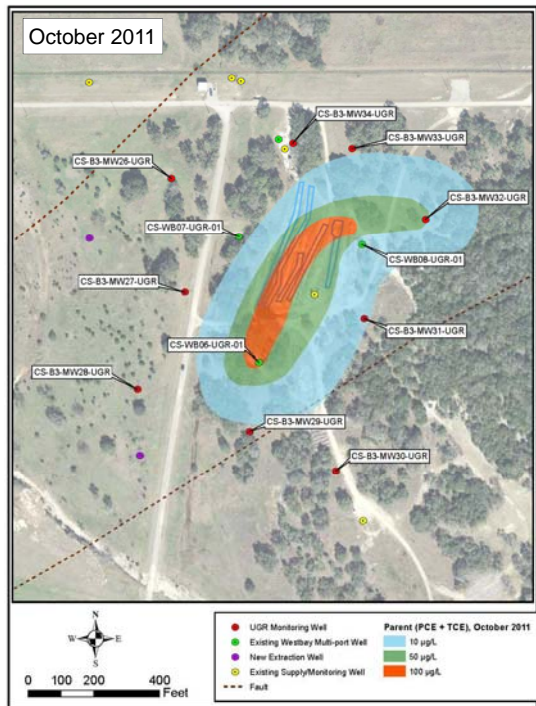
- pH
- DO
- Conductivity
- ORP
- Temp
- Water Level

B-3 Bioreactor

UGR Observations – PCE and TCE

- PCE and TCE concentrations appear to remain stable within the bioreactor footprint.
- Shallow wells south and east of the bioreactor contain elevated concentrations of PCE and TCE.
- Shallow wells to the west of the bioreactor continue to contain minor concentrations of PCE or TCE.

13

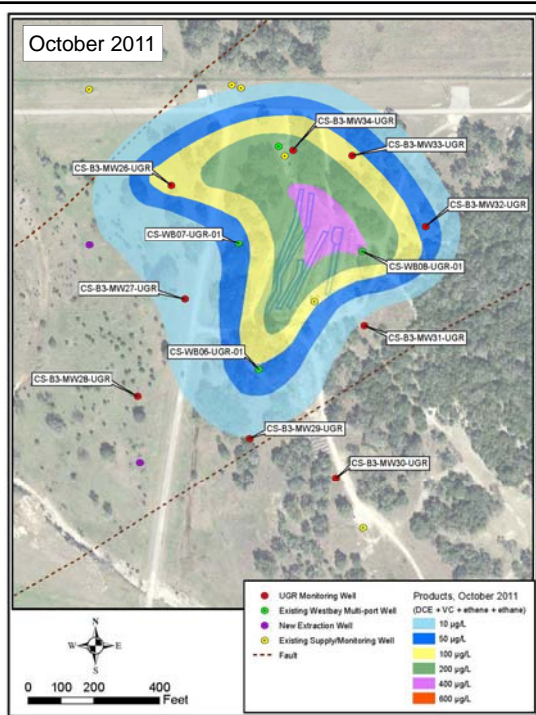


B-3 Bioreactor

UGR Observations – Dechlorination Products

- Widespread presence of degradation products shows influence of bioreactor.

14

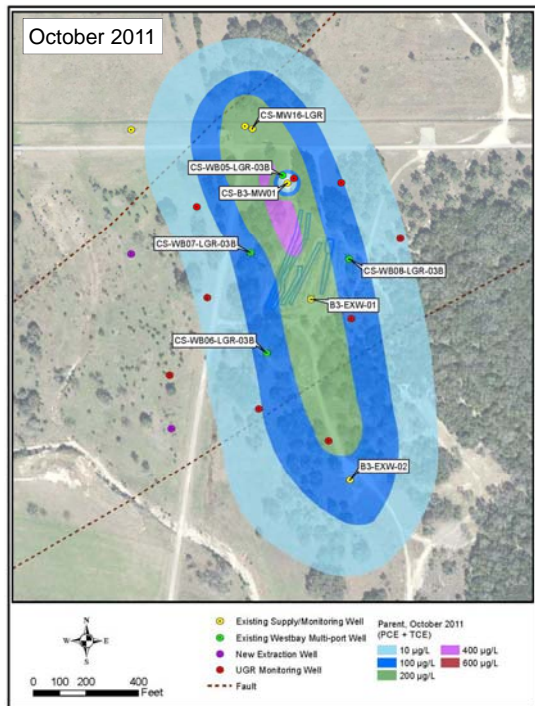


B-3 Bioreactor

LGR Observations – PCE and TCE

- Lack of PCE and TCE in the vicinity of CS-B3-MW01 reflect degradation associated with lactate injection in 2006.

15

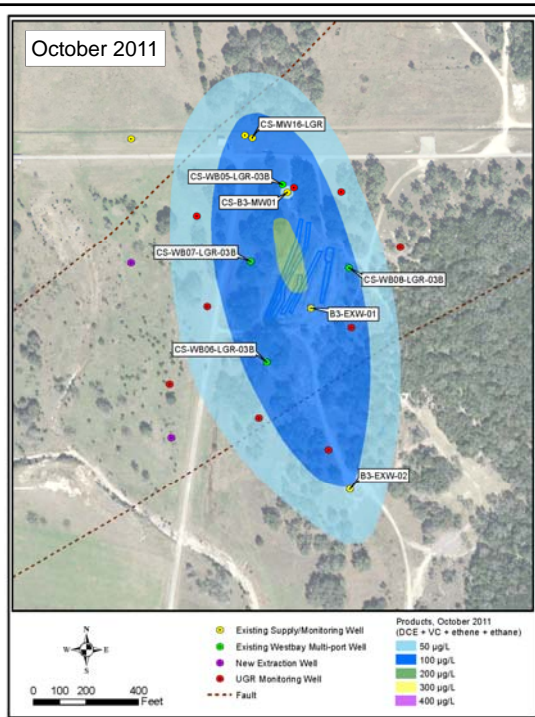


B-3 Bioreactor

LGR Observations – Dechlorination Products

- Moderate to low concentrations of *cis*-DCE are pervasive across the site.
- Vinyl chloride is detected at WB05-LGR-03B and CS-B3-MW01, possibly due to lactate injection activities.

16

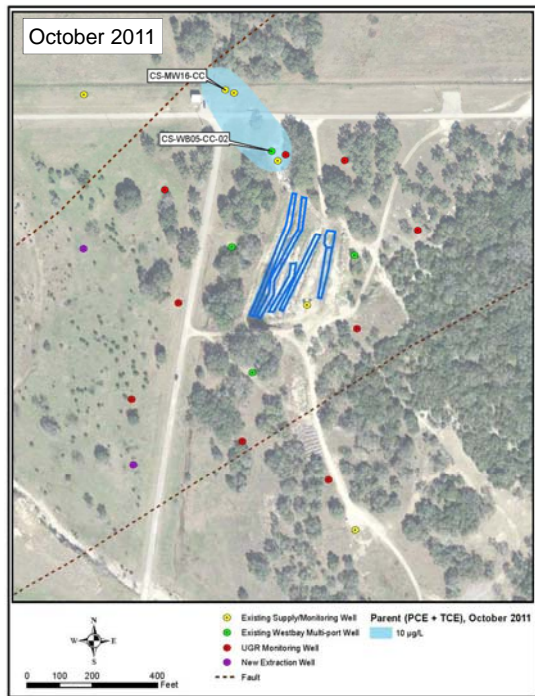


B-3 Bioreactor

CC Observations – PCE and TCE

- Low concentrations of parent contaminants have been identified within the CC (less than 50 µg/L).
- TCE accounts for ~ 90% or greater of parent concentrations.

17

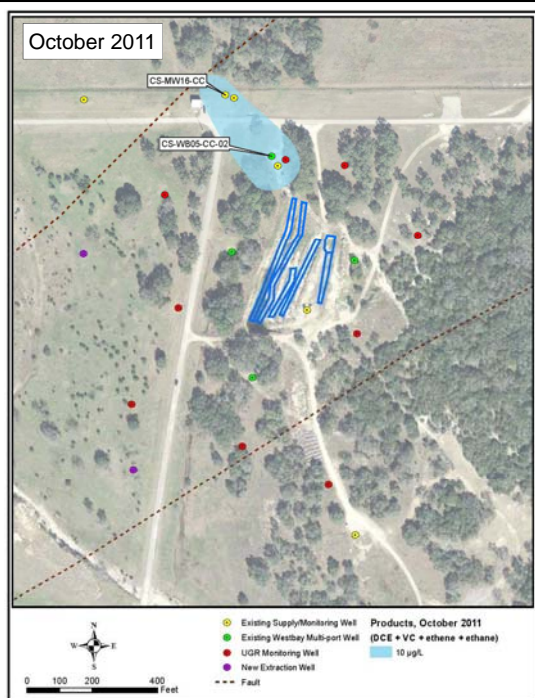


B-3 Bioreactor

CC Observations – Dechlorination Products

- Low concentrations of dechlorination products have been identified within the CC (less than 50 µg/L).
- *cis*-DCE is the main dechlorination product identified.
- Minor amounts (< 2 µg/L) of VC are present in WB05-CC-02.

18

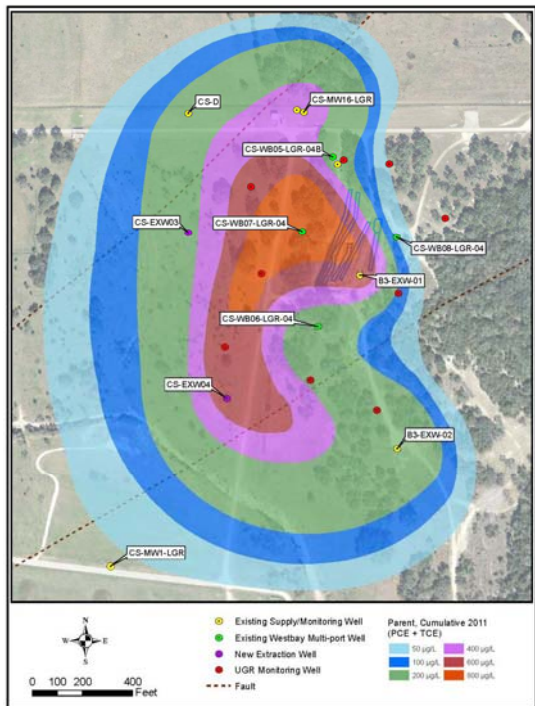


B-3 Bioreactor

Cumulative LGR Observations – PCE and TCE

- Approximate plume location using data from LGR wells over multiple sampling events in 2011.

19

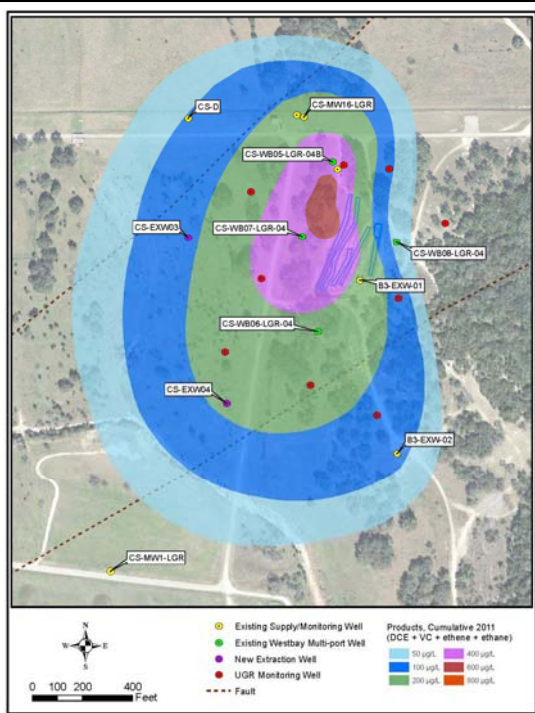


B-3 Bioreactor

Cumulative LGR Observations – Dechlorination Products

- Samples of groundwater for PCE-TCE for surrounding WB-LGR04, LGR monitoring wells and B-3 extraction wells
- Degradation product concentration plume expected once all wells are on semi-annual basis.

20



SWMU B-3 Treatability Study

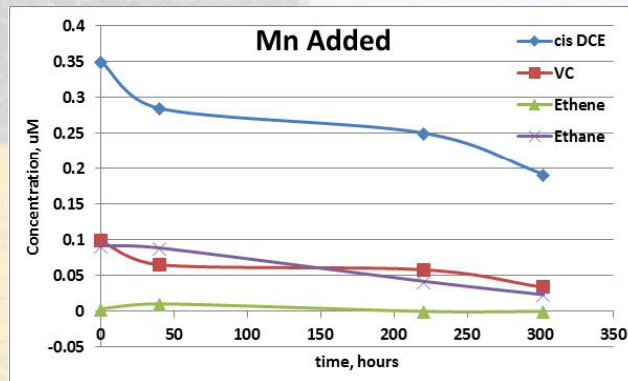
- Purpose of Noblis TS- optimize performance of bioreactor
 - Is microbial reductive dechlorination only pathway of degradation?
 - How do variable geochemical conditions affect contaminant degradation?
- Approach
 - Use laboratory microcosm study to evaluate alternate pathways
 - Evaluate DCE and VC degradation with individual electron acceptors (Mn, Fe) under “constant” geochemical conditions

Treatability Study Results from Texas A&M University

- BASED on PRELIMINARY DATA
- Three microcosms
 - Control (DCE, no Mn, bioreactor water)
 - Mn-added (DCE, Mn, bioreactor water)
 - Killed Control (DCE, Mn, sterilized water)
- DCE concentrations attenuate in both the Control and Mn-added microcosms
- Dissolved Mn produced only in Mn-added microcosm
 - Mn not produced by a strictly geochemical mechanism

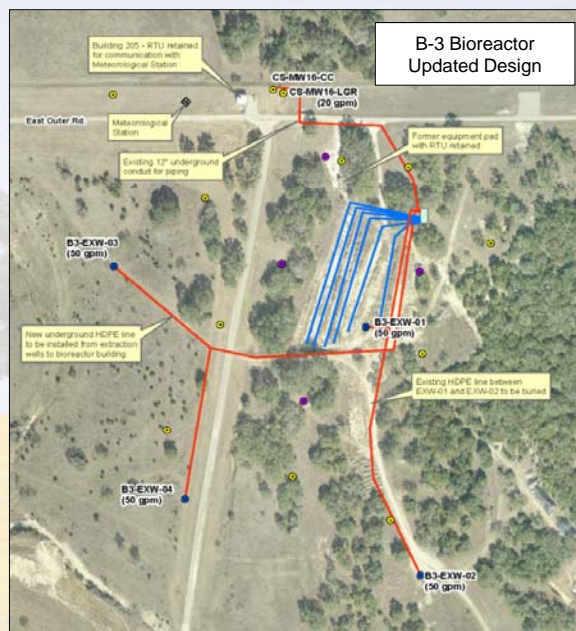
Results for Mn-added Microcosm

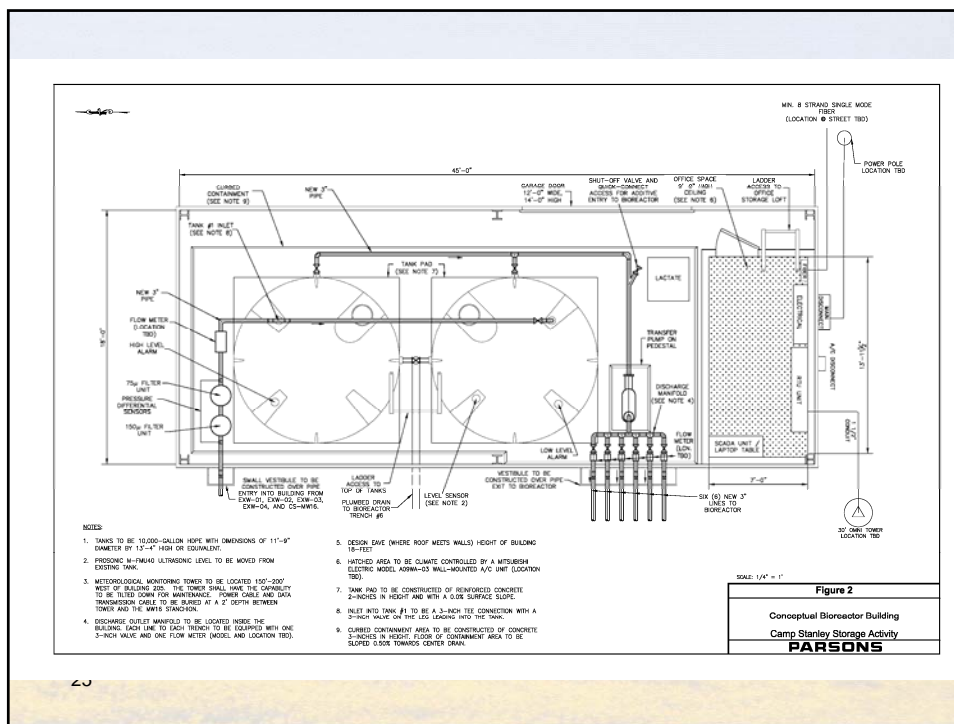
Time (hours)	Mn (ug/L)	ORP (mv)
0	0	-58
40	0	-238
220	1366	-82
302	1123	135



SWMU B-3 Bioreactor Next Steps

- Continue monitoring bioreactor.
- Update bioreactor injection and control systems.
- Recharge trenches with new mulch and gravel, and install new injection lines.
- Identify potential new LGR monitoring well location east of bioreactor.
- Determine viability of lactate injections in surrounding wells.

