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**WZI** INC.

**FAX LEAD SHEET**

To: STEVE MUIR  
 Company: SIERRA BRAVO/WZI  
 From: Jerry  
 Subject: Schropp Farms  
 Message: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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GARRISON LAW CORPORATION  
ATTORNEYS AND COUNSELORS AT LAW

RECEIVED BY  
OCT 17 1995  
WZI INC.

REFER TO FILE  
Schropp

October 12, 1995

Richard Jones  
Agriculture Industries, Inc.  
P.O. Box 1076  
West Sacramento, CA 95691

Re: Crude Oil Impacted Soil Remedial Action Plan  
Schropp Farms  
3800 Mountain House Road, Byron, CA

Dear Mr. Jones:

Enclosed please find a draft copy of the Crude Oil Impacted Remedial Action Plan prepared by PiCES for the above-referenced site. Please review the enclosed and contact my office with any questions or comments. Shell and its consultant are anxious to conduct the site investigation before the onset of the rainy season; therefore, your timely response would be appreciated.

In addition, I received your October 11, 1995 letter concerning the effect of previous sampling on the bean crop. This information will be conveyed to Shell immediately.

Should you have any questions or require further clarification on the attached, please contact my office.

Sincerely yours,

GARRISON LAW CORPORATION



G. S. Garrison, REA & CEI  
Attorney at Law

Enclosures

cc: Steve Muir, WZI (w/enclosure)

Faxed 10-17-95 to off



PROFESSIONAL INTEGRATED CONSULTING  
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*"A Pledge to Quality"*

October 3, 1995

Shell Oil Company  
511 N. Brookhurst Street  
Anaheim, California 92803

Project Number: 405-005

**D R A F T**

**CRUDE OIL IMPACTED SOIL  
REMEDIAL ACTION PLAN  
MOUNTAIN HOUSE ROAD  
BYRON, CALIFORNIA**

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George L. Cusimano  
Principal Geochemist

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Aklile Gessesse  
Principal Hydrogeologist

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# DRAFT

## 1.0 INTRODUCTION

PiCES was retained by Shell Oil Company (Shell) to develop a Remedial Action Plan (RAP) for localized petroleum impacted soil along a portion of the former Shell Pipeline located in Byron, California. The site location is shown on Plate 1. PiCES previously conducted separate exploratory trenching and soil boring activities along the former Shell pipeline right-of-way that confirmed the presence of localized subsurface soil contamination. This RAP summarizes the explorations activities and findings, defines the remedial objectives and alternatives.

### 1.1 PURPOSE AND OBJECTIVES

The purpose of the proposed remedial action is to mitigate the environmental impact of localized crude oil contaminated soil that has been identified at this site. The objectives of this RAP are as follows:

1. To remove adsorbed-phase hydrocarbons from the subsurface soil to nondetectable levels.
2. To prevent further downward or lateral movement of hydrocarbon constituents within the shallow water-bearing zone.
3. To excavate the contaminated soil to groundwater or to nondetectable levels, whichever is encountered first.
4. Installation of a groundwater monitoring system.
5. To accomplish soil remediation in a manner that is effective, and economical.

### 1.2 BACKGROUND

The site is located on the property of Agriculture Industries Inc. Schropp Ranch (SCHROPP) east of Mountain House Road on Alameda County Assessors Parcel Number 99B-7200-2-3. The former Shell crude-oil pipeline right-of-way crosses the SCHROPP property east of Mountain House Road and continues northwest. The pipeline reportedly carried only crude oil destined for the Richmond/Martinez area. The right-of-way contained two pipelines (an 8-inch and 10-inch diameter pipeline) as reported by Shell.

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### 1.2.1 *Initial Site Assessment*

Sometime prior to May 1994 during a potential property transfer investigation by SCHROPP consultant WZI Inc. (WZI) of Bakersfield, California, vadose zone soil contamination was identified east of the Mountain House Road around the former Shell pipeline area. WZI reported observing an exposed 12-inch diameter pipeline at the bottom of the Byron-Bethany Irrigation District canal which is located approximately 1/2 mile north of the SCHROPP property.

