WORK PLAN FOR SOIL AND GROUND WATER INVESTIGATION

at

Homestead Federal Savings Association Branch 3900 Piedmont Avenue Oakland, California

Nov 15,95

Prepared for:

TELACU/Carpenter
as Asset Management Contractor for
the Resolution Trust Corporation
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Irvine, California 92715

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Environmental Technology, Inc.

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Homestead Federal Savings Association Branch 3900 Piedmont Avenue Oakland, California

prepared by:

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November 15, 1995

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1 INTRODUCTION

Telacu/Carpenter of Irvine, California, a Resolution Trust Corporation (RTC) asset management contractor has retained PHR Environmental Consultants, Inc. (PHR) to provide project coordination and data analysis, and Cambria Environmental Technology, Inc. (Cambria) as a subcontractor to PHR, to complete a subsurface investigation at the site referenced above. The upcoming investigation will include drilling of soil borings, installation of ground water monitoring wells, execution of a hydraulic test and development of a remedial plan, and cost estimates. The following Draft Soil and Ground Water Investigation Workplan is limited to the duties, liabilities, obligations, and the statement of work as set forth in the RTC Scope of Work dated July 18, 1994.

1.1 <u>Assessment Objectives</u>

The objective of this expanded Phase II Environmental Assessment is to develop an estimate of the cost and time required to clean up the site to the target clean up levels specified by the regulatory agency having oversight authority for the site. Meeting this objective requires that the level and geographic extent of soil and ground water contamination exceeding target cleanup levels be estimated. The activities described in this workplan should allow us to accurately assess the vertical and horizontal extent of hydrocarbons in soil and ground water at the 3900 Piedmont Avenue, Oakland site. Although it is possible that the installed borings/wells will not completely bound/describe the impacted area, we should still be able to achieve the assessment objectives of reliably estimating site cleanup costs because the data collected can be analyzed/modeled in a manner that should fill in any gaps in the field investigation data set.

1.2 Background

A former Standard Oil (now Chevron) service station operated underground storage tanks (USTs) at the site until 1978, when the station was demolished and the tanks were apparently removed. Phase I and Phase II investigations conducted in 1993 determined that the former gasoline and waste oil USTs and the service station pump islands had released gasoline-range hydrocarbons and oil and grease to the subsurface. The investigations generally identified the locations of the former tanks (Figure 1). Based on these analytic results, the RTC (the owner of the property) requested that additional soil and ground water investigation be completed.

1.3 Assumptions and Limitations

The previous site investigations located the former tanks or piping, as well as all known potential nearby offsite sources. Based on this work, we have assumed that the former tanks/piping were located near the southwestern corner of the site and that these former structures were responsible for the hydrocarbons detected in the earlier Phase II assessment. We further assume that gasoline hydrocarbons, volatile organics and lead are the only compounds of concern and that no offsite sources are contributing hydrocarbons or other compounds to the site soils or groundwater. However, because of the uncertainty associated with all environmental investigations, we have designed this assessment to confirm the presumed location and nature of the contamination and to ensure that no previously unidentified offsite sources exist. Furthermore, the results of our recommended work plan will confirm that no other contaminants, tanks or other structures are present on the site.

2 DATA REVIEW/EVALUATION AND AGENCY REQUIREMENTS

This site is located in Northern Alameda County and is, therefore, within the jurisdiction of the Alameda County Department of Environmental Health (ACDEH). As the lead agency, the ACDEH will evaluate the investigation results and will work with the site consultant in developing cleanup standards for site remediation. The ACDEH

has not established their own guidelines, but rely instead on State Regulations (Title 23) and on existing and evolving procedures established by the Regional Water Quality Control Board - San Francisco Region (RWQCB). Directives established by Title 23, Article 11, Section 2725 require that all sites that have experienced unauthorized releases must undergo thorough site investigations to "assess the vertical and lateral extent of the unauthorized release". In addition, guidelines established by the three Northern California Regional Boards (the "Tri-regional Guidelines") stipulate procedures for installation of monitoring wells following tank removals or other indications of releases. In practice, these documents necessitate sampling ground water down gradient of the source area and beyond the leading edge of the hydrocarbon plume. We developed the investigation strategy presented below based on our review of the available data, and on our experience conducting subsurface investigations in Alameda County and negotiating clean-up criteria with ACDEH.

2.1 <u>Conceptual Site Model</u>

The site is located on the East Bay Plain adjacent to the foothills of the Diablo range. The subsurface stratigraphy in this part of the East Bay Plain typically consists of finely interbedded clays, silts and sands, with shallow ground water. The actual site stratigraphy, as interpreted by logs of previous soil borings, confirms this stratigraphy. The site soils consist of silty gravel fill to about three ft depth, and interbedded clayey sand, clayey gravel and silty sand to the total depth explored of 16.5 ft. The site stratigraphy is illustrated in Figure 2. Ground water depth was about 11 ft at the time of the November 1993 investigation. Based on the regional topographic gradient, ground water in the area probably flows southwest. Ground water depth in this area typically fluctuates about three to five ft due to seasonal changes and annual rain fall variation. This fluctuation probably created a hydrocarbon smear-zone up to five ft thick down gradient of the former USTs.

Based on the analytic results for soil and ground water presented in ESE's November 15, 1993 report and on the clayey soils encountered during the subsurface investigation, it appears that gasoline range volatile hydrocarbons in soil are restricted horizontally to the area surrounding boring FNBO-5, presumably located immediately southwest of the former tanks, and the area surrounding boring FNBO-7, located near the former service island (Figure 1). Total petroleum hydrocarbons as gasoline (TPH-g) and benzene were also detected in the ground water sample collected from boring FNBO-6, located adjacent to FNBO-5. This indicates that the release from the former USTs has impacted ground water in the vicinity of the former UST location. Since no additional ground water samples were collected, the horizontal extent of hydrocarbons in ground water cannot be completely assessed at this time. However, since only 7,800 ppb TPHg and 7.7 ppb benzene were detected in the ground water sample collected from boring FNBO-6, and since the subsurface stratigraphy consists of low hydraulic conductivity clayey soils, hydrocarbons in ground water should not extend more than thirty to fifty ft beyond the southwestern property line. In addition, due to the high dissolved oxygen concentrations found in most East Bay ground water, natural biodegradation bioattenuation is probably restricting hydrocarbon migration down gradient of the former tanks.

2.2 Data Sources and Summary of Data

Cambria selected the soil and ground water sampling points presented in Figure 1 based on analytic results for soil and ground water presented in a November 15, 1993 investigation report prepared by ESE, on the historic site information presented in the Augeas May 1993 Phase I report, on our conceptual assessment of the likely extent of site contamination and on our experience conducting numerous similar investigations in this area of Oakland. The analytic results for soil and ground water generated during previous investigations are summarized in Table 1.

2.3 Agency Target Cleanup Standards

Evolving policies at both the California Regional Water Quality Control Board - San Francisco Bay Region (WQCB-SFBR) and the ACDEH are allowing increased use of site specific considerations and risk assessment in establishing site cleanup standards. However, in the absence of these evolving policies, many nearby site remediations have used numerical ground water cleanup standards established by the ACDEH, working under the technical guidance of the WQCB-SFBR. Ground water in all regions within the jurisdiction of the ACDEH is considered to have beneficial use as potential municipal drinking water supply unless the aquifer beneath the site maintains a yield of less than 200 gallons per day and the Total Dissolved Solids (TDS) content of the water is greater than 3,000 ppm. If the aquifer is characterized as having a drinking water beneficial use, then the cleanup standards for the aquifer are California Department of Toxic Substances Control (DTSC) maximum contaminant levels (MCLs) for drinking water, which are 1 part per billion (ppb) for benzene, 680 ppb for ethylbenzene, 1,000 ppb for toluene (EPA MCL) and 1,750 ppb for xylenes.

Although the new ACDEH and WQCB-SFBR policies also incorporate risk considerations in establishing soil cleanup standards, many recent site remediations overseen by ACDEH have used "default" numerical soil cleanup standards. These ACDEH's "default" cleanup standards require that gasoline impacted soil be remediated to below detection limits for total petroleum hydrocarbons as gasoline (TPHg) and benzene, using typical industry detection limits of one ppm for TPHg and 0.05 ppm for benzene.

The ACDEH allows use of either the conservative default standards or use of flexible, risk-based decision criteria to establish cleanup standards for soil. They allow risk-based decisions because they recognize that all sites are different and that ground water usage, site stratigraphy, ground water depth and flow direction vary greatly between sites, resulting in varying risk to ground water resources and to human exposure and toxicity. Considerations they use in establishing soil cleanup standards include soil grain size and heterogeneity, ground water depth, infiltration, the presence or absence of vertical channeling and the mobility of the released compounds. Once additional soil and ground water analytic data is collected and the potential human exposure pathways are researched, appropriate soil cleanup levels can be negotiated with the ACDEH. The primary factor that they will consider in establishing the soil cleanup goals is the potential threat that the residual hydrocarbons present to ground water.

The ACDEH uses a similar risk-based approach in establishing ground water cleanup goals. They consider the site hydrogeology, the contaminant properties, the location of nearby human receptors and the projected future land use in evaluating the potential for human exposure to the released compounds. The results of the proposed soil and ground water investigation activities described below can be used as inputs to this risk-assessment process to determine the site specific cleanup goals for ground water. If a risk-based decision process is not used to determine site specific cleanup goals for this site, then the drinking water standards described above are likely to be used as ground water cleanup standards.

In addition to these risk-based approaches, the ACDEH also uses an alternative approach recently approved by the RWQCB - SFBR in regulating site cleanup. The new closure program, called the Non-Attainment Area (NAA) policy, is enjoying increased use among Bay Area regulatory agencies including the ACDEH. The program is based on the RWQCB's recognition that extensive cleanup efforts are not always necessary or cost-effective to protect the state's ground water resources. The RWQCB has established two categories of sites where case closure may be granted: I) sites with ground water and soil contamination that present limited risk to the

environment and human health, and II) sites where the approved remediation program has not resulted in compliance with state water quality objectives. The program allows the establishment of alternative compliance points such as property lines or the existing plume boundaries if all of the following criteria are met:

- Adequate characterization has fully defined the site stratigraphy and has demonstrated that the plume is not and will not migrate either horizontally or vertically,
- The source material (usually unsaturated soil beneath/adjacent to the source) has been removed,
- Available technologies will be unable to significantly improve ground water conditions, and
- An acceptable plan is submitted for containing and managing remaining risks posed by the residual contaminants in ground water.

Based on our familiarity with this program and on our preliminary understanding of the site conditions, the 3900 Piedmont Avenue site is a strong candidate for closure under this program.

2.4 Applicable Agency Guidelines, Rules and Procedures

A number of state statutes and state and federal regulatory agency guidelines will be used by the ACDEH in overseeing the assessment and cleanup of this site. The primary regulation used to encourage site assessment and remediation is CCR Title 23, Article 11. This state regulation requires abatement of unauthorized releases, thorough assessment of the extent of contamination from a release and implementation of a corrective action. The most common and easily applied state guidance document used to design ground water investigations is the Tri-Regional Guidelines discussed in Section 2.3 above. This document stipulates that, in situations where existing site data indicates that a release has occurred, at least one ground water monitoring well must be installed in the down gradient direction from the release point. The procedures to be followed in establishing risk-based cleanup goals for both soil and ground water are outlined in standards published by ASTM. Finally, the Non-Attainment Policy is described in a draft memorandum entitled "Implementation of Alternative Compliance Points for Ground Water Cleanup:" published in July 1994 by the RWQCB - SFBR.

2.5 <u>Soil Gas Survey Results</u>

As requested in a letter from Telacu Carpenter to PHR dated June 14, 1995, based on an Environmental Report Evaluation prepared by the RTC, the soil gas survey for this site was canceled. The survey was therefore not performed.

3 SAMPLE PLAN DESIGN

3.1 <u>Data Quality Objectives</u>

Data Quality Objectives are developed based on the level of uncertainty that the decision maker in an environmental assessment or remediation project is willing to accept. Data quality will affect the following factors that are important inputs to our remediation cost evaluation:

- Extent of soil and ground water contamination
- Soil properties, especially soil grain size and site stratigraphy,
- Aguifer properties.

Since contaminant distribution data developed from soil sampling is subject to considerable natural variability, the contaminant distribution assessment developed from the soil chemistry data will also involve considerable variability. We intend to reduce the variability as much as possible by maintaining strict QA/QC for all soil sample collection, storage and transport procedures. Our QA/QC procedures are discussed in detail in Section 4.2 below. The variability of ground water quality data developed from properly constructed, developed and sampled monitoring wells is considerably less than that for soil data. Therefore, the contaminant distribution calculations and the ground water remediation costs developed from the well data will be more accurate. Our strict QA/QC procedures for well installation, development and sampling will further increase the accuracy of these calculations.

Since soil properties affect remediation technology selection and the ease of contaminant removal, it is important to accurately characterize site stratigraphy and grain size and distribution during drilling of the soil borings. We will maximize the accuracy of our soil and ground water remediation cost estimates by locating the soil borings appropriately, by collecting and logging at least 1.5 ft of each 5 ft soil column encountered during drilling and by maintaining an accurate log of the soil properties. Our soil characterization procedures are described in Section 3.4 below.

The design and operation of ground water extraction and other remediation techniques are also affected by aquifer properties, and therefore the results of the proposed aquifer slug testing will influence our remediation cost estimates. However, our experience has shown that the results of these short term field tests provide only limited assistance in designing insitu remediation systems. Therefore, we intend to design and conduct the tests primarily to determine the spatial variability of aquifer properties.

3.2 <u>Statistical Sampling Methodology</u>

Geostatistical analysis will be performed to estimate the extent of released hydrocarbons in the subsurface. The existing data presented with the RFP documents as well as the new data generated by the activities described in this workplan will be used as inputs to this statistical analysis. The analysis will quantify the horizontal distribution and maximum and minimum variability of key indicator compounds such as TPHg and benzene.

The geostatistical analysis will assist in the development of variograms used to predict the expected hydrocarbon (and possibly other compound) concentrations at various areas at the site. Because hydrocarbon migration characteristics vary according to direction from the source area (ie. maximum migration usually occurs in the direction of the ground water flow direction) the variograms will represent hydrocarbon distribution in the southwest (down gradient), northeast (up gradient), northwest and southeast (both cross gradient) directions from the highest prior sampling results along Montell Street. Log transforms of all available chemical data will be used to develop the variograms.

The extent of hydrocarbon-impacted soils will be estimated using the following procedures:

• The site will be subdivided into three layers of 20-ft by 20-ft horizontal blocks. Three layers are appropriate for this site because the approximate 10 ft ground water depth creates three separate zones characterized by distinct hydrocarbon migration mechanisms. The shallow zone (0-4 ft depth) would contain compounds released by low-volume surface spills. The middle zone (4 to 8 ft depth) would contain vertically-distributed compounds resulting from more substantial releases. The deepest zone (8 to 12 ft depth) would show horizontally-distributed hydrocarbons emplaced by hydrocarbons migrating with ground water parallel to the local ground water

gradient. Based on the approximate 12,000 sq ft area of the site, the subdivision will create 90 blocks.

- Using the parameters derived from the variograms, kriging will be used to predict the hydrocarbon concentration in each of the 90 blocks, using a target 80% confidence level.
- The volume of hydrocarbon-impacted soil will then be estimated from the predicted concentrations. The values assigned to each of the 90 blocks will be contoured using isopleths for each of the three levels described above. The area of soil inside each isopleth will then be calculated to estimate the volume of soil needing treatment or disposal.

Since the confidence level of a predicted concentration decreases proportionally with the distance from the predicted value to the location of the nearest actual sample, the accuracy of the above-described modeling effort will be dependent on the placement of our proposed boring locations relative to the source areas. Therefore, it is possible that additional sampling may be needed after the modeling effort is complete to "fill in" areas with low confidence levels.

