**PARSONS ENGINEERING SCIENCE, INC.**
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.

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RL 17

March 18, 1997

*Via Federal Express*

Ms. Jo Jean Mullen (QAE)
AFCEE\ERD
3207 North Road, Room 151
Brooks AFB, Texas 78235-5363

Reference: Contract F11623-94-D0024, Delivery Order RL17
Item No. 3.0.2, Technical Interchange Meeting
Camp Stanley Storage Activity (CSSA) SWMU Closures and
Integrated Spill and Waste Management Plan
Meeting Minutes 5 (Item 5.2.4; A007)

Dear Ms. Mullen:

Enclosed are three copies of the final minutes of the February 13, 1997 technical interchange meeting with CSSA, AFCEE, and Parsons ES at CSSA, Texas. We are also transmitting ten copies of these minutes to Mr. Brian Murphy, CSSA, and copies of this transmittal letter as noted below. Because CSSA and AFCEE attendees were provided with copies of the meeting presentation materials, the handouts are not included with the meeting minutes. If you require additional copies of the handouts, please give me a call and we will be happy to send any additional copies requested.

Please call me at (512) 719-6051 if you have any questions or comments.

Sincerely,

Susan V. Roberts
Project Manager

xc: Brian Murphy, CSSA
John Stewart, Parsons ES - St. Louis, letter only
Nancy Stine, AMC, letter only

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# MEETING MINUTES

Reference: Contract F11623-94-D0024, Delivery Order RL17
Item No. 3.0.2 Technical Interchange Meeting
Camp Stanley Storage Activity (CSSA) SWMU Closures and Integrated Spill and Waste Management Plan
Meeting Minutes 5 (Item 5.2.4, A007)

Meeting: February 13, 1997
Camp Stanley Storage Activity (CSSA), Texas

Subject: Project status to date

The meeting was held at the CSSA Building One conference room, beginning at 1000 hours on February 13, 1997. This meeting was attended by representatives of CSSA, AFCEE, and Parsons ES. The following were in attendance (see attached sign-in sheet for "TIM No. 5" meeting attendees):

| Name | Organization |
|---|---|
| Rod Chatham | CSSA Director of Special Projects |
| Brian Murphy | CSSA Environmental Officer |
| Jo Jean Mullen | AFCEE/ERD Restoration Team Chief |
| Beth Garland | AFCEE/ERC Chemist |
| Beth Berman | AFCEE/ERC Chemical Engineer |
| Susan Roberts | Parsons ES, Austin, Project Manager |
| Ken Rice | Parsons ES, Austin, Task 05 Manager |
| Brian Vanderglas | Parsons ES, Austin, Task 05A Manager |
| Julie Burdey | Parsons ES, Austin, Background Revisions Task |

## MEETING PURPOSE

The purpose of the meeting was to discuss issues relative to the background metals study, review outstanding issues, and to update AFCEE and CSSA on the project status to date.

## MEETING AGENDA

The agenda was as follows:

- Project Status
  - ⇒ Closure investigations (Task 03)
  - ⇒ O-1 treatability study (Task 05)
  - ⇒ B-3 treatability study (Task 05A)
  - ⇒ Sampling and analysis (Task 09)
  - ⇒ Integrated Waste Management/Spill Plan (Task 99)
- Schedule and budget
- Issues to be resolved
- Project activities for the next period (until the next TIM)

## PROJECT STATUS

Closure Investigations (Task 03):

Based on AFCEE's November 1996 and pending background levels revisions, minor revisions to the draft closure reports and draft soil gas investigation reports continue. Complete revisions to the draft reports will only be possible once 1) background metals levels are revised and approved by AFCEE and CSSA, and 2) a final ITIR is approved by AFCEE and CSSA. Parsons ES requests to hold a teleconference with AFCEE within the next month to discuss a response to comments for these reports, including a proposed format for soil gas investigation reports for 6 sites (these draft reports can be submitted for review after clarification of issues). Jo Mullen indicated that a teleconference would be fine and that Parsons ES can set up a schedule in the next 2 weeks.

As noted in a 13 February 1997 request to AMC, Parsons ES would like to submit the draft background metals study revisions on 21 February 1997. AFCEE has indicated that this is acceptable; however, due to their statistician's TDY schedule during the next month, a 2-week review may not be possible.

Results to date indicate that no groundwater monitor wells will be necessary. However, only one site has not undergone Field Effort 2 drilling and sampling - SWMU B-33. This site was used as a example of background levels acceptable to the state where more than one soil type exists. The TNRCC has not responded to the Parsons ES Sep 96 letter citing examples for a site-by-site basis for establishment of appropriate background. It was agreed that work at B-33 should take place within the next month so as to complete all field work for the task, and to see if any groundwater monitoring wells are necessary for the project. AFCEE and CSSA gave approval at the meeting for Parsons ES to contact TNRCC next week to remind them of the Sep 96 letter and to let them know that we plan to drill at the B-33 site within a month. Jo Mullen observed that Parsons ES should let TNRCC know that the contract is drawing to a close, and that we need to

complete all field work in an expedited manner. Parsons ES will send email or facsimile messages to AFCEE and CSSA regarding the results of the phone conversations with TNRCC.

Also at B-33, CSSA's recent pipeline work in that area has excavated a portion of the B-33 lead shot area. CSSA would like help in locating an OSHA-40-hour trained backhoe operator to excavate the lead shot and soil to be placed on plastic sheeting above ground until final disposition of the soil is determined. Parsons ES will call for qualified local operators in the San Antonio area to help with this endeavor.

O-1 Treatability Study (Task 05):

Ken Rice briefly discussed his evaluation of electrokinetic vendor bids, submitted to AFCEE and CSSA in January 1997. Though some minor clarifications are still necessary, the lowest qualified bidder is LynnTech, Inc., at about $92,000 (vendor response to the clarifications may show further reduced costs). Rod Chatham asked if the electrokinetic study was comparable to costs for excavate and haul as a remedial option. 'Jo Mullen replied that her extensive review of cost-effective options to remediate both VOCs and chromium to acceptable levels showed that either electrokinetics or a treatment train would be necessary. Very few remedial techniques are effective for both VOCs and metals. Furthermore, the results of this treatability study using electrokinetics would be applicable to other CSSA sites such as B-3 that also have metals and possible residual VOCs. Ken Rice noted that for the approximate 200 cubic yards of soil requiring treatment at the O-1 site, excavation and hauling would be about $85,000. Brian Murphy was also concerned about the liability of excavate and haul, due to landfill closings. Therefore, it was agreed to continue with the electrokinetic treatability study at O-1.

After discussion of the project budget, it appears that that sufficient funds exist in the task budget for the subcontracted work and that a subcontract agreement can be made to begin work in the next month. A timetable for the treatability study will be prepared during this period for submittal to AFCEE, CSSA, and AMC. AFCEE and CSSA also requested that the study be discussed with the TNRCC so as to keep them "in the loop" for potential remediation work at CSSA.

B-3 Treatability Study (Task 05A):

Brian Vanderglas reviewed the field work to date at the B-3 SVE system. Installation of twelve (12) additional SVE wells was completed in December 1996, and testing of system initiated in early January 1997, including initial testing and hydrocarbon recovery testing per the work plan. The team plans to complete the first multiple configuration testing in February 1997.

Initial results show low to zero oxygen, no soil gas "hits", and no pressure responses at VEWs 7, 12, 17, and 18 (map included in presentation materials). At the other VEWs, the oxygen readings increased when the blower turned off. The results are fairly

consistent with previous testing. Also of significance are the preliminary, unvalidated soils data which show greatly reduced (3 to 5 orders of magnitude) soil concentrations of *cis*-1,2-DCE, TCE, and toluene in confirmation samples. The results show that the SVE pilot system has reduced chlorinated volatiles around the vent wells in significant amounts.

Sampling and Analysis (Task 09):

With the exception of metals data, which is compared to the background metals levels (currently under revision), validation of all field effort 2 analyses has been completed. Parsons ES submitted a letter to AFCEE in Sep 96 and Jan 97 noting that the final ITIR for field effort 1 does not contain revised background levels, but the AFCEE comments of Nov 96 indicate that the ITIR should be submitted to the regulatory agencies. After discussion, it was agreed that the ITIRs are informal documents by nature and do not have to be submitted. Therefore at this time, the field effort 1 ITIR will not be revised, but the draft field effort 1 closure reports will include comparison of site-specific metals levels to revised background metals levels.

Integrated Waste Management/Spill Plan (Task 99):

The final plan has been submitted. Additional copies are being prepared for CSSA per their request. Draft handout materials for a presentation to CSSA on use of the integrated plan are in preparation. It was agreed that the presentation may take place during the first week of March 97, and that an overview of about 1 hour would be prepared for general CSSA staff, while a more in-depth review of about 3 to 4 hours would be necessary for CSSA staff working daily with hazardous materials and/or wastes. The presentation will be given by Ken Rice at CSSA.

## SCHEDULE AND BUDGET

A proposed draft project reprogramming budget was presented for discussion. The proposed reprogramming should allow completion of each task to be completed within the estimated budget. Overall the project is on schedule, though the schedule needs for the O-1 and B-3 treatability studies will be reviewed in the next month. Any changes to the schedule will be requested through AMC.

## ISSUES TO BE RESOLVED

Resolution of responses to AFCEE's Nov 96 comments on the field effort 1 draft closure reports, and formatting of draft soil gas investigation reports: A teleconference will be held during the next month between AFCEE and Parsons ES to discuss and resolve the comments.

O-1 treatability study: The study will progress using a subcontracted vendor to be selected and subcontracted during the next period.

B-3 SVE automation system and use of CSSA personnel to install: It was agreed that Parsons ES is to procure equipment for an automation system to empty the SVE condensation tank, and that CSSA personnel will install the equipment.

Field Effort 1 ITIR: No changes (regarding background metals levels currently in revision) to the final ITIR for field effort 1 will be made at this time. However, Parsons ES will make every effort to have the data presented in tables conformable to the GIS database format now in progress under RL33.

## PROJECT ACTIVITIES FOR THE NEXT PERIOD

*Next period is assigned for the duration of time between TIM No. 5 and TIM No. 6, assumed to be approximately two months.*

Closure Investigations (Task 03):

1. Submit draft revisions to background metals levels study on 21 Feb 97.
2. Call TNRCC personnel (Kirk Coulter and Richard Clarke) regarding proposed actions at SWMU B-33. Send email or facsimile messages to AFCEE and CSSA after contact has been made with TNRCC.
3. Aid CSSA in subcontracting an OSHA-trained backhoe operator for an estimated 1/2 to 1 day of work for excavations at SWMU B-33.
4. Schedule drilling/sampling at SWMU B-33 for March 97 (and SWMU B-29 at no cost to the government).
5. Schedule teleconference within 2 weeks of TIM No. 5 between AFCEE and Parsons ES regarding response to comments on the draft closure reports and soil gas investigation reports.
6. Review data tables for compatibility with GIS database format under RL33.
7. Complete draft soil gas investigation reports for six (6) sites.

O-1 Treatability Study (Task 05):

1. Subcontract selected electrokinetics vendor.
2. Define schedule for submittal to AFCEE, CSSA, and AMC.
3. Discuss treatability study progress with TNRCC, and provide results of that discussion to AFCEE and CSSA via email or facsimile.
4. Initiate treatability study at O-1.

