United States Department of Agriculture
Agricultural Research Service
Pacific West Area
800 Buchanan Street
Albany, California
94710

August 19, 1992

Alameda County Department of Health Services
Hazardous Materials Division
Attn: Mr. Larry Szeto
80 Swan Way
Room 200
Oakland, CA 94621

Re: Ground Water Monitoring Well Project, USDA, Albany, CA

Dear Mr. Szeto:

Enclosed is a copy of the Draft Project Plan for the groundwater monitoring well project for this location. As you know, this project is in response to minor amounts of chlorinated contaminants detected upon removal of underground storage tanks in December, 1990.

It is requested that you make all necessary comments and return them to me. If you have no comments, please provide documentation as such.

It is requested that you return your comments to me by September 1, 1992. The fiscal year ends on September 30, 1992 so we need to expedite this project as quickly as possible in the event additional funds will be needed. If you have any questions related to this matter, please do not hesitate to contact me at (510) 559-5622. Your cooperation and assistance in this matter is greatly appreciated.

Sincerely,

Gary Fleming

DRAFT WORKPLAN FOR
SOIL AND GROUND WATER INVESTIGATION

at the

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WESTERN REGIONAL RESEARCH CENTER
800 BUCHANAN STREET
ALBANY, ALAMEDA COUNTY, CALIFORNIA

Prepared For
WESTERN REGIONAL RESEARCH CTR
USDA Agricultural Research Service
Pacific West Area
800 Buchanan Street
Albany, California 94710

Contract No. 53-91H2-2-278

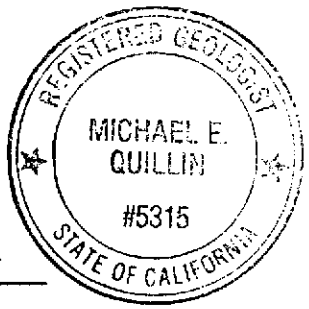
Prepared By

Environmental Science & Engineering, Inc.
4090 Nelson Avenue, Suite J
Concord, California 94520

August 15, 1992

This Draft Workplan has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of the United States Department of Agriculture Agricultural Research Service, Pacific West Area as it pertains to their site located at 800 Buchanan Street in Albany, Alameda County, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this workplan.

REPORT PREPARED BY:



Michael E. Quillin
Senior Project Hydrogeologist
California Registered Geologist No. 5315

8/15/92
DATE

UNDER THE PROFESSIONAL SUPERVISION OF:

Susan S. Wickham
Senior Geologist
California Registered Geologist No. 3851

8/15/92
DATE

PROJECT NO. 6-92-5405

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1.0 INTRODUCTION

This workplan was prepared by Environmental Science & Engineering, Inc. (ESE) for the United States Department of Agriculture (USDA) Agricultural Research Service (ARS) Western Regional Research Center ("site") located at 800 Buchanan Street, Albany, Alameda County, California (see Figure 1 - Location Map). The activities described herein will be conducted pursuant to ARS Contract No. 53-91H2-2-278, effective July 31, 1992.

The workplan addresses a soil and ground water investigation associated with residual chlorinated solvents in the vadose and saturated zones near two solvent extraction facilities at the site. A brief discussion of facility and investigation background is presented. Tasks associated with the approved scope of work are described in detail. Finally, a progress and reporting schedule is presented.

1.1 Objectives

The objectives of the work described in this workplan are to:

- Compile and review background data regarding soil and ground water investigation at the site, local hydrogeology, and area land and ground water use;
- Conduct a soil and ground water investigation at the site to determine if residual chlorinated solvents are present in soil and/or ground water;
- Dispose of soil and ground water generated as a result of prior excavation of solvent underground storage tanks (USTs) and current drilling activities;
- Prepare project and environmental site assessment reports documenting the results of activities addressed in this workplan;
- Conduct quarterly ground water monitoring from wells installed in association with the current work, and prepare the associated reports, and
- Develop a Remedial Action Plan (RAP) for soil and ground water, if necessary.

Some of the activities associated with project objectives have already been initiated. Activities requiring approval and/or review by the Alameda County Department of Environmental Health - Hazardous Materials Program (Alameda County), the agency with regulatory oversight for this investigation, have not been initiated.

2.0 BACKGROUND

2.1 Site Description

The site, located on Buchanan Street immediately east of Interstate 80 in Albany (Figure 1) occupies approximately 16 acres on the flat alluvial lowlands adjacent to the San Francisco Bay. It is located within the coast ranges geomorphic province (Norris & Webb, 1976) and is approximately three miles west of the Hayward Fault.

Original development of the site was initiated in 1939, with additional construction occurring in the mid-1960's. The site consists of the Main Laboratory, which houses the administration wing, chemical laboratory wing, and industrial laboratory wing; the west annex and woodshop building, the word processing building; the service building; a complex of five greenhouses; solvent extraction facilities (SEFs) 1 and 2; numerous small sheds and enclosures, and a main parking lot. Site layout near the SEFs, which are the primary focus of this investigation, is detailed in Figure 2 - Site Plan. SEF #1 is no longer active and the building is currently used for bulk materials storage. SEF #2 is still active.

2.2 Investigation History

Site investigation pertinent to the current work was initiated in December 1990 when five USTs of various capacities were excavated and removed. Tank locations are shown in Figure 2 and included two 550-gallon solvent tanks immediately east of SEF #1 (UST's 1 and 2; Figure 2), one 1,000-gallon solvent tank immediately west of SEF #1 (UST 3; Figure 2), one 200-gallon solvent tank immediately west of SEF #2 (UST 4; Figure 2) and one 550-

gallon gasoline tank near the western main entrance to the site from Buchanan Street (UST 5; Figure 2). A total of five soil samples (one sidewall sample from each excavation) and two ground water samples (one each from the 1,000-gallon and 200-gallon tank excavations) were collected. Soil and ground water samples from the solvent tank excavations were analyzed for Volatile Hydrocarbons and using EPA Method 8010 and for Volatile Aromatics using Method 8020. The soil sample collected from the gasoline tank excavation was analyzed for Total Petroleum Hydrocarbons as Gasoline (TPH-g) and for Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX) using EPA Method 8015/8020.

