THE BOARD OF SUPERVISORS OF THE COUNTY OF STANISLAUS
ACTION AGENDA SUMMARY

DEPT: PUBLIC WORKS

Urgent ____ Routine ✓

CEO Concurs with Recommendation YES ____ NO ____
(Information Attached)

BOARD AGENDA # *C-6

AGENDA DATE OCTOBER 2, 2001

4/5 Vote Required YES ____ NO ✓

SUBJECT:

APPROVAL TO DIRECT THE PURCHASING AGENT TO EXECUTE PROJECT AGREEMENT NO. 2001-04 WITH KLEINFELDER, INC. TO CONDUCT ADDITIONAL GROUNDWATER INVESTIGATION AT THE GEER ROAD LANDFILL

STAFF RECOMMEN-DATIONS:

1. APPROVAL TO DIRECT THE PURCHASING AGENT TO EXECUTE PROJECT AGREEMENT NO. 2001-04 WITH KLEINFELDER, INC. TO CONDUCT ADDITIONAL GROUNDWATER INVESTIGATION AT THE GEER ROAD LANDFILL; AND,

2. DIRECT THE AUDITOR TO INCREASE APPROPRIATIONS IN THE GEER ROAD LANDFILL BUDGET IN THE AMOUNT OF $242,686 PER THE ATTACHED BUDGET JOURNAL.

FISCAL IMPACT:

Approval of the additional groundwater investigation this is being required by the Regional Water Quality Control Board requires increasing appropriations in the Geer Road Landfill budget. There are sufficient funds available in the Geer Road Landfill Enterprise Fund to cover this transaction.

BOARD ACTION AS FOLLOWS:

No. 2001-767

On motion of Supervisor Simon , **Seconded by Supervisor** Blom
and approved by the following vote,
Ayes: Supervisors: Mayfield, Blom, Simon, Caruso, and Chair Paul
Noes: Supervisors: None
Excused or Absent: Supervisors: None
Abstaining: Supervisor: None

1) X **Approved as recommended**
2) ____ **Denied**
3) ____ **Approved as amended**
MOTION:

Christine Ferraro

ATTEST: CHRISTINE FERRARO TALLMAN, Clerk **By: Deputy** **File No.**

DISCUSSION: In January of 2001, Stanislaus County submitted to the Central Valley Regional Water Quality Control Board a report detailing groundwater investigation results for the Geer Road Landfill. Based on these results, areas requiring further groundwater testing were identified along with other items necessary to allow us to adequately determine groundwater characteristics. The contract with the firm of Kleinfelder, Inc. was negotiated to provide this work. This contract and work plan have also been approved by the Water Quality Control Board.

The Board's approval authorized the Purchasing Agent to execute Project Agreement No. 2001-04. It will provide for the necessary work. Some of the additional investigations include:

- Task 1: Install and Sample Additional Shallow and Deep Groundwater Monitoring Wells
- Task 2: Evaluate Soil/Waste Contact at Bottom of Landfill
- Task 3: Install Two Leachate Wells
- Task 4: Install Gas Probes in Vadose Zone Beneath the Landfill
- Task 5: Monitor Groundwater in Domestic Wells Adjacent to the Landfill
- Task 6: Sampling of Additional Gas Probes
- Task 7: Evaluate Influence of River Stage on Groundwater Elevations
- Task 8: Findings and Feasibility Study Report

Approval of Project Agreement No., 2001-04 to the Master Agreement for Professional Services with Kleinfelder, Inc. requires increasing appropriations in the Geer Road Landfill budget in the amount of $242,686.00.

POLICY ISSUES: This action is consistent with the Board's goal of providing a safe, healthy community.

STAFFING IMPACT: There is no staffing impact associated with this item.

PB:la
H:\Patrick\Geer Road Groundwater InvestigationBOS.wpd

AUDITOR - CONTROLLER
COPY

AUDITOR-CONTROLLER
BUDGET JOURNAL

Stanislaus County
Striving to be the Best

Budget Organization: **Stanislaus Budget Org**
Budget: **LEGAL BUDGET**
Accounting Period From: Jul-01
To: Jun-02

Department of Public Works
STANISLAUS COUNTY

BATCH SCREEN

Journal Batch: **PW - LW** BO --
Category: **Budget**

Line	Coding Structure: Fund 4	Org 7	Account 5	G/L Proj 7	Loc 6	Misc 6		Period Sep-01 AMOUNT	Description
1	4031	41200	63280	0	0	0	.0	242,686.00	Increase Appr
2							.0		
3							.0		
4							.0		
5							.0		
6							.0		
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8							.0		
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21							.0		
22							.0		
23							.0		
24							.0		
25							.0		
						Totals		242,686.00	

Explanation:
To fund additional Required Ground Water Investigation at Geer Road landfill

Requesting Department	CEO	Auditors Office Only
Larry Wendel		
Signature	Signature	Approved By / Admin Approval ($75K+)
25-Sep-01		9/26/01
Date	Date	Date

PROJECT NO. 2001-04
(Kleinfelder)

A. TERMS AND CONDITIONS

Except as hereinafter provided, the services provided by the Consultant under this Project shall be subject to the terms and conditions set forth in the MASTER AGREEMENT FOR PROFESSIONAL SERVICES made and entered into by and between the COUNTY OF STANISLAUS ("County") and KLEINFELDER, INC., a California corporation ("Consultant"), on November 23, 1998, as amended by Amendment No. 1 (the "Agreement") approved June 8, 1999 (Resolution No. 1999-428).

B. SCOPE OF WORK

The Consultant shall provide services under the Agreement for additional groundwater investigation at the Geer Road Landfill in accordance with the adopted Central Valley Regional Water Quality Control Board requirements and applicable Waste Discharge Requirements, as set forth in the Consultant's "Revised Proposal for Additional Groundwater Investigation Geer Road Landfill Stanislaus County, California" dated September 14, 2001, Proposal 23-YP6778 (the "Proposal"), attached hereto and, by this reference, made a part hereof.

C. COMPENSATION

1. The Consultant shall be compensated for the services provided under this Agreement on a time and materials basis, based on the hours worked by the Consultant's employees or subcontractors, multiplied by the applicable rates set forth in Table 4 of the Consultant's Proposal; provided, however, the Consultant will provide the County 30-days notice before any change in the rate schedule takes effect. In addition to the aforementioned fees, Consultant will be reimbursed for the following expenses, plus any expenses agreed to by the parties as set forth in a Schedule of Rates attached hereto, that are reasonable, necessary and actually incurred by the Consultant in connection with the services:

(a) Any filing fees, permit fees, or other fees paid or advanced by the Consultant.

(b) The cost of any subcontractors, consultants, experts or investigators retained pursuant to Paragraph 1.6 of the Agreement.

(c) Expenses, fees or charges for printing, reproduction or binding of documents at actual costs.

2. Fees paid to the Consultant for sampling and analytical costs shall be prorated based on the actual number of wells sampled each month.

3. The parties hereto acknowledge the maximum amount to be paid by the

County for services provided shall not exceed $242,686.00, including, without limitation, the cost of any subcontractors, consultants, experts or investigators retained pursuant to Paragraph 1.6 of the Agreement.

IN WITNESS WHEREOF, the parties have executed this Project No. 2001-04 on October 3rd, 2001.

COUNTY OF STANISLAUS

By:_____ 10-3-01
Dale Butler
Purchasing Agent

"County"

KLEINFELDER, INC.

By:_____ P.E. for
~~John A. Baker, P.E.~~
Regional Manager Russell Carey Division Manager.

"Consultant" Senior V.P.

Taxpayer Identification No _____

APPROVED AS TO CONTENT:
George Stillman, Director
Department of Public Works

By:_____
Patrick Bates
Business Manager

APPROVED AS TO FORM:
Michael H. Krausnick
County Counsel

By:_____
John P. Doering
Deputy County Counsel

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KLEINFELDER
An employee owned company

September 14, 2001
File No.: 23-YP6778

Ron Grider
Stanislaus County Department of Public Works
P.O. Box 86
Crows Landing, California 95313

Subject: Revised Proposal for Additional Groundwater Investigation
Geer Road Landfill, Stanislaus County

Dear Mr. Grider:

Enclosed with this letter is our revised proposal for additional groundwater investigation at Geer Road Landfill. Our first proposal was submitted to you in a letter dated May 18, 2001 with an estimated budget of $151,918. This proposal was based in a May 18th workplan conceptually approved by Wendy Arano at the Regional Water Quality Control Board (RWQCB). As you are aware, Ms. Arano left the RWQCB and was replaced by Ms. Kim Schwab. Ms. Schwab reviewed the May 18th workplan and issued a letter dated August 13, 2001 requesting additional information that expanded the scope of the investigation. The revised proposal enclosed with this letter addresses the RWQCB comments with an expanded investigation. The estimated budget for this expanded scope of work is now $242,686. This increase in cost is due to addition of the follow items to the overall scope of work:

- Addition of three new groundwater monitoring wells (two dual-completion, one single-completion).
- Converting three proposed groundwater monitoring wells from single-completion to dual-completion.
- Addition of direct-push sampling to establish drilling locations for new groundwater monitoring wells.
- Gather information on construction of domestic wells on surrounding properties.
- Addition of geomembrane boots to gas wells and leachate wells advanced through the landfill.
- Modeling the performance of the existing groundwater extraction system.
- Addition of detailed geologic cross-sections to final report.

If you have any questions or require additional information, please feel free to contact me.

Sincerely,

KLEINFELDER, INC.

Timothy A. Crandall, P.E.
Senior Engineer

23-YP6778\2311P371

REVISED PROPOSAL FOR ADDITIONAL GROUNDWATER INVESTIGATION GEER ROAD LANDFILL STANISLAUS COUNTY, CALIFORNIA

September 14, 2001
Proposal: 23-YP6778

TABLE OF CONTENTS

CHAPTER **PAGE**

PLATES

APPENDICES

1 INTRODUCTION

Geer Road Landfill is a closed Class III facility that formerly accepted municipal and cannery waste. The landfill is approximately 10 miles southeast of the City of Modesto in Stanislaus County (Plate 1). The workplan prepared on May 18, 2001 presents the scope of work and cost estimate for implementing the recommendations presented in the Groundwater Investigation Report for Geer Road Landfill (Kleinfelder, January 15, 2001). It also included the additional investigation work requested by the RWQCB in its March 2, 2001 letter to Stanislaus County regarding review of the January 15, 2001 Groundwater Investigation Report. However, after further review, the RWQCB requested additional scope items in the August 13, 2001 letter. This revised workplan includes these additional tasks in conjunction with those presented in the May 18, 2001 Workplan.

The following tasks are outlined and discussed in further detail in the following sections describing the Scope of Work for the Additional Investigation.