B-3 Treatability Study (Task 05A):

1. Complete the first multiple configuration test in February 1997.
2. Begin second multiple configuration test in March 1997, and the third in April 1997.

3. Initiate design and procurement of SVE system automation, and coordinate installation with CSSA staff.

Sampling and Analysis (Task 09):

1. Begin data validation of all metals data after final revisions to the background metals study have been approved (the final approval is assumed to be mid-March 1997).

   ⇒ **Within 30 days of completion of the data validation, submit the draft Analytical ITIR for Field Effort 2.**

   ⇒ **Within 30 days of receipt of comments, submit the final Analytical ITIR for Field Effort 2.**

   ⇒ **Within 45 days of the final Analytical ITIR, submit draft closure certifications and reports.**

Integrated Waste Management/Spill Plan (Task 99):

1. Deliver six (6) additional copies of plan to CSSA.
2. Submit draft presentation materials to CSSA and AFCEE by 28 Feb 97 for review and comments.
3. Presentation to be given to CSSA staff, tentatively scheduled for the first week of March 1997 (presentation is to be prepared under Task 12000 per the SOW).

**ACTION ITEMS**

**Parsons ES**

*See "Project Activities for Next Period" above.*

**AFCEE/BAH**

Closure Investigations (Task 03):

1. Review draft TIM No. 5 meeting minutes and provide comments if necessary.
2. Participate in teleconference regarding response to draft closure reports, to be scheduled by Parsons ES for Feb or March 1997.
3. Provide review comments as necessary for draft revisions to background metals study, to be submitted by Parsons ES on 21 Feb 97.

O-1 Treatability Study (Task 05):

1. Review schedule to be submitted during the next period.

*B-3 Treatability Study (Task 05A):*

*1. No actions.*

Sampling and Analysis (Task 09):

1. Upon submittal of draft ITIR for field effort 2, review and provide comments as necessary (draft ITIR is not anticipated for at least 2 months due to background study revisions).

Integrated Waste Management/Spill Plan (Task 99):

1. Review draft presentation materials prior to the tentatively scheduled presentation for the first week of March 1997.

**CSSA**

Closure Investigations (Task 03):

1. Review draft TIM No. 5 meeting minutes and provide comments if necessary.

O-1 Treatability Study (Task 05):

1. Review schedule to be submitted during the next period.

B-3 Treatability Study (Task 05A):

1. Install automation system with Parsons ES' procured equipment and coordination.

*Sampling and Analysis (Task 09):*

1. *No actions.*

Integrated Waste Management/Spill Plan (Task 99):

1. Review draft presentation materials prior to the tentatively scheduled presentation for the first week of March 1997.

SWMU general
TIM 5

**AMC Contract Number F11623-94-D-0024/Delivery Order RL17**
**SWMU Closure Investigations and Integrated Waste Management/Spill Plan**

**Technical Interchange Meeting 5**
**Agenda**

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Date: Thursday, 13 February 1997

Time: 11:00 A.M.

Place: CSSA, Building 1

- Project Status to Date

  SWMU Closure Investigations (Task 03)

  O-1 Treatability Study (Task 05)

  B-3 Treatability Study (Task 05A)

  Sampling and Analysis (Task 09)

  Integrated Waste Management/Spill Plan (Task 99)

- Schedule and Budget
- Issues to be Resolved
- Project Activities for Next Period

Training for employees first week of March 97

AMC Contract Number F11623-94-D-0024/Delivery Order RL17

**SWMU Closure Investigations and Integrated Waste Management/Spill Plan**

**Technical Interchange Meeting 5**
**Project Status**

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## PROJECT STATUS TO DATE

### SWMU Closure Investigations (Task 03)

- Continued work pending background concentration revisions. (Attachment 1, Background Response to Comments)
- Developed response to AFCEE comments on draft closure reports.
- Prepared internal draft investigation reports for sites with only soil gas surveys.

### O-1 Treatability Study (Task 05)

- Bids evaluated for electrokinetic treatability study (Attachment 2, Electrokinetic Bid Evaluation Memo).
- Need to discuss options for subcontracting treatability study efforts.

### B-3 Treatability Study (Task 05A)

- Completed installation of 12 VEWs, and associated soil sampling (Attachment 3, B-3 Site Map).
- Completed initial testing of system and hydrocarbon recovery testing as per workplan (Attachment 4, SVE Initial Results).
- Nearing completion of first multiple configuration testing event.

### Sampling and Analysis (Task 09)

- Validation of all analyses with the exception of metals completed.

### Integrated Waste Management/Spill Plan (Task 99)

- Final document completed. (Preparation of presentation for CSSA personnel in progress under Task 12.)

## SCHEDULE AND BUDGET

- Overall, project is on schedule.
- Budget status estimated by task (as of 1/31/97) (Attachment 5, Budget Table).

## ISSUES TO BE RESOLVED

- Resolve questions from response to comments concerning AFCEE comments on draft closure reports (Task 03).

- Soil gas report format (Task 03)
- Potential for reduced scope of work for O-1 treatability study (Task 05).
- Use of CSSA personnel in automation of B-3 SVE system (Task 05A).
- Potential revisions to field effort 1 final ITIR (Task 09).

## PROJECTED ACTIVITIES FOR NEXT PERIOD

### SWMU Closure Investigations (Task 03)

- Completion of draft soil gas reports for six sites.

### O-1 Treatability Study (Task 05)

- Initiate O-1 treatability study.

### B-3 Treatability Study (Task 05A)

- Complete first multiple configuration test.
- Idle system to equilibrium status (approximately 20 days).
- Begin second multiple configuration test, tentatively scheduled to start 12 March 1997.
- Initiate design and installation of SVE system automation.

### Sampling and Analysis (Task 09)

- Draft ITIR for field effort 2 to be initiated upon completion of background opt revisions.

### Integrated Waste Management/Spill Plan (Task 99)

- Pending AMC approval of proposed modification no. 6 request, deliver six additional copies of Integrated Waste Management/ Spill Plans to CSSA.
- Set date for CSSA guidance presentation of Spill Plan (Task 12).

# Attachment 1

# Background Response to Comments

**PARSONS ENGINEERING SCIENCE, I**
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.
400 Woods Mill Road, South, Suite 330 • Chesterfield, Missouri 6

| Post-It® Fax Note 7671 | Date 11 Feb 97 | # of pages ▶ 1 |
|---|---|---|
| To Susan Roberts | From John Stewart | |
| Co./Dept. | Co. | |
| Phone # | Phone # | |
| Fax # | Fax # | |

11 February 1997

AMC CONF/LGCFB
Attn: Ms. Nancy K. Stine
102 E. Martin Street, Room 216
Scott AFB, IL 62225-5015

Subject: Air Mobility Command F11623-94-D0024
Environmental Architect Engineering Services for
Prime Contract F11623-94-D0024
Delivery Order No. RL17; Closure of Solid Waste Management Units (SWMUs) and Preparation of Integrated Waste Management Plan
Request for Schedule Etension

Reference: AMC CONF/LGCFB letter dated 29 October 1996, subject: Request for Delay in Submittal of Technical (Closure Report), CDRL A004

AMC CONF/LGCFB Modification 5 to Delivery Order No. RL17, dated 30 January 1997

Dear Ms. Stine:

Parsons Engineering Science, Inc. (Parsons ES) would like to request a no-cost one week schedule extension for the submittal of the interim draft background metals report revisions. Due to approval for mod 5 being received later than anticipated when the schedule was originally proposed on 10 January, and scheduling of technical interchange meetings for both delivery orders No. RL17 and No. RL33 on 13 February, it is not possible to complete the interim draft on 14 February 1997. Parsons ES is requesting a no-cost modification to reschedule as follows:

| Submittal | Due Date |
|---|---|
| Interim Draft Report | February 21, 1997 |
| AFCEE comments | March 7, 1997 |
| Final Report | March 14, 1997 |
| Letter to TNRCC | March 18, 1997 |

Should you have any questions regarding this letter, please contact me at (314) 576-7330, or Susan Roberts at (512) 719-6000.

Sincerely,
**PARSONS ENGINEERING SCIENCE, INC.**

John T. Stewart, P.E.
Program Manager

cc: Jo Jean Mullen, AFCEE/ERD QAE
Brian Murphy, CSSA Environmental Officer
M.Mouin Masseoud, HQ AMC/CEVP
Susan Roberts, Parsons ES Austin
file (RL17)
PARSONS

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Response to comments from Booz-Allen & Hamilton, Inc.
Draft Report for the Evaluation of Background Metals Concentrations in
Soil Types at Camp Stanley Storage Activity (CSSA)

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| **GEOLOGY** | | | |
| 1 | N/A | General | **The Contractor should address how background concentrations will be determined for solid waste management units (SWMUs) that encompass more than on soil type. For example, according to Figure 3.1, SWMU B-20 contains three soil types: Brackett Soils, Krum Complex, and Crawford and Bexar Stony Soils. If the boundaries of these three soil types are not readily apparent in the field, establishing cleanup goals may be difficult unless a preapproved procedure has been established.** |
| | | | Final disposition: Add discussion on why background study was the done the way it was (TNRCC direction). Describe roles of TNRCC & EPA. |
| | | | *Concur, with exception. At the time that the background evaluation report was prepared, Parsons ES asked CSSA if they would like to include a discussion of how background concentrations will be determined for the SWMUs. Knowing that this issue would cause some controversy with TNRCC, CSSA asked that it not be included (in hopes that approval of the background concentrations themselves could be quickly obtained). Since that time, there have been meetings with TNRCC during which this issue was discussed. After TNRCC rejected using the highest background value for each site with more than one soil type, CSSA asked TNRCC that the background levels be determined on a case-by-case basis.* |
| 2 | 2-1 | 2 | **The Table of Contents and the second sentence of the paragraph reference Figure 2.1 (Geologic Map), which was not included in the report. This figure should be included in the next submittal of the report.** |
| | | | *Concur.* |
| 3 | 2-1 | 2.1.1 Paragraph 1 | **The first sentence states that the Glen Rose Formation overlies the Trinity Group. However, Table 2-1 indicates that the Glen Rose Formation is part of the Trinity Group. The Contractor should clarify this discrepancy.** |
| | | | *Concur. The Glen Rose Formation is the upper member of the Trinity Group. Text will be clarified.* |
| 4 | 2-5 | 2.1.1 Paragraph 3 | **In the last paragraph of the section, the second sentence indicates that the Corbula pelecypods are about 1 to 2 millimeters (mm) in diameter. However, the third paragraph** |

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | of Section 2.1.1 states that the pelecypods are 3 to 5 mm in diameter. The contractor should clarify this discrepancy.<br><br>*Concur.* |
| 5 | 2-5 | 2.2 Paragraph 1 | **The Table of Contents and the last sentence of the paragraph reference Figure 2.2 (Soils Map), which was not included in the report. Consequently, the appropriateness of the soil types sampled at CSSA could not be verified. This figure should be included in the next submittal of the report.**<br><br>*Concur. Soil types were based on the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey for Bexar County. Soil type boundaries shown in aerial photographs in the survey were digitized to create Figure 2.2.* |
| 6 | | Figure 3.1 | **The contractor should cite the reference used to delineate the various soil types at CSSA. Also, the Contractor should verify that all background sampling was conducted during February and December 1994 at CSSA as indicated in the title of the figure.**<br><br>*Concur. The Bexar County Soil Survey (USDA, 1991) was used to delineate soil types at CSSA. The title of the figure will be revised to indicate that sampling occurred in February 1994, December 1994, and March 1996.* |
| **STATISTICS** | | | |
| 7 | N/A | General | **A major assumption of this report is that the concentrations of the nine metals of interest vary by soil type. However, this hypothesis is never tested. If the concentrations of the nine metals examined in the report do not vary by soil type or differ only between some but not all types, then the data for several soil types could be combined, the robustness of the data set could be increased, and the number of soil types with which there is a concern could be decreased. The Contractor should perform an analysis of variance or a similar test to determine if the concentrations of the nine metals differ by soil type and then adjust the rest of the report as required.**<br><br>*In a comment on the B-20 Closure Plan (March 1994), TNRCC specified that background metals levels should be evaluated for each soil type at the site. That comment was the basis for the way in which the background evaluation was completed. Parsons ES feels that the approach suggested in the comment (and its implications) should be discussed with CSSA and AFCEE before proceeding.* |

AFCEE accepts background soil type distinctions at this time.