3.3 Sample Areas and Locations

Since the actual hydrocarbon source (the former tanks) is apparently covered by the existing building, we are able only to drill borings around the perimeter of the suspected source. Based on our experience and on the site layout, we recommend that 31 soil samples be analyzed for the upcoming investigation. One to two samples should be collected and analyzed from each of the 14 proposed borings and six proposed borings drilled for monitoring well installation (20 boreholes total). Our proposed boring locations are shown in Figure 1. We estimate that each boring will be drilled to at least 10 ft depth, and to two ft below the water table.

Our recommended ground water sampling plan is based on our professional judgement developed from conducting more than 300 UST assessments since 1986. In our experience, dissolved hydrocarbon plumes from older leaks rarely extend more than about 60 ft down gradient of the source, especially where concentrations in ground water at the source areas are relatively low and where oxygen levels in soil are probably high. Based on the available data for the subject site, we estimate that hydrocarbons in ground water extend no more than about 60 ft down gradient of boring FNBO-5 (the closest access we have to the apparent source) and no more than about 30 ft cross gradient from boring FNBO-5 (Figures 3 and 4). Based on this estimated distribution, we recommend the installation of six ground water monitoring wells to characterize the extent of dissolved hydrocarbons and to provide suitable measurement points for the aquifer slug testing described in Section 5 below. Our proposed monitoring well locations are shown in Figure 1.

Our recommended ground water sampling locations are based on a 60 ft maximum dissolved hydrocarbon migration and on a southwestward ground water flow direction. The well installation layout indicated on Figure 1 provides for the installation of two source area wells (MW-1 and MW-2), two cross gradient wells (MW-3 and 4), one down gradient plume boundary well (MW-5) and one up gradient well (MW-6). Assuming that our estimated hydrocarbon distribution and assumed ground water flow direction proves accurate, this layout should completely define the horizontal distribution of released hydrocarbons in a single investigation phase. Our recommendation for this number and location of wells is also based on the need for adequate spatial coverage for the aquifer slug tests described in Section 5 below.

3.4 Sampling Equipment and Procedures

Vertical and Horizontal Sample Locations

The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. Recorded sample elevations will be referenced to the surveyed onsite monument of record. The horizontal location of each boring will be measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and Sampling Methods

Soil Boring and Sampling: Soil borings will be drilled using hollow-stem augers or hydraulic push samplers. At least one and one-half ft of the soil column will be collected for every five ft of drilled depth. Additional soil samples will be collected near the water table and at lithologic changes. Samples will be collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. Borings not completed as wells will be filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Monitoring Well Installation: Ground water monitoring wells will be installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths will be based on the encountered ground water depth, occurrence of hydrocarbons or other compounds in the borehole and stratigraphy. Well screens will extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will not extend into or through a clay layer that is at least three ft thick.

Well casing and screen will be 4 inch diameter, flush-threaded, Schedule 40 PVC. The screen slot size will depend on the sediments encountered, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand will occupy the annular space between the boring and the well screen to about one to two ft above the well screen. A two-ft-thick hydrated bentonite seal will separate the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads will be secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. The well top-of-casing elevation will be surveyed with respect to mean sea level and the well will be surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development: The installed wells will be developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water will be extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction will continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually will occur prior to installing the sanitary surface seal to ensure sand pack stabilization.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Ground Water Sampling: Three to four well-casing volumes of ground water will be purged prior to sampling. Purging will also continue until ground water pH, conductivity, and temperature have stabilized. Ground water

samples will be collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory.

Documentation of Field Activities

Cambria's field personnel will maintain a rigorous field log that documents all important aspects of the field work performed. The field log will, among other things, document equipment calibration and cleaning, document weather conditions, identify all field personnel, document the execution of QA/QC procedures and record the quantities of materials used during the sampling. It will also document the arrival and departure times of Cambria's field personnel, subcontractors and other concerned personnel and record miscellaneous items needed for invoicing (mileage, truck usage, materials purchasing, etc.).

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category
- Color
- Approximate water or product saturation percentage
- Observed odor and/or discoloration
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy)
- Estimated permeability

Equipment Decontamination

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Preservation, Storage, Handling and Transport

Soil sampling tubes chosen for analysis will be trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples will be labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. The samples will be transported under chain-of-custody to a State-certified analytic laboratory. Water sample containers will be preserved with dilute hydrochloric acid and will be labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples will be collected for the monitoring well sampling program, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks will be analyzed to check for cross-contamination caused by sample handling and transport. One trip blank will be analyzed for each sample container used during each sampling event. Two equipment blanks will be analyzed for each round of ground water sampling, since we anticipate the use of non-dedicated sampling equipment.

Waste Handling and Disposal

Soil cuttings from drilling activities will be stored onsite in drums. At least three individual soil samples will be collected from the drums for later compositing at the analytic laboratory. The composite sample will be analyzed for the same constituents analyzed in the borehole samples. Based on the composite analytic results, soil cuttings will be transported by licenced waste haulers and disposed in secure, licenced facilities designated by the client. Neither *Cambria* nor PHR will determine or recommend disposal procedures for wastes.

Ground water removed during well sampling and/or rinseate generated during decontamination procedures will be stored onsite in sealed 55 gallon drums. Each drum will be labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water will be based on the analytic results for the well samples. The water will be either pumped out using a vacuum truck for transport to a licenced waste treatment/disposal facility or the individual drums will be picked up and transported to the waste facility where the drum contents will be removed and appropriately disposed.

4 SAMPLE ANALYSIS PLAN DESIGN

4.1 Target Analytes and Analytical Methods

We intend to analyze selected soil and ground water samples for the following compounds:

- TPHg by modified EPA Method 8015,
- Benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Method 8020
- Volatile organics by EPA Method 8260
- Lead by EPA Method 7420
- and Total Recoverable Petroleum Hydrocarbons (TRPH) by EPA Method 418.1

We base this recommendation on the fact that only gasoline-range hydrocarbons and Oil and Grease were detected during the earlier sampling, and because only the above compounds are suspect at the site.

4.2 <u>Laboratory Certification Documentation and OA/OC Procedures</u>

Appropriate documentation of the State certification for NET Pacific of Santa Rosa, California, our chosen analytical subcontractor, will be provided as an appendix to our final report. Laboratory QA/QC will conform to EPA and California State procedures will include, at a minimum, calibration standard maintenance and method blank, matrix spike, matrix spike duplicate and laboratory control sample analyses. Reports of each of these procedures will be included as an appendix to our draft and final investigation reports.

4.3 Chemical Data Reporting

Our investigation report will include comprehensive data summary tables that present the results of all chemical analyses conducted, including the results of the field screening analyses and the laboratory analytic results. The data tables will identify the date and depth of sample collection, the analytic method used for the analysis, as well as other appropriate information such as the ground water depth at the time of sampling and the occurrence of unexpected compounds in the analytic chromatograms. Laboratory analytic reports and data tables from the aquifer testing will be presented as appendices to our report.

5 AQUIFER TEST PLAN

We propose to conduct the aquifer testing using a "slug test" procedure from three individual wells. Our procedures for this testing are as follows:

- 1) Measure water levels in all site wells before beginning the test.
- Place pressure transducer at the bottom of the test well, recording the data produced on a data logger.
- 3) After establishing a reliable water level baseline, drop a weighted solid casing into the well to produce an instantaneous hydraulic head increase.
- 4) Monitor the water level declines using the pressure transducers. Data collection will occur approximately once every 30 seconds for the first five minutes of the test, once per minute for the next 15 minutes, and once every five minutes for the remainder of the test.

We propose to perform this procedure on wells MW-1, MW-2 and MW-5 to provide optimal onsite areal coverage. The above procedure will be repeated for each well.

6 DATA ANALYSIS PLAN

Following the execution of the field investigation and collection of soil and ground water samples, we will analyze the collected data to estimate, 1) the approximate quantity of soils contaminated above regulatory limits, 2) the extent of ground water contamination, and 3) aquifer characteristics including the actual ground water flow direction and velocity. This information will then be used to develop remediation cost estimates for both soil and ground water.

6.1 <u>Data Analysis and Evaluation Methods and Procedures</u>

We will measure the top-of-casing elevation of the installed wells and the water levels after the wells equilibrate following well development. We will then calculate the ground water flow direction and gradient.

Depending on the quality and variability of additional data collected during the field investigation, we will analyze the chemical data using either a geostatistical approach or an alternate method that uses contouring (most likely using geostatistical contouring software such as "Surfer") of soil chemistry data to estimate soil volumes.

If a geostatistical methodology is used, we intend to analyze the contaminant distribution data using variograms and kriging of key parameters. Several variograms will be developed to predict the distribution of hydrocarbons in soil parallel and perpendicular to the actual ground water flow direction. Key values from the variograms will then be used as inputs to a kriging analysis.

The collected data will be analyzed by computer generated contour plots illustrating the horizontal distribution of one or more key chemical parameters. Based on the available data, it is likely that we will use either TPHg or benzene data. The isopleth contour maps will illustrate the contaminant distribution at 5 ft depth and immediately above the water table. These isopleth contours will be used to generate the soil volume estimates.

The test data produced from the aquifer slug tests will be tabulated and then analyzed using either the Horslev or Bouwer-Rice method, both of which are appropriate for the analysis of data derived from tests of unconfined (water table) aquifers. As discussed in Section 3.1, the principal objective of the slug testing is to determine the spatial variability of hydraulic conductivity, the most important aquifer property for the purposes of site remediation.

6.2 <u>Tables and Figures</u>

The soil and ground water investigation report will include tabulated analytic results for all analysis performed and figures depicting the site layout, site stratigraphy, boring and well locations and isopleth contours for TPHg and benzene in both soil and ground water. Pump test data, laboratory analytic reports and QA/QC documentation and chain of custody documents will be presented as appendices.

7 REPORT FORMAT

We will prepare a final subsurface investigation/remediation cost estimate report that will contain:

- Rationale for the soil boring and well locations,
- Descriptions of the boring and well installation and sampling methods,
- Descriptions of the hydraulic test procedures and results,
- Statistical data analysis procedures and results,
- Descriptions of our recommended remedial approach for site cleanup including a detailed discussions of probable agency soil and ground water cleanup goals,
- Detailed cost estimates for our recommended remedial approach including cost ranges for system installation and operation,
- Tabulated analytic results for both soil and ground water,
- Boring logs and well construction diagrams,
- Chain of custody documents and laboratory analytic reports,
- Quality Assurance and Control. All data will be evaluated to confirm compliance with RTC and industry standards.

8 SCHEDULE

We will begin the boring/well installation permitting process once we receive authorization from Telacu/Carpenter and the RTC. Since permits can generally be secured within one week of submittal, we should be able to begin the field investigation within two weeks of receipt of authorization. Two copies of the draft investigation report will be submitted to Telacu/Carpenter within 5 weeks following completion of the ground water sampling.

9 HEALTH AND SAFETY PLAN

Our site specific Health and Safety plan that includes hazard reduction procedures and routes to the nearest hospital with a trauma ward is included as Attachment A. The safety plan will be reviewed daily by all field personnel.

3900 Piedmont Avenue

Oakland, California

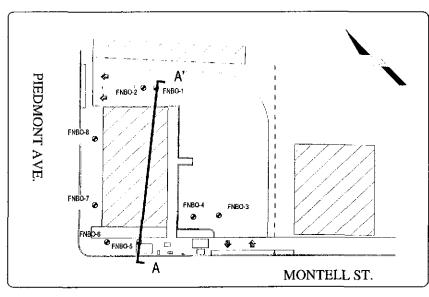
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PROPOSED SOIL BORING

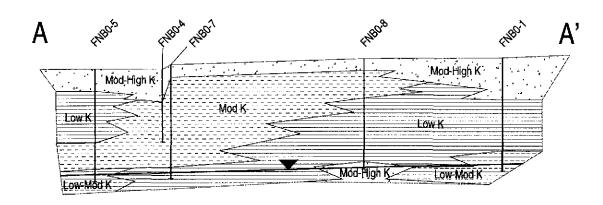
SURVEY POINT AND IDENTIFICATION

PROPERTY LINE



10 ft 20 ft

Cross-Section Location Map





CAMBRIA

Environmental Technology, Inc.

Low permeability sediments Low to moderate permeability sediments Moderate permeability sediments

Moderate to high permeability sediments

EXPLANATION

Cross-Section A-A'

3900 Piedmont Avenue Oakland, California

FIGURE



CAMBRIA Environmental Technology, Inc.

FNBO-7 (350) 🚱

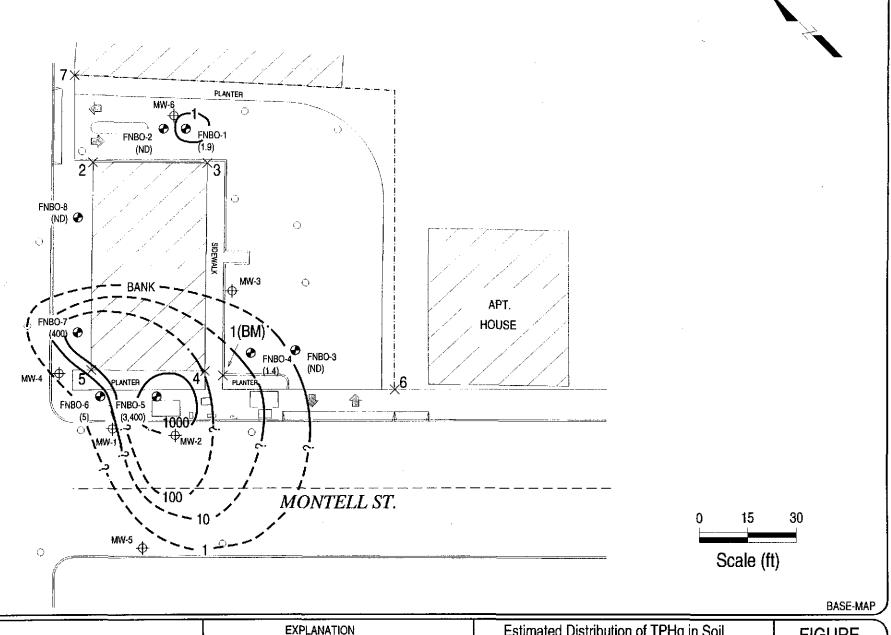
С

PREVIOUSLY DRILLED SOIL BORING (WITH TRPH CONCENTRATIONS - ppm) PROPOSED WELL PROPOSED SOIL BORING PROPERTY LINE

SURVEY POINT AND IDENTIFICATION

Estimated Distribution of TRPH in Soil
Between 5 and 11 ft Depths
First Nationwide Bank
3900 Piedmont Avenue
Oakland, California

FIGURE 3





Environmental Technology, Inc.

