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REFER TO FILE
SCHROPP

February 17, 1999

Via Facsimile 209/369-9358

Stephen G. Muir
WZI
4700 Stockdale Hwy, Suite 120
Bakersfield, CA 93309

Re: Schropp Farms/Brown & Caldwell Work Plan

Dear Mr. Muir:

In reference to the above-entitled matter, I received a telephone call from Tom Fojut of Brown & Caldwell this morning, confirming that work will begin the morning of February 20, 1999, on the school property which is adjacent to Schropp Farms. Brown & Caldwell invites you to review any future groundwater monitoring well construction and/or development.

Our office will keep you apprised of further developments as they arise. Also enclosed for your review and files is the finalized Work Plan.

Should you have any questions, please do not hesitate to contact our office.

Very truly yours,
GARRISON LAW CORPORATION

Kathy Fischer
Legal Assistant for
G. S. Garrison

/kmf

Enclosure

cc: Dick Jones, AII (w/ enclosure)

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BROWN AND CALDWELL

Environmental Engineering & Consulting

SITE ASSESSMENT WORK PLAN

Schropp Farms – East Property
3880 Mountain House Road
Byron, California

Submitted to

California Regional Water Quality Control Board
Central Valley Region

January 21, 1999

Prepared for

Shell Oil Company
One Shell Plaza
P.O. Box 2463
Houston, Texas 77252-2463

Prepared by

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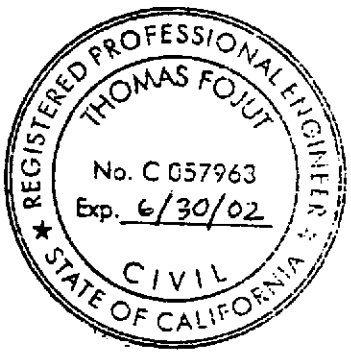
Brown and Caldwell Project Number 17323-001



Thomas Fojut

Thomas Fojut, P.E., R.G.
Senior Engineer

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CHAPTER 1

BACKGROUND

Brown and Caldwell has prepared this Site Assessment Work Plan for Shell Oil Company in response to a letter to Shell from the California Regional Water Quality Control Board – Central Valley Region (RWQCB), dated November 5, 1998 (RWQCB, 1998). The RWQCB requested further investigation downgradient of a crude oil release along the former Shell Central Valley Pipeline (CVP) near Byron, California. The investigation objective is to provide the RWQCB with additional downgradient data before it considers the case for regulatory closure. As requested by the RWQCB's letter, this workplan has been prepared in the RWQCB's format for site assessment work plans.

The site of the release is an agricultural field, currently owned by Werner R. and Irmgard S. Schropp and managed by Agriculture Industries, Inc. (AII) and referred to as the Schropp Farms – East Property or the "site", located immediately east of Mountain House Road in Byron, California (Figure 1). The Schropp Farms – West Property and Mountain House School are located on the west side of Mountain House Road and are referred to as "adjacent properties." The Schropp Farms – West Property is also owned by the Schropps and managed by AII. Much of the investigation described in this work plan is proposed for the Mountain House School property.

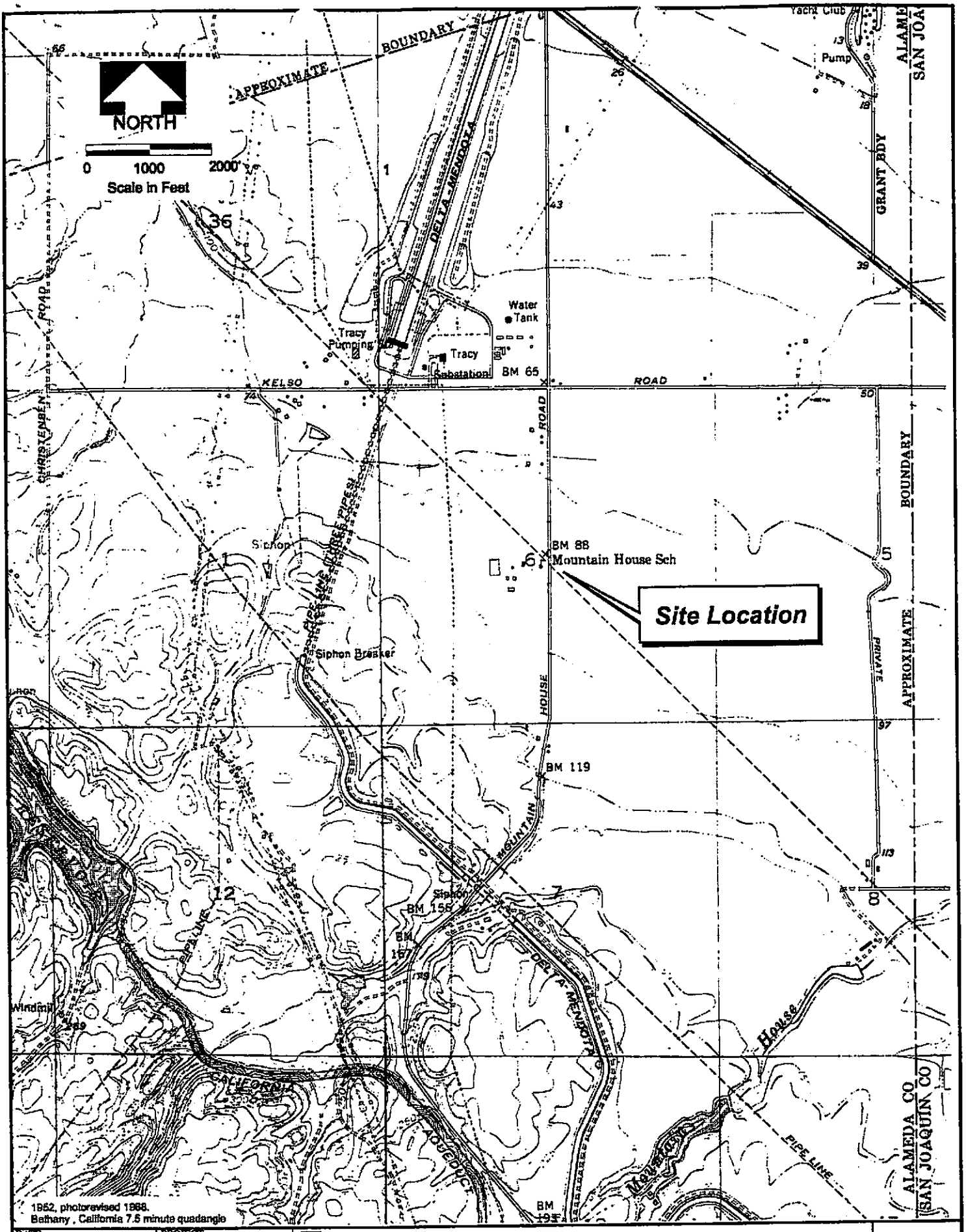
The site history and a description of the local topography and hydrogeology are presented below.

A. Site History

This section describes all known operations conducted at the site, the history and size of the CVP, and the use of other chemicals onsite.

1. **Site Operations.** The site has presumably never been developed, except for the CVP installation and as agricultural land. Recently, alfalfa has been the site's primary crop (WZI, 1994).

   The former CVP, which consisted of one 8-inch and one 10-inch diameter underground pipeline, was installed in the early 1900s. Short segments of the 8-inch line were coupled with 12-inch diameter pipe. The CVP ran from the southeast to the northwest beneath the site and transmitted crude oil from oil fields near Coalinga, California to Shell's refinery in Martinez, California. The CVP never transmitted refined product and was decommissioned in 1968. After decommissioning, the CVP was washed and abandoned in place in the site vicinity. In the early 1970's, Shell "quitclaimed" the CVP to Wing Ranch, the site owner at the time. Thus, the site owner elected to leave the abandoned pipeline in place. In 1979, Wing Ranch sold the site to the Schropps.



1952, photorevised 1968.
Bethany, California 7.5 minute quadangle

DATE	PROJECT	SITE	
12-17-98	1_7323_001	3880 Mountain House Road, Bryon, California	Figure 1
BROWN AND CALDWELL		TITLE: Site Location Map	

An irrigation supply well for Mountain House School is 160 feet southwest of the former CVP and does not appear to be listed on the DWR database. The school does not have construction details for this well, but does sample it monthly for volatile organic compounds (VOCs), metals and general minerals in accordance with California Department of Health Services (DHS) requirements. The school uses the well solely for irrigation and sanitation. According to school staff, students, employees and visitors drink bottled water because of the well water's poor taste. Sampling this well is part of this work plan's scope of work (Chapter 3).

Three existing site groundwater monitoring wells were not present on the DWR database. More information about these wells is provided in Chapter 2.