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| 8 | 3-1 through 3-2 | 3.1 | **The Contractor may not be using all of the available data to calculate the background concentration. The text discusses two data sets with 10 and 25 samples respectively. However, the data set compiled for each soil type consists of only 10 samples. The text should be revised to clearly explain how the "ten representative samples of each soil type" were selected from the 35 total samples collected across the facility.**<br><br>*Do not concur. As stated in the second paragraph of Section 3.1, existing data have been used to the fullest extent possible. A total of thirty-five background samples existed prior to the March 1996 sampling effort. Since there are eight soil types at CSSA, and at least ten samples of each were required (per TNRCC comment on B-20 closure plan), a total of eighty background samples were required for the statistical evaluation. The remaining 45 samples were collected in March 1996. The results of the analysis of the eighty samples are listed in Table 4.2. All of these results were used in the background evaluation.* |
| 9 | 3-2 | 3.2 | **The text should state that "surface debris" was cleared away when surface soil samples were collected, not that surface soil was cleared away. The text should be revised.**<br><br>*Concur, with exception. The reader may misinterpret "surface debris" to be waste material. Instead, Parsons ES recommends deleting the entire sentence. The previous sentence states the depth at which the sample was collected.* |
| 10 | 3-5 | 3.2.3 and Table 3.1 | **The text and table should be revised to discuss the lower of the risk reduction standards (RRSs) that may be applied at the sites. The discussion should include a comparison of RRSs to the method detection limits (MDLs) and the practical quantitation limits (PQLs) listed in the table. This comparison should be completed because it will ensure that analytical methods will be able to determine concentrations below the selected RRS. The Environmental Protection Agency (EPA) minimum recommended requirement is that the MDL be no more than 20 percent of the concentration of concern (i.e., if the RRS is 70 mg/kg, then the MDL should be no greater than 14 mg/kg). The Contractor should expand this portion of the test and address the relationship between the RRS and the MDL and add an additional column to Table 3.1 with the RRS for each chemical.**<br><br>*Concur, with exception. Since this report does not specifically address closure of any site, Parsons ES does not feel that an in depth description of the risk reduction rules and standards is appropriate in this document. The "selected" RRS may vary from site to site. In addition, this document cannot address* |

Final disposition:
Clarify the three data sets - identify project, lab, method #, etc. → in a table, per AFCEE's request.

Clarify

Final disposition:
Add general discussion: How study fits in Risk Reduction Rules.
Add description/ discussion of PQLs & MDLs.

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | *MDLs or PQLs for SWMU or other site analyses, which, in the future, could be done by different labs with different MDLs and PQLs. Instead, we feel that this document should be used as a reference for background metals levels only.* |
| 11 | 3-6 | Table 3.1 | **The Contractor should explain the seventh footnote to the table which states that different analytical tests (i.e., SW7421 or SW6010) were performed based on the concentration of lead in the sample. The Contractor should explain how the type of analytical test was selected based on the concentration of lead in the sample.**<br><br>*Concur. The following explanation will be added: Since relatively high lead levels were detected in many of the samples, the low detection limit provided by SW7421 was not necessary. The lab analyzed all of the samples (SS11 through SS35) for lead using SW6010. If no lead was detected using SW6010, the lab analyzed the sample for lead again using SW7421. The SW7421 result was then reported.* |
| 12 | 3-7 | 3.3.1 | **The Contractor refers to the calculation of the background concentration as a "tolerance interval test." This description is incorrect and should be revised because the calculation of a tolerance interval, and more specifically the 95 percent upper tolerance limit (UTL), is not the same as a tolerance limit test. In addition, a tolerance limit is not "an approved method of comparing background monitoring data to compliance wells." A tolerance interval is a statistically calculated range for a predetermined percentile of the data. The calculation and use of a tolerance interval and 95 percent UTL should be explained in proper statistical terms.**<br><br>*Concur. The 95 percent upper tolerance limit was used. The sentence regarding "an approved method" can be changed to "The UTL (EPA, 1989) on background data is used as a screening level concentration for comparison with soil boring concentrations at potentially contaminated areas." According to EPA's Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, addendum to interim final guidance (pg. 50, July 1992), "Tolerance intervals can be used in detection monitoring when comparing compliance data to background values."* |
| 13 | 3-7 | 3.3.1 | **The statement that "the UTL assumes a normal distribution" is in conflict with the rest of the paragraph because Section 3.3.3. discusses testing the data to determine if its distribution is normal, lognormal, or undefined. The sentence should be revised.** |

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | *Concur. Sentence will be deleted.* |
| 14 | 3-9 | 3.3.2 | **It is unclear if the term "detection limit" refers to the MDL, PQL, or some other contract required detection limit. In addition, the grammatical construction of the first sentence is confusing and appears to imply that the "detection limit" was used as a proxy concentration when the results were nondetect. Using the "detection limit," rather than one half the "detection limit" as described in EPA's Risk Assessment Guidance for Superfund, may overestimate the concentration of metals present and is inconsistent with EPA risk assessment guidance which stipulates that one half the sample quantitation limit (SQL) should be used. The text should be clarified and the proxy concentrations used for nondetected concentrations included.** |
| | | | *More research into the historic data indicated that a mix of SQLs and MDLs were used. Where possible, MDL values will be replaced with SQLs provided by the lab. However, one lab (which has since closed) reported MDLs only. Parsons ES proposes calculating the SQLs by multiplying the method PQL by the percent moisture content. One-half SQL values will be used for proxy concentrations. This revision may affect the following values:*<br>*Glen Rose: None (SQLs were used)*<br>*Brackett: Mercury*<br>*Brackett-Tarrant: Mercury, cadmium*<br>*Crawford and Bexar: Cadmium, mercury*<br>*Krum: Cadmium*<br>*Lewisville: Mercury*<br>*Tarrant (rolling): Mercury*<br>*Tarrant (undulating):Mercury*<br>*Trinity and Frio: Mercury* |
| 15 | 3-9 | 3.3.2 | **In the first item listed in the test, the Contractor states that nondetected values were replaced with one half the PQL. However, EPA risk assessment guidance stipulates that one half the SQL should be used because the SQL captures individual samples variability better than the PQL. The Contractor should recalculate the UTL for each metal using one half the SQL rather than the one half the PQL.** |
| | | | *See response to comment 14.* |
| 16 | 3-9 | 3.3.3 | **This section should be expanded to briefly explain the Shapiro-Wilk test and the decision rule for removing outliers.** |

Final disposition:

Use ½ PQLs for all NDs.

Table and text will be added to describe differences in MDLs, PQLs between labs.

Statistical tables will be revised accordingly.

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | Final disposition: AFCEE does not feel that outliers should be removed. Statistics will be revised. For these metals, lognormal distribution will be assumed (if it is neither), as directed by AFCEE. |
| | | | **A reason for removing outliers from the data set should be documented especially because removing outliers will have a large effect on the UTL if the size of the data set is small. Any outliers removed should be reevaluated due to the errors in the probability plots.**<br><br>*Concur, with exception. Removal of outliers was based on the calculated correlation coefficient, not visual observation of the probability plots. If the coefficient was less than 0.9, the value was considered to be an outlier. This decision rule will be added to the text.* |
| 17 | 3-9 | 3.3.3.1 | **The probability plots should be revised. Rather than plotting the concentration versus the normal quantile, the Contractor should plot the concentration versus (*I*-0.5)100/n, where *I* is the order statistic. Plotting the percentage of the data rather than then normal quantile will allow the reader to visualize the percentage of the data to which the UTL corresponds. In addition, probability plots usually are constructed by plotting the un-transformed data on a log scale, not the transformed data on a nonlog scale.**<br><br>*Do not concur. Probability plots for this report were constructed as described on pages 5-6 of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities (Draft), Addendum to Interim Final Guidance, EPA, July 1992.* |
| 18 | 3-10 | 3.3.3.2 | **The equation for the W statistic should be revised because the exponent on the right-hand side of the equation should be "2" not"-2." The Contractor should revise the equation and also ensure that this typographical error was not included in the spreadsheet used in the statistical calculations. If the error in the equation was duplicated in the statistical calculations, then the Shapiro-Wilk test should be recalculated.**<br><br>*Concur. Typographical error will be corrected. Statistical tables were checked, and found to be correct (i.e. "2" was used, not"-2").* |
| 19 | 3-10 | 3.3.3.2 | **The equation parameters "$x_j$" and "$a_j$" are not the same parameters used in the tables in the appendices. The parameters used in the equation should be revised so that they match the parameters used in the tables.**<br><br>*Concur.* |
| 20 | 3-10 | 3.3.3.3 | **The equation for the correlation coefficient does not follow the equation provided in the EPA statistical guidance. The numerator for this equation appears to be missing one or** |

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | **more parameters based on a comparison to the equation cited by the Contractor. The Contractor should verify, and if necessary, revise the equation. If an error in the equation is duplicated in the statistical calculations, then the correlation coefficients should be recalculated.**<br><br>*Do not concur. The equation provided in the EPA statistical guidance is a modification of equation (2) in The Probability Plot Correlation Coefficient Test for Normality (James J. Filliben, Technometrics, Vol. 17, No. 1, February 1975). The EPA equation provides the same results as the Filliben equation.* |
| 21 | 3-11 | 3.3.4.1 and 3.3.4.2 | **The Contractor should provide citations for the decision rule statements (i.e., the "if...then" statements) at the end of each of these sections. Citation to a current EPA or state guidance will better support the basis for decision making.**<br><br>*Concur.* |
| 22 | 3-12 | 3.3.4.3 | **The term "detection limit" should be defined. See item 14.**<br><br>*Concur.* |
| 23 | 3-12 | 3.3.4.3 | **The parameters "n" and "m" in the first equation should be defined in the text.**<br><br>*Concur.* |
| 24 | 4-6 | Table 4.3 | **The first column in this table has a footnote indicator; however, there is no footnote for the table. The table should be revised to add the footnote.**<br><br>*Concur. The missing footnote should specify the source of the soil type locations (Bexar County Soil Survey).* |
| 25 | 4-6 | Table 4.3 | **A table similar to Table 4.3 should be constructed and added to the report. The additional table(s) should contain the individual sampling results, as well as the mean, standard deviation, coefficient of variance, number of nondetects, minimum, maximum, tolerance coefficient (K), and UTL concentrations for each chemical by soil type. These additional summary statistics will be useful when comparing metal concentrations among the soil types and between soil types and remedial sites.**<br><br>*Concur. Draft table is attached.* |
| 26 | 4-6 | Table 4.3 | **It appears that the UTL was selected as the background concentration even when the UTL exceeded the maximum** |