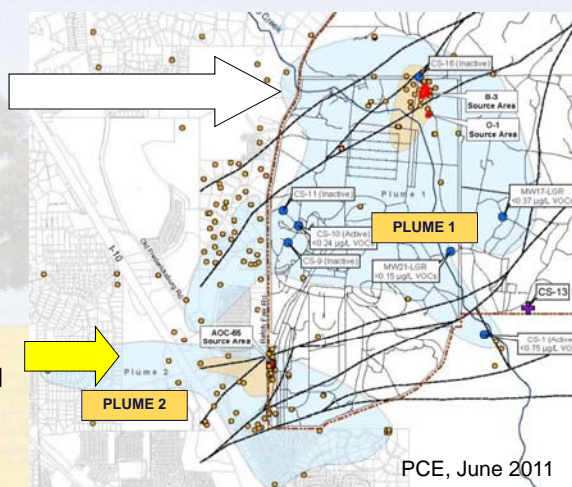




SWMU B-3 and AOC-65 Description

1. **SWMU B-3 Bioreactor:**
Enhanced anaerobic bioremediation of chlorinated hydrocarbons in underlying fractured limestone at Plume 1.

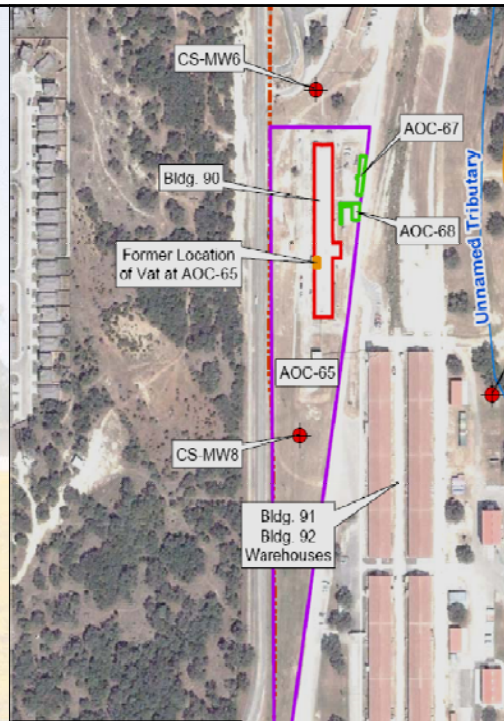
2. **AOC-65 Soil Vapor Extraction and Interim Removal Action:**
Removal of chlorinated hydrocarbons in underlying fractured limestone at Plume 2.



AOC-65 Background

- AOC-65 consists of an area surrounding Building 90.
- Chlorinated solvent degreasing units (vats) were removed in 1995.
- Initial investigations identified groundwater plume (2) in 1999.
- Interim Removal Actions in 2001 excavated and disposed of ~1,300 CY of impacted soil media off-post.
- SVE Pilot Study initiated in 2002, which continues to operate within Permit By Rule Limits.

27



AOC-65 Treatability Study Objectives Review and Summary

Activities since July 2011 :

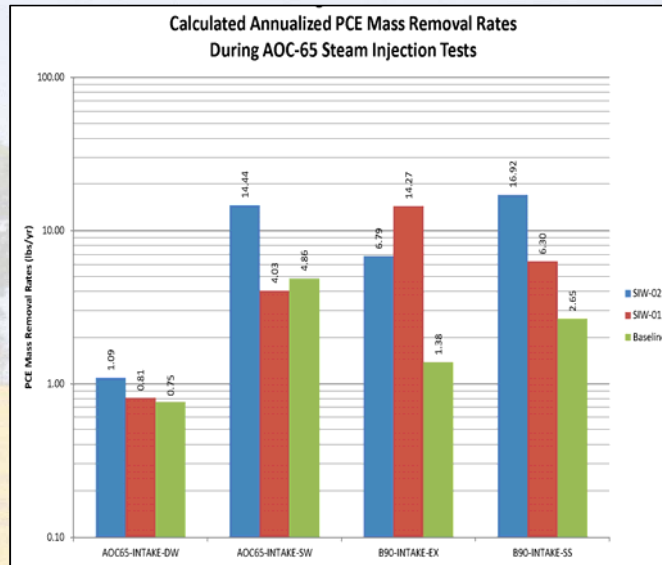
- Installed 2 steam injection wells (SIW) and 5 Vapor Extraction Wells (VEW).
- Upgraded existing SVE system (new Building 90 External system blower installed).
- Performed treatability study utilizing thermally enhanced SVE.
- Repaired waterline leaks.



28

Thermally Enhanced SVE Treatability Study Results

- **Baseline.**
 - Western System
5.61 lb/yr
 - Eastern System
4.03 lb/yr
- **SIW-01.**
 - Western System
4.84 lb/yr
 - Eastern System
20.57 lb/yr
- **SIW-02.**
 - Western System
15.53 lb/yr
 - Eastern System
23.21 lb/yr



* Samples collected 24 hrs after steam injection began at each SIW

29

Thermally Enhanced SVE Treatability Study Results (cont.)

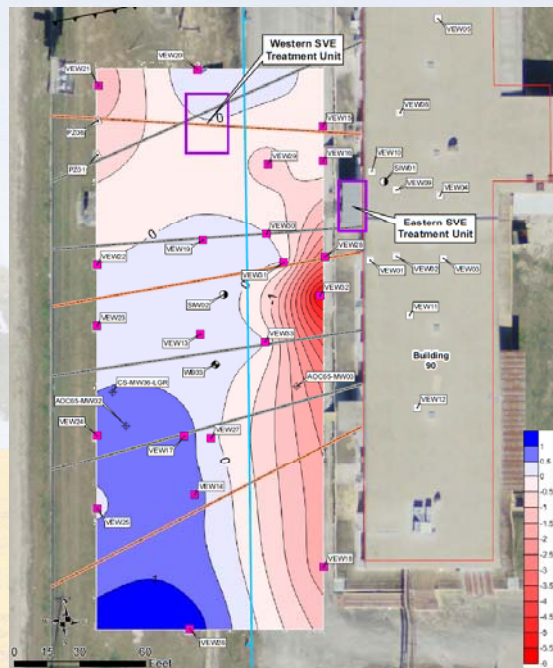
- **Physical Parameter Results**
 - Temperature profiles: no significant findings.
 - TPH profiles: little correlation with laboratory samples.
- **WB03-UGR01 Temperature/Pressure Profiling**
 - Pressure changes throughout both tests were similar to changes in atmospheric pressure.
 - No significant changes in temperature were recorded.
 - The UGR01 interval at WB03 is packered between 20 and 37 feet bgs only slightly overlaps the open borehole interval at SIW-02 (between 10 and 26.5 bgs).

30

Thermally Enhanced SVE Treatability Study Results (cont.)

Water Level Survey

- Application of Steam at SIWs results in the accumulation of condensate in the subsurface.
- Water level (WL) increases in individual VEWs indicate subsurface connections/ preferred flowpaths to point of steam injection.



31

Water Line Repair

- Evidence of water line leak near Building 90 discovered during monitoring and drilling activities.
- Groundwater sample from CS-MW36-LGR showed chlorine disinfection by-products (i.e. chloroform).
- Water lines near Building 90 inspected and pressure tested.
- Water lines determined to be in very poor condition were abandoned in place or repaired as necessary.



32

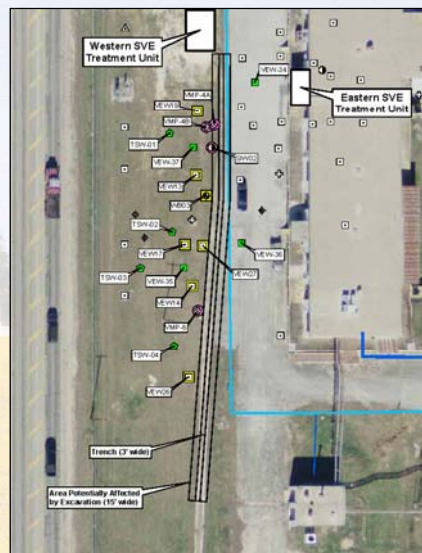
AOC-65 Treatability Study Next Steps

- Continue monitoring SVE system to determine effectiveness of treating source area.
- Plug and abandon VMPs and SIW-02.
- Conduct IRA along drainage ditch west of Building 90 to remove contaminated soil and limestone media.
- Perform fracture analysis on trench walls.
- Install infiltration system within trench.
- Conduct gaseous chemical tracer test.
- Drill/install 4 monitoring/vapor extraction wells.
- Perform bench-scale testing and pilot-scale treatability test of ISCO application on AOC-65 source area.

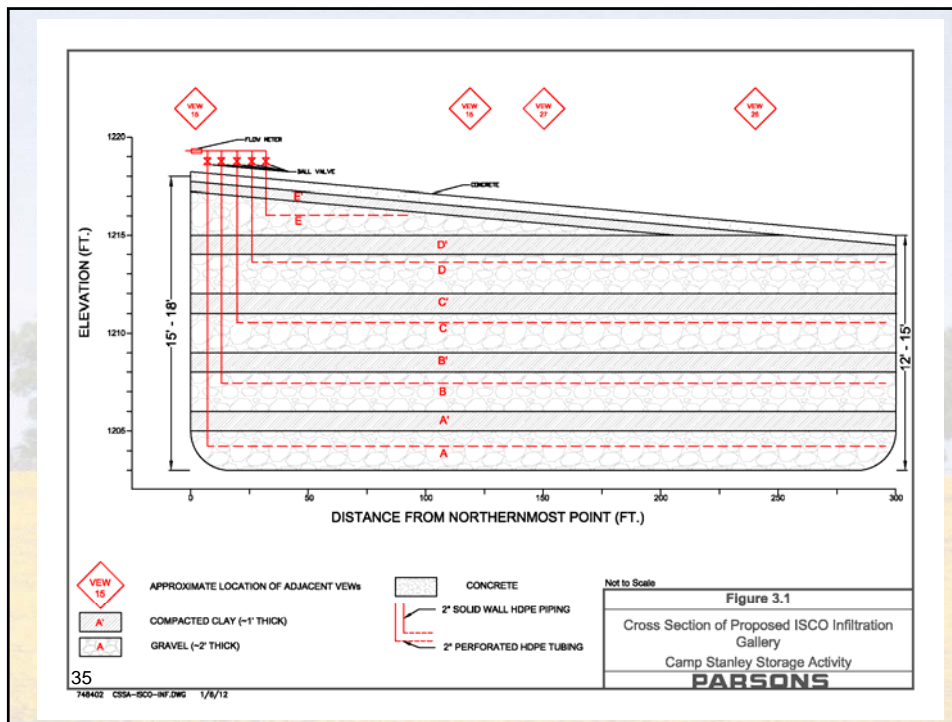
33

AOC-65 Treatability Study Updates Proposed Interim Removal Action

- IRA removing potentially contaminated soils and bedrock west of Building 90 within the ditch area.
- Approximate dimensions of the trench will be 300 ft long, ~3 ft wide, and up to 15 ft deep.
- The trench will be backfilled with alternating layers of gravel and compacted clay.
- Perforated pipe will be installed within the gravel layers for delivery of an ISCO solution.
- An ISCO solution of sodium persulfate activated with sodium hydroxide will be applied and allowed to infiltrate through fractures intersecting the trench.

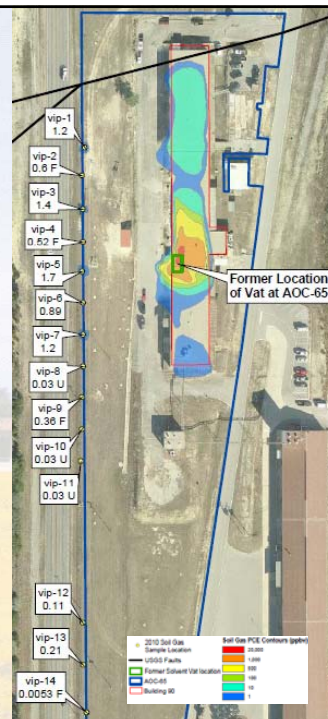


34



Vapor Intrusion

- Work Performed: soil vapor sampling, two industrial hygiene surveys, and soil gas/indoor air surveys.
- Well CS-WB04-LGR-06 exceeded TCEQ RBEL of $12.2\mu\text{g}/\text{m}^2$ in September 2009 with a concentration of $13\mu\text{g}/\text{m}^2$. All additional samples below RBEL (ranging from 9.0 to $9.6\mu\text{g}/\text{m}^2$).
- Recommended Remediation Activities:
 - Continue SVE system
 - Thermal enhanced SVE within Building 90
 - IRA for vadose zone limestone west of Building 90
 - In-situ oxidation in vadose zone



GROUNDWATER UPDATE

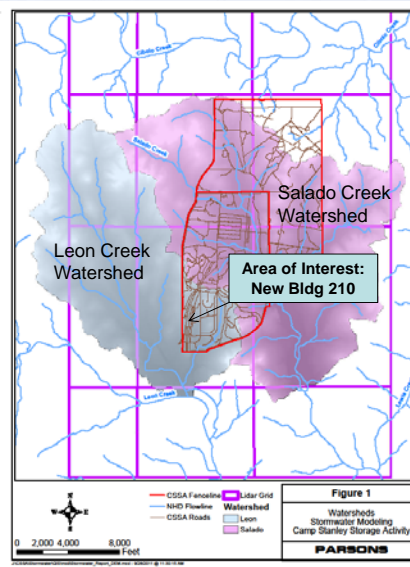
37

Groundwater Parsons Hydrology Study

Tasks included:

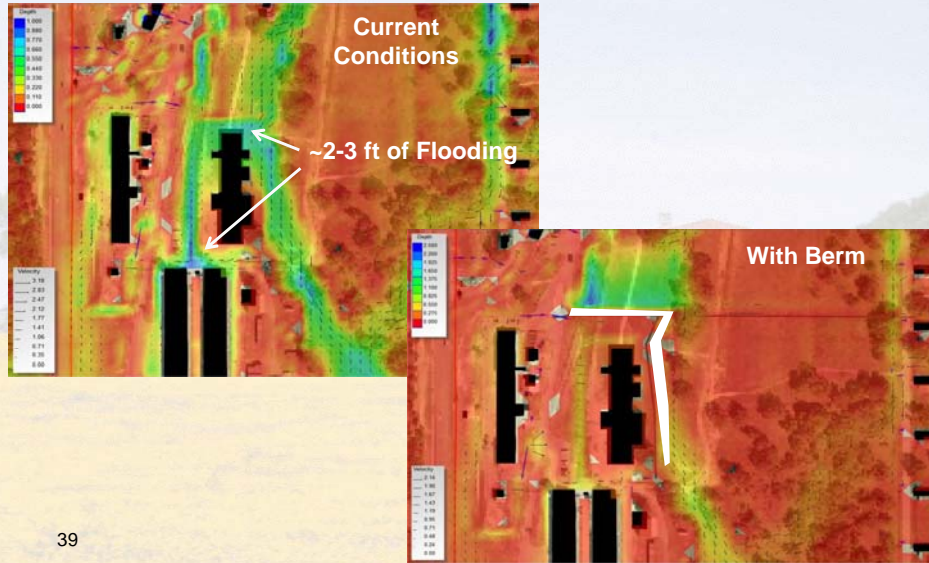
- Characterization and delineation of Leon and Salado Creek Drainage Basins
- Collection of field data, including location and elevations of culverts, inlets, collectors, and outlets
- Development of a 1D/2D Hybrid Model
- Scenario analysis (25-yr and 100-yr storms)
- Drainage modification recommendations

Ultimately, CSSA would like to tie surface water model in to the USGS model.