### 1.2.2 *PiCES Site Investigation*

On October 11 and November 17, 1994, PiCES conducted soil sampling explorations within and around the localized area identified by WZI as having hydrocarbon contamination (Plate 2). The primary objectives of the explorations were to determine if the soil along the former pipeline has been impacted by petroleum hydrocarbons, define the vertical and horizontal extent of hydrocarbons in the vadose zone if soil impacted along the former pipeline is encountered, and determine if groundwater has been impacted.

Three trenches (T1, T2, and T3) were excavated at the locations shown on Plate 1 using a back hoe. All three trenches were excavated to 8 feet bgs. Two soil samples were collected in T1 and T2 (GB-1 through GB-4), and one soil sample was collected in T3 (GB-5). Six soil probes (SB-1 through SB-6) were driven at locations shown on Plate 1 using a van-mounted Geoprobe Systems hydraulic probe consisting of 1-inch diameter steel casing. Soil probes SB-1, SB-5 and SB-6 were driven to 18 feet bgs. Soil probes SB-2, SB-3, and SB-4 were driven to 16, 19, and 20 feet bgs respectively.

Two soil samples each from T1 and T2, and one soil sample from T3 showing discoloration were selected for chemical analyses. The chemical analysis included TRPH (EPA Method 418.1), BTEX (EPA Method 8020), TPH-Diesel (EPA Method 8015 modified for diesel), and TPH-Gasoline (EPA Method 8015 modified for gasoline).

One soil sample from each probe was selected for chemical analysis. Chemical analysis included TRPH (EPA Method 418.1), BTEX (EPA Method 8020), TPH-Diesel (EPA Method 8015 modified for diesel), and TPH-Gasoline (EPA Method 8015 modified for gasoline).

From the five soil samples collected from the three excavations submitted for chemical analysis, GB-1 through GB-4 contained levels of TPH-D ranging from 3,137 to 6,917 parts per million (ppm), whereas the GB-5 TPH-D was 854 ppm. TRPH was detected in all samples which ranged from 97 ppm in GB-5 to 2,362 ppm in GB-4. TPH-G was only detected in GB-4 at 12 ppm. Ethylbenzene was detected in soil samples from GB-1 and GB-2 at concentrations of 0.030 and 0.020 ppm respectively. Benzene, toluene and total xylenes were not detected in any of the samples collected from the three excavations.

From the six soil boring samples submitted for chemical analysis, TRPH was detected in two soil samples (SB-3 and SB-6) at concentrations of 216 and 340 ppm. TPH-D was detected at levels ranging from 958 to 4,632 ppm from soil borings SB-3, SB-4, and SB-6. TPH-G was also detected in these borings at concentrations ranging from 90 to 433 ppm. Toluene and ethylbenzene were detected in soil borings SB-3, SB-4, and SB-6 at concentrations ranging from 0.165 to 3.338 ppm. Total xylenes were only detected in soil borings SB-4 and SB-6 at concentrations of 1.309 and 0.835 respectively. Benzene was not detected in any of the soil samples collected from the six soil borings.

Since contaminated soil was encountered in both borings (SB-3 and SB-4) that were driven to groundwater, it is assumed that groundwater has been impacted.

The full report entitled "Site Assessment Final Report, Mountain House Road, Byron, California," is presented in Appendix A.

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## 2.0 SITE CONDITIONS

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### 2.1 REGIONAL GEOLOGY

The site is situated in the northwestern section of San Joaquin Valley. The site is underlain by clay, silts, sands, and gravel's of Recent, Pleistocene, and Pliocene Age (Hotchkiss and Balding, 1971). The shallow deposits of the site consists of alluvial deposits, comprised of silts and clays with occasional lenses of sand and gravel. These shallow deposits are underlain by the upper portion of the Tulare Formation. The Tulare Formation consists of alluvial clays, silts, sands and gravel's to a depth of approximately 1,000 feet (Hotchkiss and Balding, 1971). Within the Tulare Formation, a laterally extensive clay layer, known as the Corcoran Clay Member, is present at approximately 100 feet below ground surface. The Tulare Formation is underlain by sedimentary and crystalline rocks of Tertiary and pre- Tertiary age.

