Feb. 1, 1993

CORRECTIVE ACTION PLAN soil

for

OLD GRAYSTONE FUELING FACILITY
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

Submitted to:

Alameda County Health Care Services Agency
Division of Hazardous Materials
Department of Environmental Health
80 Swan Way, Room 350
Oakland, CA 94621

Prepared by:

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4090 Nelson Avenue, Suite J
Concord, CA 94520

Project No. 6-92-5454
February 1, 1993

This corrective action plan has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of the Alameda County General Services Agency as it pertains to their site located at the Old Graystone Fueling Area of the Santa Rita Correctional Facility in Dublin, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this corrective action plan.

REPORT PREPARED BY:

Bart S. Miller
Senior Staff Geologist

2-2-93
Date

UNDER THE PRIMARY REVIEW AND SUPERVISION OF:

Michael E. Quillin
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California Registered Geologist No. 5315

2/2/93
Date

PROJECT NO.6-92-5454

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1.0 INTRODUCTION

This corrective action plan has been prepared by Environmental Science & Engineering, Inc. (ESE) for the Alameda County Health Care Services Agency (HCSA) on behalf of the Alameda County General Services Agency (GSA) as it pertains to the Old Graystone fueling facility (site) located at the Santa Rita Jail Facility, Dublin, Alameda County, California (Figure 1 - Location Map). The GSA formerly owned and operated at the site one 10,000-gallon unleaded gasoline underground storage tank (UST) referred to as UST 2942-11, one 11,000-gallon regular gasoline UST referred to as UST 2942-12, and one 500-gallon waste oil UST referred to as UST 2942-12A (Figure 2 - Site Map).

Under permit from the HCSA and the Doherty Regional Fire Authority (DRFA), ESE removed and disposed of USTs 2942-11 and 2942-12A on May 18, 1992. UST 2942-12 was removed on May 20, 1992. Under the direction of a HCSA representative, a total of five soil samples were collected by ESE personnel from the bottom of the three UST excavations and submitted for analysis. A closure report for removal of the USTs at the site was submitted by ESE to the HCSA on July 20, 1992. ESE also submitted an Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report to the HCSA on November 19, 1992.

The site work described in this corrective action plan is proposed to remove soil and ground water impacted with gasoline at the site. ESE is presently preparing a separate workplan for the HCSA which describes ground water monitoring activities to be conducted after completion of the corrective action described herein.

2.0 SUMMARY OF PREVIOUS WORK

2.1 Excavation and Trenching Activities

On October 26, 1992, ESE submitted a workplan for the excavation and removal of gasoline-impacted soil from the UST 2942-11, UST 2942-12, and 2942-12A excavations at

the site (Figure 3 - Site Plan). ESE commenced excavation activities at the site on November 8, 1992 and identified gasoline-impacted clay soil in the UST 2942-11 excavation at a depth of approximately 22 feet below grade. The impacted soil was readily identifiable due to grey discoloration and a strong gasoline odor. No ground water was observed in the excavations created during this phase of sitework.

To estimate the lateral extent of impacted soil, ESE proceeded to excavate narrow trenches and test pits to a total depth of 22 feet below grade at various locations in and around the UST excavations (Figure 4 - Site Plan, Excavation Activities). A total of three soil samples (T11-1-22', T12-1-22', and T12A-1-22') were collected from the test pit/trench locations and submitted to a State-certified laboratory for analysis. All samples were reported to contain detectable concentrations of gasoline constituents. Based on the findings of this limited excavation, ESE recommended in a letter report to the GSA that a subsurface investigation be performed to determine the vertical and lateral extent of gasoline-impacted soil at the site and to determine whether ground water has been impacted.

2.2 Soil and Ground Water Investigation

On November 18, 1992, ESE submitted a workplan to the HCSA describing a subsurface investigation consisting of the collection of soil samples in borings and the collection of ground water samples in selected borings using a Hydropunch®. During the period November 23 to November 25, 1992, ESE drilled 21 soil borings at the site (Figure 5 - Soil Boring Locations). A total of 21 soil samples and 8 ground water samples were collected and submitted for analysis. Detectable gasoline constituents were reported to occur in one soil sample collected at a depth of 25 feet in a soil boring G9, located to the immediate north of the UST 2946-11 excavation (see Figure 5). Detectable concentrations of benzene and TPH-G were reported in ground water samples collected during this investigation (Figures 6 and 7). Ground water appears to have the highest concentrations of gasoline constituents near the former USTs and concentrations in ground water are noted to decrease radially outward from the former UST location.

ESE documented the findings of this investigation in a report which was submitted to the GSA on January 15, 1993. In summary, the results of fieldwork to date suggests the presence of "hot spots" of gasoline in the immediate vicinity of the former USTs and that the gasoline appears to have spread laterally along the capillary zone. Based on these findings and the time constraints imposed by the GSA for corrective action, ESE has recommended that the gasoline-impacted soil at the site be excavated.

3.0 PROPOSED CORRECTIVE ACTION

3.1 Excavation Methodology

ESE proposes to excavate soils impacted with gasoline at the site. With TPH-G concentrations in soil samples collected at the immediate vicinity of the USTs ranging from 13 to 6,600 milligrams per kilogram (mg/Kg) and benzene concentrations reported up to 9,600 micrograms per kilogram (μg/Kg), ESE anticipates that limited excavation will provide effective removal of the impacted soil. ESE will mobilize an excavator for removal of the impacted soil and will excavate and remove soils meeting the following criteria:

- TPH-G concentrations exceeding the detection limit of 1 mg/Kg; and
- BTEX concentrations exceeding the detection limit of 5 μ/Kg.

Because the site is large and space for temporary stockpiling of soil is available, ESE will spread the excavated soil on plastic sheeting at a location selected by the GSA. Upon completion of the proposed excavation activities, ESE will cover the soil stockpile with plastic sheeting and proceed to permit on-site treatment of the soil by aeration with the Bay Area Air Quality Management District (BAAQMD) .

3.2 Soil Sampling and Analysis

ESE will collect soil samples from the excavation sidewalls and the excavation floor on a ten-foot grid. A minimum of one sample will be collected from each wall of the excavation. Soil samples will be collected in accordance with the sampling procedure specified in ESE Standard Operating Procedure (SOP) No. 1 (Appendix A). Soil excavation and transport to the stockpile area will continue until excavation sidewall and floor soil sample analytical

results for TPH-G and BTEX concentrations provided by a mobile laboratory are less than the cleanup criteria above.

ESE will contract a State of California certified mobile laboratory to analyze the soil samples at the site. As described in ESE SOP No. 1, all soil samples will undergo preliminary screening for Volatile Organic Compounds (VOCs) using a Photoionization Detector (PID). Upon completion of the excavation and collection of final confirmation samples, each confirmation sample will be analyzed for TPH-G using EPA method 8015-modified and for BTEX using EPA method 8020. Additionally, one soil sample per one hundred cubic yards of excavated spoils will be collected and analyzed for TPH-G and BTEX to evaluate the impact of gasoline.

3.3 Excavation Dewatering

Upon completion of excavation activities, ESE will pump the excavation of all accumulated ground water. This dewatering activity will accomplish two objectives. First, pumping ground water from the open excavation will remove ground water containing the highest concentrations of petroleum hydrocarbons. Second, pumping ground water will lower the local water table, facilitating placement and compaction of clean import fill material.

Dewatering will be accomplished by lowering a portable submersible pump into the open excavation and pumping to a nearby portable 20,000-gallon above-ground temporary storage tank. A minimum of 20,000 gallons of ground water will be removed in this way. When the above ground tank is approaching full capacity one ground water sample will be collected from the submersible pump and analyzed by the mobile laboratory for TPH-G and BTEX. If high concentrations of TPH-G and/or BTEX persist after the removal of 20,000 gallons, additional water storage may be secured and pumping continued.

Upon completing one 20,000-gallon tank volume, one ground water sample will be collected from the tank and analyzed for TPH-G using EPA method 8015-modified and BTEX using EPA method 8020. These analytical results will provide ESE with a basis for the evaluation

of ground water disposal alternatives.

The Dublin San Ramon Services District (DSRSD) will receive ground water with TPH concentrations less than or equal to fifteen milligrams per liter. In view of the observed TPH concentrations in ground water samples and ESE's experience with similar ground water removal projects, ESE anticipates that ground water will be acceptable to DSRSD without treatment. With explicit written authorization from DSRSD for discharge, ESE will locate a nearby sewer lateral and discharge this ground water. In the unlikely event that the water is not acceptable to DSRSD, ESE will prepare a brief proposal for pretreatment or alternative disposal.

3.4 Excavation Backfill

Upon completion of the corrective action activities, the excavation will be backfilled with clean import fill. The clean import fill will be placed to 90 percent relative compaction.

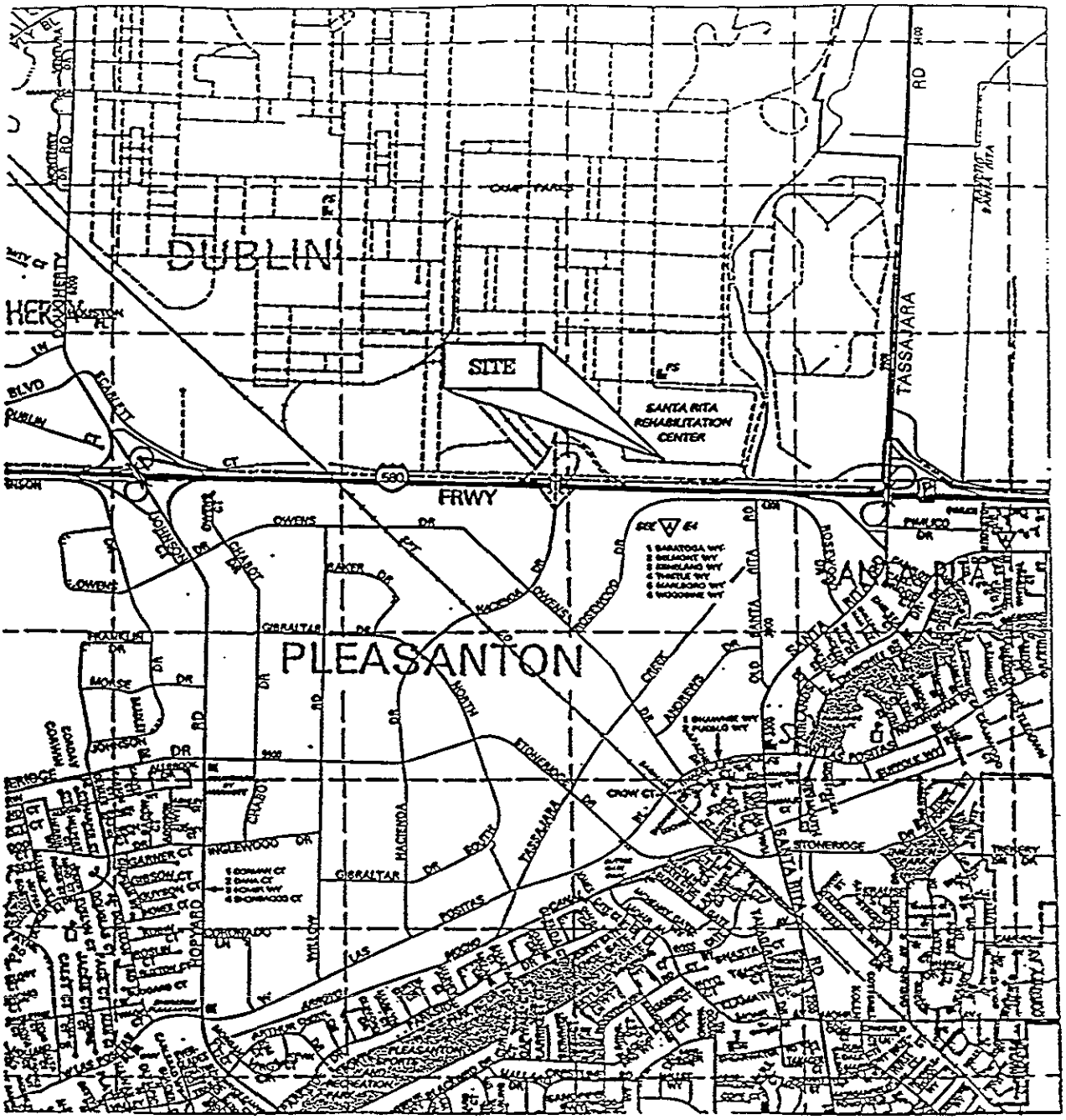
4.0 HEALTH AND SAFETY

ESE has prepared a Health and Safety Plan (HASP) for the sitework described in this corrective action plan (Appendix B). The HASP will be reviewed and approved by ESE's Concord Office Health and Safety Officer prior to its implementation and is intended to ensure the safety of ESE personnel and subcontractors, as well as visitors to the site. The HASP will delineate potential physical and chemical hazards associated with the work, and, general and site specific safe work practices to be followed by all ESE personnel, subcontractors, and visitors to the site. The HASP will be reviewed by all ESE personnel, subcontractors, and site visitors prior to the commencement of fieldwork. Because the corrective action described in this plan involves excavation, additional care will be taken to ensure that the excavation is securely fenced when no field activities are being conducted and that the excavation sidewalls are appropriately sloped in accordance with the recommendations of a State of California registered Civil Engineer.

5.0 REPORT PREPARATION

ESE will prepare a corrective action report documenting methods employed while conducting field activities, findings of the field activities including effectiveness of the corrective action method, and conclusions and recommendations based on those findings. The report will include lithological cross-sections from the excavation sidewalls, a table summarizing analytical results, and a figure showing final excavation dimensions and confirmation sample locations. A draft copy of the corrective action report will be submitted to the GSA for review. Subsequently, the report will be finalized based on GSA review comments and final copies will be submitted to the HCSA and the RWQCB, San Francisco Bay Region.

