

**RCRA FACILITY INVESTIGATION EXPEDITED WORKPLAN**  
**SWMU 12 - FORMER MSMA SALT UNLOADING AREA**  
**SWMU 11 - FORMER MSMA PRODUCTION AREA**  
**SWMU 15 - FORMER METHYL PARATHION PRODUCTION AREA**  
**SWMU 16 - FORMER ATRAZINE PRODUCTION AREA**  
**SWMU 1 - CONTAINER (DRUM) STORAGE AREA**  
**SWMU 17 - RETURNED PRODUCT STORAGE AREA**

**VICKSBURG CHEMICAL COMPANY**  
**VICKSBURG, MISSISSIPPI**

Prepared for  
Vicksburg Chemical Company  
Vicksburg, Mississippi

Cedar Chemical Corporation  
Memphis, Tennessee

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**Woodward-Clyde**



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LIST OF ACRONYMS

<u>Acronym</u>	<u>Meaning</u>
CCC	Cedar Chemical Corporation
VCC	Vicksburg Chemical Company
RFI	RCRA Facility Investigation
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
SWMU	Solid Waste Management Unit
AOC	Area of Concern
PECMT	Preinvestigation - Evaluation of Corrective Measures Technologies
EPA	United States Environmental Protection Agency
MSDEQ	Mississippi Department of Environmental Quality
CMS	Corrective Measures Study
SWMU 1	Hazardous Waste Container Storage Area
SWMU 17	Off-specification Product Storage Area
SWMU 2	Inactive Landfill will include AOC 4
SWMU 7	Former Dinoseb Production Area
SWMU 14	Former Toxaphene Production Area
SWMU 4	Activated Carbon Treatment Unit
SWMU 5	South Plant Drainage System
SWMU 8	Dinoseb Loading/Unloading Area
SWMU 9	Dinoseb Drumming Area
SWMU 11	Former MSMA Production Area
SWMU 12	Former MSMA Unloading Area
SWMU 13	South Plant Drainage Ditches
SWMU 15	Former Methyl Parathion Production Area
SWMU 16	Former Atrazine Production Area
SWMU 17	Returned Product Storage Area
SWMU 18	Former Blue Tank
SWMU 20	Railroad Car Loading/Unloading Station
SWMU 22	North Plant Neutralization System Concrete Sump
SWMU 25	North Plant Subsurface Wastewater Pipes
SWMU 29	Floor under North Plant Oil Collection Unit
SWMU 30	North Plant Waste Accumulation Area
SWMU 31	North Plant No. 6 Fuel Oil Area
bgs	below ground surface
TCL	Toxic Compound List
TAL	Toxic Analyte List

**INTRODUCTION**

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Vicksburg Chemical Company (VCC) has retained Woodward-Clyde Consultants (WCC) to perform activities associated with a RCRA corrective action program. The corrective action program is in response to a Consent Decree. The Consent Decree requires that a RCRA Facility Investigation (RFI) be conducted at the Vicksburg, Mississippi manufacturing facility.

The purpose of the RFI is to determine the nature and extent of releases of hazardous wastes and/or constituents from regulated units, solid waste management units (SWMUs), and other areas of concern (AOCs) at the facility and to gather all necessary data to support a Corrective Measures Study.

The RFI constitutes the second phase of the RCRA corrective action program. The program's initial phase consists of the RCRA Facility Assessment (RFA) which is conducted by EPA and precedes the RFI. The RFI itself is divided into five separate tasks which includes the Preliminary Report (submitted as a separate document and resubmitted as the Amended and Restated Preliminary Report and subsequently approved by the U.S. EPA), the RFI Work Plan (submitted in June 1996), the Facility Investigation, and the Investigative Analysis and Reports. In addition to these phases, a Groundwater Assessment Work Plan (submitted in June 1996), a Closure Plan for SWMU 1 and SWMU 17 (submitted and subsequently approved by the U.S. EPA) and Annual Groundwater Assessment Reports are required by the Consent Decree.

This document is an RFI Expedited Work Plan and is limited to the following areas:

- SWMU 12, Former MSMA Unloading Area;
- SMWU 11, Former MSMA Production Area;
- SWMU 15, Former Methyl Parathion Production Area;
- SWMU 16, Former Atrazine Production Area (including warehouse);
- SWMU 1, Container (Drum) Storage Area; and
- SWMU 17, Returned Product Storage Area.

The location of the SWMUs are presented on Figure 1.

This work plan includes or incorporates by reference the following plans presented in the RFI Work Plan (submitted in June 1996):

- Data Collection Quality Assurance Plan
- Data Management Plan
- Health and Safety Plan

This work plan also includes or incorporates by reference the plans presented in the Closure Plan for SWMU 1 and SWMU 17. The RFI Report, which will present the results of the investigation, will also incorporate the results pertaining to SWMU 16 presented in the October 1994 RCRA Facility Investigation Report (SWMU 9, Former Dinoseb Drumming and Storage Area and SWMU 16, Former Production Storage Area).

This RFI Expedited Work Plan is guided by the information contained in the Amended and Supplemental Preliminary Report (Report of Current Conditions) and is expedited because of VCC's plans to consider construction of a new manufacturing facility in the South Plant and potentially utilize some of the area to be investigated for storage, transportation and manufacturing.

The RCRA Facility Investigation is intended to obtain information to characterize the nature and extent of releases of hazardous waste or constituents, if any. This information will be used to determine whether a Corrective Measures Study (CMS) will be necessary. The purpose of a CMS is to develop and evaluate the corrective action alternatives and to recommend the corrective measure or measures to be taken at the facility.

**RFI EXPEDITED WORK PLAN STRATEGY**

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The Amended and Supplemental Preliminary Report provides an overview of the investigations and analyses undertaken to characterize the potential contaminants of concern as well as the environmental setting and to determine those areas requiring additional investigation. Completed work tasks include:

- Compiled site background information
- Reviewed facility's history and file data
- Characterized the facility's environmental setting
- Established boundaries of SWMUs and AOCs
- Identified surface SWMUs not requiring further investigation
- Characterized waste sources to fullest extent possible
- Identified potential receptor population

The RFI Expedited Work Plan objectives, strategy, and approach are presented herein. Several plans are needed to insure an accurate and complete field investigation of the facility. These plans include by reference the RFI Work Plan (submitted in June 1996) and any modifications of that plan needed to comply with deficiencies to the plan provided by the U.S. EPA and MSDEQ.

**2.1 RFI EXPEDITED WORK PLAN OBJECTIVES**

The primary objectives for the RFI Expedited Work Plan shall be to provide procedures for collecting information as necessary to protect human health and the environment. A secondary objective is for evaluation of areas for new manufacturing facilities in the South Plant and potentially utilize some of the area to be investigated for storage, transportation and manufacturing. Specifically, the objectives are to:

- Identify specific constituents of concern.
- Determine whether or not the areas to be investigated are releasing hazardous constituents into the environment.

- If a release of hazardous constituents is occurring, identify the source(s) of contamination.
- Determine the horizontal and vertical extent of contamination.
- Evaluate migration rates, pathways, and potential receptors.
- Provide data for the evaluation of remedial alternatives and associated health risk assessments for the site.

These objectives will be obtained by establishing data quality objectives to be met during the investigation and then implementing the RFI Expedited Work Plan as discussed in the Section 4.0 Project Schedule. For quality objectives, quality assurance and quality control (QA/QC) procedures will be followed as delineated in the Data Collection Quality Assurance Plan.

## **2.2 RFI WORK PLAN RATIONALE**

The rationale which forms the basis for the Expedited Work Plan is based on VCC's knowledge of the SWMUs requiring further investigation. For example, it is known that the Inactive Landfill (SWMU 2) is associated with waste disposal practices (SWMU 2 is not included within the Expedited Work Plan). In addition, several former production areas have been identified as requiring further investigation based on current information as discussed in the Preliminary Report. SWMU 1 and SWMU 17 are investigated for purposes of closure and possible reuse.

The location of each SWMU is shown in Figure 1. SWMU boundaries were defined in the Preliminary Report. The environmental setting and potential receptors/pathways were presented in the Preliminary Report. The information to be gathered during the Expedited RFI and GWA (after the GWA Work Plan is approved) includes the following:

- The vertical and horizontal extent of releases that have or are occurring within the SWMU boundaries which could potentially impact human health or the environment.
- The transport mechanisms, rates, and pathways for migration of hazardous constituents from SWMU areas.

For the former production areas, it is necessary to determine if hazardous constituents are migrating out of the SWMU area through surface water or groundwater. If there are indications of release, the vertical and horizontal extent of established constituents of concern will be assessed and data will be gathered to determine flow directions and pathways.

Storage areas will be approached from the standpoint that the type of hazardous constituents stored in the units are known. The extent of contamination, if any, will therefore be assessed, in the overall RFI (which will incorporate data obtained in this Expedited RFI) followed by a study of migration rates, pathways, and potential receptors. Groundwater contamination and plume migration will not be considered in the Expedited RFI but will be considered in the overall RFI and GWA.

The field investigation will proceed in phases. Phase I will focus on areas of surficial contamination within the SWMUs or AOCs that are suspected or confirmed to have a release. The density of sampling is approximately one sample per 2,500 square feet of area investigated. This Expedited RFI should be considered a part of the overall Phase I program.

The following table is a summary of the total surficial contamination sampling to be executed during Phase I (more specific information on the sampling under the Expedited RFI is included in Section 3.1):

SWMU Number	Sample Points	Samples	Analyte Lists
1/17 - Container Storage - Off-Spec Storage*	12	34	A
2 - Landfill	10	23	B
4 - Activated Carbon Treatment	6	6	B
5 - South Plant Drainage	16	16	C
7/20 - Former Dinoseb Production Area/Railroad Car Loading/Unloading Station	21	42	A
8 - Dinoseb Loading/Unloading Area	2	6	A
11/12/15 MSMA-Methyl Production Area*	57	105	A, B, C, D, G
13 - West Drainage	9	9	C
14 - Toxaphene	3	6	C

SWMU Number	Sample Points	Samples	Analyte Lists
16 - Atrazine - Production and Warehouse*	35	57	C
18 - Blue Tank	3	3	C
30 - Waste Oil	3	3	E
34 - Junkyard	6	6	F

LEGEND:

- \* Part of the Expedited RFI (sampling density generally has been increased to expedite investigation by precluding a need for Phase II shallow or surface sampling)
- A Atrazine, cyanazine, arsenic, dinoseb, toxaphene, toluene
- B TCL, TAL, atrazine, cyanazine, dinoseb
- C Atrazine, cyanazine, arsenic, dinoseb, toxaphene
- D TLC, dioxin, TAL, atrazine, cyanazine, dinoseb
- E BTEX, TPH
- F BTEX, TPH, atrazine, cyanazine, arsenic, dinoseb, toxaphene
- G Arsenic

The Phase II Field Investigation Work Plan will be prepared for those areas where additional information is needed. The primary objective of Phase II will be to establish the vertical and horizontal extent of contamination, if it is not adequately established in Phase I. The Phase II Work Plan will, for example, identify locations for monitor wells for individual SWMUs where there is evidence of releases.

## SITE CHARACTERIZATION PLAN

The overall approach is designed to accomplish the objectives as stated in Section 2.1. The primary purpose of the sampling will be to determine if the areas to be investigated are releasing hazardous constituents of concern into the environment. A secondary purpose is for evaluation of areas for new manufacturing facilities in the South Plant and potentially utilize some of the area to be investigated for storage, transportation and manufacturing. To accomplish this, the effort will involve specific field sampling, data assessment, and development of a field investigation report which summarizes the results of the work.

The general locations of the areas to be investigated are depicted in Figure 1.

### 3.1 SAMPLING RATIONALE

For each sample point there will be two or three samples taken:

- A core of the concrete (if the sample point is a former production or storage area).
- A composite sample of the first six inches of soil beneath the concrete referred to as the shallow sample.
- A sample of soil generally 12 inches or deeper beneath the concrete referred to as the deep sample.

The total number of samples to be submitted for analysis shall be, as a minimum, as follows:

SWMU Number	Sample Description	Sample Points	Number of Samples	Analyte List
11, 12, 15 MSMA and Methyl Parathion	Sludge/Sediment (from drains, sumps and pits)	9 sludge/sediment	9	D
	Water	2 water	2	D
	Concrete and Soil	3 concrete and soil	9	D
	Soil	2 soil	4	D

SWMU Number	Sample Description	Sample Points	Number of Samples	Analyte List
11, 12, 15 MSMA and Methyl Parathion	Concrete and Soil	3 concrete and soil	9	G
	Soil (underneath concrete)	25 soil	50	G
	Soil	8 soil	16	G
	Wipe	5 paper	5	G
	QA/QC	Matrix spike, matrix spike duplicate, trip	11	8-G 3-D
16 Atrazine Warehouse	Concrete and Soil	5 concrete and soil	15	C
	Soil	1 soil	2	B
16 Atrazine Production Area	Concrete and Soil	18	18	C
	Soil	11	22	B
	QA/QC	Matrix spike, matrix spike duplicate, trip	6	3-B 3-C
1, 17 Container Storage and Off-Spec Storage	Concrete and Soil	10 concrete and soil	30	A
	Soil	2 soil	4	A
	QA/QC	Matrix spike, matrix spike duplicate, trip	4	4-A

## LEGEND:

- A Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene, Toluene
- B TCL, TAL, Atrazine, Cyanazine, Dinoseb
- C Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene
- D TCL, Dioxin, TAL, Atrazine, Cyanazine, Dinoseb
- E BTEX, TPH
- F BTEX, TPH, Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene
- G Arsenic

The sample points for SWMUs 11, 12, and 15 are located on Figure 2. The sample points for SWMUs 16, 1, and 17 are located on Figure 3. Note that Figure 1, the SWMU Location Map, also locates sample points specified in the overall RFI Work Plan. The number of samples for SWMUs 11, 12, 15, 16, 1 and 17 have been increased per the specifications in this Expedited Work Plan.

### 3.2 ANALYTICAL RATIONALE

The soil and concrete samples submitted for analysis will be analyzed for atrazine, cyanazine, arsenic, dinoseb and toxaphene. Many samples will be analyzed for the Toxic Compound List (TCL) and Toxic Analyte List (TAL). The TCL/TAL parameters provide scientifically valid data that is more defensible than protocols for Appendix IX constituents. The following paragraphs are discussions of the list TCL/TAL parameters presented in the RFI Work Plan and the list of Appendix IX constituents.

Most Superfund site investigations involve analyzing for TCL organics and TAL metals. The list is an expanded version of the Clean Water Act (CWA) Priority Pollutant List. (These lists are often referred to as the Hazardous Substance List). On July 9, 1987, the EPA finalized new groundwater monitoring requirements for TSD facilities. These new requirements specify monitoring for a list of 252 organic, metallic and inorganic analytes contained in Appendix IX of 40 CFR Part 264 when a contamination plume is present. Although the regulation is specific for groundwater analysis, the analytes can be determined in other matrices.

Comparison of the TCL/TAL analytes with the Appendix IX analytes reveals that the TCL and TAL parameters include 9 parameters that are not included in the Appendix IX listing. These parameters consist of benzoic acid in the semivolatile fraction, endrin ketone in the pesticide/PCB fraction, and aluminum, calcium, iron, magnesium, manganese, potassium, and sodium in the inorganic fraction. The concentration of aluminum, calcium, iron, and magnesium can be particularly informative with regard to providing insight to results reported for several of the other metals.

Even though the Appendix IX Ground Water Monitoring List appears to be a diverse list of compounds the usefulness of the list is suspect. Consider, for example the following subset of compounds found in Appendix IX:

- Safrole
- Isosafrole
- Phenacetin
- 2-Acetylaminofluorene

- Aramite®
- Sym-Trinitrobenzene

Safrole is a constituent of several essential oils and most notable sassafras, i.e., root beer, in which it is the major compound amounting to about 75 percent (Merck, page 8175). Isosafrole is a minor compound of sassafras (Merck, page 5075). Phenacetin or acetophenetidin is an analgesic and antipyretic pharmaceutical and is employed as a stabilizer in hydrogen peroxide in hair bleaching preparations (Sittig, page 817). Sym-Trinitrobenzene is an explosive more powerful and brisant but less sensitive to shock than TNT (2,4,6-trinitrotoluene).

The majority of the organic parameters in the Appendix IX List can be analyzed employing the two general GC/MS Methods 8240 and 8270 for the volatiles and semivolatiles, respectively; however, the compounds enumerated as being characterized with Method 8240 cannot be determined from a single analytical run as the chemical and physical properties of these compounds are widely divergent. In actual fact, the properties vary continuously from the well behaved compounds to the highly polar water soluble compounds. Consequently, these compounds must be considered in terms of at least two distinct categories according to the required sample preparation conditions summarized as follows:

Compound Category/Sample Matrix	Purge Temperature
Well Behaved Compounds: Water Low Soil High Soil	Ambient 4°C Ambient
Highly Polar Water Soluble Compounds: Water Low Soil High Soil	85°C 85°C 85°C

Thus, the analysis of Appendix IX volatiles for a single sample requires a minimum of two discrete determinations provided that all the compounds are amenable to purge and trap isolation. If this is not the case, then at least one additional analytical run must be performed.

In the summary, the TCL/TAL is a listing of analytes for which: (1) analytical methods are established based on available laboratory data and judgment of technical experts, and (2) analytical methods have been rewritten in standard format, subjected to editorial review, extensive revisions, and validated in numerous EPA and contractor laboratories throughout the country. Precision and accuracy criteria for these protocols have been established in terms of analytical data required on real world samples.

No such accreditation can be stated for the Appendix IX parameters which are not also included in the TCL or TAL given in the RFI Work Plan. The following are some of the reasons that such accreditation is not possible at this time:

- Regulations apply to Appendix IX parameters only to monitor well groundwater samples; however, it appears that regulations were established without any serious consideration of how any required analytical measurements would be performed.
- Validated analytical methods are not available for a number of Appendix IX parameters even in water and no deliberative attempt has been made by the agency to develop analytical methods for the Appendix IX parameters.
- The suggested analytical methods for characterizing the Appendix IX parameters are provided in SW-846; however, the only justification for inclusion of a significant number of the Appendix IX parameters in existing SW-846 analytical methods seems to have been some type of extrapolation, i.e., according to someone's judgment, the method should work.
- The suggested Appendix IX analytical methods are not even necessarily analytical fraction specific, i.e., both purgeable volatile and semivolatile extractable analytical methods are quoted for some specific parameters.

Regulatory flexibility concerning permissible analytical methods for a given parameter may be desirable. Further, it may be technically feasible to analyze certain parameters in either the purgeable volatile or semivolatile

analytical fractions. However, this raises concern as to whether the data from the two methods would be comparable.

- The SW-846 analytical methods possess one or more of the following shortcomings with respect to the characterization of a given Appendix IX parameter:
  - Parameter not enumerated in the list of the method's target parameters.
  - Characteristic masses not provided for the parameter.
  - Chromatographic retention time value not provided for the parameter.
  - Only an estimated chromatographic retention time provided for the parameter.
  - QA accuracy and precision criteria are not provided for the parameter.
  - The only practical quantitation limits quoted in SW-846 for Appendix IX organic compounds are for those compounds included in the TCL.
  
- Authentic analytical standards are not readily available for all of the Appendix IX parameters.
  
- EPA laboratory control standards are not available for a substantial number of the Appendix IX parameters.
  
- The SW-846 document is an evolving one, i.e., analytical methods are currently being modified, deleted, and/or added.
  
