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

December 15, 1992

Mr. Larry Seto
Alameda County Department of Health Services
Hazardous Material Division
80 Swan Way, Room 200
Oakland, CA 94621

Re: Ground Water Monitoring Well Project
U.S. Department of Agriculture
800 Buchanan Street, Albany, CA 94710

Dear Mr. Seto:

The United States Department of Agriculture (USDA), Agricultural Research Service (ARS) is pleased to provide a draft copy of the Report on Soil and Ground Water Investigation developed by Environmental Science and Engineering, Inc., (ESE) 4090 Nelson Avenue, Suite J, Concord, California 94520, for USDA/ARS Western Regional Research Center (WRRC), 800 Buchanan Street, Albany, California 94710.

This project is the result of ARS's effort to identify potential hazardous waste sites/conditions at our location under authority of Alameda County Department of Environmental Health Services (Alameda County) and the San Francisco Bay Regional Water Quality Control Board (Regional Board) as a result of the removal of potentially leaking underground storage tanks (Alameda County, May 7, 1991).

As indicated in my earlier letter, I invited you and Mr. Richard Hiett of the Regional Board to participate in this project. This draft report is being provided to give you an opportunity to review it, and ultimately concur.

It has been concluded by our contractor that no detectable concentrations of VOCs were detected subsurface at the site.

In view of the above, ARS is requesting permission to abandon the monitoring wells at the site. We would like to close this project before the end of the current calendar year. Therefore, it would be appreciated if we could receive your comments by December 28. Your help in this matter is appreciated.

Sincerely,

Gary Fleming
Facilities Engineer

Enclosure

cc: A. Betschart, Director, WRRC
C. Reder, Area Administrative Officer, Pacific West Area, ARS
R. Abeyta, Contracting Officer, Pacific West Area, ARS
R. Hiett, Regional Water Quality Control Board
G. Jensen, Senior Deputy District Attorney, Alameda County
R. Shahid, Director, Environmental Health Department, Alameda County

Environmental
Science &
Engineering, Inc.
A CILCORP Company

RECD DEC 14 1992

December 3, 1992

Project 6-92-5405

Mr. Gary Fleming
Facility Engineer
United Stated Department of Agriculture
Agricultural Research Service
Pacific West Area
800 Buchanan Street
Albany, California 94710

SUBJECT: **Draft Report on Soil and Ground Water Investigation**

Dear Mr. Fleming:

Enclosed are five copies of a draft *"Report on Soil and Ground Water Investigation at the United Stated Department of Agriculture Western Regional Research Center"* for your review and comment. Based on the results of this investigation, Environmental Science & Engineering, Inc. (ESE) recommends site closure. It is possible that the County of Alameda Health Care Agency will require a year of quarterly or semi-annual monitoring to verify the absence of contaminants in the ground water through seasonal changes. If this is requested, ESE will perform this work as contracted.

ESE is currently obtaining permission from the City of Albany to discharge drummed water at the site and permission from the West Richmond Landfill for acceptance of drummed soil and stockpiled soil from the site. ESE will keep you informed of these disposal operations.

Your comments can be directed to Mike Quillin or Sue Wickham at (510) 685-4053 . Please note that Mike will be on vacation the latter part of December 1992.

Sincerely,

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

Susan S. Wickham

Susan S. Wickham, RG 3851
Senior Geologist

enclosures (5)

4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323

REPORT ON SOIL AND GROUND WATER INVESTIGATION

at the

UNITED STATES DEPARTMENT OF AGRICULTURE
WESTERN REGIONAL RESEARCH CENTER

Submitted to:

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

Prepared by:

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

Project No. 6-92-5405
December 3, 1992

This report has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of the United States Department of Agriculture 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 the professional advice in this report.

PREPARED BY:

_____ _____

Bart S. Miller
Senior Staff Geologist

Date

UNDER THE PROFESSIONAL REVIEW AND SUPERVISION OF:

_____ _____

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

Date

_____ _____

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

Date

PROJECT NO. 6-92-5405

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1.0 INTRODUCTION

This report 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 field activities described herein were conducted during September, 1992 pursuant to ARS Contract No. 53-91H2-2-278, effective July 31, 1992.

The report 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.

1.1 Objectives

The objectives of the work described in this report were to:

- Compile and review background data regarding soil and ground water investigations at and proximal to the site, local hydrogeology, and both local land and ground water usage;
- Conduct a soil and ground water investigation at the site to determine if residual chlorinated solvents are present in the soil and/or ground water;
- Determine whether a Remedial Action Plan (RAP) for soil and/or ground water is necessary.

All activities associated with meeting the project objectives have been completed.

2.0 BACKGROUND

2.1 Site Description

The 16-acre site is located on Buchanan Street, immediately east of Interstate 80, in Albany, California (Figure 1) and occupies a low relief area adjacent to San Francisco Bay. Original development of the site was initiated during 1939 and additional construction occurred during the mid-1960's. Site structures include the Main Laboratory which is comprised of an administration wing, a chemical laboratory wing, and an industrial laboratory wing; the West Annex and woodshop building; the word processing building; the service building; a complex of five greenhouses, two solvent extraction facilities (SEFs), 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 Background Environmental Conditions

Site investigation pertinent to the current work commenced during December 1990 when five underground storage tanks (USTs) were excavated and removed. Former UST locations are shown in Figure 2. The USTs are as follows: two 550-gallon solvent USTs immediately east of SEF #1 (USTs 1 and 2, Figure 2), one 1,000-gallon solvent UST immediately west of SEF #1 (UST 3, Figure 2), one 200-gallon solvent UST immediately west of SEF #2 (UST 4; Figure 2), and one 550-gallon gasoline UST near the west 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 UST excavations) were collected and submitted for chemical analysis. Soil and ground water samples collected from the solvent UST excavations were analyzed for Halogenated Volatile Organic Compounds (HVOCs) using EPA Method 8010 and for Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) using EPA Method 8020. The soil sample collected from the gasoline UST excavation was analyzed for Total Petroleum Hydrocarbons as Gasoline (TPH-G) and for BTEX using EPA Method 8015/8020.

Analytical results for soil samples collected from the excavations for USTs 1 and 2 indicated detectable concentrations of chloroform at 1,200 and 1,400 micrograms per kilogram (μg/Kg) or parts per billion (ppb), respectively. The soil sample collected from the excavation for UST 3 reported no detectable concentrations of HVOCs or BTEX; however, the ground water sample collected from the excavation reported concentrations of Methylene Chloride and Chloroform at 11 and 12 micrograms per liter (μg/L), or ppb, respectively. The soil sample collected from the excavation for UST 4 reported detectable concentrations of Methylene Chloride and Chloroform at 12 and 6.6 μg/Kg, respectively, and the ground water sample collected from the excavation contained Methylene Chloride and Chloroform concentrations of 480 and 360 μg/L, respectively. The soil sample collected from the excavation for UST 5 reported no detectable concentrations of TPH-G or BTEX,

3.0 GEOLOGY AND HYDROLOGY

3.1 Regional Geology

The site is located within the Coast Ranges geomorphic province (Norris and Webb, 1976) at the East Bay Plain area of the San Francisco Bay depression (Hickenbottom and Muir, 1988). The site is situated within a relatively flat, alluviated lowland portion of the East Bay Plain at the northernmost boundary of a subarea referred to as the Berkeley Alluvial Plain. Alluvial sediments are underlain by consolidated, undivided bedrock units.

The East Bay Plain sediments in this area are Quaternary in age and are commonly referred to as (from youngest to oldest) Younger Alluvium, Bay Mud, Merritt Sand, and Older Alluvium. Younger alluvium occurs as 10- to 50-foot thick, unconsolidated, moderately sorted silt, sand, and gravel deposited in alluvial fan and narrow canyon stream channel environments. Bay Mud is observed to vary in thickness from less than one foot to as much as 120 feet and is comprised of an unconsolidated, highly organic, dark plastic to silty clay with thin lenses of silt and sand. Merritt Sand has been reported to have a maximum thickness of approximately 65 feet and is best described as a well-sorted, fine to medium-grained sand containing silty and clayey lenses. This sand was derived chiefly as a wind and water deposited beach and near shore deposit. Older Alluvium is reported to have a maximum thickness of approximately 1,100 feet and is comprised of layers of poorly consolidated to unconsolidated clay, silt, sand, and gravel.

During late Pleistocene time, the abovementioned unconsolidated sediments were being deposited in a valley formed by a downdropped block of land located west of the northwest trending Hayward Fault (Robinson, 1953). The Hayward Fault is located approximately 2.5 miles west of the USDA site.

3.2 Regional Hydrology

Unconsolidated deposits (including Older Alluvium, Merritt Sand, Bay Mud, interfluvial basin deposits, fluvial deposits, and Younger Alluvium) collectively make up the ground

water reservoir in the East Bay Plain area (Hickenbottom and Muir, 1988). Undivided bedrock located east of the Hayward fault and beneath the unconsolidated deposits form the boundaries of the East Bay Plain Aquifer System. The majority of ground water in this aquifer is supplied by the Older Alluvium.

The Older Alluvium is a permeable unit which yields large to small quantities of ground water to wells dependent upon location. This unit is the major ground water reservoir in the East Bay Plain area. Merritt Sand is a permeable unit which decreases in permeability with depth due to increased consolidation. The unit contains some ground water but is not considered a primary source of supply because of its limited areal distribution and thickness. The Bay Mud has low permeability and effectively functions as a barrier to the vertical movement of salt water from San Francisco Bay into the productive ground water aquifers. Though the Bay Mud is water saturated because most of it lies beneath the water table, it is not considered a useable source of ground water to wells because of its low permeability and the high probability for it to contain salt water.

Under natural conditions, ground water in the East Bay Plain moves west and southwestward from recharge areas along the Hayward Fault toward and under San Francisco Bay (Clark, 1924). Based on data collected during the spring of 1987 and prior, the ground water gradient in the upper several hundred feet of the Older Alluvium is reported to vary from 5 to 10 feet per mile (Hickenbottom and Muir, 1988). Ground Water in both the upper portion of the Older Alluvium and below 200 feet in the older alluvium was reported to be moving toward San Francisco Bay.