Analysis of soil samples from the excavations for UST's 1 and 2 for Volatile Hydrocarbons detected Chloroform at 1,200 and 1,400 micrograms per kilogram (ug/Kg) or parts per billion, respectively. The soil sample from the excavation for UST 3 reported no detectable Volatile Hydrocarbons or Aromatics; however, the ground water sample collected from the excavation reported Methylene Chloride and Chloroform at 11 and 12 micrograms per liter (ug/L), respectively. The soil sample from the excavation for UST 4 reported Methylene Chloride and Chloroform at 12 and 6.6 ug/Kg, respectively; however, the ground water sample collected from he excavation reported Methylene Chloride and Chloroform at 480 and 360 ug/L, respectively. The soil sample collected from the excavation for UST 5 reported no detectable TPH-g or BTEX.

The depth to ground water within the excavations was not reported with the analytical results. It is known from site reconnaissance by ESE and daily observation by ARS representatives that ground water recurs at about four feet deep in the excavations, which have been backfilled.

3.0 SCOPE OF WORK

ESE has defined eight tasks that will accomplish the stated objectives of this project. Each task is described in this section. A schedule for implementation and completion of these tasks is presented in Section 4.

3.1 Task 1 - Prepare Project Workplan

Development of this workplan, which addresses the method and associated standards to be employed during site soil and ground water investigation, and ESE's approach to background data review and project reporting, is the initial step in the scope of work. The Work Plan will be consistent with appropriate guidelines established by the Alameda County Department of Environmental Health Services (Alameda County) and the San Francisco Bay Regional Water Quality Control Board (Regional Board). Methods and procedures to be addressed in the workplan include:

- Drilling and logging soil borings,
- Collecting soil samples,
- Installing and developing monitoring wells,
- Monitoring ground-water levels and collecting ground-water samples,
- Analyzing soil and ground-water samples for chlorinated hydrocarbons and heavy metals content, and
- Quality Assurance/Quality Control (QA/QC) analyses for ground-water samples.

A draft version of the workplan will be submitted to ARS for review and comment. ESE will incorporate ARS review comments as appropriate and submit final copies of the workplan ARS.

In association with development of this workplan, ESE prepared a site Health and Safety Plan for implementation during the field portion of the proposed investigation. The Health & Safety Plan contains details on the following elements specific to this investigation:

- Personnel requirements and responsibilities,
- Potential chemical and physical hazards,
- Personal protection equipment,
- Standard work practices, and
- Emergency information and contingency plans.

All ESE personnel, subcontractors, ARS representatives, and other authorized site visitors will be required to review and acknowledge the Health & Safety Plan before entering work areas, and to comply with all terms therein.

3.2 Task 2 - Perform Background Data Review and Compilation

Previous to and in association with the proposed soil and ground-water investigation, it will be necessary to review background information regarding the following:

- UST history
- Investigation history associated with decommission and removal of the subject USTs,
- Local geology and hydrology,
- Land and ground water use in the area, and
- Available site plans.

Data regarding local geology and hydrology, as well as land and ground water use, are necessary for determining potential dispersion and exposure pathways, and for defining risk to human health and/or the environment as a result of potential releases of chlorinated solvents to soil or ground water. Site plans will be of assistance in identifying potential subsurface obstructions to drilling and installing monitoring wells.

ESE will compile and review hydrogeologic data for the area available through existing literature and previous site investigation. In addition, ESE will coordinate data regarding existing ground water wells for the area through the California Department of Water Resources (DWR) and the Alameda County Department of Public Works.

Some aspects of this task are currently in progress. Coordination with ARS representatives to obtain available site plans and records has been completed.

3.3 Task 3 - Conduct Soil and Ground Water Investigation

ESE will install ground water monitoring wells at locations that will permit appropriate evaluation of soil and ground water both downgradient of the former tanks and at an upgradient, "background" location. Based on the site's proximity to San Francisco Bay, as well as topographic grade in the area under investigation, ESE assumes that the approximate direction of ground water flow will be to the west.

Proposed locations for the monitoring wells are shown in Figure 2. Well MW-1 will be installed immediately west (within 10 feet) of the excavation for UST 3. The purpose of this well will be to sample soil and ground water downgradient of the excavations for UST 1, UST 2, and UST 3. Well MW-2 will be installed immediately west and within 10 feet of the excavation for UST 4 and will be for the purpose of sampling soil and ground water downgradient of that excavation. MW-3 is to be installed at location upgradient of the referenced excavations in order to evaluate "background" soil and ground water conditions. Investigation of soil and ground water conditions near the excavation for UST 5 is not proposed because no evidence of gasoline was detected in the soil at the time the tank was excavated.

The primary consideration in designing monitoring wells for this investigation is that the occurrence of chemical constituents with specific gravities greater than water is being

evaluated. Free-phase chemicals will tend to partition to the bottom of the water column within a well, as will dissolved constituents, though to a lesser degree. It is therefore necessary to construct the proposed wells to enhance monitoring and sampling for such constituents. Ideally, soil borings would be drilled through permeable aquifer materials to a depth sufficient to encounter the first relatively impermeable zone (aquitard), at which point drilling would be suspended and the monitoring well would be constructed. This configuration would permit sampling chemicals trapped above the aquitard at the base of the aquifer.

From available geologic literature (USGS, 1979), it is known that surface soils in the vicinity of the site are characterized by medium grained alluvium with beds of well sorted clay, silt, and gravel. In this environment, ESE anticipates that a fine grained unit behaving as a relative aquitard will probably be encountered within the first twenty feet below ground surface. For the purpose of this proposal, ESE assumes that each of the three proposed wells will be drilled to a maximum depth of twenty feet. Assuming an average depth to water of 3 to 4 feet below ground surface, this will permit a screened well interval of up to 18 feet. This interval should provide evaluation of the degree to which the chemicals of concern partition within the shallow ground water. Specific construction details for the wells are discussed below.

If a clearly definable aquitard is not encountered within twenty feet of ground surface, it will be necessary to evaluate soil conditions more thoroughly to determine if drilling deeper is necessary and/or feasible. Cuttings and core samples will be carefully inspected for evidence of decreasing grain size with depth to define the possible occurrence of confining conditions. In addition, soil samples will be screened on a foot by foot basis to determine if volatile hydrocarbons are present at apparently low concentrations so that an approximate base of contamination can be estimated. If these criteria cannot be evaluated sufficiently to allow completing a well before an obvious aquitard is found, ESE will deepen the proposed borings until an appropriate basal zone is found. Monitoring wells will then be constructed in accordance with ground water evaluation criteria described below.