- The regulations apply to Appendix IX parameters only to monitoring well groundwater samples and water analytical methods do not necessarily translate to soil matrices.

- Required method detection limits are not specific in the regulations even for groundwater samples. There is confusion with the concept of detection and quantitation limits associated with Appendix IX parameters.

For example, with regard to the Practical Quantitation Limits (PQLs) quoted in the Appendix IX Ground Water Monitoring List, variation in quantitation limits for a given parameter by a factor of 800, simply due to the application of different analytical methods, is acceptable. Variation in quantitation limits quoted for a given parameter by a factor of 50 to 100 is common.

Use of the TCL and TAL given in the Expedited RFI Work Plan in lieu of the Appendix IX list of parameters for the analysis of soil sample collection during Phase I of the RFI will provide laboratory data that is valid and defensible.

### 3.3 SAMPLING PROCEDURES

The following procedures will be employed to sample the soil and concrete under concrete. The 104 sampling locations, noted in Figures 2 and 3 are approximate. If there is a crack near the sample point the field sampler is to sample near the crack. A concrete saw, concrete drill or geoprobe will be used to remove a small section or plug of the concrete. The concrete samples will be wrapped in aluminum foil.

Samples of soil underneath the concrete will be taken either utilizing a 1-inch diameter stainless steel tube encased in a 2-foot long stainless steel soil probe, a hand auger, or a geoprobe. Following the removal of the soil probe or auger, the sample will be extracted. The soil sample will be transferred to sample bottles, appropriately labeled, and placed on ice for transport to the laboratory. All equipment will be cleaned in accordance with decontamination procedures before collection of each sample.

Sample points are to be chosen near to locations of joints and/or cracks where contamination could most likely accumulate if released. As a point of reference, according to guidance provided in OSWER 9476-00-8.C a clean closure demonstration may be made with one sample per 2500 ft<sup>2</sup>. The areal locations meet the criterion noted. The mobility of pesticides

in soil underneath the concrete will be limited; therefore, the highest concentrations would likely be found in areas where there are cracks just below the concrete/soil interface.

All equipment will initially be decontaminated before use and again after each sample is collected. The following decontamination procedures will be employed:

- Washing in tap water and a detergent (Alconox) solution. Brush, if necessary, to remove particulate matter and surface films
- Rinsing thoroughly with tap water
- Rinsing with distilled, deionized water
- Rinsing twice with pesticide - grade solvent
- Rinsing with organic - free water
- Allow to air dry as long as possible

After decontaminating, the sample equipment will be wrapped in aluminum foil for protection until its subsequent use. All wash fluids will be containerized for later disposal by VCC.

### **3.4 DOCUMENTATION OF SAMPLE ACQUISITION**

All information pertinent to field observations and sampling will be recorded in a logbook with consecutively numbered pages. Entries in the logbook will include at least the following:

- Sketch of the container storage area with measurements
- A grid of the site area
- Purpose of sampling
- Number and approximate volume of samples taken
- Location of sampling point on grid
- Description of sampling point
- Date and time of collection
- Collector's sample identification number(s)
- References, such as maps or photographs of the sampling site

- Field observations
- Weather conditions

The documentation in the logbook will be sufficient to reconstruct the sampling situation without relying on the collector's memory.

Proper sample preservation is important in retaining the sample characteristics prior to analysis. Sample preservation is documented on the chain-of-custody form and also in the field logbook. The proposed analytical methods required that the sample be kept on ice until transferred to the laboratory.

Once the sample has been transferred to an appropriate laboratory sample container, sample tags will be completed and affixed to the sample container. The concrete samples will be wrapped in aluminum foil.

#### **3.4.1 Sample Tagging**

Each sample will be tagged and sealed properly immediately after collection. Sample tags are necessary to prevent misidentification of samples. The tag will include at least the following information:

- Name of collection
- Date and time of collection
- Place of collection
- Collector's sample number, which uniquely identifies the sample

#### **3.4.2 Chain-of-Custody**

In addition in the field logbook, each sample will be recorded on a chain-of-custody record. An identifying code will be assigned to each sample and this code will be used on the chain-of-custody and in the logbook to ensure that the sample description is identifiable. A brief description of the sampling point will also be placed on the chain-of-custody form.

Chain-of-custody forms will become the permanent records of all sample handling and shipment. If standard sampling procedures are not used, a written justification of each deviation will be placed in the project file. Upon completion of sampling, the sample will be prepared for shipment in accordance with the applicable sampling instruction, including preservation, labeling, and logging.

The person collecting a sample will initiate the document(s) at the source of sample and start the chain-of-custody procedure.

The sample will be kept in a limited access or locked storage at the proper temperature until custody is relinquished from the site and formal documentation of the transfer is completed.

Upon transfer of the custody, the person involved will verify sample numbers and condition and will document the sample acquisition and transfer. The field sampler will properly package the samples, indicate method of shipping, obtain documentation of the shipment, such as certified mail receipt or bill of lading number, and sample identification records (one of each with the shipment, one of each by mail to the laboratory, and one of each returned with field records).

On transfer of custody of the samples to the transport agency, the field sample custodian will sign and retain a copy of the chain-of-custody, witness the transport company custody signature, and send two copies of the chain-of-custody, witness the transport company custody signature, and send two copies of the chain-of-custody with the samples. On arrival at the laboratory, the sample custodian will sign for custody and return a copy of the completed chain-of-custody to VCC. Custody procedures will then proceed according to the procedures of the selected testing laboratory.

### **3.4.3 Analytical Methods and Parameters**

A summary of the parameter and possible methods to be employed by the offsite laboratory are as follows:

Toxaphene, Atrazine and Cyanazine	EPA SW-846, Method 8080
Dinitrobutyl Phenol (Dinoseb)	EPA SW-846, Method 8150
Arsenic	EPA SW-846, Method 7060
BTEX	EPA SW-846, Method 8020
TCL/TAL	See Table 1

### 3.5 EVALUATION OF DATA

Upon completion of the field investigation of Phase I, the next step will involve the analysis of data collected during the first task. Methods, procedures and data base tools, detailed in the Data Management Plan, will be implemented to the extent necessary to ascertain trends, constituents of concern, and indications of potential release.

The analysis of data will be summarized and presented to the VCC in a report. The report will discuss the sampling and analytical results and present the data in a concise manner along with conclusions and recommendations. In the event that a release or potential release of established contaminants of concern is not indicated, the report could include recommendations for no further action. If a potential release is indicated, recommendations would include submittal of conceptual plans for corrective action.

**PROJECT SCHEDULE**

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**4.1 RFI FIELD INVESTIGATION WORK PLAN SCHEDULE**

The schedule for the completion of the project is as follows:

- Week one - Establish and mark sample points and clear space for sampling. Mobilize and sample. Send samples for analyses.
  
- Week five - Receive results of analysis and finalize Expedited RFI Field Investigation Report.

The rationale, approach, and strategy for the Expedited RFI discussed above will be implemented in accordance with the referenced Data Collection Quality Assurance Plan and Data Management Plan, where appropriate. The Health and Safety Plan is appropriate for all of the WCC work on the VCC site. Changes in the procedures outlined will be documented.

**4.2 RFI FIELD INVESTIGATION REPORTS**

A report will be compiled at the conclusion of the field investigation. The report will include the following:

- Discussion of work accomplished to date
- Summary of findings
- Conclusions and recommendations
- Supporting analytical and field data

In addition, the report will include discussion of results, and any new significant issues that would impact the RFI. The report will have appropriate drawings, tables, figures, charts, bar graphs, maps, cross-sections, and other diagrams as needed to allow for a clear understanding of the nature and extent of any potential contaminations that may exist at the site.

**PROJECT MANAGEMENT PLAN**

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The Project Management Plan consists of the following elements:

- Project task definition
- Specific personnel positions within the project organizational structure

**5.1 PROJECT TASK DEFINITION**

Vicksburg Chemical Corporation (VCC) has retained the services of Woodward-Clyde Consultants (WCC) to develop the Expedited RFI Field Investigation Plan and complete the field investigation phases of the RFI.

**5.2 PROJECT PERSONNEL**

Duties of key personnel are described

**5.2.1 Vicksburg Chemical Project Director**

The Vicksburg Chemical Project Director is Steve Boswell and is the official representative for VCC. He is in charge of administration of the work and the completion of the project.

**5.2.2 Woodward-Clyde Consultants Project Manager**

The WCC Project Manager will develop the plans required and oversee implementing of the work plan on behalf of Vicksburg Chemical, and will be the primary contact with the Vicksburg Chemical. The WCC Project Manager is Richard D. Karkkainen.

**5.2.3 Expedited RFI Field Investigation Site Coordinator**

Richard D. Karkkainen will handle day to day work plan activities. He will coordinate efforts with personnel from Terra Technologies who will perform the sampling and he will oversee and assist their implementation.

**5.2.4 WCC Health and Safety Officer**

A WCC Health and Safety (H&S) officer will be responsible for the administration and implementation of site Health and Safety for work plan activities. The H&S officer will have the overall responsibility for safety and health and will:

- Ensure that an employee medical surveillance program which meets the requirements of 29 CFR 1910.120 is instituted and maintained.
- Be responsible for the initial pre-construction indoctrination of all on-site personnel with regard to the H&S Plan and other safety requirements to be observed during the construction, including but not limited to:
  - potential hazards
  - personal hygiene principles
  - personnel protective equipment
  - respiratory protection equipment usage and fit testing, and
  - emergency response including site evacuation, dealing with fire and medical situations
- Be responsible for the maintenance of separate exclusion, contamination reduction, and support zones as described in the Contractor's H&S Plan when appropriate.
- Ensure that personnel exposure air monitoring is properly conducted and recorded when appropriate.

- Maintain a record keeping system which will include daily records of all site activity, waste quantities produced, waste transportation activity information, laboratory results, and other information as required when appropriate.

**TABLES**

TABLE 1

## TCL/TAL ANALYTES

	Volatiles	CAS Number	Quantitation Limits**	
			Water ( $\mu\text{g/L}$ )	Low Soil/Sediments ( $\mu\text{g/Kg}$ )
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
3.	Vinyl Chloride	75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene Chloride	75-09-2	5	5
6.	Acetone	67-64-1	10	10
7.	Carbon Disulfide	75-15-0	5	5
8.	1,1-Dichloroethane	75-35-4	5	5
9.	1,1-Dichloroethane	75-34-3	5	5
10.	1,2-Dichloroethane (Total)	540-59-0	5	5
11.	Chloroform	67-66-3	5	5
12.	1,2-Dichloroethane	107-06-2	5	5
13.	2-Butanone	78-93-3	10	10
14.	1,1,1-Trichloroethane	71-55-6	5	5
15.	Carbon Tetrachloride	56-23-5	5	5
16.	Vinyl Acetate	108-05-4	10	10
17.	Bromidichloromethane	75-27-4	5	5
18.	1,2-Dichloropropane	78-87-5	5	5
19.	cis-1,3-Dichloropropane	10061-01-6	5	5
20.	Trichloroethane	79-01-6	5	5
21.	Dibromochloromethane	124-48-1	5	5
22.	1,1,2-Trichloroethane	79-00-5	5	5
23.	Benzene	71-43-2	5	5
24.	trans-1,3-Dichloropropane	10061-02-6	5	5
25.	Bromoform	75-25-2	5	5
26.	4-Methyl-2-pentanone	108-10-1	10	10
27.	2-Hexanone	591-78-6	10	10
28.	Tetrachloroethane	127-18-4	5	5
29.	Toluene	108-88-3	5	5

TABLE 1 (Continued)

## TCL/TAL ANALYTES

	Volatiles	CAS Number	Quantitation Limits**	
			Water ( $\mu\text{g/L}$ )	Low Soil/Sediment* ( $\mu\text{g/Kg}$ )
30.	1,1,2,2-Tetrachloroethane	79-34-5	5	5
31.	Chlorobenzene	108-90-7	5	5
32.	Ethyl Benzene	100-41-4	5	5
33.	Styrene	100-42-5	5	5
34.	Xylenes (Total)	1330-20-7	5	5
35.	Phenol	108-95-2	10	330
36.	bis-2-Chloroethyl ether	111-44-4	10	330
37.	2-Chlorophenol	95-57-8	10	330
38.	1,3-Dichlorobenzene	541-73-1	10	330
39.	1,4-Dichlorobenzene	104-46-7	10	330
40.	Benzyl Alcohol	100-51-6	10	330
41.	1,2-Dichlorobenzene	95-50-1	10	330
42.	2-Dichlorobenzene	95-48-7	10	330
43.	bis(2-Chloroisopropyl)ether	108-60-1	10	330
44.	4-Methylphenol	106-44-5	10	330
45.	N-Nitroso-di-n-dipropylamine	621-64-7	10	330
46.	Hexachloroethane	67-72-1	10	330
47.	Nitrobenzene	98-95-3	10	330
48.	Isophorone	78-59-1	10	330
49.	2-Nitrophenol	88-75-5	10	330
50.	2,4-Dimethylphenol	105-67-9	10	330
51.	Benzoic Acid	65-85-0	50	1600
52.	bis(2-Chloroethoxy)methane	111-91-1	10	330
53.	2,4-Dichlorophenol	120-83-2	10	330
54.	1,2,4-Trichlorobenzene	120-82-1	10	330
55.	Naphthalene	91-20-3	10	330
56.	4-Chloroaniline	106-47-8	10	330
57.	Hexachlorobutadiene	87-68-3	10	330
58.	4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
59.	2-Methylnaphthalene	91-57-6	10	330

TABLE 1 (Continued)

## TCL/TAL ANALYTES

Volatile	CAS Number	Quantitation Limits**	
		Water ( $\mu\text{g/L}$ )	Low Soil/Sediment <sup>b</sup> ( $\mu\text{g/Kg}$ )
60. Hexachlorocyclopentadiene	77-47-4	10	330
61. 2,4,6-Trichlorophenol	88-06-2	10	330
62. 2,4,5-Trichlorophenol	95-95-4	50	1600
63. 2-Chloranaphthalene	91-58-7	10	330
64. 2-Nitroaniline	88-74-7	50	1600
65. Dimethylphthalate	131-11-3	10	330
66. Acenaphthalene	208-96-8	10	330
67. 2,6-Dinitrotoluene	606-20-2	10	330
68. 3-Nitroaniline	99-09-2	50	1600
69. Acenaphthene	83-32-9	10	330
70. 2,4-Dinitrophenol	50	1600	
71. 4-Nitrophenol	50	1600	
72. Dibenzofuran	10	330	
73. 2,4-Dinitrotoluene	10	330	
74. 4-Dithylphthalate	10	330	
75. 4-Chlorophenyl-phenyl-ether			
76. Fluorene	86-73-7	10	330
77. 4-Nitroaniline	100-01-6	50	1600
78. 4,6-Dinitro-2-methylphenol	534-52-1	50	1600
79. N-nitrosodiphenylamine	86-30-6	10	330
80. 4-Bromophenyl-phenylether	101-55-3	10	330
81. Hexachlorobenzene	118-74-1	10	330
82. Pentachlorophenol	87-86-5	50	1600
83. Phenanthrene	85-01-8	10	330
84. Anthracene	120-12-7	10	330
85. Di-n-butylphthalate	84-74-2	10	330
86. Fluoranthene	206-44-0	10	330
87. Pyrene	129-00-0	10	330
88. Butyl Benzyl Phthalate	85-68-7	10	330
89. 3,3-Dichlorobenzidine	91-94-1	20	660
90. Benzo(a)anthracene	56-55-3	10	330

TABLE 1 (Continued)

## TCL/TAL ANALYTES

Semivolatiles	CAS Number	Quantitation Limits**		
		Water ( $\mu\text{g/L}$ )	Low Soil/Sediment <sup>b</sup> ( $\mu\text{g/Kg}$ )	
91.	Chrysene	218-01-9	10	330
92.	bis(2-Ethylhexyl)phthalate	117-81-7	10	330
93.	Di-n-octylphthalate	117-84-0	10	330
94.	Benzo(b)fluoranthene	205-99-2	10	330
95.	Benzo(k)fluoranthene	207-08-9	10	330
96.	Benzo(a)pyrene	50-32-8	10	330
97.	Ideno(1,2,2-cd)pyrene	193-39-5	10	330
98.	Dibenz(a,h)anthracene	53-70-3	10	330
99.	Benzo(g,h,i)perylene	191-24-2	10	330
100.	alpha-BHC	319-84-6	0.05	8.0
101.	beta-BHC	319-85-7	0.05	8.0
102.	delta-BHC	319-86-8	0.05	8.0
103.	gamma-BHC(Lindane)	58-89-9	0.05	8.0
104.	Heptachlor	76-44-8	0.05	8.0
105.	Aldrin	309-00-2	0.05	8.0
106.	Heptachlor Epoxide	1024-57-3	0.05	8.0
107.	Endosulfan I	959-98-8	0.05	8.0
108.	Dieldrin	60-57-1	0.10	16.0
109.	4,4'-DDE	72-55-9	0.10	16.0
110.	Endrin	72-20-8	0.10	16.0
111.	Endosulfan II	33213-65-9	0.10	16.0
112.	4,4'-DDD	75-54-8	0.10	16.0
113.	Endosulfan Sulfate	1031-07-8	0.10	16.0
114.	4,4'-DDT	50-29-3	0.10	16.0
115.	Methoxychlor	72-43-5	0.5	80.0
116.	Endrin ketone	53494-70-5	0.10	16.0
117.	alpha-Chlordane	5103-71-9	0.5	80.0
118.	gamma-Chlordane	5103-74-2	0.5	80.0
119.	Toxaphene	8001-35-2	1.0	160.0
120.	Aroclor-1061	12674-11-2	0.5	80.0
121.	Aroclor-1221	11104-28-2	0.5	80.0
122.	Aroclor-1232	11141-16-5	80.0	
123.	Aroclor-1242	53469-21-9	80.0	
124.	Aroclor-1248	12672-29-6	80.0	
125.	Aroclor-1254	11097-69-1	1.0	160.0
126.	Aroclor-1260	11096-82-5	1.0	160.0

## TARGET ANALYTE LIST (TAL) METALS

Analyte	Contract Required Detection Limits*	
	Water ( $\mu\text{g/l}$ )	Soil (mg/kg)
Aluminum	200	20
Antimony	60	6.0
Arsenic	10	1.0
Barium	200	20
Beryllium	5	0.5
Cadmium	5	0.5
Calcium	5000	500
Chromium	10	1.0
Cobalt	50	0.5
Copper	25	2.5
Iron	100	10
Lead	3	0.5
Magnesium	5000	500
Manganese	15	1.5
Mercury	0.2	0.1
Nickel	40	4.0
Potassium	5000	500
Selenium	5	0.5
Silver	10	1.0
Sodium	5000	500
Thallium	10	1.0
Vanadium	50	5.0
Zinc	20	2.0

- <sup>a</sup> Medium Soil/Sediment quantitation limits for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment instrument detection limits.
- <sup>b</sup> Medium Soil/Sediment quantitation limits for Semivolatile TCL Compounds are 15 times the individual Low Soil/Sediment quantitation limit.
- <sup>c</sup> Medium Soil/Sediment quantitation limits for Pesticide/PCB TCL Compounds are 15 times the individual Low Soil/Sediment quantitation limit.
- \* Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.
- \*\* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis are required by the contract, will be higher.

Source: Statement of Work for Organic Analysis Multi-Media Multi-Concentration  
SOW 2/88, Revisions, 9/88, 4/89, and 5/89, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., May 1989.

