Public Health Assessment for

ICT

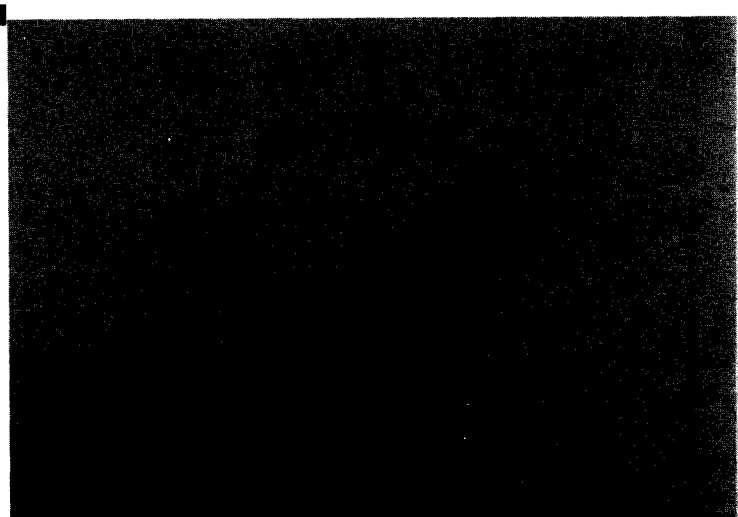
OLD SOUTHINGTON LANDFILL

SOUTHINGTON, HARTFORD COUNTY, CONNECTICUT

CERCLIS NO. CTD980670806

MARCH 9, 1995

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry



THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i) (6) (F) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

PUBLIC HEALTH ASSESSMENT

OLD SOUTHINGTON LANDFILL

SOUTHINGTON, HARTFORD COUNTY, CONNECTICUT

CERCLIS NO. CTD980670806

Prepared by

Connecticut Department of Public Health and Addiction Services
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry (ATSDR)

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30 day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

Additional copies of this report are available from:
National Technical Information Service, Springfield, Virginia
(703) 487-4650

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, is an agency of the U.S. Public Health Service. It was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists then evaluate whether or not there will be any harmful effects from these exposures. The report focuses on public health, or the health impact on the community as a whole, rather than on individual risks. Again, ATSDR generally makes use of existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further research studies are needed.

Conclusions: The report presents conclusions about the level of health threat, if any, posed by a site and recommends ways to stop or reduce exposure in its public health action plan. ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions

of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When informed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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SUMMARY

The Old Southington Landfill (OSL) is located in Southington, Connecticut. The landfill operated for approximately 47 years, between the years 1920 and 1967. Open dumping of liquid, solid and hazardous wastes began in 1950. Open burning of wastes and spontaneous chemical fires occurred for an unknown period of time prior to 1964. In 1967 the landfill was closed and the property was subdivided and developed into residential and commercial properties.

Various contaminants of concern, including volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, and pesticides have been found in ground water and soil. One public well (number five) located northwest of OSL was found to be contaminated with VOCs. VOCs were identified above background levels in 1976 and the public well was taken out of service in 1979. The well was operated until 1979 because the limited number of drinking water standards in effect at that time were not exceeded.

The principal community health concerns associated with the site include: current exposures to potentially contaminated indoor and outdoor air which several residents state were making them feel sick; and concern that the soil on residential property is contaminated and possibly not safe for growing edible plants. In addition, the residents expressed concern over the potential for exposures to contaminants from swimming and fishing in Black Pond.

A preliminary investigation by the Connecticut Department of Public Health and Addiction Services (CT DPHAS) found small age-specific increases in bladder and testicular cancers for the entire town. This review was initiated by a citizen's complaint.

Based on the physical hazards associated with the methane contamination of indoor air in commercial facilities, the site is a public health hazard. However, the physical hazards associated with the methane are currently being addressed. Workers have been, and are now potentially being exposed to hazardous levels of methane and potentially other unknown toxic gases in indoor air. Residents received exposures to site related compounds from a contaminated public drinking water well for an undetermined amount of time. In addition, airborne exposures may have occurred in the past from open burning of waste and chemical fires.

The data and information evaluated in the public health assessment for the Old Southington Landfill, Southington, Connecticut was reviewed by the ATSDR Health Activities Recommendations Panel for appropriate follow-up with respect to health actions. The panel determined that community and health professional education are indicated for the site. In addition, other follow up actions will be considered when the results of a dose reconstruction analysis

and further analysis of a cancer cluster study are complete -- these actions are on-going or planned in relation to the Solvents Recovery Services of New England site, Southington, Connecticut.

BACKGROUND

In cooperation with the ATSDR the CT DPHAS evaluated the public health significance of the Old Southington Landfill (OSL) site. The purpose of the public health assessment is to determine whether adverse health effects are possible and to recommend actions to reduce or prevent possible health effects.

A. SITE DESCRIPTION AND HISTORY

The OSL, also referred to as the Old Turnpike Road Landfill, is located in Southington (Hartford County), Connecticut. The 13 acre site is located adjacent to Old Turnpike Road in the Plantsville section of town (see Figure 1-1 in Appendix 1). Town production well number five is located approximately 700 feet northwest of the landfill. Based on the Remedial Investigation/Feasibility Studies (RI/FS) documents reviewed (GZA 1989, 1990, 1991; ESE 1993), the landfill site is located parallel to and along the eastern side of Old Turnpike Road.

Based on the ATSDR review of available studies (Bionetics 1988; GZA 1990; GZA 1991; O'Connor Connecticut Department of Environmental Protection (CT DEP) Memorandum 1991), the extent of the landfill's boundaries are not established and have not been clearly defined by the RI/FS (GZA RI/FS 1990;1991) conducted to date.

A review of historical aerial photography (Bionetics, 1988) and according to interviews with local residents, there are eleven buildings (including four residential buildings) located on the OSL site. Figure 1-2 in Appendix 1 shows a map of the commercial and residential properties that comprise the site and the neighboring study area.

The OSL site is bordered by Old Turnpike Road to the west, Rejean Road to the north and Black Pond to the east (Figure 1-2 in Appendix 1). The surrounding neighboring properties include town production well number five, the land occupied by the Lori Corporation, WNT4 Radio Station and Chuck and Eddie's Used Auto Parts yard to the west of the site. A total of eleven buildings (which includes eight industrial and four residential properties) were mapped as potentially being located on the OSL site in a report by Bionetics (1988).

The OSL operated for approximately 47 years, from 1920 to 1967. Open dumping at the landfill began in 1950. During this period, liquid, solid, and hazardous wastes were accepted from residential, commercial, and industrial sources. Hazardous materials reportedly disposed of in the landfill include metal hydroxide sludge, metals, organic solvents, and acid/alkali solutions (GZA 1989). Prior to 1964, open burning took place at OSL for an unknown period of time (Harvanek, J 1990). Based on past records (E & E, 1980, in GZA

1990; CFE 1979), approximately 2.7 million gallons of solvent contaminated waste were disposed of in the landfill. Chemical classes documented at OSL include: a variety of VOCs, PCBs, pesticides, furans, and metals.

After the landfill closed in 1967, the property was subdivided and developed into commercial, industrial and residential properties. The process of landfill closure included compacting loose refuse, covering the landfill with clean fill and seeding the material with grasses. Areas to the north of Rejean Road are believed to be partially wetlands prior to the construction of the existing residential area. A review of state aerial photography files indicates that filling of this area with soil began in the late 1960s.

Although the landfill was covered and subdivided there has been no remediation of the site to date.

In 1985, the site was placed on the U.S. Environmental Protection Agency's (EPA) National Priority List (NPL) of hazardous waste sites, due to the ground water contamination (above background levels) identified in town municipal well number five. The town municipal well number five was installed in 1971. In 1979, the well was deactivated because ground water analysis indicated the presence of VOCs, including 1,1,1-trichloroethane (TCA) at levels exceeding the CT DPHAS water quality guidelines. This well was never reactivated and was abandoned by the Southington Water Department in August of 1987. Although not site related, other town wells (number 2, 4, and 6) were also identified as contaminated with VOCs during the mid 1960s to the late 1970s.

Four water supply wells are located within 1,000 feet of the OSL. One well, located at the Lori Corporation, is used for industrial processes. A second well, located at Chuck and Eddie's is used for fire suppression needs and not for drinking purposes (Personal Communication November 28, 1994). The third well was used as a potable water supply at a private residential property. This well is located approximately 360 feet southwest of the southern end of the study site and is now inactive. The fourth well located at Solomon Casket, is currently inactive. The well was used for the washing of trucks and occasionally for drinking purposes for an unknown period of time until 1988. Both the private residence and the Solomon Casket facility were connected to public water in 1988 and 1991 respectively.

In 1989, the ATSDR performed a Preliminary Health Assessment on OSL. Based on the information available at that time, the site was considered to be a potential public health concern because of the risk to human health caused by the potential exposures to hazardous substances.

Actions Implemented During the Health Assessment Process

The public health actions that were implemented by the ATSDR, the CT DPHAS, CT DEP, and the EPA are as follows:

1. In 1991 and 1992, dangerously elevated levels of methane posing an explosion hazard were detected in three on-site commercial facilities. In response, at the request of the EPA, methane alarms and engineering controls were subsequently installed by Environmental Science and Engineering (ESE) to protect on-site residents and workers. The CT DPHAS performed on-site educational meetings to teach facility employees and residents about the hazards of methane and how to protect themselves.

2. The CT DPHAS and the CT DEP sampled fish from Black Pond in order to assess what potential compounds may be bioaccumulating in the fish and what adverse effects may occur as a result of ingestion. No adverse health effects are expected from the ingestion of fish from Black Pond.

3. The CT DPHAS sampled tap water from the four on-site residences in order to assess whether site related contaminants are migrating into water supply pipes. No contaminants were identified in the water samples taken.

4. The ATSDR performed a health consultation to assess the potential health risks associated with the levels of combustible gases at OSL and recommended actions to protect the public health. The health consultation is attached in Appendix 4.

5. The CT DPHAS and the CT DEP met with residents in their homes frequently to discuss the results of environmental data and other concerns with the site.

6. The EPA conducted a soil gas survey as part of the RI/FS in order to assess ambient air contamination. This gas study was performed outside of the buildings and has investigated the types of gases generated in order to design an appropriate permanent remedy for gases released by the landfill.

7. The EPA conducted surface soil sampling as part of the RI/FS in order to assess exposure to contaminated soils. A review of the sampling data results indicates that exposures to surface soils do not present a health concern.

8. The EPA has characterized the extent and degree of contamination that exits on the site and has delineated much of the site boundaries as part of the RI/FS.

9. The Southington Fire Department is monitoring all residential

and industrial facilities for methane bimonthly to protect residents and workers on the landfill from fire and explosion hazards.

B. SITE VISIT

Several site visits have been conducted by the following representatives of the CT DPHAS, Division of Environmental Epidemiology and Occupational Health, Brian Toal, Edith Pestana, Sandra Geschwind, Jennifer Kertanis, and Kenneth Foscue. The CT DPHAS personnel were accompanied by representatives from the CT DEP, and Suzanne Simon of the ATSDR. The site visits were performed in April, July, and November of 1991, and in May, June, and July of 1992. The following residences were visited: 413 and 425 Old Turnpike Rd and 101 Rejean Rd. The following commercial facilities were visited: Northeast Machine Company, Southington Parks and Recreation Department, R.V. & Son, Southington Metal Fabricator, and Solomon Casket.

Evidence of subsidence was observed in each of the commercial facilities ranging from one inch to 24 inches.

Four private residences are located along the northern portion of the landfill just north and west of Black Pond. A survey of these properties did not reveal any visual leachate or landfill associated materials. One of the residences had a rowboat located on the banks of Black Pond that appeared to be actively used. In addition, a raft was observed along the northern shore of the pond.

Black Pond is located just east-northeast of the commercial properties. Inspection of the southwest shore of Black Pond on April 16, 1991, revealed seepage of landfill leachate material into the pond and adjacent wetlands. In addition, refuse was also observed along the banks of Black Pond. Seepage of landfill leachate was also observed in the wetlands located south of Black Pond on the approach road to the Meriden Box Property. Located just north of Black Pond on Rejean Road is a small area of undeveloped municipal land used for recreational purposes.

Explosive levels of methane were measured in floor cracks in the Southington Parks and Recreation building and in two buildings (northernmost and southernmost buildings) at Southington Metal Fabricators during a site visit in July of 1992 by Edith Pestana and a fireman from the Southington Fire Department. The public health implications of the methane levels found are discussed in the On-site Contamination and Physical and Other Hazards Sections.

C. DEMOGRAPHICS, LAND USE AND NATURAL RESOURCE USE

The township of Southington, CT had a 1990 Census population of 38,518 persons. The area surrounding the site represents a mixture

of light industrial and residential areas. The OSL site is located in the Standard Metropolitan Statistical Area 5440, County 003, and census tracts 4301, 4303, and 4304.

Approximately 19 percent of the population in the three census tracts is over 65 years of age and 6 percent is under 5 years old. The population is 98 percent white, divided equally between males and females. A total of 13,285 people and 4,578 housing units comprise the three census tracts that are all within 1/2 mile of the site boundary.

The landfill is located approximately 700 feet southeast of municipal well number five. This well operated from 1972 to 1979, and was used as a public potable water source, which supplied between 9 and 24 percent of the total water supply for the town. In 1976, sampling results indicated the presence of TCA at levels exceeding the CT DPHAS guidelines and the well was deactivated.

There are four residential homes located on the site. All residences located on-site and on neighboring properties and all commercial facilities on-site are connected to public water.

Two properties within 1,000 feet of the landfill were found to use private wells for non-potable water purposes: Chuck and Eddie's Junkyard and the Lori Corporation. One private residence used their wells for potable purposes up until the summer of 1991 when they were connected to the public water supply.

Black Pond is located due east of the northern portion of the landfill. The pond has dimensions of approximately 400 feet by 600 feet. A stream flows west from Black Pond toward the swamp area to the west of OSL and ultimately drains into the Quinnipiac River, approximately 4,500 feet to the west. A second stream flows into Black Pond from the northern residential area above Rejean Road. Surface water drainage from Rejean Road, Old Turnpike Road and the surrounding areas flow into Black Pond as well. The pond is used for several recreational purposes including swimming, boating, fishing, and duck hunting.

D. HEALTH OUTCOME DATA

Based on a citizen complaint in March of 1990, the CT DPHAS began to investigate the concern that there was an excess of cancer cases in Southington, Connecticut. While this complaint was initially generated because of potential exposure to the Solvent Recovery Service of New England (SRSNE) NPL site, (located approximately four miles due north of the OSL site), the investigation included the entire town. The rationale for including these data in this report is based on the fact that potentially a large percentage of the population of the town was exposed to contaminated drinking water from several municipal town wells (number 2, 4, 5, and 6). In

addition, all water wells in town are pumped through the entire town water distribution system, thereby allowing for mixing and cross contamination of water from the various wells throughout the town.

1. Studies of tumor incidence in Southington, CT

In the Spring of 1990, the CT DPHAS was contacted by a resident of Southington who was concerned that there was an excess of cancer occurring in that resident's neighborhood near the SRSNE site. This concern triggered an initial investigation of cancer incidence in the town of Southington and then subsequent follow-up investigations. These investigations are included in this health assessment because they studied tumor incidence in the entire town, not just near the SRSNE site.

All tumor incidence information was obtained from the CT DPHAS Tumor Registry. Since 1935, any tumor diagnosed to a resident of Connecticut must be reported to the CT DPHAS Tumor Registry. In addition to reporting from physicians, hospital records are reviewed by the Tumor Registry to ensure that reporting is complete.

a. Initial study of cancer incidence in Southington 1979 to 1988

The citizen who first expressed concern regarding excess cancer in Southington provided a list of cases that was verified against the Tumor Registry records to confirm primary site of diagnosis, age of the case, and date of diagnosis. The CT DPHAS then gathered data on the incidence of leukemia, non-Hodgkin's lymphoma, bladder, brain, and breast cancer for the town of Southington and the state of Connecticut for the years 1979 to 1988.

The purpose of this initial study was to compare cancer incidence rates in the entire town of Southington with State of Connecticut cancer incidence rates. The results of this study is discussed in the Public Health Implications section.

b. Follow-up study of bladder and testicular cancer in Southington 1970 to 1989 using Geographic Information System (GIS) technology

While none of the tumor sites studied in the initial investigation showed an overall excess in the town of Southington, it did not address the question of the possible increase of cancer occurring in particular neighborhoods. There were age specific increases in the bladder cancer rate for the age group 40-49 years, but not in the overall cancer rates for the town. Bladder and testicular cancer were selected for further study because:

* the age specific increases in bladder cancer,

* continued concern on the part of citizens regarding testicular cancer,

* the water was known to be contaminated, and

* it seemed biologically possible that bladder cancer rates may have been affected.

The purpose of the study was to determine where the cancer cases occurred in Southington and whether the incidence of these cases was higher near the SRSNE site. A computerized Geographic Information System (GIS) assisted in the mapping of testicular and bladder cancer cases that occurred to residents of Southington during the years 1970 to 1989. The GIS also was used to determine if these cases lived within one mile of the contaminated wells and to estimate the number of persons living within one mile of the wells.

The results of this study are discussed in the Public Health Implications Section.

c. **Expanded GIS study of exposure to contaminants and cancer incidence in Southington 1970-1989**

The study of bladder and testicular cancer relied on the assumption that those persons who lived within one mile of the contaminated wells were more likely to receive higher levels of contaminants in the water distribution system than persons who lived further than one mile from the contaminated wells. This rough exposure assessment may not accurately reflect the travel of the contaminants in the water distribution system. Therefore, the ATSDR has funded the CT DPHAS to conduct an expanded study to better assess how residents of Southington were exposed to contaminants from the wells (including well number five near OSL), and contaminants released into the air from SRSNE.

Cases of liver and kidney cancer, leukemia, lymphoma, and Hodgkins disease will be mapped using the GIS. The water distribution system is being evaluated by the ATSDR to develop an exposure ranking scheme. Census blocks will be scored for the amount of water contamination the people living within the census block were likely to have received through the water distribution system. Air contaminants will be similarly ranked. The goal of this study is to compute cancer rates for each tumor site by a relative measure of exposure to contaminants in the water and the air and determine if there is a dose-response association between cancer risk and exposure to contaminants.

2. Infant and Perinatal Mortality Rate.

Given that infants are especially sensitive to environmental conditions, preliminary trend assessments of infant (1 to 11 months) and perinatal (fetal deaths, age greater than 20 weeks and neonatal deaths age 1 to 28 days) mortality rates were performed by the CT DPHAS Division of Health Surveillance & Planning Unit.

Infant and perinatal mortality rates were calculated for Southington and the surrounding towns for the years 1947 to 1988 and compared with those of the state for the same period by the CT DPHAS Division of Health Surveillance & Planning (see Appendix 3 for results). The results are discussed in the Public Health Implications Section.

COMMUNITY CONCERNS

On November 21, 1991, the CT DPHAS held an informal 'public availability' session in Southington in order to discuss with local residents any community health concerns associated with the OSL site. Approximately 20 local residents attended the meeting and expressed the following concerns:

1. Residents living on the landfill are concerned about the potential exposures to toxic indoor air emissions.

2. Residents expressed concerns about potential exposures to contaminated soils and gases while performing gardening and general yard work. One resident stated that skin rashes sometimes develop while working in the yard. In addition, residents question whether they can grow vegetables and fruit on their property as they are concerned that the soil is contaminated.

3. Recreational activities such as fishing and swimming are common in Black Pond. Residents feel these recreational activities are unsafe and that warning signs should be posted along the shores of the pond to keep people out.

4. An employee from the Southington Parks and Recreation Department stated that the building where he worked was contaminated with toxic gases. He stated that he experienced an allergic skin reaction (reddening and burning of the skin) while working inside one of the facility buildings. He stated that other employees avoid working in the building because they experience nausea and headaches when they work inside.

5. Residents living within the northern boundary of OSL have expressed concern over recent indoor air samples taken by the EPA. One resident expressed concern as to the meaning and

interpretation of the indoor air results and delays in governmental decision making.

6. Several residents will not drink the tap water in their homes because the public water supply pipes were installed in landfill material.

7. Several residents and employees of the commercial facilities stated that they see the EPA RI/FS workers wearing health and safety protective clothing and equipment on their property. They feel the EPA is keeping information from them and they are worried about their safety.

A community meeting was held on April 21, 1994, to provide information on the causes and movements of landfill gases and to listen and note any health concerns related to landfill gases. The following community concerns were noted.

8. Residents living along Rejean Road raised concerns about the possibility of landfill gases entering their homes and the lack of adequate environmental monitoring to determine the likelihood of such movement.

9. Residents living on the northern portion of the landfill did not believe that the methane monitors installed in their homes were adequately checked or maintained.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The majority of the sampling data reviewed for this assessment was obtained from the EPA RI/FS performed by GZA Consultants. Data were also obtained from the CT DEP and the Southington Water Company files. During the investigations by GZA on-site and off-site samples were collected from ground water, soils, ambient air, surface water, and surface water sediments.

Sampling for methane in indoor air is being conducted as a follow-up to citizen complaints and because unsafe levels have been detected in commercial buildings. In addition, combustible gases have been detected in residential yards.

In the data tables that follow under the On-site Contamination and Off-site Contamination subsections, the listed contaminant does not mean that it will cause adverse health effects from exposures. Instead, the list indicates which contaminants will be evaluated further in the Health Assessment.

Comparison values for health assessments are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk

Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on a one excess cancer in a million persons similarly exposed over a lifetime. Maximum Contaminant Levels (MCLs) represent drinking water contaminant concentrations that EPA deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of two liters of water per day. Proposed Maximum Contaminant Goals (PMCLGs) are MCLs that are being proposed. While MCLs are regulatory concentrations, PMCLGs are not. The EPA Reference Dose (RfD) is an estimate of the daily exposure to a contaminant that is not expected to cause adverse health effects.

A. THE TOXIC CHEMICAL RELEASE INVENTORY

To identify possible facilities that could contribute to contamination near the site, the 1989 Toxic Release Inventory (TRI) was searched. The TRI contains information on total releases of chemicals from certain industries. Only the Lori Corporation located just north of the OSL was listed on the TRI in 1989. The facility reported releasing 250 pounds of copper and 15,000 pounds of trichloroethylene into the air. The TRI did not contain information on any of the commercial facilities located on the landfill.

The TRI does not identify all facilities which may have historically contributed to contamination near the site.

B. ON-SITE CONTAMINATION

The on-site contamination which is presented in Table 1 through Table 4 include sampling data from ground water monitoring wells, surface and subsurface soils, and indoor air. The data in the tables reflect all contaminants of concern identified and their range of concentrations. These chemicals are those which are present in high concentrations relative to comparison values, and which are known to be toxic. Comparison values are contaminant concentrations in specific media (soil, air, ground water, etc.) that are used to select contaminants for further evaluation.

Ground Water-Monitoring Wells

GZA (1990, 1991) and ESE (1992) sampled 12 on-site ground water monitoring wells and detected VOCs, semi-volatile compounds (SVOCs), metals, and PCBs above comparison values. Table 1 lists those contaminants detected above comparison values.

