ABB ENVIRONMENTAL SERVICES

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PN: 07121-26

February 15, 1993

Ms. Sally Dewes
Bureau of Eastern Remedial Action
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation

Subject: Review of Preliminary Risk Assessment Information
Sheridan Waste Oil Company Site, Medford, NY

Dear Ms. Dewes:

As you know, ABB Environmental Services (ABB-ES) has begun to prepare a human health risk assessment for the Sheridan Waste Oil Company Site in Medford, NY. We have enclosed for critical review some preliminary risk assessment information. Our intent is to obtain feedback early in the risk assessment process and to minimize revisions to the draft risk assessment report. Therefore, a copy of this information has been forwarded to Lloyd Wilson in DOH's Bureau of Environmental Exposure Investigation who will be reviewing the risk assessment.

We have also included a description of the site and a brief site history (Attachment A) as background information.

Exposure Pathways

Attachment B contains several draft tables related to the exposure assessment. Table 1 lists the potential exposure pathways and identifies those pathways that we anticipate evaluating quantitatively. The current use of the site is both vacant land zoned for commercial use and a small residential lot. We have assumed that future use of the entire property is likely to be residential as a portion of the site is already so used and much of the adjacent land is residential. This assumption is critical, as it defines potential future exposures to theoretical receptors based on residential site usage.

The semivolatile polyaromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), and a heavy metal (lead) are chemicals of potential concern (CPCs) for surface soil. These substances can be taken up by plants and bioconcentrate in plant tissue. Ingestion of home-grown fruits and vegetables is a potential exposure pathway under the residential use scenario. Because these CPCs are present in surface soil at such low concentrations (parts per billion except for lead), this pathway will be evaluated qualitatively.

Volatile organic compounds (VOCs) are CPCs in surface and subsurface soil. With VOCs present in soil, there is potential for volatilization of those chemicals into ambient air. Inhalation of those vapors represents an additional potential exposure pathway for receptors exposed to soil.

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Analysis of soil samples resulted in generally very low frequency of detections and concentrations of VOCs with the exception of a single "hotspot" sample (boring BS-3 at a depth of 6-8 ft.). Although a total of twelve VOCs are soil CPCs, six of them were detected in only one of 15 samples and all but one was detected in three or fewer samples. Except for a single sample "hotspot" with maximum detected concentrations of approximately 30 parts per million (ppm) total VOCs (toluene, xylene, ethylbenzene, 4-methyl-2-pentanone, total 1,2-dichloroethene), the maximum detected VOC concentrations for the other samples total approximately 2.2 ppm. The arithmetic average concentration of all VOCs detected in both surface and subsurface soil is less than 3 ppm total VOCs. With both frequency of detects and soil VOC concentrations as low as they are, the potential exposure pathway of VOC migration (via soil gas) into residential basements and the associated risks are unlikely to be significant. However, because construction workers could excavate into the "hotspot" area, we propose to evaluate risks from VOC soil volatilization for the construction worker exposure pathway only.

The inhalation of contaminants adhering to wind-eroded dust is a potential exposure pathway for the utility and the construction worker receptor. Air exposure point concentrations (EPCs) of CPCs borne on respirable dust particles will be estimated using a model developed by Cowherd (1985).

Tables 2 through 13 present exposure parameter values for the receptors in each of the respective media through which exposures could potentially occur. We have followed EPA's most recent guidance (USEPA,1989a; USEPA, 1989b; USEPA, 1991; USEPA, 1992) in the selection of these values with the exception of the soil ingestion rate (IR) for receptors exposed through construction and/or soil excavation. The soil ingestion rate (IR) of 110 mg/day is an adjusted value based on a paper by Hawley from which the USEPA has adopted the current default soil ingestion value of 480 mg/day for a construction/soil excavation scenario (Hawley, 1985). The only change in assumptions made by ABB-ES from those in Hawley is a reduction in the soil adherence factor (SAF) of 3.5 mg/cm^2 to the current USEPA default upper bound value for a SAF of 1.0 mg/cm^2. Attachment C provides greater detail regarding the revised soil IR. Please review, in particular, the values described in the tables as "based on professional judgement".

Sampling Results

Figures showing soil sampling locations are included in Attachment D. Attachment D also contains tables summarizing the sampling data from locations and sampling depths we propose to use to estimate soil EPCs. Samples taken at a depth of 0 to 2 feet are evaluated as surface soil. Samples taken at a depth of 2 to 4 feet through 14 to 16 feet are evaluated as subsurface soil. Samples taken at a depth of 16 feet and deeper are not used to calculate soil EPCs because it is unlikely that any receptor will contact soil at such depths. The purpose of sample BS-1 is to establish site-specific soil background concentrations primarily to determine if concentrations of inorganic chemicals are substantially elevated from natural background levels. Additionally, the background sample could be of help in determining if off-site contamination could be impacting the site. Sample BS-1 was not used to calculate soil EPCs. Attachment E presents all soil data.

Chemicals of Potential Concern

Validated groundwater data are currently not available. When they are received, the data will be reviewed to determine if CPCs are present. If groundwater is contaminated, groundwater CPCs will be evaluated

under the residential drinking water ingestion and the dermal contact during bathing exposure pathways described in the Potential Exposure Pathway Table (Table 1) using the exposure parameters listed in Attachment B, Tables 4 and 5, respectively. If VOCs are found to be groundwater CPCs, they will also be evaluated with the residential shower inhalation pathway described in Table 1 using the exposure parameters listed in Attachment B, Table 6. Indoor air EPCs will be estimated using a model developed by Foster and Chrostowski (1987). ABB-ES will communicate to you via either telephone or a short memorandum whether the drinking water pathway will be evaluated and, if so, substances determined to be groundwater CPCs.