### 2.2 REGIONAL HYDROGEOLOGY

Two major aquifers of various thickness and groundwater quality are present near and beneath the site. They are the upper and lower zones of the Tulare Formation, which are separated by a laterally continuous clay layer known as the Corcoran Clay. The groundwater quality in the lower zones yields a major potable groundwater resource for the area. This groundwater, however, is not in hydrologic communication with the shallow zone due to the Corcoran Clay layer acting as a barrier between the upper and lower zones (Hotchkiss and Balding, 1971). The shallow water bearing zone is reported to have varying water table depths due to the local shallow clay lenses creating localized confining conditions. These conditions are likely to be present beneath the site.

The general groundwater flow direction in the area as reported by WZI is to the north and depth to groundwater is on the order of 15 to 25 feet below grade surface (bgs). Groundwater levels in the area are known to fluctuate on the order of 5 to 10 feet bgs in response to irrigational activities and seasonal change.



### 3.0 CONTAMINATION ASSESSMENT

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#### 3.1 DATA SUMMARY

Analytical results of the soil chemical analysis for the organic analytes are presented in Table 1 and the inferred soil plume is shown in Plate 2.

The soil plume extends approximately 80 feet from Mountain House Road in a southeasterly direction. Hydrocarbon impacted soil extends vertically to groundwater as indicated by the presence of free product in soil samples collected from SB-3 and SB-4. The western extent of soil contamination has not been assessed at present due to the difficulty in getting access on Mountain House Road. The vertical extent of hydrocarbon contamination appears to be confined between the original depth of the former crude oil pipeline (approximately 4 feet bgs) and a clay layer 20 feet bgs.

#### 3.2 CONCLUSIONS

Results of chemical analysis suggest that the contamination consists primarily of high molecular weight hydrocarbons of low volatility and mobility. Hydrocarbon concentrations greater than 1,000 ppm TPH-D (indicative of the possible presence of free product) are present at depths of 16 to 19 feet bgs at SB-4 and SB-3 and in T1 and T2 which are located along the former Shell pipeline right-of-way. Free product and a sheen were observed in SB-4 and SB-3, respectively, upon encountering groundwater.

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## 4.0 SOIL REMEDIATION

As discussed in the Background section of this RAP, hydrocarbon constituents are found adsorbed to the soil within the vadose zone. To a lesser degree, free-phase hydrocarbons have been detected in the groundwater within a localized area. The following sections of this remedial action plan present viable alternatives to address the vadose zone soil hydrocarbon occurrences.

### 4.1 REMEDIAL ALTERNATIVE EVALUATION

By significantly reducing the mass of the hydrocarbons within the vadose zone, future impact to groundwater resources can be minimized. The recovery of this phase of hydrocarbons represents the primary objective of this remedial action plan.

#### 4.1.1 *Excavation and Off-site Disposal With or Without Treatment*

Excavation and off-site disposal are definitive means of removing impacted soil from a site. This is accomplished with conventional excavation equipment and is most appropriate for a localized area limited to shallow depths. The impacted soil, once excavated, can be treated above ground or transported untreated to an appropriately permitted facility. Recognizing that soil impact is not homogenous throughout the area of excavation, frequently, the most cost-effective means of soil disposal involves segregation of material with low hydrocarbon concentrations during excavation. This material can be transported to a Class III landfill without treatment. The remaining soil volume of soil is then treated to reduce hydrocarbon concentrations or transported to a Class I facility.

Typically, hydrocarbon-impacted soil is treated above ground using one of three alternatives; thermal desorption, enhanced biodegradation, and/or aeration. Each of these alternatives has been evaluated for use at this site as discussed below.

#### 4.1.2 *Incineration*

This method of soil remediation involves introduction of the impacted soil to a rotary-type kiln operating at an elevated temperature. The kiln is heated to approximately 600 degrees F to 800 degrees F which initially reduces the water content of the soil and then promotes volatilization of the hydrocarbon constituents. This alternative is appropriate for this facility as the hydraulic

fluid impacting the subsurface is not volatile at ambient conditions. The hydrocarbons removed from the soil are typically passed through an afterburner operating at a temperature of approximately 1400 degrees F to oxidize the contaminants to water and carbon dioxide. A baghouse filter reduces dust originated from the kiln.