Pre-field Activities: Gather and Evaluate Information Relevant to Field Activities

Task 1: Install and Sample Additional Shallow and Deep Groundwater Monitoring Wells
Task 2: Evaluate Soil/Waste Contact at Bottom of Landfill
Task 3: Install Two Leachate Wells
Task 4: Install Gas Probes in Vadose Zone Beneath the Landfill
Task 5: Monitor Groundwater in Domestic Wells Adjacent to the Landfill
Task 6: Sampling of Additional Gas Probes
Task 7: Evaluate Influence of River Stage on Groundwater Elevations
Task 8: Findings and Feasibility Study Report

2 SCOPE OF WORK

2.1. PRE-FIELD ACTIVITIES - GATHER AND EVALUATE INFORMATION RELEVANT TO FIELD ACTIVITIES

The installation locations of wells and gas probes discussed in the following tasks are dependent upon information gathered prior to initiating field activities. Of importance is gathering information on the Pinewood Meadows mobile home park regarding the leach fields and production well pumping rates. Owners of Pinewood Meadows have been contacted for the information. The facility was sold approximately two months ago and the new owners do not have the information, particularly the location of the leach fields. They are currently searching their records for leach field information.

2.2. TASK 1 - INSTALL AND SAMPLE ADDITIONAL SHALLOW AND DEEP GROUNDWATER MONITORING WELLS

2.2.1. Direct Push Exploration

The results of the direct push groundwater sampling in October 2000 suggested that the VOC plume extended beyond the property boundary of the landfill. The RWQCB requested in its August 13, 2001 letter that the plume boundaries be first assessed and that additional wells be placed at the outer edges of the plume to establish a "zero" line. This will be accomplished using the step-out/step-down procedure outlined below.

Step-out/Step-down Procedure

1. Starting at the landfill facility boundary, advance direct push probe to first encountered groundwater, collect groundwater sample, and analyze for VOCs using onsite mobile laboratory.

2. If VOCs are detected, advance probe additional 20 feet and resample. Repeat until VOCs are no longer detected.

3. Step-out from landfill 300 feet from initial point and repeat process until the "zero" line is found.

Data from the direct push investigation will be used to place the monitoring wells based on the following decision rules:

1. Place shallow groundwater well at first step-out location where VOCs were not detect in first encountered groundwater.

2. At same location of shallow well, set the top of the screen of the deep well at an elevation equal to the deepest depth of detected VOCs in the immediate area plus 20 feet.

Depending on the location and purpose of the monitoring well, the complete step-out/step-down procedure may or may not be used. Implementation of the step-out/step-down procedure for individual wells is described below.

- **Lopez Property Wells** (two dual-completion wells): Use full step-out/step-down procedure.
- **Wells South of Tuolumne River** (two dual completion wells): Use full step-out/step-down procedure starting at point south of river.
- **Wells West of Mobile Home Park** (one dual-completion well): Step-out/step-down procedure will not be used. North-South location of well will be based on known or inferred location of mobile home park leach fields. Deeper well top of screen will be set at 30 feet below first encountered groundwater or possibly deeper based on depth of domestic wells in mobile home park.
- **Background Well** (one single-completion well): Use full step-out/step-down procedure and screen well across first encountered groundwater.

The well installations for the above locations and types of wells are described in further detail in the following subsections.

2.2.2. Lopez Property Wells

Kleinfelder proposes to install two additional monitoring wells along the northwestern side of the landfill to evaluate if there is a component of groundwater flow in a northwesterly direction. The two well locations will each have two casings screened in the shallow and deep horizons. Shallow wells will be screened in first encountered groundwater with the screen positioned 5 feet above and 15 feet below the groundwater surface. The deep well will be screened at a depth of 20 feet below the deepest vertical extent of VOC impacts found in the immediate area during the direct push investigation. The two wells will be completed as dual-completion wells.

2.2.3. Wells South of Tuolumne River

Kleinfelder proposed to install two groundwater monitoring locations to the south of the river and the landfill. These will be dual-completion wells and will use the step-out procedure to determine the location of the casings. Currently Tuolumne Irrigation District is performing channel work on the river. Fieldwork for direct push exploration and well installation will not be initiated in this area until construction is complete. The completion date of the river work is currently unknown.

2.2.4. Wells West of Mobile Home Park

Kleinfelder proposes to install one additional monitoring well east of Geer Road and downgradient of the Pinewood Meadows mobile home park, to monitor possible effects of groundwater draw-down caused by pumping of the mobile home park groundwater production wells. This proposed well will also be used to evaluate if the septic-system leach fields of the mobile home park are affecting groundwater quality beneath the landfill. The exact location of this well is dependent upon information gathered from the mobile home park regarding the leach fields and production wells. The well will have two casings screened in the shallow and deep horizons. As requested by the County, a separate document will include the data quality objectives, construction details, and a sampling and analysis plan for the proposed monitoring well.

2.2.5. Background Well

Kleinfelder also proposes to install an additional background monitoring well for the shallow horizon, which would replace MW-13S and MW-16S for background monitoring points. MW-13S and MW-16S were found to be impacted with VOCs. The new background monitoring well will be located upgradient of the landfill and the VOC plume ("zero" line assessed by direct push sampling).

2.2.6. Monitoring/Background Well Installation and Construction

Kleinfelder will contract the services of a California licensed water well drilling company to drill 6-inch diameter boring for these eleven proposed monitoring wells using continuous-flight hollow-stem auger drilling methods. The wells will be constructed of 2-inch inside diameter (ID) polyvinyl chloride (PVC) flush threaded well casing, with 0.02 screen slot size. Each well will have a single 20-foot long factory machine-slotted screen interval placed 5 feet above and 15 feet below the static water table for the shallow wells. The screened area will have a sand pack using 2/12 Lonestar sand. The deep wells will be screened differently for each location as described in the previous paragraphs. The total depth of the wells will be dependent upon the depth to first encountered groundwater and direct push groundwater sampling results. Well surface completion will consist of lockable protective metal risers or flush mount vault boxes if vehicle traffic at the well location is expected.

One of the borings will be drilled as deep as possible to determine if a possible aquitard exists in the area. The boring location will be determined based on the results of the direct push exploration. Once the deepest extent of the boring has been reached, the borehole will be filled with a cement/bentonite slurry up to the setting of the deepest well for that borehole.

Kleinfelder will apply for well construction permits from Stanislaus County Department of Environmental Resources and contact Underground Service Alert for subsurface utility clearance prior initiating drilling. Kleinfelder also will apply for an easement from Stanislaus County Department of Public Works for access to install the monitoring well proposed on the east side of Geer Road. Kleinfelder will oversee the drilling and well construction activities and will log the subsurface soil to characterize the material type using the Unified Soil Classification System. Drill cuttings will be spread on the ground surface.

2.2.7. Monitoring and Reporting

These additional wells will be sampled immediately after installation and development and thereafter included in the semiannual monitoring for the landfill. Samples will be analyzed for groundwater monitoring parameters listed in RWQCB Waste Discharge Requirement, Monitoring and Reporting Program (MRP) Order No. 5-00-087. Field activities for the installation of these wells will be discussed in a report of findings and summarized in the next semi-annual monitoring report following installation. The report of findings will include boring

logs, well construction details, and surveyed elevation and location data for the new wells. Appendix C describes the methodology for sampling groundwater.

2.3. TASK 2 - EVALUATE SOIL/WASTE CONTACT AT BOTTOM OF LANDFILL

The Groundwater Investigation Report recommends geophysical methods to attempt to map the soil/waste contact at the bottom of the landfill. However, further evaluation of available methods indicates that, without cost prohibitive coverage, the anticipated heterogeneous nature of mixed waste at the landfill will likely result in poor data quality. Therefore, Kleinfelder proposes to drill several test borings at various locations in the landfill cells to evaluate potential areas were waste is in contact with groundwater.

2.3.1. Exploratory Boring Location

Kleinfelder proposes to install an estimated five test borings through the landfill waste. The actual total number of test borings to be drilled for the Task 2 evaluation will be based on field conditions encountered. Based on review of limited available information on the landfill "as-built" design, the maximum depths to be drilled are uncertain. Kleinfelder has estimated the total depth for each boring to be approximately 100 feet. Drilling is estimated to last for five days. The proposed boring locations are shown on Plate 2, but may be modified based on field conditions.

Inadvertently, creating a conduit for release of leachate is a concern. As drilling proceeds, the waste will be checked (in 5 feet intervals) for pooled leachate. If pooled leachate is encountered, the boring will be terminated at that elevation. If pooled leachate is not encountered, the boring will be only advanced to the soil/waste contact at the bottom of the landfill.

Kleinfelder will apply for applicable test boring construction permits from Stanislaus County Department of Environmental Resources prior initiating drilling. Kleinfelder will contract the services of a California licensed well driller to drill 8-inch diameter boring for these five proposed test borings using continuous-flight hollow-stem auger drilling methods. The drilling contractor will have experience in installing wells in landfills with methane gas and potentially explosive conditions. A Health and Safety Plan for the drilling activities can be found in Appendix A of this Workplan. Kleinfelder will oversee the drilling and well construction activities and log the subsurface material to identify the depth of groundwater and waste contact with the underlying soil.

Test borings will be grouted with a cement/bentonite slurry from the bottom of the boring and capped with native soil. Since we will be drilling through the geomembrane (60 mil HDPE) in the final cap, the damaged membrane will be repaired by covering the puncture with a patch of similar material and then extrusion welding the patch to the underlying sheet. Drill cuttings will be left on the landfill surface and tarped. The cuttings will then be loaded into a dump truck, tarped, and transported to Fink Road Landfill for disposal. Investigative derived wastewater will be discharged to the onsite groundwater treatment plant.

2.3.2. Reporting

At the request of the RWQCB (March 2, 2001 letter), a separate report with the results of Task 2 will be prepared and submitted to the RWQCB. This report will present the results of Task 2 and show final locations for the leachate wells (Task 3) and the vadose zone gas monitoring probes (Task 4). It will be submitted for RWQCB review and approval prior to installing either the leachate wells or the gas probes.

2.4. TASK 3 - INSTALL LEACHATE WELLS

Kleinfelder proposes to install two leachate wells through the top of the landfill down to the bottom of waste. These wells would be located in areas of suspected "wet feet." One leachate well is proposed in the northern portion of the landfill and one in the southern portion. The proposed well locations are shown on Plate 2, but may be modified depending on the findings of Task 2. The purpose of these leachate wells is to evaluate if there is an inundation of waste by rising groundwater causing standing leachate in these areas.

2.4.1. Leachate Well Installation and Construction

Kleinfelder will apply for well construction permits from Stanislaus County Department of Environmental Resources prior initiating drilling. Kleinfelder will also oversee the drilling and well construction activities and log the subsurface material to identify the depth of groundwater and waste contact with the underlying soil.

Kleinfelder will contract the services of a California licensed well driller to drill 8-inch diameter boring for these three proposed monitoring wells using continuous-flight hollow-stem auger drilling methods. The drilling contractor will have experience in installing wells in landfills with methane gas and potentially explosive conditions. A Health and Safety Plan for the drilling activities can be found in Attachment A of this Workplan. The wells will be constructed of 4-inch ID PVC, with 20-foot long factory machine-slotted screened intervals. These wells are proposed as 4-inch diameter wells for possible conversion to leachate extraction wells at a later date. The size of the screen for the leachate wells will be 0.25 inches to accommodate for slime build-up in the well that could potentially block the screens. The gravel pack around the screened interval will be 1-inch clean coarse gravel.

