PARSONS

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March 7, 2012

Texas Commission on Environmental Quality
Attn: Mr. Bryan Smith
UIC Permits Team
Radioactive Materials Division
MC233
PO Box 13087
Austin, Texas 78711-3087
512/239-6466

Subject: Authorization to Operate a Class V Injection Well for an In Situ Chemical Oxidation Pilot Study at AOC-65 Located at Camp Stanley Storage Activity in Boerne, Texas

Dear Mr. Smith:

Please find enclosed the completed Inventory Authorization Form to operate a Class V Injection Well as part of an In Situ Chemical Oxidation pilot study at AOC-65 which is located at Camp Stanley Storage Activity (CSSA) in Boerne, Texas.

If you have any questions regarding the Class V Inventory Authorization Form submitted on behalf of CSSA, please feel free to contact me at 512-719-6074, kirk.lawson@parsons.com or Ken Rice at 512-719-6050, ken.r.rice@parsons.com .

Regards,

Kirk W. Lawson

Kirk W. Lawson, P.E., P.G.

cc: Gabriel Moreno Fergusson, CSSA Environmental Manager
Greg Lyssy, USEPA Region 6
Jorge Salazar, TCEQ Region 13
Julie Burdey, Parsons – Austin
Ken Rice, Parsons - Austin

CLASS V UNDERGROUND INJECTION WELL INVENTORY AUTHORIZATION FORM, IN SITU CHEMICAL OXIDATION PILOT STUDY AT AOC-65

CAMP STANLEY STORAGE ACTIVITY

Prepared for:
Camp Stanley Storage Activity
Boerne, Texas

Prepared by:
PARSONS
Austin, Texas

March 2012

Document Certification
Class V Injection Well Inventory
Camp Stanley Storage Activity – Boerne, Texas

Camp Stanley Storage Activity (CSSA) in Boerne, Texas intends to operate a Class V Injection Well as part of an Insitu Chemical Oxidation pilot study at AOC-65 which is located on the south side of the CSSA facility. I certify that this Class V Injection Well Inventory Authorization to operate the Class V Injection Well at CSSA was prepared under my direction, and to the best of my knowledge and belief, this authorization form has been properly completed.

Kirk W. Lawson

Kirk W. Lawson, P.E.
State of Texas #79204
Parsons

3-6-2012
Date

TCEQ Core Data Form
TCEQ-10400

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission *(If other is checked please describe in space provided)*

☒ New Permit, Registration or Authorization *(Core Data Form should be submitted with the program application)*

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Attachments — Describe Any Attachments: *(ex. Title V Application, Waste Transporter Application, etc.)*

☒ Yes ☐ No — TCEQ CLASS V INJECTION WELL INVENTORY/AUTHORIZATION FORM

3. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	4. Regulated Entity Reference Number *(if issued)*
CN 602728206		RN 104431655

SECTION II: Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

6. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check only one of the following:*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other: _____

7. General Customer Information

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State) ☒ No Change**

If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.

8. Type of Customer:			
☐ City Government	☐ County Government	☐ Federal Government	☐ State Government
☐ Other Government	☐ General Partnership	☐ Limited Partnership	☐ Other:

9. Customer Legal Name *(If an individual, print last name first: ex: Doe, John)* — *If new Customer, enter previous Customer below* — *End Date:*

10. Mailing Address:

City | State | ZIP | ZIP + 4

11. Country Mailing Information *(if outside USA)*

12. E-Mail Address *(if applicable)*

13. Telephone Number ( ) -

14. Extension or Code

15. Fax Number *(if applicable)* ( ) -

16. Federal Tax ID *(9 digits)*

17. TX State Franchise Tax ID *(11 digits)*

18. DUNS Number *(if applicable)*

19. TX SOS Filing Number *(if applicable)*

20. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

21. Independently Owned and Operated?
☐ Yes ☐ No

SECTION III: Regulated Entity Information

22. General Regulated Entity Information *(If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information ☒ No Change** *(See below)*

**If "NO CHANGE" is checked and Section I is complete, skip to Section IV, Preparer Information.

23. Regulated Entity Name *(name of the site where the regulated action is taking place)*

24. Street Address of the Regulated Entity: *(No P.O. Boxes)*								
	City		State		ZIP		ZIP + 4	
25. Mailing Address:								
	City		State		ZIP		ZIP + 4	
26. E-Mail Address:								

27. Telephone Number	28. Extension or Code	29. Fax Number *(if applicable)*
( ) -		( ) -

30. Primary SIC Code (4 digits)	31. Secondary SIC Code (4 digits)	32. Primary NAICS Code (5 or 6 digits)	33. Secondary NAICS Code (5 or 6 digits)

34. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:	

36. Nearest City	County	State	Nearest ZIP Code

37. Latitude (N) In Decimal:			38. Longitude (W) In Decimal:		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form or the updates may not be made. If your Program is not listed, check other and write it in. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Industrial Hazardous Waste	☐ Municipal Solid Waste
☐ New Source Review – Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS	☐ Sludge
☐ Stormwater	☐ Title V – Air	☐ Tires	☐ Used Oil	☐ Utilities
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Ken Rice	41. Title:	Task Manager

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 719-6050		(512) 719-6099	ken.r.rice@parsons.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 9 and/or as required for the updates to the ID numbers identified in field 39.

(See the Core Data Form instructions for more information on who should sign this form.)

Company:	US Army - Camp Stanley Storage Activity	Job Title:	Installation Manager
Name *(In Print)*:	Jason D. Shirley	Phone:	(210) 698-5208
Signature:	Jason D. Shirley	Date:	5 MAR 12

TCEQ CLASS V INJECTION WELL INVENTORY AUTHORIZATION FORM TCEQ-10338

SUBMIT TO:
TCEQ
UIC Permits Team
Radioactive Materials Division
MC233
PO Box 13087
Austin, Texas 78711-3087
512/239-6466

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CLASS V INJECTION WELL
INVENTORY/ AUTHORIZATION FORM

For TCEQ Use Only

Reg. No. _____

Date Received _____

Date Authorized _____

Reg. No. 5X26____

Section I General Information

Provide the information in items 1 through 8

1. TCEQ Program Area (PST, VCP, IHW, etc.), Contact Name and Phone Number

HW Mr. Kirk Coulter (512) 239-2572

2. Agent/Consultant, Contact Name, Address (Street, City, State, and Zip Code), and Phone Number

Ms. Julie Burdey, Project Manager
Parsons
8000 Centre Park Dr., Suite 200
Austin, TX 78754
(512) 719-6062

3. ____ Owner _x___Operator
Owner/Operator, Contact Name, Address (Street, City, State, and Zip Code), and Phone Number

Installation Manager
U.S. Army, Camp Stanley Storage Activity
25800 Ralph Fair Rd.
Boerne, TX 78015-4800 (210) 698-5208

4. Facility Name, Address (Street, City, County, State, and Zip Code) or location description (if no address is available) and Facility Contact Person and Phone Number

Camp Stanley Storage Activity
25800 Ralph Fair Rd.
Boerne, TX 78015-4800

5. Latitude and Longitude (degrees-minutes-seconds) and method of determination (GPS, TOPO, etc.)
(Attach topographic quadrangle map as attachment A)

From GPS data for AOC-65 injection well and injection trench, respectively: Latitude = 29 degrees 40'59.344", Longitude = -98 degrees 37'51.263" and Latitude = 29 degrees 40'58.7964", Longitude = -98 degrees 37'52.061".
A copy of the topographic map for Camp Stanley Storage Activity (CSSA) is included as Figure A.1 in Attachment A

Section I General Information (continued)

6. Type of Well Construction (Vertical Injection, Subsurface Fluid Distribution System, Infiltration Gallery, Temporary Injection Points, etc.) and Number of Injection Wells

At AOC-65, an ISCO chemical shall be injected into an excavated trench (approximately 300 feet long, 3.5 feet wide and 15 feet deep) and also into a former SVE well that has been converted into an injection well. An injection gallery will be constructed within the excavated trench and will consist of 2-inch high density polyethylene (HDPE) piping installed at the same elevation as field-identified transmissive layers of the Upper Glenrose (UGR) Limestone. Five injection gallery zones are planned within the trench. The former SVE well is a straight-walled, single-cased, open borehole well constructed with a nominal diameter of 8 inches and total depth of 25 feet bgs. The injection well includes 10 feet of 4-inch steel casing and 1.5-inch steel tubing for the ISCO injection.

7. Detailed Description regarding purpose of Injection System. Attach a Site Map as Attachment B (Attach the Approved Remediation Plan [if appropriate])

A description of the injection system and a site map are included in Attachment B.

8. Water Well Driller/Installer, Address (Street, City, State, and Zip Code), Phone Number, and License Number

Lee Gebbert
GeoProjects International, Inc.
8834 Circle Dr.
Austin, TX 78736
(512) 288-3777

TX License #: 2525PW

Section II Proposed Down Hole Design
Attach a diagram signed and sealed by a licensed engineer as Attachment C

Name of String	Size	Setting Depth	Sacks Cement/Grout - Slurry Volume - Top of Cement	Hole Size	Weight (lbs/ft) PVC/Steel
9. Casing	7”	10.5’	2 sacks Portland cement	8”	12.7, Steel
10. Tubing	1.5”	10’	1.5” diameter tubing suspended in open borehole	4”	3.64, Steel
11. Screen	1.5”	10’	1.5” diameter perforated tubing suspended in open borehole	8”	3.64, Steel

Section III Proposed Trench System, Subsurface Fluid Distribution System, or Infiltration Gallery
Attach a diagram signed and sealed by a licensed engineer as Attachment D

12. System(s) Dimensions

A certified diagram of the fluid distribution system is included in Attachment D as Figure D.1.

13. System(s) Construction

A certified diagram of the fluid distribution system is included in Attachment D as Figure D.1.

Section IV Site Hydrogeological and Injection Zone Data
Provide the information in items 14 through 31

14. Name of Contaminated Aquifer

Upper and Middle Trinity Aquifer

15. Receiving Formation Name of Injection Zone

Glen Rose Formation (Upper and Lower Units)

16. Well/Trench Total Depth

The AOC-65 injection well is approximately 25 feet bgs. The AOC-65 total trench depth is approximately15 feet below grade surface (bgs).

Section IV Site Hydrogeological and Injection Zone Data (continued)

17. Surface Elevation

Land surface elevation at AOC-65 is approximately 1,220 feet above mean sea level (MSL).

18. Depth to Ground Water

Highly variable, approximately 60-305 feet bgs depending on season and climate.

19. Injection Zone Depth

2-20 feet bgs.

20. Injection Zone vertically isolated geologically? Y/N Impervious Strata between Injection Zone and nearest Underground Source of Drinking Water

Name: Glen Rose Formation

Thickness: Approximately 350 feet

The injection or infiltration will occur into the Glen Rose limestone formation. The injection location is approximately 1,250 feet from the nearest water supply well, and injection activities are not anticipated to impact local drinking water supplies. The Lower Glen Rose (LGR) and Cow Creek (CC) limestone units are utilized as sources of drinking water in the immediate vicinity of CSSA. The Bexar Shale (BS), a 60 to 80 foot thick sequence of silty dolomite, marl, calcareous shale, and shaley limestone, serves as an aquitard hydraulically separating the LGR and CC formations.

21. Provide a list of contaminants and the levels (ppm) in contaminated aquifer
Attach as Attachment E

See Tables E.1, E.2, and E.3 in Attachment E.

22. Horizontal and Vertical extent of contamination and injection plume
Attach as Attachment F

See Figures F.1 through F.3 in Attachment F.

23. Formation (Injection Zone) Water Chemistry (Background levels) TDS, etc.
Attach as Attachment G

See Table G.1 and Figure G.1 in Attachment G.

24. Injection Fluid Chemistry in PPM at point of injection
Attach as Attachment H

See Attachment H.

25. Lowest Known Depth of Ground Water with < 10,000 PPM TDS

The depth to high salinity groundwater containing total dissolved solids (TDS) in excess of 10,000 milligrams per liter (mg/L) has not been identified in the vicinity of the site, however, according to Ground-Water Quality of Texas - An Overview of Natural and Man-Affected Conditions, Texas Water Commission, Report 89-01, March 1989, the Trinity Aquifer in Bexar County does not contain groundwater with TDS concentrations greater than 10,000 mg/L. Therefore, groundwater with TDS below 10,000 mg/L can be expected to extend deeper than the approximately 1000-foot sequence of Cretaceous-age deposits in the area. Groundwater with TDS exceeding 10,000 mg/L is believed to occur in the underlying Paleozoic-age schists where lower groundwater flow velocities and higher water-rock interactions will likely result in highly mineralized groundwater.

Section IV Site Hydrogeological and Injection Zone Data (continued)

26. Maximum injection Rate/Volume/Pressure

A onetime injection of in situ chemical oxidation (ISCO) chemicals totaling 15,000 gallons is proposed for the karst formation underlying AOC-65 (through a trench and well). The chemicals will not be injected under pressure, but instead will be pumped into the well or trench and allowed to slowly move into the target formation (see Attachment B for complete details) (maximum 20 gallons per minute [gal/min] infiltration rate). In addition, Helium gas (~300 $feet^3$ or 50-liter water volume) will be injected into the injection zones as a tracer under atmospheric pressure.

27. Water wells within 1/4 mile radius (attach map as Attachment I)

One water supply well (RFR-10) is present within 1/4 mile of the AOC-65 infiltration area. The private water supply well currently has wellhead protection consisting of a granular activated carbon (GAC) treatment unit. The GAC treatment unit is expected to remove chemical by-products generated from injection activities as necessary.
See Figure I.1 in Attachment I.

28. Injection wells within 1/4 mile radius (attach map as Attachment I)

No other injection wells are present within 1/4 mile of the AOC-65 infiltration area. There is an injection well operated at CSSA under TCEQ Authorization No. 5X2600431 and is located near SWMU B-3.

29. Monitor wells within 1/4 mile radius (attach drillers logs and map as Attachment I)

See Figure I.2 in Attachment I. Drillers logs for the monitoring wells identified in Figure I.2 are included in Attachment I

30. Sampling frequency

Prior to the ISCO injection, baseline sampling from the nearby monitoring locations, including VOC-impacted public supply wells, will occur to determine pre-injection water quality. During the baseline sampling event, groundwater samples will be analyzed by a NELAP-certified laboratory for VOCs by USEPA Method 8260B, dissolved priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc) by USEPA Method 6010B/7470A, and sulfate by USEPA Method 300.0.

As part of the initial tracer test, vapor and groundwater samples will be collected from the nearby soil vapor extraction (SVE) systems and the surrounding monitoring wells and multi-port monitoring well (Westbay®) after the injection of the helium tracer. This will be done to monitor the migration of the tracer through the formation. For the tracer study, groundwater sampling will be collected from the monitoring points every other day beginning 1 week prior to the predicted arrival time. Once the tracer arrives at the SVE headers, samples will be collected on a daily basis from nearby associated Vapor Extraction Wells (VEWs) to determine connections of the injection points to the surrounding monitoring systems. Groundwater and vapor samples collected for the tracer tests will be analyzed in the field for helium using field detection equipment.

Prior to the ISCO (sodium persulfate) injection, the activator sodium hydroxide will be injected into the injection trench and well. The surrounding monitoring wells will be tested for field pH analysis to provide data on applicability of an ISCO injection on the subsurface conditions. If an ISCO injection appears to be beneficial based on the pH results associated with the activator injection, then CSSA will proceed with the ISCO injection.

Following injection of the ISCO (sodium persulfate), groundwater sampling will occur at intervals of one day, five days, 15 days, and 30 days, from the time of injection. Groundwater samples will be collected from nearby monitoring wells, VOC-impacted public supply wells and the lowest sampling zone (LGR-9 or LGR-11) of the Westbay wells all located within ¼ mile of the injection trench and well at AOC-65. Following the initial 30 day sampling events, groundwater monitoring for the wells located within ¼ mile of AOC-65.is expected to resume the current nine month sampling interval. At a minimum, the groundwater samples will be analyzed for VOCs, metals, and sulfate. Additional analyses may include pH, chloride, alkalinity, sulfides, and manganese.

After the initial pilot study test, additional ISCO injections may be conducted at the same trench and well as part of the groundwater remediation program at AOC-65. If additional injections are performed, the composition and rate of the substrate mixture are expected to be similar to the above description. Following each ISCO injection, groundwater samples will be collected from the same surrounding wells and on the same 30-day schedule as described above. Sample analyses will again include VOCs, metals, and sulfate. Additional groundwater sampling will be performed at downgradient monitoring wells after subsequent injections at sampling frequencies determined appropriate based on results of the pilot study. Recommended sampling analysis and frequency is further discussed in Attachment I.

