

**Report on Site Investigations
Site #91-1104**

**Mack Molding
Arlington, Vermont**

May 1994

Prepared for:

MACK MOLDING COMPANY
Arlington, Vermont

Prepared by:

THE JOHNSON COMPANY, INC.
5 State Street
Montpelier, Vermont 05602

May 17, 1994

E. Matt Germon
Sites Management Section
Hazardous Materials Management Division
103 South Main Street\West Building
Waterbury, Vermont 05671-0404

Re: Report on Site Investigations
Mack Molding Company, Arlington, Vermont
VT Site #91-1104
JCO #1-1352-1

Dear Matt:

Enclosed is a copy of our report on site investigations conducted at Mack Molding in Arlington, Vermont. As you know, 4 underground storage tanks were removed from this property, petroleum contaminated soils were disposed of off site, and groundwater monitoring wells were installed and sampled. No leaks were observed in the tanks removed under the scope of work reported on here. The site history indicates a potential for the contamination having originated from previously existing tanks and/or piping.

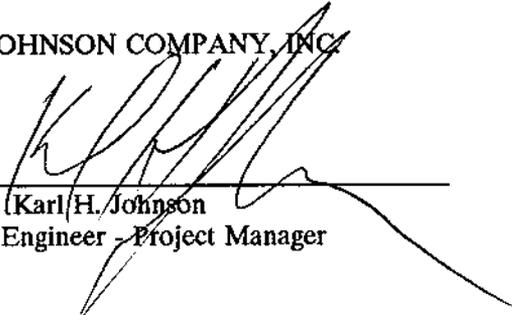
No drinking water wells were identified that are believed to be at any potential risk from this site. No further remedial action is recommended at this site based on the information available to us at this time.

Please call with any questions which arise.

Sincerely Yours,

THE JOHNSON COMPANY, INC.

By: _____


(Karl H. Johnson
Senior Engineer - Project Manager

cc: Ed Ericksen/with attachments

Reviewed by: jrb
I:\PROJECTS\1-1352-1\GERMON.LTR May 17, 1994 12:16

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 BACKGROUND 1

3.0 TANK REMOVAL 3

4.0 SOIL DISPOSAL 3

5.0 SOIL BORINGS AND FIELD SCREENING 3

6.0 MONITORING WELL CONSTRUCTION 4

7.0 GROUNDWATER SAMPLING AND ANALYSIS 4

8.0 GROUNDWATER FLOW DIRECTION 6

9.0 RISK TO DRINKING WATER SUPPLIES 6

10.0 CONCLUSIONS 9

11.0 LIMITATIONS 9

12.0 RECOMMENDATIONS 10

LIST OF FIGURES

- Figure 1 Site Location Map
- Figure 2 Monitoring Well Location Plan
- Figure 3 Groundwater Contour Map
- Figure 4 Down-Gradient Water Supply Wells

LIST OF ATTACHMENTS

- Attachment A Letter from Lincoln Applied Geology to Chuck Schwer Dated 1/9/94
- Attachment B Tank Pull Form and Letter Report to the Underground Storage Tank Program
- Attachment C Laboratory Results
- Attachment D Drilling Logs

1.0 INTRODUCTION

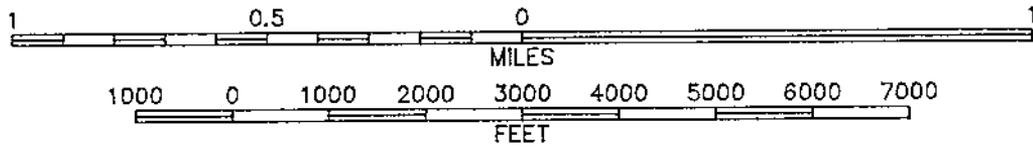
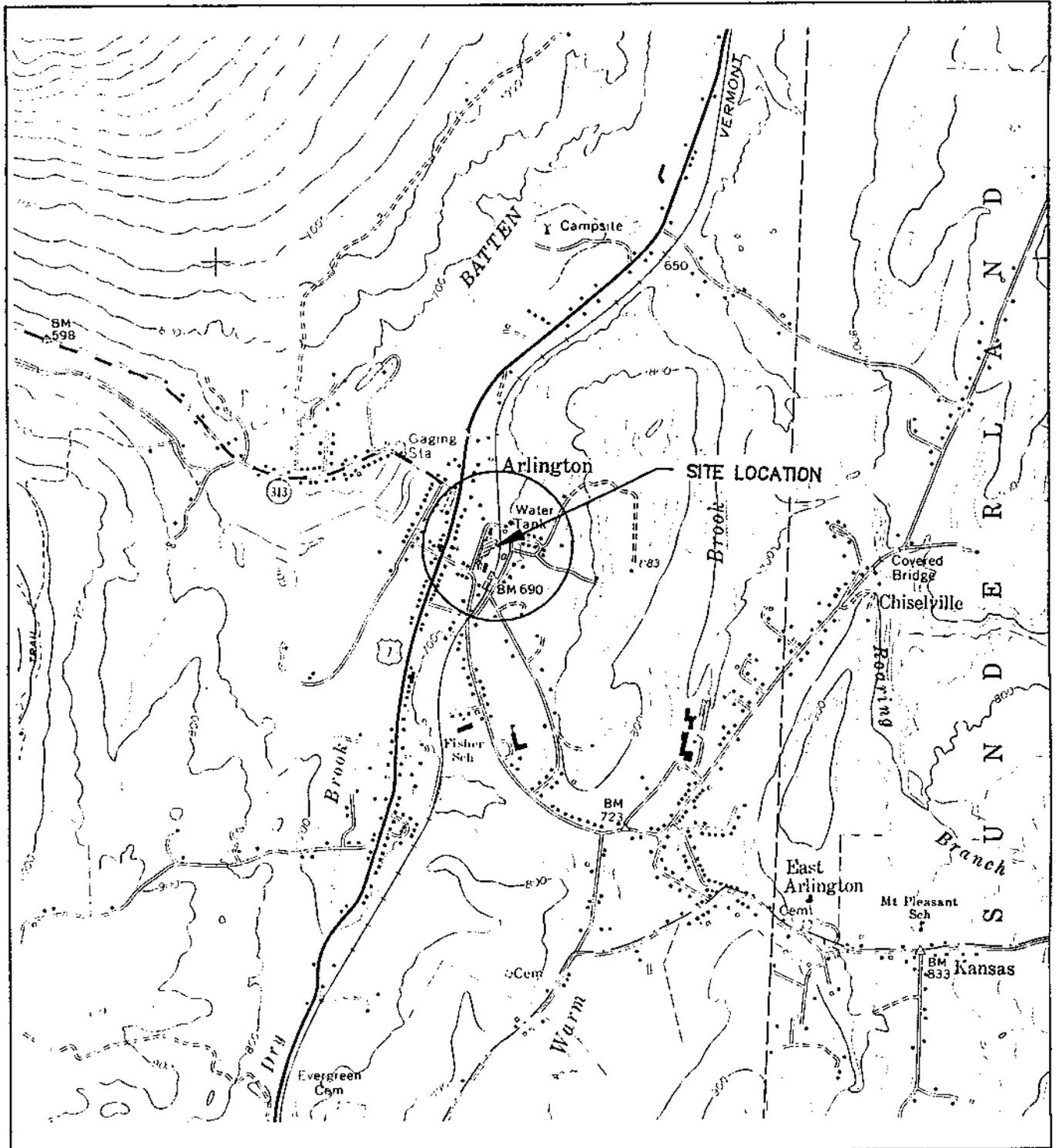
The Johnson Company, Inc., of Montpelier, Vermont was retained by Mack Molding Company to: effect the removal of four underground fuel oil storage tanks (USTs) and associated piping; oversee the removal and disposal of petroleum contaminated soils; manage the installation of two new replacement 10,000 gallon, double-walled fuel oil USTs, associated piping, leak detection and monitoring systems; advance 6 soil borings in the vicinity of the removed USTs; construct groundwater monitoring wells when the water table was encountered, develop and sample the groundwater monitoring wells; obtain laboratory analysis of the samples for volatile organic chemicals and total petroleum hydrocarbons; survey the monitoring well elevations; map the water table contours in the vicinity of the UST removal; conduct a sensitive receptor survey of potentially impacted drinking water wells within the area of the release; coordinate all aspects of the project with the State of Vermont Agency of Natural Resources; and document and report the results and findings of this work in a report to be submitted to the Agency of Natural Resources' Sites Management Section (SMS).

2.0 BACKGROUND

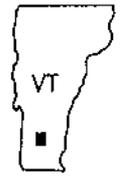
Mack Molding Company (Mack) is located immediately on the north side of the East Arlington Road, approximately 1/10th of a mile East of Vermont Route 7A in Arlington. Mack manufactures injection-molded plastic components for a variety of products and industries. A Site Location Map is included as Figure 1.

The plant building was originally used by the Arlington Refrigerator Company and was initially heated by coal and was subsequently converted to fuel oil. Mack has maintained and operated a fuel oil storage and transmission system comprised of a total of 6 USTs and associated piping for approximately forty to fifty years. Mack initiated the removal and replacement of their existing system in 1991 of their own volition due to the age of the facility.

Two underground fuel oil storage tanks were removed previously (May 10, 1991) by Jetline Services. Petroleum contaminated soils were removed from the excavation and disposed of (off-site). A single groundwater monitoring well was subsequently installed and sampled for laboratory analysis at the request of the SMS by Lincoln Applied Geology (LAG) on November 25, 1991. The results of the analysis of the sample from the original monitoring well were transmitted to the State in a letter to Chuck Schwer dated January 9, 1992 from John F. Amadon of LAG. A copy of that letter (with attachments) is included here as Attachment A.



CONTOUR INTERVAL 20 FEET



MAP LOCATION

BASE MAP : USGS 15 Minute Topographic Quadrangle: Arlington, VT (1967).

FIGURE 1 : Site Location Map
 Mack Molding Company
 Arlington, Vermont

THE JOHNSON COMPANY
 Environmental Sciences and Engineering
 MONTPELIER, VERMONT

3.0 TANK REMOVAL

On November 4th and 5th, 1993, The Johnson Company observed and documented the removal of the remaining 4 USTs from Mack Molding Company property. Fuel oil was observed in the soils and on the surface of the water table which was encountered in the excavation. Contaminated soils were stockpiled for disposal, and free product was promptly swabbed from a sump maintained in the tank excavation. A copy of the Tank Pull Form and the letter report to the Underground Storage Tank Program is included here as Attachment B. (In the process of excavating the area for the removal of the remaining four USTs, the original monitoring well installed by LAG in November 1991 was inadvertently destroyed.)

4.0 SOIL DISPOSAL

Approximately 100 tons of fuel-oil contaminated soils were stockpiled in the parking lot at Mack during the tank removals. The soil was polyencapsulated, tested and shipped for disposal at MTS of Chichester, New Hampshire from Mack on December 16, 1993.

A sample of the soil was submitted for laboratory analysis prior to acceptance at the disposal facility, and a copy of the laboratory results are included in Attachment C.

5.0 SOIL BORINGS AND FIELD SCREENING

On November 9, 1993, The Johnson Company oversaw the advancement of 6 soil borings by Great Works Test Boring of South Berwick, Maine, in the vicinity of the underground storage tank removal using a track-mounted drill rig and hollow stem augers. Soil samples were obtained by Johnson Company personnel from split spoon samplers during the advancement of each boring. These soil samples were field-screened using a calibrated photo-ionization detector (PID) and field headspace techniques as described under the AGENCY GUIDELINES FOR PETROLEUM CONTAMINATED SOIL AND CARBON MEDIA, Section II. "Guidelines for Sampling". All significant observations are reported on the Drilling Logs which are included as Attachment D.

The only soil boring location which yielded field assay results above the Agency's Soil Guideline Concentrations (10.0 parts per million (ppm)) was MW-5 at a depth of approximately 9.0 feet below ground surface. The PID headspace of this sample produced results of 16.2 ppm. This location ultimately was determined to be approximately 2 feet below the static level of the groundwater in this well.

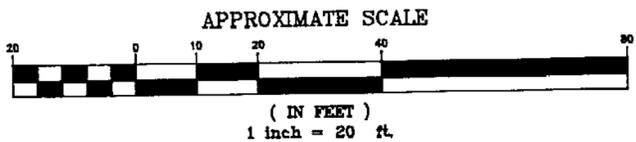
6.0 MONITORING WELL CONSTRUCTION

Groundwater monitoring wells were constructed upon encountering the water table in each soil boring. Monitoring wells were constructed of 2 inch diameter, Schedule 40, flush-coupled PVC pipe. Factory-slotted 0.01 inch well screen was installed so as to straddle the water table as encountered in each boring. Monitoring well construction details are also shown on the Drilling Logs in Attachment D. Please see Figure 2 for monitoring well locations.

7.0 GROUNDWATER SAMPLING AND ANALYSIS

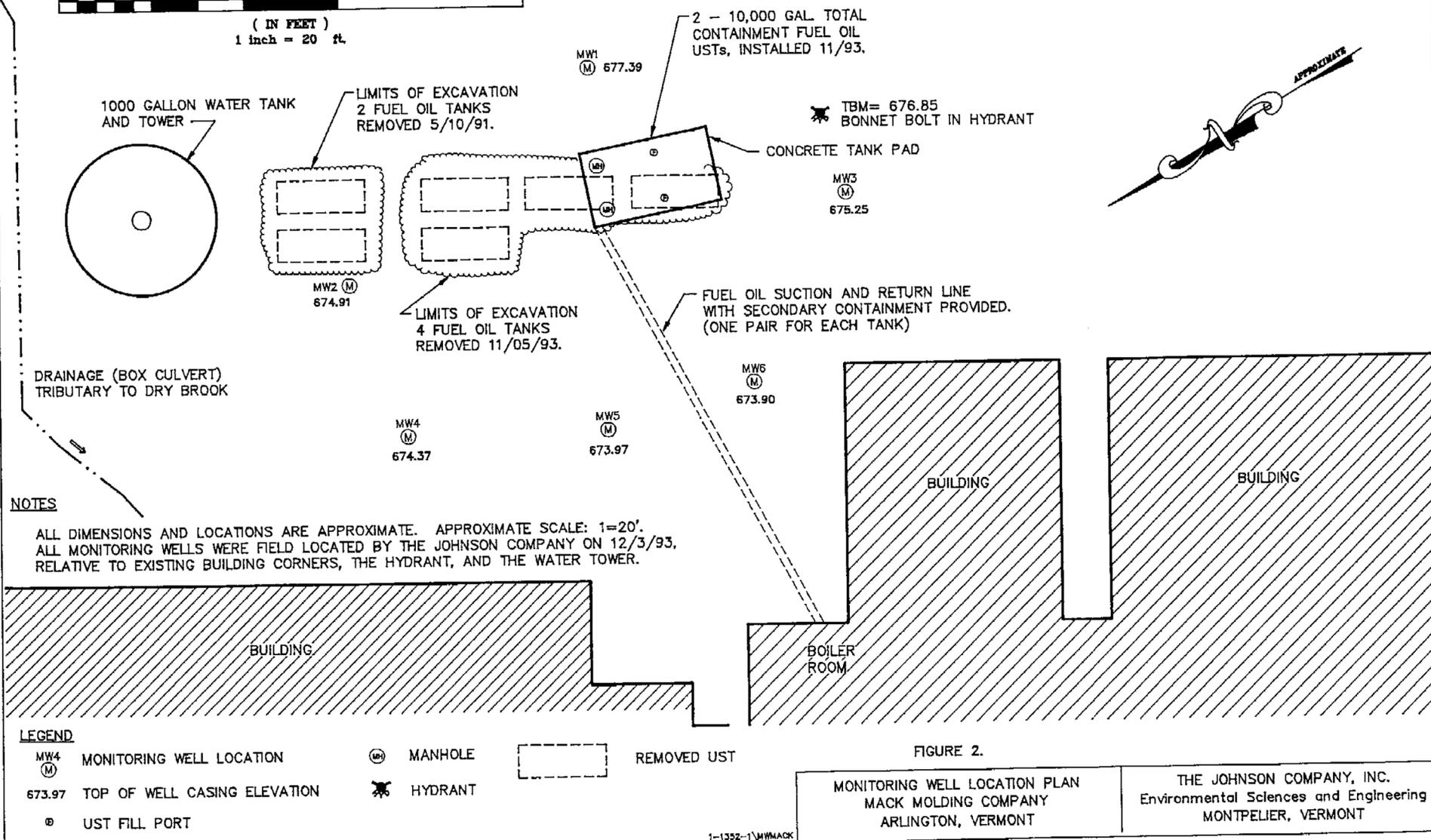
The groundwater monitoring wells installed on November 8th and 9th were promptly developed and sampled for laboratory analysis by EPA Methods 8020 and 418.1 (groundwater monitoring wells MW-2 and MW-3 did not yield enough groundwater to obtain representative samples.) The results of the laboratory analysis are presented in Table 1.