Due to differences in hydraulic head there has always been vertical movement of ground water between the different geological units in the East Bay Plain. Hickenbottom and Muir (1988) report that, under natural conditions, ground water in the confined aquifers probably had sufficient head to cause upward migration from the older alluvium through the confining Bay Mud into surficial deposits including the Merritt Sand. This feature was manifested by flowing wells along the bayshore. Active pumping over the past 60 years has reduced the

hydraulic head in various aquifers and, as of spring 1987, no flowing wells are known to exist along the Bay. Because the past upward movement of ground water during natural conditions has reversed to a downward migration, the potential for contaminant impact to the older alluvium aquifer now exists.

Precipitation that falls on the plain and adjacent hills is the primary source of most ground water in the East Bay Plain area. Seepage from streams, infiltration through soil, and subsurface inflow from adjacent areas and the bedrock units are considered the methods of aquifer recharge (Hickenbottom and Muir, 1988). Recharge to the confined aquifers (the main water-producing units of the East Bay Plain) from yearly rainfall occurs mainly along the area adjacent to the Hayward Fault and, due to recent dry weather conditions, the amount of recharge has been estimated to be only several thousand acre-feet per year.

3.3 Local Hydrology, Precipitation, and Water Usage

Ground water well inventory data for wells existing in the immediate vicinity of the site (Township 1 N, Range 4 W, Section 33) was acquired by ESE from the Alameda County Department of Public Works (ACDPW) and is presented as Appendix A. A total of two soil borings and nine monitoring wells were identified as being located at the site or within approximately 2,000 feet of the site. The two soil borings were reportedly owned by Daniel Mann and were drilled at 800 Buchanan Street during September 1988. Ground water reported to have occurred at a depth of twelve feet below ground surface (bgs).

Three of the nine monitoring wells are/were owned by Santa Fe Pacific Realty and located at Buchanan Street and Eastshore Highway. In November 1988, ground water levels in all three wells during were reported to be six feet bgs. Two other monitoring wells are/were owned by Williams and Lane Energy and located at 1077 Eastshore Highway. Ground water levels in these two wells were reported to be six feet bgs during June 1986. Four monitoring wells were installed by E.C Buehrer and Associates, Inc. at 1060 and 1061 Eastshore Highway. All water levels at this location were reported to be four feet bgs

during April 1990. Because these reported sites are located south (and topographically downslope) of the USDA facility adjacent to Codornices Creek, it is presumed that depth to ground water will be slightly greater at the site.

A total of seven more monitoring wells were identified to be within 3,000 feet of the site. All seven wells are/were owned by Shell Oil Company and located at 999 San Pablo Avenue. Data reported during January, April, and August 1990 indicated ground water levels ranging between six to eight feet bgs during January and April, and between nine to twelve feet bgs during the month of August.

Alameda County exhibits a Mediterranean type of climate characterized by winter rains and summer dryness (Hickenbottom and Muir, 1988). Winter rains are caused by frontal storms generated in the North Pacific Ocean and the majority of this rainfall occurs during the months of November through March. The Alameda County Flood Control and Water Conservation District (ACFCWCD) collects rainfall data from at least 67 stations within Alameda County. Two ACFCWCD stations, 98D and 99B, are located at Pierce Street and Talbot Street in Albany, respectively. Based on data collected until 1987 and using 90-year rainfall averages on all rainfall gauges throughout Alameda County and nearby areas, the ACFCWCD has calculated that the USDA site is located at an area where rainfall ranges between 18 to 20 inches per year.

More than 900 ground water wells in the East Bay Plain area are or have been used for irrigation purposes. A large proportion of these wells were reportedly drilled during the 1976-1977 drought and are relatively shallow in depth. Domestic water supply is the second largest use of the ground water resources in the East Bay Plain area with 545 domestic wells recorded with the ACFCWCD. These domestic wells are reportedly located in unincorporated areas of the Bay Plain and it is not known how many of these wells are still in use. All other domestic water is obtained primarily from surface waters from the Sierra

Nevada Mountains imported by East Bay Municipal Utilities District (EBMUD). As well, the ACFCWCD has over 100 records of industrial wells in the East Bay Plain area. This ground water is reportedly used for cooling, processing food products, and washing down equipment and work areas.

4.0 SAMPLING METHODOLOGY

All methods and associated standards employed by ESE during this site soil and ground water investigation were 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).

All appropriate permitting for this subsurface investigation was secured by ESE through the ACFCWCD - Zone 7. In order to identify all underground obstructions to drilling, ESE reviewed all available ARS site plans and supervised Subtronic of Concord, California in locating subsurface utilities with appropriate electromagnetic field locating instruments at the locations targeted for drilling.

4.1 Soil Boring and Soil Sample Collection

Three soil borings were drilled in complete accordance with ESE Standard Operating Procedure (SOP) No. 1 for Soil Borings and Soil Sampling with Hollow-Stem Augers in Unconsolidated Formations. SOP No. 1 is presented for review in Appendix B - ESE Standard Operating Procedures.

One boring, MW-2, was sampled by continuous coring using a five-foot long core barrel advanced ahead of the augers. Approximately 90 percent core recovery to a depth of 20 feet bgs was achieved using the continuous method. This enabled the ESE geologist to visibly examine and describe a continuous, near-surface, stratigraphic section of the site. ESE preserved one soil sample collected immediately above the occurrence of first ground water, one soil sample from the vadose zone at a depth of five feet bgs, and a third soil sample from three to five feet below the occurrence of first ground water for possible chemical analysis. Two borings, MW-1 and MW-3, were sampled at five-foot intervals using a California Modified Split-spoon sampler as described in ESE SOP No. 1 (Appendix B).

4.2 Monitoring Well Installation and Ground Water Sampling

ESE constructed two-inch diameter ground water monitoring wells in soil borings MW-1, MW-2, and MW-3 to a depth of 20 feet bgs (Figure 2 - Site Plan). Specific procedures for the construction and development of these wells are detailed in ESE SOP No. 2 for Monitoring Well Installation and Development, which is presented in Appendix B.

After a period of five days following well development, ESE purged and sampled the three new wells in accordance with ESE SOP No. 3 for Ground Water Monitoring and Sampling from Monitoring Wells (Appendix B).

4.3 Surveying

Concurrent with well construction and development, ESE supervised Geotopo of Richmond, California (PLS #3300) in surveying the location of each new monitoring well relative to site features and determining the absolute elevation at the top of each well casing relative to mean sea level (MSL). Casing elevations were measured to the nearest 0.01 foot thereby enabling ESE to report depth to ground water measurements in feet relative to MSL. All survey points, including well casings and fixed structures, were surveyed to a City of Berkeley benchmark monument located at the intersection of 4th and Harrison Streets. This benchmark is reported to be situated at 7.65 feet above MSL.

4.4 Analytical Methods

Soil samples collected immediately above the occurrence of ground water in borings MW-1, MW-2, and MW-3 were submitted under chain of custody for analysis to National Environmental Testing, Inc. (NET), a California certified laboratory located at Santa Rosa, California. Based on the compounds identified in soil samples collected during the past tank excavations, the three samples were analyzed for VOCs using EPA Method 5030/8240.

Ground water samples collected from wells MW-1, MW-2, and MW-3 were also submitted under chain of custody to NET for analysis for VOCs using EPA Method 5030/8240. For Quality Assurance/Quality Control (QA/QC) purposes, ESE also submitted a duplicate

ground water sample collected from well MW-1 and a trip (travel) blank supplied by the laboratory to be analyzed using EPA Method 5030/8240. Duplicate samples serve as a check on ESE sampling procedures and laboratory handling procedures. Trip blanks consist of deionized water and act as a check on ESE sample handling and transport procedures.

4.5 Drill Cuttings and Purge Water Storage

As a result of the previous UST excavations, and the drilling of three soil borings, the installation and development of three monitoring wells, and the purging of ground water from each well prior to sampling, various waste materials were generated. These wastes include soil from the original UST excavations and soil cuttings from the more recent borings, rinseates from decontamination of drilling and sampling equipment, and purge water from well development and sampling. A total of eight California Department of Transportation (DOT) rated steel 55-gallon drums of soil and water were generated by ESE during this fieldwork. Of the eight drums present, three contain soil as drill cuttings and five contain water as rinseates and purge water. In addition, one soil stockpile of approximate dimensions eight feet long by five feet wide by four feet high (approximate volume of three cubic yards), generated from the previous excavation activities, is also present at the site. ESE sampled the soil in this stockpile by digging inward to the pile approximately one foot and physically advancing a brass sample ring into the soil. The ends of the ring were sealed with Teflon® tape and plastic end caps, and the sample was placed in a cooler on ice for transport under Chain of Custody to NET. This stockpile soil sample was analyzed for VOCs using EPA Method 5030/8240.

5.0 RESULTS OF INVESTIGATION

5.1 Soil

Soil samples observed and collected by ESE from soil borings MW-1, MW-2, and MW-3 indicate Bay Mud sediments from ground surface to 20 feet bgs (Appendix C - Boring Log and Well Completion Summaries). This unit was observed in MW-1 and MW-2 to be a brown to grey clay of moderate plasticity and high organic content with minor, thin (less than two inches in thickness) lenses of coarse sand (0.08 to 0.19-inch diameter grain size) with or without gravel fragments (0.19 to 1.00-inch diameter). Boring MW-3 had the Bay Mud sediments, as described above, to a depth of 20-feet bgs, however, a two-foot thick bed of sand was observed from 11 feet bgs to 13 feet bgs and is noted to be brown, poorly-sorted, and coarse-grained with some gravel fragments. This sand is observed to be essentially the same in composition and grain size distribution as the sand observed in thinner lenses at borings MW-1 and MW-2.

All soil samples screened for VOCs using a PID were observed to vary in concentration from two parts per million (ppm) to twelve ppm. Three soil samples collected immediately above the occurrence of ground water (MW1-10', MW2-10', and MW3-10') were analyzed for VOCs using EPA Method 5030/8240 and all three soil samples were reported not to contain detectable concentrations of VOCs (Appendix D - Analytical Results and Chain of Custody Documentation). The soil sample collected from previously stockpiled soil (SP-1; Appendix D) also reported nondetectable concentrations of ESE drilled soil borings and installed ground water VOCs monitoring wells at the site on September 14 and 15, 1992. the wells were purged and sampled on September 21, 1992.

5.2 Stockpile Soil

Soil stockpile from the previous UST excavation was sampled (SP-1) and analyzed for VOCs. Analytical results indicated that the sample contained nondetectable concentrations VOCs (see Appendix D).