Table 1.GROUND WATER CONTAMINATION IN ON-SITE MONITORING WELLS(1,2)

CONTAMINANT	CONCENTRATION RANGE ppb	COMPARISON VALUE ppb	SOURCE
Benzene	ND - 27	1	CREG
Beryllium	ND - 24.6	0.008	CREG
Cadmium	5 - 14.4	7	EMEG
Chromium	ND - 593	100	MCL
1,1-Dichloroethene	ND - 580	0.06	EMEG
1,2-Dichloroethene	ND - 3,000	70	MCL
Ethyl Benzene	ND - 710	700	MCL
Manganese	6.2 - 50,500	200	RMEG
Naphthalene	ND - 100	20	LTHA
PCBs	ND - 8.3	0.005	CREG
Di(2-ethyhexyl) phthalate(DEHP)	ND - 78	3	CREG
Toluene	ND - 12,000	7,000	RMEG
1,1,1-Trichloroethane	ND - 1,300	200	MCL
Trichloroethylene	ND - 11	3	CREG
Vinyl Chloride	ND - 3,500	0.7	EMEG

CREG - Cancer Risk Evaluation Guide
EMEG - Environmental Media Evaluation Guidelines
LTHA - Lifetime Health Advisory for drinking water
MCL - Maximum Contaminant Levels: The level EPA has determined to be protective of public health over a lifetime at an exposure rate of two liters of water a day.
ND - none detected
ppb - parts per billion
RMEG - Reference Dose Media Evaluation Guide
1 GZA 1990,1991
2 ESE 1992

Private Drinking Water

On October 6, 1992, in response to citizens concerns that contaminated groundwater may enter the municipal water mains and contaminate their tap water, the CT DPHAS sampled the tap water at the four homes located on-site. The tap water samples were analyzed for metals, VOCs, and the standard chemicals that water companies are required to test for (i.e. nitrates). No chemicals were identified above health comparison values. The water was found to be hard. Hardness is a measure of the amount of calcium and magnesium in the water. Hardness is not considered to be a contaminant. Drinking water that is hard is believed to beneficial in the prevention of heart disease.

Surface Soil

Forty surface soil samples (0 to 12 inches in depth) were collected and analyzed for metals, VOCs, SVOCs, polyaromatic hydrocarbons (PAH), PCBs, and pesticides. Nineteen samples were taken from the four residential properties (ESE 1992). No contaminants were found in the surface soils above health comparison values.

Subsurface Soil

Approximately sixty-three subsurface soil and refuse samples were collected and analyzed for metals, VOCs, SVOCS, PAHs, PCBs, and pesticides collected by GZA (1990, 1991) and ESE (1992). Several VOCs and PAHs were found above comparison values. The highest concentrations of VOC contaminants were detected on the R.V. & Sons property in 1991.

Subsurface soil samples collected by ESE (1992) identified concentrations of PAHs above comparison values on the R.V. & Sons, Parks and Recreation and on all residential properties. Table 2 lists those contaminants identified above health comparison values in subsurface soils.

Table 2. SUBSURFACE SOIL CONTAMINATION ON-SITE (1, 2)

CONTAMINANT	CONCENTRATION RANGE (ppm)	COMPARISON VALUE ppm	SOURCE
Benzene	ND - 1,500	20	CREG
Benzo(a)pyrene(PAH)	ND - 690	0.1	CREG
Toluene	ND - 16,000	10,000	RMEG-C

CREG - Cancer Risk Evaluation Guide
ND - non detected
ppm - parts per million
RMEG-C - Reference Dose Media Evaluation Guide - Children
1 GZA 1990,1991
2 ESE 1992

Gas Monitoring Wells

In 1987, methane was found in four on-site gas monitoring wells and within a methane extraction trench installed by GZA at levels between 5 percent and 66 percent by volume of methane in air and above comparison values (25 percent Lower Explosive Limit {percent LEL}), indicating that a condition of gas entrapment, methane migration or both is present beneath the ground surface. The four on-site gas wells and the methane extraction trench are located east of the Northeast Machine and the Parks and Recreation buildings.

Subsurface Soil Gas

As part of the RI/FS, two soil gas surveys, and a survey for combustible gases at 111 locations throughout the site were performed by GZA and ESE.

Four pockets of detectable VOCs were found within the OSL site and neighboring properties by GZA in subsurface soils (RI/FS 1990). VOCs were detected around the buildings of R.V. & Sons, Parks and Recreation, Southington Metal Fabricators and Solomon Casket. VOC readings in exceedance of 1,000 ppm on an HNU screening instrument were measured during subsurface soil drilling in front of the R.V. & Sons Welding building by GZA in 1991. The facility was subsequently evacuated to protect employees from potentially toxic gases and fumes.

No VOCs were detected in subsurface soil gas on the residential properties.

In the July of 1992, a total of 60 subsurface gas samples were taken by ESE in order to assess VOC and methane contamination throughout the site. Samples were also taken from permanent monitoring probes on residential properties. Elevated levels of combustible gases were identified on two residential properties located on the north side of the landfill and in the areas extending from the Parks and Recreation property to the Solomon Casket property (see Figure 3 in Appendix 4 for the location of methane concentrations). Screening for combustible gases (i.e., methane) is performed with a combustible gas indicator (CGI). The CGI is an instrument that measures the percentage of gases that can be combusted in the atmosphere. The results are presented as percentages of lower explosive limit (LEL) of methane. The LEL is the minimum amount of gas required in air by volume to sustain combustion.

Combustible gas readings were identified above the LEL from subsurface (below the surface by at lease 3 inches) measurements taken from the yards of residential properties number 11 and number 12 (see Figure 1-2). Combustible gas readings ranged between 0 and in exceedance of 1,000 percent LEL (see Figure 1-2). This suggests that either methane is migrating from the southern areas of the landfill or is being generated naturally from buried organic materials.

Indoor Air

Indoor air sampling for air toxics and methane was performed on a number of occasions. The following paragraphs represent a chronological summary of the indoor air testing that has taken place at the OSL to date.

In 1986, GZA performed air quality monitoring in buildings within the study area for organic vapors, oxygen and combustible gas concentrations. This was done for the protection of on-site workers, nearby residents and businesses. VOCs were found in approximately 25 percent of the 220 samples screened.

In 1990, the EPA took indoor air samples (EPA Sept, 1990) in two homes located within the boundaries of the landfill. These homes were sampled because a study conducted by the EPA in 1985 identified methane in a commercial building located on OSL below the LEL. The concern was raised that methane buildup from the landfill may be present and could act as a carrier gas for other toxic chemicals buried within the landfill. The two private residences selected were located at 413 and 425 Old Turnpike Road. The VOCs detected were below health comparison values.

In November of 1991, the EPA had received the following reports: that workers in the Southington Parks and Recreation Department were becoming ill while inside the building; and that flames had been ignited in cracks in the concrete floor at the Southington Metal Fabricator facility during welding operations.

Subsequently, the Southington Fire Department detected the presence of organic vapors and combustible gases inside and outside of the Southington Parks and Recreation building. The Southington Fire Department obtained LEL readings ranging from 30 to 90 percent, and at least one substance in addition to methane was also detected during their survey in the Southington Parks and Recreation Department facility and Southington Metal Fabricators. The results in Table 3 show the percent LEL of methane detected.

In response on December 12, 1991, the EPA performed indoor air screening for methane and non-methane volatile organic compounds in three residential and nine commercial buildings. The EPA screening results found elevated levels of combustible gases in the breathing zone of three of the nine commercial/industrial facilities tested. No combustible gases were identified above comparison values in any of the three private residences screened.

In June of 1992, OSHA performed indoor air screening and found methane above comparison values (8-198 percent LEL) in two buildings of the Southington Metal Fabricators facility.

In August of 1992, the CT DEP sampled the private residence located at 413 Old Turnpike Road for VOCs and found benzene below comparison values.

In September of 1992, explosive levels of methane (0-70 percent LEL) were identified in the floor cracks of the R.V. & Sons welding shop by the Southington Fire Department. According to the owner of the facility, the level of combustible gases set off the ambient air combustible gas alarm.

In response to the identification of explosive levels of methane in the three commercial facilities, passive venting systems were installed in the summer and fall of 1992 in the following commercial facilities: R.V. & Sons, Southington Metal Fabricators, and Parks & Recreation Department.

In November of 1992, the EPA performed an air monitoring survey for the presence of methane and total VOCs. Samples were collected from the residential properties, two residential methane monitoring probes and from inside the following businesses: Southington Metal Fabricators, Parks and Recreation Department, Northeast Machine, WNTY Radio Station, Solomon Casket, and Meriden Box. High levels of total VOCs and explosive levels of methane were identified in the cracks in the floor of Southington Metal Fabricators. Elevated readings of total VOCs were detected in the Northeast Machine building. These detections may be due to the chemicals used in the facility (i.e. degreasers).

No VOCs or combustible gases were detected above background levels in the other facilities. None of the VOC measurements obtained from the residential properties were above health comparison values.

TABLE 3. RANGE OF METHANE CONCENTRATION IN INDOOR AIR

LOCATION	CONTAMINANT	CONCENTRATION RANGE (percent LEL)	COMPARISON VALUE (percent LEL)	SOURCE
R.V. & Sons	Methane	0 - 70	25	OSHA
Southington Dept. of Parks and Recreation	Methane	30 - 1,000	25	OSHA
Southington Metal Fabricators	Methane	8 - 198	25	OSHA

LEL-Lower Explosive Limit standard set by the Occupational Safety and Health Administration.

Ambient Air

Past exposures to contaminants in air from previous fires and the open burning of waste cannot be assessed because there are no data available for the years the landfill was in operation.

C. OFF-SITE CONTAMINATION

Ground Water Monitoring Wells

There are approximately forty-six ground water monitoring wells off-site. VOCs, SVOCs, metals, and PCB contamination above

comparison values were found in eight wells just west of the site. Table 4 lists those contaminants found above present comparison values.

Analytical testing by Warzyn in 1980 (Warzyn May 1989, p. 32) found two off-site monitoring wells with methylene chloride at 10 ppb and trans 1,2-dichloroethylene at 29 ppb. GZA could not confirm these results on their follow-up sampling of these wells in 1990.

Elevated concentrations of metals were found in off-site monitoring wells near the Lori Corporation facility and may reflect localized contamination and not contamination from the OSL site.

TABLE 4. CONCENTRATION RANGE OF CONTAMINANTS IN OFF-SITE GROUND WATER WELLS (1,2)

CONTAMINANT	CONCENTRATION RANGE (ppb)	COMPARISON VALUE (ppb)	SOURCE
Barium	41.1 - 1,080	700	RMEG-C
Benzene	ND - 9	1	CREG
Beryllium	ND - 43.5	0.008	CREG
Chromium	ND - 1,020	100	MCL
1,2-Dichloroethene	ND - 6,000	70	MCL
Ethyl Benzene	ND - 10,000	700	MCL
Lead	113 - 670	0	MCLG
Manganese	ND - 38,800	50	RMEG-C
Methylene chloride	ND - 10	5	MCL
Naphthalene	ND - 100	20	LTHA
PCBs	ND - 14	0.005	CREG
Di(2-ethyhexyl) phthalate(DEHP)	ND - 700	3	CREG
Tetrachloroethylene	ND - 62	0.7	CREG
Toluene	ND - 23,000	2000	RMEG-C
1,1,1-Trichloroethane	ND - 1,800	200	LTHA
Trichloroethylene	ND - 580	3	CREG
Vinyl chloride	ND - 23	0.7	EMEG

CREG - Cancer Risk Evaluation Guide
EMEG - Environmental Media Evaluation Guide
LTHA - Lifetime Health Advisory
MCL - Maximum Contaminant Level
MCLG - Maximum Contaminant Level Goal
ppb - Parts Per Billion
RMEG-C - Reference Dose Media Evaluation Guide -Children
1 GZA 1990, 1991
2 Warzyn 1989

Ground Water - Public Well

Municipal well number five was found to be contaminated above natural background levels in 1976 and not deactivated until 1979. The well continued to operate until 1979 because there were no water quality guidelines for VOCs when the well was initially identified as contaminated. The well was found to be contaminated with TCA, trichloroethylene, carbon tetrachloride, methane and trace amounts of lead and mercury. PCB contamination was detected by GZA in 1987 during one sampling round (GZA RI/FS Volume III, 1991). Table 5 lists those contaminants detected in municipal well number five above present comparison values. Currently there are no public drinking water wells within a mile of the OSL site. In addition, the Southington public water supply is safe to drink.

Ground Water - Private Wells

Low levels of VOCs were detected in two commercial private water wells located just west of OSL. The VOCs include chloroform, 1,2 dichloroethene, trichloroethylene, and vinyl chloride. The VOCs detected were found at levels below comparison values and are not considered a health concern. Currently there are no residential drinking water wells in the vicinity of the site. All residential wells in the vicinity of the site have been connected to the public water supply.

TABLE 5. GROUND WATER CONTAMINATION OF MUNICIPAL WELL 5 (1)

CONTAMINANT	CONCENTRATION (ppb)	COMPARISON VALUE (ppb)	SOURCE
Carbon tetrachloride	8.9	0.3	CREG
PCB	1.1	0.005	CREG
1,1,1-Trichloroethane	300	200	LTHA
Trichloroethylene	45	3	CREG

CREG - Cancer Risk Evaluation Guide
LTHA - Lifetime Health Advisory
ppb - parts per billion
[1] GZA 1991

Surface Water

Black Pond and its outlet stream are the main receiving waters for OSL and neighboring properties, collecting surface water runoff from the surrounding roadways, industrial, residential, and commercial properties.

Surface water samples were collected in June of 1990 from Black Pond and the stream into which Black Pond discharges. Iron, hexavalent chromium, and manganese were detected above comparison values and are listed in Table 6. Trace amounts of carbon disulfide were found and are not considered a risk to human health

or aquatic life. The aquatic criteria values protect plants and animals. The fish consumption values are protective of human health taking into account the lowest contaminant concentrations from ingestion of water and fish, and the ingestion of fish only.

Surface water samples collected from the Quinnipiac River (GZA 1990) identified minimal levels of VOCs and semi-volatile compounds. Several metals were detected at levels higher than background concentrations in downstream surface water samples. Samples taken in wetland areas (using ground water well points less than 5 feet deep) indicated the same pattern of contamination as described in surface water samples.

TABLE 6. CONCENTRATION RANGE OF CONTAMINANTS IN OFF-SITE SURFACE WATER 1

CONTAMINANT	RANGE (ppb)	AQUATIC CRITERIA (ppb) Acute	Chronic	FISH CONSUMPTION (ppb) water+fish	fish ingestion only
		LOEL	LOEL		
Carbon disulfide	4-23	-	-	-	-
Iron	666 -2,010	1,000	-	300	-
Manganese	212-1,000	-	-	50	100
Chromium	ND-25.95	16	11	-	-

LOEL - Lowest observable effect level
ND - None detected
ppb - parts per billion
1 GZA 1990

Fish

In September of 1992, the CT DPHAS and the CT DEP, Inland Fisheries Program caught approximately 200 live fish specimens from Black Pond using a net. All the fish caught appeared healthy. Twenty-five fish were collected from this sample of 200 fish. The remaining fish were returned to the pond. The fish species collected were catfish, yellow perch, bass and white suckers. Composite samples of five specimens from each species were analyzed for metals and PCBs. Trace levels of metals and PCBs were found in the fish below health comparison values.

Stream Sediments

Semi-volatile organic compounds (SVOCs) were found in sediments from the outlet stream to Black Pond and the impounded wetland south of Black Pond. The SVOC concentrations in the sediments ranged from 0.9-10 ppm. These levels are below comparison values and therefore are not considered a health threat.

Other chemicals identified in the sediments below comparison values include carbon disulfide, phthalates, and furans. The metals detected include cadmium, lead and nickel. The metals detected in sediments occur at natural background levels (Kabata-Pendias and Pendias, 1985).

Subsurface Soil Gas

Subsurface gas sampling was also conducted, primarily for the protection of workers, as well as the residents and businesses located adjacent to the subject site area. Some boreholes contained VOC levels between 1-3 ppm, and levels between 0-50 ppm were found in a few of the ground water monitoring wells. The VOC levels detected in borehole readings correspond with areas of current industrial operations. Monitoring well results may be explained by the potential for the natural biodegradation of organic matter, or the fact that the PID readings may be skewed by the presence of naturally occurring chemicals, such as hydrogen sulfide (GZA,1990).

Four areas were found to be contaminated with detectable levels of VOCs. These include:

- the southern portion of Chuck and Eddie's Used Auto Parts property,
- east and west of the Solomon Casket Co. building,
- east and west of Old Turnpike Road, and
- north of Meriden Box.

Based on the sampling distribution results, those contaminants detected west of Old Turnpike Road and north of Meriden Box are not likely attributable to past landfill activities, but rather, to present industrial activities ongoing in the sampling areas.

Ambient Air

Past exposures to contaminants in air from previous fires and the open burning of waste cannot be assessed because there are no data available for the years the landfill was in operation.

D. QUALITY ASSURANCE AND QUALITY CONTROL

The Consulting Firms (GZA and ESE) conducting the RI/FS were monitored by EPA oversight personnel, both in field and laboratory procedures. However, the procedures used by these firms or other consultants who have conducted historic sampling at the site were not evaluated by the Connecticut Department of Public Health and Addiction Services. Therefore, the conclusions drawn for this health assessment were determined by the availability and reliability of the referenced information and it is assumed that adequate quality assurance and quality control measures were

followed with regard to chain of custody, laboratory procedures and data reporting.

As indicated in Table 5, elevated levels of PCB contamination was detected by GZA in 1987 during only one sampling round (GZA RI/FS Volume III, 1991.) in Town well number five. The levels ranged from ND to 1.1 ppb. However, it should be noted that there exists some controversy regarding the reliability of the data analysis since PCBs were not analyzed for in prior sampling events.

E. PHYSICAL AND OTHER HAZARDS

Although no physical hazards were observed during our site visit, methane has been detected in one building at Southington Parks and Recreation, one building at R.V. & Sons, and two buildings at Southington Metal Fabricators. Gas production in landfills is a subject of much concern because of the potential hazards of methane combustion.

Methane was detected in 1986 (GZA 1986) at levels ranging from 0.1 to 2.3 percent Lower Explosive Limit (LEL) beneath the R.V. and Sons building (GZA 1986), and in 1991 and 1992 at dangerously high levels (30 to greater than 1000 percent LEL) in the R.V. & Sons building, the Southington Parks and Recreation building and in two out of three buildings (northernmost and southernmost buildings) of Southington Metal Fabricators.

According to an employee from Southington Metal Fabricators, during the winter seasons, a gas-like odor is frequently detected in the building where welding is commonly performed. In addition, he also stated that cracks in the floor of the facility have ignited when a welding torch was lit.

The CT DEP observed the ignition of floor cracks in the Southington Parks and Recreation building during a site inspection in the summer of 1992.

In July of 1992, the ATSDR performed a health consultation to assess the presence of combustible gases on-site and provide advice for its remediation. The ATSDR health consultation report indicated that due to ceiling height, floor space and adequate daily ventilation of the structures, it is unlikely that enough methane could accumulate in these buildings to cause an explosion or health hazard. However, the report notes that accumulation of methane gases in a small confined space, such as a closet, is possible and could create a dangerous situation (the ATSDR health consultation report is in Appendix 5).

Engineering controls have been installed in 2 facilities (Southington Parks and Recreation and Southington Metal Fabricators) to control the entrance of combustible gases. Steps

have also been taken by ESE to seal cracks in these 2 buildings. Combustible gas indicators have been installed in all the commercial and residential buildings on the site. However, cracks in the floors of some of the commercial buildings continue to develop creating new gas migration pathways into the buildings.

Because of the continuing subsidence, the methane levels detected and the fire incidents, the potential exists for methane levels to increase at any time. In addition, the potential exists for methane to migrate into other buildings. Therefore, the potential exists for fire and explosion hazards.

PATHWAYS ANALYSES

To determine whether nearby residents have been or are being exposed to contaminants migrating from the site the CT DPHAS and the ATSDR evaluated the environmental and human components that lead to human exposures and an exposed population. The pathway analysis consists of five elements: a source of contamination, transport through an environmental medium, a point of exposure, a route of human exposure and an exposed population. Exposure pathways discussed here are air, soil, groundwater and surface water. For exposure pathways to be completed all five elements of the pathway must be present. Potential pathways are those where there is not enough evidence to show that all the elements are present, could be present or were present in the past.

A. Completed Exposure Pathways

Public Ground Water Wells

Residents were exposed to the contaminated public water supply for an indeterminate period of time. OSL is suspected to have contaminated one of the town production wells located 600 feet from the site. According to various engineering reports, landfill waste sources are suspected to have migrated in the ground water to town well number five. In addition, there are other industrial facilities in the area (Lori Corporation, and Chuck and Eddie's) which could also have been sources of contamination.

A large portion of the population of Southington received ingestion, skin contact and inhalation exposure to water contaminated with VOCs from town well number five. This occurred for an unknown period of time between 1972 and 1979. Southington residents ingested water contaminated with VOCs, and received dermal and inhalation exposures to VOCs when they bathed or washed with water from this well.

Although not site related, town wells 2, 4, and 6 are discussed here because all municipal wells are pumped through the entire

water distribution system of the town. Town well 4 was installed in 1967, was identified as contaminated with VOCs in 1976, and was operated until deactivated in 1979. Town well 6 was installed in 1976, identified as contaminated with VOCs in 1976 and deactivated in 1980. Town well 2 was installed in 1952, identified as contaminated with VOCs in 1982 and deactivated. Subsequently, an air stripper was installed to remove the VOCs contamination and the well is currently in use. As a result, Southington residents were exposed to VOCs when they ingested water contaminated with VOC from these wells. The residents received dermal and inhalation exposure to VOCs when they bathed or washed with water from these three wells. The ATSDR estimates that approximately 30,000 Southington residents received contaminated water from these wells for an unknown period of time.

Indoor Air Pathway

Employees of the Southington Parks and Recreation facility and Southington Metal Fabricators received skin contact and inhalation exposure to indoor air contaminated with methane and other unknown gases migrating from landfill waste source.

Concentrations of combustible gases have repeatedly been shown to exceed comparison values in the floor cracks of three facilities on-site, the Southington Parks and Recreation Department and Southington Metal Fabricators and R.V. & Sons. In addition, employees of the Southington Parks and Recreation have complained of illness (allergic skin reactions, headaches and nausea.)

B. Potential Exposure Pathways
Private Well Pathway

Ingestion, dermal (skin absorption), and inhalation exposures to elevated concentrations of VOCs, or metals may have occurred in the past if the four private wells (three commercial wells and one residential well) in the area were used for drinking or washing. Both Solomon Casket and the one private residence historically used private water wells for drinking water purposes. These two wells have been closed and both the residence and Solomon Casket have been connected to public water. All residential wells in the vicinity of the site have been connected to the public water supply.

An employee of Solomon Casket stated that the well water occasionally had a bad odor and was not ingested during these times. According to the employee the well was principally used for washing trucks.

Although the resident claimed the well was tested for basic water chemistry standards and was declared 'acceptable' this information could not be confirmed.

Inhalation and dermal exposure can occur when contaminated well water is used for both household and industrial purposes, such as showering or hand washing.

Soil Pathway

High levels of VOCs and PAHs were found in subsurface soils on several commercial properties. The compounds found (benzene, ethyl benzene, toluene, and PAHs) are volatile. The potential exists for dermal and inhalation exposures to contaminated soils to occur to persons involved in excavations or digging on the R.V. & Sons property and/or along Old Turnpike Rd near the R.V. & Sons property.

No contaminants were identified above health comparison values in surface soils. Therefore, exposures to surface soils is not considered a cause for concern.

Surface Water Pathway

Residents could potentially receive inhalation, dermal or ingestion exposures to potentially contaminated water or landfill leachate while swimming in Black Pond. Leachate seeps are common along the western shores of the pond and carbon disulfide and a variety of metals have been found in surface water samples.

Ambient Air Pathway

Landfill workers and other persons in the area may have received inhalation exposures to toxic air emissions generated from the open burning of potentially hazardous liquid and solid wastes in the landfill. The estimated period of exposure was from 1920 to 1967. The landfill open burned industrial wastes (solvents, metal sludges, etc.) and spontaneous chemical fires were common, according to an employee from Solomon Casket.

