FOLLOW-UP HYDROGEOLOGIC WORK PLAN FOR THE SPRINGS - FIREPLACE LANDFILL

Prepared for

TOWN OF EAST HAMPTON

APRIL 1993

fanning, phillips & molnar
ENGINEERS
RONKONKOMA NEW YORK

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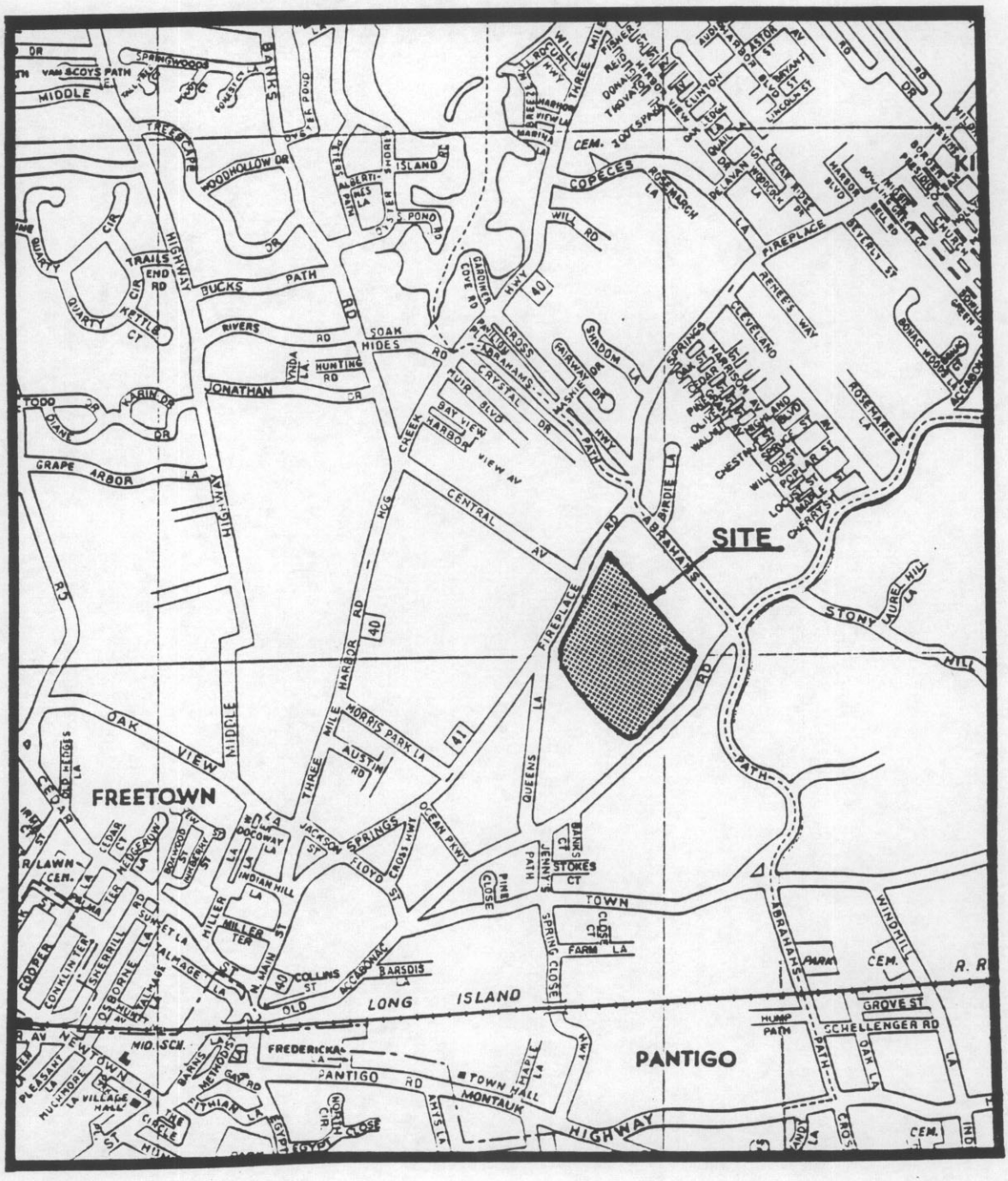
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SECTION 1.0
INTRODUCTION

This Follow-Up Hydrogeologic Investigation Work Plan has been prepared for the Town of East Hampton concerning the Springs-Fireplace Road Landfill (see Figure 1.1 for site location). This work plan has been prepared to supplement the Fanning, Phillips and Molnar report, entitled "Hydrogeologic/Phase II Investigation for the Springs - Fireplace Landfill" report (June 1991) for compliance with 6 NYCRR Part 360-2.11.

The purpose of the hydrogeologic investigation is to establish a groundwater monitoring system capable of readily detecting a contaminant release from the landfill, determine whether the site is contaminating subsurface waters, and determine if the contaminants are leaving the site and the resulting impact on human population and/or the environment.

The objectives of this work plan are intended to satisfy the New York State Department of Environmental Conservation (DEC) requirements and complete the groundwater monitoring well network. This will include the installation of additional wells to augment the eleven existing wells; to delineate the groundwater divide at the southern portion of landfill; and, to obtain the water quality data in areas that were not previously monitored.


N
SITE
FREETOWN
PANTIGO
LONG ISLAND
R. R
FIREPLACE RD
ABRAHAMS PATH
MIDDLE HIGHWAY
THREE MILE HARBOR RD
OAK VIEW
MORRIS PARK LA
AUSTIN RD
QUEENS LA
STONY HILL RD
CENTRAL AV
BAY VIEW
HARBOR VIEW AV
MUIR BLVD
CRYSTAL DR
JONATHAN DR
GRAPE ARBOR LA
BUCKS PATH
RIVERS RD
SOAK HIDES RD
HUNTING RD
TRAILS END RD
QUARRY CIR
KETTLE CT
KARIN DR
DIANE DR
TODD DR
BANKS DR
WOODHOLLOW DR
TREE & CARE
SPRINGWOODS
VAN SCOYS PATH
OYSTER POND RD
OYSTER SHORES
ISLAND DR
CEM.
COPECES RD
WILL RD
GARDINER COVE RD
HWY 40
SINDOM LA
FAIRWAY DR
CROSS ABRAHAMS PATH
SPRUNKS
CLEVELAND
AENEES WAY
ROSEMARIES LA
BIRDIE LA
BIRCH LA
CHESTNUT ST
WALNUT ST
SPRUCE ST
WILLOW ST
POPLAR ST
MAPLE ST
OAK ST
LOCUST ST
HIGHLAND BLVD
HARRISON PL
PARKER ST
PARK
SKYCREST ST
BOHAC WOODS LA
ACCABONAC
HARBOR BLVD
BAYCREST DR
BAYCREST LA
BAYCREST CT
BAYVIEW CT
BAYVIEW LA
BAYVIEW DR
BAYVIEW ST
BAYVIEW CIR
BAYVIEW RD
BAYVIEW PL
BAYVIEW AV
BAYVIEW BLVD

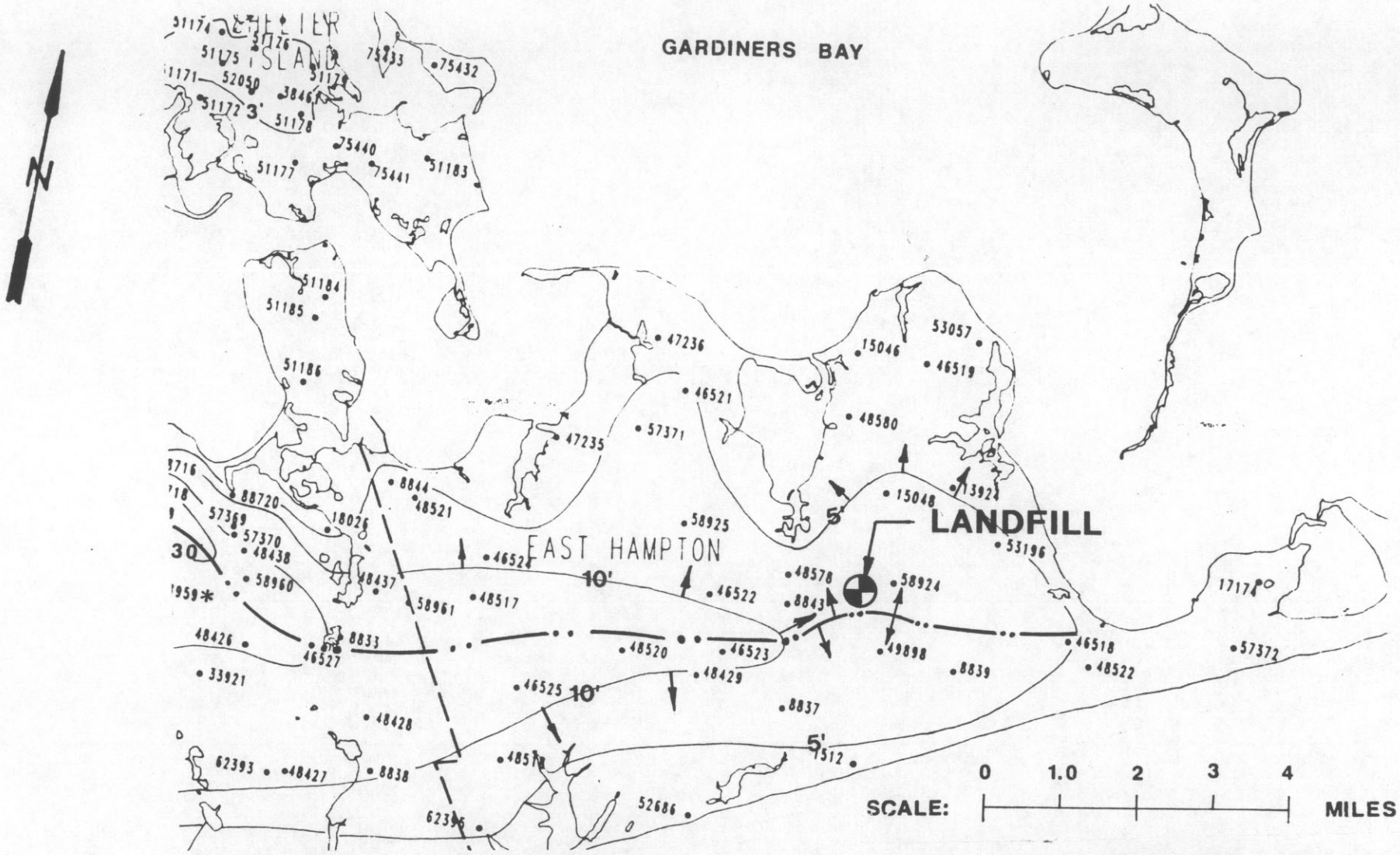
SECTION 2.0
SUMMARY OF PREVIOUS INVESTIGATION

The Hydrogeologic/Phase II report was prepared in June, 1991 for the Town of East Hampton concerning the Springs-Fireplace Road Landfill. The report was developed for compliance with 6NYCRR Part 360 Section 2.11.

During the months of October and November, 1990, four paired piezometers and two shallow wells were installed at the landfill to augment the one existing well (see Plate 1 for well locations). The four paired piezometers were placed on the northwest, south, and east sides of the landfill. Each paired piezometer consists of one shallow and one deep well. The shallow wells (S1 through S6) were installed to intercept the water table and the deep wells (D1 through D4) were installed at depths ranging from 96 to 105 feet below MSL and contain 20-foot screens. The existing well, GP-1, is screened from 114 to 119 feet below mean sea level (MSL).

The purpose of the paired piezometers was to obtain water level measurements from the shallow and deeper zones of the first water bearing zone (uppermost aquifer), to estimate three-dimensional groundwater flow, and to obtain water quality data for the groundwater beneath the landfill.

Groundwater across the site was determined to flow north to northeast for the shallow groundwater and north for the deeper groundwater. The updated regional groundwater flow direction was obtained from the SCDHS contour map for 1992 (see Figure 2.1 for 1992 SCDHS contour map). This map shows that the regional groundwater divide exists in the vicinity of the southern portion



SOURCE: 1992 SCDHS GROUNDWATER CONTOUR MAP

LEGEND:

10' — GROUNDWATER ELEV. CONTOUR LINE

→ GROUNDWATER FLOW DIRECTION

ESTIMATED POSITION OF GROUNDWATER DIVIDE

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FIGURE 2.1
REGIONAL GROUNDWATER FLOW DIRECTION IN THE VICINITY OF THE LANDFILL

Drawn By: H.C.	Checked By: M.T.	Date: 12/3/92

of the landfill. The regional groundwater flow direction is shown to range from northeast to northwest. To augment the head measurements from the 1991 investigation, Fanning, Phillips and Molnar performed an additional round of head measurements in December, 1992. The results of both the 1991 and 1992 head measurements for the shallow and deep wells are presented in Table 2.1.

Based on the December 1992, head measurements, the groundwater flow direction in the shallow groundwater was generally north-northeast (see Figure 2.2 for 1992 shallow well contour map). For the deeper groundwater, the November, 1991 and December, 1992 flow direction is generally north (see Figure 2.3 for 1992 deep well contour map).

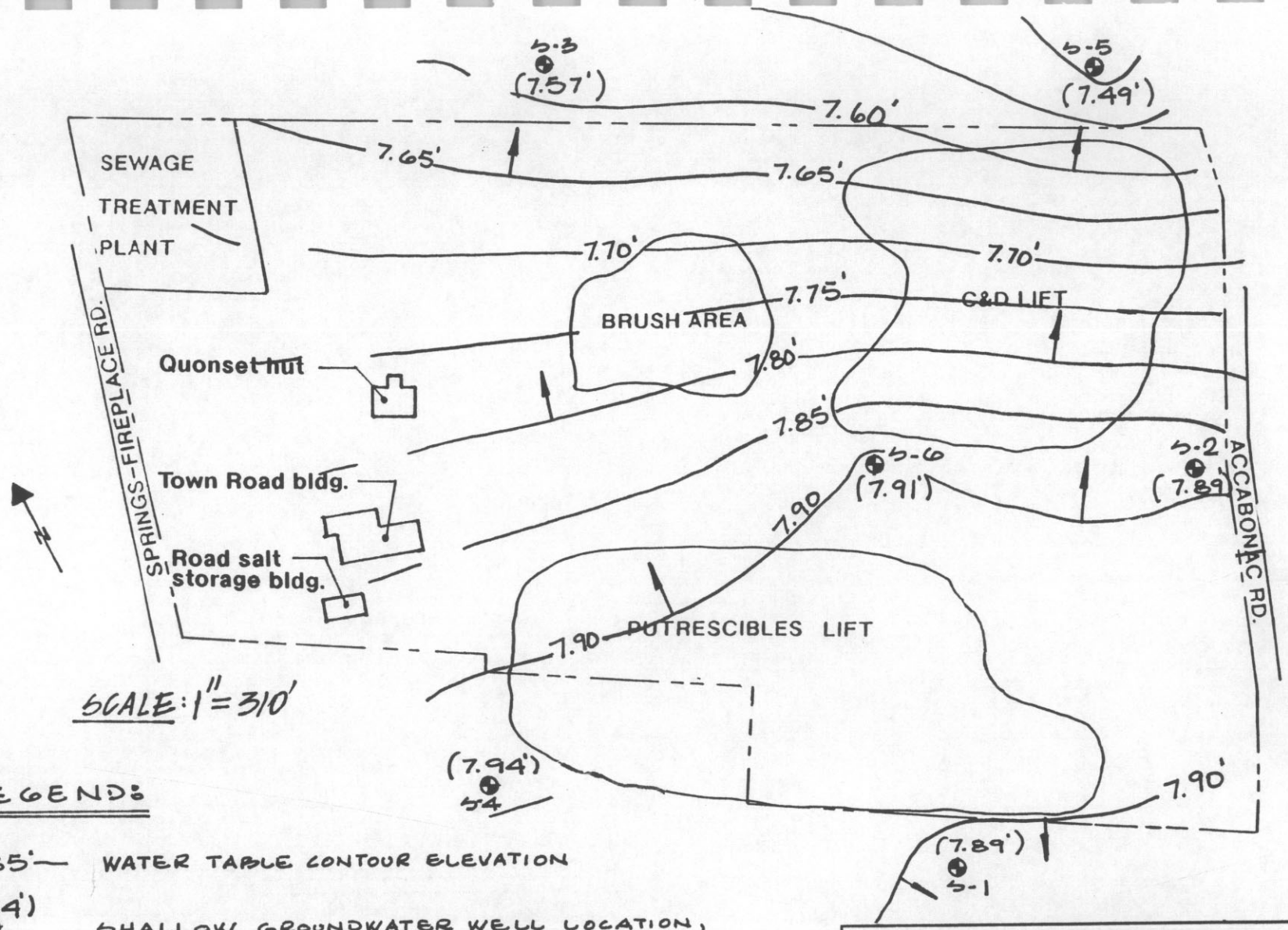
The eleven groundwater wells were sampled in the period from January 7th through 10th, 1991. The results of the groundwater sampling are presented in Table 2.2. A complete discussion of the results can be found in the 1991 report.

TABLE 2.1
GROUNDWATER HEAD MEASUREMENTS

Well Number	Date of Measurement						
	1-11-91	2-11-91	2-27-91	3-21-91	4-3-91	4-4-91	12-7-92
S-1	8.96	9.02	8.99	9.10	9.19	9.19	7.89
S-2	8.96	9.00	8.97	9.05	9.12	9.15	7.89
S-3	8.67	8.64	8.58	8.76	8.80	8.85	7.51
S-4	8.95	9.04	9.04	9.14	9.21	9.22	7.94
S-5	8.57	8.56	8.47	8.63	8.69	8.73	7.49
S-6	8.97	9.02	8.99	9.07	9.13	9.16	7.91
Average	8.85	8.88	8.84	8.96	9.02	9.05	7.78

Well Number	Date of Measurement		
	1-11-91	4-4-91	12-7-92
D-1	8.92	9.20	7.88
D-2	8.94	9.16	7.91
D-3	8.71	8.97	7.69
D-4	8.96	9.16	7.89
Average	8.88	9.12	7.84

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LEGEND:

~7.85'~ WATER TABLE CONTOUR ELEVATION

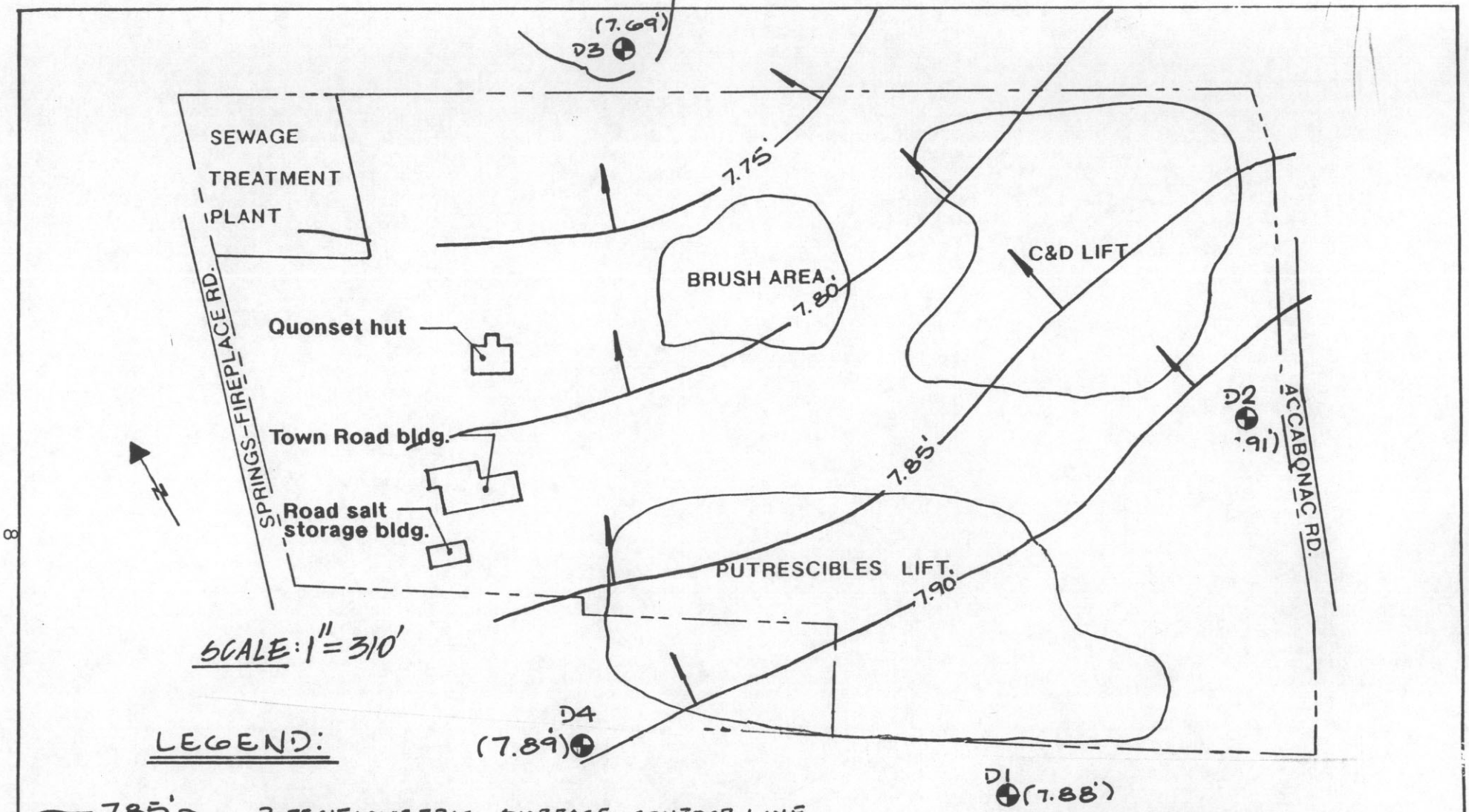
(7.94') S-4 SHALLOW GROUNDWATER WELL LOCATION, I.D.# & WATER TABLE ELEVATION

→ DIRECTION OF LOCAL GROUNDWATER FLOW

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FIGURE 2.2
WATER TABLE ELEVATION CONTOUR MAP FOR SPRINGS-FIREPLACE RD. LANDFILL SHALLOW WELLS (DATA FROM 12/7/92)