5.3 Ground Water

Ground water was encountered in borings MW-1, MW-2, and MW-3 at an average depth of approximately 12 feet bgs. This depth closely correlates with depth to water data presented in the ACDPW well search conducted by ESE (see Section 3.3 - Local Geohydrology, Precipitation, and Water Usage). Field sampling logs for all three wells indicating depth to water and physio-chemical conditions of the ground water prior to sampling are presented as Appendix E - Well Sampling Field Logs. Depth to water and ground water elevations are presented in the following table. ESE contoured ground water elevations on Figure 3 - Ground Water Elevations.

TABLE 1. GROUND WATER ELEVATIONS (SEPTEMBER 21, 1992)

Monitoring Well Number	Well Diameter (inches)	Depth to Water (feet)	Reference Elevation (feet AMSL)	Ground Water Elevation (feet AMSL)
MW-1	2	6.03	7.42	1.39
MW-2	2	6.63	7.57	0.94
MW-3	2	11.01	13.22	2.21

*NOTES: * AMSL refers to Above Mean Sea Level*

The direction of ground water flow during this monitoring event was towards the west at a gradient approximating 0.007 foot per foot or approximately 37 feet per mile. These findings correlate with regional hydrological conditions researched by ESE and presented in section 3.2 - Regional Hydrology.

Ground water samples from all wells, including the duplicate sample, were reported to be nondetectable for VOCs. The trip blank sample was also reported to be nondetectable for VOCs.

6.0 DISCUSSION AND CONCLUSIONS

During the period of September 14 through September 21, 1992, ESE sampled three soil borings to a depth of 20 feet bgs adjacent to excavations formerly occupied by solvent USTs at the USDA ARS site located at Albany, California. Two-inch diameter ground water monitoring wells were installed in the three soil borings and subsequently, developed, purged, and sampled. A soil stockpile generated during the December 1990 excavation of USTs was also sampled. All subsurface soil and ground water samples collected by ESE were found to contain no detectable concentrations of VOCs. Stockpiled soil was found to contain nondetectable VOC's.

VOC concentrations reported for soil and tank pit water samples collected during the removal of the solvent USTs in December 1990 were less than 1.4 ppm and less than 0.36 ppm, respectively. These low concentrations of VOCs have likely undergone a combination of biodegradation, volatization, and natural attenuation. The existence of low permeability Bay Mud at the site would have significantly reduced the likelihood of vertical or horizontal migration of the VOCs in ground water prior to complete degradation.

7.0 RECOMMENDATIONS

Based on the findings of this site investigation, ESE recommends the following:

- Site closure should be requested, in writing, from Alameda County,
- Monitoring wells MW-1, MW-2, and MW-3 should be abandoned as soon as closure is granted,
- Discharge of drummed ground water, purge water, and decontamination rinsates (approved and permitted through the City of Albany Public Works Department) to sanitary sewer should be conducted as soon as is feasible, and;
- Drummed and stockpiled soil resulting from previous UST excavation and monitoring well drilling should be disposed at a Class III landfill as nonhazardous waste.

8.0 REFERENCES

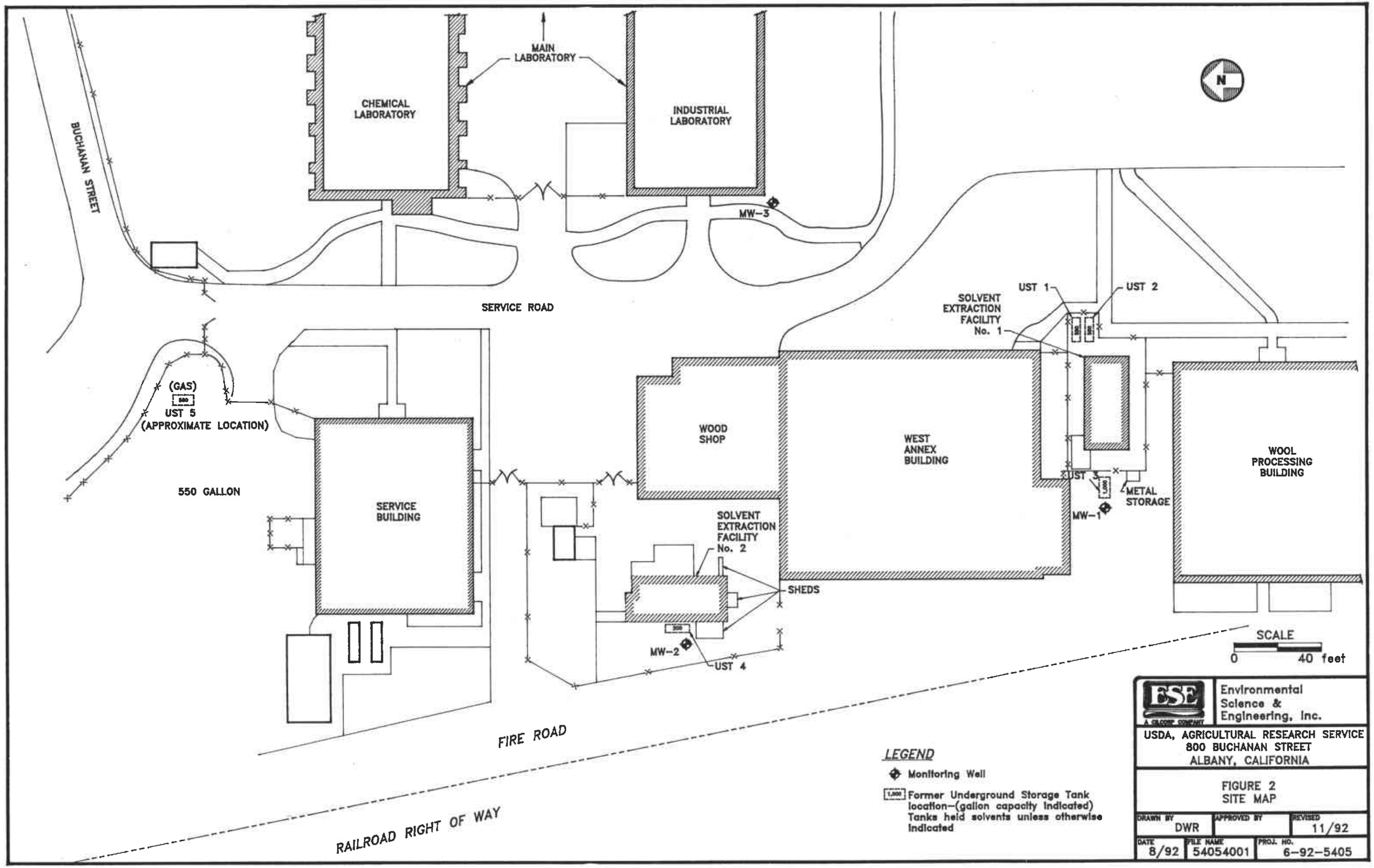
Clark, W.O., 1924. Ground Water in the Santa Clara Valley, California. US Geol. Surv. Water-Supply Paper 519, 209 pp.

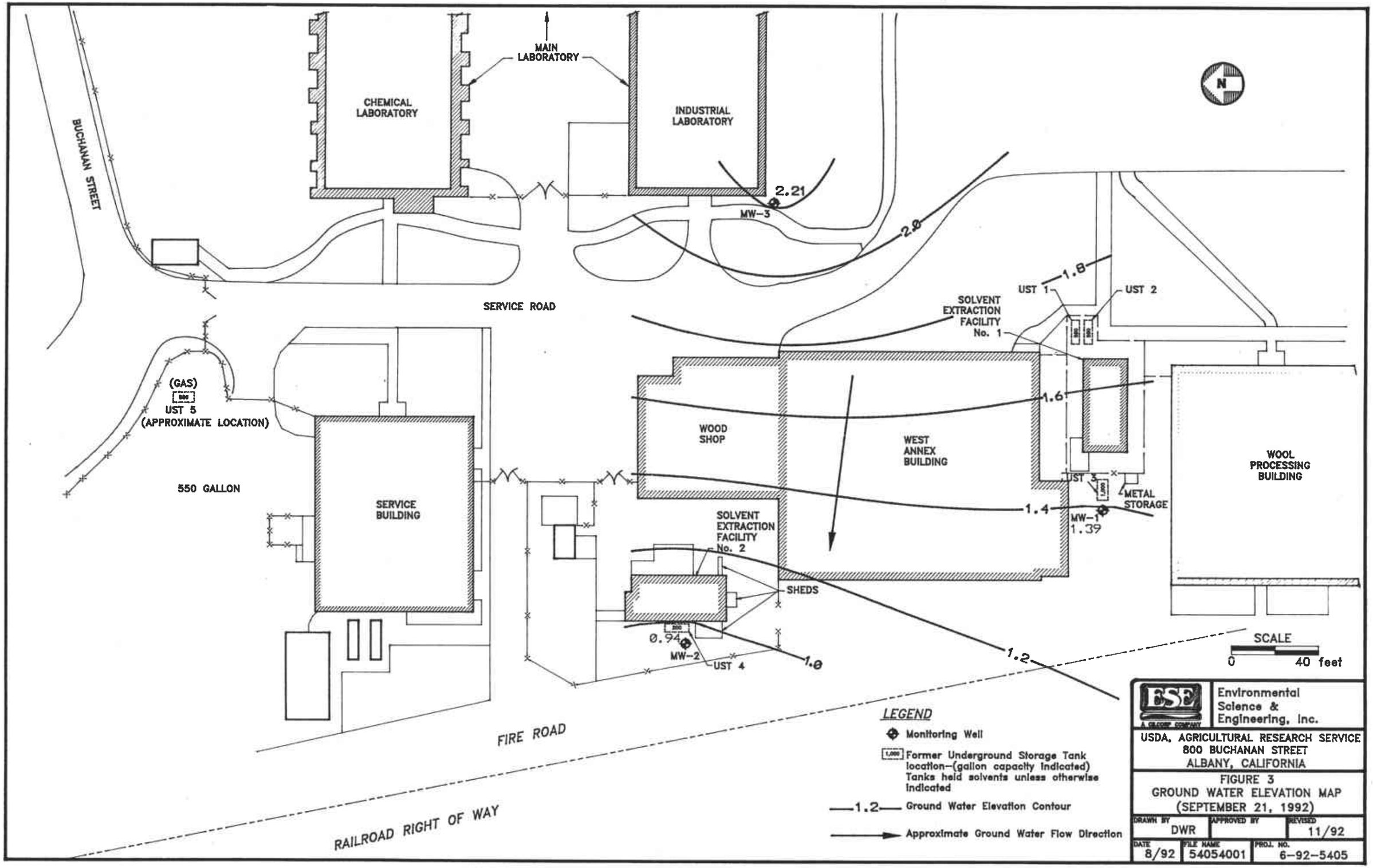
Hickenbottom, K., and Muir, K., 1988. Geohydrology and Ground Water Quality Overview, of the East Bay Plain Area, Alameda County, California. Alameda County Flood Control and Water Conservation District Report 205 (J), 83 pp.