The initial moisture content of the soil, soil type and volatility of the impacting hydrocarbon fraction dictates the speed at which the soil can be processed by the desorber. The treated soil is rehydrated and cooled using a water spray. In addition to the removal of the impacted hydrocarbons, naturally occurring organic matter is destroyed in the treatment process. Because of this, the cohesive strength of the treated soil is reduced, and this material may not be suitable as backfill beneath a structure.

#### 4.1.3 *Ex-situ Biodegradation*

This method of soil treatment involves placement of the impacted soil within an engineered treatment cell located at either the originating site or an off-site facility. The treatment cell is designed such that moisture, supplemental nutrients, non-indigenous microbe population and oxygen concentrations are controlled. In this manner, the impacting hydrocarbons are used as a food source for the microbes and are reduced to primarily carbon dioxide, water and biomass.

The success of this alternative depends on factors such as soil type, hydrocarbon fraction and indigenous microbial population. As discussed previously in this report, the primary soil type found at the site is a silty clay to a clayey silt. The fine-grained nature of this material may not be conducive for enhanced biodegradation as adequate delivery of supplemental nutrients and oxygen may be difficult to control. Because of this complication, pockets of untreated soil are likely to occur which can significantly extend the time and expense required to accomplish adequate degradation.

The hydrocarbon fraction making up the crude oil consists of long, branched hydrocarbon chains. This fraction requires considerably longer time for sufficient degradation than the short-chain hydrocarbons. Because of the conditions at the site, ex-situ degradation is probably not the most appropriate means of reducing hydrocarbon concentrations, and is not recommended.

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#### 4.1.4 *Aeration*

This method of treatment is best applied to soil with moderate to high permeability impacted with relatively volatile hydrocarbon constituents. As already discussed, the impacted soils at this facility has low permeability and the impacting hydrocarbon fraction consists of primarily volatile constituents at ambient conditions. Because of these two limiting conditions, aeration would probably not be effective for this site. The relative successfulness of other alternatives (thermally enhanced desorbtion, for example) precludes the use of this alternative.

#### 4.1.5 *In-situ Biodegradation*

The processes described for ex-situ treatment apply for in-situ treatment as well. Essentially, a combination of horizontal and vertical extraction/infiltration are employed to control the flow of oxygen, supplemental nutrients and non-indigenous microbes. In this manner, the expense and complications of excavation are eliminated.

The success of this alternative is dependent on the same parameters as discussed with ex-situ biodegradation; soil type, microbial population and contaminant properties. As with ex-situ degradation, the adequate transport of supplemental nutrients and oxygen may be difficult to implement. In fact, control of these factors would be more difficult. The probable result may be untreated pockets of impacted soil. Additionally, the introduction of fluids containing supplemental nutrients and/or microbes may enhance mobilization of the hydrocarbons in the dissolved phase.

Because of the probability of inadequate degradation and the possibility of enhanced dissolution of hydrocarbons and subsequent impact to groundwater, in-situ biodegradation is not recommended for use at this facility.

#### 4.1.6 *Soil Flushing with or without Surfactants*

Soil flushing is a process which involves introducing water to the subsurface, usually mixed with a surfactant, in an effort to leach compounds present into the surfactant solution. The solution is then extracted, immediately down gradient of the leaching site, through a collection system consisting of a series of shallow well points or subsurface drains. Treatment processes are then carried out in the solution which can be recycled to the beginning of the flushing

process. The final leachate, consisting of petroleum products combined with the surfactant is disposed off-site.

Limitations of the soil flushing process include adequate transport of the flushing fluid throughout the impacted area. This is especially difficult to control when applied to fine-grained materials with low permeability. As with enhanced in-situ biodegradation, there is a potential for channeling of the surfactant along preferential pathways. Additionally, the introduction of these fluids, by design, may enhance migration of dissolved-phase hydrocarbons and may potentially affect the groundwater beneath the site. Because of these limitations, in-situ soil flushing does not appear to be the most feasible and/or cost effective solution for this site.

## 4.2 SELECTED REMEDIAL TECHNOLOGY

Based on the information collected during the site investigation and an evaluation of alternatives, as discussed in section 2 of this report, it is PiCES recommendation to implement excavation and soil treatment to address the hydrocarbon impact found at this site. Excavation and above-ground treatment of the soil is the most cost effective and feasible alternative of removing the source hydrocarbons from the subsurface.