TABLE 2

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
69	Acenaphthene	83-32-9	200
66	Acenaphthylene	208-96-8	10
6	Acetone	67-64-1	200
	Acetophenone	98-86-2	100
	Acetonitrile; MethylCyanide	75-05-8	100
	2-Acetylaminofluorene; 2-AAF	53-96-3	10
	Acrolein	107-02-8	5
	Acrylonitrile	107-13-1	5
105	Aldrin	309-00-2	0.05
	Allyl Chloride	107-05-1	5
	4-Aminobiphenyl	92-67-1	10
	Aniline	62-53-3	10
84	Anthracene	120-12-7	200
M	Antimony	(Total)	300
	Aramite	140-57-8	10
M	Arsenic	(Total)	500
M	Barium	(Total)	20
23	Benzene	71-43-2	2
90	Benzo(a)anthracene; Benzantracene	56-55-3	200
94	Benzo(b)fluoranthene	205-99-2	200
95	Benzo(k)fluoranthene	207-08-9	200
99	Benzo(g,h,i)perylene	191-24-2	200
96	Benzo(a)pyrene	50-32-8	200
40	Benzyl Alcohol	100-51-6	20
M	Beryllium	(Total)	3
100	alpha-BHC	319-84-6	0.05
101	beta-BHC	319-85-7	0.05
102	delta-BHC	319-86-6	0.1
103	gamma-BHC; Lindane	58-89-9	0.05
52	Bis(2-chloroethoxy)methane	111-91-1	10
36	Bis(2-chloroethyl)ether	111-44-4	10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
	Bis(2-chloromethylethyl)ether; 2,2'-Dichlorodiisopropyl ether	108-60-1	100
92	Bis(2-ethylhexyl)phthalate	117-81-7	20
17	Bromodichloromethane	75-27-4	1
25	Bromoform; Tribromomethane	75-25-2	2
80	4-Bromophenyl phenyl ether	101-55-3	5
88	Buty benzyl phthalate; Benxyl butyl phthalate	85-68-7	10
M	Cadmium	(Total)	40
7	Carbon Disulfide	75-5-0	5
15	Carbon Tetrachloride Chlordane	56-23-5 57-74-9	1 0.1
56	p-Chloroaniline	106-47-8	20
31	Chlorobenzilate Chlorobenzilate	108-90-7 510-15-6	2 10
58	p-Chloro-m-cresol	59-50-7	5
4	Chloroethane; Ethyl Chloride	75-00-3	5
11	Chloroform	67-66-3	0.5
63	2-Chloroanphthalene	91-58-7	10
37	2-Chlorophenol	95-57-8	5
75	4-Chlorophenyl phenyl ether Cnloroprene	7005-72-3 126-99	10 50
M	Chromium	(Total)	70
91	Chrysene	218-01-9	200
M	Cobalt	(Total)	70
M	Copper m-Cresol	(Total) 108-39-4	10 10
42	o-Cresol	95-48-7	10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
44	p-Cresol	106-44-5	10
	Cyanide	57-12-5	40
	2,4-D' 2,4-Dichlorophenoxyacetic acid	94-75-7	10
112	4,4'-DDD	72-54-8	0.1
109	4,4'-DDE	72-55-9	0.005
114	4,4'-DDT	50-29-3	0.1
	Diallate	2303-64-9	10
98	Dibenz(a,h)anthracene	53-70-3	200
72	Dibenzofuran	132-64-9	10
21	Dibromochloromethane;		
	1,2-Dibromo-3-chloropropane	124-48-1	1
	DBCP	96-12-8	100
	1,2-Dibromoethane; Ethylene dibromide	106-93-4	10 5
85	Di-n-butyl phthalate	84-74-2	5
41	o-Dichlorobenzene	95-50-1	2
38	m-Dichlorobenzene	541-73-1	5
39	p-Dichlorobenzene	106-46-7	2
89	3,3'-Dichlorobenzidine	91-94-1	20
	trans-1,4-Dichloro-2-butene	110-57-6	5
	Dichlorodifluoromethane	75-34-3	10
9	1,1-Dichloroethane	75-34-3	1
12	1,2-Dichloroethane; Ethylene dichloride	107-06-2	0.5
8	1,1-Dichloroethylene;		
	Vinylidene chloride trans-1,2-Dichloroethylene	75-35-4 156-60-5	1 1
53	2,4-Dichlorophenol	120-83-2	5
	2,6-Dichlorophenol	87-65-0	10
18	1,2-Dichloropropane	78-87-5	0.5
19	cis-1,3-Dichloropropane	10061-01-5	20
24	trans-1,3-Dichloropropene	10061-02-6	5
108	Dieldrin	60-57-1	0.05

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
74	Diethyl phthalate	84-66-2	5
	O,O-Diethyl O-2,pyranziny phosphorothioate; Thionazin	297-97-2	10
	Dimethoate	60-51-5	10
	p-(Dimethylamino)azobenzene	60-11-7	10
	7,12-Dimehtylbenz(a)anthracene	57-97-6	10
	3-3'-Dimethylbenzidine	119-93-7	10
	alpha, alpha-Dicmehtylphenethylamine	122-09-8	10
50	2,4-Dimethyphenol	105-67-9	5
65	Dimethyl phthalate	131-11-3	5
	m-Dinitrobenzene	99-65-0	10
78	4,6-Dinitro-o-cresol	534-52-1	150
70	2,4-Dinitrophenol	51-28-5	150
73	2,4-Dinitrotoluene	121-14-2	0.2
67	2,6-Dinitrotoluene	606-20-2	10
	Dinoseb; DNBP; 2-sec-Butyl-4,6- dinitrophenol	88-85-7	1 10
93	Di-n-octyl phthalate	117-84-0	30 10
	1,4-Dioxane	123-91-1	150
	Diphenylamine	122-39-4	10
	Disulfoton	298-04-4	2 10
107	Endosulfan I	959-98-8	0.1
			10
111	Endosulfan II	33213-65-9	0.05
113	Endosulfan Sulfate	1031-07-8	0.5
			10
110	Endrin	72-20-8	0.1 10
	Endrin Aldehyde	7421-93-4	0.2
			10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
32	Ethylbenzene	100-41-4	2
			5
	Ethyl Methacrylate	97-63-2	10
			5
	Ethyl Methanesulfonate	62-50-0	10
	Famphur	52-85-7	10
86	Fluoranthene	206-44-0	200
			10
76	Fluorene	86-73-7	200
			10
104	Heptachlor	76-44-8	0.05
			10
106	Heptachlor Epoxide	1024-57-3	1
			10
81	Hexachlorobenzene	118-74-1	0.5
			10
57	Hexachlorobutadiene	87-68-3	5
			10
60	Hexachlorocyclopentadiene	77-47-4	5
			10
46	Hexachloroethane	67-72-1	0.5
			10
	Hexachlorophene	70-30-4	10
	Hexachloropropene	188-71-7	10
27	2-Hexanone	591-78-6	50
97	Ideno(1,2,3-od)pyrene	193-39-5	200
			10
	Isobutyl Alcohol	78-83-1	50
	Isodrin	465-73-6	10
48	Isophorone	78-69-1	60
	Isosafroie	120-58-1	10
	Kepone	143-50-0	10
M	Lead	(Total)	40
			1,000
			10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
M	Mercury	(Total)	2
	Methacrylonitrile	126-98-7	5
	Methapyrilene	91-80-5	10
115	Methoxychlor	72-43-5	2 10
2	Methyl bromide (Bromomethane)	74-83-9	20 10
1	Methyl chloride (Chloromethane)	74-87-9	1 10
	3-Methylcholanthrene	58-49-5	10
	Methylene bromide (Dibromomethane)	74-95-3	15
			5
5	Methylene chloride (Dichloromethane)	75-09-2	5 5
	Methyl ethyl ketone; MEK	78-93-3	10 100
	Methyl Iodide (Iodomethane)	74-88-4	40
	Methyl methacrylate	80-62-6	5 2
	Methyl methanesulfonate	66-27-3	5 10
59	2-Methylnaphthalene	91-67-8	10
	Methyl parathion; Parathion methyl	298-00-0	0.5 10
26	4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	5 50
55	Naphthalene	91-20-3	200 10
	1,4-Naphthoquinone	130-15-4	10
	1-Naphthylamine	134-32-7	10
	2-Naphthylamine	91-59-8	10
M	Nickel	(Total)	50
			400
64	o-Nitroaniline	88-74-4	50
68	m-Nitroaniline	99-09-2	50
77	p-Nitroaniline	100-01-6	50

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
47	Nitrobenzene	98-95-3	40 10
49	o-Nitrophenol	88-75-5	5 10
71	p-Nitrophenol	100-02-7	10 50
	4-Nitroquinoline-1-oxide	56-57-5	10
	N-Nitrosodi-n-butylamine	924-16-3	10
	N-Nitrosodiethylamine	55-18-5	10
	N-Nitrosodimethylamine	62-75-9	10
79	N-Nitrosodiphenylamine	86-30-6	10
45	N-Nitrosodipropylamine; Di-n-propyl-nitrosamine	521-64-7	10
	N-Nitrosomethylethylamine	10595-95-6	10
	N-Nitrosomorpholine	59-89-2	10
	N-Nitrosopiperidine	100-75-4	10
	N-Nitrosopyrrolidine	930-55-2	10
	5-Nitro-o-toluidine	99-55-8	10
	Parathion	56-38-2	10
	Polychlorinated biphenyls: PCBs	Note 7	50 100
	Polychlorinated dibenzo-p-dioxins; PCDDs	Note 8	0.01
	Polychlorinated dibenzofurans; PCDFs	Note 9	0.01
	Pentachlorobenzene	608-93-5	10
	Pentachloroethane	76-01-7	5 10
	Pentachloronitrobenzene	82-68-8	10
82	Pentachlorophenol	87-86-5	5 50
	Phenacetin	62-44-2	10
83	Phenanthrene	85-01-8	200 10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
35	Phenol	108-95-2	1
			10
	p-Phenylenedizmine	106-50-3	10
	Phorate	298-02-2	5
			10
	2-Picoline	109-06-8	5
			10
	Pronamide Propionitrile; Ethyl cyanide	23950-58-5 107-12-0	10 60
		5	
87	Pyrene	129-00-0	200
			10
	Pyridine	110-86-1	5
		10	
	Safrole	94-59-7	10
M	Selenium	(Total)	750
			20
			20
M	Silver	(Total)	70
			100
	Silvex; 2,4,5-TP	93-72-1	2
33	Styrene	100-42-5	1
			5
	Sulfide	18496-25-8	10,000
	2,4,5-T; 2,4,5-Trichlorophenol-xyacetic acid	93-76-5	2
	2,3,7,8-TCDD; 2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	0.005
	1,2,4,5-Tetrachlorobenzene	95-94-3	10
			5
	1,1,1,2-Tetrachloroethane	630-20-5	5
			5
30	1,1,2,2-Tetrachloroethane	79-34-5	0.5
			5
28	Tetrachloroethylene; Perchloroethylene;	127-18-4	0.5
	Tetrachlorothene		5
	2,3,4,6-Tetrachlorophenol	58-90-2	10
	Tetraethyl dithiopyrophosphate; Sulfotepp	3689-24-5	10

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

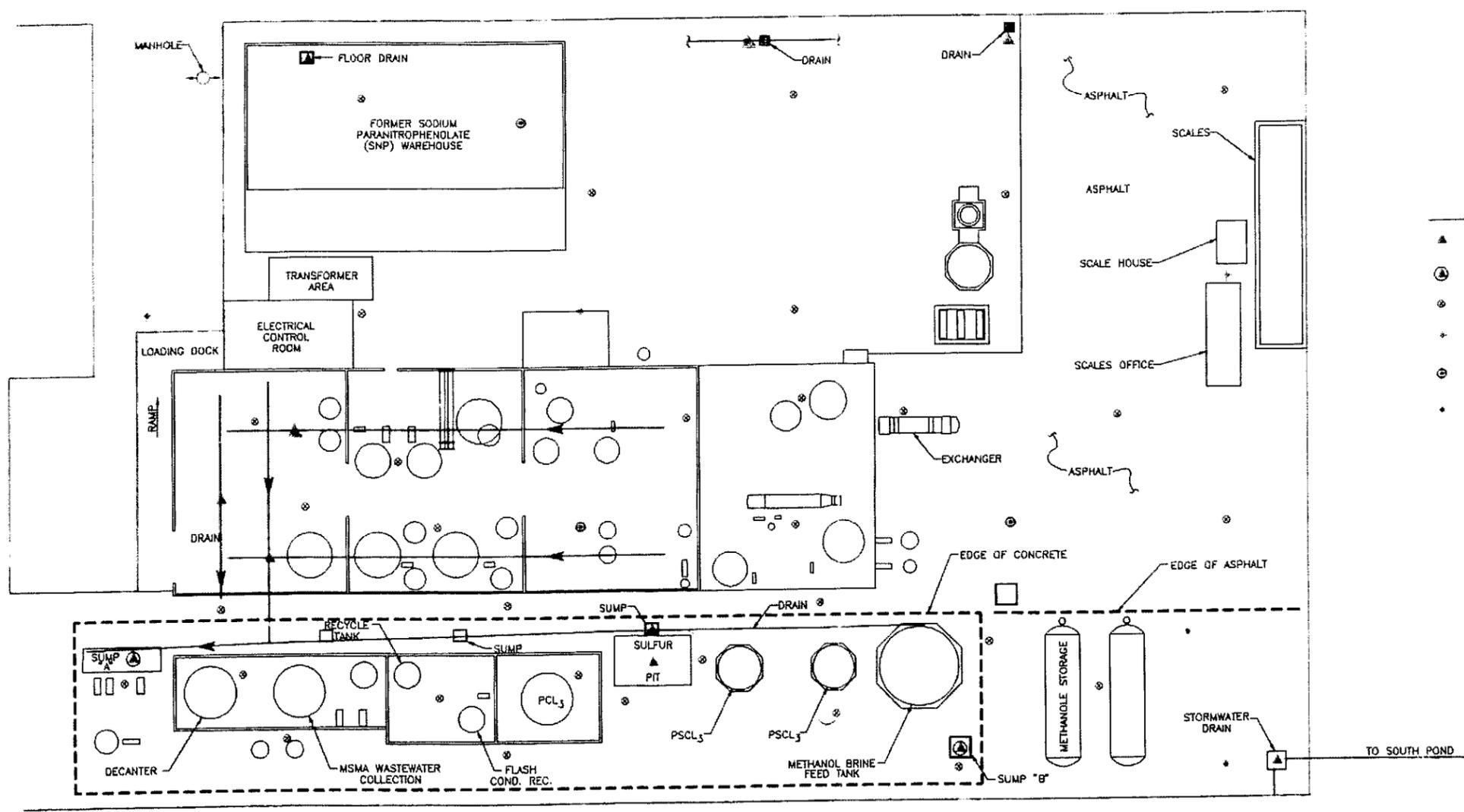
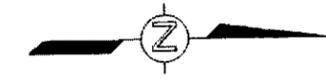
Cross-Reference Number from TCL Table 1 or M for TAL	Common Name <sup>2</sup>	Number	PQL ( $\mu\text{g/L}$ ) <sup>6</sup>
M	Thallium	(Total)	400 1,000 10
	Tin	(Total)	8,000
29	Toluene	108-88-3	2 5
	<i>o</i> -Toluidine	95-53-4	10
119	Toxaphene	8001-35-2	2 10
54	1,2,4-Trichlorobenzene	120-82-1	10
14	1,1,1-Trichloroethane; Methylchloroform	71-55-8	5
22	1,1,2-Trichloroethane	79-00-5	0.2 5
20	Trichloroethylene; Trichloroethene	79-01-6	1 5
	Trichlorofluoromethane	75-69-4	10 5
62	2,4,5-Trichlorophenol	95-95-4	10
61	2,4,6-Trichlorophenol	88-06-2	5 10
	1,2,3-Trichloropropane	96-18-4	10 5
	O,O,O-Triethyl phosphorothioate	126-68-1	10
	sym-Trinitrobenzene	99-35-4	10
M	Vanadium	(Total)	80 2,000 40
16	Vinyl acetate	108-05-4	5
3	Vinyl chloride	75-01-4	2 10
34	Xylene (total)	1330-20-7	5 5
M	Zinc	(Total)	20 50

TABLE 2 (Continued)

## APPENDIX IX - GROUND WATER MONITORING LIST

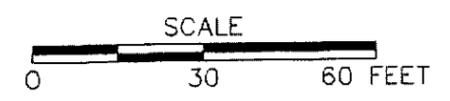
- <sup>1</sup> The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.
- <sup>2</sup> Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.
- <sup>3</sup> Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.
- <sup>4</sup> CAS index names are those used in the 9th Cumulative Index.
- <sup>5</sup> Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste", third edition, November 1986. Analytical details can be found in SW-846 and in documentaiton on file at the agency. CAUTION: The methods listed are representative SW-846 procedures adn may not always be the most suitable method(s) for monitoring an analyte under the regulations.
- <sup>6</sup> Practical Quantitation Limits (PQLs) are the lowest concentrations in groundwaters that can be reliably determined within specified limits of precision and accuracy by teh indicated methods under routine laboratory operation conditions. The PQLs listed are generally stated to one significant figure. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.
- <sup>7</sup> Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor-1016 (CAS RN 12674-11-2); Aroclor-1221 (CAS RN 11104-28-4), Aroclor-1232 (CAS RN 11141-16-5); Aroclor -1242 (CAS RN 53469-21-9), Aroclor-1248 (CAS RN 12672-29-6), Aroclor-1254 (CAS RN 11097-6-1), and Aroclor-1260 (CAS RN 11-96-82-5). The PQL shown is an average value for PCB congeners.
- <sup>8</sup> This category contains congener chemicals, including tetrachlorodibenzo-p-dioxins (see also 2,3,7,9-TCDD), pentachlorodibenzo-p-dioxins, and hexachlorodibenzo-p-dioxins. The PQL shown is an average for PCDD congeners.
- <sup>9</sup> This category contains congener chemicals, including tetrachlorobenzofurand, pentachlorodibenzofurans, and hexachlorodibenzofurans. The PQL shown in an average value for PCDF congeners.