Drawn By: J.A.G	Checked By: M.T.	Date: 12-10-92



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Engineers

FIGURE 2.3
POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP FOR SPRINGS-FIREPLACE DEEP WELLS (DATA FROM 12/7/92)

Drawn By: J.A.G	Checked By: H.T.	Date: 12.10.92

TABLE 2.2
DETECTED COMPOUNDS FROM GROUNDWATER SAMPLES
AT THE SPRINGS-FIREPLACE ROAD LANDFILL

		Date Sampled	1-7-91	1-10-91	1-9-91	1-8-91	1-9-91	1-9-91	1-7-91	1-10-91	1-9-91	1-8-91	1-9-91	
Parameters		**Well #**	**S-1**	**S-2**	**S-3**	**S-4**	**S-5**	**S-6**	**D-1**	**D-2**	**D-3**	**D-4**	**GP-1**	**GA Standards**
Inorganics (units in parentheses)														
Aluminum	(mg/l)		1.2	0.74	1.8	1.6	2.9	1.9	1.3	16.9	11.5	0.62	1.2	NS
Boron	(mg/l)		ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	NS
Cadmium	(ug/l)		8	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	10
Calcium	(mg/l)		8.2	7.4	6.7	5.3	8.3	60.9	2.2	9.4	16.8	8.6	4.6	NS
Chloride	(mg/l)		11	26	10	**540**	10	20	10	17	13	**280**	11	250
Chromium	(mg/l)		ND	ND	0.02	ND	0.01	ND	ND	0.02	0.02	ND	ND	0.05
COD	(mg/l)		65	ND	ND	90	ND	25	ND	ND	20	90	25	NS
Color	(color units)		20	100	120	40	150	70	20	120	150	10	100	NS
Copper	(mg/l)		0.05	0.03	ND	ND	0.03	0.02	ND	0.02	0.03	ND	0.05	<0.2
Iron	(mg/l)		**3.1**	**3.8**	**6.8**	**12.8**	**8.4**	**8.1**	**0.86**	**15.2**	**10.0**	**0.37**	**2.1**	0.3
Hardness Total	(mg/l)		49.2	28.75	25.77	18.99	37.97	190.78	10.42	50.56	70.7	45.69	16.83	NS
Potassium	(mg/l)		2.0	0.60	1.1	1.8	1.1	11.6	0.70	1.8	2.6	2.9	1.1	NS
Magnesium	(mg/l)		7.0	2.5	2.2	1.4	4.2	9.4	1.2	6.6	7.0	5.9	1.3	NS
Manganese	(mg/l)		**29.7**	0.17	0.09	**1.9**	**7.0**	**35.4**	ND	0.27	**0.38**	0.05	0.19	0.3
Sodium	(mg/l)		8.5	9.1	9.2	**276**	8.2	11.4	**42.8**	**27.5**	**43.9**	**242**	6.5	<20
Ammonia (NH_3)	(mg/l)		1.5	ND	ND	0.41	0.52	1.1	ND	0.32	0.65	0.05	ND	<2.0
Nickel	(mg/l)		0.14	0.06	ND	ND	0.05	0.14	ND	ND	ND	ND	ND	NS
Nitrate (as N)	(mg/l)		ND	ND	ND	0.1	ND	ND	0.5	2.6	0.2	2.2	0.2	10
Lead	(ug/l)		6.3	6.1	8.7	8.1	10.7	8.7	ND	23.3	16.4	ND	8.2	25
pH	(pH units)		**5.8**	**6.4**	6.7	**5.4**	**6.0**	**6.2**	**9.1**	8.3	6.8	7.1	6.8	6.5-8.5
Total Phenols	(ug/l)		**4.0**	ND	ND	**4.2**	ND	ND	**3.7**	**1.5**	ND	**1.7**	**4.5**	1
Silver	(mg/l)		ND	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	0.05
Sulfate	(mg/l)		32	ND	9	27	ND	126	24	14.5	20	45	5.5	250
Total Alkalinity	(mg/l)		90.2	38.5	25.1	37.2	54.7	174.0	70.5	40.1	114.0	201	18.3	NS
Total Dissolved Solids	(mg/l)		178	102	74	**956**	88	411	151	168	281	**774**	61	500
Total Kjeldahl Nitrogen	(mg/l)		2.5	0.2	0.8	5.2	1.4	3.0	0.08	1.4	1.0	0.9	1.0	NS
Total Organic Carbon	(mg/l)		12.5	2.5	1.6	4.8	3.0	25.5	2.2	2.5	4.1	3.3	3.6	NS
Turbidity	(turbidity units)		8.0	18	15	10	6.0	10	10	100	100	2.5	10	NS
Zinc	(mg/l)		0.15	0.13	0.16	0.06	0.19	0.17	0.06	0.13	0.51	0.09	0.11	<0.8
Iron Plus Manganese	(mg/l)		**32.8**	**3.97**	**6.89**	**14.7**	**15.4**	**43.5**	**0.86**	**15.47**	**10.38**	0.42	**2.29**	0.5

TABLE 2.2 (CONTINUED)
DETECTED COMPOUNDS FROM GROUNDWATER SAMPLES AT THE SPRINGS-FIREPLACE LANDFILL

Parameters	Date Sampled / Well #	1-7-91 S-1	1-10-91 S-2	1-9-91 S-3	1-8-91 S-4	1-9-91 S-5	1-9-91 S-6	1-7-91 D-1	1-10-91 D-2	1-9-91 D-3	1-8-91 D-4	1-9-91 GP-1	GA Standards
Target Compound UST Volatile Organic Compounds (all results in ug/l)													
Chlorobenzene		**8**	ND	ND	ND	ND	**20**	ND	ND	ND	ND	ND	5
Acetone		ND	ND	**96**	ND	ND	ND	ND	ND	ND	ND	ND	50
Tetrachloroethene		ND	ND	ND	ND	ND	ND	ND	ND	**110**	ND	ND	5
Total TCL VOCs		8		96			20			110			
Target Compound List Semi-Volatile Organic Compounds (all results in ug/l)													
Total TCL Semi-Volatile Organics		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Target Compound List Herbicides (all results in ug/l)													
Total TCL Herbicides		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Target Compound List Pesticides (all results in ug/l)													
Total TCL Pesticides		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Target Compound List Polychlorinated Biphenyls (PCBs)													
Total TCL PCBs		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

ND = Not Detected
NT = Not Tested
NS = No GA Standard Exists

Note: "Bold Faced" results indicate contravention of NYS "GA" Standards.

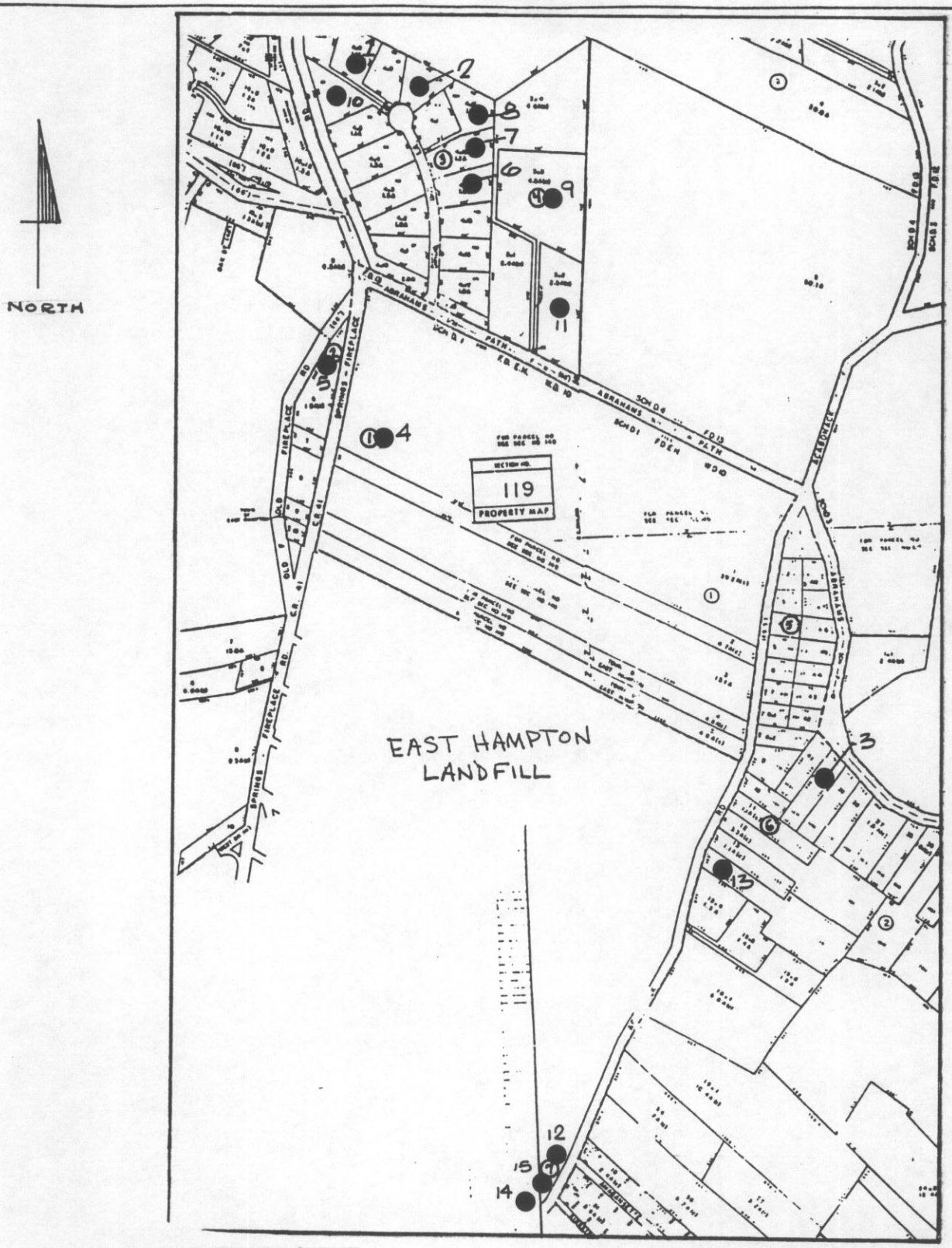
SECTION 3.0
EVALUATION OF PRIVATE AND PUBLIC WELL DATA

3.1 Private Wells

On April 20, 1992, Fanning, Phillips and Molnar provided the DEC with a list of residents in the vicinity of the landfill who were using private wells as a drinking water supply (see Appendix A for list of residents using public or private water in the landfill vicinity).

Fifteen private wells in the vicinity of Springs/Fireplace Road Landfill were sampled by Suffolk County Department of Health in July, 1992 for total metals, volatile organic compounds (VOCs), pesticides, and herbicides. The sampling locations are presented in Figure 3.1.1 and the sampling results are presented in Table 3.1.1.

The results show contraventions of NYS GA Standards for pH, iron (as high as 1.33 mg/l), copper (as high as 0.4 mg/l), sodium (as high as 74.2 mg/l), and zinc (as high as 1.8 mg/l). Nitrate was detected at Location 12 (south of the landfill) at 10.4 mg/l. The highest level of nitrate detected at the landfill during the 1991 sampling was 2.6 mg/l. Therefore, this elevated nitrate level may not be due to landfill activities. Chloroform was detected at 7 of the 15 wells sampled. The concentration ranged from 1 to 4 ug/l. None of the wells containing chloroform exceeded the standards. No other VOCs, pesticides, or herbicides were detected. In addition, no chloroform was detected at any of the landfill wells during the 1991 sampling.



SOURCE: SCDHS

LEGEND:

(5) - LOCATION OF RESIDENCE SAMPLED (MARCH 88)

● 4 - LOCATION OF RESIDENCE SAMPLED (JULY 1992)

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Engineers

FIGURE 3.1.1
LOCATIONS OF RESIDENCES CHOSEN FOR WELL SAMPLING BY THE SCDHS

Drawn By: JAC	Checked By: M.T.	Date: 12-10-92

TABLE 3.1.1
SUMMARY OF THE WATER QUALITY ANALYSES FROM 15 PRIVATE WELLS
NEAR THE EAST HAMPTON SPRINGS/FIREPLACE ROAD LANDFILL - JULY, 1992

Parameters	NYS GA Standard	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
specific conductivity	-	115	84	123	755	298	122	93	94	101	118	121	231	229	61	144
pH	6.5 - 8.5	**5.6**	**6.4**	**6.2**	**6.4**	**6.2**	6.7	6.7	6.7	6.5	**6.4**	**6.4**	**5.2**	**6.2**	**5.9**	7.0
nitrate	10 mg/l	0.2	U	U	3.5	U	0.7	U	U	0.7	0.4	U	**10.4**	9.7	U	2.5
free ammonia	2 mg/l	U	U	U	U	U	U	U	U	U	U	U	U	0.42	U	U
chloride	250 mg/l	14	12	20	16.3	76	16	10	11	13	17	18	19	40	11	17
sulfate	250 mg/l	14	5	5	30	8	7	6	6	5	8	12	31	4	6	7
iron	0.3 mg/l	**1.33**	U	U	0.23	U	U	U	**0.6**	U	**0.67**	**0.67**	U	0.19	U	U
manganese	0.3 mg/l	0.05	U	0.06	U	U	U	U	U	U	U	U	0.29	0.06	U	U
copper	0.2 mg/l	0.13	U	**0.28**	**0.36**	**0.4**	U	0.11	U	U	U	U	**0.34**	U	U	U
sodium	20 mg/l	12.4	7.9	10.3	**74.2**	**31.1**	10.4	8.5	8.9	9.1	17.4	19.2	**24.8**	**32.9**	14.4	17.4
zinc	0.3 mg/l	U	**0.4**	U	U	U	**0.8**	U	**1.7**	U	**1.4**	**0.8**	**1.2**	**1.8**	U	U
selenium	10 ug/l	U	U	2.7	U	U	U	U	U	U	U	U	U	U	NT	U
lead	25 ug/l	3.0	1.8	16.9	8.6	2.4	3.1	U	U	4.7	3.4	U	4.3	U	3.2	1.8
VOC (ug/l)**																
chloroform	7	U	1	2	U	U	2	1	U	4	1	1	U	U	U	U
methyl tertiary butyl ether	-	U	U	U	U	U	U	U	U	U	U	U	17	U	U	U
dichlorodifluoromethane	5	NT	NT	NT	2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

U - Undetected
NT - Not Tested
- - Limits not established

Note: Boldfaced results indicate contravention of Drinking Water Standard

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3.2 Public Wells

The nearest SCWA public supply well to the landfill is the Springs-Close Highway wellfield which is located approximately one mile south of the landfill. Two wells (S-14921 and S-66733) exist in this wellfield with rated pumping capacities of 1000 and 750 gallons per minute and are located at depths of 125 feet and 243 feet, respectively. To determine if landfilling activities have impacted the wellfield, well sampling data was obtained from the SCDHS. Analysis results for organic compounds showed that between the years 1978 and 1992 (the range of years for which data was available) three detections of organic compounds were recorded in Well #1 (S-14921) at the Springs-Close Highway wellfield. These detections include 0.8 ppb of chloroform detected in February 6, 1990, 0.7 ppb of chloroform detected in August 31, 1988, and 0.8 ppb of chloroform in August 10, 1988. None of the chloroform detections exceeded NYS Class GA Standards. No organic compounds were detected in Well #2 at the wellfield during this period. Inorganic analysis data for the wells was available for the period between the years of 1988 and 1992. No exceedances of GA Standards were noted for any of the inorganic parameters tested.

Therefore, no evidence was found to indicate that landfilling activities at the Springs-Fireplace landfill have adversely affected groundwater quality at the Spring-Close Highway wellfield.

SECTION 4.0
PROPOSED FOLLOW-UP HYDROGEOLOGIC INVESTIGATION

Fanning, Phillips and Molnar is proposing the installation of seven additional groundwater monitoring wells at four locations. The purpose of these wells is to augment the existing eleven wells and complete the groundwater monitoring well network.

4.1 Monitoring Well Installation

All monitoring wells will be constructed to satisfy the monitoring well and piezometer specifications as outlined in the 6 NYCRR Part 360 regulations.

According to the equipotential fields and flowlines presented in the previous investigation, the landfill appears to have the regional groundwater divide existing at or near the southern boundary of the landfill. Consequently the north portion of the landfill has an upward groundwater flow component, the south portion of the landfill has a downward groundwater flow component. Therefore, additional shallow wells will be placed at the north portion of the landfill and an additional paired piezometer and a triplet piezometer (deep and shallow wells) will be placed at the south portion of the landfill to monitor potential contaminant releases from the landfill. In addition, because the groundwater divide has been shown to exist near the southern border of the landfill, additional piezometers at the south portion of the landfill will be installed to clarify the location of the divide and determine if leachate-enriched groundwater is present south of the divide. Plate 1 shows the location of all existing and proposed monitoring wells.

A triplet piezometer (S-8, D-8, and B-8), a paired piezometer (S-9 and D-9), and two shallow wells (S-7 and S-10) will be installed at the landfill to augment the eleven existing wells.

The shallow wells will be installed to intersect the water table. Each shallow well will contain a 15-foot screen (0.020-inch diameter) which will extend to 10 feet below the water table leaving five feet of screen above the water table. Well S-7 will be installed between the putrescibles lift and the sewage treatment plant. This well will be used to determine if leachate-enriched groundwater is migrating in the direction of the sewage treatment plant as no monitoring wells are located in this area and the sewage treatment plant has had occasional exceedances of NYS Class GA Groundwater Standards. Well S-10 will be placed near the north border of the landfill. This well will be used to monitor groundwater between existing wells S-3/D-3 and S-5 and reduce the distance between monitoring points from approximately 1100 feet to approximately 550 feet.