ESE will secure appropriate permits for installing the proposed monitoring wells through the Alameda County Flood Control and Water Conservation District - Zone 7. In conjunction with permitting, ESE will use available ARS site plans to aid in identifying locations of underground obstructions to drilling. In conjunction with that effort, ESE will use appropriate electromagnetic field locating instruments for locating utilities and other potential obstructions not identifiable from ARS site plans.

Prior to initiating field work, ESE will coordinate a meeting with ARS and Alameda County to establish the following:

- That the proposed well locations are acceptable to Alameda County;
- Which of the three wells (borings) will be continuously cored, and
- That ESE's overall approach to this investigation is consistent with Alameda county's objective.

Upon receiving approval from Alameda County to proceed, and obtaining the required permits for monitoring wells, ESE will coordinate obtaining site clearance and schedule the drilling phase consistent with the schedule described below.

Soil borings will be drilled in complete accordance with ESE Standard Operating Procedure (SOP) No. 1 for soil borings and soil sampling with hollow-stem augurs in unconsolidated formations. SOP No. 1 is presented for review in Appendix A - ESE Standard Operating Procedures.

The scope of work requires collecting a continuous core from one well. This well will be decided upon in the field and in coordination with ARS and Alameda County. The core will be obtained using a 5-foot core barrel advanced ahead of the augers. A core will be obtained for the entire boring or as deep as core recovery is possible. The core will be visibly examined and described as above. From the core, ESE will preserve one sample for

analysis from immediately above the occurrence of first ground water using methodology described below. A second soil sample will be preserved for analysis from the first apparent aquitard found below approximately 15 feet deep in the boring. Soil samples will be collected for description and possible analysis within the unsaturated zone in the remaining borings. Boring logs will be prepared for each boring.

ESE will preserve for analysis one soil sample from just above the water table in each of the remaining borings, using the methodology described above. Based on compounds identified in soil samples collected at the time of tank excavation, ESE recommends analyzing each soil sample for halogenated and aromatic volatile organic compounds. Table 2 of the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites (revised August 1990) indicates that if chlorinated solvents are the suspected leak, halogenated and volatile organic compounds can be analyzed using EPA Methods 8010 and 8020, respectively, or by EPA Method 8240. A third option is analysis using EPA Method 8260. Because the organic constituents of primary concern in this investigation are Methylene Chloride, Chloroform, Toluene, Xylenes, and potentially Acetone, ESE recommends using EPA Method 8240 for soil sample analysis. This method will identify all these analytes, if present, at detection limits consistent with Tri-Regional guidelines.

One soil sample will also be analyzed for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver using the EPA 7000 Series methodology. The purpose of analysis for these heavy metals is to evaluate the potential hazardous nature of the soil. ESE has selected NET-Pacific (NET) of Santa Rosa, California to perform the required soil analyses. NET is a State of California-Certified Analytical Laboratory.

ESE will construct 2-inch diameter wells to a maximum depth of 20 feet, consistent with the criteria described above. Specific procedures for well construction and development are detailed in ESE's SOP No. 2 for monitoring well installation and development, which is presented in Appendix A.

A minimum of 72 hours following well development, ESE will purge and sample the new wells in accordance with ESE SOP No. 3 for ground water monitoring and sampling from monitoring wells. To obtain representative samples for dense phase chlorinated hydrocarbon analyses, ESE will collect samples from the bottom of each well using a discrete depth bailer. During all phases of field work, the ESE site supervisor will maintain a data log of site activities. The field log will document all relevant observations, including field activities, events, procedures, accidents and releases, number and type of samples collected, inspections, equipment and personnel on site, visitors, and any problems encountered. All field activities will be keyed to a master site field map and incorporated with the daily log.

Based on previous analytical data, ground water samples from each well will be analyzed for halogenated and aromatic volatile organic compounds (VOCs) using EPA Method 8240. Also, the ground water sample collected from the upgradient well will be analyzed for heavy metals using EPA 7000 series methodology.

If free phase product is encountered in wells, ESE will bail as much as possible from the well and store the product in a DOT-rated drum. The material will be disposed through an appropriate waste hauler/recycler. ESE will not collect ground water samples from wells showing free product; however, a sample of the product will be collected in order to analytically identify the product.

For Quality Assurance/Quality Control (QA/QC) purposes, ESE will collect several additional samples. QA/QC samples will include:

- Duplicate samples for VOC and metals analyses, and
- Trip (travel) blanks for VOC analyses.

Duplicate samples serve as a check on ESE sampling procedures and laboratory handling procedures. One duplicate sample will be collected for each of the requested analyses. Trip blanks are supplied by the analytical laboratory and consist of deionized water. They are collected as a check on ESE sample handling and transport procedures. Because ESE will use dedicated disposable bailers for ground water sample collection, no equipment (rinsate) blanks will be collected.

Each of the samples will be documented under full chain of custody as described above. The following is a summary of samples and analyses to be conducted in association with the proposed investigation:

Sample Description	Method 8240 Volatile Organics	Title 26 Metals
Soil	3	1
Ground Water	3	1
Duplicate Ground Water	1	1
Trip Blank	1	Not Applicable
Totals	**8**	**3**

QA/QC sample results will be used to evaluate the validity of ground-water sample data. Duplicate sample results will be compared on the basis of relative percent difference (RPD), which is defined as:

$$RPD = \frac{| D_1 - D_2 |}{(D_1 + D_2) / 2} \times 100,$$

where

D_1 = First sample result, and

D_2 = Second sample result.

RPDs of 20 or less for ground water samples are considered good agreement.

Ideally, trip blanks analyzed for VOCs will show no detectable constituents. The detection of trace organic constituents in the trip blank indicates that sample handling and transport procedures may have resulted in contamination of samples. Results for ground water samples may, therefore, be inaccurate by a factor equivalent to detected concentrations of hydrocarbons in trip blanks.

If duplicate sample RPDs exceed 20 percent, or if significant concentrations of hydrocarbons are detected in ESE's trip blanks, it will be necessary to reconsider the validity of analytical data. ESE will qualitatively evaluate overall results and, if deemed essential to project quality assurance, re-sampling may be necessary.

In addition to the original investigation of ground water, ESE will conduct quarterly monitoring from the wells if required by Alameda County and/or the Regional Board. Monitoring activities are addressed in Section 3.6.