**FIGURES**



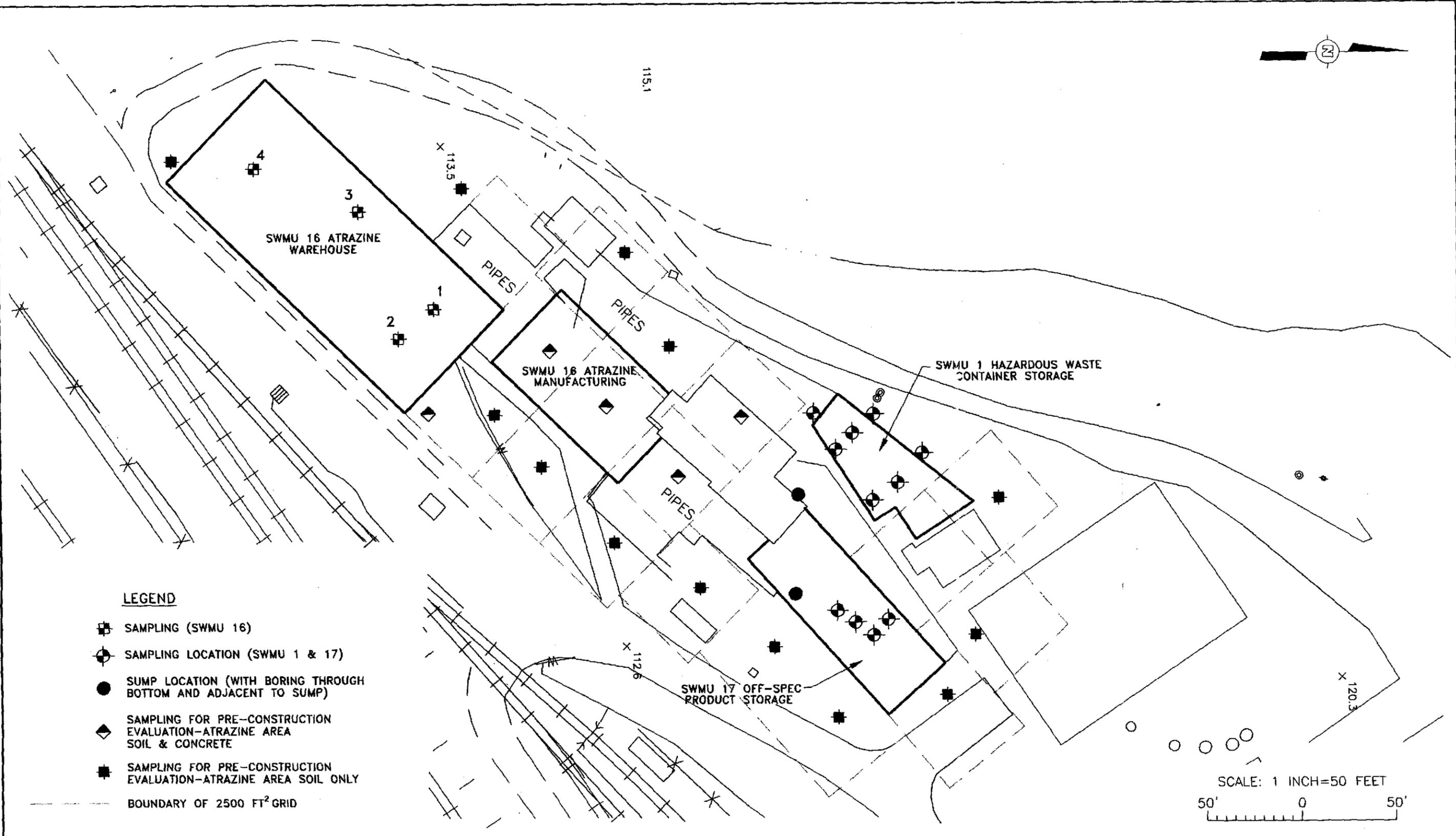
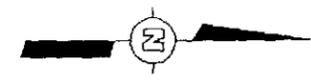
**LEGEND**

- ▲ SLUDGE/SEDIMENT SAMPLE LOCATION (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB)
- ⊙ WATER SAMPLE LOCATION (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB)
- ⊛ SOIL SAMPLE LOCATION (ARSENIC ONLY)
- ⊕ CONCRETE AND SOIL SAMPLE - MATRIX SAMPLING (ARSENIC ONLY)
- ⊙ CONCRETE SAMPLE AND SOIL SAMPLE REQUIRED BY PROPOSED RFI WORKPLAN (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB)
- SOIL SAMPLE-RFI WORKPLAN (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB)



<b>VICKSBURG CHEMICAL</b> VICKSBURG, MISSISSIPPI			
SCALE:	DRAWN BY: A. LUQUET	DATE: 9-4-96	
	CHKD. BY: JH	DATE: 9/6/96	
PROJECT NO. <b>WCC 96B3 15P</b>	CAD FILE	THIFIG01.DWG	
SWMUS 11,12,15 RFI/EXPANDED INVESTIGATION			FIGURE <b>2</b>

R.M. 08/16/1996 15:47 L:\VICKSBURG\THIFIG01



**LEGEND**

- SAMPLING (SWMU 16)
- SAMPLING LOCATION (SWMU 1 & 17)
- SUMP LOCATION (WITH BORING THROUGH BOTTOM AND ADJACENT TO SUMP)
- ◆ SAMPLING FOR PRE-CONSTRUCTION EVALUATION-ATRAZINE AREA SOIL & CONCRETE
- SAMPLING FOR PRE-CONSTRUCTION EVALUATION-ATRAZINE AREA SOIL ONLY
- - - BOUNDARY OF 2500 FT<sup>2</sup> GRID

SCALE: 1 INCH=50 FEET  
 50' 0 50'

K:\CAD\92B007\92B007B Thu Jan 16 08:56:35 1997

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL  
 VICKSBURG, MISSISSIPPI

**Woodward-Clyde Consultants**  
 Engineering & sciences applied to the earth & its environment  
 2822 O'Neal Lane  
 Baton Rouge, Louisiana 70816

SCALE	AS SHOWN
DESIGNED	
DRAWN	PCG
CHECKED	
PAPER REVIEWED	
DATE	1/15/97

SUMU 16, 1, AND 17  
 SAMPLE AREA LOCATIONS

REVISION	
PROJECT	92B007C-10
DRAWING	3

**HEALTH AND SAFETY PLAN**

**HEALTH AND SAFETY PLAN**

**VICKSBURG CHEMICAL CORPORATION  
VICKSBURG, MISSISSIPPI**

October 1993

**Woodward-Clyde Consultants** 

Consulting Engineers, Geologists, and Environmental Scientists  
2822 O'Neal Lane, Baton Rouge, LA 70896

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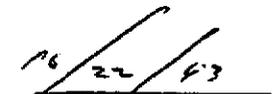
HEALTH AND SAFETY PLAN

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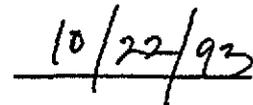
Client: Vickburg Chemical Corporation  
Project: RFI Field Investigation, Groundwater Assessment, and Interim Measures  
Project Manager: Richard D. Karkkainen  
Project Number: 92B007C  
Date of Plan: Revised October 22, 1993  
Estimated Dates of Work: North Pond, October 25, 1993 through November 5, 1993, Additional Pending EPA and MSDEQ  
Expiration Date: Pending EPA and MSDEQ

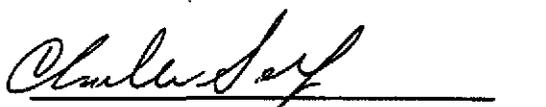
1.1 HEALTH AND SAFETY PLAN APPROVALS

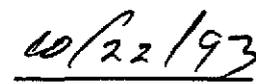
  
Richard D. Karkkainen  
Project Manager  
(504) 751-1873

  
Date

  
Tanya Pawley  
Health and Safety Officer  
Baton Rouge Business Unit  
(318) 439-2683

  
Date

  
Charles Self, C. I. H.  
Corporate Health and Safety Officer  
(318) 439-2683

  
Date

- To have an approved Health and Safety Plan prepared and properly implemented for this project.
- To provide the Business Unit Health and Safety Officer with project information related to health and safety matters and development of the Health and Safety Plan.
- To implement the Health and Safety Plan.
- To insure compliance with the Health and Safety Plan by WCC and contractor personnel.
- To coordinate with the Business Unit Health and Safety Officer on health and safety matters.

The Project Manager has the authority to take the following actions:

- To determine matters relating to schedule, cost, and personnel assignments on hazardous waste management projects.
- To temporarily suspend field activities, if the health and safety of personnel are endangered, pending further consideration by the Business Unit Health and Safety Officer.
- To temporarily suspend an individual from field activities for infractions of Health and Safety Plan, pending further consideration by the Business Unit Health and Safety Officer.

Health and Safety Officer: Tanya Pawley

The Health and Safety Officer has the following responsibilities:

- To interface with the Project Manager as may be required in matters of health and safety.

- To assist the Project Manager in all aspects of implementing the Health and Safety Plan.
- To maintain health and safety equipment on-site, as specified in Health and Safety Plan.
- To perform health and safety activities on-site, as specified in the Health and Safety Plan, and report results to the Project Manager and the Business Unit Health and Safety Officer.

The SSO has the authority to take the following actions:

- To temporarily suspend field activities, if the health and safety of personnel are endangered, pending further consideration by the Business Unit Health and Safety Officer.
- To temporarily suspend an individual from field activities for infractions of the Health and Safety Plan, pending further consideration by the Business Unit Health and Safety Officer.

WCC Corporate Health and Safety Officer: Charles Self

The WCC CHSO has the following responsibilities:

- Direct the implementation of the Health and Safety Program of the operating group and provide recommendations for improvement of the program.
- Coordinate health and safety activities of the operating units in the operating group.
- Determine need for project Health and Safety Plans.
- Review and approve Health and Safety Plans.

## **2.2 SITE LOCATION**

Vicksburg Chemical Corporation (VCC) is located less than a mile south of Interstate 20 bordering the City of Vicksburg, Mississippi. To the north and west of the site is light residential properties. To the East of the site is light industrial properties including the Vicksburg water treatment facility and an asphalt mixing and gravel drying operation. To the South of the site is light residential to rural properties.

## **2.3 SITE DESCRIPTION**

VCC is located off Highway 61 on Rifle Range Road. The facility is comprised of a North Plant and a South Plant and occupies approximately 640 acres. Currently, the only active areas of the plant include the nitric acid and potassium nitrate plants. All other portion of the plant are no longer in operation. Resources such as a potable water supply, electricity, and telephone service are available at the plant office located at the facility entrance on Rifle Range Road. Chemical on-site relative to the aforementioned active plants include anhydrous ammonia, nitric acid, potassium chloride, chlorine, and occasional nitrogen tetroxide, and nitrogen dioxide. Chemical on-site related to past production activities include atrazine, dinoseb, methyl parathion, monosodium methane arsenate (MSMA), and toxaphene. Other chemicals that have been detected on-site include carbon tetrachloride, chloroform, 1,1-dichloroethylene, ethylbenzene, methylene chloride, toluene, and xylene.

The work sites concerning this plan are associated with the South and North Plants (Figure 1) and include several Solid Waste Management Units (SWMUs) and Other Areas of Concern (OACs).

## **2.4 SITE HISTORY**

In the past, VCC produced various types of pesticides and herbicides such as dinoseb, toxaphene, atrazine, and monosodium methane arsenate. All of these chemicals have been detected in the soil and water by VCC and the state of Mississippi. Concentrations range from less than extractable products on hazardous wastes to an average of about 5 part per million (ppm). Chlorinated solvents have been detected in

**PURPOSE AND SCOPE OF PROPOSED WORK**

---

WCC will perform work as required in a Consent Decree effective April 17, 1992. This Consent Decree requires Interim Measures activities, a Groundwater Assessment Program, and a RCRA Facility Investigation be conducted at the facility. These three workplans require geophysical borings, monitor well sampling and installation, subsurface soil sampling, and surface soil sampling. Some construction in conjunction with sump closure may be included in the Interim Measures activities.

#### 4.4 CHEMICAL HAZARDS

Due to past production activities at the facility, pesticides, herbicides, chlorinated solvents, and volatile organic solvents have been detected on-site during site characterization efforts conducted by VCC and the state of Mississippi. The constituents detected included dinoseb, toxaphene, atrazine, carbon tetrachloride, methylene chloride, chloroform, 1,1-dichloroethylene, xylene, toluene, and ethylbenzene at concentration report in the parts per million range. Of the constituents detected on-site, carbon tetrachloride, methylene chloride, and chloroform are classified by OSHA and/or ACGIH as known or suspected human carcinogens.

The constituents detected on-site are present in low concentrations. However, exposure to these chemicals may potentially occur through inhalation, ingestion, and/or direct contact. Chemical exposure via multiple exposure pathways is cumulative, therefore it is important to recognize potential exposure situations and to take precautions to minimize exposure to chemical hazards by all routes.

The following potential exposure routes and associated health hazards have been identified:

Inhalation: Chemical hazards associated with inhalation exposures may include irritation of the mucous membranes and respiratory tract or with more severe exposures, may include systemic effects. Table 1 presents recommended exposure limits for potential airborne constituents.

Ingestion. Ingestion of chemical will be controlled on-site by prohibiting eating, smoking, or drinking in the Exclusion Zone and by requiring all field personnel to conduct decontamination procedures prior to leaving the Exclusion Zone.

Direct Contact: Skin and eye contact with chemical hazards may potentially result in irritation, rashes, or burns. If a person should exhibit symptoms of eye or skin irritation, he/she should report to the SSO for immediate medical attention.

Constituent	ACGIH TWA	OSHA PEL-TWA	STEL	IDLH
+ Toxaphene	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	200 mg/m <sup>3</sup>
Atrazine	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	--	--
+ Carbon Tetrachloride	5 ppm	2 ppm	--	Ca
Methylene Chloride	50 ppm	500 ppm	--	Ca
Chloroform	10 ppm	2 ppm	--	Ca
Xylene	100 ppm	100 ppm	150 ppm	1000 ppm
Toluene	100 ppm	100 ppm	150 ppm	2000 ppm
Ethylbenzene	100 ppm	100 ppm	125 ppm	2000 ppm
Lime Kiln Dust	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	--	--
Ammonia	25 ppm	50 ppm	35 ppm	500 ppm

- + Potential Skin Irritant
- Ca Potential Human Carcinogen (Cancer Causing);
- No IDLH level established.

Tyvek coveralls will be discarded after each use or when they become worn or punctured. Suit materials are resistant to all known or anticipated chemicals at the site. If the disposable protective suits appear to be deteriorating under chemical action, the Site Safety Officer should be notified.

In addition to the personal protective equipment listed above, general safety equipment available for use will include a first aid kit, portable eye wash and fire extinguisher.

## 5.2 WORK ZONES

During activities conducted in Modified Level D PPE, management of this project shall be conducted in such a manner which will restrict access to the job site by unauthorized personnel. If Level D action levels established in Table 2 are exceeded resulting in an upgrade to Level C PPE, work zones as described in the following paragraphs shall be implemented.

To minimize the movement of contaminants from the site to uncontaminated areas, three work zones will be set up during activities conducted under Level C PPE. The three work zones will include the following:

- Zone 1: Exclusion Zone
- Zone 2: Contamination Reduction Zone
- Zone 3: Support Zone

The exclusion zone is the zone where contamination does or could occur. Observations by the site safety officer will determine the extent of the zones. All persons entering this zone must wear at a minimum the level of protection set forth in Section 5.1 (Level C PPE).

Between the exclusion zone and support zone is the personnel contamination reduction zone (CRZ) which provides a transition zone between the contaminated and clean areas of the site. This zone will be located directly outside of the exclusion zone and will be defined as 10-foot zone directly outside the exclusion zone.

Decontamination of equipment shall be conducted in Modified Level D PPE as listed in Section 5.1. While utilizing methanol for decontaminating equipment, personnel shall position themselves upwind of decontamination operations to minimize inhalation exposures to methanol vapors. If this is not feasible, respiratory protection as listed under level C PPE in Section 5.1 shall be worn during methanol use.

### **5.3.2 Personnel Decontamination**

Decontamination of personnel will be performed at a designated location at the perimeter of the work area. Decontamination will consist primarily of soap and water washings and water rinse of exterior protective gear to remove contaminants, followed by doffing of the gear.

Coveralls should be removed by turning the clothing inside out. A general sequence of doffing procedures is outlined below. The extent of washing required, or modifications to the sequence, may be specified as appropriate.

Personnel will be decontaminated by the following procedure:

- Wash and rinse outer protective coverall
- Wash work gloves and boots
- Remove outer protective clothing
- Rinse respirator if worn
- Wash hands and face

Contaminated disposable PPE and all decontamination fluids shall be containerized on-site for subsequent disposal by the direction of VCC.

### **5.4 MEDICAL EXAMINATION**

Before commencing any of the field or laboratory activities defined in Section 3.0, all WCC personnel and all WCC subcontractors must take an annual WCC-approved medical examination as part of WCC's medical surveillance program.

A project safety log will be used to record the names, entry and exit dates and times of all WCC and subcontractor personnel and of project site visitors; accidents, injuries, and illnesses; incidence of safety infractions by field personnel; air quality and personal exposure monitoring data; and other information related to safety matters. All accidents, illnesses or other incidence shall be reported immediately to the WCC Project Manager, and the WCC Baton Rouge Health and Safety Officer and subsequently documented for filing on the *HS-502 Incident Report Form*.

**5.9 PROHIBITIONS**

- Smoking, eating, drinking, chewing gum or tobacco, storing food or food containers shall not be permitted on the work site. Good personal hygiene should be practiced by field personnel to avoid ingestion of contaminants or spread of contaminated materials.
- Ignition of flammable liquids within, on, or through improvised heating devices or space heaters.
- Approach or entry into areas or spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment available to enable safety entry.
- Conduct of on-site operations without off-site back up personnel.

**5.10 SITE SAFETY MEETINGS**

During all site characterization activities, daily safety meetings will be held by the site safety officer to review and plan the specific health and safety aspects of scheduled work for that day.

**PERSONAL PROTECTIVE EQUIPMENT**

---

This section outlines the general usage guidelines for personal protective equipment.

**7.1 HEAD PROTECTION**

Hard hats must be worn by all personnel working on-site.

**7.2 EYE PROTECTION**

Safety glasses with side shields or goggles must be worn by all personnel performing activities where potential for eye or face exposure exists due to splash, dust, or vapor, etc. An eyewash station will be set up by the site safety officer prior to commencing field activities and should be placed so that it could be used quickly in an emergency.

**7.3 SKIN PROTECTION**

Due to the potential for skin absorption and carcinogenic properties chemical resistant gloves and coveralls shall be worn by all personnel during subsurface and sample handling activities. These will be disposed of in a designated sealable drum after each use of when they become worn or punctured.

**7.4 FOOTWEAR**

Chemical-resistant boots with steel toes and shanks will be worn by field personnel engaged in the field activities at the site. Chemical-resistant booties can be substituted for chemical resistant boots, although work boots to be covered must always maintain steel toes and shanks.

**AIR QUALITY MONITORING**

---

The primary goal of on-site air quality monitoring will be compliance with the specified contaminant action levels. The secondary goal will be documentation of personal exposures as required by OSHA 1920.120.

**8.1 AIR QUALITY SURVEY**

During modified Level D field activities at the site, an air quality survey will be performed utilizing an HNu-photoionization detector (PID) equipped with an 11.7 eV probe, or equivalent instrument to characterize volatile organics and ammonia concentrations on-site. Standard operating procedures for this instrument are attached as Appendix E. During Level C field activities, additional sampling utilizing colorimetric tubes specific for detecting chloroform, methylene chloride, and carbon tetrachloride will be used along with the HNu for total organic vapors. At least two sampling events utilizing each of these tubes will be conducted in the breathing zone of personnel closest to the subsurface activities at the site. Table 2 lists air monitoring action levels for Level D and C work.

**EMERGENCIES/ACCIDENTS**

---

A site map and direction to Vicksburg Hospital are included in Figure 1. Illnesses, injuries, and accidents occurring on-site must be attended to immediately in the following manner:

- Remove the injured or exposed person(s) from immediate danger.
- Render FIRST AID if necessary. Decontaminate affected personnel, if necessary.
- Call ambulance for transport to local. This procedure should be followed even if there is no apparent serious injury. Emergency numbers are listed on the following section.
- Evacuate other personnel on-site to a safe place until the engineer (assisted by the Site Safety Officer) determines that it is safe for work to resume.
- Report the accident to the Health and Safety Officer immediately.
- Develop procedures, in accordance with the Health and Safety Officer, Site Safety Officer, and Project Manager to prevent a recurrence.