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | **observed concentration. Typically, the maximum concentration is selected as the background concentration when the UTL exceeds the maximum concentration. This approach is consistent with EPA risk assessment guidance which states that the maximum concentrations should be used when the 95 percent upper confidence limit of the mean exceeds the maximum concentration. This approach is acceptable because a large standard deviation will result in a very large UTL, thereby allowing the statistical procedure to control the process rather than applying professional judgment. The Contractor should replace the UTL with the maximum observed concentration when the UTL exceeds the maximum.** |
| | | | *Do not concur. According to pg. 44 of the Statistical Training Course for Ground-Water Monitoring Data (1992), "tolerance intervals will generally be wider than confidence intervals about the mean..." In just about every case at CSSA, the 95% UTL exceeds the maximum. This is interpreted to be a result of relatively wide variation in the sample concentrations, as well as the tolerance coefficient.* |
| | | | *The steps for determining the 95% tolerance limit are described in detail on pages 44 and 55 of EPA's Statistical Training Course for Ground-Water Monitoring Data Analysis (1992). The directions do not include substituting the maximum concentration for the 95% UTL when it exceed the maximum. No basis for replacing UTLs with maximum values could be found in any of our references.* |
| | | | *Although replacing the maximum for the 95% UCL is appropriate for risk assessments, this approach cannot be used for the background evaluation for two reasons: 1) The UCL is not the same thing as the UTL, and 2) The purposes of a risk assessment are different. Risk assessments are meant to show the risk that actual contamination at a site may be causing. Therefore, it makes sense to not use values higher than the maximum observed in the calculations. However, for our background study, we are trying to establish a level that will be considered clean.* |
| 27 | 5-2 | 5.0 | **The entry in the bibliography for Shapiro-Wilk is incomplete and should be revised.** |
| | | | *Concur. The complete reference [Shapiro and Wilk, 1965. An Analysis of Variance Test for Normality (complete samples). Biometrika, volume 52, pg. 591-611. S.S Shapiro and M.B. Wilk, 1965] can be added.* |

Use UTL, not max, as directed by AFCEE.

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| 28 | N/A | General | **The background metals evaluation has incorporated three independent sets of analytical results. These results were summarized in three reports: *Remedial Investigation Report for the B-20, Former Open Burn/Open Detonation Area, Department of the Army, Camp Stanley Storage Activity, Boerne, Texas* (June 1995); *Closure Report for the F-14 accumulation Site, Camp Stanley Storage Activity, Texas* (April 1995); and *Evaluation of Background Metals Concentrations in Soil Types at Camp Stanley Storage Activity* (June 1996). These three reports were reviewed. Based on the text sections regarding data validation, it appears that most AFCEE required quality control (QC) elements were performed within the established acceptance criteria. However, sufficient laboratory results and associated QC results have not been presented in the reports to verify that the information presented in the data validation summaries is complete or accurate. In the absence of this laboratory data, a thorough independent review of the analytical results cannot be performed.** |
| | | | *Only the last set of samples (collected specifically for the facility-wide evaluation) were analyzed under the recent AFCEE QAPP requirements. Samples for the previous projects (F-14 and B-20) were collected under another contract. AFCEE QC elements were not required for the other contractor. Data for the earlier projects meets level III criteria. Copies of data packages can be provided.* |
| 29 | 3-6 | Table 3.1 | **Table 3.1 of this report and Attachment A of this review show that individual analytical methods have not been consistently used for determination of each metal. For example, cadmium analyses have been performed using method SW6010 and method SW7131. Attachment A shows that method sensitivities can vary by as much as an order of magnitude between inductively coupled plasma (ICP) and atomic absorption (AA) methods. Therefore, the use of multiple analytical methods for statistical interpretation of background concentrations at or near the method detection limits is not advisable, because the analytical results obtained from the different methods may constitute distinctly different data sets.** |
| | | | *Concur. Data used for the background evaluation was collected under three projects. For six metals (barium, chromium, copper, mercury, nickel, and zinc), the same analytical method was used during each sample collection period. Since multiple methods were used for the three remaining metals (arsenic, cadmium, and lead), these must be evaluated further. Where multiple methods were used, the metals concentrations can be evaluated to* |

Define level III

Add Table showing which methods used when.

| Item | Page | Section | Comments and Responses |
|---|---|---|---|
| | | | *determine if the use of different methods resulted in widely varying results.* |
| 30 | 3-7 | 3.2.5 | **It is not clear whether the statement "All analytical reports were validated by a chemist to ensure that the data meet EPA level 3 and the AFCEE QAPP reporting and methodology requirements" refers only to the March 1996 data set or includes the results reported previously for sites F-14 and B-20. The discussion should be clarified to unambiguously identify the data that were validated in accordance with the AFCEE QAPP.**<br><br>*Only the March 1996 data meets the AFCEE QAPP reporting and methodology requirements. Previous data meets EPA level III requirements.* |
| 31 | 3-9 | 3.3.2 | **It is not clear if the term "detection limit" as used in this project is the method detection limit (MDL) as defined in SW-846. Furthermore, it is not entirely clear that the values reported by the laboratories, such as "<2.2" refer to the MDL or the PQL. The definition of the term "detection limit" should be more specifically defined for this project, and the laboratory data should be verified to determine that the term is used consistently.**<br><br>*Concur. Text and tables can be revised for clarification.* |

# Attachment 2

# Electrokinetic Bid Evaluation Memo

*PARSONS ENGINEERING SCIENCE, INC.*

MEMORANDUM
January 10, 1997

**To:** Project File
AMC Contract F11623-94-D0024

**From:** Ken Rice
Parsons ES, Austin

**Subject:** Treatability Study for RL17
SOW Task 05

This memo provides a summary of the budget history, including costs spent to date, and an estimate of the remaining budget for Task 05. In addition, the anticipated activities are identified along with costs from Parsons ES to complete the effort.

Parsons ES originally identified actions such as excavation and disposal of soils at the site. Based on 1995-1996 work performed under an Armstrong Laboratory/OEB (AL/OEB) for CSSA at the oxidation pond, this work is no longer considered the best option.

During May 1996, efforts for Task 05 were initiated with a review of remedial alternatives. The 16 July 1996 meeting resulted in agreement that an effective and viable treatment option for the oxidation pond is electrokinetics. Parsons ES has contacted subcontractors to establish a cost for a benchscale treatability study, and it is believed that such study can be performed for $40,000 to $50,000, followed by a treatability study report for an estimated $25,000. Preliminary bids for a treatability study on 0-1 soils are in attachment 1. The original $158,188 was reduced to an estimated $85,107, allowing the overrun in task 01 to be reprogrammed through task 05 reductions, as well as projected additional costs for tasks 03, 11, 15, and 90. Budget was reprogrammed for $45,000 in labor costs and $40,000 in ODCs. Cost incurred through July 1996 was approximately $10,000 in labor costs and $1,000 in ODCs.

During field effort 2 activities, August 1996, additional samples of O-1 soils were analyzed for hexavalent chromium to obtain data for proposal efforts. Results were evaluated and a scope of work developed for the treatability study. Requests for proposals for providing Laboratory Benchscale and Field Pilot Scale treatability tests were issued 20 November 1996. Responses were received on 12 December 1996 with additional request for information letters dated 20 December sent to three of the four respondents, as necessary for clarification. A summary of the responses is in attachment 2. Costs incurred to date are approximately $22,000 in labor and $2,500 in ODCs.

The expected effort for Parsons ES during the treatability efforts include: subcontractor oversight, data compilation, initial soil assessment, evaluation of results, and report production. Currently, approximately $23,000 are available in labor, and approximately $37,500 available in ODCs.

Table 1 provides a breakdown of the work efforts remaining and costs for completing Task O5 including ODCs. Approximately $35,000 would be available for subcontracting an electrokinetic remedial action for O-1.

In summary:

| | |
|---|---|
| Current budget is | $85,100 |
| Budget expended to date is | $24,500 |
| Remaining budget is | $60,600 |
| Lowest bid for treatability study is | $91,522 |

Table 1: Projected costs to finish.

Att. 1: Preliminary bids for treatability study on 0-1 soils.

Att. 2: Summary of bid responses from RFP dated 20 November 1996.

Table 1. Projected Task 05 Cost Estimate as of January 1997
O-1 Treatability Study

| Task | Total Hours | Total Cost |
|---|---|---|
| 1. Laboratory Benchscale Test | | |
| Initial soil assessment | 20 | $1,160 |
| Data compilation | 18 | $890 |
| Work Plan development | 12 | $780 |
| Evaluate Benchscale results | 32 | $2,110 |
| Subcontractor oversight | 12 | $780 |
| Task 1 total labor | 94 | $5,720 |
| 2. Field Pilot Scale Test | | |
| Initial soil assessment | 24 | $1,440 |
| Data Compilation | 36 | $1,770 |
| Subcontractor oversight | 52 | $3,270 |
| Draft and final report | 216 | $10,680 |
| Task 2 total labor | 328 | $17,160 |
| Total labor | 422 | $22,880 |
| Other direct costs | | |
| Computer/CAD/WP | | $560 |
| Equipment rental | | $100 |
| Materials/supplies | | $100 |
| Phone/telecopy | | $30 |
| Postage/freight | | $45 |
| Reproduction | | $260 |
| *Subcontract** | | $35,000 |
| Travel and subsistence | | $1,400 |
| Total other direct costs | | $37,495 — 84,325 |
| Estimated project costs to completion | | $60,375 |

* Potential electrokinetic firms

# ATTACHMENT 1

# PRELIMINARY BIDS FOR TREATABILITY STUDY ON 0-1 SOILS

**ELECTROKINETICS INC.**
Electrokinetic Soil Processing

*"Technologies for Waste Management"*

Phone (504) 753-8004
FAX (504) 753-0028
E-mail ekinc@pipeline.com

11552 Cedar Park Avenue
Baton Rouge, LA 70809

August 29, 1996

Mr. John Meadows
Parsons Engineering Science, Inc.
8000 Centre Park Drive
Suite 200
Austin, Texas 78754

Re: *Camp Stanley Site Cost Estimates*

Dear Mr. Meadows:

Thank you very much for your interest in the services Electrokinetics, Inc. (EK) provides. I enclosed the cost estimates you have requested for the Camp Stanley site located in San Antonio, Texas. All the estimates are based on the assumption that the chromium is found in the Cr III form. We estimated the following cost for the below depicted scenarios:

- ***Short Term Feasibility Study*** (6 months) - $70,500.00
  The short term feasibility study will consist of complete characterization of the chromium, and soil along with six extraction batch tests and with three bench scale tests. The batch tests will be conducted to optimize conditions for chromium extraction by electrokinetics. Bench scale tests will be conducted to evaluate and optimize the processing conditions for in-situ electrokinetic remediation. The cost estimate includes all the chemical analysis. This study will take approximately six months to complete from the start to the end of the reporting phase.