FIGURES



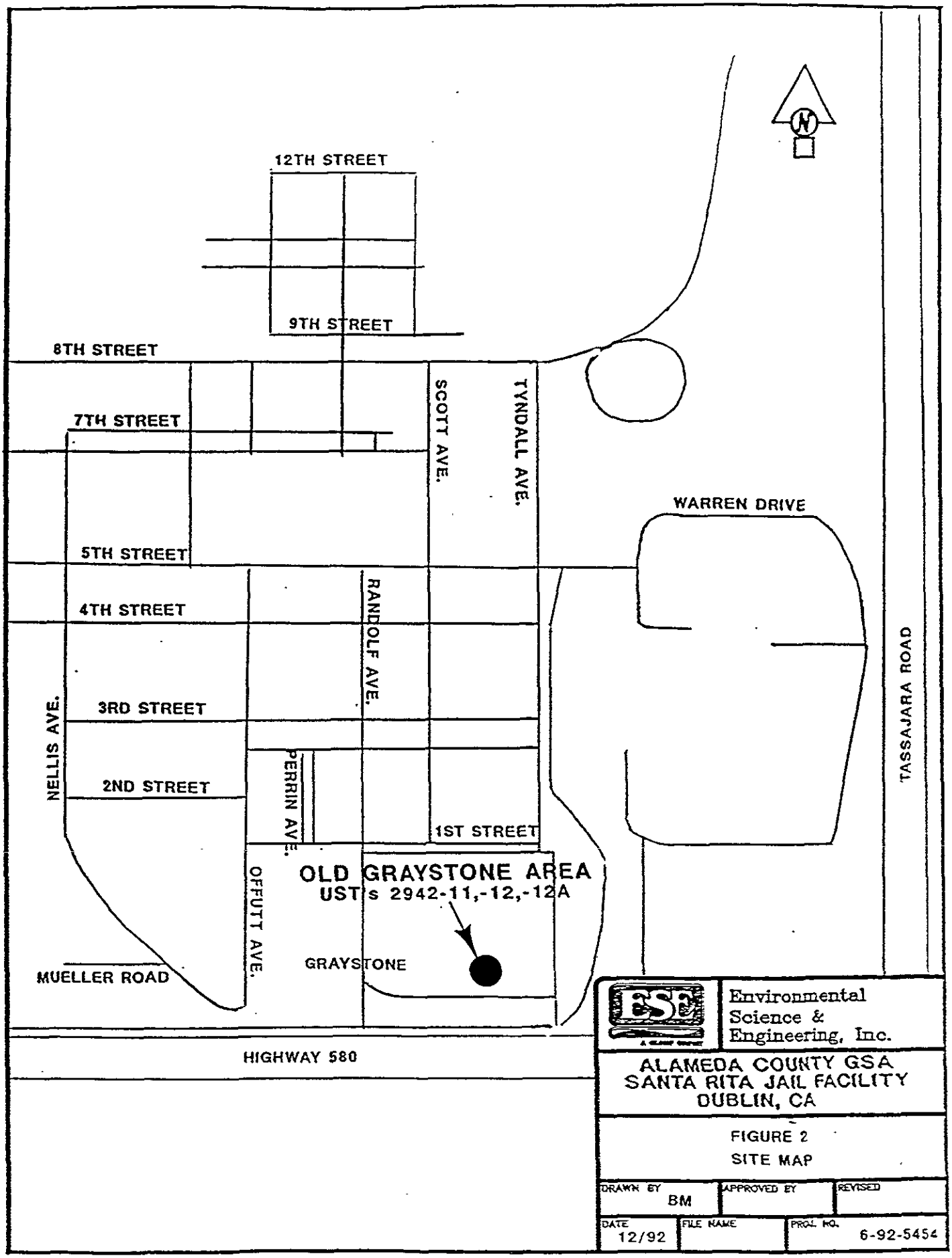
SCALE OF SINGLE MAP PAGES
1 INCH TO 2200 FEET

Environmental Science & Engineering, Inc.
A CLOOSE COMPANY

ALAMEDA COUNTY GSA
SANTA RITA JAIL FACILITY
DUBLIN, CA

FIGURE 1
LOCATION MAP

DRAWN BY	APPROVED BY	REVISED
RSW		
DATE	FILE NAME	PROJ. NO.
6/25/92		6-92-5442



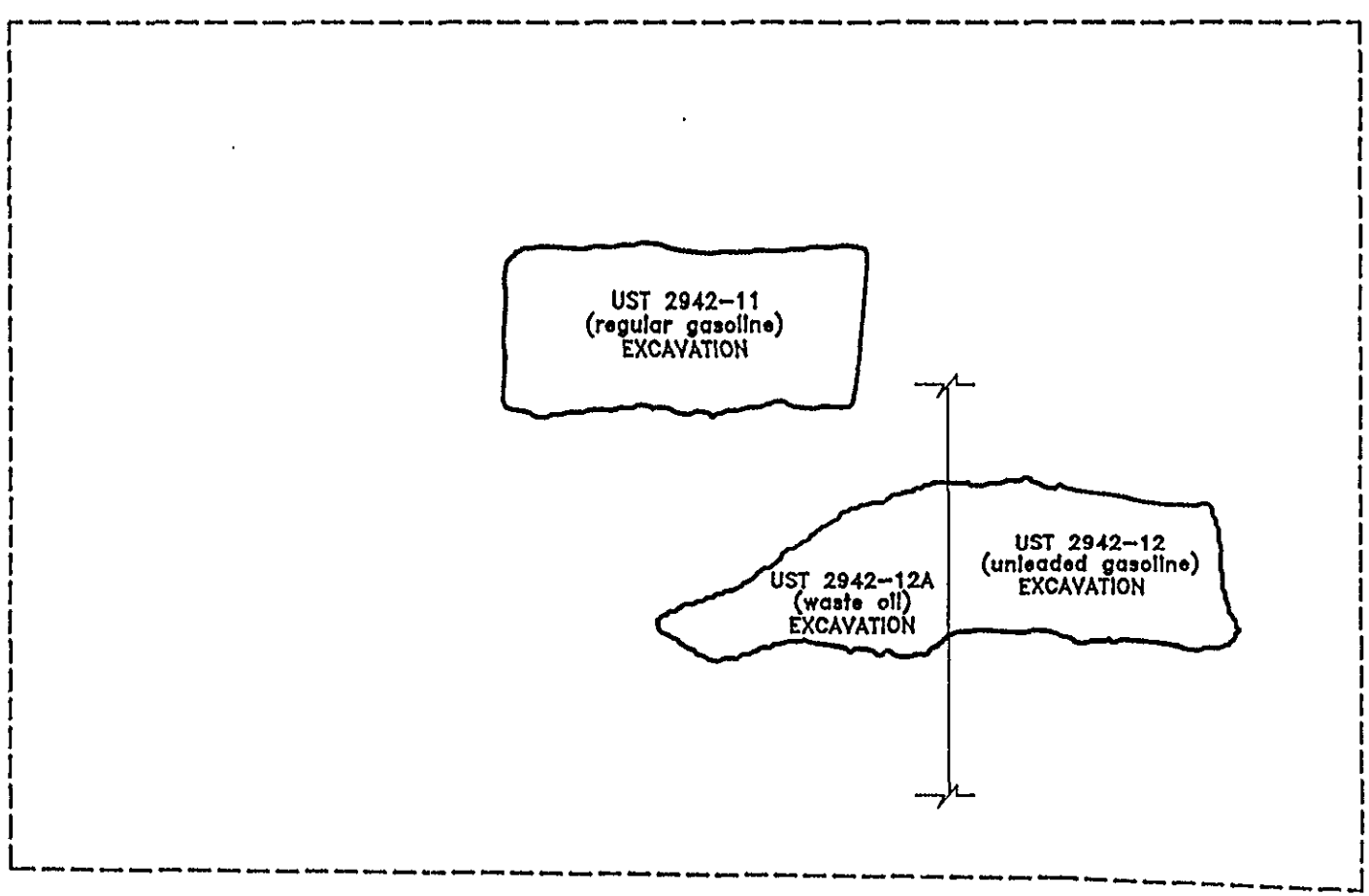
Environmental Science & Engineering, Inc.

ALAMEDA COUNTY GSA
SANTA RITA JAIL FACILITY
DUBLIN, CA

FIGURE 2
SITE MAP

DRAWN BY	APPROVED BY	REVISED
BM		

DATE	FILE NAME	PROJ. NO.
12/92		6-92-5454

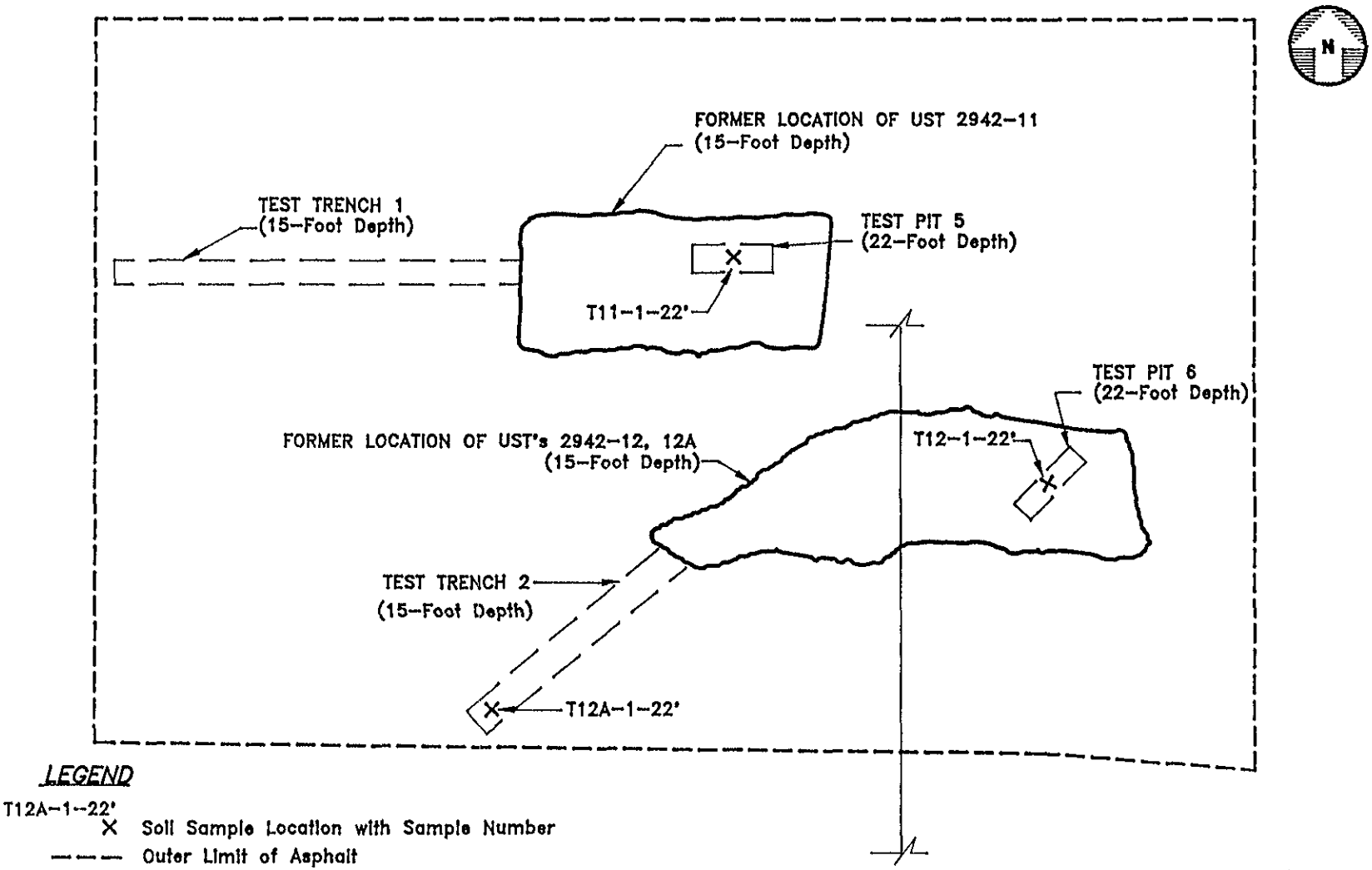


LEGEND

- Boundary of Asphalt
- Steel Pipe
- Boundary of Excavation

SCALE
0 20 FEET

Environmental Science & Engineering, Inc. A GILCORP Company	DATE 12/92	PROJ/PROP 6-92-5454	ALAMEDA COUNTY GSA SANTA RITA JAIL FACILITY DUBLIN, CA
	DRAWN BY DWR	CAD FILE 54542002	
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	APPROVED BY	REVISED	FIGURE 3 SITE PLAN



