File YE4C
Gaetano
VCA

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 6
Dulles State Office Building, 317 Washington Street, Watertown, New York 13601-3787
Phone: (315) 785-2513 • FAX: (315) 785-2422
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

FACSIMILE

TO: John Sulkowsi - 781-337-7642

FROM: Peter S. Ouderkirk 315-785-2422 (fax), 785-2513 (work)

SUBJ: Semi-volatile Organic Cleanup goals

DATE: Thursday, April 3, 2003

PAGES: 3

John:

Thanks for the help - attached are our soil cleanup goals. We use the column b which I have circled for our cleanup goals.

If I can answer any questions, please feel free to contact me.

Peter

New York State Department of Environmental Conservation

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4046

DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

TO: Regional Haz. Waste Remediation Engineers, Bureau Directors, and Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM: DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

DATE: JAN 24, 1994

Michael J. O'Toole, Jr. (signed)

Appendix A - Recommended Soil Cleanup Objectives | Appendix B - Total Organic Carbon (TOC)
Table 1 - Volatile Organic Contaminants
Table 2 - Semi-Volatile Organic Contaminants
Table 3 - Organic Pesticides / Herbicides and PCBs
Table 4 - Heavy Metals

The cleanup goal of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. INTRODUCTION:

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment ofthese generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. Project Managers should use these cleanup objectives in selecting alternatives in the Feasibility Study (FS). Based on the proposed selected remedial technology (outcome of FS), final site specific soil cleanup levels are established in the Record of Decision (ROD) for these sites.

It should be noted that even after soil cleanup levels are established in the ROD, these levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. BASIS FOR SOIL CLEANUP OBJECTIVES:

The following alternative bases are used to determine soil cleanup objectives:

a. Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

b. Human health based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

c. Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;

d. Background values for contaminants; and

e. Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

3. DETERMINATION OF SOIL CLEANUP GOALS FOR ORGANICS IN SOIL FOR PROTECTION OF WATER QUALITY

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

PART A: PARTITION THEORY MODEL

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration Cs = f x Koc x Cw . . . . (1)

Where: f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be estimated by the following equation:

$$\log \text{Koc} = 3.64 - 0.55 \log S$$

S = water solubility in ppm
Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual should be used for the purpose. If the Koc value for a contaminant is not listed, it should be estimated using the above mentioned equation.

PART B: PROCEDURE FOR DETERMINATION OF SOIL CLEANUP OBJECTIVES

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1. Total VOCs $\leq$ 10 ppm.
2. Total Semi VOCs $\leq$ 500 ppm.
3. Individual Semi VOCs $\leq$ 50 ppm.
4. Total Pesticides $\leq$ 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. DETERMINATION OF FINAL CLEANUP LEVELS:

Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the preferred remedial action must be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

TAGM 4046 Footnotes:

1. Class A are proved human carcinogens
2. Class B are probable human carcinogens
3. Class C are possible human carcinogens

APPENDIX A

TABLE 1
Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin-ogens	Systemic Toxicants		
Acetone	2.2	50	0.0011	0.11	N/A	8,000	10	0.2
Benzene	83	0.7	0.0006	0.06	24	N/A	5	0.06
Benzoic Acid	54 *	50	0.027	2.7	N/A	300,000	5	2.7
2-Butanone	4.5 *	50	0.003	0.3	N/A	4,000	10	0.3
Carbon Disulfide	54 *	50	0.027	2.7	N/A	8,000	5	2.7
Carbon Tetrachloride	110 *	5	0.006	0.6	5.4	60	5	0.6
Chlorobenzene	330	5	0.017	1.7	N/A	2,000	5	1.7
Chloroethane	37 *	50	0.019	1.9	N/A	N/A	10	1.9
Chloroform	31	7	0.003	0.30	114	800	5	0.3
Dibromochloromethane	N/A	50	N/A	N/A	N/A	N/A	5	N/A
1,2-Dichlorobenzene	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	310 *	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,1-Dichloroethane	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1-Dichloroethene	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene (trans)	59	5	0.003	0.3	N/A	2,000	5	0.3
1-3 dichloropropane	51	5	0.003	0.3	N/A	N/A	5	0.3
Ethylbenzene	1,100	5	0.055	5.5	N/A	8,000	5	5.5
113 Freon (1,1,2 Trichloro-1,2,2 Trifluoroethane)	1,230 *	5	0.060	6.0	N/A	200,000	5	6.0
Methylene chloride	21	5	0.001	0.1	93	5,000	5	0.1
4-Methyl-2-Pentanone	19 *	50	0.01	1.0	N/A	N/A	10	1.0

TABLE 1 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Tetrachloroethene	277	5	0.014	1.4	14	800	5	1.4
1,1,1-Trichloroethane	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	118	5	0.006	0.6	35	N/A	5	0.6
1,2,3-trichloropropane	68	5	0.0034	0.34	N/A	80	5	0.4
1,2,4-trichlorobenzene	670 *	5	0.034	3.4	N/A	N/A	330	3.4
Toluene	300	5	0.015	1.5	N/A	20,000	5	1.5
Trichloroethene	126	5	0.007	0.70	64	N/A	5	0.7
Vinyl chloride	57	2	0.0012	0.12	N/A	N/A	10	0.2
Xylenes	240	5	0.012	1.2	N/A	200,000	--	1.2

