

Public Health Assessment (Addendum)

A. O. Polymer

Sparta Township, Sussex County, New Jersey

Cerclis No. NJD030253355

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Environmental Health Service

Under Cooperative Agreement With:
The Agency For Toxic Substances And Disease Registry

TABLE OF CONTENTS

Summary	1
Background	3
A. Site Description And History	3
B. Site Visit	5
C. Demographics, Land Use, And Natural Resources Use	6
D. Health Outcome Data	8
Community Health Concerns	8
Environmental Contamination And Other Hazards	9
A. On-Site Contamination	11
B. Off-Site Contamination	14
C. Quality Assurance And Quality Control	17
D. Physical And Other Hazards	18
E. Toxic Chemical Release Inventory Data	18
Pathways Analysis	18
A. Completed Exposure Pathways	19
B. Potential Exposure Pathways	19
Public Health Implications	23
A. Toxicological Evaluation	23
B. Health Outcome Data Evaluation	25
C. Community Health Concerns Evaluation	25
Conclusions	27
Recommendations	28
Health Activities Recommendation Panel (HARP) Statement	29
Public Health Action Plan	29
A. Public Health Actions Taken	29
B. Public Health Actions Planned	29

Preparers Of Report	30
References	31
Appendices	33

SUMMARY

The A.O. Polymer site is an inactive resin and plasticizer manufacturing plant, approximately four acres in size, located at 44 Station Road in the Township of Sparta, Sussex County, New Jersey. The site is bounded to the north and east by Station Park, a municipal recreation area, to the southeast by Station Road, and to the south and west by the New York, Susquehanna and Western Railway (NYS&R). Several small businesses and three homes are located near the site on the Station Road. The Sparta High School is approximately one-half mile to the north-northeast and a private gun club is located 500 feet northwest of the site. The Wallkill River flows 500 feet southeast of the site.

In 1973, residents began to complain of chemical odors in domestic well water and air. In December 1978, the Sparta Health Department and the New Jersey Department of Environmental Protection (NJDEP) conducted an investigation of the site and began collecting water samples from domestic potable wells in the vicinity of the site. Analysis of these water samples revealed the presence of volatile organic compounds in three private domestic wells located along Station Road. In January 1980, these homes were connected to the public water line.

A partial remediation of the site was performed in 1980 through 1981 by the NJDEP. The site was placed on the National Priorities List on September 1, 1983. The Remedial Investigation and Feasibility Study was completed in April 1991. Volatile organic compounds have been detected at levels of public health concern in on-site soils and groundwater. In 1991, the United States Environmental Protection Agency (USEPA) assumed the site from the New Jersey Department of Environmental Protection (NJDEP). A Record of Decision (ROD) was signed by the USEPA on June 28, 1991, detailing the final remedy for remediation of soil and groundwater contamination. Activities described in the ROD include the treatment of the contaminated groundwater and remediation of the on-site subsurface soil, the source of groundwater contamination.

The A.O. Polymer facility has been the subject of numerous complaints to local health authorities throughout its operational history. The community concerns associated with the site centered on the chemical odors emanating from the site, and the possibility of future exposures to site related contaminants and health problems. Just prior to the cessation of plant operations, a fire occurred at the site.

Municipal water supplies have been available to residents since 1980. A total of about 70 people may have been exposed to contaminated groundwater in the past, including the residents and workers on Station Road and the A.O. Polymer employees. The site is no longer an active production facility.

Based on current site data and information, the NJDOH and the ATSDR consider the A.O. Polymer site to currently present no apparent public health hazard as site conditions have changed due to numerous removal actions, and on-going treatment of residual soil contamination between

10 to 20 feet below the former disposal lagoons with a vapor extraction system. These contaminants, currently being removed by this system, are the source of groundwater contamination. Access to all buildings on the A.O. Polymer property has been secured by USEPA eliminating the physical hazards to trespassers. The odor complaints have been eliminated by the on-going remediation at the site.

The A.O. Polymer site has been evaluated to represent a public health hazard in the past based upon toxicological analyses of human exposure to contaminants in domestic well water.

Health outcome data for the site were not reviewed because the population size was too small for the application of relevant data bases to yield statistically significant results. The Health Activities Recommendation Panel (HARP) determined that no follow up actions are indicated at this time. According to the Public Health Action Plan, the ATSDR will reevaluate the site annually for any indicated follow-up. The New Jersey Department of Health (NJDOH) conducted a comment period for the Public Health Assessment Addendum for the A.O. Polymer site from March 28, 1994 to April 29, 1994. The Public Health Assessment Addendum was placed in local repositories to facilitate commentary and reaction from the public at large.

BACKGROUND

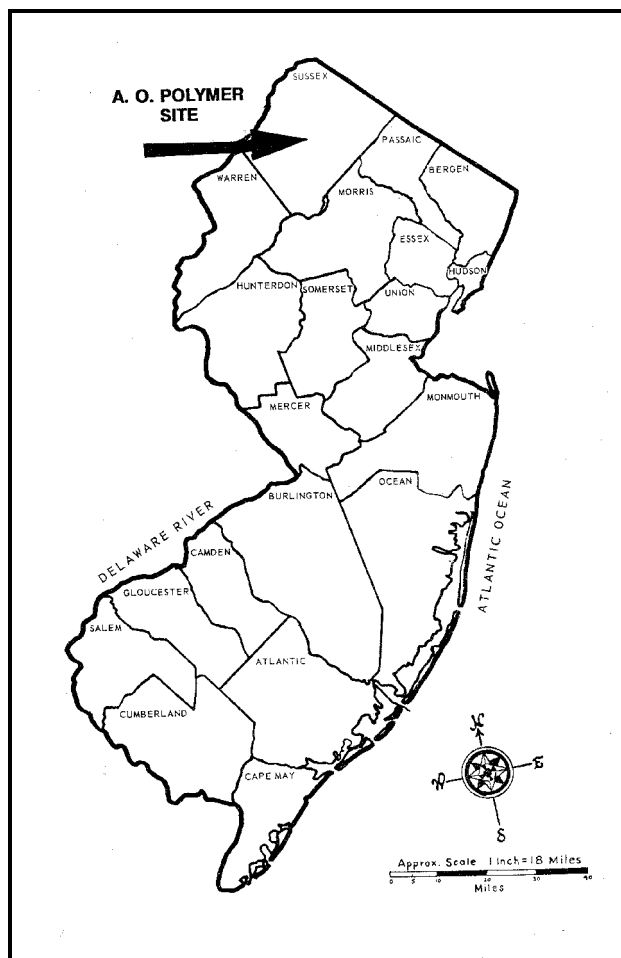
In cooperation with the New Jersey Department of Health (NJDOH), the Agency for Toxic Substances and Disease Registry (ATSDR) will evaluate the public health significance of this site. More specifically, ATSDR will determine whether health effects are possible and will recommend actions to reduce or prevent possible health effects. ATSDR, located in Atlanta, Georgia, is a Federal agency within the U.S. Department of Health and Human Services and is authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, to conduct public health assessments at hazardous waste sites. This evaluation is intended to addend the A.O. Polymer Health Assessment of August 3, 1990 (**Appendix A**).