Table 14 in Attachment B lists the proposed CPCs for surface soil and subsurface soil. We propose excluding all metals except lead. Using maximum detected inorganic chemical concentrations and the exposure parameters for a residential child receptor (the most exposed receptor to soil on a daily basis), predicted daily intakes were calculated. Predicted daily intakes including both the oral and dermal routes were compared to intakes which should not result in any toxic effects (allowable intakes) and were found to be below these allowable intakes for every chemical except lead (See Table 15).

There is currently no USEPA toxicity value for lead for comparison to predicted intakes. An oral and dermal chronic reference dose for lead was derived based on back-calculation from the drinking water action level of 0.015 mg/l. Risk from lead exposures can be evaluated using either this derived value or the EPA Uptake/Biokinetic Model for lead which estimates blood lead concentrations for children of ages 0 to 6 years old (USEPA, 1991b). Because young children are the most sensitive receptor to the effects of lead, it would be appropriate to use this model for the risk assessment.

Exposure Point Concentrations

Following USEPA guidance (USEPA, 1989), the 95th upper confidence limit (UCL) of the mean calculated for each CPC will be used as the EPC. However, for any CPCs in which the 95th UCL exceeds the maximum detected concentration, the maximum detected concentration will be the EPC.

Dose/Response Assessment

To estimate the risks associated with the carcinogenic PAHs detected at this site, we propose to use the Toxic Equivalency Factor (TEF) approach. Evaluation of carcinogenic PAHs via the TEF approach is currently a Draft Policy of USEPA Region II (USEPA, Region II, 1992). This approach assigns relative potency factors to carcinogenic PAH compounds based on a comparison to the potency of benzo(a)pyrene. The relative potency factors for the carcinogenic PAHs reported at this site are shown below:

Benzo(a)pyrene	1.0 (not detected at site, included for comparison)
Benzo(a)anthracene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01

This approach has not been officially adopted by the U.S. EPA Superfund Program as of this date. An alternative (and more conservative approach) is to apply the cancer slope factor for benzo(a)pyrene (7.3E-0) to each of the carcinogenic PAH compounds. Although we propose to use the TEF approach to evaluate receptor risk and calculate target cleanup levels (if necessary), we will also evaluate risks using the conservative approach to determine the effect of each approach on the risk estimates.

Follow-up

We will call you to arrange for the receipt of your comments on this material. Thank you for taking the time to review this information. We look forward to receiving your comments.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

David Gordon
Public Health Scientist

Mark Seelen
Project Manager

Attachments

cc: Lloyd Wilson, NYDOH
Stan Reed, ABB-ES

m7-sheridan.mem

ATTACHMENT A

SITE DESCRIPTION AND HISTORY

2.0 SUMMARY OF EXISTING DATA

2.1 SITE LOCATION, SIZE, AND ACCESS

The Sheridan Waste Oil Company was operated as a waste oil recycling facility located in Medford (Town of Brookhaven), Suffolk County, New York. Sheridan is located on a 2.7 acre lot bordered by Peconic Avenue to the north and private residences on Eileen Court to the south. The site is not paved, and the surface is sandy and relatively flat. Direct access to the site is obtained from the eastbound lane of Peconic Avenue in Medford. The property east of the site is wooded and undeveloped; properties west and south of the site are residential. North of Peconic Avenue near the site, the land use is primarily light industrial/ commercial. The site is surrounded with chainlink fence topped with looped concertina wire, and a locking double gate provides access from Peconic Avenue.

2.2 SITE TOPOGRAPHY AND DRAINAGE

The Sheridan site is at an elevation of approximately 85 feet above mean sea level (MSL) (Figure 2-1). The site and surrounding terrain are relatively flat and no surface water drainage has been observed on or adjacent to the site. The site is approximately 4.5 miles west of the Carmans River and 4.7 miles north of the Bellport Bay section of the Great South Bay of Long Island.

FIGURE 2-1
SITE LOCATION MAP
SHERIDAN WASTE OIL SITE

SOURCE: U.S.G.S. MAP BELLPORT, N.Y. DATED 1967

EC JORDAN CO

2.3 SITE GEOLOGY AND HYDROGEOLOGY

Sheridan is located on glacial outwash deposits of sand and gravel, approximately 85 feet above mean sea level. The site has been cleared, regraded, and slightly modified by the addition of 1 to 5 feet of sandy fill, but was originally wooded and relatively flat. No surface water ponding or stream drainage has been observed on or adjacent to the site. The site is located on sandy soil developed on Upper Glacial aquifer sand and gravel estimated to be approximately 100-125 feet in thickness. The Upper Glacial aquifer overlies the Magothy aquifer (more than 600 feet of sand and gravel). A thin, discontinuous layer of silty clay, the Gardiners Clay Formation, may separate the Upper Glacial and Magothy deposits near the site, but the Gardiners Clay is not expected to prevent vertical movement of groundwater between the aquifers. Based on previous investigations, the average depth to the groundwater saturated zone is 30 to 35 feet below ground surface (bgs) on-site, and the horizontal groundwater flow direction is to the southeast. The bedrock underlying Long Island is estimated to be approximately 1600 feet bgs and will not be encountered during the course of the field program.

2.4 SITE HISTORY

Sheridan operated as a waste oil recycling facility from 1977 to 1984. Suffolk County Department of Health Services (SCDHS) was contacted on April 9, 1982 by an employee of Vulcan Fuel Corporation, who was overcome by fumes emitted when a shipment of solvent from Sheridan was mixed with Number 2 fuel oil. As a follow-up to this preliminary involvement, SCDHS conducted a hydrogeologic investigation at the Sheridan site to determine the impact of the site operations on groundwater quality. The report was completed in July 1983. SCDHS did not

determine the exact nature of site operations; however, Sheridan reportedly collected and stored waste oil and separator water in above-ground and subsurface tanks and operated a water/oil evaporation unit. Backup reports and affidavits suggest that the Sheridan company was also involved in the storage of acid products. Sheridan also operated without a permit. As part of its hydrogeologic investigation SCDHS drilled groundwater profile wells upgradient and downgradient of the site. The profile wells were drilled to termination depths approximately 80 feet bgs, then sampled in 5 or 10 foot intervals as the profile wells were pulled up. Their observations are as follows:

- No organics were detected in groundwater in the upgradient profile wells. It was inferred that upgradient industries were not contributing to the degradation of groundwater quality and the Sheridan site operations are the sole cause of on-site and downgradient groundwater contamination.