We do not know which chemicals landfill workers and other persons in the area may have been exposed to, since we do not have any ambient air data for the years when the landfill was operating.

Food Chain Pathway

According to local residents and employees, people fish and frog hunt in and along the shores of Black Pond.

The Black Pond surface water sampling results indicate that a number of metals are at levels above those established under the Federal Clean Water Act Criteria for aquatic health (freshwater

criteria and fish ingestion or fish consumption only). Therefore, there was concern for potential bioaccumulation of metals in fish. In response, fish were collected from Black Pond and analyzed for metals and PCBs. The concentrations of metals and PCBs identified in fish are below health comparison values and thus are not a health concern.

PUBLIC HEALTH IMPLICATIONS

Completed exposure pathways have been identified for indoor air and ground water. Potential exposure pathways have been identified for soil, surface water, and groundwater. In this section the health effects associated with exposure to contaminants of concern will be discussed.

A. Toxicologic Evaluation

In this section we will discuss the potential health effects in persons exposed to specific contaminants. To evaluate health effects, the ATSDR has developed a Minimal Risk Level (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer or adverse health effects are not likely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate(15 to 364 days), and chronic (greater than 364 days). The ATSDR presents these MRLs in Toxicologic Profiles. These chemical specific profiles provide information on the health effects, environmental transport, human exposure, and regulatory status. When MRLs are not available for certain chemicals, other comparison values are used to assess the potential adverse health effects associated with exposures.
In the following discussion, we used the ATSDR Toxicological Profiles for trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, toluene, benzene, ethyl benzene, benzo(a)pyrene, lead, mercury, and PCBs.

Methane

Methane was detected in the floor cracks of two non-residential facilities on the site at levels that could pose a fire or explosion hazard. The action level for the combustion of methane is greater than or equal to the OSHA 25 percent lower explosive limit (LEL) (or 25,000 ppm.) If the OSHA LEL is exceeded evacuation is necessary. The methane levels measured in the floor cracks in the facilities measured between 30 and 198 percent LEL. However, the methane levels detected in ambient air at the breathing elevations could not cause any adverse health effects. There is no MRL or RfD for methane. **Methane is an asphyxiant (will cause suffocation) and has no other health effects.**

Methane will cause suffocation at a level of 330,000 ppm (or 33 percent). The levels measured in the breathing levels in homes and in the commercial facilities (7 percent) were considerably lower than the level that would cause suffocation. Therefore, no adverse health effects from methane are expected.

Trichloroethylene (TCE)

Trichloroethylene was found above comparison values in the public drinking water well number five (45 ppb) and in ground water monitoring wells (580 ppb). The well was in operation for approximately 7 years. TCE was also detected in soil gas and in minor amounts in indoor air samples.

TCE exposure through ingestion occurred in the past to persons who drank water from TCE contaminated public well number five (45 ppb). Using the highest TCE concentration detected in the public water well (45 ppb), the ingestion exposure was calculated for adults (1.3 ug/kg/day) and children (4.5 ug/kg/day) did not exceed the ATSDR intermediate MRL (700 ug/kg/day). Therefore, adverse non-carcinogenic health effects are unlikely to occur in those persons who drank TCE contaminated water for one year. We assume that adults drink two liters (66 ounces) of tap water each day for seven years and weigh 70 Kg (154 pounds) For children we assume that they drank one liter (33 ounces) of tap water each day for seven years and weigh 10 kg (22 pounds). Because of insufficient data neither the ATSDR nor the EPA have chronic guidelines for TCE. Therefore, the health effects associated with drinking TCE contaminated tap water for over one year are not known.

Carcinogenicity studies have indicated that an association may exist between leukemia in humans and exposure to well water contaminated with chlorinated organic compounds including trichloroethylene (Kotelchuck and Parker, 1979; Parker and Rosen, 1981; Lagakos *et al.* 1986 a,b). The EPA has classified trichloroethylene in Group B2 - probable human carcinogen.

The estimated cancer risk was calculated. The cancer risk estimates calculated for an adult and a child for a seven year period indicate that TCE induced cancer from the ingestion of the TCE contaminated drinking water is unlikely to occur.

1,1,1-Trichloroethane (Methyl Chloroform, TCA)

As indicated in the environmental contamination section TCA was detected in ground water monitoring wells and in the public drinking water supply well number five at levels (300 ppb) above the Lifetime Health Advisory of 200 ppb.

There is no acute or chronic MRL or RfD for TCA. The concentrations of trichloroethane found in the well are below the Lowest Observed

Effect Level for ingestion in laboratory animals. Studies have not been performed on the effects of long term exposure on humans to low levels of TCA. Thus, the human health effects resulting from long-term exposure of humans to water contaminated with specific levels of trichloroethane are not known. Therefore, the long term health effects of exposure to trichloroethane in the tap water are not known.

Although TCA was also detected in soil gas samples (ranging from ND to 150 ppb) and in indoor air samples at levels at or above 98 percent of average homes (US EPA TEAM Study, 1987), no adverse health effects are expected from inhalation exposures at these levels.

The main effect of TCA exposure at levels much greater than those found in the public drinking water well and in indoor air is central nervous system depression. Kidney and liver damage are minimal and have not occurred when used as an anesthetic agent.

Carbon Tetrachloride

Carbon tetrachloride was found in ground water monitoring wells and in public drinking water well number five (8.9 ppb) above the ATSDR CREG (0.3 ppb). The calculated dose estimate for an adult (0.25 ug/kg/day) and child (0.9 ug/kg/day) are below the ATSDR intermediate MRL of 7 ug/kg/day. Therefore, adverse non-carcinogenic health effects are unlikely from the ingestion of carbon tetrachloride contaminated tap water from well number five for one year.

The EPA has classified carbon tetrachloride in Group B2-probable human carcinogen. Therefore, the estimated cancer risk was calculated and compared to the ATSDR excess lifetime cancer risk estimates. The cancer risk calculations for an adult and a child for a seven year period indicate that the risk for carbon tetrachloride induced cancer from the ingestion of carbon tetrachloride-contaminated water is not significant.

Toluene

Elevated levels (16,000 ppm) of toluene have been detected in subsurface soils. Toluene was also identified in indoor air at levels ranging from 69 ug/m^3 to 212 ug/m^3. Although these air levels exceed average background levels for toluene in indoor air, adverse health effects from inhalation exposures at these levels are not expected.

Studies have not been performed on the health effects of short or long term exposure to toluene at low levels. None of the available studies suggest that toluene is carcinogenic.

Benzene

Elevated levels of benzene have been detected on-site in subsurface soils and soil gas, in ground water monitoring wells, and in indoor air samples. Benzene in ground water monitoring wells was found at levels (27 ppb) above the EPA MCL of 5 ppb. There is no evidence to indicate that residents have been exposed to benzene in drinking water.

Although the indoor air levels occur at concentrations greater than approximately 90 percent of the average home levels nationally, they are below health comparison values and thus no adverse health effects are expected at these levels.

Subsurface soils were found to contain between 0 and 1,500 ppm of benzene (GZA 1991). Since benzene evaporates into the air, there is a potential for inhalation exposure to benzene during on-site excavations.

Benzene is a known human carcinogen. It has been linked to the development of leukemia and other adverse affects related to the hematopoietic (blood related) system. The indoor air sampling results did not approach this level of toxicity and thus, adverse health effects are not expected.

Ethyl Benzene

Ethyl benzene was detected in on-site ground water monitoring wells (ND to 7,800 ppb) above the EPA MCL of 700 ppb. Ethyl benzene was also detected in soil gas and in indoor air at levels below health comparison values. Thus, no adverse health effects are expected from inhalation exposures to the ethyl benzene levels found on-site and there is no evidence to suggest that residents have been exposed to ethyl benzene in ground water

The health effects of low level exposure to ethyl benzene in the air for short periods of time include eye and throat irritation. One long-term study in animals suggests that ethyl benzene may cause tumors (Maltoni 1985). However, no studies were located regarding carcinogenic effects in humans to date.

Benzo(a)pyrene

Benzo(a)pyrene was found in subsurface soil at levels (4.4 ppm) above the ATSDR CREG of 0.1 ppm. Adverse dermal effects have been noted in humans following skin exposure in patients with pre-existing skin conditions. In addition, benzo(a)pyrene is a tumor promoter. Thus, humans dermally exposed to benzo(a)pyrene together with other chemicals that are carcinogenic may be at risk for developing skin cancer. This may be cause for concern during soil excavation or diggings on-site.

Lead and Mercury

Lead has been detected in ground water monitoring wells in a few locations off-site at levels exceeding the EPA action levels of 15 ppb (identified range 113-670 ppb) during sampling conducted by Warzyn between 1977-1980. In addition, lead and mercury were also detected in three public drinking water wells (4, 6, and 5). Although this contamination is not associated with the OSL site this information is included in this report to assess total metal exposures that could have potentially occurred in the Town of Southington. In addition, it should be noted that there exists some controversy regarding the reliability of the data analysis. Subsequent sampling in 1976 and 1977 did not identify mercury or lead in the three wells. The levels ranged from 7 to 70 ppb for lead which exceeds the EPA action level of 15 ppb. Town well number five had a lead level of 1.8 ppb below comparison values. The levels of mercury (1.8 to 3 ppb) are only slightly higher than the EPA MCL (2 ppb) and exceed the EPA Health Advisory of 2 ppb for lifetime exposure to mercury in drinking water.

Studies indicate that long-term exposure to low levels of lead can cause brain damage and lowered Intelligence Quotient (I.Q.) in children. If a pregnant woman is exposed to lead it can be carried to the unborn child and may cause premature birth, low birth weight, or even spontaneous abortion.

Although not likely to cause adverse effects alone, drinking water levels in the range of 60 to 70 ppb would contribute significantly to the overall body burden of lead and increase the percentage of exposed individuals at risk from lead toxicity due to other sources.

Long-term exposure to either organic or inorganic mercury can permanently damage the brain, kidneys, and developing fetuses. Exposure to mercury at the levels found in the drinking water could put some exposed individuals at risk for some of these long term adverse effects later in life.

Domestic water uses other than drinking (incidental ingestion, inhalation dermal exposure) can increase the potential for chronic health effects from mercury exposure. Mercury has not been shown to be carcinogenic in humans to date.

PCBs

PCBs were found in ground water in public drinking water well number five (Warzyn 1980) after the well was deactivated, and in on-site groundwater monitoring wells above the ATSDR EMEG comparison values. PCBs were only detected in one sampling event after the well had been deactivated. Therefore, it is unknown whether PCB contamination was present during the time the well was operating.

Using the highest concentration of PCB found in well number five (1.1 ppb) the calculated ingestion exposure dose for an adult (0.03 ug/kg/day) and a child (0.11 ug/kg/day) exceeded the ATSDR MRL of 0.02 ug/kg/day. The ATSDR MRL of 0.02 ug/kg/day is for chronic-duration oral PCB exposure. Therefore, since the exposure dose was greater than the MRL for both a child and an adult, the potential exists for noncancerous adverse health effects to have occurred or to occur in residents who were exposed to the PCB-contaminated drinking water in town well number five for over one year. The ATSDR MRL was derived from two studies that showed immunologic effects in monkeys. The studies showed a reduction in antibodies and other proteins that help the body resist infections.

In general, PCBs are easily absorbed through the skin from contaminated soils or other materials. The four major toxic effects of high level exposure to these compounds are chloracne, the wasting syndrome, liver toxicity, and immunotoxicity. Because the possibility exists that the water was contaminated with PCBs, and PCBs are classified as a probable carcinogen the estimated cancer risk was calculated. The cancer risk calculations for an adult and a child for a seven year period indicate that the risk for PCB induced cancer from the ingestion of PCB-contaminated drinking water is not significant.

Currently, the potential for exposure to PCBs at the site is not expected to occur and thus, adverse health effects from on-site PCB contamination are unlikely to occur.

B. Health Outcome Data Evaluation

A number of health outcomes were evaluated for the town of Southington, including cancer, infant mortality, perinatal mortality, learning disabilities, and birth defects. While these analyses may generate clues regarding the association between certain chemical exposures and disease outcomes, it must be stressed that such an association is not considered a causal link. Many other factors may also contribute to the onset of disease, including diet, tobacco use, family history, age, race, occupation, and socioeconomic factors. In sum, the tools of epidemiology are very limited in terms of proving causation because of the complexity of factors that are involved in the development of disease.

1. Results of Tumor Incidence Studies

Two cancer incidence studies have been completed and the third is currently underway. The results of these studies are presented below.

a. Initial study of cancer incidence in Southington 1979 to 1988
Citizen concern prompted the CT DPHAS to conduct a study of cancer incidence in Southington, CT. Data was gathered from the Tumor

Registry on tumor incidence for bladder, brain, breast, leukemia, non Hodgkin lymphoma, testis, and all sites combined for the years 1979 to 1988.

Information on the total number of tumors in Connecticut and in Southington was obtained from the Tumor Registry for the tumor sites listed above. Age specific incidence rates per 10,000 population were generated for Connecticut and Southington for the ten year period 1979 to 1988. The age specific incidence rates and standardized incidence ratios were computed for each of the tumor sites bladder, brain, breast, leukemia, and non-Hodgkin's lymphoma, testis and all sites combined. A spreadsheet program was developed to assist in these calculations. A summary of the results is presented in Table 7.

Table 7
SUMMARY OF INITIAL CANCER INCIDENCE STUDY
CONDUCTED BY DPHAS IN SOUTHINGTON, CT 1979-1988

SITE	OBSERVED EXPECTED	STANDARD INCIDENCE RATIO	95 PERCENT CONFIDENCE INTERVAL
ALL SITES	1355 1433	0.95	0.89, 0.99
BLADDER	79 76	1.04	0.80, 1.28
BRAIN	28 40	0.70	0.51, 0.87
BREAST	222 237	0.94	0.82, 1.05
LEUKEMIA	34 35	0.97	0.65, 1.27
NON-HODGKIN's LYMPHOMA	44 47	0.94	0.68, 1.20
TESTICULAR	9 10	0.90	0.36, 1.49

The Standardized Incidence Ratio (SIR) is an overall summary measure of the cancer risk. The SIR is calculated by multiplying the Connecticut cancer incidence rate by the population of the town to estimate an 'expected' number of cancers in each age group. The actual (or observed) number of cases identified by the Tumor Registry are divided by the expected number to obtain the SIR. When the SIR is less than one (1.00) the risk of cancer is less than expected, when the SIR is greater than one the risk is more than expected. This method allows for the inclusion of age as a risk factor in the analysis. Age is important to consider because generally speaking the risk of cancer varies with age.

The SIR did not significantly differ from one (1.00) in most instances. However, the SIR was significantly less than one for brain and for all sites combined. This indicates that Southington as a whole did not experience a higher than expected cancer incidence for the period 1979 to 1988 and in fact the number of tumors was actually lower than expected for most sites evaluated. Review of the ten year age specific rates indicated that only for bladder cancer among individuals between age 40 to 49 did the 95 percent confidence interval indicate a statistically significant elevation in rate.

This preliminary review of the tumor incidence data indicated that there is not a cancer epidemic occurring in Southington. The analysis was based on town wide statistics, however, and did not address the question of whether specific neighborhoods in Southington were experiencing more than their share of cancer. Because there was known contamination of the water supply by emissions from SRSNE a follow-up of this preliminary study was initiated.

b. Follow-up study of bladder and testicular cancer in Southington 1970 to 1989 using Geographic Information System technology

A computerized Geographic Information System (GIS) operated by the CT DEP assisted in the exact mapping of 11 of 12 testicular cancer cases and 125 of the 127 bladder cancer cases that occurred to residents of Southington during the years 1970 to 1989. The GIS was also used to determine where these cases lived in relation to the contaminated public supply wells and to estimate the total number of persons living in relation to the wells so that age specific cancer incidence rates could be calculated.

The use of the GIS allowed the CT DPHAS to analyze cancer rates in geographic areas not defined by town boundaries and to look at smaller geographic areas. Specifically this study focused on a one mile radius surrounding the contaminated public drinking water wells. While the town water supply system contained water that was blended from several sources, this study area was chosen because it was felt that the residents who lived closest to the contaminated wells would receive the majority of their water from these wells.

Estimates of the population in these smaller geographic areas was made relying on data from the 1980 census. The study areas were comprised of one mile radii surrounding each of the public water supply wells. Wells 4 and 6 were combined because of their close proximity.

Standardized incidence ratios were calculated for the study areas. The number of testicular cancers was too small to present any meaningful statistical analysis near the contaminated wells. A

summary of the bladder cancer results is presented in Table 8.

Table 8

OBSERVED/EXPECTED BLADDER CANCER CASES
STANDARD INCIDENCE RATIOS
AND 95 PERCENT CONFIDENCE INTERVALS
IN ONE MILE RADIUS FROM CONTAMINATED WELLS
IN SOUTHINGTON, CT 1970 TO 1989

Well	OBSERVED / EXPECTED	STANDARD INCIDENCE RATIO (SIR)	95 PERCENT CONFIDENCE INTERVAL
WELL 2	7 / 8.52	0.82	0.21, 1.43
WELL 5	43 / 31.40	1.37	0.96, 1.78
WELLS 4 & 6	20 / 16.46	1.22	0.68, 1.75
WELLS 4, 5 & 6	63 / 47.86	1.32	0.99, 1.64

The population in the one mile radius around well number 2 did not experience an excess cancer risk. The population who lived within one mile of wells number 4, 5, or 6 did experience an excess bladder cancer risk.

This study demonstrated the value of the GIS in enabling the study of the occurrence of disease in relation to a geographic area that is not restricted to political boundaries.

This study did reveal an elevation in bladder cancer among persons living near contaminated wells. However, the study could be improved by developing a better measure of exposure to emissions rather than just the one mile radii around the contaminated wells.

c. **Expanded GIS study of exposure to contaminants and cancer incidence in Southington 1970-1989**

The ATSDR has funded the CT DPHAS to conduct an expanded study to better assess how residents of Southington were exposed to contaminants from the wells (including well number five near OSL), and contaminants released into the air from SRSNE.

Additional cancer sites were selected for inclusion in the expanded study based on whether toxicological or epidemiological studies had suggested a possible link between exposure to the contaminants found in the drinking water and development of cancer in animals or humans. Cases of liver and kidney cancer and leukemia, lymphoma and Hodgkins disease will be mapped using the GIS. The water

distribution system is being evaluated by the ATSDR to develop an exposure ranking scheme. Census blocks will be scored for the amount of water contamination they were likely to have received through the water distribution system. Air contaminants will be similarly ranked. The goal of this study is to compute SIRs for each tumor site by a relative measure of exposure to contaminants in the water and the air and determine if there is a dose/response association between cancer risk and exposure to contaminants.

2. Infant and Perinatal Mortality Rates

Plots of the infant and perinatal mortality rates for Southington reflect elevated rates with respect to the state and surrounding towns for the years 1949 to 1965 (Appendix 3). It has been theorized that infant mortality rates or miscarriage rates may be sensitive indicators of adverse environmental exposures. Although the present rates are below those of the state and surrounding towns, the historical fluctuation in rates may warrant further detailed investigations with respect to past environmental contamination in the Town of Southington. This may prove to be difficult due to the absence of environmental data from that time period.

Other factors that may play a role in infant and perinatal mortality rates, include the availability of medical care, the occurrence of infectious disease, as well as other data.

C. COMMUNITY HEALTH CONCERNS EVALUATION

On July 1, 1993, the Connecticut State Health Services Commissioner Susan S. Addiss of the Department of Health Services announced the release of the Old Southington Landfill Public Health Assessment (PHA) for public comment. The locations for reviewing the PHA included the Southington Health Department, the Southington Town Hall, the Office of the Southington Town Clerk, and the Southington Public Library. The public comment period was for 30 days beginning July 1, 1993. In response to community health concerns obtained from interviews with local residents and employees of facilities located on OSL, the following discussion provides an evaluation by the ATSDR as well as those actions that have been or will be taken to address the community's health concerns. See appendix five for details of the public comments.

1. Residents living and working on the landfill are concerned over potential exposures to toxic indoor air emissions.

As previously discussed, indoor air sampling performed in homes identified the presence of several potentially toxic gases above background levels which exceeded the average for area homes but did not exceed health comparison values. However, it is difficult to assess whether these gases are generated from

the landfill or from household sources (i.e. cigarette smoking, paint cans, and lawn mowers) given the sampling locations. Methane has been identified at explosive levels, in the floor cracks of nonresidential facilities. This suggests that other toxic gases could be migrating into indoor air through the floor cracks as well. Therefore, the CT DPHAS and the ATSDR believe that contamination of indoor air is possible.

2. **Residents expressed concerns over the potential exposures to contaminated soils and gases while performing gardening and general yard work. One resident stated that skin rashes sometimes develop while working in the yard. In addition, residents question whether they can grow edible plants on their property as they are worried that the soil is contaminated.**

   As part of the RI/FS the EPA conducted surface soil sampling in order to assess and subsequently remediate any potentially contaminated soils. No contamination was found and thus growing edible plants is not a concern.

   In July of 1992, ESE conducted subsurface gas screening for combustible gases from permanent monitoring probes on residential properties. Combustible gas readings were found above comparison values in the yards of residential properties number 11 and number 12. This suggests that either methane is migrating from the southern areas of the landfill or is being generated naturally from buried organic materials. The CT DPHAS does not know if dermal exposure to subsurface gases while gardening, could have caused the resident's skin irritations.

3. **Recreational activities such as fishing and swimming are common in Black Pond. Residents feel these recreational activities are unsafe and that warning signs should be posted along the shores of the pond to keep people out.**

   The CT DPHAS and the ATSDR feel that recreational activities taking place at Black Pond could be cause for concern. Although surface water sampling has not detected any significant contamination, carbon disulfide was identified from the water samples taken from the stream into which Black Pond discharges. In addition, during several site visits, state representatives have observed leachate seeping from the western shoreline into the water.

   The CT DPHAS did sample fish from Black Pond to assess what potential compounds may be bioaccumulating, and what adverse effects may occur if the fish are ingested. The fish were not found to be contaminated.

4. **An employee from the Southington Parks and Recreation Department stated that the building where he worked was**

contaminated with toxic gases. He stated that he experienced an allergic skin reaction (reddening and burning of the skin) while working inside the facility building. He stated that other employees avoid working in the building because they experience nausea and headaches.

The CT DPHAS brought this to the attention of the EPA. The Southington Fire Department responded and found elevated methane gas readings at levels that posed a fire and explosion hazard in the facility. The facility was evacuated and some remedial work was performed which lowered the methane gas levels. In addition, methane monitoring alarms and a passive ventilation system have been installed inside two of the non-residential facilities to ensure safe methane levels.

In addition, the CT DPHAS, the Southington Fire Department and a representative from the Yankee Gas company provided educational training sessions to workers and residents on the dangers of combustible gases and on how to use their methane monitoring alarms. Whether or not the combustible gases seeping into the Parks and Recreation building caused the workers health problems is unknown at this time.

5. **Residents living within the northern boundary of OSL have expressed concern over recent indoor air samples taken by the EPA. One resident expressed concern as to the meaning and interpretation of the indoor air results and delays in governmental decision making.**

   In response to the community concerns, the EPA performed a series of air monitoring rounds for methane and total VOCs in residential and commercial buildings. There were no combustible gases detected in the residences sampled. The VOCs measurements sampled from the residences were approximately equivalent to the instrument background levels.

6. **Several residents will not drink the tap water because the public water supply pipes were installed in landfill material.**

   The CT DPHAS sampled the tap water of those residents that expressed concern. No contaminants were identified and there is no evidence to indicate that there is cause for concern or that the residents' tap water is contaminated.

