EPA Region 5 Records Ctr.
235094

SITE ASSESSMENT/REMOVAL ACTION PLAN
FOR
MARK TWAIN INDUSTRIES
West Frankfort, Illinois

TDD: T05-9308-001
PAN: EIL0803SAA

SEPTEMBER 27, 1993

Prepared by: John Sherard Date: 9-28-93

Reviewed by: Brad Stiple Date: 9-28-93

Approved by: [signature] Date: 9/28/93

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International Specialists in the Environment

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1.0 INTRODUCTION

The Ecology & Environment, Inc. (E & E), Technical Assistance Team (TAT) was tasked by the United States Environmental Protection Agency (U.S. EPA) under Technical Directive Document (TDD) number T05-9308-001 to implement a sampling plan, document site conditions, inventory site wastes, and prepare a site assessment/removal action plan for the Mark Twain Industries (MTI) site, West Frankfort, Franklin County, Illinois. As requested by U.S. EPA On-Scene Coordinator (OSC) Thomas Bloom, the TAT prepared the assessment report, utilizing existing documentation, previous chemical analysis, and chemical analysis of samples collected as part of this site investigation.

The site assessment was performed in accordance with the National Contingency Plan (NCP), and Paragraph (b) (2) of 40 Code of Federal Regulations (CFR) section 300.415 to evaluate on-site conditions and possible threats to human health and the environment. This report summarizes these activities.

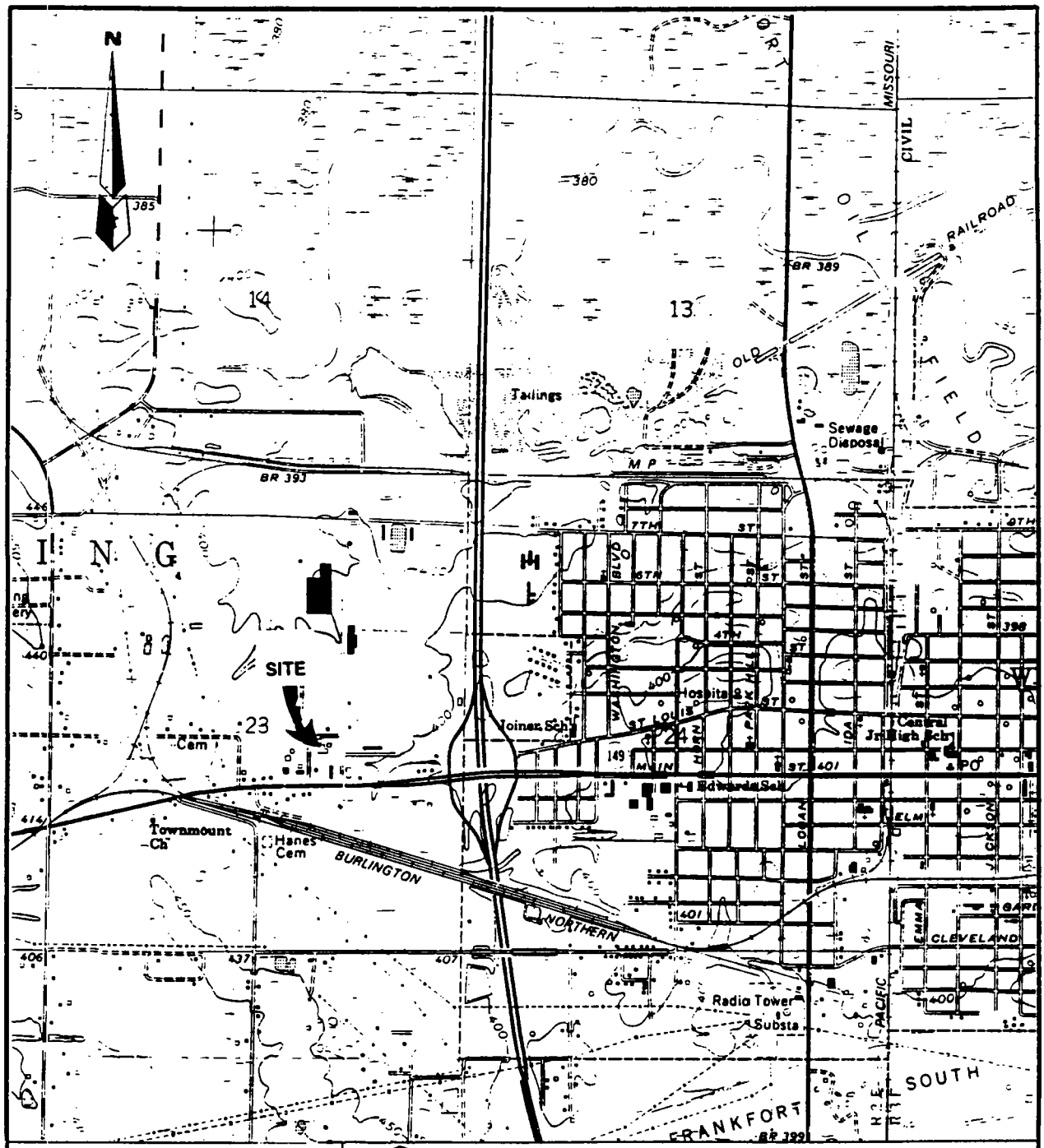
2.0 SITE BACKGROUND

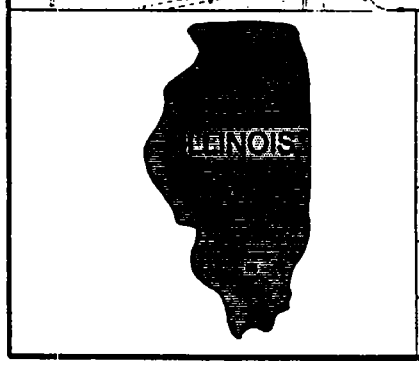
The MTI Site is the location of a pleasure boat manufacturing facility. The facility is located in an industrial park in the downstate city of West Frankfort, Franklin County, Illinois (See Site Location Map, Figure 1). The Mark Twain manufacturing plant consists of two warehouse-type buildings which are used to form and assemble pleasure boats. Currently, the smaller of the two buildings is used to store boat molds and equipment (See Site Features Map, Figure 2). The building comprises three rooms and one equipment bay area.

From 1980 until 1990, the facility was operated by MTI. The manufacturing process of fiber glass molding, foam generation, carpentry, upholstering, and painting was employed. Acetone, which was used to clean air guns, was the primary waste generated. In addition, waste paints, glues, solvents, resins, and other flammable liquids were generated. In late 1990, MTI ceased operation due to bankruptcy, and process wastes and residuals were abandoned on-site.

Currently, the property is leased to Crown Line Boats, Inc. (CLB) which continues to manufacture pleasure boats from the facility. CLB manufactures pleasure boats employing a process similar to the one used previously at the site by MTI. Employees of CLB work in and around the small warehouse. According to David McKenzie, CLB's Safety Director, personnel are informed to use caution and are instructed not to move drummed materials and wastes which are located in the three rooms and one equipment bay of the small warehouse.

The Illinois Environmental Protection Agency (IEPA) referred the





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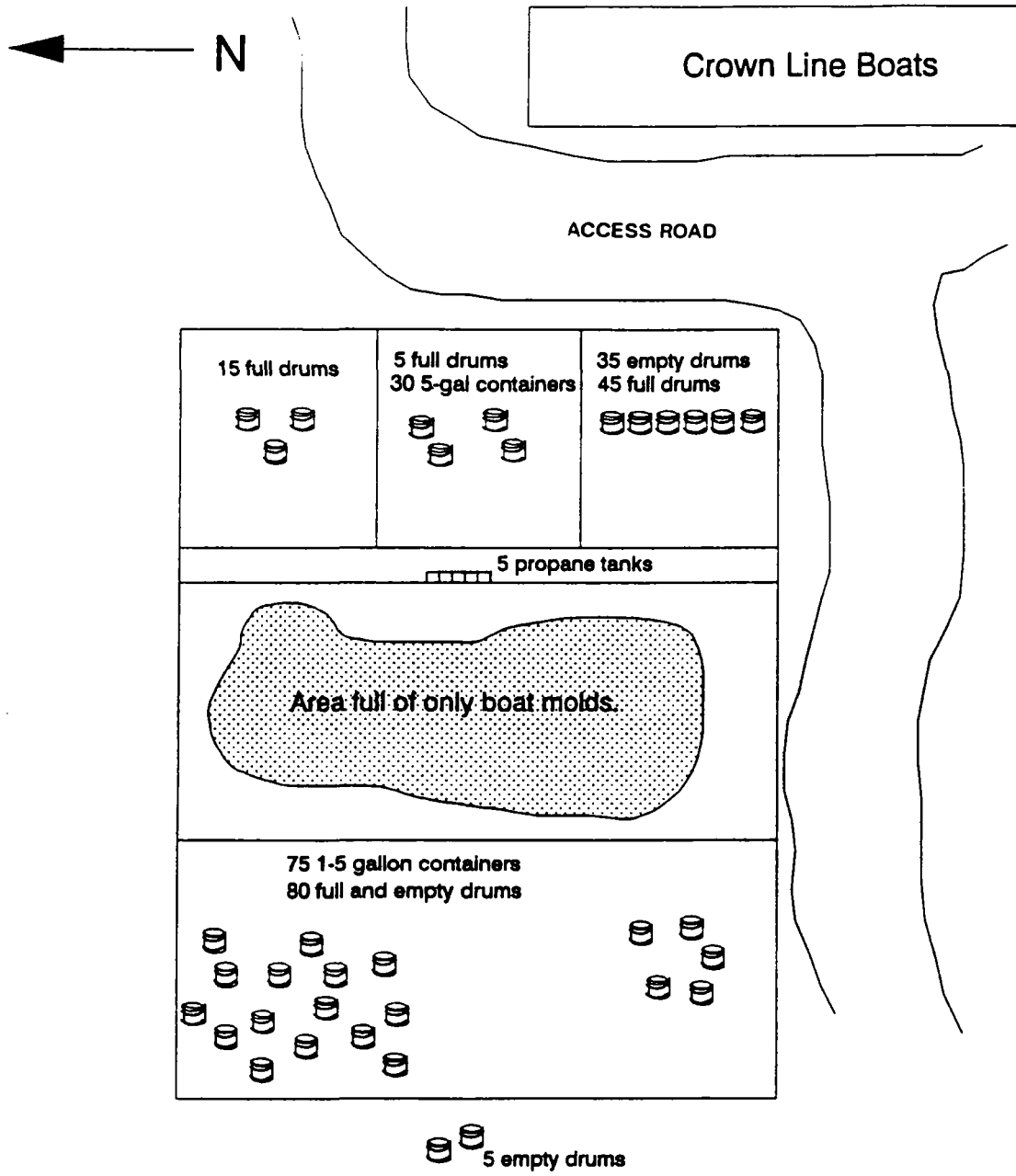
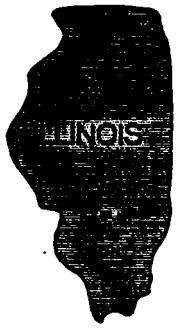
Region V

TITLE Site Location Map	FIGURE # 1
SITE Mark Twain Industries	TDD# T05-9308-001
CITY West Frankfort STATE Illinois	SCALE None
SOURCE USGS Quadrangle	DATE 09-07-93
	REVISED





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TITLE Site Features Map	FIGURE # 2
SITE Mark Twain Industries	TDD# T05-9308-001
CITY West Frankfort STATE Illinois	SCALE None
SOURCE Ecology & Environment, Inc.	DATE 09-07-93
	REVISED

MTI Site to the U.S. EPA Emergency and Enforcement Response Branch (EERB) in a memo dated July 27, 1993. EERB conducted a site assessment on September 1, 1993.

3.0 SITE ACTIVITIES

On August 31, 1993, TAT members Brad Stimple and John Sherrard met with U.S. EPA On-Scene Coordinator (OSC) Thomas Bloom and IEPA representative Tom Edmundson at the Marion, Illinois, IEPA regional office. Activities continuing throughout the remainder of the day focused on discussing past and present site history and activities. TAT members reviewed and photocopied existing IEPA documentation. Due to pending legal issues between IEPA and MTI, only limited site information was made available to the TAT at the time.

On September 1, 1993, the TAT members, the OSC, and the IEPA representative met with Crown Line Boat's Inc. (current leaser) Safety Director, David McKenzie, at the MTI site and were given a tour of the facility and its operations. At the end of the tour, McKenzie showed the group the boat assembly warehouse west of the building containing Crown Line's main operations. The warehouse appeared to be in good structural condition with three bay areas within the building. The east bay area had three office rooms filled with approximately 100 drums, approximately 30 containers (with capacity 15 gallons or less), and debris. The middle bay area was filled with numerous boat molds. The west bay area contained approximately 80 drums, approximately 75 containers (with capacity 15 gallons or less), debris, and a boat mold. (See Appendix C - Site Photographs)

A total of approximately 100 containers (with capacity of 15 gallons or less) and approximately 175 55-gallon drums were located in the smaller warehouse building. Many of the drums and containers are deteriorated and exist in an unsafe condition. Several drums contain industrial solvents considered flammable such as acetone and methyl ethyl ketone and one drum is known to contain toluene diisocyanate (TDI), which is considered a water reactive chemical. Access to the building and containers is unrestricted during business hours.

At 0900 hours, TAT members Stimple and Sherrard entered the warehouse in level B personal protection, and collected four liquid and two solid drum samples. The first drum sample contained a cloudy liquid (D-01) and had an HNu reading of 25 ppm. D-02 was a tan, cloudy liquid with an HNu reading of 250 ppm. The third drum sampled (D-03) contained a red, hard solid. D-04 was a black solid. The fifth drum sampled (D-05) containing a dark black, oily liquid. D-06 was a clear liquid from a small container with a label which read methyl ethyl ketone (MEK). Many of the drums contained paint wastes, glues, solvents, and drums with "flammable" labels on the side. Samples were

collected with either a dedicated glass thieving rod or a dedicated stainless steel trowel.

Air monitoring was conducted throughout the warehouse using the HNu, and readings of 1 to 3 parts per million (ppm) were obtained in the breathing zones. HNu readings from next to the drums ranged from 20 to 1,000 ppm.