Throughout the course of field activities associated with soil and ground water investigation, ESE will maintain a field log documenting dates, times, and activities conducted with respect to this project. This procedure will also apply to activities associated with disposal of waste soil and ground water and quarterly ground-water monitoring, as described below.

As part of the scope of work, well abandonment following completion of the project must be addressed. ESE will direct the proper abandonment of the wells in accordance with California Well Standards using the drilling contractor who will drill borings and install monitoring wells. The point at which wells are abandoned will depend on findings of the proposed soil and ground-water investigation. If no hydrocarbons are detected in ground-water samples from wells, it may be appropriate to decommission the wells as soon as possible. ESE will coordinate with ARS in petitioning Alameda County and the Regional Board to allow well abandonment, if appropriate. If, however, volatile organics (or

exceptionally high metals concentrations) are detected in any of the wells, ESE assumes that the wells will remain in place for at least three years. Well abandonment will, then, be addressed as appropriate.

3.4 Task 4 - Dispose of Soil and Ground Water

As a result of the previous excavation of USTs, and of drilling soil borings, installing and developing monitoring wells, purging wells, and collecting ground water samples, various waste materials will have been generated. These wastes include soil from the original UST excavation and soil cuttings from proposed borings (each potentially containing chlorinated solvents and/or heavy metals), rinsate from decontamination of drilling and sampling equipment, and purge water from well development and sampling. Depending upon concentrations of various constituents reported from laboratory analyses, some or all of these materials may require disposal as hazardous waste.

From the preliminary site walk, ESE estimates that approximately two cubic yards of soil were generated as a result of UST excavation. ESE anticipates that an additional one-half to three-quarters of a cubic yard will be generated as a result of proposed drilling activities. Soil cuttings will be stored onsite in appropriately labeled DOT-rated drums pending sample analysis, at which time ESE will coordinate appropriate disposal of the materials. Similarly, ESE will coordinate appropriate characterization of soil from the UST excavations and arrange for proper disposal.

Based on background analytical data currently available, ESE assumes that soil cuttings (and excavated soil) containing chlorinated solvents at historical concentrations will require disposal at a Class I (hazardous waste) disposal facility, but will not require incineration prior to landfilling. This will apply to soils generated from tank excavation and soil borings, with Methylene Chloride and Chloroform concentrations not exceeding 0.96 and 6.0 parts per million, respectively. ESE will segregate cuttings by boring, so that only those cuttings showing detectable chlorinated solvents or metals exceeding State action levels will be

disposed as hazardous waste, with the remaining cuttings to be disposed as non-hazardous waste at a Class III facility.

Ground water recovered during well development and subsequent purging, along with decontamination rinsates, will be stored in DOT-rated drums with labels indicating nature of the material, date collected, and emergency contacts. ESE estimates that approximately 300 gallons of water will be generated, and will require appropriate disposal. Based on previous data, ESE believes waste water can be sent to a licensed waste water recycling facility for disposal. ESE also assumes no additional analytical profiling will be required.

On a quarterly basis, wells will be purged in preparation for quarterly ground water sampling. An estimated 50 gallons of purge water and associated decontamination rinsate will be generated during each event. This water will require periodic recycling as described.

All waste materials will be manifested, transported, and disposed or recycled in accordance with all applicable State and Federal statutes. ESE will include copies of all waste manifest documentation in appropriate reports to be submitted to ARS, as described below.

3.5 Task 5 - Prepare Project and Environmental Site Assessment Reports

General (background) environmental conditions, local water use, and the results of environmental site assessment are to be documented in draft and final reports to ARS. The first report (Project Report) will document information on local soil types, geology, land use, precipitation, ground-water conditions, hydraulic gradient, and dispersion/exposure pathways for potential contaminants in ground water. The Project Report will also document the existence and details of all active and abandoned water wells within a one thousand-foot radius of the former USTs. ESE will compile this information from existing site information, hydrogeologic literature, and well records maintained by DWR.

Concurrent with preparation of the Project Report, ESE will compile an Environmental Site Assessment Report that documents the results of the proposed soil and ground water investigation. The Environmental Site Assessment Report will document site history and conditions (as available from historical records and site reconnaissance), methods employed to investigate soil and ground water, findings and conclusions of the investigation, and evaluation of the need for site remediation (if appropriate). The Environmental Site Assessment Report will contain all field documentation for soil borings, monitoring well construction, soil sampling intervals, and ground water sample collection. The report will contain copies of boring logs, analytical results for soil and ground water samples (including chain of custody documentation), and waste manifest documentation for waste soil and ground water disposal. Other inclusions to the required reports will be site maps, local maps, and ground water elevation contour maps showing direction of ground water flow.

All aspects of both reports will be in accordance with reporting requirements set forth in Tri-Regional guidelines and will address all applicable contaminant action levels as codified in Title 26. Draft copies of the Project and Environmental Site Assessment Reports will be submitted to ARS September 28, 1992. Within ten days of receipt of written review comments from ARS, ESE will make the appropriate changes and submit final documents to ARS.

3.6 Task 6 - Conduct Quarterly Ground Water Monitoring and Reporting

Beginning approximately ninety days after initiating ground water investigation, ESE will implement a program of quarterly monitoring and reporting in accordance with Regional Board requirements. All ground water gauging, purging, sample collection, sample documentation, and sample analysis will be conducted in accordance with procedures specified above. The term of the proposed work is four sampling periods (four quarters). Upon receipt of analytical results for each quarterly sampling event, ESE will prepare a report of findings that documents ground water gauging, estimated direction of ground-water flow, and analytical results. The report will include a table of ground-water level and

analytical results, and a ground water contour map showing estimated flow direction. Draft reports will be submitted to ARS within two weeks following receipt of analytical results. Upon receiving written review comments from ARS, ESE will finalize the reports and submit them to ARS, the Regional Board, and Alameda County.

3.7 Task 7 - Develop Remedial Action Plan

The results of the proposed investigation may lead to the conclusion that remediation of soil and/or ground water is necessary for the site. Several factors to be considered in determining whether remediation is appropriate or applicable include:

- MCLs for metals and organic compounds established under Title 26 of the California Code of Regulations (CCR),
- Action levels for metals and organic compounds established by the California Department of Toxic Substances Control (DTSC),
- Site hydrogeologic conditions that may contribute to off-site migration of contaminants in ground water,
- Ground water use in the area,
- Potential routes of exposure,
- Concentrations of contaminants in soil and/or ground water, and
- Technical and economic feasibility of remedial alternatives.