TABLE 1 - LABORATORY REPORTED COMPOUNDS AND ANALYTES IN GROUNDWATER MONITORING WELLS - MACK MOLDING - NOVEMBER 1993 - SITE #91-1104				
Location	Parameter	Reported Concentration	Enforcement Standard	Preventative Action Limit
MW-1	All parameters reported as Below Practical Quantitation Limit (<1 ppb)			
MW-2	WELL WAS DRY			
MW-3	WELL WAS DRY			
MW-4	Toluene	2	2,420	1,210
	Chlorobenzene	4	100	50
	1,4-dichlorobenzene	10	75	7.5
	TPH	31	N/A	N/A
MW-5	TPH	82	N/A	N/A
MW-6	1,4-dichlorobenzene	51	75	7.5
	TPH	220	N/A	N/A
N/A - Not Applicable TPH - Total Petroleum Hydrocarbons (ug/l unless otherwise indicated)				



SOURCE

"MACK MOLDING COMPANY SITE PLAN" PREPARED BY
MACK MOLDING COMPANY, ARLINGTON, VERMONT, DATED 5/27/86.



Chlorobenzene and 1,4-dichlorobenzene were also detected in the soils that were disposed of under this scope, and in the groundwater sample obtained by LAG in 1991. Information on these compounds is included in Attachment A.

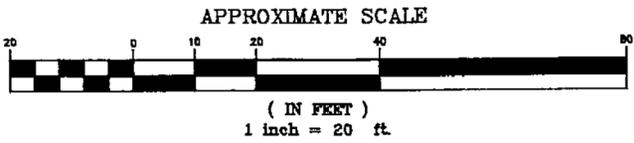
8.0 GROUNDWATER FLOW DIRECTION

On December 3, 1993 the top of the casing of the monitoring wells at Mack Molding Company were surveyed relative to the National Geodetic Vertical Datum (1927). Measurements of the depth from the top of the monitoring well casing to the surface of the water table were obtained during the sampling of the monitoring wells. Using measurements of the depth to the water table and the surveyed elevations, a contour map of the surface of the water table was produced. The resulting groundwater contour map is presented here as Figure 3, and indicates a north, northwesterly groundwater flow direction in the vicinity of the UST removal. A small stream flowing from the hillside east of Mack passes beneath the Mack plant building in manmade conveyance(s) on its way to a confluence with Dry Brook to the West of Route 7A in Arlington and may influence the groundwater flow direction.

9.0 RISK TO DRINKING WATER SUPPLIES

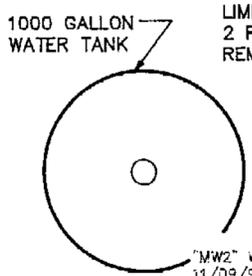
As a result of the contamination observed during the UST removal and in the samples obtained from the groundwater monitoring wells, a sensitive receptor survey was performed by The Johnson Company in order to identify any drinking water sources potentially at risk, and to assess the degree of risk presented. Working with the Arlington Water Company, The Johnson Company identified 4 downgradient wells that were potentially at risk. Subsequent field work revealed that 3 of the wells potentially at risk served private homes near a beaver pond on Dry Brook, approximately 1700 feet from Mack Molding Company property. The remaining drilled well potentially at risk is located on Mack Molding Company property, and is maintained as a backup source of water for their manufacturing operations.

Due to the isolation distance from this release to all of the nearby wells that were located under this scope, none of these 4 identified wells downgradient of the UST removal were determined to be at risk for contamination from this release. Figure 4 shows the proximity of each of these wells to the Mack Molding Company Site. The existence of the contaminants in the unconsolidated deposits and the depth of the bedrock well on Mack property all combine to reduce the risk of contamination to downgradient wells. The Mack well is likely isolated from the area of contamination by the shallow drainage flow regime as well as the potential for the well to be drawing water from an entirely different aquifer. The downgradient wells are also isolated due to the proximity of the surficial drainage channel.

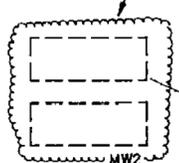


SOURCE

"MACK MOLDING COMPANY SITE PLAN" PREPARED BY
MACK MOLDING COMPANY, ARLINGTON, VERMONT, DATED 5/27/86.



LIMITS OF EXCAVATION
2 FUEL OIL TANKS
REMOVED 5/10/91.



"MW2" WAS DRY ON
11/09/93 SAMPLING DATE.
(NOT CONTOURED ON THIS MAP.)

MW2
667.0

LIMITS OF EXCAVATION
4 FUEL OIL TANKS
REMOVED 11/05/93.

MW4
666.0

MW5
667.6

CONCRETE TANK PAD:
2 - 10,000 GAL TOTAL
CONTAINMENT FUEL OIL
USTs, INSTALLED 11/93.

TBM = 676.85
BONNET BOLT IN HYDRANT

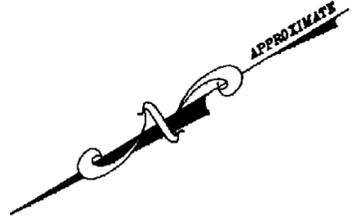
MW3
668.2

FUEL OIL SUCTION AND RETURN LINE
WITH SECONDARY CONTAINMENT PROVIDED.
(ONE PAIR FOR EACH TANK)

MW6
668.6

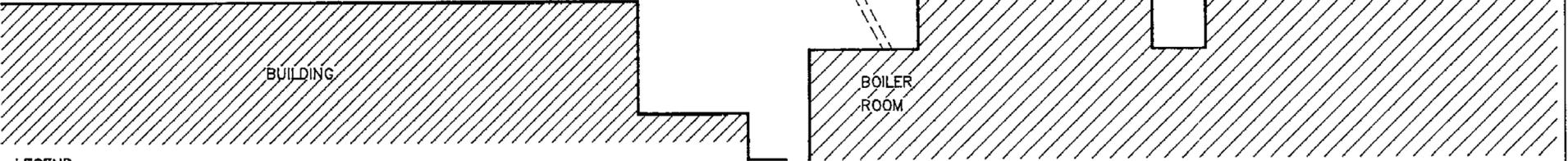
DRAINAGE (BOX CULVERT),
TRIBUTARY TO DRY BROOK

MW2
DESTROYED



NOTES

ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE. APPROXIMATE SCALE: 1=20'.
ALL MONITORING WELLS WERE FIELD LOCATED BY THE JOHNSON COMPANY ON 12/3/93,
RELATIVE TO EXISTING BUILDING CORNERS, THE HYDRANT, AND THE WATER TOWER.



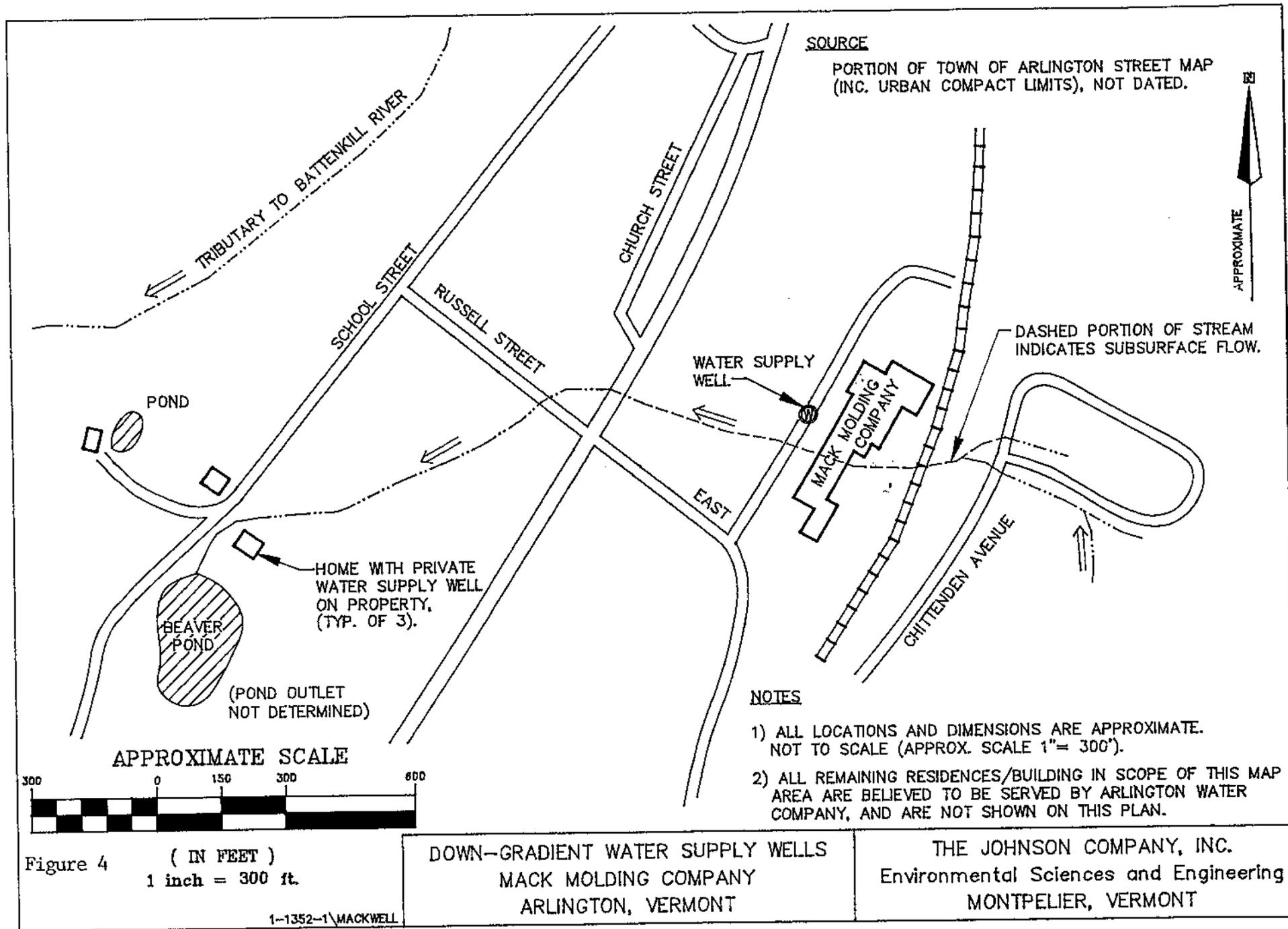
LEGEND

- MW4 (M) MONITORING WELL LOCATION
- 667.6 GROUNDWATER ELEVATION (11/09/93)
- GROUNDWATER CONTOUR (11/09/93)
- (M) MANHOLE
- HYDRANT
- UST FILL PORT
- [] REMOVED UST

FIGURE 3.

GROUNDWATER CONTOUR MAP
MACK MOLDING COMPANY
ARLINGTON, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
MONTPELIER, VERMONT



10.0 CONCLUSIONS

Soils and groundwater were contaminated at the Mack Molding Company property in Arlington, Vermont in the vicinity of tankage and pipelines that were used in over 50 years of petroleum product storage and handling.

No leaks were confirmed in the 4 tanks which were removed by The Johnson Company on November 4-5, 1993.

Overfills, piping systems leaks, and/or potential releases from historic tank installations at the same location could account for the product observed in the excavation during removal of the 4 remaining USTs.

Approximately 100 tons of petroleum contaminated soils were removed for processing into "cold mix" at an asphalt batching facility.

A majority of the Town of Arlington is supplied with drinking water by the Arlington Water Company. Several private water wells exist downgradient from the location of this release. No drinking water wells were determined to be at risk from this release.

11.0 LIMITATIONS

The conclusions presented here are arrived at through consideration of the findings of this investigation as presented herein. Consideration was given to the information gathered during past work by others at this site, to the observations made during the tank removal, the field screening results of environmental samples, the groundwater flow direction(s) determined, and through interpretation of laboratory analytical data. A diligent effort was made to identify areas of concern that may have been indicated from the conditions described above.

This investigation was based on sound scientific investigative techniques and experience with similar investigations. However, the conclusions of this investigation are limited by the sources of data, as stated above, and the conclusions and recommendations must be considered within this context. The status of the site may change, and additional information may become available in the future which will require modification or updating of the conclusions and recommendations presented here. If conditions are found to vary from those presented here, supplemental conclusions and recommendations may be warranted.

12.0 RECOMMENDATIONS

Based on the information sited above, The Johnson Company does not recommend any additional remedial action(s) at this site.

Any additional groundwater samples should be analyzed by EPA Method 8020, in order to confirm a decline in the contaminant concentrations and to support a petition for closure of this site under the Hazardous Materials Management Division's July 17, 1992 DRAFT Hazardous Site Closure Policy.

Any concerns over the potential contamination of the existing Mack bedrock well could be easily addressed by laboratory analyses of samples obtained during a pump test prior to reactivation of this well as a back-up process make-up supply.

Reviewed by: SAW

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ATTACHMENT A

Letter from Lincoln Applied Geology to Chuck Schwer Dated 1/9/92



January 9, 1992

3 1002

Mr. Chuck Schwer
Petroleum Sites Coordinator
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Summary Report - Mack Molding Company, Arlington, Vermont (Site #91-1104)

Dear Chuck:

The following letter report and attachments summarize our preliminary hydrogeologic investigation for the Mack Molding Company that you requested in your October 3, 1991 letter to Mr. Erickson.