Since drilling will occur through the geomembrane (60 mil HDPE) in the final cap, the punctured membrane will be repaired by attaching an HDPE boot to a slip collar around the well casing. The slip collar can be adjusted for settling of the landfill without tearing the HDPE liner. The edges of the boot will be extrusion welded to the underlying sheet. The RWQCB has expressed concern regarding settlement in the immediate vicinity of the leachate wells and that settlement may lead to ponding. SCS Field Services monitors and maintains the landfill gas extraction system at Geer Road Landfill and inspects the facility on a weekly basis. SCS Field Services will also be instructed to inspect the leachate wells on a weekly basis. If evidence of ponding is found, repairs will be made to correct the problem.

The total depth of the leachate wells will be based on findings of the test borings proposed in Task 2. Based on review of the available information for the landfill, Kleinfelder proposes to install the well in the northern and southern portions of the landfill to depths of approximately 100 feet below ground surface (bgs). The bottom of the wells will be set at the waste/soil interface (place where waste contacts native soil).

Drill cuttings will be left on the landfill surface and tarped. The cuttings will then be loaded into a dump truck, tarped, and transported to Fink Road Landfill for disposal. Investigative derived wastewater will be discharged to the onsite groundwater treatment plant.

2.4.2. Monitoring and Reporting

These additional wells will be fitted with water level monitoring probes fitted with data loggers. The probes will be placed in the wells and left for one wet season (rainy season of 2001/2002) in

an attempt to detect a seasonal rise of groundwater, possibly into the landfill waste. Field activities for the installation of these monitoring probes will be discussed in the subsequent semi-annual monitoring report following installation.

2.5. TASK 4 - INSTALL GAS PROBES IN VADOSE ZONE BENEATH LANDFILL

Kleinfelder proposes to install vadose-zone soil gas-monitoring probes to measure the character of vadose zone gases beneath the landfill. Three probes will be installed beneath the landfill (instead of at the edges, where the current gas probes are located) to further evaluate the occurrence, source, and migration pathway of VOCs in the vadose zone. A fourth gas probe will be installed west of groundwater monitoring wells MW-7S and MW-7D to evaluate higher VOC concentrations in the landfill that may be associated with the offsite migration to groundwater monitoring well MW-16S. The proposed location of these probes is shown on Plate 2. A construction diagram of the probes is shown on Plate 3 and 4.

2.5.1. Gas Probe Drilling and Construction

The total depth of the three gas probes to be installed beneath the landfill will be based on findings of the soil/waste contact evaluation (Task 2), the location of the probe, and conditions encountered during drilling. However, for cost estimating purpose the proposed depth of these three gas wells beneath the landfill is based on review of available landfill design and construction information provided by Stanislaus County. Based on review of the available information for the landfill, Kleinfelder proposes to install the probes to depths approximately 90 feet bgs, with a single screened interval from about 85 to 90 feet bgs or at a depth below the landfill waste and above the groundwater table. If there is a greater amount of vadose zone available between the bottom of the landfill and the groundwater table, an additional screened interval will be added to the gas well. If standing leachate is found in the borehole, the probes will not be installed at that location and the hole will be grouted to the surface.

The gas probe to be installed west of groundwater monitoring wells MW-7S and MW-7D will be screened at depths of approximately 5 to 10 feet, 25 to 30 feet, and 50 to 55 feet bgs. These screened intervals will provide monitoring at depths consistent with gas probe GP-38 installed at the eastern side of the landfill, between MW-7S and MW-16. Construction diagrams are provided on Plate 3 and 4.

Kleinfelder will contract the services of a California licensed well driller to drill 10-inch diameter boring for the proposed gas probes using continuous-flight hollow-stem auger drilling methods. The probes will be constructed of 1/2-inch ID PVC, with 5-foot long factory machine-slotted screened intervals. Since we will be drilling through the geomembrane (60 mil HDPE) in the final cap, the damaged membrane will be repaired by attaching HDPE boots to the well casings and then extrusion welding the edges of the boots to the underlying sheet. The gas probes surface completions will consist of lockable protective metal risers. SCS Field Services will monitor the probe locations for ponding as described in Task 3.

Drill cuttings will be left on the landfill surface and tarped. The cuttings will then be loaded into a dump truck, tarped, and transported to Fink Road Landfill for disposal. Investigative derived wastewater will be discharged to the groundwater treatment plant.

2.5.2. Monitoring and Reporting

After the three gas probes are installed, a gas sample will be taken to determine the VOC concentrations at the different intervals. Task 6 describes this monitoring along with other selected probes at the landfill. Appendix C describes the methodology for gas sampling.

2.6. TASK 5 - MONITOR OFF-SITE DOMESTIC WELLS ADJACENT TO LANDFILL

Kleinfelder proposes to initiate quarterly monitoring of domestic production wells located on properties adjacent (north, south, and east) to Geer Road Landfill. The quarterly monitoring will include the groundwater monitoring parameters listed in MRP Order No. 5-00-087 and will occur until instructed by the RWQCB to stop. Kleinfelder will also evaluate the influence of the groundwater extraction rates from these wells on groundwater flow beneath the landfill. The private properties (Lopez to the north, Streeter to the south, and Pinewood Meadows Mobile Home Park to the east) and locations of the domestic wells are shown on Plate 2. The Streeter Property appears to have two wells, but is currently only using one. The well in use will be

sampled. If the other well is brought online, then it will also be sampled. Pinewood Meadows has three domestic wells. Kleinfelder will sample the one that is in use at the time of sampling.

Results of the quarterly monitoring will be discussed in a report of findings for this investigation and summarized in the semiannual groundwater monitoring reports submitted to the RWQCB. Findings of the evaluation of extraction rates form these wells will also be included in the report of findings. Additionally, results of the analyses of groundwater samples collected from the private domestic wells will be reported in letter reports to the RWQCB and the property owners. The Lopez results will also be reported to Stanislaus County Department of Environmental Resources.

In addition to monitoring the chemistry of groundwater in these wells, the CVRWQCB has also requested that the amount of water pumped out of the wells be monitored. We understand the newest domestic well at Pinewood Meadows is fitted with a flow totalizer. During quarterly sampling, we will take a reading from the flow totalizer. The Lopez well is not fitted with either a flow totalizer, flow meter, or pump hour meter. Kleinfelder proposes to install a flow meter on the Lopez domestic well (assuming the well owners will give permission to install the equipment).

Construction details for the Lopez, Streeter, and Pinewood Meadows wells will be assembled and presented in the feasibility study (see Task 8).

2.7. TASK 6 - SAMPLING OF ADDITIONAL GAS PROBES

Kleinfelder proposes to collect one round of vadose zone soil gas samples from gas probes GP-1, GP-2, and GP-3 to evaluate if the unusual nature of gases found in gas probe GP-38 extends further south along the landfill. To evaluate potential VOC concentration gradients in this area Kleinfelder also will collect vadose zone soil gas samples from probes GP-37, GP-38, and the new gas probes (to be installed) concurrent with sampling of probes GP-1, GP-2, and GP-3. The tentative location of the new probes is shown on Plate 2. The new gas probe near MW-7S/D will have three screened intervals and the two gas probes beneath the landfill will have, if possible, two screened intervals. Results of this additional sampling will be included in a report of findings for this investigation and summarized in the next semiannual monitoring report following sampling and analysis. Appendix C describes the methodology for gas sampling.

2.8. TASK 7 - EVALUATE INFLUENCE OF RIVER STAGE ON GROUNDWATER ELEVATIONS

Kleinfelder proposes to evaluate influence of the river stages on groundwater elevations at the landfill by installing groundwater elevation sensors and data loggers in Tuolumne River adjacent to the landfill and in groundwater monitoring wells MW-12S and MW-15S (well closest to Tuolumne River). These instruments will provide information on how groundwater elevations change in response to changes in the river stage. Kleinfelder proposes to record the river and groundwater elevations at these locations at a frequency of one reading per hour for duration of one year. Findings of this evaluation will be included in a report of findings for this investigation and summarized in the semiannual monitoring reports submitted to the RWQCB. Currently Tuolumne Irrigation District is performing channel work on the river. Fieldwork for the installation of the river stage-elevation sensor will be delayed until construction in this area is complete.

2.9. TASK 8 - FINDINGS AND FEASIBILITY STUDY REPORT

At the request of the RWQCB (March 2, 2001 letter), a separate report with the results Task 2 and the proposal locations for the leachate wells (Task 3) and the vadose zone gas monitoring probes (Task 4) will be submitted for RWQCB review and approval prior to installing either the leachate wells or the gas probes beneath the landfill.

Field activities for Tasks 1 through 7 will be discussed in a report of findings and summarized in the next semiannual monitoring report following the completion of the activities. The report of findings will include boring logs, well construction details, laboratory analytical reports, monitoring data, and surveyed elevation and location data for the new well and gas probes. Descriptions and cross-sections will be provided for the landfill lithology, potentiometric surface and topography. The report of findings will also include findings of Kleinfelder's evaluation of the occurrence, source, and migration of potential leachate and pathways of VOCs in the vadose zone in the landfill.

The report of findings will also include a feasibility study for additional corrective actions at Geer Road Landfill, based on the findings of tasks 1 through 7. The presence of low level VOCs should not necessarily be viewed as sufficient justification for expansion of the existing groundwater treatment system. Instead, the data should be evaluated as part of a focused feasibility study where remedial goals are first carefully defined based on regulatory

requirements, health risks, and other factors. Once remedial goals are set, the cost, effectiveness and implementability of different corrective action scenarios are evaluated relative to their ability to meet remedial goals. This study will be used to decide if additional corrective actions are needed and if so, which corrective action scenario would be the best choice to implement.

3 SCHEDULE

Initiation of this work is dependent upon the duration of the normal contracting procedure used by Stanislaus County in hiring firms such as Kleinfelder to conduct such work. At this time, we anticipate that Kleinfelder will be issued a notice to proceed in mid to late September. Should this be the case, we expect the fieldwork to follow the tentative schedule provided in Appendix B.

4 PROJECT COST ESTIMATE

The estimated costs associated with the described scope of work are in Appendix D. These costs are on a time and materials basis. Some of the assumptions made in the cost estimate are included as comments following the table in Appendix D.

5 CLIENT RESPONSIBILITIES AND ASSUMPTIONS

- Adequate workspace and access will be provided. Issues of rights-of-entry onto the land of private property owners and shoulder of Geer Road (background well installation) will be coordinated by Stanislaus County.

- Disposal and transportation of investigative derived soil within the landfill to be coordinated by Stanislaus County.

- Water generated during the purging and sampling will be discharged to the ground surface, except for water generated within the landfill waste. The landfill wastewater will be transported to the onsite treatment plant.

- The proposed scope of work and cost estimate are based on requests from the RWQCB in the August 13, 2001 letter. If additional boring or samples are drilled or collected due to the unexpected presence of leachate at the proposed locations, the costs will be correspondingly higher.

- Assume hollow stem augering (HSA) method used to complete boring through the waste in assumed amount of time. If HSA proves to be slower then costs for drilling will be greater.