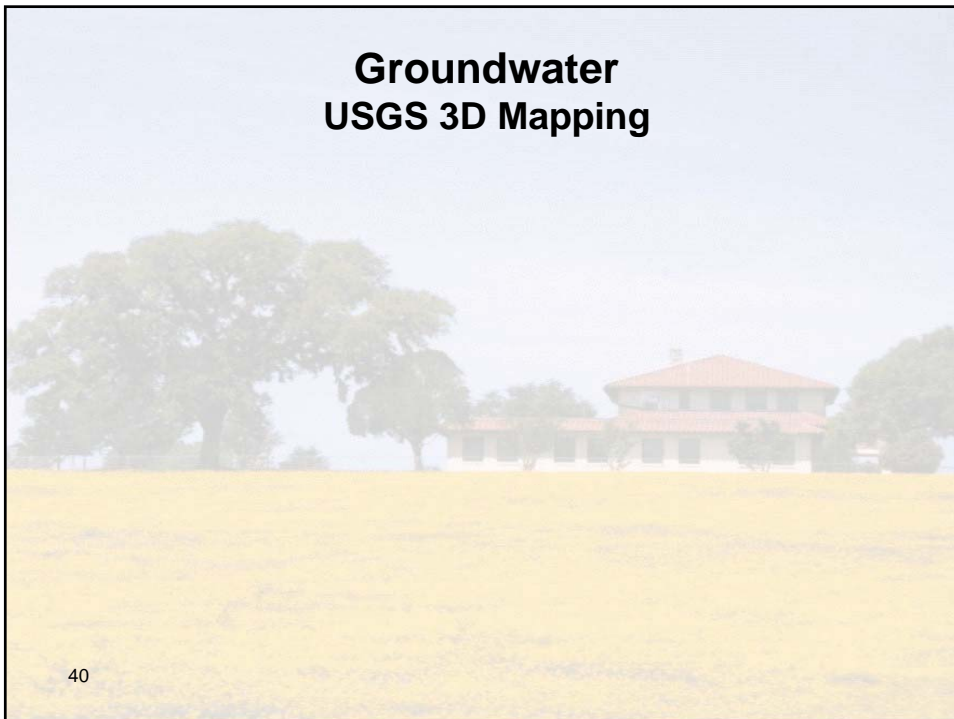


38

Groundwater Parsons Hydrology Study – 100 yr Storm



Groundwater USGS 3D Mapping



USGS 3-D EV Modeling and Down-hole Logging of the CSSA for FY-12

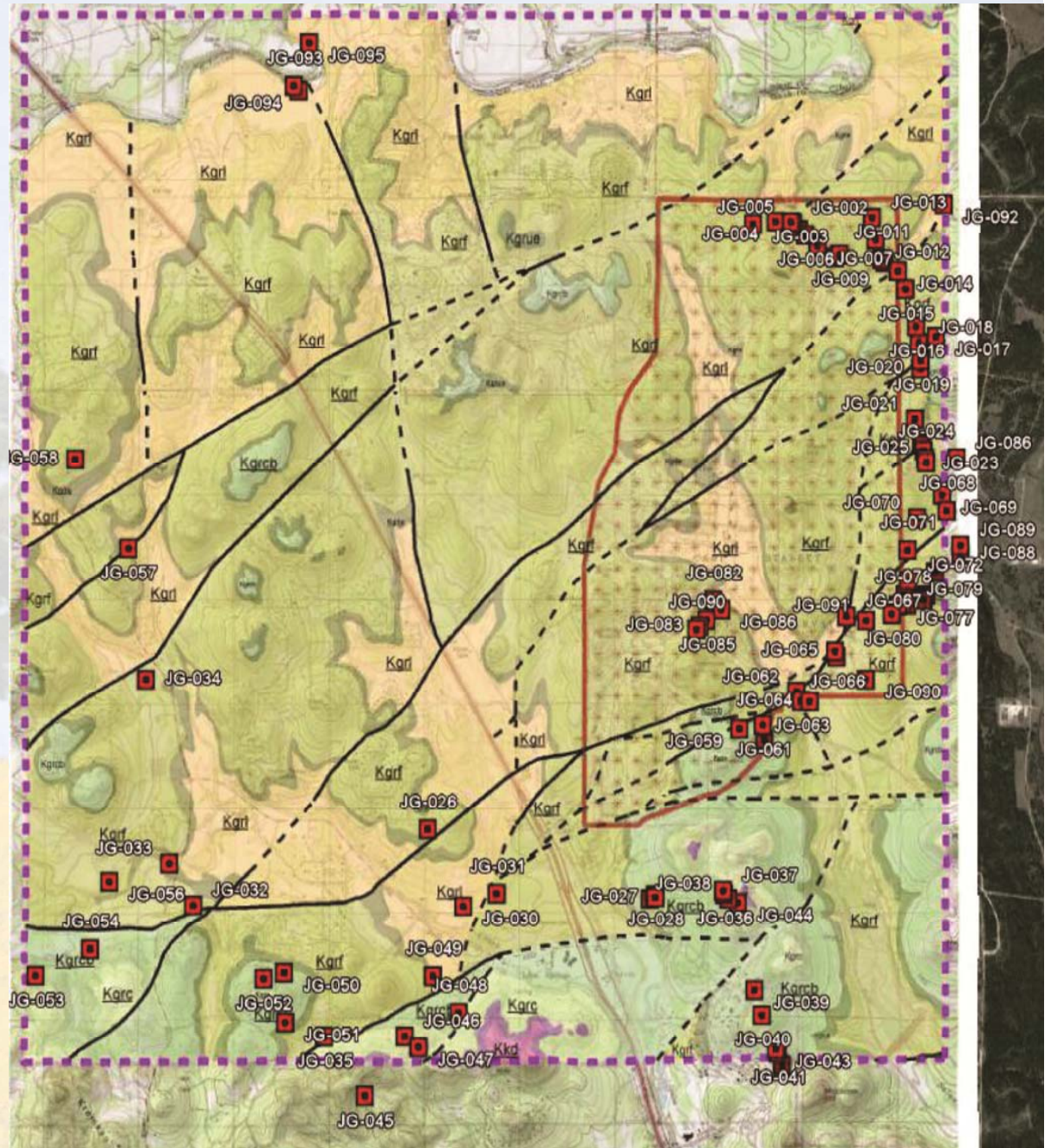
By: Chuck Blome, Dave Smith, Mike Pantea - Denver, and
Greg Stanton - Austin



FY11

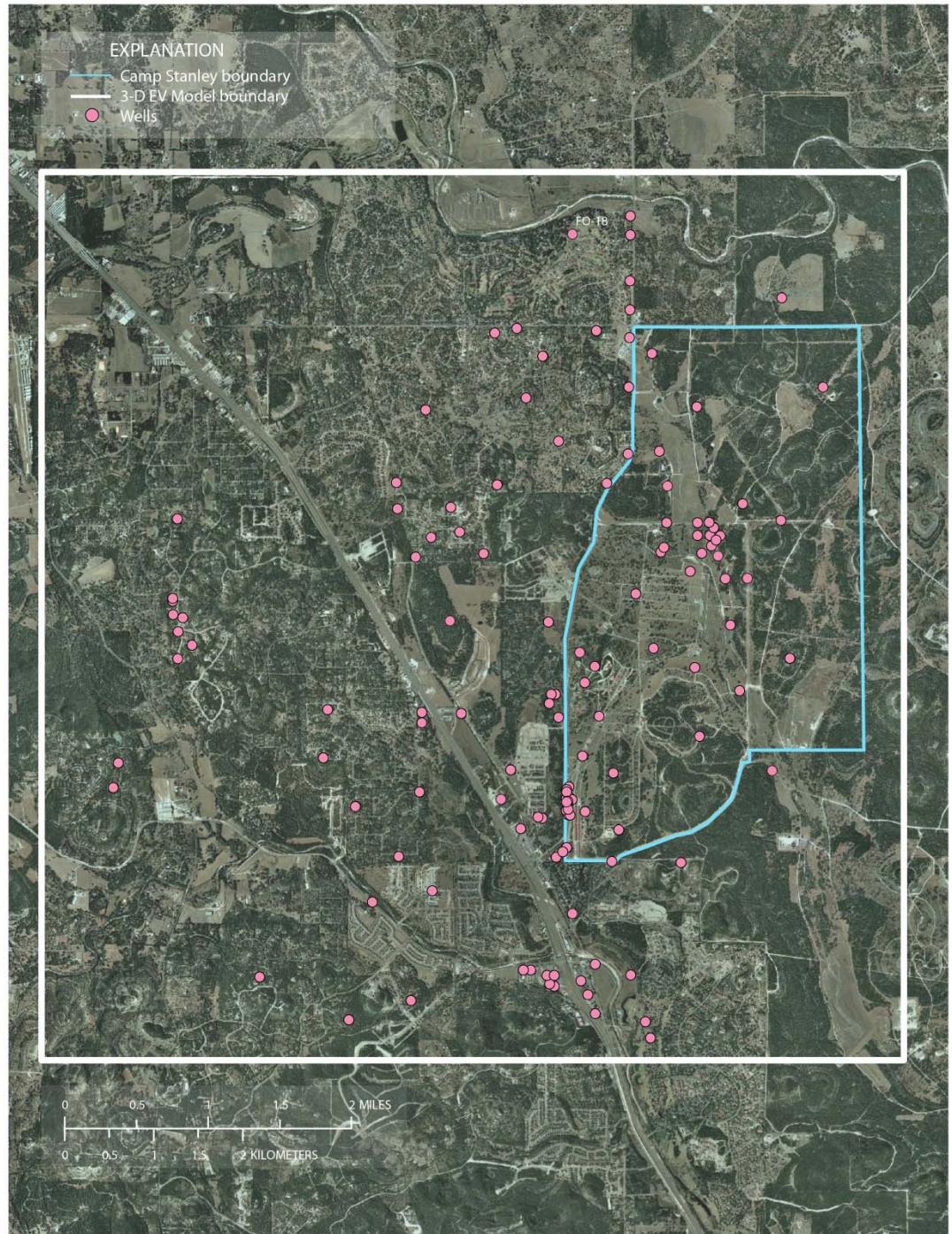
Accomplishments:

- Preliminary 6-layer EarthVision model built but model had well/fault location issues
- All fault structures now corrected with GPS

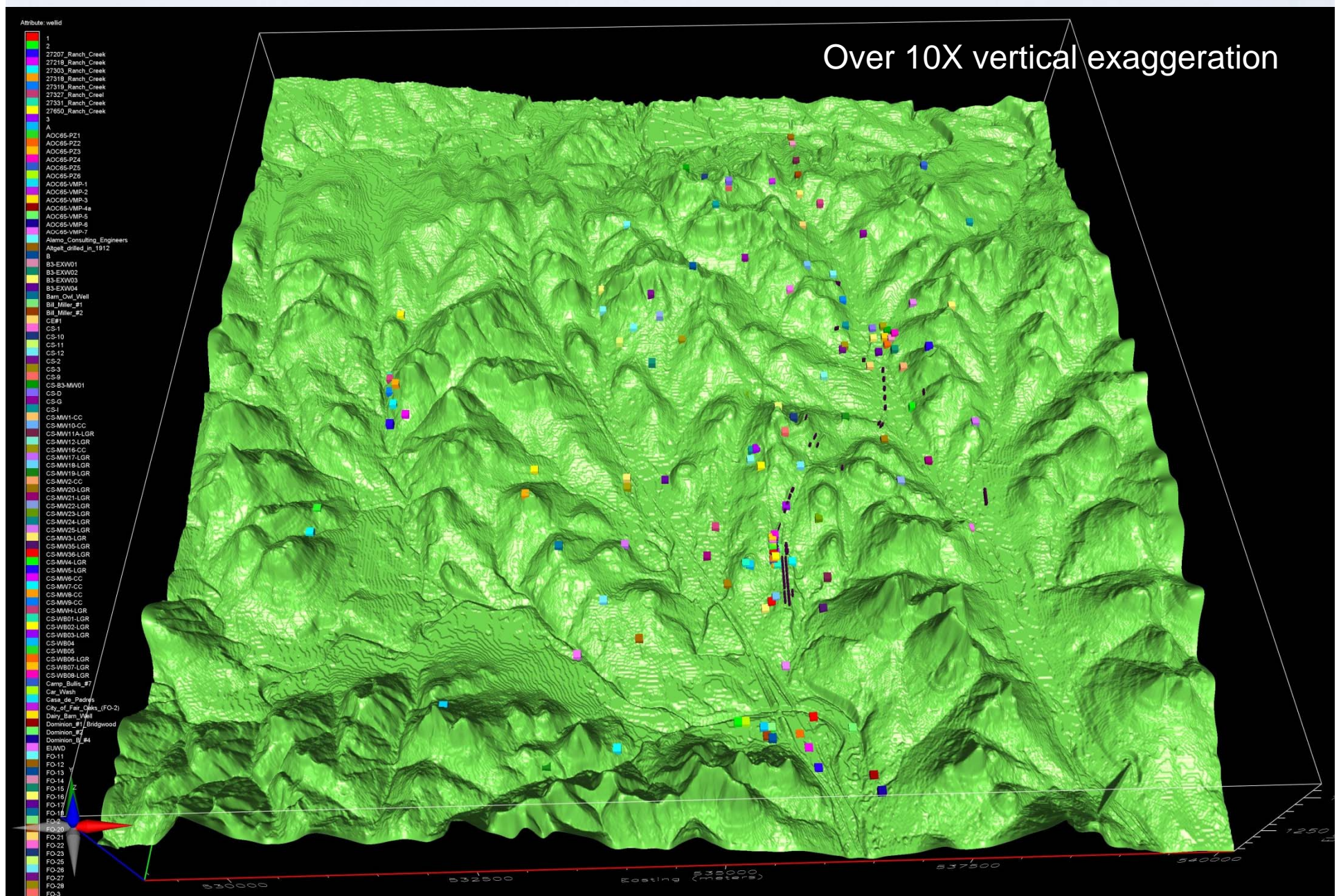


FY11 Accomplishments (con't):

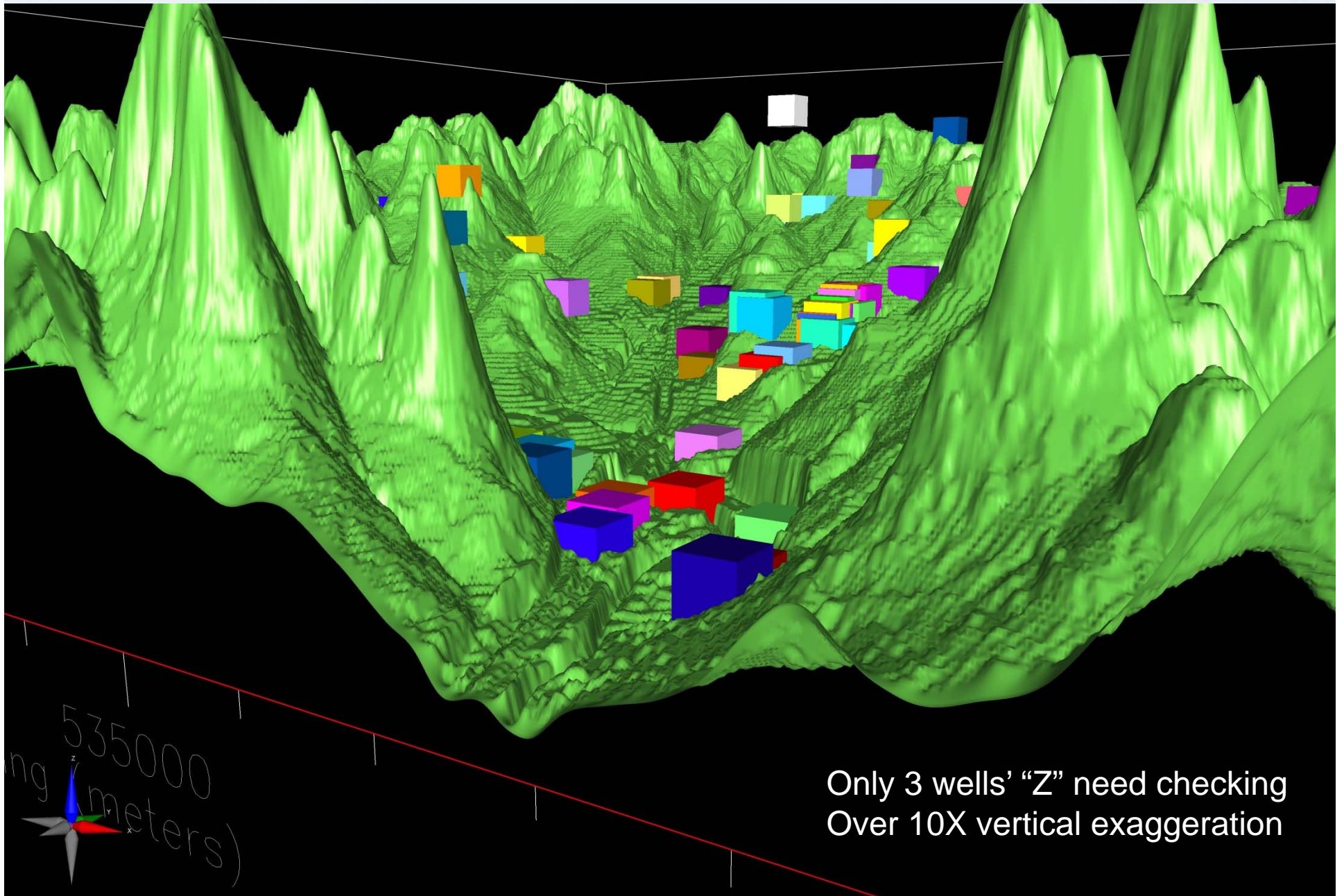
- All well locations corrected (Google Earth/GPS and S. Pearson's help)
- All well picks (td's) corrected
- Accuracy of well locations verified using EarthVision:



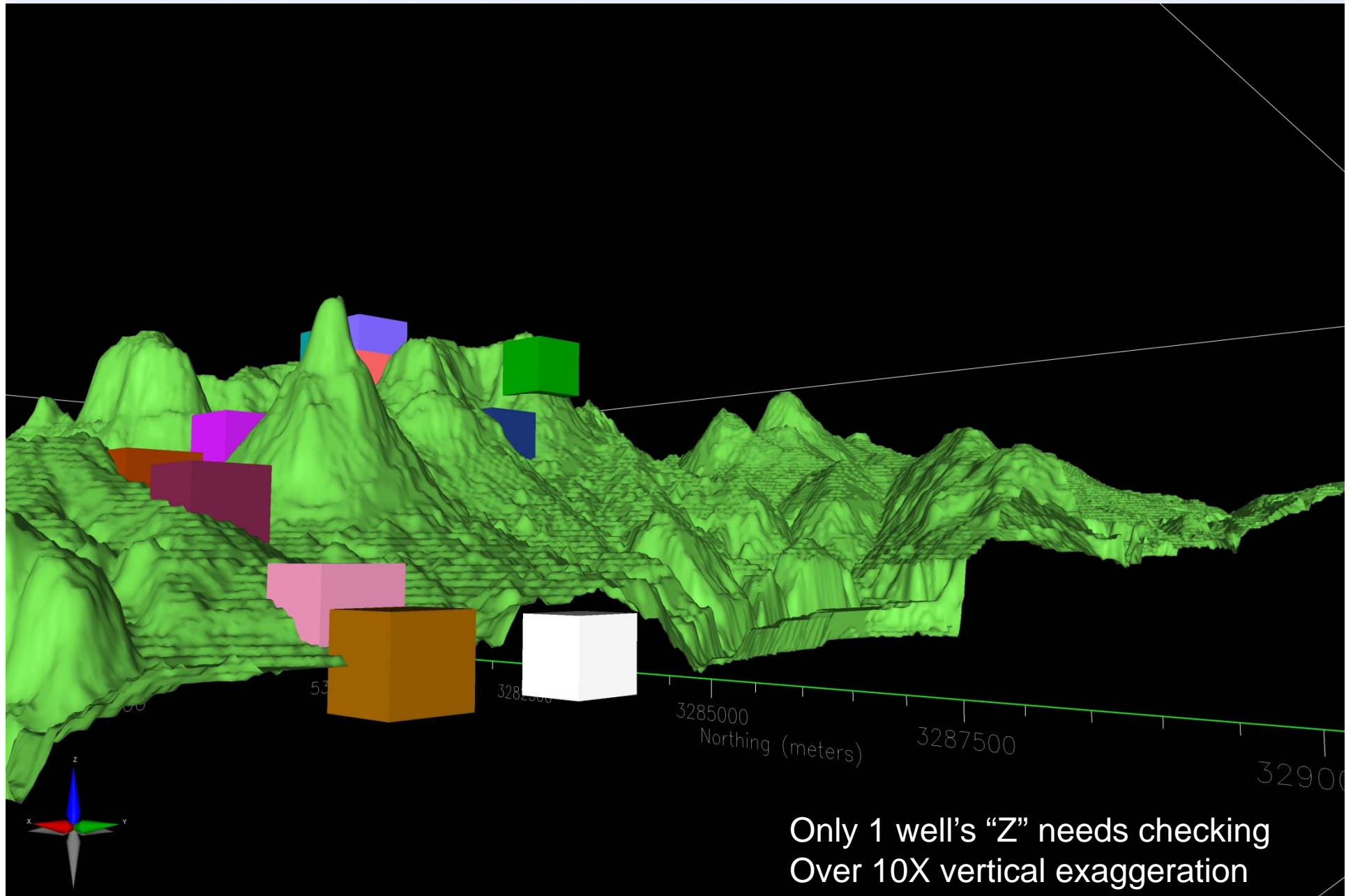
Current CSSA 3-D EV model surface



Checking accuracy of well locations - top

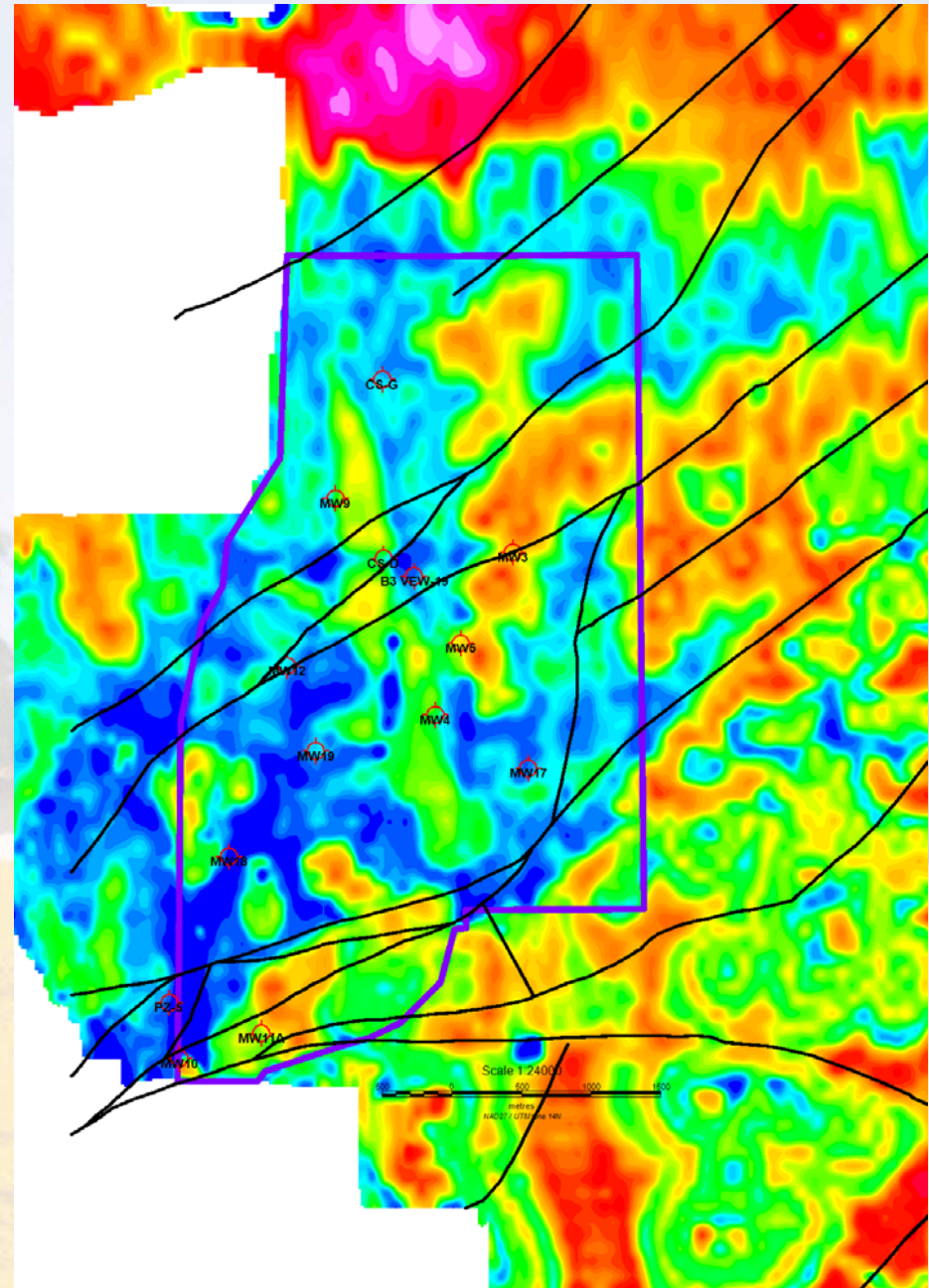


Checking well locations - bottom

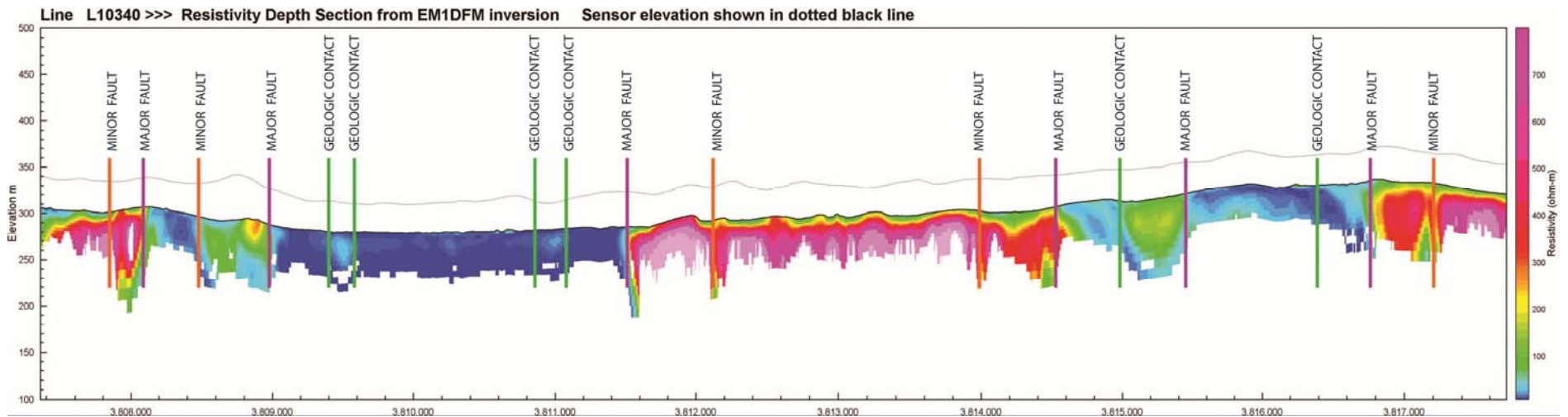


Proposed FY-12 Tasks:

- Completion of 16-layer CSSA 3-D EV model by end of fiscal year
- Include FY-08 helicopter electromagnetic data (work leveraged with USGS FedMap funds)



Interpretation of HEM Profiles

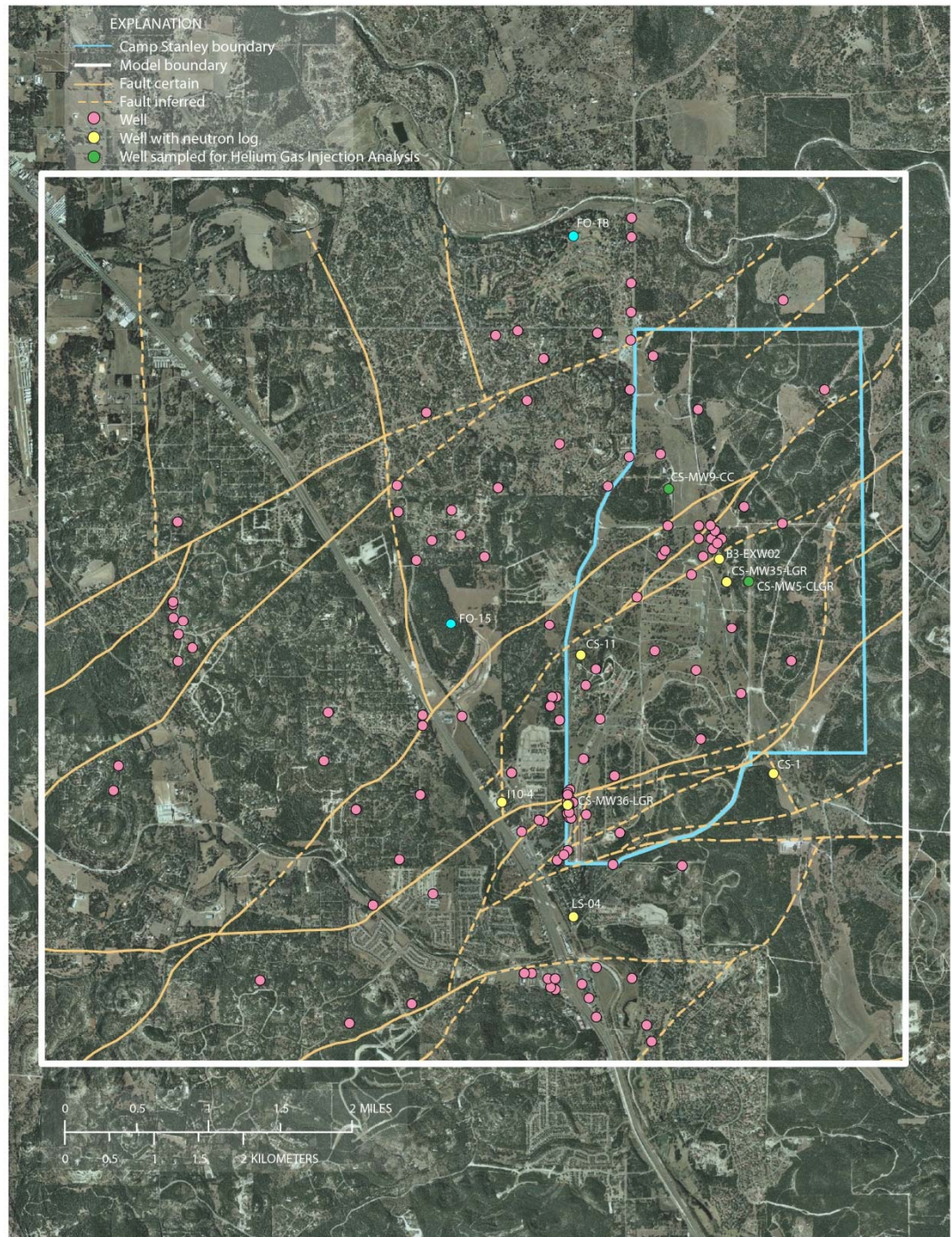


The following structural features can be inferred from lateral discontinuities in the resistivity-depth profiles from each flight line:

- Major faults (PURPLE index line)
- Minor faults (ORANGE index line)
- Geologic contacts (GREEN index line)

Proposed FY-12 Tasks (cont.):