PREVIOUSLY DRILLED SOIL BORING (WITH TPHg CONCENTRATIONS - ppm) PROPOSED WELL PROPOSED SOIL BORING PROPERTY LINE

SURVEY POINT AND IDENTIFICATION

FNBO-7 (350)

Estimated Distribution of TPHg in Soil Between 5 and 11 ft Depths First Nationwide Bank 3900 Piedmont Avenue Oakland, California FJPROJECT/PHR/PIED-R12

FIGURE

Table 1. Soil and Ground Water Analytic Data, Homestead Federal Savings, 3900 Piedmont Avenue, Oakland, California

Boring ID	Depth	Date Sampled	TRPH	VOCs	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes
							(Concentration in ppm, mg/kg or mg/l)			
Soil Samples										
NBO-1	10.5	10/20/93	350	ND	1.9 ^a	ND	ND	ND	ND	ND
NBO-2	10	10/20/93	86	ND	ND	ND	ND	ND	ND	ND
NBO-3	10.5	10/20/93	NA	NA	ND	ND	ND	ND	ND	ND
NBO-4	6	10/20/93	320	ND	1.4	ND	ND	ND	ND	ND
NBO-5	6	10/21/93	NA	NA	3,400	ND	ND	ND	19	7.5
NBO-5	10	10/21/93	160	ND	15	ND	0.03	ND	0.31	0.12
NBO-6	5.5	10/21/93	NA	NA	5.0 ^a	ЙĎ	ND	ND	ND	ND
NBO-6	01	10/21/93	10	ND	3.6 ^b	ND	ND	ND	0.034	0.041
NBO-7	6	10/21/93	NA	NA	350 ^b	ND	ND	ND	ND	ND
NBO-7	11	10/21/93	NA	NA	400 ^b	ND	1.0	1.5	5.0	13
NBO-8	11	10/21/93	NA	NA	ND	ND	ND	ND	ND	ND
iround Water San	<u>iple</u>									
NBO-6		10/21/93	3	С	7.8	NA	0.0077	0.021	0.26	0.26

Table 1. Soil and Ground Water Analytic Data, Homestead Federal Savings, 3900 Piedmont Avenue, Oakland, California

Abbreviations

TRPH = Total recoverable petroleum hydrocarbons by EPA method 418.1

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8260

TPHd = Total petroleum hydrocarbons as diesel by modified EPA Method 8260

VOCs = Volatile organic compounds by EPA method 8260

ND = No compounds detected above laboratory detection limit

NA = Not analyzed

Benzene by EPA Method 8260 Ethylbenzene by EPA Method 8260 Toluene by EPA Method 8260 Xylenes by EPA Method 8260

Notes:

All soil and ground water samples collected by Environmental Science and Engineering of Concord California

a = Quantified as light petroleum distillates.

b = Quantified as gasoline and light petroleum distillates

c = 0.03 ppm acetone and 0.035 ppm carbon disulfide detected No.035

CAMBRIA ENVIRONMENTAL TECHNOLOGY INC.

SITE SAFETY PLAN

Date:	6/28/95 Project Number: 53-187-03
Α.	SITE DESCRIPTION
	Client: Telacu/Carpenter
	Site Address: 3900 Piedmont Avenue
	Site Use/Conditions: Bank
	Area Land Use: [X] Residential [X] Commercial [] Industrial [] Agricultural [] Other
	Topography: [X] Flat [] Hilly [] Open Excavation [] Paved [] Unpaved [] Other
	Weather Conditions: clear
В.	WORK TO BE PERFORMED Soil Borings and Monitoring Well Installation
C.	ON SITE CONTROL
-	
A safe p	erimeter has been established. The boundaries are defined by: [X] Tape [X] Cones [] fence [] Other.
The Cor	tamination Reduction Zone is designated as: Area adjacent to drill rig
The Sup	port Zone is designated as: area adjacent to Cambria Vehicle
	F
CHEMI	CAL HAZARD EVALUATION
Suspect	ed or known concentrations of the following compounds are expected at the site:

Compound	Free Product (thickness)	Ambient Air Conc.	Soil Conc.	Water Conc.	TWA	IDLH
Gasoline	NA		350/3400 ppm	7,800ppb	NA	NA S
Diesel	NA		NA:	NA	NA	
Benzene	NA ·		1.0 ppm	7.7ppb	10ppmv	carcinogen
Acetone	NA:		ND	30ррь	750ppmv	20,000 ppmv
	·					

[X] [] []	Applicable material safety data sheets (MSDS) are attached. Vapor-phase concentrations may exceed 10% of the lower explosive limit (LEL). Vapor-phase concentrations may exceed OSHA PEL or 8-hour TWA for the following compounds:	V. A. W.
		. •

PHYSICAL HAZARD EVALUATION

- [X] Underground utilities and or process lines have been identified. An underground line detector survey is [X], is not [] required.
- Personnel are aware of the safety hazards associated with lifting heavy objects, moving machinery and equipment, slipping, falling and operating or working near electrical equipment.
- [] Confined space entry is [], is not [X] required. If required, a confined entry checklist is attached and proper confined space entry procedures will be followed.

AIR QUALITY MONITORING

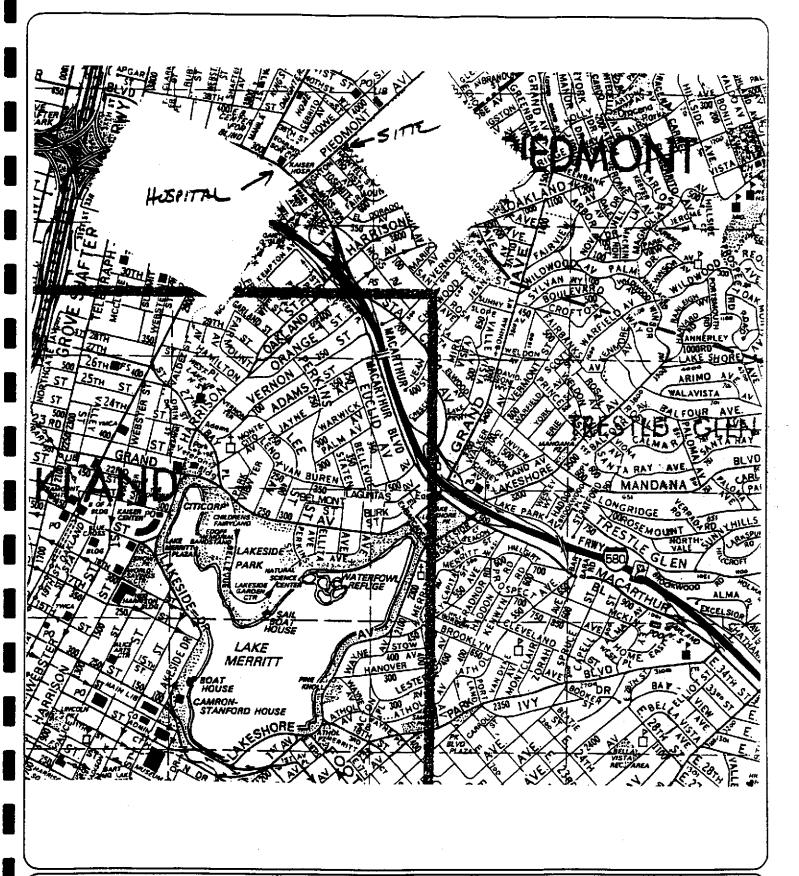
	Instrument [X] PID [] FID [X] LEL Meter	Monitoring Intervals Hourly or at odor detection
	[X] Colorimetric tubes	As needed
Substance	PID Hourly or at odor detection FID LEL Meter As needed Colorimetric tubes As needed Concentration Ranges Pump Strokes 1-25 ppm 50 TVE EQUIPMENT Totective equipment level is: []A,[]B,[]C,[X]D. present required: glaves steeltoed boots bardbat ired: langeleeved shirt and pants equired: half face mask wapper dit to provide protection for 8 hrs have been trained in the use of protective equipment PROCEDURES at shall be decontaminated as follows: [X] Wash and rinse all exposed skin and equipment. PROCEDURES tt shall be decontaminated as follows: [X] wash and rinse all exposed skin and equipment. PROCEDURES tt warning (temperature over 95 degrees F) has been issued by the weather service. ained to recognize and treat heat stress symptoms. The site safety officer will monitor pulse and revorkers showing signs of heat stress. No person shall work with a temperature exceeding 100 degrees r is available at: Cambria Vehicle DURES Officer and Project Team Leader should evaluate the injury and contact an ambulance and/or the ity as needed. An incident report form should be filed for any injury.	
benzene	1-25 ppm	50-
PERSONAL PROTECTIVE EQUIPMENT The required personal protective equipment level is: []A,[]B,[]C,[X]D. Specific protective equipment required: glaves steeltoed hoots hardhat Protective clothing required: longsleeved shirt and pants Respiratory equipment required: half face mask Carridge type: organic vapor This carridge is expected to provide protection for 8 hrs [X] All site personnel have been trained in the use of protective equipment DECONTAMINATION PROCEDURES Personnel and equipment shall be decontaminated as follows: [X] Wash and rinse all exposed skin and equipment. [] Other: HEAT STRESS MONITORING The anticipated air temperature is 70 degrees F. Adjusted air temperature [Tadj, Tair (fo) + (13 X % Sunshine)] is not expected to exceed 80 degrees F. [] A Health Alert Warning (temperature over 95 degrees F) has been issued by the weather service. [X] Workers are trained to recognize and treat heat stress symptoms. The site safety officer will monitor pulse and temperature of workers showing signs of heat stress. No person shall work with a temperature exceeding 100 degrees F. [X] Drinking water is available at: Cambria Vehicle		
The required person	al protective equipment level is:	A, []B, []C, [X]D.
Protective clothing r Respiratory equipme Cartridge type: orga This cartridge is exp	equired: longsleeved shirt and pants ent required: half face mask nic vapor ected to provide protection for 8 hrs	
DECONTAMINAT	ION PROCEDURES	
Personnel and equip		[X] Wash and rinse all exposed skin and equipment.
HEAT STRESS MO	NITORING	
Adjusted air tempera [] A Health A [X] Workers a temperatus F.	ature [Tadj. Tair (fo) + (13 X % Sunshine) Alert Warning (temperature over 95 degree re trained to recognize and treat heat stress re of workers showing signs of heat stress.	es F) has been issued by the weather service. s symptoms. The site safety officer will monitor pulse and
FMERGENCY PRO	OCEDIIRES	
Injury: The Site Sa designated medical t	fety Officer and Project Team Leader shot facility as needed. An incident report form	n should be filed for any injury.
Substance 1-25 ppm		

Emergency escape route and meeting place: Immediately across Piedmont Avenue

EMERGENCY MEDICAL FACILITIES

Reviewed by Industrial Hygienist

Hospital name and location: Kaiser H	ospital Howe and Mac	Arthur
Hospital phone number: 596-1000		
A map to the hospital is attached.		
a first aid kit, eye wash and other emer	gency equipment is loca	ated in the Site Safety Officer's vehicle.
Police Number:911		Fire Number:911
Office Number:911		Client Number: 714-263-4559
should unform me medical care facility	that this is a Worker's (ary should be forwarded	's Compensation insurance. Any injured Cambria employee Compensation claim and that our insurance policy is to our insurance carrier at Blue Shield. Cambria employees mustrly file this claim.
Any injured sub-contractor or sub-cont	ractor employee will be	covered under their employer's policy.
Emergency medical treatment due to che MSDS forms.	nemical exposure to con-	spounds anticipated to be at the site is presented on the artached
All site workers have read the plan and	are familiar with and w	ill abide by its provisions.
Project Team Leader	Name	Signature
Site Safety Officer		
Field Team Leader		
Field Team Member		
Field Team Member		



CAMBRIA Environmental Technology, Inc.

3900 Piedmont Ave Homestead Federal Savings Oakland, California Hospital Location

FIGURE

1

Common Synon Motor sprik Petrol		Congress to pale Gaspine odor brown or prot.	6. FIRE HAZARDS 6.1 Flush Point: —36°F C.C. 6.2 Flammable Limms in Air: 1.4%-7.4% 6.3 Fire Extinguishing Agents: Form, carbon doolds, dry chemical 6.4 Fire Extinguishing Agents Not to be	10. HAZARD ASSESSMENT CODE (See Mazard Assessment Hundbook) A-T-U-V-W
Stur of grain Stay upward a legiste and re	e il possolle. Keep peopre avvin on sources and call fire departe nel use veere gray to Tracot o ancive decharged meterali, aath and polivide control agent	lown" vapor,	Usus: Water may be ineffective 6.5 Special Hazarda of Combustom Production Name 6.6 Betweeter in Filter Vapor is hazarda than air and may travel considerable distance to a source of ignition and flash thack. 6.2 Ignition Temperature SSTF	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Regulation fixed 11.2 NAS Heave Rating for Bulk Water Transportation: Category Rating
Fire	FLAMMABLE. Reprised today report trail in Vegor may expects if synamic Exercises with any orderinate Water may be swittener on Cool exposed containing with	in an enclosed area. lears, or caroon dismile. re.	6.8 Electrical Mazard: Chain I, Group D- 6.9 Burning Role: 4 man/min. 6.10: Adiabotis Flame Temperature: Data rout evaluble 6.11: Stoichiomatric Air to Fuel Role: Data rout evaluble 6.12: Flame Temperature: Data rout evaluble	Fine
Exposure	or loss of corecoustween store to risms at, if breathing has stopped, give if breathing has stopped, give on LIGUID Interest to sten and eyes. If swellowed, will cause nature Remove consumerate outsite Flusty affected areas with plan If the FVES had events one.	is, headache, difficult bresthing antificial responsion. years. es or vorming, g and shoes. by of water. a lord fisch with planty of water. c CONSCIQUS, have victors drink water.	7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No vanction 7.2 Reactivity with Common Metertain: No reaction 7.3 Stability Earling Transport: State 7.4 Houtrellainy Agents for Adde and Casellos: Not partirent 7.5 Polymerization: Not partirent 7.6 Inhibitor of Polymerization: Not perinent 7.7 Mater Resio (Reactivity Late 7.8 Reactivity Group: 33	Pancibity Other Chemicals 0 Water 0 Soft Reaction 0 11.3 MFPA Manaral Cineal/Icutions Category Ciseal/Icution Health Hexard (Blash 1 Flammability (Red) 3 Flancowity (Yellow) 0
Water Pollution	HARMFUL TO ACUATIC LIF Fouring to showers May be despeous it is enten Nosely local health and wildlife Nosely local health and wildlife Nosely operators of nearby we	officials.		12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 store Liquid 12.2 Michaeuter Weight: Not pertinent 12.3 Selling Point at 1 store 140—380°C = 333—472°K 12.4 Freezing Point: Not pertinent
(See Response		LABEL To Category: Plansmable fiquid Category: 2 Category: 2	1. WATER POLLISTION 1.1 Aquebe Testolit; 50 open/24 terjevenia American shad/Ti_/feath water 91 mg/1/24 terjevenia American shad/Ti_/feath water 1.2 Waterboard Testolity; Date not available 1.3 Biological Ozygen Demond (800);	12.5 Critical Temperature: Not periment 12.6 Critical Pressure: Not periment 12.7 Specific Genelly: 9.7227 et 20°C (Iquid) 12.8 Liquid Seriose Tematos: 19-23 dynas/cm — 0.019-0.023 N/m at 20°C 12.9 Liquid Water Interfactul Temator:
	ne of hydrocarbonia netton: 3.1/1203 03	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as objecto); Liquid 4.2 Calar: Colonias to brown 4.1 Object Gasoline	8%, 5 days Q.4 Food Chain Concestration Principle: None	49-51 dynas/cm = 0.046 - 0.051 M/m at 20°C 12.10 Vaper (Gas) Specific Grevity: 3.4 12.11 Ratio of Specific Hentin of Vapor (Gas): (401) 1.054 12.12 Latent Heat of Vaporization: 130-150 Stu/b = 7161 cal/g = 1.0 3.4 X 10 ⁵ J/kg 12.13 Heat of Combastion:18,720 Stu/b =10,400 cal/g = 435.1 X 10° J/kg
5.2 Symptoms For depression countries angua signs of the S.3 Treatment of rest it liquid doctors if an week of and S.4 Threshold Liw 5.5 Short Terrus in S.5 Short Ter	active Equipment: Protective gi dowling Exposure: tritation of it contrast nervous system. Bress neston or, it more severe cases it will cluste severe imission, or unconneumones and presumonis Exposure: INHALATION: mainto is in lungs. INGESTION: do NO preciable quantity is availlowed. wasth with stopp and water. It Yellow: 300 opin sheleton Llimits: 500 ppm for 31 sheleton Llimits: 500 ppm for 31	rescous membranes and stimusation followed by hing of vapor may also cause discress, headed-e, a mesthese, coma, and respiratory errest, if liquid oughing, gagging, pulmonery edema, and, lieter, is Smallowing may cause evapular headbest. In the community of the control of the respiration and administer oxygen; enforce bed if induce voluming; stomech should be leveged (by EYES; wash with copious quantity of water. SKIN:	SHIPPING INFORMATION S.1 Grades of Purity: Vertous octone ratings: military obedicasons S.2 Starage Temperature: Ambient S.3 Innert Atmosphere: No requestions: S.4 Vereting: Open (Benn arrester) or prepairs-vacuum	12.14 Heat of Decomposition: Not perinnet 12.15 Heat of Solution Not perinnet 12.16 Heat of Polymortastion: Not perinnet 12.25 Heat of Feuton: Date not available 12.25 Limiting Value: Date not available 12.27 Reid Vapor Pressure: 7.4 psia
5.7 Late Toxicity: 5.8 Vapor (Gas) in system if on 5.9 Liquid or Soli	vitant Cherecteristics: Vapors agent in high concentrations. The d Instant Cherecteristics: Mine cause smarting and reddening ld; 0.25 ppm	Cause: a signt smarting of the eyes or respiratory e effect is temporary, hum hazard, if spiled on closhing and allowed to		HOTES