At 1130 hours, the TAT members organized the samples to be hand delivered to Great Lakes Analytical in Buffalo Grove, Illinois, and analyzed for volatile organic analytes (VOAs), semi-volatile organic analytes (SVOAs), flash point, and the eight Resource Conservation and Recovery Act (RCRA) metals. Once the samples were organized, all personnel departed the site.

Samples were hand delivered to Great Lakes Analytical, Buffalo Grove, Illinois, on September 2, 1993, for chemical analysis.

4.0 ANALYTICAL RESULTS

Analytical results were collected by the TAT from six drums existing at the MTI facility (D01-D06). All samples were analyzed for VOAs and SVOAs, and for flash point determination. Samples D01 through D05 were analyzed for the 8-RCRA metals. Samples D03 and D04 were collected as solid samples. The remaining three samples were of a liquid phase.

Various concentrations of volatile and semi-volatile compounds were detected in all samples collected by the TAT. VOA results indicate the presence of trichlorofluromethane detected at 14,000 micrograms per liter (µg/l) in sample D02; styrene from 25,000 µg/l in sample D03 to 43,000,000 µg/l in sample D06; 2-butanone at 170,000,000 µg/l or 17% in sample D06, and chlorobenzene at 100,000 µg/l in sample D05, as the most notable (See Appendix A for complete analytical results).

Results of total metal analysis indicated the presence of lead and chromium in sample D03 detected at 2,300 milligrams per kilogram (mg/kg) and 960 mg/kg, respectively.

Sample D06 recorded a flash point of 70°F, which, according to 40 CFR Section 261.21, is considered a RCRA characteristic hazardous waste by virtue of ignitability (flash point of less than 140°F). The remaining five samples recorded flash points above 200°F.

5.0 DISCUSSION OF POTENTIAL THREATS

Conditions present at the MTI site may constitute an imminent and substantial threat to public health and welfare and the environment, based upon considerations as set forth in the National Oil and Hazardous Substances Pollution Contingency Plan

(NCP), 40 CFR Section 300.415 (b) (2), and therefore may justify that a time-critical removal action be conducted at the MTI site. These conditions include, but are not limited to, the following:

* **Actual or potential exposure to nearby populations, animals, or the food chain from hazardous substances, pollutants, or contaminants.**

The site is located in a mixed residential and commercial area in West Frankfort, Illinois. The site is located in a warehouse within the property of Crown Line Boats, Inc., and is secured by the company's fence during non-business hours. During business hours, the fence is unlocked and vehicular or pedestrian access is not restricted.

Analytical results from TAT-collected samples and from a previous IEPA site investigation indicate the presence of acetone (U.S. EPA waste code - F003) at concentrations of up to 260,000 μ/g and styrene at up to 43,000,000 μg/L in drum samples. In addition, 2-butanone (methyl ethyl ketone [D035]), lead (D008), and chromium (D007) have been detected in drum samples at concentrations as high as 170,000,000 μg/L, 2,300 mg/kg, and 940 mg/kg, respectively. Inhalation is the most important route of exposure for styrene, acetone, and 2-butanone (methyl ethyl ketone). Symptoms of inhalation of these substances include nose, throat, and serious eye irritation; headaches; dizziness; confusion; nausea; and vomiting. Ingestion of 2-butanone in laboratory animals has caused problems with the nervous system and in some cases caused death. Ingestion of acetone has caused comas, kidney damage, and metabolic changes. Ingestion of lead produces a damaging effect on the organs or tissues with which it comes in contact. Dermal contact with either of the contaminants causes skin inflammation. In addition, chromium is a known carcinogen, and styrene and lead are suspected carcinogens.

* **Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.**

Approximately 175 55-gallon drums and 100 containers of 15-gallon capacity or less exist in the warehouse building. Many of the containers are in poor condition and could possibly leak. Access to both the site and the building is unrestricted during the day, allowing unauthorized access to the drums and containers stored at the site. Contaminants and/or products within the containers could be ignited, inhaled, or come in contact with the human population.

* **Threat of fire or explosion.**

Acetone and 2-butanone are highly flammable liquids. Acetone is a dangerous disaster hazard due to its propensity for fire and

explosion and can react vigorously with oxidizing materials. Styrene is a very dangerous fire hazard when exposed to flame, heat, or oxidants. Styrene is explosive in the form of vapor when exposed to heat or flame, and reacts with oxygen at temperatures above 40°C to form a heat-sensitive explosive peroxide. Toluene diisocyanate (TDI) is a dangerous disaster hazard due to its propensity for fire and explosion when reactant with water.

Access to the site and a number of containers is unrestricted, and the contaminants and/or products within the containers could be ignited. In the event of a fire at this site, toxic fumes and hazardous particulate matter from burning material may be emitted from the facility and endanger adjacent commercial and residential areas.

6.0 REMOVAL ACTION

Mitigation of the threats described above requires the removal of approximately 100 containers (with capacity of 15 gallons or less) and approximately 175 55-gallon drums of paint wastes, acetones, glues, solvents, and flammables. A two-phase removal action plan which implements off-site disposal is as follows.

6.1 Removal Action - Phase I

Phase I of the removal action would begin with the mobilization of the Emergency Response Cleanup Contractor Service (ERCS) to the site, the development of a site safety plan, securing the site, staging the drums and containers for sampling, hazard categorization (hazcatting) of materials in each container and separation of drums into appropriate hazardous waste streams, compositing waste streams, sending out composites for disposal parameters analysis, and sending composites to appropriate disposal facilities for waste approval.

6.2 Removal Action - Phase II

Phase II of the removal action would consist of sending the drums and containers off-site for treatment by incineration or to a fuels blending facility. The disposal would be followed by demobilization from the MTI site.

7.0 ESTIMATED COSTS

The cost estimation prepared for the mitigation of threats at the MTI site addresses the disposal of all of the containers and drums on-site. Estimated costs are based on fuels blending 40 drums of flammable liquids, 40 drums of flammable solids, and the incineration of 70 hazardous solid drums, which includes a 20% contingency factor. The disposal of the containers and drums is estimated to require 21 10-hour working days plus mobilization

and demobilization time, and to cost approximately $208,870. The cost estimate was generated by the Removal Cost Management System (RCMS). A copy of the cost estimate and the assumptions used is presented in Appendix C.

APPENDIX A

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MEMORANDUM

DATE: September 24, 1993

TO: John Sherrard, Project Manager, E & E, Chicago, IL

FROM: Yvette Anderson, TAT-Chemist, E & E, Chicago, IL

THRU: Lisa Ende, TAT-Chemist, E & E, Chicago, IL

SUBJ: Organic Data Quality Assurance Review, Mark Twain site, West Frankfort, Franklin County, Illinois.

REF: Analytical TDD: T059308819 Project TDD: T059308001
Analytical PAN: EIL0803AAA Project PAN: EIL0803SAA

The data quality assurance review of 4 liquid samples and 2 solid samples collected from the Mark Twain site in West Frankfort, Illinois has been completed. Analysis for Semivolatile (SVOA) and Volatile (VOA) Organics was performed by Great Lakes Analytical of Buffalo Grove, Illinois, in accordance with U.S. EPA Methods 6000 and 7000 series.

The samples were numbered D01-D06, and the laboratory numbered the samples 3090039-3090044.

Data Qualifications:

I Holding Time: Acceptable.

The SVOA and VOA samples were collected on 9/1/93 and analyzed on 9/2-9/93. SVOA were extracted on 9/2/93. The holding time criteria of 14 days for soils and 7 days for water between collection and analysis were satisfied for both matrices.

II GC/MS Tuning: Acceptable.

GC/MS ion abundance criteria for VOA using Bromofluorobenzene (BFB) and for SVOA using Decafluorotriphenophosphine (DFTPP) have been satisfied.

III Calibration: Qualified.

A. Initial Calibration:
A 5-point calibration was performed prior to analysis. All average relative response factors were greater than 0.05 for VOA and

SVOA. The percent relative standard deviations (%RSD) between response factors were less than 30% for VOA and SVOA except vinyl acetate (39), 2,4-dinitrophenol (39), pentachlorophenol (31), benzidine (34), chrysene (33), and 3,3-dichlorobenzidine (30.8) which have been qualified as estimated (J) or UJ for nondetects.

B. Continuing Calibration:

The percent differences (%D) between initial and continuing calibration for VOA and SVOA were within quality control guidelines of less than or equal to 25%, except the compounds listed below. The results have been qualified as estimated (J) and the non-detects have been qualified as (UJ).

Compound (VOA)	Compound (SVOA)
Acetone (34 and 27)	Benzo(k)fluoranthene (36)
Methylene Chloride (45)	Bis(2-chloroethyl)ether (27)
Styrene (28)	
2-Butanone (65)	

IV Method Blank: Acceptable.

A method blank was run with the samples. Acetone and methylene chloride were contaminants detected in the balnk. No action is required since the sample results are less than 5 times the IDL for SVOA and less than 10 times the IDL for methylene chloride and acetone.

V Surrogate Recovery: Acceptable.

The percent recoveries were all within the established control limits for VOA. No surrogate recoveries were obtained for SVOA due to an interference of the diluted sample matrix. No action is required.

VI Matrix Spike/Matrix Spike Duplicates: Qualified.

The percent recoveries and relative percent differences (RPD) for the Matrix Spike/Matrix Spike Duplicates (MS/MSD) were within quality control limits for both VOA and SVOA of 80-120% and the established percents for RPD, except 1,2,4-trichlorobenzene (36) which has been qualified UJ.

VII Internal Standards: Acceptable.

The established quality control criteria for the internal standard (IS) area counts is in the range of -50% to +100% from the associated calibration standard. Retention time for IS is within the ±30 second control limit.

VIII Overall Assessment of Data for Use

According to the laboratory, analyses were difficult for both VOA and SVOA due to the sample matrix. There were numerous runs made in order to achieve results for VOAs, and SVOAs were diluted which resulted in unrecoverable surrogates. No action is required because of systematic difficulties in analysing the sample matrices.

The overall usefulness of the data is based on the criteria outlined in "Quality Assurance/Quality Control Guidance for Removal Activities" (OSWER 9360.4-01 April, 1990). Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the contract required detection limits or quality control criteria were not met.

UJ - The material was analyzed for, but not detected. The reported detection limit is estimated because Quality Control criteria were not met.

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain		Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D01		Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240		Analyzed:	Sep 3-7, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0039		Revised Report:	Sep 16, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acetone	**10**	**280**
Benzene	**2.0**	**4.5**
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chlorodibromomethane	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
Total 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	**2.0**	**68**
2-Hexanone	10	N.D.
Methylene chloride	**2.0**	**780**
4-Methyl-2-pentanone	10	N.D.
Styrene	**2.0**	**2,200**
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl acetate	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

3090039.ECE <16>

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D02	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240	Analyzed:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0040	Reported:	Sep 8, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acetone	10,000	N.D.
Benzene	2,000	N.D.
Bromodichloromethane	2,000	N.D.
Bromoform	2,000	N.D.
Bromomethane	2,000	N.D.
2-Butanone	10,000	N.D.
Carbon disulfide	2,000	N.D.
Carbon tetrachloride	2,000	N.D.
Chlorobenzene	2,000	N.D.
Chlorodibromomethane	2,000	N.D.
Chloroethane	2,000	N.D.
2-Chloroethyl vinyl ether	10,000	N.D.
Chloroform	2,000	N.D.
Chloromethane	2,000	N.D.
1,1-Dichloroethane	2,000	N.D.
1,2-Dichloroethane	2,000	N.D.
1,1-Dichloroethene	2,000	N.D.
Total 1,2-Dichloroethene	2,000	N.D.
1,2-Dichloropropane	2,000	N.D.
cis 1,3-Dichloropropene	2,000	N.D.
trans 1,3-Dichloropropene	2,000	N.D.
Ethylbenzene	2,000	N.D.
2-Hexanone	10,000	N.D.
Methylene chloride	2,000	N.D.
4-Methyl-2-pentanone	10,000	N.D.
Styrene	2,000	3,000
1,1,2,2-Tetrachloroethane	2,000	N.D.
Tetrachloroethene	2,000	N.D.
Toluene	2,000	N.D.
1,1,1-Trichloroethane	2,000	N.D.
1,1,2-Trichloroethane	2,000	N.D.
Trichloroethene	2,000	N.D.
Trichlorofluoromethane	2,000	14,000
Vinyl acetate	2,000	N.D.
Vinyl chloride	2,000	N.D.
Total Xylenes	2,000	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Kevin W. Keeley
Laboratory Director

3090039.ECE <17>

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain		Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid: D03		Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240		Analyzed:	Sep 3, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0041		Reported:	Sep 8, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
Acetone	6,300	N.D.
Benzene	1,300	N.D.
Bromodichloromethane	1,300	N.D.
Bromoform	1,300	N.D.
Bromomethane	1,300	N.D.
2-Butanone	6,300	N.D.
Carbon disulfide	1,300	N.D.
Carbon tetrachloride	1,300	N.D.
Chlorobenzene	1,300	N.D.
Chlorodibromomethane	1,300	N.D.
Chloroethane	1,300	N.D.
2-Chloroethyl vinyl ether	6,300	N.D.
Chloroform	1,300	N.D.
Chloromethane	1,300	N.D.
1,1-Dichloroethane	1,300	N.D.
1,2-Dichloroethane	1,300	N.D.
1,1-Dichloroethene	1,300	N.D.
cis-1,2-Dichloroethene	1,300	N.D.
trans-1,2-Dichloroethene	1,300	N.D.
1,2-Dichloropropane	1,300	N.D.
cis 1,3-Dichloropropene	1,300	N.D.
trans 1,3-Dichloropropene	1,300	N.D.
Ethylbenzene	1,300	N.D.
2-Hexanone	2,500	N.D.
Methylene chloride	1,300	N.D.
4-Methyl-2-pentanone	2,500	N.D.
Styrene	1,300	25,000
1,1,2,2-Tetrachloroethane	1,300	N.D.
Tetrachloroethene	1,300	N.D.
Toluene	1,300	N.D.
1,1,1-Trichloroethane	1,300	N.D.
1,1,2-Trichloroethane	1,300	N.D.
Trichloroethene	1,300	N.D.
Trichlorofluoromethane	1,300	N.D.
Vinyl acetate	2,500	N.D.
Vinyl chloride	1,300	N.D.
Total Xylenes	3,800	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