C. Hydrogeology

1. **Regional Hydrogeology.** The site is located in the northwestern portion of the San Joaquin Valley about 20 miles southeast of the Sacramento – San Joaquin River Delta. Recent, Pleistocene and Pliocene sediments underlie this portion of the valley (WZI, 1994; WA, 1997). These sediments are underlain by the Tulare Formation, which consists of alluvial clay, silt, sand and gravel to approximately 1,000 feet depth. The Corcoran Clay Member, a unit within the Tulare Formation and an extensive clay aquitard, is approximately 100 feet beneath ground surface (bgs). Tertiary and pre-Tertiary sedimentary and crystalline rocks underlie the Tulare formation (WZI, 1994).

   Two major aquifers, separated by the Corcoran Clay Member, are present in the site vicinity. These are the upper and lower zones of the Tulare Formation and vary in thickness and groundwater quality. Groundwater in the lower zone is a drinking water source. Groundwater from the upper zone has a poorer quality and is confined only in some areas. The regional groundwater flow direction in the upper aquifer is northward but may vary locally due to extensive pumping for agriculture (WZI, 1994).

2. **Local Hydrogeology.** According to previous investigations, soil beneath the site consists primarily of fine sand from the surface to approximately 25 feet bgs. A one-foot thick gravel unit underlies the sand at 25 feet bgs. Fine to medium sand was encountered below the 26 foot depth to the total depth explored of about 35 feet bgs (PiCES, 1996; WA, 1997).

   The water table has been measured between 12 to 15 feet bgs in 1996 and 1997. The groundwater flow direction at the site has consistency been to the west with a gradient of about 0.019 ft/ft (WA, 1997).

2. **Storage Tanks.** To the best of Brown and Caldwell's knowledge, no storage tanks have existed on the site. Information regarding tanks at the Schropp Farms – West Property is presented in Chapter 2. The tanks on this adjacent property were not operated by or in association with Shell.

3. **Test and Repair Records.** No records of tests or repairs on the CVP are available. It does not appear that any records exist considering that the CVP last operated more than 30 years ago.

4. **Other Site Chemicals.** Except for the possible use of herbicides, pesticides and fertilizers, Brown and Caldwell is not aware of the use or storage of any other chemicals on the site. It is not likely that any maintenance shops have existed on the site.

B. Local Topography

1. Site Drainage. The site gently slopes down to the northeast and is between about 75 and 95 feet above mean sea level (Figure 1). A drainage canal runs along the site's western boundary. A small creek flows eastward about 1,500 feet north of the site, and another small creek flows southeastward about 3,500 feet south of the site. Both of these creeks flow into Mountain House Creek, which drains northwest into Old River, a channel that eventually empties into the San Joaquin River.

Pipelines that connect two portions of the Delta-Mendota Canal are about 3,000 feet west of the site. This canal and the Governor Edmund G. "Pat" Brown California Aqueduct, located about two miles west of the site, pump water from Clifton Court Forebay, a former levee-ringed island about two miles north of the site. The canals are generally concrete-lined and channel water to Central and Southern California.

2. **Wells in the Site Vicinity.** A search of California Department of Water Resources (DWR) well records identified eight wells near the site (WA, 1997). Two and six of the wells were registered for "household" and "observation" uses, respectively. At least five of the observation wells appear to have been associated with the Schropp Farms – West Property and were apparently installed to monitor ground water near former underground storage tanks (USTs) on that property.

   In 1992 or 1993, WZI, Inc. of Lodi, California abandoned one of the household wells listed on the DWR database. This well was a domestic well also on the Schropp Farms – West Property and was located about 500 feet west of the site. The well was adjacent to the West Property's USTs and was screened between 50 and 140 feet depth. The well was the domestic water supply for a house located near the well. Prior to its abandonment, occupants of the house had complained of a strong gasoline-like odor from the house's water supply lines.

CHAPTER 2

PREVIOUS SITE ASSESSMENTS

Previous site assessments and remedial activities are described below for the site and adjacent properties. Previous soil and ground water analytic results for previous site investigations are included as Appendices A and B, respectively.

A. Site

1. **April 1992 Phase I Environmental Site Assessment.** WZI Inc. (WZI) completed a Phase I Environmental Site Assessment of the site (Schropp Farms – East Property) and the adjacent Schropp Farms – West Property for AII (WZI, 1992). The site assessment reported the presence of two former gasoline USTs and an electrical transformer and that pesticides were not known to have been stored on the site. The report did not identify the presence of the former CVP.

2. **May 1994 Exploratory Trench.** In May 1994, WZI was retained by AII to dig an exploratory trench on the site adjacent to where the former CVP crossed beneath Mountain House Road (WA, 1997). The trench was dug to assess whether petroleum hydrocarbons were in the subsurface after WZI had recently observed an exposed portion of the CVP about one-half mile north of the site. A soil sample from five feet below ground surface (bgs) contained 8,000 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as diesel (TPH-D). Although the chromatogram for this sample is not available, it is probable that this TPH-D value represents unrefined crude oil hydrocarbons in the diesel range because refined product was never transmitted through the CVP.

3. **October 1994 Exploratory Trenches.** Shell retained Professional Integrated Consulting & Environmental Services Associates (PiCES) of Tustin, California, to investigate the extent of hydrocarbons in the subsurface and to excavate the source area (PiCES, 1996). In October 1994, PiCES excavated trenches T-1, T-2, and T-3 and collected five soil samples from 7 to 8 feet bgs from the trenches to verify the May 1994 sample results. Each of the soil samples was analyzed for total recoverable petroleum hydrocarbon (TRPH); benzene, toluene, ethylbenzene and total xylenes (BTEX); TPH-D; and total petroleum hydrocarbons as gasoline (TPH-G). Up to 2,362 mg/kg TRPH and up to 6,917 mg/kg TPH-D were detected in the soil samples. No TPH-G or BTEX were detected above laboratory reporting limits (LRLs) in the five samples except for 12 mg/µg TPH-G in one sample and up to 0.03 mg/µg in two samples.

4. **November 1994 Soil Borings.** In November 1994, PiCES drove soil borings SB-1 through SB-6 to depths between 16 and 20 feet to assess the extent of petroleum hydrocarbons in the subsurface (PiCES, 1996). One soil sample from between 16 and 20 feet bgs was collected from each boring. Up to 340 mg/kg TRPH, up to 4,632 mg/kg TPH-D and up to 433 mg/kg TPH-G were detected in the samples. Although concentrations of toluene, ethylbenzene, and xylenes were detected slightly above LRLs in three of the six soil samples, no benzene was detected above LRLs in any of the samples. Also, no petroleum hydrocarbons were detected above LRLs in the samples from borings SB-1, SB-2 and SB-5. Soil borings SB-3 and SB-4 were driven to ground water, which was between 16 to 19 feet bgs. A light non-aqueous phase liquid (LNAPL) was observed on the water table in those borings, and therefore no groundwater samples were collected.

5. **October 1995 Soil Borings.** In October 1995, PiCES drilled 35 soil borings on the site along 3,500 feet of the former CVP southeast of the release area (PiCES, 1996). The objective of the borings was to assess whether petroleum hydrocarbons were in soil along other portions of the former CVP beneath the site. PiCES collected one soil sample from each boring between six and seven feet bgs. The samples were composited into seven samples, each of which was analyzed for TPH-D, TPH-G and BTEX. Because no petroleum hydrocarbons were detected in any of the soil samples above LRLs, PiCES concluded that no further investigation was warranted along this portion of the former CVP.

6. **November 1995 Soil Excavation.** In November 1995, PiCES directed NG Chemical of Santa Maria, California, to excavate and dispose of hydrocarbon-bearing soil from the area outlined on Figure 1 (PiCES, 1996). Soil was transported to the McKittrick Waste Treatment Site in McKittrick, California and the Altamont Landfill in Livermore, California. Average excavation depths were 25 and 12 feet bgs in the western and eastern portions of the excavation, respectively. The maximum excavation depth was 35 feet bgs. Thirty-five confirmation samples were analyzed for TRPH, BTEX, TPH-D and TPH-G. Confirmation soil samples from the final northern, eastern and southern walls contained up to 64 mg/kg TPH-D and 13.0 mg/kg TRPH. Because of the presence of Mountain House Road, soil from the excavation's western wall that contained higher petroleum hydrocarbon concentrations could not be excavated. These samples contained up to 1,400 mg/kg TPH-D and up to 670 mg/kg TRPH. About 4,000 tons of fill was used to backfill the excavation.

7. **March 1996 Well Installations.** On March 29, 1996, PiCES installed groundwater monitoring wells MW-1, MW-2, and MW-3 to determine whether petroleum hydrocarbons were present in groundwater north of the former CVP (PiCES, 1996). The wells were installed to a maximum depth of 30 feet and were completed with 4-inch diameter polyvinyl chloride (PVC) casing and screens extending approximately 20 feet below and 5 feet above the water table. Apparently, no soil

samples from the borings for the wells were analyzed by an analytical laboratory. The well locations are shown on Figure 2.