31. Known hazardous components in injection fluid

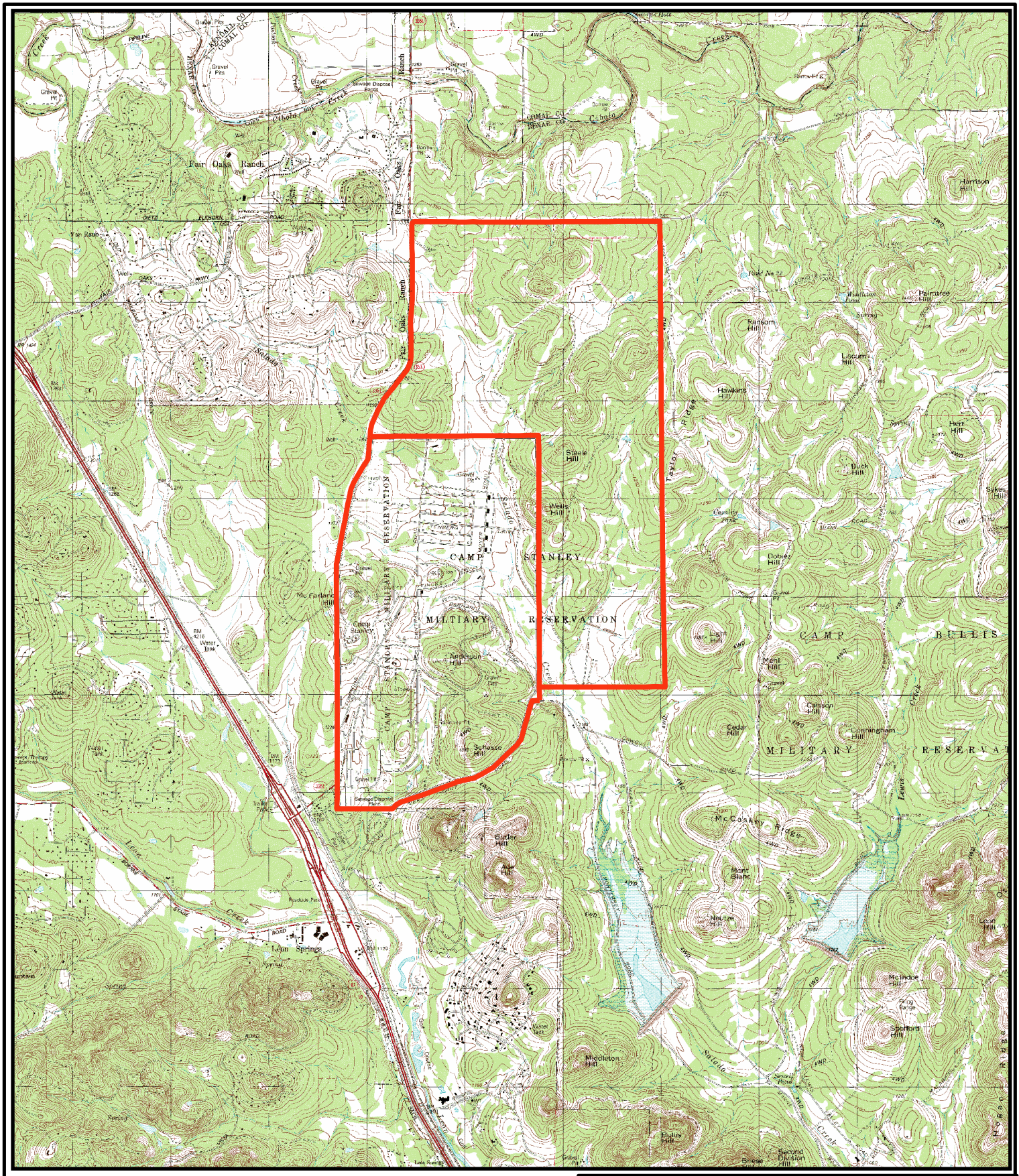
The ISCO components include Sodium Persulfate (CAS # 7775-27-1) which is a strong oxidizer and sodium hydroxide (CAS # 1310-73-2) which is a strong chemical base used to activate the sodium persulfate. Material Safety Data Sheets for the injection chemicals are included in Attachment I. Additionally, Helium (CAS # 7440-59-7) is anticipated to be used as a tracer gas for a tracer study associated with the ISCO pilot study planned at AOC-65.

Section V Site History Provide the information in items 32 through 35
32. Type of Facility CSSA is a U.S. Army facility. AOC-65 is an area of contamination resulting from Building 90 operations.
33. Contamination Dates Chlorinated solvents (i.e., tetrachloroethylene, trichloroethylene) use was reportedly replaced in 1995, but the first use of chlorinated solvents at Building 90 is unknown.
34. Original Contamination (VOCs, TPH, BTEX, etc.) and Concentrations Attach as attachment J See Attachment J.
35. Previous Remediation Attach results of any previous remediation as attachment K See Attachment K.

<<NOTE>> Authorization Form should be completed in detail and authorization given by TCEQ before construction, operation, and/or conversion can begin. Attach additional pages as necessary.

ATTACHMENT A

Map A.1



0 0.375 0.75 1.5 2.25 3 Miles

Figure: A.1

USGS Topo Map
Camp Bullis Quadrangle
Camp Stanley Storage Activity

P a r s o n s

J:\744223\GIS\b3-permit_app_topo_map.mxd

ATTACHMENT B

DESIGN OF AOC-65 *IN SITU* CHEMICAL OXIDATION STUDY

Introduction

An injection well is proposed within the former vat area of Building 90 for the purpose of injecting ISCO chemicals. The location of the well is near the former solvent operations building which overlies impacted limestone. Additionally, a trench shall be excavated at AOC-65 in the vicinity of the concrete-lined drainage ditch (**Figure B.1**). The excavation of the trench serves two purposes. First, the drainage ditch is a suspected source of vapor and aqueous phase contamination at AOC-65. Previous activities at the site include the potential release of tetrachloroethene (PCE) into the ditch, and the eventual infiltration of contaminants into the matrix and fractures in the subsurface beneath the ditch. Removal of contaminated media beneath the ditch removes one source of contamination at AOC-65, thus reducing the potential impact to receptors. Second, the excavated trench is proposed to be used as a infiltration gallery to treat subsurface contamination with in-situ chemical oxidation (ISCO). The trench will be backfilled with alternating layers of gravel and clay. Perforated piping will be installed within the gravel layers for treatment of contaminated vadose zone limestone.

Injection Well Installation

As part of this application Parsons will convert an existing SVE well to potentially inject chemicals and treat underlying contaminants within AOC-65. The SVE well, was installed in the former solvent vat inside building 90 and was drilled using a compact drilling rig capable of clearing 10' overhead obstructions. Because of the access issues and limited rig size that could be used inside Building 90, the well was direct drilled at a 8-inch diameter for the total length of the borehole. The well was drilled by a licensed well service contractor, Lee Gebbert of GeoProjects International, Inc. TX License #: 2525PW and the construction and surface completion adhered to local and state regulations.

Construction of the proposed converted ISOC injection well occurred between April 11 and May 11, 2011. The injection well is cased with 4-inch steel casing, and the wellheads were prefabricated and welded to the casing prior to installation. The wellhead is essentially two flanges bolted together: one welded to the casing and the second, a blind flange, bolted to the first. The blind flange has two 1.5-inch, threaded access ports, to attach the injection pipe and injection line, and for access to the well for sampling or water level collection. Portland cement was used to seal the well. The cement was added in two lifts over a two-day period, and a total of 3.5 bags were used to cement up to ground surface. The upper portion of the wellhead consists of a 4-inch blind flange with a 1.5-inch-diameter, 23-foot-long steam injection pipe attached. The 23-foot-long black-iron, injection pipe is perforated from 13 to 23 feet to deliver steam to the open borehole (from 10 to 20 feet bgs). The top portion of the well head, with steam injection pipe attached, was lowered over the casing and bolted in place. **Figure C.1** illustrates the concept of the injection well design.

Trench Excavation

As part of this application, Parsons will convert an Interim Removal Action trench excavated within AOC-65 ditch line west of Building 90 to include the potential to treat contamination from the underlying limestone. The exact dimensions of the trench will be

determined in the field, however, the maximum depth of the trench shall be 15 feet at the northern most portion of the trench, and the base of the trench shall remain level as trenching proceeds southward. The maximum width of the trench will be determined by the width of the trenching equipment; however, the width shall not exceed 3.5 feet. The length of the trench shall be approximately 300 feet, with the final length of the trench determined in the field by a supervising Parsons geologist/scientist. Trench excavation will be completed with an Austin Trencher (AT) 1460 or similar. The AT 1460 has the ability to reach depths up to 18 feet, and the width of the cutting arm is 42 inches.

Excavated soils will be sampled for waste characterization and managed appropriately and in accordance with CSSA approved RFI/IM Waste Management Plan dated May 2006.

Photo Mosaic Analysis

Once the trench has been excavated, video logs of the trench walls will be taken. Locations and orientations of fractures and faults will be determined by inspecting the video logs. Open aperture fractures will be highlighted and targeted for placement of the treatability study wells (TSWs), as the migration of infiltrated ISCO solution will likely occur along these fractures.

SVE/ISCO System Installation

The trench will be backfilled with alternating layers of gravel and clay to create distinct zones in which to inject ISCO solutions (**Figure D.1**). The ISCO injection lines will be installed in each gravel layer. The lines will be constructed of 2-inch HDPE tubing that will be perforated throughout its length and capped on the south end of the trench. Near the north end of the trench, the lines will be connected to an elbow, and will be extended vertically, until they exit the trench, where they will be connected to a manifold. Gravel will be applied in layers approximately 2-feet thick along the length of the trench followed by a 1-foot layer of compacted clay. It is anticipated that the upper gravel layer will not be a uniform thickness as there is an approximate 3-foot elevation change from the north part of the trench to the south. This upper layer will effectively be a wedge of gravel with the uppermost clay layer capping the trench along its entire length. A new concrete ditch will be installed above the uppermost compacted clay layer to manage runoff.

Gaseous Chemical Tracer Study

A gaseous chemical tracer test will be performed at AOC-65 following the installation of the infiltration gallery. Helium will be used as the tracer, and will be directly injected into the ISCO injection lines. The helium will be continuously monitored at individual SVE blower intakes. When the helium has been positively identified at an intake, each of the individual vapor extraction wells (VEWs) will be monitored to determine vadose zone migration pathways from the trench to the SVE system. Water samples will be collected from monitoring wells, treatability study wells (TSWs), and VEWs to determine the dissolved phase migration pathways in the saturated portion of the water bearing-zone of the UGR and upper portion of the LGR at AOC-65. Several rounds of groundwater sampling may be required in order to determine arrival times and duration of the tracer.

ISCO Pilot Study Chemicals

ISCO chemical solution injection will commence upon completion of the tracer study and the installation of additional TSW's or VEWs, as necessary, to fill data gaps identified by the tracer study. The ISCO study will include a bench scale test to identify the volumetric amounts of chemicals necessary to treat a predetermined aerial extent of subsurface contamination. Chemical solutions planed for injection include sodium persulfate (CAS # 7775-27-1), a strong oxidizer, and sodium hydroxide (CAS # 1310-73-2), a strong chemical base used to activate the sodium persulfate. Material Safety Data Sheets for the injection chemicals are included in Attachment H. Approximately 15,000 gallons of chemical solution is estimated for the injection study within the proposed infiltration gallery.

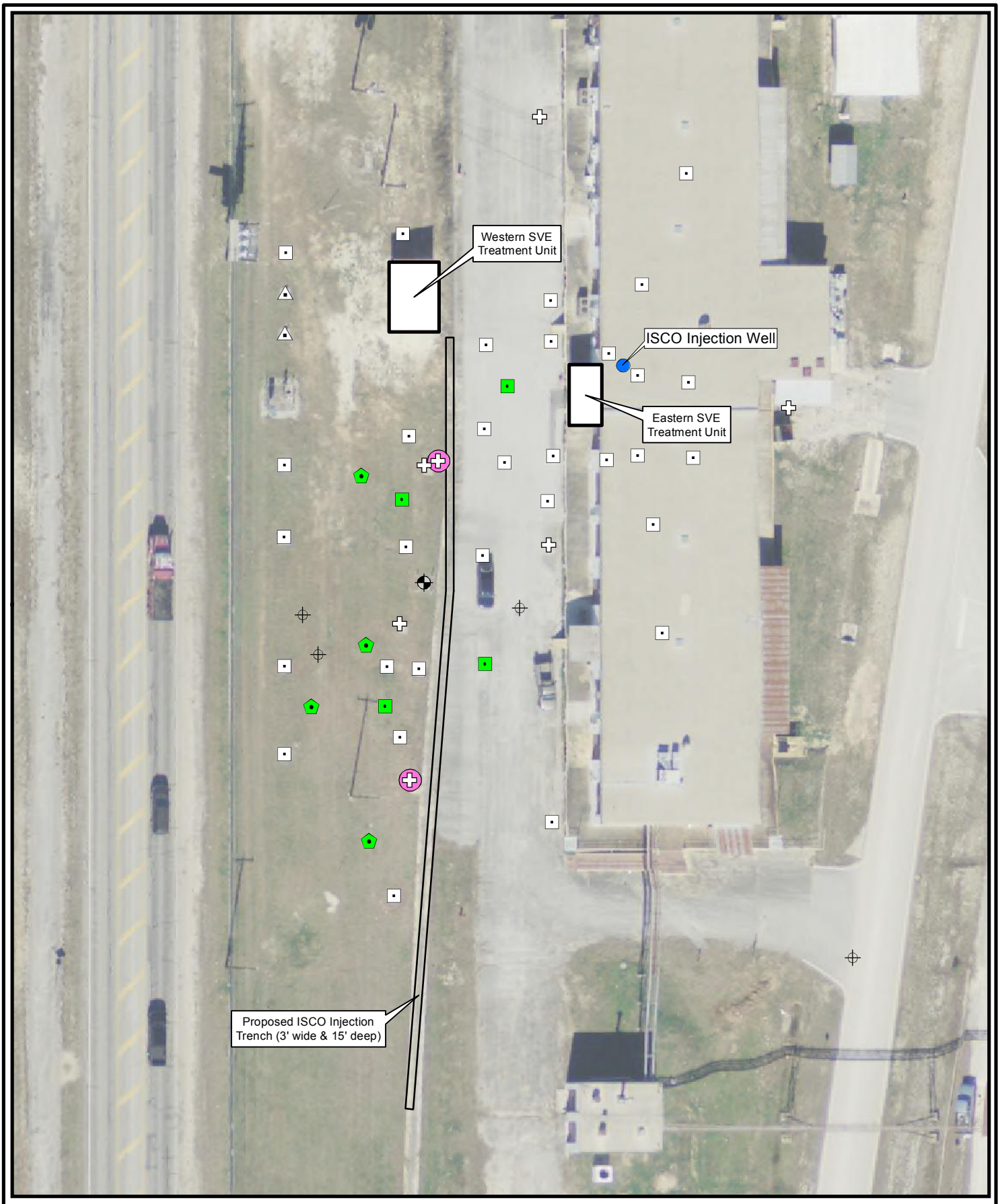


Figure B.1

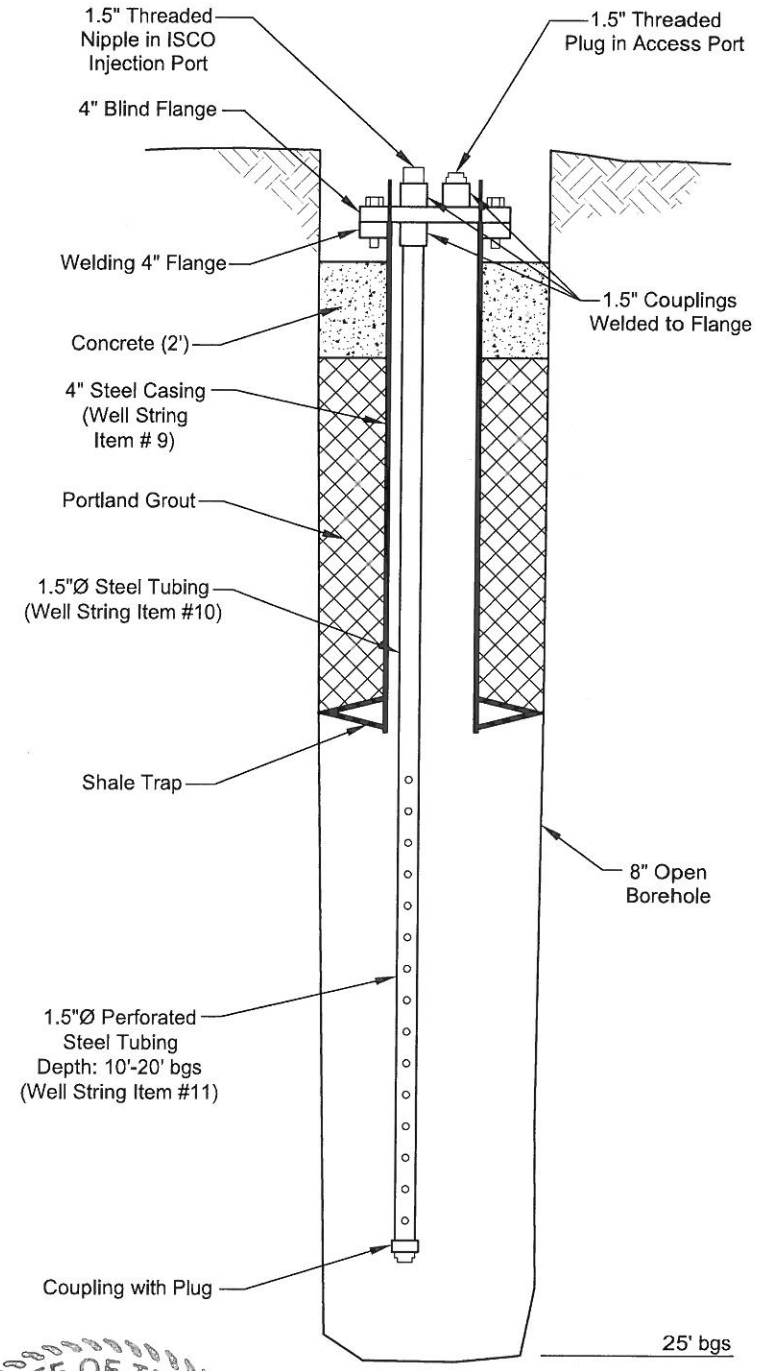
AOC-65 Proposed ISCO Injection Trench
Camp Stanley Storage Activity

PARSONS

J:\CSSA\GIS\AOC65_Bldg90\Maps\AOC65_Interim_Removal_Action_Figure_B-1.mxd

ATTACHMENT C

The proposed injection well construction details for the AOC-65 ISCO pilot study are included in Figure C.1.