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 2
Recommended soil cleanup objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcinogens	Systemic Toxicants		
Acenaphthene	4,600	20	0.9	90.0	N/A	5,000	330	50.0 ***
Acenaphthylene	2,056 *	20	0.41	41.0	N/A	N/A	330	41.0
Aniline	13.8	5	0.001	0.1	123	N/A	330	0.1
Anthracene	14,000	50	7.00	700.0	N/A	20,000	330	50.0 ***
Benzo(a)anthracene	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.224 or MDL
Benzo (a) pyrene	5,500,000	0.002 (ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Benzo (b) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo (g,h,i) perylene	1,600,000	5	8.0	800	N/A	N/A	330	50.0 ***
Benzo (k) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
bis(2-ethylhexyl)phthalate	8,706 *	50	4.35	435.0	50	2,000	330	50.0 ***
Butylbenzylphthlate	2,430	50	1.215	122.0	N/A	20,000	330	50.0 ***
Chrysene	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
4- Chloroaniline	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL
4-Chloro-3-methylphenol	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2-Chlorophenol	15 *	50	0.008	0.8	N/A	400	330	0.8

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Dibenzofuran	1,230 *	5	0.062	6.2	N/A	N/A	330	6.2
Dibenzo(a,h)anthracene	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	380	1	0.004	0.4	N/A	200	330	0.4
2,4-Dinitrophenol	38	5	0.002	0.2	N/A	200	1,600	0.200 or MDL
2,6 Dinitrotoluene	198*	5	0.01	1.0	1.03	N/A	330	1.0
Diethylphthlate	142	50	0.071	7.1	N/A	60,000	330	7.1
Dimethylphthlate	40	50	0.020	2.0	N/A	80,000	330	2.0
Di-n-butyl phthalate	162*	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	2,346 *	50	1.2	120.0	N/A	2,000	330	50.0 ***
Fluoranthene	38,000	50	19	1900.0	N/A	3,000	330	50.0 ***
Fluorene	7,300	50	3.5	350.0	N/A	3,000	330	50.0 ***
Hexachlorobenzene	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Indeno (1,2,3-cd)pyrene	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
Isophorone	88.31 *	50	0.044	4.40	1,707	20,000	330	4.40
2-methylnaphthalene	727 *	50	0.364	36.4	N/A	N/A	330	36.4
2-Methylphenol	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	17	50	0.009	0.9	N/A	4,000	330	0.9
Naphthalene	1,300	10	0.130	13.0	N/A	300	330	13.0
Nitrobenzene	36	5	0.002	0.2	N/A	40	330	0.200 or MDL

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
2-Nitroaniline	86	5	0.0043	0.43	N/A	N/A	1,600	0.430 or MDL
2-Nitrophenol	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
4-Nitrophenol	21	5	0.001	0.1	N/A	N/A	1,600	0.100 or MDL
3-Nitroaniline	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
Pentachlorophenol	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Phenanthrene	4,365 *	50	2.20	220.0	N/A	N/A	330	50.0 ***
Phenol	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pyrene	13,295 *	50	6.65	665.0	N/A	2,000	330	50.0 ***
2,4,5-Trichlorophenol	89 *	1	0.001	0.1	N/A	8,000	330	0.1

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available
MDL is Method Detection Limit

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm., Total Semi- VOCs < 500ppm. and Individual Semi-VOCs < 50 ppm.

**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels...... EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'MAIN'.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 3
Recommended soil cleanup objectives (mg/kg or ppm)
Organic Pesticides / Herbicides and PCBs

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041
alpha- BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'- DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (< 0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0
Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10

APPENDIX A

TABLE 3
Recommended soil cleanup objectives (mg/kg or ppm) Organic Pesticides / Herbicides and PCBs

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcinogens	Systemic Toxicants		
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041
alpha- BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'- DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (< 0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0
Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10

TABLE 3 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcinogens	Systemic Toxicants		
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - BHC (Lindane)	1,080	ND (<0.05)	0.0006	0.06	5.4	20	8	0.06
gamma - chlordane	140,000	0.1	0.14	14.0	0.54	5	80	0.54
Heptachlor	12,000	ND (<0.01)	0.0010	0.1	0.16	40	8	0.10
Heptachlor epoxide	220	ND (<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Methoxychlor	25,637	35.0	9.0	900	N/A	400	80	***
Mitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parathion	760	1.5	0.012	1.2	N/A	500	8	1.2
PCBs	17,510 *	0.1	0.1	10.0	1.0	N/A	160	1.0 (Surface) 10 (sub-surf)
Polychlorinated dibenzo-furans (PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silvex	2,600	0.26	0.007	0.7	N/A	600	330	0.7
2,4,5-T	53	35	0.019	1.9	N/A	200	330	1.9

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB Guidance Document), and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 4
Recommended soil cleanup objectives (mg/kg or ppm)
Heavy Metals