GAT

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

	12.17 LIQUID DENSITY	12.18 LIQUID HEAT CAPACITY		LIQUID THERM	12.19 NL CONDUCTIVITY	12.20 LIQUID VISCOSITY	
Comperature (degrees F)	Pounds per cubic fact	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour-square (oot-F (estimate)	Temperature (degrees F)	Centipoise
45	46.270	10	.459	40	.909	46	.521
50	46.130	15	.462	50	.900	48	-514
55	46,000	20	.464	60	.891	50	.507
60	45.850	25	.457	70	.883	52	.500
65	45.710	30	.470	80	.874	54	.494
70	45.560	35	.472	90	.865	56	.487
75	45.400	40	.475	100	.856	58	.481
60	45,240	45	478	110	.847	60	.475
85	45.080	50	.480	120	.838	62	.469
90	44,910	55	483	130	.829	64	.463
95	44.750	60	.486	140	.821	66	.457
100	44.570	65	.488	150	.812	68	.451
105	44,390	70	.491	160	.803	70	.446
110	44,210	75	.494	170	794	72	.440
115	44.030	80	.496	160	.785	74	.435
	l l	85	.499	190	.776	76	.430
	1	90	.502			78	.424
	· •	95	.504			80	,419
	1	100	.507			82	.414
		105	.510			84	.410
]			86	.405
					la la	68	. 40 0
	1	•			K P	90	.396
	[]					92	.391
					1	94	.387
	1					96	.382

	SOLUBILITY	2.21 IN WATER	12.22 SATURATED VAPOR PRESSURE		SATURATED V	12.23 APOR DENSITY	12.24 IDEAL GAS HEAT CAPACITY		
_	Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	
		I N S O L U B L E		DATA NOT AVAILABLE		NOT PERTINENT		DATA NOT AVAILABLE	
	;								

OILS, MISCELLANEOUS: MOTOR

Contemps Synonymia Cranicose of Luoricating oil Transmission oil Sino decharge Call for departs Avoid contact in Inscite and rem	Floring on water.	Yellow-torowit Lube of order	5. FIRE HAZARDS 6.1 Fleein Points 275—600°F C.C. 6.2 Fleenments Limits in Air. Coate not evaluable 6.3 Pine Extreputabling Agents: City charactel, loans, or carton doubts 6.4 Pine Extreputabling Agents Not to be Used: Water may be instituctive 6.5 Special Hazards of Cambuston Productor Not periment 6.6 Retweet in Pine Not periment	TR. PHAZARD ASSESSMENT CODE (Smillingard Assessment Hundbook) A-T-LI TR. RAZARD CLASSIFICATIONS 11.1 Senior of Federal Regulations: New Select 11.2 Stills Heaterd Retting for Bulk Water
	Combustion. Estimated with dry chemical, is Water rate to instactive on in Cool explained containers with it	gam or carbon drombs.	4.7 Igention Temperature: 225—425°F 4.8 Electrical Magazie Not permand 5.3 Septing Rule: 4 marimin. 6.10 Adiabatic Plane Temperature: Data not available 5.11 Solicitionwests Air to Fuel Ratio: Data not available 6.12 Plane Temperature: Outs not available	The compart of large Constitution Cons
Exposure	CALL FOR MEDICAL AND. LIQUID Invisiting 25 size and eyes. Harman & president. Remove consumented clothin Rush attends make with plant F et EYES, hald eyeste opin F SHALLOWED and victim a gr mak. DO NOT BEDUCE VOMITING.	ny di wasan, n and filiah with planty of water. CONSCIOUS, have vicins direk water	7. CHEMICAL REALTIVITY 7.1 Reactivity With Water No reaction 7.2 Reactivity with Common Materials No reaction 7.3 Stability Outing Transport: State 7.4 Neutralizing Agents for Acids and Common Not partners 7.5 Polymortanifors Not parament 7.6 Intelligent of Polymortanifors 10to partners 7.7 Motor Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 33	12. FFWYSICAL AND CHEMICAL PROPERTIES
(See Response Mechanical C Should be m		wayer intaines.	E. WATER POLLITION E.1 Aquesic Yendolty: Dem not evaluate E.2 Westerwal Toxicity: Data not evaluate 8.3 Bilangical Cargain Demand (SOC): Does not evaluate E.4 Food Chain Canonivation Pursonal. None	12.1 Resputch State at 15°C and 1 atm: Liquid 12.2 Whitecolar Weight: Not pertinent 12.3 Shating Point at 1 atm: Very righ 12.4 Sevening Point: —29.5°F = —34.4°C = 238.5°K 12.5 Common Temperature: Not personant 12.5 Common Temperature: Not personant 12.5 Separatic Gravity: 0.84—0.96 at 15°C (injuid) 12.6 Separatic Gravity: 12.7 Separatic Gravity: 12.8 Separatic Gravity: 12.9 Separatic Common Temperature: 12.9 Separatic Common Temper
	opii;side netion: 3,3/12/0 ?O	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (see shippedic Liquid 4.2 Color: Yellow Suprescent 4.3 Oder: Characteristic		at 20°C Table (Can) Specific Gravity: Not perturent 1228: Helde of Specific Heats of Vapor (Gas): Not perturent 1228: 'Labout Heat of Vaporization: Not perturent 1228: 'Stant of Communities:
5.2 Symptome for featurery or but may be 9.3 Treasment of probably no chest select se	sective Equipment: Protective influence (Protective influence) (Prot	IT layers or inducts operand, Assertic Lock institution if of pulmonery entation can be detected by served counts of wester. SIGN: wipe off oil and wests with south solid labels of 15 g/kg is caused a slight smarting of the eyes or respiratory he office as temporary.	Skipping InfoRMATION To Grades of Purity: Venous vaccasies Searge Temperature: Artifect Is insert Atmosphere: No requirement Venting: Open (Reme arrester)	1226 Heast of Schedioc Not personnel 1226 Heast of Polynestration: Not personnel 1226 Heast of Fusion: Data not available 1226 Lizelling Value: Data not available 1226 Read Vapor Pressure: Data not available 1226 Motor Vapor Pressure: Data not available

OMT

OILS, MISCELLANEOUS: MOTOR

SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		LIQUID THERMA	2.19 L CONDUCTIVITY	12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot (estimate)	Temperature (degrees F)	British thermal unit per pound-F (estimate)	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F (estimate)	Temperature (degrees F)	Centipoise
50	52,430	50	.460	35	.920	100.42	275,000
52	52,430	52	.461	40	.919	100112	
54	52,430	54	462	45	.918		
56	52,430	56	463	50	.917		
58	52,430	58	464	55	.916		
50 60	52,430	60	465	60	.915		
62	52,430	62	466	65	.914		*.
64	52.430	64	.467	70	,913	į	
66	52,430	66	.468	75	.912	Į	
58	52,430	68	.469	80	.911	į.	
70	52,430	70	.470	85	.910		
70 72	52.430	72	.471	90	.909		
74	52,430	74	472	95	.908		
76	52,430	76	.473	100	.907	'	
78	52,430	78	474	105	.906		
80	52,430	80	475	110	.905	1	
82	52,430	82	476	115	.904		
84	52,430	84	477	120	.903		
-	32.33	66	478				
		68	479	ŀ		_	
		90	.480	•		,	
]	92	.481	1.		i	
		94	.482				
	1	96	.483				
	1	98	.484	1			
	1	100	.485				

Temperature (degrees F)	
N 75 .049 O T T O 85 .065 D P	О
N 75 .049 O T T O 85 .065 D P	0
S 80 .057 T O 85 .065 L 90 .076	
O 85 .065 L 90 .076	
L 90076 P	
	· ј р
່ ປ 95 .087 E	E A
8 100 .100 A	į a
L 105 .114 T) T
E 110 .131	1
115 _149 N	N
120 .170 E	E
125 .193 N	l N
130 218 T	Т
135 247	
140 .279	
145 2314	.1
150 .352	3.9
155 .395	
160 .443]	
165 .495	
170552	
175 .615	-
180 .683	
185 .758	
190 .841	
195 .930	Į.

BENZENE

Common Sym Benzole Benzole		Manny Squid	Calorium	Gestaline-like outor	G G	6. FRE Plant Point: 1 Plantaghit U
		Flores on motor. Flor point is 427	menable, entiting vector F,	r is proclused. Freezing	<u>د</u> د	For Estinguis Igans, or Ca Fire Estinguis Unant Willia
3 Subtraine		ene vegyr. Keep poop gement tymeling 200 and get let departme te.			ن د	Special Hazz Production Spherior in S
	i rentra del	terged masses. Salutes control agencia	MAT VESOT		<u></u>	
Fire	Wear go	ci, acceptante d'allement de la company despisable de la company de la c	ed breathing apperatus.		(1)	
Exposure	VAPOR Interest If inval Move to It trees It breat Harita Harita Flash If SW	g to eyes, none and the act, will cover headerchi by heart att, hing rus sispeed, give on g to sisp and eyes. I di guardonid. I communicated circling a communicated circling	e, difficult beauting, or artificial respiration. Igen.	load of correciousnable. of water. of water.	7.2 7.3 7.4 7.3 7.3	7. CHES Reactivity Will Reactivity wit Reactivity or Stability Out Housewalter Counties Projector of i Not perior Note Perior Projector of Reactivity G
Water Pollution	Many t	PUL TO ACEIATIC UF e dengatous if it enter; local basels and width opening of meetly wi	e officials.	DENTRATIONS.		
(See Ross	esponse thathar remark thathar remark high th it accounts		Z. LUBEL 2.1 Category: Pi 2.2 Channe: 3			\$. WA 1.1 Aquatic Tot 5 ppm/6 with: 20 ppm/6 1.2 Waterfood: 1.3 Biological (1.2 B/K
3. C 3.1 CG Comp hydro 3.2 Forestic 3.2 640/UN I 3.4 DOT 33 N 3.5 CAS Reg	zerbon CeHe Devignation: :	1.2/1114	4.1 Physical Str 4.2 Color: Color 4.3 Oxfor: Arom	ABLE CHARACTERISTICS the (see adopting liquid that the (rather pleasent aromatic tracteratic odd/		E.4 Food Chair None
S.2 Sympton S.2 Sympton houses S.3 Treatme conta metA sacoro S.4 Therein S.5 Short T S.6 Toxish S.7 Late T S.8 Vapor (gt sy S.4 Lauid	carbon-mobile carbon-matchia carbon-matchia come Federalm sche, breuthin sent of Emples crumanad clothe carbon-matchia carbon-	Equipment: Hydrocarbo- sis exister or plantic glo- sis exister or plantic glo- sis guess mach as reope sis guess mach as reope sis guess mach as reope art; Sillic listes with us art; Sillic listes with us art; Sillic listes with us art gand weath skin. Eve se from expected event- scassory, administer der siz 10 poin m. Listes 27 ppm for 3 nc Grade 3; LOse = 50 mis Chummadertakin: It pres siry system. The utfact of et Chummadertakin: Me et Chummadertakin.	wett: chereccal goggleis- reme. exactation, palitor, folion on, Come and possebil este foliowed by salate a \$35. flustin with plenty of adassely. Call is physical rigen. 10 mm. 1 to 500 mg/kg seent on high compensate is termporary. namum hapand. It spritte	end by Husburg, weakness.		9. SR 9.1 Graces of Industri Thoph Nergoti Industri Renge 9.2 Storey 9.3 Invert Atm 9.4 Ventung: 1

6. FIRE HAZAROS	IQ. HAZARD ASSESSMENT CODE
LT Floor Point 12'F C.C.	(See Hazard Assessment Hundbook)
2 Florencias Limits in Air; 1.3%-7.9%	A-T-U-V-W
4.3 Fire Estinguishing Agents: Dry charriest.	ŀ
town, or curton didwide	!
6.4 Fire Extinguishing Agents that he but	
United Water (key be intellective	11. HAZARD CLASSIFICATIONS
6.5 Special Hazards of Combuston	11,1 Code of Foderst Regulations:
Productic Not participal	Pleasurable Equal
E.S. Bohavior in First Vapor in heavier than air	and the same same of the same same same same same same same sam
and many travel considerable distance to 4	Transportation:
source of ignition and flush back	Category Reting
6.7 Ignition Temperature: 1087 F	₹ 3
4.8 Electrical Hazard: Class I, Group O	Health
6.9 Suming Rates 6.0 mm/min.	Vapor intent
6.10 Adiabetic Florin Temperature.	Liquid or Solid Irritant
Outs, mot available	Posenti
6.11 Steichiemente Air te Fest Retir. Data not evaluate	Water Polution
4.12 Plane Temperature Com not evaluable	Human Taxaty
£12 /	Aquatic Toxicity
	Application Effect
7. CHEMICAL REACTIVITY	Reactivity
7.1 Resolviny With Water: No reaction	Other Chemicals
7.1 Reactivity with Common Metaristic No.	Cod Courtes 0
	Sam Laboratory Street Control of
7.3 Studies During Transport: State	11.3 NFFA Hugard Classification: Category Classification
7.4 Household Agents for Acids and	Category Classification tipolity (Stat)
Counties: Not pertners	
7.5 Polymerization: Not personnit	Rescuisity (Yellow)
7.6 Inhibitor of Polymericalitate	PLANCES (TORNEY)
Not pertinent	· ·
7,7 Motor Ratio (Reactors to	
Prostuctly Data not available	
7.8 Reactivity Group: 32	\
	1
	12 PHYSICAL AND CHEMICAL PROPERTIES
	12.1 Physical State at 15°C and 1 arec
	Liquid
	12.2 Melecular Weight 78.11
	12.3 Solling Point at 1 stee: 1767F == 80,1°C == 353,3°K
	1
	12.4 Freezing Politic 42.07F = 5.5°C = 278.7°K
1 WATER POLLUTION	12.5 Critical Temperature
	552.0TF = 284.9°C = 562.1°K
8.1 Aquatic Toulony:	12.6 Critical Procession
5 ppm/6 te/minros/fethal/distilled	710 peet = 46.3 strs = 4.89 MM/m²
	12.7 Specific Gravity:
20 ppm/24 ty/ppm/n/TL_/tap water	0.879 at 20°C (figure)
8.2 Weterload Toxicity: Data not available	12.6 Upped Surtage Tempore
8.3 Biological Oxygen Comund (BOO):	28.9 synes/cm = 0.0289 N/m at 20°C
t_2 lb/lo, 10 days £4 Food Chain Concentration Potential:	17.9 Liquid Water Interfacial Tenniors
8.4 Food Chain Companies and Posterior	35.0 dynasicm = 0.035 N/m at 20°C
140.4	12.16 Vapor (Gas) Specific Gravity: 2.7
	12,11 Ratio of Specific Hests of Vapor (Gast
	1,061
	12.12 Lateral Heart of Vaportzation:
	169 Sturft = 94.1 cal/g =
	3.94 X 10° J/bg
	12.13 Heat of Combustion: 17.460 Stu/fb
	= −9696 cal/g = −405.0 X 10 ^a J/i
1 SHIPPING INFORMATION	12.14 Heat of Decomposition: Not pertended
	12.15 Heart of Solution: Not personni
5,1 Graces of Purity:	12.16 Heat of Polymertzation: Not perturent
industrial pure99+%	12.25 Heat of Fesion; 30.45 cal/g 12.26 Limiting Value: Data not available
Thiophene-free99 + %	12.26 Limiting Value: Usta not available 12.27 Reid Yapor Pressure: 3.22 psus
Negation99 + %	12.27 Helica Labora Laboratory 2.27 house
industrial 90%65+%	Í
Resign 99+%	1
9.2 Storage Temperature: Open	
\$.3 Inert Atmosphere; No requierrant	\
5.4 Venting: Pressure-vacuum	1
	i
	į
1	1
1	

