HARTCROWSER

Earth and Environmental Technologies

SAMPLING AND ANALYSIS PLAN

GRAND AUTO/SUPER TIRE FACILITIES
4240/4256 E. 14th STREET,
OAKLAND, CALIFORNIA 94601

PACCAR AUTOMOTIVE, INC.

J-6077

HART CROWSER, INC.

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SAMPLING AND ANALYSIS PLAN
GRAND AUTO/SUPER TIRE FACILITIES
4240/4256 E. 14th Street, Oakland, CAlifornia

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4240 / 4256 E. 14th STREET, OAKLAND, CA.

1.0 INTRODUCTION AND OVERVIEW

Hart Crowser has prepared this Sampling and Analysis Plan (SAP) for the Preliminary Site Investigation being conducted at the Grand Auto and former Super Tire facilities (the site) at the 4240 and 4256 East 14th Street in Oakland, California. The site is located at the corner of East 14th Street and High Street in Oakland, California, as shown on the Site Location Map (Figure 1). This SAP was prepared for PACCAR Automotive, Inc. (PAI) in accordance with our "Proposal to Provide Environmental Assessment and Restoration Services" (the Proposal), dated May 29, 1992.

This SAP is composed of a Field Sampling Plan (FSP), Quality Assurance/ Quality Control Plan (QA/QC Plan) and Health and Safety Plan (HSP) (Appendix B). The purpose of the SAP is to describe field activities which will be undertaken to obtain site-specific chemical analysis and site characterization data needed to evaluate potential remediation alternatives for the Site.

2.0 PROJECT DESCRIPTION

The following paragraphs present a summary of the Preliminary Site Investigation being conducted at the site. This section includes a discussion of the purpose of the investigation; a summary of the site background; and the scope of the field investigation.

2.1 *Purpose of the Preliminary Site Investigation*

Each of the two facilities has been used for underground storage of petroleum fuels. Records of tank removals are limited. PAI is currently leasing the site, and has entered into an agreement with the property owner to a site investigation and perform environmental remedial activities as necessary. The purpose of the field investigation is to obtain site-specific characterization data. This data may be used for future remedial activities.

2.2 *Site Background*

4240 E 14th St

The Grand Auto retail facility is located on an approximate 1.2 acre site. Three 10,000-gallon underground fuel storage tanks were installed during 1972 and removed during the second half of 1986. No information on the tank removal or any interim remedial actions that were taken at that time are available. A tank integrity test performed prior to tank removal indicated a leak in at least one of the tanks. As a result, impacts to site soils and groundwater in this area likely occurred. Based on observations made during a site visit, the pump islands and fuel conveyance piping were not removed during the tank closure.

why not ?

4256 E 14th St

The Super Tire facility was leased by PAI in March, 1976. PAI never operated the site as a gas station, but did remove two existing underground gasoline storage tanks and a waste oil tank in July 1976. No environmental sampling was done as part of the tank removal, and no information on the tanks' condition at the time of removal are available. Based on observations made during our site visit, the pump islands, product piping and vent pipes were not removed during tank closure. Two hydraulic hoists and a floor sump remain in the service bay of this facility.

2.3 *Scope of the Field Investigation*

The following tasks will be performed by Hart Crowser during the field investigation:

- Subsurface soil sampling and monitoring well installation will be performed to characterize soil and groundwater quality in areas of the site which are most likely to have been impacted by the former fuel storage operations. The monitoring wells will be used to obtain groundwater quality data, potentiometric data, and to determine the hydrogeologic characteristics of the shallow aquifer beneath the site. Actual installation of these monitoring wells will be contingent on the noted presence of petroleum hydrocarbons, as determined by visual field observations and photo-ionization detector (PID) readings during soil sampling.

- Sumps and inactive hydraulic hoists will be removed from the site. Two hydraulic hoists and a floor sump remain at the former Super Tire Facility. An additional sump will be removed from the former car wash area at the Grand Auto facility. Removal of these objects and sampling of the excavations will occur in accordance with Alameda County Department of Environmental Health (ACDEH) requirements.

Details of each of these proposed tasks are provided in Section 3.0 of this SAP. The QA/QC procedures for the field investigations, including sample storage, handling, and custody, are discussed in Section 4.0 of the SAP. All field investigation tasks will be conducted in accordance with the Site Health and Safety Plan (Appendix B).

3.0 FIELD SAMPLING PLAN

This field sampling plan (FSP) describes the type, location, quantity and rationale for all samples to be collected and measurements to be made during this investigation. This FSP includes the following information:

- The objectives of the investigation;
- A description of the types of samples (soil, groundwater) which will be taken, and the chemical parameters which will be analyzed or tested for in the samples;
- A description of the depth and frequency of sampling at each location;
- Specifications for drilling of soil borings and construction of groundwater monitoring wells.
- A map showing all locations which will be sampled;

3.1 *Soil Boring and Monitoring Well Installation*

3.1.1 Soil Boring and Monitoring Well Placement Objectives

The objectives of the subsurface soil sampling effort are to characterize the nature and extent of potential subsurface contamination borings locations were determined based on the examination of historical aerial photos and maps, as well as the

current site configuration. The objective of the groundwater monitoring well installations is to determine potential impacts groundwater from a previous release of petroleum fuel.

The groundwater investigation at this site will involve the installation of ground water monitoring wells in the shallow groundwater aquifer. According to regional information, depth to groundwater ranges from approximately 6 to 15 feet BGS, and the regional groundwater flow direction is to the southwest.

3.1.2 Types, Locations, and Numbers of Soil Borings and Wells

A maximum of six subsurface borings will be drilled on the site during this Preliminary Site Investigation. Of these six borings, three may be converted to groundwater monitoring wells. The proposed locations of the borings and wells are shown on Figure 2. The locations of these borings are approximate and may change due to unforeseen conditions such as site access, drilling refusal and the presence of utilities.

The initial boring will be continuously sampled to more clearly define stratigraphic details and local depth to groundwater. A minimum of three soil samples will be collected from each boring. Should extremely shallow groundwater depths exist at the site (less than 5 feet), the remaining borings will similarly be continuously sampled to the depth of static water. If the depth to groundwater is greater than 5 feet, one soil sample will be obtained from within the first three feet of the subsurface, and then at five foot intervals to the total depth of the boring. Soil samples may also be collected at depths of known or anticipated changes in lithology. Each boring will be logged by a Hart Crowser geologist, and all samples will be screened using a field PID.

A minimum of one sample per boring will be submitted for analysis of chemical concentrations. The remaining samples will be retained by Hart Crowser for future analytical or geotechnical analysis if required. Samples will be selected for analysis based on visual indications of contamination or PID measurements.

The following paragraphs describe the rationale for each of the soil borings and well locations.

- Boring **B-1** will be drilled through the backfill of the former waste oil tank location along the northern wall of the former Super Tire building. This boring will provide information regarding the extent of the petroleum hydrocarbons within the backfill material and the native soils beneath it. This boring will be advanced to a depth just below the estimated static water level, or the depth at which native soil is encountered, whichever is deeper.

- Two borings **(B-2 and B-4)** will be drilled through backfill of the former fuel tank location at the Grand Auto and former Super Tire facilities. These borings are intended to provide information on whether these areas are currently a source of petroleum hydrocarbons (i.e. was contaminated soil replaced in the pit as backfill material following removal of the tanks). These borings will similarly be advanced to a depth just below the estimated static water level, or the depth at which native soil is encountered, whichever is deeper. Results of PID field screenings and visual observations will be discussed with PAI immediately following the completion of the previously mentioned borings (B-1, B-2, and B-4). A determination of the appropriateness of monitoring well installation will be made in conjunction with PAI at this time.

- Two borings **B-3 and B-5** will be placed contingent on the field screening of soils and groundwater conditions in the three previously mentioned borings (B-1, B-2, and B-4, see above). These borings will be placed southeast of borings B-2 and B-4 to evaluate native site stratigraphy and potential subsurface soil and groundwater contamination resulting from previous fueling activities. Monitoring wells will be emplace within these borings; borings **(B-3 and B-5)** will be advanced to a depth appropriate to the desired well screen interval. This depth will be determined by the geologist in the field, but will not provide for breaching of a lower isolated aquifer.

- Boring **B-6** will be placed north of boring B-1 for the purpose of monitoring well installation if monitoring wells are constructed within borings B-3 and B-5. This will allow for accurate well triangulation necessary for the construction of a groundwater contour map. This boring will similarly be advanced to a depth appropriate to the desired well screen interval. This depth will be determined by the geologist in the field, but will not provide for breaching of a lower isolated aquifer.

3.1.3 Soil Boring Procedures

3.1.3.1 Drilling Procedures site construction drawings provided by PAI and markings provided by West Coast Locators will be used to locate underground utilities at the Site prior to drilling operations. Borings will be drilled using a truck-mounted Hollow-Stem Auger (HSA) technique. This drilling method is effective for shallow borings and monitoring well installations in fine grained soils such as those expected beneath the site.

Borings not intended for monitoring well installation will be backfilled to the surface with cement/bentonite slurry grout. In the event that groundwater is present in the boring, the grout will be pumped to the bottom of the boring by way of a tremie pipe to minimize the tendency for bridging. Drill cuttings will be stored in DOT-approved 55-gallon drums and kept in a secure location onsite pending analytical results. Subsequently, the analytical results will be used to determine the appropriate disposal method.

3.1.3.2 Borehole Logging In order to characterize the subsurface materials, a complete log of all conditions encountered during drilling will be maintained. This includes lithologic and hydrogeologic descriptions along with notations on drilling speed, and drill-bit behavior as different materials are encountered.

Borings will be logged by a Hart Crowser geologist in accordance with the Unified Soil Classification System and standard geologic practice. A sample boring log is presented in Appendix A. The geologist will be responsible for including the following information on the boring log.

- Soil Type;
- Color of cuttings;
- Size of cuttings, e.g. cobbles, sand, silt, and clay;
- Descriptive comments; e.g. degree of cementation;
- Moisture content;
- Moisture of all the cuttings will be noted along with the depth at which ground water is first encountered; and
- Drilling speed and rig behavior will be noted to help verify the nature of the material encountered by the drill bit;

When obtaining samples with a split-spoon sampler, blow counts counted by the driller will be recorded for every 6-inch penetration of a 140-pound weight free-falling 30 inches.

3.1.3.3 Subsurface Soil Sampling Procedures Samples will be obtained using a modified California split-spoon sampler. Stainless steel liners will be placed in the sampler barrel to retrieve and store the sample. Sample depths of all soil samples will be noted on the borehole log form.

The soil sample liners will be removed from the sampler and the liners will be sealed with Teflon tape, covered with tight fitting plastic caps, labeled, and placed in refrigerated storage for analysis. The samples intended for analysis will be delivered via courier to a State-certified chemical testing laboratory. Strict chain of custody procedures will be observed as detailed in the QA/QC Plan.

A portion of each cutting sample will be retained in a small sample bag for future reference. This sample will be tagged with the location and exploratory boring number, the cutting depth, and the date and time the cuttings were obtained.

3.1.3.4 Subsurface Soil Analyses Samples will be stored in coolers and transported to the analytical laboratory using strict chain-of-custody procedures. Selected subsurface soil samples will be analyzed for the following parameters, which are constituents that are commonly associated with the previous fueling/waste oil storage activities at the Site. Samples from soil boring B-1 (former waste oil tank location) will be analyzed by the following methods in accordance with LUFT requirements:

- TPH-diesel (EPA 8015)
- TPH-gasoline/BTEX (EPA 8015/8020)
- Oil & grease (EPA 5520)
- Chlorinated hydrocarbons (EPA 8020)
- Metals (Cd, Cr, Pb, Ni, Zn) (EPA 6010)
- Organic lead (DHS/LUFT)

Samples from the remaining soil borings will be analyzed by the following methods:

- TPH-diesel (EPA 8015)
- TPH-gasoline/BTEX (EPA 8015/8020)
- Organic lead (DHS/LUFT)

3.1.4 Well Installation Procedures

3.1.4.1 Permits Well construction permits will be obtained from the Alameda County Zone 7 Water Resources Management District prior to commencement of drilling operations. The ACDEH will also be notified of planned activities at the site and a permit will be obtained if required.

