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November 4, 1996

Mr. Steve Chrissanthos
Alameda Cellars
1709 Otis Drive
Alameda, California 94501

RE: Oxygen Releasing Compound Work Plan
2425 Encinal Avenue, Alameda, California
ACC Project No. 96-6039-2.6

Dear Mr. Chrissanthos:

ACC Environmental Consultants, Inc., is pleased to provided the enclosed Work Plan for drilling soil borings and injecting Oxygen Releasing Compounds into the groundwater as requested by the Alameda County Health Care Services Agency (ACHCSA).

If you have any questions, please call me at (510) 638-8400.

Sincerely,

Misty Kaltreider

Misty C. Kaltreider
Project Geologist

/mck:mcr

Enclosures

cc: Ms. Juliet Shin, ACHCSA

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WORK PLAN
2425 Encinal Avenue
Alameda, California

ACC Project No. 96-6039-2.6

Prepared for:

Mr. Steve Chrissanthos
Alameda Cellars
1709 Otis Drive
Alameda, California

November 4, 1996

Prepared by: _____
Misty C. Kaltreider
Project Geologist

Reviewed by: _____
David R. DeMent, RG
Senior Geologist

REGISTERED GEOLOGIST
DAVID R. DEMENT
NO. 5674
STATE OF CALIFORNIA

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WORK PLAN
2425 Encinal Avenue
Alameda, California

1.0 INTRODUCTION

This Work Plan has been prepared by ACC Environmental Consultants, Inc., (ACC) at the request of Mr. Steve Chrissanthos for the site located at 2425 Encinal Avenue, Alameda, California (Figure 1). The work proposed includes drilling seven exploratory borings, collecting soil and grab groundwater samples, and injecting Oxygen Releasing Compounds (ORC™) into the water-bearing zone in the vicinity of the former underground storage tanks (USTs) for the purpose of enhancing natural biodegradation at the site.

2.0 BACKGROUND

In March 1990, two 10,000-gallon gasoline USTs were removed from the subject site. Analysis of the soil samples collected from beneath the USTs indicated concentrations up to 710 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHg).

In December 1992, ACC performed a subsurface investigation, including drilling five borings on site. Three of the borings were converted into monitoring wells MW-1, MW-2a, and MW-3. Analytical results of the soil collected during drilling and sampling indicated concentrations up to 1,365 ppm TPHg and up to 18.9 ppm benzene. Initial groundwater samples collected in January 1993 from the monitoring wells indicated up to 5,680 parts per billion (ppb) in well MW-2a and up to 1,560 ppb benzene in well MW-1.

An additional soil investigation was conducted in May 1993 to evaluate the extent of impact in the soil and groundwater. Findings of the additional investigation indicated the lateral extent of petroleum hydrocarbon impacted soil did not appear to extend beyond the property boundaries along the northern, western, and eastern sides. However, along the southern side, the impacted soil appeared to extend into Park and Encinal Avenues. Field observations made during the additional investigation and soil sample analysis indicated impacted soil existed primarily around the former tank excavation and the former dispenser island. The vertical extent of petroleum hydrocarbons in the soil occurs at the soil/groundwater interface.

Analytical results of grab groundwater samples collected from borings drilled during the additional investigation indicate that residual petroleum hydrocarbons from the former tank excavation and dispenser island are migrating off site via the groundwater.

In December 1993, three additional monitoring wells (MW-4, MW-5, and MW-6) were installed at the property to further evaluate the extent of petroleum hydrocarbon impact to groundwater. Laboratory analysis of the soil samples collected from each boring indicated no detectable concentrations of constituents above laboratory reporting limits, which verifies the lateral extent of soil impact.

Laboratory analysis of the groundwater samples collected from monitoring wells MW-5 and MW-6 have consistently indicated no detectable concentrations above laboratory reporting limits of constituents evaluated, indicating a lateral extent of groundwater impact. Laboratory analysis of groundwater collected from monitoring well MW-4 indicated detectable concentrations of constituents, which indicated the southern edge of the groundwater plume. The location of the southern edge of the groundwater impact is just off site to the south. This crossgradient movement is attributed to the relatively flat gradient and possible recharge into the excavated area.

In its letter dated July 31, 1996, the Alameda County Health Care Services Agency (ACHCSA) requested that measures be taken to retard offsite migration of constituents. ACHCSA suggested creating a bio-barrier by injecting ORC™ into the groundwater.

3.0 SCOPE OF WORK

To perform interim remedial actions including installation of a bio-barrier to retard offsite migration of constituents, ACC proposes the following scope of work:

- Drill seven exploratory borings, collect soil samples in designated borings to further characterize subsurface conditions in the vicinity of the former USTs; and

- Inject ORC™ into the groundwater at each boring location.