- Groundwater from four homeowner wells which were believed to be screened at approximately 80 feet bgs (40 feet below the water table), located south of the site on Eileen Court, was analyzed for organic compounds. No organics were detected in any of the homeowner wells.

- Organic compounds were detected in groundwater above the drinking water guidelines in all the downgradient profile wells. As a result of the SCDHS July 1983 report, the County Attorney succeeded in obtaining a court order to close down the Sheridan site operations.

A site inspection conducted on May 17, 1983 to aid in initiating litigation of the site by the Attorney General revealed many areas of surface spillage and discoloration. Soil samples from the original soil surface reportedly exhibited organic solvent and petroleum contamination. The site has been regraded, with the addition of a layer of sandy fill, 1 to 5 feet in thickness.

ATTACHMENT B

TABLES

TABLE 1
POTENTIAL EXPOSURE PATHWAYS
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

Potential Exposure Medium and Route	Potentially Exposed Population and Exposure Point	Is Pathway Complete?	Risks Quantified	Reason for Selection or Exclusion
CURRENT LAND USE				
Surface Soil: Incidental ingestion	Child Trespasser	Current exposures could occur	Yes	Children living in area could be exposed if they trespass onto the site
Dermal contact			Yes	
Surface Soil: Incidental ingestion	Site Worker	No. The commercially zoned portion of the site is presently vacant	Yes	If commercial use of the site resumes, worker exposure is possible
Dermal contact			Yes	
CURRENT AND POTENTIAL FUTURE LAND USE				
Groundwater:			Conditional	If site-related groundwater plume is present, this pathway will be evaluated quantitatively. If VOCs are present, inhalation will be evaluated
Ingestion	Residents with downgradient wells	Unknown. Depends on results of groundwater/ private well data analysis not, as yet, available	Yes	
Dermal			Yes	
Inhalation of vapors during showering			Yes	
Surface Soil: Incidental ingestion	Child Resident	Current and potential future exposures could occur	Yes	Current residents and future site-wide residents could be exposed. VOC concentrations in soil are very low
[redacted]rmal contact			Yes	
[redacted]alation of vapors			No	
[redacted]rface Soil: Incidental ingestion	Adult Resident	Current and potential future exposures could occur	Yes	Current residents and future site-wide residents could be exposed. VOC concentrations in soil are very low
Dermal contact			Yes	
Inhalation of vapors			No	
Fruits & Vegetables, Homegrown: Ingestion	Child and Adult Residents	Current and potential future exposures could occur	No	Concentrations of surface soil CPCs that can potentially bioconcentrate in plants-PAHs, pesticides/PCBs heavy metals, are very low
Surface and Subsurface Soil: Incidental ingestion	Utility Workers	Current and potential future exposures could occur	Yes	Underground utilities may need repair/installation for a limited duration. VOC concentrations in soil are very low
Dermal contact			Yes	
Inhalation of dust			Yes	
Inhalation of vapors			No	
POTENTIAL FUTURE LAND USE				
Surface and Subsurface Soil: Incidental ingestion	Construction Worker	No current exposures Potential future exposures could occur	Yes	Residential construction could expose workers for a limited duration.
Dermal contact			Yes	
Inhalation of dust			Yes	
[redacted]halation of vapors			Yes	Workers could excavate at VOC "hotspot" locations

SURSOIL	05-Feb-93

TABLE 2
DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
RECEPTOR: CHILD (AGE 7-16 YEARS), SITE TRESPASSER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	
INGESTION RATE	IR	100	mg/day	USEPA,1991
FRACTION INGESTED	FI	100%		PRO.JUDGEMENT
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	6,150	cm²/day	USEPA, 1989B(1)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	40	kg	USEPA, 1989B
EXPOSURE FREQUENCY	EF	26	days/year	PRO.JUDGEMENT (2)
EXPOSURE DURATION	ED	10	years	PRO.JUDGEMENT
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	10	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA,1989A RISK ASSESSMENT GUIDANCE FOR SUPERFUND
USEPA, 1989B "EXPOSURE FACTORS HANDBOOK"

(1) HANDS, ARMS, LEGS
(2) ONCE A WEEK, MAY THROUGH OCTOBER

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

[redacted] [redacted] [redacted]

SRSOIWRK	05-Feb-93

TABLE 3
DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
RECEPTOR: ADULT, SITE WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	
INGESTION RATE	IR	50	mg/day	USEPA,1991
FRACTION INGESTED	FI	100%		PRO.JUDGEMENT
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	2,104	cm²/day	USEPA, 1989B(1)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	70	kg	USEPA, 1989A
EXPOSURE FREQUENCY	EF	175	days/year	PRO.JUDGEMENT(2)
EXPOSURE DURATION	ED	25	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	25	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA, 1989A RISK ASSESSMENT GUIDANCE FOR SUPERFUND
USEPA, 1989B "EXPOSURE FACTORS HANDBOOK"

(1) HANDS, FOREARMS
(2) APRIL-NOVEMBER, 5 DY/WK

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

DRNK-RES	05-Feb-93

TABLE 4
INGESTION OF DRINKING WATER (GROUNDWATER)
RECEPTOR: ADULT, RESIDENT
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	95th UCL or MAX	mg/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
SURFACE AREA EXPOSED	SA	Not Applicable	cm^2	
BODY WEIGHT	BW	70	kg	USEPA, 1989A
CONVERSION FACTOR	CF	0.001	$liter/cm^3$	
EXPOSURE TIME	ET	Not Applicable	hours/day	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	30	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA, 1989A RISK ASSESSMENT GUIDANCE FOR SUPERFUND