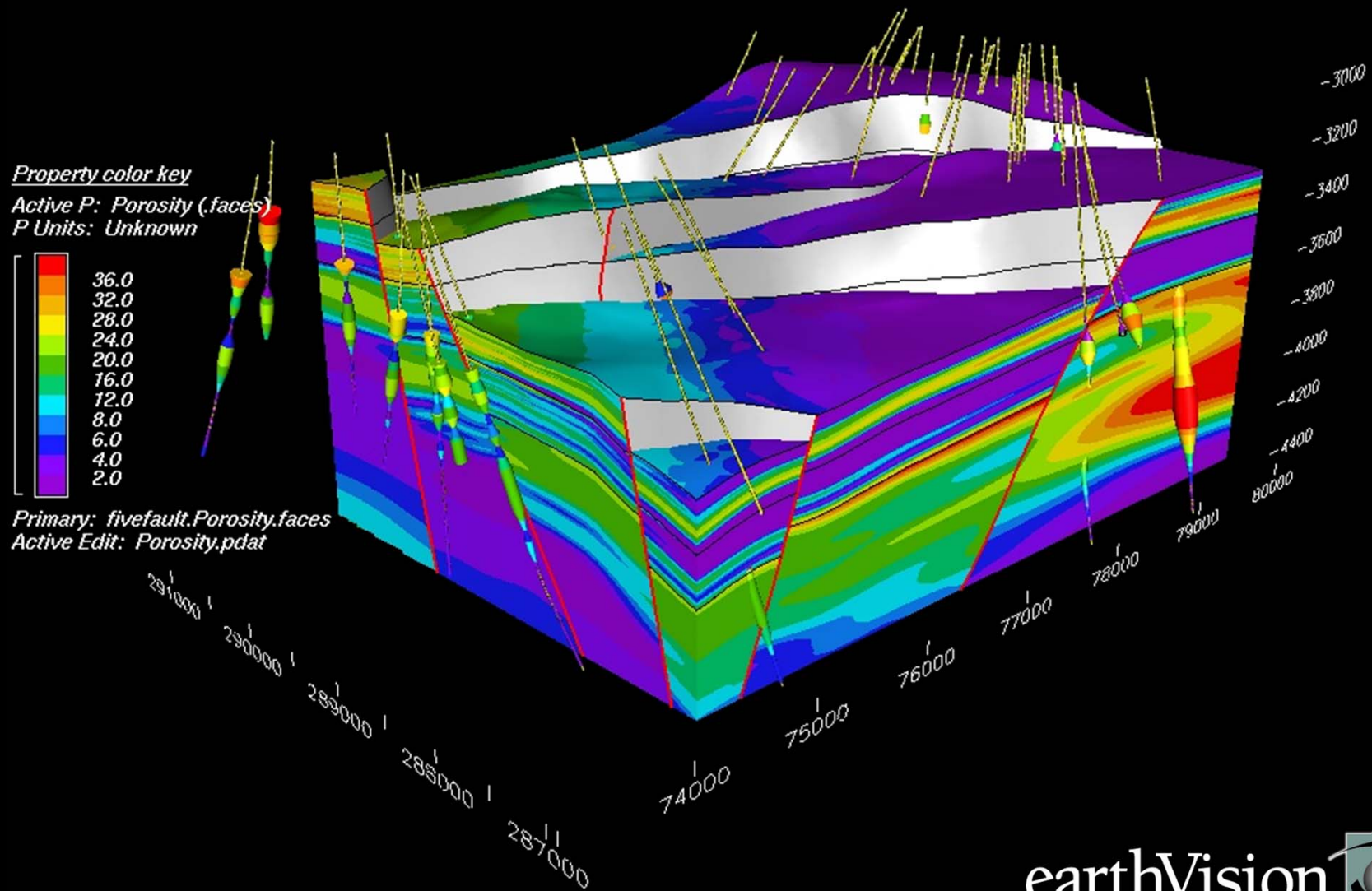
- Density and neutron logs and He injection analyses will provide the porosity data for future 3-D EV rock property models.
- 3-D EV porosity property models will help explain whether faults impede or redirect flow



Proposed FY-12 Tasks (cont.):

- Analysis and interpretation of previously collected neutron, density and sonic geophysical data to calculate porosity values of relevant zones
 - Priority wells with existing USGS logs: I10-4, LS-3, LS-4, B3-EXW02, CS-11, OFR-1, MW27, MW32, MW35-LGR, MW36-LGR
- Borehole geophysical data collection on selected wells
 - CSSA has selected priority wells for additional logging in FY12: CS-G, CS-I, CS-2, CS-3, CS-4, CS-D, CS-13, EXW03, EXW04, OFR-3, I10-2, I10-5, I10-8, I10-9, and JW-5, 6, or 12
 - Planning on full suite of logs where applicable including resistivity, gamma, caliper, induction, neutron, density, sonic, and flowmeter (pumping and ambient)

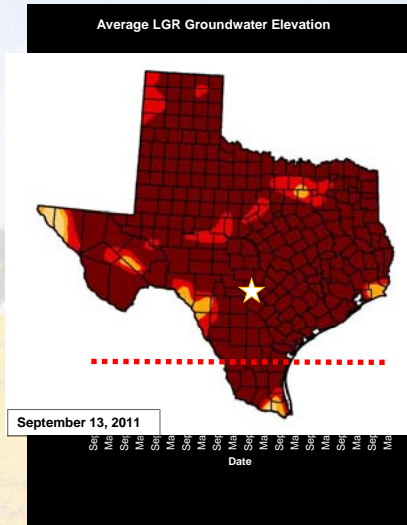
3-D EV Porosity Model - Example



Groundwater Monitoring Program Recent Changes

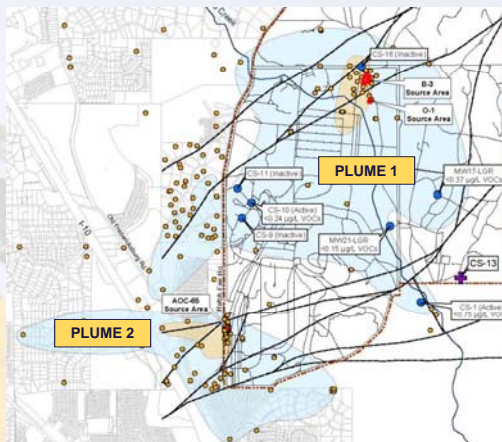
- Central Texas has been experiencing an “exceptional” drought, since May 2011, receiving only 17.3 inches of rainfall at CSSA in 2011, which is about half of the annual average. No residential irrigation for past 17 months at CSSA.
- Of the 17.3 inches in 2011, most of that (12.3 inches) occurred in the last 3 months, reducing drought to “extreme”.
- Aquifer levels have dropped more than 200 feet in 18 months, affecting the yield of groundwater from the production wells. Beneficial rainfall resulted in a 13 feet of aquifer rebound since September 2011.
- Note that the average aquifer elevation “bottoms out” near the top of the LGR production zone during droughts.

43



Groundwater Monitoring Program General Facts

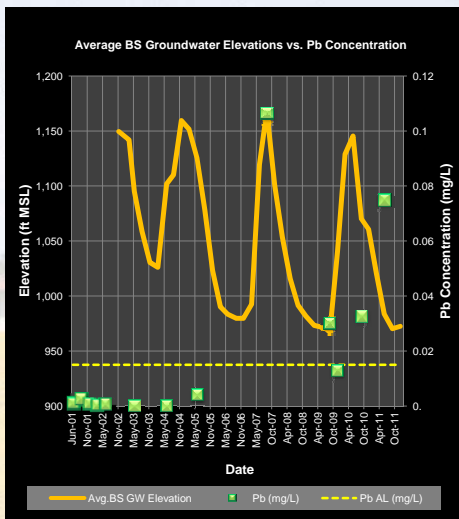
- Plume 1** originates from SWMUs B-3 and O-1 in the Inner Cantonment.
- Plume 2** originates from AOC-65 in the SW corner of CSSA.
- Concern about increasing trend at I10-4 west of CSSA (Plume 2) prompted additional sampling locations west of IH-10 (10 new wells since March 2011).
- The new DQOs and LTMO program (approved in 2010) went into effect in June 2011 with a “snapshot” event (all wells sampled).
- March 2012 will be the next snapshot event.



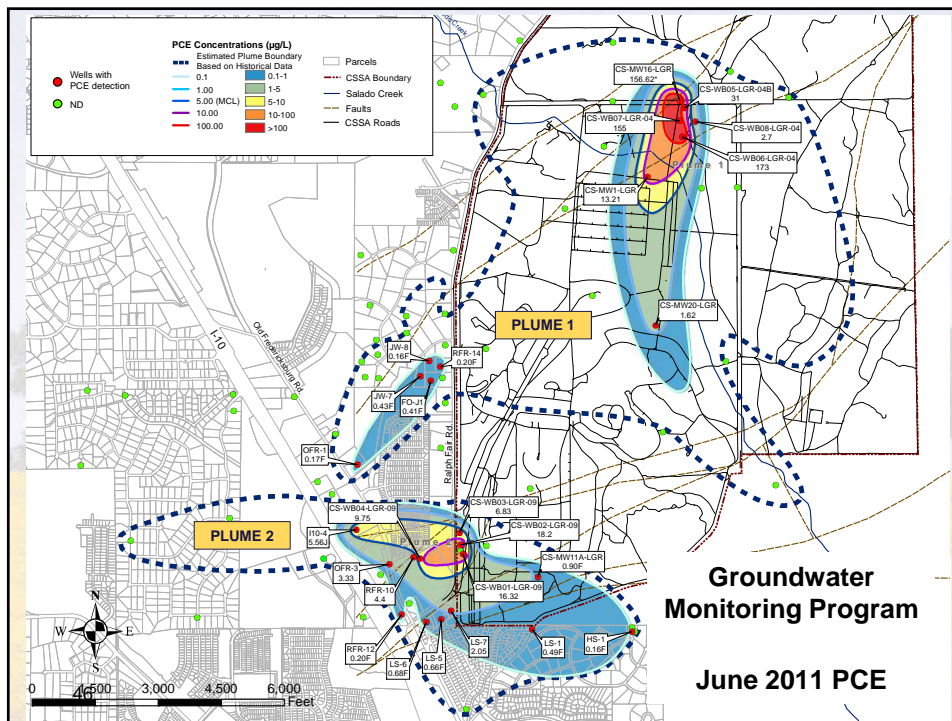
44

Groundwater Monitoring Program June 2011 Results Overview

- “Snapshot” event included 32 On-post and 52 Off-post wells. 14 On-Post wells that were scheduled for sampling could not be sampled due to depressed water levels (water level below pump).
 - Newly installed drinking well CS-12 was added to the quarterly program. No VOCs reported. All metals were below ALs/MCLs, SCLs.
 - Three on-post wells continue to exceed the MCL for either PCE, TCE, or *cis*-1,2-DCE.
 - On-post well CS-MW9-BS continues to exceed the AL (0.015 mg/L) for lead.
 - Off-post well I10-4 continues to hover above the PCE MCL at 6.00 µg/L. The well continues to remain inactive.
 - Eight wells west of IH-10 were sampled for the second consecutive quarter and no VOCs were detected.
 - Semi-annual GAC maintenance including a carbon exchange took place in July 2011. The next carbon exchange will be in January 2012.

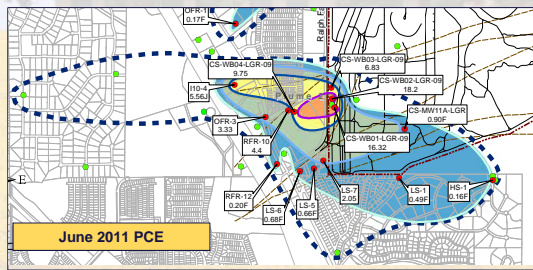
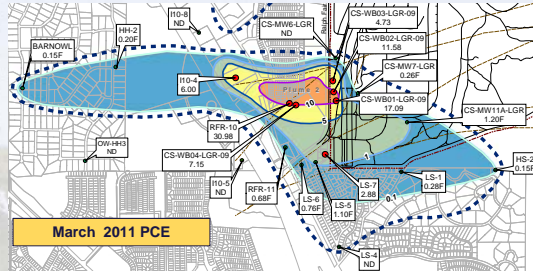


45



Groundwater Monitoring Program Plume 2 Results

- The March 2011 detection of PCE at The Oaks WSC is significant because it extends the margin of the plume to 1 mile west of I10-4 well.
- PCE contamination now detected 1.5 miles west of CSSA boundary.
- No VOCs detected in these wells during the June, September, December 2011 sampling events.



47

Groundwater Monitoring Program September 2011 Results Overview

- 8 Off-post wells were sampled
 - No VOC detections in The Oaks WSC wells west of IH-10.
 - New off-post wells: SLD-01 was ND. I10-9 was (0.57F µg/L TCE).
 - Wells above the MCL for PCE were OFR-3 (7.72 µg/L) and RFR-10 (6.75 µg/L).
 - I10-4 (unused) and RFR-11 (GAC'd) were below the MCL.
 - LS-5 reached 90% of the MCL in September 2011 (TCE = 4.8 µg/L). A GAC unit was installed in October 2011.
 - LS-5, LS-7, and RFR-11 were re-sampled on October 12, 2011 after 4.84" of rainfall. PCE/TCE levels were reduced in all wells after event.



48

Groundwater Monitoring Program September 2011 Results Overview (cont.)

- 6 On-post wells were sampled
 - New On-post Wells: CS-MW35-LGR was 2.01 µg/L PCE. CS-MW36-LGR exceeded the MCL for PCE (9.91 µg/L) and TCE (9.93 µg/L).
 - Former drinking well CS-9 exceeded the AL for lead (0.019 mg/L) and mercury (0.0051 mg/L). This well has been off-line since 2006.
 - Lead (0.0294 mg/L) was detected above the MCL in drinking well CS-1. The well was re-sampled in November 2011 to confirm lead contamination (0.0214 mg/L).
 - A distribution system compliance point (Building 38) was sampled in September 2011 to confirm that PWS was meeting all criteria.

49



Groundwater Monitoring Program December 2011 Results Overview

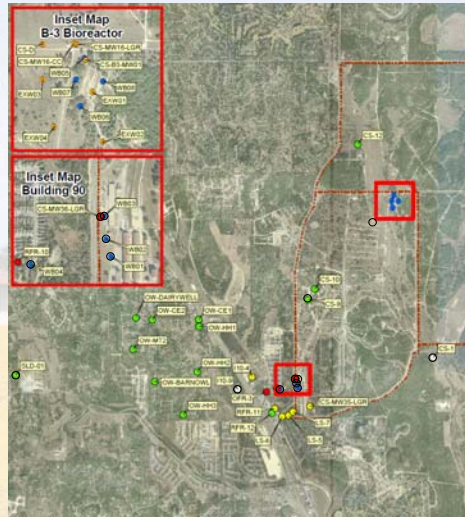
- 16 Off-post wells were sampled
 - No VOC detections in The Oaks WSC wells west of IH-10. ND since March 2011.
 - I10-9 increased to 1.29 µg/L TCE, up from 0.57F µg/L in September 2011.
 - I10-4 (6.87 µg/L) and RFR-10 (11.41 µg/L) were above the PCE MCL.
 - LS-6, LS-7, and RFR-11 appear to be showing and increasing trend in TCE concentrations.

50



Groundwater Monitoring Program December 2011 Results Overview (cont.)

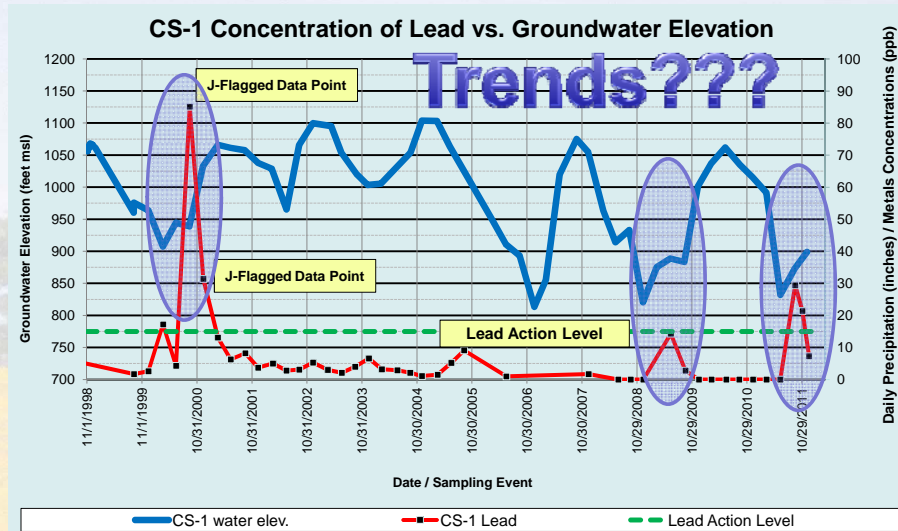
- 12 On-post wells were sampled
 - CS-MW1-LGR was 14.11 µg/L PCE and 30.37 µg/L TCE. CS-MW36-LGR exceeded the MCL for PCE (7.21 µg/L) and TCE (6.23 µg/L).
 - Former drinking well CS-9 exceeded the AL for lead (0.0581 mg/L) and mercury (0.018 mg/L). This well has been offline since 2006.
 - Lead (0.0073F mg/L) was detected below the AL in drinking well CS-1, after 2 detections above AL in September/November 2011.
- 31 Westbay Zones were sampled in 4 wells
 - 28 zones had detectable results for PCE, TCE, and/or cis-1,2-DCE.
 - 17 zones were above the MCL for PCE and/or TCE.



