Public Health Assessment for

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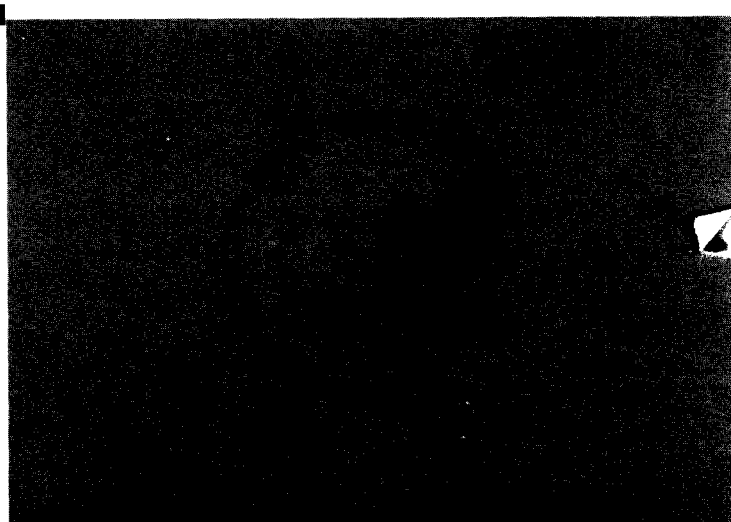
LAUREL PARK, INC.

NAUGATUCK, NEW HAVEN COUNTY, CONNECTICUT

CERCLIS NO. CTD980521165

JANUARY 4, 1994

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

LAUREL PARK, INC.

NAUGATUCK, NEW HAVEN COUNTY, CONNECTICUT

CERCLIS NO. CTD980521165

Prepared by

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

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.

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ATSDR and its Public Health Assessment

ATSDR is the Agency for Toxic Substances and Disease Registry, a federal public health agency. ATSDR is part of the Public Health Service in the U.S. Department of Health and Human Services. ATSDR is not a regulatory agency. Created by Superfund legislation in 1980, ATSDR's mission is to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment.

The Superfund legislation directs ATSDR to undertake actions related to public health. One of these actions is to prepare public health assessments for all sites on or proposed for the Environmental Protection Agency's National Priorities List, including sites owned or operated by the federal government.

During ATSDR assessment process the author reviews available information on

- **the levels (or concentrations) of the contaminants,**
- **how people are or might be exposed to the contaminants, and**
- **how exposure to the contaminants might affect people's health**

to decide whether working or living nearby might affect peoples' health, and whether there are physical dangers to people, such as abandoned mine shafts, unsafe buildings, or other hazards.

Four types of information are used in an ATSDR assessment.

1) **environmental data; information on the contaminants and how people could come in contact with them**

2) **demographic data; information on the ethnicity, socioeconomic status, age, and gender of people living around the site,**

3) **community health concerns; reports from the public about how the site affects their health or quality of life**

4) **health data; information on community-wide rates of illness, disease, and death compared with national and state rates**

The sources of this information include the Environmental Protection Agency (EPA) and other federal agencies, state, and local environmental and health agencies, other institutions, organizations, or individuals, and people living around and working at the site and their representatives.

ATSDR health assessors visit the site to see what it is like, how it is used, whether people can walk onto the site, and who lives around the site. Throughout the assessment process, ATSDR health assessors meet with people working at and living around the site to discuss with them their health concerns or symptoms.

A team of ATSDR staff recommend actions based on the information available that will protect the health of the people living around the site. When actions are recommended, ATSDR works with other federal and state agencies to carry out those actions.

A public health action plan is part of the assessment. This plan describes the actions ATSDR and others will take at and around the site to prevent or stop exposure to site contaminants that could harm peoples' health. ATSDR may recommend public health actions that include these:

- restricting access to the site,
- monitoring,
- surveillance, registries, or health studies,
- environmental health education, and
- applied substance-specific research.

ATSDR shares its initial release of the assessment with EPA, other federal departments and agencies, and the state health department to ensure that it is clear, complete, and accurate. After addressing the comments on that release, **ATSDR releases the assessment to the general public.** ATSDR notifies the public through the media that the assessment is available at nearby libraries, the city hall, or another convenient place. Based on comments from the public, ATSDR may revise the assessment. ATSDR then releases the final assessment. That release includes in an appendix ATSDR's written response to the public's comments.

If conditions change at the site, or if new information or data become available after the assessment is completed, ATSDR will review the new information and determine what, if any, other public health action is needed.

For more information about ATSDR's assessment process and related programs please write to:

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SUMMARY

The Laurel Park Landfill is in Naugatuck, Connecticut, one mile west of the Naugatuck River. The landfill occupies about 19 acres of a 35 acre site. The landfill operated from the early 1949 to 1987 accepting industrial as well as municipal wastes.

The site represents an indeterminant public health hazard. Although past exposures to contaminated air, as a result of open burning and accidental fires occurred, there is no data to assess what people were exposed to. Leachate runoff contaminated surface water with a variety of compounds including acetone, benzene and chromium. Some private wells in the vicinity of the landfill were found to have trace amounts of contaminants believed to be site related. Concern about continued migration of contaminated groundwater initiated the provision of bottled water to the fifty residences within a half mile of the site. All but three of these homes were hooked up to public water. These three home owners chose not to hook up to public water. In addition, soil and sediment sampling have detected contamination.

The information in the RI/FS is not sufficient nor adequate to fully characterize the site, the extent of contamination or the potential for migration.

At the time of our site visit the landfill was readily accessed and there was evidence of trespassing. However, since then the landfill is no longer readily accessed. A six-foot high chain link fence was installed around much of the site with the exception of areas where obstacles, such as step embankments, provide restricted access to the site. Numerous physical hazards exist onsite including abandoned vehicles, holes, pits, and protruding objects. Leachate seeps are quite common throughout the site.

There has been a significant amount of community concern and interest in the site since the early years of landfill operations when open burning occurred. An organized citizens group was very active in the 1980's and played a role in the final landfill closure.

It is recommended that access to the landfill be restricted. Private well water testing should be performed for the three private wells in the area of the landfill that have not been connected with public water. In addition, the land adjacent to the site should not be developed unless environmental data shows the property to be uncontaminated. The remedial activities outlined in the Record of Decision should be implemented as soon as possible to prevent any further migration of contaminants.

The public health assessment for Laurel Park was reviewed by ATSDR's Health Activities Recommendations Panel for appropriate follow-up with respect to health actions. The panel agrees that

the community health education planned by CT DPHAS is appropriate for the site.

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

BACKGROUND

In cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), the Connecticut Department of Public Health and Addiction Services (CT DPHAS) evaluated the public health significance of the Laurel Park Landfill 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 Laurel Park Landfill is in Naugatuck, Connecticut, New Haven County, one mile west of the Naugatuck River and Connecticut Route 8. The landfill is on the north and west slope of Huntington Hill and occupies about 19 acres of a 35 acre site. No buildings are on the site. Most of the site is enclosed by a fence. A fence was not installed in areas where obstacles, such as steep embankments, provide restricted access to the site. Figure 1 shows the location of the site and vicinity.

The site is currently owned by Laurel Park, Inc. a corporation.

The site was in operation from 1949 to 1987. In the 1960's the site was excavated in some areas to bedrock. According to a 1972 Inventory of clients serviced by the landfill conducted by the CT DEP, 107,000 tons of solid waste and 46 tons of liquid waste were disposed of per year at the Laurel Park Landfill.(Solid Waste Files, CT DEP) These include rubber products, tires, chemicals, oils, solvents, chemical solids and municipal wastes (Solid Waste Files, CT DEP.) In the late 1980's the landfill accepted approximately 200 tons per day of municipal and industrial wastes (Solid Waste Files, CT DEP.)

The landfill was known to have operational problems. Fires were common, the facility used fly ash as a cover which was inadequate to prevent litter from being blown off-site (Camp, Dresser & McKee, 1986 and Memo R.J. Botti, CT DEP Site Inspection, June 1990.) Spills on the roads leading to the landfill were common according to local residents.(Solid Waste Files, CT DEP) In addition, local residents reported seeing leachate flowing into an unnamed creek along Andrews Avenue (Solid Waste Files, CT DEP.)

In the early 1970's, the CT DPHAS recommended steps to eliminate the migration of contaminants into surface waters. A sand filter was installed in response to CT DPHAS recommendations on the western edge of the site in the mid 1970's.

In the early 1980's, monitoring of residential wells in the vicinity of Laurel Park found that some wells had contaminants

believed to be site related. As a result, residences were provided with bottled water in 1983 by Laurel Park, Inc., and subsequently by the CT DEP until 1990 when the majority of the residences near the landfill were connected to the public water supply.

In 1983 the CT DEP and Laurel Park Inc., entered into a stipulated judgement which required: (1) the installation of monitoring wells; (2) the construction of a leachate collection system; and (3) delivery of bottled water to affected homeowners. The judgement also allowed the landfill to be used for disposal of municipal waste only. In 1983, a leachate collection system was constructed to convey wastes off-site into the Naugatuck municipal waste water treatment plant. However, it was not hooked up until 1989. The CT DEP did not allow the collection system to flow into the municipal sewers until an additional separate leachate line was installed in December 1989.

On October 13, 1983 the CT DEP issued a cease and desist order prohibiting the operation of the landfill based on the detection of 2,3,7,8-tetra-chloro-p-dioxin (TCDD) in an onsite monitoring well. Later sampling and analyses did not detect the presence of this contaminant. As a result the landfill was allowed to reopen and accept municipal waste.

In 1986, a preliminary health assessment was performed by ATSDR which concluded that surface runoff and leachate associated with the site posed a potential public health threat to residents near the site. This health assessment outlined the following recommendations:

1. Determine if the existing monitoring system (i.e. sampling techniques, sampling locations, contaminant analysis, well configuration and location) is capable of evaluating exposures.

2. Consider collection of additional monitoring data including all ground water monitoring wells, residential wells adjacent to the site, surface water drainage from the site, and specific indicator contaminant air sampling in the direction of the predominant winds in the areas of potential human exposure.

3. Limit site access to prevent human exposure.

4. Institute operational controls to prevent leachate overflows and seeps.

In May of 1988 an Addendum to the Health Assessment was released. ATSDR reviewed a list of proposed alternatives for remediation to determine which were adequate for the protection of public health.

Leachate is produced by rain percolating into the ground and coming into contact with contaminated waste buried in the landfill.

Leachate overflow has been a problem at the site. In the late 1980's leachate collected in the leachate system, overflowed a manhole on the Laurel Park site entering a stream that passes by several residences and a school playground. Tests of the leachate and the stream revealed the presence of hazardous substances, including benzene, toluene, and ethyl benzene.

The landfill was closed in 1987.

In 1989, the USEPA ordered the owners of the landfill to construct a sewer line connecting the leachate collection system to the Naugatuck Municipal Sewage Treatment Plant. The sewer line was installed to alleviate the serious problem of overflow of contaminated leachate from a manhole on the Laurel Park site. This sewer line discharges into the Naugatuck municipal sewage treatment plant.

The public health assessment for Laurel Park was reviewed by ATSDR's Health Activities Recommendations Panel for appropriate follow-up with respect to health actions. The panel agrees that the community health education planned by CT DPHAS is appropriate for the site.

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

B. SITE VISIT

Edith Pestana and Jennifer Kertanis of the Connecticut Department of Health and Addiction Services and staff from the Connecticut Department of Environmental Protection conducted a site visit on Wednesday, July 15, 1992. During the site visit we climbed to the top of the landfill and walked the perimeter.

During an inspection of the site, the following observations were made. These observations are not presented in order of significance or importance.

- The landfill is located on a hill in a thickly wooded area.
- A make-shift gate was placed at the entrance of the landfill access road.

- Strong pungent odors were detected throughout the site visit.
- Four (4) empty 55 gallon drums were found adjacent to a monitoring well at the top of the landfill. These drums were utilized for containerizing purge water. (These drums have since been properly removed from the site.)
- Spent fireworks (fire crackers, roman candles, etc.) were observed at the top of the landfill.
- Dirt bike tracks were evident throughout the site.
- A pilot sludge ash testing pad was on the top of the landfill. The purpose was to provide weight to evaluate potential settlement due to capping.
- Four streams of leachate seepage were observed.
- Two abandoned cars with bullet holes were observed on the road leading to the top of the landfill.
- Two abandoned excavators with bullet holes were observed at the base of the landfill along the access road.
- Along the perimeter of the landfill, four manholes, part of the leachate collection system, were observed.
- Ten empty 55 gallon steel drums were located at the base of the landfill near what appeared to be a work trailer for the contractors working at the site. (The drums have since been properly removed from the site.)
- Bullet holes were observed on signs marking environmental hazard areas.
- A siltation fence was constructed adjacent to the landfill cover stockpile area on the southeast side of the site.
- Two inclinometers which were installed to measure lateral movement in the landfill were observed.
- One partially buried 55 gallon steel drum numerous tires and debris were seen protruding from the overgrown landfill area.
- An abandoned 2,000 gallon steel storage tank was observed on the southeastern portion of the landfill, it appeared to be empty.
- Deer and other wildlife were seen grazing on the landfill.
- Wetlands bordered the edge of the refuse on the northern slope.
- The landfill was overgrown with weeds and small shrubs.