8. **1996-7 Ground Water Monitoring.** In April 1996, PiCES collected ground water samples from wells MW-1, MW-2 and MW-3. No TPH-D or BTEX were detected above LRLs in any of the samples, except for 1,000 µg/L TPH-D in the sample from well MW-2. Subsequently, Shell retained Weiss Associates (WA) of Emeryville, California, to sample the wells in January, February, March, May and July 1997. No BTEX were detected above LRLs in groundwater samples from any well. Up to 1,500 µg/L total petroleum hydrocarbons as crude oil (TPH-CO) and up to 190 µg/L TPH-D were detected in the ground water samples from these sampling events. It is likely that the TPH-D is due to the crude oil constituents because crude oil was never transmitted through the CVP (WA, 1997).

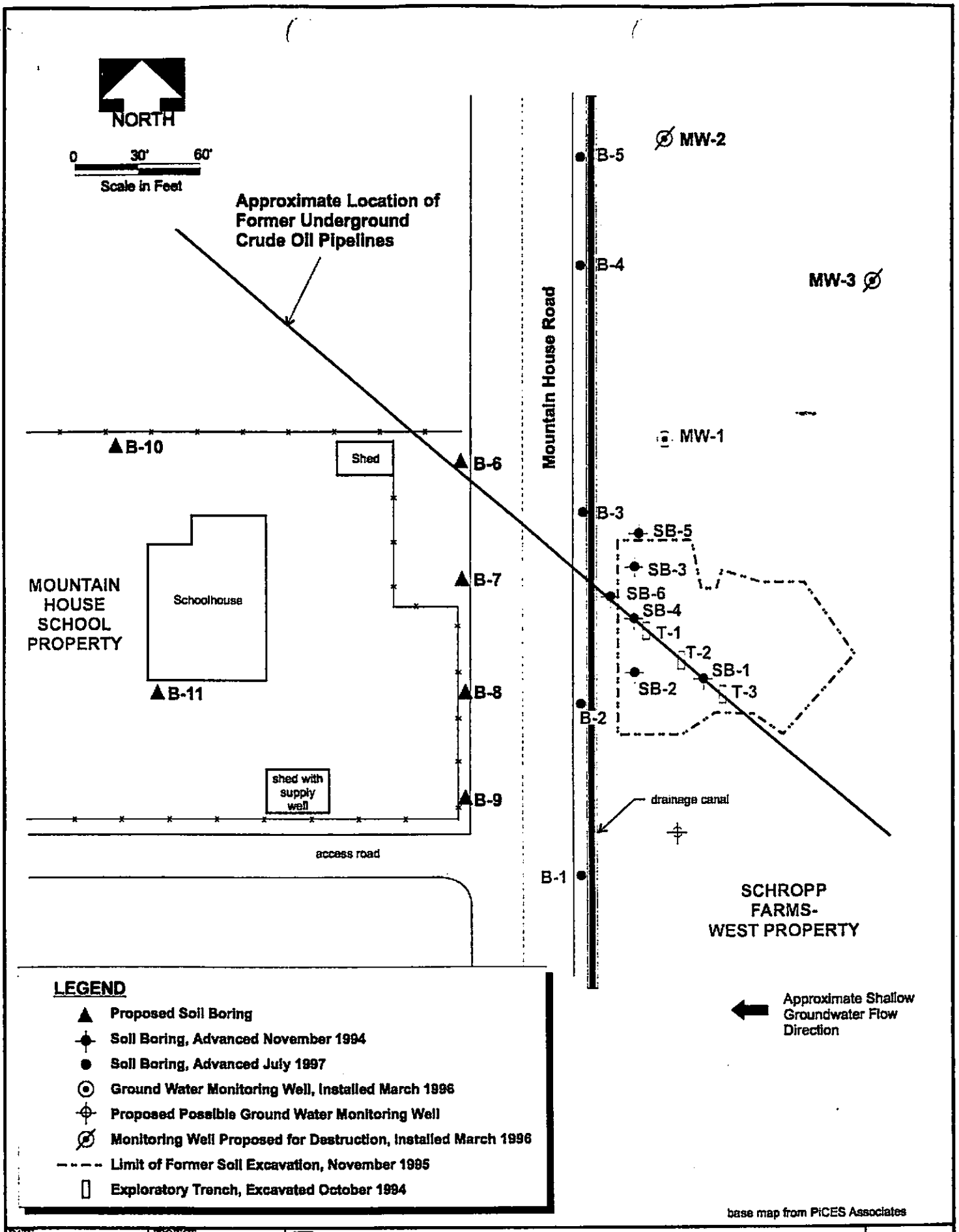
9. **July 1997 Soil Borings.** In July 1997, WA advanced soil borings B-1 through B-5 along the site's western boundary to assess whether petroleum hydrocarbons were in soil and ground water on the downgradient edge of the former excavation (WA, 1997). Two soil and one ground water sample were collected from each boring. No BTEX or TPH-G was detected above LRLs in any sample. Three samples contained TPH-CO above LRLs. A maximum of 49 mg/kg were detected in the sample from 7.5 feet depth in boring B-2, located immediately adjacent to the former excavation. Although the soil samples contained up to 2.6 mg/kg TPH-D, the positive laboratory result is probably due to crude oil constituents because diesel was not transmitted through the CVP.

   No TPH-D, TPH-G, BTEX or methyl tertiary-butyl ether (MTBE) were detected above LRLs in the ground water samples from any of the borings. Between 410 and 1,600 µg/L TPH-CO were detected in the water samples.

B. Adjacent Properties

The former Schropp Farms – West Property had two former USTs that were located about 500 feet west to southwest of the site (WZI, 1994). The first UST was reportedly installed in the 1950s or earlier. Because this UST was believed to be leaking, it was removed and replaced around 1970 with a 550-gallon UST. Both tanks reportedly only stored gasoline. In 1991, the second UST, a dispenser and associated product piping were removed and not replaced.

In April 1992, WZI, Inc. of Lodi, California excavated exploratory trenches for AII near the former USTs. Samples from 10.5 and 19.5 feet bgs contained up to 23 mg/kg benzene and 1,140 mg/kg total petroleum hydrocarbons as gasoline (TPH-G). A groundwater sample from one trench contained 1,200 µg/L benzene.



DATE	PROJECT	SITE	
11-23-98	1_7323_001	Schropp Farms-West Property - 3880 Mountain House Road Byron, California	Figure 2
BROWN AND CALDWELL		TITLE: Proposed Sampling Locations	

In late 1992 and early 1993, AII disposed of the UST that had been excavated in 1991. WZI overexcavated about 2,000 cubic yards of petroleum hydrocarbon-impacted soil from the former UST area. WZI also abandoned a domestic well that supplied water to an adjacent farmhouse. This well abandonment is discussed in more detail in Chapter 1, Section B, Subsection 2 of this workplan.

CHAPTER 3

FIELD INVESTIGATION

A. General

1. **Rationale.** The general purpose of the subsurface investigation proposed by this work plan is to assess the horizontal extent of petroleum hydrocarbons downgradient from the site. To achieve this objective, Brown and Caldwell proposes to:

   - Advance soil borings B-6 through B-9 in the locations shown on Figure 2. If field observations indicate that soil and ground water samples from these borings contain petroleum hydrocarbon concentrations, then Brown and Caldwell will also advance borings B-10 and B-11 and collect soil and ground water samples from these borings.
   - Install one ground water monitoring well downgradient from the site only if petroleum hydrocarbons are observed in any soil or ground water samples from borings B-6 through B-11. If possible, the well will be located downgradient of the downgradient extent of petroleum hydrocarbons in ground water.
   - Properly destroy monitoring wells MW-2 and MW-3. Well MW-1 is sufficient to monitor the northern extent of petroleum hydrocarbons in ground water. Destroying these wells will eliminate two potential vertical conduits to ground water.
   - Install one ground water monitoring well on the southern side of the former excavation only if a downgradient well is installed. The objective of this well will be to: 1) assess the southern (crossgradient) extent of petroleum hydrocarbons in ground water; and 2) provide adequate triangulation for determining the ground water flow direction in case a downgradient monitoring well is installed.
   - Inspect and sample the irrigation supply well on the Mountain House School property (Figure 2). Brown and Caldwell will document the well's condition, measure the well's water depth and total depth and collect ground water samples for laboratory analysis.

2. **Equipment Decontamination Procedures.** All sampling equipment will be unused and disposable or will be reusable equipment that will be thoroughly decontaminated prior to each use. Any pre-used equipment, such as soil sampling tubes or split spoon samplers, will be cleaned prior to use and between each sampling. This equipment will be thoroughly scrubbed in a hot Alconox-tap water solution and rinsed in two successive de-ionized water rinses.

Equipment that may come into contact with ground water or saturated sediments, including measurement probes, well construction materials, augers and downhole sampling rods, will be previously unused or will be decontaminated prior to each use. Equipment will be steam-cleaned or scrubbed in a hot Alconox-tap water solution.

All equipment that has come into contact with soil and ground water will be cleaned before it leaves the work area. Steam-cleaning rinsate will be contained and stored in sealed drums onsite. Vehicles will be sufficiently cleaned to prevent tracking mud outside of the work area.