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times RAF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

DERM-SHR	11-Feb-93

TABLE 5
DERMAL CONTACT WITH DRINKING WATER (GROUNDWATER) DURING SHOWERING
RECEPTOR: ADULT, RESIDENT
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	95th UCL or MAX	mg/liter	
INGESTION RATE	IR	Not Applicable	liters/day	USEPA, 1991
SURFACE AREA EXPOSED	SA	18,180	cm^2	
BODY WEIGHT	BW	70	kg	USEPA, 1989A
CONVERSION FACTOR	CF	0.001	$liter/cm^3$	
EXPOSURE TIME	ET	0.2	hours/day	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	30	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA,1989A RISK ASSESSMENT GUIDANCE FOR SUPERFUND

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-DERMAL} = \frac{CW \times SA \times PC \times CF \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

VP-SHOW	09-Feb-93

TABLE 6
INHALATION EXPOSURE TO VOCs DURING SHOWERING
RECEPTOR: RESIDENTIAL ADULT
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION AIR	CA		ug/m3	Modeled
CONVERSION FACTOR 1	CF1	24	hours/day	
EXPOSURE TIME	ET	0.2	hours/day	USEPA, 1989a
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
CONVERSION FACTOR 2	CF2	365	days/year	
AVERAGING TIME CANCER	AT	70	years	USEPA, 1989a
AVERAGING TIME NONCANCER	AT	30	years	USEPA, 1989a*

USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance:
Standard default Exposure Factors
USEPA, 1989a. RAGs, Part A.

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{CAair * EF * ET * ED}{AT * CF1 * CF2}$$

Note:

*For noncarcinogenic effects: AT = ED

RESOI-CH	05-Feb-93

TABLE 7
DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
RECEPTOR: CHILD RESIDENT (AGE 1-6)
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	MAXIMUM
INGESTION RATE	IR	200	mg/day	USEPA,1991
FRACTION INGESTED	FI	100%		PRO.JUDGEMENT
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	3,720	cm²/day	USEPA, 1989B(1)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	16	kg	USEPA, 1989B
EXPOSURE FREQUENCY	EF	350	days/year	USEPA,1991
EXPOSURE DURATION	ED	6	years	USEPA,1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	6	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA,1989A RISK ASSESSMENT OUIDANCE FOR SUPERFUND
USEPA, 1989B "EXPOSURE FACTORS HANDBOOK" (1) HANDS, ARMS, LEGS, FEET

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

RESOI-AD	05-Feb-93

TABLE 8
DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
RECEPTOR: ADULT RESIDENT (AGE 7-30)
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	MAXIMUM
INGESTION RATE	IR	100	mg/day	USEPA,1991
FRACTION INGESTED	FI	100%		PRO.JUDGEMENT
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	4,474	cm²/day	USEPA, 1989B(1)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	70	kg	USEPA, 1989B
EXPOSURE FREQUENCY	EF	350	days/year	USEPA,1991
EXPOSURE DURATION	ED	24	years	USEPA,1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989A
NONCANCER	AT	24	years	USEPA, 1989A*

USEPA, 1991 "STANDARD DEFAULT EXPOSURE FACTORS"
USEPA,1989A RISK ASSESSMENT GUIDANCE FOR SUPERFUND
USEPA, 1989B "EXPOSURE FACTORS HANDBOOK"

(1) HANDS, FOREARMS, LOWER LEGS

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
*For noncarcinogenic effects: AT = ED

[redacted] [redacted] [redacted]

SOI-UT1	05-Feb-93

TABLE [redacted]
DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE AND SUBSURFACE SOIL
RECEPTOR: SITE UTILITY WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	
INGESTION RATE	IR	110	mg/day	ABB-ES, 1992 (1)
FRACTION INGESTED	FI	100%		
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	3,295	cm²/day	USEPA, 1989b (2)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	70	kg	USEPA, 1989a
EXPOSURE FREQUENCY	EF	5	days/workweek	PRO.JUDGEMENT
EXPOSURE DURATION	ED	1	workweek(s)	PRO.JUDGEMENT
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989a
NONCANCER	AT	1	workweek(s)	USEPA, 1989a*

USEPA, 1991. "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors".

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications, Interim report, EPA/600/8-91/011B, January 1992.

USEPA, 1989a. RAGs, Part A.

USEPA, 1989b. Exposure Factors Handbook.

(1) See Attachment C

(2) Upper extremities

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION (HQ)} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 5\ \text{days/workweek}}$$

$$\text{INTAKE-INGESTION (CANCER RISK)} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL (HQ)} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 5\ \text{days/workweek}}$$

$$\text{INTAKE-DERMAL (CANCER RISK)} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

*For noncarcinogenic effects: AT = ED

AIR-UTIL	05-Feb-93

TABLE 10
INHALATION EXPOSURE TO DUST- SHORT-TERM
RECEPTOR: UTILITY WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION AIR	CA		mg/m^3	Modeled
INHALATION RATE	IR	2.5	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1989a
EXPOSURE TIME	ET	8	hours/day	USEPA, 1991
EXPOSURE FREQUENCY	EF	5	days/workweek	PRO. JUDGEMENT
EXPOSURE DURATION	ED	1	weeks	PRO. JUDGEMENT
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989a
NONCANCER	AT	1	weeks	USEPA, 1989a*

USEPA, 1991. "Human Health Evaluation Manual , Supplemental Guidance:
Standard Default Exposure Factors
USEPA, 1989a RAGs, Part A.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

$$\text{INTAKE} = \frac{CA \times IR \times RAF \times ET \times EF \times ED}{BW \times AT \times 365\ days/year}$$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times RAF \times ET \times EF \times ED}{BW \times AT \times 5\ days/workweek}$$