The triplet piezometer (S-8, D-8, and B-8) will be to reduce the horizontal monitoring distance between locations S-4/D-4 and S-1/D-1 from approximately 950 to approximately 475 feet. These triplet piezometers will also be used to determine water quality at shallow (water table), deep (approximately 110 feet below the water table), and at the base of the Upper Glacial Aquifer (B-9 will be screened at a depth of approximately 280 to 300 feet below grade). Previous investigations have shown that the base of the Upper Glacial deposits exist at approximately 240 feet below MSL. The surface elevation at this location is approximately 70 above MSL

and, therefore, the estimated depth to the Upper Glacial/Magothy interface is approximately 310 feet. Well B-8 will contain a 20-foot screen which will be placed to a depth of approximately 10 feet above the interface. The interface will be determined by field split-spoon sample analysis by the field geologist. Upon encountering the Magothy Formation, the borehole will be grouted to a level approximately 10 feet above the interface. The grout will be allowed to set for a minimum of four hours prior to setting the well. Well D-9 will also contain a 20-foot screen.

The paired piezometers (S-9, D-9) will be placed along Accabonac Road approximately 400 feet south of the southern boundary of the landfill. These piezometers will be used to determine water quality in this area as well as more accurately define the location of the groundwater divide. The additional piezometric data obtained from these wells will be used to construct a flow net to show the three-dimensional pressure distribution and vertical components of flow.

All wells will be installed using the mud-rotary drilling method. This method has been chosen because of the amount of till boulders that were encountered during the previous investigation which precluded the hollow-stem drilling method at some locations. Also, the mud-rotary method will greatly reduce or eliminate landfill gases from emanating from the borehole and creating a hazardous or explosive atmosphere in the work zone. During the previous investigation, "Pure Gold" brand pure sodium bentonite was used as the drilling mud to install the deep wells at the landfill. Comparison of water quality in the deep wells (using "Pure Gold")

and the shallow wells (hollow-stem auger wells) showed no evidence of residual Pure Gold in the deep wells. Therefore, Pure Gold will be used to install the proposed wells.

All wells will be developed to a turbidity of 50 nephelometric turbidity units after construction. The wells will be allowed to stabilize for a minimum of one week prior to sampling. The drilling mud and development water will be discharged onto the ground in the vicinity of the well.

4.2 Soil Sampling

Split-spoon soil samples will be collected at five-foot intervals from some of the boring locations. Split-spoon samples will be obtained at location S-7 starting at depth of five feet above the water table. The rest of the vadose zone geology in this location was obtained during the installation of the nearby (approximately 100 feet) methane well (M-10). At location S-8/D-8/B-8, only B-8 will require split-spoon sampling. At Well B-8, split-spoon samples will be obtained at five-foot intervals and will be set at a depth of 100 feet below MSL as the zone above this depth has been adequately characterized by the paired piezometers installed to the east and west of well B-8. At location S-9/D-9, split-spoon sampling will occur at D-9 from the water table to 100 feet below MSL. Split-spoons will not be obtained in the vadose zone at this location. At well S-10, split-spoon samples will be obtained beginning at a depth of five feet above the water table as this well will be installed next to methane well M-15 for which split-spoons have been obtained. Each of the soil samples will be visually described by the project geologist using the Unified Soil

Classification System. Blow counts for each six-inch interval will be recorded for each split spoon.

At paired and triplet piezometer locations, the borings will be drilled in order of depth with the shallow well drilled first. The same mud pit will be used to drill all wells at each location.

4.3 Geophysical Testing

Resistivity and gamma logging will be performed on boreholes B-8 and D-9. The procedures will be identical to those used in the previous investigation. The purpose of these boreholes will be to determine geologic changes (such as clay layers) in the boreholes and determine if resistivity logging can identify areas of possible leachate-enriched groundwater.

4.4 Groundwater Sampling

The eleven existing and seven newly-installed wells will be sampled for all baseline parameters as per the 6NYCRR Part 360 regulations (see Table 4.4.1). The wells will be sampled on a quarterly basis as per the 360 regulations.

The wells will be sampled by first measuring the depth to water. Then, a decontaminated submersible pump will be placed in the well and three well volumes will be removed. After the removal of each volume, pH, specific conductivity, and temperature will be measured. If the stability readings for volumes two and three agree with each other within ten percent, the well purging will be complete. If not, an additional volume will be purged and compared with the previous readings. If the readings do not agree within ten percent, a fifth volume will be purged prior to sampling. No more than five volumes will be purged from the well. The purged

TABLE 4.4.1
NYSDEC BASELINE PARAMETERS FOR
WATER QUALITY ANALYSIS

Field Parameters	Leachate Indicators	Metals
Static water level (in wells and sumps)	Total Kjeldahl Nitrogen (TKN)	Potassium
Specific Conductance	Ammonia	Sodium
Temperature	Nitrate	Iron
Floaters or Sinkers[1]	Chemical Oxygen Demand (COD)	Manganese
	Biochemical Oxygen Demand (BOD_5)	Magnesium
		Lead
pH	Total Organic Carbon (TOC)	Cadmium
Eh	Total Dissolved Solids (TDS)	Aluminum
Dissolved Oxygen[2]	Sulfate	Calcium
Field Observations[3]	Alkalinity	Toxic metals[4]
	Phenols	and cyanide
	Chloride	
	Total hardness as $CaCO_3$	
	Turbidity	
	Color	
	Boron	
	Volatile Organic Compounds[5]	

All groundwater samples will be unfiltered for total metals analysis.

1 Any floaters or sinkers found must be analyzed separately for baseline parameters.

2 Surface water only.

3 Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

4 Toxic metals include: Antimony, Arsenic, Beryllium, Barium, Cadmium, Chromium (total and hexavalent)*, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

5 Volatile organics are to be analyzed using EPA methods 601 and 602 as described in 40 CFR Part 136 (see section 360-1.3 of this Part).

* The department may waive the requirement to analyze Hexavalent Chromium provided that Total Hexavalent and Trivalent Chromium values do not exceed 0.05 mg/l.

water will be discharged onto the ground in the vicinity of the well from which it was purged.

After purging, the wells will be sampled by lowering a bottom-loading Teflon® bailer down the well attaching to a dedicated polypropylene line. Sample bottles for VOCs will be filled first (to zero headspace) and then the bottles for the rest of the analytical parameters. The sample bottles will be appropriately labelled and placed in a cooler with ice packs for transport to the analytical laboratory. Custody seals will be placed on the coolers and chain-of-custody procedures will be followed.

A field blank will be prepared for each day in the field by pouring laboratory-supplied deionized water through the decontaminated bailer and capturing the water in the laboratory-supplied sample bottles. The field blank will be analyzed for all baseline parameters as listed in Table 4.4.1.

A trip blank will accompany the sample coolers and one trip blank will be submitted for analysis for each day in the field. The trip blank will be analyzed for VOCs only.

A blind duplicate sample will be submitted to attest to the precision of the laboratory. This duplicate sample will be obtained from Well S-6. The duplicate sample will be labelled as "S-11" to conceal its identity from the laboratory.

4.5 Slug Testing

Slug testing will be performed on one well, Well B-8, to estimate hydraulic conductivity at the base of the Upper Glacial Aquifer. The slug testing will be performed with a five-foot-long, three-inch-diameter slug. The data will be recorded with a Telog

2100 data logger. The hydraulic conductivity will be estimated using the Bouwer-Rice method. All slug testing procedures will be identical to those used in the previous investigation. Slug testing will not be performed on any of the other shallow or deep wells as the hydraulic conductivity has been adequately characterized in these zones during the previous investigation.

SECTION 5.0
QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES

This portion of the report will discuss the QA/QC procedures to be used during field activities described in this sampling plan.

5.1 Sampling Methods

Sampling procedures, standards, and techniques will be in accordance with the New York State Department of Environmental Conservation guidelines and regulations.

5.2 Sampling Equipment Decontamination Procedures

All sampling equipment (i.e., split spoons, bailers, augers, drill rod, scoops, and trowels) will be constructed of inert materials and will be decontaminated prior to use in the field. All augers and drill rods will be steam cleaned prior to use at each sampling location. All groundwater sampling equipment will be cleaned and prepared for field use by the following procedures:

1. Non-phosphate detergent and tap water wash.
2. Tap water rinse.
3. Rinse with 10% nitric acid if sample is to be analyzed for metals.
4. Tap water rinse.
5. A methanol rinse followed by hexane rinse.
6. Deionized water rinse.
7. Air dry.
8. Wrap in aluminum foil (shiny side out), if transported.

5.3 Monitoring Well Installation Procedures

Each monitoring well will be drilled using a mud-rotary drill rig. Each deep piezometer will be constructed using a 20-foot

length of screen. An appropriate length of riser pipe will be attached to the screen. The shallow well screens will be 15 feet in length with 5 feet extending above the water table and 10 feet below the water table. An appropriate length of riser pipe will be attached to the screen. All wells installed during this investigation will be completed and developed as described below:

Casing and Well Screen:	Four inch I.D., threaded, Schedule 40 PVC. No solvent or glue will be used to assemble the well screen and riser casing.
Screen Slot Size:	0.020 - inch machine slotted.
Storage of Casing and Screen:	The PVC casing and screen lengths will not be stored on the ground. The well string will be assembled on racks or on a clean tarp spreading over level ground.
Cleaning of Casing and Screen:	Casing and screen will be steam cleaned before they are installed in the boring.
Bottom Cap:	A flush-threaded bottom cap will be installed in all monitoring wells.
Decontamination:	All downhole equipment will be steam cleaned. The procedure will be repeated between drilling each well. The circulating system and water tank debris will be flushed with clean water prior to drilling. The rinse water will be collected and disposed of properly.
Sand Pack:	A #0 Morie gravel will be placed in the borehole opposite the screen.
Placement of the Sand Pack:	The sand pack will extend to approximately two feet above the top of the well screen and six (6) inches below. This extension will be confirmed by measuring down the annular space with a weighted tape. The sand pack will be poured directly into the annular space.

Bentonite Seal:	At a minimum, a two-foot bentonite seal will be placed in the annular space above the sand pack of each well.
Grouting Annular:	A Volclay grout will be pumped into the annular space to fill the space from top of the bentonite seal to the ground surface. The grout will be tremie-piped into the annular space. Care will be taken not to disrupt the bentonite seal.
Well Development:	Will be performed in accordance with Part 360-2.11(a) (8) (iii). In addition, each well will also be developed until the turbidity is 50 nephelometric turbidity units (NTU) or less.
Protective Casing:	A 5 foot-long section of 6-inch I.D. steel casing will be placed over the 4 inch well casing, to protect the well. The casing will be set approximately 2 to 3 feet into the Volclay grout in the annular space, and will stick up above the ground surface, approximately 3 feet. A lockable cap will be affixed to the protective casing.
Well Labeling:	The complete identification number of each monitoring well will be painted on the protective steel casing.
Surveying:	A survey will be performed in which the elevation of top of the PVC well casing and the surrounding steel protective to a 0.01 foot, and the reference point marked. The horizontal coordinates of each will be tied into the site map.
Abandonment of Wells:	All soil boring that are not completed as monitoring wells or piezometers, and other abandoned wells will be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the bore hole. The sealing will include pressure injection with bentonite grout using a tremie-pipe and this mixture will

extend the entire length of the boring to 5 feet below the ground surface. The upper 5 feet will be backfilled with appropriate native materials compacted to avoid settlement.

Logs: Complete and accurate drilling logs will be provided to the department for all soil borings. These logs will provide detailed soil classification according to the Unified Soil Classification System (USCS). The USCS visual method will be used on all samples. Logs will contain a description of matrix and clasts, mineralogy, roundness, and color.

5.4 Soil/Sediment Sampling Procedures

1. Collection of split-spoon soil samples will be performed using a steam-cleaned 24-inch-long, 2-inch-diameter carbon steel split spoon. When retrieved, the sampler will be opened, and the soil will be placed into a jar using a clean, stainless steel scoop or trowel. A photoionization detector will be used to screen each split-spoon sample. the readings will be recorded in the field book.
2. Each sample bottle will be labeled with the following information and be recorded in a log book:
   A. Project Name
   B. Sample location and depth interval
   C. Date

5.5 Groundwater Sampling Procedures

1. Prior to groundwater sampling, the depth to the static water level in each well will be measured with a calibrated tape or cable to the nearest 0.01 foot and recorded. The depth to the bottom of the well from the top of the PVC casing will also be

measured and recorded. To avoid cross contamination between wells, the indicator probe and the immersed portion of the tape or cable will be decontaminated.

2. The laboratory-provided sample-bottle cooler will be inspected to ensure that all the required bottles are present and labeled.

3. Using a stainless steel submersible pump, the wells will be purged. During well purging, pH, temperature, and specific conductance will be monitored. Sampling will occur after all three characteristics have stabilized. Stability will be achieved when each parameter is within 10 percent of the previous value. Should any well not stabilize, five volumes of the borehole will be removed. Sampling of the groundwater will then commence. A flow meter or a calibrated bucket will be used to estimate the pumping rate. Groundwater will discharge onto to the ground in the immediate vicinity from where it has emanated.

4. A decontaminated Teflon bailer will be used to obtain a water sample from each well. A dedicated polypropylene line will be used to slowly lower the bailer. The first bailer of groundwater will be used to fill the volatile organic analysis bottles. At the completion of the sampling of a well, the bailer will be decontaminated.

5. For each well sampled, the bailer will be handled with a new pair of disposable plastic surgical gloves. Water samples will be transferred from the bailer to the sample bottles to minimize the potential for aeration of the sample.

6. Each bottle will be labeled with the following information:

   A. Project Name

   B. Well number or designation

   C. Date

   D. Time

   E. Laboratory analysis parameter

7. Prior to sampling, a separate flask or jar will be filled with well water from the bailer used to perform the field tests. The field tests include temperature, pH, and specific conductivity. The tests will be performed using portable meters. Prior to the tests, the instruments will be calibrated according to the manufacturer's specifications. The probes will then be inserted into the container and the readings will be recorded when the meter display stabilizes.

8. Full and labeled sample bottles will be placed in the cooler with ice or chemical ice packs to maintain a temperature at 4°C.

9. The Chain-of-Custody and recording procedures will be observed.

5.6 Field Blanks, Trip Blanks, and Duplicate Samples

A field blank will be prepared for each analytical parameter for each day in the field. Trip blanks will be present during sampling and will be included with each delivery to the laboratory. The field blanks will be tested for the same parameters as groundwater samples, and the trip blanks will be tested for VOCs only.

SECTION 6.0
HEALTH AND SAFETY PLAN

This Health and Safety Plan (HASP) has been written for compliance with "OSHA Hazardous Waste Operations Standards (29 CFR 1910.120)" and the guidance documents, "Standard Operating Safety Guidelines (Office of Solid Waste and Emergency Response, 1988)" and the "Occupational Safety and Health Guidance Manual for Hazardous Waste Activities" (U.S. Department of Health and Human Services, 1985).

6.1 Scope and Applicability of The HASP

This HASP is designed to be applicable to locations where groundwater monitoring well installations are performed at the Springs/Fireplace Road Landfill (the "Site") by all parties that either perform or witness the activities on Site. This HASP may be modified or amended to meet specific needs of the proposed work as it occurs.

This HASP will detail the Site safety procedures and safety monitoring. Contractors will be required to adopt this HASP in full.

The Health and Safety Officer (HSO) will be present at the Site to inspect the implementation of the HASP, however, it is the sole responsibility of the contractor(s) to comply with the HASP.

The HASP has been formulated as a guide to complement professional judgment and experience. The appropriateness of the information presented should always be evaluated with respect to unforeseen Site conditions which may arise.

6.2 Site Work Zone and Visitors

The Site work zone (a.k.a. exclusion zone) during the drilling of groundwater monitoring wells will be a 30-foot radius about the drilling location. This work zone may be extended if, in the judgment of the health and safety officer (HSO), Site conditions warrant a larger work zone. Each work zone will be established by placing traffic pylons at the work zone's outer boundary. Yellow "caution" tape will connect the pylons. One entrance/exit to the work zone will exist to control access to the work zone (access control point). If personnel decontamination procedures become necessary as a result of upgrading to Level C equipment, the decontamination will occur at the access control point. Personnel decontamination procedures at the access control point will be described later in Subsection 6.5. During groundwater sampling activities, the work zone will be defined by the HSO and will be at a minimum a 20-foot radius about the sampling point.

No visitors will be permitted within the work zone without the consent of the HSO. All visitors will be required to be familiar with, and comply with, the HASP. The HSO will deny access to those whose presence within the work zone is unnecessary or those who are deemed by the HSO to be in non-compliance with the HASP.

The HSO will also give an on-Site health and safety discussion to all Site personnel, including the contractors prior to initiating the Site work. Workers not in attendance during the health and safety talk will be required to have the discussion with the HSO prior to entering the work zone.

The following section will present health and safety analyses for the groundwater monitoring well drilling task and the groundwater sampling tasks.

6.3 Well Drilling Safety Analysis

The installation of the monitoring wells will be performed by a well drilling company. The drilling will employ the hollow-stem auger and mud rotary methods into unconsolidated glacial deposits consisting primarily of glacial till and sand. Fanning, Phillips and Molnar personnel will be present to observe the drilling and the health and safety operations. In general, Fanning, Phillips and Molnar will employ one to two persons at the Site. No drilling or other Site operations will be conducted by contractors without the presence of a Fanning, Phillips and Molnar representative on Site. In the event that the HSO is not present on the Site, the Assistant HSO will implement the HASP.

Level D personal protective equipment will be utilized by the drilling crew and site hydrogeologist during monitoring well installation, groundwater sampling, and decontamination events. This will include protective clothing, eye protection, hard hats, and work boots. The personal protective equipment level will be upgraded as necessary based on the criteria detailed in this section.

Based on the Site history and previous analyses of groundwater samples at the landfill, it has been determined that the chemical compounds of potential concern consist of methane, metals and organic compounds in the sediments and groundwater beneath the Site.

Metals are not considered to present a significant health and safety concern as the reasonable pathway for workers at the Site to become exposed to metals is through inhalation of metal-containing dust particulates. To minimize the potential for dust inhalation at the Site, the HSO will assess wind, vegetation, and soil moisture conditions and, if deemed necessary by the HSO, the affected area will be wetted with potable water. If this measure is determined to be ineffective, the HSO may decide to upgrade personal protection to Level C respiratory protection to include respirators with dust cartridges. If extremely windy and dusty conditions exist, the HSO may choose to postpone the drilling until such time as conditions improve.

Volatile organic compound concentrations will be monitored in the work zone by utilizing a Century 128 Organic Vapor Analyzer or a Photovac MicroTIP Photoionization Detector. The term OVA will be used (in this HASP) to apply to either instrument. The OVA will be "zeroed" by exposing the OVA to a canister of hydrocarbon-free air (<0.1 parts per million (ppm) hydrocarbons). Background VOC concentrations will then be established in the work zone prior to drilling and recorded in the HSO field book (natural background conditions should not normally exceed 4 ppm which is the approximate ambient atmospheric methane contribution).

Methane concentrations will be monitored in the work zone and augers by utilizing a Mine Safety Appliance Model 360 Combustible Gas Indicator (CGI). Background concentrations of combustible gas will be established in the work zone prior to drilling and recorded in the HSO field book.

Upon commencement of drilling with hollow stem augers, OVA and CGI readings will be obtained in the open auger section after the auger has been driven into the ground and upon removal of the auger drive cap. Readings will be obtained following the initial five-foot auger advance into the ground and every ten feet (two auger sections) thereafter. At the discretion of the HSO, OVA and CGI readings may be obtained more frequently. All readings and observations will be recorded in the HSO field book. OVA and CGI air monitoring will be conducted by Fanning, Phillips and Molnar personnel. Monitoring at mud rotary locations will be conducted on the area over the mud pit and borehole. Monitoring will take place every 10 to 20 minutes. The monitoring may be performed more frequently at the discretion of the HSO.

Steady-state OVA readings greater than five ppm in the worker's breathing zone will require upgrading to Level C personal protective equipment. Steady-state readings, for this purpose, will be defined as readings exceeding five ppm above background for a minimum of ten seconds. If readings exceed five ppm within the auger head, readings will then be obtained at points approximately one foot above and then around the auger opening. These points will define the worker's breathing zone. For mud rotary drilling, the breathing zone will be defined as the area beyond a distance of one foot from the drilling mud.

Steady state methane readings greater than 25% of the lower explosion limit (LEL) will require stopping or modifying the method of auger advancement. Modification of the method of auger advancement will be limited to addition of potable water to

suppress the methane. If the modification does not suppress the methane below the 25% LEL level, the borehole location will be properly abandoned and the borehole location moved farther away from the landfill mass in increments of 50 feet.