4.0 RATIONALE FOR PROPOSED SCOPE OF WORK

The work will be conducted to stimulate natural biodegradation of petroleum hydrocarbons at 2425 Encinal Avenue, Alameda, California, by injecting ORC™ into the saturated zone via soil borings. In its letter dated July 31, 1996, the ACHCSA requested that measures be taken to retard offsite migration of constituents. ACHCSA suggested creating a bio-barrier by injecting ORC™ into well MW-1; however, ACC believes this will render well MW-1 useless for further groundwater monitoring. ACC therefore proposes to inject ORC™ into soil borings so well MW-1 can still be used in groundwater monitoring and sampling. The effectiveness of ORC™ as a bio-barrier may be observed through analytical testing of groundwater in monitoring well MW-4.

5.0 DRILLING PROGRAM

5.1 Exploratory Borings

This Work Plan details procedures for ORC™ injection as part of interim remedial action at the 2425 Encinal Avenue, Alameda, California. Seven borings will be drilled using a Geoprobe™, 2-inch-diameter, hydraulically-driven sampling probe. One to two soil samples will be collected in the borings as necessary. The boring will be located approximately five feet apart in locations estimated to be useful in retarding offsite migration of constituents. Proposed boring and sampling locations are illustrated on Figure 2.

Excavation and drilling permits will be obtained from the County of Alameda Flood Control and Water Conservation District - Zone 7 before drilling and sampling activities. The locations of the proposed borings will be marked with white paint. Underground Service Alert will be notified at least 48 hours before commencing work.

The sampling probes for the borings will be advanced using an hydraulically-driven Geoprobe™, 2-inch-diameter, drive-point sampler operated under the supervision of a C-57 licensed contractor. An ACC geologist will observe as each sampling probe is advanced. Boring and drilling protocol to be followed during field activities is described in Appendix 1 - Soil Sampling Protocol.

During drilling, undisturbed soil samples will be obtained for geotechnical classification at 3-foot to 5-foot intervals, distinct lithologic changes and at the soil/groundwater interface. Sampling will begin at a depth of 5 feet bgs and will continue to the bottom of each boring, approximately 17 feet bgs. An ACC geologist will observe drilling, identify the subsurface materials in the borings using visual and manual methods, and classify the materials as drilling progresses according to the Unified Soil Classification System. This work will be performed under the supervision of a California Registered Geologist. The pneumatic sampling investigation will be conducted in 1 day. No drill cuttings will be generated using the pneumatic sampling process.

Following collection of the soil samples from representative depths at the capillary fringe, the Geoprobe™ will be driven to approximately 10 feet into the saturated zone.

After completion of drilling, an ORC™ and water mixture grout consisting of 20 pounds of ORC™ to 2 gallons of water will be injected into each boring at approximately 1 gallon of ORC™ grout per one foot of boring while removing the probes. ORC™ consists of magnesium peroxide that will slowly release oxygen in the groundwater zone to enhance natural aerobic biodegradation processes that can reduce petroleum hydrocarbons into carbon dioxide and water.