- ***Complete Remediation*** (9 to 12 months) - $197,000.00
  In this phase we recommend to remediate the identified fill area (45 feet in diameter and approximately 5 feet deep) utilizing the electrokinetic remediation technology. This estimate includes all the material, time and engineering design cost. The cost of chemical analysis is not included. In the event that Camp Stanley can provide the specified power supplies, the cost of the remediation can be cut down by $20, 000.

I have also included some information about our company and the innovative technologies we are working on. Please contact me at (504) 753-8004 if you have any questions or need additional information concerning the technology.

Sincerely,
Electrokinetics, Inc.

(Ms.) Elif ). Acar
President

ATTACHMENT 2

SUMMARY OF BID RESPONSES FROM RFP
DATED 20 NOVEMBER 1996

*PARSONS ENGINEERING SCIENCE, INC.*

**MEMORANDUM**
January 10, 1997

**To:** Subcontract File for Treatability Study on SWMU O-1,
AMC Contract F11623-94-D0024

**From:** Ken Rice
Parsons ES, Austin

**Reference:** RFP, dated November 20, 1996
**Subject:** Treatability Study for SWMU 0-1
SOW Task 05

This memo summarizes the responses obtained from a Request for Proposal (RFP) dated 20 November 1996 and subsequent clarification letter dated 20 December 1996. The respondents include: Lynntech, Inc.; Electrokinetics, Inc.; Fluor Daniel GTI, proposing with Geokinetics International Inc.; and Isotron Corporation, proposing with Sat-Unsat, Inc. This summary contains a brief overview of the technical approach, expected investigative derived waste (IDW) generation, patent issues, previous experience, key personnel of each respondent along with conclusions of the proposals received for RFP 728487.3000-00.

***Project Costs:***

| Item | Lynntech, Inc. | Fluor Daniel GTI. | Electrokinetics, Inc. | Isotron Corporation |
|---|---|---|---|---|
| Laboratory Bench-Scale Test | $12,501 | $34,250 | $32,820 | $38,372 |
| Field Pilot-Scale Test | $79,021 | $73,540 | $129,776 | $113,223 |
| Other | $0 | $15,000 | $0 | $48,631* |
| **Total** | **$91,522** | **$122,790** | **$162,596** | **$200,226** |

* - included as Option 2.

*Technical Approach:*

1. **Lynntech, Inc.**

   Lynntech's stated objectives include a demonstration of the effectiveness and establishment of cost performance criteria for Lynntech's electrokinetics soil processing system. Lynntech's technical approach includes a laboratory bench-scale test using approximately 20 pounds of soil in a recompacted test bed and a field-scale treatment area of approximately 20 x 30 feet (ft) using "dc/ac electrokinetics", which is a pulsing of direct current and alternating current, operated for 60 days. The proposed 20 x 30 ft system could be reduced in order to minimize IDW generation, as stated in Lynntech's clarification letter response. To optimize the dc/ac electrokinetic soil remediation technology, Lynntech proposes to use a 2% solution of citric acid (approximately 100 kg) as a leachant for chromium and cadmium contaminants. Typically, citric acid is added to the cathode to neutralize the base produced by the electrochemical reaction. Electrochemically produced acid in the anode well is diluted by adding water to the wells. The soil pH is precisely controlled between the electrodes by adjusting the current at the electrodes during the process. Chromium and cadmium, if in the cationic form, would be electroplated at the cathodes and removed from the cathode effluent. The anode well solution would be circulated through a chromate collection tank and recovered by adsorption at carbon or ion exchange filters.

2. **Fluor Daniel GTI with Geokinetics International, Inc.**

   Fluor Daniel GTI and Geokinetic's objectives are "in accordance with the scope of work as identified in the RFP." Fluor Daniel GTI and Geokinetics International, Inc.'s technical approach includes a laboratory test, six initial screening tests (to evaluate the effect of different anions on the solubility of the contaminants), and a field-scale treatment system of a 4 x 4 array of 16 electrodes arranged in two alternating pairs of anodes and cathodes for a period of approximately 45-50 days. The exact size of the treatment array would be determined by the laboratory and initial screening tests. The initial screening test would be conducted in 1 to 27 liter treatment cells. The proposed laboratory bench-scale tests would identify optimization of the soil buffering capacity, rate of contaminant advancement, the current-voltage relationship, and the scalability of the proposed system. Fluor Daniel GTI would be the prime contractor, responsible for project management, and field operations. Geokinetics International, Inc. would be a subcontractor to Fluor Daniel GTI and responsible for the laboratory studies and the core technology.

3. **Electrokinetics, Inc.**

   Electrokinetics, Inc.'s stated objective is "to provide, evaluate, and optimize alternative approaches for treatment of chromium and cadmium from soil and groundwater at CSSA." Electrokinetics, Inc.'s technical approach includes a batch

test, laboratory test, and field-scale treatment area of approximately 6 x 6 ft using an electrode system consisting of four anodes and one cathode installed to 3.5 ft in depth with an activated carbon filter to capture any PCE that may migrate to the wells. Electrokinetics' scope includes conducting batch tests to optimize chromium extraction. These batch tests would be conducted with soil samples mixed with different acidic solutions at a soil to solution ratio of 1:10. The resultant leachate would be analyzed for different forms of chromium.

4. **Isotron Corporation with SAT-UNSAT, INC.**

   Isotron's stated objectives are to extract and address waste disposition of contaminants using the ELECTROSORB™ process. Isotron Corporation's technical approach includes an "essential" laboratory test, and a field-scale test system that includes three scenarios. All three scenarios are 12 x 12 ft. Scenario A uses a planar anode configuration with seven cathodes (steel rebar or pipe) arranged linearly and parallel to the planar anode. Scenario B uses three anodes and four cathodes placed approximately one meter apart. The anode cylinders would be impregnated with a carbon filled hydrogel polymer. As in scenario A, the cathodes are steel rebar or pipe. Scenario C uses the same electrode array pattern as scenario B; however, both the cathode and the anode are wells used in a system that circulates electrolytes for pH control. The scenarios are proposed as Option 1. Option 2 was not clearly stated and seems to include additional costs associated with the speciation of chromium. In other words, Option 1 intends to treat chromium (VI) and proposes to convert from chromium (III), if necessary. Option 2 would remove chromium (III) as is, with additional costs. SAT-UNSAT, Inc. would be responsible for bench-scale treatability tests, and provide input to environmental, health and safety, and quality assurance activities, as well as regulatory compliance.

### *IDW Generation:*

1. Lynntech's estimate of the amount and type of IDW to be generated includes 350 gallons of effluent from the cathode wells and approximately 20 cubic yards of clayey material.
2. Electrokinetics, Inc.'s estimate of the amount and type of IDW to be generated include 50 gallons of soil, 55 gallons of liquid, and 50 gallons of miscellaneous waste.
3. Fluor Daniel GTI and Geokinetics International, Inc.'s IDW generated quantities were estimated 10 gallons of solids and 8 gallons of electrolyte solution at a neutral pH.
4. Isotron proposes to use a 'clean systems approach' in handling IDW. The approach is to provide for their ultimate disposition in a cost effective manner, which minimizes waste volume associated with processing at the site.

*Patent Issues:*

1. Lynntech claims to have proprietary positions in the areas of application of electric fields and controlling the processes that occur in the electrode wells, "Patent applications have been made covering many aspects of these processes." In response to the clarification letter, additional assurances of Lynntech's position regarding patent infringements were provided by Jeffrey L. Streets of the law firm of Patterson & Streets, L.L.P.
2. Fluor Daniel GTI and Geokinetics International, Inc. claim to have the earliest priority date of any modern era electrokinetic patent (13 October 1987 in Europe). Geokinetics claims that US patent no's. 5,137,608 (Acar et al. patent) and 5,074,985 (Probstein et al. patent) use electro-osmotic flow of an aqueous solution from the anode to the cathode. They do not include the incorporation of electrolytes pumped into and out of electrode casings, processing to recover contamination, or the use of electrolytes to achieve pH control (the "Pool Process"). The US patent no's. 5,433,829 (Lageman et al. patent) and 5,580,056 claim to be dominate over all useful methods of using electrolytes and managing electrolyte properties in electrokinetic remediation. As such, all others using this process would be in violation of Geokinetics intellectual property rights. In addition, Geokinetics claims to have a portfolio of 17 additional US patents and applications. In response to the clarification letter, Fluor Daniel GTI and Geokinetics International, Inc. indicated that they are the only organization entitled to use the "Pool Process" as defined in US patent no. 5,433,829 (including US patent 5,580,056).
3. Electrokinetics, Inc. claims to operate or hold patents for "Electrochemical Decontamination of Soils or Slurries" (US patent no. 5,137,608, the Acar et al patent) and "Electrobioremediation of Mixed Wastes and Slurries" (US patent no. 5,458,747).
4. Isotron claims that their US patent no's. 5,405,509 and 5,489,370 use an ELECTROSORB™ cylinder concept to remove the anionic species of metals. For this reason, the technology does not conflict with patents associated with electro-osmosis patents. In addition, Isotron claimed novelty with its ELECTROSORB™ cylinder concept, not the concept of electrokinetic transport of ionic species from soil (i.e., the Lageman patent).

***Previous Experience:***

1. Lynntech has provided two pilot-scale system demonstrations, one for the Air Force and one for the Army Corps of Engineers. They are currently working on a combined field demonstration of electrokinetics and bioremediation at Kennedy Space Center, Florida.
2. Fluor Daniel GTI and Geokinetics International, Inc. have extensive field application experience of electrokinetic remediation in Europe.

3. Electrokinetics, Inc. has no previous field experience; however, they have provided several bench-scale studies to the US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

4. Isotron Corporation has been working with field deployment of electrokinetic technologies for more than six years. Sat-Unsat, Inc. is currently working with Sandia National Laboratories on developing a viable *in situ* remediation alternative using electrokinetic phenomena.

### *Key Personnel*

1. Lynntech proposes to use Dr. Dalibor Hodko as the project manager for the CSSA treatability study effort. Dr. Hodko has been with Lynntech since 1992 and has provided support in the two field demonstrations. In addition, Lynntech proposes to use Dr. Tom Rogers as project scientist. Dr. Rogers has been with Lynntech since 1990 and would coordinate and arrange all activities related to site development, logistics, system start up, and other field demonstration activities.

2. Fluor Daniel GTI with Geokinetics International, Inc. proposes to use Mr. Stan Hill as the project manager and engineering manager. Mr. Hill has 24 years of experience and has participated in several technology-related projects involving the development and demonstration of bench-scale, pilot, and full-scale environmental treatment units. Additionally, Dr. Stuart Smedley, laboratory manager, and Dr. Steve Schwartzkopf, field manager, are proposed for the CSSA treatability efforts.

3. Electrokinetics, Inc. proposes to use Ms. Elit Ozsu-Acar, Electrokinetics' president, as the project manager. Ms. Acar has six years of experience with remedial investigations and feasibility studies.