Based on these factors, ESE will develop proposed cleanup levels applicable to the site. ESE will assist ARS in negotiating acceptable cleanup levels with Alameda County and the Regional Board.

When cleanup levels have been negotiated, ESE will incorporate as part of the Environmental Site Assessment Report (Task 5) a Remedial Action Plan presenting a description of practical remedial alternatives and a basis for selection of the appropriate remedial approach. The Remedial Action Plan will detail the approach to site remediation, and will include appropriate schematics, relative economics, and support data sufficient for

review and evaluation by ARS, as well as Alameda County and the Regional Board. Review comments by ARS, Alameda County, and the Regional Board will be incorporated into the Final Environmental Site Assessment Report.

Because of the limited scope of the proposed soil and ground-water investigation, it may be that additional field investigation will be necessary for evaluation of remedial alternatives. Examples of additional testing include aquifer pumping tests, soil gas surveys, and vapor extraction tests. If ESE determines that additional testing is required, a proposed approach will be presented in the Remedial Action Plan.

3.8 Task 8 - Perform Project Management

For purposes of this proposal, ESE assumes that the project, with the exception of Task 6, is to last for 120 days, and that three meetings with ARS and/or other agencies will be required during that term. ESE will prepare for and participate in these meetings as directed by ARS. Additional project management and oversight will be conducted, as appropriate, for the one-year term of ground-water monitoring and reporting, if that task becomes part of the original scope of work.

ESE will prepare biweekly progress reports documenting the status of all work completed, work in progress, and planned activities for the next reporting period. Reports will also present funds expended to date, and a forecast of cost to completion. ESE will submit two biweekly reports at the end of each month, along with a monthly invoice.

ESE will manage this project by employing the following elements:

- Established project communication procedures,
- Routine project progress reporting,
- Cost control,
- Schedule control,
- Data and document management,

- Subcontractor management,
- A quality assurance/quality control program, and
- A health and safety program.

In association with routine project management, ESE will maintain telephone logs documenting conversation related to the project. This documentation will include the time and date of the call; name, title, affiliation and telephone number of the person or persons participating int he call; the purpose of the call; and a summary of the conversation.

On a biweekly basis, ESE will prepare written progress reports documenting the status of all work performed and in progress. The progress report will summarize expenditures to date and a forecast of costs to be incurred. Progress reports will be submitted to ARS monthly along with monthly invoices prepared under this task. ESE will provide verbal status reports to ARS on a as-needed basis.

4.0 PROGRESS AND REPORTING SCHEDULE

A schedule for project progress and reporting is presented in below Table 1. This schedule is consistent with the terms of the referenced USDA, and will not be amended without receiving prior written approval from ARS. As noted in Table 1, the schedule is dependent on the term for which quarterly ground water monitoring may be necessary if monitoring is not necessary or required, the term of the project will be 120 days, as specified in the contract.

TABLE 1
PROGRESS AND REPORTING SCHEDULE
USDA ARS
Albany, California

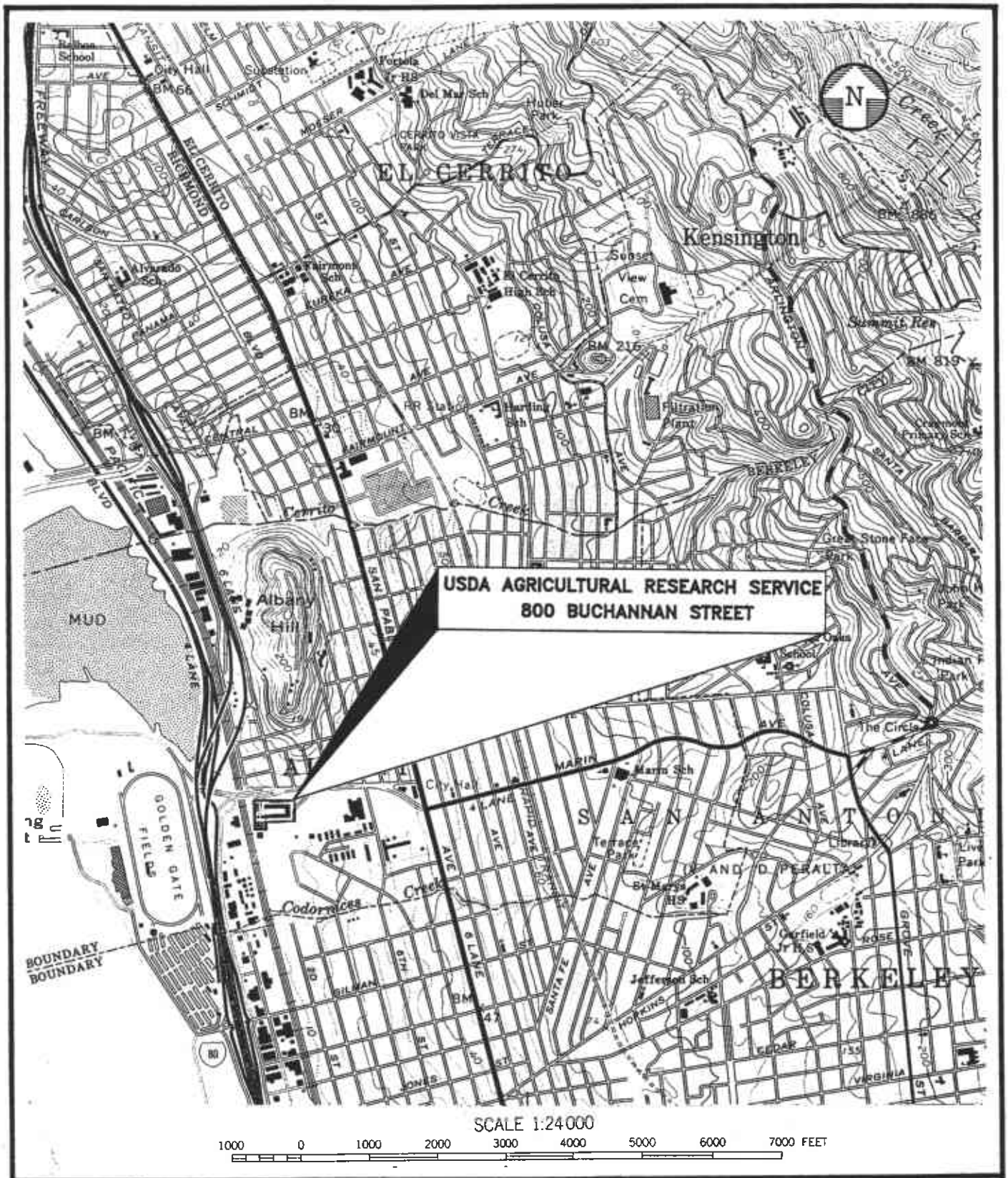
TASK	START DATE	FINISH DATE
1) Prepare Project Work Plan		
- Draft	07/31/92	08/15/92
- Final	08/31/92	09/09/92
2) Perform Background Data Review and Compilation	07/31/92	08/28/92
3) Conduct Soil and Ground Water Investigation	09/14/92	09/23/92
4) Dispose of Soil and Ground Water	10/05/92	10/16/92
5) Prepare Project and Environmental Site Assessment Reports		
- Draft	09/28/92	10/29/92
- Final	11/18/92	11/28/92
6) Conduct Quarterly Ground Water Monitoring and Reporting	12/23/92	[1]
7) Develop Remedial Action Plan[2]	09/28/92	11/28/92
8) Perform Project Management	07/31/92	11/28/92[3]