Supply Well CS-1

- The well pump at CS-1 was replaced in July 2011 when there were electrical indications that the motor was going to fail.
- The well was logged by the USGS, a new 15-hp pump was installed, and the well was disinfected, sampled, and returned to service.
- The next quarterly event (September 2011) indicated Lead above the AL at 0.0294 mg/L. A November 2011 re-sample at 0.0214 mg/L confirmed the result.
- The subsequent quarterly event in December 2011 was below the AL at 0.0073F mg/L.
- Results prompted CSSA to see if there are any discernable trends.

Supply Well CS-1



53

Supply Well CS-1 (cont.)

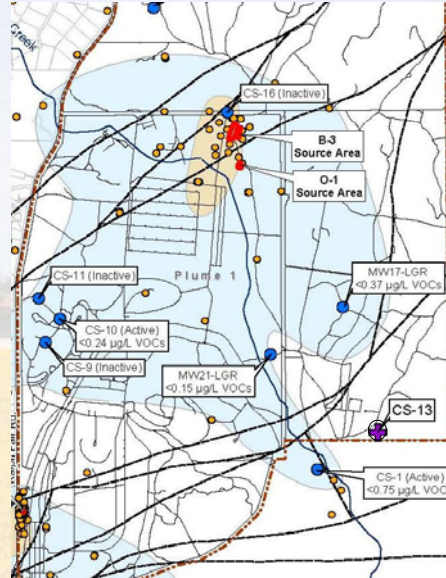
- CSSA intends to convert all of its potable water supply wells to hypochlorite disinfection systems. This process will begin at well CS-1.
- Parsons submitted an **Engineering Plans and Specifications** document to the TCEQ on September 15, 2011, which included demolishing the existing gas chlorination system, remodeling the facility, and constructing a hypochlorite system.
- The TCEQ approved the modification on November 8, 2011.
- CSSA is currently contracting the construction effort through the USACE.
- Expect that the upgraded well will be operational in Spring 2012.



54

East Pasture Well

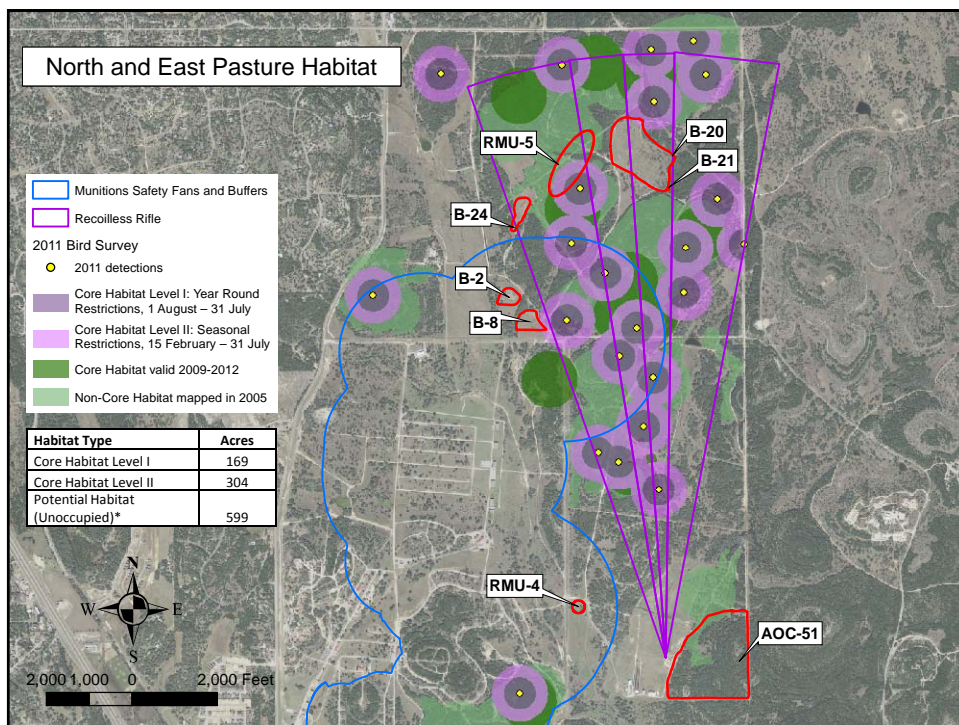
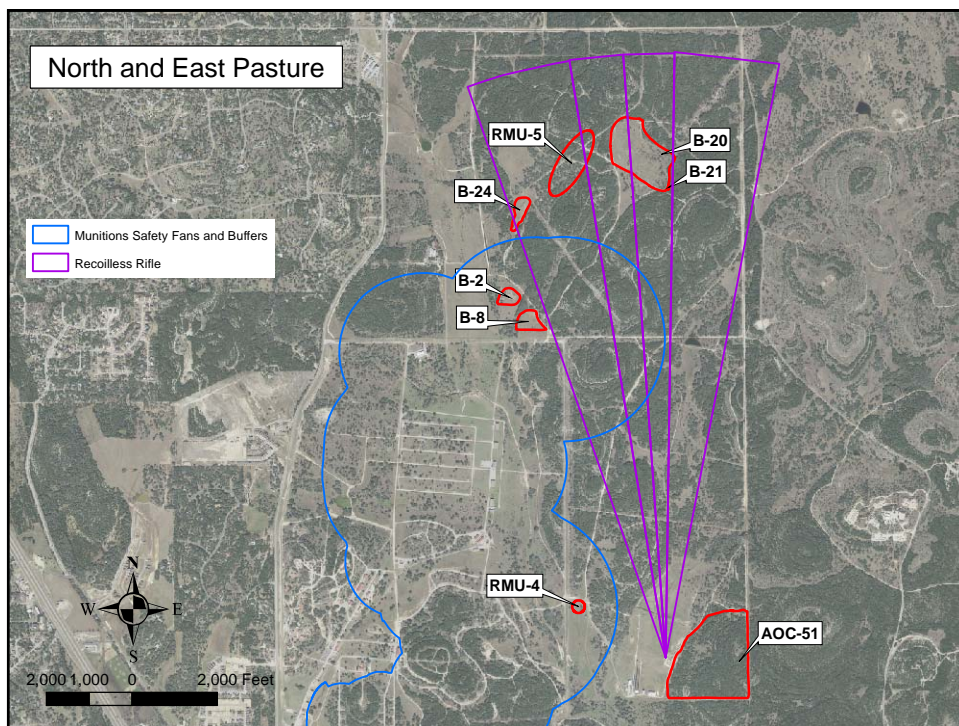
- Location will initially be drilled as an 8-inch, sampled for contamination, and tested for yield.
- If well is contaminated or has low yield, it will be completed as a monitoring well or a non-potable fire suppression well for the East Pasture.
- If well is found to be clean, installation of a supply well will be further pursued through TCEQ.
- CSSA has submitted a request to the TCEQ to install CS-13 as a supply in the East Pasture, which is currently under "review".

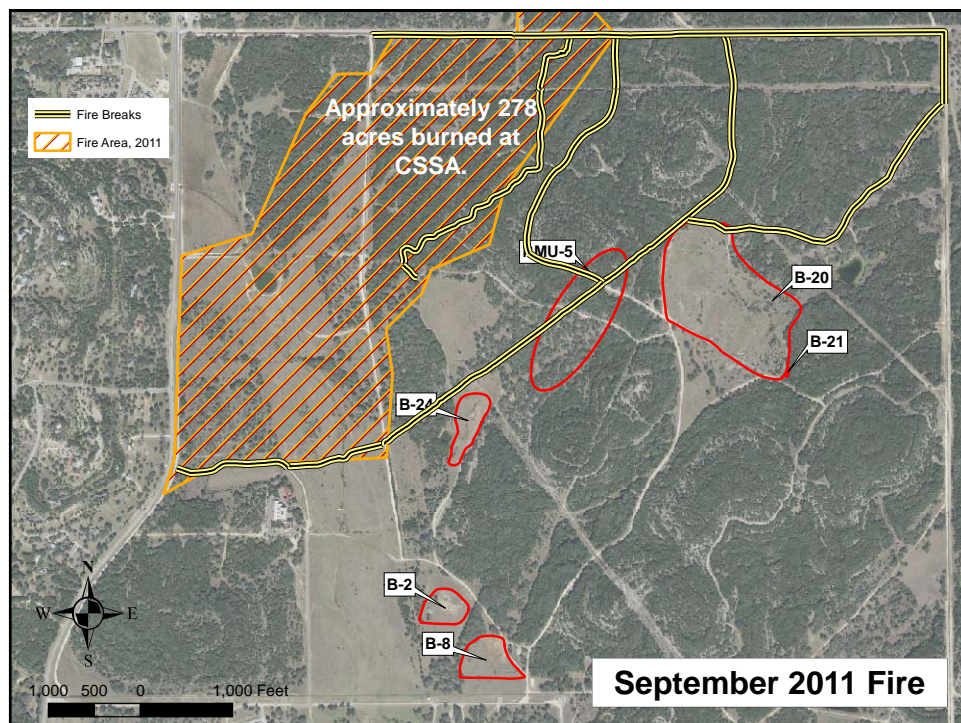
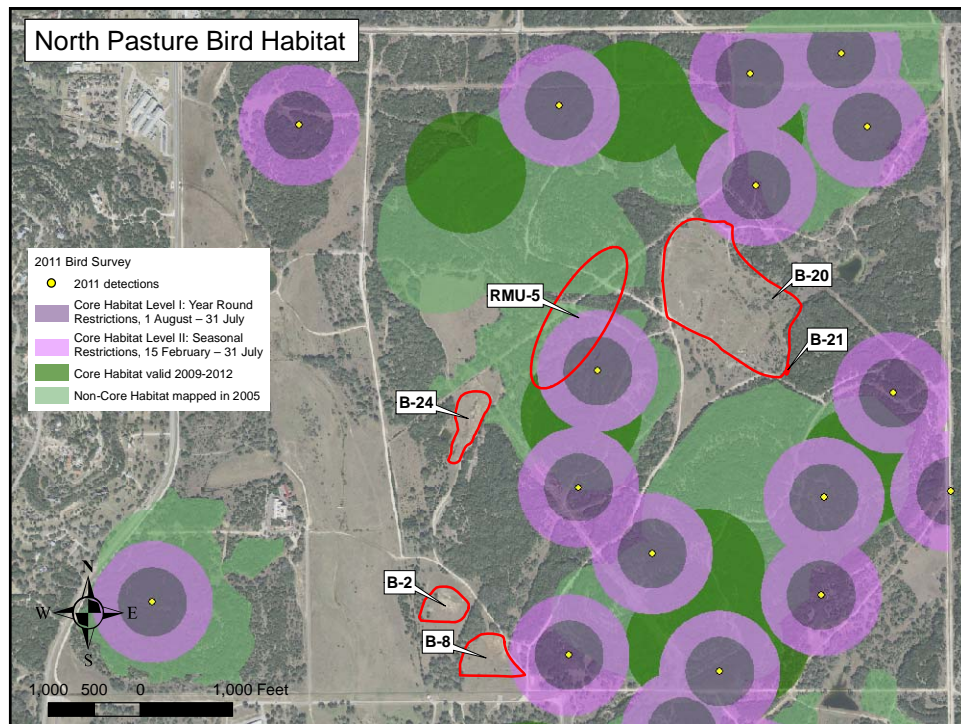


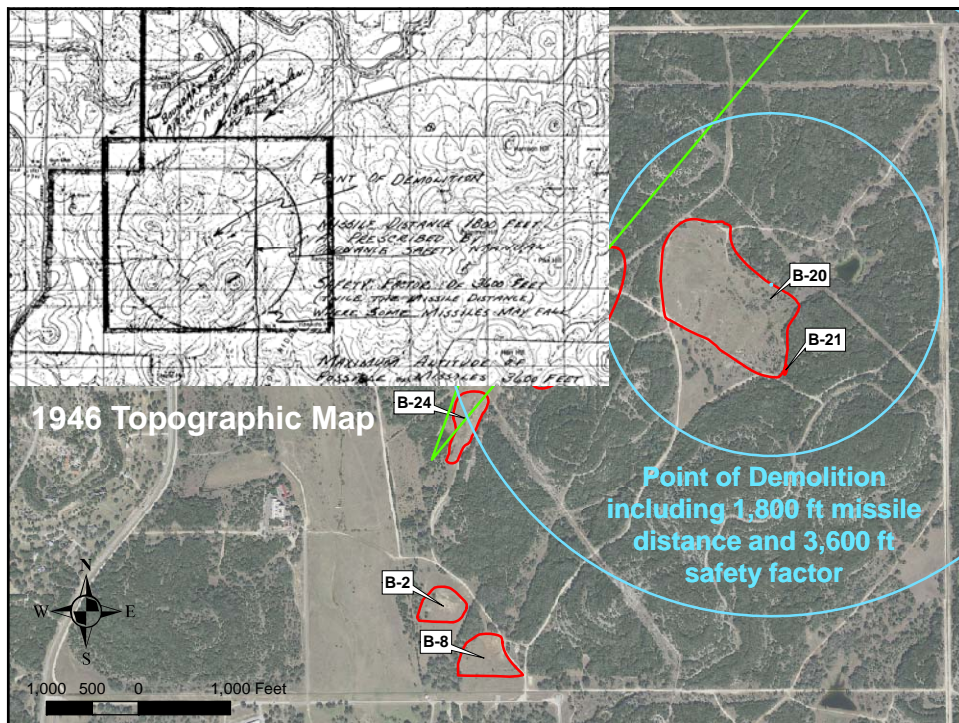
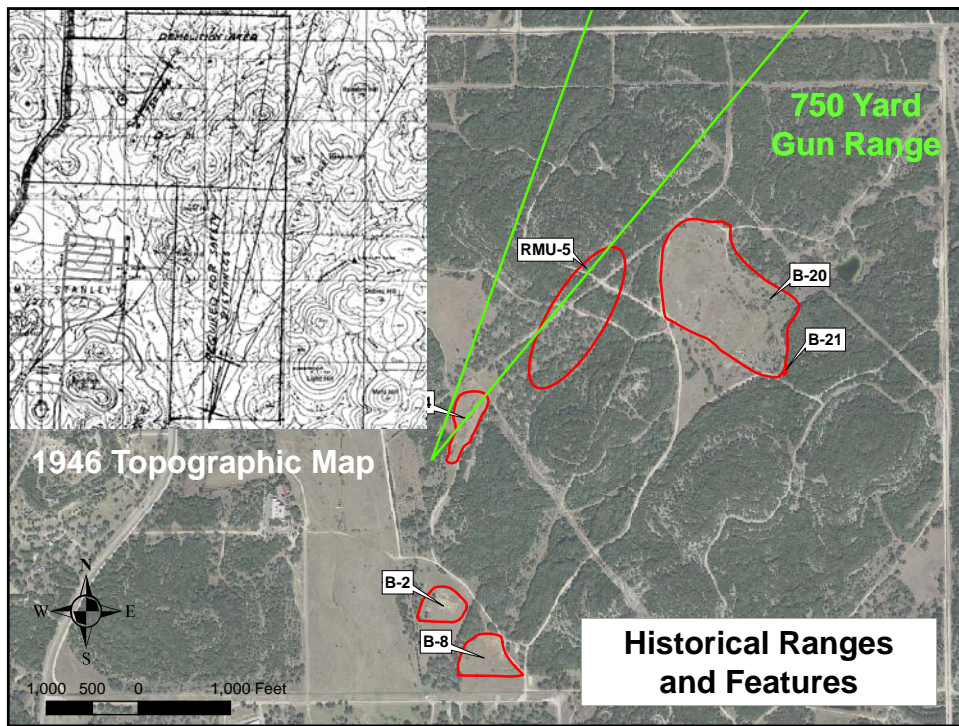
55