4. Isotron Corporation, with Sat-Unsat, Inc proposes to use Mr. Henry Lomasney as the project manager. Mr. Lomasney has 30 years experience in the field of polymers, coatings, radionuclide decontamination, cathodic protection, and electrochemical phenomenon. He is the president of Isotron, Inc. In addition, Dr. Valeriy Yachnener, senior chemist, and Earl Mattson, president of Sat-Unsat, Inc., will provide technical support. Mr. Mattson has over six years of experience with electrokinetic phenomena in unsaturated soils.

### *Conclusions:*

All respondents satisfied the basic requirements of the request for proposal. Electokinetics, Inc. has little field experience and proposes to use subcontractors to build and deploy field equipment for the field pilot-scale treatability study. With the schedule proposed, I am concerned about the ability of Electrokinetics, Inc. to provide the necessary work within the time allotted. Therefore, due to the lack of demonstrated field experience and field equipment, Electrokinetics, Inc. was not included for further technical review.

The remaining respondents were sent follow-up clarification letters requesting additional information, including financial statements and identification of any dispute or litigation associated with the use of the proposed technology. All respondents supplied the requested information, and all claim to have the required technology, financial support, and proprietary positions on their individual technologies necessary for the treatability study at CSSA.

Fluor Daniel GTI and Isotron Corporation both intend to subcontract portions of the efforts. In each case, I am concerned that the prime did not propose to do the work turn-key.

Lynntech, Inc. provided the lowest cost estimate by $31,268 over Fluor Daniel GTI. Lynntech's overall estimate for the proposed scope of work is $91,522. Isotron Corporation's estimate was the highest at $200,226.

Each of the respondent's bidforms and any assumptions associated with each of the bidders proposals are attached.

cc: Brian Murphy, CSSA
Jo Jean Mullen, AFCEE ERD
Susan Roberts, Parsons ES, Austin
Roxanne Powers, Parsons ES, St Louis
John Stewart, Parsons ES, St. Louis
Jay Snow, Parsons ES, Austin
John Koon, Parsons ES, Pasadena
Subcontract File

TECHNICAL AND COST PROPOSAL

# SOIL TREATABILITY STUDY REMEDIAL SERVICES

CAMP STANLEY STORAGE ACTIVITY
BOERNE, TEXAS

A Proposal in Response to:

Parsons Engineering Science, Inc.
8000 Centre Park Drive, Suite 200
Austin, TX 78745-5140

RFP No. 728487.3000-00
Project No. 728487.05

Submitted by:

*Lynntech, Inc.*

7610 Eastmark Drive, Suite 105
College Station, Texas 77840, U.S.A.
Phone: (409) 693-0017
FAX: (409) 764-7479

December 11, 1996

BIDFORM 1

Schedule of Unit Rates for Electrokinetic Remediation Treatability Study
Field Pilot Scale Test
Camp Stanley Storage Activity, Boerne, Texas

| Task | Estimated Quantity | Unit | Unit Rate | Estimated Total Cost |
|---|---|---|---|---|
| 1. Work plan | 1 | Lump sum | $ _____ | $ 4,048 |
| 2. Health and safety plan | 1 | Lump sum | $ _____ | $ 1,349 |
| 3. Mobilization | 1 | Lump sum | $ _____ | $ 12,665 |
| 4. Demobilization | 1 | Lump sum | $ _____ | $ 3,708 |
| 5. Construction of necessary field equipment | 1 | Lump Sum | $ _____ | $22,758 |
| 6. Field pilot scale study (minimum 6 weeks duration) | 1 | *In situ* | $ _____ | $40,264 |
| 7. Soil chemical analyses | 36 * | Sampling event | $ XXXX | $ XXXX |
| 8. Soil physical analyses | 1 | Sampling event | $ _____ | $ Bid Form 2 |
| 9. Progress reports | 3 | monthly | $ 1,286 | $ 3,858 |
| 10. Final field pilot scale treatability study report. | 1 | Lump Sum | $ _____ | $ 5,840 |
| 11. Site restoration | 1 | Lump Sum | $ _____ | $ 1,236 |
| | | | Total: | $ 95,726 |

*Subcontractor to estimate number of chemical contaminant analytical sampling events required for a field pilot scale test.

## How Estimated Total Costs Are Established

Using the Task costs developed from Lynntech's Work Plan Schedule, costs have been allocated on Bid Form 1 as shown below.

| Bid Form Task | Derived From Lynntech Task (See Work Plan Schedule) |
|---|---|
| 1 & 2 | 75% of Tasks 1, 2 and 3 |
| 3 | Task 7 |
| 4 | 75% of Task 11 |
| 5 | Task 8 |
| 6 | Tasks 9 and 10 |
| 7 | xxxxxxxxxxx |
| 8 | Performed in Bench Scale Test: See Bid Form 2 |
| 9 | See Work Plan Schedule below Task 14 |
| 10 | Tasks 12 and 13 |
| 11 | 25% of Task 11 |

BIDFORM 2

Schedule of Unit Rates for Electrokinetic Remediation Treatability Study
Laboratory Benchscale Test
Camp Stanley Storage Activity, Boerne, Texas

| Task | Estimated Quantity | Unit | Unit Rate | Estimated Total Cost |
|---|---|---|---|---|
| 1. Work plan | 1 | Lump sum | $ _____ | $ 1,799 |
| 2. Laboratory benchscale study | 1 | *Ex situ* | $ _____ | $ 7,773 |
| 3. Soil chemical analyses | 12* | Sampling event | $ XXXX | $ XXXX |
| 4. Soil physical analyses | 1 | Sampling event | $ _____ | $ 1,800 |
| 5. Progress reports | 3 | Monthly | $ _____ | $ See 5 below |
| 6. Final laboratory benchscale treatability study report | 1 | Lump sum | $ _____ | $ 1,129 |
| | | | Total: | $ 12,501 |

*Subcontractor to estimate number of chemical contaminant analytical sampling events required for a laboratory benchscale test.

How Estimated Total Costs Are Established

Using the Task costs developed from Lynntech's Work Plan Schedule, costs have been allocated on Bid Form 2 as shown below.

| Bid Form Task | Derived From Lynntech Task (See Work Plan Schedule) |
|---|---|
| 1. | 25% of Tasks 1, 2 and 3. |
| 2. | Task 6 |
| 3. | xxxxxxxxxxx |
| 4. | From Task 6 |
| 5. | Included in cost shown on Bid Form 1 |
| 6. | Included as part of costs for Tasks 5 and 6. |

## BUDGET OPTION 1
## RFP No. 728487.3000-00 "Soil Treatability Study Remedial Services Camp Stanley Storage Activity

Should the Contractor and Client so desire, it may be advantageous to extend the duration of the electrokinetic field test beyond the 60 days proposed by Lynntech. Since the majority of the study expense is incurred through the 60 days of field testing, extending the duration can be accomplished very cost-effectively. An additional 30-day extension of the field test would cost $11,500. This would include 220 labor hours (combined Scientist and Technical), lodging, per diem and rental truck for personnel stationed at the site. This cost is based on all rates detailed in the primary budget for labor overhead, G&A and profit.

Should this option be enacted by the Contractor, the projects costs shown for all task activities after the field test (Tasks 11-14) would remain the same, but would be completed as scheduled following the 30-day extension.

LYNNTECH, Inc.

7610 Eastmark Drive, Suite 105 • College Station, Texas 77840 • Phone (409) 693-0017 • Fax (409) 764-7479

December 26, 1996

Roxanne M. Powers
Senior Contracts Administrator
Parsons Engineering Sciences, Inc.
400 Woods Mill Rd., Suite 300
Chesterfield, Missouri 63017-3427

Re: RFP No. 728487.3000-00
Soil Treatability Study Remedial Services
Clarification of Electrokinetic Proposal

Dear Ms. Powers:

The following information is provided to clarify specific questions in your letter of December 20, 1996.

1. The objectives described in our proposal can be accomplished using a smaller system and test plot. This would reduce the IDW generation and other costs associated with the field pilot study.

2. It is possible to operate the system using intermittent site visits (i.e., two times each week). Based on the reduction in labor hours (310 hours) and other costs associated with the field activity, the proposed cost is reduced by $16,705 (including overheads and profit) to $91,522.

3. U.S. Patent No. 5,433,829 cited in your letter of December 20 has been reviewed. Lynntech's method for electrokinetic technology does not infringe on this patent. U.S. Patent No. 5,589,056 cited in your letter of December 20 has not yet been issued; therefore, we are unable to comment.

   Lynntech is prepared to submit documentation prepared by a patent attorney concerning Lynntech's patent position with reference to the above patents. Lynntech requests an extension of this response opportunity to 5:00 p.m. on January 3, 1997, so that legal counsel (unavailable during the holidays) can provide clarification.

4. Lynntech is not currently, nor has it been in the past, involved in a dispute or litigation with any other firm, agency or individual relative to the use of the proposed technology.

5. See attached financial statements.

6. Lynntech is prepared to slide the schedule in accordance with altered contract dates. We would continue to use the schedule provided in the proposal as a sequence for tasks events, and the dates would be altered to fit the tasks as proposed. For example, Lynntech plans to carry out the pilot field test for 8 weeks. These 8 weeks could be adjusted to occur during a time frame in April-May, or as needed.

With best regards

Sincerely,

G. Duncan Hitchens
Vice President

c.c. Ken Rice, Parson's ES - Austin

Proposal to

**Parsons Engineering Science, Inc**

in response to

**RFP No. 728487.3000-00**

for

# Electrokinetic Treatability Services at Camp Stanley Storage Activity, Texas

Submitted by

**FLUOR DANIEL GTI**

and

KINETICS

December 12, 1996

BIDFORM 1
Schedule of Unit Electrokinetic Remediation Treatability Study
Field Pilot Scale Test
Camp Stanley Storage Activity, Boerne, Texas

| # | TASK | ESTIMATED QUANTITY | ESTIMATED TOTAL COST ($) |
|---|---|---|---|
| 1 | Work Plan, SAP, QAPP | 1 | 5,730 |
| 2 | Health and Safety Plan | 1 | 1,660 |
| 3 | Mobilization | 1 | 4,820 |
| 4 | Demobilization | 1 | 4,760 |
| 5 | Construction & Installation of Necessary Field Equipment | 1 | 16,630 |
| 6 | Field Pilot Study (minimum 6 weeks duration) | 1 | 15,960 |
| 7 | Soil Chemical Analyses* | 10 | XXXXX |
| 8 | Soil Physical Analyses | 0 | 0 |
| 9 | Progress Reports | 3 | 2,890 |
| 10 | Final Field Pilot-scale Treatability Study Report | 1 | 3,820 |
| 11 | Site Restoration Allowance | 1 | 620 |
| 12 | Project Management & Administration | 1 | 9,470 |
| 13 | Site Visit | 1 | 2,420 |
| 14 | Permit Allowance | 1 | 4,760 |
| | | | |
| | TOTAL | | 73,540 |

* 15 Metals each

The following are estimated quantities of utilities consumed and IDW generated based on our Electrokinetic process model

| Item | Units | Estimated Quantity |
|---|---|---|
| Energy | kw-hr | 10,000 |
| Electrolyte solution | gallons | 80 |
| IDW & PPE | gallons | 130 |
| Power Requirements | | 440 v, 3 phase |

BIDFORM 2
Schedule of Unit Electrokinetic Remediation Treatability Study
Laboratory Bench Scale Test
Camp Stanley Storage Activity, Boerne, Texas

| # | TASK | ESTIMATED QUANTITY | ESTIMATED TOTAL COST ($) |
|---|---|---|---|
| 1 | Work Plan | 1 | 3,360 |
| 2 | Laboratory Bench Scale Study | 1 | 17,386 |
| 3 | Soil Chemical Analyses** | 10 | XXXXX |
| 4 | Soil Physical Analyses | 0 | 1,184 |
| 5 | Progress Reports | 3 | 6,720 |
| 6 | Final Laboratory Report | 1 | 5,600 |
| | | | |
| | TOTAL | | 34,250 |

** 3 Metals each

Fluor Daniel GTI (FDGTI), in association with Geokinetics International, Inc. (GTI) is pleased to present this cost estimate in response to RFP No. 728487.3000-00, dated November 20, 1996. The cost estimate has been prepared in full compliance with all instructions and requirements of the solicitation.