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3090039.ECE <22>

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain		Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid: D04		Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240		Analyzed:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0042		Reported:	Sep 8, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
Acetone	13,000	N.D.
Benzene	2,500	N.D.
Bromodichloromethane	2,500	N.D.
Bromoform	2,500	N.D.
Bromomethane	2,500	N.D.
2-Butanone	13,000	N.D.
Carbon disulfide	2,500	N.D.
Carbon tetrachloride	2,500	N.D.
Chlorobenzene	2,500	N.D.
Chlorodibromomethane	2,500	N.D.
Chloroethane	2,500	N.D.
2-Chloroethyl vinyl ether	13,000	N.D.
Chloroform	2,500	N.D.
Chloromethane	2,500	N.D.
1,1-Dichloroethane	2,500	N.D.
1,2-Dichloroethane	2,500	N.D.
1,1-Dichloroethene	2,500	N.D.
cis-1,2-Dichloroethene	2,500	N.D.
trans-1,2-Dichloroethene	2,500	N.D.
1,2-Dichloropropane	2,500	N.D.
cis 1,3-Dichloropropene	2,500	N.D.
trans 1,3-Dichloropropene	2,500	N.D.
Ethylbenzene	2,500	2,900
2-Hexanone	5,000	N.D.
Methylene chloride	2,500	N.D.
4-Methyl-2-pentanone	5,000	N.D.
Styrene	2,500	41,000,000
1,1,2,2-Tetrachloroethane	2,500	N.D.
Tetrachloroethene	2,500	N.D.
Toluene	2,500	N.D.
1,1,1-Trichloroethane	2,500	N.D.
1,1,2-Trichloroethane	2,500	N.D.
Trichloroethene	2,500	N.D.
Trichlorofluoromethane	2,500	N.D.
Vinyl acetate	5,000	N.D.
Vinyl chloride	2,500	N.D.
Total Xylenes	7,500	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain		Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D05		Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240		Analyzed:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0043		Reported:	Sep 8, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acetone	100,000	N.D.
Benzene	20,000	N.D.
Bromodichloromethane	20,000	N.D.
Bromoform	20,000	N.D.
Bromomethane	20,000	N.D.
2-Butanone	100,000	N.D.
Carbon disulfide	20,000	N.D.
Carbon tetrachloride	20,000	N.D.
Chlorobenzene	20,000	100,000
Chlorodibromomethane	20,000	N.D.
Chloroethane	20,000	N.D.
2-Chloroethyl vinyl ether	100,000	N.D.
Chloroform	20,000	N.D.
Chloromethane	20,000	N.D.
1,1-Dichloroethane	20,000	N.D.
1,2-Dichloroethane	20,000	N.D.
1,1-Dichloroethene	20,000	N.D.
Total 1,2-Dichloroethene	20,000	N.D.
1,2-Dichloropropane	20,000	N.D.
cis 1,3-Dichloropropene	20,000	N.D.
trans 1,3-Dichloropropene	20,000	N.D.
Ethylbenzene	20,000	N.D.
2-Hexanone	100,000	N.D.
Methylene chloride	20,000	N.D.
4-Methyl-2-pentanone	100,000	N.D.
Styrene	20,000	N.D.
1,1,2,2-Tetrachloroethane	20,000	N.D.
Tetrachloroethene	20,000	N.D.
Toluene	20,000	N.D.
1,1,1-Trichloroethane	20,000	N.D.
1,1,2-Trichloroethane	20,000	N.D.
Trichloroethene	20,000	N.D.
Trichlorofluoromethane	20,000	N.D.
Vinyl acetate	20,000	N.D.
Vinyl chloride	20,000	N.D.
Total Xylenes	20,000	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
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3090039.ECE <18>

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain		Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D06		Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8240		Analyzed:	Sep 3, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0044		Reported:	Sep 8, 1993

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acetone	10,000,000	N.D.
Benzene	2,000,000	N.D.
Bromodichloromethane	2,000,000	N.D.
Bromoform	2,000,000	N.D.
Bromomethane	2,000,000	N.D.
2-Butanone	2,000,000	170,000,000
Carbon disulfide	2,000,000	N.D.
Carbon tetrachloride	2,000,000	N.D.
Chlorobenzene	2,000,000	N.D.
Chlorodibromomethane	2,000,000	N.D.
Chloroethane	2,000,000	N.D.
2-Chloroethyl vinyl ether	10,000,000	N.D.
Chloroform	2,000,000	N.D.
Chloromethane	2,000,000	N.D.
1,1-Dichloroethane	2,000,000	N.D.
1,2-Dichloroethane	2,000,000	N.D.
1,1-Dichloroethene	2,000,000	N.D.
Total 1,2-Dichloroethene	2,000,000	N.D.
1,2-Dichloropropane	2,000,000	N.D.
cis 1,3-Dichloropropene	2,000,000	N.D.
trans 1,3-Dichloropropene	2,000,000	N.D.
Ethylbenzene	2,000,000	N.D.
2-Hexanone	10,000,000	N.D.
Methylene chloride	2,000,000	N.D.
4-Methyl-2-pentanone	10,000,000	N.D.
Styrene	2,000,000	43,000,000
1,1,2,2-Tetrachloroethane	2,000,000	N.D.
Tetrachloroethene	2,000,000	N.D.
Toluene	2,000,000	N.D.
1,1,1-Trichloroethane	2,000,000	N.D.
1,1,2-Trichloroethane	2,000,000	N.D.
Trichloroethene	2,000,000	N.D.
Trichlorofluoromethane	2,000,000	N.D.
Vinyl acetate	2,000,000	N.D.
Vinyl chloride	2,000,000	N.D.
Total Xylenes	2,000,000	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Kevin W. Keeley
Laboratory Director

3090039.ECE <19>

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D01	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0039	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acenaphthene	400	N.D.
Acenaphthylene	400	N.D.
Aniline	400	N.D.
Anthracene	400	N.D.
Benzidine	10,000	N.D.
Benzoic Acid	2,000	N.D.
Benzo(a)anthracene	400	N.D.
Benzo(b)fluoranthene	400	N.D.
Benzo(k)fluoranthene	400	N.D.
Benzo(g,h,i)perylene	400	N.D.
Benzo(a)pyrene	400	N.D.
Benzyl alcohol	400	32,000
Bis(2-chloroethoxy)methane	400	N.D.
Bis(2-chloroethyl)ether	400	N.D.
Bis(2-chloroisopropyl)ether	400	N.D.
Bis(2-ethylhexyl)phthalate	2,000	N.D.
4-Bromophenyl phenyl ether	400	N.D.
Butyl benzyl phthalate	400	N.D.
4-Chloroaniline	400	N.D.
2-Chloronaphthalene	400	N.D.
4-Chloro-3-methylphenol	400	N.D.
2-Chlorophenol	400	N.D.
4-Chlorophenyl phenyl ether	400	N.D.
Chrysene	400	N.D.
Dibenz(a,h)anthracene	400	N.D.
Dibenzofuran	400	N.D.
Di-N-butyl phthalate	2,000	N.D.
1,3-Dichlorobenzene	400	N.D.
1,4-Dichlorobenzene	400	N.D.
1,2-Dichlorobenzene	400	N.D.
3,3-Dichlorobenzidine	2,000	N.D.
2,4-Dichlorophenol	400	N.D.
Diethyl phthalate	400	N.D.
2,4-Dimethylphenol	400	N.D.
Dimethyl phthalate	400	N.D.
4,6-Dinitro-2-methylphenol	2,000	N.D.
2,4-Dinitrophenol	2,000	N.D.

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D01	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0039	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
2,4-Dinitrotoluene	400.0	N.D.
2,6-Dinitrotoluene	400.0	N.D.
Di-N-octyl phthalate	400.0	N.D.
Fluoranthene	400.0	N.D.
Fluorene	400.0	N.D.
Hexachlorobenzene	400.0	N.D.
Hexachlorobutadiene	400.0	N.D.
Hexachlorocyclopentadiene	400.0	N.D.
Hexachloroethane	400.0	N.D.
Indeno(1,2,3-cd)pyrene	400.0	N.D.
Isophorone	400.0	N.D.
2-Methylnaphthalene	400.0	N.D.
2-Methylphenol	400.0	N.D.
4-Methylphenol	400.0	N.D.
Naphthalene	400.0	N.D.
2-Nitroaniline	2,000	N.D.
3-Nitroaniline	2,000	N.D.
4-Nitroaniline	2,000	N.D.
Nitrobenzene	400.0	N.D.
2-Nitrophenol	400.0	N.D.
4-Nitrophenol	2,000	N.D.
N-Nitrosodiphenylamine	400.0	N.D.
N-Nitroso-di-N-propylamine	400.0	N.D.
Pentachlorophenol	2,000	N.D.
Phenanthrene	400.0	N.D.
Phenol	400.0	N.D.
Pyrene	400.0	N.D.
1,2,4-Trichlorobenzene	400.0	N.D.
2,4,5-Trichlorophenol	2,000	N.D.
2,4,6-Trichlorophenol	400.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Kevin W. Keeley
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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D02	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0040	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acenaphthene	400	N.D.
Acenaphthylene	400	N.D.
Aniline	400	N.D.
Anthracene	400	N.D.
Benzidine	10,000	N.D.
Benzoic Acid	2,000	N.D.
Benzo(a)anthracene	400	N.D.
Benzo(b)fluoranthene	400	N.D.
Benzo(k)fluoranthene	400	N.D.
Benzo(g,h,i)perylene	400	N.D.
Benzo(a)pyrene	400	N.D.
Benzyl alcohol	400	N.D.
Bis(2-chloroethoxy)methane	400	N.D.
Bis(2-chloroethyl)ether	400	N.D.
Bis(2-chloroisopropyl)ether	400	N.D.
Bis(2-ethylhexyl)phthalate	2,000	N.D.
4-Bromophenyl phenyl ether	400	N.D.
Butyl benzyl phthalate	400	N.D.
4-Chloroaniline	400	N.D.
2-Chloronaphthalene	400	N.D.
4-Chloro-3-methylphenol	400	N.D.
2-Chlorophenol	400	N.D.
4-Chlorophenyl phenyl ether	400	N.D.
Chrysene	400	N.D.
Dibenz(a,h)anthracene	400	N.D.
Dibenzofuran	400	N.D.
Di-N-butyl phthalate	2,000	N.D.
1,3-Dichlorobenzene	400	N.D.
1,4-Dichlorobenzene	400	N.D.
1,2-Dichlorobenzene	400	N.D.
3,3-Dichlorobenzidine	2,000	N.D.
2,4-Dichlorophenol	400	N.D.
Diethyl phthalate	400	N.D.
2,4-Dimethylphenol	400	N.D.
Dimethyl phthalate	400	N.D.
4,6-Dinitro-2-methylphenol	2,000	N.D.
2,4-Dinitrophenol	2,000	N.D.

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled: Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D02	Received: Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted: Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0040	Analyzed: Sep 6, 1993
			Reported: Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
2,4-Dinitrotoluene	400.0	N.D.
2,6-Dinitrotoluene	400.0	N.D.
Di-N-octyl phthalate	400.0	N.D.
Fluoranthene	400.0	N.D.
Fluorene	400.0	N.D.
Hexachlorobenzene	400.0	N.D.
Hexachlorobutadiene	400.0	N.D.
Hexachlorocyclopentadiene	400.0	N.D.
Hexachloroethane	400.0	N.D.
Indeno(1,2,3-cd)pyrene	400.0	N.D.
Isophorone	400.0	N.D.
2-Methylnaphthalene	400.0	N.D.
2-Methylphenol	400.0	N.D.
4-Methylphenol	400.0	N.D.
Naphthalene	400.0	N.D.
2-Nitroaniline	2,000	N.D.
3-Nitroaniline	2,000	N.D.
4-Nitroaniline	2,000	N.D.
Nitrobenzene	400.0	N.D.
2-Nitrophenol	400.0	N.D.
4-Nitrophenol	2,000	N.D.
N-Nitrosodiphenylamine	400.0	N.D.
N-Nitroso-di-N-propylamine	400.0	N.D.
Pentachlorophenol	2,000	N.D.
Phenanthrene	400.0	N.D.
Phenol	400.0	N.D.
Pyrene	400.0	N.D.
1,2,4-Trichlorobenzene	400.0	N.D.
2,4,5-Trichlorophenol	2,000	N.D.
2,4,6-Trichlorophenol	400.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

Crystal Pallack /L

Kevin W. Keeley
Laboratory Director

3090039.ECE <29>

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GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid: D03	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0041	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
Acenaphthene	1,000	N.D.
Acenaphthylene	1,000	N.D.
Aniline	1,000	N.D.
Anthracene	1,000	N.D.
Benzidine	25,000	N.D.
Benzoic Acid	5,000	6,000
Benzo(a)anthracene	1,000	N.D.
Benzo(b)fluoranthene	1,000	N.D.
Benzo(k)fluoranthene	1,000	N.D.
Benzo(g,h,i)perylene	1,000	N.D.
Benzo(a)pyrene	1,000	N.D.
Benzyl alcohol	1,000	1,000
Bis(2-chloroethoxy)methane	1,000	N.D.
Bis(2-chloroethyl)ether	1,000	N.D.
Bis(2-chloroisopropyl)ether	1,000	N.D.
Bis(2-ethylhexyl)phthalate	3,300	N.D.
4-Bromophenyl phenyl ether	1,000	N.D.
Butyl benzyl phthalate	1,000	N.D.
4-Chloroaniline	1,000	N.D.
2-Chloronaphthalene	1,000	N.D.
4-Chloro-3-methylphenol	1,000	N.D.
2-Chlorophenol	1,000	N.D.
4-Chlorophenyl phenyl ether	1,000	N.D.
Chrysene	1,000	N.D.
Dibenz(a,h)anthracene	1,000	N.D.
Dibenzofuran	1,000	N.D.
Di-N-butyl phthalate	3,300	N.D.
1,3-Dichlorobenzene	1,000	N.D.
1,4-Dichlorobenzene	1,000	N.D.
1,2-Dichlorobenzene	1,000	N.D.
3,3-Dichlorobenzidine	5,000	N.D.
2,4-Dichlorophenol	1,000	N.D.
Diethyl phthalate	1,000	N.D.
2,4-Dimethylphenol	1,000	N.D.
Dimethyl phthalate	1,000	26,000
4,6-Dinitro-2-methylphenol	5,000	N.D.
2,4-Dinitrophenol	5,000	N.D.

GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-7772

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled: Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid: D03	Received: Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted: Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0041	Analyzed: Sep 6, 1993
			Reported: Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
2,4-Dinitrotoluene	1,000	N.D.
2,6-Dinitrotoluene	1,000	N.D.
Di-N-octyl phthalate	1,000	N.D.
Fluoranthene	1,000	N.D.
Fluorene	1,000	N.D.
Hexachlorobenzene	1,000	N.D.
Hexachlorobutadiene	1,000	N.D.
Hexachlorocyclopentadiene	1,000	N.D.
Hexachloroethane	1,000	N.D.
Indeno(1,2,3-cd)pyrene	1,000	N.D.
Isophorone	1,000	N.D.
2-Methylnaphthalene	1,000	N.D.
2-Methylphenol	1,000	N.D.
4-Methylphenol	1,000	N.D.
Naphthalene	1,000	N.D.
2-Nitroaniline	5,000	N.D.
3-Nitroaniline	5,000	N.D.
4-Nitroaniline	5,000	N.D.
Nitrobenzene	1,000	N.D.
2-Nitrophenol	1,000	N.D.
4-Nitrophenol	5,000	N.D.
N-Nitrosodiphenylamine	1,000	N.D.
N-Nitroso-di-N-propylamine	1,000	N.D.
Pentachlorophenol	5,000	N.D.
Phenanthrene	1,000	N.D.
Phenol	1,000	N.D.
Pyrene	1,000	N.D.
1,2,4-Trichlorobenzene	1,000	N.D.
2,4,5-Trichlorophenol	5,000	N.D.
2,4,6-Trichlorophenol	1,000	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid: D04	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0042	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
Acenaphthene	18,000	N.D.
Acenaphthylene	18,000	N.D.
Aniline	18,000	N.D.
Anthracene	18,000	N.D.
Benzidine	450,000	N.D.
Benzoic Acid	90,000	N.D.
Benzo(a)anthracene	18,000	N.D.
Benzo(b)fluoranthene	18,000	N.D.
Benzo(k)fluoranthene	18,000	N.D.
Benzo(g,h,i)perylene	18,000	N.D.
Benzo(a)pyrene	18,000	N.D.
Benzyl alcohol	18,000	N.D.
Bis(2-chloroethoxy)methane	18,000	N.D.
Bis(2-chloroethyl)ether	18,000	N.D.
Bis(2-chloroisopropyl)ether	18,000	N.D.
Bis(2-ethylhexyl)phthalate	59,000	N.D.
4-Bromophenyl phenyl ether	18,000	N.D.
Butyl benzyl phthalate	18,000	75,000
4-Chloroaniline	18,000	N.D.
2-Chloronaphthalene	18,000	N.D.
4-Chloro-3-methylphenol	18,000	N.D.
2-Chlorophenol	18,000	N.D.
4-Chlorophenyl phenyl ether	18,000	N.D.
Chrysene	18,000	N.D.
Dibenz(a,h)anthracene	18,000	N.D.
Dibenzofuran	18,000	N.D.
Di-N-butyl phthalate	59,000	77,000
1,3-Dichlorobenzene	18,000	N.D.
1,4-Dichlorobenzene	18,000	N.D.
1,2-Dichlorobenzene	18,000	N.D.
3,3-Dichlorobenzidine	90,000	N.D.
2,4-Dichlorophenol	18,000	N.D.
Diethyl phthalate	18,000	N.D.
2,4-Dimethylphenol	18,000	N.D.
Dimethyl phthalate	18,000	N.D.
4,6-Dinitro-2-methylphenol	90,000	N.D.
2,4-Dinitrophenol	90,000	N.D.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1
111 W. Jackson Blvd.	Sample Descript:	Solid: D04	Received:	Sep 2, 1
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 2, 1
Attention: Mary Jane Ripp	Lab Number:	309-0042	Analyzed:	Sep 6, 1
			Reported:	Sep 8, 1

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg, Dry Weight	Sample Results µg/kg, Dry Weight
2,4-Dinitrotoluene	18,000	N.D.
2,6-Dinitrotoluene	18,000	N.D.
Di-N-octyl phthalate	18,000	N.D.
Fluoranthene	18,000	N.D.
Fluorene	18,000	N.D.
Hexachlorobenzene	18,000	N.D.
Hexachlorobutadiene	18,000	N.D.
Hexachlorocyclopentadiene	18,000	N.D.
Hexachloroethane	18,000	N.D.
Indeno(1,2,3-cd)pyrene	18,000	N.D.
Isophorone	18,000	N.D.
2-Methylnaphthalene	18,000	N.D.
2-Methylphenol	18,000	N.D.
4-Methylphenol	18,000	N.D.
Naphthalene	18,000	N.D.
2-Nitroaniline	90,000	N.D.
3-Nitroaniline	90,000	N.D.
4-Nitroaniline	90,000	N.D.
Nitrobenzene	18,000	N.D.
2-Nitrophenol	18,000	N.D.
4-Nitrophenol	90,000	N.D.
N-Nitrosodiphenylamine	18,000	N.D.
N-Nitroso-di-N-propylamine	18,000	N.D.
Pentachlorophenol	90,000	N.D.
Phenanthrene	18,000	N.D.
Phenol	18,000	N.D.
Pyrene	18,000	N.D.
1,2,4-Trichlorobenzene	18,000	N.D.
2,4,5-Trichlorophenol	90,000	N.D.
2,4,6-Trichlorophenol	18,000	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other fac required additional sample dilution, detection limits for this sample have been raised.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled: Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D05	Received: Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted: Sep 3, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0043	Analyzed: Sep 6, 1993
			Reported: Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit mg/L	Sample Results mg/L
Acenaphthene	2.0	N.D.
Acenaphthylene	2.0	N.D.
Aniline	2.0	N.D.
Anthracene	2.0	N.D.
Benzidine	50	N.D.
Benzoic Acid	10	N.D.
Benzo(a)anthracene	2.0	N.D.
Benzo(b)fluoranthene	2.0	N.D.
Benzo(k)fluoranthene	2.0	N.D.
Benzo(g,h,i)perylene	2.0	N.D.
Benzo(a)pyrene	2.0	N.D.
Benzyl alcohol	2.0	N.D.
Bis(2-chloroethoxy)methane	2.0	N.D.
Bis(2-chloroethyl)ether	2.0	N.D.
Bis(2-chloroisopropyl)ether	2.0	N.D.
Bis(2-ethylhexyl)phthalate	10	N.D.
4-Bromophenyl phenyl ether	2.0	N.D.
Butyl benzyl phthalate	2.0	N.D.
4-Chloroaniline	2.0	N.D.
2-Chloronaphthalene	2.0	N.D.
4-Chloro-3-methylphenol	2.0	N.D.
2-Chlorophenol	2.0	N.D.
4-Chlorophenyl phenyl ether	2.0	N.D.
Chrysene	2.0	N.D.
Dibenz(a,h)anthracene	2.0	N.D.
Dibenzofuran	2.0	N.D.
Di-N-butyl phthalate	10	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,2-Dichlorobenzene	2.0	N.D.
3,3-Dichlorobenzidine	10	N.D.
2,4-Dichlorophenol	2.0	N.D.
Diethyl phthalate	2.0	N.D.
2,4-Dimethylphenol	2.0	N.D.
Dimethyl phthalate	2.0	N.D.
4,6-Dinitro-2-methylphenol	10	N.D.
2,4-Dinitrophenol	10	N.D.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled: Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D05	Received: Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted: Sep 3, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0043	Analyzed: Sep 6, 1993
			Reported: Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit mg/L	Sample Results mg/L
2,4-Dinitrotoluene	2.0	N.D.
2,6-Dinitrotoluene	2.0	N.D.
Di-N-octyl phthalate	2.0	N.D.
Fluoranthene	2.0	N.D.
Fluorene	2.0	N.D.
Hexachlorobenzene	2.0	N.D.
Hexachlorobutadiene	2.0	N.D.
Hexachlorocyclopentadiene	2.0	N.D.
Hexachloroethane	2.0	N.D.
Indeno(1,2,3-cd)pyrene	2.0	N.D.
Isophorone	2.0	N.D.
2-Methylnaphthalene	2.0	N.D.
2-Methylphenol	2.0	N.D.
4-Methylphenol	2.0	N.D.
Naphthalene	2.0	N.D.
2-Nitroaniline	10	N.D.
3-Nitroaniline	10	N.D.
4-Nitroaniline	10	N.D.
Nitrobenzene	2.0	N.D.
2-Nitrophenol	2.0	N.D.
4-Nitrophenol	10	N.D.
N-Nitrosodiphenylamine	2.0	N.D.
N-Nitroso-di-N-propylamine	2.0	N.D.
Pentachlorophenol	10	N.D.
Phenanthrene	2.0	N.D.
Phenol	2.0	N.D.
Pyrene	2.0	N.D.
1,2,4-Trichlorobenzene	2.0	N.D.
2,4,5-Trichlorophenol	10	N.D.
2,4,6-Trichlorophenol	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid: D06	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:	Sep 3, 1993
Attention: Mary Jane Ripp	Lab Number:	309-0044	Analyzed:	Sep 6, 1993
			Reported:	Sep 8, 1993

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit mg/L	Sample Results mg/L
Acenaphthene	20	N.D.
Acenaphthylene	20	N.D.
Aniline	20	N.D.
Anthracene	20	N.D.
Benzidine	500	N.D.
Benzoic Acid	100	N.D.
Benzo(a)anthracene	20	N.D.
Benzo(b)fluoranthene	20	N.D.
Benzo(k)fluoranthene	20	N.D.
Benzo(g,h,i)perylene	20	N.D.
Benzo(a)pyrene	20	N.D.
Benzyl alcohol	20	N.D.
Bis(2-chloroethoxy)methane	20	N.D.
Bis(2-chloroethyl)ether	20	N.D.
Bis(2-chloroisopropyl)ether	20	N.D.
Bis(2-ethylhexyl)phthalate	100	N.D.
4-Bromophenyl phenyl ether	20	N.D.
Butyl benzyl phthalate	20	N.D.
4-Chloroaniline	20	N.D.
2-Chloronaphthalene	20	N.D.
4-Chloro-3-methylphenol	20	N.D.
2-Chlorophenol	20	N.D.
4-Chlorophenyl phenyl ether	20	N.D.
Chrysene	20	N.D.
Dibenz(a,h)anthracene	20	N.D.
Dibenzofuran	20	N.D.
Di-N-butyl phthalate	100	N.D.
1,3-Dichlorobenzene	20	N.D.
1,4-Dichlorobenzene	20	N.D.
1,2-Dichlorobenzene	20	N.D.
3,3-Dichlorobenzidine	100	N.D.
2,4-Dichlorophenol	20	N.D.
Diethyl phthalate	20	N.D.
2,4-Dimethylphenol	20	N.D.
Dimethyl phthalate	20	N.D.
4,6-Dinitro-2-methylphenol	100	N.D.
2,4-Dinitrophenol	100	N.D.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:
111 W. Jackson Blvd.	Sample Descript:	Liquid: D06	Received:
Chicago, IL 60604	Analysis Method:	EPA 8270	Extracted:
Attention: Mary Jane Ripp	Lab Number:	309-0044	Analyzed:
			Reported:

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit mg/L	Sample mg/
2,4-Dinitrotoluene	20.0	N.D
2,6-Dinitrotoluene	20.0	N.D
Di-N-octyl phthalate	20.0	N.D
Fluoranthene	20.0	N.D
Fluorene	20.0	N.D
Hexachlorobenzene	20.0	N.D
Hexachlorobutadiene	20.0	N.D
Hexachlorocyclopentadiene	20.0	N.D
Hexachloroethane	20.0	N.D
Indeno(1,2,3-cd)pyrene	20.0	N.D.
Isophorone	20.0	N.D.
2-Methylnaphthalene	20.0	N.D.
2-Methylphenol	20.0	N.D.
4-Methylphenol	20.0	N.D.
Naphthalene	20.0	N.D.
2-Nitroaniline	100	N.D.
3-Nitroaniline	100	N.D.
4-Nitroaniline	100	N.D.
Nitrobenzene	20.0	N.D.
2-Nitrophenol	20.0	N.D.
4-Nitrophenol	100	N.D.
N-Nitrosodiphenylamine	20.0	N.D.
N-Nitroso-di-N-propylamine	20.0	N.D.
Pentachlorophenol	100	N.D.
Phenanthrene	20.0	N.D.
Phenol	20.0	N.D.
Pyrene	20.0	N.D.
1,2,4-Trichlorobenzene	20.0	N.D.
2,4,5-Trichlorophenol	100	N.D.
2,4,6-Trichlorophenol	20.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or othe required additional sample dilution, detection limits for this sample have been raised.

GREAT LAKES ANALYTICAL

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ecology and environment, inc.

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International Specialists in the Environment

MEMORANDUM

DATE: September 24, 1993

TO: John Sherrard, Project Manager, E & E, Chicago, IL

FROM: Yvette Anderson, TAT-Chemist, E & E, Chicago, IL

THRU: Lisa Ende, TAT-Chemist, E & E, Chicago, IL

SUBJ: Inorganic/Flash Point Data Quality Assurance Review, Mark Twain site, West Frankfort, Franklin County, Illinois.

REF: Analytical TDD: T059308819 Project TDD: T059308001
Analytical PAN: EIL0803AAA Project PAN: EIL0803SAA

The data quality assurance review of 4 liquid samples and 2 solid samples collected from the Mark Twain site in West Frankfort, Illinois has been completed. Analysis for Inorganics (U.S. EPA Methods 6000 and 7000 series) and Flash Point (U.S. EPA Methods 1010 and 1020) was performed by Great Lakes Analytical of Buffalo Grove, Illinois.

The samples were numbered D01-D06, and the laboratory numbered the samples 3090039-3090044.

Data Qualifications:

I **Sample Holding Time:** Acceptable.

The samples were collected on 9/1/93 and analzed on 9/3-8/93. The holding time criteria for metals of 6 months and for mercury of 28 days were satisfied. Flash point analyses were performed on 9/7/93.

II **Calibration:** Acceptable.

A. **Initial Calibration and Calibration Verification:**
Calibration results were within established quality control limits of 90-110% metals and 80-120% for mercury.