As you will recall, during removal of two 10,000 gallon USTs petroleum product contamination of surrounding soils was recorded by Jet-Line Services in their tank pull report. That finding, coupled with your staff discussions with Mr. Erickson, resulted in your request to install one monitoring well.

On November 22, 1991 one of our staff hydrogeologists oversaw the installation of MW-1. The soil boring was drilled by Green Mountain Boring Company, Inc. using hollow stem augers and obtaining split spoon samples at discrete depths for soil descriptions and PID assays.

The logs and well construction details are attached. The location of MW-1 is in the former tank location. Evidence of diesel fuel within the soil profile was apparent both visually and by PID (10.2 eV HNU).

On November 25, 1991 a ground water sample was obtained for analysis by EPA Methods 602 and 418.1. The ground water level was 13.7 feet below ground surface with no evidence of free floating product. The analytical results

Mr. Chuck Schwer
Page 2
January 9, 1992

are attached along with a copy of the sample chain of custody. The results confirm the presence of hydrocarbon contamination of ground water underlying the former tank area.

If you have any questions or concerns with regard to this matter, please do not hesitate to call me at 802-453-4384.

Sincerely,



John F. Amadon, CPSS

JFA/smd
Enclosures

WELL LOG
MACK MOLDING

WELL: MW-1
 LOCATION: Mack Molding Company, Arlington, Vermont
 DRILLER: Green Mountain Boring, Inc., Barre, Vermont
 HYDROGEOLOGIST: William Norland, Lincoln Applied Geology, Inc.
 DATE: November 22, 1991

SOILS DESCRIPTION:

<u>Depth</u>	<u>Description</u>	<u>HNU (ppm)</u>
0.0' - 10.0'	<u>Fill</u> ; Gravel, cobbles, sand. Former tank location - later backfilled with rock and sand. Diesel fuel on fill below 8' depth.	
10.0' - 10.5'	Moist, brown, <u>medium to coarse sand</u> ; some silt; little coarse gravel. Strong diesel odor.	16.2 (10' - 10.5')
10.5' - 15.0'	<u>Fill</u> ; Gravel, cobbles, boulders, sand. Boulder at 13', no penetration. Move boring 5' to the west. Boulder at 15', no penetration. Move boring 15' to the east.	
15.0' - 16.0'	Wet, dark brown to black, <u>medium to coarse sand</u> ; little fine gravel. Saturated with diesel.	22.0 (15' - 16')
16.0' - 21.5'	Wet, olive green to brown, <u>fine sand and silt</u> ; little coarse gravel. No saturation with diesel. Augered to 21.5' - refusal on boulder.	8.6 (16'-17')

Well Construction

Bottom of Boring: 21.5'
 Well Screen: (15') 5' - 20', 0.020" slot, 2" PVC, sch. 40
 Solid Riser: (5') 0' - 5', 2" PVC, sch. 40
 Sand Pack: (19.5') 2' - 21.5'
 Bentonite Seal: (1') 1' - 2'
 Backfill: (0.5') 0.5' - 1'
 Well Box: One - flush with surface grade.



Lincoln Applied Geology, Inc.
Environmental Consultants



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

TOTAL HYDROCARBONS - EPA METHOD 418.1

CLIENT: L.A.G.
REPORT DATE: December 16, 1991
PROJECT NAME: Mack Molding
DATE SAMPLED: November 25, 1991
DATE RECEIVED: November 25, 1991
DATE ANALYZED: December 16, 1991
SAMPLER: James

Reference number:

Concentration (mg/L)¹

26,334

220.

Sample ID:

26,334: MW-1; 2:30

Notes:

1 Method detection limit is 0.8 ppm



Reviewed by _____



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: L.A.G.
PROJECT NAME: Mack Molding
REPORT DATE: December 5, 1991 ANALYSIS DATE: December 3, 1991
SAMPLER: James STATION: MW-1
DATE SAMPLED: November 25, 1991 REF.#: 26,333
DATE RECEIVED: November 25, 1991 TIME SAMPLED: 2:30

<u>Parameter</u>	<u>Minimum Detection Limit</u>	<u>Concentration (ug/L)</u>
Benzene	2.	ND ¹
Chlorobenzene	1.	35.8
1,2-Dichlorobenzene	2.	ND
1,3-Dichlorobenzene	2.	ND
1,4-Dichlorobenzene	2.	TBQ ²
Ethylbenzene	1.	21.1
Toluene	1.	ND
Xylenes	5.	128.
MTBE	1.	ND

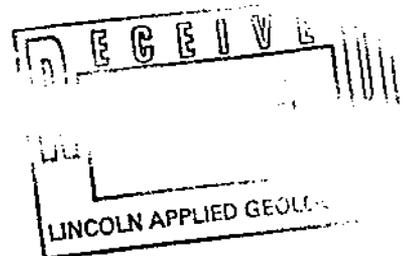
100/50
650/340
400/200

NUMBER OF UNIDENTIFIED PEAKS FOUND: 5

NOTES:

- 1 None detected
- 2 Trace below quantitation limits

Reviewed by _____



Project Name: <i>MALTS HOLDING</i> Site Location: <i>E. ARLINGTON, VT</i>	Reporting Address: <i>RD1 BOULTON ARLINGTON VT 05443</i>	Billing Address:
Endyne Project Number:	Contact Name: <i>L. A. G</i> Company/Phone #: <i>457-4754</i>	Sampler Name: <i>JAMES</i> Company/Phone #: <i>457-4754</i>

Lab #	Sample Description	Matrix	Date/Time	Container		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
				No.	Type/Size				
	<i>MW-1</i>		<i>11-25-91</i> <i>2:30</i>				<i>607</i>	<i>11/18</i>	
	<i>MW-1</i>		<i>11-25-91</i> <i>2:30</i>				<i>418.1</i>	<i>11</i>	

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>[Signature]</i>	Date/Time <i>11/25/91 5:30p</i>
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Relinquished by: Signature	Received by: Signature	Date/Time
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Requested Analyses

1	pH	6	TRN	11	Total Solids	16	Metals ICP/AA	21	EPA 624	26	EPA 8270
2	Chloride	7	Total P	12	TSS	17	Fecal and/or Tot.	22	EPA 625 B/N or A	27	EPA 8010
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8020
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB	29	EPA 8080
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 661/602	25	EPA 8240	30	EPTOX
31	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
32	Other (Specify):										

p-DICHLOROBENZENE

DBP

Common Synonyms Paradichlorobenzene Dichlorobenzene Paradi Paradiol Paramon Santochlor	Solid crystals Sinks in water.	White to clear	Mothballs odor
Avoid contact with solid. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	Combustible. POISONOUS GASES ARE PRODUCED IN FIRE. Wear goggles and self-contained breathing apparatus. Extinguish with water, dry chemical, foam, or carbon dioxide. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID SOLID Irritating to skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.		
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shrimps. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-water contaminant Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Competibility Class: Halogenated hydrocarbon 3.2 Formula: $p-C_6H_4Cl_2$ 3.3 IMO/IUM Designation: 9.0/1592 3.4 DOT ID No.: 1582 3.5 CAS Registry No.: 106-48-7		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Solid 4.2 Color: White 4.3 Odor: Aromatic	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Full face mask fitted with organic vapor canister for concentrations over 75 ppm; clean protective clothing; eye protection. 5.2 Symptoms Following Exposure: INHALATION: irritation of upper respiratory tract; over-exposure may cause depression and injury to liver and kidney. EYE CONTACT: pain and mild irritation. 5.3 Treatment of Exposure: INHALATION: if any ill effects develop, remove patient to fresh air and get medical attention. If breathing stops, give artificial respiration. EYES: flush with plenty of water and get medical attention if ill effects develop. SKIN AND INGESTION: no problem likely. 5.4 Threshold Limit Value: 75 ppm 5.5 Short Term Inhalation Limit: 50 ppm for 60 min. 5.6 Toxicity by Ingestion: Grade 2; $LD_{50} = 0.5$ to 5 g/kg 5.7 Lethal Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If applied on clothing and allowed to remain, may cause smarting and reddening of the skin. 5.10 Odor Threshold: 15-30 ppm 5.11 IDLH Value: 1,000 ppm			

6. FIRE HAZARDS 6.1 Flash Point: 185°F O.C.: 150°F C.C. 6.2 Flammable Limits in Air: Data not available 6.3 Fire Extinguishing Agents: Water, foam, carbon dioxide or dry chemical. 6.4 Fire Extinguishing Agents Not to be Used: Not pertinent 6.5 Special Hazards of Combustion Products: Vapors are irritating. Toxic chlorine, hydrogen chloride, and phosgene gases may be generated in fire. 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: Data not available 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 1.3 mm/min. (approx.) 6.10 Adiabatic Flame Temperature: Data not available <i>(Continued)</i>	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) II
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Bases: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 36	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: ORM-A 11.2 NAB Hazard Rating for Bulk Water Transportation: Not listed 11.3 NFPA Hazard Classification Category Classification Health Hazard (Blue) 2 Flammability (Red) 2 Reactivity (Yellow) 0
8. WATER POLLUTION 8.1 Aquatic Toxicity: 50 ppm*/fish/interval/fresh water 880 mg/1/48 hr/rainbow trout/TL ₅₀ /fresh water *No time interval specified 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): Data not available 8.4 Food Chain Concentration Potential: Data not available	12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 16°C and 1 atm: Solid 12.2 Molecular Weight: 147.01 12.3 Boiling Point at 1 atm: 345.8°F = 174.2°C = 447.4°K 12.4 Freezing Point: 130°F = 53°C = 328°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 1.458 at 20°C (solid) 12.8 Liquid Surface Tension: Not pertinent 12.9 Liquid Water Interfacial Tension: Not pertinent 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: Not pertinent 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 29.07 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: Data not available
9. SHIPPING INFORMATION 9.1 Grades of Purity: Solid: 5 grades, chemical purity close to 100% Liquid: 1-2% orthodichlorobenzene. 9.2 Storage Temperature: Data not available 9.3 Inert Atmosphere: Data not available 9.4 Venting: Data not available	
6. FIRE HAZARDS (Continued) 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	

CHLOROBENZENE

CRB

<p>Common Synonyms</p> <p>Monochlorobenzene Phenyl chloride Benzene chloride MCB</p>		<p>Watery liquid</p> <p>Sinks in water</p>	<p>Colorless</p> <p>Flammable vapor is produced.</p>	<p>Sweet, almond odor</p>
<p>Avoid contact with liquid and vapor. Keep people away. Stop discharge if possible. Call fire department. Stay upwind and use water spray to "knock down" vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>				
<p>Fire</p>		<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Extinguish with dry chemical, foam, or carbon dioxide.</p>		
<p>Exposure</p>		<p>CALL FOR MEDICAL AID</p> <p>VAPOR If inhaled, will cause coughing or dizziness. Not irritating to eyes, nose and throat. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.</p>		
<p>Water Pollution</p>		<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>		
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Should be removed. Chemical and physical treatment.</p>		<p>2. LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class: 3</p>		
<p>3. CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Halogenated hydrocarbon 3.2 Formula: C₆H₅Cl 3.3 IMO/IUN Designator: 33/1134 3.4 DOT ID No.: 1134 3.5 CAS Registry No.: 108-90-7</p>		<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Mild amine odor; sweet, almond-like; aromatic</p>		
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Organic vapor-acid gas respirator where appropriate; neoprene or vinyl gloves, chemical safety spectacles, plus face shield where appropriate; rubber footwear; apron or impervious clothing for splash protection, hard hat.</p> <p>5.2 Symptoms Following Exposure: Irritating to skin, eyes and mucous membranes. Repeated exposure of skin may cause dermatitis due to defatting action. Chronic inhalation of vapors or mist may result in damage to lungs, liver, and kidneys. Acute vapor exposures can cause symptoms ranging from coughing to transient anesthesia and central nervous system depression.</p> <p>5.3 Treatment of Exposure: Get medical attention for all eye exposures and any serious over-exposures. Treat the symptoms. INHALATION: remove to clean air; administer oxygen as needed. INGESTION: dilute by drinking water; if vomiting occurs, administer more water. Administer saline laxative. EYES: flush thoroughly with water. SKIN: remove contaminated clothing; wash exposed area with soap and water.</p> <p>5.4 Threshold Limit Value: 75 ppm 5.5 Short Term Inhalation Limits: Data not available 5.6 Toxicity by Ingestion: Grade 2, LD₅₀ = 0.5 to 5 g/kg (rat, rabbit) 5.7 Late Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Vapors are nonirritating to the eyes and throat. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smearing and reddening of the skin. 5.10 Odor Threshold: 0.21 ppm 5.11 IDLH Value: 2,400 ppm</p>				

6. FIRE HAZARDS

6.1 Flash Point: 84°F C.C.; 87°F D.C.
6.2 Flammable Limits in Air: 1.3%-7.1%
6.3 Fire Extinguishing Agents: Carbon dioxide, dry chemical, foam or water spray
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion: Products: Burning in open flame can form toxic phosgene and hydrogen chloride gases.
6.6 Behavior in Fire: Heavy vapor can travel a considerable distance to a source of ignition and flash back.
6.7 Ignition Temperature: 1184°F
6.8 Electrical Hazard: Data not available
6.9 Burning Rate: (est.) 4.6 mm/min.
6.10 Adiabatic Flame Temperature: Data not available

(Continued)

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 36

8. WATER POLLUTION

8.1 Aquatic Toxicity: 20 ppm/96 hr/bluegill/TL₅₀/fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): 0.3 lb/lb, 5 days
8.4 Food Chain Concentration Potential: Data not available

9. SHIPPING INFORMATION

9.1 Grades of Purity: 99.5%; technical
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Pressure-vacuum

6. FIRE HAZARDS (Continued)

6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

10. HAZARD ASSESSMENT CODE
(See Hazard Assessment Handbook)
A-T-X

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Flammable liquid
11.2 NFPA Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	3
Health	0
Vapor Irritant	0
Liquid or Solid Irritant	1
Poison	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	3
Aesthetic Effect	2
Reactivity	
Other Chemicals	1
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	2
Flammability (Red)	3
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 112.56
12.3 Boiling Point at 1 atm: 270°F = 132°C = 405°K
12.4 Freezing Point: -50.1°F = -45.6°C = 227.6°K
12.5 Critical Temperature: 678°F = 359°C = 632°K
12.6 Critical Pressure: 656 psia = 44.6 atm = 4.52 MN/m²
12.7 Specific Gravity: 1.11 at 20°C (liquid)
12.8 Liquid Surface Tension: 33 dynes/cm = 0.033 N/m at 25°C
12.9 Liquid Water Interfacial Tension: 37.41 dynes/cm = 0.03741 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): 1.094
12.12 Latent Heat of Vaporization: 135 Btu/lb = 75 cal/g = 3,140 X 10³ J/kg
12.13 Heat of Combustion (est.): 12,000 Btu/lb = 6700 cal/g = 280 X 10³ J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 20.40 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 0.5 psia

$\mu\text{g}/\ell$ on an acute basis and $3 \mu\text{g}/\ell$ on a chronic basis for all phthalate esters. On a chronic basis, as low as $2,944 \mu\text{g}/\ell$. To protect human health— $34,000 \mu\text{g}/\ell$.