C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

The town of Naugatuck has a population of approximately 30,600 based on the 1990 Census. Ninety-six percent of the population is white. Ten Percent of the population is under the age of six. Eighteen percent of the population is between the ages of six and nineteen. Fifty-five percent of the population is between the ages of twenty and fifty-nine. Fifteen percent of the population is over the age of sixty. The average per capita income in Naugatuck is $16,700 per year.

Approximately fifty homes are located within a one-half mile radius of the site to the east, northeast, and southeast. The areas to the south and west of the site are sparsely populated, undeveloped and forested. Residential areas are located on Lewis Street, Andrews Avenue, Hunters Mountain Road, Perock Lane and Andrews Mountain Road. The closest residents are located approximately 1,000 feet to the north, northeast, and southeast of the landfill. Up until 1990 when the public water supply was extended to this area, the residents near the landfill had private wells. Bottled water was provided to them in 1983.

An elementary school with an approximate enrollment of between 200 to 350 students is located on Andrews Avenue near the site. The town of Naugatuck, one mile to the east of the site is highly industrialized. A number of other industries exist along the Naugatuck River Valley.

Forested land surrounds the landfill. This area provides a habitat for a variety of wildlife species including birds and deer.

Hunting is likely to occur in some areas surrounding the site. Hiking and dirt bike riding in the forested area is also likely.

Surface water runoff from the landfill flows into two tributaries of the Naugatuck River, Spruce Brook and Long Meadow Pond Brook. Spruce Brook is one-half mile west and Long Meadow Pond Brook is one mile north of the landfill. Surface drainage is illustrated in Figure 2.

The major portion of the landfill, approximately 19 acres, is part of the Long Meadow watershed. Most surface drainage is channeled through a drainage ditch located around the southern and western perimeter of the landfill. This drainage ditch controls runoff around the site into the unnamed stream. Long Meadow Pond Brook is fed by an unnamed stream which begins at the base of the landfill and flows along Andrews Avenue. Meadow Pond Brook flows along Cobber Avenue and eventually empties into the Naugatuck River (See Figure 2.)

Spruce Brook flows south, originating east of the site and intercepts the Naugatuck River south of the town of Naugatuck. Fishing may occur in both Brooks and the Naugatuck River. The Naugatuck River flows through the town east of the site.

The landfill is characterized by steep slopes making it conducive to a high runoff rate over short periods of time. The eastern portion of the site, approximately 7 acres, drains as uncontrolled runoff. Some surface runoff enters wooded areas to the east as an intermittent stream and flows down the steep slopes toward the Naugatuck river. Another portion of surface

runoff is channeled easterly across the access road at the base of the landfill.

D. HEALTH OUTCOME DATA

Health outcome data was not evaluated. Please refer to the discussion in the Health Outcome Data Evaluation Section for an explanation of why these data were not evaluated.

COMMUNITY HEALTH CONCERNS

Community involvement regarding the Laurel Park landfill site dates back as far as the early 1960's when open burning activities and accidental fires were taking place at the site. In the early 1980's an organized citizen group, Pollution Extermination Group (PEG) was formed. Throughout the years citizen complaints and concerns have been numerous. Citizens concerns were compiled from historical records and documented complaints at a number of agencies. The Connecticut Department of Environmental Protection Air Management, Water, Solid Waste, and Superfund files were reviewed. In addition, local and state health officials were contacted. The concerns include:

1. Dust and debris blowing from the landfill as well as dust generated by the flow of trucks up to the site made it difficult to go outside and sometimes made it difficult to breathe while the landfill was operating.
2. What were the sludges and liquids that dripped off trucks and onto people's yards during the time when the landfill was operating?
3. What were people being exposed to when leachate runs off the landfill and onto yards, down streets and in drainage ditches?
4. Is water safe to drink in private wells in homes around the site?
5. The odors emanating from the site were very strong and sometimes nauseating.
6. What is the brook behind the Andrews School contaminated with?

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The majority of the sampling that was performed at the Laurel Park Landfill was included in the Remedial Investigation, completed in February of 1987. During site investigations, groundwater, private wells, leachate, soil, surface water, sediment and air sampling was conducted. Additional sampling of soils, surface water, private wells and sediments were conducted after the Remedial Investigation primarily as follow-up to citizen complaints.

The following discussion and data tables present the contaminants of concern. Contaminants are presented by the media (soil, groundwater, air etc.) in which they were found. The contamination is also broken into on-site and off-site. On-site refers to sampling points within the boundaries of the Murtha property and off-site refers to sampling points not within these boundaries.

These contaminants will be evaluated in subsequent sections of this public health assessment to determine whether exposures to them has public health significance. These contaminants were selected based upon the following factors:

1. Concentrations of contaminants on and off-site.
2. Field data quality, laboratory data quality and sample design.
3. Comparison of on-site and off-site concentrations.
4. Comparison of on-site and off-site concentrations with health assessment comparison values for noncarcinogenic and carcinogenic endpoints.
5. Community health concerns.

The listing of a contaminant does not mean that it will cause adverse health effects from exposure. The list indicates which contaminants will be discussed further in the public 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. EMEGs are calculated from Minimal Risk Levels (MRLs). An MRL is an estimate of daily human exposure to a chemical that is likely to be without appreciable risk of an adverse, non-carcinogenic risk. CREGs are estimated contaminant concentrations based on a one excess cancer in a million people exposed over a lifetime. EPA's Reference Dose (RfD) and Reference Concentration (RfC) are estimates of the daily exposure to a contaminant that is unlikely to cause adverse health effects. A concentration is calculated from RfDs and RfCs making certain assumptions about human intake of water or ambient air. Maximum Contaminant Levels (MCLs) represent concentrations that EPA deems protective of public health (considering the availability and economics of water treatment technology) over a 70 year period of exposure drinking two liters of water per day. Lifetime Health Advisories (LTHA) are concentrations EPA has determined to be protective of public health over a lifetime at an exposure rate of 2 liters of water per day.

A. ON-SITE CONTAMINATION

Ground Water

Ground water occurs in both bedrock and in the unconsolidated overburden formations. Within the overburden, ground water occurs in a shallow water-table aquifer. The overburden ground water principally flows from the topographic high in the south and west, and converges toward the topographic low, north of the landfill, discharging episodically into the unnamed stream (LESI 1992).

Ground water flow in bedrock is controlled principally by the fractures which occur in the upper 30 feet of bedrock. These fractures could potentially be a ground water pathway from the landfill to domestic wells.

There exist some discrepancy as to the direction of ground water flow in the bedrock. Certain hydrologic conditions suggest that the groundwater in the bedrock flows towards the east-northeast. Data on the nature and orientation of the fractures shows that ground water flows towards the northwest. In addition, there are variations in the general flow path. Ground water also flows out ward from the center of the landfill at several locations around the perimeter of the site. Dry rill channels along the east slope of the landfill show that during periods of heavy rain, ground water seeps out just east of the landfill access road and flows overland downslope.

Leachate has contaminated the ground water at the overburden-bedrock contact beneath the landfill. In addition, groundwater monitoring data indicates that the leachate has migrated into fractures in the bedrock.

Ground Water Monitoring Wells

In November and December of 1982, eight monitoring wells were constructed under a state-ordered program. During three rounds of sampling in August, October, and December of 1983, DEP sampling of these groundwater wells detected the presence of 2,3,7,8-TCDD in one monitoring well.

Thirteen monitoring wells, installed by Malcolm Pirnie as part of the Remedial Investigation were sampled in two rounds in August and November of 1985 (See Figure 3 for sampling locations). Of the thirteen monitoring wells installed, two were overburden wells, MP1A and MP2A. Two deep bedrock wells were drilled, MP1B and MP10. Eight additional bedrock wells were drilled, MP1C, MP2B, MP3, MP8, MP10A, MP11A including two shallow bedrock wells, MP9 and MP12. One well location MP5 was a dry hole.

In addition, monitoring wells installed under the state-ordered program were monitored in March, June and December, 1985 and February, 1986 (Fred C. Hart.) Data collected for all of these sampling activities are incorporated in our assessment of on-site contamination.

Additional sampling of ground water from monitoring wells was performed during the Pre-Design in 1992, by Langan Engineering and Environmental Services.

Table 1 lists the contaminants detected during these sampling events above comparison values.

Table 1
GROUND WATER CONTAMINATION IN ON-SITE MONITORING WELLS *

CONTAMINANT	CONCENTRATION RANGE PPB	COMPARISON VALUE PPB	SOURCE
Benzene	ND-8700	1.2	CREG
Benzo(a)pyrene	ND-5	0.006	CREG
2-Chlorophenol	ND-2500	40	LTHA
1,2-Dichloroethane	ND-39	0.38	CREG
2,4-Dimethylphenol	ND-1160	700	RfD
Ethyl benzene	ND-992	700	LTHA
Lead	ND-1520	0	MCLG
N-nitrosodiphenylamine	ND-1547	7.1	CREG
Methylene Chloride	ND-3340	4.7	CREG
Toluene	ND-11000	1000	MCL
Vinyl Chloride	ND-14	0.7	EMEG

ND-not detected
PPB-Parts Per Billion
CREG-Cancer Risk Evaluation Guide
LTHA-Lifetime Health Advisory
MCL-Maximum Contaminant Level
MCLG-Maximum Contaminant Level Goal
EMEG-Environmental Media Evaluation Guideline
* Malcolm Pirnie RI/FS 1987; Fred C. Hart 1986

Gas - Ground Water Monitoring Wells

Gas samples were obtained from two on-site monitoring wells (MW-1 and MW-2.) by ESE in 1993. Methane was found in both wells at levels below comparison values. Benzene gas was also detected at 31,200 and 30, 600 parts per billion by volume of air (PPBV.) The two monitoring wells are located in an area on the landfill where waste are known to exist.

Leachate

In September of 1983, Batelle did an analysis of leachate for the presence of 2,3,7,8-TCDD. TCDD was not found in the leachate sample, OCDD was detected and the highest concentration was 0.9 ppt (parts per trillion).

Leachate was sampled at four locations during the Remedial Investigation. (See Figure 4 for sampling locations.) Leachate sampling locations were identified during site reconnaissance. Sheet flow was identified at collection location LS1, 20 feet upgradient of the access road. Leachate seepage appears to re-enter the fill near the road. Collection locations LS2 and LS3 were taken from eroded leachate flow channels. The forth leachate collection took place in the overflow of the discharging manhole of the leachate collection system.

Two rounds of sampling were conducted, one sampling point had been covered over and was not sampled during the second round. Table 2 lists the contaminants detected in the leachate above comparison values.

Table 2
Leachate Contamination *

CONTAMINANT	RANGE DETECTED PPB	COMPARISON VALUE PPB	SOURCE
Acetone	100-6400	3500	RFD
Arsenic	ND-390	11	RFD
Barium	140-5850	2000	LTHA
Benzene	ND-850	1.2	CREG
Benzo(a)pyrene	ND-160	0.006	CREG
Beryllium	ND-21	0.0081	CREG
2-Butanone	60-5500	200	LTHA
Cadmium	ND-217	7	EMEG
Chromium	11-1250	100	LTHA
Copper	ND-2090	1300	MCL
1,2-Dichloroethane	ND-1300	0.38	CREG
Lead	23.5-4280	0	MCLG
Manganese	1400-44400	3500	RFD
Nickel	ND-1300	100	LTHA
N-nitrosodiphenylamine	ND-9800	7.1	CREG
Vanadium	ND-1230	20	LTHA
Zinc	332-15700	2100	LTHA

ND-not detected
PPB-parts per billion
MCL-Maximum Contaminant Level
MCLG-Maximum Contaminant Level Goal
EMEG-Environmental Media Evaluation Guideline
LTHA-Lifetime Health Advisory
* Malcolm Pirnie 1987

Soil

In September of 1983, Batelle Laboratories analyzed four soil samples for 2,3,7,8-TCDD. No TCDD was detected in any of the soil samples, OCDD was found at 280 ppt.

The on-site soil investigation for the Remedial Investigation was limited to leachate seep areas and areas that received leachate

runoff. Five soil samples were taken at unknown depths, three were composite samples. (See Figure 5 for sampling locations.) Soil samples SS1 and SS2 were approximately 75 feet west of the unnamed stream and north of the overflowing manhole. Sample SS3 was collected at the base of the landfill. SS4 and SS5 were collected on a large leachate seep area, where leachate was in direct contact with soil.

2-Butanone and acetone were found in soils above concentrations found in leachate but below comparison values. Polycyclic aromatic hydrocarbons including phenanthrene, fluoranthene, and benzo(a)pyrene were detected in soils at concentrations below comparison values.