B. **Continuing Calibration:**
Calibration results showed that established quality control limits of 90-110% for metals and 80-120% for mercury were met.

recycled paper

III Method Blank: Acceptable.

Method blanks were analyzed with the samples. Blank concentrations were below the instrument detection limit for both sample matrices.

IV Interference Check Sample Analysis: Acceptable.

All parameters were within the Interference Check Sample (ICS) control limits 80-120% of the true values. ICS was run at the beginning and end of each sample analysis.

V Matrix Spike/Matrix Spike Duplicate: Qualified.

Spike Sample Analysis:
All Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries were within the quality control limits of 80-120%, except the following which have been qualified accordingly.

Arsenic (56) and Selenium (40) have been qualified as estimated (UJ) because sample results are less than the IDL. Barium (130) has been qualified as estimated (J) because the sample results are greater than the IDL. Chromium and Lead were not were not recovered due to their high analyte concentration in soil. No action is required.

VI Determination of Bias: Acceptable.

Duplicate Sample Analysis:
The relative percent difference (RPD) of the samples were within the established quality control limits of ± 20 for liquids and $\pm$ 35 for soils.

VII Optional Additional QC: Acceptable.

Laboratory Control Sample Analysis:
The quality control criteria of 80-120% were met.

VIII Flash Point: Acceptable.

Flash point results were acceptable as the ignitablity occurred at greater than 200 F for all samples, except sample number D06 (Lab #3090044). This sample ignited before heat was applied (70 F). The sample was reanalyzed to confirm the results.

IX Overall Assessment of Data for Use

According to the laboratory, results for the sample matrices were difficult to achieve due to the high concentration of the analyte.

The overall usefulness of the data is based on the criteria outlined in "Quality Assurance/Quality Control Guidance For Removal Activities" (OSWER Directive 9360.4-01, April 1990). Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the contract required detection limits or quality control criteria were not met.

UJ - The material was analyzed for, but not detected. The reported detection limit is estimated because Quality Control criteria were not met.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Liquid	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis for:	Flash Point, Closed Cup(F)		
Attention: Mary Jane Ripp	First Sample #:	309-0039	Analyzed:	Sep 7-8, 1993
			Reported:	Sep 8, 1993

LABORATORY ANALYSIS FOR: Flash Point, Closed Cup(F)

Sample Number	Sample Description	Sample Result
309-0039	D01	>200
309-0040	D02	>200
309-0043	D05	>200
309-0044	D06	70

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 1993
111 W. Jackson Blvd.	Sample Descript:	Solid	Received:	Sep 2, 1993
Chicago, IL 60604	Analysis for:	Flash Point, Open Cup(F)		
Attention: Mary Jane Ripp	First Sample #:	309-0041	Analyzed:	Sep 7, 1993
			Reported:	Sep 8, 1993

LABORATORY ANALYSIS FOR: Flash Point, Open Cup(F)

Sample Number	Sample Description	Sample Result
309-0041	D03	>200
309-0042	D04	>200

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Ecology & Environment
111 W. Jackson Blvd.
Chicago, IL 60604
Attention: Mary Jane Ripp

Client Project ID: ZT2051, USEPA/Mark Twain
Sample Descript: Liquid: D01
Lab Number: 309-0039

Sampled: Sep 1, 1993
Received: Sep 2, 1993
Extracted: Sep 1-7, 1993
Analyzed: Sep 3-8, 193
Reported: Sep 8, 1993

RCRA METALS

Analyte	EPA Method	Detection Limit mg/L (ppm)	Sample Results mg/L (ppm)
Arsenic	3010/7060	0.050	N.D.
Barium	3010/6010	0.50	N.D.
Cadmium	3010/6010	0.010	N.D.
Chromium	3010/6010	0.010	N.D.
Lead	3010/7421	0.10	N.D.
Mercury	7470	0.0020	N.D.
Selenium	3010/7740	0.010	N.D.
Silver	3010/6010	0.050	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

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GREAT LAKES ANALYTICAL 1380 Busch Parkway • Buffalo Grove, Illinois 60089 (708) 808-7766 FAX (708) 808-777

Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep 1, 199
111 W. Jackson Blvd.	Sample Descript:	Liquid: D02	Received:	Sep 2, 199
Chicago, IL 60604			Extracted:	Sep 1-7, 199
Attention: Mary Jane Ripp	Lab Number:	309-0040	Analyzed:	Sep 3-8, 19
			Reported:	Sep 8, 199

RCRA METALS

Analyte	EPA Method	Detection Limit mg/L (ppm)	Sample Results mg/L (ppm)
Arsenic	3010/7060	0.050	N.D.
Barium	3010/6010	0.50	N.D.
Cadmium	3010/6010	0.010	0.036
Chromium	3010/6010	0.010	0.062
Lead	3010/7421	0.10	N.D.
Mercury	7470	0.0020	N.D.
Selenium	3010/7740	0.010	N.D.
Silver	3010/6010	0.050	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep
111 W. Jackson Blvd.	Sample Descript:	Liquid: D05	Received:	Sep
Chicago, IL 60604			Extracted:	Sep
Attention: Mary Jane Ripp	Lab Number:	309-0043	Analyzed:	Sep
			Reported:	Sep

RCRA METALS

Analyte	EPA Method	Detection Limit mg/L (ppm)	Sample Resu mg/L (ppm
Arsenic	3010/7060	0.050	N.D.
Barium	3010/6010	0.50	N.D.
Cadmium	3010/6010	0.010	N.D.
Chromium	3010/6010	0.20	N.D.
Lead	3010/7421	0.10	N.D.
Mercury	7470	0.0050	N.D.
Selenium	3010/7740	0.020	N.D.
Silver	3010/6010	0.050	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Laboratory Director

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep
111 W. Jackson Blvd.	Sample Descript:	Solid: D03	Received:	Sep
Chicago, IL 60604			Extracted:	Sep 1
Attention: Mary Jane Ripp	Lab Number:	309-0041	Analyzed:	Sep
			Reported:	Sep

RCRA METALS

Analyte	EPA Method	Detection Limit mg/kg , Dry Weight	Sample Resu. mg/kg , Dry We
Arsenic	3050/7060	2.5	N.D.
Barium	3050/6010	25	31
Cadmium	3050/6010	0.51	N.D.
Chromium	3050/6010	0.51	940
Lead	3050/6010	5.1	2,300
Mercury	7471	0.10	N.D.
Selenium	3050/7740	0.51	N.D.
Silver	3050/6010	2.5	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Kevin W. Keeley
Laboratory Director

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Ecology & Environment	Client Project ID:	ZT2051, USEPA/Mark Twain	Sampled:	Sep
111 W. Jackson Blvd.	Sample Descript:	Solid: D04	Received:	Sep
Chicago, IL 60604			Extracted:	Sep 1
Attention: Mary Jane Ripp	Lab Number:	309-0042	Analyzed:	Sep
			Reported:	Sep

RCRA METALS

Analyte	EPA Method	Detection Limit mg/kg , Dry Weight	Sample Resu mg/kg , Dry W
Arsenic	3050/7060	2.6	N.D.
Barium	3050/6010	26	160
Cadmium	3050/6010	0.53	0.74
Chromium	3050/6010	0.53	2.3
Lead	3050/6010	5.3	8.2
Mercury	7471	0.11	N.D.
Selenium	3050/7740	0.53	N.D.
Silver	3050/6010	2.6	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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APPENDIX B

Summary Report
Initial Cost Projection Scenario: MARK TWAIN

Projection ID Number: EIL0803S
Cleanup Contractor: RES5 - Riedel Environmental

Date: 09/02/93
TAT Contractor: E & E, INC.

Cost Projection Summary

Contractor Personnel	45,383.88
Contractor Equipment	10,106.11
Unit Rate Materials	13,663.38
At Cost Materials	0.00
Subcontractors	2,508.00
Waste Transportation	3,291.75
Waste Disposal	39,448.75
Cleanup Contractor Subtotal	114,401.87
Federal and State Agencies	0.00
Extramural Subtotal	114,401.87
20 % Extramural Contingency	22,880.37
Extramural Subtotal	137,282.24
TAT Personnel	19,980.66
TAT Special Projects	7,910.00
TAT Analytical Services	0.00
Total TAT Costs	27,890.66
Other Cost Items	0.00
Extramural Subtotal	165,172.90
15 % Project Contingency	24,775.94
Total Extramural Cost	189,948.84
EPA Regional Personnel	7,791.00
EPA Non-Regional Personnel	0.00
EPA Headquarters Direct	0.00
(0 % of Regional Hours)	
EPA Indirect	11,130.00
EPA Total	18,921.00
Project Total	208,869.84

Summary Report (cont.)
Initial Cost Projection Scenario: MARK TWAIN

Projection ID Number: EIL0803S
Cleanup Contractor: RES5 - Riedel Environmental

Date: 09/02/93
TAT Contractor: E & E, INC.

Project Scope

Number	Step/Milestone	Estimated Duration	Cost
000	GENERAL SITE COSTS	21 Days	208,869.84
			208,869.84

Detailed Report By Category
Initial Cost Projection Scenario: MARK TWAIN

Projection ID Number: EIL0803S
Cleanup Contractor: RES5 - Riedel Environmental

Date: 09/02/93
TAT Contractor: E & E, INC.

Cost Projection Detail - By Category

Contractor Personnel

Job Category	Number of Employees	Number of Days	Hrs per Day	Labor	PD, Lodge Travel	Total Charge
000 - GENERAL SITE COSTS						

Redacted-information not relevant to the selection of the removal action.

Total personnel cost: 45,383.88

Contractor Equipment

Equipment Name	Number Needed	Reg Days	Hours /day	Stby Days	Mob/Demob Days	Decon Days	Mileage	Total Charge
000 - GENERAL SITE COSTS								
10910-Car-Passenger	1	21	10.00	2	2	1	N/A	1,139.78
13610-Pickup-2 wheel drive	2	21	10.00	2	2	1	N/A	1,669.50
22020-Decon-8x25	1	21	10.00	2	2	1	N/A	603.58
33510-Forklift-Small	1	21	10.00	2	2	1	N/A	3,973.38
34531-Grappler-Drum/Hydrau	1	21	10.00	2	2	1	N/A	235.38
51520-Radio-Portable Base	1	21	10.00	2	2	1	N/A	116.73
72320-Computer-Portable PC	1	21	10.00	2	2	1	N/A	321.83
75105-Generator-5 KW	1	21	10.00	2	2	1	N/A	600.78
76730-Lighting-Light Plant	1	21	10.00	2	2	1	N/A	771.75
79020-Steam Jenny-	1	21	10.00	2	2	1	N/A	502.25
81220-Centrifugal-2 inch	1	21	10.00	2	2	1	N/A	171.15

Total for GENERAL SITE COSTS : 10,106.11

Total equipment cost: 10,106.11

Unit Rate Materials

Material Name	Material Use	Unit Cost	Number of Units	Total Charge
000 - GENERAL SITE COSTS				
DIESEL	FUEL	1.000	75.0 GAL.	78.38

Detailed Report By Category (cont.)
Initial Cost Projection Scenario: MARK TWAIN

Projection ID Number: EIL0803S
Cleanup Contractor: RES5 - Riedel Environmental

Date: 09/02/93
TAT Contractor: E & E, INC.

Unit Rate Materials

Material Name	Material Use	Unit Cost	Number of Units	Total Charge
GASOLINE	FUEL	1.250	200.0 GAL.	261.25
OVERPACKS	DRUMS	50.000	150.0 EACH	7,837.50
PPE	H & S	75.000	70.0 EACH	5,486.25
			Total for GENERAL SITE COSTS :	13,663.38
			Total unit rate materials cost:	13,663.38

At Cost Materials 0.00

Subcontractors

Subcontractor	Service	Billing	Total Charge
000 - GENERAL SITE COSTS			
	LODGING FOR WORKR	0.0 DAYS	0.00
	PER DIEM CHARGES	0.0 DAYS	0.00
WISCONSIN BELL	PHONE SERVICE	2.0 MONTHS	627.00
WISCONSIN PORT-O-JON	PORT BATHROOM REN	2.0 MONTHS	627.00
WISCONSIN EDISON	ELECTRIC SERVICE	2.0 MONTHS	209.00
	SITE WATCHMAN	2.0 MONTHS	1,045.00
		Total for GENERAL SITE COSTS :	2,508.00
		Total subcontractor cost:	2,508.00

Waste Transportation

Waste Type	Amount	Loads	Cost Per Mile	Miles	Total Charge
000 - GENERAL SITE COSTS					
HAZ. WASTE	150	3	3.00	350	3,291.75
			Total for GENERAL SITE COSTS :		3,291.75
			Total transportation cost:		3,291.75

Waste Disposal

Waste Type	Disposal Method	Units	No. of Units	Unit Cost	Total Charge
000 - GENERAL SITE COSTS					
FLAMM LIQ	FUELS BLEND	DRUM	40	100.00	4,180.00

Detailed Report By Category (cont.)
Initial Cost Projection Scenario: MARK TWAIN

Projection ID Number: EIL0803S
Cleanup Contractor: RES5 - Riedel Environmental

Date: 09/02/93
TAT Contractor: E & E, INC.

Waste Disposal

Waste Type	Disposal Method	Units	No. of Units	Unit Cost	Total Charge
FLAMM SOLID	FUELS BLEND	DRUM	40	275.00	11,495.00
HAZ SOLID	INCINERATION	DRUM	70	325.00	23,773.75
				Total for GENERAL SITE COSTS :	39,448.75
				Total disposal cost:	39,448.75

Federal and State Agencies 0.00

20 % Extramural Contingency: 22,880.37

TAT Personnel

Level	Number of Days	Hrs per Day	Hourly Rate	Labor	PD, Lodge Travel	Total Charge

000 - GENERAL SITE COSTS

Redacted-information not relevant to the selection of the removal action.

Total TAT personnel cost: 19,980.66

TAT Special Projects

Description	Total Charge
000 - GENERAL SITE COSTS	
REPORTS, ETC.	7,910.00
Total for GENERAL SITE COSTS :	7,910.00
Total TAT special project cost:	7,910.00

TAT Analytical Services 0.00

Other Costs 0.00

15 % Project Contingency: 24,775.94

Projection ID Number: EIL0803S
Date: 09/02/93
Cleanup Contractor: RES5 - Riedel Environmental
TAT Contractor: E & E, INC.