A. Site Description And History

The four-acre A.O. Polymer site is an inactive industrial operation located in Sparta Township, Sussex County, New Jersey (see inset). It is situated in a semi-rural area near the Wallkill River, about one-quarter mile from the commercial district of Sparta and one-half mile from the Sparta High School. The site is bounded to the north and east by Station Park, a municipal recreation area, to the southeast by Station Road, and to the south and west by the NYS&W railway. A road through the site provides for access to a gun club. A wetland area is located about a quarter of a mile northeast of the site.

From the early 1960's until 1977, the plant was owned and operated by Mohawk Industries Inc. In 1977, the facility was purchased by the A.O. Polymer Corporation. Some of the manufacturing/mixing processes of Mohawk Industries were continued by A.O. Polymer (e.g., the production of specialty polymers, plasticizers, paper coatings, as well as polyketone and acrylic resins).

A.O. Polymer was identified as a source of environmental contamination and was the subject of water quality and odor complaints for approximately fifteen years. In the late 1970's, the A.O. Polymer Corporation accepted waste circuit board cleaner solvents



and freon isopropyl alcohol for recycling. Subsequently, the United States Environmental Protection Agency (USEPA) has identified IBM (International Business Machines) as being a potentially co-responsible party along with A.O. Polymer Corporation.

The first complaints of odors in domestic well water and air were made by an area resident in 1973. Complaints intensified in 1978 and resulted in an investigation by the Sparta Health Department and the New Jersey Department of Environmental Protection (NJDEP). Samples from off-site potable wells demonstrated contamination with VOCs. In 1980, NJDEP began investigating reports of drum stockpiling at the site. These investigations identified on-site waste disposal and storage practices as the source of the groundwater contamination. Waste handling practices included disposal of liquid chemical waste into unlined lagoons (northern portion of property), improper storage of deteriorating drums and the burial of crushed and open drums containing waste materials. Suspected pollutants included numerous VOC's, phenols, phthalate esters, acetone, freon, and formaldehyde.

An extensive remediation was performed between 1980 and 1981 by the NJDEP which included the removal of surface drums and the excavation and removal of contaminated soil in the lagoon area to a depth of approximately 10 feet. After excavation of this lagoon area, the area was backfilled with clean soil. This cleanup resulted in the removal of 1,150 drums, 1,700 cubic yards of contaminated soils, and 120 cubic yards of crushed drums and debris. In addition, 86 drums of waste alcohols were voluntarily removed by the responsible party in October 1981. In 1982, NJDEP's Division of Water Resources installed eleven monitoring wells. The site was included on the National Priority List in 1983.

The Occupational Safety and Health Administration (OSHA) investigated the A.O. Polymer site from April to August 1983, as a result of a referral regarding exposure of workers to toluene diisocyanate (TDI), formaldehyde, and resin dust. As a result of this investigation citations were issued to A.O. Polymer for failure to: 1) Maintain a clean and orderly workplace; 2) Provide eye drenching facilities for the laboratory workers; and 3) Provide training to workers on fire management.

Throughout this period, A.O. Polymer was the focus of a variety of regulatory actions by Local, State, and Federal authorities. A.O. Polymer was cited by the NJDEP for failing to have a State discharge permit for process water discharged to the on-site cooling pond in November 1981. In January 1982, the NJDEP issued a directive order to redress a situation by which plant waste water was being discharged into the plant septic system. This was dropped when A.O. Polymer insisted that the cooling pond was lined and was only used to recycle cooling water for the reactor. As a result of odor complaints, the NJDEP's Division of Air Quality issued three administrative orders to A.O. Polymer to come into compliance with air quality standards. The site was transferred to NJDEP's Division of Hazardous Site Mitigation in 1984. In 1986, a contract was issued to a private consulting company for a Remedial Investigation and Feasibility Study (RI/FS).

The Sparta Fire Department documented numerous violations of the fire code by A.O. Polymer. As a partial response to these violations, the Sparta Emergency Management Program was established on April 3, 1989. An emergency response program was developed to help the community deal with an industrial accident/fire scenario. In 1991, the United States Environmental Protection Agency (USEPA) assumed the site from the New Jersey Department of Environmental Protection (NJDEP). A Record of Decision (ROD) was signed by the USEPA on June 28, 1991, detailing the final remedy for remediation of soil and groundwater contamination. Activities described in the ROD include the treatment of the contaminated groundwater and remediation of the on-site subsurface soil, the source of groundwater contamination.

On July 21, 1993, a public meeting was held to determine if a nearby site was suitable to build a new school. Although it was determined that there would be little likelihood that there would be any danger from the A.O. Polymer site, the school board decided in favor of another site to avoid the public concern. Just prior to the cessation of plant operations, a fire occurred (October 1993).