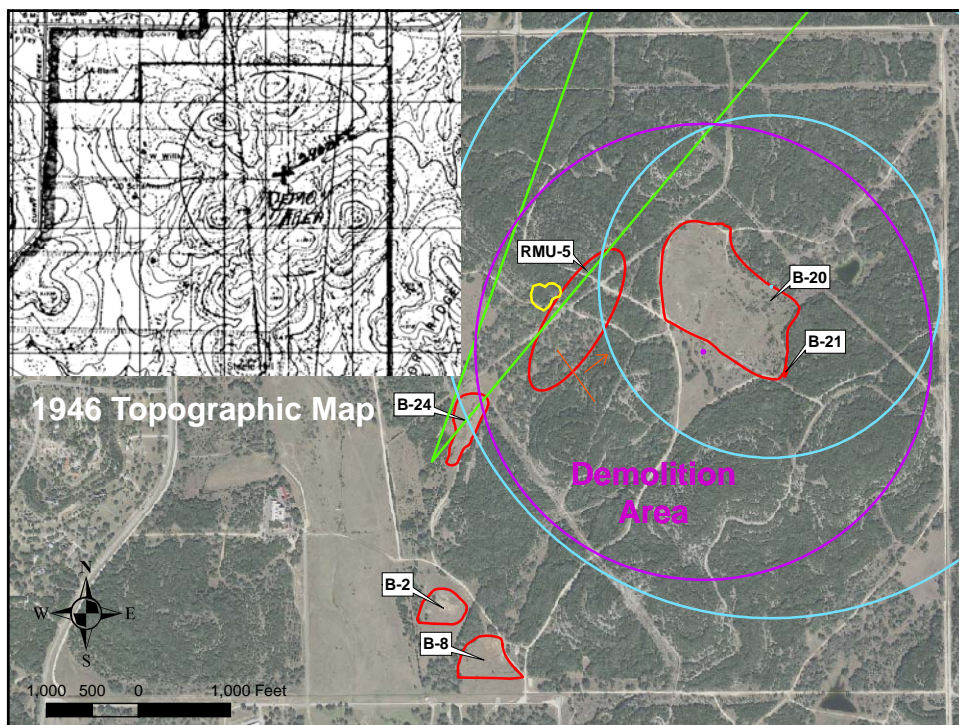
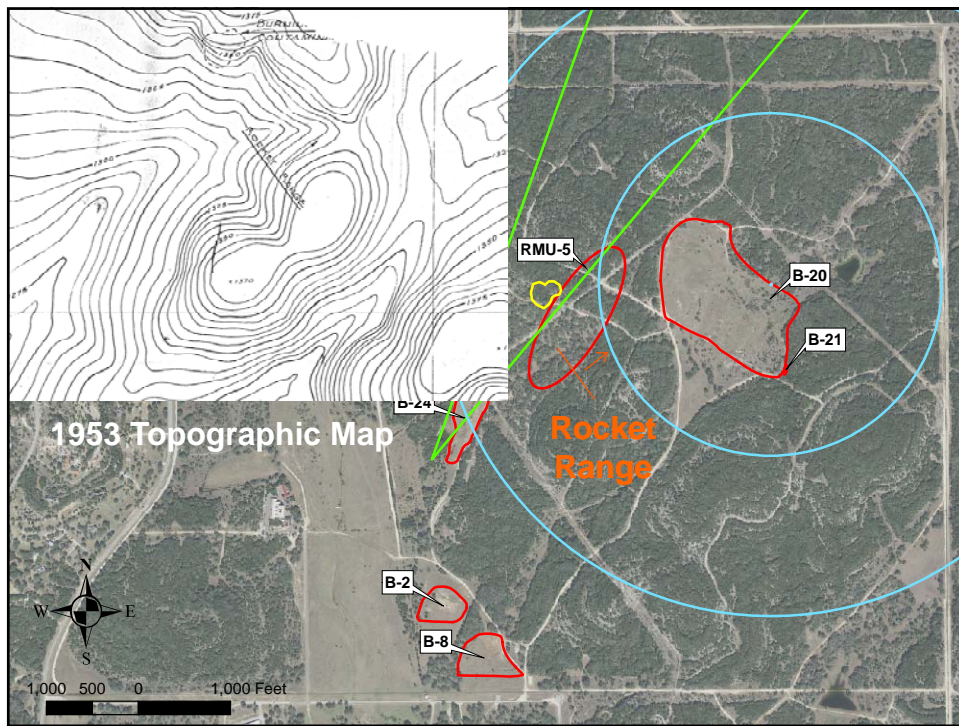
NORTH AND EAST PASTURE UPDATE

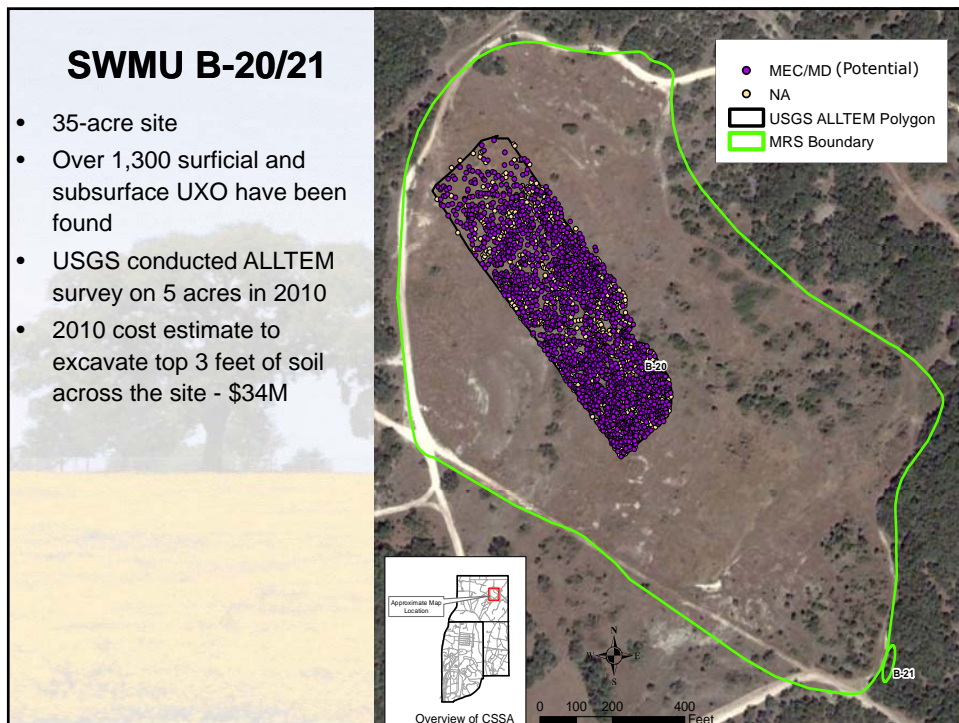
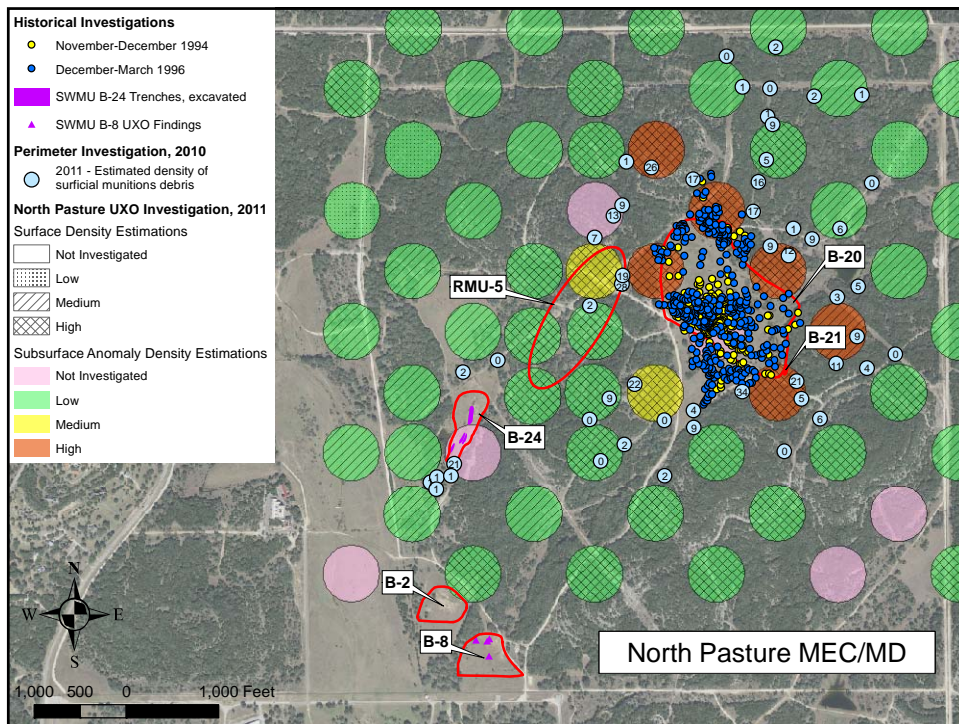
56

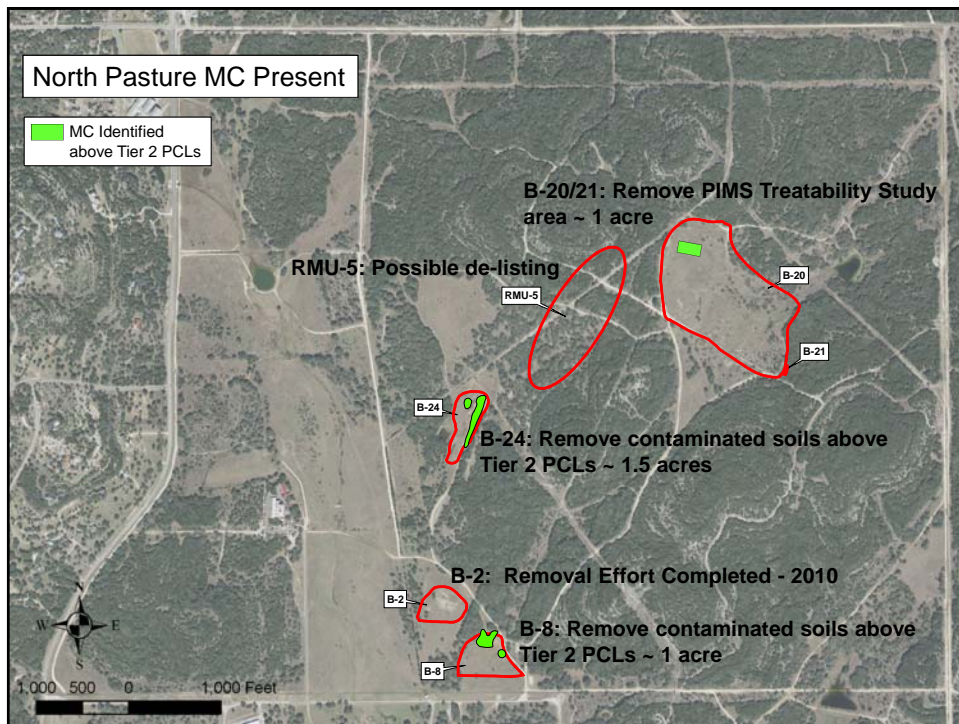






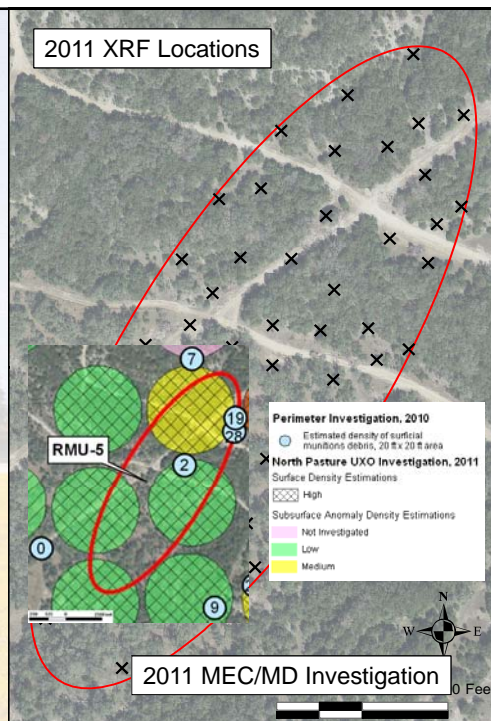


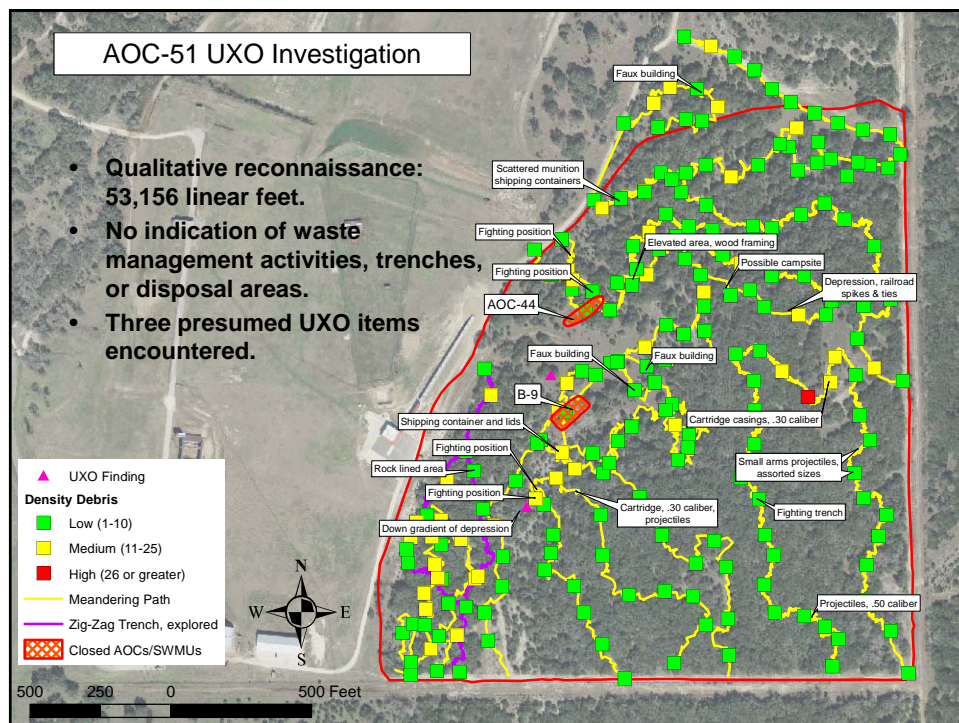
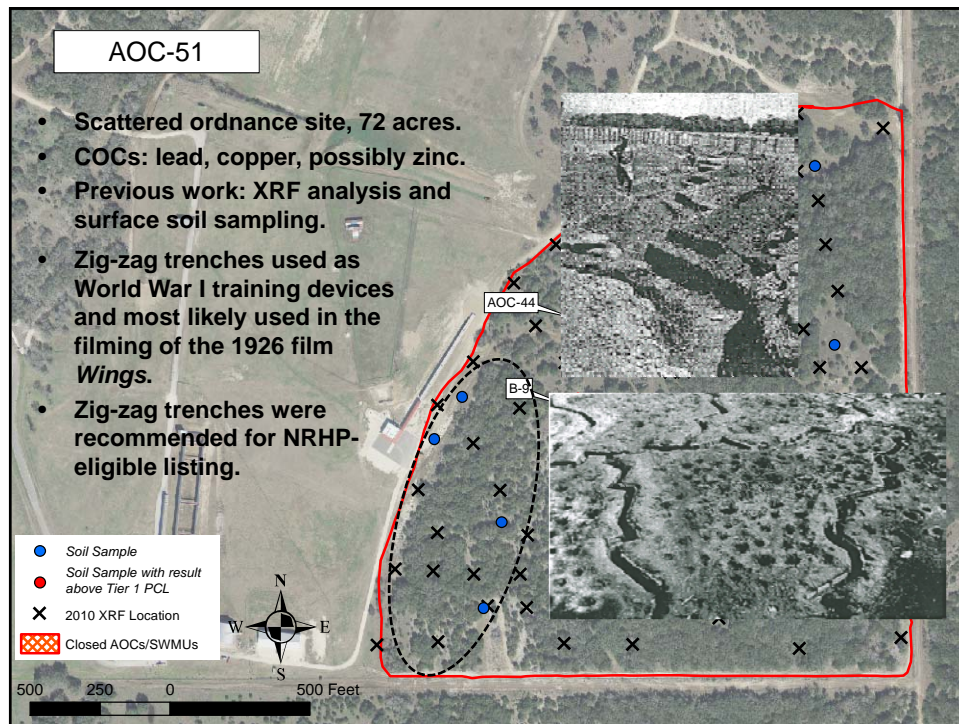




RMU-5

- Rocket range depicted on 1953 topographic map.
- No evidence of rocket range on historical photos.
- XRF Survey Results, 2010, showed no indication of metals
- UXO investigation found no evidence of Rocket Range. MD encountered was all indicative of “kick-out” from activities at SWMU B-20/21