EPA Regional Personnel

Title	Number of Days	Hrs per Day	Hourly Rate	Labor	PD, Lodge Travel	Total Charge

000 - GENERAL SITE COSTS

Redacted-information not relevant to the selection of the removal action.

Total EPA Regional Personnel Cost:	7,791.00
EPA Headquarters Cost: (0 % of Regional hours)	0.00
EPA Indirect Cost: (210 hours @ $53.00 per hour)	11,130.00
EPA Non-Regional Personnel	0.00
Total EPA Cost:	7,791.00
Total site cost:	197,739.84

APPENDIX C

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 8-31-93

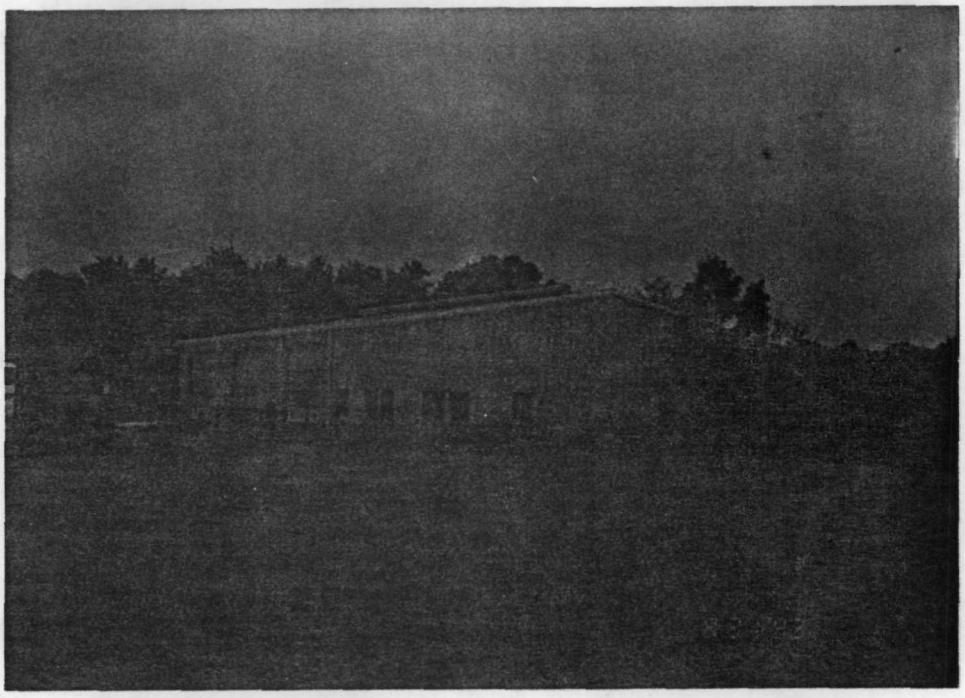
TIME: 1425

DIRECTION OF PHOTOGRAPH: northwest

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View looking northwest of the Mark Twain building storing the drums.

DATE: 8-31-93

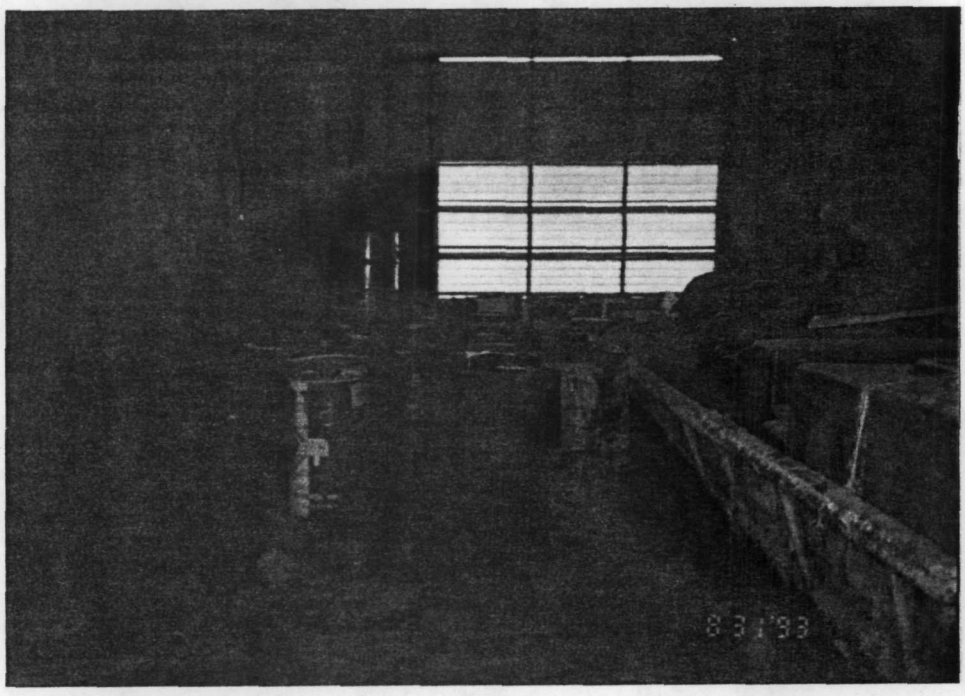
TIME: 1435

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of staged drums inside warehouse. Notice the liquid stains on the concrete slab.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 8-31-93

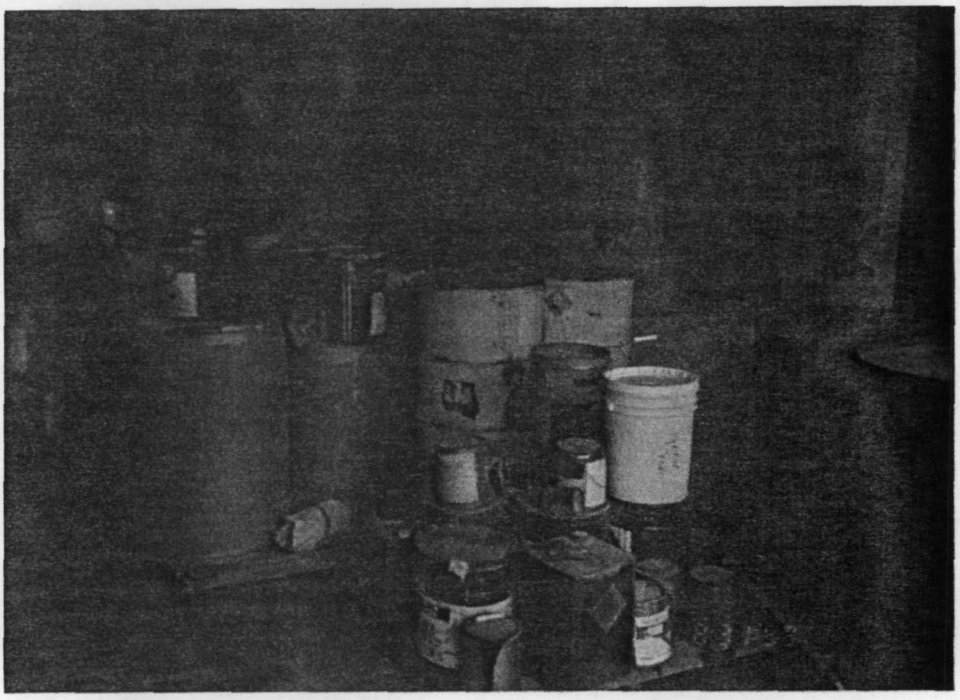
TIME: 1435

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of drums and miscellaneous containers inside warehouse.

DATE: 8-31-93

TIME: 1440

DIRECTION OF PHOTOGRAPH: east

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of drums on the west side of the warehouse.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 8-31-93

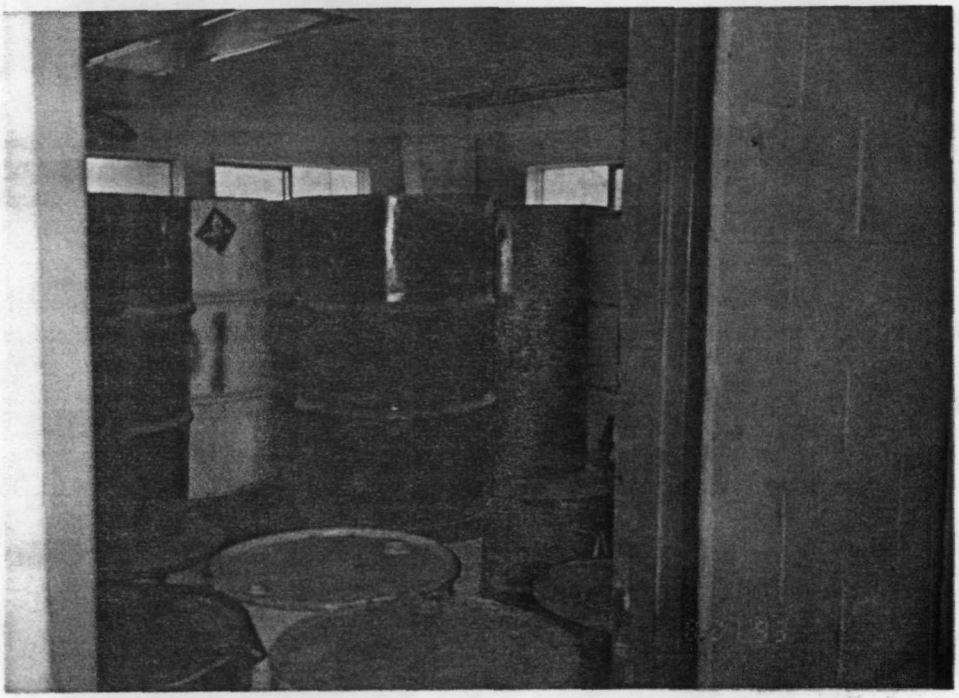
TIME: 1445

DIRECTION OF PHOTOGRAPH: southeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of stacked drums inside office rooms within warehouse. Notice flammable liquid label on white drums.

DATE: 8-31-93

TIME: 1445

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of drums inside office rooms within warehouse. Notice the flammable liquid label and "flash point @ 73°F or greater" sticker on the white drum.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 8-31-93

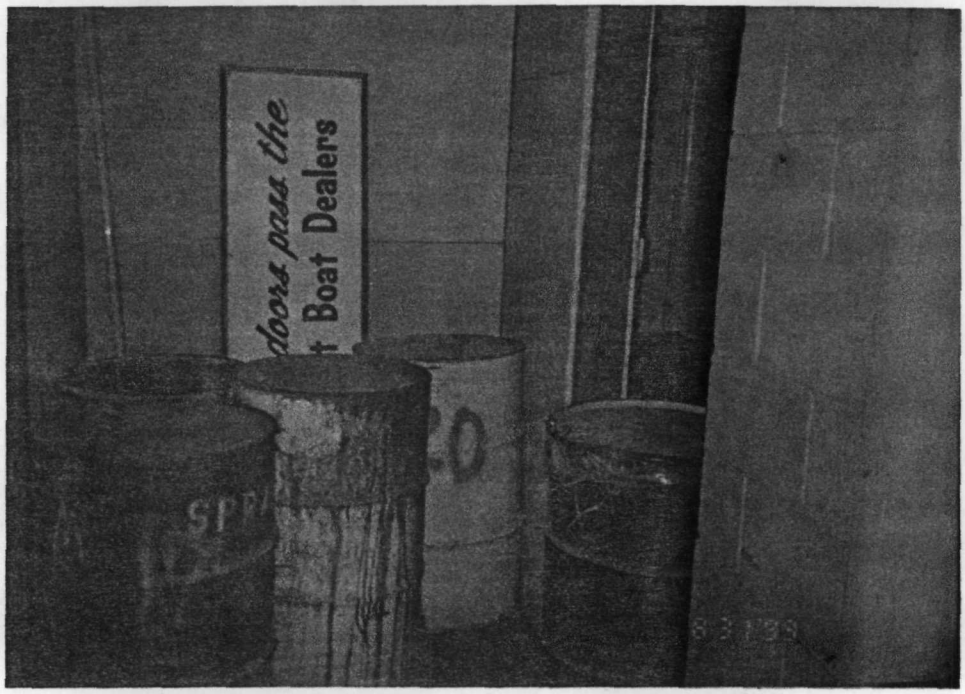
TIME: 1449

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of more drums within the warehouse.

DATE: 09-1-93

TIME: 0905

DIRECTION OF PHOTOGRAPH: south

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View looking south from east end overhead door of the drums within the warehouse.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

TIME: 0907

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of 1 to 15 gallon containers at the west end of the warehouse.

DATE: 09-1-93

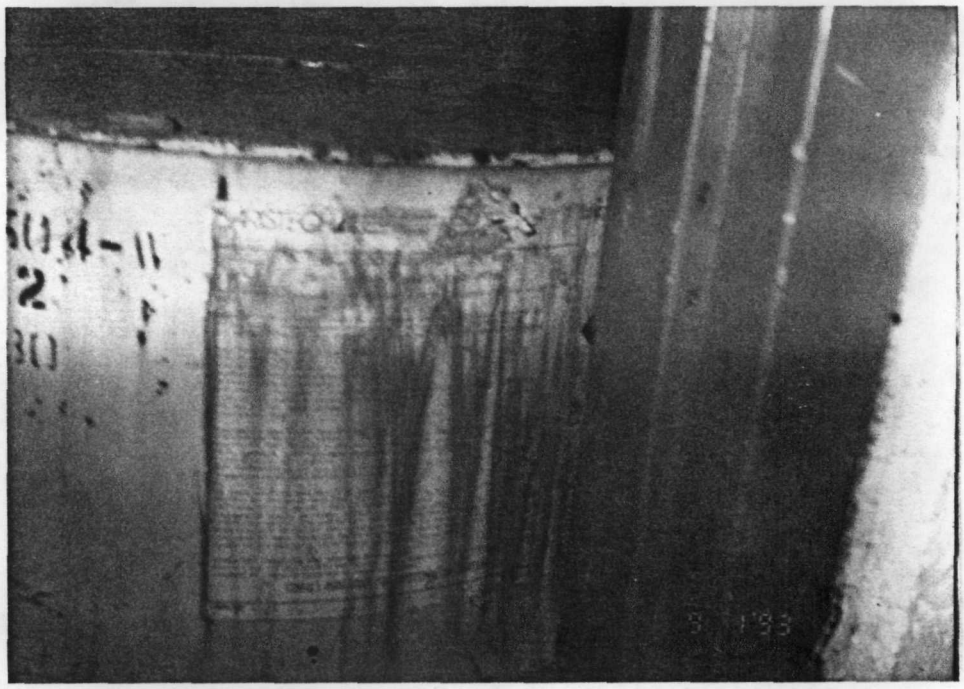
TIME: 0908

DIRECTION OF PHOTOGRAPH: east

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of a label on a drum. The label reads "Aristech Chemical Corporation Resin Solution Flammable Liquid"

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

TIME: 0910

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of "Flammable Liquid Flash Point 73°F or Higher" sticker on a drum.