3.1.4.2 Monitoring Well Installation Monitoring well installation and sampling procedures will follow guidelines and procedures contained in the California Department of Health Services Draft Site Characterization guidelines, dated August 1990. The monitoring wells will be installed using the procedures and equipment described in the following paragraphs. A schematic drawing of a typical monitoring well is presented in Figure 3. During well installation, construction specifications will be recorded on a Monitoring Well Installation Report, shown in Appendix A.

The following paragraphs list the monitoring well construction specifications for each proposed well.

Monitoring Well Casing The monitoring wells will be constructed of new 4-inch diameter, flush joint threaded Schedule 40 polyvinyl chloride (PVC) casing and factory-constructed well screen. The slot width of the well screen will be 0.020 inches. All PVC casing will include the National Sanitation Foundation (NSF) and/or American Society for Testing and Materials (ASTM) designation.

The well screen will extend through the entire thickness of the uppermost aquifer or to a depth of 25 feet BGS, whichever is less. The upper portion of the screened section will extend approximately 3 to 5 feet into the unsaturated material above the first encountered water-bearing zone. The bottom of the

screened section will be fitted with a flush joint threaded bottom cap. The solid section of the well casing will extend from the top of the screened section to approximately 4 inches below the ground surface.

Filter Pack Material After placement of the casing, an appropriate filter pack will be placed in the annulus between the exploratory boring and the casing. The filter pack will be sized appropriate for the formations encountered and the screen size installed. The filter pack should extend from the bottom of the well screen to a minimum height of 2 feet above the top of the well screen. This height may vary for the anticipated shallow groundwater conditions.

The well will be sealed by the placement of at least 6 inches of water-charged bentonite pellets above the filter pack and concrete or cement grout to the ground surface. An Emco-Wheaton sealed traffic box will be placed over the well head to protect the well while providing easy access.

3.1.4.3 Well Development Prior to groundwater sampling and development, each well will be checked for the presence of a free-floating petroleum product phase with an electronic interface probe and a transparent bailer. Both items will be decontaminated in a non-phosphate detergent solution and rinsed in distilled water prior to each use.

Each well will be developed by removing a minimum of eight well volumes of groundwater and until discharged water is reasonably free of sediment. A well volume is calculated using the following equation:

$$V_b = Pi \times [R_c^2 (1-n) + nR_b^2] \times H$$

Where:

V_b - volume of standing water in borehole, cubic feet (ft^3)
Pi - 3.14
R_c^2 - radius of casing, feet
R_b^2 - radius of soil boring, feet
n - porosity of filter pack, decimal fraction
H - height of standing water in well, feet.

The variable H is determined by subtracting the depth to water from the total well depth. The porosity, n, for this investigation is assumed to be 0.3. To convert the borehole volume to gallons multiply by 7.48 gallons per ft^3. Water levels and well depths will be obtained using an electric sounding device.

Wells will be developed by use of a surge block and bailer, or a surge block and 2 or 4-inch submersible pump combination. Monitoring wells that are slow to recharge groundwater will be developed by bailing dry at least twice. Groundwater parameters will be collected, if possible, for each borehole volume removed. Information collected during well development will be recorded on a Well Development Data Form (Appendix A).

Water discharged from the monitoring wells will be stored in DOT-approved sealed head 55-gallon drums. Groundwater analytical results will be used to determine the appropriate disposal method.

3.2 *Groundwater Sampling*

3.2.1 Groundwater Sampling Objectives

Objectives of the groundwater sampling and analysis effort are:

- Determine the presence of chemicals of potential concern in areas of the site that are likely to have been impacted by previous fuel storage activities.
- Determine the concentrations of contaminants (if present) in groundwater at specific locations of the Site.

3.2.2 Types, Locations, and Numbers of Samples

A groundwater sample will be obtained from the three onsite monitoring wells (if installed) and analyzed for TPH as gasoline with BTEX distinction by EPA Method 8015/8020. A duplicate sample will be obtained at one well and analyzed for these same parameters. If floating product is present in a well, that well will not be sampled. The tentative locations of the wells are shown on Figure 2.

3.2.3 Well Purging Procedure

Prior to sampling the monitoring wells, each well will be purged of a minimum of three and a maximum of five casing volumes of water using a Teflon bailer or a 2 or 4-inch submersible pump constructed of Teflon and stainless steel materials. A casing volume is calculated using the following equation:

$$V_c = Pi \times R_c^2 \times H$$

Where:

V_c - volume of standing water in well casing, cubic feet (ft^3)
Pi - 3.14
R_c^2 - radius of casing, feet
H - height of standing water in well, feet.

All purging equipment will be properly decontaminated prior to use at each well. Water discharged during purging operations will be stored as previously described.

3.2.4 Measurement of Field Parameters

Field parameters (pH, conductivity, and temperature) will be measured at the start of purge water pumping and at each consecutive well volume until sequential measurements differ by no more than 10 percent. Field measurements will be compared with data from previous sampling rounds, if available, and examined for significant discrepancies. Specific procedures for operation, maintenance and calibration of the field instruments are presented in the Quality Assurance/Quality Control Plan.

An oil-water interface probe will be used to measure the thickness of floating product, if present. Product thickness will be measured to the nearest 0.01 foot.

The following equipment will be used for measurements of ground water parameters in the field:

- pH/Temperature — Orion 230 A or equivalent
- Conductivity — Orion 120 or equivalent

3.2.5 Groundwater Sampling Procedures

Water samples will be collected using a decontaminated Teflon or pre-cleaned single-use disposable bailer. Water samples will be placed in 40 milliliter borosilicate glass VOA containers and preserved with HCl. Details of the water sampling procedures will recorded on the Groundwater Sampling Data report form, as shown in Appendix A. A laboratory prepared trip blank will accompany all groundwater samples, and will be analyzed for similar chemical constituents.

All samples and blanks will be placed in a cooler with ice packs to cool the samples to a maximum temperature of 4°C and transported via courier to a State-certified hazardous materials testing laboratory. Chain of custody procedures will be observed as detailed in Section 4.3.

3.2.6 Sample Handling, Packaging and Shipping Procedures for Groundwater Samples

Outlined in this section are the sample handling, packaging and shipping procedures for groundwater samples collected during the investigation at this site. These procedures are to be followed to yield samples representative of field conditions.

Only laboratory prepared bottles are to be used for sample collection. Bottles will be received from the laboratory cleaned and if necessary, with preservative added. A label will be affixed to the bottle by the laboratory indicating the presence and type of preservative used.

Unpreserved sample bottles will be rinsed with the water to be sampled prior to sample collection. Sample bottles containing preservative are not to be rinsed. Sample bottles requiring zero head space will be checked for air bubbles after the cap and septum have been securely fastened. If air bubbles are detected, the sample will be recollected.

A sample tag will be filled out for each sample bottle. The sample tag will contain the following information:

- Project number
- Project name
- Sample location
- Date of sample collection
- Time of sample collection
- Type of preservative
- Sampler's initials

The samples will be properly packed in ice chests containing an appropriate amount of "blue ice". Blue ice will be properly decontaminated using a phosphate-free detergent and rinsed with deionized water prior to use. Bagged ice or dry ice may be used only if sealed in a clean water-tight container.

3.3 *Sump and Hydraulic Hoist Removal / Floor Drain Capping*

3.3.1 Sump and Hydraulic Hoist Removal Objectives

The existing sump and the two existing hydraulic hoist will be removed from within the Super Tire service area. An additional sump will be removed adjacent to the former car wash within the Grand Auto facility.

Oil remaining in the hydraulic lift system and the sump will be collected in drums to the maximum extent possible. The floor sump will then be rinsed with a high pressure steam washer. The rinsate will be collected and stored in drums onsite. The drums will be sampled and profiled at a local oil recycler. A maximum liquid volume (oil and rinsate) requiring disposal has been assumed to be 150 gallons.

The concrete floor will be sawcut to the assumed excavation dimensions. The concrete will be broken up with a hydraulic breaker and disposed of at a recycler.

Do to the access limitations within a building, a mini-excavator will be used to expose and remove the two hoist systems and associated reservoirs and lines. The lift will be cleaned onsite and disposed of at a permitted facility. Additional soil will excavated if visually contaminated. The maximum depth of excavation in the building is assumed to be eight feet. The estimated maximum volume of soil to be excavated is 100 yards. No shoring is assumed to be required.

Soil samples will be collected from areas beneath and/or surrounding the present locations of specified sumps and hydraulic hoists located on the Grand Auto and former Super Tire facilities. These samples will aid in characterization of potential hydrocarbon residues remaining within the shallow soils beneath the site.

3.3.2 Types, Locations, and Numbers of Samples

One soil sample will be collected beneath each removed sump and hoist location at the maximum depth of the excavation. If groundwater is present within the excavation, sidewall samples will be obtained at a location slightly above the current static water elevation. A grab sample of groundwater will also be obtained.

Should overexcavation be required, a soil sample will be collected every 20 feet (on center) across the floor of the excavation, or every 20 feet along the excavation sidewall should groundwater enter the pit.

Excavated soil will be sampled to determine disposal requirements as appropriate. One composite sample (consisting of four individual samples which will be composited by the analytical laboratory) will be obtained for each 50 cubic yards of excavated soil.

3.3.3 Excavation Soil Sampling Procedures

In order to minimize risk to the safety of the sampler and subcontracting crew surrounding an unshored excavation, samples will be collected from soil collected within the excavator bucket. The sampler shall endeavor to obtain a sample which appears representative of the soil conditions at

the point of collection and has been minimally disturbed by the excavation process. The sample will be collected in a pre-cleaned stainless steel sampling tube by manual penetration into the soil or with an appropriate slide hammer tool, depending on the bulk density of the soils encountered. All sampling equipment will be thoroughly decontaminated prior to sample acquisition. Disposable nitrile surgical-type gloves will be worn during sample collection to minimize the potential for cross-contamination.

3.3.4 Excavation Soil Sample Analyses

Samples will be stored in coolers and transported to the analytical laboratory using strict chain-of-custody procedures. Selected subsurface soil samples will be analyzed for the following parameters, which are constituents that are commonly associated with the previous automotive service activities at the Site:

- TPH-diesel (EPA 8015)
- TPH-gasoline/BTEX (EPA 8015/8020)
- Oil & grease (EPA 5520)
- Chlorinated hydrobons (EPA 8020)
- Metals (Cd, Cr, Pb, Ni, Zn) (EPA 6010)
- Organic lead (DHS/LUFT)

3.3.5 Floor Drain Capping

Interior floor drainage points within the service areas of the Site will be capped with a cement seal to prevent future drainage of potential contaminants into the sanitary sewer.

3.4 *Decontamination Procedures*

All equipment that may come in contact with potentially contaminated soil or water is decontaminated prior to and after use. Decontamination consists of steam cleaning (high pressure, hot water rinse) or phosphate-free detergent wash, and deionized (DI) or tap water rinse as appropriate.

Drilling, sampling, and monitoring well installation equipment is decontaminated as follows:

1. The drill rods and augers (and casings, if soiled) will be steam-cleaned prior to use to prevent cross-contamination between exploratory borings. Cleaning shall be accomplished by scraping loose soil off the equipment, followed by the removal of all soil with an electric or fuel powered pressure steam cleaner. All soils and fluids generated from the cleaning shall be contained and transferred to DOT-approved 55 gallon drums for disposal.

2. Soil sampling equipment (e.g., split-barrel or standard penetration samplers, sampling tubes) are cleaned prior to use in each boring and between sampling. The sampler may be steam cleaned or washed in a phosphate-free detergent solution and rinsed in tap water. Visible soil is removed at this time. Wash solutions and rinse water are renewed prior to each boring.