Contaminants	Protect Water Quality (ppm)	Eastern USA Background (ppm)	* CRDL (mg/kg or ppm)	***** Rec. Soil Cleanup Objective (ppm)
Aluminum	N/A	33,000	2.0	SB
Antimony	N/A	N/A	0.6	SB
Arsenic	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	15-600	2.0	300 or SB
Beryllium	N/A	0-1.75	0.05	0.16 (HEAST) or SB
Cadmium	N/A	0.1-1	0.05	1 or SB
Calcium	N/A	130 - 35,000 ***	50.0	SB
Chromium	N/A	1.5 - 40 **	0.1	10 or SB
Cobalt	N/A	2.5 - 60 **	0.5	30 or SB
Copper	N/A	1 - 50	0.25	25 or SB
Cyanide	N/A	N/A	0.1	***
Iron	N/A	2,000 - 550,000	1.0	2,000 or SB
Lead	N/A	****	0.03	SB ****
Magnesium	N/A	100 - 5,000	50.0	SB
Manganese	N/A	50 - 5,000	0.15	SB
Mercury	N/A	0.001 - 0.2	0.002	0.1
Nickel	N/A	0.5 -25	0.4	13 or SB
Potassium	N/A	8,500 - 43,000 **	50.0	SB
Selenium	N/A	0.1 - 3.9	0.05	2 or SB
Silver	N/A	N/A	0.1	SB
Sodium	N/A	6,000 - 8,000	50.0	SB
Thallium	N/A	N/A	0.1	SB
Vanadium	N/A	1-300	0.5	150 or SB
Zinc	N/A	9-50	0.2	20 or SB

Note: Some forms of metal salts such as Aluminum Phosphide, Calcium Cyanide, Potassium Cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

SB is site background
N/A is not available

* CRDL is contract required detection limit which is approx. 10 times the CRDL for water.

** New York State background

*** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

**** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

***** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

APPENDIX B

Conventional Sediment Variables
Total Organic Carbon (TOC)
March 1986

TOTAL ORGANIC CARBON (TOC)

USE AND LIMITATIONS

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

FIELD PROCEDURES

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples.

LABORATORY PROCEDURES

Analytical Procedures

- Equipment
  - Induction furnace
    e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106
  - Analytical balance
    0.1 mg accuracy
  - Desiccator
  - Combustion boats
  - 10 percent hydrochloric acid (HCL)
  - Cupric oxide fines (or equivalent material)
  - Benzoic acid or other carbon source as a standard.

- Equipment preparation

  - Clean combustion boats by placing them in the induction furnace at 950° C. After being cleaned, combustion boats should not be touched with bare hands.
  - Cool boats to room temperature in a desiccator.
  - Weigh each boat to the nearest 0.1 mg.

- Sample preparation
  - Allow frozen samples to warm to room temperature.
  - Homogenize each sample mechanically, incorporating any overlying water.
  - Transfer a representative aliquot (5-10 g) to a clean container.

- Analytical procedures
  - Dry samples to constant weight at 70 ± 2°C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
  - Cool dried samples to room temperature in a desiccator.
  - Grind sample using a mortar and pestle to break up aggregates.
  - Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
  - Determine sample weight to the nearest 0.1 mg.
  - Add several drops of HCL to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCL atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
  - Dry the HCL-treated sample to constant weight at 70 ± 2° C.
  - Cool to room temperature in a desiccator.
  - Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
  - Combust the sample in an induction furnace at a minimum temperature of 950 ± 10° C.

- Calculations
  - If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

$$\text{Percent carbon} = \frac{A\ (0.2729)\ (100)}{B}$$

Where:

A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion

B = dry weight (g) of the unacidified sample in the combustion boat

0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

- If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

DATA REPORTING REQUIREMENTS

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).

Jack Eisenbach Engineering, P.C.
291 Genesee Street, Utica, New York 13501 · 315 735 1916 · Fax 315 735 6365 · E-mail.
www.JACKESIENBACHENGINEERING.com

FAX MEMO

Date:	3/27/2003
Attn:	Peter Ouderkirk –785-2422
CC:	
From:	Mark Ruhnke
Project:	02517
Re:	General Cable Site
Number of Pages:	10-page(s)
CC:	

- Comments:

Peter, here are the summary tables for the sample results from the excavation. Note Samples WSW-8 and WS-12 are closure samples from the west sides of the excavation along the storm line. I have also included sample results from Phase II in this area.

Please contact me any questions 737-1916

C02549

Analysis(ug/Kg)	ESW-1- 18 001 2/18/03	ESW-2- 18 002 2/18/03	ESW-3- 18 003 2/18/03	ESW-4- 18 004 2/18/03	ESW-5- 19 005 2/19/03	ESW-6- 19 006 2/19/03	SSW-7- 19 007 2/19/03	SSW-9- 19 008 2/19/03	WSW-8- 19 (10-12'bgs) 009 2/19/03	WSW-12- 20 (14'bgs) 010 2/20/03	NSW-10- 20 011 2/20/03	NSW-10- 20 DUP 012 2/20/03	NSW-11- 20 013 2/20/03	PIPE#1 BEDDING 014 2/18/03	TAGM μg/kg
ASP B VOLATILES-SOIL EPA 8260															
1,1,1-Trichloroethane	<62	170	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	630	
1,1,2,2-Tetrachloroethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
1,1,2-Trichloroethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
1,1-Dichloroethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
1,1-Dichloroethylene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
1,2-Dichloroethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
1,2-Dichloropropane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
2-Butanone-(MEK)	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
2-Hexanone	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
4-Methyl-2-Pentanone (MIBK)	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Acetone	51	<70	79	31	84	<59	7	15	<62	<54	29	55	<60	<160	
Benzene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Bromodichloromethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Bromoform	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Bromomethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Carbon Disulfide	<62	<70	<64	<14	<64	<59	<12	3	<62	<54	<57	<52	<60	<160	
Carbon Tetrachloride	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Chlorobenzene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Chloroethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Chloroform	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Chloromethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
cis-1,2-Dichloroethylene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	140	
cis-1,3-Dichloropropene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Dibromochloromethane	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Ethylbenzene	<62	52	<64	<14	80	<59	<12	<11	94	<54	<57	<52	41	<160	5,500
M & P XYLENE	<62	120	53	<14	180	<59	<12	<11	220	55	<57	<52	140	<160	1,200
Methylene Chloride	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
O-XYLENE	<62	130	<64	<14	24	<59	<12	<11	57	<54	<57	<52	28	<160	1,200
Styrene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Tetrachloroethylene	<52	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Toluene	<52	33	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
trans-1,2-Dichloroethylene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
trans-1,3-Dichloropropene	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	
Trichloroethylene	<62	820	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	950	
Vinyl Chloride	<62	<70	<64	<14	<64	<59	<12	<11	<62	<54	<57	<52	<60	<160	