Note:
*For noncarcinogenic effects: AT = ED

TABLE 11

SOI-CON	05-Feb-93

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE AND SUBSURFACE SOIL
RECEPTOR: SITE CONSTRUCTION WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	95th UCL or MAX	mg/kg	
INGESTION RATE	IR	110	mg/day	ABB-ES, 1992 (1)
FRACTION INGESTED	FI	100%		
SOIL ADHERENCE FACTOR	SAF	1	mg/cm²	USEPA, 1992
SURFACE AREA EXPOSED	SA	3,295	cm²/day	USEPA, 1989b (2)
CONVERSION FACTOR	CF	0.000001	kg/mg	
BODY WEIGHT	BW	70	kg	USEPA, 1989a
EXPOSURE FREQUENCY	EF	5	days/workweek	PRO.JUDGEMENT
EXPOSURE DURATION	ED	8	workweek(s)	PRO.JUDGEMENT
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989a
NONCANCER	AT	8	workweek(s)	USEPA, 1989a*

USEPA, 1991. "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors".

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications, Interim report, EPA/600/8-91/011B, January 1992.

USEPA, 1989a. RAGs, Part A.

USEPA, 1989b. Exposure Factors Handbook.

(1) See Attachment C

(2) Upper extremities

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE = (INTAKE-INGESTION) + (INTAKE-DERMAL)

$$\text{INTAKE-INGESTION (HQ)} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 5\ \text{days/workweek}}$$

$$\text{INTAKE-INGESTION (CANCER RISK)} = \frac{CS \times IR \times RAF \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL (HQ)} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 5\ \text{days/workweek}}$$

$$\text{INTAKE-DERMAL (CANCER RISK)} = \frac{CS \times SA \times SAF \times RAF \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

*For noncarcinogenic effects: AT = ED

AIR-CONS	05-Feb-93

TABLE 12
INHALATION EXPOSURE TO DUST- SHORT-TERM
RECEPTOR: CONSTRUCTION WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION AIR	CA		mg/m^3	Modeled
INHALATION RATE	IR	2.5	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1989a
EXPOSURE TIME	ET	8	hours/day	USEPA, 1991
EXPOSURE FREQUENCY	EF	5	days/workweek	PRO. JUDGEMENT
EXPOSURE DURATION	ED	8	weeks	PRO. JUDGEMENT
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989a
NONCANCER	AT	8	weeks	USEPA, 1989a*

USEPA, 1991. "Human Health Evaluation Manual , Supplemental Guidance:
Standard Default Exposure Factors
USEPA, 1989a RAGs, Part A.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

$$\text{INTAKE} = \frac{\text{CA x IR x RAF x ET x EF x ED}}{\text{BW x AT x 365 days/year}}$$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x RAF x ET x EF x ED}}{\text{BW x AT x 5 days/workweek}}$$

Note:
*For noncarcinogenic effects: AT = ED

TABLE 13
INHALATION EXPOSURE TO VOCs VIA SOIL GAS, SHORT-TERM
RECEPTOR: CONSTRUCTION WORKER
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION AIR	CA		ug/m3	Modeled
CONVERSION FACTOR	CF	168	hours/week	
EXPOSURE TIME	ET	8	hours/day	USEPA, 1989a
EXPOSURE FREQUENCY	EF	5	days/week	USEPA, 1991
EXPOSURE DURATION	ED	0.1538461	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1989a
NONCANCER	AT	0.1538461	years	USEPA, 1989a*

USEPA, 1991. "Human Health Evaluation Manual, Supplemental Guidance:
Standard default Exposure Factors
USEPA, 1989a. RAGs, Part A.

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{\text{CAair} * \text{EF} * \text{ET} * \text{ED}}{\text{AT} * \text{CF}}$$

Note:

*For noncarcinogenic effects: AT = ED

TABLE 14
CHEMICALS OF POTENTIAL CONCERN
IN SURFACE AND SUBSURFACE SOIL
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

	Surface Soil	Subsurface Soil
Volatile Compounds:		
Acetone		X
Benzene*		X
2-Butanone		X
1,1-Dichloroethane		X
1,2-Dichloroethene		X
Ethyl Benzene		X
Styrene*		X
Tetrachloroethene*	X	X
Toluene		X
1,1,1-Trichloroethane		X
Xylenes		X
4-Methyl-2-Pentanone		X
Semivolatile Compounds:		
bis(2-Ethylhexyl)phthalate*		X
Butylbenzylphthalate	X	X
Di-n-butylphthalate	X	X
Di-n-octylphthalate	X	X
Diethylphthalate	X	X
Carbazole*	X	X
Phenol		X
N-nitrosodiphenylamine	X	X
Hexachlorobenzene*		X
Isophorone*		X
2-Methylnaphthalene	X	X
Naphthalene	X	X
Acenaphthene	X	X
Anthracene		X
Phenanthrene	X	X
Fluoranthene	X	X
Pyrene	X	X
Benzo(a)anthracene*	X	
Chrysene*	X	X
Benzo(k)fluoranthene*	X	
Pesticides and PCBs:		
Chlordane*	X	
Heptachlor epoxide*	X	
Total PCBs*	X	X
4-4-DDT*	X	X
4-4-DDE*	X	X
4-4-DDD*	X	X
Inorganics:		
Lead*	X	X

* Chemicals classified as carcinogens by USEPA

TABLE 15
INORGANIC COMPOUNDS EXCLUDED AS CHEMICALS
OF POTENTIAL CONCERN FROM SOILS USING
A CHILD RESIDENT EXPOSURE SCENARIO*
SHERIDAN WASTE OIL CO. SITE
MEDFORD, NY

