

Health Consultation

IMPERIAL OIL COMPANY, INCORPORATED/
CHAMPION CHEMICALS

MORGANVILLE, MONMOUTH COUNTY, NEW JERSEY

CERCLIS NO. NJD980654099

FEBRUARY 19, 1999

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation 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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HEALTH CONSULTATION

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CHAMPION CHEMICALS**

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CERCLIS NO. NJD980654099

Prepared by:

**Hazardous Site Health Evaluation Program
Consumer and Environmental Health Service
Division of Environmental and Occupational Health
New Jersey Department of Health and Senior Services
Under Cooperation Agreement with the
Agency for Toxic Substances and Disease Registry**

BACKGROUND AND STATEMENT OF ISSUES

Statement of Issues

This health consultation will evaluate the public health significance of an assumed exposure pathway associated with an off-site area at the Imperial Oil Company site. The pathway specifically examined is the ingestion of PCB and arsenic contaminated soil or sediments, by residents utilizing the Birch Swamp Brook. Health effects in both adults and children will be evaluated.

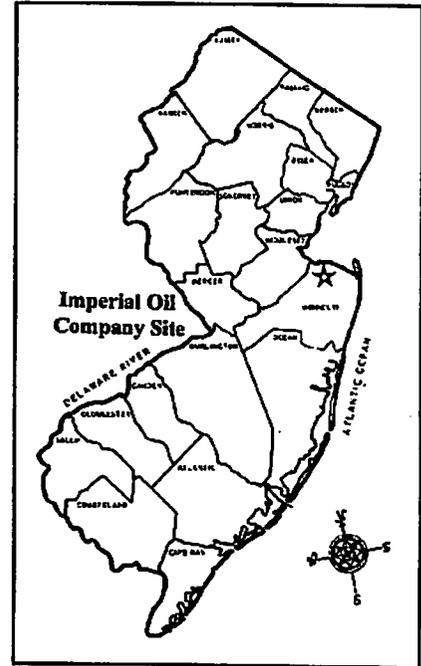
Background

The Imperial Oil Company site (IOC) is located in the Morganville section of Marlboro Township, Monmouth County, New Jersey (Inset). The IOC site is a triangular shaped property of approximately 15 acres. It is bounded to the north by Birch Swamp Brook, to the east/southeast and the south by several private residences, and to the west by a Central Railroad right of way. The Birch Swamp Brook flows through the site and approximately 1.2 miles north to Lake Lefferts (Figure 1). Lake Lefferts is used for swimming, fishing and other recreational purposes. The total human population within one mile of the site is approximately 3,321 (Figure 2).

The IOC is an active facility, currently consisting of storage and maintenance buildings, and above ground storage tanks.

Since 1912, the IOC site has been used by a variety of commercial operations. During the period from 1912-1917, it was occupied by a tomato paste and ketchup manufacturer. The site was then occupied by the Stratford Chemical Company (later Bocker Chemical Co.) from 1917 to 1944. During that time these chemical companies manufactured calcium arsenate. This calcium arsenate operation is considered to be the primary source of high levels of arsenic present in on-site and off-site soils. From 1944-1949, S.B. Pennick & Co. produced flavors and fragrances at the location of the IOC site. In 1950, the site was acquired by the Champion Chemicals Company (CC), which commenced oil reclamation operations.

The Imperial Oil Company began leasing the property in 1969. They conducted an oil blending operation on the site. The combined activities of both companies, IOC and CC, produced the following waste products: wash water, waste oils, sludges, and oily filter clay. As a result, on-site soils were contaminated with petroleum hydrocarbons, lead, barium, arsenic, and polychlorinated biphenyls (PCB's). Off-site soil and sediment samples from the adjacent wetlands area exhibit significant concentrations of petroleum hydrocarbons, PCB's, lead and arsenic.



The Remedial Investigation/Feasibility Study (RI/FS) for the IOC site was initiated in the summer of 1986, with Phase I field work conducted in winter of 1987, and Phase II field work conducted in 1989-1990⁽²⁾. The Record of Decision (ROD) defining the selected remedy for off-site soils was signed in September 1990⁽¹⁾. The selected remedy included the installation of fencing along the perimeter of the site to restrict access, excavation and off-site disposal of approximately 3,700 cubic yards of contaminated soils, restoration of affected wetlands, and delineation of contaminated soils in off-site areas. The ROD for groundwater remediation was signed in September 1992, and the removal of floating product is ongoing. Delineation of off-site contamination occurred in the 3rd and 4th quarters of 1994. Five rounds of sampling indicated that contaminants, particularly arsenic, are more widespread than originally anticipated. Approximately 4 acres were addressed by the 1990 ROD, but the study area now encompasses approximately 25 acres, and additional characterization activities are continuing. Data collected indicate site-related contaminants have migrated along a surface water feature (Birch Swamp Brook) as far as Lake Lefferts which is located in Matawan Borough, approximately 1.2 miles downstream from the IOC site.