Sediments

In September of 1983, Batelle performed analysis for 2,3,7,8-TCDD on three sediment samples taken from the leachate collection system. No 2,3,7,8-TCDD was detected, OCDD was found as high as 690 ppt.

OFF-SITE CONTAMINATION

Ground Water - Private Wells

In December of 1983, DEP coordinated residential well sampling of forty-one homes and analysis by three laboratories for 2,3,7,8-TCDD. No TCDD was detected in any of the private wells by any of the laboratories.

In March of 1985, eight residential wells were sampled by NUS Corporation to confirm previous results taken by Fred C. Hart. No priority pollutants were detected in any of the samples. Low concentrations of tetrachloroethane were found in three private wells. However, subsequent sampling of the three wells did not find the presence of this compound.

Thirty-nine residential wells located to the north, northeast and northwest of the site were sampled as part of the state-ordered program. Most of these wells are in bedrock, a few are at the overburden-bedrock contact. The depths of these private wells range from 18 to 725 feet. According to the RI/FS, leachate has contaminated the ground water at the overburden-bedrock contact making wells located in this zone more susceptible to landfill contamination. Well samples were taken in September 1984, February, June and December, 1985.

Table 3 reports the contaminants detected during the residential well sampling rounds. Validation criteria for methylene chloride was not met for the first three sampling rounds so those contaminant ranges should be interpreted with caution.

Pesticides, polychlorinated biphenyls, and 2,3,7,8-TCDD analysis was dropped after the first round of sampling because none of these contaminants were detected.

Table 3
Ground Water Contamination in Private Wells *

CONTAMINANT	RANGE DETECTED PPB	COMPARISON VALUE PPB	SOURCE
Benzene	ND-32	1.2	CREG
Lead	2-17	0	MCLG
Methylene Chloride	ND-252	4.7	CREG
Tetrachloroethylene	ND-168	5	MCL
Trichloroethylene	ND-13	5	MCL
Vinyl Chloride	ND-5	0.7	EMEG

ND-not detected
PPB-parts per billion
CREG-Cancer Risk Evaluation Guide
MCL-Maximum Contaminant Level
MCLG-Maximum Contaminant Level Goal
EMEG-Environmental Media Evaluation Guideline
* Malcolm Pirnie 1987; CT DEP Water Compliance Files

Leachate

In 1990, leachate monitoring was done regularly at a monitoring station located at the bottom of Andrews Avenue. Starting in February, sampling was done weekly for one month then monthly samples were taken thereafter. Benzene has been detected at 200 ppb. Ethyl benzene, toluene and xylenes have been detected below comparison values.

Soil

During the 1980's, soil sampling was performed at the Andrews School and residential properties following complaints of run-off and overflow of storm drains.

At the Andrews School, samples were collected by the CT DEP near the storm drain. No TCDD was detected. No volatile organic compounds were detected near the storm drain. Toluene was detected at very low concentration as were ethyl benzene and xylenes.

Soil at residential properties, to the east and south of the site, on Hunters Mountain Road and to the north of the site on Andrews Avenue have been sampled. Nothing was detected above comparison values.

Surface Water and Sediments

The RI/FS included surface water and sediment sampling conducted by Fred C. Hart under the state ordered program and sampling conducted by Malcolm Pirnie (See Figure 6 for sampling locations). Each of these sampling activities included three locations for a total of six samples. Sediment sampling was conducted at the same locations. Composite samples were taken at two inch depths near the stream bank and mid stream.

In June of 1986, additional sampling was done by EPA at eleven locations in the unnamed stream. Malcolm Pirnie also collected samples in Spruce Brook at five locations. Table 4 lists the contaminants detected in surface water above comparison values.

Low concentrations of volatile organics including acetone, toluene and 2-Butanone were detected in sediment samples. Metals were present at high concentrations. These include lead, barium, zinc, and copper (Malcolm Pirnie 1987.)

In June of 1991, the stream on the east side of Hunter Mountain Road was sampled by the DEP. Nothing was detected above comparison values.

Table 4
Surface Water Contamination *

CONTAMINANT	RANGE DETECTED PPB	COMPARISON VALUE PPB	SOURCE
Trichloroethane	ND-120	0.61	CREG
N-Nitrosodiphenylamine	ND-1600	7.1	CREG
Benzene	ND-650	1.2	CREG

ND-not detected
PPB-parts per billion
CREG-Cancer Risk Evaluation Guide
* Malcolm Pirnie 1987; USEPA 1986

C. QUALITY ASSURANCE AND QUALITY CONTROL

Several consulting firms (Fred C. Hart, Malcolm Pirnie, YWC, and Langan Engineering) have conducted analyses of soil, groundwater, air, surface water and leachate. The QA/QC procedures used by

these consultants were not evaluated by the Connecticut Department of Health Services. We did not obtain the Quality Assurance/Quality Control summary from EPA on the RI/FS data. Therefore, the conclusions drawn for this health assessment are 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.

However, we do not feel that the data in the RI/FS is sufficient or adequate to characterize the extent of contamination or the potential for migration of contamination off-site in surface water, groundwater, surface soil and air. In addition, we found some analytical problems and controversy with the data that was available for our review.

In 1983 analyses for TCDD was performed by three laboratories. This compound was found in one on-site monitoring well and soil. There exists some controversy regarding the reliability of the first TCDD data because subsequent analysis for TCDD did not find the presence of TCDD in any of the media analyzed. Thus the first round samples may have been contaminated during sample collection or in the laboratory.

Analytical problems were noted for methylene chloride contamination in well water because methylene chloride was found in the laboratory blanks.

Analyses of different media for chromium reported only total chromium. Therefore no analytical information exists on the form of chromium (Chromium III, Chromium VI) in the sampled media. The form of chromium is important because some forms are more toxic than others.

Past exposures to contaminants in air from previous fires and the open burning of waste can not be assessed because there is no data available.

The soil data is insufficient and inadequate. Only five soil samples were collected from unknown depths and analyzed during the RI/FS investigation. The soil data is insufficient to allow the assessment of downwind deposition of contaminants in soil through fugitive dusts. Nor is the data sufficient to assess the potential for transport of soil contamination through surface water runoff.

The low concentrations of contaminants found in the on-site groundwater monitoring data (Malcolm Pirnie RI/FS 1987) are not representative of the historical on-site waste disposal practices. This is based on a review of the 1972 CT DEP Commercial and Industrial Solid Waste Survey which indicates that approximately one million gallons of sludge and liquid hazardous

wastes were disposed of for approximately 15 to 20 years. According to the CT DEP (Patton, E., personal communications) much of the leachate generated in the landfill flowed off-site through the unnamed stream. In addition, most of the industrial waste was burned after disposal. These factors could explain the low concentrations found in ground water. The public health implications are discussed in the Conclusion and Recommendations section.

D. PHYSICAL AND OTHER HAZARDS

It is apparent based on observations made during the site visit that trespassers do frequent the site. Dirt bike tracks could be seen throughout the site and fireworks had obviously been launched from the top of the landfill. The physical hazards at the site are numerous. Trespassers could fall or cut themselves while playing or climbing on the abandoned equipment and cars . Dirt bikers and hikers could also come in direct contact with other hazards including partially buried drums and tires, ditches and holes.

PATHWAYS ANALYSES

To determine whether nearby residents have been or are being exposed to contaminants migrating from the site CT DHS and ATSDR evaluate the environmental and human components that lead to human exposure 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, ground water and surface water. ATSDR categorizes exposure pathways as either completed or potential pathways. For an exposure pathways to be completed all five elements of the pathway must be present. Potential pathways are those where there isn't enough evidence to show that all the elements are present, could be present or were present in the past.

A. COMPLETED EXPOSURE PATHWAYS

No completed exposure pathways were identified.

B. POTENTIAL EXPOSURE PATHWAYS

Private Well Pathways

Past exposures may have occurred from contaminated ground water present in private wells. Please refer to Table 3. Forty-four private wells near the Laurel Park were sampled during a

quarterly monitoring program. These chemicals were not detected repeatedly in the same well except for a few isolated instances and no repetitive pattern of findings can be found. Many of these, however, are considered reliable indicators of possible leachate contamination. The highest concentrations of contaminants were detected after residences were put on bottled water.

Elevated levels (6 to 70 ppm) of chloride were found in residential wells toward the northeast. There are several potential sources for the presence of chloride. The presence of chloride could be indicative of the potential for leachate migration towards the northeast. Or the could be the result of road salt contamination.

In response to the identification of contaminants in private wells and the potential for contamination of nearby private wells the CT DEP provided fifty (50) residences in the area with bottled water in 1983. The residences were provided with bottled water until 1990 when all but four residences were connected to the public water supply. These residents chose not to abandon their wells. These wells have not been monitored since the mid 1980's.

Although the residents were provided with bottled water those households with contaminated wells still use this water for other purposes such as bathing or showering.

Benzene, tetrachloroethylene, vinyl chloride, phenols, and PAH's evaporate into the air from contaminated water during showering or baths. Inhalation exposures occur when persons breath the indoor air in the house while showering or bathing. In addition, these compounds will be absorbed through the skin during showers and baths. While lead can be ingested, inhalation of lead during showering is unlikely.

Because quarterly sampling did not consistently detect contaminants and because residences were placed on bottled water in 1983, before water sampling detected contamination, we do not know if and for how long neighboring residents were exposed to these chemicals.

In 1983, CT DEP found 2,3,7,8-TCDD in an on-site ground water monitoring well. Subsequent sampling of 35 private wells by CT DHS did not show the presence of this contaminant. There were no confirmed positive detections of 2,3,7,8-TCDD in any residential well in the vicinity of Laurel Park.

Ambient Air Pathway

Past exposures to contaminated ambient air from on-site and off-site Laurel Park operation activities may have occurred.

The landfill open burned industrial wastes (solvent sludges, rubber products, etc.) in the early 1960's (Malcom Pirnie 1987). The residents of approximately fifty (50) homes in the area may have received inhalation exposure to potentially toxic emissions generated from the open burning of waste. In addition, residents may have been exposed to smoke and fume emissions generated from two large uncontrolled fires.

In 1962 a large fire burned for 5 days. Residents may have been exposed to potentially toxic emissions from the wastes that burned for 5 days. The smoke and fumes reportedly caused several people to become ill. (Camp, Dresser, McKee 1982)

In 1986, a fire occurred at the top of the west slope of the landfill resulting in the evacuation of approximately 500 persons in the surrounding area and the town of Naugatuck.(Letter, Commissioner CT DEP, Naugatuck Town Files, Solid Waste, CT DEP) The fire burned for 4 hours. Residents may have been exposed to potentially toxic emissions generated from the wastes that burned.

We do not know what residents may have been exposed to, since we do not know what types of waste were burned. There is no ambient air data for the years when the landfill actively burned waste nor for the uncontrolled fires.

We know from complaints that residents received inhalation exposure to fumes generated from the transport and spilling of waste chemicals along Hunters Mountain Road. (Solid Waste Files, CT DEP)

Gas production in landfills is a subject of much concern because of the potential hazards of methane combustion. Methane measurements have been taken from two on-site monitoring wells and methane was found below comparison values. A gas venting system will be installed in the landfill and additional gas sampling is planned during the Remedial Action.

Surface Water/Leachate Pathways

Residents may have received inhalation and dermal exposures to VOCs (i.e., acetone, benzene, methyl ethyl ketone) from the on-site stream that carried leachate materials off-site. The most significant exposures are believed to have occurred when the stream flowed through residential backyards and along the rear of the Andrews Avenue Elementary School along Andrews Avenue and Scott Street. The stream flowed into a storm drain into an underground culvert beneath the Andrews Avenue School. School children may have received inhalation exposures to VOC's (i.e., acetone, benzene, methyl ethyl ketone) and other compounds evaporating into the air from the leachate.

According to CT DEP representative who inspected the site in the early 1980's the stream was contaminated and had an extremely bad odor (Patton, E., personal communication, CT DEP Water Management.) Residents consistently complained about leachate flowing in the stream and the extremely bad odor the stream had as the leachate flowed past their backyards. (Naugatuck Town Files, Solid Waste Files, CT DEP)

Soil/Dust Pathways

Past, current and future exposure pathways are possible from the contamination of soil and dust. The mechanisms of contamination include transport of contaminated soil and dust by wind, surface water runoff, excavation, and trucks transporting waste. The predominant wind blows in a northerly direction up the valley, however, most of the potential exposures discussed here are expected to be from localized activities.

Soil samples collected on-site showed the presence of VOCs (e.g., acetone and benzene) and metals (e.g., arsenic, chromium and lead).

Residents, landfill workers and truck drivers potentially received ingestion, inhalation and dermal exposure to contaminated soil and road dust in the past when the landfill was in operation.

We observed evidence of on-going recreational activities (e.g., spent fire works and dirt bike trails) on unvegetated landfill areas.

Residents involved in recreational activities on-site can potentially receive inhalation, skin and ingestion exposures to VOCs and metals from contaminated soils.