6 LIMITATIONS

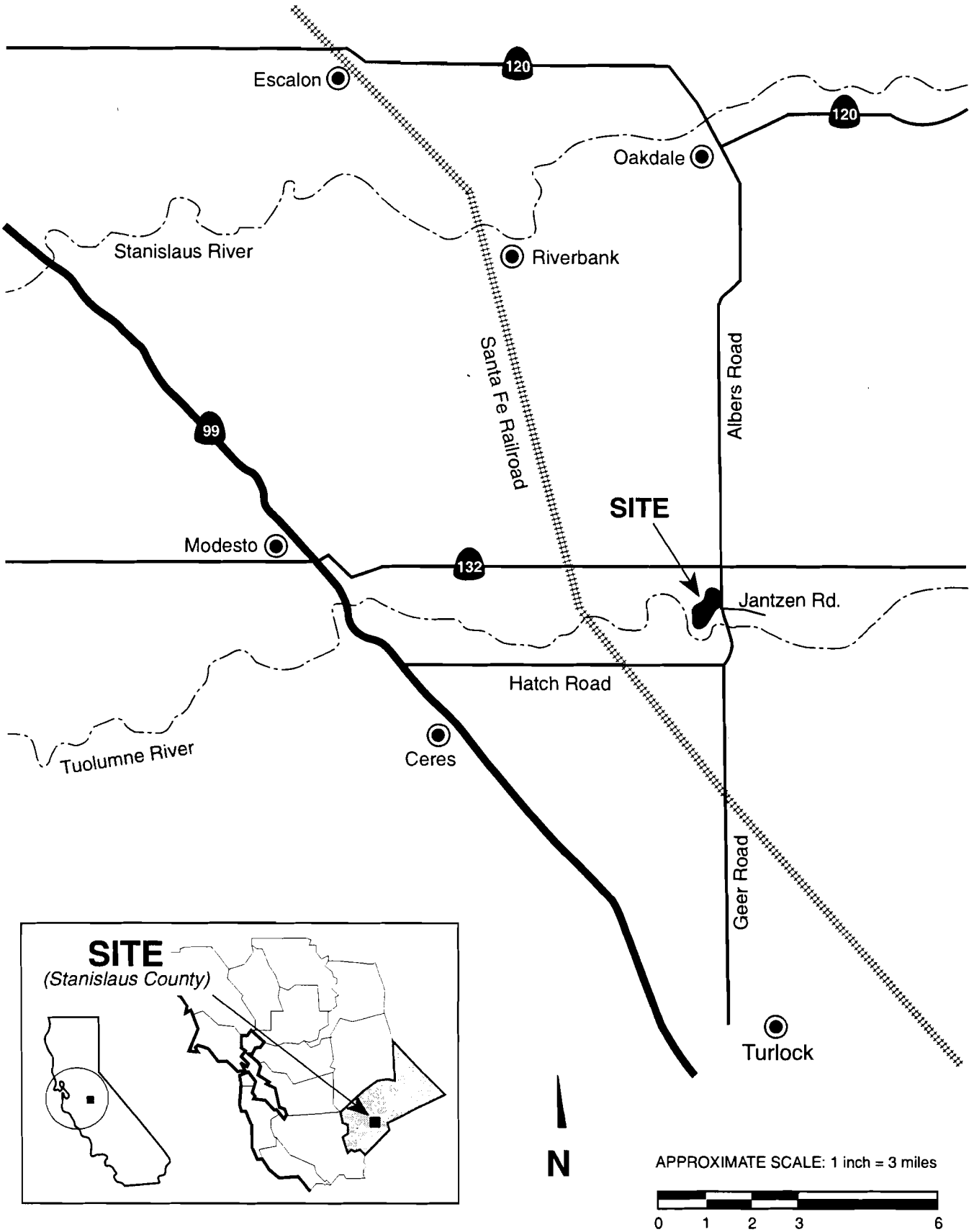
Kleinfelder has prepared this report in accordance with the generally accepted standards of care which exist in northern California at the time of writing. It should be recognized that definition and evaluation of geologic and chemical subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and/or historic conditions applicable to the site. The conclusions of this assessment are based on site conditions and design guidelines described by others. More extensive studies may further reduce the uncertainties associated with this assessment. Kleinfelder should be notified for additional consultation if the client wishes to reduce the uncertainties beyond the level associated with this report. No warranty, expressed or implied, is made.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive investigations yield more information, which may help understand and manage the level of risk. Since detailed investigation and analysis involves greater expense, our clients participate in determining levels of service which provide adequate information for their purposes at acceptable levels of risk.

Regulations and professional standards applicable to Kleinfelder's services are continually evolving. Techniques are, by necessity, often new and relatively untried. Different professionals may reasonably adopt different approaches to similar problems. Therefore, no warranty or guarantee, expressed or implied, will be included in Kleinfelder's scope of service.

This document may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this document by any unauthorized party.

Plates



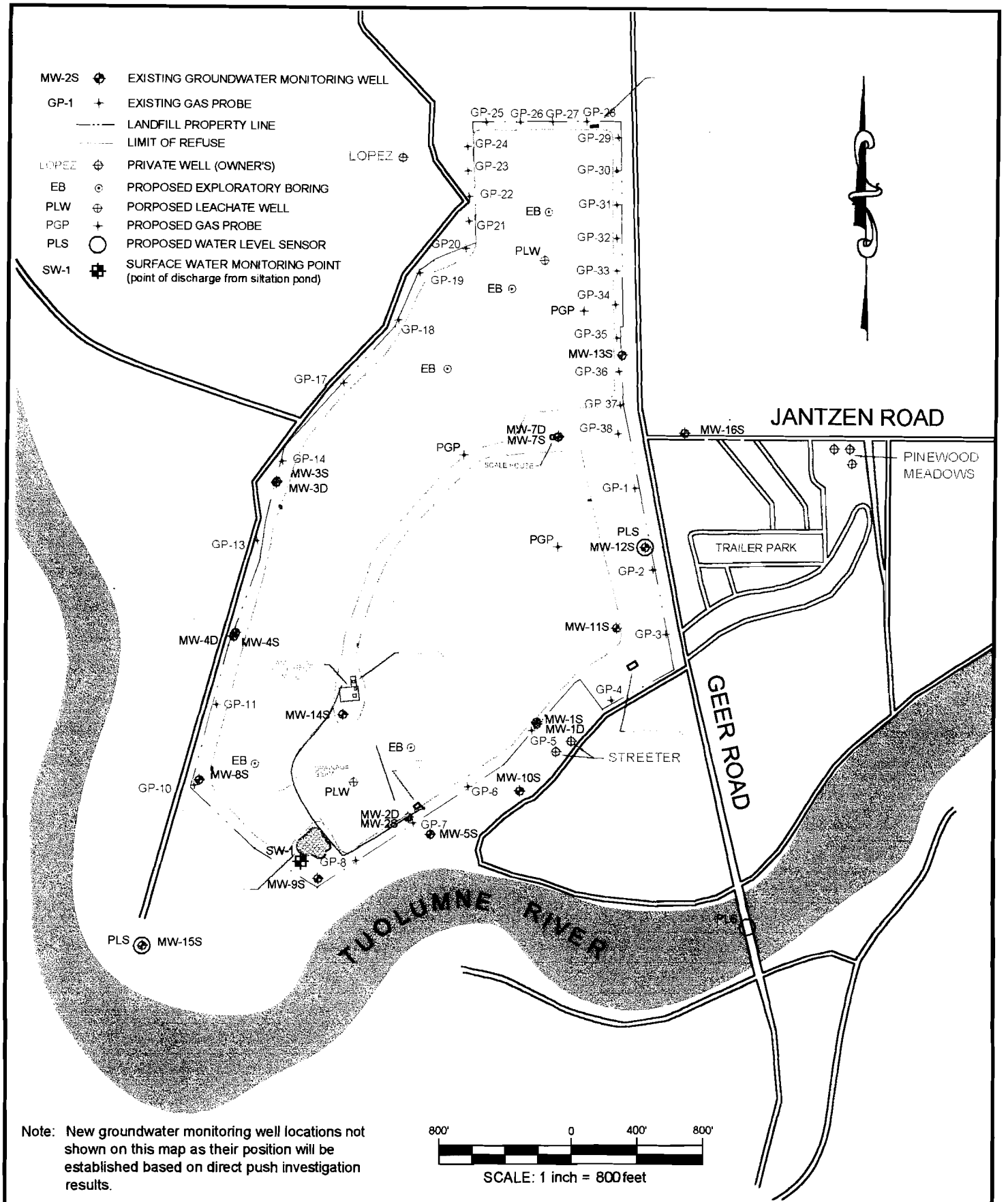
KLEINFELDER

Drawn By: M.BUSSANICH	Date: 5-18-01
Project No. 23-yp6778	Filename: 2081d.fh8

SITE LOCATION MAP

GEER ROAD LANDFILL
STANISLAUS COUNTY, CALIFORNIA

PLATE
1



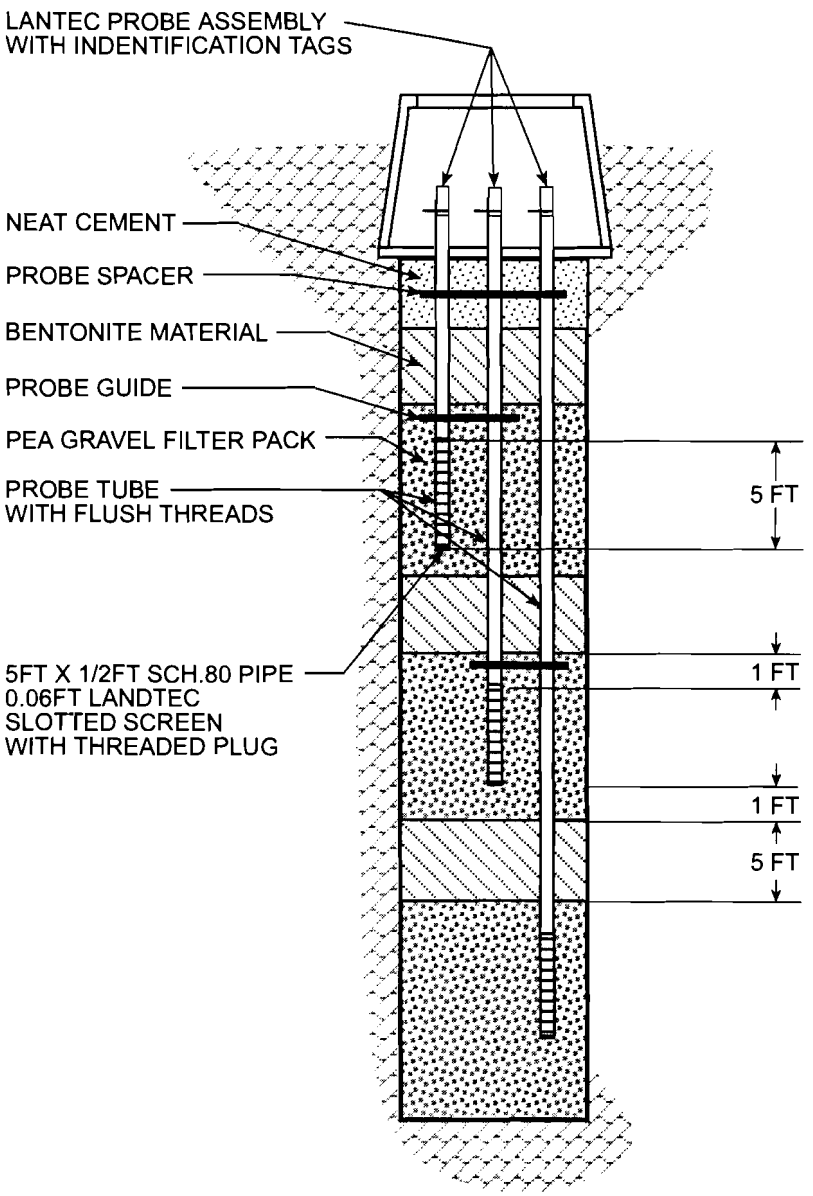
Note: New groundwater monitoring well locations not shown on this map as their position will be established based on direct push investigation results.