LEGEND

T12A-1-22' × Soil Sample Location with Sample Number

Outer Limit of Asphalt

Outer Limit of Test Pit/Trench

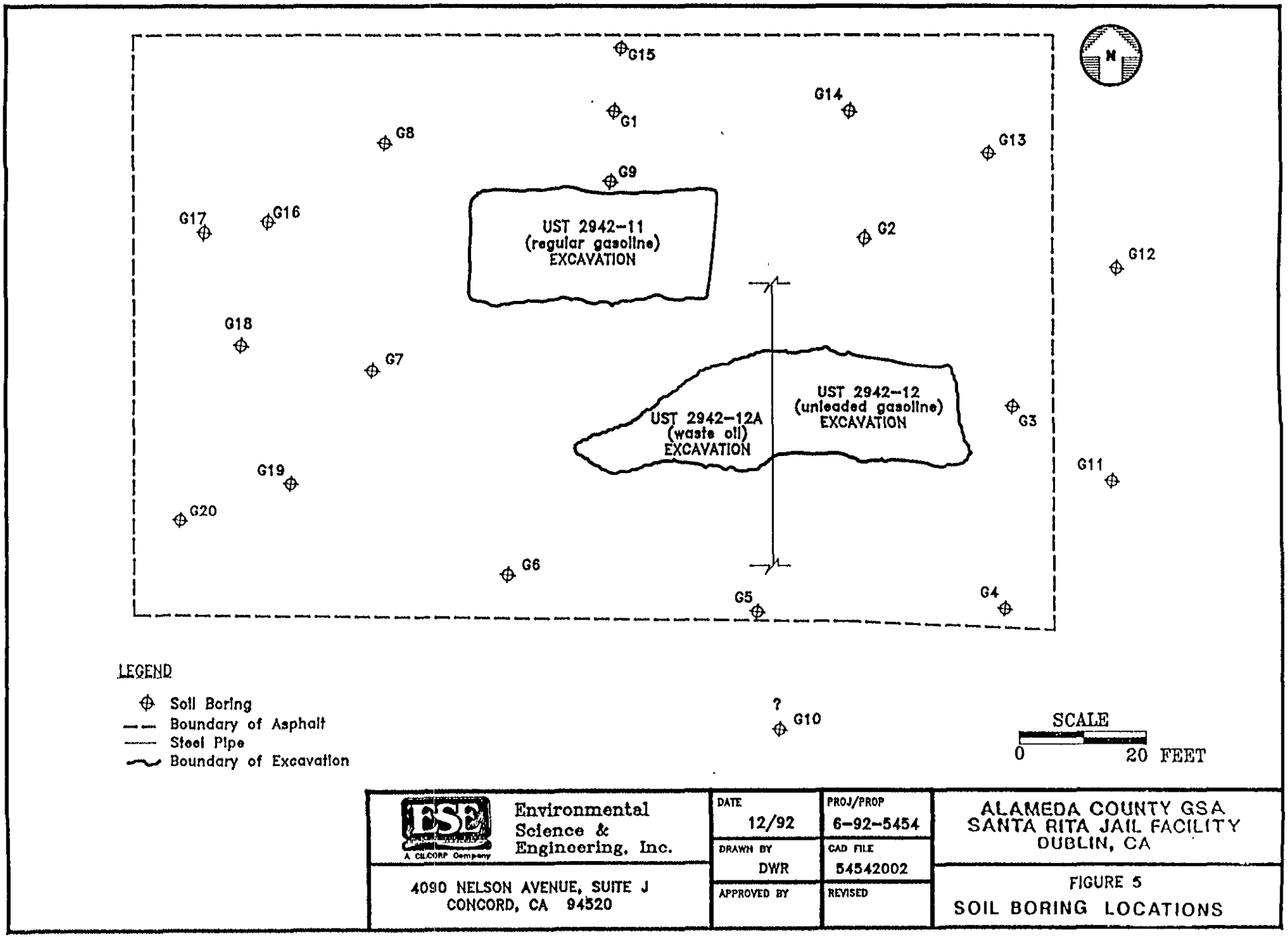
Steel Pipe

Boundary of Excavation

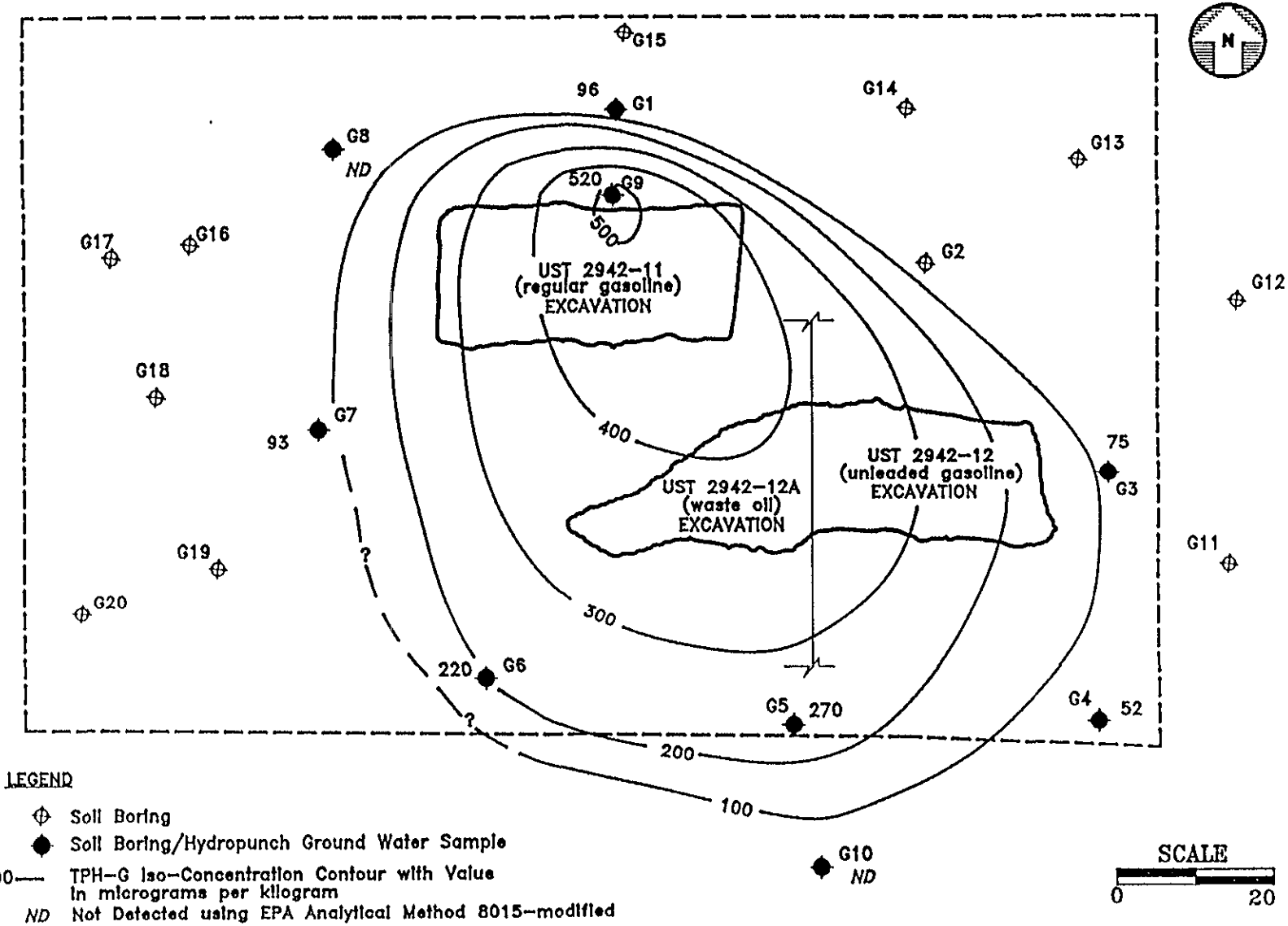
SCALE

0 20 FEET

ESE A CILCORP Company — Environmental Science & Engineering, Inc.	DATE 12/92	PROJ/PROP 6-92-5442	ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DRAWN BY DWR	CAD FILE 54422002	FIGURE 4 SITE PLAN, EXCAVATION ACTIVITIES
	APPROVED BY	REVISED	



Environmental Science & Engineering, Inc.	DATE 12/92	PROJ/PROP 6-92-5454	ALAMEDA COUNTY GSA SANTA RITA JAIL FACILITY DUBLIN, CA
	DRAWN BY DWR	CAD FILE 54542002	
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	APPROVED BY	REVISED	FIGURE 5 SOIL BORING LOCATIONS



LEGEND

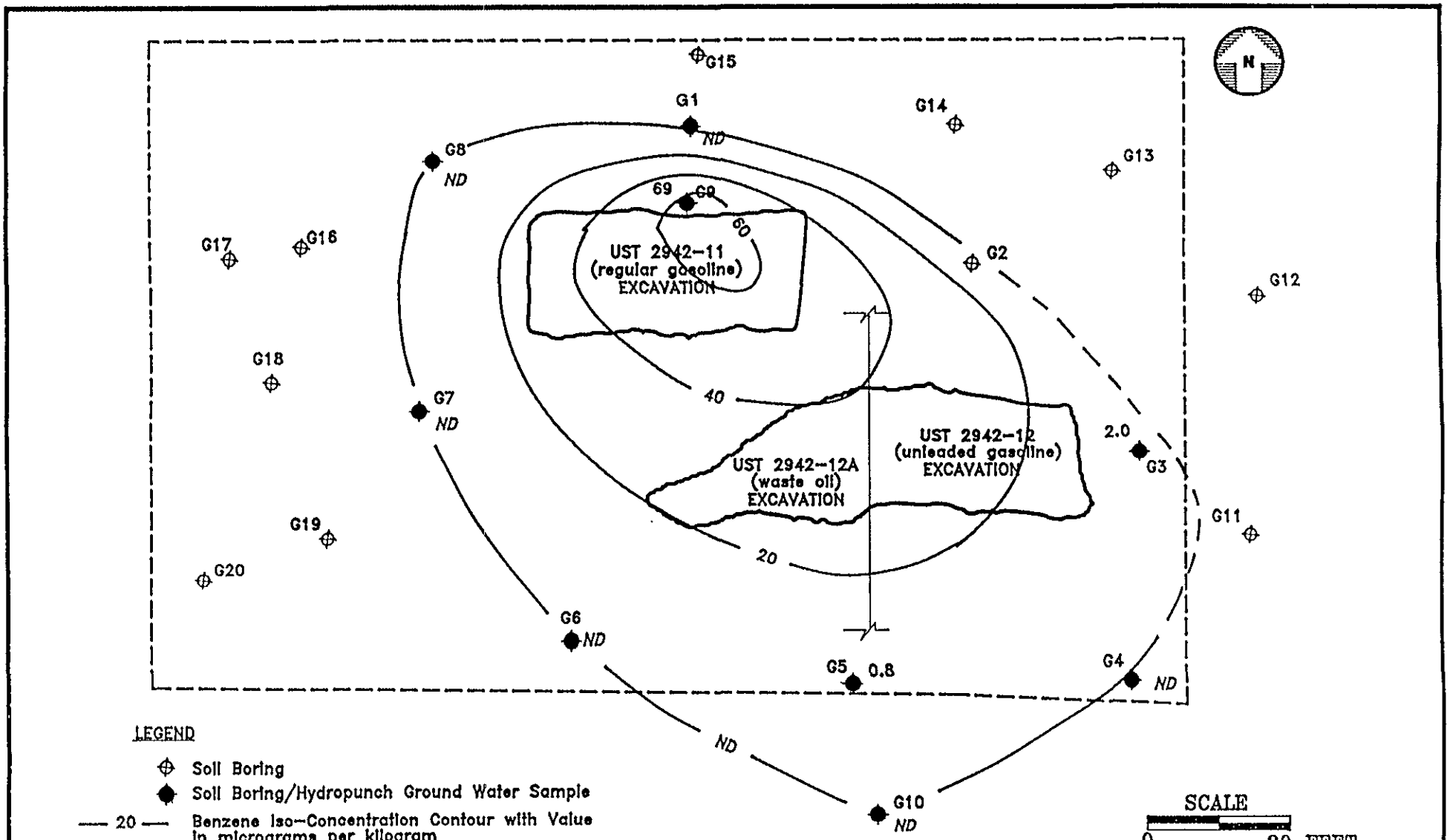
- Soil Boring
- Soil Boring/Hydropunch Ground Water Sample
- —100— TPH-G Iso-Concentration Contour with Value in micrograms per kilogram
- *ND* Not Detected using EPA Analytical Method 8015-modified
- Boundary of Asphalt
- Steel Pipe
- Boundary of Excavation

ESE A CH2M HILL Company
Environmental Science & Engineering, Inc.
4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

DATE	PROJ/PROP
12/92	6-92-5454
DRAWN BY	CAD FILE
DWR	54542007
APPROVED BY	REVISED

ALAMEDA COUNTY GSA
SANTA RITA JAIL FACILITY
DUBLIN, CA

FIGURE 6
TPH-G CONCENTRATION IN GROUND WATER



Environmental Science & Engineering, Inc. A CH2MHILL Company 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DATE: 12/92	PROJ/PROP: 6-92-5454	ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA
	DRAWN BY: DWR	CAD FILE: 54542008	FIGURE 7 BENZENE CONCENTRATION IN GROUND WATER
	APPROVED BY:	REVISED:	

APPENDIX A

ESE Standard Operating Procedure No. 1

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

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

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

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

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

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

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN

SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
HEALTH AND SAFETY PLAN
for
SANTA RITA CORRECTIONAL FACILITY

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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

This Health and Safety Plan shall provide the safety and health requirements for general site work taking place under a contract with **Alameda County General Services Agency**. This plan provides the structure for a Site-Specific Health and Safety Plan, and provides information which will apply to all Environmental Science & Engineering, Inc. (ESE) projects. Together, they comprise the Health and Safety Plan (HASP). This HASP will be considered complete only with an associated Site-Specific HASP.

The purpose of this HASP is to protect individuals, those working at the site, visitors, and the surrounding populace, and the environment during site sampling and site characterization activities at petroleum hydrocarbon impacted sites. This plan includes preventative and protective measures against health hazards, fire and explosion hazards, and mechanical hazards which may exist or occur during field activities.

1.2 SITE INFORMATION

The General Information section of each Site-Specific HASP will provide the following information:

1. Name and Location of the Site;
2. Name of Individual Preparing the Plan, and Date of Preparation;
3. Brief Site History;
4. Investigative Objective and Workplan;
5. Proposed Dates of Investigation; and
6. Assessment of Overall Worker and Public Health Hazards.

1.3 REGULATORY REQUIREMENTS

Occupational Safety and Health Administration (OSHA) standards 29 Code of Federal Regulations (CFR) 1910 and 1926 apply to work under this site-specific HASP. Additional requirements are contained in Code of Federal Regulations title 40, Protection of the Environment.

2.0 PERSONNEL REQUIREMENTS

2.1 ORGANIZATION

The overall project organization as described in this document will be shown in the Site-Specific Health and Safety Plan, and will identify and show responsibilities for key personnel, employees, and subcontractors.

2.2 ENVIRONMENTAL SCIENCE & ENGINEERING, INC. (ESE) HEALTH AND SAFETY POLICY AND RESPONSIBILITY

It is the policy of the management of ESE and also a contract requirement that a safety plan be implemented at hazardous material contamination sites to protect individuals and the environment. ESE personnel involved in work on these sites will conform and comply with this safety program. Each individual is, and therefore must regard and conduct him/herself as, a member of the safety team and adhere to the prescribed site safety plan to ensure his/her own safety as well as that of fellow workers, visitors, and the public.

A key element of this plan is the reliance upon the buddy system for site activities. This system requires that activities at the site be conducted using a minimum of 2-person teams.

2.3 PERSONNEL RESPONSIBILITIES

For each site, the responsibilities of the Project Manager include:

1. Preparing an effective site safety plan for the project;
2. Categorizing and identifying for the project staff the levels of potential exposure and dangerous levels of hazardous materials possibly encountered on site;
3. Ensuring that adequate and appropriate safety training and equipment are available for project personnel; and
4. Arranging for medical examinations for specified project personnel.

Overall responsibility for safety during the site investigative activities rests with the Project Manager. To assist the Project Manager, a qualified Site Safety Officer will be appointed for each site.

The Site Safety Officer's responsibilities include:

1. Implementing safety procedures and operations on site;
2. Updating equipment or procedures based upon new information gathered during the site inspection;
3. Upgrading or downgrading the levels of personal protection based upon site observations;
4. Determining and posting locations and routes to medical facilities (including poison control centers) and arranging emergency transportation to medical facilities (as required);
5. Notifying (as required) local public emergency officers (i.e., police and fire departments) of the nature of the team's operations and making emergency telephone numbers available to team members;
6. Ensuring that at least one member of the field team is available to stay behind and notify emergency services if the Site Safety Officer must enter an area of maximum hazard or entering this area only after notifying emergency services (police department);
7. Observing work party members for symptoms of on-site exposure or stress; and
8. Arranging for the availability of on-site emergency medical care and first aid, as necessary.

The Site Safety Officer has the ultimate responsibility and authority to stop operations that threatens the health or safety of the team or surrounding populace or that may cause significant adverse impact to the environment.

The responsibilities of the Field Team Leader include:

1. Ensuring and enforcing compliance with the Project Safety Plan;
2. Controlling site entry of unauthorized personnel or coordinating with local law enforcement agencies or state authorities to limit site access;
3. Coordinating site activities such that they may be performed in an efficient and safe manner consistent with the Project Safety Plan;
4. Enforcing the buddy system on site; and
5. Ensuring the ready access and availability of safety equipment.

The responsibilities of other on-site personnel include:

1. Complying with the Project Safety Plan, including strict adherence to the buddy system;
2. Obeying the orders of the Field Team Leader and the Site Safety Officer; and
3. Notifying the Field Team Leader or Site Safety Officer of hazardous or potentially hazardous incidents or working situations.

2.4 TRAINING

ESE site personnel working on the hazardous material contamination site investigations will have completed an extensive training course and have worked at least 3 days at a hazardous waste site. The course, designed to meet training requirements of 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response), is taught utilizing in house expertise headed by a certified safety professional (CSP). The course consists of an initial 40-hour session and annual refreshers of 8 hours. Subcontractors and visitors are required to provide proof of equivalent training. The field team leader will have completed an additional 8 hours of waste site supervisory training. For each location, specific training is given by the Project Manager or Site Safety Officer to inform employees of site-specific hazards. An outline of the ESE training course in shown in Table 2-1.

At least one field team member will be trained to perform cardiopulmonary resuscitation (CPR) and first aid.

2.5 MEDICAL MONITORING PROGRAM

ESE on-site personnel, subcontractors, and visitors for this project will be required to have the medical examination outlined in Table 2-2. This examination is given annually and more often if specified by the attending physician. Medical examinations include certification by the physician of the employee's ability to wear a negative-pressure respirator and to perform strenuous work. If a person sustains an injury or contracts an illness related to work on site that results in lost work time, he must obtain written approval from a physician to regain access to the site.

The individuals listed in the Site-Specific Plan organization chart will be certified to wear respirator protection in accordance with criteria from the ANSI Z88.2 and 29 CFR 1910.134.