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12.17 SATURATED LIQUID DENSITY			12.18 AT CAPACITY	LIQUID THERMA	12.19 NL CONDUCTIVITY	12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise
55	55.330	45	394	75	.988	55	.724
60	55,140	50	396	80	.981	60	.693
65	54,960	55	398	85	.975	65	.665
70	54,770	60	.400	90	.969	70	.638
75	54,580	65	.403	95	.962	75	.612
80	54,400	70	,405	100	,956	80	.512
85	54,210	75	.407	105	.950	85	.566
90	54,030	80	.409	110	.944	90	.544
95	53,840	85	.411	115	.937	95	.524
100	53,660	90	.414	120	.931	100	.505
105	53,470	95	.416	125	.925	105	.487
110	53,290	100	.418	130	.919	110	.470
115	53.100		1	135	.912	115	.453
120	52,920			140	.906	120	.438
125	52,730			145	.900	,20	,-30
130	52,540		l	150	.893	i	
135	52,360			155	887		
140	52,170			160	.881		
145	51,990			165	.875		
150	51,800		1	170	.868		
155	51.620		1				
160	51,430					!	
165	51.250						
170	51.060						
175	50.870	4				j	

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal un per pound-F
77.02	.180	50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.881 1.171 1.535 1.989 2.547 3.227 4.049 5.033 6.201 7.577 9.187 11.060 13.220 15.700 18.520 21.740 25.360	50 60 70 80 90 100 110 120 130 140 150 180 170 180 190 200 210	.01258 .01639 .02109 .02681 .03371 .04196 .05172 .06317 .07652 .09194 .10960 .12980 .15270 .17850 .20750 .23970	0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450	.204 219 234 248 261 275 288 .301 .313 .325 .337 .349 .360 .371 .381 .392 .402 .412
						475 500 525 550 575 600	.431 .440 .449 .457 .465 .474

ETHYLBENZENE

		Colorinas Sweet, gasoline-like	7 [6. FIRE HAZAROS		L HAZARD ASS
Common Syrichy	Ame Coding	adar	1 1	Flesh Point: 80'F C.C.; S9'F C.C.	(See	n Hazzri Assai
The spinster of the last of th	1		1 1	Plantenthin Limits in Air; 1,0%-6,7%	1	A-1
EB	1 _				,	
	Plants on water. Pl	erricia, military vapor is produced.	43			
1	1		1 1	effectively, water log, carbon dicade or	1	
	ļ.		_1 1	gry chamical.		
			7 14	Fire Extinguishing Agents Het to be	1	1. HAZARO CL
Avoid contac	of with least and veptir. Keep to be path-contained treating apple	COMM. AND CLOSER OVERCOSTERS	1 1	Upod: Not perknert		ada of Foderal
Men 30352	There is a second of the secon		عبا		11.1 6	Surveyerie (C)
Shed off ion	nou sometim true cay has determ article determin	MATE.	1 1 -	Products: interny vapors are generated		
			1 1	when hedged.	11.2 M	U.S Hesseri Reli
Stay upwno	will the mark alast to proce the a beautiful alast to proce		1 1 44			Transportation
South today	presit: euc bayreau cousa, sóm Militiria circum Ant militirio			and may travel considerable distance to	1	Categor
1			7 1	the source of ignition and facility back.	Į.	Fre
	FLAMMAKE. Plumback story vapor trail in		1 1		i	Health
1	Vegor may emission of spread	in an engineed area.	47		i.	Vapor Imiani
	West groupes, self-continued	in an employed area.	44		i	Liqued or Soli
1	(including gloves). Exemplish with dry charricol.		0		1	Poissons
Fire	Marie units per sentacture ou Extendent ann one common	ters.	4.10	Adabatic Plante Temperature:	1	Water Polyton
1	Cool supplied continues will	t ungder.	1 1	Outs Not Avadable	l .	Harman Toma
1	1				1	Aquatic Toxi
	i.			(Construed)	1	Approve Ell
l	<u> </u>		→ -		1	Asserted
	CALL FOR MEDICAL AID.		1 1	7. CHEMICAL REACTIVITY	1	Other Chart
İ	1		1 1 ,,	Reactivity With Water: No rescion	1	Water
1	YAPOR Intellig to over, note and t	voet.	1 1 77	Rescrivity with Common Materials: No	1	Sail Reaction
		s or difficult breating.	·-	Maction	1	HTA Heserd C
	More to tream er.	a anticas testeration.	1 1 79	Statellity Guring Transport: Statute	"- "	Cates
1	It presented in approach the presented to approach the special of the secondary the special of the special of the secondary the special of the special of the secondary the special of the special of the special of the special of the special of the special of the special of the special of the special of the special of the special of the special of the special of the special of the	anygen.		Heutralising Agents for Acids and	1	Heath Heath
1	N .			Counties: Not continued.		Florensbilly (
1	LIGURE		1 74	Polymertsations Not partinent	l .	
1	Will burn plain and eyes. Harmful if presidents. Remove consuments close			inhibitor of Polymerization:	1	Rescuvity (Yel
Exposure	Pleasure consumerated cloth	ing and shoes.	1 1 "	Not particular	ł	
	IE M FYFS had eveids of	unity of weldf. ion and flush with planty of water.		Major Radio (Resolant to	1	
	HE SWALLOWED and victim	E CONSCIOUS, have worm draft water	1 1 "	Productic Data Not Available	1	
l l	DO NOT INDUCE VOMITIN	e		Recuerty Group: 32	1	
ł	OU HO! INDOCE FORMITE	•	'"	Henchark commercial	}	
	1		1 1			
1	Ī		i I		12.	PHYSICAL AN
1			1 1		121	Physical State
1			-		' '	لغون
	HARMFUL TO ACUATIC U	FE IN VERY LOW CONCENTRATIONS.	l i		122	Motocuter We
Water	Fouling to shoretime. May be dangerous if it enter		1 1		12.3	Belling Point
	With pe devide one is a depart	I was report	1 1		1	277.27
Pollution	Nosty focal health and wild	ide officiels.	1 1		124	
	Hosely observed of needby				⊣ " ~ ~	138°F =
<u> </u>				2. WATER POLLUTION		
1 25574	OKSE TO DISCHARGE	Z. LABEL	1 1		12.5	651.0°F =
		2,1 Category: Florematria tiquid	"	1 Aquello Tesioliy:	1	
	Methods Handbook)	2.2 Clare: 3	1 1	29 com/86 hr/blagd/TL _a /bach water	12.5	Critical Press
	Containment		1 1 6	2 Waterfowl Toxicity: Date not available	-1	SZI pris -
Should be			1 1 4	3 Siglogical Oxygen Demand (SCC):	12.7	
Chemical a	nd physical treatment		1 1	2.8% (West), 5 days	1	0.867 🛍 21
				4 Food Chain Concentration Potential:	12.4	Liquid Surfec
- P	•		1 1 "	None		29.2 dynes
			 - 1		12.9	Liquid Water
		4. ORSERVABLE CHARACTERISTICS	3 1			35.48 dyna
1 CHEN	NCAL DESIGNATIONS	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1		i	20°C
21 000	My Class: Arcmitic	4.1 Physical State (as shipped): Lisad	1 1		12.10	Yapor (Gen)
tryorocarte	· · ·	4.2 Geter: Colortess	1 1		l l	Not pertin
3.2 Formula Cult	LCH-CH-	4.3 Odor: Arometic	1		12.11	t Resto of Spe
1.3 MO/UN Deal	matter: 3.3/1175		1 1			1,071
3.4 DOT ID No.: 1	1175	1	1 I		12.17	Z Latent Heet
3.5 CAS Registry	No.: 100-41-4	1	1 1			144 Btu/8
22 CV2 Ledwol		1	į l			3.35 X 10
.					12.13	3 Heat of Com
		LETH HAZARGS	1 1	9. SHIPPING INFORMATION	'"	-9577
				.1 Grades of Purity: Research grade:	121	4 Heat of Dec
5.1 Personal Pri	elective Equipment: Sel-contai	ned breathing apparatus; salety goggles.	_	1 Grades of Francis American Grades		5 Heat of Solu
	Cadamina Francuski infisition	CALL COURSE STATEGED OF ACRES, GESTATURE, DEPARTMENT.	1 1	99.96%; pure grade; 99.5%; technical		S Heart of Poly
		A CONTROL SAMENER OFFE THAT HERE CONTROL THROUGH THE	1 1	grade: 99.0%		s Heat of Funi
	J FRANKER HHALATION: # ■	Affacts Occur, remove victiff to fresh ar, ketc full		2 Storage Temperature: Ambiect		S Limiting Value
	quiet, and get medical help pro-	mody; if breaking stock, give attention restments.		2 Inert Atmosphere: No requirement		7 Reid Vapor
		system's approval; material in lung may classe	1 1 1	L4 Venting: Open (Reme arrester) or	122	· Handa Ambay

- 9.3 Insert Atmosphere: No requirement
- 9.4 Venting: Open (forms arrester) or

SESSMENT CODE

-T-U

LASSIFICATIONS

- ni Regulettoric
- iting for Bulk Water

Category	Re	
Fre		3
Health		
Vapor imigri		2
Liqued or Solid Instant		Z
Point		2
Water Polyton		
Human Tomoty		*
Aquatic Toxicity		3
Approve Sheet		2
Assetivey		
Other Characters		1
Weist	_	0
Self Reaction		٥
META Hazard Classification:		

NO CHEMICAL PROPERTIES

- es at 15°C and 1 etra:
- t at 1 atric ... 136.2°C = 409.4°K
- int: = _-95°C = 178°K
- 343.9°C = 617.1°K
- = 35.6 atm = 3.61 MN/m²
- evity: 20°C (Fauid)
- es/cm = 0.0292 N/m at 20°G or intertacial Teneron: Mas/cm = 0.03548 N/m at
- welfic Heats of Yapor (Gas):
- t of Veportzetten:
- (8) = 80.1 cal/g = O* J/%G
- mbustions -- 17,780 Bts/Ib 77 caug = -413,5 X 10° J/kg More Not pareners
- luttore Not perment
- MORE DATE NOT AVERAGE
- 12.25 Neet of Public Unit For Avelians
 12.25 Liveting Value: Data Not Avelable
 12.27 Reid Vapar Pressure: 0.4 ptst

E FIRE HAZAROS (Continued)

- ric Air to Fuel Retic: Data Not Available
- 6.12 Flame Temperature: Cala Not Available

5.4 Threshold (Janet Value: 100 ppm

5.10 Odor Threshold: 140 ppm

5.11 IDLH Velue: 2.000 ppm

Late Texicity: Data not available

5.5

Short Term inheletion Limits: 200 ppm for 30 mm.

Toxicity by Ingestion: Grade 2; LOss = 0.5 to 5 g/kg (rat)

short exposure; may cause secondary burns on long exposure.

INCESTION: induce ventiling only upon physician's approval; restend in lung may classe chemical preventions. SKIN AND EYES; promptly than with planty of water (15 min. for eyes)

Yapor (Ges) Irritant Characteristics: Yapors cause reposite irritation such that paraonnel will Yeapor (were intreme unimervenesses; vapora cause recomme musicon such met personne we find high concentrations unpleasant. The effect is temporary.
 Liquid or Solid invitant Characteristics: Courses smarting of the son and instidegree burns on

and get medical attention; remove and wear, contaminated clothing before reuse.

ETB

ETHYLBENZENE

12.17 SATURATED LIQUID DENSITY		LIQUID HEA	12,18 LT CAPACITY		12.19 IL CONDUCTIVITY	LIQUID VISCOSITY		
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square toot-F	Temperature (degrees F)	Centipoise	
40	54.990	40	.402	90	1.065	40	.635	
50	54.680	50	.404	80	1.056	50	.774	
60	54.370	60	.407	— 70	1.047	60	.719	
70	54,060	70	.409	60	1.037	70	.670	
80	53.750	80	.412	— 50	1.028	60	.626	
90	53,430	90	.414	—40	1.018	90	.586	
100	53.120	100	.417	30	1.009	100	.550	
110	52.810	110	.419	20	1.000	110	.518	
120	52.500	120	.421	-10	.990	120	.488	
130	52,190	130	.424	0	.981	130	.461	
140	51.870	140	.426	10	.971	140	.436	
150	51.560	150	.429	20	.962	150	.414	
160	51_250	160	.431	30	.953	160	.393	
170	50.940	170	.434	40	.943	170	.374	
160	50.620	180	.436	50	.934	180	.356	
190	50.310	190	.439	60	.924	190	.340	
200	50.000	200	,441	70	.915	200	.325	
210	49.690	210	.443	80	.906	210	.311	
]			90	.896			
			İ	100	.887	į		
	1			110	.877	}	-	
	1		1	120	.868			
	1		1	130	.859	ſ		
	1			140	.849			
	1			150	.840			
			1	160	.830			

12.21 SOLUBILITY IN WATER					12.23 VAPOR DENSITY	12.24 IDEAL GAS HEAT CAPACITY		
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic toot	Temperature (degrees F)	British thermal unit per pound-f	
68.02	.020	80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380	.202 .370 .644 1.071 1.713 2.643 3.953 5.747 8.147 11.290 15.320 20.410 26.730 34.460 43.800 54.950	80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380	.00370 .00654 .01099 .01767 .02734 .04087 .05926 .08363 .11520 .15510 .20490 .26570 .33910 .42620 .52850 .64720	-400 -350 -350 -300 -250 -200 -150 -100 -50 0 50 100 150 200 250 300 350 400 450 500 550 600	007 .026 .060 .093 .125 .157 .187 .247 .246 .274 .301 .327 .353 .377 .401 .424 .446 .467 .487 .507 .525	