A Phase II of RI/FS for the IOC site was conducted in 1989 and 1990 and was designed to further delineate the distribution of contaminants identified on the site during Phase I.

Phase III of RI/FS for the IOC site, performed in 1994 and 1995, was designed to fill data gaps from earlier investigations. Sampling conducted by the New Jersey Department of Environmental Protection (NJDEP, December 1994) included residential properties, and indicated arsenic levels above NJDEP cleanup criteria (20 mg/kg residential), with one residential property exhibiting one stream bank sample at 9,460 mg/kg at 1-2 feet below grade (fbg). The NJDEP applied to the United States Environmental Protection Agency (USEPA) for a removal action of this "hot spot" contamination at this residence, but it did not qualify for a removal action due to the remoteness and depth of the contamination.

The final Remedial Investigation and the draft Feasibility Study reports were issued in December 1996⁽³⁾ and August 1998⁽⁵⁾, respectively.

Two additional Field Sampling and Analysis Reports have been issued by the NJDEP in connection with the site. The first concerned additional sampling around the residential properties on Orchard Street (April 1997)⁽⁴⁾. The second report included additional sediment sampling along the length of the Birch Swamp Brook (January 1998)⁽⁶⁾. The U.S. Geological Survey issued a report titled "Arsenic and Metals in Soils in the Vicinity of the Imperial Oil Company Superfund Site" (May 1998).

Past ATSDR/NJDHSS Activity

The NJDHSS prepared a Health Assessment for the IOC site in July 1990⁽⁷⁾. At the time, the site was evaluated to present a public health concern on the basis of unrestricted access to, and the need for further characterization of, contaminated off-site areas, and data gaps with regard to potable wells

in the area. Subsequent to the health assessment, activity by the NJDEP has addressed these issues in a manner consistent with protection of the public health.

The NJDHSS prepared a site review and update (SRU) for the IOC site in April 1993 which identified remedial progress at the site⁽⁸⁾. The SRU concluded that the site influenced area water resources (groundwater, surface water, wetlands), and that the site should be monitored in that context.

Both of the above referenced evaluations were based upon the Operable Unit 1 Remedial Investigation and Record of Decision, prior to the 1994 off-site characterization activities.

The NJDHSS prepared a Health Consultation on April 5, 1995⁽⁹⁾. This consultation evaluated the nature and magnitude of potential health effects to residents exposed to arsenic in surface soils. NJDHSS recommended that remediation of the property with the highest arsenic level occur at the earliest opportunity, an exposure investigation be conducted, and a need for further off-site characterization.

ATSDR/NJDHSS evaluated an exposure investigation (June 8, 1995) performed by the Monmouth County Health Department⁽¹⁰⁾. Residents living near the IOC site were evaluated for arsenic exposure. This investigation indicated that none of the residents tested showed exposure to significant levels of arsenic.

A data review was conducted on sample data collected in Lake Lefferts and supplied by NJDEP (August 24, 1995)⁽¹¹⁾. The review noted that there were no risk of non-carcinogenic effects at the contamination levels found in the lake. Arsenic levels in the more frequently used areas of the lake were essentially at background.

The NJDHSS prepared an issue of Health and Hazardous Waste (December 1995) to specifically deal with arsenic and arsenic contamination at the IOC site⁽¹²⁾. This guide was mailed to all physicians in Monmouth and surrounding counties.

Site Visit

On January 22, 1998, J. Pasquale and J. Winegar of the New Jersey Department of Health and Senior Services (NJDHSS) visited the Imperial Oil Company (IOC) site accompanied by a representative of the New Jersey Department of Environmental Protection (NJDEP). A Representatives of the ATSDR also participated in the site visit. The following observations were made during the January visit:

- The IOC site is an active facility that appears to be in a "run down" condition. The active industrial area is about 3 acres. The main production buildings were surrounded by a chain

link fence with unguarded gate. The area is not restricted and is potentially accessible to trespassers.