Norris, R.M., and Webb, R.W., 1976. Geology of California, John Wiley & Sons, Inc., New York. 365 pp.

Radbruch, D.H., 1957. Areal and Engineering Geology of the Oakland West Quadrangle. US Geol. Surv. Misc. Geol. Inv. Map 1-239, 1:24,000.

ESE A GLOOMP 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)
UST 5
(APPROXIMATE LOCATION)
550 GALLON
WOOD SHOP
WEST ANNEX BUILDING
WOOL PROCESSING BUILDING
UST 3
METAL STORAGE
MW-1
SERVICE BUILDING
SOLVENT EXTRACTION FACILITY No. 2
SHEDS
MW-2
UST 4
FIRE ROAD
RAILROAD RIGHT OF WAY
N
SCALE
0
40 feet
LEGEND
Monitoring Well
Former Underground Storage Tank location–(gallon capacity indicated) Tanks held solvents unless otherwise indicated
ESE
A DAMES & MOORE COMPANY
Environmental Science & Engineering, Inc.
USDA, AGRICULTURAL RESEARCH SERVICE
800 BUCHANAN STREET
ALBANY, CALIFORNIA
FIGURE 2
SITE MAP
DRAWN BY DWR
APPROVED BY
REVISED 11/92
DATE 8/92
FILE NAME 54054001
PROJ. NO. 6-92-5405


MAIN LABORATORY
CHEMICAL LABORATORY
INDUSTRIAL LABORATORY
BUCHANAN STREET
SERVICE ROAD
2.21
MW-3
2.0
UST 1
1.8
UST 2
SOLVENT EXTRACTION FACILITY No. 1
(GAS)
UST 5
(APPROXIMATE LOCATION)
550 GALLON
WOOD SHOP
WEST ANNEX BUILDING
1.6
WOOL PROCESSING BUILDING
UST 3
METAL STORAGE
1.4
MW-1
1.39
SERVICE BUILDING
SOLVENT EXTRACTION FACILITY No. 2
SHEDS
0.94
MW-2
UST 4
1.0
1.2
FIRE ROAD
RAILROAD RIGHT OF WAY
N
SCALE
0
40 feet
LEGEND
Monitoring Well
Former Underground Storage Tank location—(gallon capacity indicated) Tanks held solvents unless otherwise indicated
1.2 Ground Water Elevation Contour
Approximate Ground Water Flow Direction
ESE
A GEOMATRIX COMPANY
Environmental Science & Engineering, Inc.
USDA, AGRICULTURAL RESEARCH SERVICE
800 BUCHANAN STREET
ALBANY, CALIFORNIA
FIGURE 3
GROUND WATER ELEVATION MAP
(SEPTEMBER 21, 1992)
DRAWN BY DWR
APPROVED BY
REVISED 11/92
DATE 8/92
FILE NAME 54054001
PROJ. NO. 6-92-5405

APPENDIX A

September 30, 1992 Alameda County Well Inventory Data

9/30/92

ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER
1N/4W 26J 1	PG&E	HILLDALE & GRIZZLY PEAK	SLZ	0
1N/4W 26N 1	PG&E	SAN FERNANDO	SLZ	0
1N/4W 26P 1	PG&E	SANTA BARB. & N.HAMPTON	SLZ	0
1N/4W 27P 1	PG&E	WARD & CARMEL	ALB	0
1N/4W 28R 1	FRED GRANNART	501 SAN PABLO AVENUE	ALB	0
1N/4W 32G 1	CITY OF ALBANY	EMBARCADERO ROAD	ALB	0
1N/4W 32G 2	CITY OF ALBANY	EMBARCADERO ROAD	ALB	0
1N/4W 32G 3	CITY OF ALBANY	EMBARCADERO ROAD	ALB	0
1N/4W 33	DANIEL MANN	800 BUCHANAN ST.	ALB	0
1N/4W 33C	WESTERN FORGE & FLANGE	540-A CLEVELAND AVE	ALB	0
1N/4W 33C 1	WESTERN FORGE & FLANGE	540-A CLEVELAND AVE	ALB	0
1N/4W 33C 2	WESTERN FORGE & FLANGE	540-A CLEVELAND AVE	ALB	0
1N/4W 33C 3	WESTERN FORGE & FLANGE	540-A CLEVELAND AVE	ALB	0
1N/4W 33K	DANIEL MANN	800 BUCHANAN ST.	ALB	0
1N/4W 33M 1	SANTE FE PACIFIC REALTY	BUCHANAN ST. & EASTSHORE	ALB	0
1N/4W 33M 2	SANTE FE PACIFIC REALTY	BUCHANAN ST. & EASTSHORE	ALB	0
1N/4W 33M 5	SANTE FE PACIFIC REALTY	BUCHANAN ST. & EASTSHORE	ALB	0
1N/4W 33Q 1	WILLIAMS & LANE ENERGY	1077 EASTSHORE HWY	ALB	0
1N/4W 33Q 2	WILLIAMS & LANE ENERGY	1077 EASTSHORE HWY	ALB	0
1N/4W 33Q 3	E.C. BUEHRER & ASS. INC.	1061 EASTSHORE HWY.	ALB	0
1N/4W 33Q 4	E.C. BUEHRER & ASS.INC.	1060 EASTSHORE HWY.	ALB	0
1N/4W 33Q 5	E.C. BUEHRER	1060 EASTSHORE HWY.	ALB	0
1N/4W 33Q 6	E.C. BUEHRER & ASS. INC.	1061 EASTSHORE HWY.	ALB	0
1N/4W 34B 1	PG&E	SAN CARLOS & WASH	BER	0
1N/4W 34D 1	PG&E	PORTLAND & CORNELL	BER	0
1N/4W 34M 1	EXXON OIL	SAN PABLO & BUCHANAN	BER	0
1N/4W 34M 2	SHELL OIL COMPANY	999 SAN PABLO AVENUE	ALB	0
1N/4W 34M 3	SHELL OIL COMPANY	999 SAN PABLO AVENUE	ALB	0
1N/4W 34M 4	SHELL OIL COMPANY	999 SAN PABLO AVENUE	ALB	0
1N/4W 34M 5	SHELL OIL COMPANY	999 SAN PABLO AVENUE	ALB	0
1N/4W 34M 6	SHELL OIL COMPANY	999 SAN PABLO AVENUE	ALB	0
1N/4W 34M 7	SHELL OIL COMPANY	999 SAN PABLO AVE.	ALB	0
1N/4W 34M 8	SHELL OIL COMPANY	999 SAN PABLO AVE.	ALB	0
1N/4W 34P 1	PG&E	EVELYN & GILMAN ST	BER	0
1N/4W 35K 1	PG&E	SHATTUCK & EUNICE	BER	0
1N/4W 36D 1	PACIFIC GAS AND ELECTRIC	LATHAM & CRESTON BLVD	BER	0
1N/4W 36Q 2	PG&E	HARVARD CIRCLE	BER	0
1N/4W 36R 1	CONVERSE CONSULTANTS	CENTENIAL DR	BER	0
1N/4W 36R 2	CONVERSE CONSULTANTS	CENTENIAL DR	BER	0
1S/3W 4J 1	EBMUD	ENOS & MACARTHUR	BER	0
1S/3W 6D 1	UNIV OF CALIF	UP HILL FROM FIRETRAIL	BER	0
1S/3W 6E 1	LAWRENCE BEK LAB	1 CYCLOTRON ROAD-BLDG.62	BER	0
1S/3W 6N 2	DAN KEIG	200 PANORAMIC WY	BER	0
1S/3W 6N 3	WILLIAM F. COOX	PANORAMIC WY	BER	0
1S/3W [illegible]	[illegible]	[illegible]	BER	0

ALAMEDA COUNTY -- HAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL
1N/3W 33K	09/88	0	22	12	0	BOR	G	0	0
1N/4W 26J 1	10/75	0	120	0	0	CAT	D	0	0
1N/4W 26N 1	12/74	0	120	0	0	CAT	D	0	0
1N/4W 26P 1	10/75	0	120	0	0	CAT	D	0	0
1N/4W 27P 1	5/76	0	120	0	0	CAT	D	0	0
1N/4W 28R 1	06/90	0	15	0	0	MON	X	0	0
1N/4W 32G 1	06/88	0	66	43	0	MON	D	0	0
1N/4W 32G 2	06/88	0	68	44	0	MON	D	0	0
1N/4W 32G 3	06/88	0	49	31	0	MON	D	0	0
1N/4W 33C	5/84	0	14	0	0	BOR	?	0	0
1N/4W 33C 1	5/84	0	19	0	0	MON	?	0	0
1N/4W 33C 2	5/84	0	16	0	0	MON	?	0	0
1N/4W 33C 3	7/84	0	13	0	0	MON	?	0	0
1N/4W 33K	09/88	0	13	0	0	BOR		0	0
1N/4W 33K	09/88	0	13	12	0	BOR	G	0	0
1N/4W 33K	09/88	0	14	0	0	BOR	G	0	0
1N/4W 33M 1	11/88	0	15	6	0	MON	D	0	0
1N/4W 33M 1	11/88	0	15	6	0	MON	D	0	0
1N/4W 33Q 1	6/86	0	24	6	0	MON	D	0	0
1N/4W 33Q 2	6/86	0	24	6	0	MON	D	0	0
1N/4W 33Q 3	04/90	0	14	4	0	MON	D	0	0
1N/4W 33Q 4	04/90	0	15	4	0	MON	X	0	0
1N/4W 33Q 5	04/90	0	14	4	0	MON	X	0	0
1N/4W 33Q 6	04/90	0	14	4	0	MON	X	0	0
1N/4W 34B 1	3/73	0	75	0	0	CAT	D	0	0
1N/4W 34D 1	5/76	0	120	0	0	CAT	D	0	0
1N/4W 34M 1	7/77	0	50	0	0	CAT	D	0	0
1N/4W 34M 2	01/90	0	12	9	0	MON	X	0	0
1N/4W 34M 3	01/90	0	12	3	0	MON	X	0	0
1N/4W 34M 4	01/90	0	12	3	0	MON	X	0	0
1N/4W 34M 5	04/90	0	16	7	0	TES	X	0	0
1N/4W 34M 6	04/90	0	14	6	0	TES	X	0	0
1N/4W 34M 7	8/90	0	15	12	0	TES	X	0	0
1N/4W 34M 8	8/90	0	15	9	0	TES	X	0	0
1N/4W 34P 1	3/76	0	120	0	0	CAT	D	0	0
1N/4W 35K 1	4/76	0	109	0	0	CAT	D	0	0
1N/4W 36D 1	12/75	0	120	0	0	CAT	D	0	0
1N/4W 36Q 2	3/76	0	120	0	0	CAT	D	0	0
1N/4W 36R 1	4/83	0	100	0	0	CAT	D	0	0
1N/4W 36R 2	4/83	0	100	0	0	PIE	D	0	0
1S/2W 44R 2	8/88	24	30	11	0	MON	D	0	0
1S/3W 4J 1	6/81	0	65	0	0	CAT	D	0	0
1S/3W 6D 1	2/79	0	667	110	0	MON	D	0	0
1S/3W 6N 2	8/78	0	204	135	0	DOM	D	0	0
1S/3W 6N 3	4/79	0	390	275	0	?	D	0	0
1S/3W 7E 2	?	0	205	0	0	IRR	?	0	0
1S/3W 7E 3	?	0	0	0	0	IRR	?	0	0
1S/3W 7P	8/87	0	300	0	0	BOR	D	0	0