Leachate Pathway

Although the leachate collection system was designed to convey leachate to the northern end of the landfill and through a sewer following the path of the unnamed stream, leachate seeps are common throughout the landfill. Persons involved in recreational activities (dirt bikers) can potentially receive dermal and inhalation exposures to leachate (e.g., benzene, acetone, toluene) evaporating into the air from the leachate.

Fish Pathways

The potential exist for past exposures to fish contaminated with leachate in the Meadow Brook Stream. A review of the CT DEP

Solid Waste files provided evidence that residents actively fished in this stream while they observed leachate flowing down stream.

Acetone was detected at 65 ppb, methyl ethyl ketone at 30 ppb, and heptane and methane were found in trace concentration in sediments (CT DEP 1980). Since, these compounds do not bioaccumulate in fish they are not cause for concern with respect to fish consumption.

Heavy metals, which include lead, zinc, and copper were found in the sediments in Long Pond Meadow Brook stream. The potential exists for exposures to fish contaminated with zinc and copper because fish will bioaccumulate zinc, and copper.

We do not feel that the lead from the contaminated sediments is cause for concern because it is mostly likely the inorganic form of lead. In order for lead to bioaccumulate in fish it has to be in the organic form, which is rarely found.

PUBLIC HEALTH IMPLICATIONS

A. TOXICOLOGICAL EVALUATION

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

We used ATSDR Toxicologic Profiles in our review of the health effects associated with site contaminants. ATSDR's Toxicological Profiles are chemical-specific profiles which provide information on health effects, environmental transport, and human exposures.

Tetrachloroethylene

Tetrachloroethylene was detected in one private well at 168 ppb. This concentration was not detected in the same well when tested two times prior and once after. This concentration exceeds the current EPA MCL of 5 ppb, however, this was detected after this residence was placed on bottled water.

Exposure to tetrachloroethylene through inhalation can cause eye and upper respiratory irritation headaches, dizziness and drowsiness at high levels. These adverse effects would not be expected as a result of short term exposures to this compound during bathing and showering at the concentrations found in this well.

The EPA recommended a Group B (probable human carcinogen) weight of evidence classification for tetrachloroethylene.

Trichloroethylene

Trichloroethylene was detected in one private well at 1 ppb, the EPA MCL for trichlorethylene is 5 ppb. Trichloroethylene was not detected in four follow-up samples of this same well.

The elevated concentration of trichloroethylene was detected in the private well after bottled water had been provided. Adverse effects from trichloroethylene during showering and bathing are not expected. Dermal effects have not been reported from exposure to dilute solutions containing trichloroethylene. Inhalation exposures at the concentrations detected are also not likely to cause adverse effects.

Vinyl Chloride

Vinyl chloride was detected in one private well at 5 ppb, the current EPA MCL in 2 ppb. This concentration was not confirmed during four follow up samplings. Vinyl chloride was detected after residents were provided with bottled water.

Vinyl chloride is not absorbed by the skin during dermal exposure. If you breathe high levels of vinyl chloride, dizziness, sleepiness and unconsciousness may occur. These effects occur at levels much higher than those found in the water.

Methylene Chloride

Methylene chloride was detected in several private wells. The highest concentration detected was 252 ppb, above the EPA MCL of 5 ppb. Methylene chloride was also detected in laboratory blanks, therefore these concentrations should be interpreted with caution. In addition, methylene chloride detection was not consistently confirmed in follow up sampling.

Exposure to methylene chloride affects the central nervous system. Inhalation of methylene chloride at 300 ppm or greater for short periods of time can cause inability to hear faint sounds and vision impairment. Mild skin irritation can occur after dermal exposure to methylene chloride.

Benzene

Benzene was detected in three private wells, only one well had concentrations above the EPA MCL of 5 ppb. These benzene concentrations were not consistently found on follow up. The

well with the highest concentration of 32 ppb had nondetectable levels on follow-up sampling. Benzene vapors were detected in two on-site ground water monitoring wells at 30,600 and 31,200 ppb. Benzene was also found in leachate as high as 850 ppb on site and 200 ppb off-site.

Benzene is a known human carcinogen. It has been linked to the development of leukemia and other adverse effects related to the hematopoietic (blood related) system.

The highest concentration of benzene detected in private well water was found after bottled water was supplied. Oral exposure to benzene is not likely to have occurred.

Inhalation exposure and dermal exposures to benzene may have occurred during showering and bathing and in areas of leachate seepage. It is not likely that adverse health effects would occur from inhalation exposure caused from the liberation of benzene found at concentrations in water. Benzene is a skin irritant causing a defatting of the keratin layer. A dry and scaly dermatitis may occur as a result of dermal exposures.

Other Volatile Organic compounds

Several volatile organic compounds (VOCs) were identified in on-site groundwater monitoring wells but not in private drinking water wells above EPA MCL standards. These are ethyl benzene, and 1,2 dichloroethane. These compounds are included in this section because of the potential for these contaminants to migrate into the four private wells in the area that have not been hooked up to public water.

Ethyl benzene

As indicated in Table 1 elevated levels (992 ppb) of ethyl benzene were detected in groundwater monitoring wells but not in private drinking water wells at levels higher than the current EPA MCL of 680 ppb.

No studies were found which provide evidence regarding adverse respiratory, cardiovascular, gastrointestinal, hematological. musculoskeletal, hepatic, reproductive or renal effects in humans or animals following oral or dermal exposures (ATSDR 1990). No studies were found regarding carcinogenic effects in humans to date (ATSDR 1990).

1, 2-dichlorethane

As indicated in Table 1, elevated levels of 1,2 dichloroethane (39 ppb) were found in groundwater monitoring wells at levels exceeding the EPA MCL of 5 ppb. The amount of 1,2 dichloroethane in drinking water with known health effects in humans and animals

is not known. In short term animal studies exposures to levels much higher than those identified on the site increased the susceptibility to infection in laboratory animals.

No studies were found which provide evidence regarding adverse respiratory, cardiovascular, gastrointestinal, hematological. musculoskeletal, hepatic, reproductive or renal effects in humans or animals following oral or dermal exposures (ATSDR 1990.) No studies were found regarding carcinogenic effects in humans to date (ATSDR 1990).

Benzo(a)pyrene

Benzo(a)pyrene was found in leachate (160 ppb) and on-site groundwater monitoring wells (5ppb). Benzo(a)pyrene, has been found to cause birth defects, decreased body weight and reproductive effects in laboratory animals at levels (308ppm) higher than those detected at Laurel Park (160 ppb.)

However, adverse skin effects have been seen in humans following skin exposure in patients with preexisting skin conditions. This suggests that skin exposures to leachate maybe cause for concern.

Heavy Metals

Heavy metals were detected in private ground water wells, leachate sediments, and surface water.

Lead

Lead was found in leachate (23.5 to 4280 ppb) and ground water (0 -1520 ppb), private wells (2 to 17 ppb), surface water (780 to 8200 ppb), and in minor amounts in on-site soils.

Studies indicate that long term exposure to low levels of lead can cause brain damage and lowered I.Q. in children. Exposure to high levels of lead can cause the brain and kidneys of humans to be badly damaged. Lead exposure can increase blood pressure in middle aged men. If a pregnant women is exposed to lead it can be carried to the unborn child and cause premature birth, low birth weight, or even spontaneous abortion.

Chromium

Chromium was found in leachate at concentrations of 11 to 1250 ppb. There are several different forms of chromium in the environment. The most common forms include chromium (III) and chromium (VI). The RI/FS did not identify what form of chromium was found in the leachate. Chromium (III) is an essential nutrient in humans. No adverse effects have been reported from exposure to chromium (III) in part because of it's non-corrosive and it cannot be readily absorbed in the human body. In contrast

chromium (VI) is toxic because it is easily absorbed into the body. Concentrations of 1900 ppb chromium (VI) applied to the skin of laboratory animals has been found to cause skin ulcerations. It is highly unlikely that the chromium found in leachate is entirely chromium IV however, skin exposure to chromium from recreational activities at Laurel Park may be cause for concern.

Octachlorodibenzo(p)dioxin (OCDD)

OCDD was detected in all media sampled. The highest concentration was found in sediments at 690 parts per trillion (PPT). In addition, OCDD was detected in private wells near the site in trace amounts (105 to 709 parts per quadrillion.) However, these amounts are very low and there is no evidence to suggest that exposure to these levels of OCDD will cause an adverse health effect. OCDD is a common by-product of combustion. Thus, the OCDD found in all media sampled was probably generated from the burning of wastes on-site.

Few studies have been undertaken to assess the toxicity of OCDD in animals, but preliminary indications suggest it is much less toxic than 2,3,7,8- tetrachlorodibenzo (p) dioxin (TCDD), the most highly toxic form of dioxin. The four major toxic effects of exposure to these compounds at levels significantly higher than those measured on-site are: chloracne, the wasting syndrome, liver and immune system damage and cancer.

In 1983, analyses for TCDD was performed by various laboratories. This compound was found in one on-site monitoring well and soil. There exists controversy regarding the reliability of the first TCDD data because subsequent analysis for TCDD by the three laboratories did not find the presence of TCDD in any of the media analyzed. Thus, the first round samples may have been contaminated during sample collection or in the laboratory.

B. HEALTH OUTCOME DATA EVALUATION

Health outcome data were not evaluated for this public health assessment. Specifically, because there is no documented evidence to indicate that the nature and extent of exposure that occurred could have caused an adverse toxicologic or physiologic effect. Although records suggest that inhalation exposures to toxic air contaminants may have occurred because of the landfill fires, and the open burning of waste, we have no air monitoring data to work with that would enable us to identify what potential contaminants people may have been exposed to. In addition, there were no documented concerns of specific adverse health outcomes.

C. COMMUNITY HEALTH CONCERNS EVALUATION

Community concerns are reported in the document as broad categories of issues. This was done because community involvement has occurred for long periods of time and concerns were gathered from historical reports. We addressed these concerns as follows.

1. Dust and debris blowing from the landfill as well as dust generated by the flow of trucks up to the site make it difficult to breath.

There was no air monitoring done in the vicinity of the residential properties or on the road during active landfill operations. We cannot make an assessment of what people may have been exposed to in the fugitive dusts. The landfill was closed and truck traffic has stopped. A permanent cap as required by the Record of Decision will also address fugitive dust issues.

2. What are the sludges and liquids that dripped off trucks and onto people's yards?

The sludges and liquids that spilled from trucks were not sampled to allow us to make an assessment of them. According to CT DEP files, an effort was make to reduce dripping from trucks by adding a catchment system to them. Soil sampling was done in some residential yards along the road leading to the landfill. Nothing was detected above comparison values.

3. What are people being exposed to when leachate runs off the landfill and onto yards?

The leachate running off the landfill has been sampled. A variety of compounds including acetone, benzene, chromium and lead were detected at levels above health comparison values. Some of these compounds will volatilize into the air and people may have been exposed through inhalation, however, we do not know at what concentrations. A leachate collection system was installed on the site to capture leachate run-off. However, because the system was not hooked up to the waste water treatment plant until 1989, overflow of the leachate flowed down Andrews Avenue.

4. Is the water safe to drink in private wells in homes around the site?

Sampling of private wells closest to the landfill was conducted by both CT DEP and during the remedial investigation. A quarterly sampling program beginning in 1984 found low concentrations of contamination in a few wells. These contaminants were not found consistently in the wells during subsequent sampling. Residents were placed on bottled water in

1983 after groundwater monitoring wells on site detected TCDD. We have no evidence that private wells were impacted by the landfill prior to being placed on bottled water in 1983. Four residences continue to use private wells and have not been sampled since the mid 1980's. There is the potential for contamination of these wells.

5. The odors emanating from the site are very strong and sometimes nauseating.

We do not know what specific contaminants were contributing to the odor problem at the site. The permanent cap will help reduce these odors.

6. Is the brook behind the Andrews School contaminated?

Leachate contaminants flowed into the stream prior to the leachate collection system being connected to the waste water treatment facility.

CONCLUSIONS

1. Based on the information reviewed, ATSDR has concluded that this site is an indeterminant public health hazard. Past exposures may have occurred principally to contaminants in air from uncontrolled fires, the open burning of wastes, and other landfill activities. However, there is no analytical data to document any exposures to contaminants in air and thus adverse health effects cannot be assessed.

   As noted in the Pathway Analyses section past exposures to VOCs and metals may have occurred due to contaminated private drinking water wells. Because quarterly sampling did not consistently detect contaminants and because residences were placed on bottled water in 1983, before water sampling detected contamination, we do not know if and for how long neighboring residents were exposed to these chemicals.

2. Although all residents with private wells were provided with bottled water, those residents with contaminated wells received inhalation exposures while breathing indoor air during showering or bathing. It is unlikely that adverse health effects would have occurred at the levels found.

3. There are four private wells in the area which could potentially be impacted by contaminants migrating through groundwater off-site. The lack of data on these wells from 1987 to present prevent firm conclusions about the quality of water in these wells at the present time.

4. Residents potentially received inhalation and dermal exposures to VOCs from the migration of leachate contamination in surface water. Andrews School children potentially received inhalation exposures to VOCs from the stream that flowed adjacent to the school.