COMPOUND	MAXIMUM DETECTED CONCENTRATION (mg/kg)	BACKGROUND RANGE FOR NY REGION (1) (mg/kg)	ALLOWABLE DAILY INTAKE (mg/kg/day)	BASIS FOR ALLOWABLE DAILY INTAKE	MAXIMUM PREDICTED INTAKE (mg/kg/day)
Aluminum	8,940	1,000 – 25,000	0.5 (3)	Doull et al., 1980	0.26
Arsenic	2.4	3–12	0.001	Oral RfD (4)	0.000069
Barium	36.3	15 – 600	0.13	Estimated Adequate and Safe Intake (5)	0.00010
Calcium	11,800	130 – 35,000	60	RDA (6)	0.34
Chromium	12.1	1.5–40	0.005	Oral RfD (VI)	0.00035
Cobalt	3.2	2.5 – 60	1	Chronic toxic dose in children (7)	0.000092
Copper	17.2	1–15	1.4	Estimated Adequate and Safe Intake	0.00050
Iron	8,530	17,500 – 25,000	49	Estimated toxic level for humans (6)	0.25
Lead	195	10 – 37	0.00075	Back-calculation from USEPA Drinking Water Action Level	0.0056
Magnesium	839	1,700 – 6,000	10	RDA	0.024
Manganese	155	50 – 5,000	0.1	Oral RfD	0.0045
Nickel	10.4	0.5 – 25	0.02	Oral RfD	0.00030
Potassium	669	8,500 – 43,000	154	Estimated Adequate and Safe Intake	0.0193
Vanadium	14.6	25 – 60	0.003	Oral RfD	0.00042
Zinc	69.3	37 – 60	0.5	RDA	0.0020

Selected as a CPC

* A Child resident is the most exposed individual on a daily basis to contaminants in soil

(2) "Background concentrations of 20 elements in soils with special regard for New York State", NYSDEC, no date

(3) Estimated intake of aluminum (largely from food)

(4) HEAST, 1991 (USEPA, 1991b)

(5) NAS, 1980

(6) Recommended Daily Allowance; NAS, 1980

(7) NAS, 1980

ATTACHMENT C

REVISION OF SOIL INGESTION RATE

The USEPA (1991) Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" currently suggests for an individual engaged in construction or landscaping, a soil ingestion rate of 480 mg/day. This value was obtained from a Hawley (1985) article on exposure to contaminated soil. ABB-ES has reviewed the Hawley article and suggests a revised soil ingestion rate based on more recently available data.

Hawley assumed the following for an adult's ingestion exposure to outdoor soil:

1. The inside surface of the hands (fingers and thumbs) is 14% of the entire surface of the hands.
2. An adult ingests soils covering one-half of the inside surface of the hands two times per day.
3. The amount of soil adhering to the hands is 3.5 mg/cm^2, based on density of soils and an assumed thickness of the adhering soil layer.

Items 1 and 2 appear reasonable. However, USEPA (1992) has recently issued guidance on adherence of soil to the skin surface (item 3). The guidance describes various studies and lists suggested values for use in risk assessment. The value to represent an average adherence is 0.2 mg/cm^2, while 1 mg/cm^2 is suggested as a reasonable upper value.

If Hawley's assumptions (items 1 and 2, above) are used and it is also assumed that, 1) the surface area of the hands (adult, male and female combined) is 790 cm^2 (USEPA, 1989); and, 2) soil adherence is 1 mg/cm^2, a soil ingestion rate of 110 mg/day is obtained.

REFERENCES

Hawley, John, K., 1985. "Assessment of Health Risk from Exposure to Contaminated Soil"; Risk Analysis; Vol. 5, No. 4.

USEPA, 1989. Exposure Factors Handbook; Exposure Assessment Group, Office of Health and Environmental Assessment, Washington, D.C., May 1989.

USEPA, 1991. Standard Default Exposure Factors. Human Health Evaluation Manual, Supplemental Guidance; Office of Emergency and Remedial Response; OSWER Directive 9285.6-03; Washington, D.C.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; Office of Research and Development; EPA/600/8-91/011B; Washington, D.C.