ETHYLENE DICHLORIDE

		·			
Common Synony 1. 2-Dictionations Ethioris Chands EDC Broads Outch liquid	-	Cotonines Several 0001 mable, svitabing vapor is producted.	E1 E2	6. FIRE HAZARDS Pleah Point: 60°F C.C.; 55°F C.C. Flammable Limits in Air 6.2°×-13.6°× Per Exemplaining Agents: Foun, carbon double, dry character	10. MAZARO ASSESSMENT CODE (See Hazard Assessment Hendbuck) A-X
Glycol dictivande Avoid contect Weser gargetit (onclu- Shap discharin Stap discharin Stap questic i	with letted and vapor. Keep people self-commented breathing appear doing promote and call fee decurring as possible, and use water spray we "propote distribution of the commented as the comment	int.		Fire Extinguishing Agents Not to be Used: Water may be institution. Special Hammels of Combustion Products: Toxic and evisions guint (hydrogen chlorole, phoagune) atta generated. Behavior in Fire: Vapor is heavier than air and may toxid considerable distance to a	11. NAZARD CLASSIFICATIONS 11.1 Cade of Federal Regulations: Flammacola legal 11.2 NAS Hazard Rasing for Bulk Water Transportation: Casepory Rasing Fig. 3
Fire	FLAMMABLE POISONOUS GASES ARE PR Pleshback slong vapor trail my	COUCED IN FIRE. 17 cooks 18 on endosed and. Investing appealus, and higher overdoring appealus, and higher overdoring. 18.	17 12 13 14 14	Execution Magaret: Class L, pricep D Bearing Reset: 1.6 resolves Adjubusin Flores Temperature: Data: Not Avadable (Continued)	Health Vapor Internal 2 Licuit or Solid Internal 2 Postore 3 Water Polition Narran Toxicity 1
Exposure	Move to Instit air. It breathing not stooped, give on It breathing is difficult, give on LIGUED Will breathing is difficult, give on Hearmand if seaffiched. Remove constantiated coothin Flush attended areas with press Ir in EYES, held dynamics ook IF SWALLOWED and victors is or mails and helve victors is	dezintess of chical present, article respirator. Q and shoots.	7.3 7.3 7.4 7.5 7.4	7. CHEMICAL REACTIVITY Reactivity With Water No reaction Reactivity with Common Materials No reaction Stability During Transport: Stable Houtesting Agents for Acids and Caustics: Not pariners Polymerization: Not pariners Inhibitor of Polymerization: Not puriners Inhibitor of Reaction Not periners Inhibitor Not periners Inhibitor Not periners Inhibitor In	Other Chemicals 1 Water 0 Self Reaction 0 11.3 NPPA Hazard Classification Category Classification Health Nazard (Shee) 2 Flammatility (Red) 3 Reactivity (Yellow) 1
See Resport	Compensus to aquestic side on May be dereparture at a vertice. Notely local health and widdle Notely operators of reserve we see that the seed of the	s water majores.		WATER POLLETION Aspendic Toxicoloy: 150 point "(pin texts/TL_/sea water "Time period not specified. Wetherlow Toxicoloy: Debt not available Stetopical Oxygen Deamand (BOD): 0.002 lo/b, 5 days Food Chain Conventantion Potential:	12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 98.96 12.3 Besting Point at 1 atm: 18.27° = 93.5°C = 258.7°K 12.4 Freezing Point: —32.5°F = -35.7°C = 237.5°K 12.5 Critical Temperature: 550°F = 286°C = 561°K 12.6 Critical Temperature: 725 pais = 50 sim = 5.1 MM/m² 12.7 Specific Grantly: 1.253 at 20°C (squar) 12.8 Liquid Surface Tempior: 32.2 dynamicm = 0.0322 N/m at 20°C
3.1 CG Compatible hydrocartor 3.2 Formula: CKC 3.3 MMO/UN Deals 3.4 DOT ID No.2 1	luCH _E CI gnedion: 3.2/1184	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (se enterpred; Liquid 4.2 Color: Coloriess 4.3 Oder: Etheres; chlorosom-site; ether-like		None	12.9 Liquid Water Interfacial Terminor: (ext.) 30 dynamicram a 0.03 N/m at 25°C 12.10 Vapor (Gas) Specific Gravity: 3.4 12.11 Platio of Specific Heats of Vapor (Gas): 1.116 12.12 Lintert Heat of Vaporization: 138 Stu/fb = 76.4 cat/g = 3.2 X 10 ⁶ J/fsg 12.13 Heat of Combustions (ext.) 3400 Stu/fb 12.14 Heat of Combustions (ext.) 3400 Stu/fb
shields. Ri mask and 5.2 Symptoms i Contact of burn. 5.3 Treatment if quest and respiration environment and wests and wests	MACTIVE Equipment: Clean, bod MERITATORY protection: up to 50 pp Canasser; greater then 2%, self-of- Following Exposers: Inhalation i I liquid win eyes may produce or ME Exposure: INHALATION: if we warm, and get medical attention LINGESTION: induce vormings; or by with copious amounts of flows sain throtophy with soop and we sain throtophy with soop and we	of vagors causes names, disintermines, represents primes musty. Protonged contact with skin may calcal a time is overcome, remove hen to trush air, keep him remarkeery; if breathing stops, give artificial all a physicians treat the symptoms. EVES: flush ing water for at least 15 mm. SKIN: remove clothing aller; wash contaminated clothing before reuse. 5 mm. during any 3-hour period.		9. SKIPPING INFORMATION LT Grades of Purity: Commercial Storage Temperature: Architect Invert Atmosphere: No requirement Venting: Pressure-vacuum	12.15 Heart of Solution: Not permant 12.16 Heart of Polymertzation: Not pervivers 12.25 Heart of English 27.12 cast9 12.26 Limiting Value: Data Not Available 12.27 Reid Vapor Pressure: 2.7 page
5.7 Late Toxich 5.8 Yapor (Gas) ted high	by: Data not available juritant Characteristics: Vapor concentrations unpleasant. The 4 polid terraint Characteristics: Ca poure; may cause secondary but should: 100 ppm.	s cause moderate entation such that personnel wit iffect is temporary uses smaring of the skin and test-degree burns on		6. FIRE 6.11 Stoichlometric Air tu Fuel Rattic Data 6.12 Flame Temperature: Data Not Avaisol	HAZAROS (Comtinues) I NOT Available le

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ETHYLENE DICHLORIDE

SATURATED LIQUID DENSITY			12.18 LIQUID HEAT CAPACITY		12.19 AL CONDUCTIVITY	12.20 LIQUID VISCOSITY		
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise	
35	79,879	0	283	o	.990	35	1.098	
40	79.629	10	285	10	.982	40	1,054	
45	79.379	20	288	20	.974	45	1.013	
50	79,129	30	290	30	.965	50	.975	
55	78.879	40	293	40	.957	55	.938	
60	78,620	50	296	50	.949	. 60	.904	
65	78.370	60	.298	60	.941	65	.871	
70	78,120	70	.301	70	.933	70	.840	
75	77,860	80	.303	80	.924	75	.611	
80	77.599	90	306	90	.916	80	.784	
65	77,349	100	.309	100	.908	85	.758	
90	77.089	110	.311	110	.900	90	.733	
95	76.630	120	314	120	.892	95	.709	
100	76.570	130	.317	130	.883	100	.687	
105	76.309	140	.319	140	.875	105	.665	
110	76.049	150	.322	150	.867	110	.645	
115	75.790	160	.324	160	.859	115	.625	
120	75.520	170	.327	170	.850	120	.607	
125	75.259		ļ -	,,,,	1	125	.589	
130	74,990					130	.573	
135	74.730			Ì		135	.556	
140	74,459			l		140	.541	
145	74.190		ŧ			145	.526	
150	73,919					150	.512	
155	73.660					155	.499	
160	73,379			İ	1	160	.486	

SOLUBILITY	12.21 SOLUBILITY IN WATER		12.22 APOR PRESSURE		12.23 /APOR DENSITY	12.24 IDEAL GAS HEAT CAPACITY		
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	
68.02	.800	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95	.231 .274 .323 .380 .445 .520 .606 .704 .816 .942 1.085 1.246 1.428 1.632 1.860 2.116 2.401 2.718	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95	.00449 .00526 .00614 .00715 .00830 .00960 .01108 .01274 .01461 .01671 .01907 .02169 .02462 .02788 .03149 .03548 .03990 .04477	0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600	.177 .182 .187 .191 .195 .200 .204 .208 .212 .217 .221 .225 .229 .232 .236 .240 .244 .247 .251 .254 .258 .261 .265 .268 .271	

TOLUENE

					A CONTRACTOR OF THE CONTRACTOR
Сописон Зуполуч	ne Watery Equid	Coloriess Pleasant orior	4.1	E FIRE HAZARDS	10. PARTAIN DESCRIPTION 10.00 (Household Partain 10.00 (Household Parta
Coluct Methytherizane Methytherizal	berzene 1			Parnomable Limits in Air: 1.27%-7% Fire Extinguishing Agents: Carbon dicaste or dry chemical for small frest, ordinary loam for large frest.	
Shut off sphilit Stay upwind a Avoid contact	e il possible. Keed people avvey, ni scuriose and call live deperime pred use vajare sorrey to "Anock do reath topus and vapor, vivove decharged material, assett and poliution control agenci		u	Pay Exampliating Agents Not to be Used: Water may be entrective Special Historius of Combastion Productor Not portrant Behavior to Plet: Vapor is historic than ar and may trevial a Gyreidemble distance to a source of ignition and flush back.	11. HAZARO CLASSIFICATIONS 11.1 Cade of Federal Regulations: Figuration liquid 11.2 NAS Natural Resing for Suft. Water Transportation: Category Resing
Fire	FLAMMABLE. Restributes along vepor trail may vacor may expected it ignited in Wear goggles and self-content. Earlinguish with dy chemical. It water may be ineffective on in Cool exposed containers with	od breathing apparatus. Dem, or carbon double.	<u>u</u>	Igention Temperature; 997°F Decricol Hammert Class I, Group D Burning Rate: 5.7 min/min. Adiabetic Plante Temperature; Data not evaluate (Continued)	Health Vapor Initiant
Exposure	Remove contaminated closes Flush affected areas with ples	ordering, measurements ordering inseperation. e. vormating or loss of consciousmess. g and shoes, ay of water. a roth flugh with planty of water. E CONSCIOUS, have woter chark water	7.2 7.3 7.4 7.5 7.6	7. CHEMICAL REACTIVITY Reactivity With Water: No reaction Reactivity with Common Messeries: No reaction Reactivity Outing Transpert: Stables Nesserability During Transpert: Stables Nesserability Outing Transpert: Stables Nesserability Outing to Acidia and Countries Not parisers Industries of Polymerization: Not parisers Into parisers Not parisers Not parisers Not parisers Not parisers Not parisers Not parisers Not parisers Reactivity Group: 32	Other Cremicals 1 Water 0 Salf Reaction 0 11.3 NFPA Instant Classification: Category Classification Hearth Hazard (Blvs) 2 Flammability (Red) 3 FleeCivity (Yelfow) 0
(See Respons	Derrogenous to accusso life in his proving to interesting. May be designed it ament notify local health and width Notify local health and width Notify operators of nearby with the control of the contro	vegiar istaket. e officials.	100	2. WATER POLLUTION Assume Toxicity: 1180 rep/L/96 hr/surdisth/TL_/resh vester Waterfewi Toxicity: Desa not evelable Biological Oxygen Demand (BOD): 0%, 5 days: 38% (theor), 8 days Food Chain Concentration Potential:	12. PHYSICAL AND CREMICAL PROPERTIES
3.1 CG Competible Hydrocertsis 2.2 Formula: Calif. 3.3 McC/UN Deals 3.4 DOT 10 No.1	3. CHEMICAL DESIGNATIONS 4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as ehipped): Liquid 4.2 Color: Coloriese 4.3 Odder: Purgent; aromatic, barzene-like; 4.4 DOT 10 No.: 1294 4.5 CAS Registry No.: 106-86-3			Nore	23.0 dynamicm at 0.0290 N/m et 20°C 12.6 Liquid Water Inhiritation Terrators 36.1 dynamicm = 0.0361 N/m at 25°C 12.10 Vapor (Gas) Specific Gravity: Not pertners 12.11 Ranto of Specific Heats of Yapor (Gas): 1,088 12.12 Letent Heat of Vaportzation: 15.5 Bluifs = 86.1 califg = 3,61 X 10° J/leg 12.13 Heat of Combostion: —17,430 Bluifs
5.2 Symptome in headschall engineed control of the	osective Equipment: Air-supplies Following Exposure: Vapors into , ansethasis, respectory areast. L causes coupring, geging, disht gustes vondeng, grping, disht sall at doctor, INGESTION: can sall at doctor, INGESTION: do NO at least 15 mm. Skith: wipe off, s Lient Value: 100 ppm for inquisition: Liente: 600 ppm for inquisition: Grade 2: LDae w 0.5 ky; Kidney and Iver damage may i) intent Characteristics: Vapor	to to fresh and, give arrandom requirements and congress of induces vormiting; cell a dictorir. EYES; Bush with reach with soap and water. 30 mm. 100 5 g/kg 100cw ingestion. 5 cause a signt smeating oil the eyes or respiratory to a client or internocerir.		S. SHIPPING . NFORMATION Gredes of Purity: Research, respent, respect, respect, respect, respect, respectively. Orders 94. + %; inclustred; contains 94. + %; with 5% system and small amounts of benzere and reneurosatic hydrocarbone; 90/120; less pure then inclustred. Storage Temperature: Ambient levert Administration of the contained of the con	=9686 cat/g =405.5 X 10° J/b 12.14 Heat of Decomposition: Not perfect 12.15 Heat of Salution: Not periment
	iolid livitient Charectwistica: Mi ney cause smarting and reddenin shold: 0,17 ppm	WHITE PARTY IS SOMEOUT ON COOKING AND SECURE OF		6. FIRE 8.11 Stoichiometric Air to Fuel Reno; Data 8.12 Plante Temperature: Data not availabil	MAZARDS (Continued) not aveilable

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12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY			12.19 L CONDUCTIVITY	12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise
—30	57,180	0	.396	0	1.026	o	1.024
—20	56.870	5	.397	10	1.015	5	.978
-10	56.550	10	.399	20	1.005	10	.935
ō	56.240	15	.400	30	.994	15	.894
10	55.930	20	.402	40	.983	20	.857
20	55.620	25	.403	50	.972	25	.821
30	55,310	30	.404	60	962	30	.788
40	54.990	35	.406	70	.951	35	.757
50	54,680	40	.407	80	.940	40	.727
60	54.370	45	.409	90	.929	45	.700
70	54,060	50	.410	100	.919	50	.673
80	53.750	55	.411	110	.908	55	.649
90	53,430	60	.413	120	.897	60	.625
100	53.120	65	.414	130	.886	65	.603
110	52.810	70	.415	140	.876	70	.582
120	52,500	75	.417	150	.865	75	.562
	1.	80	.418	160	.854	80	.544
		65	.420	170	.843	85	.526
		90	.421	180	.833	90	.509
		95	.422	190	.822	95	.493
		100	.424	200	.811	100	.477
	1	105	.425	210	.800	i	•
	1	110	.427				
		115	.428				
		120	.429				
	1	125	.431				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		SATURATED V	12.23 /APOR DENSITY	12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal ur per pound-F
68.02	.050	0	.038	0	.00070	0	.228
00.02	.000	10	.057	10	.00103	25	.241
		20	.084	20	.00150	50	255
		30	.121	30	.00212	75	.268
	}	40	.172	40	.00296	100	.281
	1	50	.241	50	.00405	125	294
	į	60	.331	60	.00547	150	.306
		70	.449	70	.00727	175	.319
		80	.600	80	.00954	200	.331
		90	.792	90	.01237	225	.343
		100	1.033	100	.01584	250	.355
		110	1.332	110	.02007	275	.367
	{	120	1.700	120	.02518	300	.378
		130	2.148	130	.03127	325	.389
		140	2.690	140	.03850	350	.400
	į.	150	3.338	150	.04700	375	,411
		160	4.109	160	.05691	400	.422
		170	5.018	170	.06840	425	.432
		180	6.083	180	.08162	450	,443
		190	7.323	190	.09675	475	.453
		200	8.758	200	.11400	500	.462
		210	10,410	210	.13340	525	.472
ı						550	.482
			1			575	.491
						600	.500