Notes:

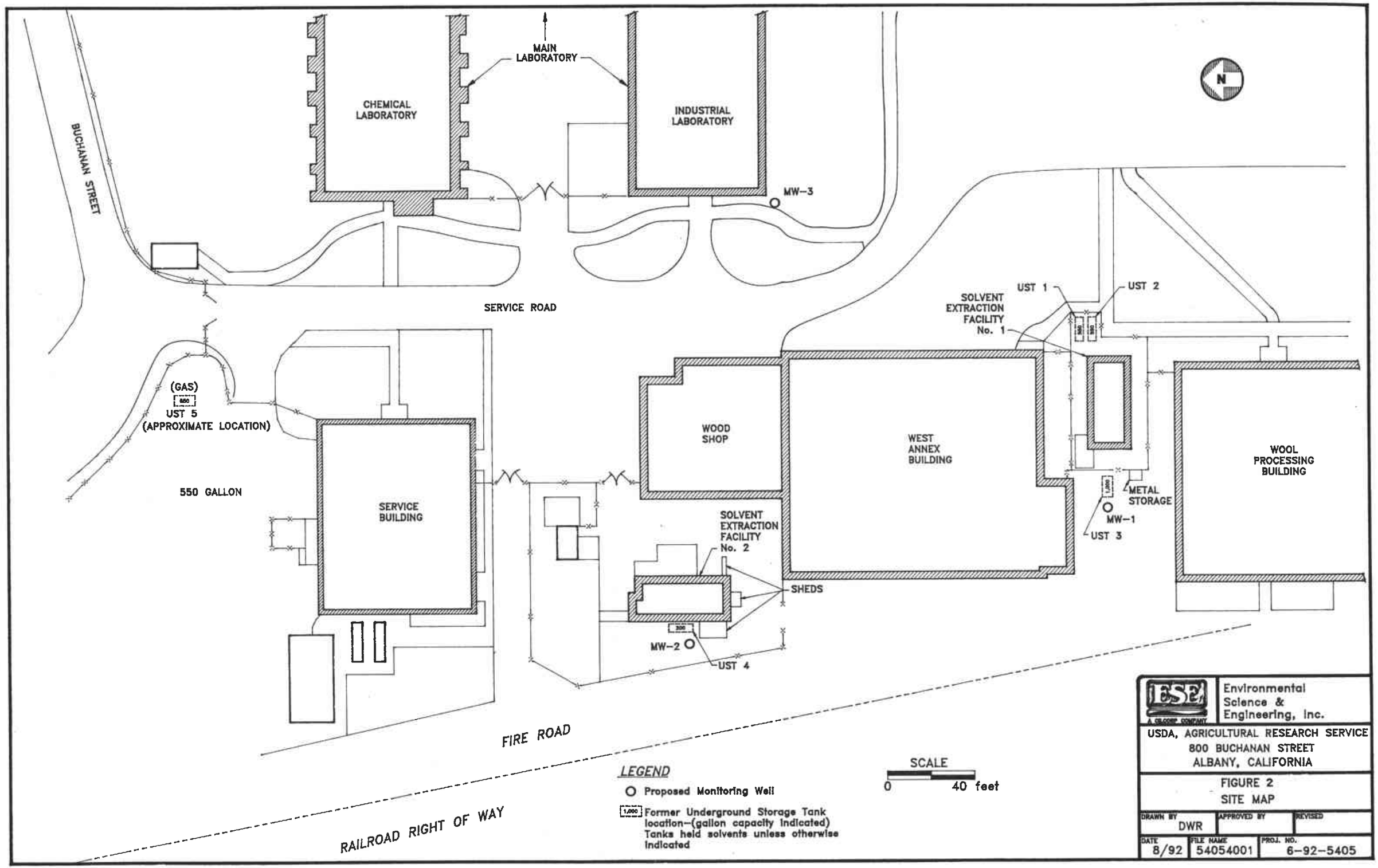
[1] Duration of quarterly monitoring (if necessary) dependent upon extent of contamination and negotiated agency requirements.

[2] Remedial Action Plan developed in association with Project and Environmental Site Assessment Reports.

[3] Duration of Project Management beyond the 120 days specified in Contract No. 53-91H2-2-278 dependent upon the length of time quarterly monitoring is required.