Determination in Water: Gas chromatography (EPA Method 606) or gas chromatography plus mass spectrometry (EPA Method 625).

Routes of Entry: Inhalation, ingestion, eye and skin contact.

Harmful Effects and Symptoms: Irritation of nasal passages and upper respiratory system; stomach irritation; light sensitivity.

Points of Attack: Respiratory system, gastrointestinal system.

Medical Surveillance: Consider the points of attack in preplacement and periodic physical examinations.

First Aid: If this chemical gets into the eyes, irrigate promptly. If this chemical contacts the skin, wash regularly. If a person breathes in large amounts of the chemical, move the exposed person to fresh air at once and perform artificial respiration. When swallowed, get medical attention. Give large quantities of salt water to induce vomiting. Do not make an unconscious person vomit.

Personal Protective Methods: Wear eye protection to prevent any reasonable probability of eye contact.

Respirator Selection:

250 mg/m^3 : HiEPF/SAF/SCBAF
9,300 mg/m^3 : SAF:PD,PP,CF

Disposal Method Suggested: Incineration.

References

- (1) U.S. Environmental Protection Agency, *Phthalate Esters: Ambient Water Quality Criteria*, Washington, DC (1980).
- (2) National Institute for Occupational Safety and Health, *Profiles on Occupational Hazards for Criteria Document Priorities: Phthalates, 97-103*, Report PB-274,073, Cincinnati, OH (1977)
- (3) U.S. Environmental Protection Agency, *Di-n-butyl Phthalate*, Health and Environmental Effects Profile No. 62, Washington, DC, Office of Solid Waste (April 30, 1980).
- (4) See Reference (A-61).
- (5) United Nations Environment Programme, *IRPTC Legal File 1983*, Vol. II, pp VII/632-4, Geneva, Switzerland, International Register of Potentially Toxic Chemicals (1984).

DICAMBA

- Hazardous Substance (EPA)

Description: $\text{Cl}_2\text{C}_6\text{H}_2(\text{OCH}_3)\text{COOH}$ is a colorless solid melting at 114° to 116°C .

Code Numbers: CAS 1918-00-9 RTECS DG7525000 UN: - (NA 2769)

DOT Designation: ORM-E

Synonyms: Dianat (in U.S.S.R.); MDBA (in Japan); 3,6-dichloro-o-anisic acid; 3,6-dichloro-2-methoxybenzoic acid; Banvel®; Mediben®.

Potential Exposure: Those involved in manufacture, formulation and application of this postemergence herbicide.

Permissible Exposure Limits in Air: No standards set.

Permissible Concentration in Water: A no-adverse effect level in drinking water has been calculated by NAS/NRC (A-2) at $0.009 \text{ mg}/\ell$.

Determination in Water: A detection limit of 1 ppb for Dicamba by electron-capture gas chromatography has been reported by NAS/NRC (A-2).

Harmful Effects and Symptoms: The acute toxicity of Dicamba is relatively low. Dicamba produced no adverse effect when fed to rats at up to $19.3 \text{ mg}/\text{kg}/\text{day}$ and $25 \text{ mg}/\text{kg}/\text{day}$ in subchronic and chronic studies. The no-adverse-effect dose in dogs was $1.25 \text{ mg}/\text{kg}/\text{day}$ in a 2-year feeding study. Based on these data, an ADI was calculated at $0.00125 \text{ mg}/\text{kg}/\text{day}$. No data were available on human exposure.

References

- (1) United Nations Environment Programme, *IRPTC Legal File 1983*, Vol. I, pp VII/118-19, Geneva, Switzerland, International Register of Potentially Toxic Chemicals (1984).

DICHLOROACETYLENE

Description: $\text{ClC}\equiv\text{CCl}$ is a liquid with an isocyanide-like odor boiling at 32°C .

Code Numbers: CAS 7572-29-4 RTECS AP1080000

DOT Designation: Forbidden.

Synonyms: None.

Potential Exposure: Dichloroacetylene may be produced by incineration of trichloroethylene below optimal furnace temperatures. Also in closed circuit anesthesia with trichloroethylene, heat and moisture produced by soda-lime absorption of CO_2 may produce dichloroacetylene along with phosgene and CO (A-34).

Incompatibilities: Shock, heat, acid, oxidizing materials.

Permissible Exposure Limits in Air: There are no Federal standards but ACGIH (1983/84) has set a ceiling value of 0.1 ppm ($0.4 \text{ mg}/\text{m}^3$). There is no STEL value given.

Permissible Concentration in Water: No criteria set.

Harmful Effects and Symptoms: Headache, loss of appetite, extreme nausea vomiting, involvement of the trigeminal nerve and facial muscles and the development of facial herpes. A number of fatalities attributed to dichloroacetylene have been reported (A-34).

DICHLOROBENZENES

- Hazardous substances (EPA)
- Hazardous wastes (EPA)
- Priority toxic pollutants (EPA)

Description: $\text{C}_6\text{H}_4\text{Cl}_2$, there are three isomeric forms: 1,2-dichlorobenzene is a colorless to pale yellow liquid with a pleasant, aromatic odor boiling at 179°C ; 1,3-dichlorobenzene is a liquid boiling at 172°C ; and 1,4-dichlorobenzene is a colorless solid with a mothball-like odor, boiling at 174°C but melting at 53°C .

Code Numbers:

1,2-DCB	CAS 95-50-1	RTECS CZ45	UN 1591
1,3-DCB	CAS none	RTECS none	UN —
1,4-DCB	CAS 106-46-7	RTECS CZ455	UN 1592

DOT Designations: ORM-A.

Synonyms: 1,2-Dichloro-*o*-DCB, 1,2-DCB, ODB, ODCB, Dowtherm E®; 1,3-dichloro-*m*-DCB, 1,3-DCB; and 1,4-dichloro-*p*-DCB, 1,4-DCB, PDB, PDCB.

Potential Exposure: The major uses of 1,2-DCB are as a process solvent in the manufacturing of toluene diisocyanate and as an intermediate in the synthesis of dyestuffs, herbicides, and degreasers. 1,4-Dichlorobenzene is used primarily as an air deodorant and an insecticide, which account for 90% of the total production of this isomer. Information is not available concerning the production and use of 1,3-DCB. However, it may occur as a contaminant of 1,2- or 1,4-DCB formulations. Both 1,2-dichloro- and 1,4-dichlorobenzene are produced almost entirely as by-products during the production of monochlorobenzene. Combined annual production of these two isomers in the United States approaches 50,000 metric tons.

Incompatibilities: For *o*- or 1,2-dichlorobenzene, strong oxidizers, hot aluminum or aluminum alloys. For *p*- or 1,4-dichlorobenzene no hazardous incompatibilities are cited.

Permissible Exposure Limits in Air:

	Federal Standard	1983/84 STEL	IDLH Level
<i>o</i> -DCB	50 ppm (300 mg/m ³)*	none	1,700 ppm
<i>p</i> -DCB	75 ppm (450 mg/m ³)	110 ppm (675 mg/m ³)	1,000 ppm

* As a ceiling value.

Determination in Air: Charcoal adsorption followed by CS₂ workup and gas chromatographic analysis. See NIOSH Method, Set J for *o*-DCB and Set T for *p*-DCB. See also reference (A-10).

Permissible Concentration in Water: To protect freshwater aquatic life—1,120 µg/l on an acute toxicity basis and 763 µg/l on a chronic basis. To protect saltwater aquatic life—1,970 µg/l on an acute toxicity basis. To protect human health—400 µg/l for all isomers.

Determination in Water: Gas chromatography (EPA Methods 601, 602, 612) or gas chromatography plus mass spectrometry (EPA Method 625). Gas-chromatographic methods have been developed for PDB with a sensitivity of 380 pg/cm peak height, and PDB concentrations as low as 1.0 ppb in water have been analyzed according to NAS/NRC.

Routes of Entry: Inhalation, ingestion, eye and skin contact for *p*-DCB. Also skin absorption for *o*-DCB.

Harmful Effects and Symptoms: Human exposure to dichlorobenzene is reported to cause hemolytic anemia and liver necrosis, and 1,4-dichlorobenzene has been found in human adipose tissue. In addition, the dichlorobenzenes are toxic to nonhuman mammals, birds, and aquatic organisms and impart an offensive taste and odor to water. The dichlorobenzenes are metabolized by mammals, including humans, to various dichlorophenols, some of which are as toxic as the dichlorobenzenes.

Persons with preexisting pathology (hepatic, renal, central nervous system, blood) or metabolic disorders, who are taking certain drugs (hormones or other-

wise metabolically active), or who are otherwise exposed to DCBs or related (chemically or biologically) chemicals by such means as occupation, or domestic use or abuse (e.g., pica or "sniffing") of DCB products, might well be considered at increased risk from exposure to DCBs.

For *o*-DCB, irritation of eyes and nose; liver and kidney damage; skin blistering. For *p*-DCB headaches; eye irritation, periorbital swelling; profuse rhinitis; anorexia, nausea, vomiting, weight loss, jaundice, cirrhosis.

Points of Attack: For *o*-DCB—liver, kidneys, skin, eyes. For *p*-DCB—liver, respiratory system, eyes, kidneys, skin.

Medical Surveillance: Consider the points of attack in preplacement and periodic physical examinations.

First Aid: For *o*-DCB — If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, wash with soap promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. When this chemical has been swallowed, get medical attention. Give large quantities of salt water and induce vomiting. Do not make an unconscious person vomit.

For *p*-DCB — If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, wash with soap. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. When this chemical has been swallowed, get medical attention. Give large quantities of water and induce vomiting. Do not make an unconscious person vomit.

Personal Protective Methods: Wear appropriate clothing to prevent repeated or prolonged skin contact. Wear eye protection to prevent any reasonable probability of eye contact. Employees should wash promptly when skin is wet or contaminated (and daily at the end of each work shift in the case of *p*-DCB). Remove nonimpermeable clothing promptly if wet or contaminated with *o*-DCB.

Respirator Selection: For *o*-DCB —

- 1,000 ppm: CCROVF
- 1,700 ppm: GMOV/SAF/SCBAF
- Escape: GMOV/SCBA

For *p*-DCB —

- 1,000 ppm: CCROVFD/GMOVD/SAF/SCBAF
- Escape: GMOV/SCBA

Disposal Method Suggested: Incineration, preferably after mixing with another combustible fuel. Care must be exercised to assure complete combustion to prevent the formation of phosgene. An acid scrubber is necessary to remove the halo acids produced.

References

- (1) U.S. Environmental Protection Agency, *Dichlorobenzene: Ambient Water Quality Criteria*, Washington, DC (1980).
- (2) U.S. Environmental Protection Agency, *1,2-Dichlorobenzene*, Health and Environmental Effects Profile No. 64, Washington, DC, Office of Solid Waste (April 30, 1980).
- (3) U.S. Environmental Protection Agency, *1,3-Dichlorobenzene*, Health and Environmental Effects Profile No. 65, Washington, DC, Office of Solid Waste (April 30, 1980).
- (4) U.S. Environmental Protection Agency, *1,4-Dichlorobenzene*, Health and Environmental Effects Profile No. 66, Washington, DC, Office of Solid Waste (April 30, 1980).
- (5) U.S. Environmental Protection Agency, *Dichlorobenzenes*, Health and Environmental Effects Profile No. 67, Washington, DC, Office of Solid Waste (April 30, 1980).

- (6) See Reference (A-61).
 (7) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 4, No. 2, 45-48, New York, Van Nostrand Reinhold Co. (1984) (1,3-Dichlorobenzene).
 (8) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 4, No. 2, 49-52, New York, Van Nostrand Reinhold Co. (1984) (1,4-Dichlorobenzene).
 (9) United Nations Environment Programme, *IRPTC Legal File 1983*, Vol. 1, pp VII/79-81, Geneva, Switzerland, International Register of Potentially Toxic Chemicals (1984).

3,3'-DICHLOROBENZIDINE AND SALTS

- Carcinogen (Animal positive, IARC) (3)
- Hazardous waste (EPA)
- Priority toxic pollutant (EPA)

Description: $C_6H_3ClNH_2C_6H_3ClNH_2$, 3,3'-dichlorobenzidine, is a gray or purple crystalline solid, melting at 132° to 133°C.

Code Numbers: CAS 91-94-1 RTECS DDO525000

DOT Designation: —

Synonyms: 4,4'-Diamino-3,3'-dichlorobiphenyl, 3,3'-dichlorobiphenyl-4,4'-diamine, 3,3'-dichloro-4,4'-biphenyldiamine, DCB.

Potential Exposure: The major uses of dichlorobenzidine are in the manufacture of pigments for printing ink, textiles, plastics, and crayons and as a curing agent for solid urethane plastics. There are no substitutes for many of its uses.

It is estimated that between 250 and 2,500 workers receive exposure to DCB in the U.S. compared to 62 for benzidine. Additional groups that may be at risk include workers in the printing or graphic arts professions handling the 3,3'-DCB-based azo pigments. 3,3'-DCB may be present as an impurity in the pigments, and there is some evidence that 3,3'-DCB may be metabolically liberated from the azo pigment. More information on the level of exposure to the pigments is needed.

Permissible Exposure Limits in Air: 3,3'-Dichlorobenzidine and its salts are included in a Federal standard for carcinogens; all contact with it should be avoided. Skin absorption is possible. ACGIH (1983/84) has categorized DCB as an "Industrial Substance Suspect of Carcinogenic Potential for Man."

Determination in Air: Collection on a filter, elution with triethylamine in methanol, analysis by high performance liquid chromatography (A-10).

Permissible Concentration in Water: To protect freshwater and saltwater aquatic life—no criteria developed due to insufficient data. To protect human health—preferably zero. An additional lifetime cancer risk of 1 in 100,000 results at a level of 0.103 $\mu\text{g}/\ell$.

Determination in Water: Chloroform extraction followed by concentration and high performance liquid chromatography (EPA Method 605) or gas chromatography plus mass spectrometry (EPA Method 625).

Routes of Entry: Inhalation and probably percutaneous absorption.

Harmful Effects and Symptoms: *Local* — May cause allergic skin reactions.
Systemic — 3,3'-Dichlorobenzidine was shown to be a potent carcinogen in

rats and mice in feeding and injection experiments, but no bladder produced. However, no cases of human tumors have been observed. Logic studies of exposure to the pure compound (6).

Medical Surveillance: Preplacement and periodic examination include history of exposure to other carcinogens, smoking, alcohol, and family history. The skin, lung, kidney, bladder, and liver should be examined; sputum or urinary cytology may be helpful.

Personal Protective Methods: These are designed to supplement controls and to prevent all skin or respiratory contact. Full body clothing and gloves should be used by those employed in handling. Fullface supplied air respirators of continuous flow or pressure demand should also be used. On exit from a regulated area, employees should change into street clothes, leaving their protective clothing and equipment at point of exit to be placed in impervious containers at the end of the shift for decontamination or disposal. Effective methods should be used to decontaminate gloves and clothing.

Disposal Method Suggested: Incineration (1500°F, 0.5 second for primary combustion; 2200°F, 1.0 second for secondary combustion). The elemental chlorine can be prevented through injection of steam or water into the combustion process. NO_x may be abated through the use of catalytic devices.