By December 7, 1993, an estimated 23,620 gallons of hazardous waste liquids and 100 cubic yards of non-hazardous solids were removed from the facility by A.O. Polymer Corporation under USEPA oversight. Under a follow-up USEPA response action, additional materials including 11 (55 gallon drums containing lab-pack containers), 8 (1 cubic yard hazardous materials boxes), and 61 (55 gallon and 85 gallon containers of material) were segregated and removed from a shed located on the adjoining rail road property by USEPA in June of 1994. On-going remediation at the site since these two removal actions have resulted in the removal of an additional 6024 gallons of liquid hazardous waste, 60 cubic yards of asbestos, 74 drums of solid waste, and 13 drums of contaminated soils.

Under USEPA's long term cleanup plan, a Soil Vapor Extraction system has been built and placed into operation at the site to eliminate residual soil contamination between 10 to 20 feet below the former disposal lagoons. These contaminants, currently being removed by this system are the source of groundwater contamination. Construction of Soil Vapor Extraction system was completed in November 1994 and the system has captured over 700 gallons of contaminants from the soils below the former lagoon area. A groundwater remediation system is currently under design.

B. Site Visit

The New Jersey Department of Health (NJDOH) has conducted several site visits at the A.O. Polymer facility starting in 1988. The most recent site visit was conducted on May 11, 1995, by Bruce Wilcomb and Narendra P. Singh of the NJDOH accompanied by the USEPA Remedial Project Manager, On-Site Coordinator (Removal Action Branch - USEPA), NJDEP Case Manager (Bureau of Federal Case Management) and the Health Officer of Sparta Township Health Department. The site visit included a formal presentation by the USEPA. Conditions at the A.O. Polymer site have changed considerably due to on-going remedial activities and the cessation of operations at the A.O. Polymer facility. Odors were not detected off-site during the

site visit. No noticeable odors were detected on-site. Under USEPA's long term cleanup plan, a soil vapor extraction system has been built and placed into operation at the site to eliminate residual soil contamination between 10 to 20 feet below the former disposal lagoons. These contaminants, are the source of present groundwater contamination. A groundwater remediation system is currently under design. On-going groundwater sampling and analysis by USEPA shows decreasing concentrations of contaminants since the installation of the soil vapor extraction system. The groundwater treatment system is expected to be installed by summer of 1996.

The following observations were made during the site visit:

- The A.O. Polymer site is situated at the end of a short side road leading from Main Street. There are several residences, a few small businesses, and a town recreation area close to the site. The principal features of the site are the railroad tracks bordering one side, and a steep but negotiable embankment along the other side of the plant area. The facility resides largely on dirt and sparse grassy areas;
- Several buildings occupy the site and approximately 10 storage tanks have been cleaned of sludge are located on-site. Excavated underground storage tanks were observed on site;
- The new soil vapor extraction system has been installed in the area of former lagoon;
- The site is fenced with an entrance gate along the eastern site boundary, and is also fenced along northern side facing the Station Park. The site is posted with no trespassing and hazard signs. The site is accessible to trespassers as there is no barrier to access on railroad side of the property;
- Nearby Rt. 517 bypass is under construction;

C. Demographics, Land Use, And Natural Resource Use

The A.O. Polymer site is located approximately one-third of a mile from a busy commercial area, and one-half of a mile from a public high school. The population of Sparta Township is estimated to be 15,000 according to the 1990 United States Census, with a population density of approximately 342 persons per square mile. Users of Station Park include 1,200 members of the Sparta Soccer and Softball clubs. Sparta High School athletic fields are about 0.5 mile from the site.

The primary public health concern in the past associated with the site was the odor emanating from the active production facility (which is now closed), and residences located on Station Road

with contaminated domestic wells. The potentially exposed population included employees and trespassers on the site and residents with contaminated domestic wells. There are three houses on Station Road with domestic wells that were contaminated by the A.O. Polymer site. The estimated number of people exposed to contaminated well water would not be expected to exceed 70, including 8 residents (3 residences X 2.5 persons/household), perhaps 40 people working at a building on Station Road, and up to 22 people who worked at the site. The A.O. Polymer workers could have also been exposed to the contaminated soil. The residential population living within a half mile of A.O. Polymer is estimated to be 183 people (73 residences x 2.5 persons/household). Of this number, up to 18 residences are close to the site and could have been negatively impacted via odors. However, the population that repeatedly comes within a mile of the site is much larger due to the use of Station Park and Sparta High School.

Land use adjacent to A.O. Polymer varies between residential, recreational, educational, and undisturbed areas. A.O. Polymer is bordered by Station Park, a business office, and a railroad. Station Park is a public recreational area, with baseball fields, soccer fields, and short trails to the river and the High School. During the winter, a hill within the Park is used for sledding. A gun club is located on the opposite side of the railroad tracks. There are residences and a private office on Station Road, which leads up to the facility. The East Seep area is a marsh-like wetland, located past the baseball field. Apparently, groundwater contamination is responsible for the presence of low levels of VOC's in the wetlands. Although accessible, the East Seep is not an inviting area, and it is unlikely that residents would repeatedly access or ingest water from the East Seep area.

The high density population areas, which are located to the south and west of the site, are connected to the public water supply. The water is supplied by the Lake Mohawk Water Company and Sparta Water District, and is a blend of surface water and groundwater.

Contaminated domestic wells located on Station Road were closed in 1979 and the residences were connected to public water lines. In July 1987, potable wells on the opposite side of the Wallkill were sampled and no contaminants were detected. Private wells that are north and east of the site are being used for potable purposes and have not been impacted by the site and have not been closed. This includes the Sparta High School well. Currently, groundwater contamination from the A.O. Polymer site is unlikely to present a direct threat to existing potable water supplies. All affected existing wells along Station Road, have been replaced with municipal water supplies.