### Project Costs

The base cost of this project is estimated at $107,790. This base cost includes the cost components for the Laboratory Bench-scale Tests and Field Pilot Test. Conservative cost factors used to account for uncertainties have not been applied to this estimate. Each of the tasks has been estimated based on our experience on projects of similar scope. As part of the overall cost of the project, we propose allocating a contingency of $15,000. This contingency would be treated in an innovative fashion where Parsons ES would approve its use on any of the subtasks requiring cost adjustments. The cost shown on the Section II pricing sheet includes this contingency factor. For a breakdown of the total cost by subtasks, refer to the following bidform sheets.

### Cost Sharing

FDGTI and GII has provided significant cost sharing associated with this project. This cost sharing is in the form of supplying equipment and technical services from GTI Technical Advisory Board at no-cost to the project. The value of the equipment including, electrodes, power unit, pumps, tankage and the control systems is approximately $62,000. In addition, we are sharing the labor cost associated with the Technical Advisory Board's input to the project. This effort is estimated at 120 hours which converts to approximately $12,000.

The cost estimate is valid for a period of 60 days.

The total estimated cost is included and has been submitted on the following Section II form.

## 4.1 COST ASSUMPTIONS

The cost provided in this proposal have been based on the following assumptions:

- The field test area will not have any liner pieces, greater than 2-foot in diameter, that are perpendicular to the electrode pairs.
- The field test area is free of large metal pieces including metal pipe, drums and miscellaneous steel.
- The cost of electrical power and water is borne by Parsons ES. Utilities, i.e., power lines, will be provided to the test area.
- A relatively level area will be provided to locate the Pilot Unit.
- Sanitary facilities exist on the site and can be used by FDGTI operating personnel.
- Provision for decontamination will be provided by Parsons ES
- Potable water will be available at the test site
- Removal of temporary utilities as part of site restoration is by Parsons ES

# *Evaluation of Electrokinetic Remediation of Oxidation Pond SWMU 0-1 at Camp Stanley Storage Activity*

*Submitted To:*

***Parsons Engineering Science, Inc.***
*8000 Centre Park Drive, Suite 200*
*Austin, Texas*

*EK Proposal No. 6-0019*
*December 10, 1996*

*Submitted By:*

***Electrokinetics Inc.***
*11552 Cedar Park Drive*
*Baton Rouge, Louisiana*

BIDFORM 1

Schedule of Unit Rates for Elecrokinetic Remediation Treatability Study

Field Pilot Scale Test

Camp Stanley Storage Activity, Boerne, Texas

| | Task | Estimated Quantity | Unit | | Unit Rate | Estimated Total Cost |
|---|---|---|---|---|---|---|
| 1. | Work Plan | 1 | Lump Sum | $ | 2,075 | $2,075 |
| 2. | Health and safety plan | 1 | Lump sum | $ | 1,800 | $1,800 |
| 3. | Mobilization | 1 | Lump sum | $ | 4,725 | $4,725 |
| 4. | Demobilization | 1 | Lump sum | $ | 4,725 | $4,725 |
| 5. | Construction of necessary field equipment | 1 | Lump sum | $ | 21,500 | $21,500 |
| 6. | Field pilot scale study (minimum 6 weeks duration) | 1 | *In situ* | $ | 63,590 | $63,590 |
| 7. | Soil chemical analyses** | -* | Sampling event | $ | 10,560 | $10,560 |
| 8. | Soil physical analyses** | 1 | Sampling event | $ | NA | NA |
| 9. | Progress reports | 3 | Monthly | $ | 467 | $1,401 |
| 10. | Final field pilot scale treatability study report | 1 | Lump sum | $ | 11,200 | $11,200 |
| 11. | Site restoration | 1 | Lump sum | $ | 8,200 | $8,200 |
| | | | | | Total: | $129,776 |

* Subcontractor to estimate number of chemical contaminant analytical sampling events required for a laboratory benchscale test.

** See Table 1-1 in the proposal for the analytical testing matrix.

NA - Not applicable.

BIDFORM 2

Schedule of Unit Rates for Electrokinetic Remediation Treatability Study

Laboratory Bench Scale Test

Camp Stanley Storage Activity, Boerne, Texas

| | Task | Estimated Quantity | Unit | | Unit Rate | Estimated Total Cost |
|---|---|---|---|---|---|---|
| 1. | Work Plan | 1 | Lump Sum | $ | 2,075 | $2,075 |
| 2. | Laboratory benchscale study | 1 | *Ex situ* | $ | 10,186 | $10,186 |
| 3. | Soil chemical analyses** | -* | Sampling event | $ | 8,900 | $8,900 |
| 4. | Soil physical analyses** | 1 | Sampling event | $ | 610 | $610 |
| 5. | Progress reports | 3 | Monthly | $ | 467 | $1,401 |
| 6. | Final laboratory benchscale treatability study report | 1 | Lump sum | $ | 9,648 | $9,648 |
| | | | | | Total: | $32,820 |

* Subcontractor to estimate number of chemical contaminant analytical sampling events required for a laboratory benchscale test.

** See Table 1-1 in the proposal for the analytical testing matrix

Proposal

for

# TECHNOLOGY DEMONSTRATION: ELECTROSORB® ELECTROKINETIC EXTRACTION PROCESS FOR EXTRACTION OF CHROMIUM AND CADMIUM FROM SOIL

RFP No. 728487-3000-00

Submitted by:

ISOTRON® Corporation
13152 Chef Menteur Hwy.
New Orleans, LA 70129-1865
Phone: (504) 254-4624
Fax: (504) 254-5172
E-mail: isotron_usa@msn.com

Submission Date:
December 12, 1996

BIDFORM 1
Schedule of Unit Rates for Electrokinetic Remediation Treatability Study
Field Pilot Scale Test
Camp Stanley Storage Activity, Boerne, Texas

| Task | Estimated Quantity | Unit | Unit Rate | Unit Rate |
|---|---|---|---|---|
| 1. Work plan | 1 | Lump sum | $10,725 | $10,725 |
| 2. Health and Safety Plan | 1 | Lump sum | $11,819 | $11,819 |
| 3. Mobilization | 1 | Lump sum | $ 4,651 | $ 4,651 |
| 4. Demobilization | 1 | Lump sum | $ 4,651 | $ 4,651 |
| 5. Construction of necessary field equipment | 1 | Lump sum | $28,018 | $28,018 |
| 6. Field pilot scale study (minimum 6 weeks duration) | 1 | *In situ* | $23,983 | $23,983 |
| 7. Soil chemical analyses | __ * | Sampling event | $ X ** | $ X ** |
| 8. Soil physical analyses | 1 | Sampling event | $ 7,754 | $ 7,754 |
| 9. Progress Reports | 3 | monthly | $ 3,895 | $11,685 |
| 10. Final field pilot scale treatability study report. | 1 | Lump Sum | $ 7,937 | $ 7,937 |
| 11. Site restoration | 1 | Lump Sum | $ 2,000 | $ 2,000 |
| | | | Total: $ | 113,223 |

*Subcontractor to estimate number of chemical contaminant analytical sampling events required for a field pilot scale test.

**Note: Tasks 7 & 8 costs combined. Task No. 7 quantity to be determined.

Note:

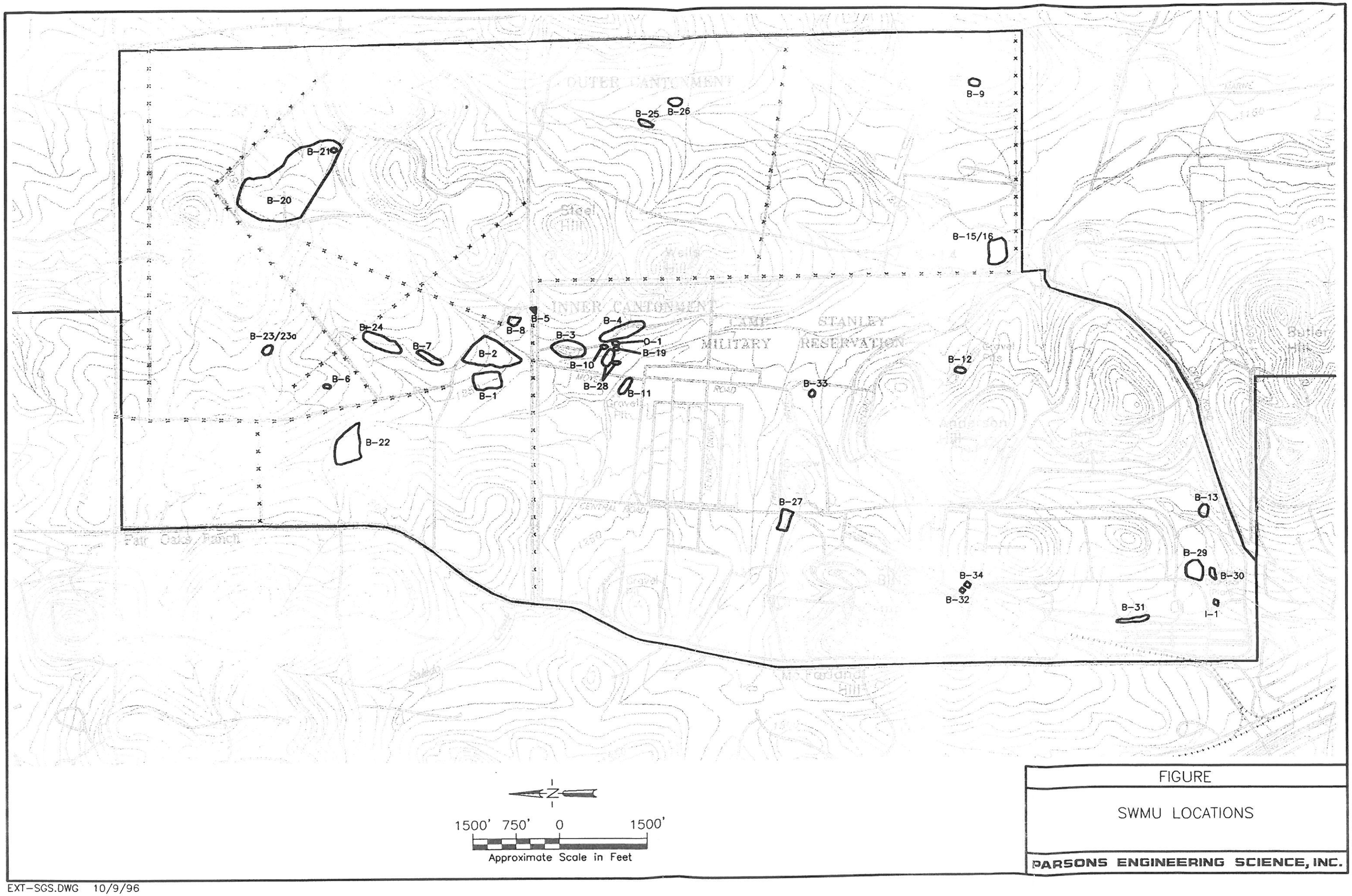
OPTION NO. 2 is applicable to tasks 3, 4, 5 and 6. It provides for more comprehensive treatability study at additional cost of $33,340. (see attached detail)