STATE OF TEXAS
KIRK WILLIAM LAWSON
79204
REGISTERED PROFESSIONAL ENGINEER
3/6/2012

Not to Scale

Figure C.1

ISCO Injection Well

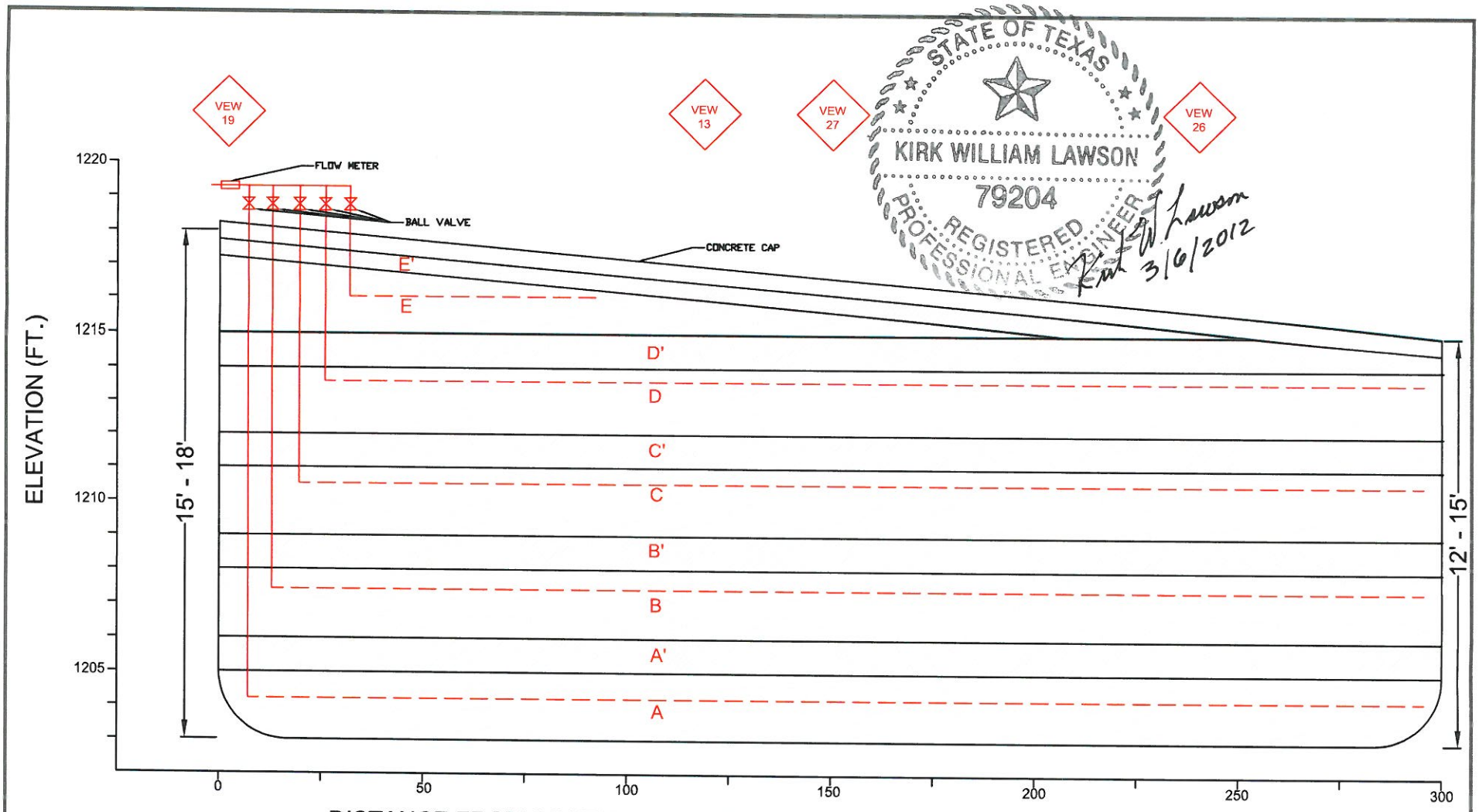
Camp Stanley Storage Activity

PARSONS

747781 CSSA-ISCOINJ.DWG 3/6/12

ATTACHMENT D

The proposed Infiltration Gallery system construction details and dimensions for the AOC-65 ISCO pilot study are included in Figure D.1.



STATE OF TEXAS
KIRK WILLIAM LAWSON
79204
REGISTERED PROFESSIONAL ENGINEER
3/6/2012

VEW 19 — APPROXIMATE LOCATION OF ADJACENT VEWs

A' — COMPACTED CLAY (~1' THICK)

A — GRAVEL (~2' THICK)

CONCRETE

2" SOLID WALL HDPE PIPING

2" PERFORATED HDPE TUBING

Not to Scale

Figure D.1

Cross Section of Proposed ISCO Infiltration Gallery

Camp Stanley Storage Activity

PARSONS

748402 CSSA-ISCO-INF.DWG 2/23/12

ATTACHMENT E

Groundwater from CSSA monitoring well program including the planned area of ISCO infiltration has been sampled and contaminant concentrations from these location are currently available in Tables E.1 through E.3.

Table E.1
2011 Westbay® Analytical Results

Well ID	Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	TCE	PCE	Vinyl Chloride
Comparison Criteria	MDL	0.3	0.16	0.19	0.16	0.15	0.23
	RL	1.2	1.2	0.6	1.0	1.4	1.1
	MCL	7.0	70	100	5.0	5.0	2.0
CS-WB01-UGR-01	14-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	8-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB01-LGR-01	14-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	8-Dec-11	<0.12	<0.07	<0.08	**0.28F**	**5.64**	<0.08
CS-WB01-LGR-02	14-Mar-11	<0.12	<0.07	<0.08	**3.71**	**13**	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	**3.21**	**13.2**	<0.08
CS-WB01-LGR-03	14-Mar-11	<0.12	<0.07	<0.08	**14.16**	**4.18**	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	**8.93**	**3.9**	<0.08
CS-WB01-LGR-04	14-Mar-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
CS-WB01-LGR-05	14-Mar-11	<0.12	<0.07	<0.08	**0.35**	<0.06	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	**0.22F**	<0.06	<0.08
CS-WB01-LGR-06	14-Mar-11	<0.12	**0.34**	<0.08	**1.95**	**0.22**	<0.08
	8-Dec-11	<0.12	**0.35F**	<0.08	**1.07**	<0.06	<0.08
CS-WB01-LGR-07	14-Mar-11	<0.12	**0.2**	<0.08	**13.14**	**13.54**	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	**14.45**	**18.91**	<0.08
CS-WB01-LGR-08	14-Mar-11	<0.12	**1.62**	<0.08	**3.08**	**0.16**	<0.08
	8-Dec-11	<0.12	**1.03F**	<0.08	**6.62**	**2.86**	<0.08
CS-WB01-LGR-09	14-Mar-11	<0.12	**0.31**	<0.08	**21.82**	**17.09**	<0.08
	6-Jun-11	<0.12	**0.34**	<0.08	**19.56**	**16.32**	<0.08
	8-Dec-11	<0.12	<0.07	<0.08	**20.7**	**16.91**	<0.08
CS-WB02-UGR-01	14-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	7-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-01	14-Mar-11	<0.12	<0.07	<0.08	**1.34**	**0.48**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	**0.84F**	<0.06	<0.08
CS-WB02-LGR-02	14-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	7-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-03	14-Mar-11	<0.12	<0.07	<0.08	<0.05	**3.02**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	<0.05	**4.68**	<0.08
CS-WB02-LGR-04	14-Mar-11	<0.12	<0.07	<0.08	**5.87**	**2.05**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	**9.15**	**3.61**	<0.08
CS-WB02-LGR-05	14-Mar-11	<0.12	<0.07	**0.2**	**2.78**	**0.71**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	**3.06**	**1.02F**	<0.08
CS-WB02-LGR-06	14-Mar-11	<0.12	**1.02**	**2.82**	**4.05**	**1.08**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	**2.95**	**1.12F**	<0.08
CS-WB02-LGR-07	14-Mar-11	<0.12	**0.16**	<0.08	**0.51**	**0.65**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
CS-WB02-LGR-08	14-Mar-11	<0.12	**3.7**	**1.41**	**0.58**	**0.19**	<0.08
	7-Dec-11	<0.12	**1.65**	<0.08	**1.06**	**1.09F**	<0.08
CS-WB02-LGR-09	14-Mar-11	<0.12	**0.2**	<0.08	**10.34**	**11.58**	<0.08
	6-Jun-11	<0.12	**0.32**	<0.08	**13.22**	**18.2**	<0.08
	7-Dec-11	<0.12	<0.07	<0.08	**11.23**	**13.12**	<0.08
CS-WB03-UGR-01	16-Mar-11	<3.00*	<1.75*	<2.00*	**22.30***	**1767.03***	<2.00*
	5-Dec-11	<6.00*	<3.50*	<4.00*	**32.76F***	**2514.83***	<4.00*
CS-WB03-LGR-01	16-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	5-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB03-LGR-02	16-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	5-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB03-LGR-03	16-Mar-11	<0.12	**0.17**	<0.08	**9.03**	**14.41**	<0.08
	5-Dec-11	<0.12	**0.34F**	<0.08	**14.51**	**31.71**	<0.08
CS-WB03-LGR-04	16-Mar-11	<0.12	<0.07	<0.08	**5.58**	**16.22**	<0.08
	5-Dec-11	<0.12	<0.07	<0.08	**12.39**	**27.28**	<0.08
CS-WB03-LGR-05	16-Mar-11	<0.12	<0.07	<0.08	**5.43**	**22.49**	<0.08
	5-Dec-11	<0.12	<0.07	<0.08	**8.84**	**27.14**	<0.08
CS-WB03-LGR-06	16-Mar-11	<0.12	<0.07	<0.08	**0.86**	**5.86**	<0.08
	5-Dec-11	<0.12	**0.25F**	<0.08	**0.86F**	**5.86**	<0.08

Table E.1
2011 Westbay® Analytical Results

Well ID	Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	TCE	PCE	Vinyl Chloride
Comparison Criteria	**MDL**	**0.3**	**0.16**	**0.19**	**0.16**	**0.15**	**0.23**
	RL	**1.2**	**1.2**	**0.6**	**1.0**	**1.4**	**1.1**
	MCL	**7.0**	**70**	**100**	**5.0**	**5.0**	**2.0**
CS-WB03-LGR-07	16-Mar-11	<0.12	**2.32**	<0.08	**7**	**8.03**	<0.08
	5-Dec-11	<0.12	**3.66**	<0.08	**5.17**	**4.56**	<0.08
CS-WB03-LGR-08	16-Mar-11	<0.12	**7.41**	<0.08	**1.67**	**7.82**	<0.08
	5-Dec-11	<0.12	**8.3**	<0.08	**1.58**	**3.83**	<0.08
CS-WB03-LGR-09	16-Mar-11	<0.12	**0.26**	<0.08	**4.04**	**4.73**	<0.08
	6-Jun-11	<0.12	**35.36**	<0.08	**3.84**	**6.83**	<0.08
	5-Dec-11	<0.12	**45.73**	<0.08	**4.05**	**11.75**	<0.08
CS-WB04-UGR-01	15-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
	6-Dec-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-01	15-Mar-11	<0.12	<0.07	<0.08	<0.05	**0.39**	<0.08
CS-WB04-LGR-02	15-Mar-11	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-03	15-Mar-11	<0.12	<0.07	<0.08	<0.05	**0.17**	<0.08
CS-WB04-LGR-04	15-Mar-11	<0.12	<0.07	<0.08	**0.25**	**0.2**	<0.08
CS-WB04-LGR-06	15-Mar-11	<0.12	**2.87**	**0.36**	**14.62**	**22.35**	<0.08
	6-Jun-11	<0.12	**3.02**	**0.32**	**13.68**	**28.74**	<0.08
	6-Dec-11	<0.12	**2.81**	<0.08	**9.39**	**28.76**	<0.08
CS-WB04-LGR-07	15-Mar-11	<0.12	**3.82**	**0.31**	**19.26**	**9.21**	<0.08
	6-Jun-11	<0.12	**2.24**	**0.23**	**11.15**	**17.91**	<0.08
	6-Dec-11	<0.12	**2.81**	<0.08	**9.91**	**24.41**	<0.08
CS-WB04-LGR-08	15-Mar-11	<0.12	**0.15**	<0.08	**1.02**	**0.38**	<0.08
	6-Dec-11	<0.12	<0.07	<0.08	**0.84F**	<0.06	<0.08
CS-WB04-LGR-09	15-Mar-11	<0.12	<0.07	<0.08	**5.77**	**7.15**	<0.08
	6-Jun-11	<0.12	<0.07	<0.08	**7.29**	**9.75**	<0.08
	6-Dec-11	<0.12	<0.07	<0.08	**7.09**	**9.25**	<0.08
CS-WB04-LGR10	15-Mar-11	<0.12	<0.07	<0.08	**0.57**	**0.8**	<0.08
	6-Jun-11	<0.12	<0.07	<0.08	**0.5**	**1.01**	<0.08
	6-Dec-11	<0.12	<0.07	<0.08	<0.05	**1.16F**	<0.08
CS-WB04-LGR-11	15-Mar-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
	6-Jun-11	<0.12	<0.07	<0.08	<0.05	**0.24**	<0.08
	6-Dec-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
CS-WB04-BS-01	15-Mar-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
CS-WB04-BS-02	15-Mar-11	<0.12	**0.15**	<0.08	<0.05	<0.06	<0.08
CS-WB04-CC-01	15-Mar-11	<0.12	**0.41**	<0.08	<0.05	<0.06	<0.08
CS-WB04-CC-02	15-Mar-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08
CS-WB04-CC-03	15-Mar-11	<0.12	<0.07	<0.08	<0.05	<0.06	<0.08

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ MCL

Notes:
- All values reported in micrograms per liter (µg/L).
- RL = reporting limit
- MCL = maximum contaminant level
- MDL = method detection limit
- VOCs analyzed using laboratory method SW8260B and reported as screening data.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- All samples analyzed by Agriculture & Priority Pollutants Laboratories (APPL), Inc. of Clovis, CA
- * = A dilution was run for this sample.
- DCE = Dichloroethene
- TCE = Trichloroethene

Table E.2
2011 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis* -1,2-Dichloro-ethene (ug/L)	*trans* -1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Specific Conductivity (mS)
FO-8	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.09	21.90	0.499
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	22.00	0.567
FO-17	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.41	21.80	0.607
Duplicate	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.41	21.80	0.607
FO-22	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.26	21.20	0.472
Duplicate	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.26	21.20	0.472
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.98	22.20	0.592
FO-J1	3/3/2011	0.12U	0.07U	0.08U	**0.22F**	0.05U	0.08U	6.90	21.80	0.521
	6/2/2011	0.12U	0.07U	0.08U	**0.41F**	0.05U	0.08U	7.48	21.60	0.565
HS-1	3/3/2011	0.12U	0.07U	0.08U	**0.15F**	0.05U	0.08U	6.85	23.60	0.510
Duplicate	3/3/2011	0.12U	0.07U	0.08U	**0.15F**	0.05U	0.08U	6.85	23.60	0.510
	6/3/2011	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U	7.08	23.70	0.591
HS-2	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.27	22.10	0.768
HS-3	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.20	24.40	0.581
I10-2	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.49	22.10	0.531
I10-4	3/1/2011	0.12U	0.07U	0.08U	**6**	**2.26**	0.08U	7.07	20.50	0.647
	5/31/2011	0.12U	0.07U	0.08U	**5.56J**	**1.97J**	0.08U	6.68	27.40	0.774
	9/7/2011	0.12U	0.07U	0.08U	**4.12**	**1.84**	0.08U	7.44	22.70	0.720
	12/6/2011	0.12U	0.07U	0.08U	**6.87**	**2.85**	0.08U	6.91	16.80	0.715
I10-5	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.97	22.40	0.502
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.22	22.70	0.635
Duplicate	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.22	22.70	0.635
I10-7	6/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.39	25.30	0.534
I10-8	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.83	22.10	0.526
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.24	22.20	0.599
I10-9	9/6/2011	0.12U	0.07U	0.08U	0.06U	**0.57F**	0.08U	6.55	21.70	0.527
Duplicate	9/6/2011	0.12U	0.07U	0.08U	0.06U	**0.32F**	0.08U	6.55	21.70	0.527
	12/19/2011	0.12U	0.07U	0.08U	0.06U	**1.29**	0.08U	7.04	20.50	0.537
JW-5	3/1/2011	0.12U	0.07U	0.08U	**0.12F**	0.05U	0.08U	7.43	19.20	0.502
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.23	24.20	0.600
JW-6	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.43	22.60	0.600
JW-7	3/3/2011	0.12U	0.07U	0.08U	**0.37F**	0.05U	0.08U	6.84	21.20	0.497
	6/7/2011	0.12U	0.07U	0.08U	**0.43F**	0.05U	0.08U	6.96	21.20	0.519
JW-8	3/1/2011	0.12U	0.07U	0.08U	**0.31F**	0.05U	0.08U	7.26	20.90	0.514
	6/1/2011	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U	7.62	21.90	0.567
JW-9	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.63	21.10	0.534
JW-13	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.45	22.40	0.550
JW-14	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.95	21.80	0.538
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.49	22.10	0.576
JW-15	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.38	21.50	0.520
	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.94	21.30	0.532
Duplicate	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.94	21.30	0.532
JW-26	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.48	23.90	0.570
JW-27	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.74	20.90	0.577
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.32	21.00	0.653
JW-28	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.19	21.60	0.591
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.31	21.70	0.652
JW-29	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.23	21.10	0.577
	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.05	21.20	0.655
JW-30	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.31	19.80	0.523
	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.99	20.70	0.586
Duplicate	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.99	20.70	0.586
JW-31	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	27.10	0.609
LS-1	3/2/2011	0.12U	0.07U	0.08U	**0.28F**	0.05U	0.08U	6.77	21.30	0.538
	5/31/2011	0.12U	0.07U	0.08U	**0.49F**	0.05U	0.08U	7.00	26.50	0.657
LS-4	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.88	23.70	0.611
	5/31/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.90	25.70	0.686
LS-5	3/2/2011	0.12U	0.07U	0.08U	**1.10F**	**2.59**	0.08U	6.78	22.20	0.601
	5/31/2011	0.12U	0.07U	0.08U	**0.66F**	**2.36**	0.08U	6.33	22.40	0.672
	9/6/2011	0.12U	0.07U	0.08U	**1.38F**	**4.8**	0.08U	8.04	21.50	0.622
	9/28/2011	0.12U	0.07U	0.08U	**1.11F**	**2.54**	0.08U	8.10	21.60	0.623
	12/5/2011	0.12U	0.07U	0.08U	**1.05F**	**3.87**	0.08U	6.98	21.60	0.625