3. **Health and Safety Plan.** Prior to commencing the field work, Brown and Caldwell will prepare a site-specific health and safety plan (HSP) to minimize health and safety risks to site workers and the general public. The HSP will be written to comply with 8 CCR 5192, Hazardous Waste Operations and Emergency Response, and will provide site control methods, air monitoring procedures, guidance on the appropriate personal protective equipment, decontamination procedures, heat stress monitoring, emergency procedures, a hospital route map, information about the anticipated chemicals of concern and a designated site safety officer.

   As will be required by the HSP and state regulations, Brown and Caldwell will notify Underground Service Alert between 48 hours and 14 days prior to the field work. A private line-locating firm will also be retained to identify underground utility lines. During the field work, all equipment and personnel will remain a safe distance from overhead electrical lines.

4. **Permits and Right-of-Entry Agreements.** Prior to the field work, Brown and Caldwell will secure a drilling permit for the proposed borings, well destructions and possible well installations from the Alameda County Zone 7 Water Agency. As required, well logs for any new wells and notices of destruction for the abandoned wells will be submitted to Zone 7 and to DWR.

   Shell will perform the site work under an existing right-of-entry (ROE) agreement with the site owners, Werner R. and Irmgard S. Schropp. Shell is negotiating a separate ROE agreement with the Mountain House Board of Trustees, the owner of the Mountain House School, for legal access to the school property.

B. Drilling Details

A California C-57 licensed contractor will advance the soil borings using a direct-push technology (DPT) soil probing rig. Soil cores will be logged by removing the cores continuously in 48-inch long, 2-inch diameter "Macro-Core" barrels containing PETG clear plastic liners. The core barrel will be hydraulically pushed and/or hammered to a maximum of four feet per drive.

The core barrel will then be removed from the boring, and the plastic liner containing the core will be moved out. A new section of core barrel will be added, the assembly decontaminated and lowered down the boring, and the process repeated until the desired total depth is reached.

A California C-57 licensed contractor will use a hollow-stem auger rig to install any ground water monitoring wells. Soil samples from these borings will be collected by driving a split spoon sampler, lined with brass or stainless steel tubes, at the desired depths. Once the sampler is full, the sampler will be removed from the boring, the sampler opened and the tubes removed. The sampler will be lowered after it is decontaminated for sampling at the next sample depth.

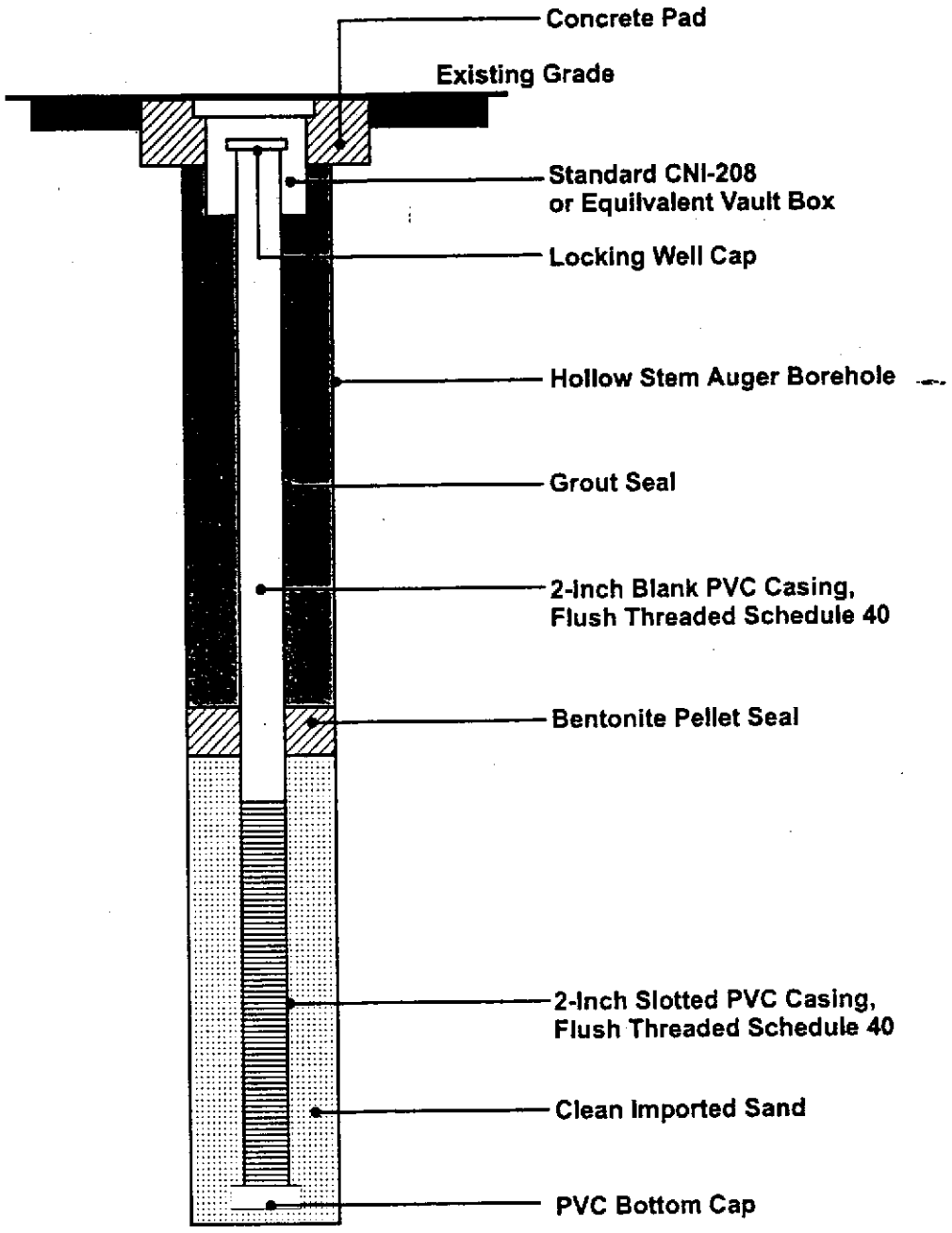
A field geologist or civil engineer will describe all soil samples according to the Unified Soil Classification System. Soil descriptions and notes will be recorded onto boring log forms. Soil samples will also be screened with a portable photoionization detector (PID) to assess if the samples contain VOCs.

Borings that are not converted into monitoring wells will be backfilled with hydrated bentonite chips or neat cement grout, mixed with 3 to 5 percent bentonite powder. If necessary, neat cement grout will be backfilled through a tremie pipe. Each boring top will be completed to match the surrounding surface.

C. Monitoring Well Design

If monitoring wells are installed, they will be constructed similar to the site's existing wells, except that any new wells will be constructed using two-inch diameter PVC casing and well screen. Borehole for the wells will be a minimum of 6.5 inches in diameter to allow at least two inches of annular space around each well screen.

Well screens will be installed to intersect the water table, which was between 12 and 15 feet bgs in 1996 and 1997. Brown and Caldwell will measure the water depth in one of the site wells prior to any well installations. Screened intervals for any new wells will be similar to the interval of well MW-1, which is screened between 5 to 35 feet bgs, but will allow for the local lithology and a deeper sanitary seal. Because it appears unlikely that the water table will rise above 10 feet bgs in the near future, the top of the screened intervals for any new wells will be around 10 feet bgs. Surface seals, which will consist of a minimum one-foot thick hydrated bentonite pellet plug and neat cement with 3 to 5 percent bentonite powder, will extend from near ground surface to about 9 feet bgs. A generalized well construction diagram is provided on Figure 3.



SECTION

Not to Scale

DATE	PROJECT	SITE	
11-23-98	1_7323_001	Schropp Farms-West Property - 3880 Mountain House Road Byron, California	Figure 3
BROWN AND CALDWELL		TITLE Proposed Well Construction Details	

The filter pack, which will likely extend from about 9 feet bgs to the wells' total depths, will consist of #2/16 Lonestar Monterey sand or equivalent. The screened portion of each well will consist of machine-slotted 0.010-inch wide perforations. Given the large amount of silt and clay on boring logs for previous site borings and wells, this sand and slot size combination should minimize the amount of fines that enter the wells.

Each new well will be capped and locked with a water-tight expandable plug. Wells installed onsite will be covered with a locking, above ground stovepipe and will be flagged with fluorescent tape to reduce the chance of well damage from agricultural equipment. Wells installed in the Mountain House Schoolyard will be covered with flushed-mounted, traffic-rated well vaults. The vaults will have bolt down lids to minimize the chance of tampering or vandalism.

D. Well Development

New wells will be developed immediately after installation but before the installation of the neat cement sanitary seal. The wells will be agitated in ten-minute intervals with a two-inch diameter surge block to loosen fines that may have settled in the well or filter pack during installation. After each surge interval, an unused disposable bailer will evacuate as much water as possible in an attempt to remove the suspended solids. This process will be repeated until water removed from the well appears clear or ten well-casing volumes have been removed.

Well development purge water and steam-cleaning rinsate will be stored onsite in 55-gallon sealed, Department of Transporation (DOT)-approved drums. The drums will be immediately labeled and purged within 90 days of generation. Water from the drums will be transported to an appropriate water recycling or disposal facility.