WELL NUMBER DATE (MO/YR) SURFACE ELEV. (FT) TOTAL WELL DEPTH (FT) DEPTH TO WATER (FT) DTW (MSL) WELL USE LOG WQ WL

APPENDIX B

ESE Standard Operating Procedures No.'s 1, 2, and 3

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.

APPENDIX C

Boring Log and Well Completion Summaries

Environmental Science & Engineering, Inc.

A GILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

MW-1

Page 1 of 1

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing: 2 Inch Diam. Blank/PVC	0.3	5
Screen: 2 Inch Diam. /0.02 Inch slot	5	20
Filter: #3 Monterey Sand	4	20
Seal: Bentonite Pellets	3	4
Grout	0.5	3

Well Cap or Box: Flush Mounted Traffic-Rated Emco-Wheaton

Project Name: USDA Project No: 6-92-5405

Location: 800 Buchanan Street
Albany, Alameda County
California.

Driller: Soils Exploration Services, Inc.
Method: Hollow-Stem Auger
Hole Diameter: 6" O.D. Total Depth: 20 FEET
Ref. Elevations: 7.42 Ft. Above Mean Sea Level
Logged By: Bart Miller

Dates:
Start: 9-14-92
Finish: 9-14-92

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)	TIME
0	Asphalt Surface - 1 inch thick							1345
	BAY MUD							
	CLAY; mottled brown and grey, slightly sandy, dry, moderate plasticity, no odor.	CL					* 6 inch thick wet zone associated with water migrating from tankpit along piping runs.	
5	CLAY; brown, dry, sandy, moderate plasticity, no odor.	CL	5 8 11			8	COLLECT SAMPLE	1355
10	CLAY; brown and grey mottled, both gravelly and sandy, moist, moderate plasticity, no odor.	CL	4 8 6			12	COLLECT SAMPLE Groundwater found at 11 feet deep while drilling.	1405
15	CLAY; brown, dry, sandy, moderate plasticity, no odor.	CL	3 5 8			10	COLLECT SAMPLE	1415
20	CLAY; as above.						Total Completed Well Depth: 20 feet. Water level observed to rise to 8 feet below grade after installation.	
25								
30								
35								

UNIFIED SOIL CLASSIFICATION SYSTEM (USC)

MAJOR DIVISIONS			GROUP SYMBOLS	DESCRIPTION	GRAPHIC LOG
COARSE GRAINED SOILS (50% or more retained on the No. 200 sieve.)	GRAVELS (More than half of coarse fraction retained on the No. 4 sieve.)	Clean sands	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.	
		Gravels with fines	GM	Silty gravels, gravel-sand mixtures.	
			GC	Clayey gravels, gravel-sand-clay mixtures.	
	SANDS (More than half of coarse fraction passing the No. 4 sieve.)	Clean sands	SW	Well-graded sands, gravelly sands, little or no fines.	
			SP	Poorly-graded sands, gravelly sands, little or no fines.	
		Sands with fines	SM	Silty sands, sand-silt mixtures.	
			SC	Clayey sands, sand clay mixtures.	
FINE GRAINED SANDS (More than 50% passing the No. 200 sieve.)	SILTS AND CLAYS	Liquid Limit below 50%	ML	Inorganic silts and very fine sands.	
			CL	Inorganic clays, gravelly clays, sandy clays, lean clays.	
			OL	Organic silts and organic clays.	
		Liquid Limit 50% and above	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
			CH	Inorganic fat clays.	
			OH	Organic clays or organic silts.	
Highly organic soils			Pt	Peat, organic content greater than 60%.	

BEDROCK

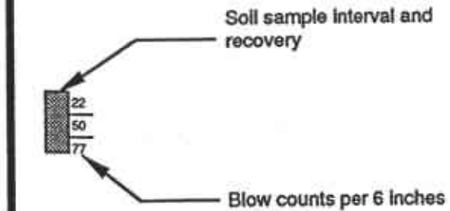
Sandstone		Metamorphics	
Shale		Volcanics	
Siltstone			

WELL INSTALLATION

SYMBOL	DESCRIPTION
	Bentonite/cement grout
	Bentonite Pellets
	Sand
	Screen section of well or piezometer
	Blank section of well or piezometer with centralizer
	Traffic rated well box with locking water-tight cap

See log for details of installation.

LEGEND



Vapor

Field Photolonization detector reading in parts per million (ppm). See remarks on log for background readings and comments.

ESE A CALCORP COMPANY
Environmental Science & Engineering, Inc.
4090 Nelson Avenue, Suite J
Concord, CA 94520
(415) 685-4053

LEGEND TO LOGS

DRAWN BY	DATE	FILE NAME
CVS	3/91	LEGEND

Environmental Science & Engineering, Inc.
A DILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

MW-2

Page 1 of 1

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing: 2 inch Diam. Blank/PVC	0.3	5
Screen: 2 inch Diam. /0.02 inch slot	5	20
Filter: #3 Monterey Sand	4	20
Seal: Bentonite Pellets	3	4
Grout	0.5	3

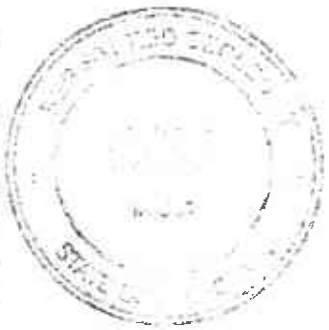
Well Cap or Box: Flush Mounted Traffic-Rated Emco-Wheaton

Project Name: USDA Project No: 6-92-5405
Location: 800 Buchanan Street
Albany, Alameda County
California.

Driller: Solis Exploration Services, Inc.
Method: Hollow-Stem Auger
Hole Diameter: 8" O.D. Total Depth: 20 FEET
Ref. Elevations: 7.57 Ft. Above Mean Sea Level
Logged By: Bart Miller

Dates:
Start: 9-14-92
Finish: 9-14-92

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)
0	Asphalt Surface - 2 inch thickness						TIME
	BAY MUD						Boring continuously sampled with five foot core barrel and 18" core barrel — 945
	CLAY; green, moderate plasticity, dry, no odor.	CL				4	
	* one-foot layer of gravelly, black, bituminous asphalt material.						
5	CLAY; brown, dry, sandy, moderate plasticity, no odor.	CL				7	COLLECT SAMPLE — 1000
10	CLAY; mottled grey and brown, becoming gravelly, grading from dry to moist at 13.0 to 13.5 feet moderate plasticity, no odor.	CL				5	COLLECT SAMPLE FOR ANALYSIS — 1025
						4.5	Groundwater found at 13 feet deep while drilling.
16	CLAY; sandy, brown, decreasing gravel content, dry, moderate plasticity, no odor.	CL				2.0	
20	CLAY; as above except no gravel.						Total Completed Well Depth: 20 feet. Water level observed to rise to 7.5 feet below grade after installation.
25							
30							
35							



Environmental Science & Engineering, Inc.

BORING LOG AND WELL COMPLETION SUMMARY

MW-3

Page 1 of 1

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing: 2 inch Diam. Blank/PVC	3.0 AGS	0
Screen: 2 inch Diam. /0.02 inch slot	5	20
Filter: #3 Monterey Sand	4	20
Seal: Bentonite Pellets	3	4
Grout	0	3
Well Cap or Box: Monument	3.5 AGS	0

Project Name: USDA Project No: 6-92-5405

Location: 800 Buchanan Street
Albany, Alameda County
California.