6.4 Groundwater and Soil Sampling Safety Analysis

During the groundwater sampling of wells at the Site, OVA and CGI air monitoring of the headspace in the well will be performed prior to sampling. Steady-state OVA readings above five ppm above background in the workers breathing zone will necessitate Level C personal protection to include full-face air-purifying respirators (as detailed in Section 6.7). The workers breathing zone will be defined as the area one foot above or around the top of the PVC riser pipe. Steady-state CGI readings of greater than 25% LEL will require that safety precautions be employed to prevent a safety compromise (e.g., use cotton rope instead of polypropylene rope to prevent static electricity discharge in the well head). It is not anticipated that methane will be above the 25% LEL level at the groundwater well locations.

Latex inner gloves and nitrile (or butyl) outer gloves will be worn by groundwater samplers to avoid accidental dermal contact. For handling sample containers, doubled latex gloves may be used if dexterity is required. In addition, full-faceshield eye protection will be worn by samplers during periods when the potential for splashing of groundwater is present (such as during well bailing).

6.5 Decontamination Procedure

The daily decontamination procedure is as follows:

1) Establish a decontamination area.

2) At each station establish a basin with detergent (Alconox or equivalent), a rinse basin with tap water and a garbage can lined with a plastic bag.

3) Wash and rinse boots.

4) Remove outside gloves and discard in plastic bag.

5) Remove disposable coveralls and discard in plastic bag (if applicable).

6) Spent organic vapor cartridges are to be discarded in the plastic bag.

The final closure of the decontamination area will involve double bagging all disposable clothing to be removed to an approved disposal facility. Decontamination and rinse solutions will be contained in 55 gallon drums for subsequent lab testing and will be removed to an approved disposal facility. All rinse basins, etc. will be thoroughly washed, rinsed and dried prior to removal from the site.

6.6 Other Safety Considerations

6.6.1 Noise

During drilling operations, operation of generators, or any other operation which may generate potentially harmful levels of noise, the HSO will monitor noise levels with a Realistic ™ hand-held sound level meter. Noise levels will be monitored in decibels (dBs) in the A-weighted, slow-response mode. Noise level readings which exceed the 29 CFR 1910.95 permissible noise exposure limits will require hearing protection (see Table 6.6.1.1 for permissible noise exposures).

TABLE 6.6.1.1
PERMISSIBLE NOISE EXPOSURES*

Duration Per Day Hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼	115

NOTES: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2 \; C_n/T_n$ exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

* Standards derived from 29 CFR 1910.95

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Hearing Protection will be available to all Site workers and will be required for exceedance of noise exposure limits. The hearing protection will consist of foam, expansion-fit ear plugs (or other approvable hearing protection) with an Environmental Protection Agency noise reduction rating of at least 29 dB. Hearing protection must alleviate worker exposure to noise to an eight-hour time-weighted average of 85 dB or below. In the event that the hearing protection is inadequate, work will cease until a higher level of hearing protection can be incorporated.

6.6.2 Slip/Trip/Fall Preventative Measures

To reduce the potential for slipping, tripping, or falling, the work zone will be kept clear of unnecessary equipment. The drill rig's operator platforms will be steam cleaned prior to drilling at each location to remove oils or grease which may present a slip hazard. In addition, all Site workers will be required to wear work boots with adequate tread to reduce the potential for slipping (work boots must be leather or chemical-resistant and contain steel toes and steel shanks).

6.6.3 Insects and Ticks

Insect problems are expected to be minimal. Potential insect problems include, but are not limited to, bees, wasps, and hornets. Prior to commencement of work, each work area will be surveyed for nests and hives to reduce the possibility of disturbing these insects. In addition, each Site worker will be asked to disclose any allergies related to insect stings or bites. The worker will be requested to keep his or her anti-allergy medicine on Site.

Tick species native to Long Island consist of the pinhead-sized deer tick and the much-larger dog tick. All Site workers will be advised to avoid walking through tall grassy areas where possible and will be advised to check for ticks on clothing periodically or to wear protective clothing such as Tyvek™ (see Section 6.7). Workers are encouraged to wear light-colored clothing and tuck pants legs into socks.

6.6.4 Heat Stress and Cold Exposure

Heat stress may become a concern especially if protective clothing is donned which will decrease natural ventilation. To assist in reducing heat stress the following measures will be taken:

- An adequate supply of water or other liquids will be brought on Site. To prevent dehydration, personnel will be encouraged to drink generous amounts of water even if not thirsty.
- A shady rest area will be designated to provide shelter during sunny days.
- In hot weather, workers wearing protective clothing may be rotated.

When the temperature is over 70 degrees Fahrenheit and personnel are wearing protective clothing, heat stress monitoring may be implemented as follows:

- Heart rate may be measured by counting the radial pulse for 30 seconds at the beginning of the rest period. The heart rate should not exceed 110 beats per minute. If the rate is higher, the next work period will be

shortened by ten minutes (or 33%). If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle will be shortened by 33%. The HSO will decide on the length of work periods and rest periods based on Site conditions.

- Body temperature may be measured, if deemed necessary, at the beginning of the rest period. Oral temperature should not exceed 99 degrees Fahrenheit. If it does, the next work period will be shortened by ten minutes (or 33%). However, if the oral temperature exceeds 99 degrees Fahrenheit at the beginning of the next period, the following work cycle will be further shortened by 33%. Work will not re-commence until by temperature has dropped below 99 degrees Fahrenheit.

Indications of heat stress range from mild (fatigue, irritability, anxiety, decreased concentration, dexterity or movement) to fatal. Medical help will be obtained for serious conditions.

Heat-related problems are:

- Heat rash: caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.
- Heat cramps: caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle spasm and pain in the extremities and abdomen.

- o Heat exhaustion: caused by increased stress on various organs to meet increased demands to cool the body. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.
- o Heat stroke: the most severe form of heat stress. Can be fatal. Medical help must be obtained immediately. Body must be cooled immediately to prevent severe injury and/or death. Signs: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

Cold exposure is a concern if work is conducted during cold weather or marginally cold weather during precipitation periods or moderate to high wind velocity periods. To assist in reducing cold exposure the following measures will be taken:

- o All personnel will be required to wear adequate and appropriate clothing. This will include head gear to prevent the high percentage loss of heat that occurs in this area (thermal liners for hard hats if hard hats are required).
- o Provide a readily available warm shelter near each work zone.
- o Carefully schedule work and rest periods to account for the current temperature and wind velocity conditions.
- o Monitor work patterns and physical condition of workers and rotate personnel, as necessary.

Indications of cold exposure range from shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision

to drowsiness. Medical help will be obtained for serious conditions if they occur.

Cold exposure related problems are:

- o Frost Bite: Ice crystal formation in body tissues. The restricted blood flow to the injured part results in local tissue destruction.
- o Hypothermia: Severe exposure to cold temperature resulting in the body loosing heat at a rate faster than the body can generate heat. The stages of hypothermia are shivering, apathy, loss of consciousness, decreasing pulse rate and breathing rate and death.

6.6.5 The Buddy System

All activities in contaminated or potentially contaminated areas will be conducted by pairing off the Site workers in groups of two (or three if necessary). Each person (buddy) will be able to:

- o Provide his or her partner with assistance.
- o Observe his or her partner for signs of chemical or heat exposure.
- o Periodically check the integrity of his or her partner's protective clothing.
- o Notify the HSO or others if emergency help is needed.

The buddy system will institute at the beginning of each work day. If new workers arrive on Site, a buddy will be chosen prior to the new worker entering the work zone.

6.6.6 Site Communications

Two sets of communication systems will be established at the Site: internal communication among personnel on-Site, and external communication between on-Site and off-Site personnel.

Internal communication will be used to:

- Alert team members to emergencies.
- Pass along safety information such as heat stress check, protective clothing check, etc.
- Communicate changes in the work to be accomplished.
- Maintain Site control.

Due to ambient noise, verbal communications may be difficult at times. The HSO will carry a whistle (and compressed air horn if respirators are donned) to signal Site workers. A single whistle blast will be the signal to immediately evacuate the work zone through the access control point. This signal will be discussed with all Site workers prior to commencement of work.

An external communication system between on-Site and off-Site personnel will be established to:

- Coordinate emergency response.
- Report to the Project Manager.
- Maintain contact with essential off-Site personnel.

A field telephone will be available at all times in the HSO's vehicle. In addition, the nearest stationary phone will be identified prior to the commencement of Site operations and this location will be relayed to all Site workers.

6.6.7 General Safe Work Practices

Standing orders which will be applicable during Site operations are as follows:

- o No smoking, eating, drinking, or application of cosmetics in the work zone.
- o No matches or lighters in the work zone.
- o All Site workers will enter/exit work zone through the access control point.
- o Any signs of contamination, radioactivity, explosivity, or unusual condition such as dead animals will require evacuating the Site immediately and reporting the information to the HSO.
- o Loose fitting clothing or loose long hair will be prohibited in the work zone during drilling operations.
- o A signal person will direct the backing of work vehicles.
- o Equipment operators will be instructed to check equipment for abnormalities such as oozing liquids, frayed cables, unusual odors, etc.

6.6.8 Hazard Communication Program

All hazardous materials brought on Site will be accompanied by Material Safety Data Sheets (MSDSs). The hazardous materials anticipated to be present at the Site consist of methanol, hexane, and a solution of 10 percent nitric acid and water (see Appendix B for these MSDSs). The quantities of each of these chemicals on Site is expected to be less than one liter. These chemicals will be stored in plastic spray bottles. They will be used for equipment decontamination of sampling bailers, hand augers, etc.

All Site workers will be trained in the safe handling of these hazardous materials. Full-faceshield eye protection will be donned by persons performing the equipment decontamination. All decontamination chemicals will be dispensed in a downwind direction to reduce the possibility of chemical contact with the person performing the decontamination. All hazardous materials brought on-Site will be clearly labeled.

6.6.9 Spill Containment

In the event of a chemical spill, a 25-pound bag of Solid-A-Sorb™ (granular diatomaceous earth) will be kept on Site. The sorbent will be placed on the spill and absorbed. The liquid-laden sorbent will then be placed in a 55-gallon drum, marked, and sealed for disposition. In addition to this measure, the NYS Department of Environmental Conservation Spill Response Department (phone number 751-7900) will be notified in the event of a chemical spill.

6.7 Personal Protective Equipment

6.7.1 General Considerations

The two basic objectives of the personal protective equipment (PPE) is to protect the wearer from safety and health hazards, and to prevent the wearer from incorrect use and/or malfunction of the PPE.

The duration of Site activities is estimated to be four weeks. Of this, the drilling activities are estimated to require three weeks. All work is expected to be performed during daylight hours and workdays, in general, are expected to be eight to ten hours in duration. Any work performed beyond daylight hours will require the permission of the HSO. This decision will be based on the

adequacy of artificial illumination and the type and necessity of the task being performed.

Personal protection levels for the Site activities, based on past investigations, are anticipated to be Level D with the possibility of upgrading to Level C. The equipment included for each level of protection is provided as follows:

Level C Protection

Personnel protective equipment

- Air-purifying respirator, full-face.
- Chemical-resistant clothing includes: Tyvek™ (spunbonded olefin fibers) for particulate and limited splash protection or Saranex™ (plastic film-laminated Tyvek) for permeation resistance to solvents.
- Coveralls*, or
- Long cotton underwear*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), leather or chemical-resistant, steel toe and shank
- Boots covers (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- Escape mask*
- 2-way radio communications (inherently safe)*

(*) optional

Criteria for Selection of Level C Protection

Meeting all of these criteria permits use of Level C Protection:

- Oxygen concentrations are not less than 19.5% by volume.
- Measured air concentrations of identified substances will be reduced by the respirator below the substance's threshold limit value (TLV).
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any body area left unprotected by chemical-resistant clothing
- Job functions do not require self-contained breathing apparatus
- Direct readings are below 50 ppm on the OVA

Level D Protection

Personnel protective equipment:

- Coveralls
- Gloves*
- Boots/shoes, leather or chemical-resistant, steel toe and shank
- Safety glasses or chemical splash goggles*
- Hard hat (face shield*)
- Escape mask*

(*) optional

Criteria for Selection of Level D Protection

Meeting any of these criteria allows use of Level D Protection:

- No contaminant levels above 5 ppm organic vapors or dusty conditions are present
- Work functions preclude splashes, immersion, or the reasonable potential for unexpected inhalation of any chemicals above the TLV

Additional Considerations for Selecting Levels of Protection

Another factor which will be considered in selecting the appropriate level of protection is heat and physical stress. The use of protective clothing and respirators increases physical stress, in particular, heat stress on the wearer. Chemical protective clothing greatly reduces natural ventilation and diminishes the body's ability to regulate its temperature. Even in moderate ambient temperatures, the diminished capacity of the body to dissipate heat can result in one or more heat-related problems.

All chemical protective garments can be a contributing factor to heat stress. Greater susceptibility to heat stress occurs when protective clothing requires the use of a tightly fitted hood against the respirator face piece, or when gloves or boots are taped to the suit. As more body area is covered, less cooling takes place, increasing the probability of heat stress.

Wearing protective equipment also increases the risk of accidents. It is heavy, cumbersome, decreases dexterity, agility, interferes with vision, and is fatiguing to wear. These factors all increase physical stress and the potential for accidents. In

particular, the necessity of selecting a level of protection will be balanced against the increased probability of heat stress and accidents.

6.8 Calibration Procedures, Frequencies, and Maintenance of HASP Monitoring Instrument

This section will present the calibration procedures, frequencies, and maintenance for the health and safety field monitoring instruments.

The use of each instrument is presented as follows (the manufacturer's owner's manuals for all equipment used will be present at the Site):

1. Photovac MicroTIP - this instrument is a photoionization detector (PID) that measures the concentration of airborne ionizable gases and vapors. The MicroTIP does not distinguish between individual compounds and will not read methane. The calibration will be performed with a cylinder of "zero gas" (hydrocarbon free air) to "zero" the instrument and a 100 ppm cylinder of isobutylene to calibrate the span.
2. Century Model OVA - 128 Portable Organic Vapor Analyzer (OVA) - this instrument is a flame ionization detector (FID) that measures the concentration of airborne ionizable gases and vapors. The OVA does not distinguish between individual compounds in the survey mode and the OVA will detect methane. The calibration will be performed with "zero gas" to "zero" the instrument. The span gas will be a 50 ppm concentration of methane.

Background atmospheric concentrations of methane are generally two to four ppm, therefore, background concentrations of organic vapors at the Site will generally be obtained with the MicroTIP (which does not detect methane).

3. Mine Safety Appliances Model 360 Carbon Monoxide, Combustible Gas & Oxygen Alarm (MSA 360) - is a hand carried, battery operated instrument designed to sample atmospheres for carbon monoxide, combustible gases or vapors, oxygen content and to warn the user when predetermined concentrations are reached.

The calibration procedures and frequencies for each instrument are presented as follows:

Photovac MicroTIP (Photoionization Detector)

Isobutylene at 100 ppm in air will be used as Span Gas. A commercial zero grade gas will be used as the zero gas. To calibrate the instrument, use the Calibration Kit (Photovac Part No. 390033) as follows:

1. Connect the supplied regulator to the Span Gas cylinder. Hand tighten the fittings.
2. Open the valve on the gas bag by turning the valve stem fully counter clockwise.
3. Attach the gas bag adapter nut to the regulator. Hand tighten the fittings.
4. Turn the regulator knob counter clockwise about half turn to start the flow of gas.

5. Fill the gas bag about half full and then close the regulator fully clockwise to turn off the flow the gas.
6. Disconnect the bag from the adapter and empty it. Flush the bag a few times with the Span Gas and then fill it.
7. Close the gas bag by turning the valve clockwise.
8. Press SETUP and select the desired Cal Memory with arrow keys and press ENTER. Press EXIT to leave Setup.
9. Press CAL and expose MicroTIP to Zero Gas. Press ENTER and MicroTIP sets its zero point.
10. MicroTIP then asks for the Span Gas concentration. Enter the Known Span Gas concentration and then connect the Span Gas bag adapter to the inlet.
11. Press ENTER and MicroTIP sets its sensitivity.
12. When MicroTIP's display reverts to normal, MicroTIP is calibrated and ready for use. Remove the Span Gas bag from the inlet.

The instrument will be calibrated prior to the commencement of each day's work. The instrument will be charged overnight prior to each day's work.

Century Model OVA-128 Portable Organic Vapor Analyzer (OVA)

Calibration will be accomplished using a sample of a known concentration of methane in air as follow:

1. Place instrument in normal operation with CALIBRATE Switch set to X10 and GAS SELECT dial set to 300, and allow 20 minutes for warm up and stabilization.
2. Use the CALIBRATE ADJUST (zero) knob to adjust the meter reading to zero.

3. Introduce a methane sample of a known concentration and adjust trimpot R32 so the meter reading corresponds to the known sample.
4. Extinguish the flame by blocking the exhaust ports.
5. Leave CALIBRATE Switch on X10 position and use CALIBRATE ADJUST (zero) knob to adjust Readout meter reading to 4 ppm.
6. Move the CALIBRATE Switch to the X1 position and using trimpot R31, adjust Readout meter reading to 4 ppm.
7. Move CALIBRATE Switch to X10 position again. Use CALIBRATE ADJUST (zero) knob to adjust Readout meter to 40 ppm.
8. Move CALIBRATE Switch to X100 position and use trimpot R33 to adjust Readout meter to 40 ppm.
9. Move CALIBRATE Switch back to X10 scale. Rezero Readout meter to 0 ppm; reignite instrument.
10. Unit is now balanced over the full range, calibrated to methane, and ready to be placed in normal service.

OVA calibration will be performed prior to entering the Site. On a daily basis, the calibration span will be checked by exposing the OVA to a known concentration of methane. If the reading deviates by greater than ten percent, the calibration procedure (shown above) will be performed. The OVA will be charged overnight prior to each day's work. Also, hydrogen refills will be performed as needed at the office of Fanning, Phillips and Molnar.

MSA 360

The combustible gas sensor of the MSA 360 is calibrated to Pentane and the instruction manual provides a conversion chart for other gases. For methane, the conversion factor is 0.6. As an example, if the CGI reads 40% LEL then the true level is 40% x 0.6 = 24% LEL, assuming that the gas is methane. Calibration of the MSA 360 will be accomplished as follows using the Model R-Calibration Kit:

1. Attach the flow control to the 0.75% pentane/15% oxygen calibration gas tank.
2. Connect the adapter-hose to the flow control.
3. Open the flow control valve.
4. Connect the adapter-hose fitting to the inlet of the instrument; within 30 seconds, the LEL readout should stabilize and indicate between 47 and 55%. If the indicator is not in the correct range, remove the right end of the indicator and adjust the LEL SPAN control to obtain 50%.
5. Verify the oxygen reading; it should be between 13 and 17%.
6. Disconnect the adapter-hose fitting from the instrument.
7. Close the flow control valve.
8. Remove the flow control from the calibration gas tank.
9. Attach the flow control to the 300 ppm carbon monoxide calibration gas tank.
10. Open the flow control valve.

11. Connect the adapter-hose fitting to the inlet of the instrument; after approximately 2 minutes, the TOX readout should stabilize and indicate between 275 and 325 ppm. If the indicator is not in the correct range, remove the right end of the indicator and adjust the TOX SPAN control to obtain 300 ppm.
12. Disconnect the adapter-hose fitting from the instrument.
13. Close the flow control valve.
14. Remove the adapter-hose from the flow control.
15. Remove the flow control from the calibration gas tank.

The instrument will be checked for calibration prior to the commencement of each day's work. The instrument will be charged overnight.

6.9 Emergency Response Plan

This section will present the Emergency Response Plan (ERP) for the Site. Pre-emergency planning will consist of reviewing the ERP with all workers at the Site prior to initiation of work.

Personnel Roles

It is anticipated that during the drilling and well installation activities at the Site, in general, four persons will be on the Site: the HSO, the assistant HSO, the driller, and the driller's assistant. Should an emergency situation arise at the Site, the HSO will assume control and decision-making. The HSO will also resolve all dispute concerning health and safety requirements and precautions. The HSO will also:

- Be authorized to seek and purchase supplies as necessary.

- Have control over activities of everyone entering the Site.