KLEINFELDER

Drawn By: D. ROSS	Date: 09/13/2001
Project No.: 23-yp6778	Filename: P6778_2.dwg

CURRENT AND PROPOSED MONITORING LOCATIONS
ADDITIONAL INVESTIGATON
GEER ROAD LANDFILL
STANISLAUS COUNTY, CALIFORNIA

PLATE
2



NOT TO SCALE

NOTES - PROBE DEPTHS WILL VARY DEPENDING ON LOCATION.
- THICKNESS OF BENTONITE MATERIAL TO BE AT LEAST FIVE FEET; DEPENDENT UPON PROBE SPACING.

KLEINFELDER

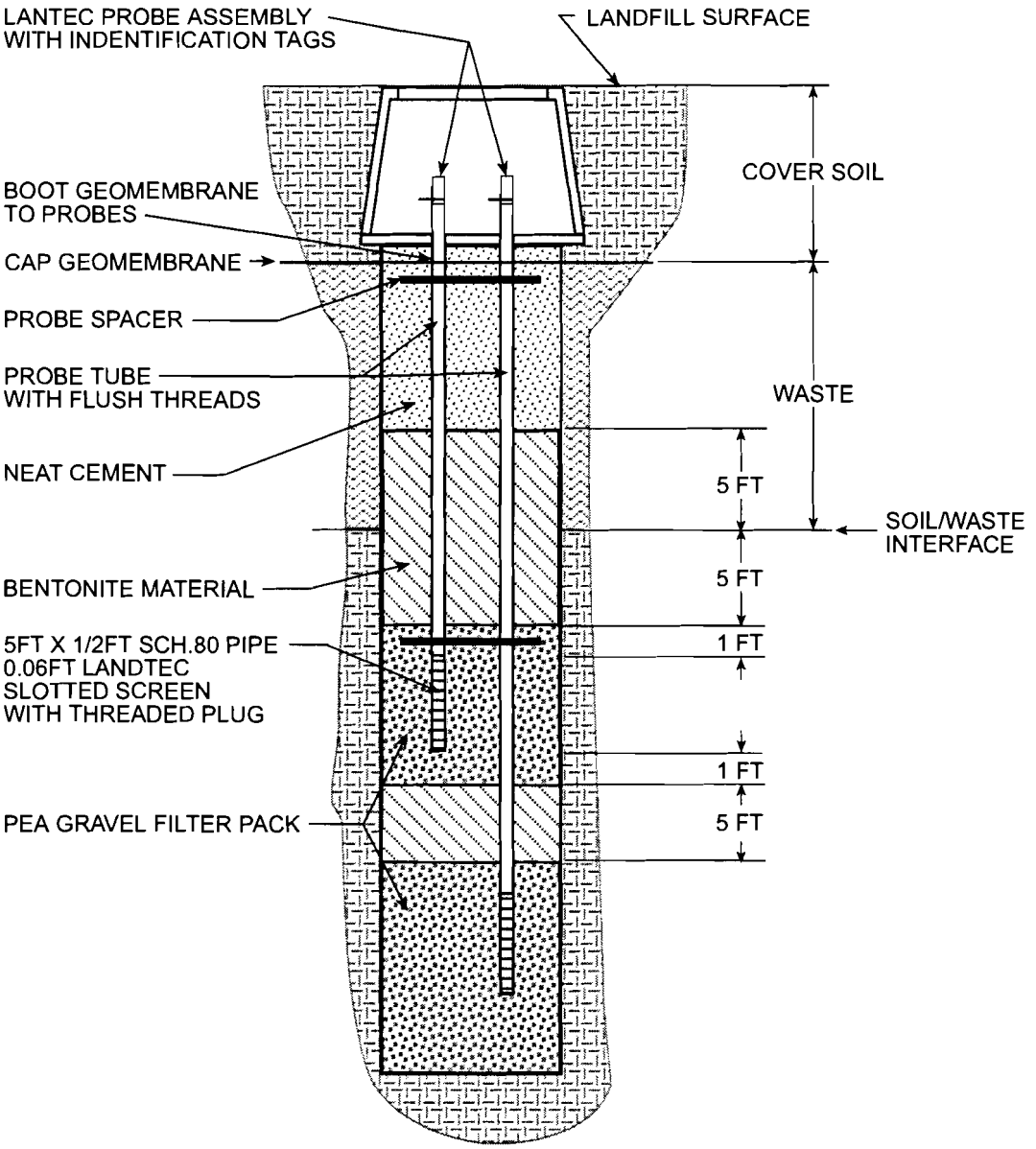
Graphic By: D. Anderson
Date: 8/28/01

Project No.: 23-YP6778
Filename: 2081w2.fh8

GAS PROBE CONSTRUCTION DIAGRAM

GEER ROAD LANDFILL
STANISLAUS COUNTY, CALIFORNIA

PLATE
3



NOT TO SCALE

NOTES - PROBE DEPTHS WILL VARY DEPENDING ON LOCATION.
- THICKNESS OF BENTONITE MATERIAL TO BE AT LEAST FIVE FEET; DEPENDENT UPON PROBE SPACING.

KLEINFELDER

Graphic By: D. Anderson
Date: 9/13/01

Project No.: 23-YP6778
Filename: 2081w3.fh8

GAS PROBE PENETRATING WASTE CONSTRUCTION DIAGRAM

GEER ROAD LANDFILL
STANISLAUS COUNTY, CALIFORNIA

PLATE
4

Appendix A

HEALTH AND SAFETY PLAN

Project No:	*23-YP6778*	**Date:**	*September-2001*
Client:	*Stanislaus County*	**Address:**	*750 Geer Road (Jantzen intersection)*
Client Contact:	*Ron Grider*	**Client Phone No.:**	*209-837-4816*
Site Contact:	*None-closed landfill*		
Landfill Phone No.:	*None-closed landfill*		
Job Location:	*Geer Road Landfill, Modesto, California*		

Work Objectives: *Direct push exploration and monitoring well, landfill gas probe, and leachate well installation.*

Key Individuals:	**Project Manager:**	*Tim Crandall*
Site Health And Safety:	*Jen Cowan/Wayne Lambert*	
Preparer:	*Jen Cowan*	
Reviewer/Approver:	*Tim Crandall*	

Hospital/Clinic:	*Memorial Hospital*		
Phone No:	*209-526-4500*		
Address:	*1700 Coffee Rd., Modesto, CA 95355*		
Paramedic *911*	**Fire Dept.** *911*	**Police Dept:** *911*	

Emergency/Contingency Plans: *Stop work, assess situation, call Kleinfelder or emergency services as appropriate. Follow guidelines below for non-emergency situation.*

15 Minute Eyewash: _____ **Fire Extinguisher:** X(in truck) **First Aid Kit:** X(in truck)

Site Control Measures: *Site is fenced. Some activity will be conducted near the roadway; traffic will cautioned with flags and signs.*

Personal Decontamination Procedures: *Wash hands before eating.*

HEALTH AND SAFETY PLAN

CHEMICAL HAZARDS:

GROUNDWATER AND VADOSE ZONE (LYSIMETERS):

Chemical Name	Expected Soil/Water Concentration	Health Hazards
Low Level VOCs	*< 50 PPB in water*	*None if no contact*

ASH:

Chemical Name	Expected Soil/Water Concentration	Health Hazards

GAS:

Chemical Name	Expected Soil/Water Concentration	Health Hazards
Methane	*0 to 50%*	*Explosion, Asphyxiation, Fire*

Note: ***See Attached Chemical Data sheet for additional information on health hazards and target organs.***

Emergency/Contingency Plans for Drilling: Guidelines if methane or other explosive gas is encountered:
A combustible gas meter will monitor explosive gas levels at the borehole during drilling operations.
1. Action will be taken if the combustible gas meter reads levels at 10% of the LEL (lower explosive limit).
2. If action levels are reached, all workers will stop drilling operations and step away from the borehole to allow it to ventilate for 15 minutes.
3. After 15 minutes, another reading will be taken with the combustible gas meter. If action levels are still exceeded, then a bore hole ventilator system shall be setup.
4. If the ventilator system does not reduce concentration of explosive gases, then the borehole will be abandoned and another bore hole will be advanced at a distance of 20 feet away from the original borehole.

PHYSICAL HAZARDS

X	**Heat (Seasonal)**	*X*	**Slip, Trip, Fall**		**Backhoe**
	Cold (Seasonal)	*X*	**Noise**	*X*	**Drill Rig, Moving Equipment**
X	**Rain (Seasonal)**	*X*	**Underground Hazards**		**Excavations/Trench**
X	**Overhead Hazards**		**Fog (Seasonal)**	*X*	**Traffic/Roadway**
	Dump trucks, earth moving equipment				
X	**Other:** *Overhead powerlines, gas extraction system piping*				

HEALTH AND SAFETY PLAN

PERSONAL PROTECTIVE EQUIPMENT R = Required A = As Needed

R	**Hard Hat**	*R*	**Safety Eyewear (Type): Safety glasses**
R	**Safety Boots**	*A*	**Respirator (Type): Face mask**
R	**Orange Vest**	*A*	**Respirator Filter Type: Organic vapor**
R	**Hearing Protection**	*R*	**Gloves (Type):**
	Tyvek Overalls	*R*	**Other:** *Mobile Phone, caution cones*
	5-Minute Escape Respirator		

MONITORING EQUIPMENT

R	**Organic Vapor Analyzer (FID)**		**PID with lamp of:**	*eV, (in PPM)*
	Oxygen Meter		**Draeger Tube:**	
R	**Combustible Gas Meter, Landtec GA 90**		**Passive Dosimeter**	
	H_2S Meter		**Air Sampling Pump**	
	W.B.G.T.		**Filter Media:**	

HEALTH AND SAFETY PLAN

ONSITE SAFETY MEETING ATTENDEES

Signature	Name (Printed)/Title	Date

YAHOO! YELLOW PAGES

[redacted]

Enter Your E-mail:

GO

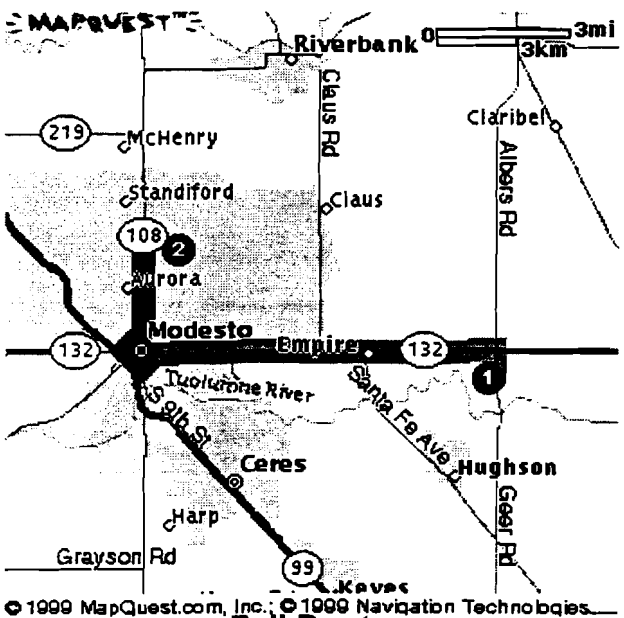
E-mail not collected without your approval...click GO! for details.