Table E.2
2011 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis* -1,2-Dichloro-ethene (ug/L)	*trans* -1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Specific Conductivity (mS)
LS-6	2/28/2011	0.12U	0.07U	0.08U	**0.76F**	**0.85F**	0.08U	7.01	22.10	0.602
	5/31/2011	0.12U	0.07U	0.08U	**0.68F**	**0.90F**	0.08U	6.39	22.30	0.677
	9/6/2011	0.12U	0.07U	0.08U	**1.43**	**1.87**	0.08U	7.55	21.20	0.628
	12/5/2011	0.12U	0.07U	0.08U	**1.16F**	**2.41**	0.08U	6.92	21.60	0.602
LS-6-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
LS-7	2/28/2011	0.12U	0.07U	0.08U	**2.88**	**0.43F**	0.08U	6.98	22.30	0.613
	5/31/2011	0.12U	0.07U	0.08U	**2.05**	0.05U	0.08U	6.46	22.40	0.683
	9/6/2011	0.12U	0.07U	0.08U	**4.35**	**1.02**	0.08U	7.47	22.20	0.632
	12/5/2011	0.12U	0.07U	0.08U	**2.48**	**1.03**	0.08U	6.61	21.90	0.633
LS-7-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
OFR-1	3/3/2011	0.12U	0.07U	0.08U	**0.24F**	0.05U	0.08U	6.99	21.50	0.515
	6/1/2011	0.12U	0.07U	0.08U	**0.17F**	0.05U	0.08U	7.50	21.90	0.588
OFR-3	5/31/2011	0.12U	0.07U	0.08U	**3.33**	**1.91**	0.08U	6.57	22.50	0.606
	9/6/2011	0.12U	0.07U	0.08U	**7.72**	**5.14**	0.08U	7.85	21.40	0.557
	12/5/2011	0.12U	0.07U	0.08U	**3.67**	**3.14**	0.08U	6.85	19.70	0.550
OFR-3-A2	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
OFR-4	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.90	21.50	0.494
	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	22.00	0.512
OW-BARNOWL	2/28/2011	0.12U	0.07U	0.08U	**0.15F**	0.05U	0.08U	7.14	21.70	0.547
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.20	21.80	0.600
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.26	21.70	0.570
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.44	21.00	0.590
Duplicate	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.44	21.00	0.590
OW-CE1	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	21.40	0.722
Duplicate	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	21.40	0.722
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.18	21.60	0.700
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.16	21.40	0.667
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.99	20.90	0.674
OW-CE2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.17	22.40	0.561
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.05	22.50	0.600
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.53	22.10	0.594
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.49	21.60	0.594
OW-DAIRYWELL	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.11	22.50	0.562
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.23	22.40	0.600
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.48	22.30	0.541
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.57	21.40	0.550
OW-HH1	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	21.50	0.732
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.25	21.70	0.822
Duplicate	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.25	21.70	0.822
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.15	21.30	0.780
Duplicate	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.15	21.30	0.780
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.48	20.90	0.764
OW-HH2	2/28/2011	0.12U	0.07U	0.08U	**0.20F**	0.05U	0.08U	7.14	22.10	0.544
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.41	22.30	0.626
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.41	22.00	0.559
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.57	21.00	0.571
OW-HH3	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.17	21.70	0.532
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	22.10	0.600
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.51	21.80	0.542
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.18	21.40	0.620
OW-MT2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.11	22.50	0.562
	6/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.29	22.00	0.600
	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.39	22.10	0.575
	12/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.34	21.30	0.695
RFR-3	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.47	21.60	0.556
RFR-4	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.39	20.30	0.654
RFR-5	6/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.52	21.90	0.565
RFR-8	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.04	22.40	0.554
RFR-9	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.29	21.50	0.516

Table E.2
2011 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis* -1,2-Dichloro-ethene (ug/L)	*trans* -1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Specific Conductivity (mS)
RFR-10	2/28/2011	0.12U	**0.39F**	0.08U	**30.98**	**13.03**	0.08U	7.07	22.50	0.575
	5/31/2011	0.12U	0.07U	0.08U	**4.4**	0.05U	0.08U	6.76	22.50	0.652
	9/6/2011	0.12U	0.07U	0.08U	**6.75**	**1.79**	0.08U	8.05	21.60	0.614
	12/5/2011	0.12U	0.07U	0.08U	**11.41**	**3.9**	0.08U	7.12	21.10	0.606
RFR-10-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-10-B2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
Duplicate	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-11	2/28/2011	0.12U	0.07U	0.08U	**0.68F**	**1.37**	0.08U	7.13	23.10	0.567
	5/31/2011	0.12U	0.07U	0.08U	0.06U	**1.92**	0.08U	6.86	26.10	0.608
	9/6/2011	0.12U	0.07U	0.08U	**0.64F**	**4.81**	0.08U	7.82	25.00	0.566
	12/5/2011	0.12U	0.07U	0.08U	**0.62F**	**2.69**	0.08U	7.12	22.80	0.586
Duplicate	12/5/2011	0.12U	0.07U	0.08U	**0.84F**	**3.11**	0.08U	7.12	22.80	0.586
RFR-11-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	9/6/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-12	6/15/2011	0.12U	0.07U	0.08U	**0.20F**	**0.63F**	0.08U	7.44	22.70	0.542
	9/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.91	22.70	0.545
RFR-13	6/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.07	23.80	0.596
RFR-14	3/3/2011	0.12U	0.07U	0.08U	**0.11F**	0.05U	0.08U	7.11	16.90	0.537
	6/3/2011	0.12U	0.07U	0.08U	**0.20F**	0.05U	0.08U	7.14	24.30	0.570
SLD-01	9/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.50	21.40	0.611

BOLD	≥ MCL
BOLD	≥ RL
BOLD	≥ MDL

Notes:
- µg/L = micrograms per liter
-mS = millisiemans
- RL = reporting limit
- MCL = maximum contaminant level
- MDL = method detection limit
- VOCs analyzed using laboratory method SW8260B.
- *Duplicate* = field duplicate
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- J = The analyte was positively identified below quantitation limits; the quantitation is an estimate.
- All samples analyzed by Agriculture & Priority Pollutants Laboratories (APPL), Inc. of Clovis, CA

Table E.3
2011 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis*-1,2 (ug/L)	Dichloro-ethene, *trans*-1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temp. (deg. C)	Specific Conductivity (mS)
								Field Measurements		
CS-1	3/8/2011	0.12U	0.07U	0.08U	0.06U	**0.30F**	0.08U	7.29	21.60	0.485
	6/7/2011	0.12U	0.07U	0.08U	0.06U	**0.34F**	0.08U	7.19	21.60	0.506
	9/14/2011	0.12U	0.07U	0.08U	0.06U	**0.25F**	0.08U	7.47	21.60	0.498
	12/15/2011	0.12U	0.07U	0.08U	0.06U	**0.28F**	0.08U	8.10	21.10	0.570
CS-2	6/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.25	20.80	0.597
CS-4	3/9/2011	0.12U	**1.09F**	0.08U	**2.36**	**2.85**	0.08U	7.44	20.50	0.500
CS-9	3/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.09	21.60	0.549
	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.23	23.40	0.594
	9/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.30	21.60	0.633
	12/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.94	21.00	0.603
CS-10	3/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	22.20	0.558
	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	22.10	0.577
Duplicate	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	22.10	0.577
	9/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	22.20	0.557
Duplicate	9/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	22.20	0.557
	12/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.96	21.70	0.561
CS-12	6/7/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.58	22.00	0.501
	9/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.53	21.90	0.489
	12/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.88	21.50	0.487
Duplicate	12/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.88	21.50	0.487
CS-MW16-LGR	3/8/2011	0.12U	**189.43***	**0.24F**	**131.48***	**164.31***	0.08U	7.27	22.70	0.512
	6/7/2011	0.12U	**179.14***	**0.25F**	**156.62***	**173.11***	0.08U	7.15	24.20	0.520
CS-MW16-CC	3/8/2011	0.12U	**29.48**	**6.81**	**0.66F**	**18.3**	0.08U	7.40	23.00	0.609
	6/7/2011	**0.21F**	**24.22**	**6.7**	**1.54**	**24.59**	0.08U	7.20	23.70	0.642
CS-D	3/8/2011	0.12U	**96.47***	**2.3**	**103.41**	**120.26***	0.08U	7.46	22.20	0.423
CS-MWG-LGR	6/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.50	21.10	0.427
CS-MWH-LGR	6/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.68	21.60	0.491
CS-I	6/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.00	21.40	0.518
CS-MW1-LGR	3/9/2011	0.12U	**17.11**	**0.23F**	**11.9**	**29.59**	0.08U	7.00	21.00	0.480
Duplicate	3/9/2011	0.12U	**16.96**	**0.26F**	**12.24**	**30.15**	0.08U	7.00	21.00	0.480
	6/9/2011	0.12U	**16.53**	**0.21F**	**13.21**	**31.37**	0.08U	7.09	21.50	0.505
	12/14/2011	0.12U	**18.93**	0.08U	**14.11**	**30.37**	0.08U	6.25	20.60	0.512
CS-MW1-BS	6/9/2011	0.12U	**1.01F**	0.08U	0.06U	0.05U	0.08U	7.40	21.60	0.506
CS-MW1-CC	6/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.36	24.70	0.684
CS-MW2-LGR	3/9/2011	0.12U	**0.57F**	0.08U	0.06U	0.05U	0.08U	10.47	21.20	0.483
	6/10/2011	0.12U	**0.74F**	0.08U	0.06U	0.05U	0.08U	10.32	21.30	0.486
	12/14/2011	0.12U	**0.54F**	0.08U	0.06U	0.05U	0.08U	10.59	20.70	0.444
CS-MW3-LGR	3/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.43	21.80	0.442
	6/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.46	22.30	0.382
CS-MW4-LGR	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	20.90	0.588
CS-MW5-LGR	3/8/2011	0.12U	**2.71**	0.08U	**1.86**	**3.63**	0.08U	7.31	22.40	0.474
	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.75	22.70	0.492
CS-MW6-LGR	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.22	22.10	0.511
CS-MW6-BS	6/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.06	22.90	0.687
CS-MW7-LGR	3/10/2011	0.12U	0.07U	0.08U	**0.26F**	0.05U	0.08U	6.91	21.40	0.586
	6/16/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.87	25.40	0.597
CS-MW8-LGR	6/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	9.06	22.30	0.630
	12/13/2011	0.12U	0.07U	0.08U	**1.94**	0.05U	0.08U	6.95	20.60	0.632
CS-MW8-CC	6/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.76	26.60	0.584
CS-MW9-LGR	3/8/2011	0.12U	0.07U	0.08U	**0.18F**	0.05U	0.08U	7.16	21.10	0.487
	6/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.01	22.10	0.307
CS-MW9-BS	6/15/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.97	22.10	0.574
CS-MW10-LGR	12/13/2011	0.12U	0.07U	0.08U	**1.95**	**0.51F**	0.08U	7.03	20.80	0.615
CS-MW11A-LGR	3/10/2011	0.12U	0.07U	0.08U	**1.20F**	0.05U	0.08U	6.92	21.30	0.528
	6/16/2011	0.12U	0.07U	0.08U	**0.90F**	0.05U	0.08U	7.41	23.00	0.554
	12/13/2011	0.12U	0.07U	0.08U	**1.28F**	0.05U	0.08U	6.65	20.50	0.564
CS-MW12-LGR	6/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.08	25.80	0.327
Duplicate	6/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.08	25.80	0.327
CS-MW12-BS	6/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.34	22.70	0.379

Table E.3
2011 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis*-1,2 (ug/L)	Dichloro-ethene, *trans*-1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temp. (deg. C)	Specific Conductivity (mS)
								Field Measurements		
CS-MW18-LGR	3/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	10.77	21.80	0.375
CS-MW19-LGR	3/9/2011	0.12U	0.07U	0.08U	**0.56F**	0.05U	0.08U	6.45	21.60	0.554
	6/16/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	8.28	22.90	0.311
CS-MW20-LGR	3/10/2011	0.12U	0.07U	0.08U	**1.91**	0.05U	0.08U	6.80	21.10	0.550
Duplicate	3/10/2011	0.12U	0.07U	0.08U	**1.51**	0.05U	0.08U	6.80	21.10	0.550
	6/13/2011	0.12U	0.07U	0.08U	**1.62**	0.05U	0.08U	7.52	21.70	0.577
CS-MW21-LGR	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.68	21.10	0.506
	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.09	21.80	0.527
CS-MW22-LGR	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.32	20.80	0.506
	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.60	22.10	0.537
CS-MW23-LGR	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.19	21.40	0.474
Duplicate	3/10/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.19	21.40	0.474
	6/13/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.49	23.00	0.494
CS-MW24-LGR	3/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.96	21.30	0.509
	6/9/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.32	21.70	0.524
	12/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.76	20.80	0.526
CS-MW25-LGR	3/8/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.49	21.90	0.399
	6/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.43	21.80	0.460
Duplicate	6/14/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.43	21.80	0.460
	MCL	7	70	100	5	5	2			
Comparison Criteria	RL	1.2	1.2	0.6	1.4	1.0	1.1			
	MDL	0.12	0.07	0.08	0.06	0.05	0.08			

Bold	≥ MCL
Bold	≥ RL
Bold	≥ MDL

Notes:
- µg/L = micrograms per liter
- mS = millisiemans
- deg. C = degrees Celsius
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- * = A dilution was run for this sample.
- RL = reporting limit
- MCL = maximum contaminant level
- MDL = method detection limit
- VOCs analyzed using laboratory method SW8260B.

Table E.3 Cont.
2011 Quarterly On-Post Groundwater Monitoring Analytical Results

	CS-MW35-LGR		CS-MW36-LGR	
Analyte (µg/L)	9/15/2011	12/13/2011	9/15/2011	12/13/2011
Benzene	0.07U	NA	0.07U	NA
Bromo-dichloro-methane	0.06U	NA	0.06U	NA
Bromoform	0.13U	NA	0.13U	NA
Bromo-benzene	0.06U	NA	0.06U	NA
Bromo-chloro-methane	0.11U	NA	0.11U	NA
Bromo-methane	0.08U	NA	0.08U	NA
Butylbenzene, N-	0.17U	NA	0.17U	NA
Butylbenzene, sec-	0.05U	NA	0.05U	NA
Butylbenzene, tert-	0.04U	NA	0.04U	NA
Carbon tetrachloride	0.06U	NA	0.06U	NA
Chloro-benzene	0.04U	NA	0.04U	NA
Chloro-ethane	0.07U	NA	0.07U	NA
Chloroform	0.06U	NA	0.06U	NA
Chlorohexane, 1-	0.04U	NA	0.04U	NA
Chloro- methane	0.16U	NA	0.16U	NA
Chloro-toluene, 2-	0.04U	NA	0.04U	NA
Chlorotoluene, 4-	0.04U	NA	0.04U	NA
Dibromo-3-chloropropane, 1,2-	0.76U	NA	0.76U	NA
Dibromo-chloro-methane	0.06U	NA	0.06U	NA
Dibromomethane	0.06U	NA	0.06U	NA
Dichlorobenzene, 1,2-	0.02U	NA	0.02U	NA
Dichlorobenzene, 1,3-	0.03U	NA	0.03U	NA
Dichlorobenzene, 1,4-	0.07U	NA	0.07U	NA
Dichlorodifluoromethane	0.11U	NA	0.11U	NA
Dichloroethane, 1,2-	0.05U	NA	0.05U	NA
Dichloro-ethane, 1,1	0.07U	NA	0.07U	NA
Dichloro-ethene, 1,1	0.12U	0.12U	0.12U	0.12U
Dichloro-ethene, *cis*-1,2	0.07U	0.07U	0.07U	0.07U
Dichloro-ethene, *trans*-1,2	0.08U	0.08U	0.08U	0.08U
Dichloro-methane (methylene chloride)	0.35U	NA	0.35U	NA
Dichloropropane, 1,2-	0.06U	NA	0.06U	NA
Dichloropropane, 1,3-	0.05U	NA	0.05U	NA
Dichloropropane, 2,2-	0.10M	NA	0.10U	NA
Dichloropropene, 1,1-	0.10U	NA	0.10U	NA
Dichloropropene, cis-1,3-	0.03U	NA	0.03U	NA
Dichloropropene, trans-1,3-	0.04U	NA	0.04U	NA
Ethylbenzene	0.05U	NA	0.05U	NA
Ethylene dibromide	0.06U	NA	0.06U	NA
Hexachlorobutadiene	0.17U	NA	0.17U	NA
Isopropylbenzene	0.04U	NA	0.04U	NA
Isopropyltoluene, 4- (Cymene, p-)	0.05U	NA	0.05U	NA
Naphthalene	0.07U	NA	0.07U	NA
Propylbenzene, N-	0.03U	NA	0.03U	NA
Styrene	0.08U	NA	0.08U	NA
Tetrachloroethane, 1,1,1,2-	0.09U	NA	0.09U	NA
Tetrachloroethane, 1,1,2,2-	0.07U	NA	0.07U	NA
Tetrachloroethene	**2.01**	**0.95F**	**9.91**	**7.21**
Toluene	0.06U	NA	0.06U	NA
Trichlorobenzene, 1,2,3-	0.24U	NA	0.24U	NA
Trichlorobenzene, 1,2,4-	0.16U	NA	0.16U	NA
Trichloroethene	0.05U	0.05U	**9.33**	**6.23**
Trichloroethane, 1,1,1-	0.03U	NA	0.03U	NA
Trichloroethane, 1,1,2-	0.06U	NA	0.06U	NA
Trichlorofluoromethane	0.07U	NA	0.07U	NA
Trichloropropane, 1,2,3-	0.17U	NA	0.17U	NA
Trimethylbenzene, 1,2,4-	0.04U	NA	0.04U	NA
Trimethylbenzene, 1,3,5-	0.04U	NA	0.04U	NA
Vinyl chloride	0.08U	0.08U	0.08U	0.08U
Xylene, m,p-	0.07U	NA	0.07U	NA
Xylene, o-	0.06U	NA	0.06U	NA
pH	7.08	7.16	6.48	7.36
Temp. (deg. C)	21.90	20.20	22.90	21.50
Specific Conductivity (mS)	0.780	0.616	0.574	0.614

Bold ≥ MCL
Bold ≥ RL
Bold ≥ MDL

Notes:
- µg/L = micrograms per liter
- mS = milliseimens
- RL = reporting limit
- MCL = maximum contaminant level
- MDL = method detection limit
- VOCs analyzed using laboratory method SW8260B.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.