E. Soil Sample Analysis

Soil samples will be collected at least every five feet from each boring. Samples will be collected from 7.5 and 11.5 feet bgs and the capillary fringe for possible laboratory analysis. Soil samples will be collected into PETG plastic, stainless steel or brass liners, immediately capped with Teflon sheeting and plastic caps, hermetically sealed with Teflon tape, labeled, refrigerated and delivered under chain-of-custody to Sequoia Analytical, Inc. in Sacramento, California, a DHS-certified analytical laboratory. At least two soil samples from each boring will be analyzed for:

- TPH-CO by modified USEPA Method 8015;
- BTEX by USEPA Method 8020; and
- Polynuclear aromatic hydrocarbons (PAHs) by USEPA Method 8270.

BTEX and PAHs are potential crude oil constituents. One or two soil samples from the investigation will also be analyzed for various geotechnical parameters, including fraction organic carbon, bulk density, total moisture, and permeability. These analyses will provide site-specific data that may be useful for any future fate and transport modeling.

Drill cuttings will be temporarily stored onsite in DOT approved 55-gallon drums. Each drum will be labeled with the generator name, date and source. One composite sample will be collected from each drum for laboratory analysis. Brown and Caldwell will consult with an offsite, licensed disposal facility for the appropriate laboratory analyses to characterize the soil. After receiving acceptance from a facility, the soil will be transported by a licensed waste hauler within 90 days of generation. Brown and Caldwell will report the disposal method of the soil to the RWQCB.

F. Ground Water Sampling

For the soil borings, a Hydropunch sampler will be driven to collect ground water samples. The drive interval will begin just above the water table, and the sampler will be driven a minimum of two feet. Ground water will be allowed to infiltrate into the Hydropunch screen. A bailer will be dropped into the screen or a peristaltic pump will be employed to remove water from the sampler.

Ground water samples will be collected from ground water monitoring wells after at least three well-casing volumes of water are purged from each well. Purge water from each monitoring well will be manually bailed or pumped. During purging, the electrical conductivity, temperature and pH of the purge water will be monitored. Sampling will occur only after these parameters have stabilized. Monitoring well samples will be collected from unused, disposable bailers.

Sampling of the Mountain House School irrigation well will occur immediately after a pumping cycle so that the well is thoroughly purged. Because the school samples the well monthly to meet DHS requirements, a sampling port is likely available. Brown and Caldwell will follow the same applicable sampling requirements that are stipulated by the DHS for this well.

All water samples will be decanted into the appropriate sampling containers. The containers will be labeled, refrigerated and transported under chain-of-custody to Sequoia Analytical, Inc., in Sacramento, California, a DHS-certified analytical laboratory. Each ground water sample will be analyzed for:

- TPH-CO by modified EPA Method 8015;
- BTEX by USEPA Method 8020; and
- PAHs by USEPA Method 8270.

Because Hydropunch samples do not always yield sufficient water for a large number of samples, collecting samples for all these analyses may not be practical. Brown and Caldwell will allow infiltration into the sampler for each boring for at least 30 minutes.

Hydrochloric acid will be added to the BTEX sample containers. No chemical preservatives will be added to the sample containers for TPH-CO and PAHs. The PAH samples will be passed through a 45-micron filter within 24 hours of sample collection to remove suspended solids prior to analysis.

G. Water Level Measurements

A California-licensed land surveyor will survey any new wells. Each well's location will be surveyed horizontally to the nearest 0.1 foot, and each well's top-of-casing and ground surface elevation will be surveyed to the nearest 0.01 and 0.1 foot, respectively, relative to mean sea level. The survey will use a United States Geological Survey (USGS) monument as a benchmark, which is located adjacent to the site on Mountain House Road.

Water level measurements will be measured to the nearest 0.01 foot using an electric sounder. The sounder will be decontaminated between measurements. Based on the measurements, Brown and Caldwell will calculate the water table elevation in each well relative to mean sea level. If new wells are installed, then Brown and Caldwell will determine the ground water flow direction and gradient.

Brown and Caldwell will attempt to measure the static water level in the Mountain House School well. Obtaining a static water level, however, may not be possible because it may depend on the frequency of the well's pumping cycles.

CHAPTER 4

LABORATORY QA/AC PROCEDURES

Laboratory quality assurance/quality control (QA/QC) procedures will include trip blanks and duplicate samples for water samples and laboratory method blanks for soil and ground water samples.

One duplicate ground water sample will be collected from one soil boring if at least one boring yields sufficient water for the duplicate sample containers. If new ground water monitoring wells are installed, then one duplicate water sample will be collected from one well. The duplicate samples will be analyzed for TPH-CO, BTEX and PAHs.

One trip blank will be submitted to the laboratory for each cooler containing water samples. The blank will be analyzed for BTEX only if all water samples from the cooler contain BTEX above LRLs.

The laboratory will analyze at least one method blank for each requested analysis. The laboratory will also report matrix spike data and surrogate recovery rates and will include the TPH-CO chromatograms in the certified analytical report. The laboratory will follow standard DHS QA/QC requirements.

Brown and Caldwell will follow all field sampling decontamination and sample handling and preservation procedures outlined in Chapter 3. All QA/QC procedures and results will be presented in the final site assessment report.

CHAPTER 5

SCHEDULE

Brown and Caldwell is currently negotiating a ROE agreement with the Mountain House School Board of Trustees for access to the school property. Within 30 days of the RWQCB's acceptance of this work plan and a secured ROE agreement with the school, Brown and Caldwell will obtain the necessary drilling permit from the Alameda County Zone 7 Water Agency and begin the field work. The field work should take about two weeks, and the laboratory analytic results will be available two weeks after the field work is complete. A Site Assessment Report will be prepared in accordance with the RWQCB's outline, will be signed by a California-registered geologist or civil engineer and will be submitted within 60 days of receiving the certified analytical reports from the analytical laboratory.

CHAPTER 6

REFERENCES

PiCES, 1996, Crude Oil Impacted Soil Remedial Action Report, Former Shell Pipeline, Mountain House Road, Byron, California, Prepared for Shell Pipe Line Corporation, 15 pages, 4 tables, 6 plates and 5 appendices, September 30, 1996.

WA, 1997, Subsurface Investigation/Quarterly Monitoring Report, Third Quarter 1997 for Schropp Farms Property, 3880 Mountain House Road, Byron, California, Prepared for Shell Oil Products, 9 pages, 2 figures, 3 tables, 5 appendices, September 19, 1997.

WZI, 1992, Problem Assessment Report and Preliminary Site Assessment Work Plan to Determine Nature and Extent of Soil and Groundwater Contamination, Prepared for Agriculture Industries, Inc., Schropp Ranch, 3880 Mountain House Road, Byron, Alameda County, California, 42 pages, 18 exhibits, 3 tables, 7 appendices, June 1992.

WZI, 1994, Final Assessment Report Describing the Nature and Extent of Hydrocarbon Contaminated Soil and Ground Water, Prepared for Agricultural Industries, Inc., Schropp Ranch Number 1, 3880 Mountain House Road, Byron, Alameda County, California, 28 pages, 7 exhibits, 7 tables and 7 appendices, October 1994.