- Two large off-site areas, Area 1 and 2, are known to be contaminated by dumping of waste oil. These areas were fenced at the time of our visit; making trespassing difficult.
- Small rivulets cut in the sand, in an inactive area south of the fire pond, indicated that surface water from this area runs off into the fire pond.
- It had rained recently and there was no evidence of any human trespassing near the fire pond. Deer tracks were seen in nearby sand/mud, opening the possibility that hunters may utilize the site.
- The Birch Swamp Brook was investigated at several locations between the site and Lake Lefferts. The brook was mostly inaccessible during its whole length from the site to Lake Lefferts. The inaccessibility of the brook is largely due to heavy underbrush on both sides and/or steep banks in many locations. Under these current conditions, it appears unlikely that the brook would be used or frequented by adults or children in the area.
- The Birch Swamp Brook does not appear to have the capacity to support fish large enough for consumption by fishermen.

DISCUSSION--Child and Adult Public Health Issues

This section contains discussion of the health effects in persons exposed to PCB and arsenic contaminated soil or sediments associated with the Birch Swamp Brook. Health effects in both adults and children will be evaluated. The PCB levels used in this health consultation are from the NJDEP field sampling (January 1998) of off-site areas at and adjacent to the Birch Swamp Brook. The arsenic levels used in this health consultation are from the NJDEP field sampling study of on and off-site areas (October 1995)⁽²⁾.

Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are potentially more likely to have associated illnesses or disease.

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimal Risk Level (MRL) and the USEPA's Reference Dose (RfD)⁽¹⁴⁾. When exposure (or dose) is below the MRL or RfD then non-cancer, adverse health effects are unlikely to occur⁽¹³⁾.

MRL's are developed for each type of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRL's in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effect of the contaminants detected in the environmental media have been considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

PCB Exposure

Residents visiting the brook may be exposed to PCB contaminated surface soils and sediments. Exposure doses for PCB's and subsequent lifetime excess cancer risk estimates (LECR's) were calculated based upon the maximum reported concentration of 118.9 mg/kg (at 0-6 inches). (Note: ATSDR and the NJDHSS consider surface soils to be 0-3 inches in depth)⁽¹³⁾.

The toxicological evaluation of the completed exposure pathway at the IOC site is based upon an adult exposure duration of forty (40) years, and a duration of ten (10) years for children. Exposure dose calculations were based upon the maximum concentrations detected, thus representing a worst case exposure scenario.

To estimate exposure doses of persons utilizing the site, the following assumptions were made: adults had a body weight of 70 kg, the site was visited 2 times per week for a period of eight months per year, and an ingestion rate of 100 mg/day. For children, the following assumptions were made: that the site was visited by children with a weight of 20 kg 2 times per week for a period of eight months per year, and that they would ingest 200 milligrams (mg) of soil during each visit.

ATSDR has established a minimal risk level (MRL) for chronic oral exposure to PCB's (duration > 1 year) of 2.0×10^{-5} mg/kg/day. An MRL is defined as an estimate of daily human exposure to a chemical that is likely to be without an appreciable risk of adverse non-carcinogenic health effects over a specified duration of exposure.

At the maximum concentration of PCB's detected (118.9 mg/kg), estimated exposure doses for adults of 1.7×10^{-5} mg/kg/day is below the chronic oral MRL for PCB's. At such concentrations non-carcinogenic health effects among adults are not generally expected. However, for children, estimated exposure doses of 2.14×10^{-4} mg/kg/day would exceed the chronic oral MRL. Exposure doses in adults and children do not exceed the no observed adverse effect levels (NOAEL's) for chronic exposure in humans (for effects other than cancer) cited in the ATSDR Toxicological Profile for PCB⁽¹⁶⁾. The USEPA has determined that PCB's are probable human carcinogens.

Carcinogenic risk based upon calculated exposure doses is estimated to range from no apparent increased risk (adults) to low increased risk (children).

PCB contaminated water and sediment can result in contamination of fish. PCB concentrations in bottom dwelling fish are slightly higher than in other fish. There does not appear to be fish of eatable size in the brook.

Arsenic Exposure

Data generated during the additional off-site characterization provided by the NJDEP (October 1995)⁽²⁾ show widespread low level arsenic contamination along the Birch Swamp Brook. Arsenic concentration in surface soil (0 - 6") ranged from 1.2 mg/kg to approximately 90.8 mg/kg

To evaluate the public health significance of these data, exposure doses for inorganic arsenic and subsequent lifetime excess cancer risk estimates (LECR's) were calculated based upon the maximum concentration of 90.8 mg/kg. The human exposure pathway is assumed to be the ingestion of arsenic contaminated soils. Toxicological estimates used were the same as those used for PCB exposure (see above).

ATSDR has established a minimal risk level (MRL) for chronic oral exposure to arsenic (duration > 1 year) of 3.0×10^{-4} mg/kg/day, which is equivalent to the USEPA chronic oral reference dose.