References

- (1) U.S. Environmental Protection Agency, *3,3'-Dichlorobenzidine: Ambient Air Quality Criteria*, Washington, DC (1980).
- (2) U.S. Environmental Protection Agency, *3,3'-Dichlorobenzidine, Health and Environmental Effects Profile No. 68*, Washington, DC, Office of Solid Waste (1980).
- (3) International Agency for Research on Cancer, *IARC Monograph on the Risks of Chemicals to Humans*, Lyon, France, 4, 49 (1974).
- (4) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 2, New York, Van Nostrand Reinhold Co. (1982).
- (5) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 3, New York, Van Nostrand Reinhold Co. (1983).
- (6) See Reference (A-62). Also see Reference (A-64).

DICHLORODIFLUOROMETHANE

- Hazardous waste (EPA)

Description: CCl_2F_2 is a colorless gas with a characteristic etherlike odor. It is nonflammable and non-toxic. It is used as a refrigerant >20% by volume. It boils at -30°C.

Code Numbers: CAS 75-71-8 RTECS PA8200000 UN 1028

DOT Designation: Nonflammable gas.

Synonyms: Refrigerant 12; Freon 12; F-12; Propellant 12; Halon 12

Potential Exposure: Dichlorodifluoromethane is used as an aerosol propellant, refrigerant and foaming agent (2).

Incompatibilities: Chemically active metals—sodium, potassium, powdered aluminum, zinc, magnesium.

Harmful Effects and Symptoms: Skin and eye irritation, respiratory system irritation, pulmonary edema.

Points of Attack: Eyes, skin, respiratory system, lungs.

Medical Surveillance: Consider the points of attack in preplacement and periodic physical examinations.

First Aid: If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, wash with soap immediately. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. When this chemical has been swallowed, get medical attention. Give large quantities of salt water and induce vomiting. Do not make an unconscious person vomit.

Personal Protective Methods: Wear appropriate clothing to prevent any possibility of skin contact. Wear eye protection to prevent any possibility of eye contact. Employees should wash immediately when skin is wet or contaminated. Work clothing should be changed daily if it is possible that clothing is contaminated. Remove nonimpervious clothing immediately if wet or contaminated. Provide eyewash.

Respirator Selection:

15 mg/m³: CCROVHIEF/GMOVHIE/SAF/SCBAF

100 mg/m³: SAF:PD,PP,CF

Escape: GMOVFP/SCBA

Disposal Method Suggested: Tear gas-containing waste is dissolved in an organic solvent and sprayed into an incinerator equipped with an afterburner and alkaline scrubber utilizing reaction with sodium sulfide in an alcohol-water solution. Hydrogen sulfide is liberated and collected by an alkaline scrubber (A-31).

References

- (1) See Reference (A-61).
- (2) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 4, No. 1, 48-49, New York, Van Nostrand Reinhold Co. (Jan./Feb. 1984).

CHLOROACETYL CHLORIDE

Description: ClCH₂COCl is a colorless-to-yellowish liquid with a pungent odor which boils at 105° to 110°C.

Code Numbers: CAS 79-04-9 RTECS AO6475000 UN 1752

DOT Designation: Corrosive material.

Synonyms: None.

Potential Exposures: Chloroacetyl chloride is used in the manufacture of acetophenone. It is used in the manufacture of a number of pesticides (A-32) including: alachlor, allidochlor, butachlor, dimethachlor, formothion, mecarbam, metolachlor, propachlor. It is also used in the manufacture of pharmaceuticals (A-41) such as chlordiazepoxide hydrochloride, diazepam, lidocaine, mianserin.

Permissible Exposure Limits in Air: There is no Federal standard. ACGIH, as of 1982/84, has adopted a TWA value of 0.05 ppm (0.2 mg/m³), but has set no STEL value.

Permissible Concentration in Water: No criteria set. (Chloroacetyl chloride decomposes in water.)

Routes of Entry: Skin absorption, skin and eye contact, inhalation, ingestion.

Harmful Effects and Symptoms: Medical reports of the effects of acute exposures include: mild-to-moderate skin burns and erythema; lachrymation and mild eye burns; mild-to-moderate respiratory effects with cough, dyspnea and cyanosis; and mild gastrointestinal effects (A-34).

Points of Attack: Skin, eyes, respiratory system.

Medical Surveillance: Should include attention to skin, eyes and respiratory system in preplacement and regular physical examinations.

Personal Protective Methods: Wear rubber gloves and coveralls.

Respirator Selection: Use of self-contained breathing apparatus is recommended.

Disposal Method Suggested: It may be discharged into sodium bicarbonate solution, then flushed to the sewer with water (A-38).

References

- (1) See Reference (A-60).

CHLOROALKYL ETHERS

See separate entries under: "Bis(2-Chloroethyl) Ether," "Bis(2-Chloroisopropyl) Ether," "Bis(Chloromethyl) Ether," "Chloromethyl Methyl Ether," "2-Chloroethyl Vinyl Ether," "Bis(2-Chloroethoxy)Methane."

References

- (1) U.S. Environmental Protection Agency, *Chloroalkyl Ethers: Ambient Water Quality Criteria*, Washington, DC (1980).
- (2) U.S. Environmental Protection Agency, *Chloroalkyl Ethers*, Health and Environmental Effects Profile No. 41, Office of Solid Waste, Washington, DC (April 30, 1980).

CHLOROBENZENE

- Hazardous substance (EPA)
- Hazardous waste (EPA)
- Priority toxic pollutant (EPA)

Description: C₆H₅Cl, a colorless liquid boiling at 131° to 132°C with a mild aromatic odor.

Code Numbers: CAS 108-90-7 RTECS CZ0175000 UN 1134

DOT Designation: Flammable liquid.

Synonyms: Monochlorobenzene, chlorobenzol, phenyl chloride, MCB.

Potential Exposure: Chlorobenzene is used in the manufacture of aniline, phenol, and chloronitrobenzene and as an intermediate in the manufacture of dyestuffs and many pesticides (A-32).

Incompatibilities: Strong oxidizers.

Permissible Exposure Limits in Air: The Federal limit and the 1983/84 ACGIH TWA value is 75 ppm (350 mg/m³). There is no STEL value set. The IDLH level is 2,400 ppm.

Determination in Air: Charcoal adsorption followed by workup with CS₂ and analysis by gas chromatography. See NIOSH Methods, Set I. See also reference (A-10).

Permissible Concentration in Water: To protect freshwater aquatic life: 250 µg/l on an acute basis for chlorobenzenes as a class. To protect saltwater aquatic life: 160 µg/l on an acute basis and 129 µg/l on a chronic basis for chlorinated benzenes as a class. To protect human health: for the prevention of adverse toxicological effects, 488 µg/l; but to prevent adverse organoleptic effects, 20 µg/l.

Determination in Water: Gas chromatography (EPA Methods 601 and 602) or gas chromatography plus mass spectrometry (EPA Method 624).

Routes of Entry: Inhalation, ingestion, eye and skin contact.

Harmful Effects and Symptoms: Irritation of the eyes and nose; drowsiness, incoherence; skin irritation; liver damage.

Points of Attack: Respiratory system, eyes, skin, central nervous system, liver.

Medical Surveillance: Consider the points of attack in preplacement and periodic physical examinations.

First Aid: If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, wash with soap promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. When this chemical has been swallowed, get medical attention. Do NOT induce vomiting.

Personal Protective Methods: Wear appropriate clothing to prevent repeated or prolonged skin contact. Wear eye protection to prevent any reasonable probability of eye contact. Employees should wash promptly when skin is wet or contaminated. Remove clothing immediately if wet or contaminated to avoid flammability hazard.

Respirator Selection:

- 1,000 ppm: CCROVF
- 2,400 ppm: GMOV/SAF/SCBAF
- Escape: GMOV/SCBA

Disposal Method Suggested: Incineration, preferably after mixing with another combustible fuel; care must be exercised to assure complete combustion to prevent the formation of phosgene; an acid scrubber is necessary to remove the halo acids produced.

References

- (1) U.S. Environmental Protection Agency, *Chlorinated Benzenes: Ambient Water Quality Criteria*, Washington, DC (1980).
- (2) U.S. Environmental Protection Agency, *Chlorobenzene*, Health and Environmental Effects Profile No. 42, Office of Solid Waste, Washington, DC (April 30, 1980).
- (3) See Reference (A-61).
- (4) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 2, No. 4, 72-75, New York, Van Nostrand Reinhold Co. (1982).

- (5) Parmeggiani, L., Ed., *Encyclopedia of Occupational Health & Safety*, Third Edition, Vol. 1, pp 459-61, Geneva, International Labour Office (1983).
- (6) United Nations Environment Programme, *IRPTC Legal File 1983*, Vol. 1, pp VII/75-78, Geneva, Switzerland, International Register of Potentially Toxic Chemicals (1984).

p-CHLOROENZOTRICHLORIDE

- Carcinogen (Animal Positive) (1)

Description: Cl₃C-C₆H₄-Cl is a water-white liquid which boils at 245° to 257°.

Code Numbers: CAS 5216-25-1

DOT Designation: —

Synonyms: 1-Chloro-4-(trichloromethyl)benzene; p, alpha-, alpha-, alpha-tetrachlorotoluene; p-chlorophenyltrichloromethane.

Potential Exposure: Used in pesticide manufacture as an intermediate; reaction with HF yields chlorobenzotrifluoride as a major intermediate for several pesticides.

Permissible Exposure Limits in Air: No limits set.

Permissible Concentration in Water: No criteria set.

Routes of Entry: Inhalation, ingestion.

Harmful Effects and Symptoms: If released into the environment, pCBTC could constitute a health hazard for humans since pCBTC is carcinogenic in mice when administered either orally or dermally.

References

- (1) U.S. Environmental Protection Agency, *Chemical Hazard Information Profile Draft Report: p-Chlorobenzotrifluoride*, Washington, D.C., (February 24, 1983).

o-CHLOROENZYLIDENE MALONITRILE

Description: ClC₆H₄CH=C(CN)₂, o-chlorobenzylidene malonitrile, is a white crystalline solid.

Code Numbers: CAS 2698-41-1 RTECS OO3675000

DOT Designation: —

Synonyms: OCBM, CS, o-chlorobenzalmalononitrile.

Potential Exposures: OCBM is used as a riot control agent.

Incompatibilities: Strong oxidizers.

Permissible Exposure Limits in Air: The Federal standard and ACGIH 1983/84 TWA is 0.05 ppm (0.4 mg/m³) as a ceiling value. The notation "skin" is added to indicate the possibility of cutaneous absorption. There is no STEL value set. The IDLH level is 2.0 mg/m³.

ATTACHMENT B
Tank Pull Form and Letter Report to the
Underground Storage Tank Program

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

PF
PTD

November 9, 1993

Mr. Marc Coleman
Underground Tank Inspector
Management and Prevention Section
Hazardous Materials Management Division
103 South Main Street, West Building
Waterbury, Vermont, 05671-0404

Re: Mack Molding Company
East Arlington Road
Arlington, Vermont 05250
UST Facility ID # 375-2511
JCO No. 1-1352-1

Dear Marc:

Enclosed please find the completed Underground Storage Tank Pull Form for the above referenced site. Four Underground Storage Tanks (UST), used to store #2, #4, #6 and waste oils were removed. The tanks had not failed, but the site was contaminated with oil. Two replacement UST's have been installed.

This site is a manufacturing facility, and had as many as 6 documented UST's buried between the main plant and the railroad right-of-way. Two of the 6 tanks had been previously removed. The Johnson Company directed and documented the removal of the remaining four 10,000 gallon Underground Storage Tanks (UST) on November 4 and 5, 1993.

Upon arrival a photo-ionization detector (PID) was calibrated and PID readings at the filler pipes of each of the 4 tanks registered an average of 82 PPM. Each tank contained between 7 and 45 inches of product. The majority of the fuel in Tank # 1 (reference Site Map) was recovered by employees of Mack Molding. The majority of the water in Tank # 6 was recovered by Mack Molding during the week of November 1 to November 4, 1993. Vacuum trucks and pumps supplied by the excavator recovered the balance of 4500 gallons of mixed #2, #4, and #6 oils in addition to water and tank-bottom waste from the 4 tanks.

According to Edward E. Ericksen, Plant Engineer for Mack Molding, all 4 tanks had been in service for approximately 50 years. The tanks were partially covered by both asphalt paving and by a grassed area, and the depth of groundcover above the tanks did not exceed 2 feet. During 50 years in service, there were reportedly numerous overfills and piping accidents, resulting in surface oil spills. Soil staining was evident surrounding each of the four filler pipes.

Stained soils were observed as each of the tanks were unearthed, and PID readings greater than 10 PPM were recorded throughout the excavation. The soils immediately surrounding, and between the tanks were saturated with product. A total of approximately 70 cubic yards of petroleum contaminated soils were stockpiled on site. These soils were polyencapsulated, and rest in a secured area, on asphalt pavement.

Mr. Marc Coleman
Agency of Natural Resources
Department of Environmental Conservation
Hazardous Materials Management Division
Underground Storage Program
Waterbury, Vermont

November 9, 1993
Page 2

The soils at the eastern edge of the excavation consist of coarse sands and fill, grading to medium sands with depth. They are streaked with layers of product. The soils at the southern and western edge of the excavation consist of a bright orange sandy loam, and, below a depth of 2 feet, do not exhibit contamination either visually observed or as measured with the PID. The soils at the northern edge of the excavation are composed of very coarse sands and cobbles, interspersed with pieces of used plastic sheeting from the previous removal of 2 UST's by others. As the sheets of plastic within the fill were disturbed, pockets of water were released into the excavation.

Free product was seen to flow from beneath each of the tanks as they were uncovered, and this product pooled upon the water in the excavation. The free product was promptly swabbed and removed from the excavation. The static levels of the pools of water in the excavation did not change overnight.

The tanks were removed from the ground on Friday, November 5, 1993. Rain began by mid-morning, and product was washed from the sides of the excavation into a sump which was created in the center of the excavation. This sump was used to collect and swab free product throughout the day.

Each tank was removed, scraped clean, inspected, purged, and cleaned by Tom Boise, of New Haven, Vermont. No holes were observed in any of the four tanks. Surface corrosion no deeper than 1/16 of an inch, occupying an area no greater than 2 square inches was observed on tank # 6. The waste removed from the tank bottoms was stored in 22 drums for pickup and disposal on November 6, 1993 by Pollution Solutions of Vermont. A total of approximately 1100 gallons of tank bottom waste was removed from the 4 tanks.

After the last tank was removed from the excavation, the backhoe was directed to dig down to the limit of it's reach in an attempt to determine the depth of the contamination. At 12 feet BGS a layer of densely packed light grey sands and angular rock fragments was encountered. This layer was not visually contaminated, and PID readings of a field screened sample taken from this hardpan indicated 16 PPM. Additional excavation was not attempted.

The locations of both public and private water wells within 1/2 mile of the site was researched at the offices of the Water Supply Department of The Agency of Natural Resources. According to records in that office, there are no public or private water supplies located within 1/2 mile of the site.