EPA 8270

TAGM

	ESW-1- 18	ESW-2- 18	ESW-3- 18	ESW-4- 18	ESW-5- 19	ESW-6- 19	SSW-7- 19	SSW-9- 19	WSW-8- 19	WSW-12- 20	NSW-10- 20	NSW-10- 20 DUP	NSW-11- 20	PIPE#1 BEDDING
	001	002	003	004	005	006	007	008	009	010	011	012	013	014
	2/18/03	2/18/03	2/18/03	2/18/03	2/19/03	2/19/03	2/19/03	2/19/03	2/19/03	2/20/03	2/20/03	2/20/03	2/20/03	2/18/03
ASP B SEMIVOLATILE-SOILS														
1,2,4-Trichlorobenzene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
1,2-Dichlorobenzene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
1,3-Dichlorobenzene	<11000	<61000	<41000	<8600	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
1,4-Dichlorobenzene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,2'-oxybis(1-Chloropropane	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,4,5-Trichlorophenol	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
2,4,6-Trichlorophenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,4-Dichlorophenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,4-Dimethylphenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,4-Dinitrophenol	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
2,4-Dinitrotoluene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2,6-Dinitrotoluene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2-Chloronaphthalene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2-Chlorophenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2-Methyl Naphthalene	<11000	31000	13000	970	55000	16000	1200	1100	32000	17000	<48000	12000	20000	<100000
2-Methyl Phenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
2-Methyl-4,6-dinitrophenol	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
2-Nitroaniline	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
2-Nitrophenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<3900	<48000	<11000	<52000	<100000
3&4-Methyl Phenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<3900	<48000	<11000	<52000	<100000
3,3'-Dichlorobenzidine	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<3900	<48000	<11000	<52000	<100000
3-Nitroaniline	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
4-Bromophenyl Phenyl Ether	<11000	<61000	<41000	<8300	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
4-Chloro-3-methylphenol	<11000	<61000	<41000	<8300	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
4-Chloroanaline	<11000	<61000	<41000	<8300	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
4-Chlorophenyl Phenyl Ether	<11000	<61000	<41000	<8300	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
4-Nitroaniline	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
4-Nitrophenol	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000
Acenaphthylene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Acenapthene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Anthracene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Benzo (g,h,i) perylene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Benzo(a)anthracene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Benzo(a)pyrene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Benzo(b,k)fluoranthene	<21000	<120000	<82000	<18000	<100000	<120000	<20000	<21000	<120000	<18000	<95000	<21000	<100000	<210000
bis(2-Chloroethoxy)methane	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
bis(2-Chloroethyl)ether	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
bis(2-Ethylhexyl)phthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Butyl Benzyl Phthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Carbazole	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Chrysene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Dibenzo(a,h)Anthracene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Dibenzofuran	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Diethyl Phthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<57000	<100000
Dimethyl Phthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Di-n-butylphthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Di-n-octyl phthalate	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Fluoranthene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Fluorene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Hexachlorobenzene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Hexachlorobutadiene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Hexachlorocyclopentadiene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Hexachloroethane	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000
Indeno (1,2,3-cd)Pyrene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000

36,400

	ESW-1-18	ESW-2-18	ESW-3-18	ESW-4-18	ESW-5-19	ESW-6-19	SSW-7-19	SSW-9-19	↓ WSW-8-19	↓ WSW-12-20	NSW-10-20	NSW-10-20 DUP	NSW-11-20	PIPE#1 BEDDING	TAGM
	001	002	003	004	005	006	007	008	009	010	011	012	013	014	
	2/18/03	2/18/03	2/18/03	2/18/03	2/19/03	2/19/03	2/19/03	2/19/03	2/19/03	2/20/03	2/20/03	2/20/03	2/20/03	2/18/03	
Isophorone	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
Naphthalene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
Nitrobenzene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
N-Nitroso-di-n-propylamine	<11000	<61000	<41000	<8800	<50000	<59000	<9500	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
N-Nitrosodiphenylamine	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
Pentachlorophenol	<27000	<150000	<100000	<22000	<130000	<150000	<25000	<26000	<140000	<22000	<120000	<27000	<130000	<260000	
Phenanthrene	<11000	7600	<41000	3900	6300	<59000	1600	<10000	<58600	8300	<48000	2900	5900	<100000	50,000
Phenol	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	<100000	
Pyrene	<11000	<61000	<41000	<8800	<50000	<59000	<9900	<10000	<58000	<8900	<48000	<11000	<52000	19000	