All samples analyzed by Agriculture & Priority Pollutants Laboratories (APPL), Inc. of Clovis,

ATTACHMENT F

Water level and analytical data collected as part of the CSSA Groundwater Monitoring Program indicate that the horizontal and vertical extent of groundwater contamination in and around CSSA varies over time. It is likely these fluctuations are in response to variations in groundwater gradients resulting from the rise and fall of groundwater levels due to seasonal changes in rainfall/recharge rates and well pumping. For the most part, volatile organic compound (VOC) contamination appears to be confined to the LGR unit of the Middle Trinity Aquifer (**Figure F.1**). VOCs have also been identified in the isolated portions of the Upper Glen Rose, Bexar Shale, and Cow Creek units. A potentiometric surface map for the LGR with June 2011 data is presented in **Figure F.2**. The nearest contributing zones and recharge zones for the Edward's Aquifer are located north of CSSA and are depicted in **Figure F.3**.

The injection solutions from ISCO study would infiltrate into the LGR via the infiltration gallery. The infiltration will not result in significant migration of fluids because the volume of injection solutions is anticipated to react with subsurface contamination (consumed) generating innocuous by products carbon dioxide and sodium sulfate or sodium chloride salts.

Accurate predictions of byproduct concentration over distance and time that also account for the effects of attenuation (dilution, absorption, degradation), generally require complex numerical modeling. However, the migration rate of degradation byproducts can be approximated using analytical solutions for groundwater flow and transport processes. Using a maximum hydraulic conductivity for the injection zone of 15.8 feet per day (ft/day) (5.6×10^{-3} cm/sec) as determined during previous aquifer testing of the LGR at CSSA, an assumed hydraulic gradient of 0.01 ft/ft and an effective porosity of 5 percent, the maximum estimated groundwater velocity in the area would be 1.3 ft/day (475 ft/yr). Applying this estimated groundwater velocity and assuming no retardation or attenuation, it would take approximately 2.5 years for these constituents to migrate from the injection location to the nearest private water supply well, approximately 1,250 feet away. Since this approximation does not include the effects of attenuation or dilution, it represents a conservative estimate and the actual migration rates can be expected to be much longer.

In addition, CSSA has set up an effective monitoring network to track any contamination and degradation byproduct plume development/migration. If any drinking water wells are threatened, CSSA will respond with appropriate well-head protection in accordance with the CSSA Off-Post Monitoring and Response Plan. The nearest water supply well from the injection point (RFR-10) already employs well head protection system to protect the drinking water supply.

Wells with PCE detection above reporting limit (1 µg/L)

Wells with No PCE detection above reporting limit (1 µg/L)

PCE Concentrations (µg/L)

- 1.00 (Reporting Limit)
- 5.00 (MCL)
- 10.00
- 100.00

- Parcels
- CSSA Boundary
- Salado Creek
- Faults
- CSSA Roads

CS-MWH-LGR
CS-I
CS-MWG-LGR
FO-8
CS-12
Salado Creek
FO-22
CS-MW9-LGR
CS-MW25-LGR
RFR-5
RFR-3
CS-MW24-LGR
CS-MW16-LGR 156.62
CS-WB05-LGR-04B 31
CS-MW3-LGR
RFR-4
CS-WB07-LGR-04 155
CS-WB08-LGR-04 2.7
CS-2
CS-WB06-LGR-04 173
Plume 1
CS-MW5-LGR
CS-MW1-LGR 13.21
CS-MW2-LGR
CS-MW12-LGR
JW-15
RFR-8
CS-MW19-LGR
JW-31
JW-5
JW-13
CS-10
CS-MW20-LGR 1.62
JW-6
JW-9
CS-9
JW-26
JW-27
JW-8
RFR-14
CS-MW21-LGR
JW-28
JW-14
I-10
Old Fredericksburg Rd.
OW-DAIRYWELL
OW-CE2
OW-CE1
FO-17
JW-29
JW-30
FO-J1
JW-7
RFR-13
CS-MW22-LGR
CS-13 (Proposed)
OW-HH1
OFR-4
RFR-9
Ralph Fair Rd.
OW-MT2
OFR-1
I10-8
CS-MW23-LGR
CS-WB04-LGR-09 9.75
CS-WB03-LGR-09 6.83
CS-1
I10-7
CS-WB02-LGR-09 18.2
OW-HH2
I10-4 5.56J
Plume 2
CS-MW7-LGR
OW-BARNOWL
CS-MW8-LGR
OFR-3 3.33
RFR-10 4.4
CS-WB01-LGR-09 16.32
CS-MW11A-LGR
I10-2
HS-2
I10-5
LS-7 2.05
HS-1
HS-3
OW-HH3
RFR-12
RFR-11
LS-6
LS-5
LS-1
LS-4

STATE OF TEXAS
JULIE A. BURDEY
GEOLOGY
No. 1913
LICENSED
PROFESSIONAL GEOLOGIST
3/7/12

N
W E
S

0 1,500 3,000 4,500 6,000 Feet

Figure F.1

Detections of PCE above the Analytical Reporting Limit (1 ug/L)
June 2011
Camp Stanley Storage Activity

PARSONS

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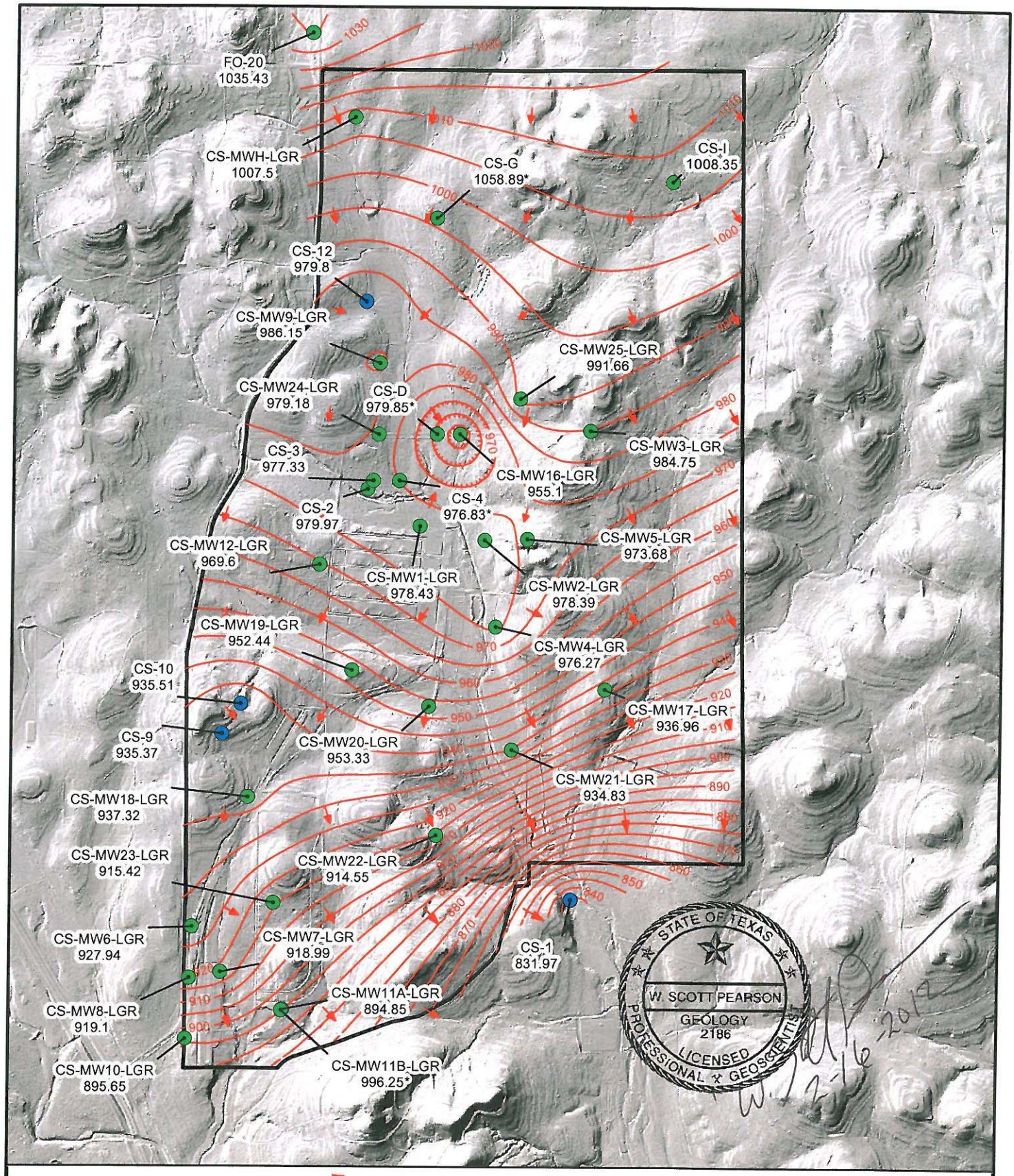

Figure F - 2

June 2011 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

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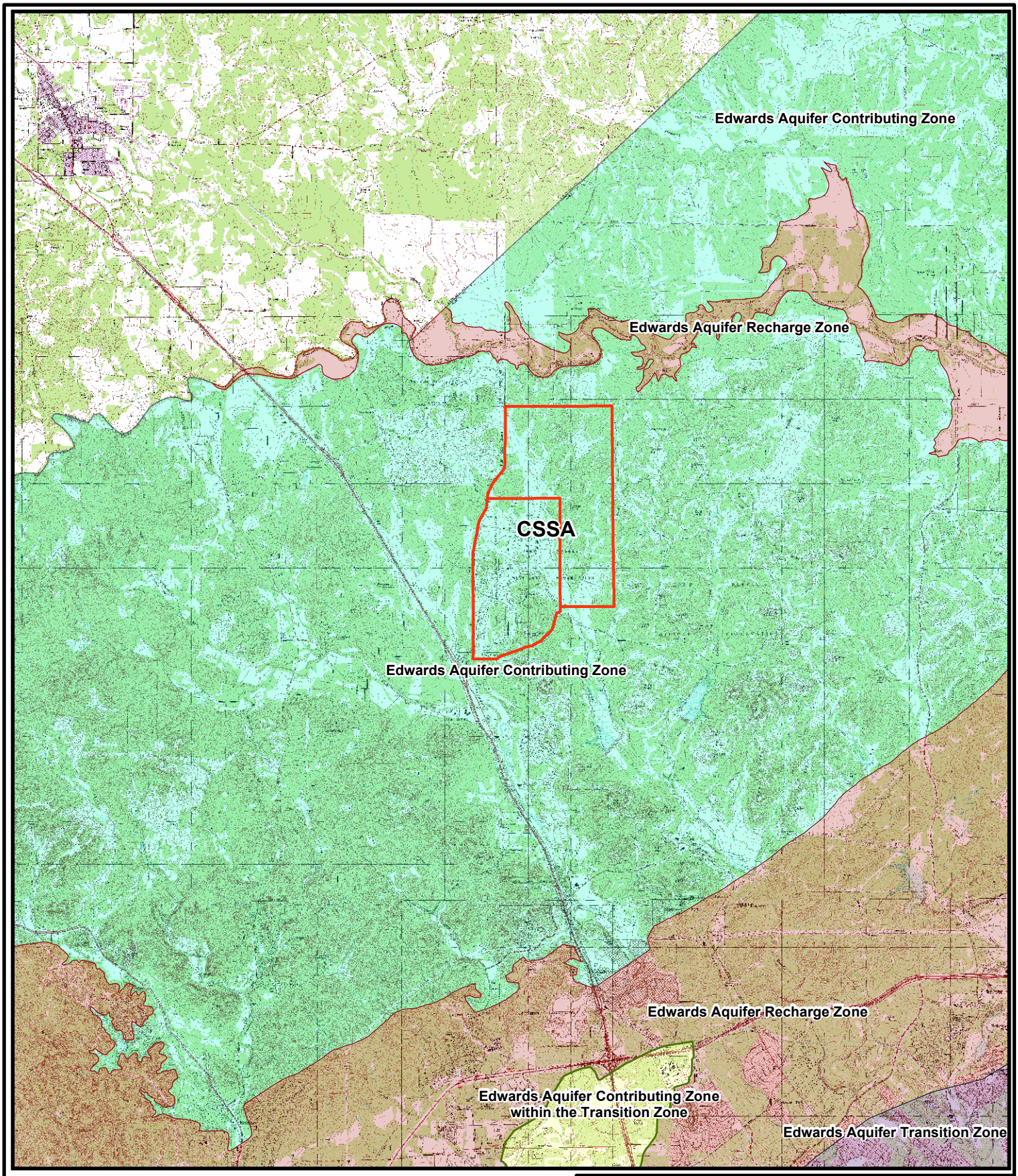

Basemap: USGS Topographic Quadrangles

N
W E
S

2 1 0 2 Miles

CSSA Boundary

Figure: F.3

Location of Edwards Aquifer Boundaries

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ATTACHMENT G

Results of geochemical analyses for the LGR Formation are summarized in **Table G.1**. Wells are shown on **Figure G.1**.

Table G.1
Results of Natural Attenuation Study - On-Post Monitoring Wells
Field Analysis
Camp Stanley Storage Activity

SampleID / **Sample Date** / **ParamID**	CS-16 09/09/02	CS-D 09/09/02	CS-9 09/10/02	CS-10 09/10/02	CS-11 09/10/02	CS-1 09/10/02	CS-MW1-LGR 09/10/02	CS-MW2-LGR 09/10/02	CS-2 09/10/02	CS-MW8-LGR 09/10/02	CS-MW5-LGR 09/11/02	CS-MW4-LGR 09/11/02	CS-MW3_LGR 9/11/2002
Hach Testing (mg/L)													
Alkalinity	230	250	236	258	244	228	258	262	242	300	244	280	158
Carbon Dioxide	60	45	55	45	65	65	45	35	60	56	65	55	45
Ferrous Iron	0	0	0	0	0.29	0.02	0.08	0.08	0.04	0	0.02	0.05	0
Hydrogen Sulfide	0	0	0	0	0	0	0	0	0	0	0	0	0
Manganese	0.2	0.2	0	0	0	0	0	0.5	0.1	0	0	0.1	0
Nitrate	3.2	3.9	2.5	2.2	0.6	2	1.9	1.3	1.9	10.4	2.8	1.7	2.1
Nitrite	0	0.001	0.001	0	0	0.001	0.002	0.002	0.002	0.018	0	0	0.006
Sulfate	24.37	18.89	28.19	28.91	43.39	38.94	23.44	40.7	48.35	3.59	20.75	36.25	24.57
Direct Readings													
pH	6.81	7.01	7.46	7.62	7.13	7.47	6.39	6.94	6.02	5.43	6.38	6.57	5.86
Conductivity*													
Redox Potential	188	207.8	-26.4	3.4	33.6	35	377.4	352.3	369.4	418.2	262.3	333.7	436.9
Dissolved Oxygen	3.44	1.41	3.65	3.35	2.52	3.35	5.24	0.16	2.51	0.44	0.47	0.11	0.95
Temperature	21.94	22.23	22.54	22.89	22.12	22.97	23.09	22.44	22.51	23.11	23.09	22.9	23.56
DH (nM)													
Dissolved Hydrogen	59	1.8	1.8	2.7	1.4	2.1	1.3	1.9	1.7	2.4	0.14	2	2.3
M2720C (ug/L)													
Methane	0.22 F	0.25 F	0.23 F	0.3 F	6.3	1	0.23 F	9.2	0.32 F	0.28 F			
Ethane	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Ethene	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0.25 F	0 U	0.36 F	0 U
SW9056 (mg/L)													
Chloride	12	11	17	13	17	12	9	9.7	26	11			
Method SW9060													
DOC	5.4	4.7	3.8	3.6	3.9	1.5	2.1	2.5	3	1.5	1.6	4.5	2.1

Table G.1 (continued)
Results of Natural Attenuation Study - On-Post Monitoring Wells
Field Analysis
Camp Stanley Storage Activity