ESE A GILCREST COMPANY	Environmental Science & Engineering, Inc.	DATE 8/92	REVISED	USDA AGICULTURAL RESEARCH SERVICE 800 BUCHANAN STREET ALBANY, CALIFORNIA
		DRAWN BY DWR	APPROVED BY	
4090 Nelson Avenue, Ste. J Concord, California 94520		FILE NAME 54051001	PROJ. NO. 6-92-5405	FIGURE 1 LOCATION MAP


MAIN LABORATORY
CHEMICAL LABORATORY
INDUSTRIAL LABORATORY
BUCHANAN STREET
MW-3
SERVICE ROAD
UST 1
UST 2
SOLVENT EXTRACTION FACILITY No. 1
(GAS)
550
UST 5
(APPROXIMATE LOCATION)
550 GALLON
WOOD SHOP
WEST ANNEX BUILDING
WOOL PROCESSING BUILDING
SERVICE BUILDING
METAL STORAGE
1,000
MW-1
UST 3
SOLVENT EXTRACTION FACILITY No. 2
SHEDS
300
MW-2
UST 4
FIRE ROAD
RAILROAD RIGHT OF WAY
LEGEND
Proposed Monitoring Well
1,000 Former Underground Storage Tank location–(gallon capacity indicated) Tanks held solvents unless otherwise indicated
SCALE
0
40 feet
ESE A GROUP COMPANY
Environmental Science & Engineering, Inc.
USDA, AGRICULTURAL RESEARCH SERVICE
800 BUCHANAN STREET
ALBANY, CALIFORNIA
FIGURE 2
SITE MAP
DRAWN BY DWR
APPROVED BY
REVISED
DATE 8/92
FILE NAME 54054001
PROJ. NO. 6-92-5405

APPENDIX A

ESE
STANDARD OPERATING PROCEDURES

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 1
FOR SOIL BORINGS AND SOIL SAMPLING WITH HOLLOW-STEM AUGERS IN UNCONSOLIDATED FORMATIONS

Environmental Science & Engineering, Inc. (ESE) typically drills soil borings using a truck-mounted, continuous-flight, hollow-stem auger drill rig. The drill rig is owned and operated by a drilling company possessing a valid State of California C-57 license. The soil borings are conducted under the direct supervision and guidance of an experienced ESE geologist. The ESE geologist logs each borehole during drilling in accordance with the Unified Soil Classification System (USCS). Additionally, the ESE geologist observes and notes the soil color, relative density or stiffness, moisture content, odor (if obvious) and organic content (if present). The ESE geologist will record all observations on geologic boring logs.

Soil samples are collected during drilling at a minimum of five-foot intervals by driving an 18-inch long Modified California Split-spoon sampler (sampler), lined with new, thin-wall brass sleeves, through the center of and ahead of the hollow stem augers, thus collecting a relatively undisturbed soil sample core. The brass sleeves are typically 2-inches in diameter and 6-inches in length. The sampler is driven by dropping a 140-pound hammer 30-inches onto rods attached to the top of the sampler. Soil sample depth intervals and the number of hammer blows required to advance the sampler each six-inch interval are recorded by the ESE geologist on geologic boring logs. The ends of one brass sleeve are covered with Teflon sheeting, then covered with plastic end caps. The end caps are sealed to the brass sleeve using duct tape. Each sample is then labeled and placed on ice in a cooler for transport under chain of custody documentation to the designated analytical laboratory. A portion of the remaining soil in the sampler is placed in either a new Ziploc® bag or a clean Mason Jar® and set in direct sunlight to enhance the volatilization of any Volatile Organic Compounds (VOCs) present in the soil. After approximately 15-minutes that sample is screened for VOCs using a photoionization detector (PID). The PID measurements will be noted on the geologic boring logs. The PID provides qualitative data for use in selecting samples for laboratory analysis. Soil samples from the saturated zone (beneath the ground-water table) are collected as described above, are not screened with the PID, and are not submitted to the analytical laboratory. The samples from the saturated zone are used for descriptive purposes. Soil samples from the saturated zone may be retained as described above for physical analyses (grain size, permeability and porosity testing).

If the soil boring is not going to be completed as a well, then the boring is typically terminated upon penetrating the saturated soil horizon or until a predetermined interval of soil containing no evidence of contamination is penetrated. This predetermined interval is typically based upon site specific regulatory or client guidelines. The boring is then backfilled using either neat cement, neat cement and bentonite powder mixture (not exceeding 5% bentonite), bentonite pellets, or a sand and cement mixture (not exceeding a 2:1 ratio of sand to cement). However, if the boring is to be completed as a monitoring well, then the boring is continued until either a competent, low estimated-permeability, lower confining soil layer is found or 10 to 15-feet of the saturated soil horizon is penetrated, whichever occurs first. If a low estimated-permeability soil layer is found, the soil boring will be advanced approximately five-feet into that layer to evaluate its competence as a lower confining layer, prior to the termination of that boring.

All soil sampling equipment is cleaned between each sample collection event using an Alconox® detergent and tap water solution followed by a tap water rinse. Additionally, all drilling equipment and soil sampling equipment is cleaned between borings, using a high pressure steam cleaner, to prevent cross-contamination. All wash and rinse water is collected and contained onsite in Department of Transportation approved containers (typically 55-gallon drums) pending laboratory analysis and proper disposal/recycling.

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 2
FOR MONITORING WELL INSTALLATION AND DEVELOPMENT
PAGE 1

Environmental Science & Engineering, Inc. (ESE) typically installs ground-water monitoring wells in unconsolidated sediments drilled using a truck-mounted hollow-stem auger drill rig. The design and installation of all monitoring wells is performed and supervised by an experienced ESE geologist. Figure A - Typical ESE Monitoring Well Construction Diagram (attached) graphically displays a typical ESE well completion. Prior to the construction of the well, the portion of the borehole that penetrates a lower confining layer (if any) is filled with bentonite pellets. The monitoring well is then constructed by inserting polyvinylchloride (PVC) pipe through the center of the hollow stem augers. The pipe (well-casing) is fastened together by joining the factory threaded pipe ends. ESE typically uses two-inch or four-inch diameter pipe for ground-water monitoring wells. The diameter of the borehole is typically 6-inches greater than that of the diameter of the well-casing, but is at least four-inches greater than that of the well casing. The lowermost portion of the well-casing will be factory perforated (typically having slot widths of 0.010-inch or 0.020-inch). The slotted portion of the well-casing will extend from the bottom of the boring up to approximately five-feet above the occurrence of ground water. A PVC slip or threaded cap will be placed at the bottom end of the well-casing, and a locking expandable well cap will be placed over the top (or surface) end of the well-casing. A sand pack (typically No. 2/12 or No. 3 Monterey sand) will be placed in the borehole annulus, from the bottom of the well-casing up to one to two-feet above the top of the slotted portion, by pouring the clean sand through the hollow stem augers. One to two-feet of bentonite pellets will be placed on top of the sand pack. The bentonite pellets will then be hydrated with three to four-gallons of potable water, to protect the sand pack from intrusion during the placement of the sanitary seal. The sanitary seal (grout) will consist of either neat cement, a neat cement and bentonite powder mixture (containing no more than 5% bentonite), or a neat cement and sand mixture (containing no more than a 2:1 sand to cement ratio). If, the grout seal is to be greater than 30-feet in depth or if standing water is present in the boring on top of the bentonite pellet seal, then the grout mixture will be tremied into the boring from the top of the bentonite seal using either a hose, pipe or the hollow-stem augers, which serve as a tremie. The well will be protected at the surface by a water tight utility box. The utility box will be set into the grout mixture so that it is less than 0.1-foot above grade, to prevent the collection of surface water at the well head. If the well is set within the public right of way, then the utility box will be Department of Transportation (DOT) traffic rated, and the top of the box will be set flush to grade. If the well is constructed in a vacant field a brightly painted metal standpipe may be used to protect the well from traffic. If a standpipe is used, it will be held in place with a grout mixture and will extend one to two-feet above ground surface. All well completion details will be recorded by the ESE geologist on the geologic boring logs.