5. Residents, landfill workers and truck drivers may have received inhalation and potentially ingestion exposures to contaminants in soil and road dust in the past when the landfill was operating.

6. Residents involved in recreational activities on-site can potentially receive inhalation, skin and ingestion exposures to VOCs, PAHs and metals from leachate seeps and contaminated soils.

RECOMMENDATIONS

1. The three private wells not connected to the public water supply should be sampled to ensure that they are not impacted by contaminants migrating off-site.

2. Measures should be taken to ensure that the vacant lands immediately surrounding the landfill are not developed into commercial, residential or recreational properties without environmental data to indicate that the properties are not contaminated.

3. The landfill should be capped as outlined in the Record of Decision, to prevent the migration of contaminants off-site through soil, surface water runoff and leachate.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATION

The data and information evaluated in the public health assessment for the Laurel Park, Inc site has been reviewed by ATSDR's Health Activities Recommendations Panel for appropriate follow-up with respect to health actions. The panel agrees that the community health education planned by CT DPHAS is appropriate for the site.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Laurel Park site contains a description of actions to be taken by ATSDR, CTDPHAS, CT DEP, and/or EPA, at and in the vicinity of the site subsequent to the completion of this health assessment. For those actions already taken at the site, please see the Background section of this Public Health Assessment. The purpose of the PHAP is to

ensure that this 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 ATSDR/CTDPHAS to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR and CTDPHAS are as follows:

1. The CT DPHAS will provide 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.

2. CT DPHAS will investigate the three remaining private wells in the area to ensure that the wells are not impacted by contaminants migrating off-site.

CERTIFICATION

The Public Health Assessment for the Laural Park, Inc. 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 Assessment and concurs with its findings.

for C. Harold Emmett
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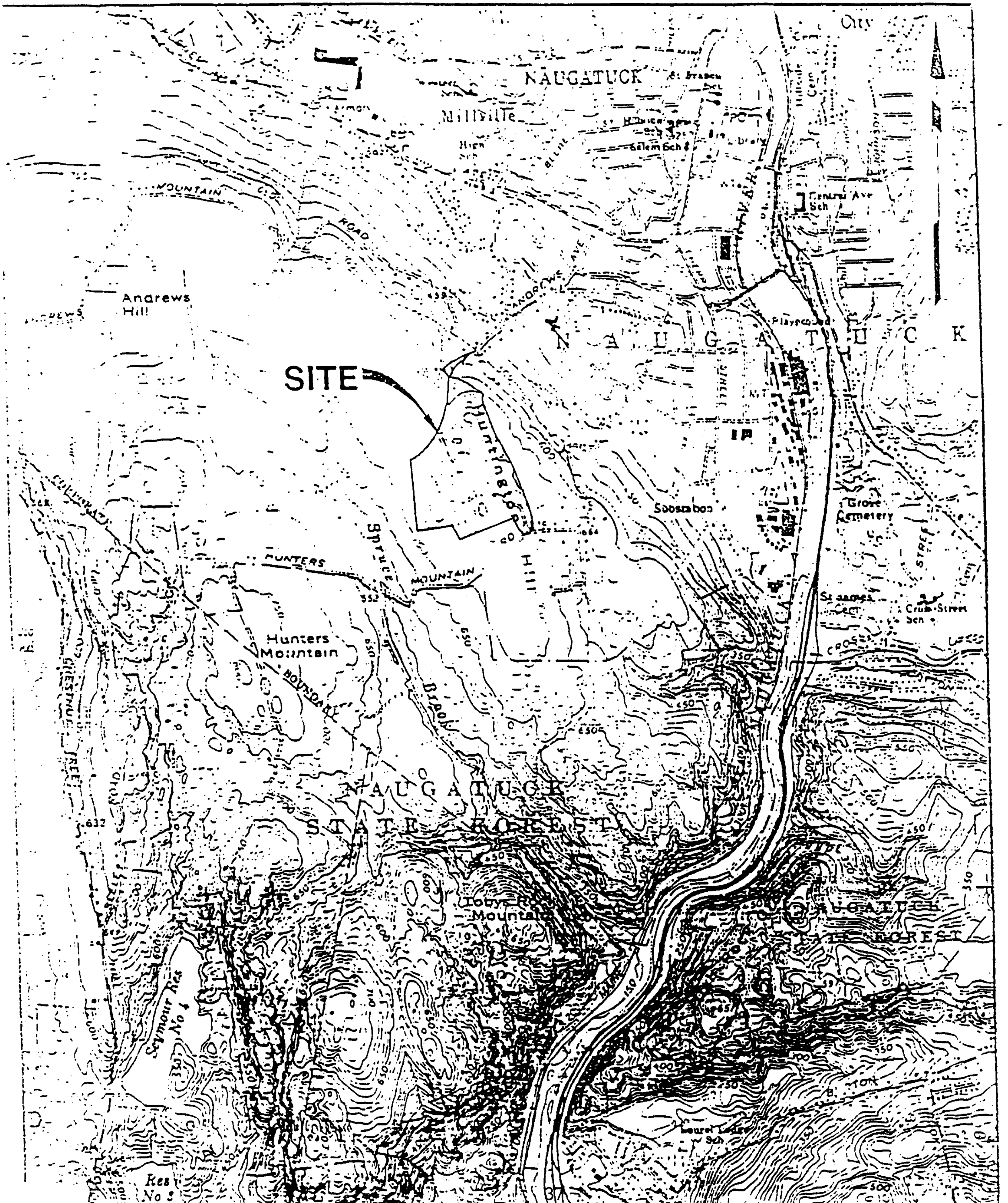
APPENDICES

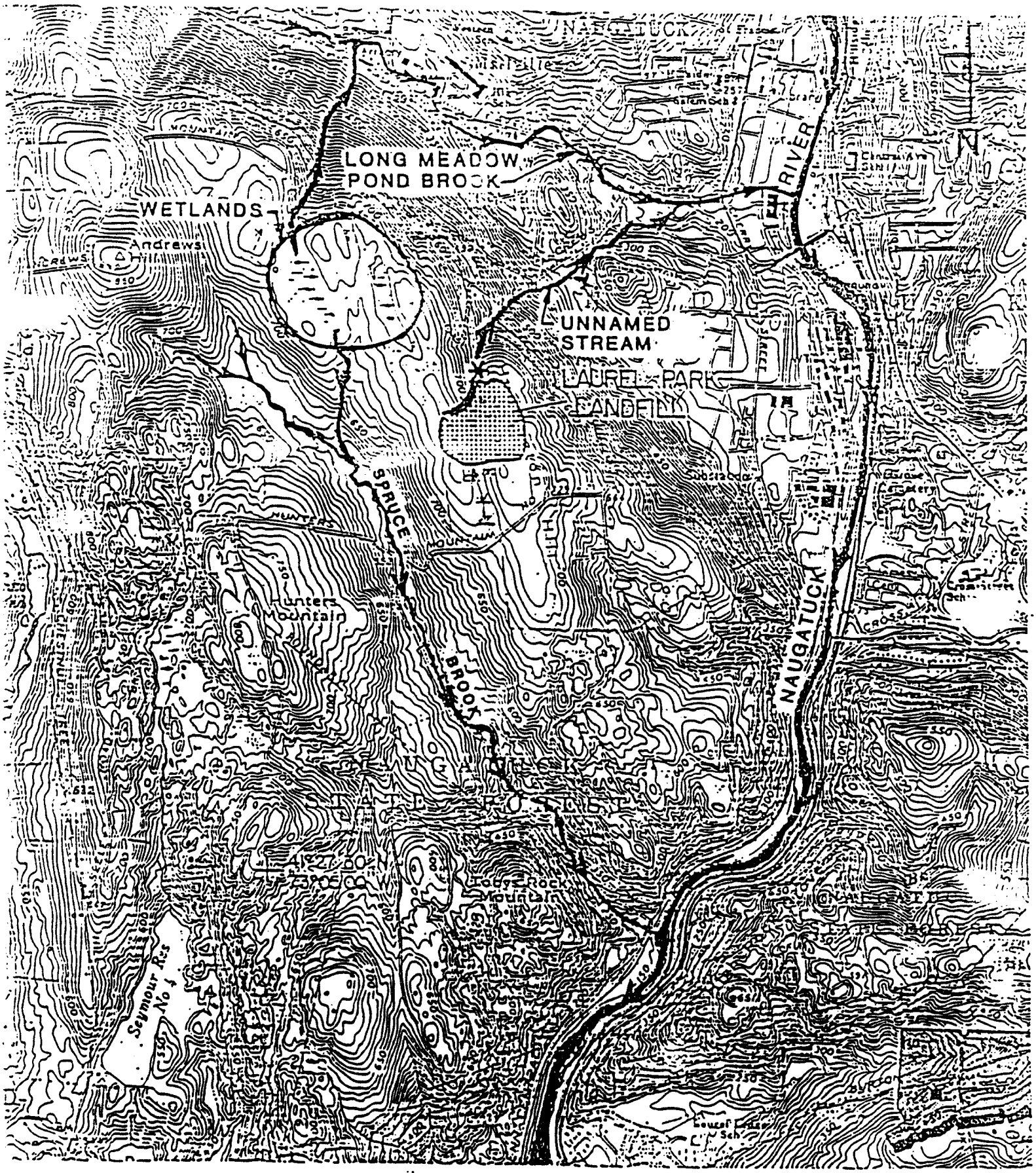
APPENDIX 1--FIGURES

FIGURE 1



NAUGATUCK
Millville
MOUNTAIN
ROAD
Andrews
Hill
ANDREWS AVE
SITE
N A U G A T U C K
Spruce
HUNTERS
MOUNTAIN
Hill
Hunters
Mountain
BOUNDARY
Brook
Grove
Cemetery
NAUGATUCK
STATE FOREST
Seymour Res
No 1

FIGURE 2



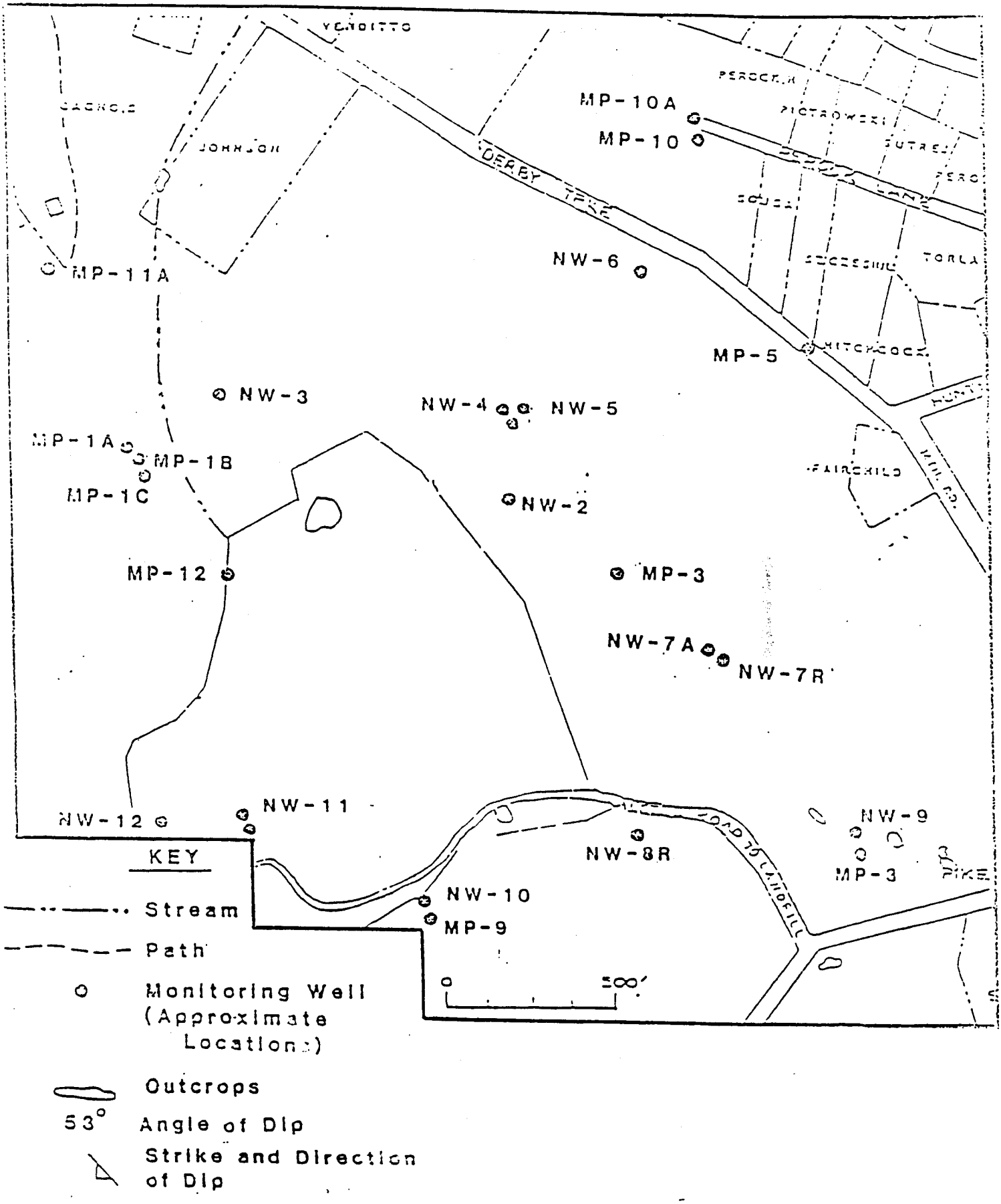
✲ Location of Overflowing Leachate Collection System Manholes