Table 2-1.

ESE Hazardous Waste/Materials Site Investigations
Training Course

Safety Plans
Fundamentals of Industrial Hygiene
Properties of Hazardous Materials/Compatibility Testing, Shipping, and Handling of Samples/Chain of Custody
Levels of Personal Protection
Air Characterization (includes Hands-On Session)
Hotline Systems
Decontamination Operation
Emergency Response
Air-Purifying Respirators and Fit-Testing
Air-Supplying Respirators
Field Exercises, Air-Purifying Respirators, and Self-Contained Breathing Apparatus (SCBA), Levels A, B, and C
Field Exercises (Site Zones and Sampling Operations)
Confined Space Entry
Review of Regulations
Engineering Controls

Source: ESE (ESE), 1989.

Table 2-2.

Medical Examination--Monitoring Program

Basic physical exam
Heart status and functions (EKG)
Chest X-ray (Roentgenogram posterior-anterior)
Pulmonary function--forced vital capacity, forced expiratory volume at 1 second and reserve volume
Blood--full SMAC Series
Hemoglobin--cell counts, protein levels
Acetylcholinesterase activity
Heavy metals
PCB in serum
Liver function--full enzyme profile
Renal function--BUN, Creatinine, Creatine/Creatinine ratio, lipoprotein count and differential, uric acid
Urinalysis
Audiometry--audio spectrum response of ear
Eye--physical condition, visual acuity

Source: Environmental Science & Engineering, Inc. (ESE), 1989.

3.0 HAZARD EVALUATION

3.1 CHEMICAL CONTAMINANTS

Potential site contaminants at petroleum contamination sites include gasoline, gasohol, motor oil, fuel oils (including kerosene, diesel fuel), and aviation grade gasoline. These materials may exist as free product in soil or on groundwater, and/or as contaminants to soil and water, and/or in tanks, piping, and systems.

Fuel products include materials in and around storage tanks, such as gasoline, kerosene, diesel, and their derivatives, xylene, toluene, benzene, tetraethyl lead (TEL), and chlorinated solvents. The chlorinated solvents include trichloroethylene and tetrachloroethylene.

3.2 PHYSICAL AND MECHANICAL HAZARDS

On-site activities may include site visits, soil gas sampling, headspace sampling, installation and sampling from monitor wells, installation of free product recovery systems, installation of groundwater recovery systems, installation of soil venting systems, installation of biological treatment systems, installation of air strippers, installation of carbon absorption units, removal of tanks, piping, and systems, and removal of contaminated soil.

Hazards associated with these activities are varied and include vehicle/pedestrian collisions, fire, collapse of excavation and trenching, handling of heavy materials and equipment operations resulting in contact and crushing type injuries, and use of air- and electrically-powered tools which may result in abrasions, contusions, lacerations, etc.

3.3 JOB HAZARD ANALYSIS AND RISK ASSESSMENT

The chemical contaminants which may be present and the hazardous activities which may be performed at the site will be identified through preliminary site assessment activities, such as site visits or records search. Based on this preliminary information, initial risk assessments will be made by the Site Safety Officer, in consultation with the ESE Corporate Health and Safety Officer, defining hazards (both chemical and physical) to workers and other on-site personnel, the surrounding populace, and the environment.

The identities of potential hazards and resultant initial risk assessments will be included in the Hazard Evaluation section of the Site-Specific Plan, will be reviewed daily, and will be updated as necessary by the Site Safety Officer. Updated information will be communicated to other on-site personnel immediately.

3.4 AIR MONITORING

An air monitoring program is fundamental to the safety of on-site and off-site personnel. Total organic vapor (TOV) levels associated with on-site activities will be monitored with a photoionization detection (PID) instrument (Photovac® TIP or HNU PI-101). This instrument will be the primary source of information for upgrading personal protection. Calibration and maintenance of monitoring equipment will be in accordance with manufacturer recommendations.

The Site Safety Officer, or designee, will establish daily a background TOV prior to initiating on-site activities. Under most circumstances, this level can be determined by taking multiple readings at representative locations along the perimeter of the site and averaging the results of sustained measurements. (A sustained measurement is defined as the arithmetic average of six readings taken at 10-second intervals.) If, due to site conditions, it appears that perimeter readings will not yield a truly representative background level, the Site Safety Officer or ESE Corporate Health and Safety Officer will be consulted for guidance.

Decisions to upgrade personal protection will be based on sustained breathing zone TOV that exceeds background levels. Breathing zone refers to the area from the top of the shoulders to the top of the head.

Explosivity levels associated with on-site activities will be monitored with an explosimeter or combustible gas meter. This monitoring will be the primary source of information for determining the potential hazard due to explosion or fire in confined spaces and other enclosed areas with little or no ventilation.

Prior to entry of areas which may contain an explosive or flammable atmosphere, the Site Safety Officer or designee will take representative readings of the suspect area. Representative readings include readings from top, middle, and lower levels of the area, and at various points at each level in larger areas. Areas in which a reading exceeds 20% of the lower flammable limit will be considered potentially explosive, and will be vented to below 20% of the lower flammable limit before the introduction of personnel or non-explosion proof powered equipment.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment to be used at petroleum contamination sites will consist of several components. These components will protect the respiratory system, eyes and face, hands, feet, body, and head from a variety of chemical and physical hazards. Levels of personal protection will be categorized in accordance with the criteria described in accordance with the guidelines given in Section 3, Air Monitoring. Additional guidance for personal protective equipment can be found in the ESSE Corporate Respiratory Protection Program, or can be obtained from the ESE Corporate Health and Safety Officer.

Action levels for upgrading to the various protective levels and levels of personal protection required for the various tasks to be performed on each site, as well as special site requirements, will be given in the Personal Protective Equipment section of the Site-Specific Plan.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL A

1. Open-circuit, pressure-demand, self-contained breathing apparatus (SCBA);
2. Totally encapsulated suit;
3. Gloves, inner (surgical type);
4. Gloves, outer, chemical protective;
5. Boots, chemical protective, steel toe and shank;
6. Booties, chemical protective.

CRITERIA

1. Sites known to contain hazards which:
    a. Require the highest level of respiratory protection (as previously stated),
    b. Will cause illness as a result of personal exposure,
    c. Permit a reasonable determination that personal exposure could occur to parts of the body; or
2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL B

1. Open-circuit, pressure-demand SCBA;
2. Chemical protective
   a. Overalls and long-sleeved jacket, or
   b. Coveralls;
3. Gloves, inner (surgical type);
4. Gloves, outer, chemical protective;
5. Boots, chemical protective, steel toe and shank;
6. Booties, chemical protective.

CRITERIA

1. Sites known to contain hazards which:
   a. Require the highest level of respiratory protection (as previously stated),
   b. Will cause illness as a result of exposure,
   c. Permit a reasonable determination that personal exposure to areas of the body not covered by Level B protective clothing is unlikely; and
2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL C

1. Full face-piece, air-purifying respirator (high-efficiency particulate/organic vapor cartridges);
2. Emergency escape oxygen pack (carried);
3. Chemical protective (Tyvek® is the minimum protection)
   a. Overalls and long-sleeved jacket, or
   b. Coveralls, or
   c. Apron;
4. Gloves, inner (surgical type) (Latex);
5. Gloves, outer, chemical protective (Nitrile);
6. Boots, chemical protective (neoprene or NBR), steel toe and shank; and
7. Booties, chemical protective (Latex).

CRITERIA

1. Sites known to contain hazards which:
    a. Do not require a level of respiratory protection greater than the level afforded by air-purifying respirators (nominal protection of 10), as previously stated;
    b. Will cause illness as a result of personal exposure; or
    c. Permit a reasonable determination that personal exposure to areas of the body not covered by Level C protective clothing is unlikely; and

2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL D

1. Coveralls, cotton;
2. Boots/shoes, safety;
3. Safety glasses;
4. Hard hat with optional face shield (where overhead hazards exist); and
5. Air-purifying respirator (readily available).

CRITERIA

Sites where the Project Manager and/or Site Safety Officer make a reasonable determination that hazards due to exposure to hazardous materials are unlikely.

ADDITIONAL PERSONAL PROTECTION

In addition to personal protective equipment, field personnel having duties on or near the hazard site should have ready access to:

1. A fully stocked industrial-size first-aid kit;
2. An eyewash kit; and
3. At least 6 gallons of potable water in a pressurized container to permit decontamination in event of accidental skin or eye contact with chemicals.

5.0 STANDARD WORK PRACTICES

5.1 GENERAL SAFETY RULES

In addition to the specific requirements of the Site-Specific Plan, common sense should prevail. The following general safety rules and practices will be in effect at the site.

1. The site will be suitably marked or barricaded as necessary to prevent unauthorized visitors, but will not hinder emergency services if needed.
2. Open holes, trenches, and obstacles will be properly barricaded in accordance with local site needs. These needs will be determined by proximity to traffic ways, both pedestrian and vehicular, and site of the hole, trench, or obstacle. If holes are required to be left open during nonworking hours, they will be adequately decked over or barricaded and sufficiently lighted.
3. Prior to conducting digging or boring operations, underground utility locations will be identified. The site representative and local utility authorities will be contacted to provide locations of underground utility lines and product piping. All boring, excavation, and other site work will be planned and performed with consideration for underground lines.
4. Smoking and ignition sources in the vicinity of flammable or contaminated material is prohibited.
5. Drilling, boring, movement and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment, and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs, lights, canopies, buildings, and other structures and construction, and natural features such as trees, boulders, bodies of water, and terrain.
6. When working in areas where flammable vapors may be present, particular care must be exercised with tools and equipment that may be sources of ignition. Tools and equipment so provided must be properly bonded and/or grounded.
7. Approved and appropriate safety equipment, as specified in this site-specific HASP, such as eye protection, hard hats, foot protection, and respirators, must be worn in areas where required by the site-specific HASP. In addition, eye protection must be worn when handling free product, contaminated soil or water, or fill dirt.
8. Beards that interfere with respirator fit are not allowed within the site boundaries. This restriction on beards is necessary because site personnel may be called upon to use

respirator protection in some situations, and beards do not allow for proper respirator fit.

9. No smoking, eating, or drinking will be allowed in the contaminated areas.
10. Tools and hands must be kept away from the face.
11. Personnel must shower at the end of the shift or as soon as possible after leaving the site.
12. Each sample must be treated and handled as though it were extremely toxic.
13. Tank pit excavations must be sampled cautiously, using a remote sampling device or securing samples from excavated soil, and the pit should be entered only as a last resort. The pit may meet the criteria for a confined space, in which case entry must be made in accordance with NIOSH recommended Confined Space Entry Procedures.
14. Persons with long hair and/or loose-fitting clothing that could become entangled in power equipment are not permitted in the work area.
15. Horseplay is prohibited in the work area.
16. Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.

5.2 WORK LIMITATIONS

Work shall be limited to daylight hours and during normal weather conditions. Extremes in temperature and weather condition (i.e., wind and lightning) will restrict working hours. For monitoring the body's recuperative ability toward excess heat, the following techniques will be used as a screening mechanism. Monitoring of personnel wearing protective clothing will commence when the ambient temperature is 70 degrees Fahrenheit (°F) or above. When temperatures exceed 85°F, workers will be monitored after work periods. Monitoring will include visual observations for signs of heat stress and measurement of radial pulse rate for 30 seconds at the beginning of each rest period. If the heart rate exceeds 110 beats per minute (beats/min) at the beginning of a rest period, the next work period will be shortened by 10 minutes, and the rest period stays the same. If the pulse rate is 100 beats/min at the beginning of the next rest period, the following work cycle will be shortened another 10 minutes.

Also, good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. If skin problems occur, consult medical personnel.

The human body "senses" cold as a result of two factors, the air temperature and the wind velocity. Cooling of the flesh increases rapidly as wind velocity goes up. Frostbite can occur at relatively mild temperatures if wind penetrates the body insulation. For example, when the air temperature is 40° F and the wind velocity is 30 miles per hour (mph), the exposed skin would

perceive an equivalent still air temperature of 13° F. Table 5-1 illustrates windchill indices and the associated hazards to exposed flesh. Precautions will be taken to minimize exposed flesh, and layered clothing will be provided, as appropriate.

Table 5-1.

Windchill Index

Windspeed (mph)	Actual Thermometer Reading (°F) 50	40	30	20	10	0	-10	-20	-30	-40
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5		48	37	27	16	6	-5	-15	-26	-36	-47
10		40	28	16	4	-9	-21	-33	-46	-58	-70
15		36	22	9	-5	-18	-36	-45	-58	-72	-85
20		32	18	4	-10	-25	-39	-53	-67	-82	-96
25		30	16	0	-15	-29	-44	-59	-74	-88	-104
30		28	13	-2	-18	-33	-48	-63	-79	-94	-109
35		27	11	-4	-20	-35	-49	-67	-82	-98	-113
40		26	10	-6	-21	-37	-53	-69	-85	-100	-116

Source: National Safety Council, 1982.

5.3 ACCIDENT PREVENTION PLAN/ACCIDENT REPORTING

The purpose of the Safety Plan is to prevent accidents and minimize the impact of an accident if one should occur. Accidents must be reported to the Site Safety Officer immediately. Prompt reporting is essential to the prevention of future incidents in addition to the well-being of the affected individual or individuals. The Site Safety Officer will notify the Project Manager of serious accidents. The Site Safety Officer or other key members of the field team will be trained in first aid and CPR. First aid will be administered to affected personnel under the direction of the Site Safety Officer. For serious accidents, the nearest ambulance service will be contacted for transport of injured personnel to the nearest medical facility (see Section 6.0). The Site Safety Officer will have established contact and liaison with medical authorities (see Section 6.0) whose personnel will be knowledgeable of the activities of the field team. Telephone numbers and addresses of ambulance and medical services will be posted on site.

A formal report of OSHA-recordable accident will be filed with ESE. Reports must be received within 2 working days.

5.4 WORK ZONES AND DECONTAMINATION PROCEDURES

Work zones will be established in accordance with guidance provided in Figure 5-1. These zones may be modified to fit applicable field conditions; however, proposed modifications must be approved by the Project Manager and Site Safety Officer prior to being implemented in the field.

Personnel decontamination will be initiated on site. Disposable clothing will be removed and stored in designated containers. If additional decontamination is necessary, based on preliminary or subsequent risk assessment by the Site Safety Officer in consultation with ESE Corporate Safety and Health Officer, additional decontamination procedures will be implemented. Site specific decontamination procedures will be listed in the Site-Specific Plan.

Heavy equipment will be decontaminated on site. Water in the form of steam cleaning and/or pressure washing may be used to remove visual contamination from drilling equipment and backhoe.

5.5 SITE SECURITY AND ENTRY

Site security measures, including barricading, fencing, and lighting, and special site entry procedures will be described in the Section 5 of the Site-Specific Plan.

6.0 EMERGENCY INFORMATION AND CONTINGENCY PLANS

Emergency information, including phone numbers, site resources, and routes to emergency medical care, will be maintained on site in the Site-Specific Plan by each field team.