Yahoo! Yellow Pages

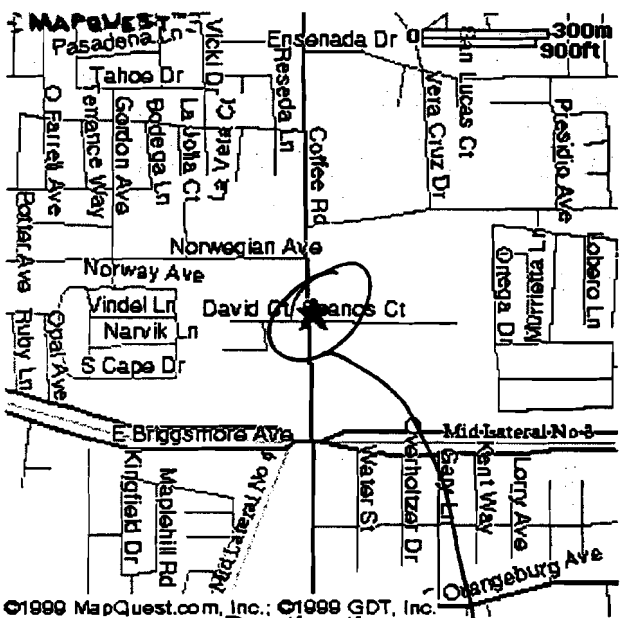
New Search

Starting From:	Arriving At:	Distance:	Approximate Travel Time:
geer road and jantzen road Modesto, CA 95357	1700 Coffee Rd Modesto, CA 95355	11.7 miles	24 mins

	Directions	miles
1.	Start out going North on GEER RD towards CA-132 by turning left.	0.6
2.	Turn LEFT onto CA-132.	8.7
3.	Turn RIGHT onto CA-108.	2.4



Full Route



Destination

Memorial Hosp.
(209) 526-4500

1) Enter a starting address :

Street Address, Intersection or Airport Code
geer road and jantzen road

City, State Zip or a ZIP
Modesto, CA 95357

2) and a destination address:

Street Address, Intersection or Airport Code
1700 Coffee Rd

City, State Zip or a ZIP
Modesto, CA 95355

Get Directions

BOC GASES

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: METHANE

1. Chemical Product and Company Identification

BOC Gases,
Division of,
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974

TELEPHONE NUMBER: (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER: CHEMTREC (800) 424-9300

BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER: (905) 501-0802
EMERGENCY RESPONSE PLAN NO: 2-0101

PRODUCT NAME: METHANE
CHEMICAL NAME: CH4
COMMON NAMES/SYNONYMS: Methyl Hydride
TDG (Canada) CLASSIFICATION: 2.1
WHMIS CLASSIFICATION: A, B1

PREPARED BY: Loss Control (908)464-8100/(905)501-1700
PREPARATION DATE: 6/1/95
REVIEW DATES: 6/1/99

2. Composition, Information on Ingredients

EXPOSURE LIMITS[1]:

INGREDIENT	% VOLUME	PEL-OSHA[2]	TLV-ACGIH[3]	LD_{50} or LC_{50} Route/Species
Methane FORMULA: CH_4 CAS: 74-82-8 RTECS #: PA1490000	100	None Established	Simple Asphyxiant	Not Available

[1] Refer to individual state of provincial regulations, as applicable, for limits which may be more stringent than those listed here.
[2] As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
[3] As stated in the ACGIH 1998-1999 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

3. Hazards Identification

EMERGENCY OVERVIEW

Odorless, colorless flammable gas. Dangerous fire and explosion hazard. Avoid heat, sparks and flames. Simple Asphyxiant – This product does not contain oxygen and may cause asphyxia if released in a confined area. Maintain oxygen levels above 19.5%. Contents under pressure. Use and store below 125 °F.

ROUTE OF ENTRY:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
No	No	No	Yes	No

HEALTH EFFECTS:

Exposure Limits	Irritant	Sensitization
No	No	No
Teratogen	Reproductive Hazard	Mutagen
No	No	No
Synergistic Effects None reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:
None anticipated.

SKIN EFFECTS:
None anticipated.

INGESTION EFFECTS:
None known. Ingestion is unlikely.

INHALATION EFFECTS:
Methane and nitrogen are simple asphyxiants. Exposure to high concentrations of this gas mixture may exclude an adequate supply of oxygen. Oxygen levels should be maintained at greater than 19.5% at normal atmospheric pressure.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

NFPA HAZARD CODES	HMIS HAZARD CODES	RATINGS SYSTEM
Health: 2	Health: 0	0 = No Hazard
Flammability: 4	Flammability: 4	1 = Slight Hazard
Instability: 0	Reactivity: 0	2 = Moderate Hazard
		3 = Serious Hazard
		4 = Severe Hazard

4. First Aid Measures

EYES:
None required.

SKIN:
None required.

INGESTION:
Not normally required.

INHALATION:
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THIS PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive. Keep victim warm and quiet.

5. Fire Fighting Measures

Conditions of Flammability: Flammable gas		
Flash point: -306°F (-188°C)	Method: Closed cup	Autoignition Temperature: 1076°F (580°C)
LEL(%): 5	UEL(%): 15	
Hazardous combustion products: Carbon dioxide, Carbon monoxide		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

FIRE AND EXPLOSION HAZARDS:
Flammable gas. Cylinder may rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA:
Carbon dioxide, dry chemical or water spray.

FIRE FIGHTING INSTRUCTIONS:
If possible, stop the flow of gas. Inerting the atmosphere to reduce oxygen levels may extinguish flame, allowing capping of leaking container. Do not attempt this unless specifically trained. Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback. Do not extinguish the fire until the supply is shut off as otherwise an explosive re-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Use non-sparking tools to close container valves.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit the number of personnel in proximity of fire and evacuate surrounding areas in all directions.

Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed cylinders until well after flames are extinguished.

6. Accidental Release Measures

Immediately extinguish all ignition sources. No smoking, flames, sparks or flares in hazard area. Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical Classification:
Not Available

Earth ground and bond all lines and equipment associated with the system. All equipment should be non sparking or explosion-proof.

Methane is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Post "NO SMOKING" signs in use or storage areas. There should be no sources of ignition in areas where this product is being used or stored. Outside or detached storage is preferred.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.

8. Exposure Controls, Personal Protection

ENGINEERING CONTROLS:
Hood with forced ventilation. Local exhaust to prevent dilution of oxygen levels below 19.5%. Mechanical in accordance with electrical codes.

EYE/FACE PROTECTION:
Safety goggles or glasses.

SKIN PROTECTION:
Plastic or rubber gloves. Protective gloves made of any suitable material.

RESPIRATORY PROTECTION:
Positive pressure air line with mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:
Safety shoes.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: Not Available	
Evaporation point	: Not Available	
Boiling point	: -285.7	°F
	: -161.5	°C
Freezing point	: -296.5	°F
	: -182.5	°C
pH	: Not Applicable	
Specific gravity	: 0.55	
Oil/water partition coefficient	: Not Available	
Solubility (H_20)	: Negligible	
Odor threshold	: Not Applicable	
Odor and appearance	: Odorless, colorless gas	

10. Stability and Reactivity

STABILITY:
Stable

INCOMPATIBLE MATERIALS:
Oxidizers

HAZARDOUS POLYMERIZATION:
Will not occur.

11. Toxicological Information

No data given in the Registry of Toxic Effects of Chemical Substances (RTECS) or Sax, Dangerous Properties of Industrial Materials, 7th ed.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

12. Ecological Information

No data given.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Methane, compressed	Methane, compressed
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1971	UN 1971
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

15. Regulatory Information

Methane is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES:
Fire Hazard
Sudden Release of Pressure Hazard

16. Other Information

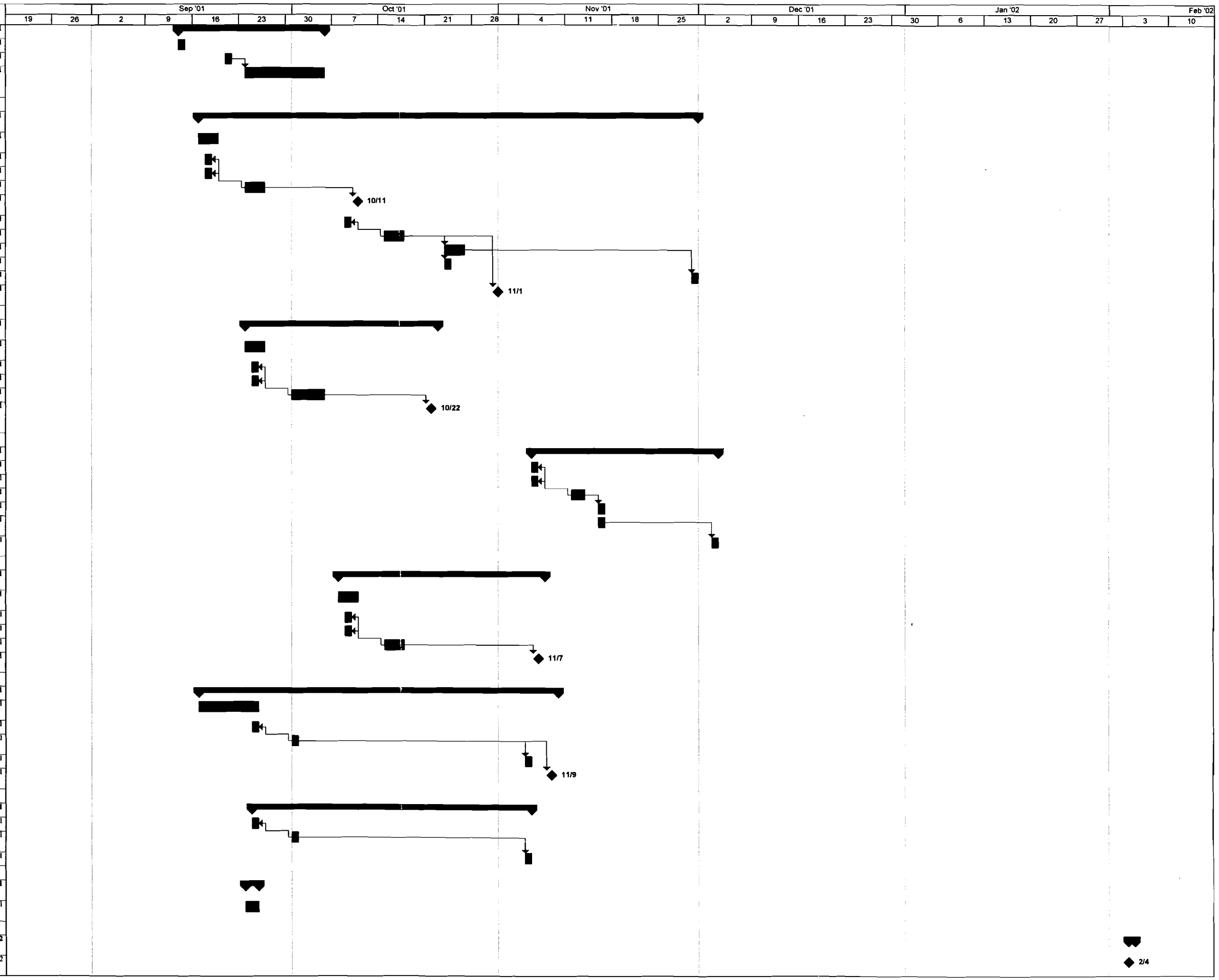
ACGIH	American Conference of Governmental Industrial Hygienists
DOT	Department of Transportation
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
WHMIS	Workplace Hazardous Materials Information System