The water table beneath the A.O. Polymer property is between 20 to 30 feet below grade. Depth to the water table decreases to the north and east of the property, until it is only 2.6 feet below the surface in Station Park next to the Wallkill River. The water table aquifer extends down to the top of the bedrock at a depth ranging from 17 to 123 feet. In addition to being highly fractured and weathered, the bedrock also has locally significant solution cavities. This bedrock, also known as the Allentown Formation, is a source of potable water in the Wallkill Valley. Groundwater contamination in the water table aquifer consists primarily of volatile organic compounds

including carbon tetrachloride, chlorobenzene, methylene chloride, 1,1,1-trichloroethane. The compounds were detected at levels above the Federal and New Jersey Maximum Contaminant Levels (MCLs). RI data show that both the water table and bedrock aquifers are hydraulically interconnected, and that groundwater contamination from the site has moved downward through the glacial overburden, and migrated from the site through the shallow portions of the Allentown formation. The RI data has defined extent of the groundwater contaminant plume. The northernmost boundary of the plume is 400 feet north of the site. The southern boundary of the plume emanates from the former disposal lagoon area and extends to the Wallkill River in the east/northeasterly direction. The plume is confined to relatively shallow portions of the groundwater flow system and is discharged to the river along with the normal groundwater flow. The downgradient extent of the plume from the former lagoon area is limited by the Wallkill River. Transport past the river is not indicated by the data and appears to be unlikely given present hydrologic conditions.

Surface water bodies in the vicinity of the site include the Wallkill River, a small wetland area located downstream of the site, and an unnamed tributary to the Wallkill River which is located approximately 500 feet to the north of the site. The A.O. Polymer facility lies on the surface water divide between the Wallkill River and the unnamed tributary, which joins the Wallkill River about one mile northeast of the site. The Wallkill River is a groundwater discharge area, contamination in the deep wells on the east side of the river (opposite the site) has not been detected, suggesting that the plume is confined to relatively shallow portions of the flow system and is thus discharged to the river along with the groundwater. The Wallkill River is stocked with trout and is used for recreational purposes. The river may also be used to water livestock. Hunting is also popular in the area near the site. The Wallkill River feeds into the Franklin Reservoir, which is approximately three miles downstream of the site. The Reservoir is used for both drinking water and recreation. The site has no apparent impact to these surface water features.

D. Health Outcome Data

There are multiple sources of health outcome data in the state of New Jersey. State and local data for health outcome information include the New Jersey State Cancer Registry, Birth Defects Registry, Vital Statistics Records, Renal Dialysis Network and Hospital Discharge Reports. Federal databases such as those maintained by the agencies within the US Department of Health and Human Services (i.e., National Cancer Institute, National Institute for Occupational Safety and Health) are not site-specific, but may be used for comparison or evaluation purposes.

Cancer might be possible from long-term exposure to one of several of the site contaminants. Please refer to the Toxicological Evaluations subsection of the Public Health Implications section for more information on cancer.

COMMUNITY HEALTH CONCERNS

In order to gather information on community health concerns, NJDOH contacted the Sparta Health Department and the NJDEP. The NJDEP conducted a public meeting on May 9, 1991, on the selected remedial alternative at which the community voiced their concerns. The NJDEP compiled the responses of letters and telephone calls that it received following the meeting. Community concerns centered on: 1) Odor complaints; 2) The threat of contamination of the high school drinking well (especially with formaldehyde); 3) Contamination of the Wallkill River; 4) Health impacts from using Station Park ball fields; 5) The safety of the public supply well; and 6) the sampling of wells during the sale of property.

Another public meeting was held on July 21, 1993 to discuss the construction of a public school near the site. This public meeting was attended by the NJDOH. Community concerns focused on: 1) Odor complaints; 2) The threat of contamination of the school drinking well; and 3) Health impacts from using Station Park ball fields.

The primary public health concerns related to exposure to contaminants (primarily via the air) from A.O. Polymer's former operations. The identity and amounts of the chemicals allegedly released are unknown. Complaints regarding odors continued for almost twenty years. Reports usually came from the east side of the plant, although one resident informed representatives of the New Jersey Department of Health (NJDOH) that people on the other side of the site had also complained about odors. Area residents reported that odors were produced intermittently. Some complaints alleged that odors were worse on weekends and off-shift times. Citizens associated respiratory irritation and other medical symptoms with odors emanating from the site. Community health concerns associated with the A.O. Polymer site in the past include:

- 1) Do the odors pose a health problem? What is the quality of the ambient air?
- 2) Is the water in existing private potable wells, or in the supply water supply safe for drinking?
- 3) Why are the wells of homes that are sold not sampled for formaldehyde and other chemicals?
- 4) Isn't inhalation of volatiles from the groundwater a concern for recreational users of Station Park?
- 5) If there are chronic effects associated with the active facility or the site, wouldn't a health study be appropriate?

These concerns are addressed in the Public Health Implication Section. The community health concerns have been minimal since the facility was closed. The New Jersey Department of Health (NJDOH) conducted a comment period for the Public Health Assessment Addendum for the A.O. Polymer site from March 28, 1994 to April 29, 1994. The Public Health Assessment Addendum was placed in local repositories to facilitate commentary and reaction from the public at large.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The data tables in this section list the site contaminants of concern. ATSDR and NJDOH evaluate these contaminants in the subsequent sections of the Public Health Assessment to determine whether exposure to them has public health significance. ATSDR and NJDOH select and discuss these contaminants based upon the following factors:

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

In the data tables that follow under the On-site Contamination subsection and the Off-site Contamination subsection, the listed contaminant does not mean that it will cause adverse health effects from exposures. Instead, the list indicates which contaminants will be evaluated further in the health assessment. When selected as a contaminant of concern in one medium, that contaminant will be reported in all media. The Data tables include the following acronyms:

- **CREG** = ATSDR Cancer Risk Evaluation Guide
- **EMEG** = ATSDR Environmental Media Evaluation Guide
- **RMEG** = Reference Dose Media Evaluation Guide, calculated from EPA's reference dose (RfD).
- **NA** = Not Analyzed
- **NJDEP** = New Jersey Department of Environmental Protection
- **NJ SAL** = New Jersey Soil Action Level
- **LTHA** = USEPA's Lifetime Health Advisory
- **NJ MCL** = NJ Maximum Contaminant Level
- **PPB** = Parts Per Billion
- **ND** = Not Detected

- **EPA MCLG** = USEPA Maximum Contaminant Level Goal
- **EPA MCL** = USEPA Maximum Contaminant Level
- **EPA PMCLG** = USEPA Proposed Maximum Contaminant Level Goal
- **PPM** = parts per million
- **EPA RfD** = USEPA Reference Dose
- **EPA RfC** = USEPA Reference Concentration
- **LTHA** = USEPA Lifetime Health Advisory

Comparison values for Public Health Assessments are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on a one excess cancer in a million persons exposed over a lifetime. CREGs are calculated from EPA's cancer slope factors.