The phone list will include the following numbers:

AMBULANCE:
FIRE DEPARTMENT:
HOSPITAL (primary):
HOSPITAL (secondary):
POISON CONTROL CENTER:
POLICE:
TOXIC WASTE AND OIL SPILL:
CLIENT CONTACT:
AGENCY CONTACT:
PROJECT MANAGER:
CORPORATE SAFETY AND HEALTH OFFICER:

The list of site resources will include fire extinguishers, first aid equipment, eyewash units, communications (telephone), emergency personal protective equipment, spill containment equipment and materials, and other special equipment, supplies or resources.

6.1 INJURY CONTINGENCY PLAN

First aid equipment will be kept on site during site activities. Additionally, one member of the field team will be trained in first aid. Emergency telephone numbers for ambulance and poison control will be maintained on site in a readily accessible location. Names, addresses, and routes to two emergency medical care providers (hospitals or emergency clinics) will be verified prior to site activity, and will be listed in the Site-Specific Plan. Maps showing the location of the site, the emergency medical care providers, and hotels and restaurants (if any) used by the field team should be provided in each vehicle. In the event of an injury that cannot be treated on site, the injured person will be immediately transported to the medical provider either by support vehicle or ambulance on determination by the Site Safety Officer, Field Team Leader, Project Manager, and/or first aid provider.

6.2 FIRE CONTROL AND CONTINGENCY PLAN

No smoking will be allowed during field activities. Fire extinguishers will be available at sites for use on small fires. Samples must be treated as flammable or explosive. The Site Safety Officer will have available the telephone number of the nearest fire station and local law enforcement agencies in case of a major fire emergency.

6.3 SPILL CONTROL AND CONTINGENCY PLAN

In the event of a spill, the Site Safety Officer will be notified immediately. The important factors are that no personnel are overexposed to vapors, gases, or mists and that the liquid does not ignite. Waste spillage must not be allowed to contaminate local water source. Small dikes will be erected to contain spills, if necessary, until proper disposal can be completed. Subsequent to cleanup activities, the Site Safety Officer will survey the area to ensure that no toxic or explosive vapors remain.

6.4 OFF-SITE INCIDENT CONTINGENCY PLAN

The Site Safety Officer will provide field team members with emergency medical care information similar to that kept on site in event of an off site emergency, such as a motor vehicle accident, food poisoning, or other injury sustained off the site.

6.5 COMMUNITY THREAT CONTINGENCY PLAN

The potential for exposure to the surrounding community will be assessed in conjunction with the preliminary site assessment. The Site Safety Officer will consult with a representative of the local emergency services agency (police or fire department, in accordance with local governmental procedures), and will outline procedures in the Site-Specific Plan to be followed in the event of an emergency threat to the surrounding populace. Situations requiring specified procedures include fire, explosion, accidental ingestion, large spills consisting of free product, and accumulation of potentially explosive vapors off site.

The Site-Specific Plan will identify individuals who will respond to reports of non-emergency community threats arising from site activities. This non-emergency response will include sampling of air, wells and ground water, and soil. Situations requiring specified procedures include small spills and presence of existing concentrations of potentially explosive vapors on site.

APPENDIX A

SITE SPECIFIC HEALTH AND SAFETY PLAN

ENVIRONMENTAL SCIENCE & ENGINEERING

SITE SPECIFIC INFORMATION

PROJECT NAME:Santa Rita Correctional Facility, Dublin, California

PROJECT NUMBER:6-92-5454

PROJECT MANAGER:Patrick E. Galvin

HEALTH AND SAFETY OFFICER:Lionel S. Reynolds, CIH

SITE SAFETY OFFICER (ALTERNATE):Bart S. Miller

THIS HEALTH AND SAFETY PLAN HAS BEEN REVIEWED AND APPROVED BY:

_____

Lionel S. Reynolds
CERTIFIED INDUSTRIAL HYGIENIST

DECLARATION OF UNDERSTANDING

I have read and understand the Health and Safety Plan and agree to abide by it.

NAME	EMPLOYEE NUMBER OR COMPANY NAME	SOCIAL SECURITY NUMBER	DATE

A. GENERAL PROJECT INFORMATION

SITE: Santa Rita Correctional Facility DATE PREPARED: 02-01-93
LOCATION: Dublin, California
PREPARED BY: Bart S. Miller, Environmental Science & Engineering, Inc.
OBJECTIVE (S) AND WORKPLAN: Excavate and sample soil potentially impacted with petroleum hydrocarbons as gasoline.
PROPOSED DATE(S) OF ON-SITE WORK: February, 1993
BRIEFING DATE(S): February, 1993
BACKGROUND REVIEW: January, 1993
COMPLETE: __
PRELIMINARY: x

----------PROJECT H.A.S.P. SUMMARY----------
LEVEL(S) OF PROTECTION: A__ B__ C__ D x MIXED__ MODIFIED x
OVERALL HAZARD ESTIMATE: HIGH__ MODERATE__ LOW x UNKNOWN__
ADDITIONAL DOCUMENTATION: TLV TABLE__ FULL HASP x METHODS__
OTHER__

B. SITE/MATERIAL CHARACTERISTICS

MATERIAL/WASTE TYPE(S): LIQUID x SOLID x GAS__ SLUDGE__
MATERIAL PRESENT IN: DRUMS__ TANKS__ OPEN x OTHER__
CHARACTERISTICS: IGNITABLE x CORROSIVE__ TOXIC x REACTIVE__
RADIOACTIVE__ VOLATILE x UNKNOWN__ OTHER__
FACILITY TYPE: Correctional Facility CLOSED x OPEN __
FACILITY SIZE: approx. 32,000 square feet
TOPOGRAPHY: Flat low relief
PRINCIPAL DISPOSAL METHOD AND LOCATION(S): The soil generated during this investigation will be stockpiled on the property at a location designated by client and covered with plastic sheeting.

C. HAZARD EVALUATION

INSTRUCTIONS: Evaluate principal hazards expected at this site. Be specific; complete all entries.

HAZARDS

Physical: Drilling equipment containing cables, heavy excavation machines, slumping of excavation walls, dropping augers etc. can be potential hazards to the site workers. Vehicles and heavy machines will be continually active during the workday.

Chemical: Some of the soil samples collected and excavated may contain petroleum hydrocarbons as gasoline and Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX) compounds which may be hazardous to individuals through inhalation and/or physical contact.

Biological: None anticipated.

CORRECTIVE ACTIONS

Physical: Site will be inspected at start up, sidewall sloping will be utilized for excavation stability, and personal protective equipment will be worn (hardhat, steel-toed safety boots, earplugs if loud noises). Identified hazards, accident prevention, and emergency procedures will be discussed at site safety meeting immediately prior to work. No person shall enter a 50-foot exclusion zone radius unless proof of 40-hour OSHA training produced on-site to SSO, medical records made available to SSO on site, individual participates in discussion with SSO pertaining to hazards at site, and individual has justifiable purpose for entering exclusion zone.

Chemical: Should breathing conditions exceed work action level while drilling or excavating, all individuals within the 50-foot exclusion zone will be required to wear a respirator (half-face mask) with organic cartridges. If an individual becomes sick, that individual will leave the work area immediately, breathe fresh air and seek medical attention if required. Recommended work action level = 5 parts per million (ppm) volatile concentration in worker's breathing zone for 3 minutes (sustained).

Biological: None Anticipated

D. WORK PLAN INSTRUCTIONS

PERSONAL PROTECTION REQUIRED:

Level of protection: A___ B___ C___ D_x_MIXED___ MODIFICATIONS___

For MIXED levels of protection describe areas and levels:_____

_____

_____

For MODIFICATIONS identify action levels: This site will involve D level protection. Respirator will be used for volatile concentrations of 5 parts per million (ppm) or greater in working area. Ear plugs will be used for noisy conditions. Eye protection will be worn by workers.

PERSONAL PROTECTIVE EQUIPMENT (PPE): Hardhat, goggles, steel-toed boots, and earplugs will be used by all workers. Respirator with organic cartridges will be available, ready for use, by all workers.

MONITORING EQUIPMENT: PID_x_ FID___ TOXIC GAS___ OXYGEN___

DETECTOR TUBES___ EXPLOSIMETER___ PERSONAL MONITOR___

OTHER INSTRUMENTS: N/A

EQUIPMENT CALIBRATION: PID instrument will be calibrated on a daily basis.

MONITORING STRATEGY: Measurements of potential vapor source, excavated soil, will be collected continuously during work.

DECONTAMINATION PROCEDURES: Drill rigs, heavy machinery, and tools to be steam cleaned. Alconox® and water solution to wash brass sampling sleeves followed by a rinse in potable water. Excavation equipment to be steam cleaned. Personal gear (eg. boots) will be washed in an Alconox® and water solution followed with a rinse in potable water.

SITE CONTROL MEASURES: Control activities within a 50-foot perimeter. Site adequately fenced off from general public and pedestrians. All workers and visitors coming within perimeter are required to read and sign H&S plan and abide by directions of the SSO. No person shall enter the excavation.

SPILL CONTAINMENT PROCEDURES: Plastic to be spread beneath excavated soil piles. Sorbent products will be available for recovery of petroleum hydrocarbons on water in excavation. Vacuum truck(s) to be used in the event petroleum hydrocarbons detected on water in excavation.

NOTES: N/A

E. EMERGENCY PROCEDURES

FIRE OR EXPLOSION: Evacuate the area and call the Fire Department at 911 immediately. All accident victims to receive emergency first aid attention until authorities arrive.

INJURY: Call Medical Assistance at 911 and administer emergency first aid to victim(s). Injured person(s) to be transported to the nearest medical facility.

WEATHER: Extremes in temperature (i.e. very cold or very hot conditions) will be avoided where possible.

OTHER:

CHEMICAL EXPOSURE ACTIONS:
(See Appendix B for Optional Material Safety Data Sheets)

EMERGENCY TELEPHONE NUMBERS

POLICE/FIRE/AMBULANCE: 911

POISON CONTROL: (800) 523-2222

ESE CONCORD OFFICE: (510) 685-4053

CHEMTREC: (800) 424-9300

UNDERGROUND SERVICE ALERT: (800) 642-2444

PROJECT CONTACTS

AGENCY CONTACT: Alameda County Health Care Services	(510) 271-4530
SITE CONTACT: Mr. Peter Kinney	(510) 535-6280
CLIENT CONTACT: Mr. Jim de Vos	(510) 535-6248

F. EMERGENCY PRECAUTIONS

PRIMARY HOSPITAL/INFIRMARY:

Name: Valley Memorial Hospital

Address: 1111 East Stanel Blvd., Livermore, California Telephone Number: (510) 447-7000

Directions from site to emergency unit: Take Tassajara Road (south) to Interstate 580. Take Interstate 580 east and exit south on First Street (Highway 84). After junction with Railroad Avenue, turn left into driveway of hospital.

Remarks: See Figure A

Occupational Safety and Health Administration (OSHA) standards 29 Code of Federal Regulations (CFR) 1910 and 1926 apply to work under this site-specific HASP.

Additional requirements are contained in Code of Federal Regulations title 40, Protection of the Environment.

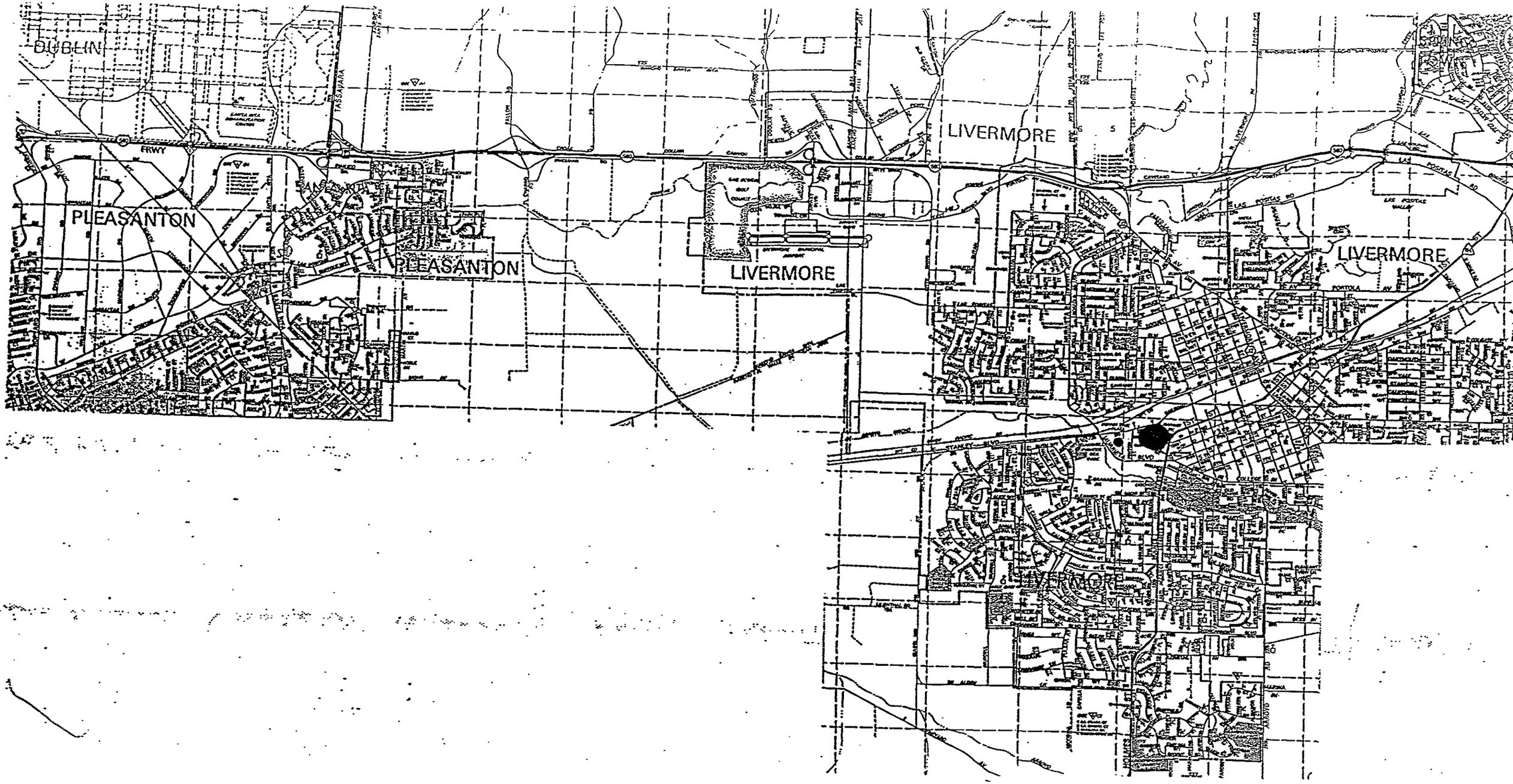
DUBLIN
PLEASANTON
PLEASANTON
LIVERMORE
LIVERMORE
LIVERMORE

FIGURE A

APPENDIX B

MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

UNOCAL 76

1201 West 5th Street
Los Angeles, California 90017

Product Name: UNOCAL 76 LEADED REGULAR GASOLINE
Product Code No: 00301

Issue Date: 04/15/91
Status: FINAL

Responsible Party:

UNOCAL REFINING & MARKETING DIVISION
UNION OIL COMPANY OF CALIFORNIA
1201 WEST 5TH STREET
LOS ANGELES, CALIFORNIA 90017

CONTACT FOR FURTHER INFORMATION:
MSDS COORDINATOR 213-977-7589

Transportation Emergencies:
CHEMTREC
(800) 424-9300 Cont. U.S.
(202) 483-7616 (Collect)
from Alaska & Hawaii
Health Emergencies:
LOS ANGELES POISON
CONTROL CENTER (24 hrs)
(800) 356-3129

PRODUCT IDENTIFICATION

PRODUCT NAME: UNOCAL 76 LEADED REGULAR GASOLINE

SYNONYMS: UNION 76 LEADED REGULAR GASOLINE

GENERIC NAME: LEADED GASOLINE

CHEMICAL FAMILY: PETROLEUM HYDROCARBON MIXTURE

DOT PROPER SHIPPING NAME: GASOLINE

ID NUMBER: UN1203

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID

PRECAUTIONARY WARNING

DANGER
EXTREMELY FLAMMABLE. VAPORS MAY EXPLODE. HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. POSSIBLE CANCER HAZARD BASED ON TESTS WITH LABORATORY ANIMALS. NO SMOKING OR OPEN FLAME. KEEP AWAY FROM HEAT, SPARKS, FLAMES OR OTHER SOURCES OF IGNITION (e.g. STATIC ELECTRICITY, PILOT LIGHTS OR MECHANICAL/ELECTRICAL EQUIPMENT). VAPORS MAY BE IGNITED BY SPARK OR FLAME SOURCE MANY FEET AWAY. DO NOT OVERFILL TANK. USE ONLY WITH ADEQUATE VENTILATION. DO NOT TASTE OR SWALLOW. KEEP CONTAINER CLOSED. DO NOT BREATHE VAPOR OR MISTS. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. WASH THOROUGHLY AFTER HANDLING. NEVER SIPHON BY MOUTH. FOR USE AS MOTOR FUEL ONLY. DO NOT USE FOR ANY OTHER PURPOSE. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, GRIND OR DRILL ON OR NEAR CONTAINER. "EMPTY" CONTAINER RETAINS RESIDUE (LIQUID AND/OR VAPOR) AND MAY EXPLODE IN HEAT OF A FIRE. KEEP OUT OF REACH OF CHILDREN. FAILURE TO USE CAUTION MAY CAUSE SERIOUS INJURY OR ILLNESS.