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:
Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Appendix B

ID	Task Name	Duration	Start	Finish
1	**Pre-Field Activities**	16 days	Fri 9/14/01	Fri 10/5/01
2	Submit addendum workplan for RWQCB	1 day	Fri 9/14/01	Fri 9/14/01
3	RWQCB approval of workplan	1 day	Fri 9/21/01	Fri 9/21/01
4	Gather and re-evaluate information regarding placement of	10 days	Mon 9/24/01	Fri 10/5/01
5				
6	**Task 1: Install and Sample Additional Shallow and Deep Gro**	55 days	Mon 9/17/01	Fri 11/30/01
7	Complete permits for Stanislaus County Department of Envi	3 days	Mon 9/17/01	Wed 9/19/01
8	Notify RWQCB of field work	1 day	Tue 9/18/01	Wed 9/19/01
9	Notify USA of field work	1 day	Tue 9/18/01	Wed 9/19/01
10	Pre-investigation with direct push technology	3 days	Mon 9/24/01	Wed 9/26/01
11	Letter to RWQCB describing results of direct push groundw	1 day	Thu 10/11/01	Thu 10/11/01
12	Notify RWQCB of field work	1 day	Tue 10/9/01	Wed 10/10/01
13	Drilling for monitoring well installation	3 days	Mon 10/15/01	Wed 10/17/01
14	Develop and sample wells	3 days	Wed 10/24/01	Fri 10/26/01
15	Call County to survey monitoring wells	1 day	Wed 10/24/01	Wed 10/24/01
16	Receive laboratory results	1 day	Fri 11/30/01	Fri 11/30/01
17	Letter to RWQCB confirming proper well installation	1 day	Thu 11/1/01	Thu 11/1/01
18				
19	**Task 2: Evaluate Soil/Waste Contact Bottom of Landfill**	21 days	Mon 9/24/01	Mon 10/22/01
20	Complete permits for Stanislaus County Department of Envi	3 days	Mon 9/24/01	Wed 9/26/01
21	Notify RWQCB of field work	1 day	Tue 9/25/01	Wed 9/26/01
22	Notify USA of field work	1 day	Tue 9/25/01	Wed 9/26/01
23	Exploratory drilling	5 days	Mon 10/1/01	Fri 10/5/01
24	Interim report to RWQCB results of landfill exploratory dril	1 day	Mon 10/22/01	Mon 10/22/01
25				
26	**Task 3: Install Leachate Wells**	20 days	Tue 11/6/01	Mon 12/3/01
27	Notify RWQCB of field work	1 day	Tue 11/6/01	Wed 11/7/01
28	Notify USA of field work	1 day	Tue 11/6/01	Wed 11/7/01
29	Drilling for leachate well installation	2 days	Mon 11/12/01	Tue 11/13/01
30	Call County to survey leachate wells	1 day	Fri 11/16/01	Fri 11/16/01
31	Water level monitoring probe installation (begin monitoring	1 day	Fri 11/16/01	Fri 11/16/01
32	Letter to RWQCB confirming proper leachate well installati	1 day	Mon 12/3/01	Mon 12/3/01
33				
34	**Task 4: Install Gas Probes in Vadose Zone Beneath Landfill**	23 days	Mon 10/8/01	Wed 11/7/01
35	Complete permits for Stanislaus County Department of Envi	3 days	Mon 10/8/01	Wed 10/10/01
36	Notify RWQCB of field work	1 day	Tue 10/9/01	Wed 10/10/01
37	Notify USA of field work	1 day	Tue 10/9/01	Wed 10/10/01
38	Drilling for soil gas well installation	3 days	Mon 10/15/01	Wed 10/17/01
39	Letter to RWQCB confirming proper soil gas well installati	1 day	Wed 11/7/01	Wed 11/7/01
40				
41	**Task 5: Monitor Domestic Wells Adjacent to Landfill**	40 days	Mon 9/17/01	Fri 11/9/01
42	Permission to sample domestic well from Pinewood Meado	7 days	Mon 9/17/01	Tue 9/25/01
43	Notify RWQCB of field work	1 day	Tue 9/25/01	Wed 9/26/01
44	Perform groundwater sampling of domestic wells (Pinewoo	1 day	Mon 10/1/01	Mon 10/1/01
45	Receive laboratory results	1 day	Mon 11/5/01	Mon 11/5/01
46	Report laboratory results to domestic well owners, RWQCB	1 day	Fri 11/9/01	Fri 11/9/01
47				
48	**Task 6: Sample Gas Probes**	30 days	Tue 9/25/01	Mon 11/5/01
49	Notify RWQCB of field work	1 day	Tue 9/25/01	Wed 9/26/01
50	Sample gas from GP-1, -2, -3, -37, -38 and new gas probes	1 day	Mon 10/1/01	Mon 10/1/01
51	Receive laboratory results	1 day	Mon 11/5/01	Mon 11/5/01
52				
53	**Task 7: Evaluate Influence of River Stage on Groundwater E**	2 days	Mon 9/24/01	Tue 9/25/01
54	Install elevation sensor/data logging equipment in MW-12S,	2 days	Mon 9/24/01	Tue 9/25/01
55				
56	**Task 8: Findings, Feasibility Study Report, and Amended R**	1 day	Mon 2/4/02	Mon 2/4/02
57	Report of findings for Tasks 1 through 7 (Include summary	1 day	Mon 2/4/02	Mon 2/4/02



Project: Tentative Schedule
Date: Fri 9/14/01

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Appendix C

APPENDIX C
KLEINFELDER FIELD PROTOCOL

TABLE OF CONTENTS

C-1 FIELD PREPARATION

Before performing work in the field, environmental staff review the scope of work, prepare a health and safety plan, coordinate the work to be done with their supervisor, assemble the necessary sample containers, and check, calibrate and clean equipment to be used in the field. When underground utilities may exist at a site where subsurface soil samples are being collected, Underground Service Alert (USA) is contacted with the boring locations and the scheduled date of drilling. A utility locating firm may be employed to check the boring locations. The RWQCB will also be notified before performing work in the field.

C-2 SUBSURFACE SOIL SAMPLING

C-2.1 Drilling

Subsurface soil samples are collected from soil borings. Soil borings are advanced using a truck-mounted drill rig, equipped with hollow stem augers. While drilling, an experienced environmental geologist classifies the soil, logs the boring and collects soil samples for laboratory analysis.

C-2.2 Decontamination of Equipment

To reduce the potential for cross-contamination, augers and associated equipment are steam cleaned prior to drilling each boring. In addition, sampling equipment is cleaned with a detergent wash and rinsed with distilled water prior to collecting each soil sample.

C-2.3 Collection of Soil Samples

Soil samples are collected approximately every 5 feet for field screening, lithologic logging, and potential chemical analysis. Samples are collected by advancing the boring to a point immediately above the desired sampling depth and then driving (vertical borings) or pushing (slant borings) a Modified California Sampler, lined with three brass tubes, into the undisturbed soil. The sampler is then removed from the bottom of the boring. The ends of the bottom (third) tube are covered with Teflon and sealed with tight-fitting plastic caps.

After the samples are collected they are individually labeled. The label includes Kleinfelder's name, job number, the date and time the sample was collected, the employee number of the individual who performed the sampling, and an unique five-digit sample identification number. A custody seal is also placed on the sample in such a way that any attempt to tamper with the sample is easily visible.

C-2.4 Field Screening

If potential chemical exposure is expected, an organic vapor detector or combustible gas detector (instrument used depends on project) is used to measure chemical concentrations in the breathing zone prior to and while drilling. The health and safety plan states which instrument to used and how to interpret the readings.

C-2.5 Soil Boring Closure and Soil Cutting Disposal

Soil borings are closed immediately after the collection and logging of soil samples. Closure is accomplished by grouting the boring with a cement/bentonite slurry or as otherwise required.

Drill cuttings will be placed in 55-gallon drums or wrapped in a tarp and left on site for disposal by the site owner. Soil cuttings not expected to contain contamination will not be drummed or tarped.

C-3 GROUNDWATER MONITORING

C-3.1 Monitoring Well Construction

Construction details for shallow groundwater monitoring wells are as follows:

- The well casing will be 2-inch (for monitoring wells) or 4-inch (for leachate wells) inside diameter, flush threaded joint, schedule 40 PVC pipe.
- The wells will be constructed in 8-inch diameter boreholes.
- Monitoring well screen sections are perforated with 0.02-inch factory-cut slots. Leachate well screen sections are perforated with 0.25-inch factory-cut slots. The screen slot size is evaluated (and modified if required) after the borings are logged and, if warranted, a sieve test has been performed and the results received.
- The wells are generally screened from 5 feet above to 15 feet below first groundwater. The screen length is reduced if an aquitard with a minimum thickness of 5 feet is encountered. If an aquitard is encountered the well is usually terminated 1 to 2 feet into the aquitard. Effort is made not to screen across two aquifers. If confined aquifer conditions or high vadose zone contamination are encountered, the well screen is usually not set above the depth of first encountered groundwater. Wells are usually not set in areas of significant soil contamination.
- The PVC pipe and end caps are steam cleaned prior to installation.
- The annular space between the screen and the wall of the boring is backfilled with the appropriate clean 2/12 Monterey sand to approximately 2 feet above the top of the perforated sections for monitoring wells. The leachate wells will have 1 inch clean coarse aggregate with the same thickness. Based on soil logs or a sieve test, modifications may be made regarding the size of sand to be used. Installation of the 0/30 sand may require that the sand be tremmied, using clean water. In this event, a sample of the tremie water is collected, unless the source is known to be clean.
- A 3 to 5-foot bentonite plug is placed above the sand pack to provide a seal against surface water infiltration.
- The remaining annular space is filled to the surface with tremmied cement/bentonite grout to the surface.
- The wells are secured in a locking stovepipe. The well heads may be enclosed in a cement utility box set flush to the ground surface located in a traffic area.

C-3.2 Monitoring Well Development and Sampling

The wells are developed to reduce the effects of drilling on the formation and to increase the effective hydraulic radius of the well.