SCALE: 1" = 2000'

MALCOLM PIRNIE

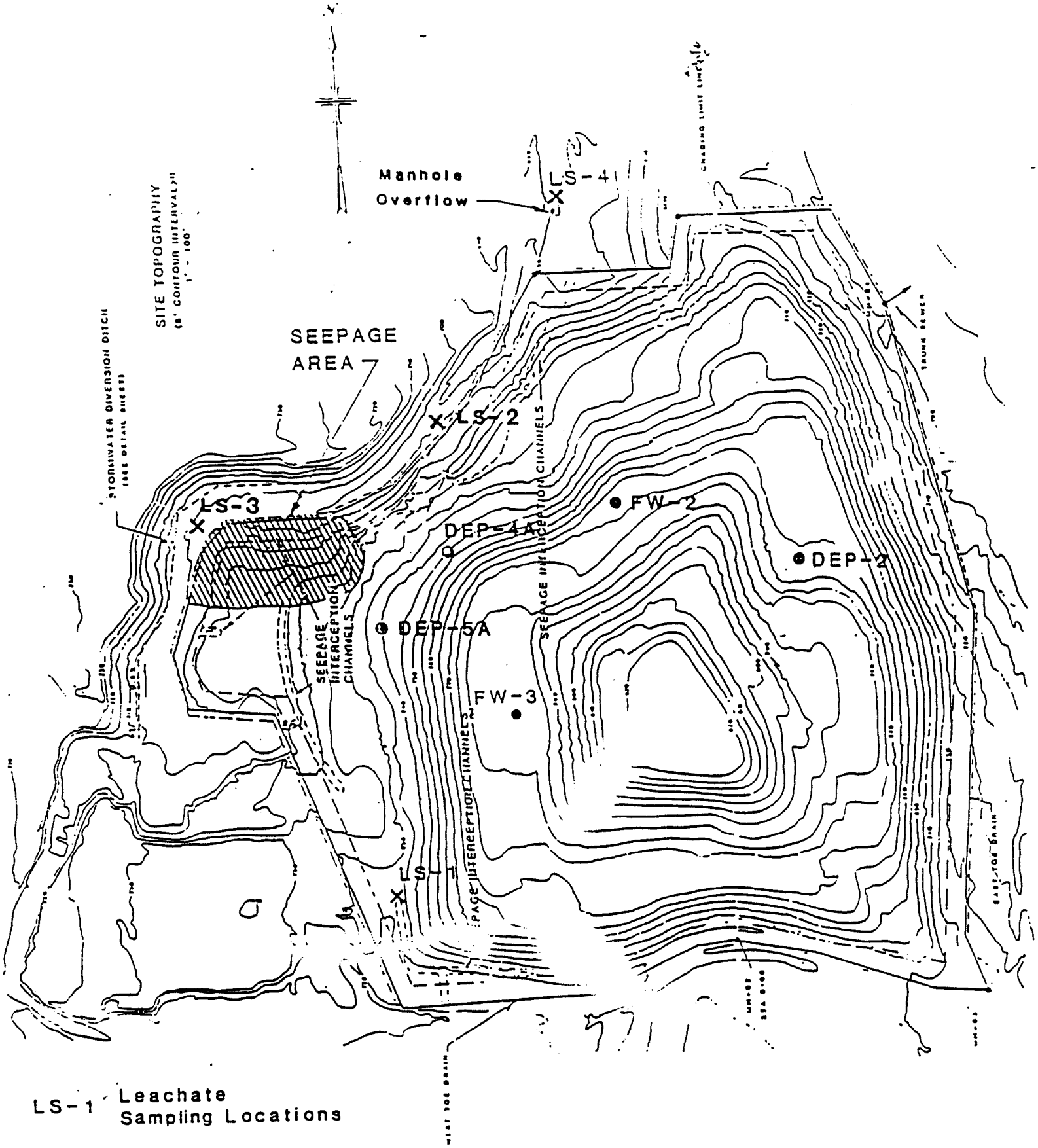
LAUREL PARK LANDFILL
NAUGATUCK, CONNECTICUT
SITE DRAINAGE

FIGURE 3



MALCOLM

FIGURE 4



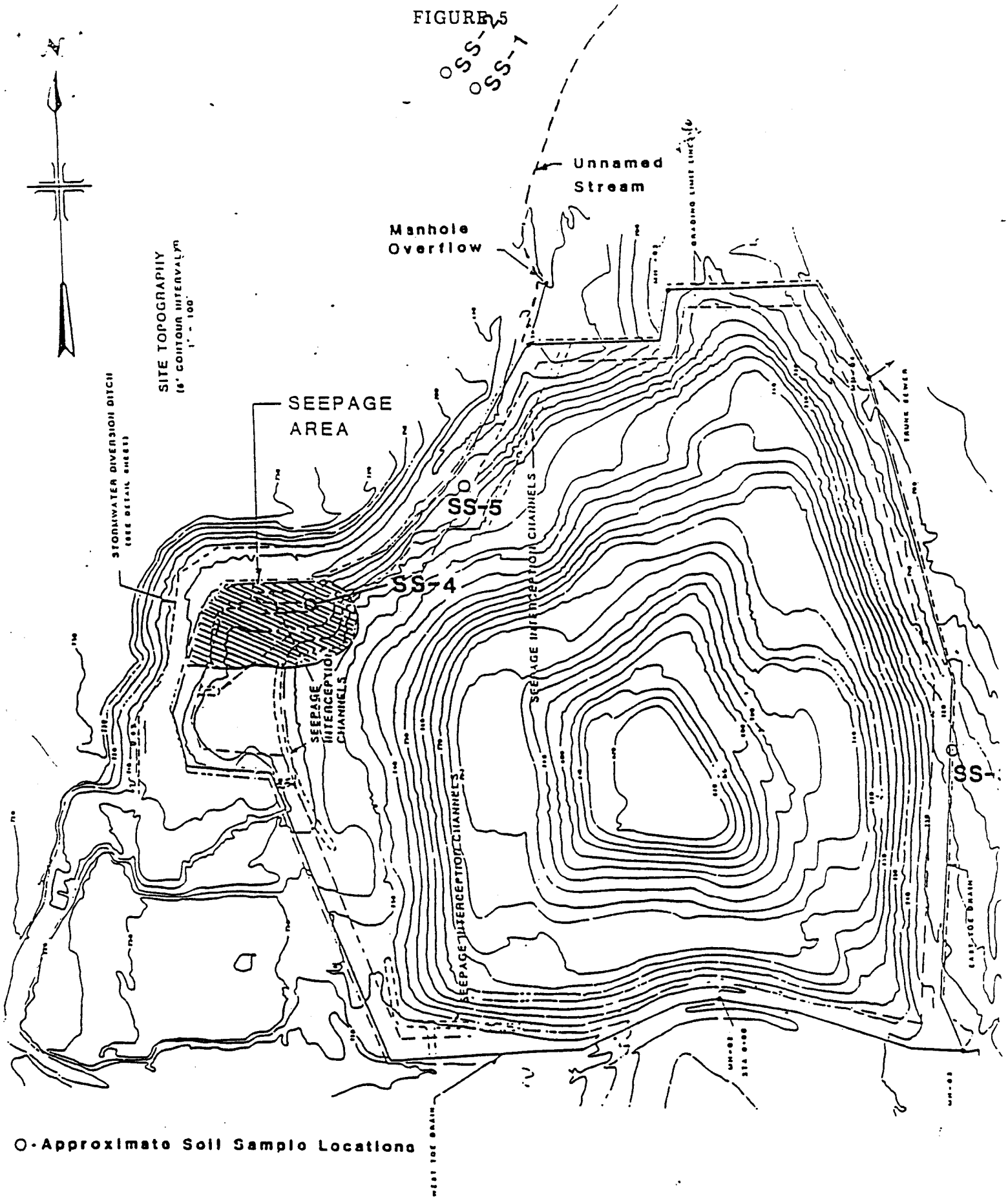
LAUREL PARK LANDFILL
NAUGATUCK, CONNECTICUT

SCALE: 1"=100'

LEACHATE SAMPLE LOCATIONS

MALCO PIRN

FIGURE 5



O-Approximate Soil Sample Locations

LAUREL PARK LANDFILL
NAUGATUCK, CONNECTICUT

SCALE: 1" = 100'

SOIL SAMPLE LOCATIONS

MALCOLM PIRNIE

FIGURE 6

SCALE: 1" = 2000'

SW-1 SURFACE WATER SAMPLING LOCATION
S-1 SEDIMENT SAMPLING LOCATION

MALCOLM PIRNIE

LAUREL PARK LANDFILL
NAUGATUCK, CONNECTICUT
SURFACE WATER ND SEDIMENT

APPENDIX 2

RESPONSE TO PUBLIC COMMENTS

The following is a compilation of all public comments received on the Laurel Park Public Health Assessment, February 22, 1993. All public comments were addressed and are discussed in the following paragraphs.

All comments received from the EPA and CT DEP were incorporated into the health assessment, with the exception of the CT DEP comment concerning the following incidence: "In the fall of 1992, workers sampling monitoring wells on-site encountered what they believe was a rabid racoon".

COMMENTS RECEIVED FROM P.E.G., INC. P.O. BOX 1023, NAUGATUCK, CT

RE: PUBLIC HEALTH ASSESSMENT, Laurel Park, Inc.

> Again, as I have stressed in the past, the people that have lived in the area of the Laurel Park Landfill, the firefighters that fought the fires at the site, the workers that dumped their products at Laurel Park should be a part of the health Assessment.
>
> Your draft labeled "initial assessment, addresses a variety of toxic organic chemicals found at Laurel Park Landfill, or found in well water, but shows little to have on human health, nor what impact they are likely to have after they moved off site.
>
> Many people have already been exposed to dangerous materials dumped at Laurel park, in the past, are presently still exposed and will be exposed in the future before any clean up operations are conducted. Upon investigation of other sites in Connecticut, it appears to be a fault of the State Dept, of Health in not assessing the health or testing residents around landfill sites. A study was requested numerous times by P.E.G. Inc., my guess is, the request have fallen on deaf ears. The local health doctor also refused to get involved because "he worked for Mayor Rado, and Rado told him to keep out of it. The lack of any monitoring records from the burning era, the lack of any testing of chemical spills on the route to the landfill and lack of testing of the people themselves, indicates no one has a base line from which to evaluate or research data. At one point in time, Yale School of Epidemiology did a survey of possible studies of health problems surrounding landfills. I don't know if anything was ever published.

Children and adults are still at risk from Laurel Park. There is easy access to the landfill by hunters, snowmobiles, ATV's and children both by direct entrance anywhere, and by indirect access from the stream that travels down Andrew Ave in close proximity to Andrew Ave School. The stream bed is still polluted and is easily accessible from the school yard.

Noted in your report that the homes not connected to the public water system should be monitored. PEG. Inc. agrees with this concept but monitoring should be at their expense as it was their option not to hook into the available system. Also noted that land adjacent to the landfill should not be developed, despite the fact that a home was built in 1991 with the approval of the health department and the Naugatuck land use board. It is my understanding that a family that recently moved into the area were not given any facts that there may be long term health risks, not what chemicals they may be exposed to daily.

Concerns about bottled water ... For approximately 2 years water was available to the residents only if they picked it up themselves at the Local Park Dept. Therefore, residents were still bathing in contaminated water for a long period of time. Again, if you review the hearing records you will get indications of great concerns. It is unfortunate that the landfill operations were unprofessional and had been allowed by D.E.P. and Dept. of Health despite the constant complaints of the citizens of the area.

Concerns about radiation and asbestos should also be addressed. Reasoning: records do not seem to be available that radiation was ever tested, fact: hospital and convalescent homes waste was disposed at the landfill, and the asbestos that was disposed at the landfill was never put in cells but allowed to be disposed of an possibly moved around just like other debris. The residents have no way of knowing if any of the aforementioned are leaving the site, via ground water runoff, leachate runoff or airborne.

It is P.E.G.'s opinion that this report tends to skim through all the health problems and seems to be protecting the unprofessional landfill operations over the many years.

In may opinion, I highly recommend that you add the stress of living in this toxic environment to your health assessment and you develop a base line from which to work from.