m-XYLENE

		Colorina Securi com		6. FIRE HAZAROS	10. HAZARO ASSESS
Common Synony	ms Watery Aquiti	Colorieus Serest dater	ا ا	Flant Point 64°F C.C.	(See Hazard Assessm
1, 3-Dimetrybaccore Zylot	i			Pleasantin Limits in Air. 1.1%-6.4%	U-T-A
	Floots on water. Fig	provide, entiring vector at produced.	4	Fire Extreplaining Agents: Folds, dry charlical, or carbon dissible	
	ţ		اا	Fire Estinguishing Agents Not to be	
	pe if possible. Keep people anny		1 1	Usest Water may be swifted we.	1L HAZARD CLASS
Call fire dapa	rimerik.	•	ا ا	Special Hazards of Contavetton Freductic Not parament	11.1 Cade of Federal Res
Avoid contact	L with houid and vapor. proprie diacharged meterali. path and pollutur control agant		ساا	Behavior in First Vapor is heavier than all	Figureable Equid. 11.2 NAS Heared Reting
Hosey local h	seggi and bognetto chause adeur		1	and may travel considerable distance to a	Transportations
]],	source of ignition and Reah back. Ignition Temperature: 986°F	Category
	FLAMMARIE		1 5		Fig.
	Pleathers along vapor trail me Vapor may explode il ignited in	ny occur. In an exclosed area.	نة إ		Yeper tribert
	Water made companied programmer	accuratus.	L 10	Adiobatic Flame Temperature: Date not available	Liquis or Solid in
Fire	Extremen with foam, dry one Water may be ineffective on t	ra,	1 1 411	Stoichiametric Air to Funi Retice	Poisont
Luc	Cool exposed containers with	wells.	1 1	Date rept evaluable	Human Toxicity.
			42	Flores Temperature: Cata not evaluable	Aquesic Torrotty
			∤ ├ ─		American Effect. Rescrivity
	CALL FOR MEDICAL AID.		1 1	7. CHEMICAL REACTIVITY	Other Chariticals
	VAPOR		7.1	Reactivity With Water: No reaction	Water
	Intelling to eyes, scale, and the school, will cause headach	roes. e, difficult breeffing, or loss of	"2	Reactivity with Common Meterials: No reaction	Self Reaction
	coreciousness.		7.3	Stability During Transport: Stable	11.2 NPPA Hazzard Class
	If breathing has stopped, give If breathing is difficult, give or	artificai respiratori. recen.	14	Heutratising Agents for Acids and	House Hezard (Bl
	II timpetting at carefull, give of LICUID		1 1	Caustics: Not pareners Polymentssilent Not performs	Plantenability (Red)
	Instrument to strip and mate.	ns, vaniting, or loss of consciousness.		inhibitar of Polymertzations	Reactivity (Yellow)
Exposure	Remove contaminated clother	ng and shoes.	1 1	Not pertiners	<u> </u>
	Flugh attached areas with pla # M EYES, hold events con	as and there with planty of WEIGT.	7.7	Motor Ratio (Reaction) to Product): Cata not available	1
1	of malk.	a CONSCIOUS, have vicem drink water	7.0	Reactivity Group: 32	
	DO NOT INDUCE VOMITING	i.	1 1 -		
1			1 1		
j			1 1		IZ. PHYSICAL AND C
	<u></u>		-		12.1 Physical State or
	HARMFUL TO ADUATIC UF	E IN VERY LOW CONCENTRATIONS.	1 1		Liquid 12.2 Motocuter Weight
Water	Fouring to shoreine. May be dangerous if it enter		1 1		12.3 Solling Point at 1
Pollution					200.4T = 131
1	Nesty local health and wildlift hosty operators of nearby w	e onces.			12.4 Freezing Point —64.27 = —
		Z. LABEL	1 1	& WATER POLLUTION	12.5 Critical Temperat
	MISE TO DISCHARGE	2.1 Category: Flammettie fiquid	1 1.	1 Aquatic Texicity:	650.8°F = 343
	z Megnede Handbook) nachigh Semmebility	22 Class 3	1 1	22 ppm/96 hr/bluegil/T/fresh webbf	12.6 Critical Procurers 512.6 dim = 3
Eventure of				Waterland Taxiotty: Date not available Stological Oxygen Demand (BOO):	W/et
Should be r	natived .	•	1 1 5	0 St/Ib, 5 cays; 0% (Shacr.), 8 days	12.7 Specific Gravity:
Chemical as	nd physical treatment		1 1 4	4 Food Chain Concentration Potential:	0,864 at 20°C
1			_1 l	Date not available	12.6 Liquid Surface To 26.6 dynes/cm
- 6959	ICAL DESIGNATIONS	4. OBSERVABLE CHARACTERISTICS	1 1		12.9 Liquid Water link
		4.5 Physical State (as arbipped): Liquid	1 1		36.4 dynes/cm
3.1 CG Competitor		4.2 Color: Colorisms			12.10 Yeper (Ges) Spe Not perinant
1.2 Formula: m-Co	HelCHele	4.3 Odor: Uke berzene; characteristic arometi	:		12.11 Rego of Specific
3.3 MIC/LIN Deeds	netion: 3.2/1307	1	1		1.071
3.4 007 10 No. 1		1			12.12 Latent Heat of V
3.5 CAS Registry	THE THE PERSON OF		1 1		3.43 X 10° J/
		<u> </u>	\dashv \vdash	9. SHIPPING INFORMATION	12.13 Heat of Combus
I		LTH HAZAROS		•	
		parenter or air-supplied massic googles or face shield;	*	1 Grades of Purity: Research: 99.99%; Pure: 99.9%; Technical: 99.2%	12.14 Heat of Solution
The state of the	en and boots.	me headache and dizziness. Liquid intates eyes and	1 1.	2 Storage Temperature: Ambent	12.16 Heat of Polymen
Auto 17 takes	in into luncis, COURSE SEVERY COU	Ching distract and reporty developing pulminary	1 1	3 Inert Atmosphere: No requirement	12.25 Heat of Funion:
edente. If b	ngueted, causes necess, vomien	ig, cramps, headeshe, and come; can be tatal. Kidney	<u> </u>	A Ventang Open (flame arrester) of	12.26 Limiting Value: 1 12.27 Raid Vapor Free
	Share CER OCCUP.		1 1	pressure-vacuum	12. 1100 1400 1100
5.3 Treatment of	EXPONENT PRIALATION: PART POWERT CAS & COCKET PARTESTY	we to fresh sir; administer artificial respiration and IN; do NOT induce vormistry; cell a doctor, EYES;	[]		1
State with a	region for all least 15 min. SKIN:	mpe off, wash with spep and water.			
S.4 Threehold U	nyt Yekre: 100 ppm				
5.5 Short Term	inhaletion Limits: 300 ppm for 3	06 min.			ļ
are less Tomoth	ngestion: Grade 3; LO:e = 50 r: Kidney and iwer damage.				
S.S. Yappy (Cas)	Interest Characteristics: Vaport	s cause a signt smerting of the eyes or respiratory			1
n because of the	resent in both concentrations. T	he effect is femograpy.	.		
5.9 Liquid or So	dd jrytunt Charactenetics: Min	emum hezerd, it spilled on clothing and allowed to			NOTES
5,10 Oder Threef	ly cause smareng and recidening hold: 0.05 ppm	t de mais suur.] [
5,11 IDLH Value:					
] "					
}			1 1		

E. FIRE HAZAROS	IQ KAZARO ASSESSMERT CODE
n Points 64°F C.C.	(See Hazard Assessment Hundbook)
unable Umits in Air. 1.15-6.4%	A-T-U
Extinguishing Agents: Foam, dry	
Estinguisting Agents Not to be	
nest Water may be swifecave.	11 HAZARD CLASSIFICATIONS
cial Human of Communition	11.1 Code of Federal Regulations:
reductic Not parament event in First Vappr is heavier then his	Florenskie Sound
nd entry travel considerable distance to a	11.2 NAS Heart Rating for Bulk Water
purce of ignition and flesh back.	Transportations Category Reting
tion Temperature: 986°F	Fire
ctricus Hazarni: Class I, Group D rang Retat; 5.8 mm/mm.	Hamile
sheds Plans Temperature:	Veger tribut
Pittoffee Ign gigt	Liquid or Solid Intant
ichiametric Air to Fusi Retica	Weser Polution
ness rept eveninties nes Temperatura; (lets not evailable	Human Toxicity
	Aquasic Tomotty 3
CHEMICAL DESCRIPTION	American Effect2 Rescrivity
CHEMICAL REACTIVITY	Other Chariticals1
catelly With Weber: No reaction	Weter0
ctivity with Common Melerinist Na eaction	Self Reaction
ality During Transport: Stable	11.3 NFPA Hazard Calebracetter: Category Classification
trakting Agents for Acids and	House Hezard (Blue)2
Counting, Not parament resonance Not parament	Flammability (Fled) 3
biter of Polymertestior c	Rescuity (Yellow) 0
Not pertiners	ļ
er Ratio (Reaction) to]
Producti: Casa not avadable scovity Group: 32	
County County or	1
	IZ. PHYSICAL AND CHEMICAL PROPERTIES
	12.1 Physical State at 15°C and 1 store
	Liquid 12.2 Moincular Weight: 106.16
	12.3 Solling Point at 1 sinc
	208.4°F = 131.9°C = 405.1°K
& WATER POLLUTION	12.5 Critical Temperature:
wate Taxicity:	650.5°F = 343.5°C = 517.0°K
22 ppm/96 hr/bluegit/Tl/treats water	12.6 Critical Prostruct
sertaul Taxicity: Date not available	513.6 atm = 34.96 paix = 3.540
plogical Oxygen Demand (BOC): 0 th/b, 5 cays; 0% (thacr.), 8 days	12.7 Specific Gravity:
of Chain Concentration Potentials	0,864 at 20°C (Squid)
Open mpt available	12.8 Liquid Seriace Termion:
	26.6 dynas/cm = 0.0286 N/m at 20°C 12.9 Liquid Water Interfactal Tensions
	36.4 dynas/cm = 0.0364 N/m at 30°C
•	12.10 Yepor (Gas) Specific Gravity:
	Not pertinent 12.11 Reto of Specific Heats of Vapor (Gen):
	1.071
	12.12 Latent Heat of Veportuation: 147 Bts/ft = 61.9 cs/fg =
	3.43 X 10° J/kg
- CHICAGO INFORMATION	12.13 Heat of Combustions —17,554 Bts://tb =
9. SHIPPING INFORMATION	97524 cal/g =406.31 X 10 ³ J/s
rades of Purity: Research 99.99%;	12.14 Heat of Decompositions Not pertment. 12.15 Heat of Solutions Not pertment.
Pune: 99,9%; Technical: 99,2% torage Temperature: Ambent	12.15 Heat of Solumer Polymertz.
ort Atmosphere: No requirement	12.25 Heat of Funion: 26.01 cal/g
enting: Open (flame arrester) or	12.26 Limiting Value: Data not evaluable
ргесацие-массыя	12.27 Rold Vapor Pressure: 0.34 psus
	}

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	12.17 IQUID DENSITY	LIQUID HEA	12.18 IT CAPACITY		12.19 L CONDUCTIVITY	LIQUID VI	2,20 ISCOSITY
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise
15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95	55.400 55.260 55.130 54.990 54.850 54.710 54.570 54.430 54.290 54.160 54.020 53.880 53.740 53.600 53.450 53.180 53.180 53.180 53.050	40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.387 .393 .398 .404 .410 .415 .421 .426 .432 .437 .443 .448 .454 .460 .465 .471 .476 .482	35 40 45 50 55 60 65 70 75 80 85 90 95	.962 .953 .944 .935 .926 .917 .908 .899 .890 .881 .873 .864 .855	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85	.938 .898 .862 .827 .794 .764 .735 .706 .682 .658 .635 .613 .592 .572

12.21 SOLUBILITY IN WATER			12.22 APOR PRESSURE	12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal uni
		60	.090	60	.00172	0	247
	N	70	.127	70	.00238	25	.260
	s	80	.177	80	.00324	50	273
	o	90	242	90	.00324	75	286
	ļ ,	100	.326	100	.00577	100	.299
	l ů .	110	.434	110	.00754	125	299
	В	120	.571	120	.00754	150	.324
		130	.743	120	.01247	175	.336
	L E	140	.956	140	.01577	200	.348
	-	150			.01977	200 225	.360
	1	160	1.219	150	.02455	250 250	.371
	[170	1.538	160	1	250 275	.383
	i		1.924	170	.03023		
		180	2.388	180	.03691	300	.394
		190	2.939	190	.04473	325	.406
		200	3.590	200	.05382	350	,417
		210	4.355	210	.06431	375	.427
		220	5.247	220	.07635	400	.438
		230	6.282	230	.09009	425	.449
i		240	7.476	240	.10570	450	.459
ļ		250	8.846	250	.12330	475	.469
ļ		2 6 0	10.410	260	.14310	500	.479
			Ĭ I			525	.489
					!	550	.499
	ļ					575	.508
]					600	.517

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		•			
Common Synon	rms Watery Squid	Colorient Sweet oder	£ FIRE I	F CC: 75 F O.C.	10. HAZARO ASSESSMENT CODE (Som HAZARO Assessment Handbook) A-T-U
tytol				Re in Air; 1,1%-7,0% ing Agustic Form, dry carbon dicielle ing Agents Not to be	
Call fire dept Avoid comac	the dipolarcia, Keep propie every, strance. It will found end vestor, smooth discharged makers. septim and polarcia control squarcia		tjeeg Winter c.s. Special Hammer Producte: H c.s. Solution in Fl grd may to	may be inattective. In oil Combuscion On partment The Yapor in treaver then air not commissenable distancia to a inition and flash back.	11. HAZARO CLASSIFICATIONS 11.1 Code of Federal Requiritions: Represente tourid 11.2 HAS Hazard Resting for Bulk Water Transportations: Category Resting Fire
Fire	Fig.AMMABLE Floerback along vapor treat man Vapor may explain it ignited in West set commands breathing a Example with items, only chronic Water may be explained on fire Cool exposed commenters with a	Contract area.	4.6 Electrical Heal 6.9 Survivery Reside 6.10 Adhabatic Plan Dean root or 4.11 Statishionness Dean root or 4.12 Plance Yempe	ard: Class I, Group 0 S.E mm/min. no Temperature: sinthe c Air to Fuel Ratio:	Health Vapor Initiani
Exposure	CALL FOR MEDICAL AID. VAPOR Integering to eyes, nose and the strength of castle insections of the castle insection. Many to treat at the castle insection of the castle insection, for it breathing its difficult, give the breathing its difficult, give the instance to the castle of t	artificial respiration. Ingen. 7.1 Genetivity WR 7.2 (resolitvity will reaction 7.2 Stability Durit 7.4 Housewitzing A Counties: 7.5 Polymeritzing 7.6 (relightor of P Not parish 7.7 Moley Ratio (h Water: No reaction in Commun Materialist No ing Transport: Stable operate for Acide and top persent ex Not persent ext Not persent ext Not persent ext Not persent ext Not persent ext Not persent ext Not persent not Date not evaluable	Other Chemicals	
(São Respo Issue wa Evacuate Should it	Designations to expense the int in Founce to strongers. It is enternable to compense it is enternable to compense in it is enternable to compense to the compe	nign concentrations.	8.1 Aquetic Tes >100 m water 8.2 Waterfood 4.3 Sicongitics G my/s.	5/1/96 hr/O, magne/TL _w /smain Coxidity: Date not evaluable Daygen Demand (BOO): 5 days: 2.5% (theor.), 8 days	12
3. CR 9.1 CG Compai Hydroca 1.2 Formula: 0 3.3 IMO/UN Do 3.4 DOT ID NO	2. CHEMICAL DESIGNATIONS 2.1 CG Compatibility Class: Aronatic Hydrocarbon 2.2 Formulae D-CIM-(CMI)+ 2.3 IMD/UN Designation: 3,2/1307 3.4 DOT ID No. 1307 3.5 CAS Requirty No. 95-47-5		Deta no	Concentration Possettist available IPPING UNFORMATION	30.53 dynasicm = 0.03933 N/m st 15.5°C 12.9 Liquid Water Intertocial Tension: 36.06 dynasicm = 0.03606 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not parament 12.11 Reiss of Specific Hests of Vapor (Gas): 1.065 12.12 Latent Heat of Vaporization: 149 Bluft = 82.9 csl/g = 3.47 × 10° J/kg
5.2 Symptom star. N edema. Kidney 5.3 Trashror oxygen fluen w 5.4 Threshrol 1.5 Short Te 5.6 Tentoty	Protective Equipment: Approved joves and boots. a Fedowing Exposure: Vapors Cateson into lungs, causes severe coll impasted, causes mases, vonitioned lower damage can opport, it of Exposure: NHMLATION: rem of required call a option. NGESTO the water for at least 15 mm, SKIN: of Linki Valuet 100 ppm for Infrastrator Junear 200 ppm for by Impastion: Gradu 3; LDas = 50	1 50 200 unford	9.1 Graden of Pure 9 9.2 Storage T 9.3 Insert Alm 9.4 Venting: C	PURITY RESERVED SPS-19-9-19-9-19-9-19-9-19-9-19-9-19-9-1	12.13 Heat of Combustion: —17.556 Btu/lc = —8754.7 cat/g = —408.41 X 10 ³ J/k 12.14 Heat of Decomposition: Not periment 12.15 Heat of Souther: Not perment 12.16 Heat of Polymentzation: Not perment 12.25 Heat of Fusion: 30.4 cat/g 12.25 Limiting Velue: Data not evaluate 12.27 Reid Vapor Pressure: 0.28 psis
5.8 Vapor (G system 5.9 Liquid of remain 5.10 Odor Th	int) (retaint Characteristics: Vapo	MALLEY IN ADDRESS ON CHANNELS AND TRAVELLE			MOTES