3. Geophysical probes and cables are steam-cleaned or washed in a phosphate-free detergent solution and rinsed in tap water and wiped clean prior to each use.

4. Casing, screen, couplings, and caps used in monitoring well installation are steam-cleaned prior to installation. Visible foreign matter is removed at this time.

5. The exterior surfaces and accessible interior portions of submersible, centrifugal, and positive-displacement pumps are steam-cleaned prior to each use or prior to each sampling round.

6. Non-dedicated bailers are steam-cleaned or washed in phosphate-free detergent solution and rinsed twice in tap water and additionally in de-ionized water prior to each use. Rope or string (used with bailers or disposable sampling bottles) that has been in contact with the water in the well or boring will be replaced after collection of each sample.

7. Steel tapes, well sounders, transducers, and field instruments will be rinsed in distilled, deionized water or wiped clean after each use. Generally, only the wetted end of these devices require cleaning.

4.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

4.1 *Introduction*

The purpose of the Quality Assurance/Quality Control (QA/QC) Plan is to specify the quality assurance and quality control objectives, organization and functional activities associated with site characterization work.

Field activities will be performed by Hart Crowser personnel, and by subcontractors retained by Hart Crowser. Chemical analyses will be performed by Superior Precision Analytical Laboratory (DOHS Certificate #1542.)

4.2 *QA Objectives for Measurement Data*

Quality assurance objectives, including precision, accuracy, representativeness, completeness, and comparability, are dictated by the project requirements and intended uses of the data. Chemical data will be used to assess the nature and extent of contaminants at the site. The chemical data must also be of sufficient quality to assess contaminant transport pathways and rates, evaluate public health and environmental risks, evaluate cleanup alternatives, and to design remediation systems. Therefore, all chemical analysis methods selected for this project meet the EPA's definition of Level III analytical methods (EPA, 1990).

Chemical analysis methods were selected on the basis of quantitation limits and the level of analytical quality control necessary to meet data quality objectives and intended data uses. Data quality objectives, including analytical detection limits, and precision and accuracy goals associated with those methods are presented in Table 1.

Precision: Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average values. Analytical precision is measured through matrix spikes and matrix spike duplicates and is quantitatively expressed as the relative percent difference (RPD) between these two measurements. Analytical precision measurements will be carried out at a minimum frequency of one in 10 samples per matrix analyzed. Specific target quantitative objectives for analytical precision are presented in Table 1.

Field and analytical precision are calculated with field duplicates. Field duplicate groundwater samples will be collected and analyzed for a complete suite of analytes at a minimum of once per each sampling event, or 1 for every 10 samples. A relative percent difference for field duplicates of less than or equal to 15% for all water analyses, will be considered acceptable for the purposes of this project.

Accuracy : Accuracy is a measure of the closeness of the measured value to the true value. The accuracy of chemical test results is assessed by "spiking" samples with known standards (surrogate or matrix spike solutions) and establishing the average recovery.

Surrogate recoveries are evaluated against surrogate recovery performance criteria. Target quantitative accuracy objectives for each analyte are presented in Table 1. Accuracy measurements will be carried out at a minimum frequency of one in 10 samples per matrix analyzed.

Representativeness: Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the matrix sampled. The sampling plan design, standard operating procedures, sampling techniques, and sample handling protocols (e.g., storage, preservation, and transportation) have been developed to ensure the collection of representative samples. The following QA/QC samples will be collected during each sampling event to evaluate the representativeness of the soil, groundwater, and sediment data obtained as part of this investigation:

Field Duplicates: Duplicate groundwater and samples will be collected with a frequency of one per 10 samples, or a minimum of one per sampling event. Duplicate samples will be collected at predetermined sampling points.

Trip Blank: Water trip blanks are used to assess the potential for contamination of samples during sample handling, storage, and transport to the laboratory. Trip blanks are prepared by the laboratory and consist of organic-free deionized water in a sealed 40-ml glass VOA vial. A trip blank or a rinsate blank will be submitted at a frequency of one per sampling event.

Rinsate Blank: Equipment rinsate blanks will be collected from any nondedicated well sampling equipment. A rinsate blank or trip blank will be submitted at a frequency of one per twenty samples, or at least one per sampling event. Rinsate blanks will be analyzed for the full suite of analytical parameters.

Method Blanks: Laboratory method blanks will be run at a minimum frequency of one per twenty samples to assess laboratory contamination during performance of the analytical method.

Completeness: Completeness is defined as the percentage of measurements made which are judged to be valid measurements. Results will be considered valid if all the precision, accuracy, and representativeness objectives are met. The target completeness goal for groundwater, soil, and sediment analyses conducted under this work plan will be 90 percent.

Comparability: Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. The use of standard operating procedures for both sample collection and laboratory analysis should provide comparable results for data collected under this work plan as well as other data generated previously using these same standard operating procedures.

The comparability of all data will be aided by using consistent data reporting units. Water quality data will be reported in microgram per liter (ug/l) or milligrams per liter (mg/l), with a consistent choice of units used for a particular chemical throughout the study. Soil and sediment data will be reported in milligrams per kilogram (mg/kg) or micrograms per kilogram (ug/kg).

4.3 *Sample Collection Procedures*

Proposed soil, groundwater, and sediment sampling procedures are specified in Section 3.0 of the SAP. Information provided in the QA/QC Plan outlines procedures for sample preservation and storage and data documentation which will be followed to assure data quality.

Sample Preservation and Holding Times

All samples will be stored in a "blue ice" filled cooler chilled to 4 degrees centigrade until they can be delivered by courier to the laboratory for analysis. If samples are retained on-site overnight, they will be kept in a secured area. The samples will either be kept in coolers or placed in a refrigerator, depending on space availability. Table 2 lists the sample container, preservative, and holding times for each analytical method.

Sample Documentation and Custody

Field activities will be recorded on the forms appropriate for each activity. An overall log of field activities will be kept in a field logbook. Sample collection and handling will be documented on the Chain-of-custody record. Sampling records shall be maintained by the Hart Crowser San Francisco office.

Sample Labeling

Sample labels will clearly indicate sampling locations, sample number, date, time, sampler's initials, and any pertinent comments such as the type of preservative used on the samples. Sample labels will be completely filled out at the time of sample collection.

Sample Custody

After collection, samples will be maintained in our custody until formally transferred to another party. For purposes of this work, custody will be defined as follows:

- In plain view of our field representatives;
- Inside a cooler which is in plain view of our field representative; or,
- Inside any locked space such as a cooler, locker, car, truck, or storage room to which the field representative has the only immediately available key(s).

chain-of-custody records will be maintained for all samples recovered. The record will be signed by the sampler and others who subsequently hold custody of the sample. Custody seals will be used when samples are shipped via courier service. Hart Crowser's Chain-of-Custody form is shown in Appendix A.

A designated sample custodian from the laboratory will accept custody of shipped samples and verify that the chain of custody form matches the samples received. The batch of samples is given a laboratory number and each sample is assigned a unique sequential identification number. The custodian is responsible for seeing that all samples are transferred to the proper analyst or stored in an appropriate secure area.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian.

Field Documentation and Reporting

In addition to sample identification numbers and chain-of-custody records, a field notebook will be maintained by the field team leader to provide a daily record of significant events, observations, and measurements during field investigations. The field notebook will contain information such as personnel present, site conditions, drilling procedures, sampling procedures, measurements procedures, calibration records, etc. Field measurements taken during well sampling will be recorded on a Hart Crowser Groundwater Sampling Data Form (presented in Appendix A). All entries in the field notebooks and on data forms will be signed and dated.

Correction to Documentation

Original data recorded in field notebooks, chain of custody records, and other forms are written in waterproof ink. None of these documents will be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on a document compiled by one individual, that individual will make the correction by crossing a line through the error, entering the correct information, and initialing and dating the change. The erroneous information will not be obliterated. Any subsequent error(s) discovered on a document will be corrected by the person discovering the error. All corrections will be initialed and dated.

4.4 *Equipment Calibration, Operation and Maintenance*

Field Calibration, Operation and Maintenance

The field equipment which will need calibration is listed below:

- pH meter;
- electrical conductivity meter;
- photoionization detector;
- temperature meter; and
- water level meters.

Proper maintenance, calibration and operation of each instrument will be the responsibility of the field officer assigned to a particularly sampling activity. All instruments and equipment used during the studies will be maintained, calibrated, and operated according to the manufacturer's guidelines and recommendations.

A routine schedule and record of instrument calibration will be maintained throughout the duration of the study.

All equipment will receive routine maintenance checks in order to minimize equipment breakdown in the field or laboratory. Any items which are found to be inoperable will be taken out of use and a note stating the time and date of this action will be made in the field log book. All field instrumentation will be maintained and operated in accordance with manufacturer's recommendations.

Laboratory Calibration , Operation and Maintenance Procedures

Laboratory calibrations will be performed as specified in the individual Quality Assurance Manuals for each laboratory.

Preventative maintenance in the laboratory will be the responsibility of the laboratory personnel and analysts and will be performed as outlined in the Quality Control Manuals of each laboratory. This maintenance includes routine care and cleaning of instruments and inspection and monitoring of carrier gases, solvents, and glassware used in analyses.

Precision and accuracy data are examined for trends and excursion beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to change as indicated by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the quality control criteria.

4.5 *Data Assessment Procedures for Accuracy, Precision, and Completeness Determinations*

All data will undergo quality control review at the laboratory and a data validation review by Hart Crowser.

Initial data reduction, validation, and reporting at the laboratory will be carried out based on in-house protocols. Any quality control issues, method deviations, or corrective actions will be discussed in the final laboratory report.

The Hart Crowser data review will be performed by a qualified environmental chemist. The data will be reviewed in general accordance with EPA Laboratory Data Validation Functional Guidelines (EPA, 1988a and 1988b) as applicable to Level III analyses. In general, chemical data will be reviewed with regard to the following:

- Analytical methodology;
- Detection limits;
- Blank contamination;
- Accuracy and precision;
- Completeness; and
- Data report formats.

Detection Limits

Analytical methods were selected for this project such that detection limits will meet risk-based quantitation goals. In general, detection limits will reflect the lowest levels of analyte that can be feasibly and defensibly detected by the analytical method employed. The following definitions apply to the detection limits reported by the laboratory:

Sample Quantitation Limit/Sample Detection Limit (SQL or SDL). The SQL (organics) and SDL (inorganics) can vary from sample to sample, depending on the sample size, matrix interferences, moisture content (soil), dilution factors, and other sample-or matrix-specific variables.

Method Detection Limit (MDL). The lowest concentration of an analyte that can be distinguished from the normal "noise" of an analytical method as demonstrated by analysis of method blank spikes.

Practical Quantitation Limit (PQL). The lowest concentration of an analyte that can be reliably and consistently distinguished from instrument noise with a known degree of confidence.

Data Qualifiers

Data will be flagged with various qualifiers based on analytical results as reported by the laboratory and based on the results of in-house data validation. The following qualifiers will be used:

J The analyte of interest was detected at an estimated concentration based on the violation of one or more of the quality assurance objectives.

U The analyte of interest was not detected, to the limit of detection indicated.

B The analyte of interest was detected in the method blank associated with the sample, as well as in the sample itself.

D The value reported derives from analysis of a diluted sample or sample extract.

R The value is considered unusable for the purposes of this project and is rejected. The data are qualitatively and quantitatively unacceptable for the intended data use.

Additional data qualifiers may be used by the laboratory to describe sample results or by Hart Crowser in validating sample results reported by the laboratory. These qualifiers will be defined in the laboratory reports or data validation reports as appropriate.

Dealing with Reported Blank Contamination

If an analyte is detected in a method blank(s), the detection limit for that analyte will be recomputed as 5 times the highest blank concentration for all samples associated with that method blank. Common laboratory contaminants, such as acetone, methylene chloride, toluene, and phthalates, will be recomputed to 10 times the blank value. Reported sample concentrations above the recomputed detection limit will be flagged with a "B".