### 4.2.1 *Contaminant Cleanup Levels*

Soil generated during the excavation will be periodically screened using an organic vapor meter (OVM). Based on field observations and screening results, soil samples will be collected to document adequate removal of the impacted soil and to guide the excavation thereby minimizing the excavation of clean material. The selected soil samples will be submitted under chain-of-custody protocol to a California-registered laboratory for TPH-Gasoline, TPH-Diesel, and TRPH.

Since cleanup levels for crude oil impacted soil have not been established, PiCES proposes to employ the method detection limit specific for each analytical technique as cleanup criteria. The MDL is a laboratory generated parameter.

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#### 4.2.2 *Estimated Volume of Contaminated Soil*

The estimated areal extent of contamination is shown on Plate 2. The western extent of impacted soil has not been defined due to inaccessibility to acquire soil samples on Mountain House Road. The estimated volume of accessible contaminated soil is based on the following assumptions:

- The maximum areal extent of petroleum hydrocarbons is approximately 80 feet in length, 50 feet in width as detected in PiCES site investigation.
- The upper 3 to 4 feet of topsoil is not contaminated.
- Depth to groundwater is approximately 16 feet bgs.

Based on the above assumptions, PiCES estimates that there is approximately 1,800 cubic yards of crude oil impacted soil.

#### 4.2.3 *Excavation and Backfill*

As stated in the Purpose and Objectives section, the primary objectives of the excavation are:

1. To remove adsorbed-phase hydrocarbons from the subsurface soil to nondetectable levels.
2. To prevent further downward or lateral movement of hydrocarbon constituents within the shallow water-bearing zone.
3. To excavate the contaminated soil to groundwater or to nondetectable levels, whichever is encountered first.

Excavation of contaminated material will be conducted by NG Chemical, Inc. (NG) of Santa Maria, California. The recommendation of excavation rather than one of many in-situ alternatives is primarily due to the low permeability of the sediments and low volatility of the contaminants. NG will obtain all necessary permits and alert all local utility companies prior to commencing excavation activities.

The areal extent of excavation is presented in Plate 2. The vertical extent of excavation is not expected to exceed 18 to 20 feet bgs, depending on depth to groundwater. The topsoil (upper

3 feet of soil column) will be graded off and stockpiled onsite. Contaminated soil generated from the excavation will be stockpiled separately and covered with Visqueen plastic sheeting.

The western extent of excavation will be terminated at the edge of Mountain House Road to minimize the possibility of undermining the integrity of the road surface. It is possible that additional impacted soil may be located farther west of the extent of excavation.

The excavation will be backfilled with clean fill prior to replacement of stockpiled topsoil. Backfill material will be compacted and graded to meet local grading requirements for the site.

#### 4.2.4 *Confirmational Sampling*

As a confirmation that all accessible contaminated material has been removed, verification samples will be collected from each sidewall and from the bottom of the excavation where groundwater is not encountered. The selected soil samples will be submitted under chain-of-custody protocol to a California-registered laboratory for TPH-Gasoline and TPH-Diesel (EPA Method 8015 Modified) and TRPH (EPA Method 418.1).

#### 4.2.5 *Soil Treatment*

The stockpiled contaminated soil removed from the excavation will be transported by truck to Port Costa Materials, Inc., of Port Costa, California for thermal treatment by incineration pending proper characterization of the materials. Three samples will be selected from the soil stockpile and analyzed by a California-registered laboratory for CAM (Title 22) Metals analysis for hazardous waste profiling.

## 5.0 GROUNDWATER MONITORING PLAN

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### 5.1 MONITORING WELL INSTALLATION

Three groundwater monitoring wells will be installed as shown on Plate 2. The location of the wells were selected in order to monitor groundwater quality in the vicinity of the excavation area.

The wells will consist of 4-inch diameter 0.02 slot PVC screen with schedule 40 PVC blank casings above the water table. The wells will be screened 10 feet below and 5 feet above the static water level. The sand pack will be #3 Monterey sand. Following the completion of the wells, development of the wells will be performed by a surge and bail technique.