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SATURATED L	12.17 LIQUID DENSITY	12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12,20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square toot-F	Temperature (degrees F)	Centipoise
15 20 25 30 35 40 45 50 55 60 65	56.460 56.330 56.190 56.050 55.910 55.770 55.630 55.490 55.360 55.220 55.080 54.940	35 40 45 50 55 60 65 70 75 80 85	.389 .391 .394 .396 .398 .400 .402 .404 .406 .408 .411	35 40 45 50 55 60 65 70 75 80 85 90	1.043 1.035 1.027 1.018 1.010 1.002 .993 .985 .977 .969 .960	15 20 25 30 35 40 45 50 55 60 65 70 75	1.328 1.263 1.202 1.145 1.092 1.042 .995 .952 .911 .873 .836 .802
75 80 85 90 95 100	54.800 54.660 54.520 54.380 54.250 54,110	95 100	.415 .417	100	.935	85 85	.740 .712

12.21 SOLUBILITY IN WATER			12.22 SATURATED VAPOR PRESSURE		12.23 APOR DENSITY	IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal uni per pound-F
(gegrees r)	I N S O L U B L E	50 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260	.071 .101 .141 .194 .263 .352 .465 .609 .787 1.007 1.277 1.605 1.999 2.469 3.028 3.686 4.456 5.352 6.389 7.581 8.947	60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260	.00135 .00188 .00258 .00349 .00464 .00611 .00794 .01021 .01298 .01634 .02038 .02520 .03090 .03759 .04539 .05443 .06484 .07674 .09030 .10560 .12290	0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575	.261 .274 .287 .299 .311 .323 .335 .347 .358 .370 .381 .392 .403 .414 .424 .435 .445 .455 .465 .475 .485

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Common Synamy t, 4-Dimenylanzene Xyldi	1	Colorless Switch odor				
	Freezry p	ont is SET.				
Cat fire outs	pr of possible. Keep people ever reners, twelst liquid and vepor, seeme describinged meterus, auth and polition control agen	ì				
Fire	PLANMABLE Plantback along visbor trail may opour. Vispor may explore if ignited in an enciosed area. West said-confamed breathing appendixs. Configure with loads, or chimical, or carbon dioxide. Waser may be indiffective on fine. Cool expused combinees with wisser.					
Exposure	CALL FOR MEDICAL AID. VAPOR Instating to eyels, richer and firmal. If inneed, will cause occurrent, difficult breathing, or tigus of contecturaries. More to tream at. If it is treating has stooped, give artificual respertion. If heapting has stooped, give artificual respertion. If heapting has stooped, give artificual respection. If heapting has stooped, give artificual respection. If heapting has stooped, give artificual respection. If well-discount and open. If seemon a continuous content of the content of content open. If seemon a content respectively of well-discount and planty of well-of-millioned open and content open and planty of well-of-millioned open and section a CONSCIOUS, have victim drink water or mail. DO NOT INDUCE VONITING.					
Water Pollution	Fouring to sharefule, May be dangerous if it enter Noosy local freeth and with Noosy operators of nearby v	fe efficiels.				
(See Paspeter Igua vertir Exucutta ar Should be to		2. IABEL 2.1 Category: Plansmable Squid 2.2 Class: 3				
1. CHEMI 21 OG Compatible Hydrocurto 12 Fermule: P-Gl 13 HRO/UN Desig 34 DOT ID No. 11 3.5 CAS Registry	n He(CHa)a pustori: 3.2/1307	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (an ohtpool): Liquid 4.2 Celec: Cooriess 4.3 Odor: Like bergahar, characteristic aromatic				
S. HEALTH HAZARDS						
5.1 Personal Protective Equipment: Approved canaser or air-supplied meet; goggles or face sheet; plassic gloves and boots. 5.2 Symptoms Fedorate; Exposure: Vapors cause headache and dizziness. Liquid initiates eyes and sin. if taken into lungs, causes severa coughing, distress, and repidly developing purnonary elema. If impassed, causes severa coughing, camps, headache, and cares. Can be take. Koney and hear damage can doour.						
5.3 Treatswork of Exposure: NNALATION: remove to fresh ar; commister artificial respiration and oxygen if required; call is doctor; NNESSTON; do NOT induce vomining call is doctor. EYES: sum with water for at legal 15 mm. SURY: wipe off, wesh with scap and water. 5.4 Threshold Limit Values 100 ppm 5.5 Shart Term inhalation Limits: 300 ppm for 30 mm. 5.6 Tosicity by Ingresion: Grade 3; Libe = 50 to 500 mg/kg 5.7 Late Tosicity; Kidney and lever damage. 5.8 Vapor (Goal inflant Cheracteristics: Vapors could a slight smaring of the syste or respiratory system if present in high concentrations. The effect as temporary. 5.9 Liquid or Solid Inflant Cheracteristics; Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting end recidening of the stan. 5.10 Odor Threeheads 0.05 opm						

	6. FIRE HAZARDS	LO. HAZARD ASSESSMENT CODE
6.1	Flesh Posts 81°F C.C.	(See Hazard Assessment Handbook)
1.2	Flammable (Jests in Air; 1,1%-6,6%	U-T-A
4.3	Fire Extinguishing Agents: Fount, dry	ľ
	channel, or cuton density	
4.4	Fire Extinguishing Agents Hell to be Upont: Water may be ineffective.	11. HAZARO CLASSIFICATIONS
4.5	Special Hazarda of Combustion	
•	Productic Not parament	11.1 Code of Federal Regulations:
44	Seheviar in Fire: Vapor is heaver then air	11.2 HAS Hazzeri Reting for Bulk Wyler
	and may travel considerable distance to a	Yramportstore
	source of spraign and flesh back.	Category Rating
C.	ignition Temperature: \$70°F	Fire3
44	Electrical Hazard: Class I, Group O Burning Rate: 5.8 rem/mat.	Health
	Adiabatic Plans Temperature:	Vepor Irriank
1 10	Date cut avaisting	Liquid or Solid Invart
6.11	Stoichismetric Air to Fuel Ratio:	Pointe 2 Water Polytoph
	Descript eventable	Hymn Toxicity
4.12	Flores Temperature: Onto not evaluate	Aquete Toxicity
		Assiratic Effect
	7, CHEMICAL REACTIVITY	Reschely
		Other Chemicals
7.1	Rescrivity with Water: No rescribin Rescrivity with Common Materials: No	Weter 0
7.2	MACCOUNTY WITH COMMISSION MACCOUNTY 190	Self Rescrion0
7.3	Stability Guring Transport: Stabili	11.2 NFPA Hazzel Classification: Category Classification
	Houtraining Agents for Acids and	Hearth Hezard (Blut)
	Causiliza: Not pertment	Please (Ped) 3
	Polymerization: Not pareners	Resouvity (Yellow)
7.6	infulbitor of PolymerizeBosc	
	Not paraners	1
7.7	Motor Ratio (Rescinst to Fredect): Data not available	
• •	Rescrivity Group 32	
7.8	Marchany Groups 25	1
		12. PHYSICAL AND CHEMICAL PROPERTIES
		12.1 Physical State at 15°C and 1 atm:
		12.2 Mointain Weight: 106.16
		12.3 Boiling Point at 1 atric
		280.9°F = 138,3°C = 411.5°K
		12.4 Freezing Point:
		56.9°F = 13.3°C = 266.5°K
	A. WATER POLLUTION	12.5 Catiloni Temperature:
£1	Aquatic Toxicity:	649.4°F = 343.0°C = 616.2°K
	ZZ ppss/96 te/bluegil/TL_/tenth water	12.6 Critical Pressure: 509,4 atm = 34,65 pais = 3,510
2.2	Weterland Topicity: Date not evaluate	Mercan and a second
47	Biological Caygon Comunité (BOC):	12.7 Specific Grantly:
	0 to/to in 5 days Food Chain Concentration Potential:	0,861 at 20°C (liquid)
L4	Opts not available	12.8 Liquid Surface Tennion:
	ORD RES SHEET	28.3 dynas/cm = 0.0283 N/m at 20°C
		12.9 Liquid Water Interfacial Tension:
		37.5 dynes/cm = 0.0376 N/m at 20°C
		12.10 Vapor (Gas) Specific Gravity:
i		Not parament 12,11 Ratio of Specific Heats of Vapor (Gast:
l		1,071
		12.12 Laterst Heart of Venorizations
l		150 Btu/Ib = 81 cal/g =
ł		3.4 X 10° J/kg
	a customer presentation	12.13 Heat of Combustion: -17,559 Btu/fb =
ļ	4. SHIPPING INFORMATION	-9754,7 cal/g = -408,41 X 10° J/kg
8.1	Grades of Purity: Research; 99.99%;	12.14 Heat of Decomposition: Not personnel
1	Pure: 99.8%; Technical: 99.0%	12.15 Hees of Solution: Not pareners
ا ا	Storage Temperature: Ambient	12.16 Heat of Polymerzation Not pertinent 12.25 Heat of Fusion: 17.83 cm/g
۱ -	i Inert Atmosphere: No recurrent	12.26 Limiting Value: Date not available
۱ ۳	Yending: Open (Name erressar) or pressure-vacuum	12.27 Reid Vapor Pressure: 0.34 pps
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12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12,19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
remperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise
60	53,970	60	.412	60	.935	60	.678
65	53.830	70	.418	6 5	.928	65	.654
70	53.690	80	.424	70	.921	70	.631
75	53.550	90	.429	75	.914	75	.610
80	53.410	100	.435	80	.907	80	.590
85	53.270	110	.440	85	.900	85	.571
90	53.140	120	.446	90	.892	90	.552
95	53.000	130	.451	95	.885	95	.535
100	52,860	140	.457	100	.878	100	.519
105	52,720	150	.462			105	.503
110	52,580	160	.468		i	110	.488
115	52.440	170	,474			115	.474
120	52.300	180	.479		}	120	.460
		190	.485				
		200	.490				
	1	210	.496				
		220	.501		į l	ļ	
	1	230	.507				
		240	.512			!	
	!	250	.518			1	
		260	.524				
	i l	270	.529			}	
]	280	.535		·		
)		}				
			1		1	í	
]		1		1		

SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
emperature degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal un per pound-F
	1 , [60	.096	60	.00183	0	.246
	N 1	70	.135	70	.00252	25	.259
	s	80	.187	80	.00343	50	.272
	ō	90	.255	90	.00459	75	.285
	L	100	343	100	.00607	100	297
	ן ט [110	.456	110	.00792	125	.309
	l e l	120	.599	120	.01022	150	.321
	L	130	.777	130	.01303	175	.333
	i ∈ i	140	.998	140	01646	200	.345
	İ	150	1,270	150	02059	225	.357
]	160	1.600	160	02553	250	.368
		170	1,998	170	.03138	275	.360
		180	2,475	180	03826	300	.391
		190	3.041	190	.04629	325	.402
		200	3.710	200	.05561	350	.413
		210	4.493	210	.06636	375	.424
		220	5.407	220	.07867	400	.435
	ł	230	6.465	230	.09270	425	.445
		240	7.683	240	.10860	450	.456
		250	9.080	250	12650	475	.466
		260	10.670	260	14670	500	.476
				200		525	.486
1	1					550	.496
	ŀ					575	.505
į	}					600	.515
							.513

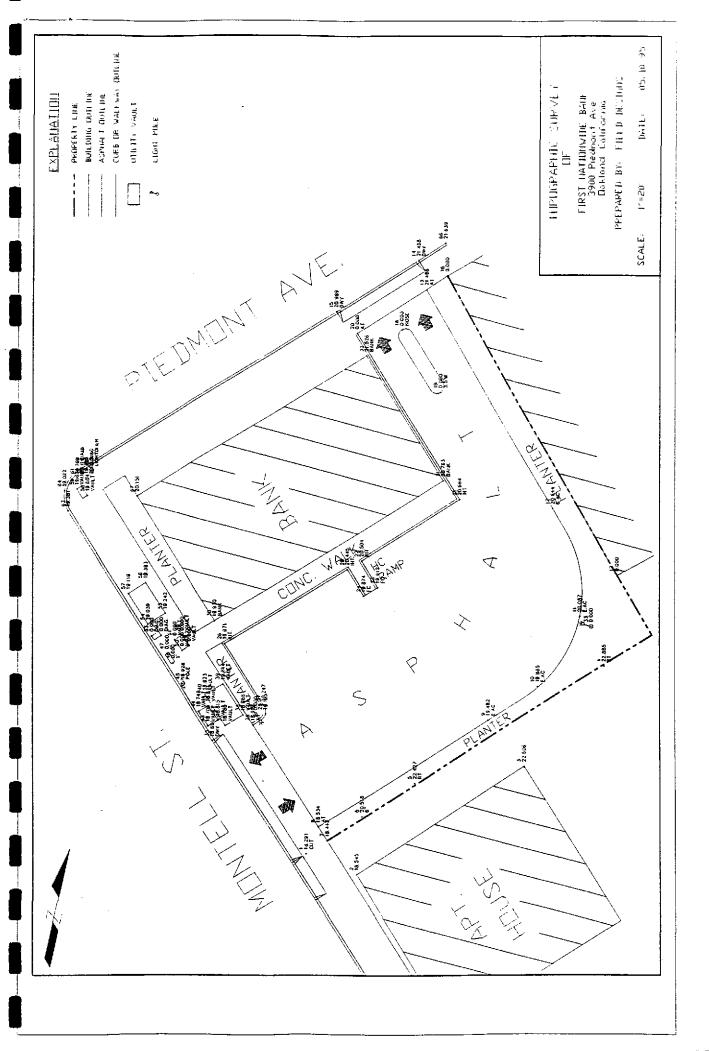
ATTACHMENT B

Site Base Map Survey Data

Attachment B

Survey Data for Site Base Map

SURVEY POINT	NORTHING	EASTING	ELEVATION
1. Monument of Record (BM)	1081.7278	4997.8444	100.00
2. Northern Building Corner	1048.3529	5067.1404	101.555
3. Eastern Building Corner	1029.7025	5037.1054	100.792
4. Southern Building Corner	1084.0937	5003.3624	99.959
5. Western Building Corner	1102.7670	5033.3345	100.180
6. Southern Property Corner	991.0622	4992.4024	102.914
7. Northern Property Corner	1028.8329	5086.2693	



59 1117.450 5035.033 19.636 VAULT
60 1115.140 5037.698 19.768 ELEC.DIAG.
61 1117.408 5037.632 19.704 ELEC.DIAG.
62 1113.841 5039.567 0.000 LIGHTOLIER
63 1119.625 5029.793 19.381
64 1120.459 5034.643 19.022
65 1116.140 5040.050 19.738
66 1029.258 5094.094 21.639
67 1102.767 5033.334 20.151