Peter F. Putis, Vice President and Chief Operating Officer of the Arlington Water Company was interviewed for this report and he confirmed that the well fields for the Arlington Water Company are located more than 1/2 mile from the site. Mr. Putis also reported there are a number of private wells within 1/2 mile of Mack Molding Company and offered to share his maps and knowledge of these water supplies. We will follow-up on the specifics of all of water supplies within a 1/2 mile radius, including a map, under separate cover. As this will likely require a separate trip to Arlington, Vermont, we would like to assess any sensitive receptors that appear to be at risk during the same trip. We will go prepared to take samples of a number of those wells for analysis by EPA Method 8020. Please let us know as soon as possible if this meets with your approval.

Mr. Marc Coleman
Agency of Natural Resources
Department of Environmental Conservation
Hazardous Materials Management Division
Underground Storage Program
Waterbury, Vermont

November 9, 1993
Page 3

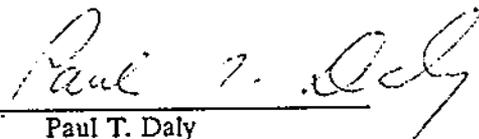
In conclusion, the petroleum contaminated soils appear to have been contained above the hardpan layer. The excavation was enlarged as needed install the 2 new UST's. The eastern limit of the excavation was limited by the adjacent railroad right of way, which is in daily use. Two new tanks were installed and the excavation was backfilled with clean fill.

Please call me if you have any questions.

Sincerely,

THE JOHNSON COMPANY

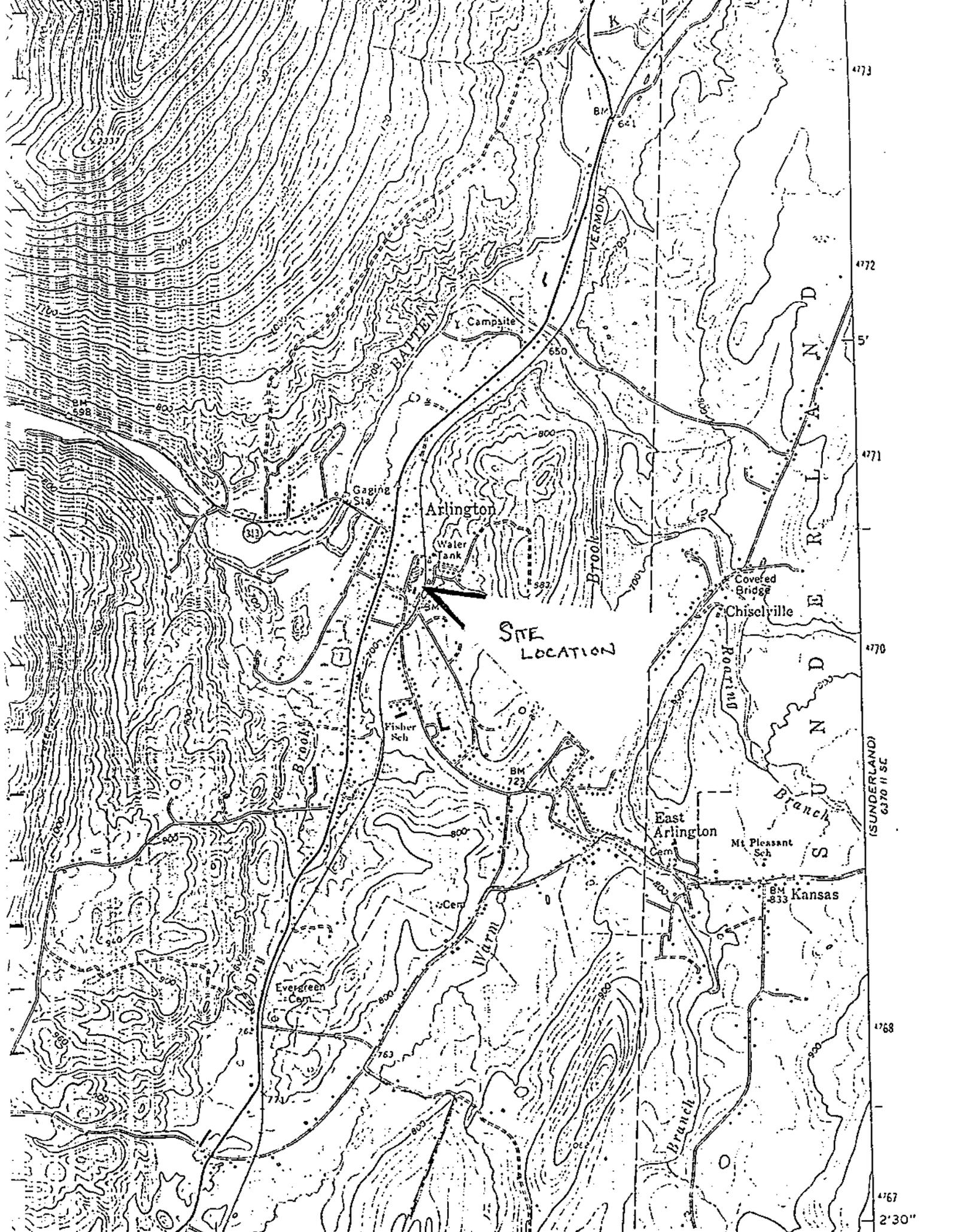
By:


Paul T. Daly
Senior Engineering Technician

cc: Edward E. Ericksen, Mack Molding Company
E. Matt Germon, Sites Management Section

enclosure

PID Readings					
Date	Time	PPM	Tank #	Depth, bgs	Location
11/4	13:08	2	2 & 3	1	Between Tanks
11/4	13:16	11	2	2	East Side
11/4		32	2	4.5	East Side
11/4	15:11	117	3	6	
11/4	13:24	114.5	3	6	
11/4	13:49	55	2	6	North Side
11/4	14:02	24.2	2 & 3	4	Between 2 & 3
11/4	13:16	32	2	2	East
11/5	10:36	16.9	3	12	Center
11/5	15:02	31	1	2	West Side
11/5	17:00	.5	1	6-8	West
11/5	17:00	.5	1	6-8	South
Average PPM 41.4					



Arlington

SITE
LOCATION

Water
Tank

Gaging
Sta

Covered
Bridge

Chisleville

East
Arlington
Cem

Mt Pleasant
Sch

Kansas

Fisher
Sch

Warm
Brook

Branch

Roaring
Brook

VERMONT
Brook

BATTEN
Brook

R
L
A
N
D
E
N
D
S

4773

4772

4771

4770

(SUNDERLAND)
6370 11 SE

4768

4767

2'30"

5'

5'

5'

5'

5'

5'

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
UNDERGROUND STORAGE TANK PROGRAM
TANK PULL FORM

TODAY'S DATE: Nov. 9 1993

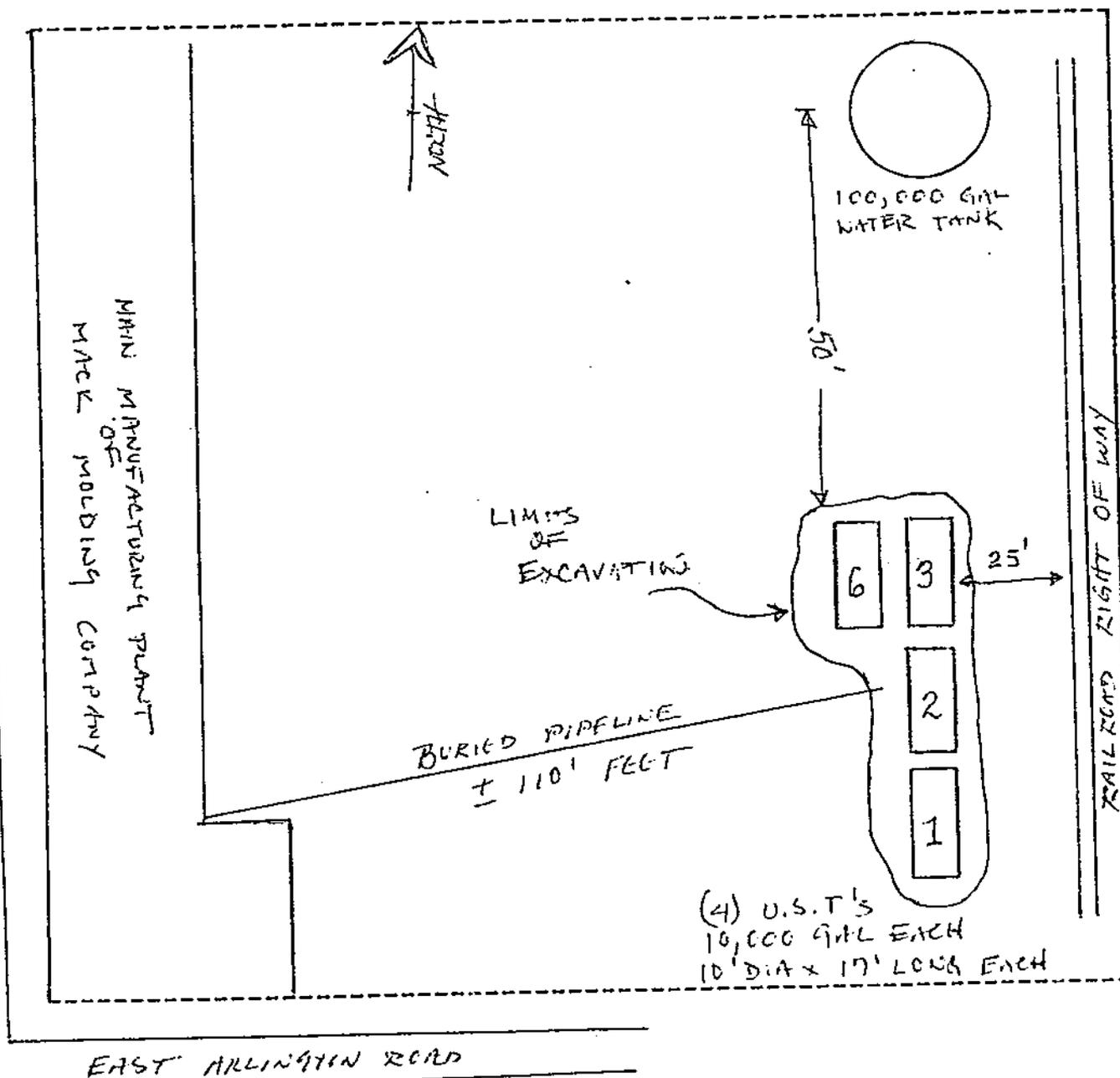
INSPECTOR: Paul T. Diney

DATE OF REMOVAL: Nov. 5 1993

BUSINESS NAME: MACK Welding Company,
ARLINGTON, VT

SITE DIAGRAM

Show location of all tanks and distance to permanent structures, sample points, areas of contamination and any pertinent site information. Indicate North arrow and major street names or route number.



(4) U.S.T.'S
10,000 GALL EACH
10' DIA X 17' LONG EACH

NOT TO SCALE

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 UNDERGROUND STORAGE TANK PROGRAM
 103 SOUTH MAIN STREET
 WATERBURY, VERMONT 05671-0404
 (802) 241-3888

Date of Removal: November 5, 1993 Date of Assessment: November 5, 1993

Person & Company Doing Assessment: Paul T. Daly of The Johnson Company Telephone Number: (802) 229-4600

Business Name Where Tank(s) Located: Mack Molding Company
 Number of Employees: ±200 East Arlington Road
 Street Address & Town/City: Arlington, VT 05250

Owner of Tank(s): Mack Molding Company Contact Person: Edward E. Erickson
 Address: Same Phone Number: (802) 375-1391
 Town/City:

UST Facility ID Number: 375-2511

Tank #	Product	Size	Condition
1	#4 & #6 Fuel Oil	10,000 gallon	Good
2	#4 & #6 Fuel Oil	10,000 gallon	Good
3	#4 & #6 Fuel Oil	10,000 gallon	Good
46	Waste Oils	10,000 gallon	Good

Reason for Tank Removal (check one): abandoned routine replacement
 tank or piping leaking liability

Replacement Tank(s)? yes no Number of Replacement Tanks: 2
 DEC UST Permit(s) Obtained? yes no

DEC-Permitted Tank(s) Still On-Site? yes no Number of Tanks: _____

Out of Service Tank(s) On-Site? yes no Number of Tanks: _____

Heating Oil Tank(s) On-Site? yes no No. of Tanks: 2 Size(s): 10,000 gallon

Any Waste Pumpage? yes no Estimated Volume: 4,500 gallons
 Transported By: Safety Kleen, Pollution Solutions of Vermont

Size of Excavation (ft³): 1,350 Depth: 11 Soil Type: Coarse sands
 Concentrations Detected with PID: Peak = 117 Average = 41

Type of PID: OVM 580B, 10.6 eV
 Number of Readings (please put locations on attached drawing): 12
 Calibration Info. (date, time, type of gas): 11/4/93 and 11/5/93 at 7:30 AM/Isobutylene

Free Phase Product Encountered? yes no Approx. Amount: 20 gallons

Cont. Soils Stockpiled? yes no Amount (yd³): 54

Cont. Soils Backfilled? yes no Amount (yd³): _____

Groundwater Encountered? yes no Depth to Groundwater: 8 FEET
 Monitoring Wells Installed? yes no Number: 6 Screen Depth: 4-20' BGS

On-Site Drinking Well? yes no (if yes: rock gravel spring)

Public Water Supply Well(s) Within 1/4 Mile? yes no
 Distance to nearest: _____

Private Water Supply Well(s) Within 1/4 Mile? yes no How Many? 2 IN QUESTION

Samples Collected for Laboratory Analysis? yes no How Many? _____
 (check all that apply: soil, groundwater, drinking water)

Receptors Affected (check all that apply):
 soil residential; # of houses/people: _____
 groundwater surface water; name/type of water body: _____

Signature of Owner or Authorized Representative: _____
 Date: _____

Signature of Person Performing Site Assessment: Paul T. Daly
 Date: Nov 9, 1993

*** ATTACH OBSERVATIONS, CONCLUSIONS, AND DRAWING ON A SEPARATE PAGE ***

ATTACHMENT C
Laboratory Results



LABORATORY REPORT

P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313

CLIENT NAME: The Johnson Company
5 State Street
ADDRESS: Montpelier, VT 05602
LABORATORY NO: 3-2053
PROJECT NO: 78611
DATE OF SAMPLE: 11/ 9/93
SAMPLE LOCATION: Mack Molding
Arlington, VT
DATE OF RECEIPT: 11/10/93
DATE OF ANALYSIS: 11/20/93
ATTN: Paul Daley
DATE OF REPORT: 11/24/93

TOTAL PETROLEUM HYDROCARBONS (418.1)

(Results expressed as milligrams per liter (mg/L) unless otherwise noted)

<u>Sample #</u>	<u>Location</u>	<u>Concentration</u>
3-2053-1	MW4	31
3-2053-3	MW5	82
3-2053-4	MW6	220

NOTE: Sample MW1 was lost during the extraction.