DATE: 09-1-93

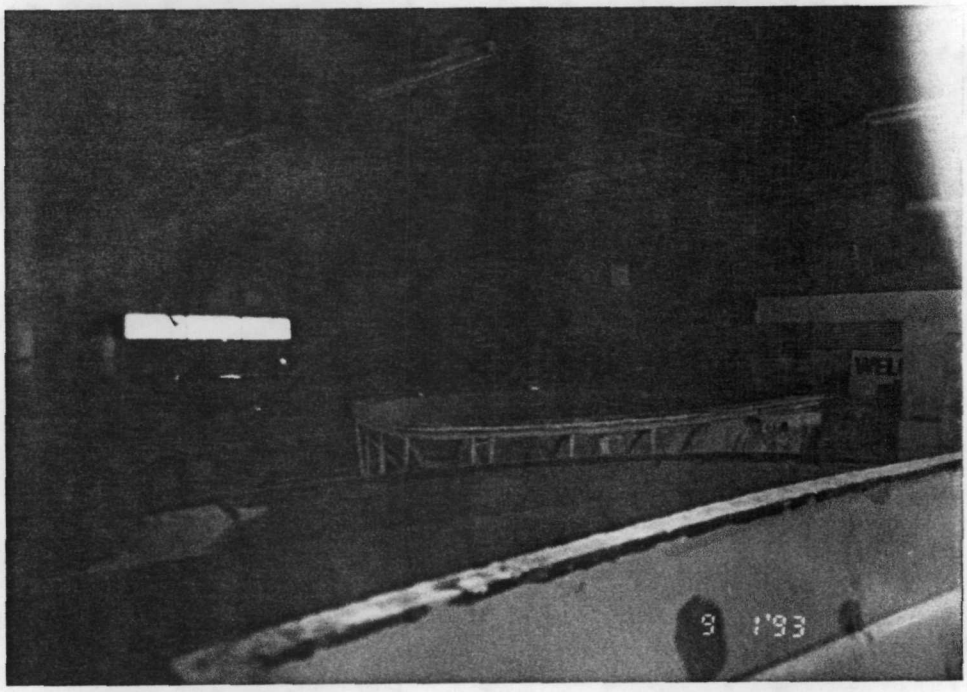
TIME: 0911

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of middle bay where only boat moldings are stored.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

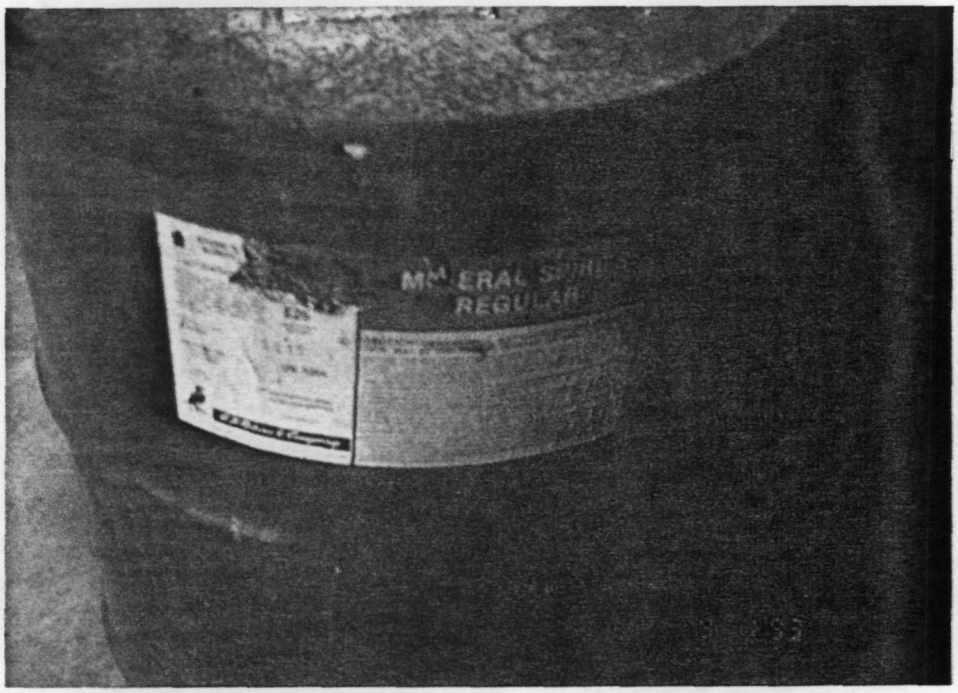
TIME: 0912

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of "Mineral Spirits Regular" sticker on on a drum.

DATE: 09-1-93

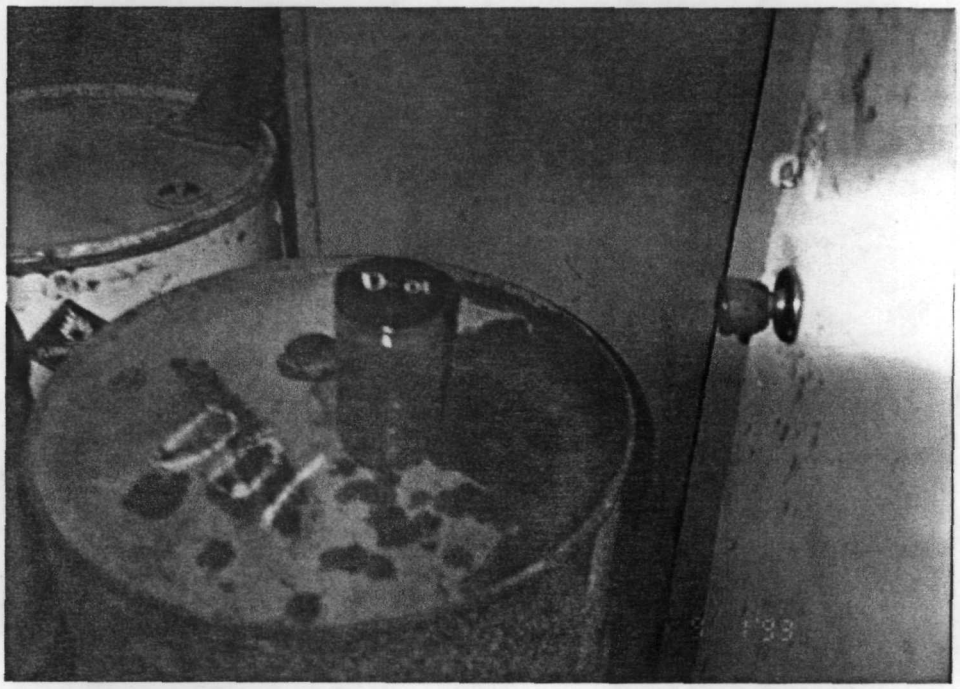
TIME: 0915

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-01



DESCRIPTION: View sample D-01.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

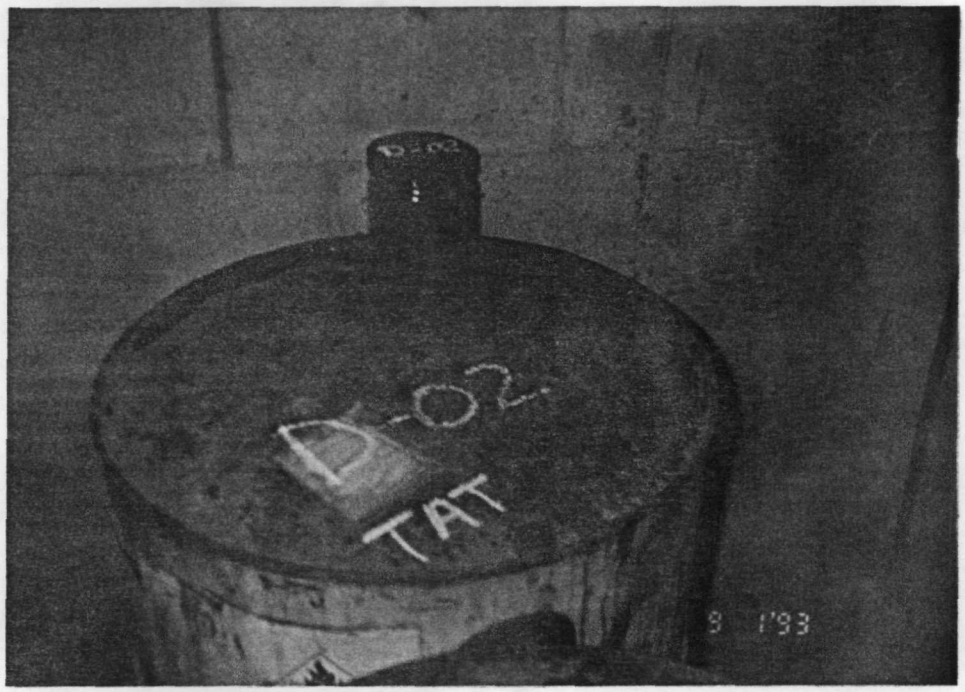
TIME: 0920

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-02



DESCRIPTION: View of drum sample D-02.

DATE: 09-1-93

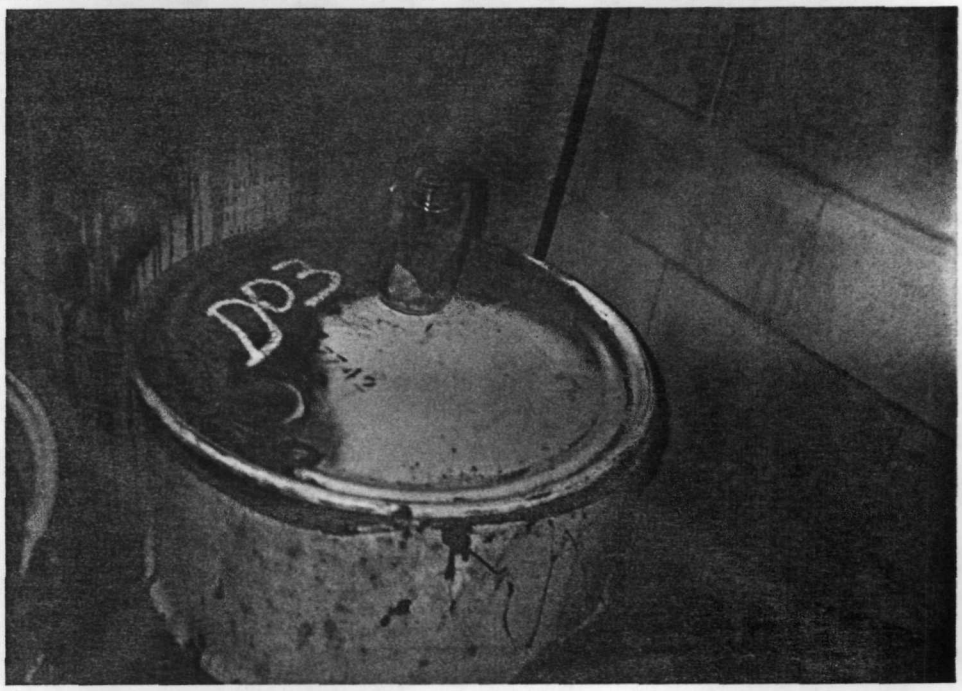
TIME: 0925

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-03



DESCRIPTION: View of drum sample D-03.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

TIME: 0930

DIRECTION OF PHOTOGRAPH: north

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-04

DESCRIPTION: View of drum sample D-04.

DATE: 09-1-93

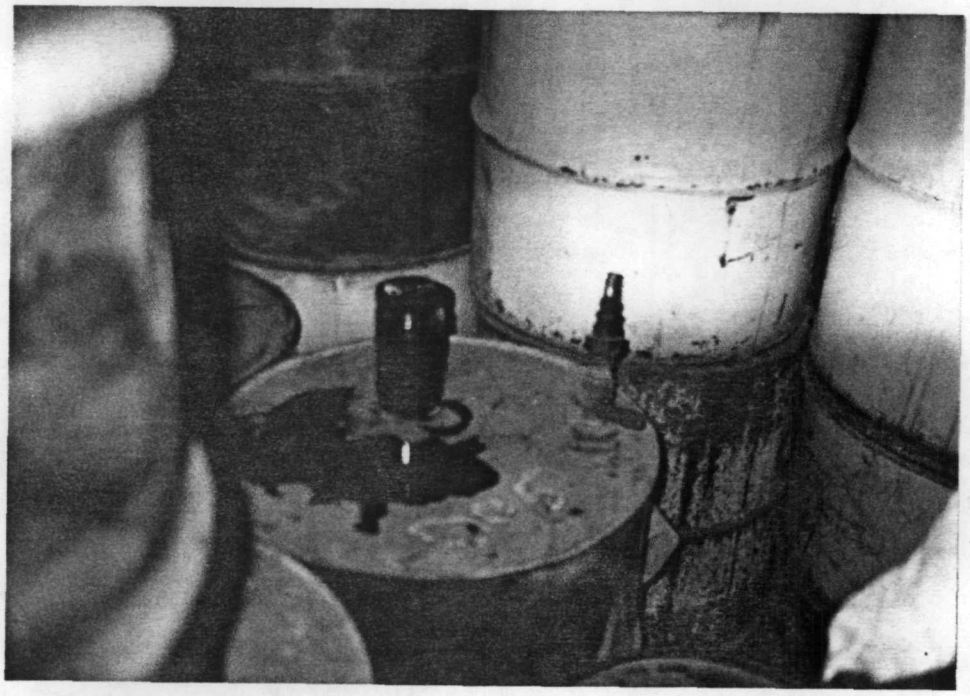
TIME: 0935

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-05



DESCRIPTION: View of drum sample D-05.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