EPA's Maximum Contaminant Level Goal (MCLG) is a drinking water health goal. EPA believes that the MCLG represents a level that no known or anticipated adverse effect on the health of persons should occur which allows an adequate margin of safety. Proposed Maximum Contaminant Level Goals (PMCLGs) are MCLGs that are being proposed. Maximum contaminant levels (MCLs) represent contaminant concentrations that New Jersey or a Federal regulatory agency, e.g. EPA, deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters of water per day. MCLs are regulatory concentrations. 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.

The environmental contamination section includes sampling data from a variety of media sources including: groundwater (Monitoring wells and residential wells); surface water; surface soil; subsurface soil; and sediments. **Tables I through III** list the contaminated media and maximum concentrations of contaminants found at the A.O. Polymer site. Contaminants of concern are selected by comparing contaminant levels detected at the site to public health assessment comparison values. These values may include ATSDR Environmental Media Evaluation Guides (EMEG's) and Cancer Risk Evaluation Guides (CREG's), New Jersey Soil Action Levels (NJSAL's), and New Jersey Maximum Contaminant Levels (NJMCL's). Selected contaminants are further evaluated in subsequent sections of the Public Health Assessment to determine whether exposure to these contaminants are likely to result in harmful health effects in humans. When selected as a contaminant of concern in one medium (i.e., water, soil, air), that contaminant

is reported for all media.

A. ON-SITE CONTAMINATION

Soil

On June 12, 1979 the NJDEP sampled on site soil for VOC's, pesticides and polyaromatic hydrocarbons (PAH's). On March 28, 1980 the NJDEP took 37 drum and soil samples and tested for VOC's. Surface and subsurface samples were taken throughout the month of May, 1987. In 1993, additional soils samples were collected and analyzed from the former lagoon area. Samples were analyzed for volatile and semi-volatile organic compounds, inorganic compounds, and total petroleum hydrocarbons.

On-site soil samples taken from 15 borings revealed the presence of various organic compounds significantly above background levels. The compounds detected most frequently were PAHs consisting of acenaphthene, benzo(A)-anthracene, benzo(B)-fluoranthene, benzo(K)-fluoranthene, benzo(A)pyrene, chrysene, naphthalene, indeno(1,2,3-CD)-pyrene, and N-nitrosodiphenylamine all at levels below ATSDR comparison values. The base neutral acid extractable compounds such as bis (2-ethylhexyl) phthalate (BEHP) and di-n-butyl phthalate were also detected in soil samples at levels below ATSDR comparison values.

The maximum reported concentrations of VOC's in soil samples were detected 10 to 12 feet below the surface: trichloroethene (TCE - 27 ppm); tetrachloroethene (PCE- 2.6 ppm); 1,1,1-trichloroethane (32 ppm); chlorobenzene (1.5 ppm); trans 1,2-dichloroethylene (5.1 ppm); and trichlorofluoromethane (53 ppm) all at levels below ATSDR comparison values. The presence of these compounds in high concentrations in Test Borings 11 and 12 corresponds well with the known locations of waste disposal lagoons remediated by NJDEP in 1980 and 1981. Inorganic chemicals detected in soil samples were at levels similar to background concentrations and were below ATSDR comparison values.

Surface soils from the former waste lagoons were remediated by NJDEP in 1980 and 1981. During this removal action, the top 10 feet of the contaminated soils in the lagoon area were excavated and disposed of off-site. The excavated area was then backfilled with clean fill, leaving behind unsaturated residual soil contamination between a depth of approximately 10 to 25 feet. Residual soil contamination from the former lagoon disposal area is the major source of the groundwater contamination emanating from the site. The source area is located approximately 10 feet below the ground surface down to the water table at a depth of 25 feet. Contaminants in subsurface soils, the source of groundwater contamination, are not readily accessible for human contact and, therefore do not pose a direct contact hazard. However, contaminants from this soil continue to be released into groundwater.

Groundwater

There are presently 35 monitoring wells either on the A.O.Polymer site or the adjoining park. Various monitoring wells in this system have been sampled in 1984, 1987, 1990, 1993, and 1994 for the purpose of delineating the nature and extent of groundwater contamination. Organic contaminants detected in on-site overburden monitoring wells were mainly volatile organic chemicals. The highest concentrations of most contaminants were detected in AOP-6; located near the northern boundary of the site. **Table I** summarizes maximum concentrations of contaminants detected in on-site groundwater samples.

Table I. Groundwater Contaminants: On-Site

Contaminant	Maximum Conc. (ppm)	Comparison Values	
		ppm	Source
Benzene	0.008	0.001	NJ MCL
Chloroform	0.5	0.1	NJ MCL
1,1-Dichloroethane	0.8	NA	NA
1,1,1-Trichloroethane	2.0	0.026	NJ MCL
1,1-Dichloroethylene	0.5	0.002	NJ MCL
1,2-Dichloroethylene	4.0	0.01	NJ MCL
4-Methyl-2-pentanone	2.9	NA	NA
Tetrachloroethylene	0.6	0.001	NJ MCL
Trichloroethylene	3.0	0.001	NJ MCL

Soil Gas

A pilot soil gas investigation was conducted at the site perimeter and on-site to determine the extent of migration of 2-butanone contamination. Although some VOC's were detected, however, 2-butanone was not found. A full-scale soil gas investigation was conducted in the summer of 1993. This soil gas investigation showed volatile organic contaminants to be present beneath the former lagoon area at a depth between 10 and 20 feet. This finding was later confirmed by 12 soil borings in the area of the former lagoon.