In the event that the HSO is not present at the Site, the assistant HSO will assume the duties of the HSO.

The HSO will communicate, by field telephone or other, with off-Site personnel to include the Project Manager to evaluate data and assist in the decision-making process. The East Hampton Fire Department will be notified as to the nature of Site operations and estimated duration of the work prior to initiating Site activity. Phone numbers for the fire department, police, ambulance, poison control center, Suffolk County Department of Health Services, and NYS Department of Environmental Conservation Spill Response Department, are listed in Table 6.9.1. The hospital which will be utilized during an emergency will be Southampton Hospital. The directions to the hospital along with the hospital's emergency room phone number are presented in Figure B.1.

Internal communications will consist of a single whistle (or compressed air horn if Level C is donned) blast. This blast will signal all workers to evacuate the work zone by the nearest exit.

Response Follow-Up

Following an emergency, or incident, a detailed report will be generated by the HSO. All equipment will be restored to pre-emergency conditions. The HASP will be reviewed following an emergency to determine if it provides adequate information to assist in dealing with the emergency. The HASP may be revised to incorporate additional information as needed.

TABLE 6.9.1

Emergency Telephone Numbers
(Area Code 516)

NYS Police	728-3000
East Hampton Police	324-0024
East Hampton Fire Department	324-6868
Ambulance	324-6767
Southampton Hospital	726-8200
Poison Control Center	542-2323
Suffolk County Dept. of Health Services	348-2900
NYS Dept. of Environmental Conservation (Chemical Spills)	751-7900

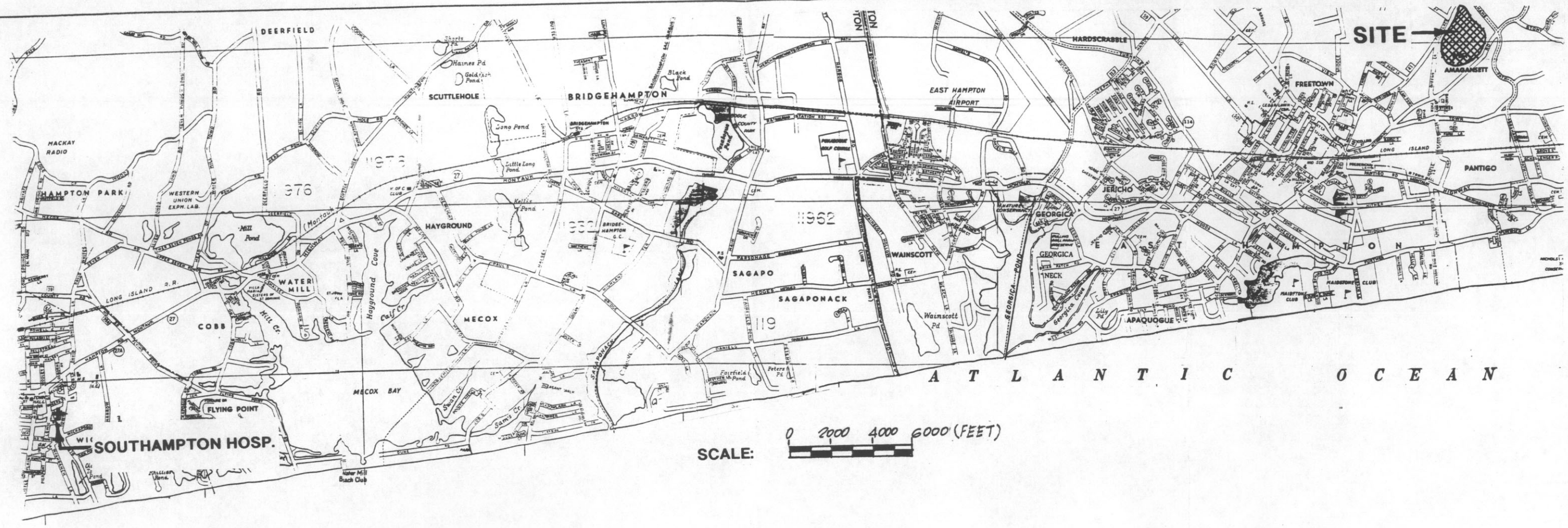
Town of East Hampton

David Paolelli - Superintendant of Sanitation/Alt. Health & Safety Officer	324-7191

FP&M Contact Personnel - (737-6200)

Dr. Kevin J. Phillips, P.E.
Peter Dermody, Project Manager
Thomas Doriski, Project Hydrogeologist/
Health & Safety Officer

/rl204



Directions from Springs-Fireplace Road Landfill to Southampton Hospital, 240 Meeting House Lane, Southampton, New York. **726-8200**

Proceed to Landfill exit. Turn left onto Springs-Fireplace Road (County Route 41) and proceed southwest 1.2 miles to intersection with North Main Street/Three Mile Harbor Road (County Route 40). Turn left onto County Route 40 and proceed south another 0.5 miles to the merge with State Route 27. Follow the State Route 27 west signs (Montauk Highway) for another 11.3 miles. At 11.3 miles, leave State Route 27 by proceeding straight ahead onto State Route 27A. [The intersection of State Route 27 and State Route 27A]. The intersection has a hospital direction sign (White H in Blue Rectangle). Proceed another 0.85 miles to Lewis Street. Turn left (south) onto Lewis Street. Proceed another 0.25 miles to Meeting House Lane. Southampton Hospital is at intersection of Lewis Street and Meeting House Lane. Emergency entrance is on Lewis Street.

Fanning, Phillips & Molnar Engineers		
FIGURE B–1 DIRECTIONS FROM SPRINGS–FIREPLACE RD. LANDFILL TO SOUTHAMPTON HOSPITAL		
Drawn By: H.C.	Checked By: T.D.	Date: 10/8/92

Emergency Recognition and Prevention

Before daily work assignments begin each day, a brief on-Site meeting will be held by the HSO which will address health and safety issues related to the day's work. Prior to initiation of work, a detailed on-Site health and safety meeting will be held to review all potential hazards, contingencies, and safety measures.

Safe Distances and Places of Refuge

The main potential cause of work zone evacuation is a significant vapor release of organic vapors or methane gas. Vapor release evacuation will be discussed prior to drilling at each location and in general will be in the upwind direction. Wind direction will be monitored at each work location and all workers will be notified of the direction of evacuation prior to commencement of work. Safe distances will be discussed at each location and determined by the HSO. The OVA will be used to determine if workers have evacuated a sufficient distance.

At all times, vehicles which may be utilized in an emergency for transport to the hospital (or other destination) will have clear access to leave the Site. The HSO will assure that an emergency vehicle does not become blocked-in by other vehicles.

Site Security and Control

The HSO will control entry of personnel into the work zone. No unnecessary person shall be permitted in the work zone.

Decontamination Procedures During Emergencies

In the event of a medical emergency, decontamination will be performed if it does not interfere with essential treatment.

Decontamination will be performed by washing, rinsing, and/or cutting off protective clothing and equipment.

If decontamination cannot be performed, the victim will be wrapped in plastic to reduce contamination to other personnel. Emergency and off-Site medical personnel will be alerted to the potential contamination.

Emergency Medical Treatment and First Aid

Medical emergencies will be treated, in general, by medical experts by transporting the victim to the nearby hospital.

A first aid kit will be present on Site for minor medical treatment.

APPENDIX A

PUBLIC AND PRIVATE WELL USERS IN THE VICINITY OF THE LANDFILL

FANNING, PHILLIPS & MOLNAR
Consulting Engineers
909 MARCONI AVENUE
RONKONKOMA, NEW YORK 11779

516/737-6200
718/767-3337
TELECOPIER 516/737-2410

RICHARD FANNING, P. E. (1931-1984)
KEVIN J. PHILLIPS, P. E., Ph. D.
GARY A. MOLNAR, P. E.

April 20, 1992

Mr. John E. Conover, Jr.
Assistant Sanitary Engineer
Division of Hazardous Waste Remediation
NYSDEC
SUNY Bldg. 40
Stony Brook, New York 11790-2356

RE: East Hampton Well Survey

Dear Mr. Conover:

As per our conversation on Thursday, April 16, 1992, please find the enclosed data concerning the well surveys for the Springs-Fireplace and Montauk Landfills (see Attachment A). As we discussed, a physical survey was performed to find the range of street addresses for a particular street. Then, the Cole Directory was consulted to obtain all the addresses and names of residents in the area of concern. A list was then compiled and sent to the Suffolk County Water Authority (SCWA). SCWA answered "Yes" (in the right-hand column) to those residents or addresses which its records showed were SCWA customers and, therefore, receive public water. Those addresses or residents with a "No" (in the right-hand column) either do not receive public water (and therefore, use private well water) or the SCWA could not confirm these residents or addresses as customers.

The SCWA has also reported that no public water recipients exist north of Abrahams Path between Springs-Fireplace Road and Accabonac Road.

As consultants for the Town of East Hampton, we would like to request that copies of the private well analyses results be forwarded to Fanning, Phillips and Molnar as they become available.

If we can be of further assistance in this matter, please do not hesitate to call.

Very truly yours,

Peter Dermody
Hydrogeologist

PD:mr
Attachment

mr/dd156

Residences/Businesses in the Vicinity of the Springs-Fireplace Landfill:

Springs-Fireplace Road

ADDRESS	NAME	PUBLIC WATER (Y OR N)
105	Peggy A. Glass	Y
107	Unknown	N
119	Gene Carter	Y
123	Gail Hayes	N
125	Unknown	Y
133	Unknown	N
135	Unknown	Y
137	Unknown	Y
139	Dr. J.J. Burrascano Joanne Hamilton, R.N. Southampton Hospital Lab	Y Y Y
141	Harro Upholsters	Y
149	Unknown	N
165	Ocean Limo Village Coach	N
168	Wendy Frazier Lillian M. Jones	Y
175	P. Bistrian's, Jr. Wainscott Sand and Gravel	Y Y
182	William Markland	Y
184	Unknown	Y
185	A&Mm Outdoor Products	Y
200	Patrice Humbert	Y
206	Herbert Nixon	Y
208	Clarence J. Blowe Curtis A. Blowe	Y Y

ADDRESS	NAME	PUBLIC WATER (Y OR N)
211	LTV Inc. Local TV Inc. Tri State Newspaper	N N N
214	Lee Dion Gateway Distributors Stewart Electric	Y Y Y
216	Blaise Oneill Drapery Millodot Sanabria Home Improvement	N N N
259	Unknown	Y
281	Pepperoni's	Y
289	Bailey's Billards	Y
291	Corner Store Health East Hampton Wines	Y Y
295	Springs-Fireplace Center Upper Crust Bakery	Y Y

Accabonac Road

245	Benjamin Gillam	Y
257	Haney Maintenance	N
261	Joseph Gilliam	Y
265	Linda Jones	Y
266	Juan Diaz	N
267	Rev. Chas. E. Hopson	N
270	S. Kristen	Y
295	Agnes Dozier Lewis Dozier	N N
297	John Wittenborn	Y
354	Donald Kennedy	N
358	Debra Foster	N

ADDRESS	NAME	PUBLIC WATER (Y OR N)
385 Through 408	Unknown	#408 Y, others N
410	Wayne P. McCann	Y
418	Harry King, Jr. William T. Sweeney Francis Thomason	N N N
420	R.D. Green	N

Birdie Lane

10	Ralph Carnicelli	N
No#	Orlando Berti	N
No#	Murray Cohen	N
No#	Asher Kahn	N
No#	Sheri Katz	N
No#	Tanya Robbins	N

Abrahams Path

162	H. Mariaux	N
No#	Gilbert Steckowski	N

Morrell Street

3	Louis Smith, Jr.	N
7	Peter Ciccariello	N
31	Unknown	N
No#	Tobi Sue Brown	N
No#	Ronald C. Gilliam	N
No#	Enrique Leon	N
No#	Marion Rohrbach	N

ADDRESS	NAME	PUBLIC WATER (Y OR N)
Crystal Drive		
62	Kathleen T. McNeil	N
63	Marilyn Tillotson	N
66	Robert Card	N
68	Vincente Tobar	N
77	Andrew Devlin	N
89	Jerry Gagne	N
Old Fireplace Road		
43	Raymond H. Hartjen	N
41	Herbert Kramer	N
39	Egon Lauterberg	N
33	Barbara Segal Leslie Segal	N N
29	E. Detullio	N
27	J. Abelman Melvin Bernstein Michael Cardacino Jane Dahlberg Sandra Davey James Ives Jim Ives C.L. Keyworth Howard Linkoff L. McVeish Richard Salter, Jr. Richard W. Salter Gary Schneider Maud Seaver Alan Sosne John Tuckman James Weston M. Wolffsohn	N N N N N N N N N N N N N N N N N N N
10	Unknown	N
4	C.A. Shea	N

Residences/Businesses in the Vicinity of the Montauk Landfill:

Navy Road

ADDRESS	NAME	PUBLIC WATER (Y OR N)
215	Unknown	N
224	Louis Croce Peter John Toscano	N N
No#	Peter A. Bradley	N
No#	Mario Castaldo	N
No#	Frank Cavallo	N
No#	V. Engstrom	N
No#	Herbert H. Ferreira	N
No#	James Ferreira	N
No#	Sheldon Feuerstadt	N
No#	Samuel Harte	N
No#	Edna Parise	N
No#	K. Plachy	N
No#	George A. Polyard	N
No#	Linda Putter	N
No#	E. Robertson	N
No#	Rudolf K. Scherbaum	N
No#	Stefani Scotto	N
No#	P.M. Smyth	N
No#	Kathryn Sussman	N
No#	Gloria Tavera	N
No#	Raymond Valcich	N
No#	Raymond R. Valcich	N

ADDRESS	NAME	PUBLIC WATER (Y OR N)
No#	August Venturini	N
No#	Michael Verrilli	N
No#	Hull & Roddy Inc.	N
No#	Joe Hill Grader Service	N
No#	Kahuna Cafe	Y
No#	Montauk Service	N
No#	Port Royal	Y
No#	Ship Wreck Club	N

North Shore Road

60	Mickey's Montauk Mowing	N
129	Luis Rosado	Y
No#	Rudolf Breyer	Y
No#	John Burgess	N
No#	Richard Green	Y
No#	Charles H. Hoeland	Y
No#	Robert E. Huser	Y
No#	D. Knight	N
No#	H. Merrill	Y
No#	Pamela Montambo	N
No#	Mrs. H. Pruszynski	Y
No#	Raymond Smith	Y
No#	Mitchell Valcich	Y
No#	McCoy Bus Co., Inc.	Y

ADDRESS	NAME	PUBLIC WATER (Y OR N)
Fort Lane		
No#	Rolf Sauer	N
No#	Bernard Turok	N
Midland Road		
No#	August Brown	Y
No#	Paul Ilief	Y
No#	Keith J. Schultzel	Y
South Davis Avenue		
No#	Alan Fite	N
No#	Richard Gosman	N
No#	P. Herbst	N
No#	Roy Lott	Y
No#	Dennis Mazzella	Y
No#	Jo Moring	Y
No#	Larry Raymond	N
No#	Daniel Stavola	N
No#	Richard P. Verne	N
South Dubois Place		
No#	Martin E. Lowy	N
No#	Martin E. Lowy	N
No#	S. Owen	N

ADDRESS	NAME	PUBLIC WATER (Y OR N)
South Duncan Drive		
No#	Albato R. Comini	N
No#	Stephan Margraf	N
No#	D. Peel	N
South Delrey Road		
3	J. Delagrammatikas	Y
7	Joseph Ferrante	N
8	George Kalfaian	Y
21	Clancy Pitts William Pitts, Jr.	Y Y
27	Matt Edwards	N
77	James R. Ketcham	Y
No#	Elisha Ammon, Jr.	Y
No#	Jose Ferney Bedoya	N
No#	John T. Britton	Y
No#	Robert L. Burke	N
No#	Ellen Cox	N
No#	A. Cragnolti	Y
No#	Arthur Delalla	Y
No#	Edward V. Ecker, Jr.	Y
No#	Charles Fuchs	Y
No#	Richard Jones	Y
No#	H. Kobayashi	Y
No#	H. Kobayashi	Y
No#	Michael Kowalcyk	Y

ADDRESS	NAME	PUBLIC WATER (Y OR N)
South Delrey Road - Cont.		
No#	Altor R. Lund	Y
No#	Harry Maurikakis	Y
No#	Scott Morfee	Y
No#	William R. Ostrander	Y
No#	Peter N. Panteles	Y
No#	Fred Pedersen	N
No#	Joseph Reccardi	Y
No#	Kenneth W. Roussell	Y
No#	Joseph Schneider	Y
No#	A. Watson	Y
No#	John Yashinowsky	N
No#	Dr. C.G. Mueller	Y
South Durham Road		
No#	Charles L. Kamensky	Y
No#	Sheldon S. Kaufman	Y
No#	Fred Klepper	Y
No#	Walden F. Lund	Y
No#	Paul J. Moss	Y
No#	C.M. Sanders	Y
No#	Stephen Spirelli	N
No#	Dr. J.M. Nolan	Y

ADDRESS	NAME	PUBLIC WATER (Y OR N)
Fairview Road		
No#	Rolando Deegan	N
No#	Richard Fossati	N
No#	Judy Frisone	N
No#	Walter Halucha	N
No#	C. Mazza	N
No#	Charles A. Miller	N
No#	Capt. George Potts	N

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APPENDIX B

MSDSs FOR METHANOL, HEXANE, AND NITRIC ACID

MATERIAL SAFETY DATA SHEETS
HEXANE

HEXANES
HEXANES
HEXANES

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **HEXANES**

TRADE NAMES/SYNONYMS:
N-HEXANE; NCI-C60571; HEXYLHYDRIDE; NORMAL HEXANE; SKELLYSOLVE B; STCC 4906187; UN 1208; H291; N3; H302; H303; H292; H300; H334; H302SK; N3S; C6H14;

CHEMICAL FAMILY:
HYDROCARBON, ALIPHATIC

MOLECULAR FORMULA: C6-H14

MOLECULAR WEIGHT: 86.20

CERCLA RATINGS (SCALE 0-3): HEALTH=0 FIRE=3 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT:	N-HEXANE CAS# 110-54-3	PERCENT: VARIES
COMPONENT:	2-METHYLPENTANE CAS# 107-83-5	PERCENT: VARIES
COMPONENT:	3-METHYLPENTANE CAS# 96-14-0	PERCENT: VARIES
COMPONENT:	2,3-DIMETHYLBUTANE CAS# 79-29-8	PERCENT: VARIES
COMPONENT:	METHYLCYCLOPENTANE CAS# 96-37-7	PERCENT: VARIES
COMPONENT:	2,2-DIMETHYLPENTANE CAS# 590-35-2	PERCENT: VARIES
COMPONENT:	2,4-DIMETHYLPENTANE	

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS
N-HEXANE:
50 PPM (180 MG/M3) OSHA TWA
50 PPM (180 MG/M3) ACGIH TWA
50 PPM (180 MG/M3) NIOSH RECOMMENDED TWA
50 PPM (180 MG/M3) DFG MAK TWA;
100 PPM (360 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1500, HYDROCARBONS).

HEXANE, ALL ISOMERS OTHER THAN N-HEXANE:
500 PPM (1800 MG/M3) OSHA TWA; 1000 PPM (3600 MG/M3) OSHA STEL
500 PPM (1800 MG/M3) ACGIH TWA; 1000 PPM (3600 MG/M3) ACGIH STEL

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1500, HYDROCARBONS).