	ESW-1- 18	ESW-2- 18	ESW-3- 18	ESW-4- 18	ESW-5- 19	ESW-6- 19	SSW-7- 19	SSW-9- 19	✓ WSW-8- 19	✓ WSW-12- 20	NSW-10- 20	NSW-10- 20 DUP	NSW-11- 20	PIPE#1 BEDDING
	001	002	003	004	005	006	007	008	009	010	011	012	013	014
	2/18/03	2/18/03	2/18/03	2/18/03	2/19/03	2/19/03	2/19/03	2/19/03	2/19/03	2/20/03	2/20/03	2/20/03	2/20/03	2/18/03
PCBs EPA 8082 (ug/kg)														
PCB-1016					<41	<39	<38	<36	<41	<39	<39	<37	<36	
PCB-1221					<82	<79	<77	<73	<84	<79	<79	<75	<74	
PCB-1232					<41	<39	<38	<36	<41	<39	<39	<37	<36	
PCB-1242					<41	<39	<38	<36	<41	<39	<39	<37	<36	
PCB-1248					<41	<39	<38	<36	<41	<39	<39	<37	[illegible]	
PCB-1254					<41	<39	<38	<36	<41	<39	<39	<37	<36	
PCB-1260					<41	<39	<38	<36	<41	<39	<39	<37	<36	
TPH Fingerprint - Oil/Solid (mg/kg)														
Diesel Fuel	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Fuel Oil #2	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Fuel Oil #4	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Fuel Oil #6	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Gasoline	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Kerosene	<6.6	<6.8		<6.5	<6.1		<5.5		<62		<5.8			<390
Petroleum Contaminants	1400	4900		1100	3200		1600		7200		1300			45000

GENERAL CABLE
Table C1
Rod Mill Petroleum Spill Investigation
Soil Sample Results (Totals) Compared to STARS TCLP Alternative Guidance Values

Table C1

Boring ID (depth)

Compound	STARS[1] LIMITS	B-2 (15'-16')	B-4R (8'-12')	B-4 (8'-12')	B-6 (12'-16')	TAGM
[illegible]						
Benzene	14	U	U	**40**	U	60 ppb
Ethylbenzene	100	U	U	65	U	5500
Toluene	100	U	U	**370**	U	1500
o-Xylene	100	U	U	**190**	U	1200
p-Xylene/ m-Xylene	100	U	U	**540**	U	1200
Isopropylbenzene	100	U	U	U	U	
n-Propylbenzene	100	U	U	U	U	
p-Isopropyltoluene	100	U	U	U	U	
1,2,4-Trimethylbenzene	100	U	**1900**	**160**	**5700**	
1,3,5-Trimethylbenzene	100	U	**870**	45	U	
n-Butylbenzene	100	U	**3400**	23	**7300**	
sec-Butylbenzene	100	U	**300**	U	U	
tert-Butylbenzene	100	U	U	U	U	
4-Isopropyltoluene	100	U	U	U	U	
Naphthalene	200	**380**	**4000**	U	**24000**	13 00
Metyl-tert-butyl-ether (MTBE)	500	U	U	U	U	
[illegible]						
Naphthalene	200	U	U	U	**580**	1300
Anthracene	1000	U	U	U	310	
Fluorene	1000	U	790	U	**1300**	50000
Phenenthrene	1000	U	**1000**	U	**1800**	50,000
Pyrene	1000	U	U	U	240 J	
Acenaphthene	400	U	**540**	U	**960**	50,000
Benzo(a)anthracene	0.04^2	U	U	U	U	
Fluoranthene	1000	U	120 J	U	U	
Benzo(b)fluoranthene	0.04^2	U	U	U	U	
Benzo(k)fluoranthene	0.04^2	U	U	U	U	
Chrysene	0.04^2	U	U	U	U	
Benzo(a)pyrene	0.04^2	U	U	U	U	
Benzo(g,h,i)perylene	0.04^2	U	U	U	U	
Indeno(1,2,3-cd)pyrene	0.04^2	U	U	U	U	
Dibenzo(a,h)anthracene	1000	U	U	U	U	
Sum of Reported Values		**360**	**12800**	**1433**	**41950**	

U - None Detected

N/A - Not Available/Not Applicable

J - result estimated below the quantitation limit

[1] - NYSDEC Spill Technology and Remediation Series (STARS) Memo #1, Petroleum- Contaminated Soil Guidance Policy, August 1992, TCLP Alternative Guidance Values

[2] - Due to the high detection limit for a solid matrix, the TCLP Extraction Method must be used to demonstrate groundwater quality protection for these compounds