RESPONSE TO COMMENTS RECEIVED ON JULY 14, FROM PEG. NAUGATUCK NJ:

The purpose of the public health assessment is not to conduct an epidemiologic investigation but rather to look for any current or future impact on public health from the information reviewed.

In response to your concern with the exposures received by fire fighters, and truck drivers, etc., the public health assessment tries to identify the need for additional health information and health studies (i.e., large epidemiologic studies, door to door surveys, etc.) which include these you have suggested. However, even the public health assessment cannot identify a causal link to a particular disease of concern in the Laurel Park Landfill area. Unless a chemical/substance is well known to produce a specific disease in humans (such as asbestos and asbestosis of the lung) it is almost impossible to establish plausible cause. Even epidemiologic studies by themselves are insufficient to provide or establish definitive evidence that the disease we are investigating was caused by an exposure to a toxic chemical.

One of the major problems with this site is the lack of data to show that people were exposed to substances. The data is just not there. This has been very frustrating for CTDPHAS and ATSDR because we are in the field of public health to try and address health concerns like PEGs.

The Yale Medical School's Department of Epidemiology and Public Health did a study of the incidence of cancer in Naugatuck Valley for the years 1973 to 1982. They did not find an increase in total cancer incidence in Naugatuck despite the environmental history of this town. Their conclusions were that the rate of cancer incidence for males in the district had increased when compared to the state average. For females, the cancer incidence had been consistently lower as compared to the state average for females. Their overall conclusion was that there were no signs that the number of cases of cancer in the Naugatuck Valley District were increasing. This study is available for your review in the library of the Department of Epidemiology and Public Health at Yale Medical School. Even if the Yale study of cancer in Naugatuck found a correlation between the number of cancer cases and geographic location, this would not definitively establish a link between having cancer and the exposure that occurred. The results would only show a relationship. It is unfortunate that the epidemiologic techniques available to us to investigate your questions, lack the power needed to detect any increase in disease.

The study is entitled: "Yale University Community Project #24, Cancer Surveillance in the Naugatuck Valley Health District" by Sharon Brooks-Robinson, Stephen Gruber, Debra Brown, Chanelle Calhoun and Ann Phelps, Faculty Advisor Dr. James Jekel.

In response to your concern about access to the site, the site is now enclosed with a fence which should limit access. In addition the site is private property and people should not be trespassing.

In response to your concern about the stream bed being still polluted, unfortunately we do not have any data to support your concern at this time.

The three homes still using water from private wells will be contacted by CTDPHAS and their wells sampled, as needed.

We have discussed our assessment of the shower exposure, but the available data does not provide evidence that significant exposures occurred. Again, we do not have enough data dating back to when the landfill was operating.

CTDPHAS knew that the community would be frustrated with our conclusions. We understand that we have not been able to answer any of your questions and it is unfortunate that the health assessment process wasn't available when the landfill was operating. Then we would have been able to collect the necessary data to address at least some of your concerns. It is also unfortunate that the environmental laws were not stringent enough to protect your community. From our review of the newspapers, we realize how awful and how stressful it must have been for your community and we really do sympathize with how you feel.

In response to your thoughts that we are in support of the landfill operations, this is not true. But what conclusions can we arrive to, without appropriate environmental data. We cannot assess health risks without knowing what chemicals people were exposed to, how much of those chemicals they were exposed to, and for how long. CTDPHAS and ATSDR are truly sorry that you suffered as much as you did.

You are correct in identifying stress as a health factor. One of the goals of the Health Professionals Environmental Education Project is to make them aware of the Laurel Park site, the contaminants, and their potential health effects. The project encourages health professionals to recognize the need to be aware of the stress among community residents related to the site and to be able to address their patients concerns in ways that help alleviate stress.

COMMENTS RECEIVED ON MARCH 22, 1993 FROM THE LAUREL PARK COALITION, UNIROYAL CHEMICAL, MIDDLEBURY CT.

RE: Written Comments, Public Health Assessment, February 22, 1993

The Laurel Park Coalition (Coalition) has reviewed the Public Health Assessment; Laurel Park Inc.; Naugatuck, New Haven County, Connecticut; CERCLIS No. CTD 980521165; February 22, 1993 prepared by the Connecticut Department of Public Health and Addiction Services (CTDPHAS.) The coalition is providing written comments.

RESPONSE TO COMMENTS RECEIVED ON MARCH 22, 1993 FROM THE LAUREL PARK COALITION, UNIROYAL CHEMICAL, MIDDLEBURY CT.

The authors of the Laurel Park Health assessment thank you for your careful review of the document and for your invaluable comments. CTDPHAS incorporated most of the Laurel Park Coalition comments making changes where necessary. Where changes weren't made in the document, an explanation is provided.

Comment No. 1, page 1, paragraph 1

According to the Feasibility Study prepared for this site, the landfill occupies about 19 acres not 25 acres, and operated from 1949 to 1987 not early 1940's to 1988. this comment also applies to the release.

Response to comment 1, page 1, paragraph 1.

Your comments on the landfill acreage and the years the landfill operated were incorporated into the health assessment.

Comment No. 2, page 1, paragraph 2

According to the Office of the Borough Engineer, borough of Naugatuck, three homes not four have refused to be hooked up to public water.

Response to comment No. 2, page 1, paragraph 3.

The number of homes not hooked up to public water was changed from four to three.

Comment No. 3, page 1, paragraph 3

The information contained in the RI/FS has been supplemented by the Final Pre-Design Report. It is the Coalition's position that this information is sufficient and adequate to fully characterize the site, extent of contamination and the potential migration.

Response to comment No. 3, page 1, paragraph 3

CTDPHAS and ATSDR do not feel that there exists enough environmental data to characterize the on-site contamination, nor the potential migration of site-related contaminants off-site. In addition, CT DPHAS and ATSDR feel that the existing environmental data for the Laurel Park Landfill site and off-site is insufficient and inadequate to assess past, present and future exposure pathways. The data was insufficient to allow us to fully address past and present community concerns.

Comment No. 4, page 1, paragraphs 4 and 6

The landfill is no longer readily accessed. A six-foot high chain link fence has been constructed around much of the site and warning signs posted to minimize access and to try to eliminate trespassing.

Response to comment No. 4, page 1, paragraphs 4 and 6

Your comment on the accessibility of the landfill was incorporated into the health assessment.

Comment No. 5, page 1, paragraph 6

The three homes not connected to the public water supply were offered connection at no cost. They have repeatedly refused connection. The three homes are not located within the ground water contamination influence zone of the landfill. These homes as well as others on Hunter's Mountain use septic systems. It is likely that the contamination in the wells, if any, are from either their septic system of a neighbor's septic system.

Response to comment No. 5, page 1, paragraph 6

Your comment on the three private wells that have chosen not to connect to public water was incorporated into the health assessment. CT DPHAS and ATSDR still feel that these wells need to be tested and will contact these residents to test their wells. Hopefully these residents will choose to have their wells tested.

Comment No. 6, page 1, paragraph 6

The land adjacent to the site has been shown to be uncontaminated. Groundwater east of the landfill property may be contaminated by septic systems. The three homes should be required to hook up to the public water supply.

Response to comment No. 6, page 1, paragraph 6

Again we do not feel that the existing information is sufficient to assess whether or not the surrounding properties are contaminated.

Comment No. 7, page 2, paragraph 3
The site is currently owned by Laurel Park, Inc., a corporation.

Response to comment No. 7, page 2, paragraph 3
Your comment of ownership of the landfill was incorporated.

Comment No. 8, page 2, paragraph 4
The site was only in operation until 1987.

Response to comment No. 8, page 2, paragraph 4
Your comment on the operation date was incorporated.

Comment No. 9, page 3, paragraph 2
The leachate collection system was constructed in 1983, however, the CTDEP did not allow the collection system to flow into the municipal sewers until an additional separate leachate line was installed in December 1989.

Response to comment 9, page 3, paragraph 2
The information of the construction of the leachate collection system was incorporated.

Comment No. 10, pate 4, paragraph 5
The sewer line connecting the leachate collection system to the Naugatuck Municipal Sewage Treatment Plant treatment facility was constructed by the Borough funded by the CTDEP and certain PRP's in cooperation with USEPA.

Response to comment 10, page 4, paragraph 5
The information you provided on the sewer line connection system was not incorporated into the document because it is not relevant to the health assessment.

Comment No. 11, page 4, paragraph 7, bullet 4
These drums which were used as part of the pre-design studies in 1992 have since been properly removed from the site.

Response to comment 11, page 4, paragraph 7, bullet 4
Your comment on the removal of the drums observed on-site during our site visit was added to the health assessment.

Comment No. 12, page 5, line 1, first bullet
These drums which were used as part of the pre-design studies in 1992 have since been properly removed from the site.

Response to comment 12, page 5, line 1, first bullet
Your comment on the purpose of the sewage sludge ash was added to the health assessment.

Comment No. 13, page 5, bullet 6

These drums which were used as part of the pre-design studies in 1992 have since been properly removed from the site.

Response to comment No. 13, page 5, bullet 6

Your comment on the use of the drums and that the drums were properly removed was added to the health assessment.

Comment No. 14, page 5, bullet 9

Two inclinometers not clinometers.

Response to comment No. 14, page 5, bullet 9

The spelling correction was made in the health assessment.

Comment No. 15, page 6, paragraph 4

Long Meadow Pond Brook is correct not Long Meadow Brook Pond.

Response to comment No. 15, page 6, paragraph 4

The correction was made in the health assessment.

Comment No. 16, page 6, paragraph 4

Long Meadow Pond Brook flows along Cobber Avenue not Andrews Avenue and this is a mixed residential/commercial area not residential.

Response to comment No. 16, page 6, paragraphs 5

Your comment on the location of Long Meadow Pond Brook was incorporated and clarified in the health assessment. The unnamed stream flows along Andrews Avenue before it merges with Long Meadow Pond Brook.

Comment No. 17, page 7, items #'s 1 through 6

It is not clear whether these items are currently happening or whether they are due to past activities and are concerns. This should be clarified.

Response to comment No. 17, page 7, items #'s 1 through 6

We have clarified the community concerns. The community's present concerns relate to **both** the landfill's past operational activities, as well as the present environmental condition of the landfill.

Comment No. 18, page 7, first paragraph under Environmental Contamination...

Additional sampling of ground water from monitoring wells was performed during the Pre-Design in 1992, the report should indicate that this additional sampling was performed.

Response to comment No. 18, page 7, first paragraph
Your comment was incorporated into the health assessment.

Comment No. 19, page 9
Why is this page blank? Was part of the report deleted and for what reason?

Response to comment No. 19, page 9
The blank page was the result of clerical error during the formatting of the document. No information from the report was deleted.

Comment No. 20 page 10, line 2
LESI not ESI. The final Pre-Design should be referenced in the Table of References.

Response to comment No. 20, page 10 line 2
The final Pre-Design Report is now referenced in the Table of References. ESI was changed to LESI.

Comment No. 21, page 10, paragraph 1
The direction and orientation of the fractures are away from domestic wells. It is unlikely that contamination from the landfill has migrated to domestic wells. There is no evidence to confirm contamination of domestic wells from the

Response to comment 21, page 10, paragraph 1
CTDPHAS, CT DEP and ATSDR feel that there is no evidence to confirm that the direction and orientation of the fractures are away from domestic wells. Most of the residents in the area were connected to public water because there was enough evidence (see Table 3, and Potential Exposure Pathway, Private wells) that there was a potential for on-site contaminants to migrate into off-site domestic wells.

Comment No. 22, pages 10, 11, 12, 1, 14, 15, and 16
The discussion of ground water contamination is confusing, only Malcolm Pirnie's wells are discussed in detail. No data presented on the NW well series, the BH well series or the newly installed MW series. Does Table 1 only relate to the MP well series? Deep bedrock and shallow bedrock should be defined. How many monitoring wells are installed at the site or off-site? Which monitoring wells are relevant? For instance, MP10 and MP10A are not installed in the same bedrock formation found at the Laurel Park landfill.

We suggest that the RI/FS and Pre-Design Reports be referenced and that only a brief summary be included in the Health Assessment.

Why spend so much time discussing TCDD when it seems that it may never have been accurately identified in samples? This

is misleading and may cause concern on the part of the reader.

The maximum values in Table 1 for Benzene and Toluene occurred in Monitoring Well DEP-5A. DEP-5A was installed through the landfill. Are these values leachate or groundwater?

Why does the first sentence on pg. 11 state that "Table 1 lists contaminants detected during these sampling events above comparison values.", when NA is listed for two compounds? Therefore, all reference to those two compounds should be deleted from the report. For instance benzene has a MCL of 5 PPB.

Are there other possible sources of contaminants, such as septic systems? Table 3 identifies the range detected for tetrachloroethylene as ND-168, however, Table 3-9 of the RI indicates a maximum value of 187. Tables 1, 2 and 4 of the Health Assessment do not indicate any tetrachloroethylene?

Tables 1,2,3, and 4 are not consistent and comprehensive with comparison values. All tables should list all compounds. If a compound was not tested for in one medium that should be indicated. It is not possible to make a meaningful comparison the way the data is presented.