7. **Several residents and employees of the commercial facilities stated that they see the EPA RI/FS workers wearing health and safety protective clothing and equipment on their property. They feel the EPA is keeping information from them and they are worried about their safety.**

   The EPA RI/FS workers are required by law to wear health and safety equipment while they are on the site performing any

sampling or investigative work. If the EPA identified a potential hazard, local residents and workers would be notified and evacuated, if necessary.

8. **Residents living along Rejean Road raised concerns about the possibility of landfill gases entering their homes and the lack of adequate environmental monitoring to determine the possibility of such movement.**

   Additional environmental monitoring is recommended to determine the possibility that landfill gases are migrating into homes north and east of the landfill, such as 3 homes on the northside of Rejean Road, across from the landfill.

9. **Residents living on the northern portion of the landfill did not believe that the methane monitors installed in their homes were adequately checked or maintained.**

   The Southington Fire Department will be advised about the citizens concerns.

CONCLUSIONS

Based on the physical hazards associated with the methane contamination of indoor air in commercial facilities, the site is a public health hazard. However, the physical hazards associated with the methane are currently being addressed. Although our evaluation of the VOC contaminated public water did not indicate that an adverse health effect is likely to occur to residents that drank the water from well number five, further studies are planned. The CT DPHAS and the ATSDR are conducting a study to try to reconstruct the dose of VOCs Southington residents may have received from contaminated drinking water with respect to the geographic location of their residence. Additionally, PCB was indentified in one sampling round from the Southington Town Well number five.

1. A large portion of the population of Southington was exposed to a variety of site-related contaminants through the contamination of public well number five. This exposure stopped in 1979 when the well was shut-down. Continued monitoring has assured that the public water supply is currently safe.

2. Elevated levels of methane were identified in the floor cracks of several nonresidential buildings posing a potential fire and explosive hazard. Combustible gases may be migrating into storm sewers or buried utility lines that lie on or adjacent to the landfill. The northern physical extent of landfill gases has not been completely defined. Sufficient data does not exist to eliminate the possibility of landfill gases migrating into homes on the north side of Rejean Road.

3. PCBs have been identified on site in soil and questionably identified in ground water (perhaps a false positive detection due to laboratory error). The available RI/FS data indicate that the potential for exposures to occur are limited.

4. Excavation and removal of contaminated soils and waste materials may expose workers to VOCs, PAHs, PCBs, and heavy metals through inhalation of volatile compounds and fugitive dusts.

5. Psychological stress associated with Old Southington Landfill including both health and attitudinal effects (demoralization, frustration, fear, anxiety, lack of trust and general helplessness) have been observed in this community and are cause for concern.

6. Due to documented exposures to site related compounds and to specific concerns expressed by local citizens to Solvents Recovery Service of New England, which is also a Superfund

site in Southington, a number of health outcome data bases were evaluated.

A review of tumor incidence data indicates that there are slight elevations in age specific bladder and testicular cancers for the town of Southington between 1979-1988.

A subsequent more detailed look at the number of bladder and testicular cases by census block using the GIS found that while the overall cancer incidence in Southington is not elevated, there was an increase in bladder cancer in those residents living within one mile of the contaminated drinking water supply wells in Southington from 1970 to 1989. Given the existing data it is not possible to determine the cause of this excess. Further studies are planned.

While there were increases in infant and perinatal mortality rates for Southington, as compared with towns surrounding Southington, or the state, between 1949-1965, these rates are no longer elevated and, in fact, remain lower than the two comparison populations in the State of Connecticut and nearby towns.

The early patterns for perinatal and infant mortality for the town of Southington are not consistent with adjacent towns or the state. Although these patterns could be associated with environmental contamination, such an association would be impossible to prove due to a lack of environmental data from that period. For this reason, no further research into this health outcome is recommended at this time.

RECOMMENDATIONS

1. Methane and VOC levels should be monitored on a regular basis in the indoor air of those facilities where dangerous levels of combustible gases have been detected. This includes those facilities where engineering controls have been installed.

2. On-site air monitoring will be necessary during all excavation operations as well as appropriate monitoring at the work site periphery to protect workers and nearby residents during remedial activities. EPA should work with the State and the ATSDR to develop a remediation safety plan that will protect nearby residents and industries from exposure to site-related chemicals.

3. Psychological stress should be addressed within the community. Local counseling centers, and physicians, should be notified of the present situation, so that they may take it into account when seeing patients.

4. Soil and groundwater contamination has been found in areas within landfill boundaries established by GZA (1989, 1990) and ESE (1993). However, the extent and degree of overburden and bedrock contamination within and emanating from the site has not been clearly defined to Southington residents. The Southington community should be informed as to the extent and degree of overburden and bedrock contamination within and emanating from the landfill. Therefore, a public meeting addressing the identified landfill boundaries is recommended. The CT DPHAS and the ATSDR recommend that residents concerned with remedial activities should review and comment on the remedial design plan for the site.

5. The northern extent of landfill gases should be defined with the use of soil gas monitoring methods such as temporary soil gas monitoring probes (punchbars). The soil gas surveys should be performed on the northern portion of the landfill and along the northside of Rejean Road. Special attention should be given to possibility of migration along buried utility lines. Human access areas (i.e., manholes) in buried utilities or storm sewers should be monitored for landfill gases, especially methane.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATION

The data and information evaluated in the public health assessment for the Old Southington Landfill, Southington, Connecticut have been reviewed by the ATSDR Health Activities Recommendations Panel for appropriate follow-up with respect to health actions. The panel determined that community and health professional education are indicated for the site. Other follow up actions will be considered when the results of a dose reconstruction analysis and further analysis of a cancer cluster study are complete -- these actions are on-going or planned in relation to the Solvents Recovery Services site, Southington, Connecticut.

PUBLIC HEALTH ACTIONS

The Public Health Action Plan (PHAP) for the OSL site contains a description of actions taken or planned by the ATSDR, the CT DPHAS, the CT DEP, the Southington Fire Department, and/or the EPA. The purpose of the PHAP is to ensure that this public health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of the ATSDR and the CT DPHAS to follow up on this plan to ensure that it is implemented. The public health actions taken or planned are as follows:

Actions Taken:

1. In 1991 and 1992, dangerously elevated levels of methane posing an explosion hazard were detected in three on-site commercial facilities. In response, at the request of the EPA, methane alarms and engineering controls were subsequently installed by Environmental Science and Engineering (ESE) to protect on-site residents and workers. The CT DPHAS performed on-site educational meetings to teach facility employees and residents about the hazards of methane and how to protect themselves.

2. The CT DPHAS and the CT DEP sampled fish from Black Pond in order to assess what potential compounds may be bioaccumulating in the fish and what adverse effects may occur as a result of ingestion. No adverse health effects are expected from the ingestion.

3. The CT DPHAS sampled tap water from the four on-site residences in order to assess whether site related contaminants are migrating into water supply pipes. No contaminants were identified in the water samples taken.

4. The CT DPHAS performed on-site educational meetings to teach facility employees and residents about the hazards of methane and how they can protect themselves.

5. The ATSDR performed a health consultation to assess the potential health risks associated with the levels of combustible gases at OSL and recommended actions to protect the public health.

6. The CT DPHAS and the CT DEP met with residents in their homes frequently to discuss the results of environmental data and other concerns with the site.

7. The EPA conducted soil gas survey as part of the RI/FS in order to assess ambient air contamination. This gas study will be performed outside of the buildings and will investigate the types of gases generated in order to design an appropriate permanent remedy for gases released by the landfill.

8. The EPA conducted surface soil sampling as part of the RI/FS in order to assess exposure to contaminated soils. A review of the sampling data results indicates that exposures to surface soils are not a health concern.

9. The EPA has characterized much of the extent and degree of contamination that exits on the site and has delineated much of the site boundaries as part of the RI/FS.

10. The Southington Fire Department has monitored all residential and industrial facilities for methane bimonthly to protect residents and workers from fire and explosion hazards.

Actions Planned:

1. The CT DPHAS have or/are planning to periodically perform site visits at those facilities where methane has been detected until indoor air screening has shown that the levels are safe.

2. The CT DPHAS is providing environmental health education for local public health officials, the local medical community and to local citizens to assist the community in assessing possible adverse health outcomes associated with exposure to hazardous substances.

3. The CT DPHAS is planning to perform educational meetings to teach residents about landfills, the hazards of methane and how they can protect themselves.

4. The Southington Fire Department will continue to monitor all on-site residential and industrial facilities for methane bimonthly to protect residents and workers from fire and explosion hazards.

5. The EPA will have additional testing performed during the summer of 1994 in the northern vicinity of the landfill to see if methane or other landfill gases are migrating to utility lines which could in turn migrate to homes near the landfill. EPA will also be looking at areas north of Rejean Road to verify, one way or another, if landfill gases are traveling across Rejean Road to these areas.

   In addition, as part of the pre-design studies, EPA will require a "mini" soil gas collection system to be installed and tested to determine what gases are being emitted and at what concentrations. If the concentrations exceed state or federal regulated levels, the soil gas system will completely enclosed and the gases will be treated. The final "full scale" soil gas collections system will be installed, during the construction phase of the project, over the entire area of the landfill. Furthermore, a number of soil gas monitoring wells will be placed outside of this system and around the entire perimeter of the landfill to make sure the system is effective and protective of human health and the environment.

6. The CT DPHAS will inform relevant utility companies about the potential risk of combustible gases, particularly methane, and recommend the use of monitors and confined space entry protocols when servicing utilities near the site.

7. The ATSDR will provide an annual follow up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this site review and update, and will be provided to persons who request it.

The ATSDR will reevaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

CERTIFICATION

The public health assessment for the Old Southington Landfill site was prepared by the Connecticut Department of Public Health and Addition Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was initiated.

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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this public health assessemnt and concurs with its findings.

for Richard Gillig

Division Director, DHAC, ATSDR

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APPENDIX 1

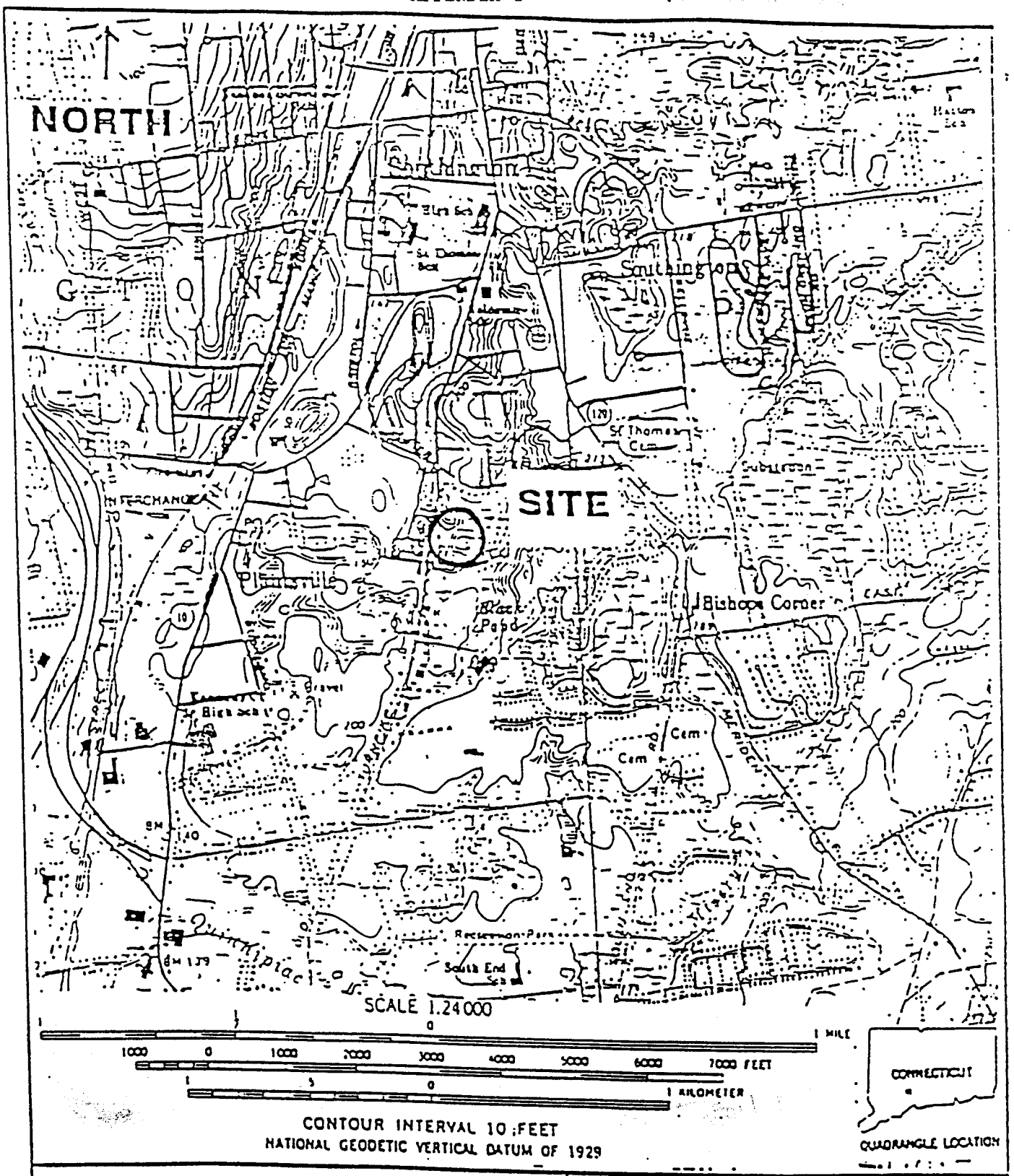


FIGURE 1-1

SITE LOCATION MAP
OLD SOUTHINGTON LANDFILL
SOUTHINGTON, CONNECTICUT

SOUTHINGTON AND MERIDEN, CT QUADRANGLES
USGS, 7.5 MINUTE SERIES TOPOGRAPHIC MAPS
MAPS PHOTOREVISED 1984

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS #
DES	11/91	1548SP1.DRW
APPROVED	DATE	TDD #
[signature]	11/91	01-9111-03

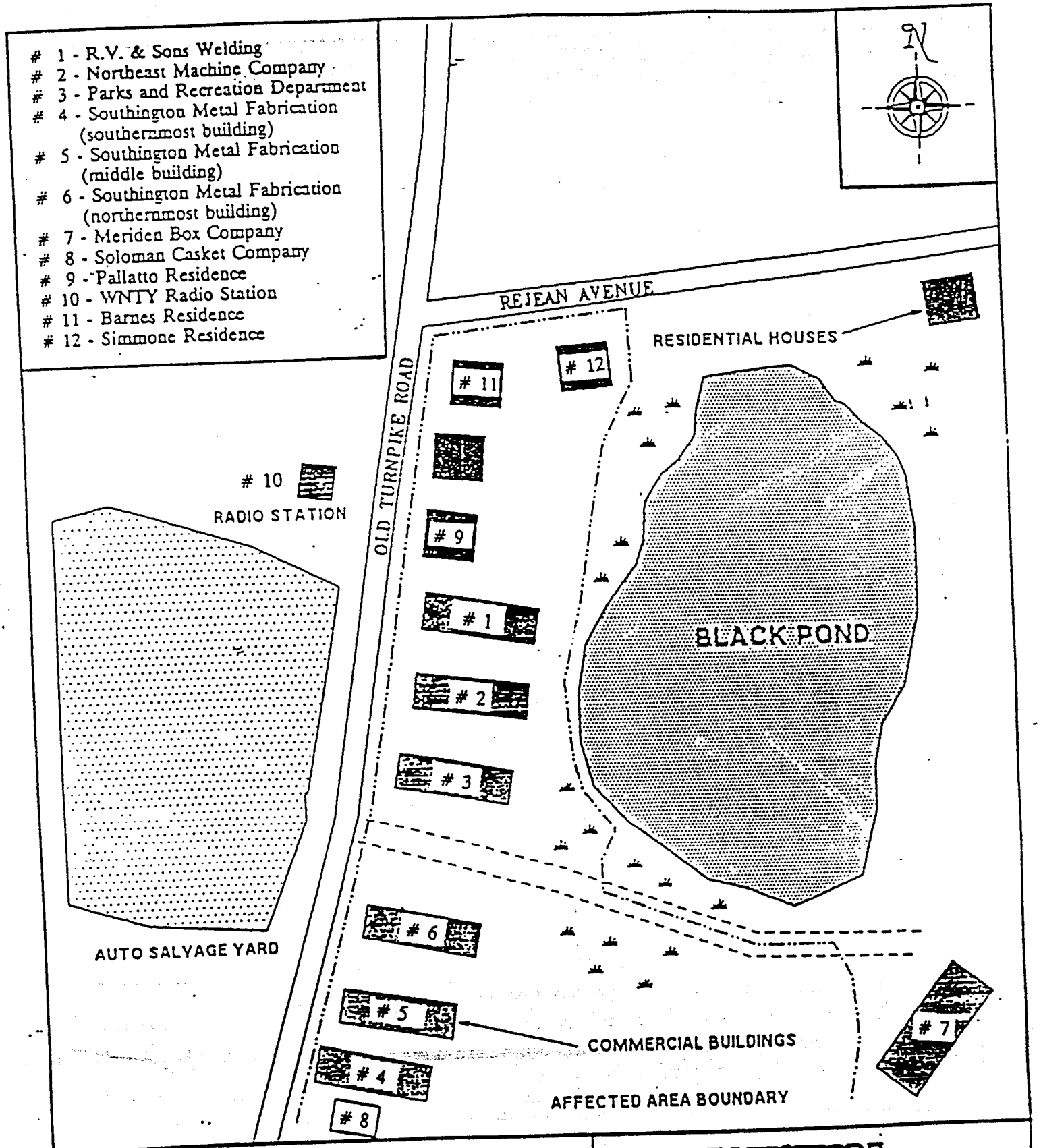


FIGURE 1-2

SITE DIAGRAM

OLD SOUTHINGTON LANDFILL

SOUTHINGTON, CONNECTICUT

NOT DRAWN TO SCALE

WESTON

REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS S/WLENAME
G. Mavris	12/91	1606
APPROVED	DATE	TDD #
	12/91	01-9112-08

APPENDIX 2

APPENDIX 2

AGE SPECIFIC TESTICULAR CANCER CASES AND INCIDENCE RATES PER 10,000 FOR CONNECTICUT AND SOUTHINGTON FOR THE 10 YEAR PERIOD 1979 TO 1988

age group	Connecticut testis cases	Southington testis cases	expected no. testis cases in Southington	Connecticut testis incidence	Southington testis incidence	Lower 95% Confidence Interval on Southington Incidence	Upper 95% Confidence Interval on Southington Incidence
0-19	52	0	0.63	1.19	0.00	-	-
20-29	204	6	2.99	10.50	21.20	9.52	47.19
30-39	200	2	3.54	10.90	6.15	1.54	24.61
40-49	107	0	1.44	5.85	0.00	-	-
50-59	55	1	0.64	3.46	5.43	0.77	30.50
60-69	25	0	0.29	1.05	0.00	-	-
70-79	11	0	0.11	1.50	0.00	-	-
80 +	7	0	0.06	2.65	0.00	-	-
TOTAL	809	9	9.70	37.99	32.79		

STANDARD INCIDENCE RATIO:

OBSERVED	EXPECTED	SIR = OBS/EXP	LOWER 95% CI	UPPER 95% CI
9	9.70	0.92793	0.36537	1.49049

APPENDIX 2

AGE SPECIFIC BLADDER CANCER CASES AND INCIDENCE RATES PER 10,000 FOR CONNECTICUT AND SOUTHINGTON FOR THE 10 YEAR PERIOD 1979 TO 1988

age grou	Connecticut bladder cases	Southington bladder cases	expected no. bladder in Southington	Connecticut bladder incidence	Southington bladder. incidence	Lower 95% Confidence Interval on Southington Incidence	Upper 95% Confidence Interval on Southington Incidence.
0-19	7	1	0.09	0.00	0.94 *	0.13	6.70
20-29	30	0	0.32	0.56	0.00	-	-
30-39	110	3	1.47	2.19	4.40	1.44	13.00
40-49	322	9	4.24	8.51	18.07 *	9.40	34.73
50-59	1057	15	12.30	31.90	38.66	23.31	64.13
60-69	2190	10	24.60.	73.03	53.25	33.55	84.53
70-79	2260	24	21.75	124.20	137.14.	91.92	204.61
80 +	1303	11	10.79	156.31	159.42	88.29	287.07
TOTAL	7359	81	75.71	396.05	411.97		

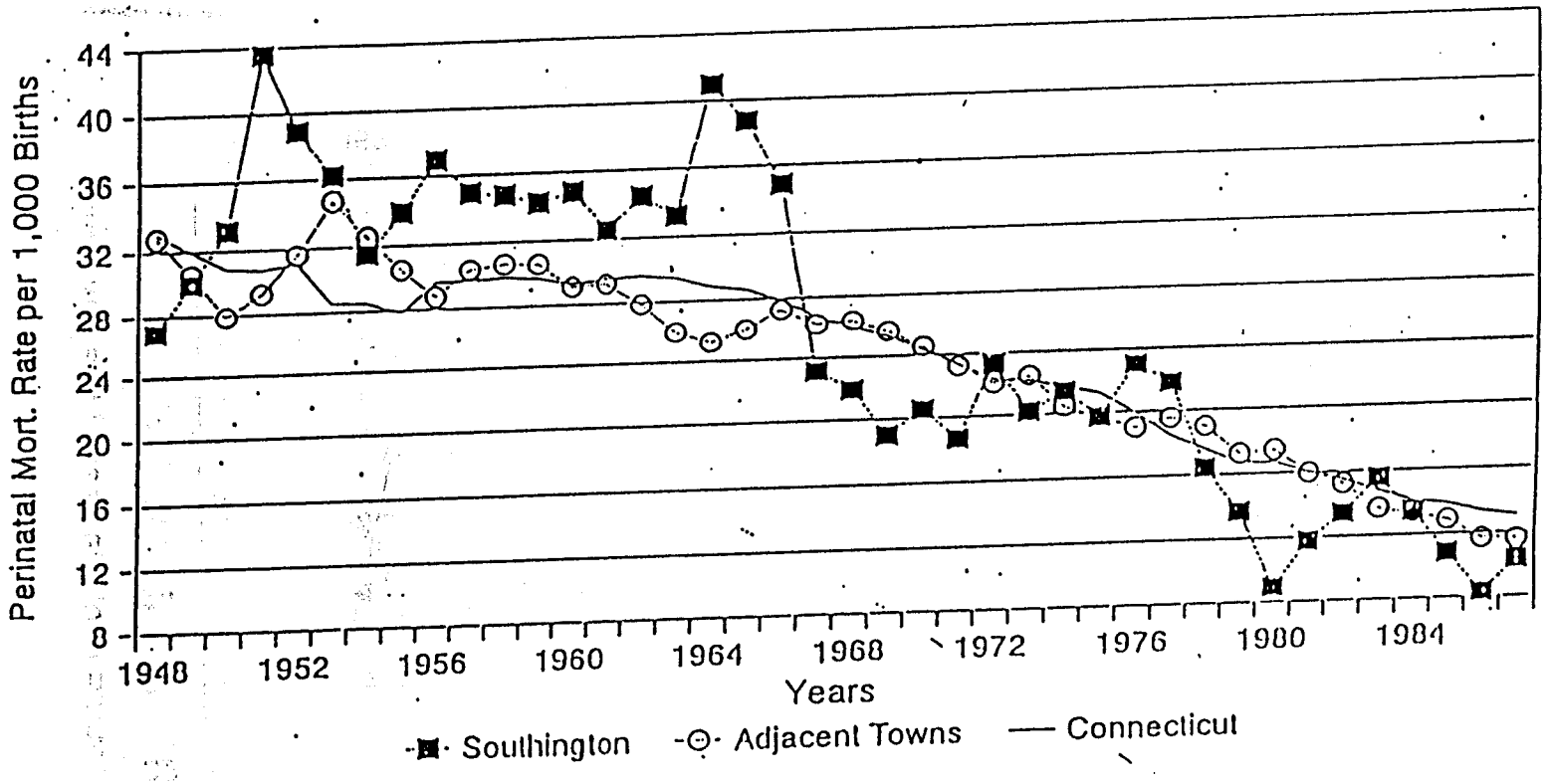
STANDARD INCIDENCE RATIO:

OBSERVED	EXPECTED	SIR = OBS/EXP	LOWER 95% CI	UPPER 95% CI
81	75.71	1.06907	0.82060	1.31914

* SIGNIFICANT AT THE P=0.05 LEVEL

APPENDIX 3

Perinatal Mortality Rates
Three-year Moving Averages
Southington/Adjacent Towns/Connecticut

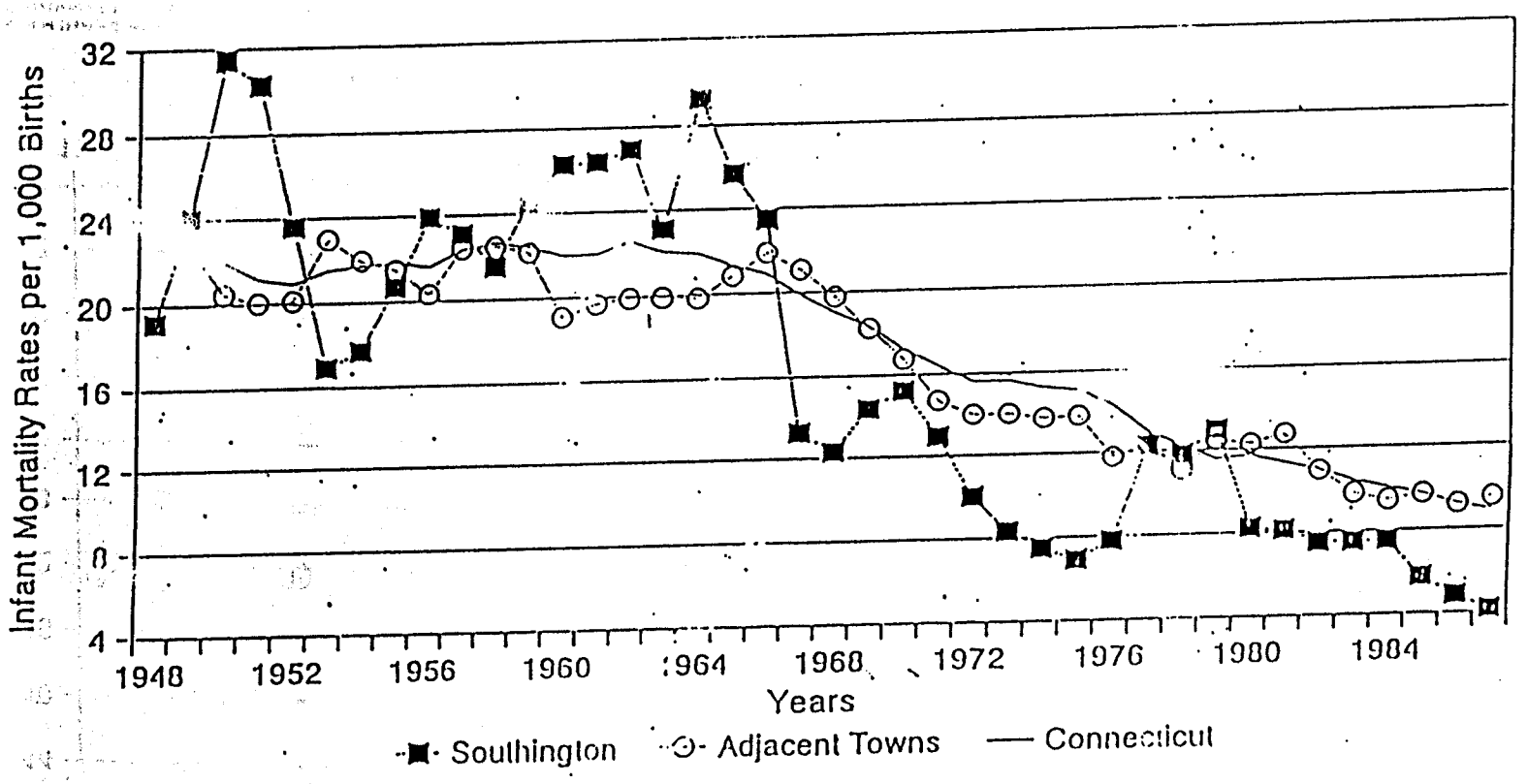


CT. Department of Health Services
Div. Health Surveillance & Planning
July, 1990

Infant Mortality Rates

Three-year Moving Averages

Southington/Adjacent Towns/Connecticut



CT. Department of Health Services
Div. Health Surveillance & Planning
July, 1990

APPENDIX 4

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date July 1, 1992

From Environmental Health Scientist, POS, ERCB, DHAC, ATSDR (E32)

Subject Health Consultation: Old Southington Landfill, Southington, Connecticut

To Susanne Simon
Public Health Advisor
ATSDR Regional Services
Region I
Through: Director, DHAC (E32)
Chief, ERCB, DHAC (E32)

BACKGROUND AND STATEMENT OF ISSUES

The Connecticut Department of Health Services (CTDHS) is nearing completion of a public health assessment of the Old Southington Landfill site (OSL) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). On June 9, 1992, CTDHS contacted ATSDR headquarters for assistance in interpreting the public health implications of methane intrusion into 3 commercial buildings built on the southwest corner of the former landfill. [6] Approximately 10 other buildings, including 4 private homes, have been built on the landfill since the landfill closed in 1967. [1] (See Figure 1) Telephone discussions with representatives of CTDHS, Connecticut Department of Environment (CTDEP), the U.S. Environmental Protection Agency Region I (EPA), and the Potentially Responsible Parties (PRPs) followed. [11] ATSDR has issued this health consultation to explain both the health concerns of the hazardous conditions at OSL, and provide recommendations to prevent injuries and other adverse health effects.

Old Southington Landfill, also referred to as Old Turnpike Road Landfill, is in Southington, Hartford County, Connecticut. The 11.8 acre site is adjacent to Old Turnpike Road in the Plantsville section of town. [7]

The landfill operated from 1920 to 1967. Liquid, solid, and hazardous wastes were disposed of beginning in 1950. In 1967, the landfill was closed and the property subdivided and developed into residential, industrial and commercial properties. The U.S. EPA placed this site on the National Priorities List in 1985. [7]

During a site visit conducted in November 1991 as part of the public health assessment, CTDHS health investigators learned of migration and ignition of flammable landfill gases in commercial buildings located within the boundaries of the Old Southington Landfill (OSL). Partially in response to the concerns of CTDHS, the Southington Fire Department (SFD) investigated the complaints and detected up to 90% of the lower explosive limit (LEL) of methane using a combustible gas indicator (CGI) in cracks in the foundation of one of the buildings (Building 3 on Figure 1). SFD ordered the building evacuated and ventilated; the cracks in the building's foundation through which the landfill gas was entering the building were sealed to prevent further entry of the gases. After this was accomplished, the CGI readings dropped to 10-30% of the LEL at unknown locations. SFD allowed re-occupation of the building provided the doors and windows were opened in the morning when the building was first occupied and kept open during occupancy. Since then, passive methane monitors have been provided by SFD, purchased by the PRPs, and installed by the owners in several buildings. In addition, as resources permit, the SFD monitors the buildings with a CGI. [11] SFD reports that the concentration of combustible gases in the ambient air of any building that they have monitored has never approached 25% of the LEL. A letter from the EPA Remedial Project Manager to the CTDHS Health Assessor provides a thorough summary of the history of the methane problems and previous actions at this site. [8]

Methane is a flammable, colorless, tasteless, and essentially odorless gas. It's toxic effects are limited to simple asphyxiation (e.g., displacement of oxygen in the atmosphere). The flammability of a gas is measured by it's flammable range. Methane has a lower flammable limit (a.k.a., lower explosive limit {LEL}) of 5% methane by volume in air and an upper flammable limit {UEL} of 15% by volume in air. Below the LEL, there is insufficient methane to burn (i.e., fuel mixture is too "lean"); above the UEL, there is too much methane to burn (i.e., fuel mixture is too "rich"). Between the LEL and the UEL, the gas is in it's flammable range. If sufficient oxygen is present and an ignition source is present, the gas can be ignited and burned while in the flammable range. If the gas is contained in a small enough space (dependent on the volume of gas present), an explosion may occur. [5]

Landfills produce methane as the organic materials in the landfill decompose. In older landfills, including the Old Southington Landfill, industrial wastes were disposed of. Industrial wastes and household consumer product wastes often contribute to the combustible gases or vapors generated by the landfill. Depending on the pressures formed in the landfill by the decomposition process, these gases can migrate through the soil following the paths of least resistance until they find an avenue to the surface. The gases then dissipate into the atmosphere or can collect in enclosed spaces such as basements, buildings, or cabinets. Utility lines can provide preferential channels for the migration of these gases, especially into buildings. The distance and speed of migration is partially dependent on the pressure in the landfill. A table in reference 4 listing the number of incidents known to involve fire and explosion of landfill gases from the 1960's to the present contains 29 events. Of these 29 events, 10 resulted in injuries or

death. [4] Compared to the number of landfills in the country, this is not perhaps a significant number of incidents; however, it is not known how many other incidents were attributed to other causes, such as a natural gas leak, without evaluating landfill gases.

The stratigraphy of the Old Southington Landfill has been fairly well defined by several studies over the years dating back to 1964. The reports of these investigations are summarized in reference 1. Essentially, portions of the landfill were built on what was once a wetland, a part of the current Black Pond. The soils are primarily fine to coarse sands and gravels with some silt. The soils are depicted as being highly permeable; groundwater velocity is estimated at approximately 1 foot per day. [1]

In September of 1990, the Environmental Protection Agency Region I (EPA) performed indoor air sampling of two of the residential buildings built on the landfill. Based on previous studies of the soil gases in the vicinity of the landfill in 1988 and 1989, several compounds were targeted for analysis. These included benzene, ethyl benzene, tetrachloroethylene, toluene, trichloroethylene, 1,1,1-trichloroethane, trans-1,2-dichloroethylene, vinyl chloride, and xylene (m-, p-, and o- isomers). Methane was analyzed for using a flame ionization detector (FID) as a field gas chromatograph calibrated to methane. Several compounds, which can have common sources in a home as well as a landfill, were detected in this study. During the study, breakthrough occurred for several volatile organic compounds (VOCs) on the filter media; also, some field blank contamination occurred giving concentrations in the same range as the actual samples. The results are shown in Table 1, taken from the study. ATSDR concurs with the conclusions of EPA that the source of the VOCs detected in the study cannot be determined. The highest concentrations of methane were 7 ppm, detected under sinks in both homes. The LEL for methane in ppm is equivalent to 50,000 ppm. [3]

In December 1991, EPA's Technical Assistance Team contractor (EPA/TAT) conducted an air monitoring survey of most of the buildings built on the landfill. EPA/TAT used a CGI, FID, and a photoionization detector (PID) as field survey instruments. Both the FID and the PID are sensitive to many organic compounds; however, the PID will not detect methane. The difference in the reading of the two instruments was interpreted as the methane concentration. The CGI measures the combustibility of the vapors and does not differentiate between compounds. Table 2 summarizes the findings of this study. [2]

EPA and the PRPs are planning to conduct a soil gas investigation this summer. This investigation is expected to better determine the constituents of the soil gas as well as delineate the sources and migration patterns of the soil gas from the landfill.

In June 1992, some workers reported to CTDHS that the vapors in unsealed cracks were ignitable. [11] On June 16, 1992, CTDEP visited Building 3 in figure 1 and was shown an open crack at the rear of the building by an employee. The employee ignited the vapors in the crack, in the presence of CTDEP. The flame continued until suppressed by the employee. [12] On June 18, 1992, CTDHS and SFD checked combustible gas

readings at the site and found three buildings with 90 - 100% LEL in cracks along the floor and wall interface. Some workers reported to CTDHS that the methane alarms in their building are frequently sounding when they arrive in the morning. [11] On June 22, 1992, (in response to a request from EPA on June 19,1992) the Occupational Safety and Health Administration investigated the complaints of the workers on site. Their findings confirm the results of CTDHS and SFD. [9]

DISCUSSION

Municipal landfills are difficult to assess because of the wide variety of materials disposed of during their operations, the varying standards under which they have operated over the years, and the geological conditions of their location. Environmental Sciences and Engineering, a consultant for the Potentially Responsible Parties (PRPs), has proposed a conceptual model of the Old Southington Landfill. According to the information available to ATSDR, this conceptual model is either being evaluated or has been approved by regulatory and environmental agencies. The model suggests that the landfill is divided into two areas shown in Figure 2. The northern area, referred to by some as the "stump dump", reportedly received brush and trees; some of which were apparently burned since ashes have been found beneath the surface. This area underlies the four homes (buildings 9 and 11-13 in Figure 1). The southern area received municipal and industrial wastes. The boundary between these two apparently distinct zones seems to be between buildings 9 and 1 in figure 1. [1]

Another significant feature, according to the conceptual model, is an extensive layer of peat; the approximate boundaries of which are shown in Figure 3. In the northern area, this layer seems to be primarily above the water table; in the southern area, the layer seems to be below the water table. [1] A continuous peat layer of this size would be significant in that the organic and water content of this layer could be expected to be quite high. This organic content may result in the peat adsorbing many of the organic compounds. The peat may also impact soil gas migration through an absorption process. While methane is probably not susceptible to the adsorption/absorption processes, if they exist, the peat may be saturated with water, like a sponge, and retard the migration of methane and other vapors from below the layer. The peat layer may also be a source of methane. [10] Other factors, which may influence soil gas migration, include groundwater flow, permeability of the landfill waste, and landfill construction.

The EPA/TAT study, supported by the reports from the SFD, indicates where landfill gases are entering the buildings and shows the area of most concern to be the southern area of the landfill. Buildings 3, 4, and 6 in figure 1 yielded significant levels of organic compounds exceeding the measurement capabilities of the FID, but not enough to be detected by the CGI. (see Table 2) The fact that the PID did not detect any organics indicates that the gas measured by the FID could be methane, as presumed by the TAT. Other compounds that are above the ionization capability of the PID, but not

the FID, may also cause this type of instrument response. The reason building 5 is not impacted is not clear. The buildings are described as having wide open areas with ceilings approximately 25 feet high. [11]

The LEL levels reported by CTDHS and SFD and vapor ignition reported by the workers indicate that there is a risk of concentrating sufficient methane in smaller spaces within these large buildings to produce a hazard to workers, if precautions are not taken. These conditions seem to represent a change from those found in 1991 by EPA/TAT and the SFD, after the sealing of the cracks. It is unclear whether only the cracks in building 3 of figure 1 were sealed in 1991, or in all the buildings. SFD only ordered the sealing of the cracks in building 3.

The primary hazard of methane is the flammability. As pointed out by EPA in it's 1990 indoor air study, the concentration necessary to produce health effects as an asphyxiant are an order of magnitude higher than the concentration necessary for ignition.

ATSDR estimated the volume of air in the three buildings of concern as if they were one room using the approximate ceiling height and the floor space from scale drawings in the file. Using this technique, building 4 has the smallest volume at 60,000 cubic feet. In order to attain a flammable atmosphere, the volume of methane entering and collecting in the building would have to total 3,000 cubic feet. This volume is unlikely to be reached except under extreme conditions such as the building being closed up for long periods of time. However, it is impossible to accurately predict these conditions in advance. The more likely scenario would be for the flammable landfill gases (mostly methane) to accumulate in a smaller enclosed space within the building such as a supervisor's office, a storeroom, utility room, or a cabinet. If this occurs, a flammable atmosphere could be generated without warning in the smaller room, potentially resulting in a fire or possible explosion. The fire could then spread to the rest of the building.

There are several options for dealing with methane intrusion; almost all of them involve the use of fixed methane monitors, periodic monitoring using portable instruments, or both. The placement of fixed monitors within a building involves many factors that are unique to the individual building. These factors include the entry points of the methane into the building, the sources of ignition present, the activities within a given space, and the frequency the space is occupied by workers or residents. For example, a fixed monitor would be ideal in a small, normally unoccupied, space where methane vents into the building and an ignition source is nearby; such a room may be an air compressor room or other utility room. In most situations, the methane monitor should not itself be a source of ignition. Finally, warnings to workers or residents by the methane alarms do not fulfill their intended function unless actions are taken by them or their employers to protect themselves. These actions would normally involve evacuation until the space is vented, controlling ignition sources (e.g., shutting down power to the building or specific circuits within the building), and notifying the fire department of the alarm.

The new or reopened cracks may also be an indication that the wastes in the landfill below are shifting and that additional cracks will be formed as the building shifts in response. This subsidence of the buildings is likely to continue and be unpredictable. The type of engineering controls used in 1991 (i.e., sealing the cracks) appear to be less than entirely successful because of this subsidence.

Engineering controls are preferable to other techniques of controlling exposures to hazards. They can be designed to prevent hazardous exposures from occurring and/or provide warnings to workers or occupants that hazardous conditions are likely, without further action on the part of the worker or the occupant. Minimizing human action in the detection or prevention of exposures reduces the likelihood of human error becoming a factor in the safety of the employees or occupants. The Occupational Safety and Health Administration mandates the use, whenever possible, of engineering controls and the National Institute for Occupational Safety and Health has recommended it at this specific site. If utilized, engineering controls have to be maintained properly to insure that they work. Employees and occupants have to be trained to understand why the engineering controls are necessary, the basis for their operation, and, in the case of warning devices, the necessary actions to be taken.

Moreover, the constituents and the relative concentration of those individual constituents in the soil gas will vary unpredictably with time. The 1990 indoor air survey by EPA points out that the detected compounds in the homes can be produced in the same concentration range by many processes within the home rather than the landfill. Saturation of the sample collection media may have occurred for 16 compounds in one or both homes, thereby rendering the interpretation of this data subject to inaccuracies. The cause of this breakthrough should be considered when designing future sampling efforts.

Commercial and industrial locations will also produce flammable gases of the same type produced by landfills as part of their normal operations. Consequently, it is often difficult to determine what proportion of indoor air pollutants is part of normal business operations or household consumer products and what proportion is caused by seepage of landfill gases into the building. One method of estimating whether the contaminants are caused by normal business operations (or household consumer products) or the landfill is to sample the soil gas close to but outside the building at the same time as samples are collected inside the building. However, unless there is a specific pollutant or combination of pollutants present in the soil gas without a source inside the building, this method of estimation may not be successful. In addition, past documented experience and reports of investigations/evaluations by EPA, OSHA, and the National Institute for Occupational Safety and Health at similar locations not impacted by a landfill may be used to evaluate and compare the data.

Nonetheless, many of the compounds that can be produced in landfills were detected in the 1990 indoor air survey; some of these compounds do have toxic effects at significantly lower concentrations than methane. Benzene, for instance, has an acute Minimum Risk Level (MRL) of 2 parts per billion by inhalation. MRLs are established by ATSDR and are based on human epidemiological or animal toxicological data. This concentration represents a daily dosage that is likely to be without appreciable risk of adverse non-cancerous effects over a specified duration of exposure.

CONCLUSIONS

ATSDR concludes that there is a substantial health hazard for workers through a fire and possibly explosion primarily in smaller, enclosed spaces within the three buildings that consistently have shown levels of methane gas. These three buildings are buildings 3, 4, and 6 on Figure 1. The hazard could be imminent depending on several factors, some of which cannot be accurately predicted or have not been determined yet. These factors include the volume of air in any given space within the building, the number of times the air changes within those spaces, and the volume of methane being released into those spaces. There is a similar potential health threat to the remaining buildings built on or in proximity to the landfill.

Inhalation of hazardous soil gas constituents, such as benzene, is also a potential health threat. The degree of health threat cannot be determined because the current constituents of the landfill gas have not been characterized.

RECOMMENDATIONS

1. Workers and residents in the vicinity of the Old Southington Landfill Site should not be exposed to atmospheres containing the equivalent of 25% or more of the LEL for methane. If a given area attains this site specific action level, then the location should be evaluated by environmental and fire protection specialists to determine appropriate actions.

2. If the levels of combustible gas reach 25% LEL, appropriate short term actions may include engineering controls, ignitions source controls, evacuations, or a combination of these techniques to reduce the threat to the workers and residents potentially exposed.

    a. Engineering controls are the preferred method of reduction and should be designed to maintain the indoor ambient concentration of methane below 1.25% by volume (i.e., 25% LEL). These engineering controls should consider possible future subsidence of the building such that this phenomena will not impede their effectiveness.

b. Ignition source controls should take into account all sources of ignition, including static electricity from personal garments.

c. Until ignition source controls and engineering controls can be instituted, the confined areas should not be utilized.

d. The SFD Fire Marshal and possibly other fire protection specialists should be involved in the process of selecting appropriate short term responses.

3. Fixed methane monitors should be installed in the lower floors of all buildings built on the landfill. If any concentrations approach 25% LEL or more in other buildings in the routine monitoring described in recommendation 4, methane monitors should be installed in those buildings. The location of the methane monitors should be selected with due consideration of the factors described in the DISCUSSION section of this health consultation.

4. Indoor air should be monitored, using a CGI, of likely gas collection points (e.g., in cabinets, under sinks, etc.) on a periodic basis where it is now being done and in all other buildings built on or immediately adjacent to the landfill. In cases described in recommendation 3 where new methane monitors are installed, consideration should be given to extending the routine monitoring to the next adjacent buildings. When combustible gas concentrations attain 25% of the LEL, the actions described in recommendation 2 should be considered. Consideration should also be given to collecting air samples for analysis in a laboratory to determine the constituents of the vapors.

5. The soil gas investigation already planned by EPA and the PRPs should be expedited to the extent practicable in order to determine the degree of the potential threat to other buildings in the vicinity. The soil gas investigation should attempt to identify the constituents of the landfill gas and the factors influencing it's migration. The sampling and analysis plan should consider the results of past investigations at this site, as appropriate. If possible, the role of the peat layer in the migration of soil gases at this site should be determined.

6. Soil gas sampling and indoor air sampling should be conducted concurrently in order to determine any correlation between the indoor air and the soil gas. In doing so, the samplers should conduct an inventory of other sources of the same types of chemicals within the building in an attempt to identify those sources that may contribute to the indoor air and to avoid the difficulties mentioned in the DISCUSSION section of this health consultation. If possible, the indoor air sampling could be conducted in conjunction with the soil gas investigation already planned; however, the soil gas investigation should not be delayed simply to include this aspect.

7. Long term remedial solutions to the landfill should be designed to prevent unsafe concentrations of the landfill gases from reaching any building.