BOLDFACE values exceed regulatory limits

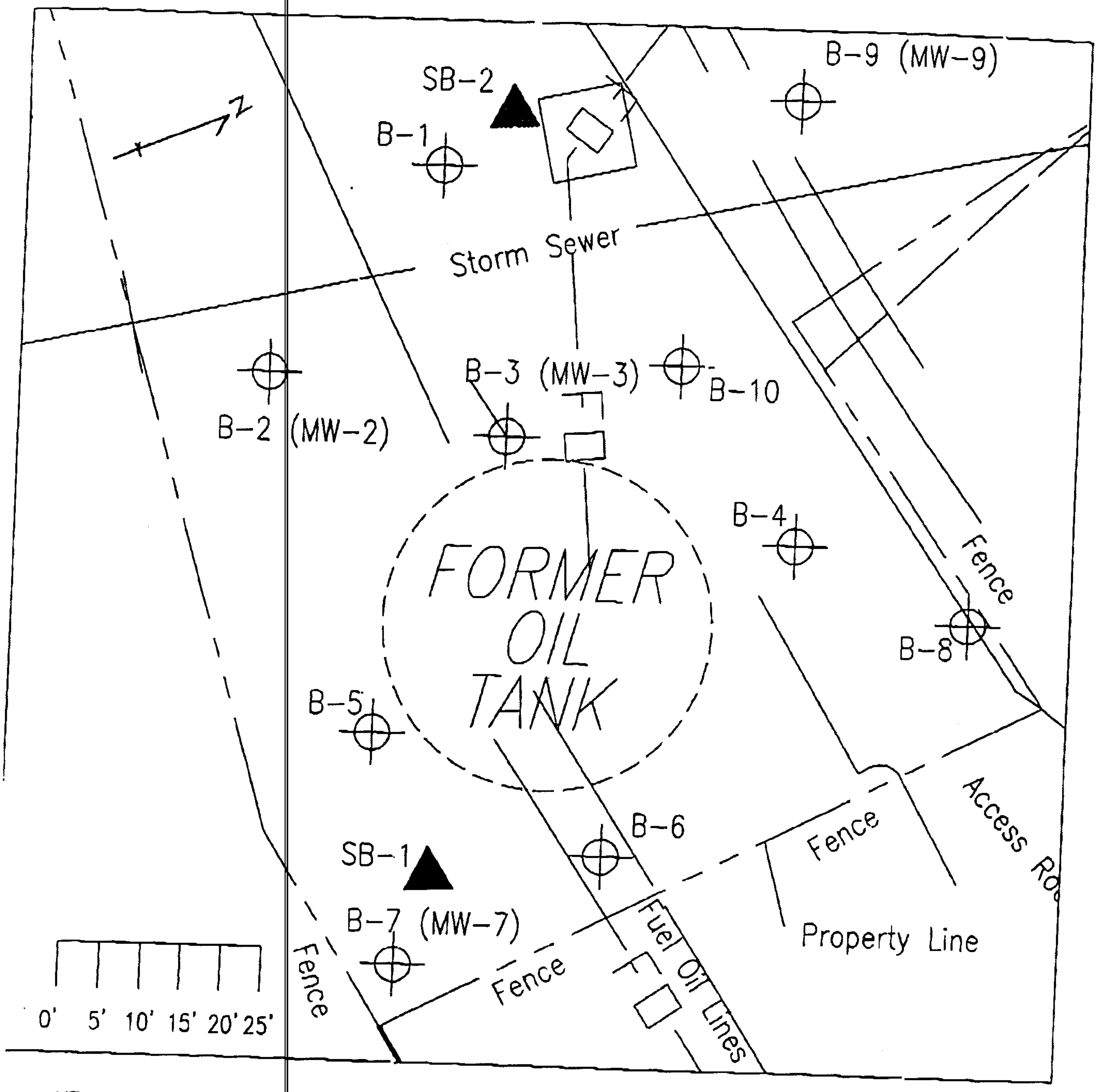
(ug/kg) - micrograms per kilogram (equivalent to parts per billion)

GENERAL CABLE
Table C2
Rod Mill Petroleum Spill Investigation
Groundwater Sample Results Compared to STARS TCLP Extraction Guidance Values

Table C2

		Boring ID (MW ID)						
Compound	STARS[1] LIMITS	B-1	B-3 (MW-3)	B-5	B-7 (MW-7)	B-8	B-9 (MW-9)	B-9R (MW-9R)
[illegible](µg/L)								
Benzene	0.7	U	U	U	U	U	U	U
Ethylbenzene	5	U	U	U	U	U	U	U
Toluene	5	U	U	U	U	U	U	U
o-Xylene	5	U	U	U	U	U	U	U
p-Xylene/ m-Xylene	5	U	U	U	U	U	U	U
Isopropylbenzene	5	U	U	U	U	U	U	U
n-Propylbenzene	5	U	U	U	U	U	1	U
p-Isopropyltoluene	5	U	U	U	U	U	2	U
1,2,4-Trimethylbenzene	5	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	5	U	U	19	18	5	11	2
n-Butylbenzene	5	U	U	11	U	2	3	U
sec-Butylbenzene	5	1	U	35	13	5	19	3
tert-Butylbenzene	5	U	U	U	U	U	9	U
4-Isopropyltoluene	5	U	U	U	U	U	U	U
Naphthalene	10	U	U	U	U	U	2	U
Metyl-tert-butyl-ether (MTBE)	50	23	39	95	36	U	38	2
[illegible](µg/L)		U	U	U	U	U	U	U
Naphthalene	10	U	400	U	26	U	U	U
Anthracene	50	U	200	U	U	U	U	U
Fluorene	50	U	680	U	7	U	U	U
Phenenthrene	50	U	1400	U	U	U	U	U
Pyrene	50	U	190	U	U	U	U	U
Acenaphthene	20	U	560	U	U	U	U	U
Benzo(a)anthracene	0.002[2]	U	U	U	U	U	U	U
Fluoranthene	50	U	190	U	U	U	U	U
Benzo(b)fluoranthene	0.002[2]	U	U	U	U	U	U	U
Benzo(K)fluoranthene	0.002[2]	U	U	U	U	U	U	U
Chrysene	0.002[2]	U	U	U	U	U	U	U
Benzo(a)pyrene	0.002[2]	U	U	U	U	U	U	U
Benzo(g,h,l)perylene	0.002[2]	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	0.002[2]	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	50	U	U	U	U	U	U	U
Sum of Reported Values		24	3659	160	100	12	85	7