In the event that an emergency site evacuation should be necessary for any reason, the Site Safety Officer will render an alarm using a horn and all personnel shall leave the site. The assembly point will be designated in the filed. Personnel will not return to the site until an all-clear has been received from the Site Safety Officer

**PERSONNEL ASSIGNMENTS**

---

WCC personnel and subcontractors authorized to work on this project and enter the site are:

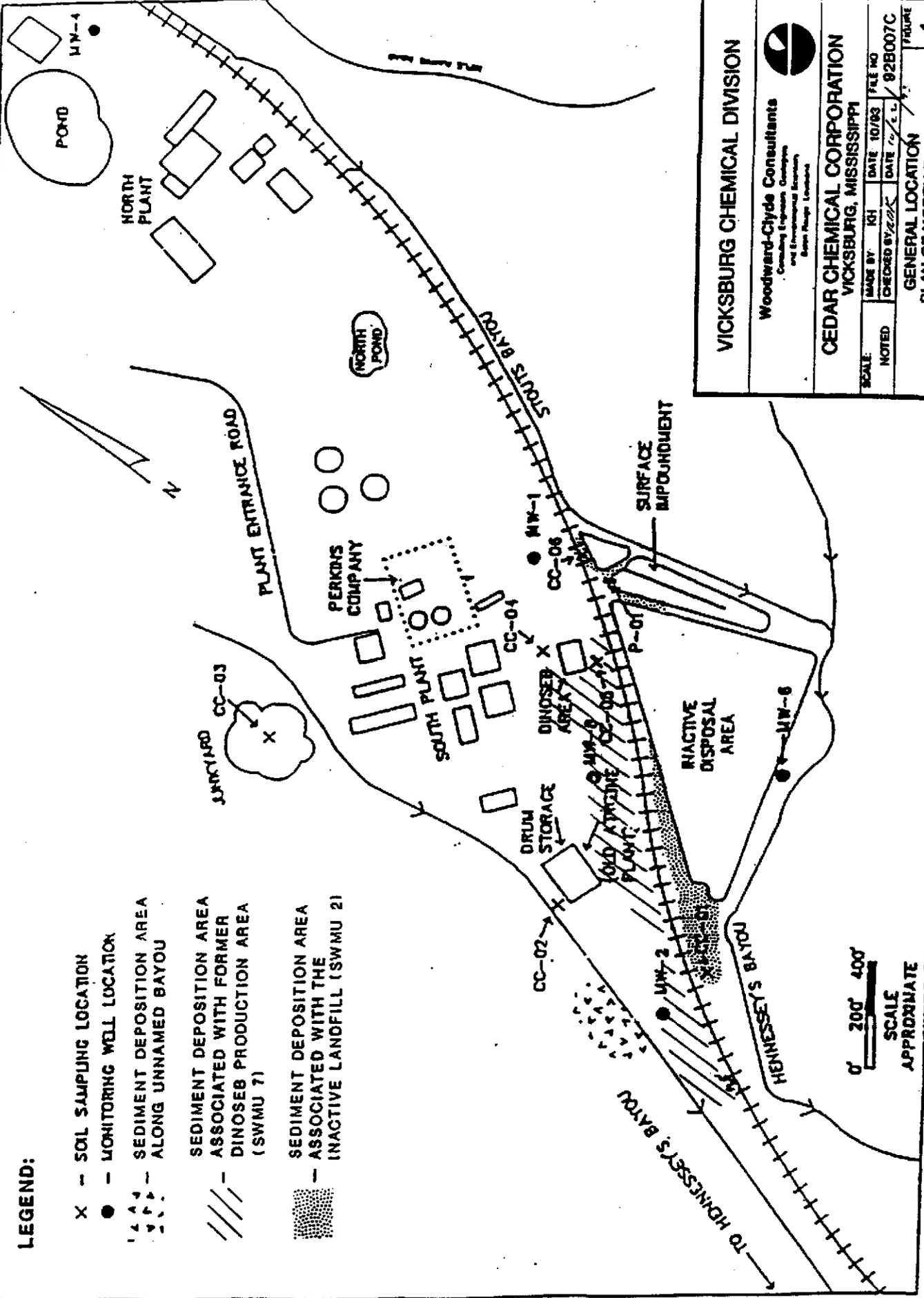
Project Manager:	Richard D. Karkkainen
Baton Rouge Health and Safety Officer:	Charles Self
Site Safety Officer:	Yong Goh
Field Personnel:	Mike Olson
Subcontractor:	Soil Testing Engineers, Inc.

**10.1 PROJECT SAFETY PERSONNEL**

Personnel responsible for implementing this Safety Plan are the Project Manager and Site Safety Officer. Their specific responsibilities and authorities for all accountable WCC personnel are listed in this plan as well as Table 2-1 of the WCC Health and Safety manual dated November 1990.

**LEGEND:**

- X - SOIL SAMPLING LOCATION
- - MONITORING WELL LOCATION
- ▲ ▲ ▲ - SEDIMENT DEPOSITION AREA ALONG UNNAMED BAYOU
- ▴ ▴ ▴ - SEDIMENT DEPOSITION AREA ASSOCIATED WITH FORMER DINOSEB PRODUCTION AREA (SWMU 7)
- /// - SEDIMENT DEPOSITION AREA ASSOCIATED WITH THE INACTIVE LANDFILL (SWMU 2)



**VICKSBURG CHEMICAL DIVISION**

Woodward-Clyde Consultants  
 Consulting Engineers, Geologists  
 and Environmental Scientists  
 Suite 3000 - Lakeview

**CEDAR CHEMICAL CORPORATION**  
 VICKSBURG, MISSISSIPPI

SCALE:	MADE BY: KH	DATE: 10/83	FILE NO:
NOTED:	CHECKED BY: JSC	DATE: 1/84	92B007C
GENERAL LOCATION			FIGURE
PLAN OF NORTH POND			1

**APPENDIX A**

**HEAT STRESS CASUALTY PREVENTION PLAN**

Due to the increase in ambient air temperatures and the affects of protective outer wear decreasing body ventilation, there exists an increase in the potential for injury, specifically, heat casualties. Site personnel will be instructed in identification of a heat stress victim, the first-aid treatment procedures for the victim and the preventing of heat stress casualties.

**A. IDENTIFICATION AND TREATMENT**

1) Heat Exhaustion

- a) Symptoms: Usually begins with muscular weakness, dizziness, nausea, and staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, his skin is clammy skin, and he may perspire profusely. The pulse is weak and fast, his breathing is shallow. He may faint unless he lies down. This may pass, but sometimes it remains and death could occur.
- b) First Aid: Immediately remove the victim to the Personnel Decontamination Reduction Zone in a shady or cool area with good air circulation. Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make him lie down, raise his feet 6 to 12 inches and loosen all clothing.) Transport victim to a medical facility as soon as possible.

- 3) A work/rest guideline will be implemented for personnel required to wear Level B or Level C protection. This guideline is as follows:

<u>Ambient Temperatures</u>	<u>Maximum Working Time</u>
Above 90°F	1/2 hour
80°-90°F	1 hour
70°-80°F	2 hours
60°-70°F	3 hours
50°-60°F	4 hours
40°-50°F	5 hours
30°-40°F	6 hours
Below 30°F	8 hours

A sufficient period will be allowed for personnel to "cool down". This may require shifts of workers during operations.

#### C. HEAT STRESS MONITORING

For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80 degrees Fahrenheit, workers must be monitored for heat stress after every work period.

Heart rate should be measured at the radial pulse for 30 seconds as early as possible in the resting period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.

**APPENDIX B**  
**SAFETY GUIDELINES FOR DRILLING**

- o After the drill rig has been moved to a new drilling site, set all brakes and/or locks. When grades are steep, block the wheels.
- o Never travel off-road with the mast (derrick) of the drill rig in the raised or partially raised position.
- o Tie-down loads on the drill rig and support trucks during transport.

### **OVERHEAD AND BURIED UTILITIES**

The use of a drill rig near electrical power lines and other utilities requires that special precautions be taken by both supervisors and members of the exploration crew. Electricity can shock, it can burn and it can cause death.

Overhead and buried utilities should be located, noted and emphasized on all boring location plans and boring assignment sheets.

Before raising the drill rig mast (derrick) on a site in the vicinity of power lines, walk completely around the drill rig. Determine what the minimum distance from any point on the drill rig to the nearest power line will be when the mast is raised and/or being raised. Do not raise the mast or operate the drill rig if this distance is less than 20 feet.

Keep in mind that both hoist lines and overhead power lines can be moved toward each other by the wind.

### **CLEARING THE WORK AREA**

Prior to drilling, adequate site cleaning and leveling should be performed to accommodate the drill rig and supplies and provide a safe working area. Drilling should not be commenced when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

## **SAFE USE OF HAND TOOLS**

There are almost an infinite number of hand tools that can be used on or around a drill rig. "Use the tool for its intended purpose" is the most important rule. The following are a few specific and some general suggestions which apply to safe use of several hand tools that are often used on and around drill rigs.

- o When a tool becomes damaged, either repair it before using it again or get rid of it.
- o When using a hammer, any kind of hammer for any purpose, wear safety glasses and require all others near you to wear safety glasses.
- o When using a chisel, any kind of chisel, for any purpose, wear safety glasses and require all others around you to wear safety glasses.
- o Keep all tools cleaned and orderly stored when not in use.
- o Replace hook and heel jaws when they become visibly worn.
- o When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform, should the wrench slip or the joint suddenly let go.

## **SAFE USE OF WIRE LINE HOISTS, WIRE ROPE AND HOISTING HARDWARE**

The use of wire line hoists, wire rope, and hoisting hardware should be as stipulated by the American Iron and Steel Institute's Wire Rope Users Manual.

All wire ropes and fittings should be visually inspected during use and thoroughly inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper weaving, jamming, crushing, bird caging, kinking, core protrusion, and damage to lifting

## **Woodward-Clyde Consultants**

To minimize shock loading of a wire rope, always apply loads smoothly and steadily.

Some additional safety guidelines that should be followed are:

- o Protect wire rope from sharp corners or edges.
- o Replace faulty guides and rollers.
- o Replace worn sheaves or worn sheave bearings.
- o Replace damaged safety latches on safety hooks before use.
- o Know the safe working load of the equipment and tackle being used. Never exceed this limit.
- o Periodically inspect and test clutches and brakes of hoists.
- o Know and do not exceed the rated capacity of hooks, rings, links, swivels, shackles and other lifting aids.
- o Always wear gloves when handling wire ropes.
- o Do not guide wire ropes on hoist drums with your hands.
- o After installation of a new wire rope, lift a light load to allow the wire rope to adjust.
- o Never carry out any hoisting operations when the weather conditions are such that hazards to personnel, the public or property are created.
- o Never leave a load suspended when the hoist is unattended.

- o Never allow feet to get under the auger section that is being hoisted.
- o When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason whatever.
- o Never use your hands or feet to move cuttings away from the auger.
- o When cleaning augers, be sure the drill rig is in neutral and the augers are stopped from rotating.

#### **SAFETY DURING ROTARY AND CORE DRILLING**

Rotary drilling tools should be safety-checked before use. In particular, check for the following:

- o See that water swivels and hoisting plugs are lubricated and checked for frozen bearings before use.
- o Check rod chuck jaws periodically and replace them when necessary.
- o Check the capacities of hoists and sheaves against the anticipated weight on the drill rod string plus other expected hoisting loads. Inspect all cables daily.

These other special precautions should be taken for safe rotary or core drilling:

- o Drill rods should not be braked during lowering into the hole with drill rod chuck jaws.
- o Drill rods should not be held or lowered into the hole with pipe wrenches.
- o If a string of drill rods are accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.

## **Woodward-Clyde Consultants**

Before raising the mast (derrick) look up to check for overhead obstructions.

Before raising the mast (derrick), all drill rig personnel and visitors (with exception of the operator) should be cleared from the area immediately to the rear and the sides of the mast. All drill rig personnel and visitors should be informed that the mast is being raised prior to raising it.

Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must be first leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be releveled if it settles after initial set up. Lower the mast (derrick) only when leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.

Before starting drilling operations, secure and/or lock the mast (derrick) if required according to the drill manufacturer's recommendations.

The operator of a drill rig should only operate a drill rig from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill.

Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.

Watch for slippery ground when mounting/dismounting from the platform.

All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors or animals from stepping or falling into the hole. All open boreholes should be covered, protected, or backfilled adequately and according to local or state regulations on completion of the drilling project.

"Horsing around" within the vicinity of the drill rig and tool and supply storage areas should never be allowed, even when the drill rig is shut down.

Be careful when lifting heavy objects.

**APPENDIX C**  
**CHEMICAL INFORMATION SHEETS**

**Personal Protective Methods:** Where ammonia hazards exist in concentrations above the standard, respiratory, eye, and skin protection should be provided. Fullface gas masks with ammonia canister or supplied air respirators, both with full facepieces, afford good protection. In areas where exposure to liquid ammonia occurs, goggles or face shields, as well as protective clothing impervious to ammonia and including gloves, aprons, and boots should be required. Where ammonia gas or concentrated ammonia solution is splashed in eyes, immediate flooding of the eyes with large quantities of water for 15 minutes or longer is advised, followed at once by medical examination.

In heavy concentrations of ammonia gas, workers should be outfitted with complete self-contained protective suits impervious to ammonia, with supplied air source, and full headpiece and facepiece. Appropriate clothing should be worn to prevent any possible skin contact with liquids of >10% content or reasonable probability of contact with liquids of <10% content. Wear eye protection to prevent any possibility of eye contact with liquids of >10% NH<sub>3</sub> content. Employees should wash immediately when skin is wet or contaminated with liquids of >10% content. Remove nonimpervious clothing immediately if wet or contaminated with liquids containing >10% and promptly remove if liquid contains <10% NH<sub>3</sub>. Provide emergency showers and eyewash if liquids containing >10% NH<sub>3</sub> are involved.

**Respirator Selection:**

- 100 ppm: CCRS/SA/SCBA
- 300 ppm: CCRSF
- 500 ppm: GMS/SAF/SCBAF
- Escape: GMS/SCBA

**Disposal Method Suggested:** Dilute with water, neutralize with HCl and discharge to sewer (A-38). Recovery is an option to disposal which should be considered for paper manufacture, textile treating, fertilizer manufacture and chemical process wastes (A-57).

**References**

- (1) National Institute for Occupational Safety and Health, *Criteria for a Recommended Standard: Occupational Exposure to Ammonia*, NIOSH Doc. No. 74-136, Washington, DC (1974).
- (2) U.S. Environmental Protection Agency, "Toxic Pollutant List: Proposal to Add Ammonia," *Federal Register*, 45, No. 2, 803-806 (January 3, 1980) Rescinded by *Federal Register*, 45, No. 232, 79692-79693 (December 1, 1980).
- (3) National Research Council, Committee on Medical and Biologic Effects of Environmental Pollutants, *Ammonia*, Baltimore, MD, University Park Press (1979).
- (4) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 2, No. 1, 65-68, New York, Van Nostrand Reinhold Co. (1982).
- (5) See Reference (A-61).
- (6) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 3, No. 3, 49-53, New York, Van Nostrand Reinhold Co. (1983).
- (7) See Reference (A-60).
- (8) Parmeggiani, L., Ed., *Encyclopedia of Occupational Health & Safety*, Third Edition, Vol. 1, pp 148-150, Geneva, International Labour Office (1983).

# Material Safety Data Sheet

from Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



GENIUM PUBLISHING CORP.

No. 22

CALCIUM OXIDE

(Revision C)

Issued: September 1978

Revised: April 1989

## SECTION 1. MATERIAL IDENTIFICATION

28

Material: CALCIUM OXIDE

Description (Origin/Uses): Used in the manufacture of steel, aluminum, glass, and paper; also found in plaster, mortar, bricks, stucco, and in other building and construction materials.

Other Designations: Lime; Quicklime; Burnt Unslaked Lime; High-Calcium Lime; CaO;  
CAS No. 1305-78-8

Manufacturer: Contact your supplier or distributor. Consult the latest edition of *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.



NFPA

HMIS

H	1	R	1
F	1	I	2
R	0	S	3
PPG*		K	0

\*See sect. 8

## SECTION 2. INGREDIENTS AND OCCUPATIONAL EXPOSURE LIMITS

Calcium Oxide, ca 100%

OSHA PEL  
8-hr TWA: 5 mg/m<sup>3</sup>

ACGIH TLV, 1988-89  
TLV-TWA: 2 mg/m<sup>3</sup>

Toxicity Data  
Not Listed\*

\*Monitor NIOSH, RTECS (EW3100000), for future data.

## SECTION 3. PHYSICAL DATA

Boiling Point: 5162 °F (2850 °C)  
Melting Point: 4658 °F (2570 °C)  
pH: >10 (Strongly Basic)

Molecular Weight: 56 g/mol  
Solubility in Water (%): Reacts  
Specific Gravity (H<sub>2</sub>O = 1): 3.2 to 3.4

Appearance and Odor: A white or grayish white solid (it can appear yellowish or brownish if iron impurities are present; commercial calcium oxide is available in a wide variety of forms such as lumps, pellets, pebbles, and powders); odorless.

## SECTION 4. FIRE AND EXPLOSION DATA

Flash Point: \*    Autoignition Temperature: \*    LEL: \*    UEL: \*

Extinguishing Media: \*Calcium oxide will not burn. Use an extinguishing agent that will put out the surrounding fire. Water reacts dangerously with calcium oxide and is not recommended as an extinguishing agent for fires that involve it. If water must be used, prevent it from coming into direct contact with the calcium oxide. If such contact is unavoidable, apply the water in flooding amounts to safely absorb the heat that will be generated. Unusual Fire or Explosion Hazard: Do not allow water to get inside containers of calcium oxide; reaction with the water will cause the calcium oxide to swell, generate heat, and burst its container. The heat generated by this reaction may ignite nearby combustible materials. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Stability/Polymerization: Calcium oxide is stable in closed, airtight containers during routine work operations. Hazardous polymerization cannot occur. Chemical Incompatibilities: Calcium oxide can react dangerously with boric oxide and calcium chloride, boron trifluoride, chlorine trifluoride, fluorine, hydrofluoric acid, phosphorus pentoxide, and water. Conditions to Avoid: Control exposure to incompatible chemicals. Always establish the compatibility of calcium oxide with another material before using it in bulk operations by testing small quantities under appropriate conditions. Avoid exposing calcium oxide to air because it reacts with the ambient moisture and carbon dioxide. Hazardous Products of Decomposition: Oxides of calcium may be produced when calcium oxide reacts with other materials during fires.

## SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: Calcium oxide is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: Calcium oxide is a strongly alkaline material; its contact with the skin, eyes, or inhalation results in severe irritation. Dust containing 25 mg/m<sup>3</sup> of this material causes strong nasal irritation; dust containing 9 to 10 mg/m<sup>3</sup> does not. The presence of moisture on the skin or on the mucous membrane of the respiratory system increases the possibility of corrosive tissue damage (chemical burns). Dehydration and thermal effects (the heat generated from reaction with water) are contributing factors to the irritating properties of calcium oxide. Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: Skin, eyes, nose, and respiratory system. Primary Entry: Inhalation and contact with skin and eyes. Acute Effects: Irritation and burns to the skin, eyes, and nose; irritation and inflammation of the respiratory system; coughing; and sneezing. Chronic Effects: Ulceration and perforation of the nasal septum, pneumonia. May cause nails to become brittle and fissure (split). (Con'd.)

# MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION  
1145 CATALYN STREET  
SCHENECTADY, NY 12303-1836 USA  
(518) 377-8855



No. 410

CARBON TETRACHLORIDE

Revision A

Date December 1980

## SECTION I. MATERIAL IDENTIFICATION

**MATERIAL NAME:** CARBON TETRACHLORIDE  
**OTHER DESIGNATIONS:** Tetrachlormethane, Perchlormethane, Methane Tetrachloride, CCl<sub>4</sub>, GE Material D5B50, CAS #000 056 235  
**MANUFACTURER:** Available from several suppliers, including:  
Linden Chemicals & Plastics  
PO Drawer J, Phone: (314) 843-1310  
Moundsville, WV 26041

## SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Carbon Tetrachloride	ca 100	6-hr TWA 5 ppm (skin) or 30 mg/m <sup>3</sup> * Human, oral LD <sub>50</sub> 43 mg/kg Human, inhalation LC <sub>50</sub> 1000 ppm TC <sub>50</sub> 20 ppm (CNS) Hamsters and mice have developed cancer on long term feeding.

\*ACGIH (1980 Intended Changes List). OSHA 8-hr TWA is 10 ppm. NIOSH has proposed a 10-hr TWA of 2 ppm. ACGIH and NIOSH recommend labeling as a suspected human carcinogen. (skin) notation indicates absorption through the skin can contribute significantly to overall exposure.

## SECTION III. PHYSICAL DATA

Boiling point at 1 atm, deg C	76.7	Specific gravity, 25/4 C	1.585
Vapor pressure @ 20 C, mm Hg	ca 91	Melting point, deg C	-23
Vapor density (Air=1)	5.3	Volatiles, %	ca 100
Solubility in water @ 20 C, wt %	0.08	Molecular weight	153.8

**Appearance & Odor:** A clear, colorless liquid with a characteristic sweetish odor. Odor recognition threshold (100% of test panel): 21.4 ppm in air when prepared from CS<sub>2</sub>; 100 ppm in air when prepared from CH<sub>4</sub>. Odor may not be objectionable at acutely toxic levels.

## SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER

**Extinguishing Media:** It is nonflammable. Use that which is appropriate for the surrounding fire. Use water spray to cool fire-exposed containers. When involved in a fire situation, this material will emit highly toxic and irritating fumes and gases. Metals, such as aluminum and magnesium, can react violently with carbon tetrachloride when hot or burning. Firefighters must wear self-contained breathing apparatus and full protective gear to fight fires involving this material.

## SECTION V. REACTIVITY DATA

This material is stable under normal conditions of handling and use. It does not polymerize. Thermal-oxidative decomposition will produce toxic, corrosive fumes, including phosgene and hydrogen chloride. Violent reactions or explosions can occur with incompatible materials, such as barium, lithium, sodium, and potassium metal, powdered aluminum, magnesium, dimethylformamide (above 65 C), fluorine, etc. (See NFPA, "Manual of Hazardous Chemical Reactions".)

# Material Safety Data Sheet

From Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Scheneectady, NY 12303-1836 USA  
(518) 377-8855



No. 53

CHLORINE  
(Revision B)  
Issued: July 1979  
Revised: April 1988

## SECTION 1. MATERIAL IDENTIFICATION

25

Material Name: CHLORINE

Description (Origin/Uses): Used mainly to manufacture chlorinated lime for bleaching fabrics; as a versatile reagent in organic chemistry; in water purification; and as a military poison gas (bertholite).

Other Designations: Bertholite; Molecular Chlorine; Cl<sub>2</sub>; NIOSH RTECS No. FO2100000;  
CAS No. 7782-50-5

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.



HMS  
H 3  
F 0 R 1  
R 1 I 4  
PPG\* S 4  
\*See sect. 8 K 0

## SECTION 2. INGREDIENTS AND HAZARDS

%

## EXPOSURE LIMITS

Chlorine, CAS No. 7782-50-5

ca 100

IDLH\* Level: 30 ppm  
OSHA PEL  
Ceiling: 1 ppm, 3 mg/m<sup>3</sup>  
TLV-STEL: 3 ppm, 9 mg/m<sup>3</sup>  
NIOSH REL  
15-Min Ceiling: 0.5 ppm, 1.45 mg/m<sup>3</sup>  
Toxicity Data\*\*  
Rat, Inhalation, LC<sub>50</sub>: 293 ppm (1 Hr)  
Mouse, Inhalation, LC<sub>50</sub>: 137 ppm (1 Hr)

\*Immediately dangerous to life and health

\*\*See NIOSH, RTECS, for additional data with references to irritative and mutagenic effects.

## SECTION 3. PHYSICAL DATA

Boiling Point: ca -29°F (-34°C)

Vapor Pressure: >760 Torrs (Normal Atmospheric Pressure)

Vapor Density (Air = 1): 1.4085 at 68°F (20°C)

Melting Point: ca -150°F (-101°C)

Molecular Weight: 71 Grams/Mole

Water Solubility: Slight

Appearance and Odor: A greenish yellow, noncombustible gas; pungent, suffocating, nauseating odor. Its odor-recognition threshold is reported to be ca 0.3 ppm.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

% by Volume

Extinguishing Media: \*Chlorine will not burn, but it supports combustion of materials already involved in a fire. Use agents that will extinguish the surrounding fire. Use a water spray to cool fire-exposed tanks and to protect personnel attempting to stop a chlorine leak.  
Unusual Fire or Explosion Hazards: Chlorine is a reactive/explosive gas. Fight fires involving it from the maximum possible distance; this gas greatly increases the flammability hazards of other combustibles that are present. Warning: Flammable gases, vapors, and mists form dangerously explosive mixtures with chlorine gas.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Fire fighters must use the maximum personal protective equipment available. If possible, have specially trained personnel remove intact cylinders of chlorine from the fire area and protect them with any available resource such as directed water spray.

## SECTION 5. REACTIVITY DATA

Chlorine is stable in closed, pressurized containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Chlorine reacts dangerously with acetylene, ammonia, hydrogen, ether, fuel gas, hydrocarbons, turpentine, finely divided metals, diborane, benzene, and acetaldehyde (see Genium ref. 84, pp. 49-28 and 491M-53 to 491M-56).

Conditions to Avoid: Do not allow open flame, unprotected heaters, lighted tobacco products, electric sparks, or excessive heat in work areas because chlorine gas can form explosive mixtures with other gases. Do not heat pressurized storage tanks or cylinders containing chlorine because they may explode. Do not allow chlorine to be directly exposed to incompatible chemicals (see above).

Hazardous Products of Decomposition: Toxic gases such as carbon monoxide, phosgene, and hydrogen chloride (Genium Industrial MSDSs 35, 66, 30) can be produced in fires involving chlorine and other combustibles.

# Material Safety Data Sheet

From Genium's Reference Collection  
 Genium Publishing Corporation  
 1145 Catalyn Street  
 Schenectady, NY 12303-1836 USA  
 (518) 377-8855



No. 315

**CHLOROFORM**  
 (Revision D)  
 Issued: August 1979  
 Revised: April 1988

## SECTION 1. MATERIAL IDENTIFICATION

25

**Material Name:** CHLOROFORM

**Description (Origin/Uses):** Used as a solvent for fats, oils, rubber, alkaloids, waxes, and resins; as a cleansing agent.

**Other Designations:** Trichloromethane; CHCl<sub>3</sub>; NIOSH RTECS No. FS9100000; CAS No. 0067-66-3

**Manufacturer:** Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS	
H 2	
F 0	R 1
R 0	I 3
PPG*	S 2
*See sect. 8	K 0



## SECTION 2. INGREDIENTS AND HAZARDS

Chloroform, CAS No. 0067-66-3

### EXPOSURE LIMITS

**OSHA PEL**  
 Ceiling: 50 ppm, 240 mg/m<sup>3</sup>

**ACGIH TLV, 1987-88**  
 TLV-TWA: 10 ppm, 50 mg/m<sup>3</sup>

**NIOSH REL**  
 Ceiling: 2 ppm, 9.78 mg/m<sup>3</sup>

**Toxicity Data\***  
 Human, Oral, LD<sub>50</sub>: 140 mg/kg  
 Rat, Oral, LD<sub>50</sub>: 908 mg/kg

\*See NIOSH, RTECS, for additional toxicity data with references to mutagenic, reproductive, tumorigenic, and irritative effects.

## SECTION 3. PHYSICAL DATA

**Boiling Point:** 142°F (61°C)  
**Melting Point:** -82.3°F (-63.5°C)  
**Vapor Pressure:** 158.4 Torr at 68°F (20°C)  
**Vapor Density (Air = 1):** 4.13

**Water Solubility (%):** 0.822 ml of CHCl<sub>3</sub> per 100 ml of H<sub>2</sub>O at 68°F (20°C)  
**% Volatile by Volume:** 100  
**Molecular Weight:** 119 Grams/Mole  
**Specific Gravity (H<sub>2</sub>O = 1):** 1.484 at 68°F (20°C)

**Appearance and Odor:** A heavy, colorless, clear, volatile liquid; characteristic, pleasant, ethereal, sweet odor (recognition threshold: 0.3 mg/m<sup>3</sup>); sweet taste.

## SECTION 4. FIRE AND EXPLOSION DATA

			LOWER	UPPER
Flash Point and Method	Autoignition Temperature	Flammability Limits in Air		
		% by Volume		

**Extinguishing Media:** \*Chloroform does not burn. Use an agent that will put out the surrounding fire.

**Unusual Fire or Explosion Hazards:** None reported.

**Special Fire-fighting Procedures:** Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Chloroform is stable if kept in closed containers and protected from air and sunlight. It does not undergo hazardous polymerization; however, even when stabilized with ethanol, this material develops acidity from prolonged exposure to air and light.

**Chemical Incompatibilities:** This material is incompatible with strong alkalis.

**Conditions to Avoid:** Avoid prolonged exposure to air and light and to strong alkalis.

**Hazardous Products of Decomposition:** Toxic and corrosive gases like hydrochloric acid (HCl), chlorine (Cl<sub>2</sub>), carbon monoxide (CO), and oxides of chlorine (ClO<sub>x</sub>) can be produced during fires.

CEDAR CHEMICAL CORPORATION  
MEMPHIS, TENNESSEE

MATERIAL SAFETY DATA SHEET  
Equivalent to OSHA form 174

-----  
PRODUCT NAME: TECHNICAL DINOSEB                      DATE: 08/15/86                      PAGE 1  
EPA REG. NO.: 56077-3

-----  
SECTION I

-----  
Manufacturer's Name: Cedar Chemical Corporation  
5100 Poplar Ave. 24th Floor  
Memphis, TN 38137  
Emergency Phone Number: 1-800-424-9300  
Information Phone Number: 1-601-636-1231  
Prepared by: M. S. Bernard

-----  
SECTION II HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

-----  
INGREDIENT                      OSHA PEL                      ACGIH TLV                      PERCENT  
Dinoseb                              n/d                              0.5mg/m<sup>3</sup>                      95.00  
Dinoseb (2-sec-butyl-4,6-dinitrophenol)  
CAS = 88-85-7  
Impurities                              n/d                              n/d                              5.00

-----  
SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

-----  
Boiling Point(°F)                      above 212                      Specific Gravity                      1.258  
Vapor Pressure(mm Hg.)                      below 1                      Melting Point(°F)                      90  
Vapor Density(Air=1)                      n/a                      Evaporation Rate                      n/d  
Solubility in Water: 0.0052g/100ml  
Appearance and Odor: Brown solid, organic acid odor

-----  
SECTION IV FIRE AND EXPLOSION HAZARD DATA

-----  
Flash Point(Method Used): 350.6°F                      TCC  
Flammable Limits: LEL- n/d                      UEL- n/d  
Extinguishing Media:  
Water Fog, Foam, Alcohol Foam, CO<sub>2</sub>, and Dry Chemical

-----  
CONTINUED ON PAGE 2

**Emergency and First Aid Procedures:**

**Oral Ingestion:** Toxic by ingestion. Induce vomiting and seek medical help immediately.

**Eye Contact:** Flush immediately with continuous irrigation with flowing water for at least thirty minutes. Seek medical consultation immediately.

**Skin Contact:** Immediately flush skin with plenty of water for at least fifteen minutes while removing contaminated clothing. Consult physician. Wash clothing before reuse.

**Inhalation:** Remove to fresh air if effects occur. Consult physician.

**Note to Physician:**

**Eyes:** Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Consult ophthalmologist. May cause temporary injury.  
**Overexposure:** Treat for symptoms. No specific antidote.  
 Human effects not established.

-----  
**SECTION VII PRECAUTIONS FOR SAFE HANDLING AND USE**  
 -----

**Steps to Be Taken in Case Material Is Released or Spilled:**

Use proper safety equipment. Absorb spill with absorbant inert material such as oil-dry. Dike area for large spills. Keep out of streams and water supplies.

**Waste Disposal Method:**

Dispose of in non-crop area away from water supplies or in an approved landfill in accordance with State, Federal, and local regulations.

**Precautions to Be Taken in Handling and Storing:**

Do not get on skin, on clothing, or in eyes. Keep out of reach of children.

**Other Precautions:**

Do not breathe spray mists. Keep away from heat or flame.

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**SECTION VIII CONTROL MEASURES**  
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**Respiratory Protection:**

None normally needed. During spraying use organic vapor respirator.

**Ventilation:** Required to control level of dinoseb.

**Protective Gloves:** Impervious rubber gloves

**Eye Protection:** Chemical workers' goggles

**Other Protective Clothing or Equipment:** Rubber boots and apron and body-covering clothing.

**Work/Hygenic Practices:** Shower after handling.

THE INFORMATION HEREIN IS SUPPLIED IN GOOD FAITH.  
 BUT NO WARRANTY, EXPLICITE OR IMPLIED, IS MADE.

**SECTION 6. HEALTH HAZARD INFORMATION, cont.**

Flush eyes, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 minutes. Skin. Rinse the affected area with plenty of water, then wash it with soap and water. Inhalation. Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. Ingestion. Unlikely. Should this type of exposure occur, the aspiration hazard must be considered. Do not induce vomiting unless directed to do so by a physician. To prevent aspiration by spontaneous vomiting, keep the victim's head low (between his or her knees). Get medical help (in plant, paramedic, community) for all exposures. Seek prompt medical assistance for further treatment, observation, and support after first aid. Note to Physician: Professional judgment is required as to whether or not to induce vomiting because of the possibility of aspiration. A gastric lavage may be administered, followed by saline catharsis, if this procedure is appropriate to the specific incident. Monitor cardiac and pulmonary functions.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition immediately, and provide adequate explosion-proof ventilation. Cleanup personnel need protection against skin or eye contact with this liquid as well as inhalation of its vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. **Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4)

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), §§ 311 (b) (4) and 307 (a).

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Wear a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. **Warning:** Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated skin contact with this material. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of this material below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Do not inhale ethyl benzene vapor.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store ethyl benzene in closed containers in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage. **Special Handling/Storage:** Outside, isolated, detached, or remote storage is recommended for large quantities of ethyl benzene. Isolate bulk storage areas from acute fire hazards. **Engineering Controls:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. To prevent static sparks, electrically ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations. **Other:** Use safety cans for transferring small amounts of ethyl benzene.

**Transportation Data (49 CFR 172.101-2)**

DOT Shipping Name: Ethyl Benzene

DOT Hazard Class: Flammable Liquid

ID No. UN1175

DOT Label: Flammable Liquid

DOT Packaging Exceptions: 49 CFR 173.118

DOT Packaging Requirements: 49 CFR 173.119

IMO Shipping Name: Ethylbenzene

IMO Hazard Class: 3.2

IMO Label: Flammable Liquid

IMDG Packaging Group: II

References: 1, 26, 38, 84-94, 100, 116, 117, 120, 122.

Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, Genium Publishing Corp. extends no warranties, makes no representations and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: W Silverman, MD

# Material Safety Data Sheet

from Genium's Reference Collection  
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1145 Catalyn Street  
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(518) 377-8855



GENIUM PUBLISHING CORP.

No. 310  
METHYLENE CHLORIDE  
(Revision F)

Issued: September 1985  
Revised: November 1988

## SECTION 1. MATERIAL IDENTIFICATION

27

Material Name: METHYLENE CHLORIDE

Description (Origin/Uses): Used widely in paint removers, as a solvent for plastics, as a degreasing agent, in propellant mixtures for aerosol sprays, and as a blowing agent in foams.

Other Designations: Dichloromethane; Freon 30<sup>®</sup>; Methane Dichloride; Methylene Bichloride; Methylene Dichloride; CH<sub>2</sub>Cl<sub>2</sub>; CAS No. 0075-09-2

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS		NFPA	
H 2	R 1	2	1
F 1	I 3	0	0
R 0	S 3		
PPG*	K 1		

\*See sect. 8.

## SECTION 2. INGREDIENTS AND HAZARDS/EXPOSURE LIMITS

Methylene Chloride, ca 100%

OSHA PEL

8-Hour TWA: 500 ppm

Ceiling: 1000 ppm Acceptable Maximum Peak above the Ceiling: 2000 ppm for 5 Minutes in Any 2-Hour Period

ACGIH TLV, 1988-89  
TLV-TWA: 50 ppm, 175 mg/m<sup>3</sup>  
(Adopted 1988-89)

Toxicity Data\*  
Rat, Oral, LD<sub>50</sub>: 2136 mg/kg  
Human, Inhalation, TC<sub>L</sub>: 500 ppm (8 Hours)

\*See NIOSH, RTECS (PA8050000), for additional data with references to irritative, reproductive, mutagenic, and tumorigenic effects.

## SECTION 3. PHYSICAL DATA

Boiling Point: 103.55°F (39.75°C) at 76 Torr

Melting Point: -142°F (-96.7°C)

Vapor Density (Air = 1): 2.9

Vapor Pressure: 440 Torr at 77°F (25°C)

Molecular Weight: 84.94 Grams/Mole  
Solubility in Water (%): 1% by Weight  
Specific Gravity (H<sub>2</sub>O = 1): 1.3255 at 68°F (20°C)  
% Volatile by Volume: Ca 100

Appearance and Odor: A clear, colorless, volatile liquid; distinctive, penetrating, ethereal odor. The odor will not serve as a useful warning property because concentrations of 100 ppm are not easily perceptible. Most persons can detect this odor at above 300 ppm.

## SECTION 4. FIRE AND EXPLOSION DATA

Flash Point\*

Autoignition Temperature: 1033°F (556°C)

LEL: 12% v/v

UEL: 19% v/v

Extinguishing Media: \*Methylene chloride is not flammable under ordinary conditions. However, flammable vapor-air mixtures can form at approximately 212°F (100°C). Use water spray to cool fire-exposed containers and to flush spills away from exposures. Use extinguishing agents that will put out the surrounding fire. Unusual Fire or Explosion Hazards: Methylene chloride vapor is heavier than air and may collect and concentrate in low-lying, confined spaces. The high vapor pressure of methylene chloride means that when it is spilled, its vapor concentration in air can increase rapidly. If this vapor is heated, an explosion hazard is associated with the vapor-air mixture. Containers of this material may rupture violently if they are involved in fires. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Stability/Polymerization: Methylene chloride is stable in closed containers during routine operations. Hazardous polymerization cannot occur. Chemical Incompatibilities: Methylene chloride can react dangerously with nitrogen tetroxide, liquid oxygen, potassium, sodium, sodium-potassium alloys, lithium, potassium hydroxide with N-methyl-N-nitroso urea, potassium t-butoxide, and finely powdered aluminum and magnesium. Conditions to Avoid: Avoid all exposure to sources of ignition, heat, and incompatible chemicals. Prolonged exposure to water may cause hydrolysis to highly corrosive hydrochloric acid when the temperature is above 140°F (60°C). In oxygen-enriched atmospheres or when heated (>212°F [100°C]), methylene chloride vapor can be readily ignited. Hazardous Products of Decomposition: Exposure to high temperature (from open flame, hot surfaces, uninsulated steam lines, welding arcs, etc.) can produce toxic and corrosive thermal-oxidative products of decomposition such as hydrogen chloride, carbon monoxide, and even small quantities of phosgene gas, which is extremely poisonous.

## SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: Methylene chloride is listed as a suspected human carcinogen by the ACGIH (which classifies it as a group A2 carcinogen). Summary of Risks: Accidental contact of liquid methylene chloride with skin or eyes causes painful irritation and possible burns if not promptly removed. Exposure by way of contaminated gloves, clothing, or paint remover formulations can produce these same irritant effects. Long-term exposure to mild or moderate doses of methylene chloride may cause a delayed (24 to 48 hours) onset of dizziness, headache, mental confusion, slurred speech, double vision, and sleeplessness. Medical recovery can be slow. Overexposure to methylene chloride can cause elevated levels of carboxy hemoglobin in the blood (this same effect results from overexposure to carbon monoxide). Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: Skin, eyes, respiratory system, CNS, liver, kidneys, and blood. Primary Entry: Inhalation, skin contact/absorption. Acute Effects: Headache, giddiness, stupor, irritability, fatigue, tingling in the limbs, and narcosis that is not usually fatal if the exposure is terminated before anesthetic death occurs. Chronic Effects: The ACGIH classification of this material as a suspected human carcinogen implies that cancer is a possible effect of chronic exposure to methylene chloride. FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with

# METHYL PARATHION

MPT

<p><b>Common Synonyms</b> Mison 407 Parathion Foson 40000 O-Dimethyl O-ethylthio Phosphorothioate Phosphorothioate</p>	<p><b>Solid crystals</b> with a color or brown and Fusion point of 60°C</p>
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**AVOID CONTACT WITH LIQUID** and avoid any  
other chemical exposure that with the chemical handling operation.  
If the substance is absorbed:  
Wash and remove contaminated clothing  
Wash eyes with water and consult a physician.

<p><b>Fire</b></p>	<p><b>COMBUSTIBLE</b> <b>POISONOUS GASES ARE PRODUCED IN FIRE AND WHEN HEATED</b> Containers may explode in fire. Wipe flames of container with wet fire extinguishing equipment - extinguish using foam type extinguisher or dry chemical extinguisher. - Do not use water.</p>
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<p><b>Exposure</b></p>	<p>"A1" FOR MEDICAL USE <b>LIQUID OR SOLID</b> <b>POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED.</b> Irritating to eyes Irritating to respiratory system and skin Irritating to skin and eyes If in eyes, flush with water and seek medical attention If SWALLOWED and victim is UNCONSCIOUS, have victim give water If in mouth and have victim rinse mouth with water If SWALLOWED and victim is UNCONSCIOUS OR HAVING CON- VULSIONS, do not attempt to vomit.</p>
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<p><b>Water Pollution</b></p>	<p><b>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.</b> Exposure is irritating to organisms May be toxic to a great many species Partly soluble in water and highly toxic Partly absorbed by water organisms.</p>
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<p><b>1. RESPONSE TO DISCHARGE</b> (See Response Methods Handbook) Solid: earthy-powder, water absorbent Reserve: none Smells: as received Chemical and physical treatment</p>	<p><b>2. LABEL</b> 2.1 Category: Poison 2.2 Class: 6</p>
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<p><b>3. CHEMICAL DESIGNATIONS</b> 3.1 CG Compatibility Class: Not listed 3.2 Formula: <chem>CH3OCH2P(S)(OC2H5)2</chem> 3.3 MSD/WH Designation: 6.1/2783 3.4 DOT ID No.: 2783 3.5 CAS Registry No.: 700-90-0</p>	<p><b>4. OBSERVABLE CHARACTERISTICS</b> 4.1 Physical State and Appearance: Solid, white, at ambient 4.2 Color: Colorless solid or granular mass 4.3 Odor: Characteristic, like rotten eggs or garlic</p>
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<p><b>5. HEALTH HAZARDS</b> 5.1 Personal Protective Equipment: Approved mask or respirator, rubber safety gloves, overalls, protective clothing, goggles 5.2 Symptoms Following Exposure: Exposure to liquid from a fire, or to the liquid, causes headache, dizziness, nausea, vomiting, diarrhea, blurred vision, weakness, numbness, tingling, paralysis, and convulsions in the brain. Muscle twitching and convulsions may follow. Symptoms may develop over a period of 2 hrs. 5.3 Treatment of Exposure: Avoid a second INGESTION and a second if water is not available. Immediately remove clothes saturated by mouth-to-mouth, mouth-to-nose, or mouth-to-artery/vein contact, when water is available, give milk, water, or soft-liquid diet. Wash clothing thoroughly. GET ON EYES: Flush and wash exposed areas thoroughly with water. Remove contaminated clothing under a shower. 5.4 Threshold Limit Value: 0.2 mg/m<sup>3</sup> 5.5 Short Term Exposure Limit: Data not available 5.6 Toxicity by Ingestion: Grade 4. LD50 (rat) 60 mg/kg (bw) 5.7 Lethal Toxicity: Data not available 5.8 Vials (Gas) irritant Characteristics: Not available 5.9 Liquid or Solid Irritant Characteristics: Irritating when absorbed through skin 5.10 Oral Toxicity: Data not available 5.11 IDLH Value: Data not available</p>
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<p><b>6. FIRE HAZARDS</b> 6.1 Flash Point: 110°F O.C. 6.2 Flammable Limits in Air: Data not available 6.3 Fire Extinguishing Agents: None 6.4 Fire Extinguishing Agents Not to be Used: Not applicable 6.5 Special Hazards of Combustion: Products: Toxic gases are produced in fire. 6.6 Behavior in Fire: Gases may expand rapidly 6.7 Ignition Temperature: Data not available 6.8 Chemical Reactivity: Not available 6.9 Burning Rate: Data not available 6.10 Autotank Point Temperature: Data not available 6.11 Steam/Smoke Air to Fuel Ratio: Data not available 6.12 Phase Temperature: Data not available</p>
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<p><b>7. CHEMICAL REACTIVITY</b> 7.1 Reactivity with Water: Not applicable in a tank at 40°C 7.2 Reactivity with Common Oxidizers: In contact with acid, etc., which must be contained in separate glass bottles. 7.3 Stability During Transport: Stable above 0°C with suitable container 7.4 Extinguishing Agents for Auto and Container: Heavy foams or water can only and water works best. 7.5 Polymerization: Not applicable 7.6 Initiator of Polymerization: Not applicable 7.7 Other Flammable Gases in Products: Data not available 7.8 Reactivity Group: Data not available</p>
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<p><b>8. WATER POLLUTION</b> 8.1 Aquatic Toxicity: 1.0 ppm/96 hr/fish/L<sub>50</sub>/fresh water 0.5 ppm/96 hr/fish/L<sub>50</sub>/fresh water 8.2 Waterway Toxicity: LD<sub>50</sub> = 10 mg/kg 8.3 Bioassay Oxygen Demand (BOD): Data not available 8.4 Feed Chain Concentration Potential: Data not available</p>
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<p><b>9. SHIPPING INFORMATION</b> 9.1 Grades of Purity: Pure (solid); technical (solid); 80% in xylene 9.2 Storage Temperature: Below 0°C 9.3 Inert Atmosphere: Not required 9.4 Venting Pressure: Not applicable</p>
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<p><b>10. HAZARD ASSESSMENT CODE</b> (See Hazard Assessment Handbook) A-X-Y</p>
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<p><b>11. HAZARD CLASSIFICATIONS</b> 11.1 Grade of Poisoning Response: Poison, 6 11.2 S&amp;S Hazard Rating for Skin Water Transportation: Not listed 11.3 EPA Hazard Classification: Category: 6 Classification: Health Hazard (H)..... 6 Physical Hazard (PH)..... 2 Reactivity (R)..... 2</p>
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<p><b>12. PHYSICAL AND CHEMICAL PROPERTIES</b> 12.1 Physical State at 10°C and 1 atm: Solid 12.2 Molecular Weight: 262.3 12.3 Boiling Point at 1 atm: 160°C 12.4 Freezing Point: 80°C = 10°C = 20°C 12.5 Critical Temperature: Not available 12.6 Critical Pressure: Not available 12.7 Specific Gravity: 1.500 at 20°C (liquid) 12.8 Liquid Surface Tension: Data not available 12.9 Liquid Water Intermittent Tension: Data not available 12.10 Vapor (Gas) Specific Gravity: Not available 12.11 Ratio of Specific Heats of Vapor (Gas): Not available 12.12 Latent Heat of Vaporization: Not available 12.13 Heat of Combustion: Data not available 12.14 Heat of Decomposition: Not available 12.15 Heat of Solution: Not available 12.16 Heat of Polymerization: Not available 12.17 Heat of Fusion: Data not available 12.18 Limiting Vapor: Data not available 12.19 Reid Vapor Pressure: Data not available</p>
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NOTES

**SECTION 6. HEALTH HAZARD INFORMATION**

Nitric acid is not listed as a carcinogen by the NTP, IARC, or OSHA.

**Summary of Risks:** This material is corrosive to any body tissue it contacts. Dental erosion is also reported.

**Medical Conditions Aggravated by Long-Term Exposure:** None reported. **Target Organs:** Skin, eyes, mucous membranes of the respiratory tract, teeth. **Primary Entry:** Inhalation, skin contact. **Acute Effects:** Irritation and/or corrosive burns of skin, eyes, and upper respiratory tract (URT), delayed pulmonary edema, pneumonitis, bronchitis, and dental erosion. **Chronic Effects:** None reported.

**FIRST AID:** **Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Treat for eye burns. **Skin.** Immediately wash the affected area with soap and water. Watch for chemical skin burns and treat them accordingly. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. If the exposure is severe, hospitalization with careful monitoring by trained medical personnel to detect the delayed onset of severe pulmonary edema (lungs filled with fluid) is recommended for at least 72 hours. **Ingestion.** Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting. If the exposed person is responsive, give him or her one or two glasses of milk or water to drink as quickly as possible after exposure.

**GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES.** Seek prompt medical assistance for further treatment, observation, and support after first aid. **NOTE TO PHYSICIAN:** Wash affected skin areas with a 5% solution of sodium bicarbonate (NaHCO<sub>3</sub>). If ingested, the risk versus the benefit of the passage of a naso-gastric tube is debatable. Activated charcoal is of no value. Do not give the exposed person bicarbonate to neutralize the material.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately in case contact with metals should produce highly flammable hydrogen gas. Cleanup personnel need protection against contact with and inhalation of nitric acid (see sect. 8). Contain large spills and collect waste. Use water sprays to direct nitric acid away from incompatible chemicals (see sect. 5). Neutralize the spilled nitric acid with soda ash or sodium bicarbonate. Use an absorbent such as sand, earth, or vermiculite on the resulting slurry and place the neutralized nitric acid material into containers suitable for eventual disposal, reclamation, or destruction.

**Waste Disposal:** Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per Clean Water Act (CWA), Section 311 (b) (4)

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing of nitric acid solution is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133).

**Respirator:** Consult the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 38) for general recommendations on proper respiratory procedures. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent skin contact with nitric acid. Choose protective equipment carefully (see sect. 5, Conditions to Avoid).

**Ventilation:** Install and operate both general and local exhaust-ventilation systems powerful enough to maintain airborne concentrations of nitric acid below the OSHA PEL standard cited in section 2. Construct exhaust ducts and systems with material such as fiberglass, which resists attack by nitric acid. **Safety Stations:** Make emergency eyewash stations, washing facilities, and safety/quickdrench showers available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean nitric acid from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Provide preplacement and annual medical exams with emphasis on skin irritation to workers who are regularly exposed to nitric acid. Workers must receive training before handling this material in the workplace; even experienced workers should undergo refresher training periodically.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store nitric acid in a cool, dry, well-ventilated area away from incompatible chemicals (see sect. 5). Consider outside, isolated, or detached storage. Protect containers from direct sunlight.

**Special Handling/Storage:** Build all storage facilities of nonflammable materials that are resistant to chemical attack by nitric acid. Protect containers from physical damage. Preplan for routine use and emergency response.

**Engineering Controls:** Proper ventilation is essential in bulk storage areas; consider installing an automatic monitoring system to detect hazardous levels of nitrogen oxides that can develop from this material.

**Comments:** Separate nitric acid from hydrazine, diethylenetriamine, fluorides, and all other corrosives except sulfuric acid and sulfur trioxide when shipping or transferring it.

**Transportation Data** (49 CFR 172.101-2)

**DOT Shipping Name:** (I) Nitric Acid, Fuming or (II) Nitric Acid, Over 40% or (III) Nitric Acid, 40% or Less

**DOT Label:** (I) Oxidizer and Poison or (II) Oxidizer and Corrosive or (III) Corrosive

**DOT Hazard Class:** (I) and (II) Oxidizer or (III) Corrosive Material

**DOT ID Nos.:** (I) UN2032; (II) UN2031; (III) NA1760

**IMO Class:** 8 (All Types of Nitric Acid)

**IMO Label:** (I) Corrosive, Oxidizer, Poison; or (II) and (III) Corrosive

**References:** 1, 2, 26, 38, 84-94, 100, 112, 113, 114.

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Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

# Material Safety Data Sheet

From Genium's Reference Collection  
 Genium Publishing Corporation  
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No. 205

POTASSIUM NITRATE

Issued: January 1987

## SECTION 1. MATERIAL IDENTIFICATION

22

**MATERIAL NAME:** POTASSIUM NITRATE  
**DESCRIPTION/USES:** Used in pyrotechnics; explosives; matches; as a specialty fertilizer; reagent; to modify burning properties of tobacco; in glass manufacture; tempering steel; curing foods; as an oxidizer in solid rocket propellants.  
**OTHER DESIGNATIONS:** Nitric Acid, Potassium Salt; Niter; Saltpeter;  
**KNO<sub>3</sub>; CAS #7757-79-1**  
**MANUFACTURER/SUPPLIER:** Available from several suppliers, including: Aldrich Chemical Co., Inc., PO Box 355, Milwaukee, WI 53201; Telephone: (414) 273-3850



HMIS Nonfire Fire  
 H 1 R 1  
 F 0 I -  
 R 1 S 2  
 PPE\* K 0  
 \*See Sect. 8

## SECTION 2. INGREDIENTS AND HAZARDS

%

### HAZARD DATA

Potassium Nitrate, CAS #7757-79-1

>99%

ACGIH TLV:  
None Established

OSHA PEL:  
None Established

Oral, Rat,  
LD<sub>50</sub>: 3750 mg/kg

Oral, Rabbit,  
LD<sub>50</sub>: 1901 mg/kg

## SECTION 3. PHYSICAL DATA

Melting Point ... 633°F (334°C)  
 Boiling Point ... 400°C (Decomposes)  
 Specific Gravity @ 16°C ... 2.11  
 Vapor Pressure @ 20°C ... Negligible  
 % Volatiles ... 0  
 Evaporation Rate ... Not Found

Solubility in Water, at 0°C ... 13.3 g/100 cc  
 at 100°C ... 247 g/100 cc  
 pH of 5% Solution, at 25°C ... 4.5-7.0  
 Molecular Weight ... 101.1

Appearance and odor: White crystalline powder or granules. No odor.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air
Not Found	Not Found	Not Found

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Potassium nitrate is not combustible. However, it is a strong oxidizer and can initiate and intensify combustion of flammable materials.  
**EXTINGUISHING AGENTS:** Flood fires involving this material with water. Keep fire-exposed containers cool with water spray. Remove containers from the fire area if it can be done safely.  
**UNUSUAL FIRE/EXPLOSION HAZARDS:** At high temperatures this material can fuse or melt; application of water when large quantities are involved can result in extensive scattering of molten material.  
**SPECIAL FIRE-FIGHTING PROCEDURES:** Toxic fumes/gases can be evolved in a fire situation. Fire fighters should use self-contained breathing apparatus and wear full protective gear.

## SECTION 5. REACTIVITY DATA

Potassium nitrate is stable at room temperature. It does not polymerize.

Violent reactions (including fire and explosion) may occur on its contact with organic materials, combustible materials, and reducing agents. Specific incompatibles under various conditions include aluminum, titanium, antimony, germanium, zinc, zirconium (and other metals), calcium disilicide, chromium nitride, metal sulfides, boron, carbon, sulfur, phosphorus, phosphides, sodium phosphinate, sodium thiosulfate, citric acid, tin chloride, sodium acetate, and thorium carbide.

Potassium nitrate decomposes at approximately 752°F (400°C) with the evolution of oxygen and oxides of nitrogen (toxic).



**SECTION 1. MATERIAL IDENTIFICATION**

20

**MATERIAL NAME:** TOLUENE

**OTHER DESIGNATIONS:** Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C<sub>7</sub>H<sub>8</sub>, CAS #0108-88-3

**MANUFACTURER/SUPPLIER:** Available from many suppliers, including:  
 Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400  
 Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219,  
 Columbus, OH; Telephone: (614) 889-3844

**HMIS**

H: 2

F: 3

R: 0

PPE\*

\*See sect. 8



R 1  
 I 3  
 S 2  
 K 4

**SECTION 2. INGREDIENTS AND HAZARDS**

%

**HAZARD DATA**

Toluene



ca 100

8-hr TLV: 100 ppm, or  
 375 mg/m<sup>3</sup>\* (Skin)\*\*

Man. Inhalation, TClO:  
 100 ppm: Psychotropic\*\*\*

Rat, Oral, LD<sub>50</sub>: 5000 mg/kg

Rat, Inhalation, LCLo:

4000 ppm/4 hrs.

Rabbit, Skin, LD<sub>50</sub>: 14 gm/kg

Human, Eye: 300 ppm

- \* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.
- \*\* Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.
- \*\*\* Affects the mind.

**SECTION 3. PHYSICAL DATA**

Boiling Point ... 231°F (111°C)  
 Vapor Pressure @ 20°C, mm Hg ... 22  
 Water Solubility @ 20°C, wt. % ... 0.05  
 Vapor Density (Air = 1) ... 3.14

Evaporation Rate (BuAc = 1) ... 2.24  
 Specific Gravity (H<sub>2</sub>O = 1) ... 0.866  
 Melting Point ... -139°F (-95°C)  
 Percent Volatile by Volume ... ca 100  
 Molecular Weight ... 92.15

**Appearance and odor:** Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

**SECTION 4. FIRE AND EXPLOSION DATA**

**LOWER | UPPER**

Flash Point and Method

Autoignition Temp.