Data Assessment Procedures

Data assessment will be based on the data quality objectives defined in Subsection 4.2 and Table 1, and data validation procedures described in the previous section. The quantitative definitions of precision, accuracy, and completeness are provided below.

Precision: The results from matrix spikes and matrix spike duplicate analyses will be used to determine the relative percent difference (RPD) between the pair of analyses. This is a measure of analytical precision and can be calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \times 100$$

Where:

RPD relative percent difference
C_1 larger of the two observed values
C_2 smaller of the two observed values

A similar calculation will be performed to evaluate the precision of field duplicate samples.

Accuracy: For spiked samples, the percent recovery (%R) can be used as the measure of accuracy as follows:

$$\%R = (C_s - C_n)/C_{sa} \times 100$$

Where:

%R percent recovery
C_s measured concentration in spiked aliquot
C_n measured concentration in unspiked aliquot
C_{sa} actual concentration of spike added

Completeness: Measurements of completeness (C) can be defined as the ratio of acceptable measurements obtained to the total number of planned measurements for an activity. Completeness can be defined as:

$$C = \frac{\text{(Number of data within target quality control limits)}}{\text{(Total number of planned data points)}} \times 100$$

4.6 *Performance and Audits*

The project quality assurance manager will monitor the performance of the field and laboratory quality assurance program. This will be achieved through regular contact with the field and analytical QA officers.

Field Performance and Audits

Field performance will be monitored through review of sample collection documentation, sample handling records (Chain-of-Custody forms), field notebooks, and field measurements and by unannounced field operations audits conducted by the Hart Crowser QA Officer.

Laboratory Performance and Audits

Hart Crowser will be in contact with the analytical laboratory on a weekly basis while samples collected during this investigation are being analyzed. This will allow Hart Crowser to assess progress toward obtaining our data quality objectives and to make corrective measures as problems arise.

4.7 *Corrective Actions*

If quality control audits result in detection of unacceptable conditions or data, the project manager, in conjunction with the project quality control coordinator, will be responsible for developing and directing implementation of corrective actions. Corrective actions may include:

- Identifying the source of the violation;
- Resampling if field records indicate that proper field procedures were not followed;

- Re-analyzing samples if holding time criteria are exceeded;
- Resampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and/or
- Accepting data and flagging the data to indicate the level of uncertainty associated with failure to meet the specified quality control performance criteria.

5.0 LIMITATIONS

Work for this project will be performed in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work will be performed. This plan has been prepared for PACCAR Automotive, Inc. for specific application to the Grand Auto/Former Super Tire Facilities at 4240/4256 E. 14th Street in Oakland, California. It should be understood that boring locations are contingent upon the location of subsurface utilities, local depth to water, and other unforeseen field conditions. Assumptions contained within this document are not intended to represent a legal opinion. No other warranty, express or implied, is made.

TABLE 1
QUALITY CONTROL OBJECTIVES
WATER MATRIX

Compound	Test Method	Detection Limit	Accuracy (% Recovery)	Precision (RPD)
METALS				
Cadmium	6010	0.005 mg/L	60-114	8
Chromium	6010	0.01 mg/L	73-110	5
Copper	6010	0.04 mg/L	78-112	5
Nickel	6010	0.01 mg/L	75-109	5
Lead	6010	0.02 mg/L	75-111	5
Mercury	7470	0.0003 mg/L	94-105	5
Zinc	6010	0.005 mg/L	67-110	5
ION BALANCE				
Alkalinity	310.1	1 mg/L	75-120	10
Ammonia Nitrogen	350.3	0.03 mg/L	75-120	5
Calcium	6010	0.1 mg/L	75-120	20
Chloride	325.3	1 mg/L	78-134	5
Iron	6010	0.05 mg/L	75-120	20
Manganese	6010	0.005 mg/L	75-120	20
pH	150.1	n/a	+/- 0.1 pH unit	+/- 0.1 pH unit
Potassium	6010	5 mg/L	75-120	20
Sodium	6010	0.05 mg/L	75-120	20
Sulfate	375.4	1 mg/L	78-118	5
Nitrate Nitrogen	352.1	0.1 mg/L	72-135	5
Total Kjeldahl Nitrogen	351.3	1 mg/L	75-120	5
Salinity	Salinometer	100 mg/L	+/- 0.003 ppt	+/- 0.002 ppt
Asbestos	TEM	50,000-2 million fibers/L(a)	n/a	n/a

Note:
n/a - not applicable

TABLE 1 (cont.)
QUALITY CONTROL OBJECTIVES
WATER MATRIX

Compound	Test Method	Detection Limit	Accuracy (% Recovery)	Precision (RPD)
ORGANICS (a)				
1,1-Dichloroethene	8240	5	65-133	13
Trichloroethene	8240	5	84-120	8.7
Benzene	8240	5	84-122	9.4
Toluene	8240	5	89-119	8.4
Chlorobenzene	8240	5	83-116	7.5
Oil & Grease	SM 5520C/F	1.0 mg/L	91-100	5
TPH as diesel	8015	0.05 mg/L	58-93	29
TPH as gasoline	8015	0.05 mg/L	72-110	14
Benzene	8020*	0.3 ug/L	78-118	10
Toluene	8020*	0.3 ug/L	81-116	10
PCBs (Aroclor 1260)	8080	0.5 ug/L	58-121	20

(a) Detection limit for asbestos TEM analysis is dependent on turbidity of sample (i.e. how much water can be drawn through the filter).

Note:
n/a - not applicable

TABLE 1 (cont.)
QUALITY CONTROL OBJECTIVES
SOIL MATRIX

Compound	Test Method	Detection Limit	Accuracy (% Recovery)	Precision (RPD)
METALS				
Cadmium	6010	0.2 mg/kg	66-91	5
Chromium	6010	6 mg/kg	49-110	5
Copper	6010	1 mg/kg	75-102	5
Nickel	6010	3 mg/kg	51-104	5
Lead	6010	2 mg/kg	70-95	5
Zinc	6010	2 mg/kg	47-98	5
Mercury	7470	0.2 mg/kg	95-105	5
Asbestos	PLM	1 percent	n/a	n/a
ORGANICS (a)				
Chlorobenzene	8240	5	81-113	10
1,1-Dichloroethene	8240	5	61-143	15
	8240	5	72-121	11
Benzene	8240	5	82-123	10
Toluene	8240	5	80-118	12
Oil & Grease Hydrocarbons	SM 5520E/F	10 mg/kg	66-130	10.2
TPH as diesel	8015	10 mg/kg	70-107	20
TPH as Gasoline	8015	0.2 mg/kg	54-120	15
Benzene	8020*	1 ug/kg	81-125	9.6
Toluene	8020*	1 ug/kg	83-119	10
PCBs (Aroclor 1260)	8080	50 ug/kg	34-134	25

(a) Reporting limits, precision and accuracy for other 8240 compounds are as reported in SW-846.

* Abbreviated 8020 used with analysis of fuel hydrocarbons.

ppt = parts per thousand

Note:
n/a - not applicable

TABLE 2
SAMPLE CONTAINERS, PRESERVATIVES,
AND HOLDING TIMES

Parameter	Test Method Water/Soil	Reference	Water Sample Containers (a)	Minimum Sample (a) (water/soil)	Water Sample Preservation (a)	Holding Time	
						Water	Soil
Volatile Organic Compounds	624/8240	1,2	2-40 mL glass vials; teflon-backed septum; zero head space	5 mL/5 g	Acidify w/ 1:1 HCL; cool to 4 degrees C	14 days until analysis	14 days until analysis
Metals - dissolved (4)	6010	2	1-1L glass or polyethylene bottle	100 mL/100 g	Filter 0.45 microns, acidify with HNO3 to <pH2; cool to 4 degrees C	6 Months	6 Months
Hexavalent Chromium	7196	2	1-1 L polyethylene bottle, teflon backed septum	300 mL	Cool to 4 degrees C	24 Hours	24 Hours
Mercury - dissolved	7471	2	1-100 mL amber glass or polyethylene bottle; teflon backed septum.	100 mL/100 g	Filter 0.45 microns acidify with HNO3 to pH<2 Cool to 4 degrees C	28 Days	28 Days
Total Petroleum Hydrocarbons - Diesel range	8015	2	1-1 L amber glass bottle; teflon backed septum	300 mL/100 g	Cool to 4 degrees C	14 Days until Extraction 40 Days after extr. until analysis (b)	14 Days until Extraction 40 Days after extr. until analysis (b)
Total Oil and Grease - by IR	SM5520 E/F	5	1-1 amber glass bottle	100 mL/100 g	Cool to 4 degrees C	28 Days	28 Days

TABLE 2 (cont.)
SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Test Method Water/Soil	Reference	Water Sample Containers (a)	Minimum Sample (c) (water/soil)	Water Sample Preservation (a)	Holding	
						Water	Soil
Total Petroleum Hydrocarbons as gasoline/BTXE	8015/8020	2	2-40 mL glass vials, teflon backed septum, zero head space	5 mL/5 g	Add 2 drops HCL Cool to 4 degrees C	14 Days until Extraction 40 Days after extr. until analysis (b)	14 Days until Extraction 40 Days after extr. until analysis (b)
Polychlorinated Biphenyls (PCBs)	8080	2	1-1 L glass bottle; teflon backed septum; zero head space	1 L/30 g	Cool to 4 degrees C	7 days to Extraction 40 Days after extr. until analysis (b)	14 Days to Extraction 40 Days after extr. until analysis (b)
Asbestos	Polarized light microscopy/ Trans-mission electron microscopy	4	1-1 L bottle	100 mL/100 g	None required	None	None
Total Alkalinity	310.1	3	Plastic	50 mL/- -	None required	14 Days	- -
Chloride	325.3	3	Plastic	50 mL/- -	None required	28 Days	- -

TABLE 2 (cont.)
SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Test Method Water/Soil	Reference	Water Sample Containers (a)	Minimum Sample (c) (water/soil)	Water Sample Preservation (a)	Holding	
						Water	Soil
Sulfate	375.4	3	Plastic	100 mL/--	None required	28 Days	--
Nitrate	352.1	3	Plastic	50 mL/--	H2SO4 to pH<2	28 Days	--
Total Kjeldahl Nitrogen	351.3	3	Plastic	125 mL/--	H2SO4 to pH<2	28 Days	--
pH	150.1	3	Plastic	25 mL/--	Cool to 4 degrees C	24 Hours	--
Salinity	Salinometer	--	Plastic	100 mL/--	None required.	28 Days	--

Notes:

a - Soil samples will be shipped to the laboratory within the brass sleeves in which the samples were collected. The soil samples will be cooled to 4 degrees C; no preservative will be added.

b - Following extraction, a secondary holding period of 40 days prior to analysis is allowed.

c - Minimum sample needed for a sample analysis. Minimum weight for soil and minimum volume for water.

d - Metals include: cadmium, calcium, chromium, copper, iron, lead, manganese, nickel, potassium, sodium, zinc.

References:

1) *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057, July 1982.

2) *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, U.S. EPA, SW-846, Third Edition, November 1986.