Subsequent to the solidification of the sanitary seal of the well (a minimum of 72 hours), the new well will be developed by an ESE geologist or field technician. Well development will be performed using surging, bailing and overpumping techniques. Surging is performed by raising and lowering a surge block through the water column within the slotted interval of the well casing. The surge block utilized has a diameter just smaller than that of the well casing, thus, forcing water flow through the sand pack due to displacement and vacuum caused by the movement of the surge block. Bailing is performed by lowering a bailer to the bottom of the well and gently bouncing the bailer off of the well end cap, then removing the full bailer and repeating the procedure. This will bring any material (soil or PVC fragments) that may have accumulated in the well into suspension for removal. Overpumping is performed by lowering a submersible pump to the bottom of each well and pumping at the highest sustainable rate without completely evacuating the well casing. Effective well development will settle the sand pack surrounding the well-casing, which will improve the filtering properties of the sand pack and allow water to flow more easily through the sand pack; improve the communication between the aquifer and the well by aiding the removal of any smearing of fine sediments along the borehole penetrating the aquifer; and, remove fine sediments and any foreign objects (PVC fragments) from the well casing. The ESE geologist or

technician will monitor the ground water purged from the well during development for clarity, temperature, pH and conductivity. Development of the well will proceed until the well produces relatively clear, sand-free water with stable temperature, pH and conductivity measurements. At a minimum, 10 well-casing volumes of ground water will be removed during the development process. Measurements of temperature, conductivity, pH and volume of the purged water and observations of purge water clarity and sediment content will be recorded on the ESE Well Development Data Forms. All equipment used during the well development procedure will be cleaned using an Alconox® detergent and tap water solution followed by a tap water rinse prior to use in each well. All ground water purged during the well development process and all equipment rinse water will be collected and contained onsite in DOT approved containers (typically 55-gallon drums) pending analytical results and proper disposal or recycling.

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 3
FOR GROUND-WATER MONITORING AND SAMPLING FROM MONITORING WELLS

Environmental Science & Engineering, Inc. (ESE) typically performs ground-water monitoring at project sites on a quarterly basis. As part of the monitoring program an ESE staff member will first gauge the depth to water and free product (if present) in each well, then collect ground-water samples from each well. Depth to water measurements are taken by lowering an electric fiberglass tape measure into the well and recording the occurrence of water in feet below a fixed datum set on the top of the well-casing. If free-phase liquid hydrocarbons (free product) are known or suspected to be present in the well, then an electric oil/water interface probe is used to determine the depth to the occurrence of ground-water and the free product in feet below the fixed datum on the top of the well-casing. Depth to water and depth to product measurements are measured and recorded within an accuracy of 0.005-foot. The electric tape and the electric oil/water interface probe are washed with an Alconox® detergent and tap water solution then rinsed with tap water between uses in different wells.

Ground-water samples are collected from a well subsequent to purging a minimum of three to four well-casing volumes of ground water from the well, if the well bails dry prior to the removal of the required minimum volume, then the samples are collected upon the recovery of the ground water in that well to 80% of its initial static level. Ground water is typically purged from monitoring wells using either a hand-operated positive displacement pump, constructed of polyvinylchloride (PVC); a new (precleaned), disposable polyethylene bailer; or, a variable-flow submersible pump, constructed of stainless steel and Teflon®. The hand pumps and the submersible pumps are cleaned between each use with an Alconox® detergent and tap water solution followed by a tap water rinse. During the well purging process the conductivity, pH and temperature of the ground water are monitored by the ESE staff member. Ground-water samples are collected from the well subsequent to the stabilization of the of the conductivity, pH and temperature of the purge water, and the removal of four well-casing volumes of ground-water (unless the well bails dry). The parameters are deemed to have stabilized when two consecutive measurements are within 10% of each other, for each respective parameter. The temperature, pH, conductivity and purge volume measurements, and observations of water clarity and sediment content will be documented by the ESE staff member on ESE Ground-Water Sampling Data Forms.

Ground-water samples are collected by lowering a new (precleaned), disposable polyethylene bailer into the well using new, disposable nylon cord. The filled bailer is retrieved, emptied, then filled again. The ground water from this bailer is decanted into appropriate laboratory supplied glassware and/or plastic containers (if sample preservatives are required, they are added to the empty containers at the laboratory prior to the sampling event). The containers are filled carefully so that no headspace is present to avoid volatilization of the sample. The filled sample containers are then labeled and placed in a cooler with ice for transport under chain of custody documentation to the designated analytical laboratory. The ESE staff member will document the time and method of sample collection, and the type of sample containers and preservatives (if any) used. These facts will appear on the ESE Ground-Water Sampling Data Forms. ESE will collect a duplicate ground-water sample from one well for every ten wells sampled at each site. The duplicate will be a blind sample (its well designation will be unknown to the laboratory). The duplicate sample is for Quality Assurance and Quality Control (QA/QC) purposes, and provides a check on ESE sampling procedures and laboratory sample handling procedures. When VOCs are included in the laboratory analyses, ESE will include a trip blank, if required, in the cooler with the ground-water samples for analysis for the identical VOCs. The trip blank is supplied by the laboratory and consists of deionized water. The trip blank is for QA/QC purposes and provides a check on both ESE and laboratory sample handling and storage procedures. Since disposable bailers are used for sample collection, and are not reused, no equipment blank (rinsate) samples are collected.