Driller: Soils Exploration Services, Inc.
Method: Hollow-Stem Auger
Hole Diameter: 6" O.D. Total Depth: 20 FEET
Ref. Elevations: 13.22 Ft. Above Mean Sea Level
Logged By: Bart Miller

Dates:
Start: 9-15-92
Finish: 9-15-92

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)
0	BAY MUD TOPSOIL; brown; significant organic content, dry, no odor.						
	CLAY; brown, gravelly, moderate plasticity, no odor, dry.	CL					Fragmented concrete from 2.0 -2.5 feet
5			2 2 5				COLLECT SAMPLE 1055
10	SAND; brown, gravelly, lesser clay, poorly graded, unconsolidated, wet, no odor.	SP	9 12 12				COLLECT SAMPLE 1103 Ground water found at 11 feet deep while drilling.
16	CLAY; brown, sandy, little gravel, moderate plasticity; dry, no odor.	CL	4 7 9				COLLECT SAMPLE 1115
20							Total Completed Well Depth: 20 feet.
25							
30							
35							

APPENDIX D

Analytical Results and Chain of Custody Documentation

NET NATIONAL ENVIRONMENTAL TESTING, INC.®

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Mike Quillin
Env. Science & Engineering
4090 Nelson Ave., Ste J
Concord, CA 94520

Date: 09/28/1992
NET Client Acct. No: 69100
NET Pacific Job No: 92.48266
Received: 09/16/1992

Client Reference Information

USDA/Albany, 800 Buchanan St., Albany, Proj:6-92-5405

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: USDA/Albany, 800 Buchanan St., Albany, Proj:6-92-5405

SAMPLE DESCRIPTION: MW2-10'
Date Taken: 09/14/1992
Time Taken: 10:25
LAB Job No: (-136746)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			09-21-92	
DILUTION FACTOR*			1	
Benzene	8240	5.0	ND	ug/Kg
Acetone	8240	25	ND	ug/Kg
Bromodichloromethane	8240	5.0	ND	ug/Kg
Bromoform	8240	5.0	ND	ug/Kg
Bromomethane	8240	5.0	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5.0	ND	ug/Kg
Carbon tetrachloride	8240	5.0	ND	ug/Kg
Chlorobenzene	8240	5.0	ND	ug/Kg
Chloroethane	8240	5.0	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5.0	ND	ug/Kg
Chloromethane	8240	5.0	ND	ug/Kg
Dibromochloromethane	8240	5.0	ND	ug/Kg
1,2-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,3-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,4-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,1-Dichloroethane	8240	5.0	ND	ug/Kg
1,2-Dichloroethane	8240	5.0	ND	ug/Kg
1,1-Dichloroethene	8240	5.0	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5.0	ND	ug/Kg
1,2-Dichloropropane	8240	5.0	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
Ethyl benzene	8240	5.0	ND	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	25	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5.0	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ug/Kg
Tetrachloroethene	8240	5.0	ND	ug/Kg
Toluene	8240	5.0	ND	ug/Kg
1,1,1-Trichloroethane	8240	5.0	ND	ug/Kg
1,1,2-Trichloroethane	8240	5.0	ND	ug/Kg
Trichloroethene	8240	5.0	ND	ug/Kg
Trichlorofluoromethane	8240	5.0	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5.0	ND	ug/Kg
Xylenes (total)	8240	5.0	ND	ug/Kg
SURROGATE RESULTS			--	
Toluene-d8	8240		102	% Rec.
Bromofluorobenzene	8240		95	% Rec.
1,2-Dichloroethane-d4	8240		99	% Rec.

Ref: USDA/Albany, 800 Buchanan St., Albany, Proj:6-92-5405

SAMPLE DESCRIPTION: MW3-10'
Date Taken: 09/15/1992
Time Taken: 11:03
LAB Job No: (-136747)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			09-21-92	
DILUTION FACTOR*			1	
Benzene	8240	5.0	ND	ug/Kg
Acetone	8240	25	ND	ug/Kg
Bromodichloromethane	8240	5.0	ND	ug/Kg
Bromoform	8240	5.0	ND	ug/Kg
Bromomethane	8240	5.0	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5.0	ND	ug/Kg
Carbon tetrachloride	8240	5.0	ND	ug/Kg
Chlorobenzene	8240	5.0	ND	ug/Kg
Chloroethane	8240	5.0	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5.0	ND	ug/Kg
Chloromethane	8240	5.0	ND	ug/Kg
Dibromochloromethane	8240	5.0	ND	ug/Kg
1,2-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,3-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,4-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,1-Dichloroethane	8240	5.0	ND	ug/Kg
1,2-Dichloroethane	8240	5.0	ND	ug/Kg
1,1-Dichloroethene	8240	5.0	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5.0	ND	ug/Kg
1,2-Dichloropropane	8240	5.0	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
Ethyl benzene	8240	5.0	ND	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	25	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5.0	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ug/Kg
Tetrachloroethene	8240	5.0	ND	ug/Kg
Toluene	8240	5.0	ND	ug/Kg
1,1,1-Trichloroethane	8240	5.0	ND	ug/Kg
1,1,2-Trichloroethane	8240	5.0	ND	ug/Kg
Trichloroethene	8240	5.0	ND	ug/Kg
Trichlorofluoromethane	8240	5.0	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5.0	ND	ug/Kg
Xylenes (total)	8240	5.0	ND	ug/Kg
SURROGATE RESULTS			--	
Toluene-d8	8240		104	% Rec.
Bromofluorobenzene	8240		98	% Rec.
1,2-Dichloroethane-d4	8240		98	% Rec.

Ref: USDA/Albany, 800 Buchanan St., Albany, Proj:6-92-5405

SAMPLE DESCRIPTION: MW1-10'
Date Taken: 09/14/1992
Time Taken: 14:05
LAB Job No: (-136748)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			09-21-92	
DILUTION FACTOR*			1	
Benzene	8240	5.0	ND	ug/Kg
Acetone	8240	25	ND	ug/Kg
Bromodichloromethane	8240	5.0	ND	ug/Kg
Bromoform	8240	5.0	ND	ug/Kg
Bromomethane	8240	5.0	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5.0	ND	ug/Kg
Carbon tetrachloride	8240	5.0	ND	ug/Kg
Chlorobenzene	8240	5.0	ND	ug/Kg
Chloroethane	8240	5.0	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5.0	ND	ug/Kg
Chloromethane	8240	5.0	ND	ug/Kg
Dibromochloromethane	8240	5.0	ND	ug/Kg
1,2-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,3-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,4-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,1-Dichloroethane	8240	5.0	ND	ug/Kg
1,2-Dichloroethane	8240	5.0	ND	ug/Kg
1,1-Dichloroethene	8240	5.0	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5.0	ND	ug/Kg
1,2-Dichloropropane	8240	5.0	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
Ethyl benzene	8240	5.0	ND	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	25	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5.0	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ug/Kg
Tetrachloroethene	8240	5.0	ND	ug/Kg
Toluene	8240	5.0	ND	ug/Kg
1,1,1-Trichloroethane	8240	5.0	ND	ug/Kg
1,1,2-Trichloroethane	8240	5.0	ND	ug/Kg
Trichloroethene	8240	5.0	ND	ug/Kg
Trichlorofluoromethane	8240	5.0	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5.0	ND	ug/Kg
Xylenes (total)	8240	5.0	ND	ug/Kg
SURROGATE RESULTS			--	
Toluene-d8	8240		102	% Rec.
Bromofluorobenzene	8240		98	% Rec.
1,2-Dichloroethane-d4	8240		95	% Rec.

Ref: USDA/Albany, 800 Buchanan St., Albany, Proj:6-92-5405

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
1,1-Dichloroethene	5	ug/Kg	117	ND	98	98	<1
Trichloroethene	5	ug/Kg	108	ND	96	99	2.0
Toluene	5	ug/Kg	96	ND	100	98	1.0
Benzene	5	ug/Kg	89	ND	100	101	1.0
Chlorobenzene	5	ug/Kg	102	ND	100	98	2.0

COMMENT: Blank Results were ND on other analytes tested.

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

8741

CHAIN OF CUSTODY RECORD

DATE 9/15/92 PAGE 1 OF 1

PROJECT NAME USDA / ALBANY

ADDRESS 800 BUCHANAN ST., ALBANY, CALIFORNIA

PROJECT NO. 6-92-5405

SAMPLED BY [signature] BART MILLER

LAB NAME NET

ESE Environmental Science & Engineering, Inc.
A CH2M HILL company
4090 Nelson Avenue
Suite J
Concord, CA 94520
(415) 685-4053
Fax (415) 685-5323

SAMPLE #	DATE	TIME	LOCATION	ANALYSES TO BE PERFORMED: EPA 8240	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
MW2-5'	9/14/92	10:00			SOIL	1	HOLD
MW2-10'	"	10:25		✓	"	1	
MW2-15'	"	10:44			"	1	HOLD
MW3-5'	9/15/92	10:55			"	1	HOLD
MW3-10'	"	11:03		✓	"	1	
MW3-15'	"	11:15			"	1	HOLD
MW1-5'	9/14/92	13:55			"	1	HOLD
MW1-10'	"	14:05		✓	"	1	
MW1-15'	"	14:15			"	1	HOLD

CUSTODY SEALED [signature]

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1. [signature]	[signature]	9/15/92	16:11
2. [signature] 9-15 7:00	[signature]	9/16/92	0800
3.			
4.			
5.			

9 TOTAL NUMBER OF CONTAINERS

REPORT RESULTS TO: MICHAEL QUILLIN

SPECIAL SHIPMENT REQUIREMENTS: COLD TRANSPORT

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):

NORMAL T.A.T.

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	

NET
NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

4

Mike Quillin
Env. Science & Engineering
4090 Nelson Ave., Ste J
Concord, CA 94520

Date: 10/12/1992
NET Client Acct No: 69100
NET Pacific Job No: 92.48416
Received: 09/23/1992

Client Reference Information

USDA-800 Buchanan St. Albany, Project No: 6-92-5405

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)

Client No: 69100 Date: 10/12/1992
Client Name: Env. Science & Engineering
NET Job No: 92.48416 Page: 2