SampleID **Sample Date** **ParamID**	CS-G 9/11/2002	CS-MW9-LGR 9/11/2002	CS-MW6-LGR 9/11/2002	CS-MW19-LGR 9/12/2002	CS-MW17-LGR 9/12/2002	CS-MW18-LGR 9/12/2002	CS-MW7-LGR 9/13/2002	CS-MW10-LGR 9/13/2002	Min	Max
Hach Testing (mg/L)										
Alkalinity	180	262	226	256	274	254	250	282	158	300
Carbon Dioxide	50	45	50	35	60	55	65	85	35	85
Ferrous Iron	0	0	0	0	0.02	0	0.01	0	0	0.29
Hydrogen Sulfide	0	0	0	0	0	0	0	0	0	0
Manganese	0	0	0	0.1	0	0.3	0	0.2	0	0.5
Nitrate	3	2.5	2.2	4.4	4.3	0.14	8.8	0	0	10.4
Nitrite	0.004	0.002	0.001	0.004	0.003	0.002	0	0.002	0	0.018
Sulfate	15.37	17.96	21.58	10.62	20.75	43.8	1.84	17.96	1.84	48.35
Direct Readings										
pH	6.09	4.2	7.38	7.3	7.03	7.63	8	7.9	4.2	8
Conductivity*			571	617	618	564	624	688	564	688
Redox Potential	404	535.6	12	93.9	40.1	32.5	-108.6	-59.5	-108.6	535.6
Dissolved Oxygen	3.83	2.2	1.12	7.36	4.57	1.74	0.32	1.96	0.11	7.36
Temperature	22.27	23.11	22.79	22.11	22.29	22.54	21.4	22.22	21.4	23.56
DH (nM)										
Dissolved Hydrogen	4.1	2.7	2.4	0.8	1.4	2	3	2.5	0.14	59
M2720C (ug/L)										
Methane	0.21 F		2.1	0.34 F	0.32 F	0.34 F		0.26 F	0.21 F	9.2
Ethane	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0	0
Ethene	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0	0.36 F
SW9056 (mg/L)										
Chloride	13		12	14	15	11		9.2	9	26
Method SW9060										
DOC	2.1	3.7	5	6.2	6.2	5.9	5.5	6.2	1.5	6.2

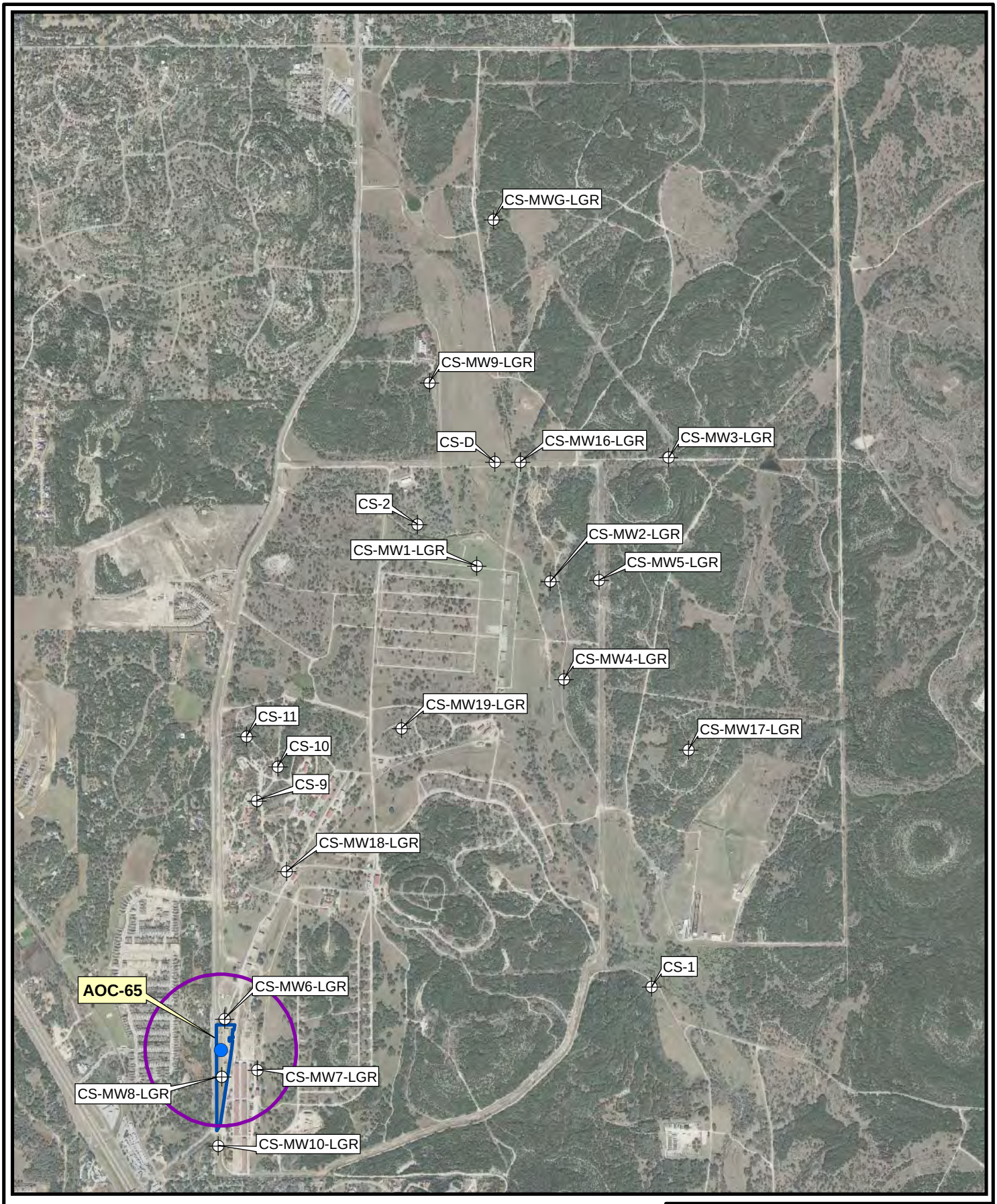

Figure G.1

On-Post Monitoring Well Locations for LGR Water Chemistry Data Camp Stanley Storage Activity

PARSONS

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ATTACHMENT H

Persulfates are strong oxidants. They exist as salts and are available as sodium, potassium, or ammonium persulfate. The use of persulfates in groundwater treatment applications is a relatively new technology, developed for use with contaminants that are not amenable to oxidation using other, more traditional oxidants such as ozone or permanganates. Persulfate can be applied with minimal risk to the environment or human health and safety. The following paragraphs describe the chemical composition of the ISCO materials and the reactions and reaction byproducts anticipated when persulfate is applied to the subsurface.

The composition of the injection solution will include a 25% by weight solution of sodium hydroxide followed by approximate 20% by weight solution of sodium persulfate. Persulfate oxidation will utilize sodium persulfate ($Na_2S_2O_8$) which will be catalyzed by sodium hydroxide at an elevated pH to produce sulfate radicals ($SO_4^{\bullet -}$) that will react with subsurface chlorinated solvents. The reaction mechanism (Equation 1) associated with the persulfate ($S_2O_8^{-2}$) process is:

$$S_2O_8^{-2} \Leftrightarrow 2SO_4^{\bullet -} \qquad \text{EQUATION 1}$$

Where,
$S_2O_8^{-2}$ = persulfate ion
$SO_4^{\bullet -}$ = sulfate radical

The chemical equation (Equation 2) for the complete oxidation of TCE (C_2HCl_3) is:

$$3NaS_2O_8 + C_2HCl_3 + 4H_2O \rightarrow 2CO_2 + 9H^+ + 3Cl^- + 3Na^+ + 6SO_4^{-2} \qquad \text{EQUATION 2}$$

In these reactions, several byproducts, including CO_2, sulfate, chloride and hydrogen ions, are generated and released to the groundwater. Depending on the contaminant concentration and the rate of reaction of persulfate, the concentration of sulfate ion may temporarily exceed groundwater quality guidelines, such as the United States Environmental Protection Agency (USEPA) secondary standard of 250 mg/L for sulfate as a nuisance chemical. However, it is expected that the sulfate ion will be generated slowly and will attenuate naturally. Additionally, potential impacts to groundwater chemistry include a decrease in pH due to generation of acids from the chloride and sulfate ions. However, these acids are expected to be neutralized through an increase in alkalinity from the injected sodium hydroxide solution. Therefore, the byproducts of these reactions are not expected to pose water quality problems because most of the byproducts are either innocuous or will readily react with aquifer material or with the applied sodium hydroxide and subsequently stabilize.

Significant, long-term increases in these constituents are not expected. However, during implementation of this pilot study, groundwater will be monitored to evaluate pH and sulfate concentrations across the treatment area. Groundwater samples will be analyzed by a NELAP-certified laboratory for VOC by USEPA Method 8260B , dissolved priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc) by USEPA Method 6010/7470A, and sulfate by USEPA Method

300.0. These performance monitoring events will determine the efficacy of the treatment system which may be used to apply the technology on a full scale application.

Material Safety Data Sheet

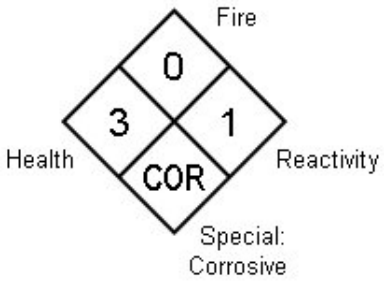
Sodium hydroxide, solid

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium hydroxide, solid.
Synonyms: Lye, sodium hydrate, white caustic, caustic soda, soda lye, soda ash, ascarite.
Company Identification:

Certified Lye
PO Box 133
Spring Valley, CA 91976-0133
Website: http://www.certified-lye.com
Email: info@certified-lye.com
Telephone: 619-548-2378

Poison Control Center: 800-222-1222
Chemtrec: 800-424-9300



Section 2 - Composition, Information on Ingredients

CAS#, Chemical Name, Percent, EINECS/ELINCS:
1310-73-2, Sodium hydroxide, 99-100, 215-185-5.
497-19-8, Sodium carbonate, <1.0, 207-838-8.
Food Chemical Codex (FCC):
These chemicals meet the FDA requirements for food use.

Section 3 - Hazards Identification

Emergency Overview

Appearance: White solid.
Danger! Causes eye and skin burns. Causes digestive and respiratory tract burns. Hygroscopic (absorbs moisture from the air).
Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes eye burns. May cause blindness. May cause chemical conjunctivitis and corneal damage.
Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin.
Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock.
Inhalation: Irritation may lead to chemical pneumonitis and pulmonary edema. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Causes chemical burns to the respiratory tract.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Effects may be delayed.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid immediately.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Immediately remove contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Contact with moisture or water may generate sufficient heat to ignite nearby combustible materials. Contact with metals may evolve flammable hydrogen gas.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Do not get water inside containers.
Flammability: Nonflammable.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Flammable Limits: Not available.
NFPA Rating: Health: 3; Flammability: 0; Instability: 1.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches that lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Do not get water on spilled substances or inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid ingestion and inhalation. Discard contaminated shoes. Use only with adequate ventilation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Keep away from acids. Store protected from moisture. Containers must be tightly closed to prevent the conversion of NaOH to sodium carbonate by the CO_2 in air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name, ACGIH (TLV), NIOSH (REL), OSHA (PEL):
Sodium hydroxide, 2 mg/m^3 Ceiling, 10 mg/m^3 Ceiling (15 minutes), 2 mg/m^3 TWA.
Sodium carbonate, none listed, none listed, none listed.
NIOSH IDLH Concentration: 10 mg/m^3.
OSHA Vacated PEL: None of these chemicals have an OSHA Vacated PEL.

Personal Protective Equipment

Eyes: Wear chemical splash goggles and face shield.
Skin: Wear gloves, apron, and/or clothing made of butyl rubber, nitrile rubber, and/or polyethylene.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirator: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Solid.
Appearance: White pellets.
Odor: Odorless.
pH: 14 (5% aq soln).
Vapor Pressure: 1 mm Hg @ 739 deg C.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 1390 deg C @ 760 mm Hg.
Freezing/Melting Point: 318 deg C.
Decomposition Temperature: Not available.
Solubility: Soluble.
Specific Gravity/Density: 2.13 g/cm^3.
Molecular Formula: NaOH.
Molecular Weight: 40.00.

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Moisture, contact with water, exposure to moist air or water, prolonged exposure to air.
Incompatibilities with Other Materials: Water, metals, acids, aluminum, zinc, tin, nitromethane, leather, flammable liquids, organic halogens, wool.
Hazardous Decomposition Products: Toxic fumes of sodium oxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

NIOSH RTECS#

CAS# 1310-73-2 (sodium hydroxide): WB4900000
CAS# 497-19-8 (sodium carbonate): VZ4050000

LD50/LC50

CAS# 1310-73-2:
Draize test, rabbit, eye: 400 ug Mild;
Draize test, rabbit, eye: 1% Severe;
Draize test, rabbit, eye: 50 ug/24H Severe;
Draize test, rabbit, eye: 1 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Severe.

CAS# 497-19-8:
Draize test, rabbit, eye: 100 mg/24H Moder;
Draize test, rabbit, eye: 50 mg Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 1200 mg/m^3/2H;
Inhalation, rat: LC50 = 2300 mg/m^3/2H;
Oral, mouse: LD50 = 6600 mg/kg;
Oral, mouse: LD50 = 6600 mg/kg;
Oral, rat: LD50 = 4090 mg/kg.

Carcinogenicity

CAS# 1310-73-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 497-19-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
Epidemiology: No information found.
Teratogenicity: No information found.
Reproductive Effects: No information found.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: No information found.
Other Studies: No information found.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA F List: None of these chemicals are listed in 40 CFR 261.31.
RCRA K List: None of these chemicals are listed in 40 CFR 261.32.
RCRA P List: None of these chemicals are listed in 40 CFR 261.33(e).
RCRA U List: None of these chemicals are listed in 40 CFR 261.33(f).

Section 14 - Transport Information

US DOT, Canada TDG

Shipping Name: Sodium hydroxide, solid; Sodium hydroxide, solid.
Hazard Class: 8, 8.
UN Number: UN1823, UN1823.
Packing Group: II, II.

Section 15 - Regulatory Information

US Federal Regulations

TSCA Section 8(b):
CAS# 1310-73-2 is listed on the TSCA inventory.
CAS# 497-19-8 is listed on the TSCA inventory.
TSCA Section 12(b): None of these chemicals are listed under TSCA Section 12(b).
TSCA Significant New Use Rule: None of these chemicals have a TSCA SNUR.
Chemical Test Rules: None of these chemicals have a Chemical Test Rule.
Health & Safety Reporting List:
None of these chemicals are on the Health & Safety Reporting List.
SARA Title III/EPCRA:
None of these chemicals have a TPQ under EPCRA Section 302 (EHS).
None of these chemicals are reportable under EPCRA Section 304.
None of these chemicals are reportable under EPCRA Section 313.
SARA Codes:
CAS# 1310-73-2: Immediate, reactive.
CAS# 497-19-8: Immediate.
CERCLA Hazardous Substances and Corresponding RQ:
CAS# 1310-73-2: 1000 lb final RQ; 454 kg final RQ.
CAS# 497-19-8: This chemical is not listed and has no RQ.
Clean Air Act:
None of these chemicals are listed under CAA Section 112(r).
None of these chemicals are listed as hazardous air pollutants.
None of these chemicals are listed as Class 1 or Class 2 Ozone Depletors.
Clean Water Act:
CAS# 1310-73-2 is listed as a Hazardous Substance under the CWA Section 311.
None of these chemicals are listed as Priority Pollutants under the CWA Section 303.
None of these chemicals are listed as Toxic Pollutants under the CWA Section 307.
OSHA: None of these chemicals are considered highly hazardous by OSHA.
SARA Title III/EPCRA States' Right-To-Know Lists:
CAS# 1310-73-2 is listed by California, Massachusetts, Minnesota, New Jersey, and Pennsylvania.
CAS# 497-19-8 is not listed by CA, FL, MA, MN, NJ, or PA.
California Prop 65:
None of these chemicals are listed on the California Carcinogenic Chemicals list.

European / International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols: C.
Risk Phrases:
R 22 (harmful if swallowed),
R 35 (causes severe burns).
Safety Phrases:
S1 (keep locked up),
S2 (keep out of the reach of children),
S26 (in case of contact with eyes, rinse immediately with plenty of water and seek medical advice),
S36 (wear suitable protective clothing),
S37 (wear suitable gloves),
S39 (wear eye/face protection),
S45 (in case of accident or if you feel unwell seek medical advice immediately; show the label where possible).
WGK (Water Danger/Protection):
CAS# 1310-73-2: 1.
CAS# 497-19-8: 1.
Canada – DSL/NDSL:
CAS# 1310-73-2 is listed on Canada's Domestic Substances List.
CAS# 497-19-8 is listed on Canada's Domestic Substances List.
Canada – WHMIS:
This product has a WHMIS classification of E (corrosive material).
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List:
CAS# 1310-73-2 is listed on the Canadian Ingredient Disclosure List.
CAS# 497-19-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: MAY/04/2006.
Most Recent Revision Date: MAY/12/2008.
Most Recent Revision: Version 4.

Addendum

Safety Precautions for Sodium Hydroxide:
http://www.certified-lye.com/safety.html
Protective Equipment for Use with Sodium Hydroxide:
http://www.certified-lye.com/protect.html

MATERIAL SAFETY DATA SHEET

Sodium Persulfate

MSDS Ref. No.: 7775-27-1
Date Approved: 06/01/2009
Revision No.: 13

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Sodium Persulfate
SYNONYMS:	Sodium Peroxydisulfate; Disodium Peroxydisulfate
GENERAL USE:	Polymerization initiator. Etchant and cleaner in manufacture of printed circuit boards. Booster in hair bleaching formulations in cosmetics. Secondary oil recovery systems as a polymerization initiator and a gel breaker.