None Detected
- Not Available/Not Applicable
esult estimated below the quantitation limit
NYSDEC Spill Technology and Remediation Series (STARS) Memo #1, Petroleum- Contaminated Soil Guidance Policy, August 1992, TCLP Extractio
ue to the high detection limit for a solid matrix, the TCLP Extraxtion Method must be used to demonstrtate groundwater quality protection for these com
DFACE values exceed regulatory limits

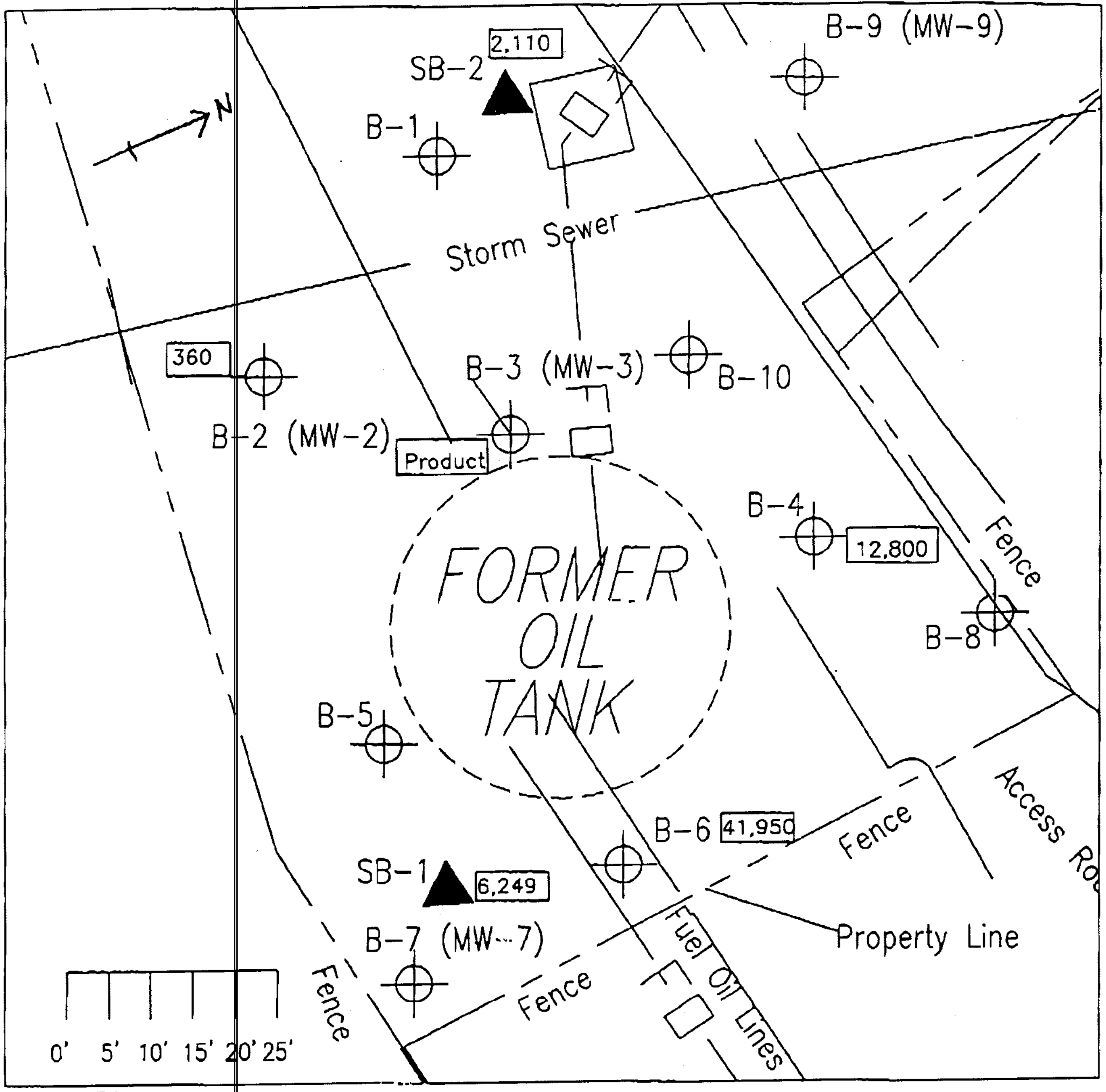


KEY:

⊕ Soil Boring- SB (Monitoiring Well- MW) Location

△ Soil Boring by RETEC, 1997 Phase 2

ISENBACH ENGINEERING, P.C. esee Street, Utica, NY 13501 315-735-1916 ton Street, Buffalo, NY 14203 716-882-3403	DATE: 4/27/01 DRAWN: MPR NO.: 8514	**GENERAL CABLE ROD MILL PARCEL** SOIL BORING & MONITORING WELL LOCATION PLAN
		C3