ALKANES (C5-C8):
350 MG/M3 NIOSH RECOMMENDED 10 HOUR TWA,
1800 MG/M3 NIOSH RECOMMENDED 15 MINUTE CEILING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID, FAINT ODOR, VERY VOLATILE

BOILING POINT: 136 F (58 C) MELTING POINT: -139 F (-95 C)

SPECIFIC GRAVITY: 0.7 VAPOR PRESSURE: 124 MMHG @ 20 C

SOLUBILITY IN WATER: INSOLUBLE VAPOR DENSITY: 3.0

SOLVENT SOLUBILITY: ALCOHOL, CHLOROFORM, ETHER

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

FLASH POINT: -7 F (-22 C) (CC) UPPER EXPLOSIVE LIMIT: 7.5%

LOWER EXPLOSIVE LIMIT: 1.1% AUTOIGNITION TEMP.: 437 F (223 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG. SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER. APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS; KEEP UPWIND. EVACUATE TO A RADIUS OF 1500 FEET FOR UNCONTROLLABLE FIRES. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

WATER MAY BE INEFFECTIVE (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1991)

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204, EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
HEXANES-UN 1208

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

N-HEXANE:
IRRITATION DATA: 10 MG EYE-RABBIT MILD.
TOXICITY DATA: 190 PPM/8 WEEKS INHALATION-HUMAN TCLO; 120 GM/M3 INHALATION-MOUSE LCLO; 28,710 MG/KG ORAL-RAT LD50; 831 MG/KG INTRAVENOUS-MOUSE LDLO; 132 MG/KG INTRAVENOUS-RABBIT LDLO; 9100 MG/KG INTRAPERITONEAL-Rat LDLO; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- SKIN, EYE.
ACUTE TOXICITY LEVEL: RELATIVELY NON-TOXIC BY INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; NEUROTOXIN.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH SKIN, PULMONARY, LIVER, OR KIDNEY DISORDERS.
ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECT. A LOW ORDER OF MYOCARDIAL SENSITIZATION TO EPINEPHRINE MAY OCCUR. ACETONE AND METHYL ETHYL KETONE MAY ENHANCE THE TOXIC EFFECTS.

2-METHYLPENTANE:
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYES.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
ADDITIONAL DATA: STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATION.

3-METHYLPENTANE:
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- SKIN, EYE, MUCOUS MEMBRANES.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
ADDITIONAL DATA: CONSUMPTION OF ALCOHOL MAY POTENTIATE THE TOXIC EFFECTS. USE OF STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATION.

2,3-DIMETHYLBUTANE:
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECTS. STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATION.

METHYLCYCLOPENTANE:
TOXICITY DATA: 95,000 MG/M3 INHALATION-MOUSE LCLO.

CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECTS. USE OF STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATION.

2,2-DIMETHYLPENTANE:
CARCINOGEN STATUS: NONE.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: POISONING MAY AFFECT THE CENTRAL NERVOUS SYSTEM.*

* MAY BE BASED ON GENERAL ALIPHATIC HYDROCARBON INFORMATION.

2,4-DIMETHYLPENTANE:
CARCINOGEN STATUS: NONE.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: NO DATA AVAILABLE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
N-HEXANE:
IRRITANT/NARCOTIC, NEUROTOXIN.
3000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- 880 PPM FOR 15 MINUTES HAS CAUSED UPPER RESPIRATORY TRACT IRRITATION. EXPOSURE TO 1000-5000 PPM MAY PRODUCE HEADACHE, NAUSEA, AND DIZZINESS. OTHER EFFECTS MAY INCLUDE GIDDINESS, COUGHING, NUMBNESS IN THE EXTREMITIES, DIFFICULTY WALKING, DEFECTS OF MEMORY, EXCITEMENT FOLLOWED BY DEPRESSION, AND UNCONSCIOUSNESS. ANESTHESIA OF SHORT DURATION WITHOUT SEQUELA IS POSSIBLE. PULMONARY EDEMA, CARDIAC ARRHYTHMIAS, BRAIN DAMAGE, CARDIAC ARREST AND DEATH MAY RESULT. HIGH CONCENTRATIONS MAY PRODUCE ASPHYXIA. CONVULSIONS HAVE BEEN PRODUCED IN ANIMALS.
CHRONIC EXPOSURE- RESULTS IN AXONAL NEUROPATHY. NEUROPATHY IS OF AN INSIDIOUS BILATERAL, SYMMETRICAL, SENSORIMOTOR PERIPHERAL NATURE. 100 PPM DAILY MAY PRODUCE CHANGES IN MUSCLE STRENGTH. PROLONGED EXPOSURE MAY CAUSE EFFECTS AS IN ACUTE EXPOSURE AS WELL AS MEMORY LOSS, PROGRESSIVE WEAKNESS, ACHING MUSCLES, SENSORY LOSS IN FEET AND HANDS, CALF CRAMPS, FACIAL NUMBNESS, IMPOTENCE, BLURRED VISION, COLOR VISION ABNORMALITIES, AND PARALYSIS OF MUSCLES USUALLY OF LOWER LIMBS. EXAMINATION REVEALS HYPOACTIVE DEEP KNEE REFLEXES, BILATERAL FOOTDROP, REDUCTION IN NERVE AND SENSITIVE CONDUCTION VELOCITIES, MODIFICATION OF DISTAL LATENCY, DIMINISHING OF SENSORY POTENTIAL, AND NEUROGENIC ATROPHY OF SKELETAL MUSCLE. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

HEXANES (OTHER THAN N-HEXANE):
IRRITANT/NARCOTIC.
ACUTE EXPOSURE- MAY CAUSE IRRITATION TO THE MUCOUS MEMBRANES. LIQUID ALIPHATICS, C_5-C_9, HAVE ANESTHETIC AND CENTRAL NERVOUS SYSTEM DEPRESSANT ACTIONS. SYMPTOMS MAY INCLUDE, BUT ARE NOT LIMITED TO, DIZZINESS, DROWSINESS, INCOORDINATION, CONVULSIONS, COLLAPSE OR COMA. SOME ISOHEXANE ISOMERS HAVE BEEN DOCUMENTED TO SENSITIZE THE MYOCARDIUM TO EPINEPHRINE.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO ALIPHATIC HYDROCARBONS MAY RESULT IN EFFECTS AS DESCRIBED IN ACUTE EXPOSURE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.

TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
N-HEXANE:
IRRITANT.
ACUTE EXPOSURE- VAPOR MAY CAUSE IRRITATION WITH REDNESS. 2 ML/KG/4 HOURS ON RABBIT SKIN RESULTED IN ATAXIA AND RESTLESSNESS. AT 5 ML/KG/4 HOURS SOME DEATHS OCCURRED.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS DUE TO DEFATTING, BLISTER FORMATION, ITCHING, ERYTHEMA, PIGMENTATION AND PAIN HAVE BEEN REPORTED. SKIN EXPOSURES MAY ENHANCE NEUROTOXIC EFFECTS FROM INHALATION EXPOSURE.

HEXANES (OTHER THAN N-HEXANE):
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE IRRITATION AND BE ABSORBED THROUGH THE SKIN.
CHRONIC EXPOSURE- THE C5 AND HIGHER LIQUID ALIPHATIC HYDROCARBONS ARE FAT SOLVENTS, AND REPEATED OR PROLONGED CONTACT MAY RESULT IN DEFATTING DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
N-HEXANE:
IRRITANT.
ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION WITH REDNESS AND PAIN. VAPORS AT 880 PPM FOR 15 MINUTES CAUSED IRRITATION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

HEXANES (OTHER THAN N-HEXANE):
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE IRRITATION. MOST LIQUID HYDROCARBONS CAUSE LITTLE OR NO INJURY ON DIRECT EXTERNAL CONTACT WITH THE EYE.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
N-HEXANE:
NARCOTIC.
ACUTE EXPOSURE- MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS, HEADACHE, NAUSEA, VOMITING, VERTIGO, BRONCHIAL AND GENERAL INTESTINAL IRRITATION WITH ABDOMINAL SWELLING AND PAIN. THE FATAL HUMAN DOSE MAY BE ABOUT 50 GRAMS. MAY VAPORIZE WHEN ASPIRATED INTO THE TRACHEOBRONCHIAL TREE WITH A RESULTANT RAPID DILUTION OF ALVEOLAR AIR AND MARKED FALL IN ITS OXYGEN CONTENT, WITH CONSEQUENT BRAIN DAMAGE OR CARDIAC ARREST.
CHRONIC EXPOSURE- REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

HEXANES (OTHER THAN N-HEXANE):
NARCOTIC.

ACUTE EXPOSURE- MAY CAUSE GASTROINTESTINAL DISTURBANCES. IF SUFFICIENT AMOUNTS OF ALIPHATIC HYDROCARBONS ARE INGESTED AND RETAINED, CENTRAL NERVOUS SYSTEM DEPRESSION MAY OCCUR. SYMPTOMS MAY INCLUDE, BUT ARE NOT LIMITED TO, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, INCOORDINATION, CONVULSIONS, AND COMA. IN ANIMAL STUDIES, ASPIRATION OF 0.2 ML OF C6-C8 ALIPHATICS, CAUSED ALMOST IMMEDIATE DEATH DUE TO RESPIRATORY PARALYSIS, ASPHYXIA AND CARDIAC ARREST.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- EXTREME CARE MUST BE USED TO PREVENT ASPIRATION. USE GASTRIC LAVAGE WITH ACTIVATED CHARCOAL AND A CUFFED ENDOTRACHEAL TUBE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OF CONVULSIONS OR IMPAIRED GAG REFLEX, IPECAC EMESIS CAN BE DONE. WHEN VOMITING BEGINS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION. AFTER VOMITING STOPS, GIVE 30-60 MILLILITERS OF FLEET'S PHOSPHO-SODA DILUTED 1:4 IN WATER. MAINTAIN AIRWAY, BLOOD PRESSURE AND RESPIRATION. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.) TREATMENT MUST BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
N-HEXANE:
CALCIUM HYPOCHLORITE: FIRE AND EXPLOSION HAZARD.
CHLORINE (LIQUID): FIRE AND EXPLOSION HAZARD.
DINITROGEN TETRAOXIDE: POSSIBLE EXPLOSION HAZARD.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
OXYGEN (CONCENTRATED): FIRE AND EXPLOSION HAZARD.
PLASTICS, RUBBER, AND COATINGS: MAY BE ATTACKED.
SODIUM HYPOCHLORITE: FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH

MAY BE IGNITED BY ELECTROSTATIC SPARKS. SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262, EPA HAZARDOUS WASTE NUMBER D001.
100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

****
CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

****
SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

(d) SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

(e) SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 05/23/85 REVISION DATE: 11/08/91

-ADDITIONAL INFORMATION-

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MATERIAL SAFETY DATA SHEET
NITRIC ACID

NITRIC ACID
NITRIC ACID
NITRIC ACID

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **NITRIC ACID**

CAS-NUMBER 7697-37-2

TRADE NAMES/SYNONYMS:
AQUA FORTIS; AZOTIC ACID; HYDROGEN NITRATE; AZOTIC ACID; NITRYL HYDROXIDE; NITAL; STCC 4918528, UN 2031; A200; A200C; A200S; A202; A256C; A509; A467; A200SI; A198C; A483; HNO3;

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H-N-O3

MOLECULAR WEIGHT: 63.01

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: NITRIC ACID PERCENT: 70

COMPONENT: WATER PERCENT: 30

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS
NITRIC ACID:
2 PPM (5 MG/M3) OSHA TWA; 4 PPM (10 MG/M3) OSHA STEL
2 PPM (5 MG/M3) ACGIH TWA; 4 PPM (10 MG/M3) ACGIH STEL
2 PPM (5 MG/M3) NIOSH RECOMMENDED TWA;
4 PPM (10 MG/M3) NIOSH RECOMMENDED STEL
10 PPM (25 MG/M3) DFG MAK TWA;
20 PPM (50 MG/M3) DFG MAK 5 MINUTE PEAK, MOMENTARY VALUE, 8 TIMES/SHIFT

MEASUREMENT METHOD: SILICA GEL TUBE, SODIUM BICARBONATE/SODIUM CARBONATE, ION CHROMATOGRAPHY, (NIOSH VOL. III # 7903, INORGANIC ACIDS).

1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY;
1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS TO PALE YELLOW LIQUID WITH A SUFFOCATING ODOR.

BOILING POINT: 181 F (83 C) MELTING POINT: -44 F (-42 C)

SPECIFIC GRAVITY: 1.5027 @ 25 C VAPOR PRESSURE: 47.9 MMHG @ 20 C

EVAPORATION RATE: NOT AVAILABLE SOLUBILITY IN WATER: VERY SOLUBLE

VAPOR DENSITY: 3.2

SOLVENT SOLUBILITY: SOLUBLE IN ETHER.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

OXIDIZER: OXIDIZERS DECOMPOSE, ESPECIALLY WHEN HEATED, TO YIELD OXYGEN OR OTHER GASES WHICH WILL INCREASE THE BURNING RATE OF COMBUSTIBLE MATTER. CONTACT WITH EASILY OXIDIZABLE, ORGANIC, OR OTHER COMBUSTIBLE MATERIALS MAY RESULT IN IGNITION, VIOLENT COMBUSTION OR EXPLOSION.

FIREFIGHTING MEDIA:
WATER, DRY CHEMICAL OR SODA ASH
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, FLOOD AREA WITH WATER FROM A DISTANCE
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 44).

USE FLOODING AMOUNTS OF WATER AS FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS, KEEP UPWIND. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
OXIDIZER

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
  OXIDIZER AND CORROSIVE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.268
EXCEPTIONS: NONE

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204,
EFFECTIVE DATE OCTOBER 1, 1991, HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52102, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47156, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
NITRIC ACID-UN 2031

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
8 - CORROSIVE MATERIAL

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG I

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
  AND SUBPART E:
CORROSIVE

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.158
BULK PACKAGING: 49 CFR 173.243

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: FORBIDDEN
CARGO AIRCRAFT ONLY: 2.5 L

TOXICITY

NITRIC ACID:
TOXICITY DATA:
  ANHYDROUS: 49 PPM/4 HOURS INHALATION-RAT LC50 (VAN WATER & ROGERS, INC
    MSDS), 2500 PPM/1 HOUR INHALATION-RAT LC50 (DUPONT MSDS); 430 MG/KG
    ORAL-HUMAN LDLO, 50-500 MG/KG ORAL-UNSPECIFIED SPECIES LD50 (DUPONT MSDS);
    110 MG/KG UNREPORTED-MAN LDLO; REPRODUCTIVE EFFECTS DATA (RTECS).
  MONOHYDRATE: NO DATA AVAILABLE.
  TRIHYDRATE: NO DATA AVAILABLE.
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: CORROSIVE- INHALATION, SKIN, EYES, INGESTION.
ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INHALATION; TOXIC BY INGESTION.
TARGET EFFECTS: NO DATA AVAILABLE.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH IMPAIRED PULMONARY FUNCTION,
  PRE-EXISTING EYE AND SKIN DISORDERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
NITRIC ACID:
CORROSIVE/HIGHLY TOXIC. 100 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- INHALATION OF ACIDIC SUBSTANCES MAY CAUSE SEVERE RESPIRATORY IRRITATION WITH COUGHING, CHOKING, AND POSSIBLY YELLOWISH BURNS OF THE MUCOUS MEMBRANES. OTHER INITIAL SYMPTOMS MAY INCLUDE DIZZINESS, HEADACHE, NAUSEA, AND WEAKNESS. PULMONARY EDEMA MAY BE IMMEDIATE IN THE MOST SEVERE EXPOSURES, BUT MORE LIKELY WILL OCCUR AFTER A LATENT PERIOD OF 5-72 HOURS. THE SYMPTOMS MAY INCLUDE TIGHTNESS IN THE CHEST, DYSPNEA, DIZZINESS, FROTHY SPUTUM, AND CYANOSIS. PHYSICAL FINDINGS MAY INCLUDE HYPOTENSION, WEAK, RAPID PULSE, MOIST RALES, AND HEMOCONCENTRATION. IN NON-FATAL CASES, COMPLETE RECOVERY MAY OCCUR WITHIN A FEW DAYS OR WEEKS OR, CONVALESCENCE MAY BE PROLONGED WITH FREQUENT RELAPSES AND CONTINUED DYSPNEA AND OTHER SIGNS AND SYMPTOMS OF PULMONARY INSUFFICIENCY. IN SEVERE EXPOSURES, DEATH DUE TO ANOXIA MAY OCCUR WITHIN A FEW HOURS AFTER ONSET OF THE SYMPTOMS OF PULMONARY EDEMA OR FOLLOWING A RELAPSE.
CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION AND DURATION OF EXPOSURE, REPEATED OR PROLONGED EXPOSURE TO AN ACIDIC SUBSTANCE MAY CAUSE EROSION OF THE TEETH, INFLAMMATORY AND ULCERATIVE CHANGES IN THE MOUTH, AND POSSIBLY JAW NECROSIS. BRONCHIAL IRRITATION WITH COUGH AND FREQUENT ATTACKS OF BRONCHIAL PNEUMONIA MAY OCCUR. GASTROINTESTINAL DISTURBANCES ARE ALSO POSSIBLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
NITRIC ACID:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH LIQUID OR VAPOR MAY CAUSE SEVERE PAIN, BURNS AND POSSIBLY YELLOWISH STAINS. BURNS MAY BE DEEP WITH SHARP EDGES AND HEAL SLOWLY WITH SCAR TISSUE FORMATION. DILUTE SOLUTIONS OF NITRIC ACID MAY PRODUCE MILD IRRITATION AND HARDEN THE EPIDERMIS WITHOUT DESTROYING IT. CONCENTRATED ACID SOLUTIONS APPLIED TO OVER 25% OF THE SKIN AREA IN RATS PRODUCED ELEVATED METHEMOGLOBIN AND BLOOD NITRATE LEVELS.
CHRONIC EXPOSURE- EFFECTS DEPEND ON THE CONCENTRATION AND DURATION OF EXPOSURE. REPEATED OR PROLONGED CONTACT WITH ACIDIC SUBSTANCES MAY RESULT IN DERMATITIS OR EFFECTS SIMILAR TO ACUTE EXPOSURE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
NITRIC ACID:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH ACIDIC SUBSTANCES MAY CAUSE PAIN AND

LACRIMATION, PHOTOPHOBIA, AND BURNS, POSSIBLY SEVERE. THE DEGREE OF INJURY DEPENDS ON THE CONCENTRATION AND DURATION OF CONTACT. IN MILD BURNS, THE EPITHELIUM REGENERATES RAPIDLY AND THE EYE RECOVERS COMPLETELY. IN SEVERE CASES, THE EXTENT OF INJURY MAY NOT BE FULLY APPARENT FOR SEVERAL WEEKS. ULTIMATELY, THE WHOLE CORNEA MAY BECOME DEEPLY VASCULARIZED AND OPAQUE RESULTING IN BLINDNESS. IN THE WORST CASES, THE EYE MAY BE TOTALLY DESTROYED. CONCENTRATED NITRIC ACID MAY IMPART A YELLOW COLOR TO THE EYE UPON CONTACT.

CHRONIC EXPOSURE- EFFECTS DEPEND ON THE CONCENTRATION AND DURATION OF EXPOSURE. REPEATED OR PROLONGED EXPOSURE TO ACIDIC SUBSTANCES MAY CAUSE CONJUNCTIVITIS OR EFFECTS AS IN ACUTE EXPOSURE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NITRIC ACID:
CORROSIVE/TOXIC.

ACUTE EXPOSURE- ACIDIC SUBSTANCES MAY CAUSE CIRCUMORAL BURNS WITH YELLOW DISCOLORATION AND CORROSION OF THE MUCOUS MEMBRANES OF THE MOUTH, THROAT AND ESOPHAGUS. THERE MAY BE IMMEDIATE PAIN AND DIFFICULTY OR INABILITY TO SWALLOW OR SPEAK. EPIGLOTTAL EDEMA MAY RESULT IN RESPIRATORY DISTRESS AND POSSIBLY ASPHYXIA. MARKED THIRST, EPIGASTRIC PAIN, NAUSEA, VOMITING AND DIARRHEA MAY OCCUR, DEPENDING ON THE DEGREE OF ESOPHAGEAL AND GASTRIC CORROSION. THE VOMITUS MAY CONTAIN FRESH OR DARK PRECIPITATED BLOOD AND LARGE SHREDS OF MUCOSA. SHOCK WITH MARKED HYPOTENSION, WEAK, RAPID PULSE, SHALLOW RESPIRATION, AND CLAMMY SKIN MAY OCCUR. CIRCULATORY COLLAPSE MAY ENSUE AND IF UNCORRECTED, LEAD TO RENAL FAILURE. IN SEVERE CASES, GASTRIC, AND TO A LESSER DEGREE, ESOPHAGEAL PERFORATION AND SUBSEQUENT PERITONITIS MAY OCCUR AND BE ACCOMPANIED BY FEVER AND ABDOMINAL RIGIDITY. ESOPHAGEAL, GASTRIC AND PYLORIC STRICTURE MAY OCCUR WITHIN A FEW WEEKS, BUT MAY BE DELAYED FOR MONTHS OR EVEN YEARS. DEATH MAY RESULT WITHIN A SHORT TIME FROM ASPHYXIA, CIRCULATORY COLLAPSE OF ASPIRATION OF EVEN MINUTE AMOUNTS. LATER DEATH MAY BE DUE TO PERITONITIS, SEVERE NEPHRITIS OR PNEUMONIA. COMA AND CONVULSIONS SOMETIMES OCCUR TERMINALLY.

CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION, REPEATED INGESTION OF ACIDIC SUBSTANCES MAY RESULT IN INFLAMMATORY AND ULCERATIVE CHANGES IN THE MUCOUS MEMBRANES OF THE MOUTH AND OTHER EFFECTS AS IN ACUTE INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ACID IMMEDIATELY BY DRINKING LARGE QUANTITIES OF WATER OR MILK. IF VOMITING PERSISTS, ADMINISTER FLUIDS REPEATEDLY. INGESTED ACID MUST BE DILUTED APPROXIMATELY 100 FOLD TO RENDER IT HARMLESS TO TISSUES. MAINTAIN AIRWAY AND TREAT SHOCK (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO HELP PREVENT ASPIRATION.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
REACTS EXOTHERMICALLY WITH WATER.

INCOMPATIBILITIES:
NITRIC ACID:
ACETIC ACID: MAY REACT EXPLOSIVELY.
ACETIC ANHYDRIDE: EXPLOSIVE REACTION BY FRICTION OR IMPACT.
ACETONE: MAY REACT EXPLOSIVELY.
ACETONITRILE: EXPLOSIVE MIXTURE.
4-ACETOXY-3-METHOXYBENZALDEHYDE: EXOTHERMIC REACTION.
ACROLEIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ACRYLONITRILE: EXPLOSIVE REACTION AT 90 C.
ACRYLONITRILE-METHACRYLATE COPOLYMER: INCOMPATIBLE.
ALCOHOLS: POSSIBLE VIOLENT REACTION OR EXPLOSION; FORMATION OF EXPLOSIVE COMPOUND IN THE PRESENCE OF HEAVY METALS.
ALKANETHIOLS: EXOTHERMIC REACTION WITH POSSIBLE IGNITION.
2-ALKOXY-1,3-DITHIA-2-PHOSPHOLANE: IGNITION REACTION.
ALLYL ALCOHOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ALLYL CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
AMINES (ALIPHATIC OR AROMATIC): POSSIBLE IGNITION REACTION.
2-AMINOETHANOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
2-AMINOTHIAZOLE: EXPLOSIVE REACTION.
AMMONIA (GAS): BURNS IN AN ATMOSPHERE OF NITRIC ACID VAPOR.
AMMONIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
AMMONIUM NITRATE: FORMS EXPLOSIVE MIXTURE.
ANILINE: IGNITES ON CONTACT.
ANILINIUM NITRATE: FORMS EXPLOSIVE SOLUTION.
ANION EXCHANGE RESINS: POSSIBLE VIOLENT EXOTHERMIC REACTION.
ANTIMONY: VIOLENT REACTION.
ARSINE: EXPLOSIVE REACTION.
ARSINE-BORON TRIBROMIDE: VIOLENT OXIDATION.
BASES: REACTS.
BENZENE: EXPLOSIVE REACTION.
BENZIDINE: SPONTANEOUS IGNITION.
BENZONITRILE: POSSIBLE EXPLOSION.
BENZOTHIOPHENE DERIVATIVES: FORMATION OF POSSIBLY EXPLOSIVE COMPOUNDS.
N-BENZYL-N-ETHYLANILINE: VIGOROUS DECOMPOSITION.
1,4-BIS(METHOXYMETHYL)2,3,5,6-TETRAMETHYLBENZENE: GAS EVOLUTION.
BISMUTH: INTENSE EXOTHERMIC REACTION OR EXPLOSION.
1,3-BIS(TRIFLUOROMETHYL)BENZENE: POSSIBLE EXPLOSION.
BORON: VIOLENT REACTION WITH INCANDESCENCE.
BORON DECAHYDRIDE: EXPLOSIVE REACTION.
BORON PHOSPHIDE: IGNITION REACTION.
BROMINE PENTAFLUORIDE: IGNITION REACTION.
N-BUTYL MERCAPTAN: IGNITION REACTION.
N-BUTYRALDEHYDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CADMIUM PHOSPHIDE: EXPLOSIVE REACTION.
CALCIUM HYPOPHOSPHITE: IGNITION REACTION.
CARBON (PULVERIZED): VIOLENT REACTION.
CELLULOSE: FORMS EASILY COMBUSTIBLE ESTER.
CHLORATES: REACTS.
CHLORINE: INCOMPATIBLE.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
CHLOROBENZENE: POSSIBLE EXPLOSION.
4-CHLORO-2-NITROANILINE: FORMS EXPLOSIVE COMPOUND.

CHLOROSULFONIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
COAL: EXPLOSIVE MIXTURE.
COATINGS: MAY BE ATTACKED.
CRESOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CROTONALDEHYDE: VIOLENT DECOMPOSITION WITH IGNITION.
CUMENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CUPRIC NITRIDE: EXPLOSIVE REACTION.
CUPROUS NITRIDE: VIOLENT REACTION.
CYANATES: POSSIBLE EXPLOSIVE REACTION.
CYCLOHEXANONE: VIOLENT REACTION.
CYCLOHEXYLAMINE: FORMS EXPLOSIVE COMPOUND.
CYCLOPENTADIENE: EXPLOSIVE REACTION.
1,2-DIAMINOETHANEBIS(TRIMETHYLGOLD): EXPLOSIVE REACTION.
DIBORANE: SPONTANEOUS IGNITION.
DI-2-BUTOXYETHYL ETHER: VIOLENT DECOMPOSITION REACTION.
2,6-DI-T-BUTYL PHENOL: FORMATION OF EXPLOSIVE COMPOUND.
DICHLOROETHANE: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
DICHLOROETHYLENE: FORMS EXPLOSIVE COMPOUND.
DICHLOROMETHANE: FORMS EXPLOSIVE SOLUTION.
DICYCLOPENTADIENE: SPONTANEOUS IGNITION.
DIENES: IGNITION REACTION.
DIETHYLAMINO ETHANOL: POSSIBLE EXPLOSION.
DIETHYL ETHER: POSSIBLE EXPLOSION.
3,6-DIHYDRO-1,2,2H-OXAZINE: EXPLOSIVE INTERACTION.
DIISOPROPYL ETHER: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
DIMETHYLAMINOMETHYLFERROCENE: VIOLENT DECOMPOSITION IF HEATED.
DIMETHYL ETHER: FORMS EXPLOSIVE COMPOUND.
DIMETHYL HYDRAZINE: IGNITES ON CONTACT.
DIMETHYL SULFOXIDE + 1,4-DIOXANE: EXPLOSION.
DIMETHYL SULFOXIDE + <14% WATER: EXPLOSIVE REACTION.
DINITROBENZENE: EXPLOSION HAZARD.
DINITROTOLUENE: EXPLOSIVE REACTION.
DIOXANE + PERCHLORIC ACID: POSSIBLE EXPLOSION.
DIPHENYL DISTIBENE: EXPLOSIVE OXIDATION.
DIPHENYL MERCURY + CARBON DISULFIDE: VIOLENT REACTION.
DIPHENYL TIN: IGNITION REACTION.
DISODIUM PHENYL ORTHOPHOSPHATE: VIOLENT EXPLOSION.
DIVINYL ETHER: POSSIBLE IGNITION REACTION.
EPICHLOROHYDRIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHANESULFONAMIDE: EXPLOSIVE REACTION.
ETHOXY-ETHYLENE DITHIOPHOSPHATE: IGNITION ON CONTACT.
N-ETHYL ANILINE: IGNITION REACTION.
ETHYLENE DIAMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHYLENE GLYCOL: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
ETHYLENEIMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
5-ETHYL-2-METHYL PYRIDINE: EXPLOSIVE REACTION.
ETHYL PHOSPHINE: IGNITION REACTION.
5-ETHYL-2-PICOLINE: FORMS EXPLOSIVE COMPOUNDS.
FERROUS OXIDE (POWDERED): INTENSE EXOTHERMIC REACTION.
FLUORINE: POSSIBLE EXPLOSIVE REACTION.
FORMIC ACID: EXOTHERMIC REACTION WITH RELEASE OF TOXIC GASES.
2-FORMYLAMINO-1-PHENYL-1,3-PROPANEDIOL: POSSIBLE EXPLOSION.
FUEL OIL (BURNING): EXPLOSION.
FULMINATES: REACTS.
FURFURYLIDENE KETONES: IGNITES ON CONTACT.
GERMANIUM: VIOLENT REACTION.
GLYCEROL: POSSIBLE EXPLOSION.
GLYOXAL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.

HEXALITHIUM DISILICIDE: EXPLOSIVE REACTION.
HEXAMETHYLBENZENE: POSSIBLE EXPLOSION.
2,2,4,4,6,6-HEXAMETHYLTRITHIANE: EXPLOSIVE OXIDATION.
HEXENAL: EXPLODES ON HEATING.
HYDRAZINE: VIOLENT REACTION.
HYDRAZOIC ACID: ENERGETIC REACTION.
HYDROGEN IODIDE: IGNITION REACTION.
HYDROGEN PEROXIDE: FORMS UNSTABLE MIXTURE.
HYDROGEN PEROXIDE AND KETONES: FORMS EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE AND MERCURIC OXIDE: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN PEROXIDE AND THIOUREA: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN SELENIDE: IGNITION REACTION.
HYDROGEN SULFIDE: INCANDESCENT REACTION.
HYDROGEN TELLURIDE: IGNITION AND POSSIBLE EXPLOSIVE REACTION.
INDANE AND SULFURIC ACID: EXPLOSIVE REACTION.
ISOPRENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
KETONES (CYCLIC): VIOLENT REACTION.
LACTIC ACID + HYDROFLUORIC ACID: EXPLOSIVE REACTION.
LITHIUM: IGNITION REACTION.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MAGNESIUM: EXPLOSIVE REACTION.
MAGNESIUM + 2-NITROANILINE: MAY IGNITE ON CONTACT.
MAGNESIUM PHOSPHIDE: INCANDESCENT REACTION.
MAGNESIUM SILICIDE: VIOLENT REACTION.
MAGNESIUM-TITANIUM ALLOY: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
MANGANESE (POWDERED): INCANDESCENCE AND POSSIBLE EXPLOSION.
MESITYL OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
MESITYLENE: POSSIBLE EXPLOSIVE REACTION.
METALS: VIOLENT REACTION WITH EXPLOSION OR IGNITION.
METAL ACETYLIDES: VIOLENT OR EXPLOSIVE REACTION.
METAL CARBIDES: VIOLENT OR EXPLOSIVE REACTION.
METAL CYANIDES: EXPLOSIVE REACTIONS.
METAL FERRICYANIDE OR FERROCYANIDE: VIOLENT REACTION.
METAL SALICYLATES: FORMS EXPLOSIVE COMPOUNDS.
METAL THIOCYANATES: POSSIBLE EXPLOSION.
2-METHYLBENZIMIDAZOLE + SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
4-METHYLCYCLOHEXANONE: EXPLOSIVE REACTION.
2-METHYL-5-ETHYLPYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
METHYL THIOPHENE: IGNITION REACTION.
NEODYMIUM PHOSPHIDE: VIOLENT REACTION.
NICKEL TETRAPHOSPHIDE: IGNITION REACTION.
NITRO AROMATIC HYDROCARBONS: FORMS HIGHLY EXPLOSIVE PRODUCTS.
NITROBENZENE: EXPLOSIVE REACTION, ESPECIALLY IN THE PRESENCE OF WATER.
NITROMETHANE: EXPLOSIVE REACTION.
NITRONAPHTHALENE: EXPLOSION HAZARD.
NON-METAL OXIDES : EXPLOSIVE REACTION.
OLEUM: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ORGANIC MATERIALS: FIRE AND EXPLOSION HAZARD.
ORGANIC SUBSTANCES AND PERCHLORATES: POSSIBLE EXPLOSION.
ORGANIC SUBSTANCES AND SULFURIC ACID: POSSIBLE EXPLOSION.
PHENYL ACETYLENE + 1,1-DIMETHYLHYDRAZINE: VIOLENT REACTION.
PHENYL ORTHOPHOSPHORIC ACID DISODIUM SALT: FORMS EXPLOSIVE PRODUCTS.
PHOSPHINE + OXYGEN: SPONTANEOUS IGNITION.
PHOSPHONIUM IODIDE: IGNITION REACTION.
PHOSPHORUS (VAPOR): IGNITES WHEN HEATED.
PHOSPHOROUS HALIDES: IGNITION REACTION.
PHOSPHORUS TETRAIODIDE: VIGOROUS REACTION.

PHOSPHORUS TRICHLORIDE: EXPLOSIVE REACTION.
PHTHALIC ACID AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
PHTHALIC ANHYDRIDE: EXOTHERMIC REACTION AND FORMS EXPLOSIVE PRODUCTS.
PICRATES: REACTS.
PLASTICS: MAY BE ATTACKED.
POLYALKENES: INTENSE REACTION.
POLYDIBROMOSILANES: EXPLOSIVE REACTION.
POLY(ETHYLENE OXIDE) DERIVATIVES: POSSIBLE EXPLOSION.
POLYPROPYLENE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.
POLY(SILYLENE): IGNITION.
POLYURETHANE (FOAM): VIGOROUS REACTION.
POTASSIUM HYPOPHOSPHITE: EXPLOSIVE REACTION.
POTASSIUM PHOSPHINATE: EXPLODES ON EVAPORATION.
B-PROPIOLACTONE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PROPIOPHENONE + SULFURIC ACID: EXOTHERMIC REACTION ABOVE -5 C.
PROPYLENE GLYCOL + HYDROFLUORIC ACID + SILVER NITRATE: EXPLOSIVE MIXTURE.
PROPYLENE OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PYROCATECHOL: IGNITES ON CONTACT.
REDUCING AGENTS: POSSIBLE EXPLOSIVE OR IGNITION REACTION.
RESORCINOL: POSSIBLE EXPLOSION.
RUBBER: VIGOROUS REACTION, POSSIBLE EXPLOSION.
SELENIUM: VIGOROUS REACTION.
SELENIUM HALIDE: IGNITION OR INCANDESCENT REACTION.
SELENIUM IODOPHOSPHIDE: EXPLOSIVE REACTION.
SILICON: VIOLENT REACTION.
SILICONE OIL: POSSIBLE EXPLOSION.
SILVER BUTEN-3-YNIDE: EXPLOSION.
SODIUM: SPONTANEOUS IGNITION.
SODIUM AZIDE: EXOTHERMIC REACTION.
SODIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.
STIBINE: EXPLOSIVE REACTION.
SUCROSE (SOLID): VIGOROUS REACTION.
SULFAMIC ACID: VIOLENT REACTION WITH EVOLUTION OF TOXIC NITROUS OXIDE.
SULFIDES: REACTS.
SULFUR DIOXIDE: EXPLOSIVE REACTION.
SULFUR HALIDES: VIOLENT REACTION.
SULFURIC ACID + GLYCERIDES: EXPLOSIVE REACTION.
SULFURIC ACID + TEREPHTHALIC ACID: VIOLENT REACTION.
SURFACTANTS + PHOSPHORIC ACID: EXPLOSION HAZARD.
TERPENES: SPONTANEOUS IGNITION.
TETRABORANE: EXPLOSIVE REACTION.
TETRABORANE DECAHYDRIDE: EXPLOSIVE REACTION.
TETRAPHOSPHORUS DIIODOTRISELENIDE: EXPLOSIVE REACTION.
TETRAPHOSPHORUS IODIDE: IGNITES ON CONTACT.
TETRAPHOSPHORUS TETRAOXIDE TRISULFIDE: VIOLENT REACTION.
THIOALDEHYDES: VIOLENT REACTION.
THIOKETONES: VIOLENT REACTION.
THIOPHENES: EXPLOSIVE REACTION.
TITANIUM: FORMS SHOCK-SENSITIVE COMPOUND.
TITANIUM ALLOYS: POSSIBLE EXPLOSIVE REACTION.
TITANIUM-MAGNESIUM ALLOY: POSSIBLE EXPLOSION ON IMPACT.
TOLUENE: VIOLENT REACTION.
TOLUIDENE: IGNITION REACTION.
1,3,5-TRIACETYLHEXAHYDRO-1,3,5-TRIAZINE + TRIFLUOROACETIC ANHYDRIDE: EXPLOSIVE REACTION.
TRIAZINE: VIOLENTLY EXPLOSIVE REACTION.
TRICADMIUM DIPHOSPHIDE: EXPLOSIVE REACTION.

TRIETHYLGALLIUM MONOETHYL ETHER COMPLEX: IGNITION REACTION.
TRIMETHYLTRIOXANE: INTENSE REACTION.
TRIS(IODOMERCURI)PHOSPHINE: VIOLENT DECOMPOSITION.
TRITHIOACETONE: EXPLOSIVE REACTION.
TURPENTINE: EXPLOSIVE MIXTURE.
UNSYMMETRICAL DIMETHYL HYDRAZINE: SPONTANEOUS IGNITION.
URANIUM: EXPLOSIVE REACTION.
URANIUM ALLOY: VIOLENT REACTION.
URANIUM DISULFIDE: VIOLENT REACTION.
URANIUM-NEODYMIUM ALLOYS: EXPLOSIVE REACTION.
VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
VINYLIDENE CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
WOOD: POSSIBLE IGNITION.
P-XYLENE: INTENSE REACTION IN PRESENCE OF SULFURIC ACID.
ZINC: INCANDESCENT REACTION.
ZINC ETHOXIDE: POSSIBLE EXPLOSION.
ZIRCONIUM-URANIUM ALLOYS: EXPLOSIVE REACTION.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF NITROGEN.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

PROTECT AGAINST PHYSICAL DAMAGE. SEPARATE FROM METALLIC POWDERS, CARBIDES, HYDROGEN SULFIDE, TURPENTINE, ORGANIC ACIDS, AND ALL COMBUSTIBLE, ORGANIC OR OTHER READILY OXIDIZABLE MATERIALS. PROVIDE GOOD VENTILATION AND AVOID DIRECT SUNLIGHT (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD PLANNING QUANTITY (TPQ):
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D002.
100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

CONDITIONS TO AVOID

NOT IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). REACTS VIOLENTLY WITH WATER AND FUELS. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

CONSULT NFPA PUBLICATION 43A, STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS, FOR STORAGE REQUIREMENTS.

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT AND LATER DISPOSAL.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DO NOT GET WATER INSIDE CONTAINER. FOR SMALL SPILLS, FLUSH AREA WITH FLOODING AMOUNTS OF WATER. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROCESS ENCLOSURE RECOMMENDED TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND

BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

NITRIC ACID:

50 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS-FLOW MODE.

100 PPM- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED CANISTER PROVIDING PROTECTION AGAINST NITRIC ACID.*
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND CARTRIDGE(S) PROVIDING PROTECTION AGAINST NITRIC ACID.*

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED CANISTER PROVIDING PROTECTION AGAINST NITRIC ACID.*
ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

* ONLY NONOXIDIZABLE SORBENTS ARE ALLOWED (NOT CHARCOAL).