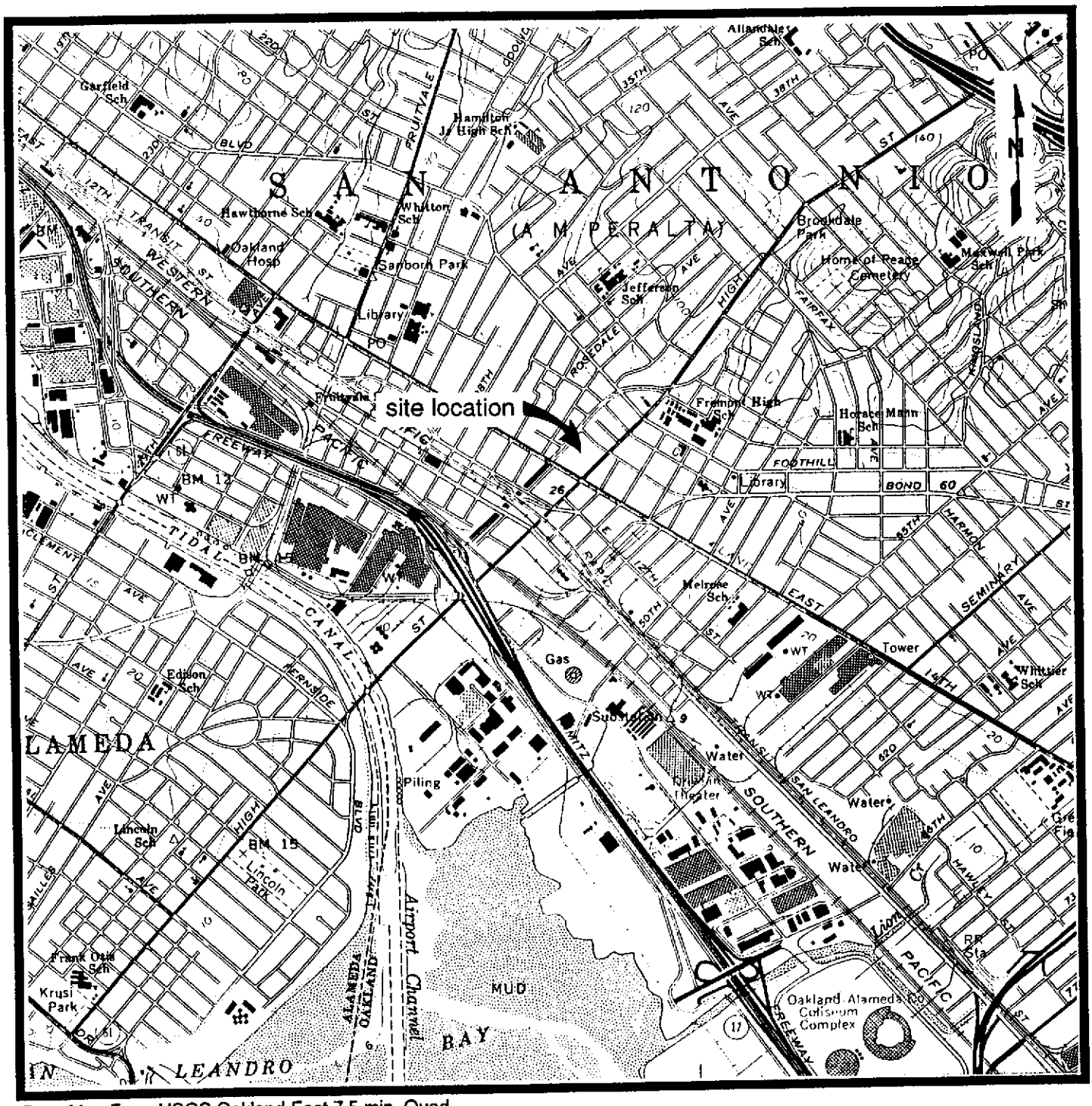
3) *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4/79/020, revised March 1983.

4) EPA 40 CFR 763, Subpart F

5) *Standard Methods for the Examination of Water and Wastewater*, 17th edition, 1989.

-- Sample not analyzed for this parameter.

FIGURES



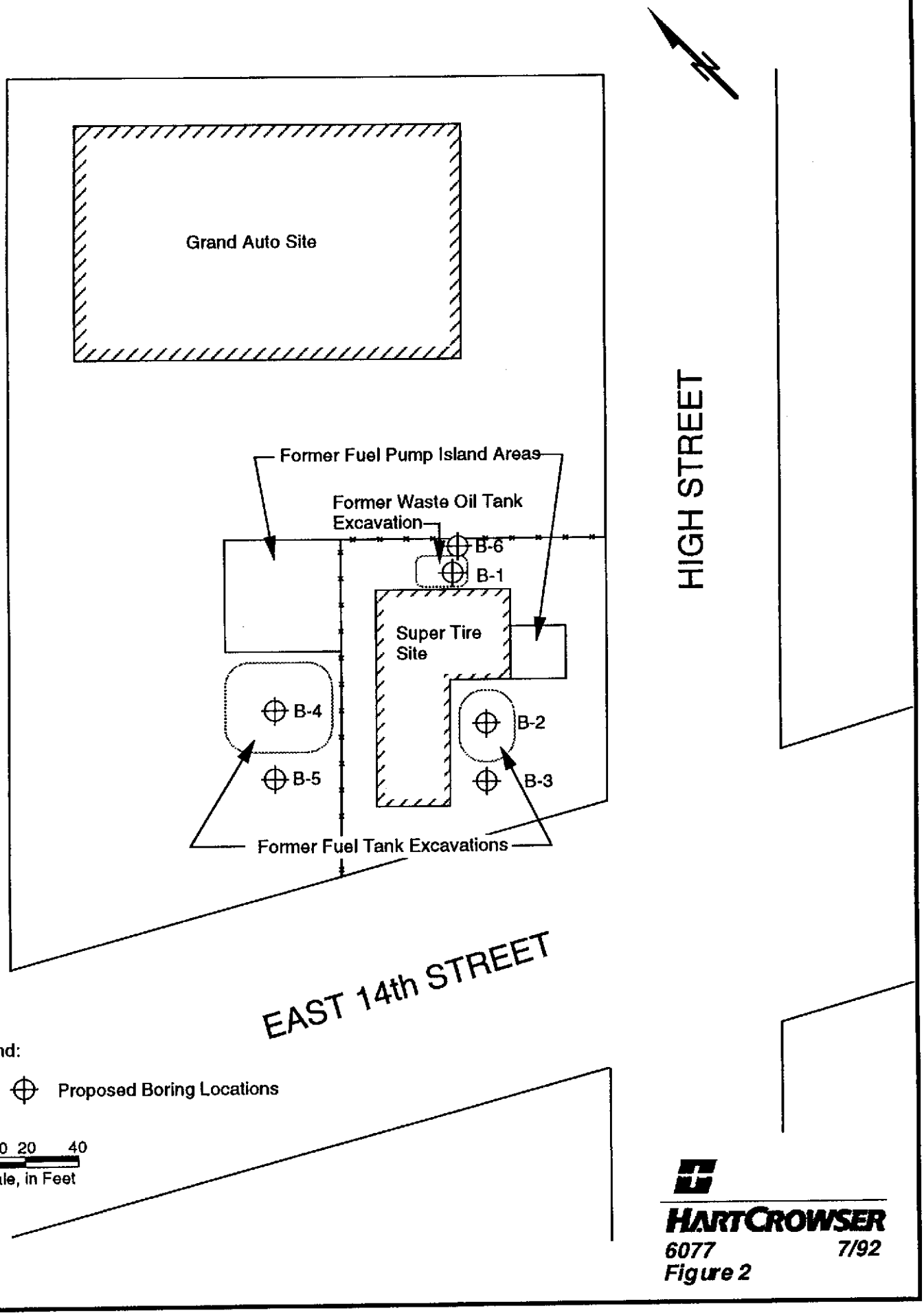
Base Map From USGS Oakland East 7.5 min. Quad

LOCATION MAP
Grand Auto/Former Super Tire Site
Oakland, California

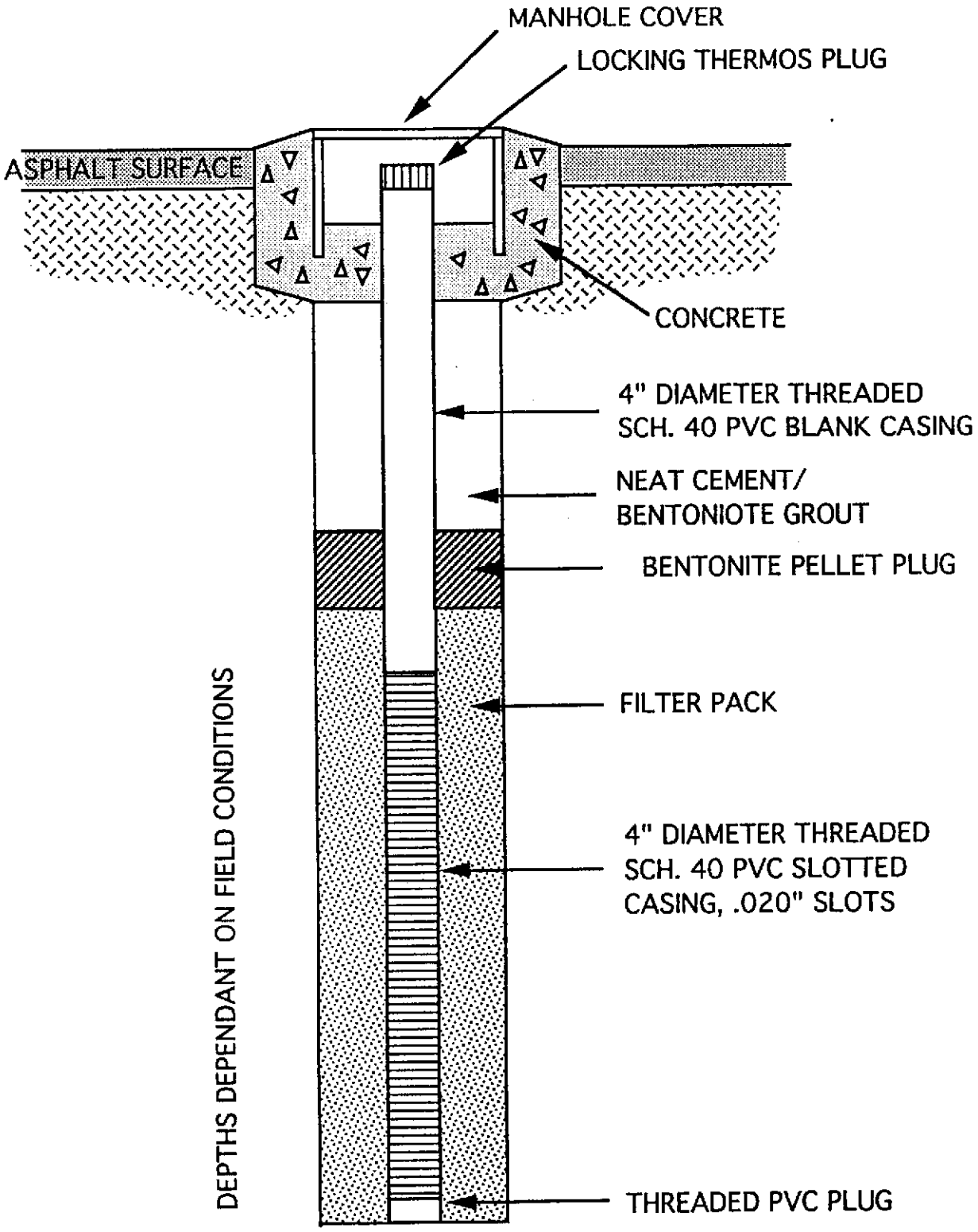
HARTCROWSER

J-6077 7/92

Figure 1



HARTCROWSER
6077 7/92
Figure 2



TYPICAL GROUNDWATER MONITORING WELL SCHEMATIC

NOT TO SCALE

HARTCROWSER

J-6077 7/92
Figure 3

APPENDIX A

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. _____

Field Report No. _____

Page _____ of _____

DATE _____
S M T W Th F S

JOB _____ ARRIVAL TIME: _____

LOCATION _____ DEPARTURE TIME: _____

CLIENT _____ WEATHER: _____

PURPOSE OF OBSERVATIONS _____

H-C REPRESENTATIVE _____ H C PROJECT MANAGER _____

CONTRACTOR _____ PERMIT NO. _____

CONTRACTOR REP. _____ JOB PHONE _____

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: _____

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

oring Location:

Elevation: Datum:

s. Well Install. Yes No

HARTCROWSER

Boring _____ Date _____ Sheet ____ of ____

Job _____ Job No. _____

Logged By _____ Weather _____

Drilled By _____

Drill Type/Method _____

Sampling Method _____

Bottom of Boring _____ ATD Water Level Depth ____ No

SIZE (%)			PID or other	DEPTH		SAMPLE		SAMPLE RECOVERY	Penetration Resistance	DESCRIPTION; Den., moist., color, minor, MAJOR CONSTITUENT. NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS; Drill action, drill and sample procedures, water conditions, heave,...etc...	SUMMARY LOG (Water & Date)
S		F										
Max.	Range	Att. Limits		From	To	Type	Number					

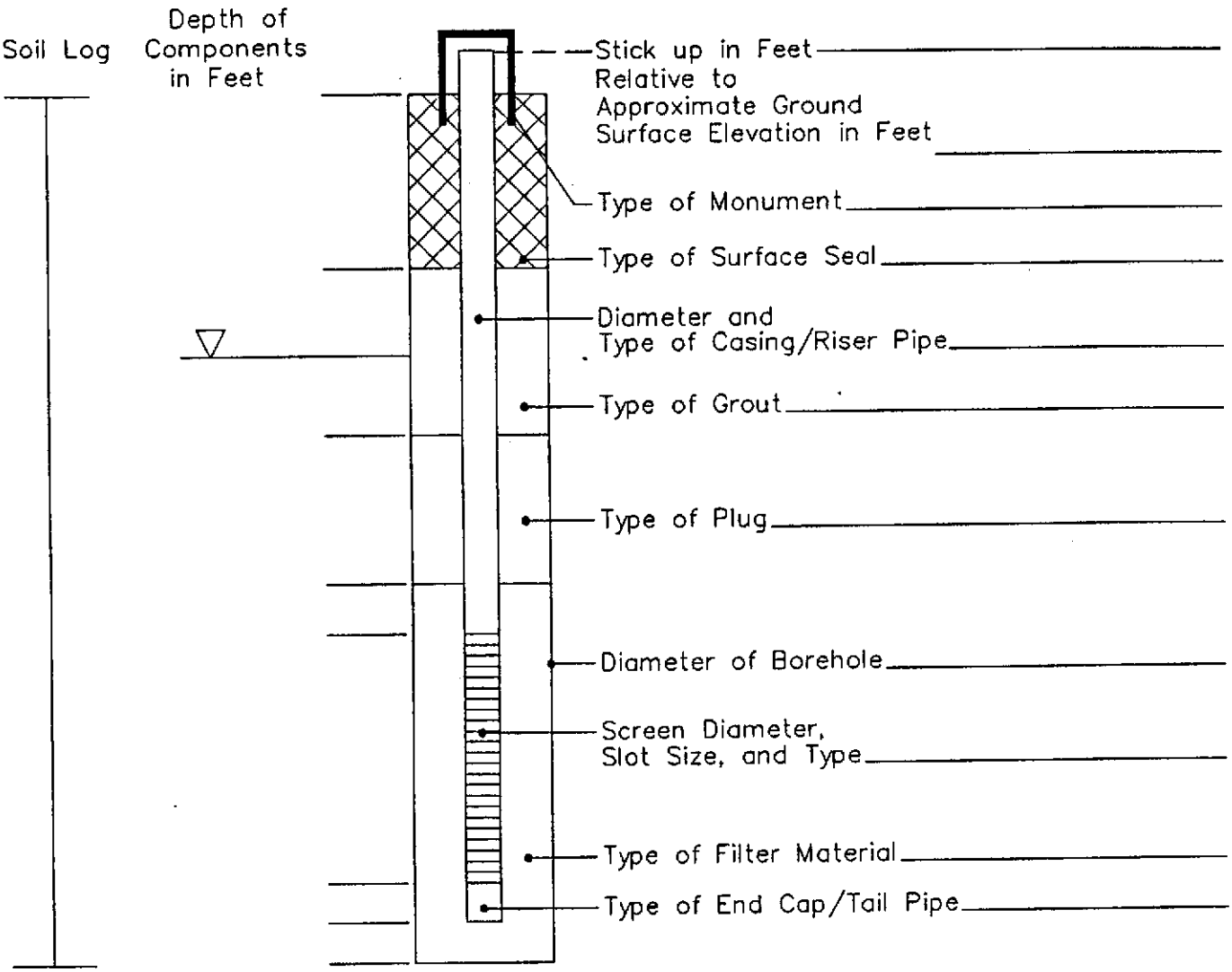
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5
6
7
8
9
0

Installation Report *Monitoring Well* _____

Project _____ Job No _____ Date _____

Location _____ HC Observer _____ Driller _____

Type of Well (Observation, Sampling, Vapor Extraction) _____



Remarks: _____

Materials Tally:

Sand _____ Monument _____

Cement _____ PVC _____

Bentonite _____ Other _____

Well Development Data

Project _____ Job No. _____

Field Rep. _____ Date _____

WELL NUMBER	DATE DEVELOPED	WELL DEPTH IN FEET	BEFORE DEVELOPMENT / AFTER			CASING VOLUME IN GALLONS	METHOD OF DEVELOPING	DEVELOPING VOLUME IN GALLONS	COMMENTS
			DEPTH TO WATER IN FEET	DEPTH TO SEDIMENT IN FEET	SEDIMENT THICKNESS IN FEET				

Hart Crowser, Inc.

Groundwater Sampling Data

Project _____ Job No. _____

Field Rep. _____ Date _____

WELL NUMBER	DATE SAMPLED	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH TO SEDIMENT IN FEET	SEDIMENT THICKNESS IN FEET	METHOD OF SAMPLING	COMMENTS	T °C	pH	EC IN µMHOS	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS

Hart Crowser, Inc.

H-Nu Photo-Ionization Detector

Head-Space Readings

Meter No.	Date Calibrated	Span/Zero

Battery [ ] Use w/Charger [ ] Background ______ / ______ Scale

Exploration No.	Sample No.	Depth in Feet	Scale	Readings	Odor/Sheen	Comments

Sample Custody Record

DATE_____ PAGE_____ OF_____

HARTCROWSER

Hart Crowser, Inc.
353 Sacramento Street, Suite 1140
San Francisco, California 94111

JOB NUMBER_____ LAB NUMBER_____

PROJECT MANAGER_____

PROJECT NAME_____

SAMPLED BY:

LAB NO.	SAMPLE	TIME	STATION	MATRIX	TESTING	NO. OF CONTAINERS	OBSERVATIONS / COMMENTS / COMPOSITING INSTRUCTIONS

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINTED NAME		PRINTED NAME	
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINTED NAME		PRINTED NAME	
COMPANY		COMPANY	

TOTAL NUMBER OF CONTAINERS

METHOD OF SHIPMENT

SPECIAL SHIPMENT / HANDLING OR STORAGE REQUIREMENTS

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

APPENDIX B

HARTCROWSER

353 Sacramento Street, Suite 1140
San Francisco, California 94111
FAX 415.391.2216
415.391.1885

Earth and Environmental Technologies

6/23/93
Spoke w/ Eric Schmitland of H.C. He left a message requesting comments on this report. I told him I'd try to get to reviewing it in the next week

June 18, 1993

Alameda County Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, CA 94621

Attention: Mr. Paul Smith

Reference: Grand Auto Facility
4240 E. 14th Street
Oakland, California I-6077

Dear Mr. Smith:

On behalf of Paccar Automotive, Inc., Hart Crowser, Inc., has completed a Supplemental Site Investigation at the Grand Auto Facility at 420 E. 14th Street in Oakland, California. A report describing our findings is enclosed.

Please call me at (415) 391-1885 with any questions on the report.

Sincerely,
HART CROWSER, INC.

Patrick G. Lynch, P.E.
Senior Project Engineer

cc: Richard Hiett, Regional Water Quality Control Board
Raymond Elliott, Paccar Automotive, Inc.
Lisa Robbins, Paccar, Inc.

3) You are requested to have your consultant document characterization and disposal of stockpiled soils from previous and future excavation/ drilling at the site. Please submit copies of bill of ladings/ manifests for this material with the next report submittal.

4) The workplan does not propose quarterly groundwater sampling. You are required to initiate a quarterly monitoring program to collect data on groundwater elevation, analytical data and to provide a quarterly update on the remedial activity.

5) The Sampling and Analysis Plan, July 13, 1992 mentions that monitoring well installation and sampling will follow guidelines and procedures contained in the CA Dept. of Health Services Draft Site Characterization guidelines, August 1990. However, upon reviewing workplans prepared for the site there is no discussion of the wells at the site being tied in to a known elevation datum. If not already scoped into the plan, you are required to have your consultant accomplish this task. The concern here is to adequately establish groundwater gradient.

6) As mentioned in the workplan the investigation and remediation of the two PACCAR sites 4240 and 4256 E 14th St are being considered separately. **Please submit a workplan for the 4256 E. 14th St. location within 60 days of the receipt of this letter.**

7) A review of the deposit/ refund account status indicates that the initial $400.00 submitted at the initiation of this project has been depleted. You are requested to remit an additional $750.00 made payable to Alameda County treasurer. This amount will be billed against at a rate of $ 75.00 per hour. Any unused portion of this amount will be refunded to you at the completion of this project. The deposit/ refund mechanism is authorized by Section 3-140.5 of the Alameda County Ordinance Code.

If you have any questions regarding the content of this letter please feel free to contact me.

Sincerely,

Paul M. Smith

Paul M. Smith
Senior Hazardous Materials Specialist

HEALTH AND SAFETY PLAN
HART CROWSER, INC.

1.0 PLAN SUMMARY

1.1 Site Location: 4240/4256 E. 14th St., Oakland, California.

1.2 Personnel Responsibilities:

Project Manager: Patrick Lynch
Project Health and Safety Manager: Laura O'Heir
Field Health and Safety Manager: Brian Bjorklund
Corporate Health and Safety Manager: Tom Boden

1.3 Description of Work:

Drilling and installation of groundwater monitoring wells; removal and excavation of onsite sumps and hydraulic hoists using a miniature back-hoe in confined spaces. Soil samples will be obtained at depths of up to eight feet below ground surface and selected samples will be submitted to a laboratory for chemical analysis.

1.4 Identified Hazards:

Chemical: Soil may potentially be impacted with petroleum hydrocarbons including benzene.

Physical: Slip, trip and fall hazards associated with the use of heavy equipment.

1.5 Monitoring Equipment:

Photoionization Detector -- H-Nu 101
Sensidyne air pump and benzene detector tubes
MSA Combustible Gas/Hydrogen Sulfide/Oxygen meter

1.6 Protective Equipment Available:

Hard Hats
Steel-toed Boots
Nitrile Gloves
Glasses with Shatterproof Lenses
Tyvek Coveralls
Air Purifying Respirators with combination cartridges if needed

1.7 Emergency Services:

Medical
Dial 911 or (510) 532-6300
Oakland Hospital

Fire
Dial 911 or (510) 444-1616
Oakland Fire Dept.

Police
Dial 911 or (510) 273-3211
Oakland Police Dept.

2.0 INTRODUCTION

This health and safety plan is designed to address potential health and safety hazards associated with drilling, excavation, and sampling activities at the Grand Auto/former Super Tire facilities located at 4240/4256 E. 14th Street in Oakland, California. A summary of site-specific information is listed in Section 1.0. A detailed description of health and safety requirements is contained in Sections 3.0 to 12.0.

3.0 ASSIGNMENT OF RESPONSIBILITIES

3.1 Project Manager - Patrick Lynch

- Overall project management
- Assists in development of Health and Safety Plan
- Communicates requirement to Hart Crowser personnel, subcontractors and client.
- Consults with CLIENT and Hart Crowser Corporate Health and Safety Managers regarding unanticipated site conditions which may arise, and subsequent changes to the Plan.

3.2 Project Health and Safety Manager - Laura O'Heir

- Assists in development of Health and Safety Plan.
- Communicates requirements to field personnel, subcontractors and client.
- Consults with Project Manager regarding unanticipated conditions which may arise and subsequent changes to the Plan.