MANUFACTURER

FMC CORPORATION
FMC Peroxygens
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)
msdsinfo@fmc.com (Email - General Information)

EMERGENCY TELEPHONE NUMBERS

(303) 595-9048 (Medical - U.S. - Call Collect)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").

POTENTIAL HEALTH EFFECTS: Airborne persulfate dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of persulfate dust may cause difficulty in breathing in sensitive persons.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Persulfate	7775-27-1	>99	231-892-1	Xn-O; R8-R22-R36/37/38-R42/43

4. FIRST AID MEASURES

EYES: Flush with plenty of water. Get medical attention if irritation occurs and persists.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral toxicity and is not irritating to the eyes and skin. Flooding of exposed areas with water is suggested. For gastric lavage or emesis induction, consider the possible aggravation of esophageal injury, and the expected absence of system effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

FIRE FIGHTING PROCEDURES: Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: Not available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

7. HANDLING AND STORAGE

HANDLING: Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection. Use clean plastic or stainless steel scoops only.

STORAGE: Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Persulfate	0.1 mg/m^3 (TWA)		

ENGINEERING CONTROLS: Provide mechanical local general room ventilation to prevent release of dust into the work environment. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical goggles. Full face shield may be used.

RESPIRATORY: Use approved dust respirator when airborne dust is expected.

PROTECTIVE CLOTHING: Normal work clothes. Rubber or neoprene footwear.

GLOVES: Rubber or neoprene gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	None
APPEARANCE:	White crystals
AUTOIGNITION TEMPERATURE:	Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating.
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not applicable
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
MELTING POINT:	Decomposes
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Oxidizer
PERCENT VOLATILE:	Not applicable
pH:	typically 5.0 - 7.0 @ 25 °C (1% solution)
SOLUBILITY IN WATER:	73 % @ 25 °C (by wt.)
SPECIFIC GRAVITY:	2.6 (H_2O=1)
VAPOR DENSITY:	Not applicable (Air = 1)
VAPOR PRESSURE:	Not applicable

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Heat, moisture and contamination.
STABILITY:	Stable (becomes unstable in presence of heat, moisture and/or contamination).
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact

with incompatible materials can result in a material decomposition or other uncontrolled reactions.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxygen that supports combustion and oxides of sulfur.

COMMENTS: PRECAUTIONARY STATEMENT: Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

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11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Non-irritating (rabbit) [FMC Ref. ICG/T-79.029]

SKIN EFFECTS: Non-irritating (rabbit) [FMC Ref. ICG/T-79.029]

DERMAL LD_{50}: > 10 g/kg [FMC Ref. ICG/T-79.029]

ORAL LD_{50}: 895 mg/kg (rat) [FMC Ref. ICG/T-79.029]

INHALATION LC_{50}: 5.1 mg/l (rat) [FMC Ref. I95-2017]

SENSITIZATION: May be sensitizing to allergic persons. [FMC Ref. ICG/T-79.029]

TARGET ORGANS: Eyes, skin, respiratory passages

ACUTE EFFECTS FROM OVEREXPOSURE: Dust may be harmful and irritating. May be harmful if swallowed.

CHRONIC EFFECTS FROM OVEREXPOSURE: Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979]. Groups of male and female rats were fed 0, 300 or 3000 ppm sodium persulfate in the diet for 13 weeks, followed by 5000 ppm for 5 weeks. Microscopic examination of tissues revealed some injury to the gastrointestinal tract at the high dose (3000 ppm) only. This effect is not unexpected for an oxidizer at high concentrations. [Ref. FMC I90-1151, Toxicologist 1:149, 1981].

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	ACGIH: Not listed

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hour LC_{50} = 771 mg/L [FMC Study I92-1250]
Rainbow trout, 96-hour LC_{50} = 163 mg/L [FMC Study I92-1251]
Daphnia, 48-hour LC_{50} = 133 mg/L [FMC Study I92-1252]
Grass shrimp, 96-hour LC_{50} = 519 mg/L [FMC Study I92-1253]

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Persulfate
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 1505
PACKING GROUP:	III
LABEL(S):	5.1 (Oxidizer)
PLACARD(S):	5.1 (Oxidizer)
MARKING(S):	Sodium Persulfate, UN 1505
ADDITIONAL INFORMATION:	Hazardous Substance/RQ: Not applicable

49 STCC Number: 4918733

This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000 - 2200 lb. IBC's (supersacks).

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME: Sodium Persulfate

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME: Sodium Persulfate

OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not applicable

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
There are no ingredients in this product, which are subject to Section 313 reporting requirements.

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted, RQ = 100 lbs., Ignitability

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
All components are listed or exempt.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: D001

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Hazard Classification / Division: C
D2A
D2B

Domestic Substance List: All components are listed or exempt.

INTERNATIONAL LISTINGS

Australia (AICS): Listed
China: Listed
Japan (ENCS): (1)-1131
Korea: KE-12369
Philippines (PICCS): Listed
New Zealand: Listed

HAZARD AND RISK PHRASE DESCRIPTIONS:

EC Symbols:	Xn	(Harmful)
	O	(Oxidizer)
EC Risk Phrases:	R8	(Contact with combustible material may cause fire)
	R22	(Harmful if swallowed.)
	R36/37/38	(Irritating to eyes, respiratory system and skin.)
	R42/43	(May cause sensitization by inhalation or by skin contact.)

16. OTHER INFORMATION

HMIS

Health	1
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA (National Fire Protection Association)

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
This MSDS replaces Revision #12, dated April 30, 2006.
Changes in information are as follows:
Section 1 (Product and Company Identification)
Section 3 (Composition / Information on Ingredients)
Section 15 (Regulatory Information)
Section 16 (Other Information)

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ATTACHMENT I

A ground water sampling program for several ground water wells located near the injection points identified in **Table I.1** will be implemented for a one-month period following injection of in situ chemical oxidation chemicals into the trench. Following the initial one month monitoring period, a nine month monitoring period will be performed to monitor groundwater conditions following the proposed ISCO injection.

Groundwater monitoring associated with this Class V aquifer remediation permit is anticipated to include monitoring of the LGR, Westbay and private wells listed in the Table I.1 below. For the Westbay® wells CS-WB01 through CS-WB04, the deepest zone LGR09 or LGR11 will be monitored. Groundwater samples will be collected 1, 5, 15 and 30 days after injection of the ISCO chemicals into the injection points, and the samples will be analyzed by a NELAP-certified laboratory for VOCs by USEPA Method 8260B, Priority Pollutant Metals by USEPA Methods 6010B/7470A, and sulfate by USEPA Method 300.0.

There is one private drinking water supply well (RFR-10) located within the ¼-mile radius of the subsurface distribution system. RFR-10 and the other private wells listed in Table I.1 below include well head protection in the form of a GAC treatment system. Additionally, CSSA has a multi-port monitoring well (Westbay® well CS-WB04) near the drinking water supply well which is also monitored through CSSA's groundwater monitoring program. **Figure I.1** depicts the location of the water supply wells within the ¼-mile radius of the injection points. **Figure I.2** shows the location of AOC-65 and the nearby monitoring wells.

Table I.1 Monitoring Wells for Proposed ISCO Monitoring Program

LGR Wells	Westbay Wells	Private Wells
MW6-LGR	WB01-LGR09	LS-5
MW7-LGR	WB02-LGR09	LS-6
MW8-LGR	WB03-LGR09	LS-7
MW36-LGR	WB04-LGR11	RFR-10
		RFR-11
		OFR-3
		I10-4

Drilling logs for CSSA monitoring wells within the AOC-65 area are included in this Attachment I.

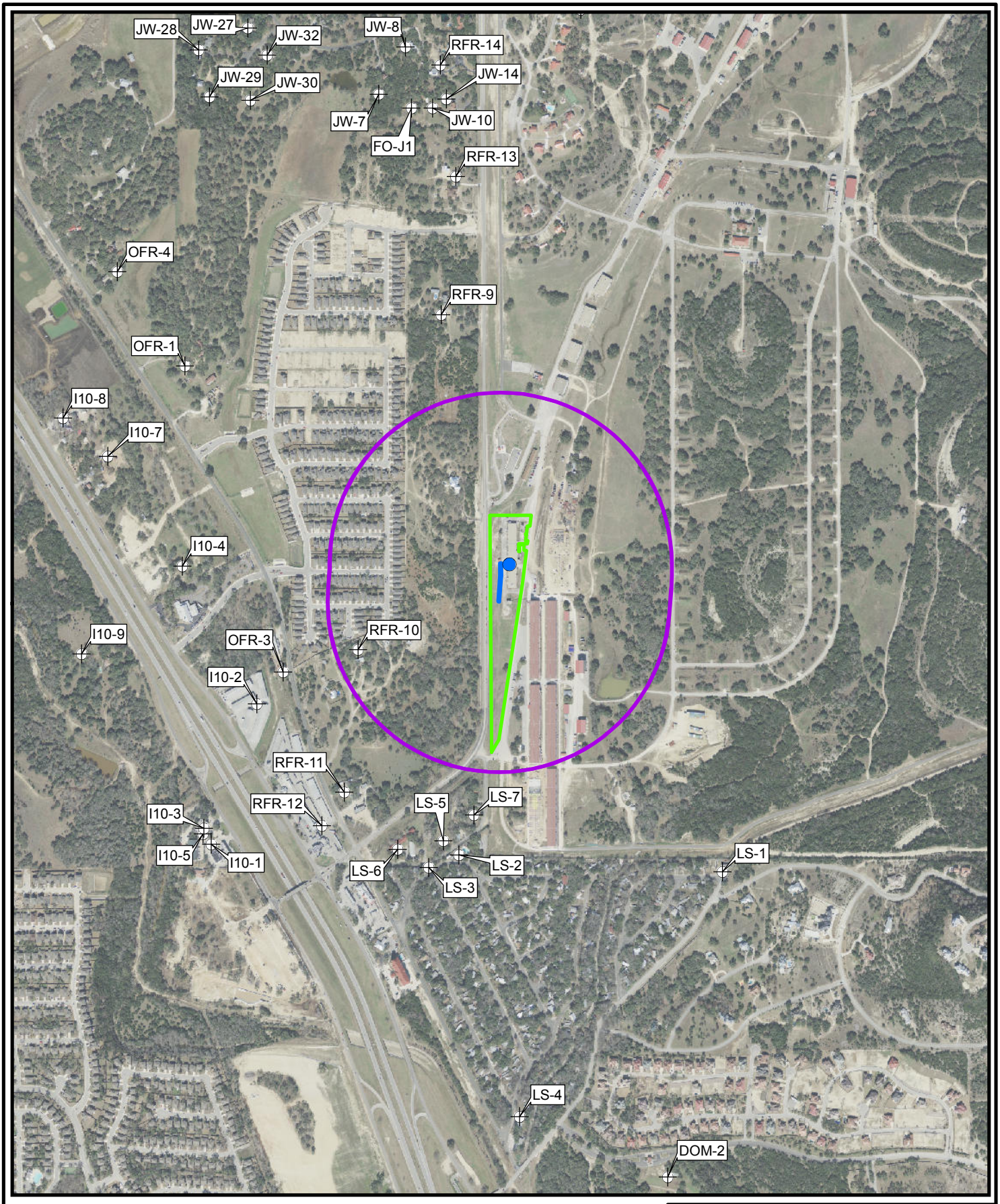

Figure I.1

Water Supply Well Location Map

Camp Stanley Storage Activity

PARSONS

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Figure I.2

On-Post Monitoring Well Locations

Camp Stanley Storage Activity

PARSONS

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STATE OF TEXAS WELL REPORT for Tracking #51113

Owner:	**U.S. GOVERNMENT**	Owner Well #:	**CS-WB01**
Address:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Grid #:	**68-19-6**
Well Location:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Latitude:	**29° 40' 53" N**
Well County:	**Bexar**	Longitude:	**098° 37' 51" W**
Elevation:	**No Data**	GPS Brand Used:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Date:	Started: **6/9/2003** Completed: **8/22/2003**
Diameter of Hole:	Diameter: **4.25 in From Surface To 314 ft**
Drilling Method:	**Air Rotary**
Borehole Completion:	Other: **WESTBAY MULTI-PORT PACKER**
Annular Seal Data:	1st Interval: **No Data** 2nd Interval: **No Data** 3rd Interval: **No Data**
Surface Completion:	**Alternative Procedure Used**

Water Level:	Static level: **No Data** Artesian flow: **No Data**
Packers:	**WESTBAY MULTI-PORT PACKERS WITH PACKERS SET AT: 26-31, 53-58, 91-96, 118-123, 138-143, 173-178, 201-206, 225-230, 254-259 AND 295-300**
Plugging Info:	Casing or Cement/Bentonite left in well: **No Data**
Type Of Pump:	**No Data**
Well Tests:	**No Data**

Water Quality:	Type of Water: **No Data** Depth of Strata: **No Data** Chemical Analysis Made: **No** Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**GEOPROJECTS INTERNATIONAL, INC. 8834 CIRCLE DRIVE AUSTIN , TX 78736**
Driller License Number:	**2525**
Licensed Well	**LEE GEBBERT**

Driller Signature:

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking **#51113**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 TO 47 UPPER GLENROSE LIMESTONE
47 TO 314 LOWER GLENROSE LIMESTONE

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
1.5 NEW SCH 40 PVC MULTI PORT PACKER COMPLETION WITH SAMPLE PORTS AT: 48', 86', 113', 133', 168', 196', 220', 244', 280' AND 300'

STATE OF TEXAS WELL REPORT for Tracking #51115

Owner:	**U.S. GOVERNMENT**	Owner Well #:	**CS-WB02**
Address:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Grid #:	**68-19-6**
Well Location:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Latitude:	**29° 40' 55" N**
Well County:	**Bexar**	Longitude:	**098° 37' 52" W**
Elevation:	**No Data**	GPS Brand Used:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Date: Started: **6/12/2003**
Completed: **8/26/2003**

Diameter of Hole: Diameter: **7 7/8 in From Surface To 27 ft**
Diameter: **4.25 in From 27 ft To 313 ft**

Drilling Method: **Air Rotary**

Borehole Completion: Other: **WESTBAY MULTI-PORT PACKER**

Annular Seal Data: 1st Interval: **From 0 ft to 27 ft with 6-CEMENT (#sacks and material)**
2nd Interval: **No Data**
3rd Interval: **No Data**
Method Used: **No Data**
Cemented By: **No Data**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Alternative Procedure Used**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **WESTBAY MULTI-PORT PACKERS WITH PACKERS SET AT:**
29-34, 46-51, 76-81, 105-110, 140-145, 163-168, 192-197, 218-223, 253-258 AND 292-297

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
Depth of Strata: **No Data**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information:	**GEOPROJECTS INTERNATIONAL, INC.** **8834 CIRCLE DRIVE** **AUSTIN , TX 78736**
Driller License Number:	**2525**
Licensed Well Driller Signature:	**LEE GEBBERT**
Registered Driller Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Comments:	**No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking **#51115**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 TO 35 UPPER GLENROSE LIMESTONE
35 TO 313 LOWER GLENROSE LIMESTONE

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
4.5 NEW SCH 40 PVC RISER SET FROM +3 TO 27

1.5 NEW SCH 40 PVC MULTI PORT PACKER COMPLETION WITH SAMPLE PORTS AT:
41', 71', 100', 135', 158', 187', 213', 248', 287' AND 297'

STATE OF TEXAS WELL REPORT for Tracking #51114

Owner:	**U.S. GOVERNMENT**	Owner Well #:	**CS-WB03**
Address:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Grid #:	**68-19-6**
Well Location:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Latitude:	**29° 40' 58" N**
Well County:	**Bexar**	Longitude:	**098° 37' 52" W**
Elevation:	**No Data**	GPS Brand Used:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Date: Started: **6/24/2003**
Completed: **8/27/2003**

Diameter of Hole: Diameter: **4.25 in From Surface To 312 ft**

Drilling Method: **Air Rotary**

Borehole Completion: Other: **WESTBAY MULTI-PORT PACKER**

Annular Seal Data: 1st Interval: **No Data**
2nd Interval: **No Data**
3rd Interval: **No Data**

Surface Completion: **Alternative Procedure Used**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **WESTBAY MULTI-PORT PACKERS WITH PACKERS SET AT:
15-20, 37-42, 68-53, 100-105, 127-132, 144-149, 185-190, 216-221, 250-255 AND 292-297**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
Depth of Strata: **No Data**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **GEOPROJECTS INTERNATIONAL, INC.
8834 CIRCLE DRIVE
AUSTIN , TX 78736**

Driller License Number: **2525**

Licensed Well **LEE GEBBERT**

Driller Signature:

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking **#51114**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 TO 23 UPPER GLENROSE LIMESTONE
23 TO 312 LOWER GLENROSE LIMESTONE

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
1.5 NEW SCH 40 PVC MULTI PORT PACKER COMPLETION WITH SAMPLE PORTS AT: 32', 63', 95', 122', 139', 180', 211', 240', 287' AND 302'

STATE OF TEXAS WELL REPORT for Tracking #51116

Owner:	**U.S. GOVERNMENT**	Owner Well #:	**CS-WB04**
Address:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Grid #:	**68-19-6**
Well Location:	**25800 RALPH FAIR ROAD BOERNE , TX 78015**	Latitude:	**29° 40' 52" N**
Well County:	**Bexar**	Longitude:	**098° 38' 03" W**
Elevation:	**No Data**	GPS Brand Used:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Date: Started: **7/2/2003**
Completed: **8/20/2003**

Diameter of Hole: Diameter: **7 7/8 in From Surface To 21 ft**
Diameter: **4.25 in From 21 ft To 513 ft**