Monitoring wells are generally developed 48 hours after installation to allow the grout to set. Each well is first sampled with a clear PVC bailer to visually inspect for a hydrocarbon layer or sheen. If no product layer or sheen is observed on the water, the well is developed by surging, pumping, or bailing. Surging along the screened interval of the well is performed to draw the sediment from the formation into the filter pack and the well, and to set the sand pack. The

sediment-laden water is purged from the well at a rate of between 0.75 to 10 gallons per minute (gpm) depending on recharge rate and casing size. Development continues until the discharge runs relatively clear of fines. Approximately 5 to 10 well volumes are generally removed from each monitoring well. Discharge water is stored in 55-gallon drums and left on site for later discharge or disposal by the client, depending on laboratory results.

After the wells are developed, the aquifer is allowed to equilibrate for at least 24 to 48 hours. The wells can then be purged and sampled. Purging and sampling may be accomplished with Teflon bladder pumps and/or bailers. While purging the wells, field parameters (pH, conductivity, Eh, turbidity, and temperature) are monitored. Samples are collected after the field parameters have stabilized (normally requiring the removal of three to five well volumes). Water sampling containers are supplied and prepared by the laboratory. These sample containers are immediately sealed after sample collection and placed in an iced cooler. At the end of the day, the water samples are delivered under chain-of-custody to the analytical laboratory's courier.

C-3.3 Sample Handling

After labeling, the sample is immediately stored in an iced cooler for transport to the analytical laboratory. The label includes Kleinfelder's name, job number, the date and time the sample was collected, the employee number of the individual who performed the sampling, and a unique five-digit sample identification number.

A Kleinfelder chain-of-custody form is attached to the cooler. The chain-of-custody form includes Kleinfelder's name, address and telephone number, the employee number of the individual who performed the sampling, the sample numbers, the date and time the samples were collected, the number of containers each sample occupies, and the analyses for which the samples are being submitted. The chain-of-custody form is signed by each person who handles the samples, including all Kleinfelder employees and the receiving employee of the analytical laboratory when the samples are delivered.

C-3.4 Equipment Decontamination

To reduce the potential for cross-contamination between wells, all developing and sampling equipment is washed in a detergent wash solution and rinsed in distilled water or steam cleaned prior to use in the next monitoring well.

C-3.5 Well Survey

The locations of soil borings and monitoring wells and the elevation of the top of the PVC casings is usually surveyed and tied into permanent markers, if readily available. Survey accuracy is 0.001 foot for the "x" and "y" coordinates and .01 foot for the "z" coordinate. The depth to static groundwater is measured from a set location at the top of the PVC casing. The depth of water is then subtracted from the elevation of the top of the well casing to provide a groundwater elevation for each monitoring well location.

C-4 DIRECT PUSH SAMPLING

C-4.1 Procedures

A direct push probe will be driven for groundwater sampling by a subcontractor to Kleinfelder. The soil type at the site will dictate the sample depths achievable by the direct push rig.

C-4.2 Collection of Groundwater Samples

The direct push probe will be driven approximately to the desired depth for sampling. Groundwater samples will be obtained by driving a 1½" steel pipe in 4' section with an inserted screen (1¼") at the bottom of the probe by air hammer and the weight of the rig to the desired sampling depth. Then, the probe will be pulled up approximately 4 feet to expose the screen to the soil and groundwater. Depth to groundwater and total depth is noted before collecting the groundwater sample. Groundwater samples will be collected from the direct push hole using a decontaminated ball and check valve, or a peristaltic pump depending on field conditions and depth of sample. New tubing will be used for each sampling location to prevent cross-contamination. Samples are collected in bottle provided by the laboratory and labeled with Kleinfelder sample identification label.

C-4.3 Sample Handling

After labeling, the sample is immediately stored in an iced cooler for transport to Kleinfelder's office sample control or to the analytical laboratory. A Kleinfelder chain-of-custody form is attached to the cooler. The chain-of-custody form includes Kleinfelder's name, address and telephone number, the employee number of the individual who performed the sampling, the sample numbers, the date and time the samples were collected, the number of containers each sample occupies, and the analyses for which the samples are being submitted, if any. The chain-of-custody form is signed by each person who handles the samples, including all Kleinfelder employees and the receiving employee of the analytical laboratory when the samples are delivered.

C-4.4 Closure

Upon completion of direct push sampling, the holes will be closed by backfilling the borings with a neat cement grout, or bentonite chips or powder.

C-4.5 Equipment Decontamination

To reduce the potential for cross-contamination between sampling locations, all equipment is washed in a detergent wash solution and rinsed in distilled water or steam cleaned prior to use in the next sampling location.

C-5 GAS SAMPLING

C-5.1 Sample container preparation

Summa canisters are prepared and provided by the laboratory prior to sampling. The vacuum in the canister is checked with a gauge to make sure there is no leaks before sampling. A 7-micron filter is put on the summa canister to filter out any particulate material from altering the sample. A new filter is used for each summa canister to prevent cross-contamination. Polyethylene tubing is used to connect the filter to the vacuum-pressure pump for purging before sampling.

C-5.2 Purging

A GA-90 Landtec will be used to measure atmospheric parameters for stability when purging gas from the probe. Similarly with groundwater well, the gas probes will be purge from three to five well volumes before taking a gas sample. A vacuum-pressure pump will be used to purge the probe. The Landtec will be connected at the outflow of the vacuum-pressure pump.

C-5.3 Collection of Gas Samples

Once the atmospheric parameters have stabilized, the tubing from the probe will be disconnected from the GA-90 Landtec while avoiding any outside air from infiltration the tube and attached to the summa canister with the micron filter and pressure gauge already attached. The valve on the summa canister will then be opened and left open until the pressure in the summa canister drops to approximately 5 Hg. After the valve is closed, a label including Kleinfelder's name, job number, the date and time the sample was collected, the employee number of the individual who performed the sampling, and a unique five-digit sample identification number, is affixed to the summa canister.

C-5.4 Sample Handling

After labeling, a Kleinfelder chain-of-custody form is attached to the group of summa canisters. The chain-of-custody form includes Kleinfelder's name, address and telephone number, the employee number of the individual who performed the sampling, the sample numbers, the date and time the samples were collected, the number of containers each sample occupies, and the analyses for which the samples are being submitted, if any. The chain-of-custody form is signed by each person who handles the samples, including all Kleinfelder employees and the receiving employee of the analytical laboratory when the samples are delivered.

Appendix D

Table 1
Cost Estimate for Additional Investigation
Geer Road Landfill

	A	B	C	D	E	F	G	H	I J	K	L M	N	O
1		**Staff Level**	**Senior**	**Project**	**Staff**	**Tech**	**Draft**	**WP**					
2		**Staff Service Code**	**P5**	**P3**	**P2**	**T2**	**C1**	**A1**	**Drilling / Direct Push**	**Materials and Equipment**	**Analytical Lab**	**Subtotal**	**Total**
3	**Task Item**	**Task Name | $/hr.**	**$ 140**	**$ 125**	**$ 105**	**$ 80**	**$ 72**	**$ 60**					
4	**Pre-field Activities**	Gather and Evaluate Information Relevant to Field Activities											$ 11,923
5		-Submit Addendum Workplan to RWQCB	4		20		4	2				$ 3,068	
6		-Gather Data on Surrounding Domestic Wells	2		30							$ 3,430	
7		-Project Setup/Management	20		25							$ 5,425	
8	1	Install Additional Shallow and Deep Groundwater Monitoring Wells											$ 96,298
9		-Initial Site Evaluation	8	8								$ 2,120	
10		- Prepare Boring Permits (Direct push and Well Installation)			8		1	1		$ 600		$ 1,572	
11		-Direct Push Exploration	4		45		8	4	$ 9,877 E	$ 2,000	$ 5,520 T	$ 23,498	
12		-Prepare Direct Push Resutls and Well Installation Workplan for RWQCB	4	12			6	4				$ 8,252	
13		-Install Wells	2	70			9		$ 26,360 S	$ 200		$ 36,238	
14		-Develop and Sample Wells		8	10	70				$ 2,000	$ 14,967 B	$ 24,617	
15	2	Evaluate Soil/Waste Contact with Five Borings											$ 30,205
16		- Prepare Boring Permits & Health and Safety Plan			6		1	1		$ 200		$ 962	
17		-Field Investigation	16	65	15				$ 9,347 SD	$ 2,300		$ 23,587	
18		-RWQCB Interim Report	8	24			18	4				$ 5,656	
19	3	Install Two Leachate Wells											$ 24,098
20		- Prepare Boring Permits			6		1	1		$ 400		$ 1,162	
21		-Install Wells	2	40			6		$ 8,670 S&D	$ 1,783		$ 16,165	
22		-Monitor Leachate Wells			20	12				$ 3,712		$ 6,772	
23	4	Install Gas Probes in Vadose Zone Beneath Landfill	2	14	30		9		$ 10,800 S&D	$ 4,156		$ 20,784	$ 20,784
24	5	Quarterly Monitoring of Domestic Wells Adjacent to Landfill	Sampling submitted as a separate cost estimate on September 6, 2001.							$ 800		$ 800	$ 800
25	6	Sampling of Additional Gas Probes	1	6	16		4			$ -	$ 10,423 A	$ 13,281	$ 13,281
26	7	Evaluate Influence of River Stage on Groundwater Elevations	4	10	30	28				$ 6,941		$ 14,141	$ 14,141
27	8	Findings and Feasibility Study Report	70	80	55		40	20		$ 1,500		$ 31,155	$ 31,155
28											**Grand Total**		**$ 242,686**

Fee Schedule = ZZ2 (2001 - 5% discount)

[A] Analytical services provided by Airtoxics Ltd.

[B] Analytical services provided by BC Laboratory

[D] Services provided by D&E Construction (geomembrane repair)

[E] Services provided by EnProb (direct push)

[S] Spectrum Drilling

[T] Analytical services provided by TEG Mobile Laboratory

NA = Not applicable

May 18, 2001
Rev. Sept. 14, 2001

Table 1
Cost Estimate for Additional Investigation
Geer Road Landfill

Cell: B8
Comment: Total of six locations and eleven casings.

Cell: K10
Comment: Permit Fee

Cell: K11
Comment: Traffic control

Cell: L11
Comment: Mobile laboratory services provided by TEG

Cell: K13
Comment: Waterra installation cost

Cell: F14
Comment: Time to develop and sample eleven new monitoring wells

Cell: K14
Comment: Misc. supplies and Waterra rental

Cell: K16
Comment: Permit Fee

Cell: K17
Comment: Includes cost for geomemebrane boot and sleeve for the well.

Cell: K20
Comment: Permit Fee

Cell: K21
Comment: Includes cost for geomemebrane boot and sleeve for the well.

Cell: B22
Comment: Assume monitor weekly through the rainy season. Period of 9 months.

Table 1
Cost Estimate for Additional Investigation
Geer Road Landfill

Cell: E22
Comment: Order and install equipment.

Cell: F22
Comment: Assist in installation

Cell: K23
Comment: Includes membrane patch by D&E Construction, materials by CES Landtec

Cell: K24
Comment: Cost for flow meter and labor costs.

Cell: D26
Comment: Data into database for 4 quarters. 2 hours/quarter.

Cell: F26
Comment: Quarterly data logger download. Assume 3 hours to download three data loggers. Also 16 hours to assist P2 during installation.