3.3 Field Health and Safety Manager - Brian Bjorklund

- Implements health and safety requirements in the field.
- Communicates requirements to field personnel and subcontractors.
- Consults with Project Manager, Project Health and Safety Manager and CLIENT'S personnel regarding new or unanticipated site conditions.

3.4 Corporate Health and Safety Manager - Tom Boden

- Communicates requirements to Project Health and Safety Manager.
- Responds to field requests for assistance in Health and Safety.

4.0 HAZARD EVALUATION AND CONTROL MEASURES

4.1 Benzene - Proposition 65 warning:

Benzene may be present at the project site. Due to its potential presence, the following warning is given pursuant to Title 22, CCR, Chapter 3, Article 16, Section 12601:

"Warning: This area may contain benzene, a chemical known to the state of California to cause cancer, birth defects and/or other reproductive harm."

4.2 Exposure to Hydrocarbon contaminated soils and particulates

Soil and groundwater contamination by petroleum hydrocarbons has previously been detected in portions of this site. There is a potential that petroleum contaminated soils or groundwater will be encountered during the excavation operations.

CONTROL: Gloves will be worn to guard against incidental exposure to petroleum hydrocarbons. Hands will be washed prior to eating, drinking or smoking. If clothing becomes contaminated, proper precautions must be taken prior to cleaning or disposal.

4.3 Toxic Vapor Exposure - Benzene and other Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) in soil can be released by exposure to open air. This release of vapors can occur from piles of soil, excavation, and during the collection of soil samples. Inhalation of these materials may cause illness (see Section 12). Skin contact with this material also presents an exposure potential.

CONTROL: An H-Nu PID will be used periodically to monitor ambient air if the release of vapors is suspected during activities, or if hydrocarbon odors are detected by smell. Air purifying respirators (APR's) with combination chemical cartridges will be available for use if vapor concentrations reach designated action levels in the breathing zone (Section 5.0). Nitrile gloves and tyvek coveralls may be worn in some instances to prevent skin contact. Monitoring for benzene using a sensidyne pump and detector tube will be conducted in the work area at the beginning of work and whenever the H-Nu PID measures greater than 5 units of the field work. If the concentration of benzene in the breathing zone is detectable, the protective measures outlined in Section 5.0 will be implemented.

4.4 Heavy Equipment Operation

Operation of drilling equipment presents hazards associated with moving machinery and heavy equipment.

CONTROL: Equipment operators will have adequate experience and training to complete the work safely. All personnel onsite will be advised to work safely and avoid unnecessary risks associated with operation of this equipment. Hard hats, steel-toed boots and eye protection will be standard protective equipment.

4.5 Particulates

Dust contaminated with heavy metals and/or petroleum hydrocarbons may be present in the soil onsite. This material presents a potential hazard through skin exposure and possible inhalation.

CONTROL: If significant dust is generated during field work, dust control will be initiated and personnel on the work site will wear APR's equipped with combination organic vapor cartridges and dust pads.

4.6 Site activities

The proposed work is to be conducted in an active retail store parking lot where moving cars may pose a hazard to contractor employees.

CONTROL: Traffic cones and barricades are to be erected wherever contract personnel are expected to traverse within the active parking lot.

4.7 Fire/Explosion

Part of the proposed excavation work is to be conducted in an automotive service bay where the potential of fire and explosions of known and unknown fuel sources may pose a hazard to contractor employees. Combustible vapors emitted by free phase hydrocarbon or contaminated soils in soil cutting piles could possibly ignite, resulting in a fire.

CONTROL: Control of potential sources of ignition is a primary concern during field activities on this project. Smoking will not be allowed at the site during exploratory work. Fire extinguishers will be positioned in close proximity to the site for timely access. Ambient air will be monitored with a PID every 15 minutes. LEL tests will be performed every 15 minutes.

5.0 EXPOSURE MONITORING AND ACTION LEVELS

H-Nu Monitoring *	Protective Measures
0 to 5 ppm	None.
5 to 10 ppm	APR with combination cartridges. Use detection tube monitoring for benzene.
10 to 50 ppm	APR with combination cartridges; ventilate work area.
Greater than 50 ppm	Ventilate work area and stop work until concentrations decrease below 50 ppm.
Calibration:	The H-Nu PI-101 will be calibrated to isobutylene as a benzene standard.

* Concentration in ambient air measured in breathing zone.

LEL/O_2 Monitoring*	Protective Measures
0 to 5 % LEL	None.
5 to 10 % LEL	Increase monitoring frequency.
10 to 20 % LEL	Ventilate work area.
> 20 % LEL	Ventilate work area; stop work until % LEL drops below 20.
Calibration:	The LEL/O_2 meter will be calibrated to ambient air offsite.

* Concentration measured in ambient air.

Detector Tube Monitoring

No Detection	No respirator required
0-1 ppm	APR with combination cartridge
1-5 ppm	APR with combination cartridge, contact Project Health and Safety Manager.

6.0 EQUIPMENT SUMMARY LIST

6.1 General Safety Equipment

- Traffic barricades and cones
- 20 pound Fire Extinguisher
- First Aid Kit
- Barrier flagging

6.2 Monitoring Equipment

H-Nu 101 PID
Sensidyne air pump and benzene detector tubes
MSA Combustible Gas/H_2S/O_2 meter

6.3 Personnel Protective Equipment Available

- Air purifying respirators (APR's) with combination chemical cartridges
- Hard hats
- Steel-toed boots
- Nitrile gloves
- Tyvek coveralls
- Glasses with Shatterproof Lenses

6.4 Decontamination Equipment (if needed)

- Wash buckets
- Long-handled scrub brushes
- Detergent
- Plastic bags
- Steam cleaner

7.0 SPECIAL TASK REQUIREMENTS

7.1 Excavating and Soil Sampling

Soil piles and soil samples produced may contain petroleum hydrocarbons or other unanticipated contaminants. The materials produced during soil excavation will be stockpiled, covered, and stored onsite pending laboratory analysis.

8.0 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

All Hart Crowser and subcontractor personnel working at this site will have received a medical evaluation for work with hazardous materials and will have received health and safety training in conformance with OSHA requirements in 29 CFR 1910.120.

9.0 DECONTAMINATION PROCEDURES

All equipment that may have become contaminated during field use will be decontaminated prior to leaving the site. Decontamination of equipment will consist of a soap and water wash followed by a water rinse. Liquids generated during this process will be poured into labeled drums on a daily basis and held pending laboratory analysis.

10.0 SITE SECURITY AND CONTROL

Each work location at this site will be isolated using traffic cones and barricades to divert vehicular traffic. Pedestrian traffic will be diverted away from the work site by traffic cones, flagging and by personnel onsite. All vehicles left overnight will be locked and any open trenches will be secured to limit access.

11.0 EMERGENCY SERVICES

Police, fire and emergency medical services are readily available at this site through use of the **911** system. The nearest telephone is located within the onsite building and Hart Crowser staff will be supplied with a mobile car phone. The nearest emergency medical facility is the Oakland Hospital [(510) 532-6300] at 2648 E. 14th Street in Oakland. A map to this hospital is included with this Plan as Figure 1.

12.0 SPECIFIC HAZARD DATA

Material Safety Data Sheets for specific health and environmental hazards posed by chemical compounds potentially associated with this project are included with this Plan in Attachment B.

13.0 CERTIFICATION

I certify that I have read this Health and Safety Plan and the attached information, and I understand the requirements for health and safety practices on this site.

_____

Tom Boden
Health & Safety Manager

_____

Hart Crowser
Field Supervisor

_____

Contractor Supervisor

Material Safety Data Sheet

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200). (Formerly Called MATERIAL INFORMATION BULLETIN)

CHEVRON Unleaded Gasoline **CPS 201110**

DANGER! **HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL**
LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
MAY CAUSE EYE AND SKIN IRRITATION. EXTREMELY FLAMMABLE
KEEP OUT OF REACH OF CHILDREN

TYPICAL COMPOSITION

Blend of paraffins, naphthenes, aromatics and olefins including less than the percentages indicated for the following: 25% toluene (CAS 108-88-3), 20% xylenes (CAS 1330-20-7), 10% methyl tert butyl ether (MTBE) (CAS 1634-04-4), 5% benzene (CAS 71-43-2), 5% n-hexane (CAS 110-54-3), 5% cyclohexane (CAS 110-82-7), 5% ethyl benzene (CAS 100-41-4) and 5% naphthalene (CAS 91-20-3)

COPY & USE FOR APPENDIX TO H+S PLAN

EY

gasoline is 300 ppm for a daily 8-hour exposure. No ard has been established for this material. See discussion of benzene exposure limits.

EMERGENCY & FIRST AID PROCEDURES

Eyes

m contact the vapor. that vapor ppm are irrita...

Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. If irritation persists, see a doctor.

Skin

Prolonged or freque... peated liquid contact may cause skin irr...cation or may cause the skin to become cracked or dry from the defatting action of this material. See Additional Health Data.

Wash skin thoroughly with soap and water. See a doctor if any signs or symptoms described in this MSDS develop or if any skin irritation occurs. Launder contaminated clothing.

Inhalation

Prolonged or repeated breathing of gasoline vapor may be harmful. See Additional Health Data.

Move exposed person to fresh air. If breathing has stopped, apply artificial respiration. Call a doctor immediately. See Respiratory Protection, Page 2.

Ingestion

This material is expected to be only slightly toxic by ingestion. **Note to Physician:** See Additional Health Data.

If swallowed, DO NOT make person vomit. Call a doctor immediately.

ADDITIONAL HEALTH DATA
See following pages

SPECIAL PROTECTIVE INFORMATION
Eye Protection: Keep away from eyes. Eye contact can be avoided by wearing chemical safety goggles.
Skin Protection: Keep away from skin. Skin contact can be minimized by wearing impervious protective clothing including gloves.
Respiratory Protection: Avoid prolonged breathing of vapor by using approved respiratory protection. In open areas, such as outdoor gasoline transfer areas, ventilation is usually adequate to prevent prolonged breathing of high gasoline vapor concentrations. See Additional Health Data.
Ventilation: Use this material only in well ventilated areas.
Comment: If you experience any of the signs or symptoms described in this MSDS, you may be exposed to harmful gasoline levels. Your exposure can be minimized if you follow the protective measures presented above.

FIRE PROTECTION
This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.
Flash Point: (P-M)<-49°F(-45°C)
Autoignition Temp.: NDA
Flammability Limits: 1.4-7.6%
Extinguishing Media: CO_2, Dry Chemical, Foam, Water Fog.
Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire MSDS.

SPECIAL PRECAUTIONS
See last page of this MSDS.