ATTACHMENT D

SOIL SAMPLE LOCATIONS

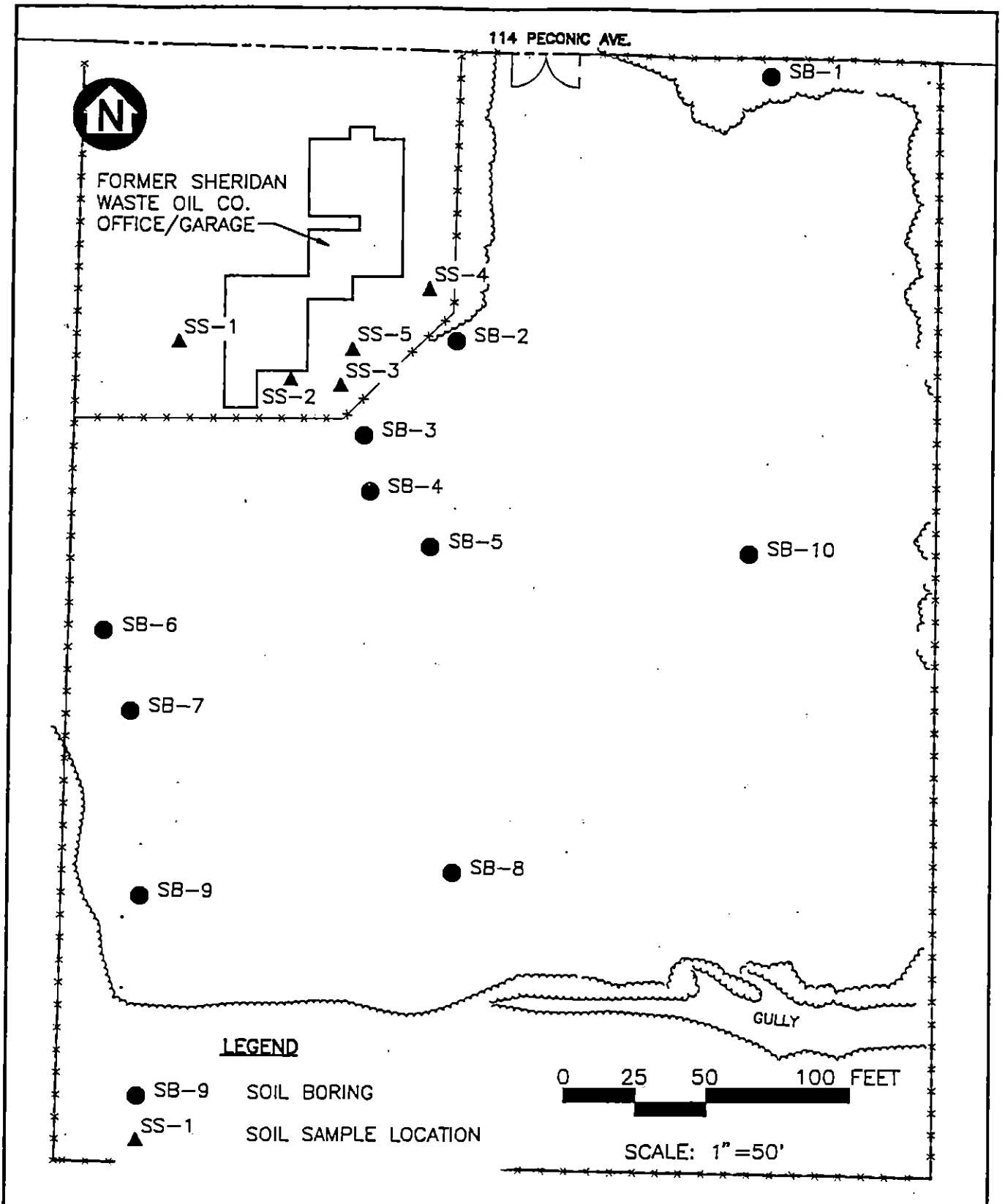

ABB Environmental Services	SOIL SAMPLE LOCATIONS
SHERIDAN WASTE OIL SITE MEDFORD, NEW YORK	SHERIDAN WASTE OIL CO. SITE
	7121-21 FIGURE ---

FIG-8

ATTACHMENT E

SOIL DATA

TABLE 7-1
SUMMARY OF SITE-WIDE SURFACE SOIL DATA

SHERIDAN WASTE OIL CO. SITE
MEDFORD, NEW YORK

COMPOUND	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION	95TH UCL	95TH MAX	ARITHMETIC AVERAGE CONCENTRATION*	BACKGROUND ARITHMETIC AVERAGE CONCENTRATION	BACKGROUND CONCENTRATIONS IN NEW YORK REGION**
VOLATILE ORGANICS (ug/kg)							
Tetrachloroethene	1/5	2	7.59	2	4.90	--	
SEMIVOLATILE ORGANICS (ug/kg)							
2-Methylnaphthalene	1/5	180	377	180	223	--	
Acenaphthene	1/5	11	410	11	189	--	
Benzo(a)Anthracene	1/5	79	235	79	160	--	
Benzo(k)Fluoranthene	1/5	88	240	88	158	--	
Butylbenzylphthalate	2/5	78-81	390	81	182	--	
Carbazole	1/5	4	413	4	188	--	
Chrysene	1/5	200	201	200	184	--	
Di-n-butylphthalate	5/5	210-2,600	2,448	2,600	706	--	
Di-n-octylphthalate	2/5	19-41	253	41	119	--	
Diethylphthalate	1/5	54	397	54	198	--	
Fluoranthene	1/5	97	225	97	163	--	
N-Nitrosodiphenylamine	1/5	26	405	26	192	--	
Naphthalene	1/5	28	405	28	193	--	
Phenanthrene	3/5	20-53	225	53	93.6	--	
Pyrene	3/5	29-130	234	130	111	--	
PESTICIDES/PCBs (ug/kg)							
4,4'-DDD	1/4	0.98	10.1	0.98	3.52	--	
4,4'-DDE	4/5	1-11	12.1	11	5.35	--	
4,4'-DDT	3/5	1.8-13	14.9	13	6.79	--	
Aroclor-1260	2/5	13-360	336	360	85.3	--	
Heptachlor Epoxide	4/5	0.64-5.1	4.64	5.1	1.72	--	
alpha-Chlordane	4/5	0.33-36	34.0	36	9.05	--	
gamma-Chlordane	4/5	0.61-28	26.5	28	7.28	--	
METALS (mg/kg)							
Aluminum	5/5	5,560-8,940	9,080	8,940	6,884	--	1,000 - 25,000
Arsenic	5/5	1.9-2.4	2.50	2.4	2.18	--	3 - 12
Barium	5/5	14.5-36.3	40.3	36.3	25.1	--	15 - 600
Calcium	5/5	248-4,020	4,086	4,020	1,774	--	130 - 35,000
Chromium	5/5	8.7-9.6	10.3	9.6	8.40	--	1.5 - 40
Cobalt	4/5	2.2-2.6	3.29	2.6	2.08	--	2.5 - 60
Copper	4/5	4.5-8.9	9.80	8.9	4.93	--	1 - 15
Iron	5/5	6,180-8,530	8,464	8,530	6,942	--	17,500 - 25,000
ad	5/5	5.8-123	130	123	58.2	--	10 - 37
agnesium	5/5	640-781	820	781	730	--	1,700 - 6,000
anganese	5/5	46-155	150	155	75.8	--	50 - 5,000
ickel	2/5	5.2-10.4	10.4	10.4	4.26	--	0.5 - 25
Potassium	1/5	374	382	374	219	--	8,500 - 43,000
Vanadium	5/5	11.1-14.6	15.6	14.6	13.2	--	25 - 60
Zinc	5/5	15.8-67.3	74.8	67.3	43.1	--	37 - 60

Samples used to estimate surface soil exposures obtained from SS-1 through SS-4 and SB-2 at 0 - 2 ft bgs.