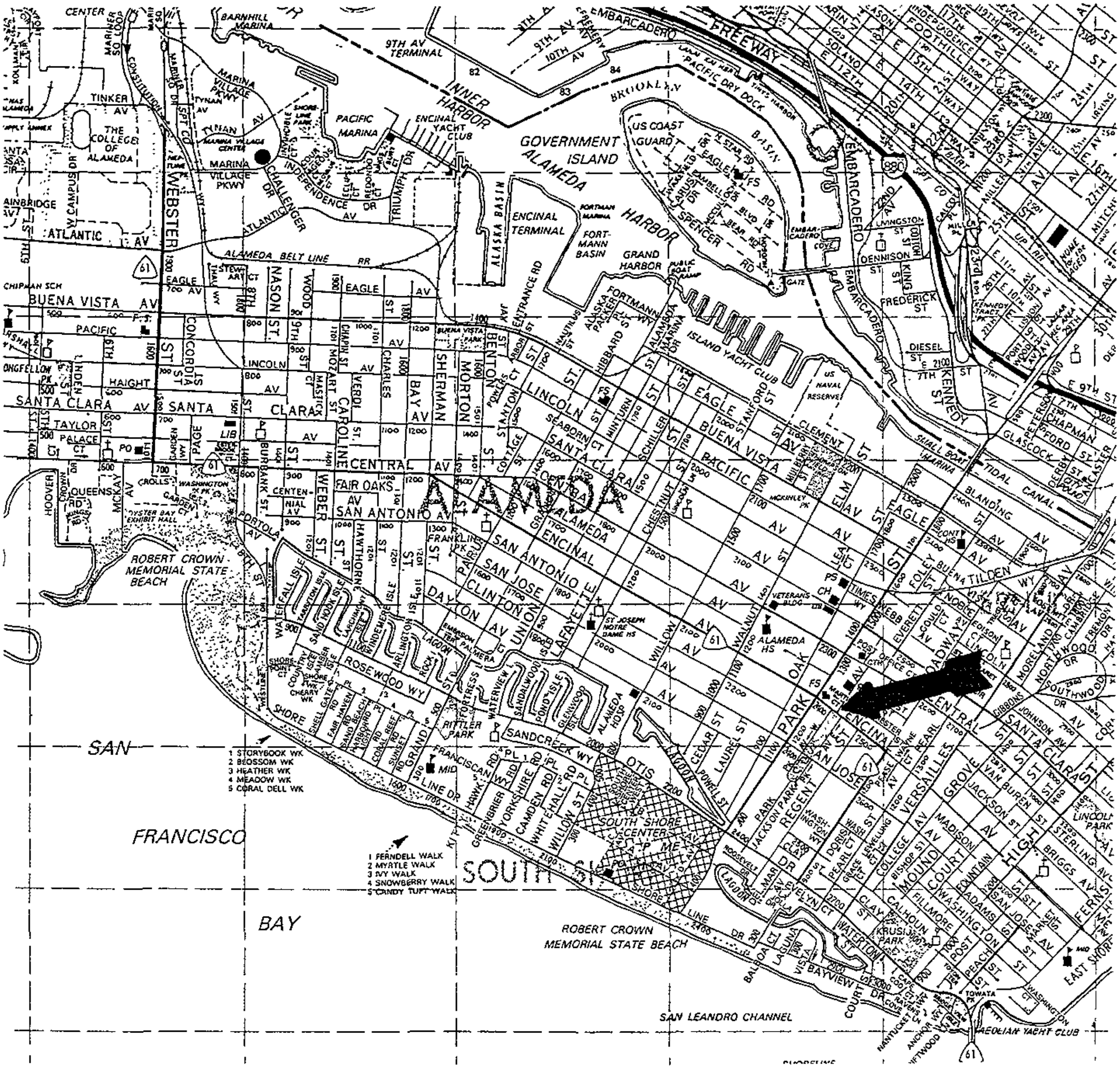
The ORC™ grout will be injected in each boring at depths from approximately one to two feet above the soil/groundwater interface (to allow for fluctuating groundwater levels) to approximately 10 feet into the saturated zone. After installation of the ORC™, portland cement will be tremied into each boring above the ORC™ to complete each hole to just below the surface. The surface of each probe location will be completed with concrete or asphalt to grade to match the surrounding material.

6.0 HEALTH AND SAFETY PLAN

A site health and safety plan which complies with the requirements of 29 CFR Part 1910.120 is on file.

7.0 TECHNICAL REPORT

A technical report discussing the subsurface findings and the ORC™ injection will be submitted to the client for review and ACHCSA. Additional reports detailing groundwater monitoring activities and results will be submitted on a quarterly basis following ORC™ injection.



SOURCE: THOMAS BROTHERS GUIDE, 1990 ed.

Title:	Location Map 2425 Encinal Avenue Alameda, California
Figure Number: 1.0	Scale: 1" = 1/4 mi
Drawn By: JVC	Date: 3/19/96
Project Number: 6039-5	N / W / E / S