Richard A. Nickle

cc: CDC/NIOSH/SHE

ATSDR:DHAC:ERCB:POS:RNickle:er:0616:070192
DOC.SOUTHING.LF

TABLE 5 TABLE 1 - ATSDR

OLD SOUTHINGTON LANDFILL AIR SAMPLING RESULTS - TENAX - (PPBV)
SAMPLING DATE: 9/25/90

COMPOUND	SAMPLE IDENTIFICATION 413-L-P	413-L-S (4)	413-L-D (6)	413-U	425-L-P (5), EXCEPT BENZENE	425-L-S	425-L-D (6)	425-U	AMBIENT (4)	(ng) TB	(ng) LB
Chloroform	ND	ND	0.12	0.1J	0.21	0.32	0.48	0.50	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2J(3,5)	0.5J(3,5)	2J(3)	3J(3)	2J(3)	2.9J(2)	5.2J(2)	5.0J(2)	ND	26	34
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.19	ND	0.26	0.25	0.19	0.29	0.48	0.49	ND	ND	ND
Benzene	5.5J(2)	0.1J(3)	5.9	5.0	6.9J(2)	1.1J(3)	17J(2)	16J(2)	ND	2.2J	1.3J
1,2-Dichloroethane	ND	ND	ND	ND	ND	0.25	0.42	ND	ND	ND	ND
Trichloroethylene	0.04J(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	0.8	0.11	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	18J(2)	0.23	19J(2)	16J	22J(2)	34J(2)	56J(2)	52J(2)	ND	ND	1.6J
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.15	ND	ND	ND
Tetrachloroethylene	0.33	ND	0.34	0.31	0.2	0.29	0.47	0.52	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	2.5	0.06J(1)	2.6	2.2	3.4	[illegible]	7.6J(2)	7.7J(2)	ND	ND	ND
Total Xylenes (p,m,o)	8.3J(2)	0.2J(1)	8.4	6.6	10J(2)	15J(2)	25J(2)	22J(2)	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	4.2	0.11	4.3	3.4	6.1J(2)	9.2J(2)	15J(2)	14J(2)	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	0.25	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	0.54	0.02J(1)	0.54	0.45	1.6	1.2	2.0	9.7	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.6	0.03J(1)	0.62	0.45	0.91	1.4	2.2	8.9J(2)	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-Butylbenzene	0.18	ND	0.21	0.24	0.30	0.46	0.33	0.71	ND	ND	ND
1,2,4-Trimethylbenzene	0.49	0.05J(1)	0.57	2.4	4.1J(2)	6.2J(2)	1.9	1.8	ND	ND	ND
s-Butylbenzene	0.02J(1,5)	0.04J(1,5)	ND	0.1J	0.09	1.2	1.3	1.7	ND	ND	ND
p-Isopropyltoluene	0.17	ND	0.31	0.29	0.56	0.8	1.2	1.2	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	0.03J(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-Chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	0.58	0.07J(1)	0.58	0.40	0.57	0.67	1.1	1.0	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7J

NOTES: ND = BELOW DETECTION LEVEL
J = ESTIMATED:
(1) = BELOW STANDARD RANGE
(2) = ABOVE STANDARD RANGE
(3) = BLANK CONTAMINATION
(4) = RECOVERY OUTSIDE SPECIFIED RANGE
(5) = BREAKTHROUGH EXHIBITED
(6) = FLOW RATE CHANGE EXCEEDED CRITERION
(7) = PARALLEL SAMPLES EXCEEDED PRECISION CRITERIA

TABLE 6

OLD SOUTHINGTON AIR SAMPLING RESULTS - SPHEROCARB - (PPBV)
SAMPLING DATE: 9/25/90

COMPOUND	SAMPLE IDENTIFICATION 413-L-P	413-L-S	413-L-D	413-U (5)	425-L-P	425-L-S	425-L-D	425-U (5)	AMBIENT	(ng) TB	(ng) LB
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.28	ND	0.78	1.4	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	0.12	ND	0.66	0.52	ND	ND	0.65	0.25	ND	ND	ND
1,1-Dichloroethylene	0.60	ND	0.35	ND	0.28	ND	1.26	0.54	0.4J(1)	ND	ND
Methylene Chloride	0.48	ND	0.62	0.28	3.9J(6)	ND	18.0J(2,6)	9.0J(2)	0.35	ND	ND
t-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	0.41	ND	ND	ND	ND
Methyl ethyl ketone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: ND = BELOW DETECTION LEVEL
J = ESTIMATED VALUE:
(1) = BELOW STANDARD RANGE
(2) = ABOVE STANDARD RANGE
(3) = BLANK CONTAMINATION
(4) = BREAKTHROUGH EXHIBITED
(5) = FLOW RATE CHANGE EXCEEDED CRITERION
(6) = PARALLEL SAMPLES EXCEEDED PRECISION CRITERIA

TABLE 2
EPA/TAT FIELD SURVEY RESULTS
DECEMBER 1991

BUILDING NUMBER[1]	MAX FID	MAX PID	MAX CGI	LOCATION WITHIN BUILDING
1	6	ND	0	Inside perimeter of bldg.
2	36	30	0	Inside perimeter of bldg.
3	>1000	1	0	Loading dock (FID in cracks)[2]
4	>1000	<1	8	Cracks in floor in main room
5	8	<1	0	Downstairs in main bldg.
6	>1000	<1	0	Inside front door by crack
7	10	4	0	Main working area.
8	10	1	0	Crack in floor near NE door
9	3	1	0	In laundry room and bottom floor[3]
10	2.5	<1	0	Inside perimeter of bldg.
11	<2	<1	0	Laundry room and bottom floor[3]
12	3	2-2.5	0	Laundry room and bottom floor[3]

NOTES: < means "less than". > means "greater than". FID was a Century Organic Vapor Analyzer (OVA); range 0-1000 units (commonly called ppm). PID was an Hnu photoionization detector (Hnu); range is 0-2000 units (also commonly ppm). Units for CGI are in %LEL of methane.

1 Building number corresponds to building numbers in Figure 1.
2 FID reading was found in cracks in the loading dock; PID reading was in the ambient air of the loading dock.
3 Readings from the garage which may be higher than those shown are not presented here.

ATSDR Figure 1

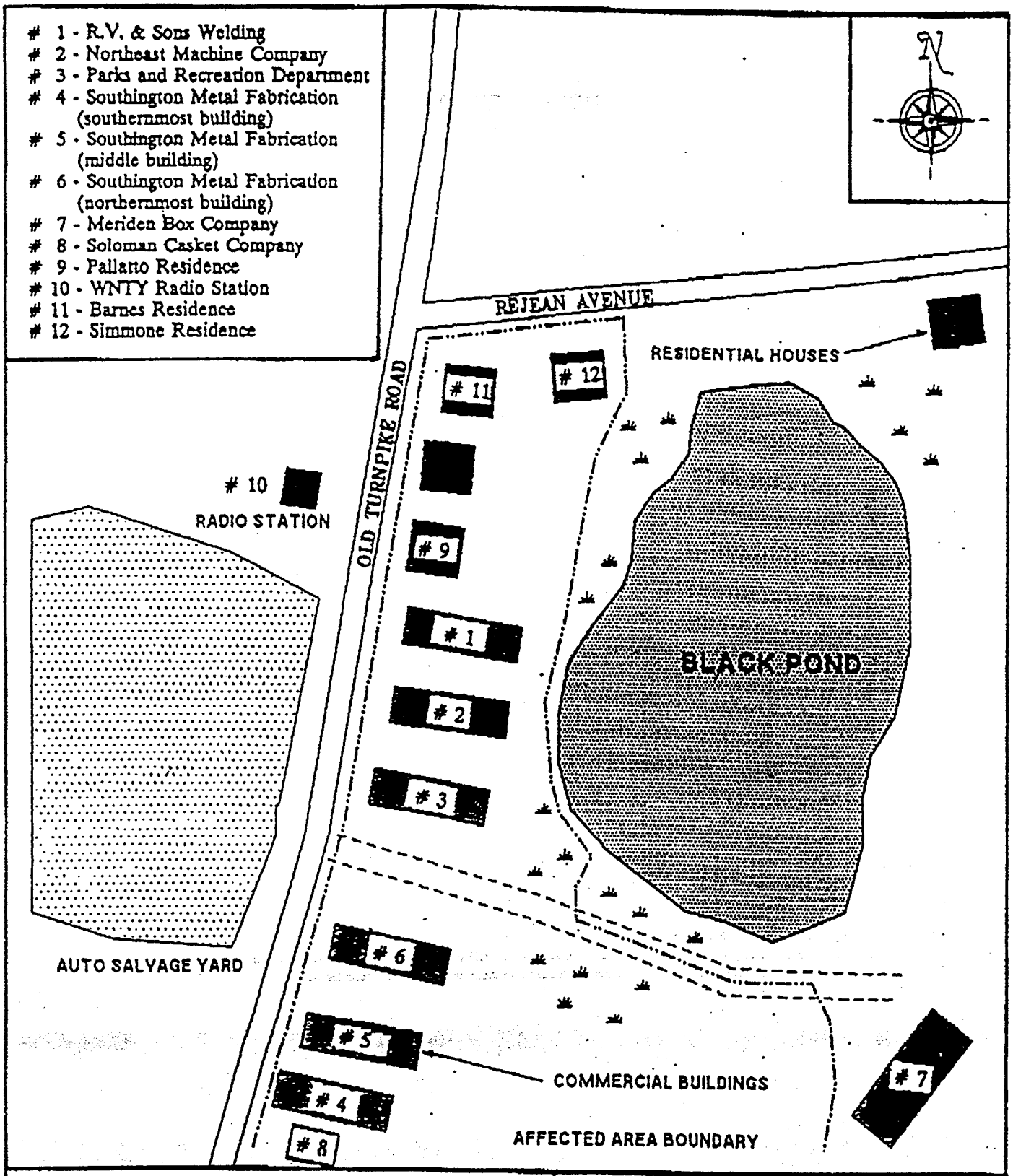
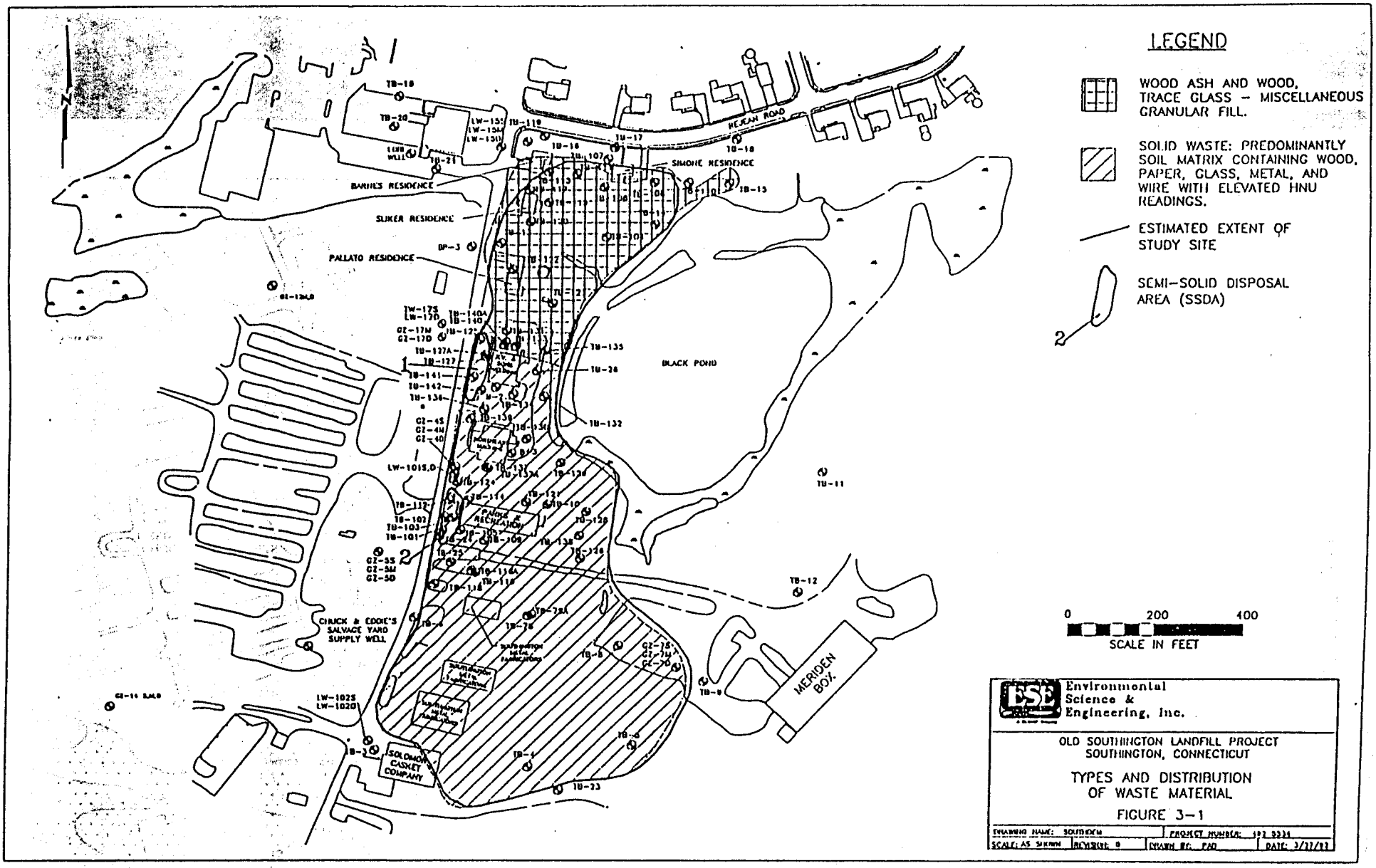


FIGURE 1
SITE DIAGRAM
OLD SOUTHINGTON LANDFILL
SOUTHINGTON, CONNECTICUT

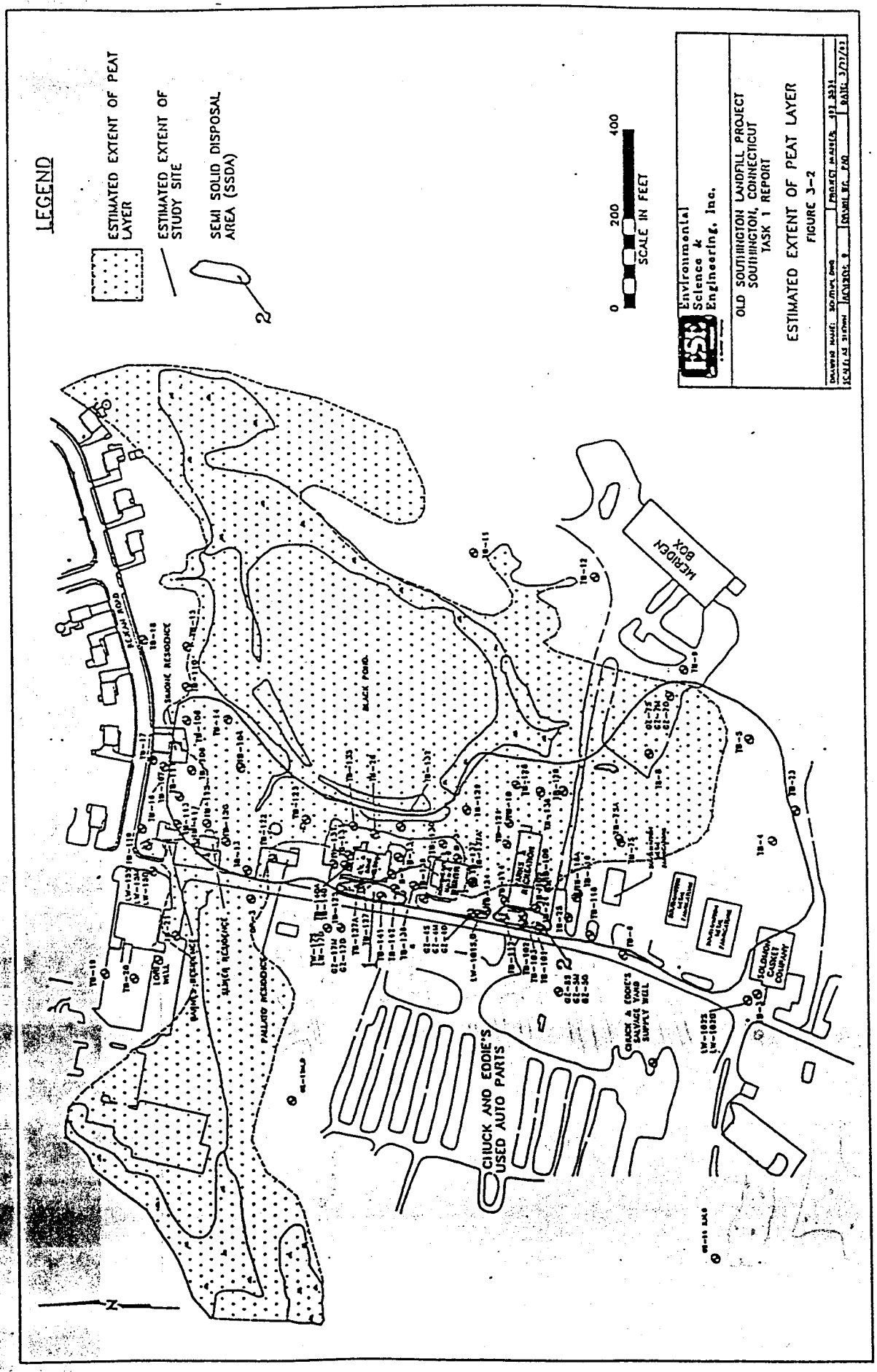
NOT DRAWN TO SCALE

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS FILENAME
G. Mavris	12/91	1606
APPROVED	DATE	TDD #
	12/91	01-9112-08


LEGEND
WOOD ASH AND WOOD, TRACE GLASS - MISCELLANEOUS GRANULAR FILL.
SOLID WASTE: PREDOMINANTLY SOIL MATRIX CONTAINING WOOD, PAPER, GLASS, METAL, AND WIRE WITH ELEVATED HNU READINGS.
ESTIMATED EXTENT OF STUDY SITE
SEMI-SOLID DISPOSAL AREA (SSDA)
2
1
N
HEDGEHOG ROAD
BARNES RESIDENCE
SLIKER RESIDENCE
PALLATO RESIDENCE
SIMONE RESIDENCE
BLACK POND
CRACK & COOKE'S SALVAGE YARD SUPPLY WELL
SOLOMON CASKET COMPANY
MERIDEN BOX
0
200
400
SCALE IN FEET
Environmental Science & Engineering, Inc.
OLD SOUTHINGTON LANDFILL PROJECT
SOUTHINGTON, CONNECTICUT
TYPES AND DISTRIBUTION OF WASTE MATERIAL
FIGURE 3-1

ATSDR Figure 3



REFERENCES

1. DRAFT Post-Screening Investigation: Task 1 Report and Task 2 Work Plan, Prepared by Environmental Science and Engineering, Inc.; Prepared for the Respondents for the Old Southington Landfill; Submitted to U.S. EPA Region I. March 26, 1992.

2. Letter Report from Mr. G. Mavris and Mr. M. McDuffee, EPA/TAT, to Mr. J. Carlson, EPA I, dated December 19, 1991 re: EPA/TAT I air monitoring survey activities.

3. Memorandum from Mr. J. Harvanek, EPA/EMA, to Ms. Margaret Velie, EPA/RPM dated December 20, 1990. Subject: Air review of Old Southington Landfill Site Characterization Report.

4. Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines, Prepared by U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, NC. March 1991

5. Hazardous Substance Database, National Library of Medicine, 1992.

6. ATSDR Record of Activity describing a telephone conversation of 6/9/92 between Ms. E. Pestana, CTDHS, and Mr. R. Nickle, ATSDR/DHAC/ERCB.

7. CTDHS Fact Sheet on Old Southington Landfill dated 5/18/92.

8. Letter from Ms. Almerinda Silva, EPA/RPM, to Ms. Edith Pestana, CTDHS, re: Methane Gas at Old Southington Landfill, Southington, CT dated June 15, 1992.

9. ATSDR Record of Activity describing a telephone conversation of 6/25/92 between Ms. B. Gordon, DOL/OSHA Region I, and Mr. R. Nickle, ATSDR/DHAC/ERCB.

10. Hawley's Condensed Chemical Dictionary, Eleventh Ed., revised by N. Irving Sax and Richard J. Lewis, Sr. Van Nostrand Reinhold Co., New York. 1987.

11. ATSDR Record of Activity describing telephone conversations beginning 6/18/92 between multiple agencies and Mr. R. Nickle concerned with various aspects of the site.

12. Memorandum from Mr. T. O'Connor, CTDEP, to Mr. E. Parker, CTDEP dated 6/18/92.

APPENIDIX 5
PUBLIC COMMENTS--RESPONSIVENESS SUMMARY

The Public Comment section for the OSL site contains the public comments received during the public comment period in July 1993 and their respective response.

PUBLIC COMMENTS RECEIVED FROM A LOCATION IN SOUTHINGTON, CT

COMMENT NO. 1.

According to the Public Health Assessment the boundaries of the landfill are not clearly defined. If this is so, then why aren't more tests being done to determine the boundaries?

RESPONSE TO COMMENT NO.1.

Since the writing of this document, information has been reviewed by the CT DPHAS and the CT DEP. The CT DPHAS and the CT DEP have determined that the northern, eastern and southern boundaries of site have been defined by the EPA RI/FS consultants ESE. At the present time there is still a question as to the western boundary of the landfill.

COMMENT NO.2.

Why hasn't more testing of the wetlands around Black Pond been done? Even though the water in the pond has tested relatively clean, what about the silt that flows out with the water and stays after the pond water recedes? More testing of the silt from the pond and the wetlands on the northeast side of the pond needs to be done. We live at number 61 Rejean Road and many times have had Black Pond overflow into our back yard, sometimes as close as ten feet from our home. Testing has not been done in any of the back yards of the homes that get overflow from the pond? Why? We would like to know if there is anything there.

RESPONSE TO COMMENT NO. 2.

Based on the data we have evaluated from Black Pond which includes, surface water, sediments and fish, we do not have any evidence that exposure to the overflow from the pond onto your backyards will cause an adverse health effect.

In response to your concern, the CT DPHAS is planning to sample the surface water overflow and surface soil in the area of your property where water from Black Pond overflows.

COMMENT NO. 3.

Why are so many of the towns wells contaminated? Our family drank the water from well number five for approximately two years. How are we and all the other people who drank from these wells going to be monitored for any illnesses in the future? What recourse do we have?

RESPONSE TO COMMENT NO. 3.

Waste disposal activities account for the contamination of the four Southington town wells that have been contaminated through time. The source of contamination for wells number 4 and 6 is Solvents Recovery Services of New England. Allegedly, there are several sources that contributed to the contamination of town well number five. These include the OSL Landfill and other industrial facilities near the well. Well 2 was contaminated by the disposal of dry cleaner waste.

In response to your question on monitoring people for illnesses, the CT DPHAS has educated physicians in Southington about the environmental history of the Town of Southington including the contamination of these four wells. This physicians education program is designed to alert physicians that exposures have occurred and that citizens are concerned for their health.

COMMENT NO. 4.

Why did the Town of Southington allow homes and businesses to be built on a landfill where it was known that hazardous waste was dumped? How could the Town of Southington allow plans for a residential area to be made and have those plans on paper years before the landfill was closed?

RESPONSE TO COMMENT NO. 4.

The CT DPHAS does not know the answer to this comment. This question should be directed to the Town Manager's office of Southington.

PUBLIC COMMENTS RECEIVED FROM A LOCATION IN PLANTSVILLE CT.

COMMENT NO. 1.

Considering my location next to R.V. & Son, I feel more testing on my property should be done for gases and contaminants.

RESPONSE TO COMMENT NO. 1.

The CT DPHAS and the ATSDR feel that adequate testing was done on-site to characterize the potential for you as a resident to be exposed to site contaminants. The CT DPHAS has reviewed the surface soil data, indoor air, drinking water and methane data that was available and did not find evidence that your family would be in danger of being exposed to contaminants from the site.

COMMENT NO. 2.

I feel my property lacks adequate subsurface testing for gases and contaminants. Due to my location how does EPA justify that adequate testing was conducted in order to collect data for the Health Risk Assessment report.

RESPONSE TO COMMENT NO.2.

The CT DPHAS cannot answer this question because it concerns the EPA Risk Assessment which is different from the ATSDR Public Health Assessment. This question should be addressed to the EPA Region I office for a response.