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

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MATERIAL SAFETY DATA SHEETS
METHANOL

METHANOL
METHANOL
METHANOL

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 67-56-1

SUBSTANCE: **METHANOL**

TRADE NAMES/SYNONYMS:
METHYL ALCOHOL; WOOD ALCOHOL; METHYL HYDROXIDE; CARBINOL; MONOHYDROXYMETHANE; WOOD SPIRIT; WOOD NAPHTHA; METHYLOL; COLONIAL SPIRIT; COLUMBIAN SPIRIT; PYROXYLIC SPIRIT; COULOMATIC (R) CONDITIONER SOLUTION; STANDARD WATER IN METHANOL; STCC 4909230; UN 1230; RCRA U154; A454; A452; A936; A408; A947; A935; BP1105; A412; A411; A433P; SW2;; SC95; A152SK; A408SK; A412P; A434; A412SK; A450; A433S; CH40;

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: C-H3-O-H

MOLECULAR WEIGHT: 32.04

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: METHYL ALCOHOL (METHANOL) PERCENT: 100
CAS# 67-56-1

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
METHYL ALCOHOL (METHANOL):
200 PPM (262 MG/M3) OSHA TWA (SKIN); 250 PPM (328 MG/M3) OSHA STEL
200 PPM (262 MG/M3) ACGIH TWA (SKIN); 250 PPM (328 MG/M3) ACGIH STEL
200 PPM (262 MG/M3) NIOSH RECOMMENDED TWA (SKIN);
250 PPM (328 MG/M3) NIOSH RECOMMENDED STEL
200 PPM (262 MG/M3) DFG MAK TWA (SKIN);
400 PPM (524 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: SILICA GEL TUBE; WATER; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 2000, METHANOL).

5000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS LIQUID WITH A CHARACTERISTIC ALCOHOLIC ODOR.

BOILING POINT: 149 F (65 C) MELTING POINT: -137 F (-94 C)

SPECIFIC GRAVITY: 0.7914 VAPOR PRESSURE: 97.25 MMHG @ 20 C

EVAPORATION RATE: (BUTYL ACETATE=1) 4.6 SOLUBILITY IN WATER: VERY SOLUBLE

ODOR THRESHOLD: 100 PPM VAPOR DENSITY: 1.11

SOLVENT SOLUBILITY: ETHER, BENZENE, ALCOHOL, ACETONE, CHLOROFORM; ETHANOL.

VISCOSITY: 0.59 CPS @ 20 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT, FLAME, OR OXIDIZERS.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FLASH POINT: 52 F (11 C) (CC) UPPER EXPLOSIVE LIMIT: 36.0%

LOWER EXPLOSIVE LIMIT: 6.0% AUTOIGNITION TEMP.: 725 F (385 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 28).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991; HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
METHYL ALCOHOL-UN 1230

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID, POISON

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.243

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 1 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

METHYL ALCOHOL (METHANOL):
IRRITATION DATA: 20 MG/24 HOURS SKIN-RABBIT MODERATE; 40 MG EYE-RABBIT MODERATE; 100 MG/24 HOURS EYE-RABBIT MODERATE.
TOXICITY DATA: 86,000 MG/M3 INHALATION-HUMAN TCLO; 300 PPM INHALATION-HUMAN TCLO; 64,000 PPM/4 HOURS INHALATION-RAT LC50; 1000 PPM INHALATION-MONKEY LCLO; 50 GM/M3/2 HOURS INHALATION-MOUSE LCLO; 44,000 MG/M3/6 HOURS INHALATION-CAT LCLO; 15,800 MG/KG SKIN-RABBIT LD50; 393 MG/KG SKIN-MONKEY LDLO; 428 MG/KG ORAL-HUMAN LDLO; 143 MG/KG ORAL-HUMAN LDLO; 6422 MG/KG ORAL-MAN LDLO; 3429 MG/KG ORAL-MAN TDLO; 4 GM/KG ORAL-WOMAN TDLO; 7 GM/KG ORAL-MONKEY LD50; 5628 MG/KG ORAL-RAT LD50; 7300 MG/KG ORAL-MOUSE LD50;

14,200 MG/KG ORAL-RABBIT LD50; 7500 MG/KG ORAL-DOG LDLO; 9800 MG/KG SUBCUTANEOUS-MOUSE LD50; 2131 MG/KG INTRAVENOUS-RAT LD50; 4710 MG/KG INTRAVENOUS-MOUSE LD50; 8907 MG/KG INTRAVENOUS-RABBIT LD50; 4641 MG/KG INTRAVENOUS-CAT LDLO; 7529 MG/KG INTRAPERITONEAL-RAT LD50; 10,765 MG/KG INTRAPERITONEAL-MOUSE LD50; 1826 MG/KG INTRAPERITONEAL-RABBIT LD50; 3556 MG/KG INTRAPERITONEAL-GUINEA PIG LD50; 8555 MG/KG INTRAPERITONEAL-HAMSTER LD50; 868 MG/KG UNREPORTED-MAN LDLO; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- SKIN, EYE.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY INHALATION, DERMAL ABSORPTION, INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; NEUROTOXIN.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH KIDNEY, EYE OR SKIN DISORDERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN. 25,000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- MAY CAUSE IRRITATION OF THE MUCOUS MEMBRANES, COUGHING, OPPRESSION IN THE CHEST, TRACHEITIS, BRONCHITIS, TINNITUS, UNSTEADY GAIT, TWITCHING, COLIC, CONSTIPATION, NYSTAGMUS, AND BLEPHAROSPASM. SYMPTOMS FROM OCCUPATIONAL EXPOSURE INCLUDE PARESTHESIAS, NUMBNESS AND SHOOTING PAINS IN THE HANDS AND FOREARMS. METABOLIC ACIDOSIS, AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM MAY OCCUR AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE EFFECTS AS IN ACUTE INGESTION. REPEATED EXPOSURE TO 200-375 PPM CAUSED RECURRENT HEADACHES IN WORKERS. EXPOSURE FOR 4 YEARS TO 1200-8000 PPM RESULTED IN MARKED DIMINUTION OF VISION AND ENLARGEMENT OF THE LIVER IN A WORKMAN. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
METHYL ALCOHOL (METHANOL):
IRRITANT/NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- CONTACT WITH LIQUID MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR AND CAUSE METABOLIC ACIDOSIS AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH THE LIQUID MAY CAUSE DEFATTING OF THE SKIN RESULTING IN ERYTHEMA, SCALING, AND ECZEMATOID DERMATITIS. CHRONIC ABSORPTION MAY RESULT METABOLIC ACIDOSIS AND EFFECTS AS DETAILED IN ACUTE INGESTION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
METHYL ALCOHOL (METHANOL):
IRRITANT.

ACUTE EXPOSURE- VAPORS MAY CAUSE IRRITATION. HIGH CONCENTRATIONS HAVE BEEN REPORTED TO CAUSE VIOLENT INFLAMMATION OF THE CONJUNCTIVA AND EPITHELIAL DEFECTS ON THE CORNEA. MILD IRRITATION MAY OCCUR WITH DILUTE SOLUTIONS; THE UNDILUTED LIQUID HAS PRODUCED MODERATE CORNEAL OPACITY AND CONJUNCTIVAL REDNESS IN RABBITS. APPLICATION OF A DROP OF METHANOL IN RABBIT EYES CAUSED A MILD REVERSIBLE REACTION, GRADED 3 ON A SCALE OF 1-10 AFTER 24 HOURS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- MAY CAUSE MILD AND TRANSIENT INEBRIATION AND SUBSEQUENT DROWSINESS FOLLOWED BY AN ASYMPTOMATIC PERIOD LASTING 8-48 HOURS. FOLLOWING THE DELAY, COUGHING, DYSPNEA, HEADACHE, DULLNESS, WEAKNESS, VERTIGO OR DIZZINESS, NAUSEA, VOMITING, OCCASIONAL DIARRHEA, ANOREXIA, VIOLENT PAIN IN THE BACK, ABDOMEN, AND EXTREMITIES, RESTLESSNESS, APATHY OR DELIUIUM, AND RARELY, EXCITEMENT AND MANIA MAY OCCUR. RAPID, SHALLOW RESPIRATION DUE TO METABOLIC ACIDOSIS, COLD AND CLAMMY SKIN, HYPOTENSION, CYANOSIS, OPISTHOTONOS, CONVULSIONS, MILD TACHYCARDIA, CARDIAC DEPRESSION, PERIPHERAL NEURITIS, CEREBRAL AND PULMONARY EDEMA, UNCONSCIOUSNESS, AND COMA ARE POSSIBLE. EFFECTS ON THE EYE MAY INCLUDE OPTIC NEURITIS, BLURRED OR DIMMED VISION, DILATED, UNRESPONSIVE PUPILS, PTOSIS, EYE PAIN, CONCENTRIC CONSTRICTION OF VISUAL FIELDS, DIPLOPIA, CHANGE IN COLOR PERCEPTION, PHOTOPHOBIA, AND OPTIC NERVE ATROPHY. PARTIAL BLINDNESS OR POSSIBLY DELAYED TRANSIENT OR PERMANENT BLINDNESS MAY OCCUR. BILATERAL SENSORINEURAL DEAFNESS HAS BEEN REPORTED IN A SINGLE CASE. LIVER, KIDNEY, HEART, STOMACH, INTESTINAL AND PANCREATIC DAMAGE MAY ALSO OCCUR. DEATH MAY BE DUE TO RESPIRATORY FAILURE OR RARELY FROM CIRCULATORY COLLAPSE. AS LITTLE AS 15 ML HAS CAUSED BLINDNESS; THE USUAL FATAL DOSE IS 60-240 ML. PROLONGED ASTHENIA AND IRREVERSIBLE EFFECTS ON THE NERVOUS SYSTEM INCLUDING DIFFICULTY IN SPEECH, MOTOR DYSFUNCTION WITH RIGIDITY, SPASTICITY, AND HYPOKINESIS HAVE BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED INGESTION MAY CAUSE VISUAL IMPAIRMENT AND BLINDNESS AND OTHER SYSTEMIC EFFECTS AS DETAILED IN ACUTE INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- IF INGESTION OF METHANOL IS DISCOVERED WITHIN 2 HOURS, GIVE SYRUP OF IPECAC. LAVAGE THOROUGHLY WITH 2-4 L OF TAP WATER WITH SODIUM BICARBONATE (20 G/L) ADDED. GET MEDICAL ATTENTION IMMEDIATELY. LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ANTIDOTE:
THE FOLLOWING ANTIDOTE(S) HAVE BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

METHANOL POISONING:
GIVE ETHANOL, 50% (100 PROOF), 1.5 ML/KG ORALLY INITIALLY, DILUTED TO NOT MORE THAN 5% SOLUTION, FOLLOWED BY 0.15-1.0 ML/KG EVERY 2 HOURS ORALLY OR INTRAVENOUSLY FOR 4 DAYS IN ORDER TO REDUCE METABOLISM OF METHANOL AND TO ALLOW TIME FOR ITS EXCRETION. BLOOD ETHANOL LEVEL SHOULD BE IN THE RANGE OF

1-1.5 MG/ML (DREISBACH, HANDBOOK OF POISONING; 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

ORAL OR INTRAVENOUS ADMINISTRATION OF 4-METHYLPYRAZOLE INHIBITS ALCOHOL DEHYDROGENASE AND HAS BEEN USED EFFECTIVELY AS AN ANTIDOTE FOR METHANOL OR ETHYLENE GLYCOL POISONING (ELLENHORN AND BARCELOUX, MEDICAL TOXICOLOGY).

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
METHYL ALCOHOL (METHANOL):
- ACETYL BROMIDE: VIOLENT REACTION WITH FORMATION OF HYDROGEN BROMIDE.
- ALKYLALUMINUM SOLUTIONS: VIOLENT REACTION.
- ALUMINUM: CORRODES.
- BARIUM PERCHLORATE: DISTILLATION YIELDS HIGHLY EXPLOSIVE ALKYL PERCHLORATE.
- BERYLLIUM HYDRIDE: VIOLENT REACTION, EVEN AT -196 C.
- BROMINE: VIGOROUSLY EXOTHERMIC REACTION.
- CALCIUM CARBIDE: VIOLENT REACTION.
- CHLORINE: POSSIBLE IGNITION AND EXPLOSION HAZARD.
- CHLOROFORM AND SODIUM HYDROXIDE: EXPLOSIVE REACTION.
- CHROMIUM TRIOXIDE (CHROMIC ANHYDRIDE): POSSIBLE IGNITION.
- CYANURIC CHLORIDE: VIOLENT REACTION.
- DICHLOROMETHANE: POSSIBLE IGNITION AND EXPLOSION.
- DIETHYL ZINC: POSSIBLE IGNITION AND EXPLOSION.
- HYDROGEN PEROXIDE + WATER: EXPLOSION HAZARD.
- IODINE + ETHANOL + MERCURIC OXIDE: EXPLOSION HAZARD.
- LEAD: CORRODES.
- LEAD PERCHLORATE: EXPLOSION HAZARD.
- MAGNESIUM: VIOLENT REACTION.
- MAGNESIUM (POWDERED): MIXTURES ARE CAPABLE OF DETONATION.
- METALS: INCOMPATIBLE.
- NICKEL: POSSIBLE IGNITION IN THE PRESENCE OF NICKEL CATALYST.
- NITRIC ACID (CONCENTRATED): MIXTURES OF GREATER THAN 25% ACID MAY DECOMPOSE VIOLENTLY.
- OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
- PERCHLORIC ACID: EXPLOSION HAZARD.
- PHOSPHOROUS TRIOXIDE: POSSIBLE VIOLENT REACTION AND IGNITION.
- PLASTICS, RUBBER, COATINGS: MAY BE ATTACKED.
- POTASSIUM: POSSIBLE DANGEROUS REACTION.
- POTASSIUM HYDROXIDE + CHLOROFORM: EXOTHERMIC REACTION.
- POTASSIUM TERT-BUTOXIDE: FIRE AND EXPLOSION HAZARD.
- SODIUM + CHLOROFORM: POSSIBLE EXPLOSION.
- SODIUM HYPOCHLORITE: EXPLOSION HAZARD.
- SODIUM METHOXIDE + CHLOROFORM: VIOLENT REACTION.
- SULFURIC ACID: FIRE AND EXPLOSION HAZARD.
- ZINC: EXPLOSION HAZARD.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER U154.

****

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES OR OTHER IGNITION SOURCES. VAPORS MAY BE EXPLOSIVE. MATERIAL IS POISONOUS; AVOID INHALATION OF VAPORS OR CONTACT WITH SKIN. DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES.

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN VAPORS.

WATER SPILL:
ALLOW SPILLED MATERIAL TO AERATE.

LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 5000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES

THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

METHYL ALCOHOL (METHANOL):

2000 PPM- ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

5000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS-FLOW MODE.

10,000 PPM- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A TIGHT-FITTING FACEPIECE AND IS OPERATED IN A CONTINUOUS-FLOW MODE.

25,000 PPM- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS

SUBSTANCE.

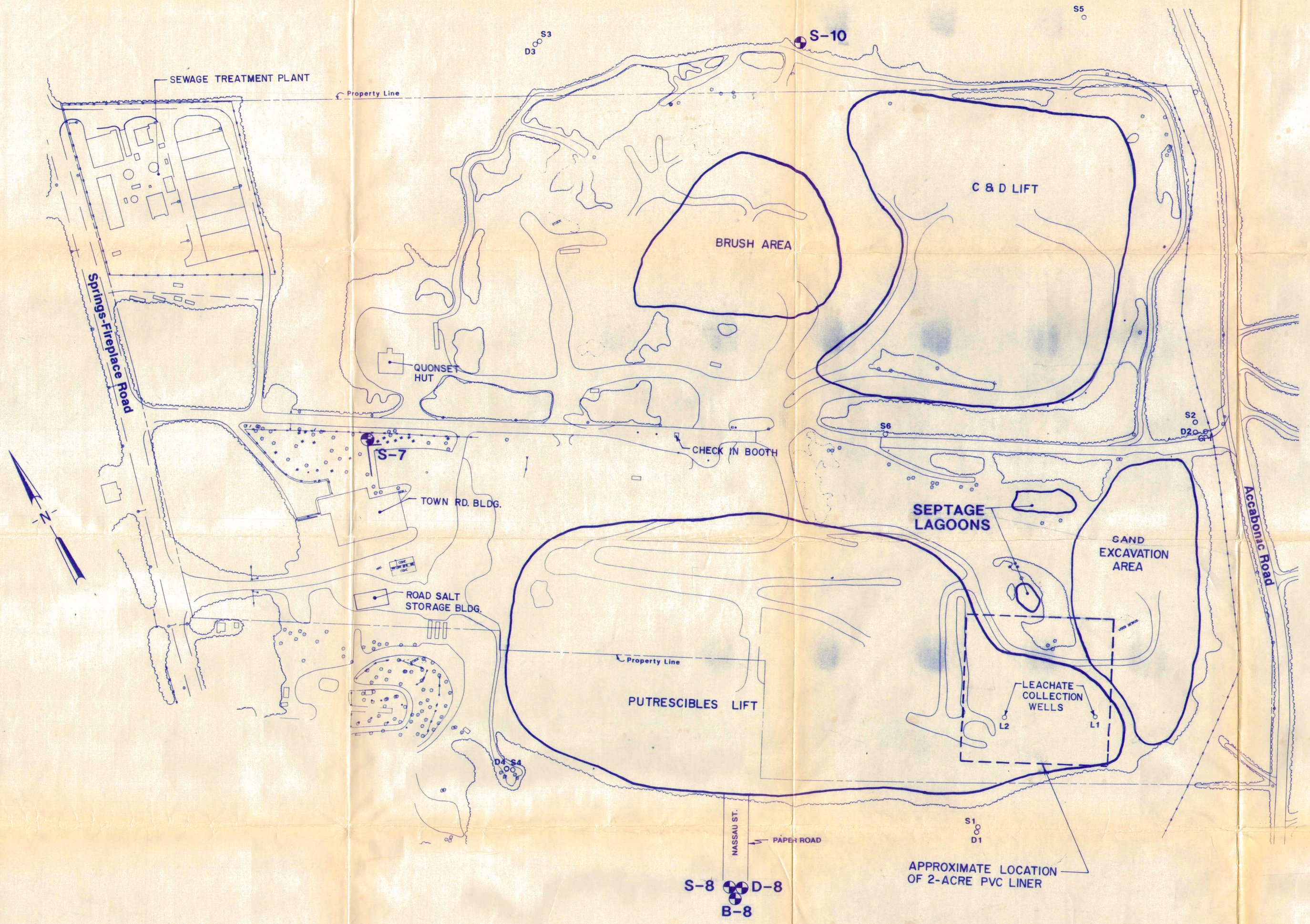
EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 09/25/84 REVISION DATE: 02/25/92

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LANDFILL WELL SURVEY RESULTS

MONITORING WELL	COORDINATE			
	NORTHING	EASTING		
			CONC SLAB (TOP INSIDE LIP)	
L1	281852.7	2505967.2	76.80	
			CONC DOME (TOP NORTH SIDE)	
L2	281937.9	2505805.1	106.61	

NOTES: 1. MONITORING WELL COORDINATES SHOWN ARE IN THE ASSUMED GRID SYSTEM COMPATIBLE WITH GRID SHOWN ON PHOTOGRAMMETRIC TOPOGRAPHY DATED DECEMBER 14, 1989.

MONITORING WELL	COORDINATE		ELEVATION		
	NORTHING	EASTING	GROUND	TOP OF CASTING	TOP OF 6" PVC
D1	281754.9	2505647.9	69.85	72.67	72.37
S1	281763.1	2505655.5	70.10	72.95	72.72
D2	282274.6	2506419.7	85.75	88.46	88.29
S2	282289.6	2506429.1	86.15	88.65	88.46
D3	283608.9	2505603.4	106.40	109.02	108.85
S3	283609.9	2505614.1	106.40	109.21	108.98
D4	282317.5	2504862.5	74.80	77.63	77.35
S4	282311.6	2504871.8	74.90	77.48	77.30
S5	283127.7	2506616.6	81.90	84.75	84.48
S6	282569.4	2505861.9	84.20	86.98	86.78

LEGEND:
L = LEACHATE MANHOLE
B, S, D, W = GROUNDWATER WELL
EXISTING GROUNDWATER MONITORING WELL
PROPOSED GROUNDWATER MONITORING WELL

NOTE: BASE MAP DRAWN BY LOUIS K. McLEAN ASSOCIATES, P.C. CONSULTING ENGINEERS

PLATE 1

REVISED: 3/18/93

EXISTING & PROPOSED GROUNDWATER MONITORING WELL LOCATIONS

SPRINGS-FIREPLACE ROAD LANDFILL
MAP Y 01-0123 (BOOK Box)
EAST HAMPTON, N.Y.

Fanning, Phillips & Molnar
Engineers
Ronkonkoma New York

Drawn By: JDS
Scale: 1"=100'
Date: 4/16/91
Drawing No:
Sheet ___ Of ___

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