At the maximum concentration of inorganic arsenic detected (90.8 mg/kg), estimated exposure doses for adults of 1.3×10^{-4} mg/kg/day is below the chronic oral MRL for arsenic. At such concentrations non-carcinogenic health effects among adults are not generally expected. However, for children, estimated exposure doses of 3.27×10^{-3} mg/kg/day would exceed the chronic oral MRL. Estimated exposure doses for children are above the NOAEL for gastrointestinal, hematological, dermal/ocular and neurological effects cited in the ATSDR Toxicological Profile for Arsenic⁽¹⁵⁾.

Studies have shown that arsenic is a human carcinogen, and is so classified by the USEPA. Carcinogenic risk based upon calculated exposure doses is estimated to range from low increased risk (adults) to moderate increased risk (children).

CONCLUSIONS

Evaluation of Nature and Magnitude of Health Risks

There are areas of documented off-site soil contamination in the Birch Swamp Brook area near the IOC site. Residents living near the site and utilizing the brook may have been exposed to PCB and arsenic contaminated surface soils. Health risks can be estimated for the potential exposure pathway

associated with ingestion of contaminated surface soil. The following conclusions were made regarding contaminant exposure to residents living near the IOC site:

1. The Birch Swamp Brook area near the IOC site is evaluated by the ATSDR/NJDHSS to represent no apparent public health hazard in the past and present, based on available data and information and under current site conditions. Adults utilizing the site were not likely to have been exposed to PCB's or arsenic contamination at concentrations sufficient to constitute a public health hazard. Using calculations and assumptions based on a worst case scenario, children may be exposed to levels of PCB or arsenic that may pose a public health hazard. It is important to note, however, that while the MRL's for children were approached and/or slightly exceeded, under current site conditions it would be unlikely that children would come in contact with these contaminants often enough to result in an exposure dose of public health significance.
2. Although ATSDR/NJDHSS does not believe that current or past exposures to contaminated sediments are likely to result in exposures at levels of health concern, future land use changes or other changes at the site could render the contaminants in the sediment more accessible to children who may play in these areas. Therefore, additional measures need to be undertaken that would reduce the likelihood of these potential future exposures.
3. Most of the off-site areas associated with IOC site, including the Birch Swamp Brook, have been adequately characterized to completely determine public health implications. The Birch Swamp Brook does not appear to support species of edible fish. Lake Lefferts biota were last sampled in 1993, and evaluated under a separate consultation (Reference #11). Lake Lefferts continues to support recreational fishing activity. Additional sampling of Lake Lefferts biota should be considered to establish contaminant concentration trends whether the result of site related contamination, or as the result of other sources.

RECOMMENDATIONS

Cease/Reduce Exposure

1. To reduce the potential for future exposures to contaminated sediments from Birch Swamp Brook, additional remedial or other measures, that render the contaminants inaccessible, should be performed.
2. Utilization of optimal dust control measures during remediation of the brook, is desirable due to the nature and extent of soil contamination.
3. New environmental, toxicological, health outcome data, or changes in conditions as a result of implementing the proposed remedial plan, may determine the need for other additional actions at this site.

Site Characterization

1. Prevent further off-site migration of PCB's and other toxic substances from the Birch Swamp Brook to Lake Lefferts.
2. Edible fish, particularly bottom feeding species, from Lake Lefferts should be sampled to determine suitability for human consumption.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Imperial Oil Company site contains a description of the actions to be taken at or in the vicinity of the site. 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 and NJDHSS to follow-up on this plan to ensure that it is implemented. ATSDR will provide an annual follow-up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this Health Consultation, and will be provided to persons who request it. The public health actions taken or to be implemented are as follows:

Actions Undertaken by ATSDR/NJDHSS:

1. These data and information developed in the Health Consultation have been evaluated by ATSDR/NJDHSS to determine public health concerns, regarding potential human exposure pathways associated with the Imperial Oil Company site.
2. The NJDHSS has prepared an issue of Health and Hazardous Waste (December 1995) to specifically deal with PCB and arsenic contamination at the IOC site. This guide was mailed to all physicians in Monmouth and surrounding counties.

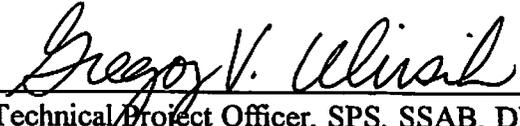
Actions Planned

1. An assessment of the need for community education is planned. The NJDHSS will contact local health officials and community leaders to assess community needs. Site-specific educational materials will be prepared and disseminated.
2. Additional health care provider education at the site may be conducted by the NJDHSS, as needed. This would include direct mailings to area physicians, school nurses, and others identified by the community and local health department.