ENVIRONMENTAL PROTECTION
Environmental Impact: Certain geographical areas have air pollution restrictions concerning the use of materials in work situations which may release volatile components to the atmosphere. Air pollution regulations should be studied to determine if this material is regulated in the area where it is to be used. This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.
Precautions if Material is Released or Spilled: Eliminate all sources of ignition in vicinity of spill or released vapor. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.
Waste Disposal Methods: Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

REACTIVITY DATA
Stability (Thermal, Light, etc.): Stable.
Incompatibility (Materials to Avoid): May react with strong oxidizing materials.
Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.
Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES
Solubility: Soluble in hydrocarbons; insoluble in water.
Appearance (Color, Odor, etc.): Clear to yellow liquid.
Boiling Point: 25-225°C (Range)*
Melting Point: n/a
Specific Gravity: 0.7-0.8 (Range)
Vapor Pressure: 5-15 psi (max) @ 100°F(Range)*
Vapor Density (Air=1): 3-4(Range)
Percent Volatile (Volume %): 99+
Evaporation: NDA
*Variable with season and location.

n/a = Not Applicable
NDA = No Data Available

Material Safety Data Sheet

CHEVRON Unleaded Gasoline CPS 201110

ADDITIONAL HEALTH DATA

Ingestion of gasoline or inhalation of gasoline vapor at airborne concentrations exceeding 1000 ppm may cause signs and symptoms of central nervous system depression such as headache, dizziness, loss of appetite, weakness and loss of coordination. Vapor concentrations in excess of 5000 ppm may cause loss of consciousness, coma and death. Intentional exposures to excessively high concentrations (e.g., when used as a drug of abuse) have been reported to result in clinical manifestations that may include convulsions, delirium, and hallucinations. These manifestations are not known to occur following accidental inhalation of vapor or skin contact with gasolines during normal operations. Brief exposures to high vapor concentrations may also cause pulmonary edema and bronchitis. **Note to Physician:** Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

This product may contain up to 4.9% benzene. Repeated or prolonged breathing of benzene vapors has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. Following a two-year cancer bioassay sponsored by the National Toxicology Program, NTP concluded that benzene is a carcinogen for rats and mice of both sexes. In its Monograph Supplement 4, the International Agency for Research on Cancer (IARC) listed benzene in Group 1, chemicals carcinogenic to humans. No teratogenic effects have been shown to occur in pregnant laboratory animals exposed to doses not acutely toxic to the mother. However, some evidence of fetotoxicity such as delayed physical development has been seen at such levels. The available information on the effects of benzene on human pregnancies is inadequate but it has been established that benzene can cross the human placenta. **Note:** Limiting the total hydrocarbon exposure to 300 ppm, the ACGIH TLV for gasoline, may not keep the benzene concentration below the 10 ppm Federal OSHA exposure standard and ACGIH TLV for benzene.

This product contains n-hexane. Prolonged or repeated contact with n-hexane may produce peripheral neuropathy characterized by progressive weakness and numbness in the extremities, loss of deep tendon reflexes and reduction of motor nerve conduction velocity. Recovery ranges from no recovery to complete recovery depending upon the duration of exposure and the severity of the nerve damage.

This product contains toluene. Toluene has been reported to decrease immunological responses in test animals. It has also been reported that when young rats were exposed to 1000 ppm toluene for 14 hours daily, for two weeks, irreversible hearing loss was detected. The same daily exposure to 700 ppm for as long as 16 weeks was without effect. Since the level necessary to produce hearing loss is greater than 7 times the 1985-86 ACGIH TLV for toluene, worker exposures at or below 100 ppm is not expected to cause any adverse effect. There are also reports that chronic abusers (glue sniffers, solvent huffers) of solvents containing toluene have suffered liver, kidney and brain damage. Scientific studies on toluene have failed to demonstrate teratogenicity in rats and mice. However, toluene has been shown to cause delayed growth and extra ribs in the offspring of rats and mice at inhaled doses (266-399 ppm) that were non-toxic to the mother. Toluene has not conclusively been shown to cause adverse reproductive effects in humans.

This product contains xylene. Xylene has been reported to be embryotoxic, teratogenic and to cause developmental disturbances in rats exposed in utero.

The American Petroleum Institute (API) sponsored a study where laboratory animals were exposed to 67, 292 and 2056 ppm unleaded gasoline vapor six hours/day, five days/week for approximately two years. Each exposure group consisted of 200 rats and 200 mice. During the course of the study, male rats had an increased incidence of kidney damage followed by repair and enlargement of the kidney tubules. At the end of the study, a dose-related incidence of microscopic kidney tumors was detected in the male rats; two tumors were found in the low exposure group, and five were found in the high exposure group. Female rats and both male and female mice did not show this type of lesion. It was noted in the study that the animals that were exposed to gasoline vapor lived longer than the control. Thus, the significance of the tumor findings is difficult to evaluate at this time. Additional findings in the API-sponsored study, which were observed only at the highest dose tested (2065 ppm), included (1) failure to gain body weight, (2) increased incidence of hepatocellular carcinomas (liver cancer) in female mice, and (3) lung inflammation in male and female rats. Subsequent testing has shown that the six to ten carbon isoparaffinic compounds in gasoline are apparently responsible for the early kidney damage seen in the male rat in the API study although the larger isoparaffins have not been individually tested. Information collected by the API and others indicates that the damage occurs only in the male rat, does not occur in female rats or mice and monkeys of either sex and may not occur in man. How this early kidney injury relates to the development of kidney tumors seen in the API study is currently unknown.

The significance to man of the results of the studies discussed above is not known. While we believe that low level or infrequent exposure to gasoline vapor is not likely to cause cancer or other serious disease, in light of the above information, the precautions outlined in this MSDS should be carefully observed. If strong odor of gasoline is present or if any irrritation occurs, individuals should leave the area or institute suitable protective measures (see page 2 - Special Protective Information).

SPECIAL PRECAUTIONS

NEVER siphon gasoline by mouth. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE AND STORE ONLY IN COOL, WELL VENTILATED AREA. Keep container closed. DO NOT TRANSFER LIQUID TO AN UNLABELED CONTAINER. DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

HMIS Hazard Rating:

Reactivity: 0, Flammability: 3, Health: 1* (*) Long-term exposure to vapor has caused cancer in laboratory animals.

Material Information Bulletin

(Approved – "Essentially Similar" to Form OSHA 20, Material Safety Data Sheet)

Chevron

CHEVRON GST OIL 100

CMS 234232

TYPICAL COMPOSITION

Hydrocarbon Base Oils	99%
Additives	1%

EXPOSURE STANDARD

The suggested Threshold Limit Value is 5 mg/m^3 (milligrams of material per cubic meter of air) for a daily 8-hour exposure. This is the OSHA exposure standard and the Threshold Limit Value (1980) for mineral oil mists.

PHYSIOLOGICAL & HEALTH EFFECTS	EMERGENCY AND FIRST AID PROCEDURES
Eyes	
Expected to cause no more than minor eye irritation.	Wash eyes with fresh water for at least 15 minutes. If irritation continues, see a doctor.
Skin	
Expected to cause no more than minor skin irritation following prolonged or frequently repeated contact.	Wash skin thoroughly with soap and water. Launder contaminated clothing.
Inhalation	
Not expected to be acutely toxic by inhalation but breathing mineral oil mists at levels above the exposure standard can cause respiratory irritation or discomfort.	If respiratory discomfort or irritation occur, move the person to fresh air. See a doctor is discomfort or irritation continues.
Ingestion	
Not expected to be acutely toxic by ingestion.	If a large volume of this material is swallowed, give a large amount of water to drink, make person vomit, and call a doctor.

ADDITIONAL HEALTH DATA

This bulletin was prepared from data available for the major components of this mixture.

SPECIAL PROTECTIVE INFORMATION

Eye Protection: No special eye protection is necessary.

Skin Protection: No special skin protection is necessary.

Respiratory Protection: If operating conditions create airborne concentrations which exceed the exposure standard, the use of an approved respirator is recommended.

Ventilation: Use adequate ventilation to keep the airborne concentrations of this material below the exposure standard.

FIRE PROTECTION

Flash Point: (COC) 240°C (Min.)
Autoignition Temp.: NDA
Flammability Limits: n/a

Extinguishing Media: CO_2, Dry Chemical, Foam, Water Spray.

Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire bulletin.

ENVIRONMENTAL PROTECTION

Environmental Impact: This material is not expected to present any environmental problems other than those associated with oil spills.

Precautions if Material is Released or Spilled: Clean up spills as soon as possible. Absorb large spills with absorbent clay, diatomaceous earth, or other suitable material.

Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable.

Incompatibility (Materials to Avoid): May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

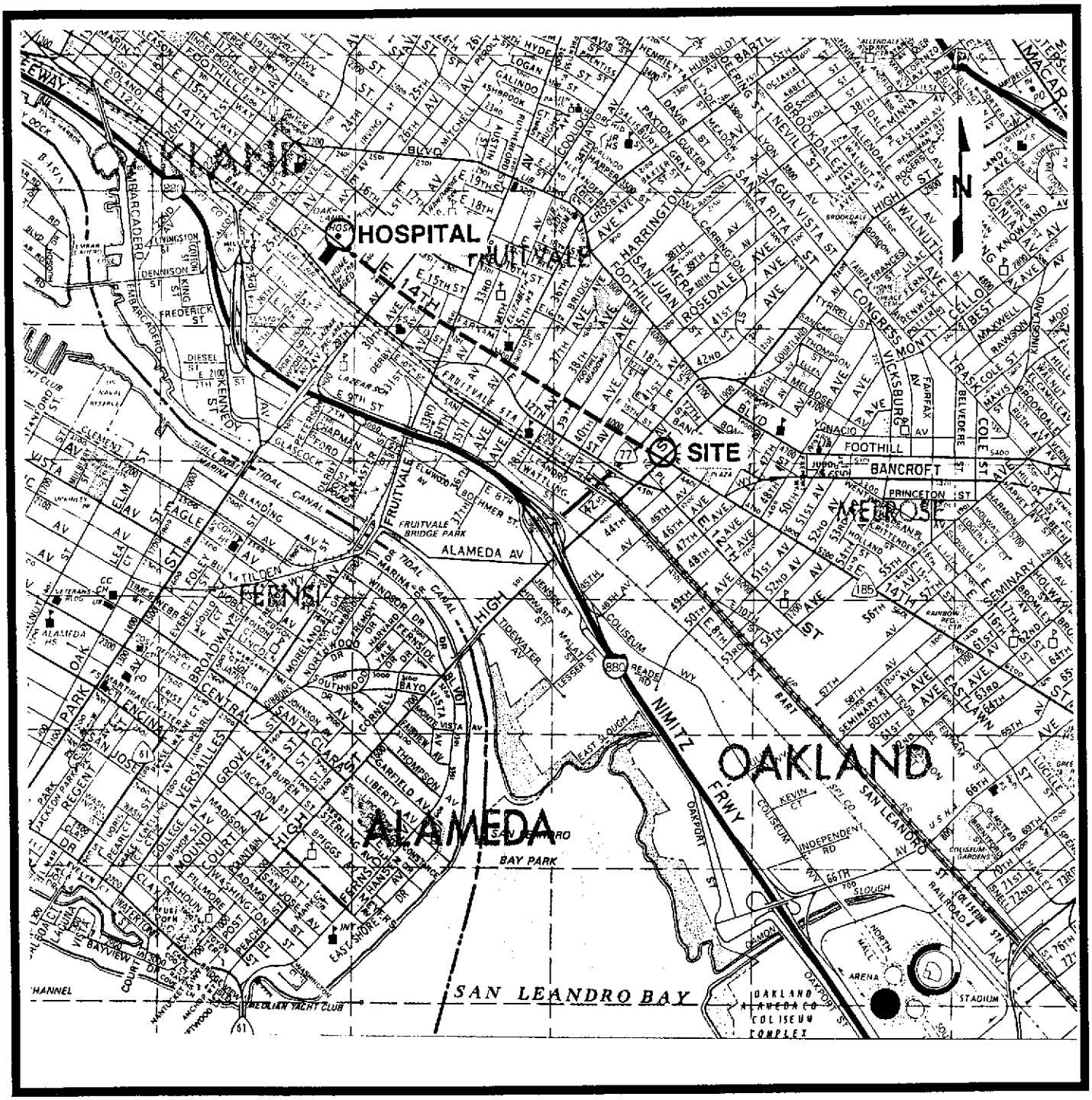
PHYSICAL PROPERTIES

Solubility: Soluble in hydrocarbon solvents; insoluble in water.

Appearance (Color, Odor, etc.): Yellow liquid.

Boiling Point: n/a
Melting Point: n/a
Specific Gravity: 0.88 @ 15.6/15.6°C
Vapor Pressure (mm Hg & Temp.): n/a
Vapor Density (Air = 1): n/a
Percent Volatile (Volume %): n/a
Evaporation (= 1): n/a
Pour Point: -14°C (Max.)
Viscosity: 90.0-100.0 cSt @ 40°C

n/a = Not Applicable
NDA = No Data Available



Base Map Thomas Bros. Alameda County Maps

HOSPITAL ROUTE MAP
Grand Auto/former Super Tire Site
Oakland, California

HARTCROWSER

J-6077 *7/92*