Ambient Air

VOC concentrations in air were calculated, by the USEPA, using a mathematical model that is based on the volatilization of chemicals from the groundwater plume. The model did not take into account the release of contaminants from manufacturing practices or from the volatilization of contaminants from the buildings themselves. Air sampling on-site and off-site were not conducted as part of the RI/FS.

Buildings

On September 23, 1993, an extensive Removal Site Evaluation (RES) was conducted at the A.O. Polymer site. In order to evaluate and document a release or threat of release from the facility 3 air samples, 5 soil samples, and 4 waste/product/raw material samples were collected. The analytical results indicated that hazardous substances contained in the drums and containers found at the site are being released onto and into surface soils. A removal action was initiated on April 27, 1994. By May 5, 1994, all 27 tanks on site were inspected, and sampled. Liquids, sludges and solid materials were removed from all but one outside aboveground storage tanks. The underground storage tank was excavated and cleaned. On-going removal action has secured and stabilized the A.O. Polymer site.

Standing Water

Two septic tanks were believed to have been used by A.O. Polymer for sewage disposal. The contents of one tank was sampled and analyzed in December 1987. Mercury, methylene chloride and m-xylene was found in the 3 to 7 ppb range. The other septic tank was inaccessible and, thus, was not sampled. Xylene was detected at 17 ppb in the on-site cooling pond. No other contaminants were detected in cooling pond samples that were in excess of ATSDR or New Jersey comparison values.

B. Off-Site Contamination

Soil

In May 1987, three surface soils samples were taken from Station Park. There were no contaminants detected in these samples in excess of ATSDR comparison values.

Shallow Monitoring wells

The RI/FS defined the extent of the shallow groundwater contaminant plume. The northern boundary is 400 ft north of the site and the southern boundary does not appear to extend past the site. The plume, which emanates from the former disposal lagoon area, appears to have stabilized latitudinally, extending to the Wallkill River. Further, the downgradient extent of the plume appears to be limited by the Wallkill River because it is a groundwater discharge area. **Table II**

contains the maximum concentrations of contaminants detected during December 1994 sampling of monitoring wells located off the A.O. Polymer property. Off-site monitoring wells were sampled in June 1987, July 1987, January 1990, 1993, and December 1994.

Table II. Groundwater contaminants : Off-Site

Contaminant	Maximum Conc. (ppm)	Comparison Values	
		ppm	Source
Carbon Tetrachloride	0.0007	0.002	NJ MCL
1,2-Dichloroethylene	4.5	0.01	NJ MCL
4-Methyl-2-pentanone	0.21	NA	NA
Tetrachloroethylene	0.15	0.001	NJ MCL
Trichloroethylene	8.4	0.001	NJ MCL

Bedrock Monitoring Wells

Four of the monitoring wells were sunk into bedrock (AOP-109, AOP-112, AOP-116, and AOP-118). Samples from these deep wells, which were collected in June 1987, and January 1990, were not contaminated. In 1993, four additional monitoring wells were placed in the park (2 shallow and 2 deep monitoring wells). Contaminant transport from the former lagoon area is believed to be approaching an almost steady state condition, and the plume may not continue to spread. Groundwater concentrations near the contaminant source have decreased since 1985 but have remained relatively stable for the last two monitoring episodes. This suggests a nearly constant input from residual contamination at the source. Downgradient from the source, near the center of the plume, a slow but gradual increase in concentration of contaminants was observed until 1987.

Potable Wells

Environmental problems resulting from the site were initially detected as a result of the contamination

of the Sparta High School well and three other residential wells, in 1979. The only contaminant detected in the Sparta High School well was formaldehyde, at 60 ppb. However, QA/QC was insufficient to determine if the presence of formaldehyde in the environmental sample was real or if it was due to laboratory error. Formaldehyde was not found to be present in on-site groundwater. Although formaldehyde was used at the A.O. Polymer site, the presence of formaldehyde in the Sparta High School well water sample may have been an anomaly. Subsequent water sampling did not show any contamination in well water. The Sparta High School well is monitored on regular basis. Formaldehyde was found in domestic well water samples at a maximum concentration of 100 ppb. In July 1987, potable wells on the opposite side of the WallKill were sampled and no contaminants were detected. The most recent groundwater sampling data indicates a decrease in groundwater contamination suggesting a leveling off trend. Therefore, all known existing water supply wells, including the Sparta High School well, are currently at minimal risk of becoming contaminated. **Table III** summarizes the contaminants of concern detected in potable well samples in 1979 (these wells are no longer in use).

Table III. Contaminants of Concern: Potable Wells

Contaminant	Maximum Conc. (ppm)	Comparison Values	
		ppm	Source
Diethyl ether	0.01	NA	NA
Formaldehyde	0.1	7.0	RMEG
Trichloroethylene	0.06	0.003	CREG
Trifluorodichloroethane	0.3	NA	NA
Trifluorotrchloroethane	1.1	NA	NA

Surface Water

The groundwater contaminant plume is presently discharging to the wetland area located on the west side of the river as well as to the river itself. It is believed that most volatile organic compounds entering the Wallkill River from the contaminated groundwater are quickly attenuated by dilution, volatilization and degradation as reflected by the low levels detected in the downstream samples.

The Wallkill River was sampled at five locations in June of 1987 (RI/FS). One location was upgradient from the site, one was at the same gradient as the site, and three locations were downgradient from the site. No inorganic chemicals were detected at concentrations which would pose a public health concern. Although acetone, and methylene chloride were detected in downgradient samples, similar concentrations were also found in the field and the laboratory blanks.