SECTION I - COMPONENTS	PERCENT	EXPOSURE LIMIT	UNITS	AGENCY	TYPE
HAZARDOUS COMPONENTS					
GASOLINE CAS #: 8006-61-9		300.000	ppm	ACGIH	TWA
		500.000	ppm	ACGIH	STEL
		300.000	ppm	OSHA	TWA
		500.000	ppm	OSHA	STEL

UNION OIL CO.

Product Name: UNOCAL 76 LEADED REGULAR GASOLINE
Product Code No: 00301

Issue Date: 04/15/91
Status: FINAL

SECTION I - COMPONENTS	PERCENT	EXPOSURE LIMIT	UNITS	AGENCY	TYPE
		300.000	ppm	CAL OSHA	TWA
BENZENE					
CAS #: 71-43-2	1.000 - 5.000	10.000	ppm	ACGIH	TWA
		25.000	ppm	MSHA	CEIL-SKIN
		1.000	ppm	OSHA	TWA
		5.000	ppm	OSHA	STEL
		50.000	ppm	CAL OSHA	CEIL
		25.000	ppm	CAL OSHA	EXCUR
		10.000	ppm	CAL OSHA	TWA-SKIN
LEAD COMPOUND		NOT ESTABLISHED			
CAS #: NONE	0.1 GM/GAL				
TOLUENE					
CAS #: 108-88-3	1.000 - 15.000	100.000	ppm	ACGIH	TWA
		150.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		150.000	ppm	OSHA	STEL
		200.000	ppm	CAL OSHA	EXCUR
		100.000	ppm	CAL OSHA	TWA-SKIN
		500.000	ppm	CAL OSHA	CEIL-SKIN
XYLENES					
CAS #: 1330-20-7	1.000 - 21.000	100.000	ppm	ACGIH	TWA
		150.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		150.000	ppm	OSHA	STEL
		200.000	ppm	CAL OSHA	EXCUR
		100.000	ppm	CAL OSHA	TWA-SKIN
		300.000	ppm	CAL OSHA	CEIL-SKIN
N-HEXANE					
CAS #: 110-54-3		50.000	ppm	ACGIH	TWA
		500.000	ppm	MSHA	TWA
		50.000	ppm	OSHA	TWA
		50.000	ppm	CAL OSHA	TWA
ETHYLBENZENE					
CAS #: 100-41-4	1.000 - 5.000	100.000	ppm	ACGIH	TWA
		125.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		125.000	ppm	OSHA	STEL
		100.000	ppm	CAL OSHA	TWA
1,2,4-TRIMETHYLBENZENE		NOT ESTABLISHED			
CAS #: 95-63-6	1.000 - 5.000				

OTHER COMPONENTS

--NONE--

THIS PRODUCT CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA 313 AND 40 CFR 372:

	CAS NUMBER	WEIGHT %
BENZENE	71-43-2	1-5
LEAD COMPOUND	NONE	0.1 GM/GAL
TOLUENE	108-88-3	1-15
XYLENES	1330-20-7	1-21
ETHYLBENZENE	100-41-4	1-5

UNION OIL CO.

Product Name: UNOCAL 76 LEADED REGULAR GASOLINE
Product Code No: 00301

Issue Date: 04/15/91
Status: FINAL

SECTION I

METHYL TERT-BUTYL ETHER	1634-04-4	0-11
1,2,4-TRIMETHYLBENZENE	95-63-6	1-5

SECTION II - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY
Have physician call LOS ANGELES POISON CONTROL CENTER (24 hrs) (800) 356-3129

EYE CONTACT:

IF IRRITATION OR REDNESS DEVELOPS, MOVE VICTIM AWAY FROM EXPOSURE AND INTO FRESH AIR. FLUSH EYES WITH CLEAN WATER. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION.

SKIN CONTACT:

WIPE MATERIAL FROM SKIN AND REMOVE CONTAMINATED SHOES AND CLOTHING. CLEANSE AFFECTED AREA(S) THOROUGHLY BY WASHING WITH MILD SOAP AND WATER AND, IF NECESSARY, A WATERLESS SKIN CLEANSER. IF IRRITATION OR REDNESS DEVELOPS AND PERSISTS, SEEK MEDICAL ATTENTION.

INHALATION (BREATHING):

IF RESPIRATORY SYMPTOMS OR OTHER SYMPTOMS OF EXPOSURE DEVELOP, MOVE VICTIM AWAY FROM SOURCE OF EXPOSURE AND INTO FRESH AIR. IF SYMPTOMS PERSIST, SEEK IMMEDIATE MEDICAL ATTENTION. IF VICTIM IS NOT BREATHING, IMMEDIATELY BEGIN ARTIFICIAL RESPIRATION. IF BREATHING DIFFICULTIES DEVELOP, OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. SEEK IMMEDIATE MEDICAL ATTENTION.

INGESTION (SWALLOWING):

ASPIRATION HAZARD: DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH BECAUSE THIS MATERIAL CAN ENTER THE LUNGS AND CAUSE SEVERE LUNG DAMAGE. IF VICTIM IS DROWSY OR UNCONSCIOUS, PLACE ON THE LEFT SIDE WITH THE HEAD DOWN. IF POSSIBLE, DO NOT LEAVE VICTIM UNATTENDED. SEEK MEDICAL ATTENTION.

COMMENTS:

NOTE TO PHYSICIANS: EXPOSURE TO HIGH CONCENTRATIONS OF THIS MATERIAL (e.g. IN ENCLOSED SPACES OR WITH DELIBERATE ABUSE) MAY BE ASSOCIATED WITH CARDIAC ARRHYTHMIAS. EPINEPHRINE AND OTHER SYMPATHOMIMETIC DRUGS MAY INITIATE CARDIAC ARRHYTHMIAS IN PERSONS EXPOSED TO THIS MATERIAL. OTHER DRUGS WITH LESS ARRHYTHMOGENIC POTENTIAL SHOULD BE CONSIDERED. IF SYMPATHOMIMETIC DRUGS ARE ADMINISTERED, OBSERVE FOR THE DEVELOPMENT OF CARDIAC ARRHYTHMIAS.

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

EYE CONTACT:

THIS MATERIAL MAY CAUSE MILD EYE IRRITATION. DIRECT CONTACT WITH THE LIQUID OR EXPOSURE TO VAPORS OR MISTS MAY CAUSE STINGING, TEARING AND REDNESS.

SKIN CONTACT:

THIS MATERIAL MAY CAUSE MILD SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY CAUSE REDNESS, BURNING, AND DRYING AND CRACKING OF THE SKIN. CONTACT MAY RESULT IN SKIN ABSORPTION BUT SYMPTOMS OF TOXICITY ARE NOT ANTICIPATED BY THIS ROUTE ALONE UNDER NORMAL CONDITIONS OF USE. PERSONS WITH PRE-EXISTING SKIN DISORDERS MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS MATERIAL.

INHALATION (BREATHING):

WHILE THIS MATERIAL HAS A LOW DEGREE OF TOXICITY, BREATHING HIGH CONCENTRATIONS OF VAPORS OR MISTS MAY CAUSE FLUSHING, BLURRED VISION, NAUSEA AND SIGNS OF NERVOUS SYSTEM DEPRESSION (e.g. HEADACHE, DROWSINESS, DIZZINESS, LOSS OF COORDINATION AND FATIGUE).

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE LOSS OF CONSCIOUSNESS, CONVULSIONS, RESPIRATORY COLLAPSE AND DEATH. RESPIRATORY SYMPTOMS ASSOCIATED WITH PRE-EXISTING LUNG DISORDERS (e.g. ASTHMA-LIKE CONDITIONS) MAY BE AGGRAVATED BY EXPOSURE TO THIS MATERIAL.

INGESTION (SWALLOWING):

ASPIRATION HAZARD - THIS MATERIAL CAN ENTER LUNGS DURING SWALLOWING OR VOMITING AND CAUSE LUNG INFLAMMATION AND DAMAGE. INGESTION OF EXCESSIVE QUANTITIES OF THIS MATERIAL MAY CAUSE IRRITATION OF THE DIGESTIVE TRACT AND SIGNS OF NERVOUS SYSTEM DEPRESSION (e.g. HEADACHE, DROWSINESS, DIZZINESS, LOSS OF COORDINATION, AND FATIGUE).

COMMENTS:

GASOLINE IS A POSSIBLE CANCER HAZARD BASED ON TESTS IN LABORATORY ANIMALS. FOLLOW-UP STUDIES SUGGEST THAT THIS MAY BE A UNIQUE EFFECT IN MALE RATS. UNLEADED GASOLINE HAS BEEN IDENTIFIED AS A POSSIBLE CARCINOGEN BY IARC. BENZENE, A COMPONENT OF THIS PRODUCT, IS A KNOWN CANCER (LEUKEMIA) HAZARD. RESULTS OF TESTS IN HUMANS HAVE SHOWN THAT EXPOSURE TO BENZENE CAN CAUSE IRREVERSIBLE CHANGES IN THE GENETIC MATERIAL (DNA) OF A CELL. THE HUMAN HEALTH CONSEQUENCES OF THESE CHANGES IS NOT FULLY UNDERSTOOD. BENZENE HAS BEEN IDENTIFIED AS A CARCINOGEN BY IARC, NTP AND OSHA. THERE IS INSUFFICIENT EVIDENCE TO SHOW THAT GASOLINE POSES ANY HAZARD RELATED TO ITS LOW BENZENE CONTENT. INTENTIONAL MISUSE BY DELIBERATE INHALATION OF LEADED GASOLINE MAY RESULT IN CHANGES IN BEHAVIOR CHARACTERIZED BY IRRITABILITY, AGGRESSIVENESS AND HALLUCINATIONS; MORE SEVERE OVEREXPOSURE MAY RESULT IN TREMORS AND SEIZURES. PERSONS WITH PRE-EXISTING HEART DISORDERS MAY BE MORE SUSCEPTIBLE TO IRREGULAR HEARTBEATS (ARRHYTHMIAS) IF EXPOSED TO HIGH CONCENTRATIONS OF THIS MATERIAL (SEE SECTION II - NOTE TO PHYSICIANS). GASOLINE ENGINE EXHAUST HAS BEEN IDENTIFIED AS A POSSIBLE HUMAN CANCER HAZARD BY IARC. THIS CLASSIFICATION IS BASED ON THE FINDING THAT SOLVENT EXTRACTS OF GASOLINE EXHAUST SOOT CAUSED SKIN CANCER IN LABORATORY ANIMALS.

SECTION IV - SPECIAL PROTECTION INFORMATION

VENTILATION:

IF CURRENT VENTILATION PRACTICES ARE NOT ADEQUATE TO MAINTAIN AIRBORNE CONCENTRATIONS BELOW THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I), ADDITIONAL VENTILATION OR EXHAUST SYSTEMS MAY BE REQUIRED. WHERE EXPLOSIVE MIXTURES MAY BE PRESENT, ELECTRICAL SYSTEMS SAFE FOR SUCH LOCATIONS MUST BE USED.

RESPIRATORY PROTECTION:

THE USE OF RESPIRATORY PROTECTION IS ADVISED WHEN CONCENTRATIONS EXCEED THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I). DEPENDING ON THE AIRBORNE CONCENTRATION, USE A RESPIRATOR OR GAS MASK WITH APPROPRIATE CARTRIDGES AND CANNISTERS (NIOSH APPROVED, IF AVAILABLE) OR SUPPLIED AIR EQUIPMENT.

PROTECTIVE GLOVES:

THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT AND POSSIBLE IRRITATION.

EYE PROTECTION:

APPROVED EYE PROTECTION TO SAFEGUARD AGAINST POTENTIAL EYE CONTACT, IRRITATION OR INJURY IS RECOMMENDED.

OTHER PROTECTIVE EQUIPMENT:

IT IS SUGGESTED THAT A SOURCE OF CLEAN WATER BE AVAILABLE IN THE WORK AREA FOR FLUSHING EYES AND SKIN. IMPERVIOUS CLOTHING SHOULD BE WORN AS NEEDED.

SECTION V - REACTIVITY DATA

REACTIVITY:

STABLE UNDER NORMAL CONDITIONS OF STORAGE AND HANDLING.

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE.

CONDITIONS AFFECTING REACTIVITY:

AVOID ALL POSSIBLE SOURCES OF IGNITION (SEE SECTIONS VII AND VIII).

INCOMPATIBLE MATERIALS:

CONTACT WITH STRONG OXIDIZING AGENTS SUCH AS CHLORINE, PERMANGANATES AND DICHROMATES MAY CAUSE FIRE OR EXPLOSION.

HAZARDOUS DECOMPOSITION PRODUCTS:

COMBUSTION MAY YIELD SIGNIFICANT AMOUNTS OF CARBON MONOXIDE AND SMALL AMOUNTS OF OXIDES OF SULFUR AND NITROGEN, BENZENE AND OTHER ORGANIC COMPOUNDS.

HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR

POLYMERIZATION CONDITIONS TO AVOID:

NONE KNOWN

SECTION VI - SPILL AND LEAK PROCEDURES ***HIGHWAY OR RAILWAY SPILLS***
Call CHEMTREC (800) 424-9300 Cont. U.S.
(Collect) (202) 483-7616 from Alaska & Hawaii

PRECAUTIONS IN CASE OF RELEASE OR SPILL:

EXTREMELY FLAMMABLE. KEEP ALL SOURCES OF IGNITION AND HOT METAL SURFACES AWAY FROM SPILL/RELEASE. STAY UPWIND AND AWAY FROM SPILL/RELEASE. ISOLATE HAZARD AREA AND LIMIT ENTRY TO EMERGENCY CREW. STOP SPILL/RELEASE IF IT CAN BE DONE WITHOUT RISK. WEAR APPROPRIATE PROTECTIVE EQUIPMENT INCLUDING RESPIRATORY PROTECTION AS CONDITIONS WARRANT (SEE SECTION IV). PREVENT SPILLED MATERIAL FROM ENTERING SEWERS, STORM DRAINS, OTHER UNAUTHORIZED TREATMENT DRAINAGE SYSTEMS AND NATURAL WATERWAYS. DIKE FAR AHEAD OF SPILL FOR LATER RECOVERY OR DISPOSAL. SPILLED MATERIAL MAY BE ABSORBED INTO AN APPROPRIATE ABSORBENT MATERIAL. NOTIFY FIRE AUTHORITIES AND APPROPRIATE FEDERAL, STATE AND LOCAL AGENCIES. IMMEDIATE CLEANUP OF ANY SPILL IS RECOMMENDED. IF SPILL OF ANY AMOUNT IS MADE INTO OR UPON U.S. NAVIGABLE WATERS, THE CONTIGUOUS ZONE, OR ADJOINING SHORELINES, NOTIFY THE NATIONAL RESPONSE CENTER (PHONE NUMBER 800-424-8802).

WASTE DISPOSAL METHOD:

DISPOSE OF PRODUCT IN ACCORDANCE WITH LOCAL, COUNTY, STATE, AND FEDERAL REGULATIONS.

SECTION VII - STORAGE AND SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

KEEP CONTAINER(S) TIGHTLY CLOSED. USE AND STORE THIS MATERIAL IN COOL, DRY, WELL VENTILATED AREAS AWAY FROM HEAT, DIRECT SUNLIGHT, HOT METAL SURFACES AND ALL SOURCES OF IGNITION. POST AREA "NO SMOKING OR OPEN FLAME." BOND AND GROUND ALL EQUIPMENT WHEN TRANSFERRING FROM ONE VESSEL TO ANOTHER. STORE ONLY IN APPROVED CONTAINERS. KEEP AWAY FROM ANY INCOMPATIBLE MATERIALS (SEE SECTION V). PROTECT CONTAINER(S) AGAINST PHYSICAL DAMAGE. THE USE OF EXPLOSION-PROOF EQUIPMENT IS RECOMMENDED AND MAY BE REQUIRED (SEE APPROPRIATE FIRE CODES.) DO NOT ENTER CONFINED SPACES SUCH AS TANKS OR PITS WITHOUT FOLLOWING PROPER ENTRY PROCEDURES SUCH AS ASTM D-4276. OUTDOOR OR

UNION OIL CO.

Product Name: UNOCAL 76 LEADED REGULAR GASOLINE
Product Code No: 00301

Issue Date: 04/15/91
Status: FINAL

SECTION VII - STORAGE AND SPECIAL PRECAUTIONS

DETACHED STORAGE IS PREFERRED. INDOOR STORAGE SHOULD MEET OSHA STANDARDS AND APPROPRIATE FIRE CODES. THE USE OF RESPIRATORY PROTECTION IS ADVISED WHEN CONCENTRATIONS EXCEED ANY ESTABLISHED EXPOSURE LIMITS (SEE SECTIONS I AND IV). WASH THOROUGHLY AFTER HANDLING. DO NOT WEAR CONTAMINATED CLOTHING OR SHOES. USE GOOD PERSONAL HYGIENE PRACTICE. "EMPTY" CONTAINERS RETAIN RESIDUE (LIQUID AND/OR VAPOR) AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. "EMPTY" DRUMS SHOULD BE COMPLETELY DRAINED, PROPERLY BUNGED AND PROMPTLY SHIPPED TO THE SUPPLIER OR A DRUM RECONDITIONER. ALL OTHER CONTAINERS SHOULD BE DISPOSED OF IN AN ENVIRONMENTALLY SAFE MANNER AND IN ACCORDANCE WITH GOVERNMENTAL REGULATIONS. BEFORE WORKING ON OR IN TANKS WHICH CONTAIN OR HAVE CONTAINED THIS PRODUCT, REFER TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ANSI Z49.1, AND OTHER GOVERNMENTAL AND INDUSTRIAL REFERENCES PERTAINING TO CLEANING, REPAIRING, WELDING, OR OTHER CONTEMPLATED OPERATIONS.

SECTION VIII - FIRE AND EXPLOSION HAZARD DATA

			HAZARD RANKING	
NFPA HAZARD CLASS	HEALTH HAZARD:	2	0 = LEAST	FLASH POINT
	FLAMMABILITY:	3	1 = SLIGHT	
	REACTIVITY:	0	2 = MODERATE	-45 F (TCC)
	OTHER:		3 = HIGH	
			4 = EXTREME	

EXTINGUISHING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, HALON, FOAM OR WATER SPRAY IS RECOMMMENDED. WATER MAY BE INEFFECTIVE.

UNUSUAL FIRE & EXPLOSION HAZARDS:

THIS MATERIAL IS EXTREMELY FLAMMABLE AND MAY BE IGNITED BY HEAT, SPARKS, FLAME OR OTHER SOURCES OF IGNITION (e.g. STATIC ELECTRICITY, PILOT LIGHTS, MECHANICAL/ELECTRICAL EQUIPMENT). VAPORS MAY TRAVEL CONSIDERABLE DISTANCES TO A SOURCE OF IGNITION WHERE THEY MAY IGNITE, FLASHBACK OR EXPLODE. VAPOR/AIR EXPLOSION HAZARD INDOORS/OUTDOORS OR IN SEWERS. VAPORS ARE HEAVIER THAN AIR AND MAY ACCUMULATE IN LOW AREAS. IF CONTAINER IS NOT PROPERLY COOLED, IT MAY EXPLODE IN THE HEAT OF A FIRE.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR APPROPRIATE PROTECTIVE EQUIPMENT INCLUDING RESPIRATORY PROTECTION AS CONDITIONS WARRANT (SEE SECTION IV). STOP SPILL/RELEASE IF IT CAN BE DONE WITHOUT RISK. MOVE UNDAMAGED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. WATER SPRAY MAY BE USEFUL IN MINIMIZING OR DISPERSING VAPORS AND COOLING EQUIPMENT EXPOSED TO HEAT AND FLAME. AVOID SPREADING BURNING LIQUID WITH WATER USED FOR COOLING PURPOSES.

SECTION IX - PHYSICAL DATA

***UNLESS OTHERWISE NOTED, VALUES ARE AT 20 C/68 F AND 760 mm Hg/1 atm.

APPROX BOILING POINT	(AIR = 1) VAPOR DENSITY	(N-BUTYL ACETATE = 1) EVAPORATION RATE	% VOLATILE
85-430F / 29-221C	>1	<1	100

% SOLUBILITY IN WATER

NEGLIGIBLE

SPECIFIC GRAVITY

0.80

UNION OIL CO.

Product Name: UNOCAL 76 LEADED REGULAR GASOLINE
Product Code No: 00301

Issue Date: 04/15/91
Status: FINAL

SECTION IX - PHYSICAL DATA

APPEARANCE

BRONZE COLORED LIQUID

ODOR

GASOLINE

SECTION X - DOCUMENTARY INFORMATION

ISSUE DATE: 04/15/91 PRODUCT CODE NO. 00301

PREV. DATE: 05/04/90 PREV. PROD. CODE NO. NONE

MSDS NO: NONE PREV. MSDS NO: NONE

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date issued. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

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MATERIAL SAFETY DATA SHEET

UNOCAL 76

1201 West 5th Street
Los Angeles, California 90017

Product Name: UNOCAL PERFORMANCE PLUS 89
Product Code No: 00401

Issue Date: 04/15/91
Status: FINAL

Responsible Party:	Transportation Emergencies:
UNOCAL REFINING & MARKETING DIVISION UNION OIL COMPANY OF CALIFORNIA 1201 WEST 5TH STREET LOS ANGELES, CALIFORNIA 90017 CONTACT FOR FURTHER INFORMATION: MSDS COORDINATOR 213-977-7589	CHEMTREC (800) 424-9300 Cont. U.S. (202) 483-7616 (Collect) from Alaska & Hawaii Health Emergencies: LOS ANGELES POISON CONTROL CENTER (24 hrs) (800) 356-3129

PRODUCT IDENTIFICATION

PRODUCT NAME: UNOCAL PERFORMANCE PLUS 89

SYNONYMS: UNOCAL 76 UNLEADED GASOLINE

GENERIC NAME: UNLEADED GASOLINE

CHEMICAL FAMILY: PETROLEUM HYDROCARBON MIXTURE

DOT PROPER SHIPPING NAME: GASOLINE

ID NUMBER: UN1203

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID

PRECAUTIONARY WARNING

DANGER
EXTREMELY FLAMMABLE. VAPORS MAY EXPLODE. HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. POSSIBLE CANCER HAZARD BASED ON TESTS WITH LABORATORY ANIMALS. ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. NO SMOKING OR OPEN FLAME. KEEP AWAY FROM HEAT, SPARKS, FLAMES OR OTHER SOURCES OF IGNITION (e.g. STATIC ELECTRICITY, PILOT LIGHTS OR MECHANICAL/ELECTRICAL EQUIPMENT). VAPORS MAY BE IGNITED BY SPARK OR FLAME SOURCE MANY FEET AWAY. DO NOT OVERFILL TANK. USE ONLY WITH ADEQUATE VENTILATION. DO NOT TASTE OR SWALLOW. DO NOT BREATHE VAPOR OR MIST. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. WASH THOROUGHLY AFTER HANDLING. NEVER SIPHON BY MOUTH. FOR USE AS MOTOR FUEL ONLY. DO NOT USE FOR ANY OTHER PURPOSE. KEEP CONTAINER CLOSED. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, GRIND OR DRILL ON OR NEAR CONTAINER. "EMPTY" CONTAINER RETAINS RESIDUE (LIQUID AND/OR VAPOR) AND MAY EXPLODE IN HEAT OF A FIRE. KEEP OUT OF REACH OF CHILDREN. FAILURE TO USE CAUTION MAY CAUSE SERIOUS INJURY OR ILLNESS.

SECTION I - COMPONENTS	PERCENT	EXPOSURE LIMIT	UNITS	AGENCY	TYPE
HAZARDOUS COMPONENTS					
GASOLINE CAS #: 8006-61-9		300.000	ppm	ACGIH	TWA
		500.000	ppm	ACGIH	STEL
		300.000	ppm	OSHA	TWA
		500.000	ppm	OSHA	STEL

UNION OIL CO.

Product Name: UNOCAL PERFORMANCE PLUS 89
Product Code No: 00401

Issue Date: 04/15/91
Status: FINAL

SECTION I - COMPONENTS	PERCENT	EXPOSURE LIMIT	UNITS	AGENCY	TYPE
		300.000	ppm	CAL OSHA	TWA
BENZENE					
CAS #: 71-43-2	1.000 - 5.000	10.000	ppm	ACGIH	TWA
		25.000	ppm	MSHA	CEIL-SKIN
		1.000	ppm	OSHA	TWA
		5.000	ppm	OSHA	STEL
		50.000	ppm	CAL OSHA	CEIL
		25.000	ppm	CAL OSHA	EXCUR
		10.000	ppm	CAL OSHA	TWA-SKIN
TOLUENE					
CAS #: 108-88-3	1.000 - 9.000	100.000	ppm	ACGIH	TWA
		150.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		150.000	ppm	OSHA	STEL
		200.000	ppm	CAL OSHA	EXCUR
		100.000	ppm	CAL OSHA	TWA-SKIN
		500.000	ppm	CAL OSHA	CEIL-SKIN
XYLENES					
CAS #: 1330-20-7	1.000 - 14.000	100.000	ppm	ACGIH	TWA
		150.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		150.000	ppm	OSHA	STEL
		200.000	ppm	CAL OSHA	EXCUR
		100.000	ppm	CAL OSHA	TWA-SKIN
		300.000	ppm	CAL OSHA	CEIL-SKIN
N-HEXANE					
CAS #: 110-54-3		50.000	ppm	ACGIH	TWA
		500.000	ppm	MSHA	TWA
		50.000	ppm	OSHA	TWA
		50.000	ppm	CAL OSHA	TWA
ETHYLBENZENE					
CAS #: 100-41-4	1.000 - 5.000	100.000	ppm	ACGIH	TWA
		125.000	ppm	ACGIH	STEL
		100.000	ppm	MSHA	TWA
		100.000	ppm	OSHA	TWA
		125.000	ppm	OSHA	STEL
		100.000	ppm	CAL OSHA	TWA
1,2,4-TRIMETHYLBENZENE		NOT ESTABLISHED			
CAS #: 95-63-6	1.000 - 5.000				

OTHER COMPONENTS

--NONE--

THIS PRODUCT CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA 313 AND 40 CFR 372:	CAS NUMBER	WEIGHT %
BENZENE	71-43-2	1-5
TOLUENE	108-88-3	1-9
XYLENES	1330-20-7	1-14
ETHYLBENZENE	100-41-4	1-5
METHYL TERT-BUTYL ETHER	1634-04-4	0-10
1,2,4-TRIMETHYLBENZENE	95-63-6	1-5

SECTION II - EMERGENCY AND FIRST AID PROCEDURES ***EMERGENCY***
Have physician call LOS ANGELES POISON CONTROL CENTER (24 hrs) (800) 356-3129

EYE CONTACT:

IF IRRITATION OR REDNESS DEVELOPS, MOVE VICTIM AWAY FROM EXPOSURE AND INTO FRESH AIR. FLUSH EYES WITH CLEAN WATER. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION.

SKIN CONTACT:

WIPE MATERIAL FROM SKIN AND REMOVE CONTAMINATED SHOES AND CLOTHING. CLEANSE AFFECTED AREA(S) THOROUGHLY BY WASHING WITH MILD SOAP AND WATER AND, IF NECESSARY, A WATERLESS SKIN CLEANSER. IF IRRITATION OR REDNESS DEVELOPS AND PERSISTS, SEEK MEDICAL ATTENTION.

INHALATION (BREATHING):

IF RESPIRATORY SYMPTOMS OR OTHER SYMPTOMS OF EXPOSURE DEVELOP, MOVE VICTIM AWAY FROM SOURCE OF EXPOSURE AND INTO FRESH AIR. IF SYMPTOMS PERSIST, SEEK IMMEDIATE MEDICAL ATTENTION. IF VICTIM IS NOT BREATHING, IMMEDIATELY BEGIN ARTIFICIAL RESPIRATION. IF BREATHING DIFFICULTIES DEVELOP, OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. SEEK IMMEDIATE MEDICAL ATTENTION.