The CT DPHAS feels that adequate testing was done on your property in order to assess the potential for exposures to occur at the present time. The CT DPHAS was concerned with surface soils, soil gas, indoor air, drinking water, and surface water from Black Pond. A review of the data from the above mentioned sources did not indicate that you or your family are being exposed to any contaminants. However, we are concerned about the methane levels that were detected in your backyard, and your home will be monitored regularly by the Southington Fire Department.

COMMENT NO. 3

What information did the EPA use in order to establish quality guidelines for VOCs in our well water? B) How can the EPA be sure the guidelines are at a safe level for consuming? (pg. 19)

RESPONSE TO COMMENT NO. 3.

These guidelines developed by the EPA are protective of public health. All these quality guidelines developed by the EPA are based on animal toxicity studies and they represent the highest concentration of a chemical that a person can be exposed to over a 70 year lifetime without causing a health problem.

COMMENT NO. 4.

How does our site compare to other sites in the way of contamination and how it effects our health? What site was used in your study to compare with ours?

RESPONSE TO COMMENT NO. 4.

As per our review of the available data from several sites in Connecticut the OSL site in comparison to other Superfund sites in the Connecticut is more contaminated than some and less contaminated than others. The CT DPHAS and the ATSDR did not use other sites for comparison in our analysis of the contamination on the OSL site. Each Superfund site that we investigate is assessed individually. The one element that all the Superfund sites have in common is contaminated ground water problems.

This is the first time that the CT DPHAS has dealt with the problem of methane migrating into the indoor air. However, when the CT DPHAS, the ATSDR, and the EPA became aware of the presence of potentially dangerous levels of methane at the site, experts that had dealt with other landfills and methane hazards in the U.S. were consulted.

PUBLIC COMMENTS RECEIVED FROM A SECOND LOCATION IN PLANTSVILLE, CT.

As long standing residents of Southington CT, we have many concerns (past, present and future) regarding our health. My husband, _____ has been a Southington resident for over 40 years. I have a daughter, _____, who is seven years old.

COMMENT NO. 1.

Our past concerns stem from contaminated drinking water, inhalation of smoke contaminated with toxic waste, and of toxic gases that we may have been exposed to from the Old Southington Landfill. We may have been exposed to contaminated water while bathing, gardening, swimming, or washing the car. We have been exposed to smoke, gases, and dust emitted from the landfill.

Many chemicals at Old Southington Landfill are cancer causing others cause heart, lung, kidney or liver diseases. Still others attack the respiratory, central nervous, or blood systems. Residents of Southington have been exposed to all of them from Old Southington Landfill. Our family and many of our immediate neighbors suffer from dizziness, severe headaches, respiratory ailments, cancer, leukemia, numbness of extremities, high blood pressure, fatigue, abdominal pain, and others too numerous to mention. All of our health problems can be attributed to exposure to toxins at the Old Southington Landfill by inhalation, ingestion, or contact.

RESPONSE TO COMMENT NO. 1.

It is true that some of the chemicals that were detected at the OSL site and in the public water wells have been found to cause heart, lung, kidney, and liver diseases in animal studies but at levels greater than those found at the site. In the Toxicologic Evaluation section each compound that was identified as a potential concern was assessed with respect to the potential for this contaminant to cause a health problems to humans. We did not find any evidence that the contaminants from the site could be causing the illness you describe above. However, we feel that your family and immediate friends should consult with a local physician or an occupational health clinic. Occupational health clinics specialize in exposures to chemicals that are found in the workplace as well as in the local environment. The CT DPHAS has consulted with physicians in Southington and with the Occupational Medicine Program at the University of Connecticut Health Center in Farmington concerning the history of the OSL site.

COMMENT NO. 2.

Our present health concerns are more personal. Our home is on the northern border of the old Southington Landfill. We live approximately forty feet away from a toxic waste Superfund site that is on the National Priority List. Everyday we acknowledge that our family is exposed to life threatening chemicals, soil

gases and landfill leachate. Some chemicals even in small amounts, are deadly.

RESPONSE TO COMMENT NO. 2.

The CT DPHAS and the ATSDR have reviewed the available data and have found no evidence that you and your family are being exposed to substances that could cause you harm. If we felt that there could be a possibility that this was true, we would have contacted you immediately. If we felt that residents were exposed to a life threatening situation, the CT DPHAS, the EPA and the ATSDR would have taken the necessary actions and evacuated the residents.

COMMENT NO. 3.

Methane gas is a major concern. Every time we hear a siren or see a fire truck in the street we panic. Have the levels of methane reached dangerous? Are we going to be evacuated? Methane migration has been detected in the southern areas of the landfill. Has any of the methane from the northern areas of the landfill migrated? Has it moved to our property? Did it carry any unknown gases or VOCs? Is methane building up in small enclosed areas -- causing an explosion danger? Are safe?

RESPONSE TO COMMENT NO. 3.

Methane was detected indoors in the floor cracks of three non-residential buildings on the OSL site at levels that could pose a fire and explosion hazard. However, methane has not been detected indoors in any of the northern residential homes on the OSL site. The Southington Fire Department inspects and monitors the homes located on the landfill every day and has not identified methane inside any of the homes to date.

Methane has been detected in methane wells installed in the backyards of homes that are on the OSL site. These wells are monitored regularly.

At the present time we do not have any information to indicate that methane and other potentially toxic gases are migrating into your homes. However, the Southington Fire Department has offered to come and test the homes of residents who are concerned about the presence of combustible gases in their homes.

COMMENT NO. 4.

High levels of VOCs and PAHs are in the soil. Elevated levels of Toluene, TCE, and other VOCs have been detected in indoor air samples at dangerous levels. The VOCs found in the samples cause dizziness and headaches. Is this the cause of our daughters unexplained chronic dizziness? Why hasn't the air been tested inside of the homes bordering the landfill?

RESPONSE TO COMMENT NO. 4.

Elevated levels of toluene, TCE, and other VOCs have not been found in any of the homes. The levels of VOCs found in indoor air samples were below health comparison values and therefore, exposure to these are unlikely to cause health problems.

Because there is no evidence that toxic gases or vapors are migrating substances into the homes located on the landfill, the CT DPHAS does not feel there is cause for concern in the homes bordering the landfill.

COMMENT NO. 5.

Chemicals causing adverse dermal effect to patients with preexisting skin conditions are in the soil. Mixtures of pyrene with other PAHs including benzo(a)pyrene and fluoroanthene cause skin cancer. Is my husband at risk?

RESPONSE TO COMMENT NO. 5.

The CT DPHAS does not believe that your husband is at risk of being exposed to subsurface soil contaminated with PAHs from the OSL site. There is no evidence that your home is on the landfill.

As discussed in the Toxicologic Implications Section, those persons involved in excavations and/or diggings on the site could be at risk of exposure to PAHs, and high levels of VOCs. The PAHs were identified at 4 foot depths on the OSL site.

COMMENT NO. 6.

Lead and mercury have been detected in ground water. Although contamination levels are relatively low - as parents we are concerned about long term exposure to mercury which can cause permanent brain damage.

RESPONSE TO COMMENT NO. 6

The lead and mercury identified in Town well number five is believed to be the result of laboratory error. The lead and mercury were only detected in laboratory analysis in a sampling round. Because subsequent sampling did not detect the presence of lead or mercury, the CT DPHAS does not believe that Town well number five was contaminated with lead or mercury.

COMMENT NO. 7.

Our future concerns center around recommended remediation of Old Southington Landfill.

When the houses and factories that are situated on solid waste, methane, or VOC pockets are destroyed, how will the contamination be contained?

COMMENT NO. 8.
When the vegetation is uprooted, how will the contaminated soil and dust be prevented from becoming air born?

COMMENT NO.9.
How will methane gas and other contaminants be contained and prevented from migrating?

COMMENT NO. 10.
Will an impermeable clay wall be installed to surround subsurface contamination?

COMMENT NO. 11.
Will sewer and utility lines be removed (not capped) to insure that gases and other contamination will not follow them and pollute the entire neighborhood?

COMMENT NO. 12.
Can mixed chemicals, PCBs and VOCs ignite or explode when exposed to oxygen?

COMMENT NO. 13.
When a clay cap is placed over the landfill will pressure cause methane or other toxic waste to spread or redistribute? How will this be prevented?

COMMENT NO. 14.
How and how often will the quality of air, soil, and water be monitored during clean up?

COMMENT NO. 15.
Different chemicals and gases travel through different avenues, air - soil - water, will monitors be installed <u>outside</u> of the landfill current boundary to insure public safety?

COMMENT NO. 16.
When our child sees the EPA employees in their space suits, what reassurance can we give her that she is <u>absolutely not</u> in danger?

COMMENT NO. 17.
We live less than 40 feet away from the Old Southington Landfill. In 1984 this site was placed on the EPA National Priority List as one of the worst toxic waste sites in the U.S. When clean up of this site begins, I want guarantees Guarantees ... that my family and friends will be safe during clean up.

COMMENT NO. 18.
Guarantees ... that our lives will proceed as normal and not be disrupted because of landfill activities.

COMMENT NO. 19.

Guarantees ... that we will be able to enjoy outdoor activities without worry.

COMMENT NO. 20.

Guarantees ... that we will be able to leave our windows open and not be assaulted with contamination.

COMMENT NO. 21.

Guarantees ... that future migration of gases, VOCs, PCBs, and landfill waste will not endanger us.

COMMENT NO. 22.

Guarantees ... that the water we drink is safe that the air we breath is not contaminated that the soil beneath our feet is not killing us.

COMMENT NO. 23.

I want to know beyond a shadow of doubt that our lives and health will not be diminished because we live on the border of a U.S. EPA Superfund Toxic Waste Site.

COMMENT NO. 24.

Our concerns and anxieties are genuine. We are apprehensive about our future. Our physical and mental health is uncertain. Our daily lives have been and will continue to be disrupted by landfill activities. Questions remain unanswered.

RESPONSE TO COMMENT NO. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 24.

The CT DPHAS and the ATSDR cannot comment on the hazards of the prospective remediation plan or methods without reviewing the EPA specific plan. The CT DPHAS recommends that concerned residents like yourself review the Remediation plan when it is made available for public comment and that you submit written comments to the EPA and the CT DEP. The EPA Remediation plan will be made available for your review at the Southington Public Library. In addition, there will be several meetings concerning the remediation of the site that you should attend.

The EPA RI/FS workers are required by law to wear health and safety equipment and clothing while they are on the site performing any sampling, investigative or remediation work. If the EPA identified a potential hazard, local residents and workers would be notified and evacuated if necessary.

COMMENT NO. 25.

The CT DPHAS has provided Southington residents with a health assessment that is factual and understandable. Along with the CT DEP, your combined efforts have overcame obstacles and have provided residents with information that is vital for our

understanding of this public disaster. Recognizing that the State of Connecticut Agencies willingly provide information when Federal and Local Governments are reluctant to do so, is a great comfort and deserving of Southington's residents gratitude. The knowledge that both the CT DPHAS and the CT DEP are safe-guarding people from harm is sincerely appreciated.

RESPONSE TO COMMENT NO. 25.

The CT DPHAS thanks you for submitting comments on the Draft Public Health Assessment for Old Southington Landfill. If you require further information or clarification on the information presented here or other issues concerning the site, please do not hesitate to contact us. We are here to serve you.

PUBLIC COMMENTS RECEIVED JULY 28, 1993 FROM PEPE & HAZARD LAW OFFICES, GOODWIN SQUARE, HARTFORD, CT.

GENERAL COMMENTS

The CT DPHAS and the ATSDR have conducted an evaluation of the human health risks and hazards presented by contamination associated with the Site. As noted in the Draft Public Health Assessment (Draft PHA), the purpose of this evaluation "is to determine whether adverse health effects are possible and to recommend actions to reduce or prevent possible health effects."

Given the stated purpose of the Draft PHA, we believe that the Draft PHA as currently written has fallen short of the mark for a number of reasons as set forth below.

GENERAL COMMENT NO 1.

* First, the Draft PHA has reviewed only selective data gathered over the years at the site. The Draft PHA has failed to include the most recent results of investigations at the Site, including the risk assessment and actions taken at the Site. These facts are critical in evaluation and presenting potential risks to nearby residences and businesses. Additionally, many of the facts reported are not correct. While there is available a large amount of information regarding the Site, much incorrect information has been reported and is repeated in the PHA. We would be willing to assist ATSDR in identifying and correcting such factual errors.

RESPONSE TO GENERAL COMMENT NO.1

The Draft PHA was reviewed by the EPA and the CT DEP before it went out for public comment. The CT DPHAS and the ATSDR rely on the EPA and the CT DEP for their comments and review of the available data. At that time neither agency commented that the information that was included in the Draft PHA was incorrect. The CT DPHAS agrees that more recent data was not included in the Draft PHA before it went out for Public comment. However,

this data does not change our assessment and conclusions of the site that it is a public health hazard. This conclusion is based on past exposures to VOC contaminated drinking water from town well number five and the present physical hazards associated with the methane contamination of indoor air in commercial facilities. The CT DPHAS and the ATSDR are conducting a study to try and reconstruct the dose of VOCs Southington residents may have received from contaminated drinking water with respect to the geographic location of their residence.

GENERAL COMMENT NO. 2.

* Second, the Draft PHA is misleading in its presentation of current potential risks posed by the Site, by intermixing and emphasizing historic risks to groundwater town-wide, which have long since ceased with discussions as to current and future risks. The fact that there may have been potential risks due to drinking groundwater in the past is an insufficient reason to classify the site as a current public health risk.

RESPONSE TO COMMENTS NO. 2

What you are discussing above is the purpose of a risk assessment which is different than the purpose of an ATSDR Public Health Assessment. The following is a comparison of these two different assessment documents.

1. The ATSDR Public Health Assessment is qualitative, and uses environmental and health outcome data and community health concerns as the primary sources of information. For the most part the health assessment is site-specific unless another source of exposure is identified near the site that may have or could impact the local community.

   The EPA risk assessment is quantitative, compound oriented, site specific and uses environmental contamination data.

2. The ATSDR Public Health Assessment weighs medical and public health perspectives to assess health hazards. It is concerned with <u>past</u>, <u>current</u>, and <u>future</u> exposures.

   The EPA Risk Assessment uses statistical and/or biologic models to calculate numerical estimates of health risks. In addition, it deals with hypothetical populations and pathways. It is concerned with <u>current</u> and <u>future</u> exposures.

3. The ATSDR Public Health Assessment is used to evaluate human health impacts and to identify public health interventions.

   The EPA Risk Assessment is used to facilitate remediations or other risk management actions.

4. The ATSDR Public Health Assessment may identify populations for which further health actions or studies are indicated.

   The EPA Risk Assessment may lead to the selection of particular remediation measures at a site.

5. The EPA Risk Assessment bears regulatory weight of authority. The PHA may lead to the issuance of a Public Health Advisory.

GENERAL COMMENT NO. 3.

* A related problem is the inclusion in the Draft PHA for the Site of a discussion of the area wide cancer studies which sprang from the SRSNE Site. The discussion of those studies is confusing and likely to mislead the public as to the nature of potential risks posed by the Old Southington Superfund Site. This is compounded by the fragmented discussion which should clearly point out that the findings of those studies have not determined whether any elevated cancer incurrences are present which are attributable to conditions which may have historically existed. To the extent the ATSDR deems these matters to be of interest to the public, the discussion should be appended to the PHA for the Site and merely referenced within the PHA.

RESPONSE TO GENERAL COMMENT NO. 3.

Although the cancer cluster investigation was initiated because of concern with the Solvents Recovery Services of New England (SRSNE) site, the cancer cases analyzed in this study were from the entire town of Southington. In addition, the CT DPHAS was evaluating the Old Southington Landfill site at the same time as the SRSNE site. Therefore, since the entire town was evaluated it was included in this public health assessment.

GENERAL COMMENT NO. 4.

* Fourth, the draft PHA fails to clearly characterize the nature and results of combustible gas investigations at the Site and the efforts undertaken by the parties to assess and prevent potential impacts. The Draft PHA should clearly differentiate between the residence on the Site where numerous sampling events have shown no potential impacts. The Draft PHA should clearly differentiate between the residences on the Site, where numerous sampling events have shown not potential problems to exist, from the commercial buildings where actions have been taken to ensure the monitoring and prevention of problems which may occur. In addition, the Draft PHA does not describe the actions taken in cooperation with the CT DEP, the CT DPHAS, the EPA, and the Fire Department to monitor combustible gas, take immediate measures in response, and install monitors and venting systems for the long term.

RESPONSE TO GENERAL COMMENT NO. 4

The CT DPHAS and the ATSDR feel that the information is clearly presented with respect to what has been identified on residential and commercial properties. The ATSDR Public Health Assessment is concerned with past, current, and future exposures. The Draft PHA does describe the actions taken by the EPA, the CT DEP, the Southington Fire Department, the ATSDR and the CT DPHAS in sections B. ON-SITE CONTAMINATION and in Public Health Action Plan.

COMMENT NO. 5.

* Finally, the Draft PHA should be rewritten in a less inflammatory style. Merely reporting statements and rumors about potential risks has no place in this report. Nonscientific assertions as to stress, etc. and the need for counseling are simply not based upon factors of the Site, are misleading to the public and are unnecessarily inflammatory.

RESPONSE TO COMMENT NO. 5

In reviewing your comments it is quite clear that you are unfamiliar with the health assessment process and most importantly its mission. The health concerns and statements of residents are not interpreted as "rumors".

Addressing the health questions of the residents associated with the site is central to the overall mission of the ATSDR and to the purposes of the Draft PHA. The health concerns will vary from site to site. In addition, addressing the health concerns of the community including stress, is crucial if the health assessment is to satisfy its purpose of helping the public and health professionals understand all the risks posed by a site. The CT DPHAS has observed an unusually high amount of stress in several communities living near Superfund sites in Connecticut and recognizes that stress can effect the quality of family life.

COMMENT NO. 6

Of the most critical importance, however, is the fact that the essential findings of the Draft PHA that the Site is a public health risk is based simply upon two conclusions: 1) historic risks due to contaminated groundwater; and 2) potential risks to businesses from combustible gas. Although the Draft PHA arrives at these conclusions, they are not clearly presented. As a result, the PHA is likely to cause unnecessary confusion and anxiety on the part of the public rather than to serve its primary function of guiding future response activities at the Site. Furthermore, the first conclusion cited in support of the findings of the Draft PHA provide no basis for that finding. While there may have been in the past potential risks due to contaminated supply wells, this risk no longer exists and is not relevant to the stated purpose for the PHA evaluation. Finally, with respect to the combustible gas

issue, the facts as to the Site, measures taken and monitoring underway do not support these issues as a sufficient basis for the Draft PHA finding.

RESPONSE TO GENERAL COMMENT NO. 6
Please see response to GENERAL COMMENT numbers 1 and 2 above.

SPECIFIC COMMENTS

SPECIFIC COMMENT NO. 1, BACKGROUND, PAGE 2, PAR. A, PAR. 2

The statement that "the extent of the landfill's boundaries are not established and have not been fully defined" is incorrect. Through the performance of the RI/FS, especially during the Post-Screening Field Investigations (PSFI), the boundaries of the landfill have been fully defined. The findings resulting from these extensive field investigations are consistent with information collected from the review of historical records, review of aerial photographs, and interviews. Attached as Exhibit I hereto is a letter to the EPA Remedial Project Manager setting forth in detail the bases for such findings. (See also Exhibit 2, EPA letter and attachments, dated June 18, 1992.)

SPECIFIC COMMENT NO. 2

The PSFI were completed in two tasks: Task I was completed in December of 1991, and Task 2 was completed in late 1992, early 1993. The PSFI included several programs designed to provide additional information relative to the extent of refuse across the Site: delineation of the landfill boundary along the west side of Black Pond; further delineation of the southern boundary of the landfill; and further delineation of the northern boundary of the landfill.

Based upon the installation of borings and chemical analysis of soils, across the Study during Task I investigations, findings were presented in the Task I Report (submitted March 26, 1992, as revised May 22, 1992) which differentiate the northern portion of the Study Site (wood debris characteristic of a "stump dump") from the southern portion (refuse characteristics of a municipal landfill). Further, the northernmost extent of the wood debris in the northern portion of the Site was confirmed to lie just south of Rejean Road.

Based upon the installation of borings and chemical analysis of soils across the southern portion of the Site, during Task 2 investigations, findings were presented in the draft Remedial Investigation Report which clearly define the extent of refuse along the southern and southeasterly boundaries of the landfill. Likewise, hand auger investigations along the western side of Black Pond delineated the extent of refuse encroachment along the shore of the Pond.

RESPONSE TO SPECIFIC COMMENTS NO 1 AND 2.

Your comments on the landfill boundaries were incorporated into the health assessment. However, in discussions with the CT DEP, there is still some controversy as to the southern limits of the landfill.

SPECIFIC COMMENT NO. 3, PAGE 2, PAR. 6

With respect to the statement concerning open burning, we believe that the reference overstates the known occurrence of such activities. The Draft PHA should state instead that there are certain reports of open burning at the landfill prior to 1964, but such activities appear to have been sporadic over that period of time.

In addition, this paragraph is misleading in its characterization of the volumes and nature of wastes received at the landfill. The Draft PHA states that approximately 2.5 million gallons of solvent were disposed of at the Site. While it is alleged that Solvents Recovery Services of New England (SRS) took approximately one million gallons of solvent contaminated wastewater to the landfill, analyses of these wastewater streams indicated that the natural percent of solvent ranged somewhere between 8 percent and 22 percent. As SRS was in the business of recycling and selling solvents, it is not likely it would have disposed of pure solvent. The Ecology and Environment report (Field Investigations of Uncontrolled Hazardous Waste Sites: FIT Project, December 29, 1980) suggests approximately 2.7 million gallons of solvent contaminated waste, not solvent waste. If ATSDR has additional information correctly indicating the amount of solvent disposed of, we would appreciate reviewing that information to determine how it may impact the RI/FS.

RESPONSE TO COMMENT 3

As previously stated above in the general comments, the CT DEP and the EPA reviewed this document previously prior to it going out for public comment and neither agency questioned this information. It is unknown how much waste was disposed of at the landfill. In addition, the CT DPHAS personally interviewed an employee of the OSL landfill and the owner of Solomon Casket. Both reported that waste burning was commonly performed during the operation of the landfill. They also reported that spontaneous chemical fires also occurred.

Your comment on the waste disposed of by SRS was addressed.

SPECIFIC COMMENT NO 4, PAGE 3, PAR. 2

This statement should be changed to read:

Since the time the landfill was covered and closed, and portions were subsequently subdivided, further remediation has not taken place. An RI/FS is being conducted at the Site,

after which the EPA will determine the appropriate remedial measures to be taken based upon the extensive studies and the feasibility of remedial options.

RESPONSE TO SPECIFIC COMMENT 4

The CT DPHAS does not see any reason to change this paragraph as it will not be adding any new information.

SPECIFIC COMMENT NO 5, PAGE 4 (B, PAR 4)

We take issue with the statements made regarding the presence of seepage of landfill leachate. During the course of he various investigations conducted to date, no evidence of seeps has been observed. What has been observed, however, is the presence of surface water runoff from existing industrial activities.

RESPONSE TO COMMENT NO 5.

On several occasions the CT DPHAS has observed and photographed what appears to be leachate seeps and not surface water runoff from the commercial facilities.

COMMENT NO. 6. PAGE 4 (B, PAR. 4)

The Draft PHA states incorrectly that the areas north of the Rejean Road are believed to have been all wetlands prior to the construction of the existing subdivision. Based on aerial photographs, subdivision plans, and Town road construction drawings, the area directly north of the site was a wooded hill, but this was significantly northeast of the site.