LABORATORY REPORT



CLIENT: The Johnson Company
 ADDRESS: 5 State Street
 Montpelier, VT 05602

LABORATORY NUMBER: 3-2053
 PROJECT NUMBER: 78611
 DATE OF SAMPLE: 11/9/93

SITE: Mack Molding, Arlington, VT
 ATTENTION: Paul Daley

DATE OF RECEIPT: 11/10/93
 DATE OF ANALYSIS: 11/19-21/93
 DATE OF REPORT: 11/23/93

RESULTS

(ug/l micrograms per liter)

<u>Parameter</u>	<u>MW-1</u>	<u>MW-4</u>	<u>MW-5</u>	<u>MW-6</u>	<u>TRIP BLANK</u>
Methyl Tertiary Butyl Ether	BPQL	BPQL	<10	<10	BPQL
Benzene	BPQL	BPQL	<10	<10	BPQL
Toluene	BPQL	2	<10	<10	BPQL
Ethylbenzene	BPQL	BPQL	<10	<10	BPQL
Total Xylenes	BPQL	BPQL	<10	<10	BPQL
BTEX	BPQL	2	<10	<10	BPQL
Chlorobenzene	BPQL	4	<10	<10	BPQL
1,2-Dichlorobenzene	BPQL	BPQL	<10	<10	BPQL
1,3-Dichlorobenzene	BPQL	BPQL	<10	<10	BPQL
1,4-Dichlorobenzene	BPQL	10	<10	51	BPQL
% Surrogate Recovery	95%	96%	89%	89%	93%

EPA Method 8020

BPQL=Below Practical Quantitation Limits; 1 ppb.

NOTE 1: MW5 and MW6 were non homogenous with free product present.

NOTE 2: MW4, MW1 and MW6 contained small unknown peaks.

NOTE 3: Chlorobenzene and 1,4-Dichlorobenzene were confirmed by Method 8010.

Page 1 of 2

RJL/mlh

Respectfully submitted,
 SCITEST, INC.
Roderick J. Lamothe
 Roderick J. Lamothe
 Laboratory Director

PTD
 CRK

1-12352-1



317 Elm Street
 Milford, N.H. 03055
 (603) 673-5440
 FAX (603) 673-0366

MR. PAUL DALY
 THE JOHNSON COMPANY
 5 STATE STREET
 MONTPELIER VT 05602

LABORATORY # : K15-93-01
 DATE SAMPLED : 11/09/93
 DATE RECEIVED : 11/15/93
 DATE COMPLETED : 11/22/93
 PICK UP : NO
 SAMPLER : W.P.O.
 PURCHASE ORDER #: N/A
 CONTROL # : 8628
 JOB # : 1-1352-1(87)

JOB NAME: MACK MOLDING
 LOCATION: ARLINGTON, VT

TEST PARAMETER	RESULTS	DATE COMPLETED	EPA METHOD	DETECTION LIMIT	ANALYST
-------------------	---------	-------------------	---------------	--------------------	---------

SAMPLE IDENTITY: STOCKPILED SOIL

CORROSIVITY (pH)	6.68	11/15/93	9045	0-14	LP
FLASHPOINT	>160°F	11/18/93	MOD.1010	40°F	LP

REACTIVITY:

CYANIDE (mg/Kg)	<25.	11/17/93	SW846 7.3.3.2	25.mg/Kg	LC
SULFIDE (mg/Kg)	<50.	11/17/93	SW846 7.3.4.1	50.mg/Kg	LC

TOXIC CHARACTERIZATION LEACHATE PROCEDURE (TCLP METHOD 1311)

ARSENIC	<0.10	11/22/93	6010	0.10	CL
BARIUM	0.42	11/22/93	6010	0.03	CL
CADMIUM	<0.05	11/22/93	6010	0.05	CL
CHROMIUM	0.16	11/22/93	6010	0.10	CL
LEAD	<0.40	11/22/93	6010	0.40	CL
MERCURY	<0.0005	11/18/93	7470	0.0005	LC
SELENIUM	<0.10	11/22/93	6010	0.10	CL
SILVER	<0.20	11/22/93	6010	0.20	CL

ALL RESULTS ARE IN (mg/L).



All analyses are performed in accordance with above referenced U.S.E.P.A./Standard Methods/ASTM Methodologies.

Inorganic results are in (mg/L) except as noted.

Certified by: _____

A handwritten signature in black ink, appearing to read "J. W. Chrystal", written over a dashed line.

Jay W. Chrystal
Laboratory Director



CUSTOMER: JOHNSON, CO.

VOLATILE ORGANIC ANALYSIS
EPA METHOD 8260

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8628

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/22/93

COMPOUND
MATRIX: SOLID
CONCENTRATION
(UG/KG)
PERCENT MOISTURE: 15.13%
DETECTION LIMIT MULTIPLIER:
(UG/KG) X 50

COMPOUND	MATRIX: SOLID CONCENTRATION (UG/KG)	PERCENT MOISTURE: 15.13% DETECTION LIMIT MULTIPLIER: (UG/KG) X 50
CHLOROMETHANE	BDL	5
BROMOMETHANE	BDL	5
VINYL CHLORIDE	BDL	5
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	5
ACETONE	BDL	15
CARBON DISULFIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
TRANS-1,2-DICHLOROETHENE	BDL	5
CIS-1,2-DICHLOROETHENE	BDL	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
2-BUTANONE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
METHYL-TERTIARY-BUTYL ETHER	BDL	5
BROMOFORM	BDL	5
2-HEXANONE	BDL	5
4-METHYL-2-PENTANONE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	250	5
CHLOROBENZENE	340	5
STYRENE	BDL	5
ETHYLBENZENE	1,400	5
TOTAL XYLENES	13,600	5
ACROLEIN	BDL	500
ACRYLONITRILE	BDL	500

NOTE: NON-TARGET COMPOUNDS PRESENT

BDL = BELOW DETECTION LIMIT

CERTIFIED BY:



SEMIVOLATILE ORGANIC ANALYSIS
EPA METHOD 8270

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8628

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/16/93

DATE EXTRACTED: 11/15/93

MATRIX: SOLID

PERCENT MOISTURE: 15.13%

COMPOUND	CONCENTRATION (UG/KG)	DETECTION LIMIT MULTIPLIER: (UG/KG) X 1000
2-Chlorophenol	BDL	10
1,4-Dichlorobenzene	BDL	10
1,3-Dichlorobenzene	BDL	10
1,2-Dichlorobenzene	BDL	10
bis(2-chloroisopropyl)ether	BDL	10
n-Nitroso-di-n-propylamine	BDL	10
Naphthalene	17,000	10
2-Methylnaphthalene	49,000	10
2,4-Dimethylphenol	BDL	10
2,4-Dichlorophenol	BDL	10
4-Chloroaniline	BDL	10
4-Chloro-3-methylphenol	BDL	10
Hexachlorocyclopentadiene	BDL	10
2,4,5-Trichlorophenol	BDL	10
2,4,6-Trichlorophenol	BDL	10
2-Nitroaniline	BDL	10
Acenaphthylene	BDL	10
3-Nitroaniline	BDL	10
Acenaphthene	BDL	10
4-Nitrophenol	BDL	10
2,4-Dinitrotoluene	BDL	10
4-Nitroaniline	BDL	10
4,6-Dinitro-2-methylphenol	BDL	10
n-Nitrosodiphenylamine	BDL	10
4-Bromophenyl-phenylether	BDL	10
Hexachlorobenzene	BDL	10
Pentachlorophenol	BDL	10
Phenanthrene	18,000	10
Anthracene	BDL	10
Di-n-butylphthalate	BDL	10
Fluoranthene	BDL	10
Pyrene	BDL	10
Butylbenzylphthalate	BDL	10
Benzo[a]anthracene	BDL	10
3,3'-Dichlorobenzidine	BDL	10
Chrysene	BDL	10
bis(2-Ethylhexyl)phthalate	BDL	10
Di-n-octylphthalate	BDL	10
Dimethylphthalate	BDL	10
Flourene	BDL	10



2 OF 2 PAGES

SEMIVOLATILE ORGANIC ANALYSIS
EPA METHOD 8270

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8628

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/16/93

DATE EXTRACTED: 11/15/93

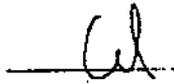
MATRIX: SOLID

PERCENT MOISTURE: 15.13%

COMPOUND	CONCENTRATION (UG/KG)	DETECTION LIMIT MULTIPLIER: (UG/KG) X 1000
2-Methylphenol	BDL	10
4-Methylphenol	BDL	10
Phenol	BDL	10
Nitrobenzene	BDL	10
Dibenzofuran	BDL	10
Benzo[b]fluoranthene	BDL	10
Benzo[k]fluoranthene	BDL	10
Benzo[a]pyrene	BDL	10
Indeno[1,2,3-cd]pyrene	BDL	10
Dibenz[a,h]anthracene	BDL	10
Benzo[g,h,i]perylene	BDL	10

NOTE: NON-TARGET COMPOUNDS PRESENT

BDL = BELOW DETECTION LIMIT

CERTIFIED BY: 



PESTICIDES
EPA METHOD 8080

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8628

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/17/93

DATE EXTRACTED: 11/15/93

MATRIX: SOLID

PERCENT MOISTURE: 15.13%

COMPOUND

CONCENTRATION
(UG/KG)

DETECTION LIMIT MULTIPLIER:
(UG/KG) X 1000

ALPHA-BHC	BDL	0.1
BETA-BHC	BDL	0.1
DELTA-BHC	BDL	0.1
HEPTACHLOR	BDL	0.1
ALDRIN	BDL	0.1
HEPTACHLOR EPOXIDE	BDL	0.1
ENDOSULFAN 1	BDL	0.1
ENDOSULFAN 2	BDL	0.1
DIELDRIN	BDL	0.1
ENDRIN	BDL	0.1
4,4'-DDE	BDL	0.1
4,4'-DDD	BDL	0.1
4,4'-DDT	BDL	0.1
TOTAL-CHLORDANE	BDL	1
LINDANE	BDL	0.1
METHOXYCHLOR	BDL	1
TOXAPHENE	BDL	1

NOTE: NON-TARGET COMPOUNDS PRESENT

BDL=BELOW DETECTION LIMIT

CERTIFIED: 



TOXIC CHARACTERIZATION LEACHATE PROCEDURE (TCLP)
HERBICIDES
EPA METHOD 1311/8150

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8628

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/19/93

DATE EXTRACTED: 11/18/93

MATRIX: SOLID

COMPOUND

CONCENTRATION

DETECTION LIMIT MULTIPLIER:

(UG/L)

(UG/L) X 2

2,4-D

BDL

10

SILVEX

BDL

10

BDL=BELOW DETECTION LIMIT

CERTIFIED: 



TOTAL PETROLEUM HYDROCARBONS
EPA MODIFIED METHOD 8100

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: STOCKPILED SOIL

CONTROL #: 8528

DATE SAMPLED: 11/09/93

RECD: 11/15/93

DATE ANALYZED: 11/16/93

DATE EXTRACTED: 11/15/93

MATRIX: SOLID

PERCENT MOISTURE: 15.13%

COMPOUND

CONCENTRATION
(MG/KG)DETECTION LIMIT MULTIPLIER:
(MG/KG) X 1TOTAL PETROLEUM
HYDROCARBONS AS
FUEL CONSTITUENTS

1,600

10

BDL=BELOW DETECTION LIMIT

CERTIFIED BY:



Quality Control



DATE : 11/22/93 LABORATORY #: K15-93-01
CUSTOMER : THE JOHNSON COMPANY CONTROL #: 8628

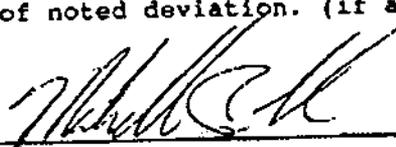
INORGANIC QUALITY CONTROL INFORMATION

Chemserve minimum quality control requires matrix or duplicate analysis every ten samples analyzed. In addition, all samples are compared to a minimum of a three point calibration curve and a reagent blank. Any digestion or extraction requires a method blank or equipment blank to verify no presence of cross contamination or carry-over. Matrix spike recoveries are generally required to be within plus or minus 25%. Extensive QC data is available for this project at our facility.

CERTIFICATION:

I certify that all quality control measures were within specification guidelines with the exception of noted deviation. (if any)

Certified by _____


MICHELLE R. COHEN - INORGANICS SUPERVISOR

A detailed QA/QC manual is available upon request.





STANDARD TCLP DATA PACKAGE

CUSTOMER: JOHNSON COMPANY

LABORATORY #: K15-93-01

CONTROL #: 8628

JOB # : 1-1352-1(87)

JOB NAME: MACK MOLDING
LOCATION: ARLINGTON, VT

MATRIX SPIKE RECOVERY FORM

SPIKE SAMPLE ID: 8522

PARAMETERS	SPIKE CONCENTRATION	SAMPLE CONCENTRATION	CONCENTRATION RECOVERED	% RECOVERY
ARSENIC	1.00	<0.10	1.08	108
BARIUM	2.00	0.63	1.86	93
CADMIUM	1.00	<0.05	1.02	102
CHROMIUM	2.00	<0.10	2.02	101
LEAD	2.00	<0.40	2.10	105
MERCURY	0.0030	<0.0005	0.0023	76
SELENIUM	1.00	<0.10	1.05	105
SILVER	2.00	<0.20	1.88	94

DUPLICATE SAMPLE ID: 7718
MERCURY DUPLICATE SAMPLE ID: 8628
DUPLICATE SAMPLE RESULTS

METHOD BLANK RESULTS

	RESULTS	RESULTS		RPD
		ORIGINAL	DUPLICATE	
ARSENIC	<0.10	<0.10	<0.10	0
BARIUM	<0.03	0.17	0.15	10
CADMIUM	<0.05	<0.05	<0.05	0
CHROMIUM	<0.10	<0.10	<0.10	0
LEAD	<0.40	<0.40	<0.40	0
MERCURY	<0.0005	<0.0005	<0.0005	0
SELENIUM	<0.10	<0.10	<0.10	0
SILVER	<0.20	<0.30	<0.20	0



**VOA SPIKE RECOVERY FORM
EPA METHOD 8260**

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

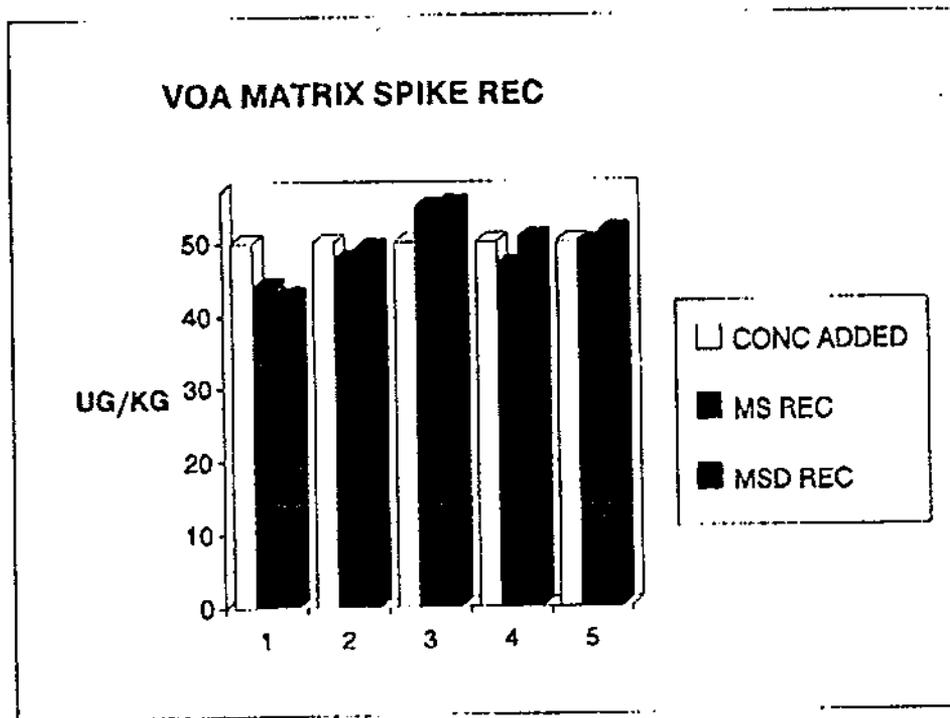
JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: QC SPIKES / 8628