APPENDIX A

ANALYTIC RESULTS FOR SOIL

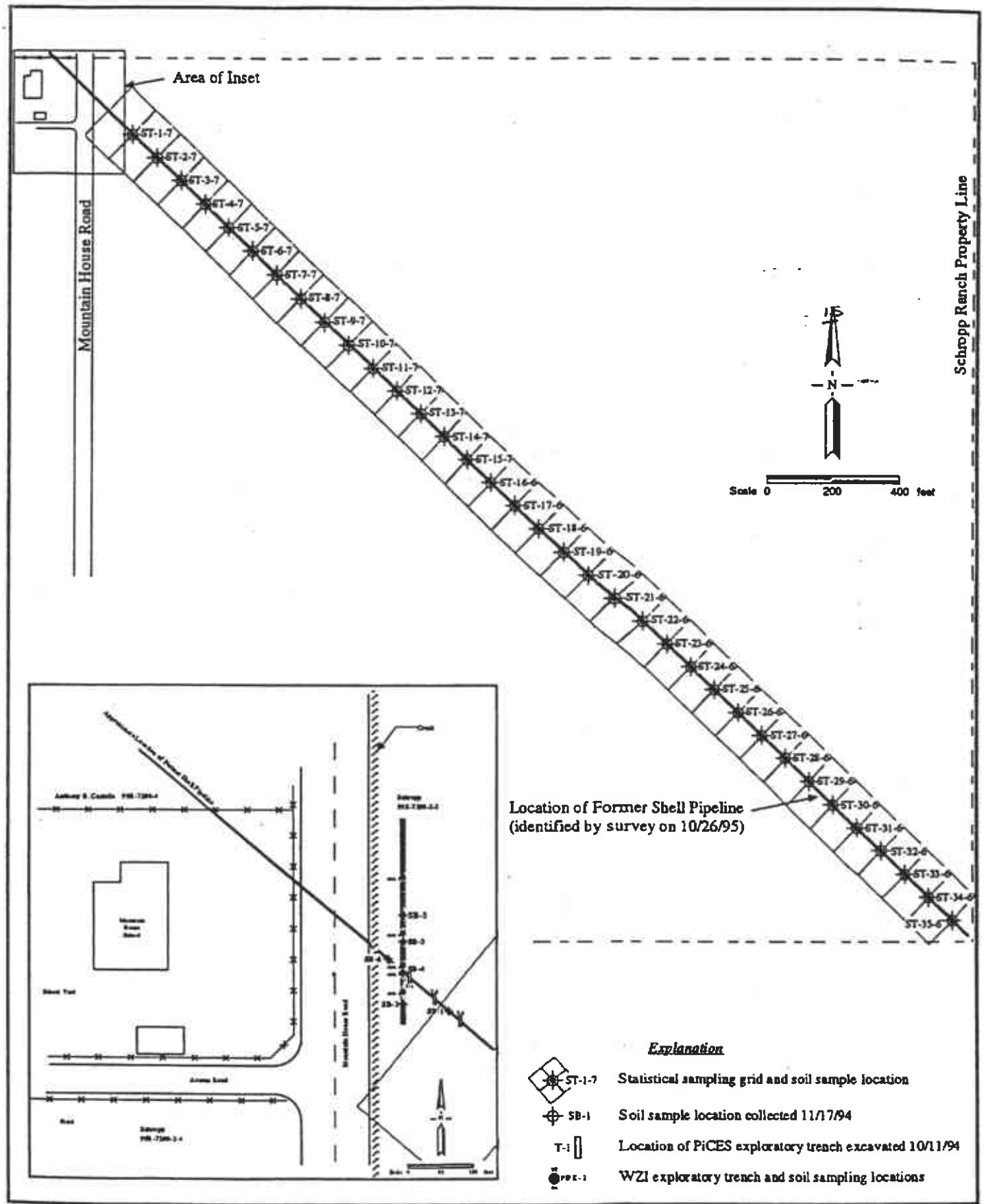
PiCES Associates

TABLE 1: RESULTS OF SITE INVESTIGATION SOIL SAMPLE CHEMICAL ANALYSIS

SCHROPP FARMS
BYRON, CALIFORNIA
PROJECT NO. 405-005

Sample No.	Date of Collection	Depth (ft. bgs)	Benzene	Toluene	Ethybenzene	Total Xylenes	TPH-G	TPH-D_{47}	TRPH
GB-1	Oct 11, 1994	7	ND	ND	0.03	ND	ND	4781	842
GB-2	Oct 11, 1994	8	ND	ND	0.02	ND	ND	3457	1599
GB-3	Oct 11, 1994	7	ND	ND	ND	ND	ND	3137	579
GB-4	Oct 11, 1994	8	ND	ND	ND	ND	12	6917	2362
GB-5	Oct 11, 1994	8	ND	ND	ND	ND	ND	854	97
SB-1	Nov 17, 1994	16-18	ND	ND	ND	ND	ND	ND	ND
SB-2	Nov 17, 1994	14-16	ND	ND	ND	ND	ND	ND	ND
SB-3	Nov 17, 1994	17-19	ND	0.165	0.598	ND	159	1258	216
SB-4	Nov 17, 1994	18-20	ND	0.377	3.338	1.309	433	4632	ND
SB-5	Nov 17, 1994	16-18	ND	ND	ND	ND	ND	ND	ND
SB-6	Nov 17, 1994	16-18	ND	0.224	1.009	0.835	90	958	340
		Limit of Quantitation	0.005	0.005	0.005	0.015	10	10	10

All results in ppm by weight (mg/kg)
ND denotes Not Detected at the limit of Quantitation



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"A Pledge to Quality"

SITE AND SOIL SAMPLE LOCATION MAP

Agricultural Industries Inc. (Schropp Ranch)
3880 Mountain House Road
Byron, California

PLATE 3

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED	DATE
CME	405-005		8/96		

PiCES Associates

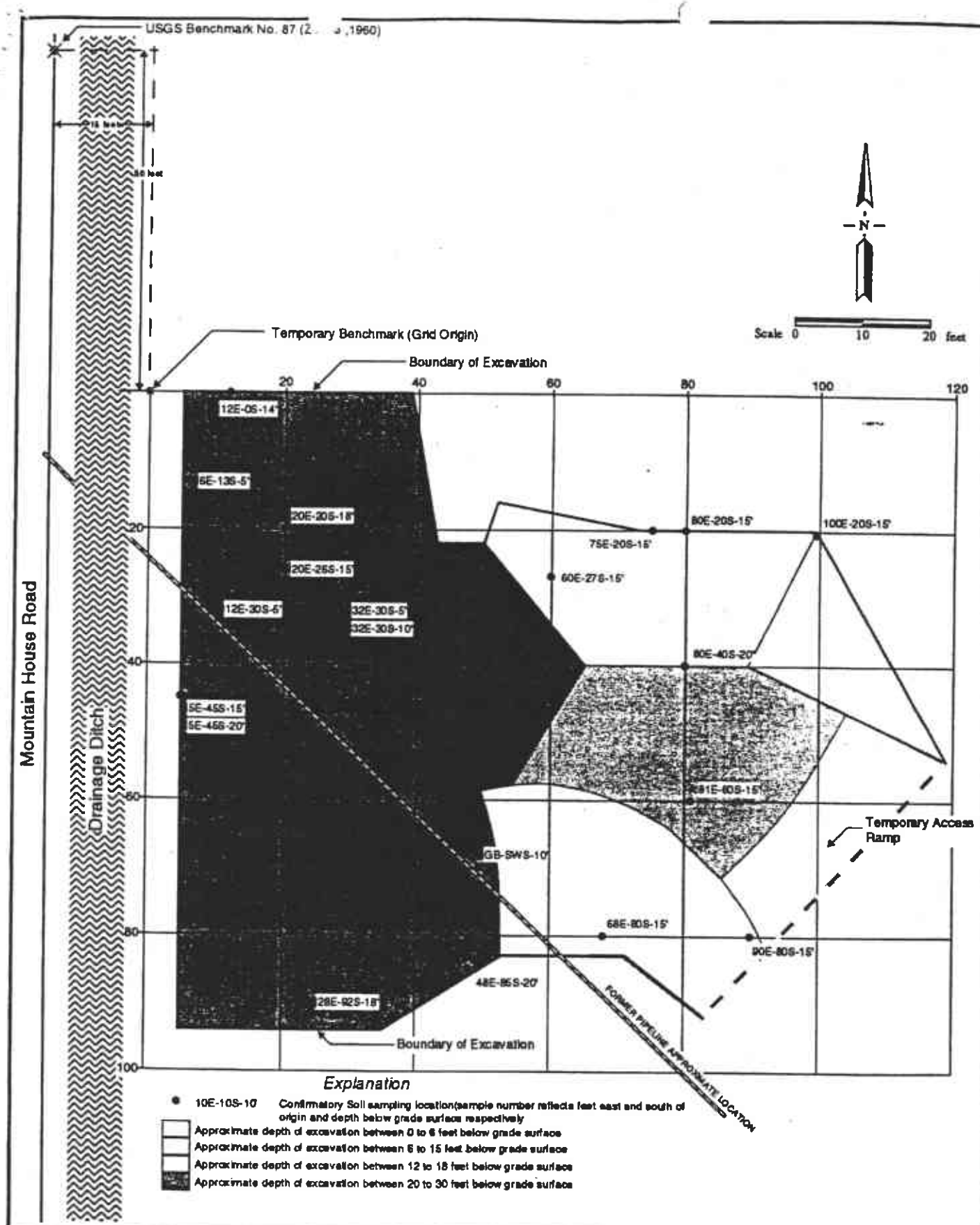
TABLE 1: RESULTS OF SUPPLEMENTARY SITE INVESTIGATION
SOIL SAMPLE CHEMICAL ANALYSIS
SCHROPP RANCH
BYRON, CALIFORNIA
PROJECT NO. 405-005

Composite Sample No.	Date of Collection	Depth (ft. bgs)	Benzene	Toluene	Ethybenzene	Total Xylenes	TPH-G	TPH-D
Composite-1	Oct 26, 1995	7	ND	ND	ND	ND	ND	ND
Composite-2	Oct 26, 1995	7	ND	ND	ND	ND	ND	ND
Composite-3	Oct 26, 1995	7	ND	ND	ND	ND	ND	ND
Composite-4	10/26, 27/1995	6	ND	ND	ND	ND	ND	ND
Composite-5	Oct 26, 1995	6	ND	ND	ND	ND	ND	ND
Composite-6	Oct 27, 1995	6						
Composite-7	Oct 27, 1995	6	ND	ND	ND	ND	ND	ND
		Limit of Quantitation	0.005	0.005	0.005	0.015	10	10

All results in ppm by weight (mg/kg)
ND denotes Not Detected at the limit of Quantitation

Composite Sample Summary:

Composite-1 : ST-1-7, ST-2-7, ST-3-7, ST-4-7, ST-5-7
Composite-2 : ST-6-7, ST-7-7, ST-8-7, ST-9-7, ST-10-7
Composite-3 : ST-11-7, ST-12-7, ST-13-7, ST-14-7, ST-15-7
Composite-4 : ST-16-6, ST-17-6, ST-18-6, ST-19-6, ST-20-6
Composite-5 : ST-21-6, ST-22-6, ST-23-6, ST-24-6, ST-25-6
Composite-6 : ST-26-6, ST-27-6, ST-28-6, ST-29-6, ST-30-6
Composite-7 : ST-31-6, ST-32-6, ST-33-6, ST-34-6, ST-35-6



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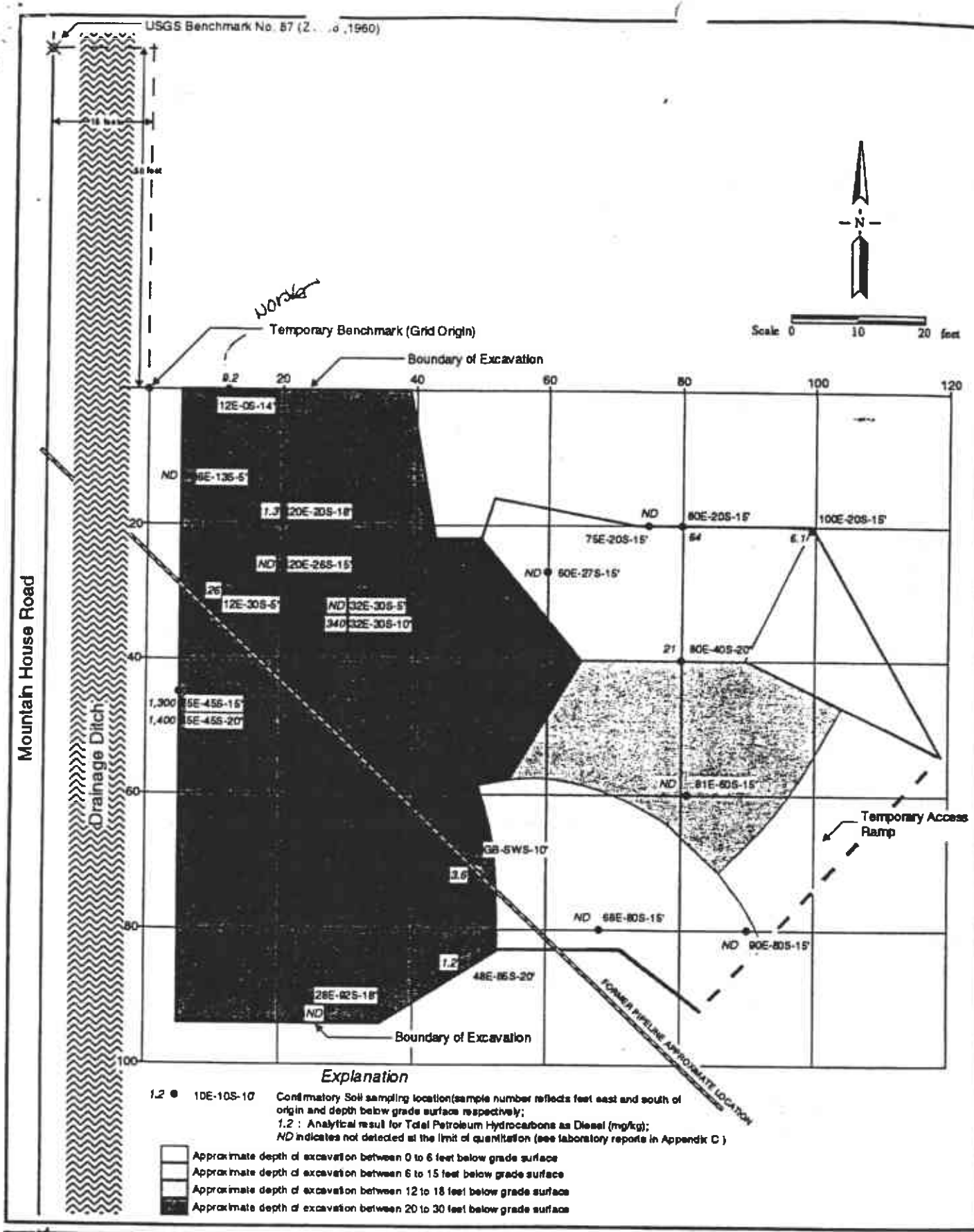
EXCAVATION DIMENSIONS AND CONFIRMATION SOIL SAMPLING LOCATIONS

Schropp Farms

Mountain House Road, Byron, California

PLATE 3

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED	DATE
CME	405-005		8/96		



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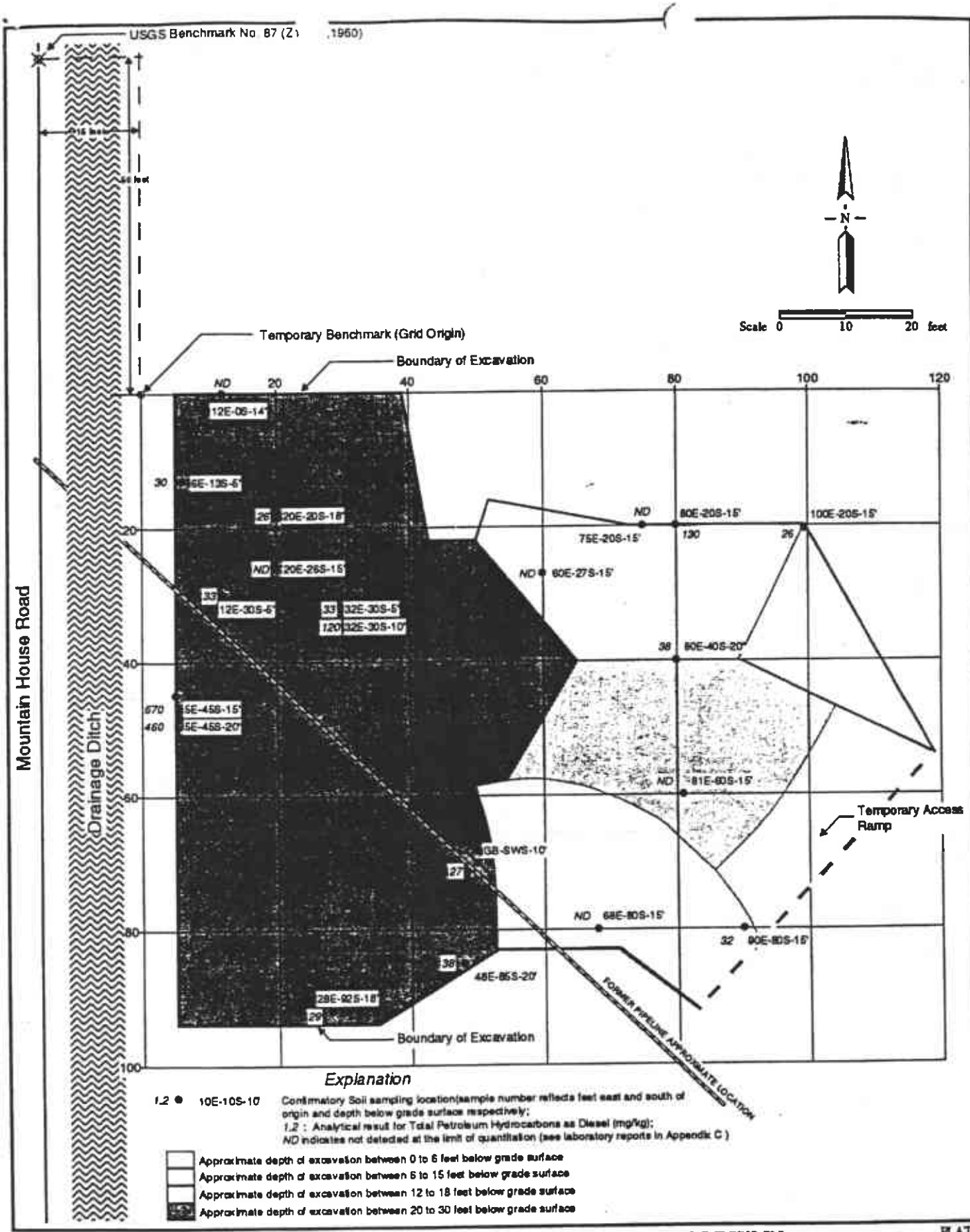
CONFIRMATORY SOIL SAMPLE RESULTS
TOTAL PETROLEUM HYDROCARBONS AS DIESEL
Schropp Farms
Mountain House Road, Byron, California

PLATE 4

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED	DATE
CME	405-005		8/96		



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CONFIRMATORY SOIL SAMPLE RESULTS
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Schropp Farms