Ref: USDA-800 Buchanan St. Albany, Project No: 6-92-5405

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-1 09/21/1992 12:54 138074	MW-2 09/21/1992 13:03 138075	Units
METHOD 8240(GCMS,Liquid)					
DATE ANALYZED			09-24-92	09-24-92	
DILUTION FACTOR*			1	1	
Acetone	8240	25	ND	ND	ug/L
Benzene	8240	5.0	ND	ND	ug/L
Bromodichloromethane	8240	5.0	ND	ND	ug/L
Bromoform	8240	5.0	ND	ND	ug/L
Bromomethane	8240	5.0	ND	ND	ug/L
2-Butanone	8240	10	ND	ND	ug/L
Carbon disulfide	8240	5.0	ND	ND	ug/L
Carbon Tetrachloride	8240	5.0	ND	ND	ug/L
Chlorobenzene	8240	5.0	ND	ND	ug/L
Chloroethane	8240	5.0	ND	ND	ug/L
2-Chloroethyl vinyl ether	8240	10	ND	ND	ug/L
Chloroform	8240	5.0	ND	ND	ug/L
Chloromethane	8240	5.0	ND	ND	ug/L
Dibromochloromethane	8240	5.0	ND	ND	ug/L
1,2-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,3-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,4-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,1-Dichloroethane	8240	5.0	ND	ND	ug/L
1,2-Dichloroethane	8240	5.0	ND	ND	ug/L
1,1-Dichloroethene	8240	5.0	ND	ND	ug/L
trans-1,2-Dichloroethene	8240	5.0	ND	ND	ug/L
1,2-Dichloropropane	8240	5.0	ND	ND	ug/L
cis-1,3-Dichloropropene	8240	5.0	ND	ND	ug/L
trans-1,3-Dichloropropene	8240	5.0	ND	ND	ug/L
Ethyl benzene	8240	5.0	ND	ND	ug/L
2-Hexanone	8240	10	ND	ND	ug/L
Methylene chloride	8240	25	ND	ND	ug/L
4-Methyl-2-pentanone	8240	10	ND	ND	ug/L
Styrene	8240	5.0	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ND	ug/L
Tetrachloroethene	8240	5.0	ND	ND	ug/L
Toluene	8240	5.0	ND	ND	ug/L
1,1,1-Trichloroethane	8240	5.0	ND	ND	ug/L
1,1,2-Trichloroethane	8240	5.0	ND	ND	ug/L
Trichloroethene	8240	5.0	ND	ND	ug/L
Trichlorofluoromethane	8240	5.0	ND	ND	ug/L
Vinyl acetate	8240	10	ND	ND	ug/L
Vinyl chloride	8240	5.0	ND	ND	ug/L
Xylenes (total)	8240	5.0	ND	ND	ug/L
SURROGATE RESULTS			--	--	
Toluene-d8	8240		103	105	% Rec.
Bromofluorobenzene	8240		101	102	% Rec.
1,2-Dichloroethane-d4	8240		104	111	% Rec.

Client No: 69100 Date: 10/12/1992
Client Name: Env. Science & Engineering
NET Job No: 92.48416 Page: 3

Ref: USDA-800 Buchanan St. Albany, Project No: 6-92-5405

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-3 09/21/1992 13:10 138076	DUP 09/21/1992 12:57 138077	Units
METHOD 8240(GCMS,Liquid)					
DATE ANALYZED			09-24-92	09-24-92	
DILUTION FACTOR*			1	1	
Acetone	8240	25	ND	ND	ug/L
Benzene	8240	5.0	ND	ND	ug/L
Bromodichloromethane	8240	5.0	ND	ND	ug/L
Bromoform	8240	5.0	ND	ND	ug/L
Bromomethane	8240	5.0	ND	ND	ug/L
2-Butanone	8240	10	ND	ND	ug/L
Carbon disulfide	8240	5.0	ND	ND	ug/L
Carbon Tetrachloride	8240	5.0	ND	ND	ug/L
Chlorobenzene	8240	5.0	ND	ND	ug/L
Chloroethane	8240	5.0	ND	ND	ug/L
2-Chloroethyl vinyl ether	8240	10	ND	ND	ug/L
Chloroform	8240	5.0	ND	ND	ug/L
Chloromethane	8240	5.0	ND	ND	ug/L
Dibromochloromethane	8240	5.0	ND	ND	ug/L
1,2-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,3-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,4-Dichlorobenzene	8240	6.0	ND	ND	ug/L
1,1-Dichloroethane	8240	5.0	ND	ND	ug/L
1,2-Dichloroethane	8240	5.0	ND	ND	ug/L
1,1-Dichloroethene	8240	5.0	ND	ND	ug/L
trans-1,2-Dichloroethene	8240	5.0	ND	ND	ug/L
1,2-Dichloropropane	8240	5.0	ND	ND	ug/L
cis-1,3-Dichloropropene	8240	5.0	ND	ND	ug/L
trans-1,3-Dichloropropene	8240	5.0	ND	ND	ug/L
Ethyl benzene	8240	5.0	ND	ND	ug/L
2-Hexanone	8240	10	ND	ND	ug/L
Methylene chloride	8240	25	ND	ND	ug/L
4-Methyl-2-pentanone	8240	10	ND	ND	ug/L
Styrene	8240	5.0	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ND	ug/L
Tetrachloroethene	8240	5.0	ND	ND	ug/L
Toluene	8240	5.0	ND	ND	ug/L
1,1,1-Trichloroethane	8240	5.0	ND	ND	ug/L
1,1,2-Trichloroethane	8240	5.0	ND	ND	ug/L
Trichloroethene	8240	5.0	ND	ND	ug/L
Trichlorofluoromethane	8240	5.0	ND	ND	ug/L
Vinyl acetate	8240	10	ND	ND	ug/L
Vinyl chloride	8240	5.0	ND	ND	ug/L
Xylenes (total)	8240	5.0	ND	ND	ug/L
SURROGATE RESULTS			--	--	
Toluene-d8	8240		104	105	% Rec.
Bromofluorobenzene	8240		103	102	% Rec.
1,2-Dichloroethane-d4	8240		112	111	% Rec.

Ref: USDA-800 Buchanan St. Albany, Project No: 6-92-5405

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results TRIP 09/21/1992 11:00 138078	Units
METHOD 8240(GCMS,Liquid)				
DATE ANALYZED			09-24-92	
DILUTION FACTOR*			1	
Acetone	8240	25	ND	ug/L
Benzene	8240	5.0	ND	ug/L
Bromodichloromethane	8240	5.0	ND	ug/L
Bromoform	8240	5.0	ND	ug/L
Bromomethane	8240	5.0	ND	ug/L
2-Butanone	8240	10	ND	ug/L
Carbon disulfide	8240	5.0	ND	ug/L
Carbon Tetrachloride	8240	5.0	ND	ug/L
Chlorobenzene	8240	5.0	ND	ug/L
Chloroethane	8240	5.0	ND	ug/L
2-Chloroethyl vinyl ether	8240	10	ND	ug/L
Chloroform	8240	5.0	ND	ug/L
Chloromethane	8240	5.0	ND	ug/L
Dibromochloromethane	8240	5.0	ND	ug/L
1,2-Dichlorobenzene	8240	6.0	ND	ug/L
1,3-Dichlorobenzene	8240	6.0	ND	ug/L
1,4-Dichlorobenzene	8240	6.0	ND	ug/L
1,1-Dichloroethane	8240	5.0	ND	ug/L
1,2-Dichloroethane	8240	5.0	ND	ug/L
1,1-Dichloroethene	8240	5.0	ND	ug/L
trans-1,2-Dichloroethene	8240	5.0	ND	ug/L
1,2-Dichloropropane	8240	5.0	ND	ug/L
cis-1,3-Dichloropropene	8240	5.0	ND	ug/L
trans-1,3-Dichloropropene	8240	5.0	ND	ug/L
Ethyl benzene	8240	5.0	ND	ug/L
2-Hexanone	8240	10	ND	ug/L
Methylene chloride	8240	25	ND	ug/L
4-Methyl-2-pentanone	8240	10	ND	ug/L
Styrene	8240	5.0	ND	ug/L
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ug/L
Tetrachloroethene	8240	5.0	ND	ug/L
Toluene	8240	5.0	ND	ug/L
1,1,1-Trichloroethane	8240	5.0	ND	ug/L
1,1,2-Trichloroethane	8240	5.0	ND	ug/L
Trichloroethene	8240	5.0	ND	ug/L
Trichlorofluoromethane	8240	5.0	ND	ug/L
Vinyl acetate	8240	10	ND	ug/L
Vinyl chloride	8240	5.0	ND	ug/L
Xylenes (total)	8240	5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8	8240		105	% Rec.
Bromofluorobenzene	8240		103	% Rec.
1,2-Dichloroethane-d4	8240		108	% Rec.

Client No: 69100 Date: 10/12/1992
Client Name: Env. Science & Engineering
NET Job No: 92.48416 Page: 5

Ref: USDA-800 Buchanan St. Albany, Project No: 6-92-5405

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
1,1-Dichloroethene	5.0	ug/L	122	ND	99	101	2.0
Trichloroethene	5.0	ug/L	99	ND	105	104	1.0
Toluene	5.0	ug/L	108	ND	97	102	5.0
Benzene	5.0	ug/L	99	ND	105	107	3.0
Chlorobenzene	5.0	ug/L	108	ND	97	103	6.0

COMMENT: Blank Results were ND on other analytes tested.

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KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

8885

CUSTODY SEALED 9/22 7:00

CHAIN OF CUSTODY RECORD

DATE 9/21/92 PAGE 1 OF 1

PROJECT NAME USDA - ALBANY

ADDRESS 800 BUCHANAN ST. ALBANY, CA

PROJECT NO. 6-92-5405

SAMPLED BY CHRIS V. / PAUL M.

LAB NAME NET PACIFIC

ESE Environmental Science & Engineering, Inc.
4090 Nelson Avenue
Suite J
Concord, CA 94520
(415) 685-4053
Fax (415) 685-5323

Seals intact: A.C.

SAMPLE #	DATE	TIME	LOCATION	ANALYSES TO BE PERFORMED: EPA METHOD 8240	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
MW-1	9/21/92	12:54	ALBANY	X	WATER	2	VOA
MW-2	"	13:03	"	X	"	2	"
MW-3	"	13:10	"	X	"	2	"
DUP	"	12:57	"	X	"	2	"
TRIP	9/21/92	11:00	"	X	"	1	

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1.			
2. 7:00 9-22	9/23/92 0800	9/24/92	2:30
3.			
4.			
5.			