Each of the monitoring wells will be completed at the surface with vaulted well boxes which will allow for easy access to the well head.

### 5.2 GROUNDWATER SAMPLING AND CHEMICAL ANALYSIS

Shell will initially measure water levels and groundwater quality in all wells to determine the degree of petroleum impaction. If groundwater impaction is observed, Shell will monitor water levels and groundwater quality by collecting ground-water samples from on-site monitoring wells on a quarterly basis for a period of one year. Prior to sample collection, approximately four well volumes of water will be removed from each well.

Shell will submit groundwater samples under chain of custody protocol to a State-certified laboratory for analysis of nonhalogenated volatile organics by EPA Method 8015 modified for gasoline and diesel.

### 5.3 QUARTERLY REPORTS

Shell will analyze the data and prepare quarterly reports, presenting the results and conclusions of groundwater monitoring and sampling. A continuation of groundwater monitoring will be reevaluated at the end of one year.



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## 6.0 FINAL REPORT

Upon completion of the soil remediation activities, a final report summarizing the results of the source removal, installation of groundwater monitoring wells, and initial groundwater monitoring findings will be submitted.

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## 8.0 BIBLIOGRAPHY

Hotchkiss, R. H. and Balding, G. O., 1971, "Geology, Hydrology, and Water Quality of the Tracy-Dos Palos Area, San Joaquin Valley, California": U.S. Geological Survey Open Field Report 72-169.

"Interim Site Assessment Guidebook, Volume I: Assessment and Cleanup Guidance": California Regional Water Quality Control Board, Los Angeles Region, 1995.



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**TABLE 1: RESULTS OF SOIL CHEMICAL ANALYSIS**

Schropp Ranch  
Mountain House Road  
Byron, CA  
Project Number: 405-005

Sample No.	Date of Collection	Depth (ft. bgs)*	Benzene	EPA Method 8020			EPA Methods†		418.1 TRPH
				Toluene	Ethybenzene	Total Xylenes	8015 Mod-G TPH-G	8015 Mod-D TPH-D	
GB-1	Oct 11	7	ND	ND	0.030	ND	ND	4781	842
GB-2	Oct 11	8	ND	ND	0.020	ND	ND	3457	1599
GB-3	Oct 11	7	ND	ND	ND	ND	ND	3137	579
GB-4	Oct 11	8	ND	ND	ND	ND	12	6917	2362
GB-5	Oct 11	8	ND	ND	ND	ND	ND	854	97
SB-1	Nov 17	16-18	ND	ND	ND	ND	ND	ND	ND
SB-2	Nov 17	14-16	ND	ND	ND	ND	ND	ND	ND
SB-3	Nov 17	17-19	ND	0.165	0.598	ND	159	1258	216
SB-4	Nov 17	18-20	ND	0.377	3.338	1.309	433	4632	ND
SB-5	Nov 17	16-18	ND	ND	ND	ND	ND	ND	ND
SB-6	Nov 17	16-18	ND	0.224	1.009	0.835	90	958	340

Note:

† TPH-G 8015 Mod-G = Total Petroleum Hydrocarbons - EPA Method 8015 modified for gasoline

TPH-D 8015 Mod-D = Total Petroleum Hydrocarbons - EPA Method 8015 modified for diesel