CONTROL #: 8628

DATE ANALYZED: 11/22/93

COMPOUND	CONC ADDED UG/KG	AMT REC UG/KG	DUP AMT REC UG/KG	%REC	DUP % REC	%DIFF
1,1-DICHLOROETHENE	50	43.98	42.77	88%	86%	2%
TRICHLOROETHENE	50	47.62	49.26	95%	99%	3%
BENZENE	50	54.77	55.17	110%	110%	1%
TOLUENE	50	46.84	50.56	94%	101%	7%
CHLOROBENZENE	50	49.73	51.36	99%	103%	3%



SPIKE RECOVERY LIMITS
 1,1-DICHLOROETHENE 59-172%
 TRICHLOROETHENE 62-137%
 BENZENE 66-142%
 TOLUENE 59-139%
 CHLOROBENZENE 60-133%



**PESTICIDES
SPIKE RECOVERY FORM
EPA METHOD 8080**

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

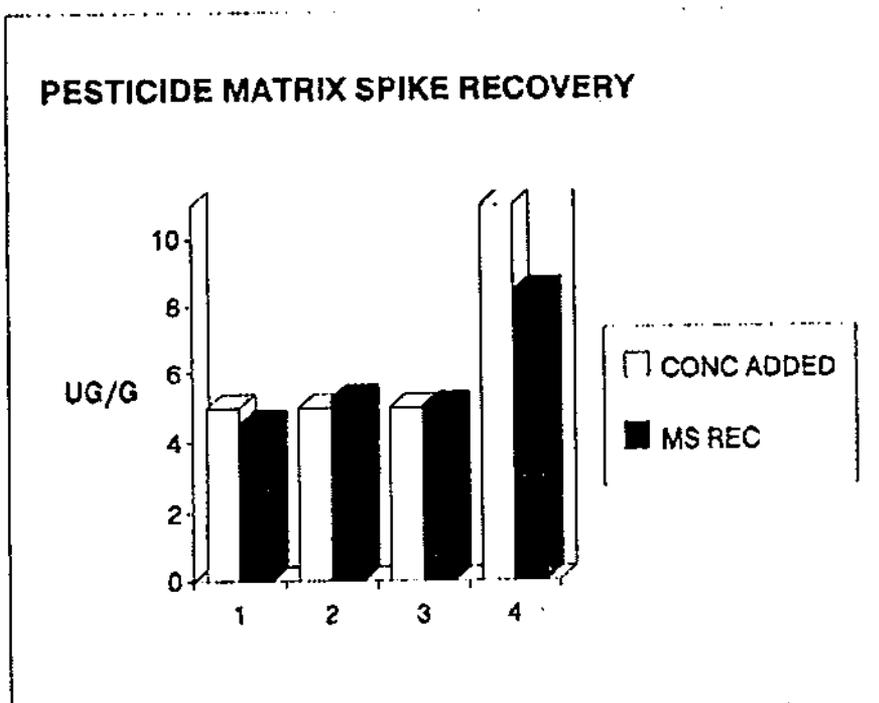
JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: QC SPIKE / 8629

CONTROL#: 8628

DATE ANALYZED: 11/17/93

COMPOUND	CONC ADDED UG/G	AMT REC UG/G	%RECOVERY
LINDANE	5	4.53	91%
HEPTACHLOR	5	5.28	106%
ALDRIN	5	5.03	101%
ENDRIN	12.5	8.44	68%



SPIKE RECOVERY LIMITS
 LINDANE 46-127%
 HEPTACHLOR 35-130%
 ALDRIN 40-130%
 ENDRIN 42-139%



TCLP HERBICIDE SPIKE RECOVERY FORM
EPA METHOD 8150

CUSTOMER: JOHNSON, CO.

LAB#: K15-93-01

SAMPLE LOCATION: MACK MOLDING, ARLINGTON, VT

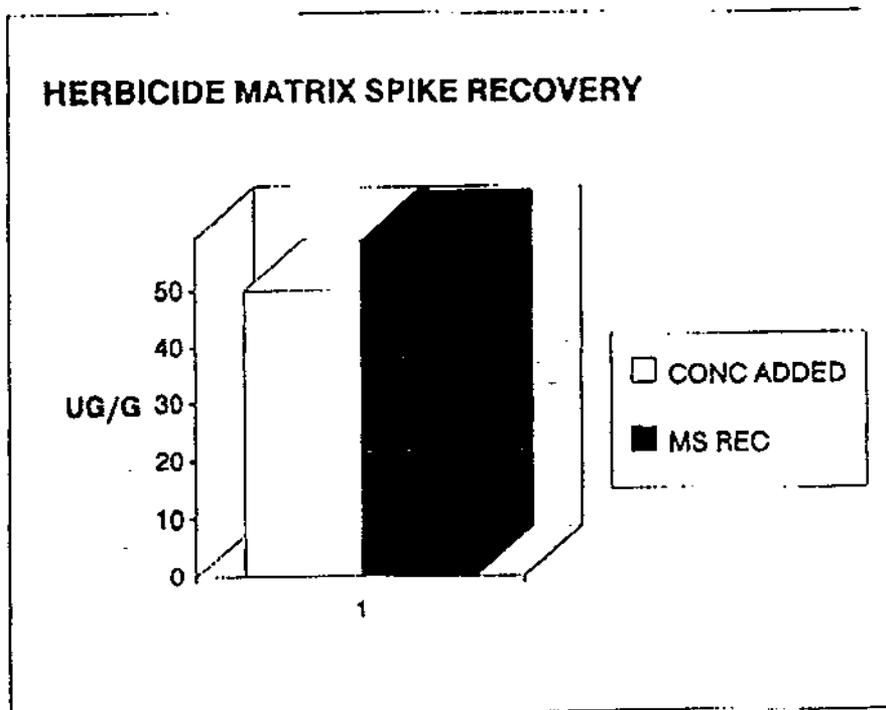
JOB#: 1-1352-1 (87)

SAMPLE IDENTITY: QC SPIKE / 8552

CONTROL#: 8628

DATE ANALYZED: 11/19/93

COMPOUND	CONC ADDED UG/G	AMT REC UG/G	%RECOVERY
SILVEX	50	58.46	117%



CONTROL LIMITS +/- 50%



Chain of Custody and Certification

(8628)
CHAIN OF CUSTODY RECORD

No. 1126

CHEM SERVE P. 19

Client/Project Name <i>Mack Molding</i>			Project Location <i>Arlington, VT</i>			ANALYSES <i>Table II, 7th Requirements for Asphalt Batching including Mod - 800 TPH</i>		
Project No. <i>1-1352-1 (87)</i>			Field Logbook No. <i>WPD-002</i>					
Sampler: (Signature) <i>Wan P. Ong</i>			Chain of Custody Tape No. <i>JCO-892</i>					
Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	ANALYSES	REMARKS		
<i>Stockpiled soil</i>	<i>11-9-93</i>	<i>1930</i>		<i>soil</i>	<i>2 jars</i>	<i>for one analysis</i>		
<i>representatives</i>								
Relinquished by: (Signature) <i>Wan P. Ong - The Johnson Co.</i>				Date <i>11-11-93</i>	Time	Received by: (Signature)		
Relinquished by: (Signature)				Date	Time	Received by: (Signature)		
Relinquished by: (Signature)				Date	Time	Received for Laboratory: (Signature) <i>M. R. L.</i>		
Sample Disposal Method:				Disposed of by: (Signature)		Date <i>11/15/93</i>		
SAMPLE COLLECTOR 5 State Street Montpelier, VT 05602 (802) 229-4600 Fax: (802) 229-5876 THE JOHNSON COMPANY, INC. Environmental Sciences and Engineering				ANALYTICAL LABORATORY ChemServe 317 Elm Street M. Ford, NH 03055 <i>one jar broke in shipping</i>				

11/23/93 10:49 2 6036730366

ATTACHMENT D

Drilling Logs

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-1

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/09/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 5.3 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 6.0 ft.
 Slot Size: .010

Total Pipe: 11.3 ft.
 Stick Up: -0.5 ft.
 Total Hole Depth: 11.8 ft.
 Well Guard Length: 0.5 ft.
 Initial Water Level: -
 Surface Elevation: -
 T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					Static Water Level (11/09/93) = 7.2' below ground surface.
4					
3					
2					
1					
0					
1	Well Guard				
2	Sand Pack				
3	Bentonite				
4	Bentonite				
5					
6					
7					
8	Sand Pack				
9				2.0 ppm	blow count: 21,11,11,9 (1.2" recovery out of 24") wet medium sand, sheen in water of split spoon sample. PID taken from spoon sample headspace.
10	Screen				
11				1.0 ppm	blow count: 12,9,10,19 (9.6" recovery out of 24") wet, tan fine sand with 1" stones, sheen in water of split spoon sample. PID taken from well headspace.
12	2" PVC cap.				
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
 WELL # MW-2

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/08/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 4.3 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 5.0 ft.
 Slot Size: .010

Total Pipe: 9.3 ft.
 Stick Up: -0.4 ft.
 Total Hole Depth: 9.3 ft.
 Well Guard Length: 0.2 ft.
 Initial Water Level: -
 Surface Elevation: -
 T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					MW-2 was dry on 11/09/93.
4					
3					
2					
1					
0	Well Guard				
1	Sand Pack			0.0 ppm	blow count: 15,13,12,8 (6" recovery out of 24") fill
2	Bentonite				
3				.5 ppm	blow count: 6,6,3,4 (18" recovery out of 24") top 6": light tan fine sand, 2.5": light brown sand, 9.5": brown coarse sand. PID split spoon sample headspace=.5 ppm, PID well headspace= 1.2 ppm.
4					
5				0.0 ppm	
6	Sand Pack				
7				.5 ppm	blow count: 3,4,5,5 (3.5" recovery out of 24") mixture of above sample (2-4 fbg).
8					
9	Screen			2.0	blow count: 6,9,13,20 (2.5" recovery out of 24") brown coarse sand, water at 8'. PID taken from split spoon headspace.
10					
11					
12					blow count: 10, 100/2" (no recovery) PID reading taken from boring headspace.
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-3

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/09/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 3.0 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 4.0 ft.
 Slot Size: .010

Total Pipe: 7.0 ft.
 Stick Up: -0.3 ft.
 Total Hole Depth: 7.3 ft.
 Well Guard Length: 0.0 ft.
 Initial Water Level: -
 Surface Elevation: -
 T.O.C. Elevation: -

█ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					Static Water Level (11/09/93)= 7.1' below ground surface.
4					
3					
2					
1					
0		Well Guard			
1		Sand Pack			
2		Bentonite			
3					
4					
5		Sand Pack			
6		Screen			
7		▽		0.0 ppm	blow count #1: (100 for 2") moist brown medium sand fill blow count #2: (31,100 for 3") 1.4' water on outside of spoon, 1"- 2" on bottom of completed well. <hr style="border-top: 1px dashed black;"/>
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-4

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/08/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 6.0 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 5.0 ft.
 Slot Size: .010

Total Pipe: 11.0 ft.
 Stick Up: -0.3 ft.
 Total Hole Depth: 11.3 ft.
 Well Guard Length: 0.2 ft.
 Initial Water Level: None
 Surface Elevation: -
 T.O.C. Elevation: -

█ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					Static Water Level (11/09/93)= 8.4' below ground surface.
4					
3					
2					
1					
0		Well Guard			blow count: 36 (no split spoon recovery) fill, no sample
1					
2		Sand Pack		0.0 ppm	
3					
4		Bentonite			
5					
6				0.0 ppm	blow count: 8,11,8,9 (no split spoon recovery) no sample
7		Sand Pack			
8		▽			
9					
10		Screen			
11				1-2.5 ppm	blow count: 11,19,22,100 for 2" gravely fill, split spoon wet. PID reading taken from split spoon sample headspace.
12					
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-5

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/08/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 4.4 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 5.0 ft.
 Slot Size: .01

Total Pipe: 9.5 ft.
 Stick Up: 0.0 ft.
 Total Hole Depth: 9.5 ft.
 Well Guard Length: 0.2 ft.
 Initial Water Level: None
 Surface Elevation: -
 T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					Static Water Level (11/09/93)= 6.4' below ground surface.
4					
3					
2					
1					
0		Well Guard			
1		Sand Pack		0 ppm	blow count: 13,15,11,6 (14" recovery out of 24")
2		Bentonite		.5 ppm	Black stony fill/coal over orange fine sand underlain by tan fine sand.
3					
4					
5		Sand Pack		.4 ppm	blow count: 6,10,7,10 (6" recovery out of 24") damp tan fine sand
6					
7		▽		9.0 ppm	blow count: 11,11,12,18 (1.2" recovery out of 24") no sample
8		Screen			
9				18.2 ppm	blow count: 13,14,23,18 (12" recovery out of 24") brown sand with product.
10					
11					blow count: 46,50,23,18 (12" recovery out of 24")
12					product and water in soil. Refusal at 10', ground rock in spoon.
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-6

Project: Mack Molding Co.
 Location: Arlington, Vermont
 Job # 1-1352-1
 Logged By: Warren Davey
 Date Drilled: 11/08/93
 Driller: Great Works
 Drill Method: Hollow Stem Auger

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 4.0 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 5.0 ft.
 Slot Size: .01

Total Pipe: 9.0 ft.
 Stick Up: -0.2 ft.
 Total Hole Depth: 9.2 ft.
 Well Guard Length: 0.2 ft.
 Initial Water Level: None
 Surface Elevation: -
 T.O.C. Elevation: -

█ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					Static Water Level (11/09/93)= 5.3' below ground surface.
4					
3					
2					
1					
0		Well Guard			
1		Sand Pack			
2		Bentonite			
3					
4					
5					
6		Sand Pack			
7					
8		Screen		9.5 ppm	blow count: 4,5,7,8 (3.2" recovery out of 24") product at ~7.5 fbs.
9					
10					
11				1.5	blow count: 53,41,39,38 (6" recovery out of 24") grey gravel, sand with product at ~10 fbs., fill and rubble, product.
12					
13					
14					
15					
16					
17					