Mountain House Road, Byron, California

PLATE 5

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED	DATE
CME	405-005		8/96		

PiCES Associates

TABLE 2: RESULTS OF CONFORMATION SOIL SAMPLE CHEMICAL ANALYSIS

SCHROPP FARMS
BYRON, CALIFORNIA
PROJECT NO. 405-005

Sample No.	Date of Collection	Depth (ft. bgs)	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH-G	TPH-D	TRPH
GB-06E-13S-05'	Nov 4, 1995	5	ND	ND	ND	ND	ND	1.8	30
GB-12E-30S-05'	Nov 4, 1995	5	ND	ND	ND	ND	ND	26	33
GB-32E-30S-05'	Nov 4, 1995	5	ND	ND	ND	ND	ND	ND	33
GB-32E-30S-10'	Nov 4, 1995	10	0.016	0.022	0.026	0.083	21	340	120
GB-SWS-10'	Nov 4, 1995	10	ND	ND	ND	ND	ND	3.6	27
GB-100E-20S-15'	Nov 4, 1995	15	ND	ND	ND	ND	ND	6.1	26
GB-80E-40S-20'	Nov 4, 1995	20	ND	ND	ND	ND	ND	21	38
GB-80E-20S-15'	Nov 4, 1995	15	ND	ND	ND	ND	ND	64	130
GB-48E-85S-20'	Nov 5, 1995	20	ND	ND	ND	ND	ND	1.2	38
GB-20E-20S-18'	Nov 5, 1995	18	ND	ND	ND	ND	ND	1.3	26
GB-28E-92S-18'	Nov 5, 1995	18	ND	ND	ND	ND	ND	ND	29
GB-90E-80S-15'	Nov 5, 1995	15	ND	ND	ND	ND	ND	ND	32
GB-75E-20S-15'	Nov 5, 1995	15	ND	ND	ND	ND	ND	ND	ND
GB-81E-60S-15'	Nov 5, 1995	15	ND	ND	ND	ND	ND	ND	ND
GB-68E-80S-15'	Nov 5, 1995	15	ND	ND	ND	ND	ND	ND	ND
GB-12E-00S-14'	Nov 5, 1995	14	ND	ND	ND	ND	9.2	ND	ND
GB-20E-26S-15'	Nov 5, 1995	15	ND	ND	ND	ND	ND	ND	ND
GB-05E-45S-15'	Nov 5, 1995	15	ND	ND	ND	ND	140	1300	670
GB-05E-45S-20'	Nov 5, 1995	20	ND	ND	ND	ND	35	1400	460
GB-60E-27S-15'	Nov 6, 1995	15	ND	ND	ND	ND	ND	ND	ND
		Limit of Quantitation	0.005	0.005	0.005	0.005	1.0	1.0	25

All results in ppm by weight (mg/kg)
ND denotes Not Detected at the limit of Quantitation
SWS denotes a composite sample collected over a 5-foot wall section of the excavation at 50E-70S.

Table 1. Results of analyses performed on soil samples collected during geoprobe investigation on July 2, 1997

Sample I.D.	TPH-CO	TPH-D	TPH-G	BTEX
B-1, 6 ft.	22	1.4	ND	ND
B-1, 10 ft.	ND	ND	ND	ND
B-2, 7.5 ft.	49	2.0	ND	ND
B-2, 11.5 ft.	ND	ND	ND	ND
B-3, 7.5 ft.	14	ND	ND	ND
B-3, 11.5 ft.	ND	ND	ND	ND
B-4, 7.5 ft.	ND	ND	ND	ND
B-4, 11.5 ft.	ND	2.6	ND	ND
B-5, 7.5 ft.	ND	1.3	ND	ND
B-5, 11.5 ft.	ND	ND	ND	ND

Notes:

All concentrations reported in mg/kg
Soil samples collected 7/2/97

Reporting Limits:

TPH-CO 10 mg/kg
TPH-D 1.0 mg/kg
TPH-G 1.0 mg/kg
BTEX 0.005 mg/kg for each compound

Table 2. Results of analyses performed on groundwater samples collected during geoprobe investigation on July 2, 1997

Sample I.D.	TPH-CO	TPH-D	TPH-G	BTEX	MTBE
B-1	720	ND	ND	ND	ND
B-2	1,300	ND	ND	ND	ND
B-3	1,600	ND	ND	ND	ND
B-4	410	ND	ND	ND	ND
B-5	610	ND	ND	ND	ND

Notes:

All concentrations reported in ug/L
Ground water grab samples collected 7/2/97

Reporting Limits

TPH-CO 250 ug/L
TPH-D 50 ug/L
TPH-G 50 ug/L
BTEX 0.5 ug/L for each compound
MTBE 2.5 ug/L

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APPENDIX B

ANALYTIC RESULTS FOR GROUND WATER

Table 1. Results of analyses performed on soil samples collected during geoprobe investigation on July 2, 1997

Sample I.D.	TPH-CO	TPH-D	TPH-G	BTEX
B-1, 6 ft.	22	1.4	ND	ND
B-1, 10 ft.	ND	ND	ND	ND
B-2, 7.5 ft.	49	2.0	ND	ND
B-2, 11.5 ft.	ND	ND	ND	ND
B-3, 7.5 ft.	14	ND	ND	ND
B-3, 11.5 ft.	ND	ND	ND	ND
B-4, 7.5 ft.	ND	ND	ND	ND
B-4, 11.5 ft.	ND	2.6	ND	ND
B-5, 7.5 ft.	ND	1.3	ND	ND
B-5, 11.5 ft.	ND	ND	ND	ND

Notes:

All concentrations reported in mg/kg
Soil samples collected 7/2/97

Reporting Limits:

TPH-CO 10 mg/kg
TPH-D 1.0 mg/kg
TPH-G 1.0 mg/kg
BTEX 0.005 mg/kg for each compound

Table 2. Results of analyses performed on groundwater samples collected during geoprobe investigation on July 2, 1997

Sample I.D.	TPH-CO	TPH-D	TPH-G	BTEX	MTBE
B-1	720	ND	ND	ND	ND
B-2	1,300	ND	ND	ND	ND
B-3	1,600	ND	ND	ND	ND
B-4	410	ND	ND	ND	ND
B-5	610	ND	ND	ND	ND

Notes:

All concentrations reported in ug/L
Ground water grab samples collected 7/2/97

Reporting Limits

TPH-CO 250 ug/L
TPH-D 50 ug/L
TPH-G 50 ug/L
BTEX 0.5 ug/L for each compound
MTBE 2.5 ug/L

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Table 3. Ground Water Elevations and Analytic Data - Schropp Farms, 3880 Mountain House Road, Byron, California

Well	Top-of-Casing Elevation (ft above msl)	Date	Water Depth (ft)	Ground Water Elevation (ft above msl)	TPH-CO	TPH-D	B	T	E	X
					parts per billion (µg/L)					
MW-1	97.99	04/26/96	13.00	84.99	---	<500	<0.5	<0.5	<0.5	<0.5
		01/20/97	15.09	82.90	<100	<50	<0.5	<0.5	<0.5	<0.5
		02/24/97	13.58	84.41	360	<50	<0.5	<0.5	<0.5	<0.5
		03/24/97	12.14	85.85	270	<50	<0.5	<0.5	<0.5	<0.5
		05/07/97	13.30	97.99	<250	<50	<0.5	<0.5	<0.5	<0.5
		07/30/97	13.63	84.36	580	70	<0.5	<0.5	<0.5	<0.5
MW-2	98.08	04/26/96	13.17	84.91	---	1,000	<0.5	<0.5	<0.5	<0.5
		01/20/97	14.99	83.09	<100	<50	<0.5	<0.5	<0.5	<0.5
		02/24/97	13.59	84.49	<100	<50	<0.5	<0.5	<0.5	<0.5
		03/24/97	12.40	85.68	<100	<50	<0.5	<0.5	<0.5	<0.5
		05/07/97	13.41	98.08	<250	<50	<0.5	<0.5	<0.5	<0.5
		07/30/97	13.58	84.50	530	70	<0.5	<0.5	<0.5	<0.5
MW-3	99.28	04/26/96	12.80	86.48	---	<500	<0.5	<0.5	<0.5	<0.5
		01/20/97	14.68	84.60	320	<50	<0.5	<0.5	<0.5	<0.5
		02/24/97	13.31	85.97	390	<50	<0.5	<0.5	<0.5	<0.5
		03/24/97	11.99	87.29	380	<50	<0.5	<0.5	<0.5	<0.5
		05/07/97	13.25	99.28	<250	<50	<0.5	<0.5	<0.5	<0.5
		07/30/97	13.13	86.15	1,500	190	<0.5	<0.5	<0.5	<0.5

Abbreviations:

msl = Mean sea level
TPH-CO = Total Petroleum hydrocarbons as crude oil by modified EPA Method 8015. Shell Central Valley crude oil used as crude oil standard.
TPH-D = Total Petroleum hydrocarbons as diesel by modified EPA Method 8015
B = Benzene by EPA Method 8020
T = Toluene by EPA Method 8020
E = Ethylbenzene by EPA Method 8020
X = Xylenes by EPA Method 8020
<n = Not detected above laboratory limit of quantification of n parts per billion
--- = Not analyzed