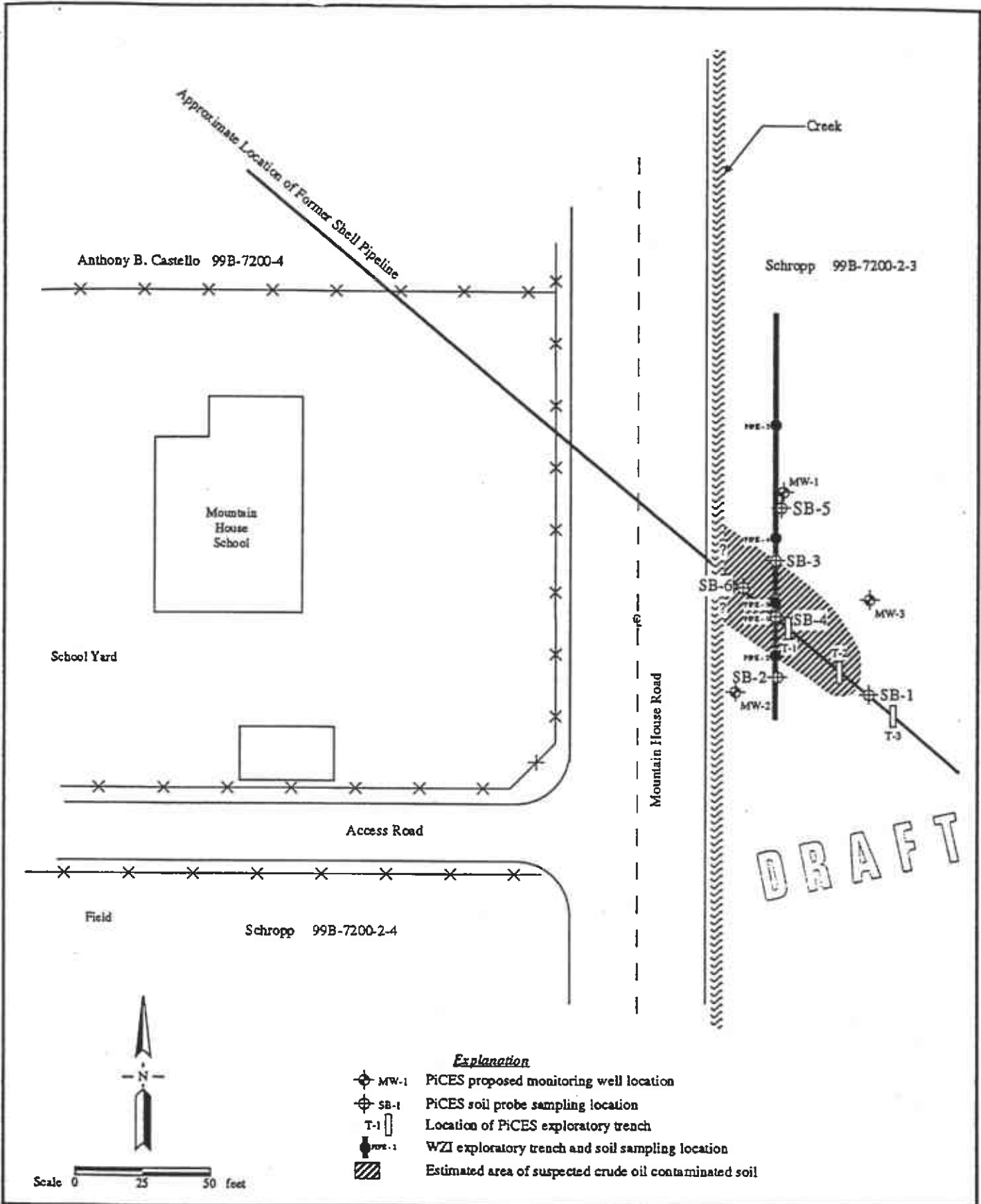
TRPH 418.1 = Total Recoverable Petroleum Hydrocarbons - EPA Method 418.1 Oil and grease

\* bgs = below grade surface

All results in ppm by weight (mg/kg)

ND denotes Not Detected at the limit of quantitation





- Explanation**
- ⊕ MW-1 PiCES proposed monitoring well location
  - ⊕ SB-1 PiCES soil probe sampling location
  - ⌋ T-1 Location of PiCES exploratory trench
  - ⊕ WZI-1 WZI exploratory trench and soil sampling location
  - ▨ Estimated area of suspected crude oil contaminated soil



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**SITE MAP**  
Agricultural Industries Inc. (Schropp Ranch)  
Mountain House Road  
Byron, California

PLATE  
**2**

DRAWN CME	PROJECT NUMBER 405-005	APPROVED	DATE 9/95	REVISED	DATE
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**APPENDIX A**  
**Site Assessment Report**

**DISTRIBUTION**

**Crude Oil Impacted Soil  
Remedial Action Plan  
Mountain House Road  
Byron, California**

Project Number

405-005

Copies 1 through 3 to:

Mr. Carlton R. Jordan  
Transportation Engineer  
Shell Oil Company  
511 N. Brookhurst Street  
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Anaheim, California 92803