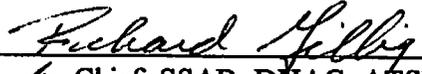
3. **The NJDHSS and/or ATSDR will reevaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.**

CERTIFICATION

The Health Consultation for the Imperial Oil Company site was prepared by the New Jersey Department of Health and Senior 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 health consultation was initiated.


Technical Project Officer, SPS, SSAB, DHAC

The Superfund Site Assessment Branch (SSAB), Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.


for Chief, SSAB, DHAC, ATSDR

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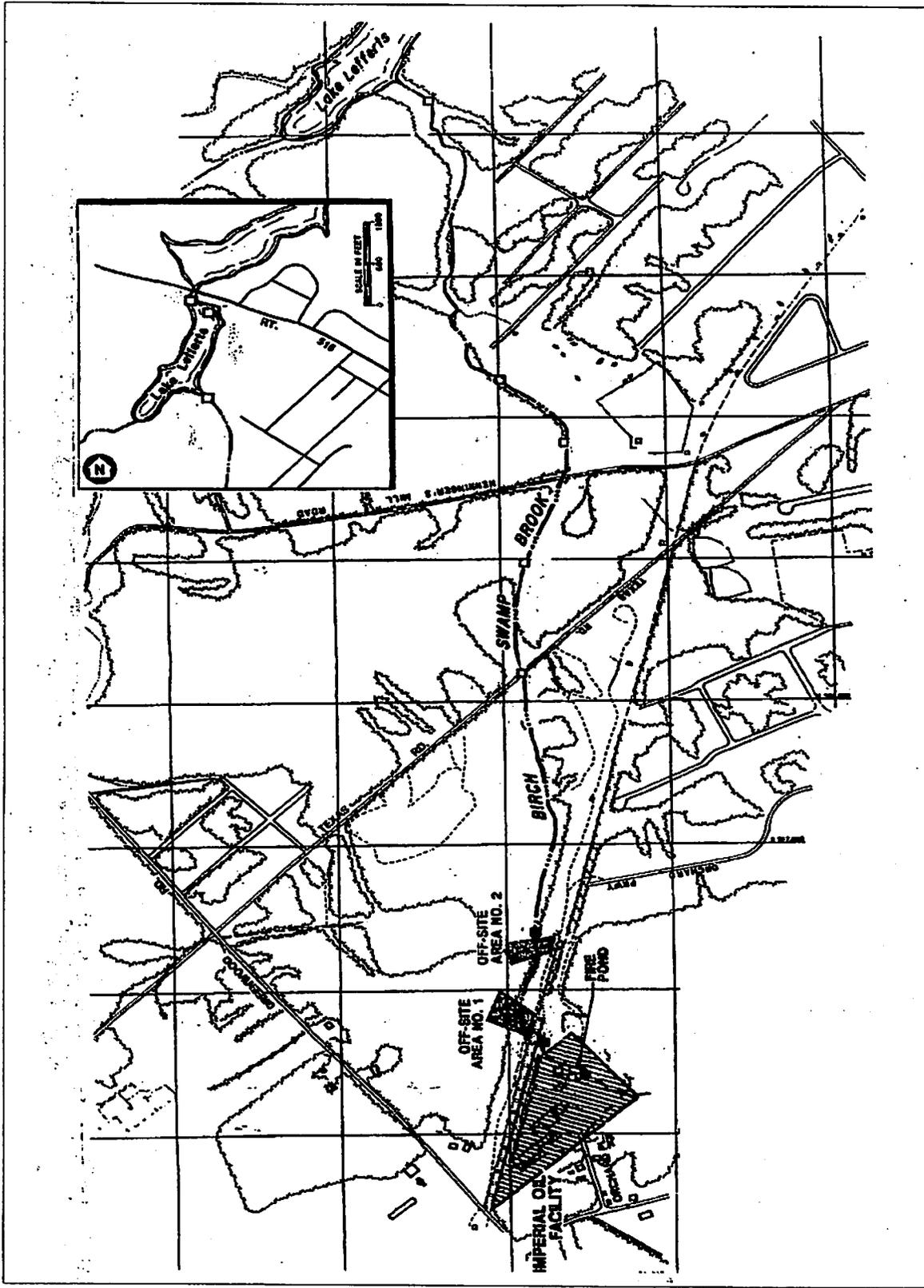


Figure 1 - Site Location Relative to Birch Swamp Brook.

Figure 2 - Demographic Data.