RESPONSE TO COMMENT NO. 6.

To respond to your comment, which concerns page 3, paragraph 2, the CT DPHAS is referring to the residential area immediately north of Rejean Road. This correction was included in the health assessment.

COMMENT NO. 7 page 4-5 (B, Par. 5)

The statements made regarding combustible gases present an incomplete history of investigations undertaken by the agencies and the parties, as well as fail to detail the activities undertaken by the agencies and the parties, as well as fail to detail the activities undertaken to monitor and respond to concerns in the past and on a continuing basis.

The Draft PHA should detail the fact that immediate steps were undertaken to seal floor cracks in the Parks and Recreation Building. Furthermore, an additional combustible gas indicator (CGI) has been placed in that building and an existing passive venting system was modified in June of 1992. In addition, a CGI has been placed in the three buildings at Southington Metal Fabricators and a passive venting system installed in two of the buildings which had detectable amounts of combustible gases. Finally, ESE, DPHAS, OSHA, and DEP have made available

to workers, etc., the results of data collected with respect to those buildings, as well as information on appropriate precautions.

RESPONSE TO COMMENT NO. 7 pages 4-5(B, Par. 5)

The Draft PHA does describe the actions taken and planned by the EPA, the CT DEP, the Southington Fire Department, the ATSDR, and the CT DPHAS in B. ON-SITE CONTAMINATION and in the PUBLIC HEALTH ACTION PLAN sections. However, in this, the final version of the PHA, we have included those actions taken during the health assessment process by the various agencies and the Southington Fire Department in the BACKGROUND section.

SPECIFIC COMMENT NO. 8, D. Health Outcome Data, Page 6

We believe that the rationale for inclusion of the cancer study data arising out of the SRSNE Site is unsupported. The inclusion of this lengthy discussion is confusing and misleading to the public. This discussion should clearly note the results of the studies to date which do not show any correlation to this Site or any site for that matter.

We would suggest that the final PHA include such discussion only as an appendix to the PHA for Site. While certainly of interest to the public, its inclusion within the body of a site-specific PHA is misleading and unnecessarily alarmist.

RESPONSE TO COMMENT NO. 8, D. Health Outcome Data, Page 6

Although the cancer cluster investigation was initiated because of concern with the Solvents Recovery Services of New England (SRSNE) site, the cancer cases analyzed in this study were from the entire town of Southington. In addition, the CT DPHAS was evaluating the Old Southington Landfill site at the same time as the SRSNE site. Therefore, since the entire town was evaluated it was included in this public health assessment.

COMMENT NO. 9, COMMUNITY CONCERNS

The Draft PHA should present a complete picture of the efforts undertaken to address community concerns. The Draft PHA should state that the EPA and the ATSDR held a public meeting in August of 1992 to provided information to the public on site conditions. In addition, the CT DEP, the EPA, and the parties' Project Technical Coordinator have met twice with residents and concerned citizens to discuss these concerns. Finally, data from monitoring in commercial and residential structures has been made available to owners of and workers within tested buildings, as well as information provided on appropriate precautions.

RESPONSE TO COMMENT NO. 9 COMMUNITY CONCERNS

The Draft PHA presents community health concerns and those actions that were taken to address these concerns. For those actions taken to address community concerns please refer to the PUBLIC HEALTH IMPLICATIONS, section C. Community Health Concerns Evaluation. Those specific actions taken by the various agencies and the Southington Fire Department to address citizen's concerns are discussed in this section.

COMMENT NO. 10, ENVIRONMENTAL CONTAMINATION, Page 8, Par. 1

See "General Comments" with respect to our concerns that the PHA was based upon selective review of data and incomplete consideration of activities conducted to date.

RESPONSE TO COMMENT NO. 10, ENVIRONMENTAL CONTAMINATION, Page 8, Par. 1

The Draft PHA was reviewed by the EPA and the CT DEP before it went out for public comment. The CT DPHAS and the ATSDR rely on the EPA and the CT DEP for their comments and review of the available data. At that time neither agency commented that the information that was included in the Draft PHA was incorrect. The CT DPHAS agrees that more recent data was not included in the Draft PHA before it went out for Public comment. However, this data does not change our conclusions that the OSL site is a Public Health Hazard.

COMMENT NO. 11, PAGE 8, PAR. 2

This statement as to the reason for indoor air sampling is incomplete and incorrect. This statement should be rewritten as follows:

In addition, sampling for combustible gas in indoor air has and is being conducted as follow-up to citizen complaints, and as part of routine monitoring by Respondents, the CT DEP, the EPA and the OSHA. Continued sampling is being conducted in commercial buildings where elevated levels of combustible gas have previously been detected and measures taken. In addition, continued monitoring has been and continues to be performed in the residences. Both are being performed pursuant to a monitoring plan submitted to the CT DEP on June 26, 1992, and memorialized in an agreement with the CT DEP on August 15, 1992.

RESPONSE TO COMMENT NO. 11

The CT DPHAS disagrees with your comment. Firstly, our review of the Southington Fire Department logs in November of 1993 indicate that continued sampling is not being conducted in <u>all</u> commercial buildings where elevated levels of combustible gas have been previously detected. According to the Southington

Fire Department Record for the month of November 1993, the Southington Metal Fabricators buildings was no longer being monitored as per ESE's request. The CT DPHAS contacted the CT DEP with respect to this matter. In addition, the extent of the methane problem at the site was discovered as a result of information received by the CT DPHAS during site visits and a public availability session that occurred in November of 1991.

COMMENT NO. 12, TOXIC INVENTORY, PAGE 9

This paragraph should make clear that the TRI would not serve to identify all facilities which may have contributed to contamination near the Site. It should be noted that considerable information regarding potential site and site vicinity contributors has been provided to the CT DEP and the EPA. In addition, information in DEP files demonstrates that other potential sources (i.e. Lori Corp.) may be responsible for historic ground water problems.

RESPONSE TO COMMENT NO. 12

Your comment was incorporated in the PHA.

COMMENT NO. 13, B. ON-SITE, PAGES 9-16

The Draft PHA concludes that there is no current health threat from contaminants which may be present as a result of the landfill, except for the potential physical hazard associated with combustible gas. This overall conclusion should be more clearly stated within the report. The RI/FS activities have, and through the remedial alternative selection process will, address contaminants present at the site and direct the steps necessary to continue to assure that the site does not pose a threat to human health.

RESPONSE TO COMMENT NO. 13

Your comment was incorporated in the PHA.

COMMENT NO. 14, SUBSURFACE SOIL GAS, PAGE 13, PAR. 2

This paragraph should further state the full facts regarding measures taken (e.g. passive venting) and monitoring underway. (See pages 2, 5 and of these comments). In addition, it should be noted that combustible gas readings within the commercial buildings have not indicated any significant problems.

RESPONSE TO COMMENT NO. 14, SUBSURFACE SOIL GAS, PAGE 13, PAR. 2

The measures that have been taken to mitigate the methane problem in the commercial facilities on the landfill is

discussed in the B. ON-SITE CONTAMINATION, Indoor Air section. Mitigation measures are addressed targeted towards the movement of soil gas into a building. Consequently, this is an indoor air issue.

The CT DPHAS and the ATSDR disagree with your comment that the combustible gas readings within the commercial buildings have not indicated a significant problem. The identification of combustible gases in the interior of a building is cause for concern. In addition, the potential exists for toxic gases to migrate into the buildings and contaminate the indoor air.

COMMENT NO. 15, PAGE 14, PAR.2

The reason for the presence of combustible gas outside of the two residential properties has not been fully determined. However, the statement that this presence is a result of migration from the southern portion of the Site is incorrect and contrary to the field data collected. A large number of combustible gas measurements have been taken in the soil gas across the northern portion of the Site. These measurements clearly show an absence of combustible gas across most of the northern portion, especially between the southern portion and the two residential properties. Additionally, measurements were taken from soil gas along the natural gas line utility trench, which runs parallel to Old Turnpike Road along the entire Site. These measurements clearly show an absence of combustible gas across most of the northern portion, especially between the southern portion and the two residential properties. Likewise, measurements taken from soil gas along the entire Site have demonstrated the lack of migration along this potential pathway. These data refute the notión that the combustible gas present at the two isolated locations is the result of migration from southern portion.

RESPONSE TO COMMENT NO. 15, PAGE 14, PAR. 2

The paragraph offers two interpretations of the potential source of methane in the residential yards. The paragraph reads as follows: "This suggests that either methane is migrating from the southern areas of the landfill or is being generated naturally from buried organic materials."

Since the CT DPHAS and the ATSDR are not 100 percent convinced that the methane is not migrating north from the southern portions of the landfill. In addition, in order for us to protect public health we have to be conservative in our interpretations of the pathways of contaminant migration.

COMMENT NO. 16, INDOOR AIR, PAGE 14-16

This discussion should clearly differentiate between results at residences and those at businesses. The Draft PHA discussion is misleading as to the significance and location of any concerns. The Draft PHA should indicate that the EPA performed GC/MS at the residences twice and the results did not show any problem from those analyses, which included combustible gases.

RESPONSE TO COMMENT NO. 16, INDOOR AIR, PAGE 14-16.

This information is already discussed in the health assessment.

COMMENT NO. 17, OFF-SITE CONTAMINATION - GROUNDWATER WELLS PAGE 17

The Draft PHA should clearly indicate that there are currently no private or public drinking water wells within this off-site area.

RESPONSE TO COMMENT NO. 17, OFF-SITE CONTAMINATION - GROUNDWATER WELLS PAGE 17

On page 17, the discussion concerns off-site ground water monitoring wells. Your comment was incorporated in the Ground Water - Public Well and Ground Water - Private Wells sections.

COMMENT NO. 18, SURFACE WATER, PAGE 20, PAR. 3

This paragraph improperly implies that compounds detected in the Quinnipiac River are site related. Numerous studies at the Quinnipiac River have shown the river to have been impacted by many sources upstream of the Site.

RESPONSE TO COMMENT NO. 18, SURFACE WATER, PAGE 20, PAR. 3

The CT DPHAS knows that there are many sources in Southington that may have impacted the Quinnipiac River.

This paragraph reports what contaminants were identified in the Quinnipiac River in the vicinity of the OSL site by the RI/FS consultants.

COMMENT NO. 19, PHYSICAL AND OTHER HAZARDS PAGE 22-23

We believe that this section as presented relies upon selective review of data and an incomplete history of activities conducted to date. As such, it presents a biased and misleading characterization of such matters. This discussion should be balanced to reflect measures taken and monitoring underway. (See General Comments).

RESPONSE TO COMMENT NO. 19, PHYSICAL AND OTHER HAZARDS PAGE 22-23

This section represents the concerns of state and federal health and regulatory agencies over the methane contamination problem on the OSL site. The CT DPHAS and the ATSDR believe the identification of combustible levels of methane are cause for concern. Indeed it is because state and federal regulatory and health agencies believe that the presence of methane at the OSL site poses a potential physical hazard that continuous monitoring is occurring and engineering controls have been installed.

COMMENT NO. 20, PATHWAYS ANALYSES PAGE 24, PAR. 2

This section should be rewritten to reflect the fact that this potential exposure pathway was historic in nature. (See General Comments). In addition, the record does not clearly show that site-related contamination was responsible for this risk.

RESPONSE TO COMMENT NO. 20, PATHWAYS ANALYSES PAGE 24, PAR 3.

The discussion of this completed exposure pathway clearly states that the exposure occurred in the past and as such will not be changed.

COMMENT NO. 21, PAGE 24, PAR 3.

As noted in our General Comments, this discussion with respect to Town wells 2, 4, and 6 is inappropriate in this site specific PHA and is confusing and misleading to the public.

RESPONSE TO COMMENT NO. 21, PAGE 24, PAR 3.

As part of the health assessment process all sources of exposure that are identified during our investigations of Superfund sites in a specific town are presented in this document. In addition, the CT DPHAS and the ATSDR are conducting a dose reconstruction study to assess the exposures that residents in Southington received from the Town's historically contaminated water supply.

It is the purpose of the health assessment process to assess past, current, and potential future exposures.

COMMENT NO. 22, INDOOR AIR, PAGE 24

This statement should be rewritten as follows: "Employees...<u>may have</u> received...

as written, this statement is speculative and biased. The paragraph should reflect the fact that no adverse health

effects are likely since methane is merely an asphyxiant, and should not speculate on "other unknown gases." Based upon numerous analyses by the EPA, combustible or other gases in the indoor air at the buildings at the site.

RESPONSE TO COMMENT NO. 22, INDOOR AIR, PAGE 24

This statement is based on health effects that have been reported by several employees interviewed by the CT DPHAS. As such **employees have become ill from the migration of gases into there working environment and the exposure occurred.**

COMMENT NO. 23, SOIL PATHWAY, PAGE 25

It should be noted that PAHs do not "readily evaporate."

RESPONSE TO COMMENT NO. 23, SOIL PATHWAY, PAGE 25

Your comment is noted and a correction was made to the sentence in question.

COMMENT NO. 24, PAGE 26

With respect to statements regarding landfill leachate see page 5 of these comments.

RESPONSE TO COMMENT NO. 24, PAGE 26

Please refer to RESPONSE TO COMMENT NO. 5.

COMMENT NO. 25, AMBIENT-AIR PAGE 26

This discussion is speculative and inflammatory. As stated above, the reports of open burning are not conclusive but rather indicate such activities occurred on a sporadic basis. The relevance of such historic allegations is unclear when the purpose of this PHA is to determine possible current and future risks associated with the Site and to recommend measures to address such risks.

RESPONSE TO COMMENT NO. 25, AMBIENT-AIR PAGE 26

Again, your comment indicates that you don't understand the health assessment process. **The purpose of the public health assessment is to determine all possible <u>past, current, and future</u> risks associated with the site.**

The CT DPHAS interviewed persons that worked in the landfill when it was in operation and residents who had businesses during this time. The CT DPHAS and the ATSDR have no reason to doubt eye- witness accounts of landfill activities from the community. Information received from the community is necessary for us to assess past exposures and at times can be

more helpful to us in getting the historic exposure history than state and federal records.

COMMENT NO. 26, COMBUSTIBLE GAS PAGE 27, PAR. 2

This statement should clarify that residences have been tested and no significant levels found. As written, homes and businesses are inappropriately grouped together. See General Comments above.

RESPONSE TO COMMENT NO. 26, COMBUSTIBLE GAS PAGE 27, PAR. 2

The CT DPHAS and the ATSDR feel that the information is clearly presented with respect to what has been identified on residential and commercial properties. Additional information was added to this paragraph which discusses the high levels of combustible gases detected in the backyards of two residential properties.

COMMENT NO. 27, TCA AND TCE, PAGES 27 -28

The Draft PHA should clarify the distinction between residences and businesses and the results of previous investigations. The PHA should not compare commercial business indoor air results with TEAM Study residential results. In addition, it should be noted that the TCE carcinogenicity assessment has been withdrawn from IRIS.

COMMENT NO. 28, TOLUENE AND BENZENE, PAGE 29 SEE COMMENT ABOVE

RESPONSE TO COMMENTS NO. 27, TCA AND TCE, PAGES 27-28 AND NO. 28, TOLUENE AND BENZENE, PAGE 29

TCE, TCA, toluene, and benzene were identified in indoor air in residential homes at levels above what would be expected based on the results of the EPA TEAM study but below health comparison values. The Draft PHA does not compare the TEAM study results with the commercial facilities' indoor air results.

COMMENT NO. 29, LEAD/MERCURY, PAGE 31, PAR.2

As stated in our General Comments, the inclusion of this discussion in a site specific PHA is inappropriate, confusing an misleading to the public, and inflammatory.

RESPONSE TO COMMENT NO. 29, LEAD/MERCURY

Lead and mercury were detected in 1976 in three public water wells in Southington including well number five. The detection of lead and mercury in town production wells 4, 5, and 6 is information that the Southington Town residents are aware of,

and as such, despite the fact that the CT DPHAS believes that the presence of these compounds was due to sampling or laboratory error, it must be discussed in the health assessment to clear up any misconceptions. As a rule the CT DPHAS is not in the business of holding back information from the public.

COMMENT NO. 30, CONCLUSIONS, INTRODUCTORY PARAGRAPH (SEE COMMENTS ON PAGE 3 OF THESE COMMENTS).

This conclusion should state that Southington residents "may have been exposed...". This conclusion should indicate that other sources of site vicinity and area wide ground water problems are likely.

RESPONSE TO COMMENT NO 30, CONCLUSIONs, PAGE 38, # 1.

The CT DPHAS obtained sufficient evidence from its review of the Southington Water Department files to conclude that people drank water that was contaminated. The Old Southington Landfill was placed on the National Priority List and is a Superfund Site because it contributed to the contamination of well number five.

Other potential sources of contamination of this well are discussed in the **Site Description and History Section.**

COMMENT NO 31, PAGE 38, #2

This conclusion should also state that based upon numerous analyses by the EPA, the CT DEP, the CT DPHAS, and ESE, combustible gases are not posing a threat to the residences.

RESPONSE TO COMMENT 31, PAGE 38, #2

Although the ongoing monitoring, and wall monitors have not detected the presence of combustible gases to date, combustible gases have been identified in residential backyards. In addition, there is evidence of subsidence in the homes which could potentially create cracks in the foundation creating a potential methane migration pathway. It is because the EPA, the CT DEP, and the CT DPHAS feel that combustible gases could pose a threat to the residences that monitoring is required under a state order.

COMMENT NO. 32, PAGE 38, #3

Conclusion should state that PCBs were only found in <u>isolated</u> subsurface samples.

RESPONSE TO NO. 32, PAGE 38, # 3

The CT DPHAS sees no reason to change the wording in this conclusion. Since sampling was not performed underneath any of the building structures, stating that PCBs were only found in isolated subsurface samples is misleading.

COMMENT NO. 33, PAGE 38, #5

As stated in our General Comments, these nonscientific assertions are inappropriate for a PHA and are misleading and inflammatory. While we appreciate the frustration which often accompanies the Superfund process, a frustration we also feel. These statements have no place in a document such as this.

RESPONSE TO COMMENT NO. 33, PAGE 38, #5

See response to GENERAL COMMENT NO 5.

COMMENT NO. 34, PAGE 38, #6

See previous discussion. Where the conclusions show no link to the Site, nor any demonstrated impact to the Town, they should not be part of this specific PHA.

RESPONSE TO COMMENT NO 34, PAGE 38, #6

See response to GENERAL COMMENT NO. 3.

COMMENT NO. 35, PAGE 39, #1

This recommendation should state that, pursuant to the monitoring plan submitted to the CT DEP and the EPA and memorialized in an agreement with DEP, combustible gases continue to be monitored and results submitted to the CT DEP. In addition, the EPA has performed monitoring in the residences. Finally, this recommendation should note that results of such investigations have shown no combustible gas impact on the four residences.

RESPONSE TO COMMENT NO. 35, PAGE 39, #1

Continuous monitoring of all of the three affected facilities has not been ongoing. The CT DPHAS review of the Southington Fire Department files indicates that no monitoring was performed at the Southington Metal Fabricators Buildings in November of 1991 as per your request. The CT DPHAS contacted EPA and the CT DEP to address this matter. In addition, combustible gases have been identified in the backyards of residences. Although the level of combustible gases is below the lower explosive level (LEL), the CT DPHAS, the CT DEP, the EPA, and the ATSDR still feel that there is cause for concern.

This concern is based on the fact that the homes are now showing signs of subsidence which could create cracks in the foundations potentially creating gas migration pathways.

COMMENT NO. 36, PAGE 39, #3

Stress-See General Comments

RESPONSE TO COMMENT NO. 36, PAGE 39, # 4

See response GENERAL COMMENT NO. 3.

COMMENT NO. 37

As stated in our General Comments, landfill boundaries have been fully delineated. Moreover, the draft RI/FS submitted to the EPA characterizes the nature and extent of groundwater contamination.

RESPONSE TO COMMENT NO. 37

Your comments on the landfill boundaries were incorporated into the health assessment. However, in discussions with the CT DEP, there is still some controversy as to the southern limits of the landfill. However, this recommendation will not be changed. The CT DPHAS and the ATSDR still feel that the Southington Community should be informed as to the extent and degree of overburden and bedrock contamination within and emanating from the landfill. Perhaps these questions will be answered in future public meetings that are planned to discuss the proposed remedial designs.

COMMENT NO. 38, PUBLIC HEALTH ACTION PLAN, PAGE 40, #1

It should be stated in addition that both the Fire Department and ESE have been and continue to monitor conditions in the commercial buildings onsite and take any measures found necessary.

RESPONSE TO COMMENT NO. 38, PUBLIC HEALTH ACTION PLAN, PAGE 40, #1

Part of your comment was incorporated in number 11 of the Public Health Action Plan. However, continuous monitoring of the three affected commercial facilities has not been occurring. The CT DPHAS review of the Southington Fire Department files indicates that monitoring was ordered stopped in November at the Southington Metal Fabricators Buildings as per your request. The CT DPHAS contacted the EPA and the CT DEP to look into this matter.

COMMENT NO. 39, PAGE 40, #2

This statement should clarify that no adverse effects were indicated based upon the results of this assessment by the CT DEP.

RESPONSE TO COMMENT NO. 39, PAGE 40, #2

Your comment was addressed in the PHA.

COMMENT NO. 40, PAGE 40, #3

This statement should state that the results showed no contamination in the tap water.

RESPONSE TO COMMENT NO. 40, PAGE 40, #3

Your comment was addressed in the PHA.

COMMENT NO. 41, PAGE 40, #6

This paragraph should state that this action has been implemented pursuant to the monitoring plan submitted to the CT DEP and the EPA and memorialized in an agreement with the CT DEP.

RESPONSE TO NO. 41, PAGE 40, #6

Your comment was incorporated in the Public Health Action Plan (PHAP). However, in November of 1993, the CT DPHAS was informed by the Southington Fire Department that the Southington Metal Fabricators facility was not to be monitored anymore. This facility continues to be a concern to the CT DPHAS with respect to the presence of combustible gases and should continue to be monitored.

COMMENT NO. 42, PAGE 40, #9

The PHA should reflect the fact that the RI/FS has completed an investigation of surface soils and that the risk assessment has determined that surface soils do not present an unacceptable risk.

RESPONSE TO NO. 42, PAGE 40, #9

Your comment was addressed in the health assessment. Although we agree with the risk assessments determination, our conclusions as to the health risk involved are based on the CT DPHAS and the ATSDR assessment of the soil and not the results of the EPA risk assessment. As previously stated the EPA Risk Assessment and the ATSDR PHA are two separate documents with different purposes.

COMMENT 43, PAGE 40, # 10

For reasons set forth on pages 3 and 4 of these comments, the Site boundaries have been delineated.

RESPONSE TO COMMENT 43, PAGE 40, # 10

See previous response.

COMMENT NO. 44, PAGE 40, #11

This paragraph should state in addition that the residences are being monitored on a bimonthly basis.

RESPONSE TO COMMENT 44, PAGE 40, # 11

This information was incorporated into the PHA.

COMMENT NO. 45

Once again, we appreciate the opportunity to provide comments on the Draft PHA. As stated above we believe that the PHA should reflect the most current data available on site conditions and potential impacts. We believe that the PHA should be redrafted to focus on the presentation of potential current and future site-specific risks in a clear, understandable and unbiased fashion.

RESPONSE TO COMMENT NO. 45

The most recent data does not change our conclusions concerning the site. The CT DPHAS and the ATSDR have categorized this site as a public health hazard based on past exposures to VOC contaminated drinking water from town well number five and the physical hazards associated with the methane contamination of indoor air. Please refer to our previous discussions concerning the differences between a Risk Assessment and a Public Health Assessment.

The CT DPHAS and the ATSDR thank you for submitting comments on the OSL PHA.