## BIDFORM 1
## FIELD SCALE PILOT TEST
## OPTION NO. 2

| OPTION NO. 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| LABOR | | BASE | | HRS | | TTL | |
| HENRY LOMASNEY | | $51.83 | | 35 | | 1,814.05 | |
| MICHAEL LOMASNEY | | $21.46 | | 100 | | 2,146.00 | |
| GLENN SEAL | | $15.19 | | 110 | | 1,670.90 | |
| JOHNNY LOMASNEY | | $14.00 | | 122 | | 1,708.00 | |
| TOTAL LABOR | | | | | | | $7,338.95 |
| | | | | | | | |
| LABOR OVERHEAD | % | 90.10% | | | | | $6,612.39 |
| | | | | | | | |
| MATERIALS | | COST | | QTY. | | TTL | |
| SUPPLIES/HARDWARE | | 5,000.00 | | | | 5,000.00 | |
| TOTAL MATERIALS | | | | | | | $5,000.00 |
| | | | | | | | |
| TOTAL COST SUBJECT TO G&A | | | | | | | $18,951.34 |
| GENERAL & ADMINISTRATIVE | % | 58.11% | | | | | $11,012.62 |
| | | | | | | | |
| SUBCONTRACTS | | COST | | | | TTL | |
| SAT/UNSAT | | 3,000.00 | | | | 3,000.00 | |
| TOTAL SUBCONTRACTS | | | | | | | $3,000.00 |
| SUBCONTRACT G&A | % | 14.52% | | | | | $435.60 |
| | | | | | | | |
| TOTAL COST | | | | | | | $33,399.56 |

**Attachment 3**

**B-3 Site Map**



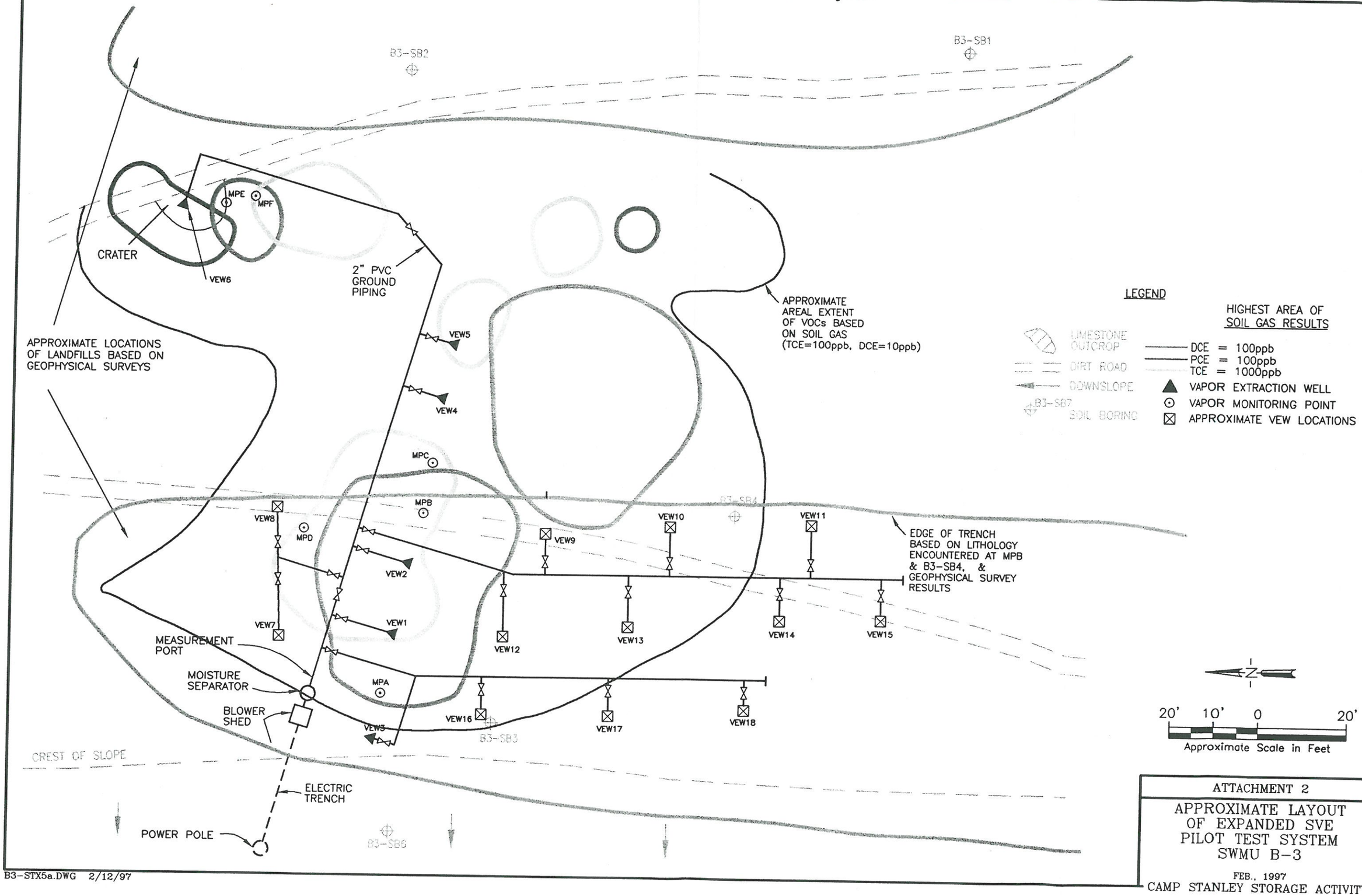

FIGURE

SWMU LOCATIONS

PARSONS ENGINEERING SCIENCE, INC.

EXT-SGS.DWG 10/9/96

PARSONS ENGINEERING SCIENCE, INC.



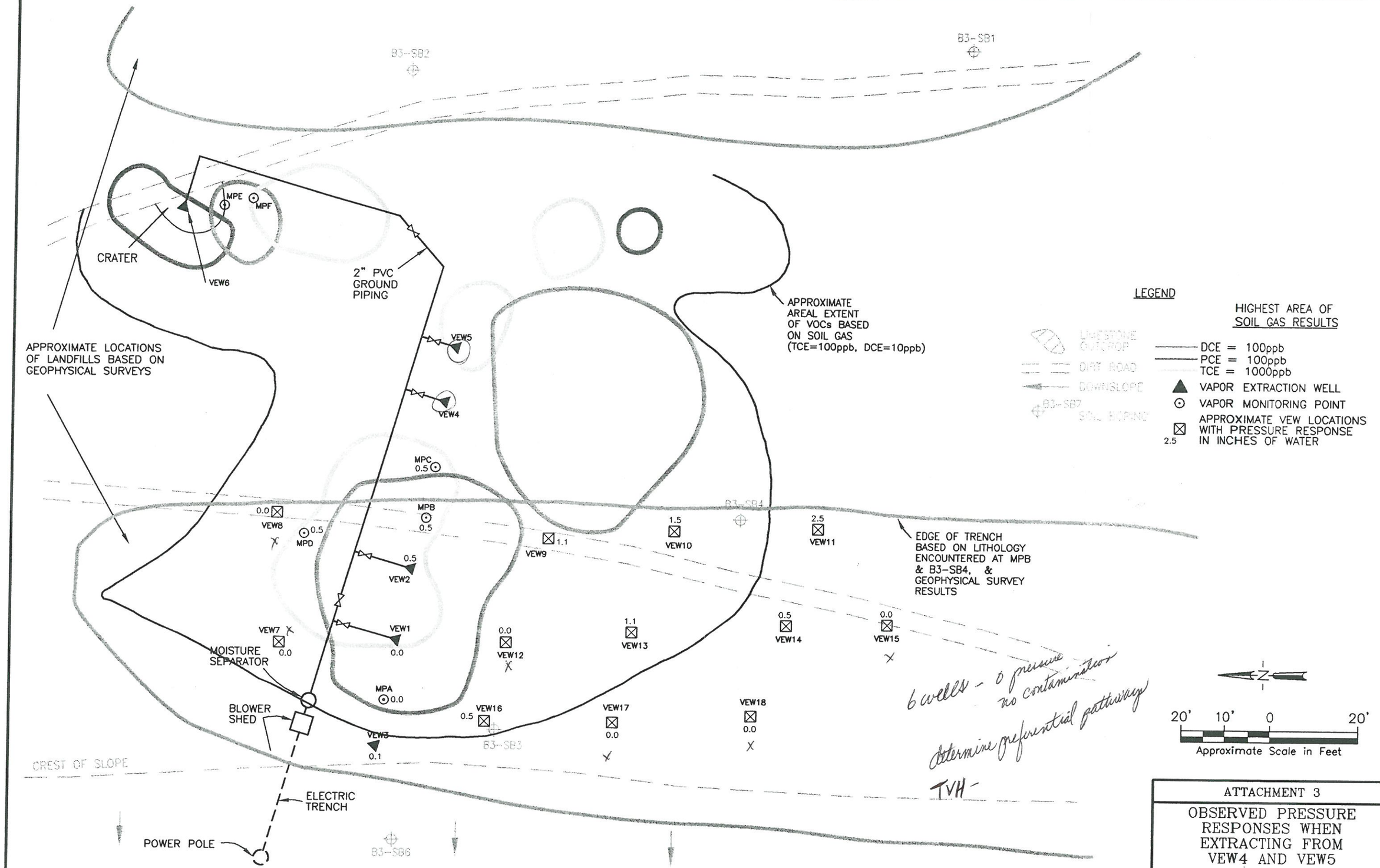

B3-STX5a.DWG 2/12/97

ATTACHMENT 2

APPROXIMATE LAYOUT OF EXPANDED SVE PILOT TEST SYSTEM SWMU B-3

FEB., 1997

CAMP STANLEY STORAGE ACTIVITY




ATTACHMENT 3

OBSERVED PRESSURE RESPONSES WHEN EXTRACTING FROM VEW4 AND VEW5

FEB., 1997

CAMP STANLEY STORAGE ACTIVITY

B3-STX5b.DWG 2/12/97