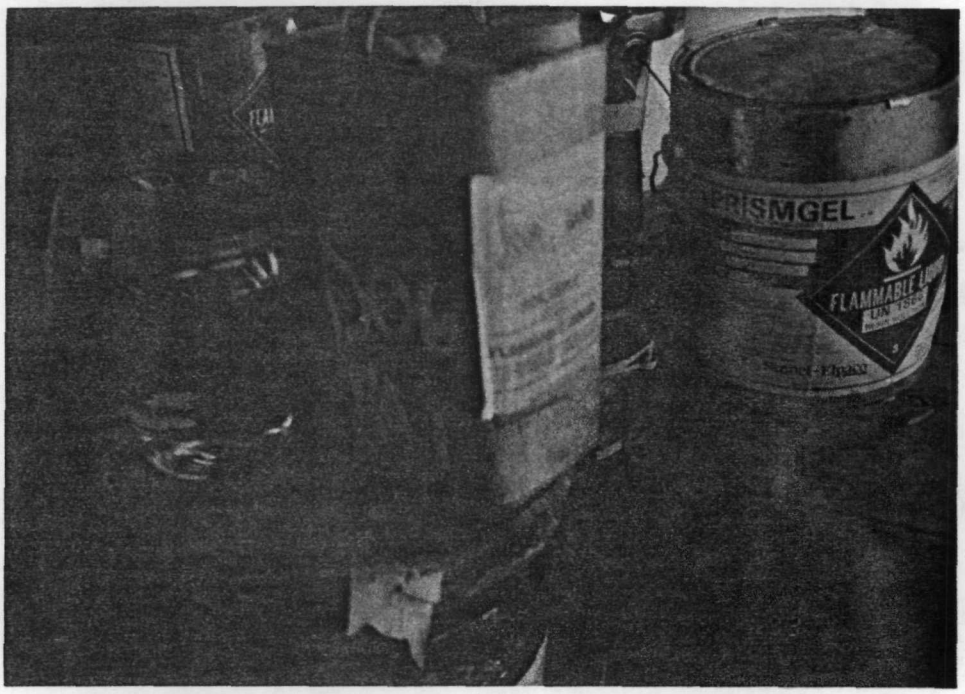
TIME: 0940

DIRECTION OF PHOTOGRAPH: south

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): D-06



DESCRIPTION: View of container sample D-06.

DATE: 09-1-93

TIME: 0945

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of small containers on west end of the warehouse.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

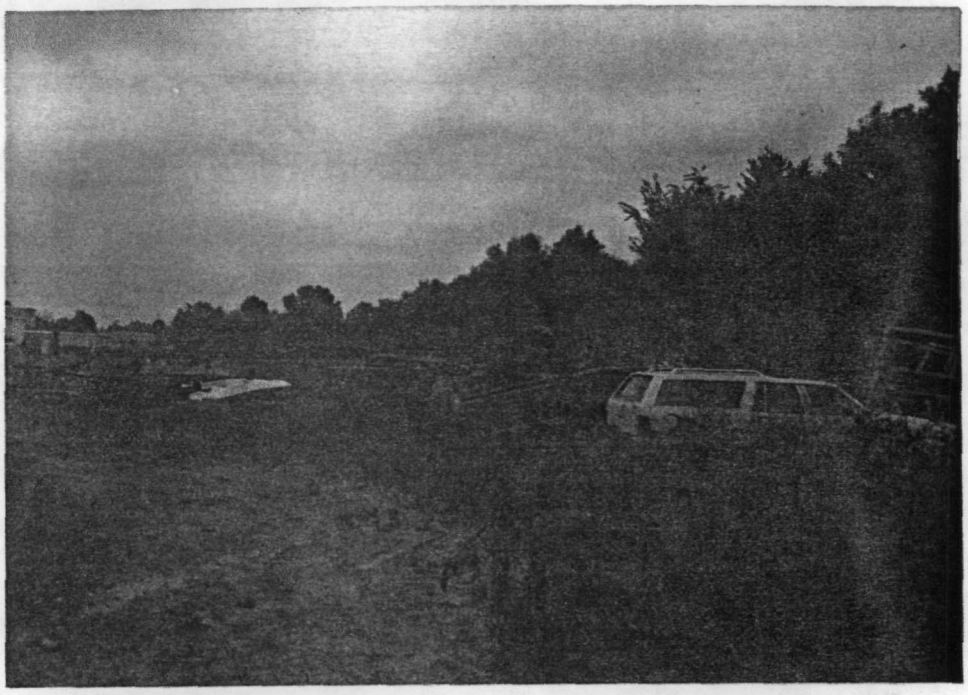
TIME: 0950

DIRECTION OF PHOTOGRAPH: southwest

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View outside of warehouse looking southwest.

DATE: 09-1-93

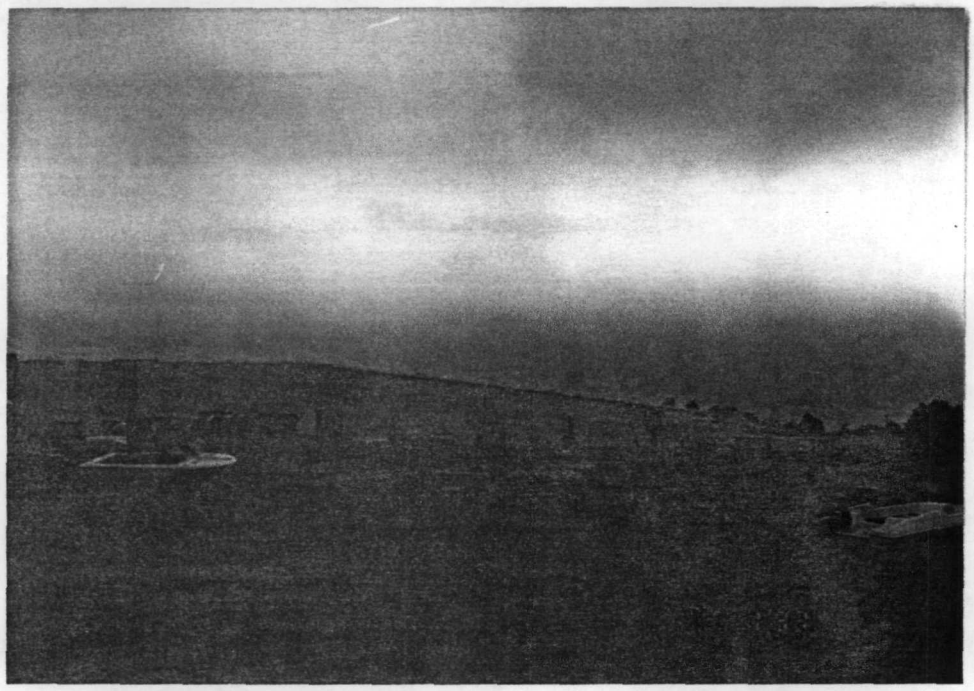
TIME: 0955

DIRECTION OF PHOTOGRAPH: south

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of Crown Line Boats, Inc. looking south from the warehouse.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A TDD: T05-9308-001 PAN: EIL0803SAA

DATE: 09-1-93

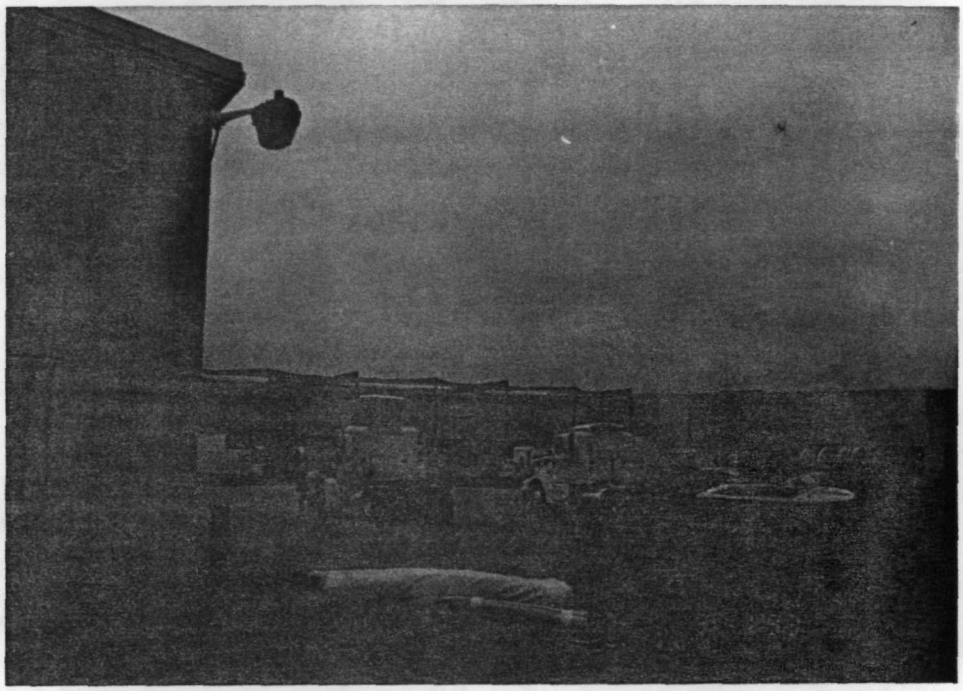
TIME: 0956

DIRECTION OF PHOTOGRAPH: east

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View looking east from warehouse at Crown Line Boats.

DATE: 09-1-93

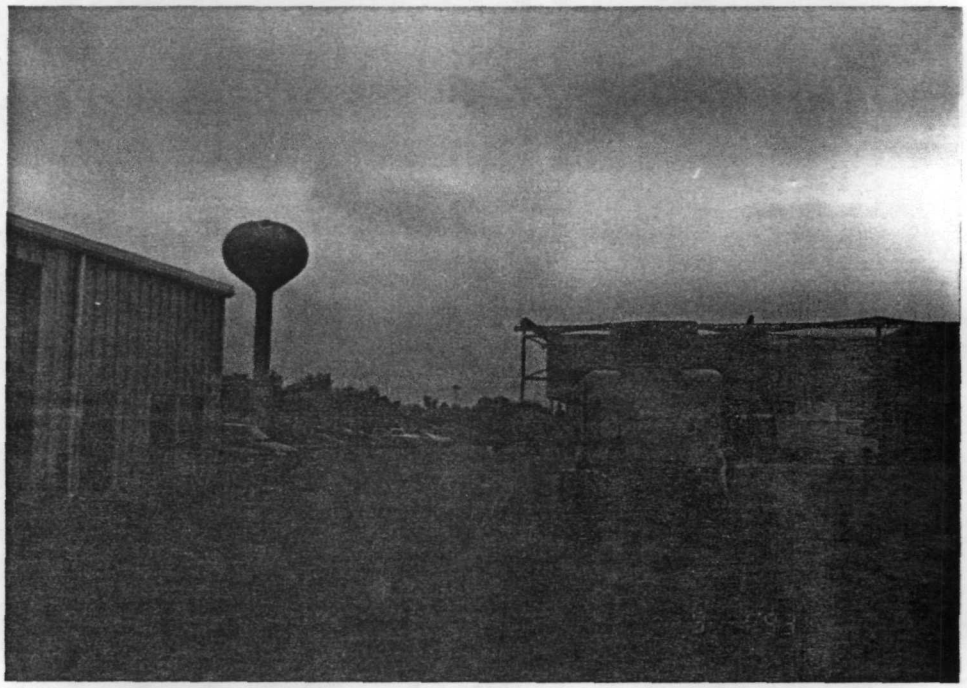
TIME: 0958

DIRECTION OF PHOTOGRAPH: east

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of Crown Line Boats, Inc. looking east from the warehouse.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Mark Twain Industries

U.S.EPA ID: N/A

TDD: T05-9308-001

PAN: EIL0803SAA

DATE: 09-1-93

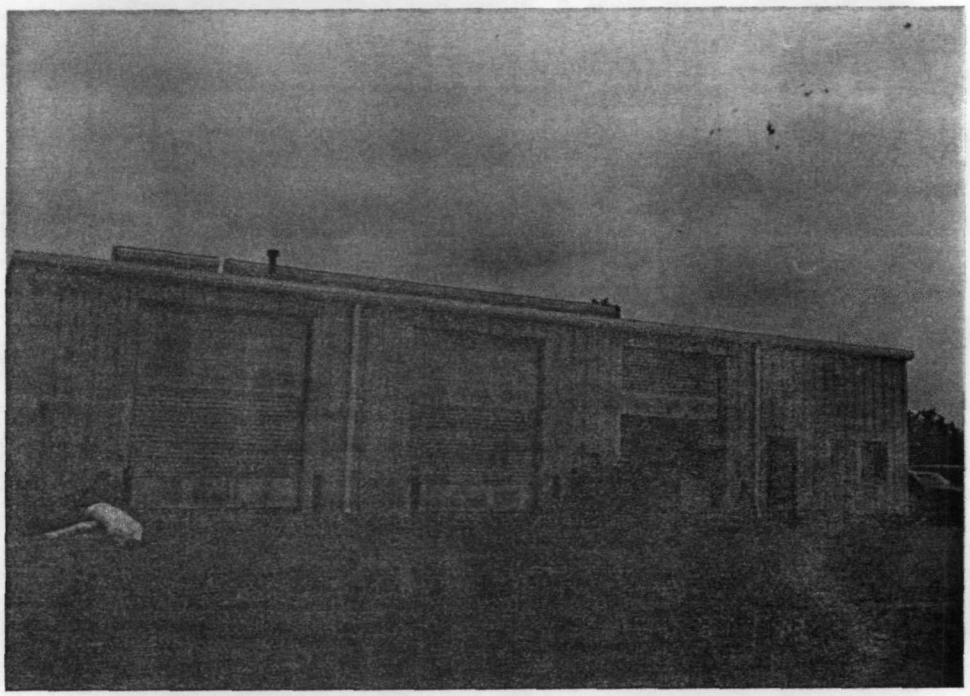
TIME: 0959

DIRECTION OF PHOTOGRAPH: northeast

WEATHER CONDITIONS: cloudy 80°F

PHOTOGRAPHED BY: John Sherrard

SAMPLE ID (if applicable): N/A



DESCRIPTION: View of warehouse looking from northeast.