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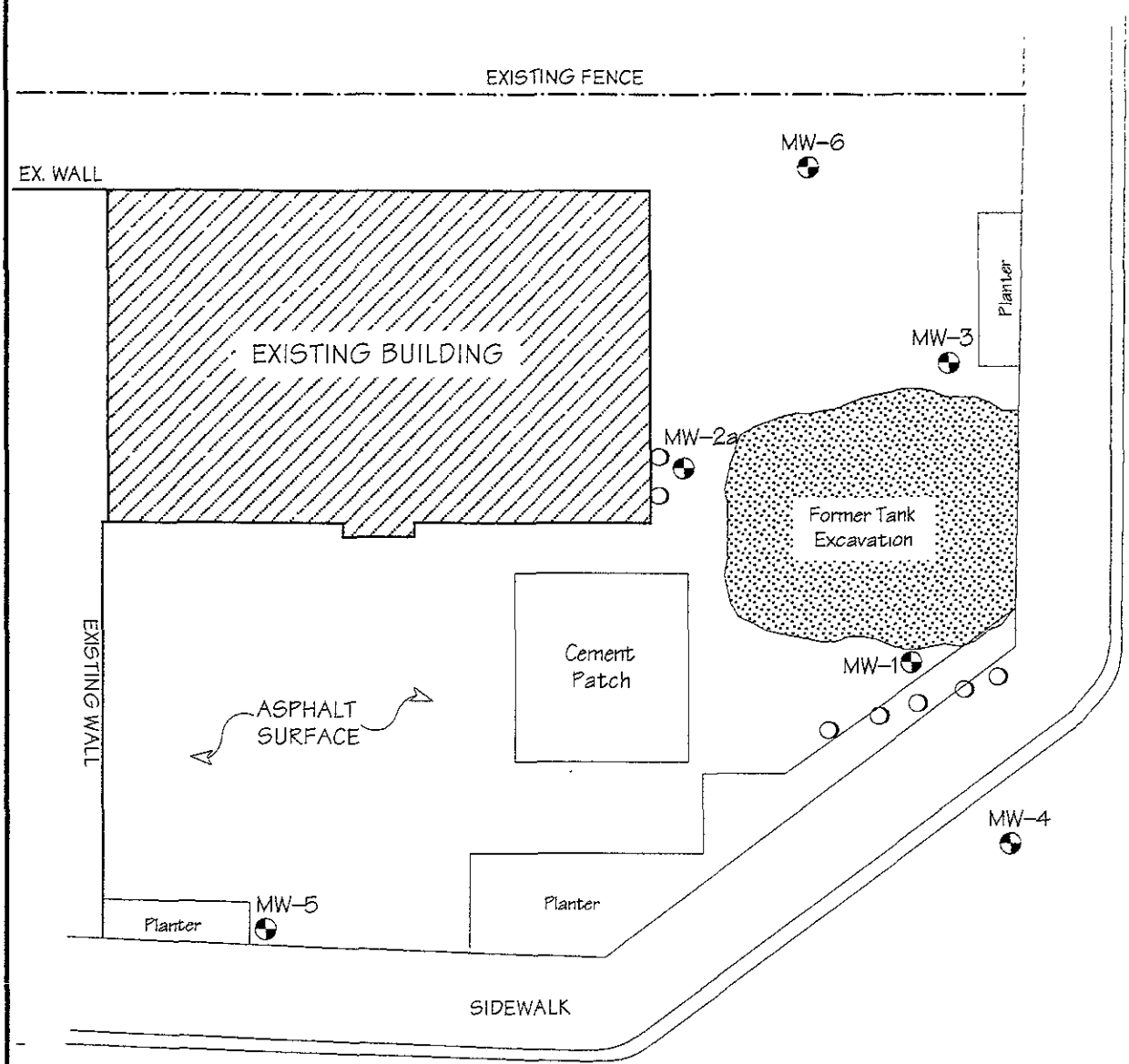

ENCINAL AVENUE

Legend

MW-5 - Groundwater Monitoring Well Location

○ - Proposed Oxygen Releasing Compound Injection Location

Title: Site Plan 2425 Encinal Ave Alameda, California	
Figure Number: 2.0	Scale: 1" = 20"
Drawn By: JVC	Date: 7/24/96
Project Number: 6039-5	

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N E W S

SOIL SAMPLING PROTOCOL

SOIL SAMPLING BY DRILLING RIG

ACC reviews the site proposal for boring locations and special instructions and confirms boring locations in the field with client when possible. Underground Service Alert is notified to mark utilities in the area before drilling.

Before initiating an exploratory boring, all equipment to be used during drilling and sampling operation is steam cleaned. Such equipment includes, but is not limited to, augers, bits, drilling rods, and soil samplers. Additionally, before each sampling event, the sampler and any sample liners are cleaned thoroughly with a dilute trisodium phosphate solution and rinsed with clean tap water or distilled water. Additional decontamination procedures are implemented as needed by specific projects.

Each exploratory boring is drilled with a truck-mounted drilling rig using either solid flight or hollow-stem augers. The boring is advanced to the desired sampling depth and the sampler is lowered to the bottom of the hole. The sampler is driven a maximum of 18 inches into the undisturbed soils ahead of the auger by a 140-pound, rig-operated hammer falling 30 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the boring log. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded. After the sampler has penetrated the full depth, it is retrieved to the surface.