Therefore, the presence of these chemicals in samples is probably due to the handling of the samples during the analytical processes. The maximum concentrations of 1,2-dichloroethylene and 1,1-dichloroethane detected in the down-gradient surface water was 6.3 ppb and 2 ppb, respectively.

Two other surface water areas were sampled in January 1990. These areas are identified as the North Seep and the East Seep. They are actually marsh-like wetland areas along the west side of the Wallkill River. Contaminants were not detected at the North Seep, which is at the same gradient as the site. The East Seep area is a marsh-like wetland, located past the baseball field. Apparently, groundwater contamination is responsible for the presence of low levels of VOC's in the wetlands. Elevated levels of a variety of VOC's were detected in the East Seep: Benzene at 4 ppb; carbon tetrachloride at 10 ppb; chlorobenzene at 6 ppb; 1,1-dichloroethylene at 8 ppb; tetrachloroethylene at 4 ppb; 1,1,1-trichloroethane at 120 ppb; trichloroethylene at 18 ppb; and vinyl chloride at 240 ppb. Several contaminants in the East Seep were at concentrations higher than expected, based on the chemical concentrations in the groundwater plume. Eight rounds of surface water sampling was conducted in the fall of 1994. Although accessible, the East Seep is not an inviting area, and it is unlikely that residents would repeatedly access or ingest water from the East Seep area. Concentrations of the contaminants found in the East Seep samples are not at levels of public health concern.

Sediment

The sediment of the Wallkill River was sampled in June 1987. The sediment contained a variety of PAH's at concentrations below ATSDR comparison values. Further, the highest concentrations of PAH's were in the upgradient sample. PAHs are ubiquitous in the environment because of their close association with the use of fossil fuels and fossil fuel by-products. In addition, PAHs tend to accumulate in sediment because of their high affinity for organic carbon. Therefore, the source of contamination may be the general human activities throughout the Wallkill River Valley upstream from the site.

Ambient Air

There is a lack of data regarding air quality in and around the A.O. Polymer facility. This data gap precludes evaluation of the adverse health effects reported by residents and employees (throat irritation and watery eyes) upon exposure to site-related odors in the past. Air monitoring was performed during EPA's removal actions.

On September 23, 1993, air monitoring with an organic vapor analyzer (OVA) was conducted during the soils and liquid sampling events. No readings above the background (0-3 units) were detected during soil sampling. Prior to air sampling using sample pumps containing the 150 mg charcoal tubes, air monitoring of the facility grounds and buildings was conducted using direct reading instruments and colorimetric detector tubes. A positive result was obtained for Xylene and Toluene using the colorimetric detector tubes (Draegers). Xylene was detected at a concentration of 50 ppm in storage building and 10 ppm in warehouse building. Toluene was detected at a concentration of 50 ppm in

storage building. The site investigation revealed the potential release of hazardous materials in the environment through current operational practices. The Soil Vapor Extraction system is currently removing contaminants from soils located beneath the area of the former disposal lagoons. This system is continuously monitored to prevent untreated releases into the atmosphere.

C. Quality Assurance/Quality Control

In preparing this Public Health Assessment, ATSDR and NJDOH relied on the information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analyses and conclusions drawn for this health assessment is determined by the completeness and reliability of the referenced information. Environmental samples were analyzed under the guidelines of the USEPA Certified Laboratory Program. Analytical data were validated by the NJDEP. While proper quality assurance and control measures were generally followed during sample collection and analyses, the quality of the data was affected by quality control sample contamination.

The validity of analytical results received from Compuchem were evaluated by both ICF/SRW Associates and by the NJDEP. The Remedial Investigation Feasibility Study (RI/FS) addresses some QA/QC problems. Acetone and methylene chloride were found in the laboratory's field and trip blanks, for at least one monitoring well. Thus, the concentrations of acetone and methylene chloride in the environmental samples could not be verified. There was also uncertainty about the presence of phthalates in the environmental samples. These compounds are not included in any discussions. Water samples taken by ICF/SRW and by the NJDEP were properly analyzed and documented. No standard method exists for the analysis of formaldehyde at low concentrations in water. Therefore, no definitive conclusions can be drawn regarding the presence of formaldehyde in the potable wells.

D. Physical and Other Hazards

On-going removal actions have secured and stabilized the site. To address physical hazards on-site, USEPA has boarded and/or secured points of access to all buildings, removed hazardous materials from buildings and tanks, cleaned all tanks and welded shut access ports to tanks. However, only a portion of the site has a fence, thus, it is accessible to trespassers. In response to community concern, an emergency response plan was developed by the local fire prevention officials in case of on-site fires.

E. Toxic Chemical Release Inventory Data

The NJDOH conducted a search of the Toxic Chemical Release Inventory (TRI) in an attempt to identify any possible facilities that could be contributing to the environmental contamination near the site. The TRI is compiled by USEPA and is based on estimated annual releases of toxic chemicals to the environment (air, water, soil, or underground injection) provided by certain industries. The TRI search for the years from 1987 to 1992 did not list any reported emissions of chemicals that are pertinent to this health assessment.

PATHWAYS ANALYSIS

To determine whether nearby residents are exposed to contaminants migrating from the site, NJDOH evaluates the environmental and human components that lead to human exposure. This pathways analysis consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) route of human exposure; and (5) an exposed population.

NJDOH classifies exposure pathways into three groups: (1) "completed pathways", that is, those in which exposure has occurred, is occurring, or will occur; (2) "potential pathways", that is, those in which exposure might have occurred, may be occurring, or may yet occur; and (3) "eliminated pathways", that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified. A summary of the pathways for the A.O. Polymer site are discussed below. **Table IV** identifies the completed exposure pathways at the A.O. Polymer site. **Table V** identifies the site's potential exposure pathways. The discussion following the two tables address only pathways important and relevant to the site.