INGESTION (SWALLOWING):

ASPIRATION HAZARD: DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH BECAUSE THIS MATERIAL CAN ENTER THE LUNGS AND CAUSE SEVERE LUNG DAMAGE. IF VICTIM IS DROWSY OR UNCONSCIOUS, PLACE ON THE LEFT SIDE WITH THE HEAD DOWN. IF POSSIBLE, DO NOT LEAVE VICTIM UNATTENDED. SEEK MEDICAL ATTENTION.

COMMENTS:

NOTE TO PHYSICIANS: EXPOSURE TO HIGH CONCENTRATIONS OF THIS MATERIAL (e.g. IN ENCLOSED SPACES OR WITH DELIBERATE ABUSE) MAY BE ASSOCIATED WITH CARDIAC ARRHYTHMIAS. EPINEPHRINE AND OTHER SYMPATHOMIMETIC DRUGS MAY INITIATE CARDIAC ARRHYTHMIAS IN PERSONS EXPOSED TO THIS MATERIAL. OTHER DRUGS WITH LESS ARRHYTHMOGENIC POTENTIAL SHOULD BE CONSIDERED. IF SYMPATHOMIMETIC DRUGS ARE ADMINISTERED, OBSERVE FOR THE DEVELOPMENT OF CARDIAC ARRHYTHMIAS.

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

EYE CONTACT:

THIS MATERIAL MAY CAUSE MILD EYE IRRITATION. DIRECT CONTACT WITH THE LIQUID OR EXPOSURE TO VAPORS OR MISTS MAY CAUSE STINGING, TEARING AND REDNESS.

SKIN CONTACT:

THIS MATERIAL MAY CAUSE MILD SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY CAUSE REDNESS, BURNING, AND DRYING AND CRACKING OF THE SKIN. CONTACT MAY RESULT IN SKIN ABSORPTION BUT SYMPTOMS OF TOXICITY ARE NOT ANTICIPATED BY THIS ROUTE ALONE UNDER NORMAL CONDITIONS OF USE. PERSONS WITH PRE-EXISTING SKIN DISORDERS MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS MATERIAL.

INHALATION (BREATHING):

WHILE THIS MATERIAL HAS A LOW DEGREE OF TOXICITY, BREATHING HIGH CONCENTRATIONS OF VAPORS OR MISTS MAY CAUSE FLUSHING, BLURRED VISION, NAUSEA AND SIGNS OF NERVOUS SYSTEM DEPRESSION (e.g. HEADACHE, DROWSINESS, DIZZINESS, LOSS OF COORDINATION AND FATIGUE). EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE LOSS OF CONSCIOUSNESS, CONVULSIONS, RESPIRATORY COLLAPSE AND DEATH. RESPIRATORY SYMPTOMS ASSOCIATED WITH PRE-EXISTING LUNG DISORDERS (e.g. ASTHMA-LIKE CONDITIONS) MAY BE AGGRAVATED BY EXPOSURE TO THIS MATERIAL.

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

INGESTION (SWALLOWING):

ASPIRATION HAZARD - THIS MATERIAL CAN ENTER LUNGS DURING SWALLOWING OR VOMITING AND CAUSE LUNG INFLAMMATION AND DAMAGE. INGESTION OF EXCESSIVE QUANTITIES OF THIS MATERIAL MAY CAUSE IRRITATION OF THE DIGESTIVE TRACT AND SIGNS OF NERVOUS SYSTEM DEPRESSION (e.g. HEADACHE, DROWSINESS, DIZZINESS, LOSS OF COORDINATION, AND FATIGUE).

COMMENTS:

GASOLINE IS A POSSIBLE CANCER HAZARD BASED ON TESTS IN LABORATORY ANIMALS. FOLLOW-UP STUDIES SUGGEST THAT THIS MAY BE A UNIQUE EFFECT IN MALE RATS. UNLEADED GASOLINE HAS BEEN IDENTIFIED AS A POSSIBLE CARCINOGEN BY IARC. BENZENE, A COMPONENT OF THIS PRODUCT, IS A KNOWN CANCER (LEUKEMIA) HAZARD. RESULTS OF TESTS IN HUMANS HAVE SHOWN THAT EXPOSURE TO BENZENE CAN CAUSE IRREVERSIBLE CHANGES IN THE GENETIC MATERIAL (DNA) OF A CELL. THE HUMAN HEALTH CONSEQUENCES OF THESE CHANGES IS NOT FULLY UNDERSTOOD. BENZENE HAS BEEN IDENTIFIED AS A CARCINOGEN BY IARC, NTP AND OSHA. THERE IS INSUFFICIENT EVIDENCE TO SHOW THAT GASOLINE POSES ANY HAZARD RELATED TO ITS LOW BENZENE CONTENT. PERSONS WITH PRE-EXISTING HEART DISORDERS MAY BE MORE SUSCEPTIBLE TO IRREGULAR HEARTBEATS (ARRHYTHMIAS) IF EXPOSED TO HIGH CONCENTRATIONS OF THIS MATERIAL (SEE SECTION II - NOTE TO PHYSICIANS). GASOLINE ENGINE EXHAUST HAS BEEN IDENTIFIED AS A POSSIBLE HUMAN CANCER HAZARD BY IARC. THIS CLASSIFICATION IS BASED ON THE FINDING THAT SOLVENT EXTRACTS OF GASOLINE EXHAUST SOOT CAUSED SKIN CANCER IN LABORATORY ANIMALS.

SECTION IV - SPECIAL PROTECTION INFORMATION

VENTILATION:

IF CURRENT VENTILATION PRACTICES ARE NOT ADEQUATE TO MAINTAIN AIRBORNE CONCENTRATIONS BELOW THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I), ADDITIONAL VENTILATION OR EXHAUST SYSTEMS MAY BE REQUIRED. WHERE EXPLOSIVE MIXTURES MAY BE PRESENT, ELECTRICAL SYSTEMS SAFE FOR SUCH LOCATIONS MUST BE USED.

RESPIRATORY PROTECTION:

THE USE OF RESPIRATORY PROTECTION IS ADVISED WHEN CONCENTRATIONS EXCEED THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I). DEPENDING ON THE AIRBORNE CONCENTRATION, USE A RESPIRATOR OR GAS MASK WITH APPROPRIATE CARTRIDGES AND CANNISTERS (NIOSH APPROVED, IF AVAILABLE) OR SUPPLIED AIR EQUIPMENT.

PROTECTIVE GLOVES:

THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT AND POSSIBLE IRRITATION.

EYE PROTECTION:

APPROVED EYE PROTECTION TO SAFEGUARD AGAINST POTENTIAL EYE CONTACT, IRRITATION OR INJURY IS RECOMMENDED.

OTHER PROTECTIVE EQUIPMENT:

IT IS SUGGESTED THAT A SOURCE OF CLEAN WATER BE AVAILABLE IN THE WORK AREA FOR FLUSHING EYES AND SKIN. IMPERVIOUS CLOTHING SHOULD BE WORN AS NEEDED.

SECTION V - REACTIVITY DATA

REACTIVITY:

STABLE UNDER NORMAL CONDITIONS OF STORAGE AND HANDLING.

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE.

UNION OIL CO.

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Status: FINAL

SECTION V - REACTIVITY DATA

CONDITIONS AFFECTING REACTIVITY:

AVOID ALL POSSIBLE SOURCES OF IGNITION (SEE SECTIONS VII AND VIII).

INCOMPATIBLE MATERIALS:

CONTACT WITH STRONG OXIDIZING AGENTS SUCH AS CHLORINE, PERMANGANATES AND DICHROMATES MAY CAUSE FIRE OR EXPLOSION.

HAZARDOUS DECOMPOSITION PRODUCTS:

COMBUSTION MAY YIELD SIGNIFICANT AMOUNTS OF CARBON MONOXIDE AND SMALL AMOUNTS OF OXIDES OF SULFUR AND NITROGEN, BENZENE AND OTHER ORGANIC COMPOUNDS.

HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR

POLYMERIZATION CONDITIONS TO AVOID:

NONE KNOWN

SECTION VI - SPILL AND LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS
Call CHEMTREC (800) 424-9300 Cont. U.S.
(Collect) (202) 483-7616 from Alaska & Hawaii

PRECAUTIONS IN CASE OF RELEASE OR SPILL:

EXTREMELY FLAMMABLE. KEEP ALL SOURCES OF IGNITION AND HOT METAL SURFACES AWAY FROM SPILL/RELEASE. STAY UPWIND AND AWAY FROM SPILL/RELEASE. ISOLATE HAZARD AREA AND LIMIT ENTRY TO EMERGENCY CREW. STOP SPILL/RELEASE IF IT CAN BE DONE WITHOUT RISK. WEAR APPROPRIATE PROTECTIVE EQUIPMENT INCLUDING RESPIRATORY PROTECTION AS CONDITIONS WARRANT (SEE SECTION IV). PREVENT SPILLED MATERIAL FROM ENTERING SEWERS, STORM DRAINS, OTHER UNAUTHORIZED TREATMENT DRAINAGE SYSTEMS AND NATURAL WATERWAYS. DIKE FAR AHEAD OF SPILL FOR LATER RECOVERY OR DISPOSAL. SPILLED MATERIAL MAY BE ABSORBED INTO AN APPROPRIATE ABSORBENT MATERIAL. NOTIFY FIRE AUTHORITIES AND APPROPRIATE FEDERAL, STATE AND LOCAL AGENCIES. IMMEDIATE CLEANUP OF ANY SPILL IS RECOMMENDED. IF SPILL OF ANY AMOUNT IS MADE INTO OR UPON U.S. NAVIGABLE WATERS, THE CONTIGUOUS ZONE, OR ADJOINING SHORELINES, NOTIFY THE NATIONAL RESPONSE CENTER (PHONE NUMBER 800-424-8802).

WASTE DISPOSAL METHOD:

DISPOSE OF PRODUCT IN ACCORDANCE WITH LOCAL, COUNTY, STATE, AND FEDERAL REGULATIONS.

SECTION VII - STORAGE AND SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

KEEP CONTAINER(S) TIGHTLY CLOSED. USE AND STORE THIS MATERIAL IN COOL, DRY, WELL VENTILATED AREAS AWAY FROM HEAT, DIRECT SUNLIGHT, HOT METAL SURFACES AND ALL SOURCES OF IGNITION. POST AREA "NO SMOKING OR OPEN FLAME." BOND AND GROUND ALL EQUIPMENT WHEN TRANSFERRING FROM ONE VESSEL TO ANOTHER. STORE ONLY IN APPROVED CONTAINERS. KEEP AWAY FROM ANY INCOMPATIBLE MATERIALS (SEE SECTION V). PROTECT CONTAINER(S) AGAINST PHYSICAL DAMAGE. THE USE OF EXPLOSION-PROOF EQUIPMENT IS RECOMMENDED AND MAY BE REQUIRED (SEE APPROPRIATE FIRE CODES.) DO NOT ENTER CONFINED SPACES SUCH AS TANKS OR PITS WITHOUT FOLLOWING PROPER ENTRY PROCEDURES SUCH AS ASTM D-4276. OUTDOOR OR DETACHED STORAGE IS PREFERRED. INDOOR STORAGE SHOULD MEET OSHA STANDARDS AND APPROPRIATE FIRE CODES. THE USE OF RESPIRATORY PROTECTION IS ADVISED WHEN CONCENTRATIONS EXCEED ANY ESTABLISHED EXPOSURE LIMITS (SEE SECTIONS I AND IV). WASH THOROUGHLY AFTER HANDLING. DO NOT WEAR CONTAMINATED CLOTHING OR SHOES. USE GOOD PERSONAL HYGIENE PRACTICE. "EMPTY" CONTAINERS RETAIN RESIDUE (LIQUID AND/OR VAPOR) AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE

SECTION VII - STORAGE AND SPECIAL PRECAUTIONS

AND CAUSE INJURY OR DEATH. "EMPTY" DRUMS SHOULD BE COMPLETELY DRAINED, PROPERLY BUNGED AND PROMPTLY SHIPPED TO THE SUPPLIER OR A DRUM RECONDITIONER. ALL OTHER CONTAINERS SHOULD BE DISPOSED OF IN AN ENVIRONMENTALLY SAFE MANNER AND IN ACCORDANCE WITH GOVERNMENTAL REGULATIONS. BEFORE WORKING ON OR IN TANKS WHICH CONTAIN OR HAVE CONTAINED THIS PRODUCT, REFER TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ANSI Z49.1, AND OTHER GOVERNMENTAL AND INDUSTRIAL REFERENCES PERTAINING TO CLEANING, REPAIRING, WELDING, OR OTHER CONTEMPLATED OPERATIONS.

SECTION VIII - FIRE AND EXPLOSION HAZARD DATA

			HAZARD RANKING	
NFPA HAZARD CLASS	HEALTH HAZARD:	2	0 = LEAST	FLASH POINT
	FLAMMABILITY:	3	1 = SLIGHT	
	REACTIVITY:	0	2 = MODERATE	-45 F (TCC)
	OTHER:		3 = HIGH	
			4 = EXTREME	

EXTINGUISHING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, HALON, FOAM OR WATER SPRAY IS RECOMMMENDED. WATER MAY BE INEFFECTIVE.

UNUSUAL FIRE & EXPLOSION HAZARDS:

THIS MATERIAL IS EXTREMELY FLAMMABLE AND MAY BE IGNITED BY HEAT, SPARKS, FLAME OR OTHER SOURCES OF IGNITION (e.g. STATIC ELECTRICITY, PILOT LIGHTS, MECHANICAL/ELECTRICAL EQUIPMENT). VAPORS MAY TRAVEL CONSIDERABLE DISTANCES TO A SOURCE OF IGNITION WHERE THEY MAY IGNITE, FLASHBACK OR EXPLODE. VAPOR/AIR EXPLOSION HAZARD INDOORS/OUTDOORS OR IN SEWERS. VAPORS ARE HEAVIER THAN AIR AND MAY ACCUMULATE IN LOW AREAS. IF CONTAINER IS NOT PROPERLY COOLED, IT MAY EXPLODE IN THE HEAT OF A FIRE.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR APPROPRIATE PROTECTIVE EQUIPMENT INCLUDING RESPIRATORY PROTECTION AS CONDITIONS WARRANT (SEE SECTION IV). STOP SPILL/RELEASE IF IT CAN BE DONE WITHOUT RISK. MOVE UNDAMAGED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. WATER SPRAY MAY BE USEFUL IN MINIMIZING OR DISPERSING VAPORS AND COOLING EQUIPMENT EXPOSED TO HEAT AND FLAME. AVOID SPREADING BURNING LIQUID WITH WATER USED FOR COOLING PURPOSES.

SECTION IX - PHYSICAL DATA

***UNLESS OTHERWISE NOTED, VALUES ARE AT 20 C/68 F AND 760 mm Hg/1 atm.

APPROX BOILING POINT	(AIR = 1) VAPOR DENSITY	(N-BUTYL ACETATE = 1) EVAPORATION RATE	% VOLATILE
85-430F / 29-221C	>1	<1	100

% SOLUBILITY IN WATER

NEGLIGIBLE

SPECIFIC GRAVITY

0.75

APPEARANCE

CLEAR LIQUID

ODOR

GASOLINE

SECTION X - DOCUMENTARY INFORMATION

ISSUE DATE: 04/15/91 PRODUCT CODE NO. 00401

PREV. DATE: 05/04/90 PREV. PROD. CODE NO. NONE

MSDS NO: NONE PREV. MSDS NO: NONE

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