The samplers commonly used are either a California modified sampler (3-inch or 2.5-inch outside diameter) or a standard penetrometer (2-inch outside diameter). The standard penetrometer does not contain sample liners and is used to determine soil strength characteristics and visually characterize the subsurface materials. If samples are collected for laboratory analysis, the California modified sampler, equipped with brass or stainless steel liners, is used except when the analysis will include metals. In this instance, the sample is collected with stainless steel liners and placed in a labeled plastic bag.

Upon retrieval, the sampler is disassembled into its component parts. One or more of the liners is selected for chemical analysis. The ends of the selected liner are sealed with aluminum foil or Teflon® sheeting, capped with tight-fitting plastic end caps, labeled, logged on chain of custody forms, and stored in a pre-chilled, insulated container for preservation in the field and during transport to the analytical laboratory. To the extent possible, all labels are pre-written with indelible ink to minimize handling time.

Samples not sealed for chemical analysis are checked for the presence of contamination in the field by the geologist. Any discoloration or odor is noted on the boring log. Each sample is classified in the field by a geologist using the Unified Soil Classification System and a Munsel soil color chart.

Samples are held in the possession of ACC personnel until transferred to the state-certified analytical laboratory. Transfer to the laboratory is accomplished either by delivery by ACC personnel, pickup by laboratory personnel, or transfer by a personal delivery service. Each transfer of responsibility is recorded on a chain of custody record that accompanies the samples.

Conditions occasionally arise when other drilling equipment is used, given site-specific formation conditions. A rotary drilling method may be selected if coring or bearing conditions arise. A rotary or casing hammer may be used as deep drilling, flowing sands, or formation-specific conditions require.

When drilling through an aquifer known to be contaminated, a staged drilling approach is used. This involves using either a temporary or permanent conductor casing placed adjacent to the contaminated aquifer and pressed or advanced slightly into the underlying aquitard. The cased hole is cleaned as necessary, following which, a smaller diameter drill bit/auger is advanced to the next underlying water bearing stratum. An impermeable seal is placed in the borehole permanent conductor casing placed adjacent to the contaminated aquifer and pressed or advanced slightly into the underlying aquitard. The cased hole is cleaned as necessary, following which, a smaller diameter drill bit/auger is advanced to the next underling water bearing stratum. An impermeable seal is placed in the borehole or annular space as appropriate upon completion of exploratory boring/well construction.

When drilling with a continuous-flight auger, special attention must be given to avoid cross contamination of underlying aquifers. The following procedures are used by the ACC geologist to prevent pollution of clean aquifers underlying contaminated zones:

1. Drilling will cease if 5 feet of saturated impermeable material is encountered. It will be assumed that any significant saturated, impermeable layer, such as a clay layer, is an aquitard separating the shallow and deep aquifers and should not be penetrated.

2. Drilling will be terminated 15 feet below any perched or unconfined water table. If the purpose of the well is to investigate groundwater impacted by dense, non-aqueous phase liquids, the goal shall be to fully penetrate the aquifer.

3. Drilling will be terminated at a depth of 45 feet below ground surface if groundwater is not encountered. This is above nearly all deep aquifers currently supplying groundwater in the Bay Area.

The ACC geologist will be present during the drilling of exploratory borings and will observe and record changes by time and depth, evaluate the relative moisture and content of the samples, and note water producing zones. This record will be used later to prepare a detailed lithologic log. Lithologic descriptions will include soil or rock type, color, grain size, texture, hardness, degree of induration, carbonate content, presence of fossils or other materials (e.g., gypsum, hydrocarbons), and other pertinent information. A copy of the logs will be retained in the field file at the project site.

SOIL SAMPLING BY HAND

Some situations require that samples be collected by hand without the assistance of drill rig (e.g., soil stock piles, excavation sidewall sampling). When possible, soil samples are collected using a steel core sampler, equipped with clean brass liners, which is advanced into the soil with a slide hammer. In other cases, the outer surface of the soil is removed and a brass liner is driven into the soil by hand or with a hammer. To avoid damaging the liner, a block of wood may be held next to the liner so that the hammer strikes the block first. The liner is removed and handled as described above. In deep excavations where safety factors preclude the direct sampling of the bottom or sidewall, soil is retrieved by a backhoe bucket. This soil is sampled as soon as feasible, and samples are collected from the least disturbed soil near the teeth of the backhoe bucket or as directed by regulatory personnel.

SOIL CUTTINGS

Soil cuttings generated during drilling will be placed in steel, Department of Transportation-approved drums. Drums will be labeled as to contents, suspected contaminants, date container was filled, expected removal dated, company name and phone number of technical contact, and name of generator. Drums will be sealed and left on site for subsequent disposal pending receipt of analytical results. Drums will be disposed of appropriately at an accepting facility.