It is inappropriate in a Health Assessment to not clearly identify what was tested, what levels were found and what does it mean. Lead on Table 1 was found as high as 1520 PPB, on Table 2 as high as 4280, not shown on Table 4 and only found at 17 PPB in private wells at Table 3. What is the significance of this ?

Response to comment 22, pages 10, 11, 12, 13, 14, 15, 16

Table 1 summarizes the range of contaminants that were detected in all on-site ground water monitoring wells. The Health Assessment separates the discussion of ground water data into two sections: On-Site Contamination and Off-Site Contamination. These sections discuss the number of ground water monitoring and private wells if they exist. For example if there aren't any off-site ground water monitoring wells than there is no discussion.

Why spend so much time discussing TCDD? TCDD is thoroughly discussed because the local community is concerned that they were exposed to it in ground water. In our discussion, we clearly outlined where TCDD was originally identified and that subsequent analysis by three laboratories never confirmed its presence. We also make it clear that TCDD was never found in any private wells, which is the pathway concern to the residents.

In response to your comment on whether Table 1 lists ground water or leachate, Table 1 lists ground water monitoring data. Leachate contamination is represented in Table 2 entitled "Leachate Contamination".

Those contaminants that were not found above health comparison values were deleted from Table 1.

In response to your comment on the different comparison values, it is ATSDR policy to use the most conservative comparison value that exists for a specific chemical in a specific media (e.g., soil, water, air). This policy is based in part on the changing toxicological data. In order for you to understand the comparison values please refer to the ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS section. This section describes how comparison values are selected, and why.

In response to your comment whether or not the presence of tetrachloroethylene was due to contaminants from septic systems, this is unknown.

In response to your comment as to why there are different concentrations of lead in Tables 1, 2, and 4, lead was found in on-site ground water monitoring wells (see Table 1), and in leachate (Table 2) at different concentrations above comparison values. Lead is not represented in Table 4, because it was not found in surface water. As a rule, chemicals are listed for ground water, soil and air if they are found above comparison values.

The comparison values change with the media (source) because the health threat of a chemical will vary depending on the source of exposure (i.e., soil versus water) and the route of exposure (e.g. inhalation, ingestion and dermal.) Certain chemicals are more toxic if inhaled, others if they are ingested. In addition, exposure doses will vary depending on the media.

Comment No. 23, page 15, first paragraph

Although there is leachate at the overburden bedrock contact at the landfill, the Pre-Design concludes that there is no pathway to residential wells and the statement included in this paragraph should be deleted.

Response to comment No. 23 page 15, first paragraph

Given the complexity of the geology in the site area, and the fact that several of the wells contained compounds (benzene and vinyl chloride) that were found in on-site ground water monitoring wells and leachate, CTDPHAS and ATSDR feel that the potential exists for site related contaminants to impact the residential wells that are still

being used. As public health officials we need to be conservative when we are assessing potential sources of exposure.

Comment No. 24, page 15, second paragraph
b: phenyls not biphenols

Response to comment No. 24, page 15, second paragraph
The spelling corrections were made.

Comment No. 25, page 15, last paragraph
The leachate monitoring station is at the bottom of Andrews Avenue not the top as noted.

Response to comment No. 25, page 15 last paragraph
Your comment on the location of the leachate monitoring station was incorporated into the health assessment.

Comment No. 26, page 17, first paragraph
The QA/QC should have been obtained and reviewed. Drawing conclusions on invalidated date is inappropriate and should be avoided.

Comment No. 27, page 17, first paragraph
The QA/QC should have been obtained and reviewed. Drawing conclusions on invalidated is inappropriate and should be avoided.

Comment No. 28, page 17, paragraph 3
This paragraph should be restated to state that there is no evidence to support TCDD at the landfill since sample cross contamination may have occurred. All reference to TCDD in this report should be deleted.

Response to comments No. 26, 27, and 28 page 17,
We agree that the QA/QC should have been obtained and reviewed, but sometimes they are not available and as such we need to assess the environmental data conservatively in order to protect the public's health. We have discussed the analytical problems associated with the soil data and private well data, etc. and feel comfortable with our conclusions on the data that was available to us.

In response to your comment that we should delete all reference to TCDD in this report, this would only serve your purpose and not the local residents. Despite the evidence indicating that the presence of TCDD was not confirmed on subsequent sampling, this needs to be made clear to the community. TCDD is a very toxic chemical and therefore the detection of TCDD in ground water monitoring wells was quite alarming to the community. Some residents are concerned that they were exposed to TCDD. Therefore, it was necessary

for CTDPHAS and ATSDR to discuss TCDD as thoroughly as possible.

Comment No. 29, page 18, paragraph 4
Chromium VI not Chromium IV

Response to comment No. 29, page 18, paragraph 3
The spelling error was corrected.

Comment No. 30, page 18, paragraph 4
Since there are no records to indicate the level of contamination in historical wastes it is inappropriate to make the statement in the first sentence.

Unsubstantiated observations provided in personal communications without reference to appropriate parameters without reference to time periods are not valid and should be removed or modified to refer to the data and time frame on which they are based.

Response to comment No. 30, page 18, paragraph 4
We feel that eye witness accounts by reputable and highly respected CT DEP personnel are excellent sources of information about the history of disposal and contamination of Laurel Park. Do you have a better explanation as to where approximately one million gallons of sludge and liquid hazardous waste went? If the Laurel Park Coalition has information as to where this waste is please provide this information to CTDPHAS and CT DEP.

Comment No. 31, page 19, Potential Exposure Pathways, paragraph 2
This is the first time that chloride is discussed in the assessment. It was not discussed at all in the Environmental Contamination and other hazards section of the report beginning on page 7 and including Tables 1, 2, 3 and 4. The steep slopes on Hunter's Mountain are salted in the winter months. Could the chloride found in residential wells be from road salt or from septic systems?

Response to comment No. 31, page 19, Potential Pathways, paragraph 2
In response to the discussion of chloride in the pathways section, the chloride was not discussed in the Environmental Contamination section because it was not found above comparison values. In response to your question, "Could the chloride found in the residential wells be from road salt or from septic systems?" Yes, this is possible and we have incorporated this in the health assessment.

Comment No. 32, page 20, first paragraph

This sentence states that residents still use groundwater for bathing or showering. Which residents are identified, all 54 or just the three remaining ?

Response to comment No. 32, page 20 second paragraph

This paragraph discusses how persons with contaminated wells can receive inhalation and dermal exposures to VOCs from bathing and showering. In this situation, past exposures were possible for all residents who had or have private wells in the area. Future exposures are possible to those residents not connected to public water.

Comment No. 33, page 20, second paragraph

Table 3 listed the maximum level of lead as 17 PPB in private wells. No correlation of lead in various sources has been presented in Health Assessment, why mention it in the Potential Exposure Pathway's section?

Response to comment No. 33, page 20, second paragraph

Lead was found above comparison values in private wells and given that lead in drinking water has been found to contribute to fetal and childhood lead poisoning, it is discussed in the pathway analysis section. If during the health assessment process a contaminant is found at levels above health comparison values, and these levels can cause an adverse health effect, it is discussed in the pathway section. Whether or not it correlates to the site is irrelevant.

Comment No. 34, page Ambient Air Pathway

This section seems to address only past ambient air pathway. What is the exposure today both to residents and trespassers? why wasn't methane, a common landfill gas, addressed in the Health Assessment?

Response to comment No. 34, page 20, Ambient Air Pathway

The present exposures to residents and trespassers is unknown given the lack of air monitoring data. The methane sampling was included in the health assessment. CTDPHAS will review the gas monitoring that is planned by the Laurel Park Coalition during the Remedial Design and assess the potential need for methane monitoring in nearby homes.

Comment No. 35, page 21, Surface Water/Leachate Pathways

This section seems to address only the past activity. Is leachate still entering the unnamed stream? Are residents still exposed? The RI on page 7-3 in the Public Health Risk Analysis states -- "Health risks associated with exposure to surface water are expected to be minimal because the contaminants are present at very low levels and the potential for contact is limited." Does the current

assessment agree or disagree? Now that much of the leachate is transported to the Naugatuck Municipal Sewage Treatment Plant, what health risks may be associated with the unnamed stream?

Response to comment No. 35, page 21 Surface Water/Leachate

The ATSDR health assessment differs from the RI/FS Risk Analysis in that it assesses the risks from past exposures. This pathway analysis refers to past exposures. Although much of the leachate is transported to the Naugatuck Municipal Sewage Treatment Plant, during our site visit, CTDPHAS and CT DEP observed and photographed leachate seeps throughout the site. Therefore CTDPHAS and ATSDR are still concerned about persons coming in contact with leachate from the site.

Comment No. 36, page 21, Soil/Dust Pathways

What if any is the potential for exposure today to residents? the landfill is capped and the potential exposure is minimal if at all.

Response to comment No, 36, page 21, Soil/Dust Pathways

According to representatives from the EPA and CTDEP the landfill is not capped to date (10/1993). Therefore, the potential still exists for soil and dust exposures to occur to those persons who trespass on the property.

Comment No. 37, page 22, 23, 24, 25, and 26, Public Health Implications

The Toxicological Implications section of the report does not seem to be complete, for instance, toluene was found at very high levels in monitoring well DEP-5A, but was not discussed. Tetrachloroethylene was never found at the landfill, and only in private wells, which could indicate that it is from other sources. Are there other contaminants identified in private wells but not found at the landfill?

Response to comment No. 37, page 22, 23, 24, 25 and 26, Public Implications

The Toxicologic Implications section does not discuss toluene or arsenic because **they were not detected** in private drinking water wells. Only those contaminants identified in private drinking water wells are discussed. This is an ATSDR policy decision.

In response to your comment on tetrachloroethylene in private wells, if during the health assessment process a contaminant is found in drinking water wells at levels above health comparison values, it is discussed in the Toxic Implications section.

Comment No. 38, page 22, Fish Pathways paragraph

Methane was not discussed in any other sections of the report, not even the section on Ambient Air pathway. Why mention it in this section, particularly if it doesn't bioaccumulate in fish? Where is Meadow Brook Stream? Are there other sources of influence to Long Meadow Pond Brook? Refer to page 4-10 of the RI.

Lead and other metals were detected in Long Meadow Pond Brook? Should people be warned not to fish there?

Response to comment No. 38, page 22, Fish Pathways paragraph

The discussion on methane was added to the surface water and sediment paragraph in the Off-site Contamination section. The fact that it doesn't bioaccumulate in fish is expressed in the Fish Pathways paragraphs. In response to the biaccumulation of metals. The material you referenced was included in our discussion.

We do not feel that the lead from the contaminated sediments is cause for concern because it is most likely the inorganic form of lead. In order for lead to bioaccumulate in fish it has to be in the organic form, which is rarely found.

Comment No. 39, page 27, Health Outcome Data Evaluation

Why is inhalation exposure due to burning specifically addressed when records also indicate the groundwater contamination and exposure to dust may have occurred?

Response to comment No. 39. page 27, Health Outcome Data Evaluation

Your comment on the many exposures was incorporated into the health assessment. Thank you.

Comment No. 40, page 27, 28 and 29, Community Health Concerns Evaluation

It is not clear whether the concerns addressed are current or due to past problems. Is leachate still flowing into the unnamed stream?

The three residences still on private wells may be impacted from other sources, possibly their own septic systems or their neighbor's.

Are there still complaints about odors from the landfill? What comparison has been made, if any, concerning ambient air in an urban environment to odors or volatiles assumed to occur from the landfill.

Comment No. 41 page 30, Recommendation 2

The three residences still on private wells are going to be contacted by the CTDPHAS. CTDPHAS has plans to test these

wells and assess the water quality. The presence of septic systems at these homes will also be evaluated. However, if these wells contain site-related contaminants we will contact CTDEP, the local health department and the EPA Regional Project Manager for Laurel Park, Almerinda Silva. If the wells are found to be contaminated they will have to be monitored and steps will be taken to remove this exposure from the residents.

The three remaining private wells may be impacted from contaminants from off-site sources as well as from the site. Since a public water supply is available, it would seem prudent to have them hook up rather than spend the State's money to investigate the wells. If they are not impacted today, would they be impacted tomorrow from the off-site or other sources, for how long will the State investigate these wells.

Response to comment 40, page 27, 28 and 29, Community Health Concerns Evaluation and Comment No. 41, page 30, Recommendation 2

The community health concern sections addresses both past present and future health concerns that residents have.

CTDPHAS has received reports that leachate is still seeping into the unnamed stream. In addition, during our site visit we observed numerous leachate seeps throughout the site.

The concerns of the surrounding community are discussed in the Community Concerns Section. CTDPHAS has not received complaints from residents concerning odors.

Comment No. 42, page 34

The Pre-Design Report was referenced on page 10 of the Health Assessment and should be included in the Reference List.

Response to comment No. 42, page 34

The Final Pre-Design Report was included in the Reference list.