Drilling Method: **Air Rotary**

Borehole Completion: Other: **WESTBAY MULTI-PORT PACKER**

Annular Seal Data: 1st Interval: **From 0 ft to 21 ft with 5-CEMENT (#sacks and material)**
2nd Interval: **No Data**
3rd Interval: **No Data**
Method Used: **TREMIE**
Cemented By: **LEE GEBBERT**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Alternative Procedure Used**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **WESTBAY MULTI-PORT PACKERS WITH PACKERS SET AT: 52-57, 84-89, 110-115, 135-140, 199-204, 231-236, 261-266, 302-307, 320-325, 345-350, 377-382, 407-412, 434-439, 469-474 AND 490-495**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
Depth of Strata: **No Data**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information:	**GEOPROJECTS INTERNATIONAL, INC.** **8834 CIRCLE DRIVE** **AUSTIN , TX 78736**
Driller License Number:	**2525**
Licensed Well Driller Signature:	**LEE GEBBERT**
Registered Driller Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Comments:	**No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking **#51116**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 TO 37 UPPER GLENROSE LIMESTONE
37 TO 377 LOWER GLENROSE LIMESTONE
377 TO 438 BEXAR SHALE
438 TO 513 COW CREEK LIMESTONE

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
4.5 NEW SCH 40 PVC RISER SET FROM +3 TO 21

1.5 NEW SCH 40 PVC MULTI PORT PACKER COMPLETION WITH SAMPLE PORTS AT: 79', 100', 130', 180', 226', 256', 292', 315', 335', 367', 402', 429', 464', 479' AND 495'

STATE OF TEXAS WELL REPORT for Tracking #265239

Owner:	**Camp Stanley Storage Activity**	Owner Well #:	**CS-MW36-LGR**
Address:	**25800 Ralph Fair Road Boerne , TX 78015**	Grid #:	**68-19-6**
Well Location:	**25800 RALPH FAIR ROAD Boerne , TX 78015**	Latitude:	**29° 40' 59" N**
Well County:	**Bexar**	Longitude:	**098° 37' 52" W**
Elevation:	**1220 ft.**	GPS Brand Used:	**Garmin**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Date: Started: **3/23/2011**
Completed: **3/30/2011**

Diameter of Hole: Diameter: **7-7/8 in From Surface To 385 ft**

Drilling Method: **Air Rotary**

Borehole Completion: Gravel Packed From: **372 ft to 340 ft**
Gravel Pack Size: **8/16**

Annular Seal Data: 1st Interval: **From 0 ft to 2 ft with 1-Cement (#sacks and material)**
2nd Interval: **From 2 ft to 335 ft with 33-Bent. Grout (#sacks and material)**
3rd Interval: **From 335 ft to 340 ft with 4-BentonitePlug (#sacks and material)**
Method Used: **Pumped via Tremie**
Cemented By: **Lee Gebbert**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **No Data**

Plugging Info: Casing left in well: Cement/Bentonite left in well:
From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used
Plug Back with 6 sks Bentonite Plug from 385 to 372

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **Fresh**
Depth of Strata: **No Data**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information:	**Geoprojects International, Inc.** **8834 Circle Drive** **Austin , TX 78736**
Driller License Number:	**2525**
Licensed Well Driller Signature:	**Lee Gebbert**
Registered Driller Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Comments:	**No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #**265239**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 to 38 Limestone, Upper Glen Rose Formation
38 to 371 Limestone, Lower Glen Rose Formation
371 to 385 Shale, Bexar Shale Formation

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
4 New SCH 80 Flush Joint Threaded (FJT) PVC Casing set from +3 to 345
4 New 304SSWWRB FJT Screen set from 345 to 370 with 0.040-inch slot

Send original copy by certified mail to: (TDLR)-(WWD/PIP), P.O. Box 12157, Austin, TX 78711 *Please use black ink.*

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 12157
Austin, Tx. 78711
1 800 803 9202 EXT. 9

1) OWNER U.S. GOVERNMENT (NAME) **ADDRESS** 25800 RALPH FAIR RD. (Street or RFD) BOERNE (City) TX (State) 78015 (Zip)

2) ADDRESS OF WELL:
County BEXAR CAMP STANLEY STORAGE ACTIVITIE (Street or RFD) BOERNE (City) TX (State) 78015 (Zip) **STATE GRID #** 68-19-6

3) TYPE OF WORK (Check):
[X] New Well [ ] Deepening [ ] Reconditioning [ ] Plugging

4) PROPOSED USE (Check): [X] Monitor [ ] Environmental Soil Bori [ ] Domestic [ ] Industrial [ ] Irrigation [ ] Injectior [ ] Public Suppl [ ] De-watering [ ] Testwell
If Public Supply well, were plans submitted to the TN [ ] Yes [ ] No

5) N

6) WELL LOG: MW6-LGR
Date Drilling
Started: 2/17 2001
Completed: 3/01 2001

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8	0	382

7) DRILLING METHOD (Check): [ ] Driven
[X] Air Rotary [ ] Mud Rotary [ ] Bored
[ ] Air Hammer [ ] Cable Tool [ ] Jetted
[ ] Other

From(ft.)	To(ft.)	Description and color of formation material
0	368	LOWER GLEN ROSE LIMESTONE FORMATION
368	382	BEXAR SHALE FORMATION

8) Borehole Completion (Check [ ] Open Hole [ ] Straight Wall
[ ] Underreamed [X] Gravel Packed [ ] Other
If gravel packed give interval ... from 366 ft. to 338 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	NEW	SCH 80 PVC RISER	+3	340	
4	NEW	STAINLESS STEEL SCREEN	340	365	.050

9) CEMENTING DATA [RULE 338.44(
Cemented from 0 ft. to 333 ft. No. of sacks used 60
Bentonite from 333 ft. to 338 ft. No. of sacks used 2
Bentonite from 382 ft. to 366 ft. No. of sacks used 5
Method used TREMIE
Cemented by LEE GEBBERT
Method of verification of above distanc

10) SURFACE COMPLETI(
[ ] Specified Surface Slab Installed [Rule 338.44(2)(A)]
[ ] Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
[ ] Pitless Adapter Used [Rule 338.44(3)(b)]
[X] Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL: N/A
Static level ft. below land surface Date
Artesian flow gpm. Date

12) PACKERS N/A Type Depth

13) TYPE PUMP N/A
[ ] Turbine [ ] Jet [ ] Submersible [ ] Cylinder
[ ] Other
Depth to pump bowls, cylinder, jet, etc., ft.

14) WELL TESTS: N/A
Type test: [ ] Pump [ ] Bailer [ ] Jetted [ ] Estimated
Yield: gpm with ft. drawdown after hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
[ ] Yes [X] No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis ma [ ] Yes [ ] No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GEOPROJECTS INTERNATIONAL INC. (Type or print) **WELL DRILLER'S LICENSE N** 2525PW

ADDRESS 8834 CIRCLE DRIVE (Street or RFD) AUSTIN (City) TX (State) 78736 (Zip)

(Signed) LEE GEBBERT (Licensed Well Driller)
(Signed) ALAN GEBBERT (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 09-01-93) TNRCC COPY

Send original copy by certified mail to: **(TDLR)-(WWD/PIP), P.O. Box 12157, Austin, TX 78711** *Please use black ink.*

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 12157
Austin, Tx. 78711
1 800 803 9202 EXT. 9

1) OWNER U.S. GOVERNMENT (NAME) **ADDRESS** 25800 RALPH FAIR RD. (Street or RFD) BOERNE (City) TX (State) 78015 (Zip)

2) ADDRESS OF WELL:
County TRAVIS CAMP STANLEY STORAGE ACTIVITY (Street or RFD) AUSTIN (City) TX (State) 78015 (Zip) **STATE GRID #** 68-19-6

3) TYPE OF WORK (Check):
[X] New Well [ ] Deepening [ ] Reconditioning [ ] Plugging

4) PROPOSED USE (Check): [X] Monitor [ ] Environmental Soil Bori [ ] Domestic [ ] Industrial [ ] Irrigation [ ] Injection [ ] Public Suppl [ ] De-watering [ ] Testwell
If Public Supply well, were plans submitted to the TN [ ] Yes [ ] No

5)

6) WELL LOG: MW7-LGR
Date Drilling
Started: 7/10 **19** 2001
Completed: 7/24 **19** 2001

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8	0	352.5

7) DRILLING METHOD (Check): [ ] Driven
[X] Air Rotary [ ] Mud Rotary [ ] Bored
[ ] Air Hammer [ ] Cable Tool [ ] Jetted
[ ] Other

N

From(ft.) To(ft.) Description and color of formation material

From(ft.)	To(ft.)	Description and color of formation material
0	352.5	LOWER GLEN ROSE LIMESTONE FORMATION

8) Borehole Completion (Check [ ] Open Hole [ ] Straight Wall
[ ] Underreamed [X] Gravel Packed [ ] Other
If gravel packed give interval ... from 319 ft. to 347 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	NEW	SCH 80 PVC RISER	+3	322	
4	NEW	STAINLESS STEEL CASING	322	347	.050

9) CEMENTING DATA [RULE 338.44(
Cemented from 0 ft. to 314 ft. No. of sacks used 60
Bentonite from 314 ft. to 319 ft. No. of sacks used 1
Bentonite from 347 ft. to 352.5 ft. No. of sacks used 3
Method used TREMIE
Cemented by LEE GEBBERT
Method of verification of above distanc

10) SURFACE COMPLETI(
[ ] Specified Surface Slab Installed [Rule 338.44(2)(A)]
[ ] Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
[ ] Pitless Adapter Used [Rule 338.44(3)(b)]
[X] Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL: N/A
Static level ft. below land surface Date
Artesian flow gpm. Date

12) PACKERS N/A Type Depth

13) TYPE PUMP N/A
[ ] Turbine [ ] Jet [ ] Submersible [ ] Cylinder
[ ] Other
Depth to pump bowls, cylinder, jet, etc., ft.

14) WELL TESTS: N/A
Type test: [ ] Pump [ ] Bailer [ ] Jetted [ ] Estimated
Yield: gpm with ft. drawdown after hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
[ ] Yes [X] No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis ma [ ] Yes [ ] No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GEOPROJECTS INTERNATIONAL INC. (Type or print) **WELL DRILLER'S LICENSE N** 2525PW

ADDRESS 8834 CIRCLE DRIVE (Street or RFD) AUSTIN (City) TX (State) 78736 (Zip)

(Signed) LEE GEBBERT (Licensed Well Driller) **(Signed)** (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified mail to: (**TDLR)-(WWD/PIP), P.O. Box 12157, Austin, TX 78711** *Please use black ink.*

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 12157
Austin, Tx. 78711
1 800 803 9202 EXT. 9

1) OWNER U.S. GOVERNMENT (NAME) **ADDRESS** 25800 RALPH FAIR RD. (Street or RFD) BOERNE (City) TX (State) 78015 (Zip)

2) ADDRESS OF WELL:
County **BEXAR** CAMP STANLEY STORAGE ACTIVITY (Street or RFD) BOERNE (City) TX (State) 78015 (Zip) **STATE GRID #** 68-19-6

3) TYPE OF WORK (Check):
[X] New Well [ ] Deepening [ ] Reconditioning [ ] Plugging

4) PROPOSED USE (Check): [X] Monitor [ ] Environmental Soil Bori [ ] Domestic [ ] Industrial [ ] Irrigation [ ] Injection [ ] Public Suppl [ ] De-watering [ ] Testwell
If Public Supply well, were plans submitted to the TN [ ] Yes [ ] No

5) N

6) WELL LOG: MW8-LGR
Date Drilling
Started: 4/11 2001
Completed: 5/08 2001

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
12 1/4	0	273
8	273	358
4	358	373

7) DRILLING METHOD (Check): [ ] Driven
[X] Air Rotary [ ] Mud Rotary [ ] Bored
[ ] Air Hammer [ ] Cable Tool [ ] Jetted
[ ] Other

From(ft.)	To(ft.)	Description and color of formation material
0	368	LOWER GLEN ROSE LIMESTONE FORMATION
368	373	BEXAR SHALE FORMATION

8) Borehole Completion (Check [ ] Open Hole [ ] Straight Wall
[ ] Underreamed [X] Gravel Packed [ ] Other
If gravel packed give interval ... from 330 ft. to 358 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
8	NEW	NEW STEEL CASING	+3	272	
4	NEW	SCH 80 PVC RISER	+3	332	
4	NEW	STAINLESS STEEL SCREEN	332	357	.050

9) CEMENTING DATA [RULE 338.44(
12' Cemented from 0 ft. to 272 ft. No. of sacks used 154
8' Cemented from 0 ft. to 325 ft. No. of sacks used 55
Bentonite from 324 ft. to 329 ft. No. of sacks used 2
Bentonite from 357 ft. to 373 ft. No. of sacks used 2
Method used TREMIE
Cemented by LEE GEBBERT

10) SURFACE COMPLETI(
[ ] Specified Surface Slab Installed [Rule 338.44(2)(A)]
[ ] Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
[ ] Pitless Adapter Used [Rule 338.44(3)(b)]
[X] Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL: N/A
Static level ft. below land surface Date
Artesian flow gpm. Date

12) PACKERS N/A Type Depth

13) TYPE PUMP N/A
[ ] Turbine [ ] Jet [ ] Submersible [ ] Cylinder
[ ] Other
Depth to pump bowls, cylinder, jet, etc., ft.

14) WELL TESTS: N/A
Type test: [ ] Pump [ ] Bailer [ ] Jetted [ ] Estimated
Yield: gpm with ft. drawdown after hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
[ ] Yes [X] No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis ma [ ] Yes [ ] No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GEOPROJECTS INTERNATIONAL INC. (Type or print) **WELL DRILLER'S LICENSE N** 2525PW

ADDRESS 8834 CIRCLE DRIVE (Street or RFD) AUSTIN (City) TX (State) 78736 (Zip)

(Signed) LEE GEBBERT (Licensed Well Driller) **(Signed)** ALAN GEBBERT (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTACHMENT J

The AOC-65 plume consists of VOC source areas believed to be associated with Building 90 and is located approximately 50 feet from CSSA's boundary. One potential source area is a sunken concrete-lined pit on the west side of the building that housed a vat which reportedly utilized PCE and trichloroethene (TCE). The metal vat (approximately 500 to 750 gallons) was reportedly installed prior to 1966 and removed in 1995 when CSSA began using a citrus-based cleaner for operations instead of chlorinated solvents. There were no reported releases of material from the vat made by CSSA personnel. AOC-65 also includes an area extending outside Building 90 that includes abandoned drain lines and related storm water ditches.

The release of chlorinated solvents to the environment at CSSA resulted in contamination of the Middle Trinity Aquifer, which is the drinking water source for the area. Contamination is most widespread within the Lower Glen Rose water-bearing unit, whose depth ranges from about 80 to 300 feet below ground surface. Locally, the Bexar Shale serves as a confining unit between the water-bearing Lower Glen Rose and Cow Creek limestones. Environmental studies demonstrate that most of the contamination resides within the Lower Glen Rose. All three units, the Lower Glen Rose limestone, the Bexar Shale, and the Cow Creek limestone, dip to the east and southeast and have been regionally fractured, with fracture patterns trending both northwest-southeast and northeast-southwest across the region.

Groundwater contamination potentially originating from Building 90 at AOC-65 was first identified in an off-post well sample in December 1999. The groundwater plume spread southward and westward from the post. The greatest concentrations of solvents are reported at the near subsurface adjacent to the Building 90 source area (30,000 micrograms per liter [µg/L]) within the Upper Glen Rose formation (UGR) for Westbay® well CS-WB03 (a multiport well). However, within the main aquifer body, solvent concentrations are only present at levels near the maximum contaminant level (MCL).

Off-post, concentrations in excess of the MCL for PCE (5 µg/L) were detected in private and public wells with open borehole completions. Concentrations exceeding 30 µg/L were reported 1,200 feet west-southwest of CSSA. Vertical profiling within that well shows that discrete intervals within uncased upper strata have PCE concentrations over 90 µg/L. Only sporadic, trace concentrations of solvents were detected in Bexar Shale and Cow Creek wells within the plume.

ATTACHMENT K

An SVE pilot test system was constructed at AOC-65 at CSSA during the latter half of 2002 and operates under Texas Commission of Environmental Quality (TCEQ) Permit by Rule (PBR) number 71208. Results of this initial study demonstrated SVE to be an effective method for source removal in surface formations at CSSA.

In 2007, the SVE system was upgraded with new extraction wells, vapor monitoring wells, and blowers. This updated SVE system is comprised of four individual blowers and associated VEWs independently designated as the Building 90 Subslab, Building 90 Exterior, AOC-65 Deep, and AOC-65 Shallow subsystems.

The annualized mass removal rate (assuming the system could run 24 hours/day, 365 days/year) was estimated to be 134.59 lb/year (approximately 10 gallons/year). All removal rate values are well below the permitted limit of 0.273 lb/hour or 2,395.77 lb/year. However, weather conditions affected SVE operations and ultimately VOC recovery rates. Drought conditions resulted in a much lower groundwater level and generally lower VOC concentrations within the subject vadose zone. Very wet conditions caused the VEWs to become flooded, preventing removal of vapor.

Each subsystem contributed the following to the total annualized mass removed:

- Sub-slab VEWs accounted for the removal of 75.82 lb (5.6 gallons);
- AOC-65 Shallow VEWs accounted for the removal of 30.42 lb (2.25 gallons);
- AOC-65 Deep VEWs accounted for the removal of 17.53 lb (1.3 gallons); and
- Exterior Building 90 VEWs accounted for the removal of 4.83 lb (0.36 gallons).

Therefore, while SVE is an applicable remedial technique employed at AOC-65, the quantity of contamination within the vadose zone limestone is unknown and therefore estimated treatment times for remediating the site are unknown. Due to the unknown quantity of contamination existing within the subsurface limestone, an interim removal action (trenching) is planned followed by a proposed ISCO pilot study.