AOC-51



Faux building



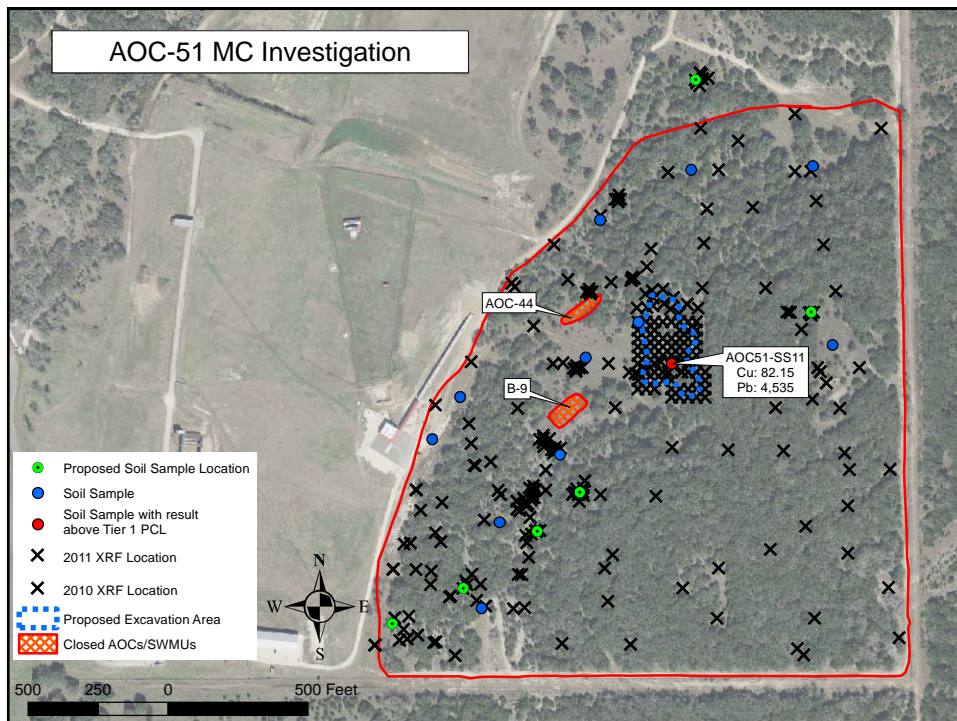
Munitions shipping container lids



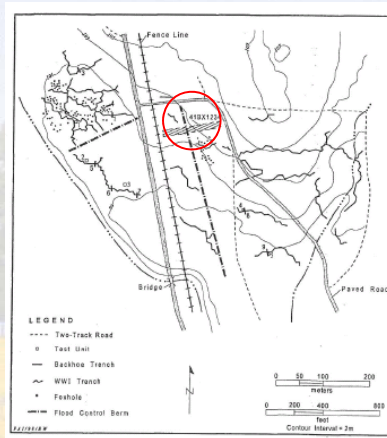
Cartridge casings



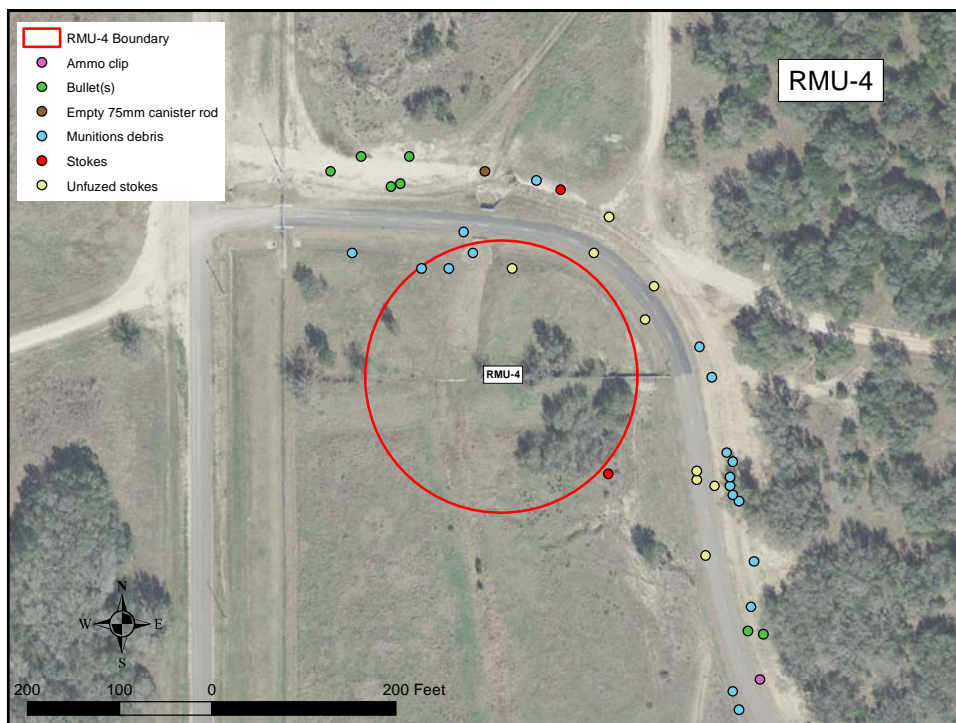
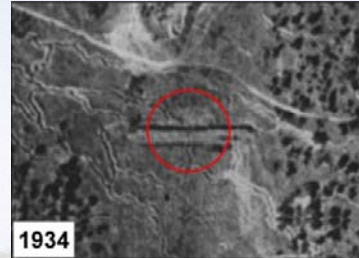
Rock Fighting position



RMU-4



Archeological Survey and Testing – April 1998



STATUS OF REMAINING SITES

75

Site Closure Status

TCEQ Closure Approvals: 13

SWMU B-15/16	AOC-45	AOC-62
SWMU B-27	AOC-52	AOC-64
SWMU B-28	AOC-57	AOC-70
SWMU B-71	AOC-58	
AOC-42	AOC-59	

Field Efforts Complete or Nearly Complete

AOC-65
AOC-72
AOC-74
SWMU B-2
SWMU B-34
RMU-5

Field Effort Funded

SWMU B-4
AOC-75
AOC-51

Field Effort Unfunded

SWMU B-8	SWMU B-20/21	RMU-3
SWMU B-13	SWMU B-24	RMU-4

76

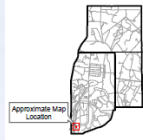




Site Closure Updates AOC-65

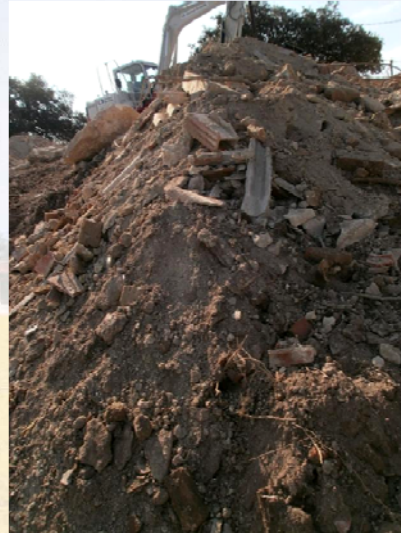
- Drainage ditch west of Building 90
- Previous work:
 - Interim Removal Actions in 2001
 - SVE Pilot Study initiated in 2002
- Next Steps:
 - Complete trench excavation
 - Install infiltration system within trench

78



Site Closure Updates AOC-72

- Construction debris landfill, 2 acres
- Previous work:
 - XRF analysis
 - Exploratory excavations
 - Surface soil sampling
- Next Steps:
 - Complete excavation
 - Submit RIR to TCEQ requesting NFA decision



79

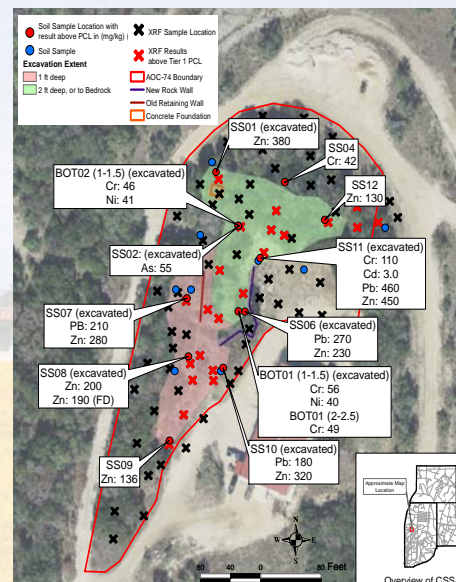


Site Closure Updates AOC-74

- Surficial construction debris, 2.5 acres
- COCs: arsenic, cadmium, chromium, lead, nickel, and zinc
- Work Performed:
 - XRF analysis
 - Surface soil sampling
 - Excavation of 2,200 CY of contaminated soil
- Next Steps:
 - Submit RIR to TCEQ requesting NFA decision



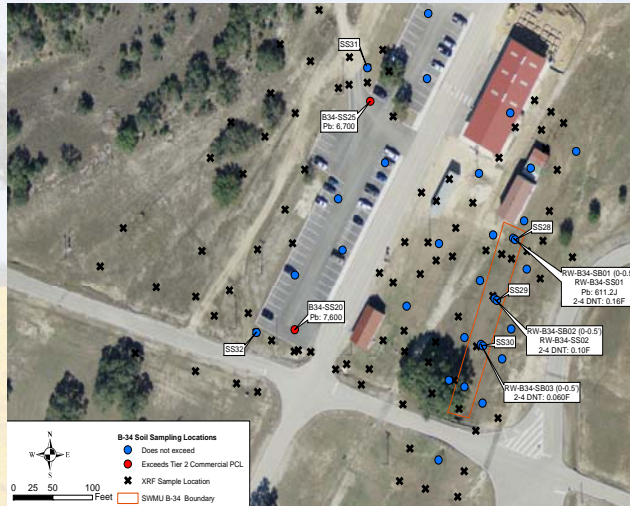
80





Site Closure Updates SWMU B-34

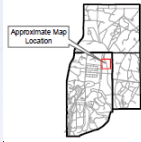
- Buried pipeline, 0.5 acres
- Previous work:
 - geophysical survey
 - surface and subsurface sampling
 - XRF analysis
- Next Steps:
 - Submit APAR requesting NFA decision to TCEQ



81



82

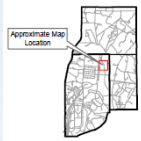


Site Closure Updates SWMU B-4

- Disposal area, 2 acres
- Previous work:
 - Geophysical surveys
 - Soil gas surveys
 - Surface and subsurface soil sampling
 - Excavation of 4 waste trenches (9,110 CY)
 - Sorting and management of 3,000 CY media remaining from excavation
- Next Steps:
 - Excavate one additional trench
 - Submit trench confirmation results to Weston for inclusion in APAR to TCEQ

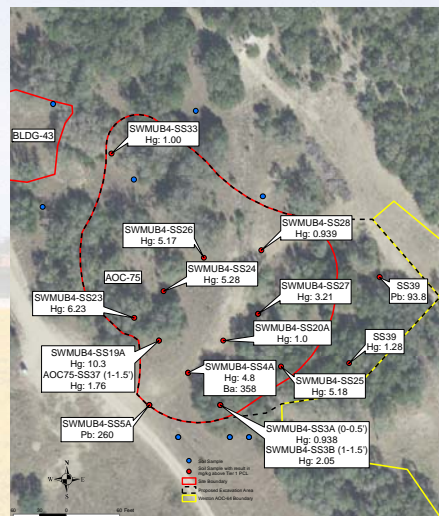


83

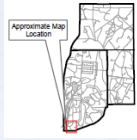


Site Closure Updates AOC-75

- Area with elevated mercury north of SWMU B-4, 1.2 acres
- COCs: mercury
- Previous Work:
 - Surface and subsurface soil sampling
- Next Steps:
 - Excavation of contaminated soil
 - Submit RIR to TCEQ requesting NFA decision.



84



Wastewater Treatment Plant

- CSSA WWTP removed from service June 24, 2011 when CSSA connected to SAWS, 0.6 acre
- Previous work: soil gas survey
- Work Performed:
 - Removal of wastewater and sludge
 - Disinfection of all WWTP components with bleach solution
 - Demolition of WWTP components
 - Excavation and removal of soil media and construction debris
 - Surface and subsurface soil sampling
- Next Steps:
 - Collect samples at ~20 feet bgs within former sludge drying bed for Nitrate/Nitrite analysis
 - Submit RIR to TCEQ requesting NFA decision



85



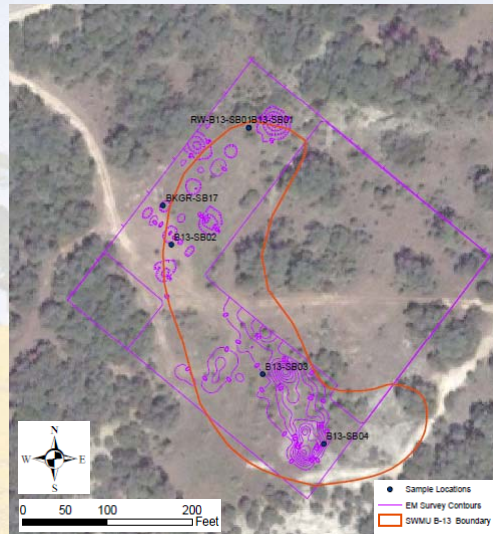
FIELD EFFORTS NOT FUNDED

86



Site Closure Updates SWMU B-13

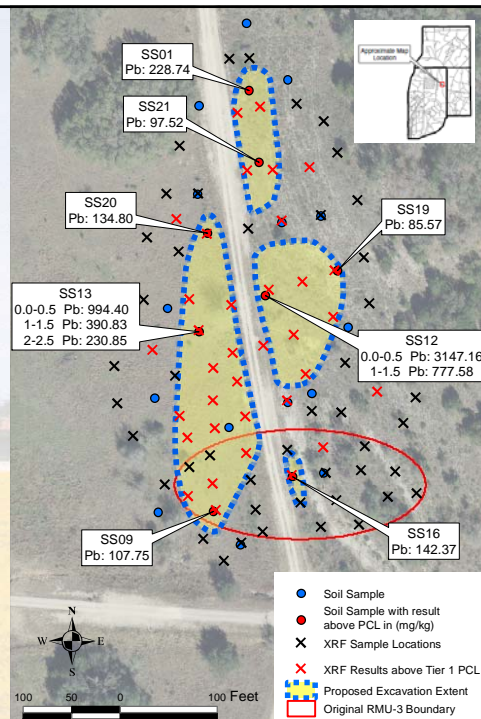
- Disposal area, 3 acres
- COCs: chromium, copper, lead, nickel, and zinc
- Previous work:
 - Geophysical survey
 - Surface and subsurface soil sampling
 - XRF analysis
- Next Steps:
 - Excavate estimated 6,000 CY of contaminated soil and waste materials
 - Submit RIR requesting NFA decision to TCEQ



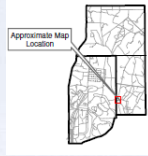
87

Site Closure Updates RMU-3

- Rifle range, 0.5 acre
- COC: lead
- Previous work:
 - XRF analysis
 - surface soil sampling
- Next Steps:
 - Excavation of contaminated soil
 - Remove surficial metal casings
 - Submit RIR to TCEQ requesting NFA decision.

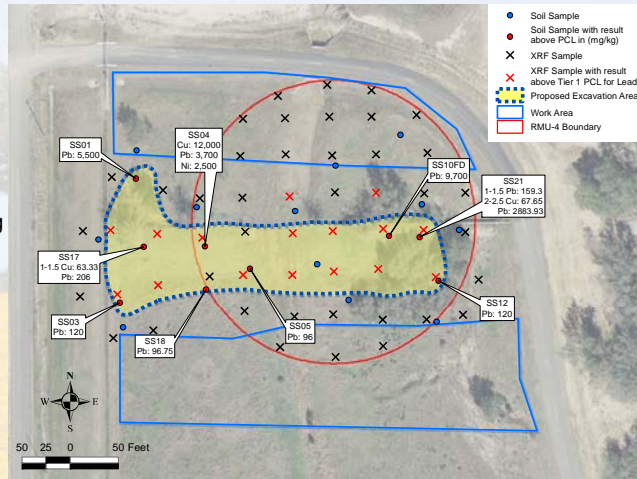


88



Site Closure Updates RMU-4

- Rifle range, 1.6 acre
- COC: copper, lead, and nickel
- Previous work:
 - Field survey
 - XRF analysis
 - Surface soil sampling
- Next Steps:
 - Excavation of contaminated soil
 - Submit RIR to TCEQ requesting NFA decision



89



90