KEY:

⊕ Soil Boring- SB (Monitoiring Well- MW) Location

△ Soil Boring by RETEC, 1997 Phase 2

12,800 Conentrations in Soil Sampling (ppb)

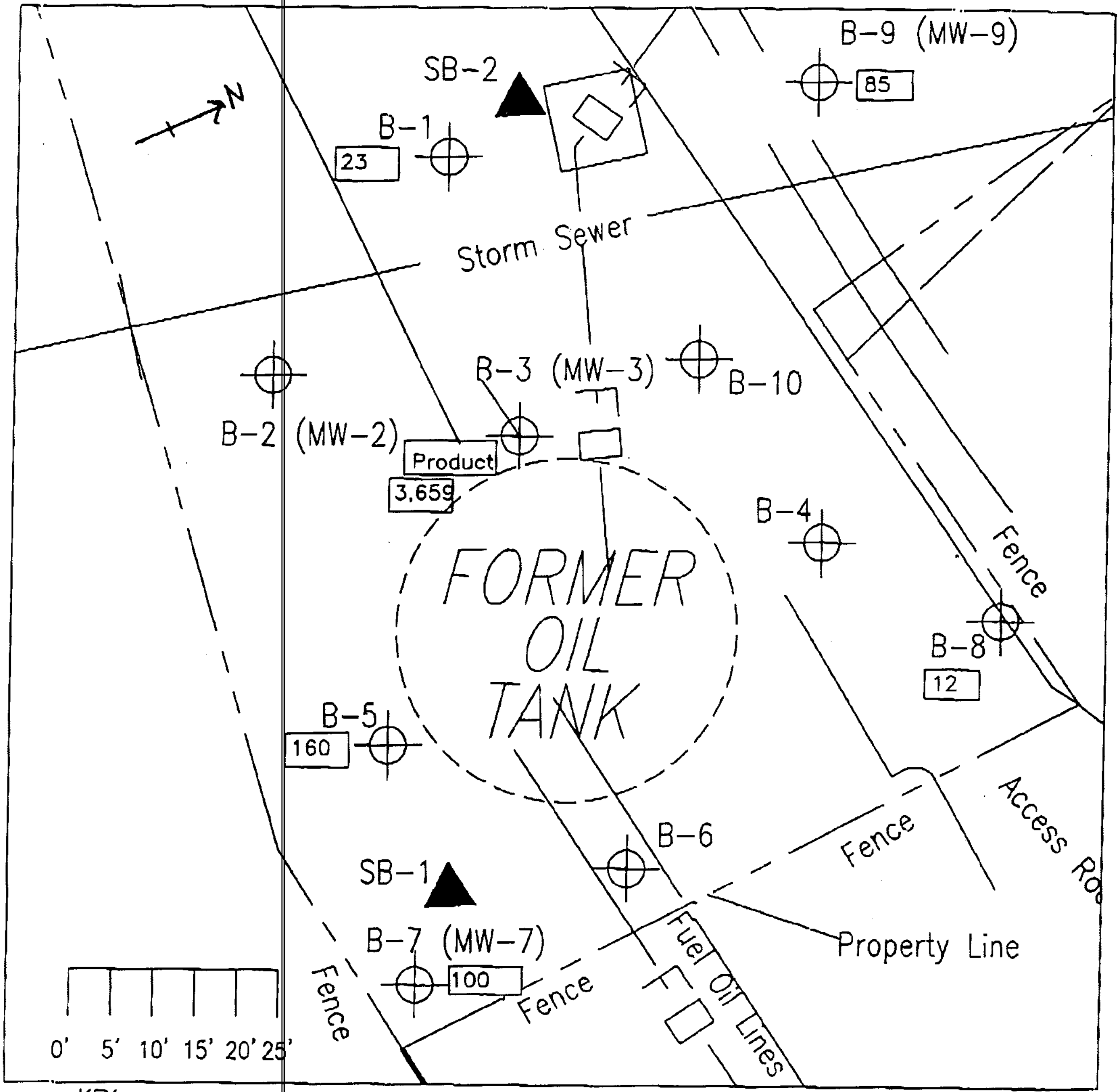
JACK EISENBACH ENGINEERING, P.C.
291 Genesee Street, Utica, NY 13501 315-735-1818
168 Carlton Street, Buffalo, NY 14263 716-882-3803

DATE: 4/27/01
DRAWN: MPR
NO.: 8514

GENERAL CABLE
ROD MILL PARCEL
SOIL SAMPLING CONCENTRATIONS (ppb)
(SUM OF REPORTED VALUES)

C4

APPENDIX A



KEY:

⊕ Soil Boring– SB (Monitoiring Well– MW) Location

△ Soil Boring by RETEC, 1997 Phase 2

12,800 Conentrations in Groundwater Sampling (ppb)

K. EISENBACH ENGINEERING, P.C.
91 Genesee Street, Utica, NY 13501 315-735-1916
8 Carlon Street, Buffalo, NY 14263 716-882-3903

DATE: 4/27/01
DRAWN: MPR
NO.: 8514

GENERAL CABLE
ROD MILL PARCEL
GROUNDWATER SAMPLING CONCENTRATIONS (ppb)
(SUM OF REPORTED VALUES)

C5