Flammability Limits in Air

40°F (4°C) CC

896°F (480°C)

% by Volume

1.27

7.1

**EXTINGUISHING MEDIA:** Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

**UNUSUAL FIRE/EXPLOSION HAZARDS:** This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

**SECTION 5. REACTIVITY DATA**

**CHEMICAL INCOMPATIBILITIES:** Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetroxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

**CONDITIONS TO AVOID:** Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

# TOXAPHENE

TXP

<p><b>Common Synonyms</b> Chlorodactone</p>	<p>White solid or in solution</p> <p style="text-align: center;">Ampul</p> <p>Soluble only in water, insoluble in oil.</p>
<p>Keep discharge if possible. Keep patient quiet. Call fire department. Avoid contact with skin and clothes. Washes and remove discharged material. Notify local health and pollution control agencies.</p>	
<p><b>Fire</b></p>	<p>Some fire extinguishers are readily extinguished in combustion.</p> <p><b>POISONOUS GASES ARE PRODUCED IN FIRE.</b> Solve for hydrogen cyanide, carbon monoxide, and carbon disulfide. Extinguish with foam, dry chemical or carbon dioxide. Water may be used on fire. Call chemical companies with water.</p> <p style="text-align: center;"><b>C</b></p>
<p><b>Exposure</b></p>	<p><b>CALL FOR MEDICAL AID.</b></p> <p><b>SOLID OR SOLUTION</b> <b>POISONOUS IF SWALLOWED.</b> Wash mouth with water. Flush stomach with 1-2 quarts of water. If in EYES, flush eyes with water and flush with plenty of water. If SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting. If SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do not give anything except water until after death.</p>
<p><b>Water Pollution</b></p>	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Soluble in water to moderate. May be transported if a certain water exists. Notify local health and waste officials. Notify operators of nearby water intakes.</p>
<p><b>1. RESPONSE TO EMERGENCY</b> (See Response Methods Handbook) Keep emergency, water department. Should be removed. Chemical and physical treatment.</p>	<p><b>2. LABEL</b> 2.1 Category: None 2.2 Class: Not pertinent</p>
<p><b>3. CHEMICAL DESIGNATIONS</b> 3.1 OB Conventional Class: Not used 3.2 Formula: C<sub>10</sub>H<sub>14</sub>O<sub>6</sub> 3.3 MSD/AM Designation: Not used 3.4 DOT ID No.: 2761 3.5 CAS Registry No.: 6911-56-2</p>	<p><b>4. OBSERVABLE CHARACTERISTICS</b> 4.1 Physical State (at standard temp and pressure): Solid 4.2 Color: Amber 4.3 Odor: Mild turpentine odor</p>
<p style="text-align: center;"><b>5. HEALTH HAZARDS</b></p> <p>5.1 Potential Protective Equipment: Chemical-eyes resistant; natural gloves; chemical goggles or face shield.</p> <p>5.2 Symptoms Following Exposure: May be absorbed through skin, lungs, or respiratory tract. Symptoms include irritation, dry and itchy nose, sore throat, coughing, hyperirritability, vomiting, dizziness, drowsiness, drowsiness, skin lesions, irritation of all mucous membranes. Lethal doses include respiratory failure. Respiration, affected as a result of the irritation from vomiting or convulsions, is not affected because of strong muscular contractions, then increased in both amplitude and rate at the mucous membrane.</p> <p>5.3 Treatment of Exposure: If symptoms of poisoning occur, promptly remove the contaminated individual from the situation by washing clothing with warm, soapy or soapy water if the patient is conscious or with the skin with soap and water. Keep patient warm and quiet. Call a physician.</p> <p>5.4 Threshold Limit Value: 0.5 mg/m<sup>3</sup></p> <p>5.5 Short Term Exposure Limit: Not available</p> <p>5.6 Toxicity by Ingestion: Grade 4, LD<sub>50</sub> below 50 mg/kg body weight</p> <p>5.7 LD<sub>50</sub> Toxicity: Data not available</p> <p>5.8 Vapor (Class) Irritant Characteristics: This class is non-applicable. For irritants, see first-aid.</p> <p>5.9 Liquid or Solid Irritant Characteristics: Minimum hazard if contact on clothing and allowed to remain. May cause irritation and reddening of the skin.</p> <p>5.10 Skin Irritant: Not pertinent</p> <p>5.11 MSD/AM Value: 200 mg/m<sup>3</sup></p>	

<p style="text-align: center;"><b>6. FIRE HAZARDS</b></p> <p>6.1 Flash Point: 67°F C.C. (minimum)</p> <p>6.2 Flammable Limits in Air: 1.7%-6.4% (lower only)</p> <p>6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide</p> <p>6.4 Fire Extinguishing Agents that do not assist: Water may be ineffective.</p> <p>6.5 Special Features of Combustion: Products: Toxic vapors are generated when heated.</p> <p>6.6 Behavior in Fire: Solution in water may produce explosive products when heated.</p> <p>6.7 Ignition Temperature: 600°F (estimated)</p> <p>6.8 Minimum Ignition Air Pressure: Not pertinent</p> <p>6.9 Burning Rate: 0.5 g/min</p> <p>6.10 Self-Heating Temperature: Data not available</p> <p style="text-align: right;">(Continued)</p>	<p style="text-align: center;"><b>10. HAZARD ASSESSMENT CODE</b> (See Hazard Assessment Handbook) <b>0-0-T-4</b></p>
<p style="text-align: center;"><b>7. CHEMICAL REACTIVITY</b></p> <p>7.1 Reactivity with Water: No reaction</p> <p>7.2 Reactivity with Common Materials: No reaction</p> <p>7.3 Stability During Transport: Stable</p> <p>7.4 Reactivity Agents for Acids and Corrosives: Not pertinent</p> <p>7.5 Polymerization: Not pertinent</p> <p>7.6 Behavior of Polymerization: Not pertinent</p> <p>7.7 Other Data: Observed in Products: Data not available</p> <p>7.8 Reactivity Groups: Data not available</p>	<p style="text-align: center;"><b>11. HAZARD CLASSIFICATIONS</b></p> <p>11.1 Grade of Federal Registration: Class 4</p> <p>11.2 MSD Standard Rating for Bulk Water Transportation: Not used</p> <p>11.3 NFPA Hazard Classification: Not used</p>
<p style="text-align: center;"><b>8. WATER POLLUTION</b></p> <p>8.1 Acute Toxicity: 0.05 ppm/24 hours/growth 100% 0.02 ppm/24 hours/weight 100% 0.02 ppm/24 hours/weight 100% 0.002 ppm/24 hours/weight 100% *Data not available</p> <p>8.2 Inorganic Toxicity: 30 g/mg</p> <p>8.3 Biological Oxygen Demand (BOD): Data not available</p> <p>8.4 Food Chain Concentration Potential: None</p>	<p style="text-align: center;"><b>12. PHYSICAL AND CHEMICAL PROPERTIES</b></p> <p>12.1 Physical State at 70°F and 1 atm: White solid</p> <p>12.2 Molecular Weight: 414 (avg.)</p> <p>12.3 Boiling Point at 1 atm (Estimated): 145-150°F</p> <p>12.4 Freezing Point: 65-66°F</p> <p>12.5 Critical Temperature: Not pertinent</p> <p>12.6 Critical Pressure: Not pertinent</p> <p>12.7 Specific Gravity: 1.5 at 15°C (solid)</p> <p>12.8 Liquid Surface Tension: Not pertinent</p> <p>12.9 Liquid Water Insolubility: Not pertinent</p> <p>12.10 Vapor (Class) Specific Gravity: Not pertinent</p> <p>12.11 Ratio of Specific Heat of Vapor (Class): Not pertinent</p> <p>12.12 Latent Heat of Vaporization: Not pertinent</p> <p>12.13 Heat of Combustion: Not pertinent</p> <p>12.14 Heat of Decomposition: Not pertinent</p> <p>12.15 Heat of Solution: Not pertinent</p> <p>12.16 Heat of Polymerization: Not pertinent</p> <p>12.17 Heat of Fusion: Data not available</p> <p>12.18 Limiting Value: Data not available</p> <p>12.19 Pure Vapor Pressure: Data not available</p>
<p style="text-align: center;"><b>9. SHIPPING INFORMATION</b></p> <p>9.1 Grades of Purity: Technical: 40% and commercial: 50% solution in xylene</p> <p>9.2 Storage Temperature: Ambient</p> <p>9.3 Vent Atmosphere: No requirement</p> <p>9.4 Venting: Sealed containers in well-ventilated area</p>	<p style="text-align: center;"><b>6. FIRE HAZARDS (Continued)</b></p> <p>6.11 Self-Heating: Air to Fuel Ratio: Data not available</p> <p>6.12 Flame Temperature: Data not available</p>

**SECTION 6. HEALTH HAZARD INFORMATION**

Xylene is not listed as a carcinogen by the IARC, NTP, or OSHA.

**Summary of Risks:** Liquid xylene is a skin irritant and causes erythema, dryness, and defatting; prolonged contact may cause blistering. Inhaling xylene can depress the central nervous system (CNS), and ingesting it can result in gastrointestinal disturbance; and possibly hematemesis (vomiting blood). Effects on the eyes, kidneys, liver, lungs, and the CNS are also reported. Medical Conditions Aggravated by Long-Term Exposure: Problems with eyes, skin, central nervous system, kidneys, and liver may be worsened by exposure to xylene. **Target Organs:** CNS, eyes, gastrointestinal tract, blood, liver, kidneys, skin. **Primary Entry:** Inhalation, skin contact/absorption. **Acute Effects:** Dizziness; excitement; drowsiness; incoordination; staggering gait; irritation of eyes, nose, and throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; and dermatitis. **Chronic Effects:** Reversible eye damage, headache, loss of appetite, nervousness, pale skin, and skin rash.

**FIRST AID:** **Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. **Skin.** Immediately wash the affected area with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have a trained person administer oxygen. **Ingestion.** Never give anything by mouth to someone who is unconscious or convulsing. Vomiting may occur spontaneously, but do not induce it. If vomiting should occur, keep exposed person's head below his or her hips to prevent aspiration (breathing the liquid xylene into the lungs). Severe hemorrhagic pneumonitis with grave, possibly fatal, pulmonary injury can occur from aspirating very small quantities of xylene.

**GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES.** Seek prompt medical assistance for further treatment, observation, and support after first aid. If exposure is severe, hospitalization for at least 72 hours with careful monitoring for delayed onset of pulmonary edema is recommended.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of xylene vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

**Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U239

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), section 311 (b) (9)

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specifics of the work operation to prevent prolonged or repeated skin contact with xylene. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of xylene below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of xylene into general work areas by eliminating it at its source. Consult the latest edition of *Genium* reference 103 for detailed recommendations. **Safety Stations:** Make eyewash stations, safety/quick-drench showers, and washing facilities available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean xylene from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Do not inhale xylene vapor.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store xylene in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage.

**Special Handling/Storage:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, producing, and sampling operations.

**Transportation Data (49 CFR 172.101-2)**

DOT Shipping Name: Xylene

DOT ID No. UN1307

DOT Label: Flammable Liquid

DOT Hazard Class: Flammable Liquid

IMO Label: Flammable Liquid

IMO Class: 3.2 or 3.3

**References:** 1, 2, 12, 73, 84-94, 100, 103.

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Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

**APPENDIX D  
FORM HS-502  
HAZARDOUS WASTE INCIDENT REPORT**

\_\_\_\_\_  
**DATE**                      **PROJECT/LOCATION**                      **BUSINESS UNIT**

**DESCRIPTION OF INCIDENT, INCLUDING INJURIES, PROPERTY DAMAGE  
AND EMERGENCY ACTION TAKEN AND PERSONNEL INVOLVED (use  
additional sheets if needed):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**WITNESSES OF INCIDENT:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**POSSIBLE OR KNOWN CAUSES:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**WHAT ACTIONS ARE NEEDED TO PREVENT A SIMILAR INCIDENT?**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
**REPORTER**

\_\_\_\_\_  
**BUSINESS UNIT SAFETY OFFICER**

\_\_\_\_\_  
**PROJECT MANAGER**

\_\_\_\_\_  
**CORPORATE HEALTH AND SAFETY  
OFFICER**

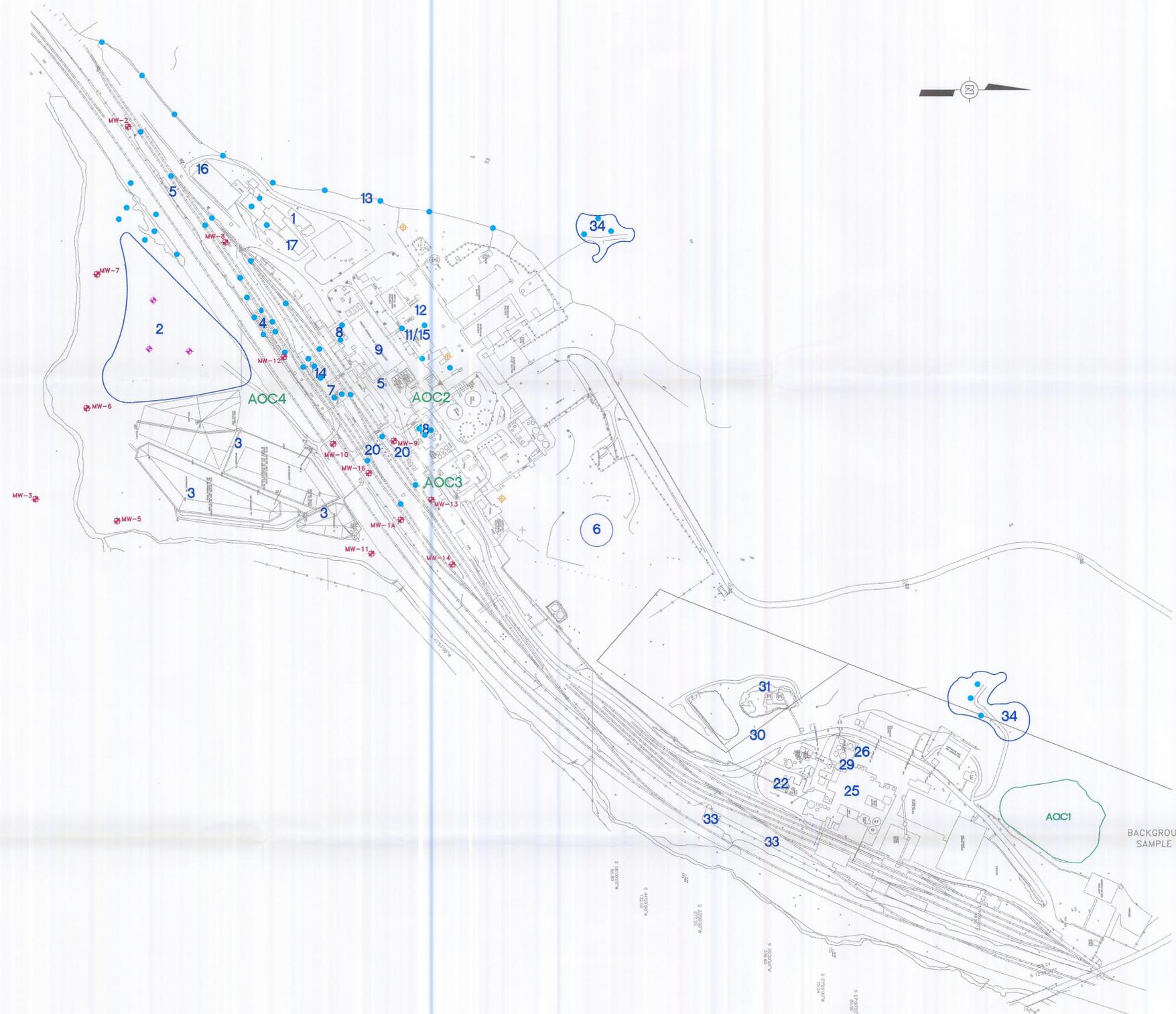
**APPENDIX E**

**HNU PHOTOIONIZATION DETECTOR (MODEL PI 101)**

The instrument is turned to the battery check position first. Assuming proper charge, the main control switch is set to the standby position using the zero knob. The instrument is then allowed to warm up for above five minutes in the standby mode. The calibration gas (usually isobutylene from the HNU factory) is attached. The proper range setting is selected (usually 0-200 ppm) and the calibration gas turned on.

The gas flows through a critical orifice which reduces its flow rate to the proper rate for calibration purposes. The normal factory calibration of this instrument is for benzene in air. Isobutylene is used for normal calibration because it is less toxic. The relative response of isobutylene as compared to benzene is about 70 percent with the 10.2 eV and 11.7 eV lamps (there is a slight difference between the relative response of the two different energy probes, but it is not considered significant for most field calibration purposes). Accordingly, a bottle of isobutylene calibration gas that contains 100 ppm isobutylene will read out as about 70 ppm on a factory calibrated instrument. A bottle of factory calibration gas will state the proper readout on the instrument "as benzene".

If the instrument does not calibrate exactly, the span pot knob is normally adjusted to bring the instrument into calibration. The normal "factory" settings are 9.8 for the 10.2 eV lamp and 5.90 for the 11.7 eV lamp. If the instrument cannot be brought into calibration by using the span pot, the lamp may need to be cleaned or other maintenance items performed so that the unit will calibrate accurately.



SWMU NUMBER	SOUTH PLANT
1	CONTAINER (DRUM) STORAGE AREA
2	INACTIVE LANDFILL
3	SURFACE IMPOUNDMENT (SOUTH PLANT)
4	ACTIVATED CARBON TREATMENT UNITS
5	SOUTH PLANT DRAINAGE SYSTEMS
6	WASTEWATER STORAGE (HILL) TANKS
7	FORMER DINOSEB PRODUCTION AREA
8	DINOSEB LOADING/UNLOADING AREA
9	DINOSEB DRUMMING AREA
11	FORMER MSMA PRODUCTION AREA
12	FORMER MSMA SALT UNLOADING AREA
13	SOUTH PLANT DRAINAGE DITCHES
14	FORMER TOXAPHENE PRODUCTION AREA
15	FORMER METHYL PARATHION PRODUCTION AREA
16	FORMER ATRAZINE PRODUCTION AREA
17	RETURNED PRODUCT STORAGE AREA
18	FORMER BLUE TANK AREA
20	RAILROAD CAR UNLOADING STATION

NORTH PLANT	
22	NORTH PLANT NEUTRALIZATION SYSTEM
23	EQUALIZATION/NEUTRALIZATION POND (NORTH PLANT)
25	NORTH PLANT WASTEWATER PIPES
26	C-10 SCRUBBER
29	OIL COLLECTION UNIT
30	NORTH PLANT WASTE OIL ACCUMULATION AREA
31	NO. 6 FUEL OIL AREA
33	NORTH PLANT DRAINAGE DITCHES

BOTH PLANTS	
34	SURPLUS EQUIPMENT STORAGE (JUNKYARD)

AOC NUMBER	AOC NAME
1	FISH POND (NORTH PLANT)
2	DRUM STORAGE AREA
3	NEUTRALIZATION TANKS (SOUTH PLANT)
4	CHEMICAL CRYPT (SEPTIC TANKS)

**LEGEND**

- ◆ DEEP BORINGS
- ◆ NEW MONITOR WELL LOCATIONS
- SHALLOW BORINGS
- ◆ EXISTING MONITOR WELLS

SCALE  
200 0 200 400 FEET

NO.	REVISION	DATE	INITIAL

RCRA FACILITY INVESTIGATION AND GROUNDWATER ASSESSMENT

**WOODWARD-CLYDE CONSULTANTS**  
Consulting Engineers, Geologists and Environmental Scientists  
Baton Rouge, Louisiana

VICKSBURG CHEMICAL COMPANY  
VICKSBURG, MISSISSIPPI

SCALE: 1"=200'	MADE BY: GT	DATE: 11/28/95	FILE NO. 92B007C
	CHECKED BY: RDK	DATE: 7/19/96	

SWMU LOCATIONS, RFI SOIL AND CONCRETE SAMPLE POINTS, GWA MONITOR WELL LOCATIONS

FIGURE 1

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