NOTES:

* Arithmetic average concentrations - non-detects were assigned values of one-half the Sample Quantitation Limit (SQL) value.

** Concentrations obtained from "Background Concentrations of 20 Elements in Soils with Special Regard for New York State" (No date). Paper prepared by E. Carol McGovern, NYSDEC Wildlife Resources Center.

-- No background surface soil sample available.

bgs Below ground surface.

ug/kg micrograms per kilogram

mg/kg milligrams per kilogram.

TABLE 7-2
SUMMARY OF SUBSURFACE SOIL DATA

SHERIDAN WASTE OIL CO. SITE
MEDFORD, NEW YORK

COMPOUND	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION	95TH UCL	95TH MAX	ARITHMETIC AVERAGE CONCENTRATION*	RANGE OF BACKGROUND CONCENTRATIONS	BACKGROUND CONCENTRATIONS FOR INORGANICS IN NY REGION**
VOLATILE ORGANICS (ug/kg)							
1,1,1-Trichloroethane	1/11	2	384	2.00	63.8	ND	
1,1-Dichloroethane	1/11	3	384	3.00	63.9	ND	
1,2-Dichloroethene (total)	2/11	6-1,200	707	1,200	114	ND	
2-Butanone	2/11	7-10	384	10.0	64.5	ND	
4-Methyl-2-Pentanone	1/11	10	384	10.0	64.5	ND	
Acetone	1/11	490	489	490	112	ND	
Benzene	1/11	1	384	1.00	63.6	ND	
Ethylbenzene	3/11	6-2,100	1,237	2,100	200	ND	
Styrene	1/11	25	385	25.0	65.9	ND	
Tetrachloroethene	3/11	1-9	384	9.00	64.0	ND	
Toluene	3/11	13-13,000	7,648	13,000	1,218	1	
Total Xylenes	3/11	39-14,000	8,303	14,000	1,398	ND	
SEMIVOLATILE ORGANICS (ug/kg)							
2-Methylnaphthalene	3/11	41-160	301	160	169	ND	
Acenaphthene	3/11	24-32	311	32.0	154	ND	
Anthracene	1/11	20	301	20.0	180	ND	
Butylbenzylphthalate	5/11	110-2,200	1,679	2,200	558	ND	
Carbazole	2/11	15-21	312	21.0	166	ND	
Chrysene	2/11	110-110	284	110	183	ND	
Di-n-butylphthalate	11/11	260-5,400	4,671	4,671	1,946	370 - 620	
Di-n-octylphthalate	4/11	26-53	303	53.0	144	ND	
Diethylphthalate	5/11	57-140	291	140	152	ND	
Fluoranthene	3/11	31-80	305	80.0	159	ND	
Fluorene	2/11	24-41	307	41.0	169	ND	
Hexachlorobenzene	1/11	30	297	30.0	180	ND	
Isophorone	1/11	240	287	240	200	ND	
[illegible]alene	3/11	19-150	306	150	165	ND	
[illegible]threne	3/11	46-70	300	70.0	162	ND	
[illegible]	1/11	41	296	41.0	183	ND	
Pyrene	3/11	68-89	293	89.0	168	ND	
bis(2-Ethylhexyl)phthalate	5/11	31-960	2,803	960	769	1500	
PESTICIDES/PCBs (ug/kg)							
4,4'-DDD	2/11	3-9.4	8.14	9.40	3.28	ND	
4,4'-DDE	1/11	1.9	7.71	1.90	3.10	ND	
4,4'-DDT	1/11	4.1	7.88	4.10	3.30	ND	
Aroclor-1242	2/11	120-160	123	160	40.5	ND	
METALS (mg/kg)							
Aluminum	11/11	114-3,580	3,579	3,579	1,283	572 - 5860	1,000 - 25,000
Arsenic	1/11	1.3	1.00	1.30	0.618	ND	3 - 12
Barium	5/11	9.1-32	27.0	32.0	9.55	4.0 - 13.8	15 - 600
Calcium	5/11	358-11,800	7,086	11,800	1,363	ND	130 - 35,000
Chromium	10/11	1.6-12.1	10.4	10.4	4.70	2.2 - 5.7	1.5 - 40
Cobalt	6/11	1.5-3.2	3.28	3.28	1.69	2.7	2.5 - 60
Copper	4/11	2.8-17.2	12.0	17.2	3.36	ND	1 - 15
Iron	11/11	292-4,350	4,319	4,319	1,822	972 - 5180	17,500 - 25,000
Lead	11/11	0.68-195	130	130	31.5	0.77 - 3.5	10 - 37
Magnesium	4/11	342-839	633	839	250	732	1,700 - 6,000
Manganese	11/11	2-48.8	40.9	40.9	17.0	20.9 - 36.7	50 - 5,000
Potassium	5/11	382-669	617	669	324	ND	8,500 - 43,000
Vanadium	9/11	2.1-7.3	8.07	8.07	3.83	9.7	25 - 60
Zinc	7/11	1.6-69	50.3	50.3	13.4	1.6 - 8.1	37 - 60

Samples used to estimate subsurface soil exposures obtained from SB-1 through SB-10 at 2-16 ft bgs.

NOTES:

* Arithmetic average concentrations - non-detects were assigned values of one-half the Sample Quantitation Limit (SQL) value.

** Concentrations obtained from "Background Concentrations of 20 Elements in Soils with Special Regard for New York State" (No date). Paper prepared by E. Carol McGovern, NYSDEC Wildlife Resources Center.

[illegible] detected in two background samples from SB-1.

[illegible]micrograms per kilogram

[illegible]milligrams per kilogram

bgs Below ground surface.