TOTAL NUMBER OF CONTAINERS

REPORT RESULTS TO: MIKE QUILLIN

SPECIAL SHIPMENT REQUIREMENTS

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):

10-day TA - call Mike Quillin w. questions

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Mike Quillin
Env. Science & Engineering
4090 Nelson Ave., Suite J
Concord, CA 94520

Date: 11/15/1992
NET Client Acct. No: 69100
NET Pacific Job No: 92.49080
Received: 10/29/1992
Revised: 11/19/92

Client Reference Information

USDA-Albany, Project No: 6-92-5405

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: USDA-Albany, Project No: 6-92-5405

SAMPLE DESCRIPTION: SP-1
Date Taken: 10/27/1992
Time Taken: 08:00
LAB Job No: (-142350)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			11-05-92	
DILUTION FACTOR*			1	
Benzene	8240	5.0	ND	ug/Kg
Acetone	8240	25	ND	ug/Kg
Bromodichloromethane	8240	5.0	ND	ug/Kg
Bromoform	8240	5.0	ND	ug/Kg
Bromomethane	8240	5.0	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5.0	ND	ug/Kg
Carbon tetrachloride	8240	5.0	ND	ug/Kg
Chlorobenzene	8240	5.0	ND	ug/Kg
Chloroethane	8240	5.0	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5.0	ND	ug/Kg
Chloromethane	8240	5.0	ND	ug/Kg
Dibromochloromethane	8240	5.0	ND	ug/Kg
1,2-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,3-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,4-Dichlorobenzene	8240	5.0	ND	ug/Kg
1,1-Dichloroethane	8240	5.0	ND	ug/Kg
1,2-Dichloroethane	8240	5.0	ND	ug/Kg
1,1-Dichloroethene	8240	5.0	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5.0	ND	ug/Kg
1,2-Dichloropropane	8240	5.0	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5.0	ND	ug/Kg
Ethyl benzene	8240	5.0	ND	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	25	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5.0	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5.0	ND	ug/Kg
Tetrachloroethene	8240	5.0	ND	ug/Kg
Toluene	8240	5.0	ND	ug/Kg
1,1,1-Trichloroethane	8240	5.0	ND	ug/Kg
1,1,2-Trichloroethane	8240	5.0	ND	ug/Kg
Trichloroethene	8240	5.0	ND	ug/Kg
Trichlorofluoromethane	8240	5.0	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5.0	ND	ug/Kg
Xylenes (total)	8240	5.0	ND	ug/Kg
SURROGATE RESULTS			--	
Toluene-d8	8240		110	% Rec.
Bromofluorobenzene	8240		91	% Rec.
1,2-Dichloroethane-d4	8240		100	% Rec.

Ref: USDA-Albany, Project No: 6-92-5405

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
1,1-Dichloroethene	5	ug/Kg	118	ND	91	84	7.0
Trichloroethene	5	ug/Kg	108	ND	106	109	3.0
Toluene	5	ug/Kg	104	ND	101	104	3.0
Benzene	5	ug/Kg	100	ND	95	100	6.0
Chlorobenzene	5	ug/Kg	104	ND	100	101	1.0

COMMENT: Blank Results were ND on other analytes tested.

NET®

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

9546

CHAIN OF CUSTODY RECORD

DATE 10/27/92 PAGE 1 OF 1

PROJECT NAME USDA - Albany

ADDRESS 800 Buchanan Albany

PROJECT NO. 6-92-9405

SAMPLED BY KERRY LEFEVER

LAB NAME

ESE Environmental Science & Engineering, Inc.
A CH2M HILL Company
4090 Nelson Avenue
Suite J
Concord, CA 94520
(415) 685-4053
Fax (415) 685-5323

SAMPLE #	DATE	TIME	LOCATION	ANALYSES TO BE PERFORMED: ETA-8340	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
SP-1	10/27/92	800	USDA - Albany	X	SOIL	1	BRASS RING

CUSTODY SEALED @ 700 KL

TOTAL NUMBER OF CONTAINERS: 1

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1. Kerry Lefever	M. Quillin	10/28/92	0730
2. M. Quillin	Pat M.	10/28/92	0800
3. Pat M.	[illegible]	10-28	1133
4. KL 10-28 700	A Hooper	10/29/92	0800
5.			

REPORT RESULTS TO: MIKE QUILLIN

SPECIAL SHIPMENT REQUIREMENTS: NET COURIER

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):

NORMAL TA

APPENDIX E

Well Sampling Field Logs

WELL SAMPLING FIELD LOG

PROJECT NAME: USDA / 6-92-5405 DATE: 9/21/92
PROJECT MANAGER: M. QUILLIN CLIENT: USDA
SAMPLER: C. VALCHEFF / P. MARSDEN SAMPLE LOCATION I.D. MW-1
GROUNDWATER: OTHER: START TIME: 11:55

CASING ELEVATION (FT): 7.42 DATUM: CASING DIAMETER: 2" ✓ 4" OTHER

DEPTH TO WATER (FT): 6.03 DEPTH OF WELL (FT): 20.0 DIFFERENCE (FT): 13.97

WATER ELEVATION (FT): 1.39 CALCULATED WELL VOLUME (GAL): 2.3

ACTUAL PURGE VOLUME (GAL): 10.0 MINIMUM PURGE VOLUME (3 x WV): 6.9 GAL

FIELD MEASUREMENTS

TIME	Volume (GAL)	pH (Units)	E.C.	Temp.	Clarity & Color	Other
11:55	0	4.99	410	76.1	Translucent, Brown	No Odor
11:56	1	6.00	270	74.4	"	"
11:57	3	6.42	270	73.4	"	"
11:59	7	6.57	280	72.9	"	"

PURGE METHOD

__Pneumatic Displacement Pump __Other

__Bailer (Teflon/PVC/SS) ✓Submersible Pump

SAMPLE METHOD

__Bailer (Teflon/PVC/SS) __Dedicated

✓Bailer (Disposable) __Other

WELL INTEGRITY:

REMARKS: Well did not pump dry at 1.15 gallon/minute pumping rate. Duplicate sample collected from this well.

SIGNATURE: C. K. Valcheff CHECKED BY:

SELECTED WELL CASING DIAMETERS VOLUMES PER UNIT LENGTH

WELL CASING I.D. (inches)	GAL/FT	CUBIC FT/FT
2.0	0.1632	0.0218
4.0	0.6528	0.0873
6.0	1.4690	0.1963

CONVERSION FACTORS

TO CONVERT	INTO	MULTIPLY
Feet of Water	Lbs/Sq. Inch	0.4335
Lbs/Sq. Inch	Feet of Water	2.3070
Cubic Feet	Gallons	7.4800
Gallons	Liters	3.7850
Feet	Meters	0.3048
Inches	Centimeters	2.5400

WELL SAMPLING FIELD LOG

PROJECT NAME: USDA / 6-92-5405 DATE: 9/21/92
PROJECT MANAGER: M. QUILLIN CLIENT: USDA
SAMPLER: C. VALCHEFF / P. MARSDEN SAMPLE LOCATION I.D. MW-2
GROUNDWATER: _____ OTHER: _____ START TIME: 12:19

CASING ELEVATION (FT): 7.57 DATUM: _____ CASING DIAMETER: 2" ✓ 4" ___ OTHER ___

DEPTH TO WATER (FT): 6.63 DEPTH OF WELL (FT): 20 DIFFERENCE (FT): 13.37

WATER ELEVATION (FT): 0.94 CALCULATED WELL VOLUME (GAL): 2.2

ACTUAL PURGE VOLUME (GAL): 8.5 MINIMUM PURGE VOLUME (3 x WV): 6.6

FIELD MEASUREMENTS

TIME	Volume (GAL)	pH (Units)	E.C.	Temp.	Clarity & Color	Other
12:19	0	6.55	1090	73.0	Translucent, Brown	No Odor
12:20	1	7.21	1120	76.5	"	"
12:22	5	7.56	1210	76.3	"	"
12:24	8	7.63	1190	75.3	"	"

PURGE METHOD

___Pneumatic Displacement Pump ___Other
___Bailer (Teflon/PVC/SS) ✓Submersible Pump

SAMPLE METHOD

___Bailer (Teflon/PVC/SS) ___Dedicated
✓Bailer (Disposable) ___Other

WELL INTEGRITY: _____

REMARKS: Well pumped dry at 5.8 gallons at 1.15 gallons/minute pumping rate

SIGNATURE: C. H. Valch CHECKED BY: [signature]

SELECTED WELL CASING DIAMETERS VOLUMES PER UNIT LENGTH

WELL CASING I.D. (inches)	GAL/FT	CUBIC FT/FT
2.0	0.1632	0.0218
4.0	0.6528	0.0873
6.0	1.4690	0.1963

CONVERSION FACTORS

TO CONVERT	INTO	MULTIPLY
Feet of Water	Lbs/Sq. Inch	0.4335
Lbs/Sq. Inch	Feet of Water	2.3070
Cubic Feet	Gallons	7.4800
Gallons	Liters	3.7850
Feet	Meters	0.3048
Inches	Centimeters	2.5400

WELL SAMPLING FIELD LOG

PROJECT NAME: USDA/6-92-5405 DATE: 9/21/92
PROJECT MANAGER: M. QUILLIN CLIENT: USDA
SAMPLER: C. VALCHEFF / P. MARSDEN SAMPLE LOCATION I.D. MW-3
GROUNDWATER: OTHER: START TIME: 12:36

CASING ELEVATION (FT): 13.22 DATUM: CASING DIAMETER: 2" ✓ 4" OTHER

DEPTH TO WATER (FT): 11.01 DEPTH OF WELL (FT): 23.0 DIFFERENCE (FT): 11.99

WATER ELEVATION (FT): 2.21 CALCULATED WELL VOLUME (GAL): 2.0

ACTUAL PURGE VOLUME (GAL): 8.0 MINIMUM PURGE VOLUME (3 x WV): 6.0

FIELD MEASUREMENTS

TIME	Volume (GAL)	pH (Units)	E.C.	Temp.	Clarity & Color	Other
12:36	0	7.61	1070	71.4	Translucent, Brown	No Odor
12:38	3	7.55	990	71.2	"	"
12:39	5	7.55	990	71.4	"	"
12:41	8	7.53	990	71.4	"	"

PURGE METHOD

__Pneumatic Displacement Pump __Other
__Bailer (Teflon/PVC/SS) ✓Submersible Pump

SAMPLE METHOD

__Bailer (Teflon/PVC/SS) __Dedicated
✓Bailer (Disposable) __Other

WELL INTEGRITY:

REMARKS: Well did not pump dry at 1.10 gallon/minute pumping rate.

SIGNATURE: C. H. Valcheff CHECKED BY:

SELECTED WELL CASING DIAMETERS VOLUMES PER UNIT LENGTH

WELL CASING I.D. (inches)	GAL/FT	CUBIC FT/FT
2.0	0.1632	0.0218
4.0	0.6528	0.0873
6.0	1.4690	0.1963

CONVERSION FACTORS

TO CONVERT	INTO	MULTIPLY
Feet of Water	Lbs/Sq. Inch	0.4335
Lbs/Sq. Inch	Feet of Water	2.3070
Cubic Feet	Gallons	7.4800
Gallons	Liters	3.7850
Feet	Meters	0.3048
Inches	Centimeters	2.5400