A. Completed Exposure Pathways

Potable Wells

The A.O. Polymer facility contaminated the shallow groundwater aquifer. The residents and employees of businesses along Station Road and the employees of A.O. Polymer were exposed to volatile organic compounds in the groundwater through the use of well water. The routes of exposure included ingestion due to drinking the water, inhalation of the volatile organic chemicals (e.g., watering the lawn, dish washing), and dermal absorption of the contaminants by direct (skin) contact with the groundwater (e.g., showers, washing hands) (**Table V**). However, this is no longer a completed exposure pathway. The wells were closed and the residents were given city water lines when the contamination was discovered. Although Sparta High School remains on private well water, the Sparta Department of Health routinely samples the water to assure its quality. The length of exposure to contaminated groundwater in domestic well is unknown, so it is assumed to be the length of time that the company was in existence, approximately 20 years.

B. Potential Exposure Pathways

Groundwater

The groundwater contaminated by the A.O. Polymer facility, underlying sections of the baseball and soccer field at Station Park, is extremely shallow (up to one foot below grade). The deep bedrock aquifer under the Township of Sparta has not exhibited site related contaminants. The contaminant plume of the shallow aquifer flows above the bedrock aquifer. Since the bedrock is highly fractured

and fissured, contaminant migration may be possible in the future. If the bedrock aquifer becomes contaminated, the quality of the public water supply may be at risk.

Soil

The east side of the A.O. Polymer plant, which faces Station Park, is not fenced or posted. There is evidence that trespassing has occurred and still continues. Thus, the potentially exposed population to contaminated soil at the A.O. Polymer site are the former A.O. Polymer employees and trespassers (**Table V**). Exposure to the contaminated soil may have occurred in the past via direct contact, through ingestion or indirectly by the inhalation of volatilized chemicals that have sequestered in the soil (**Table V**). Surface soils from the former waste lagoons were remediated by NJDEP in 1980 and 1981. During this removal action, the top 10 feet of the contaminated soils in the lagoon area were excavated and disposed of off-site. The excavated area was then backfilled with clean fill, leaving behind unsaturated residual soil contamination between a depth of approximately 10 to 25 feet.

Buildings

There are five remaining buildings on-site. They are the laboratory building, the urethane processing building, a building to store drums, a shed that housed chemicals, and an office. The office is on the periphery of the site and is not expected to have been contaminated. The storage of chemicals in the buildings represented a potential inhalation exposure hazard pathway in the past to the former employees at the site. The on-going removal actions has secured and stabilized the site and the site is no longer a potential pathway currently for trespassers via the ingestion, inhalation, and dermal contact pathways as documented in previous reports. The materials inside the buildings were sampled and classified prior to their disposal by USEPA.

Air

Complaints of odors emanating from the A.O. Polymer facility have been registered for many years with the Local Health Officer and the NJDEP Regional Enforcement Office. Although the odors have been found both on and off-site, the vast majority of complaints were from the businesses and residences along Station Road. These odors were associated with a concurrent burning sensation in the back of throats and watering eyes. The routes of exposure were inhalation and skin contact for the Sparta residents and A.O. Polymer employees. The airborne exposure route occurred in the past (**Table V**). Residents living near the site no longer complain of odors as the facility is closed.

Table IV. Completed Exposure Pathways

EXPOSURE PATHWAY ELEMENTS					TIME
SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
A.O. Polymer	Groundwater (Residential wells)	Station Road Residents & Employees (Taps)	Ingestion, Inhalation, Skin contact	Sparta Residents, A.O. Polymer employees	Past

Table V. Potential Exposure Pathways

EXPOSURE PATHWAY ELEMENTS					TIME
SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
A.O. Polymer	Soil	A.O. Polymer Site	Ingestion, Inhalation, Skin contact	Former Employees, Trespassers	Past
A.O. Polymer	Buildings	On-Site	Inhalation, Ingestion, Skin Contact	Former Employees, Trespassers	Past
A.O. Polymer	Air	On-Site Off-Site	Inhalation, Skin Contact	Sparta Residents, A.O. Polymer Employees	Past

PUBLIC HEALTH IMPLICATIONS

A. TOXICOLOGICAL EVALUATION

Introduction

In this section, NJDOH will discuss the health effects in persons exposed to specific contaminants. To evaluate health effects, ATSDR has developed a Minimal Risk Level (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). ATSDR presents these MRLs in the Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status. In the following discussion, NJDOH used ATSDR Toxicological Profiles for the contaminants of concern at the site. The NJDOH will use a USEPA Reference Dose (RfD) as a health guideline, when a MRL is not available. The RfD is an estimate of daily human exposure of a contaminant for a lifetime below which (non-cancer) health effects are unlikely to occur.

The toxicological effects of the contaminants detected in the groundwater 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.

Groundwater Exposure

In the past, residents and workers along Station Road who used well water were exposed to groundwater that was contaminated with numerous toxicants for an undetermined length of time. It is unlikely that prolonged exposure to most of these contaminants at the concentrations that were detected in the groundwater samples would result in adverse health effects. Exposure is considered to be indeterminate because groundwater concentrations could previously have been higher than the current groundwater data.

It is known that Mohawk Industries started operations in the early 1960's. Residents living near and employees of A.O. Polymer were exposed to site related contaminants (as reported in Table III) in their drinking water for approximately 20 years until 1979, when contamination were detected. The Township extended municipal water service into the area in 1980. The toxicological evaluation of the completed human exposure pathway at the A.O. Polymer site is based upon chronic oral ingestion of contaminants in potable well water. Cancer estimates are based on an intake of 2 liters of water per day for a 70 kilogram adult and an intake of 1 liters of water per day for a 35 kilogram child for

the period indicated. Toxicological evaluation were based upon the maximum concentrations detected.

The exposed population via groundwater exposure consists of approximately eight residents who live in three dwellings on Station Road who used well water, workers along Station Road and A.O. Polymer employees using well water. The total population at risk is considered to be approximately 70 people. However, there were several contaminants of concern that were found in groundwater samples on or off-site but not found in samples taken from the residential wells.

Diethyl ether, trifluorodichloroethane, and trifluorotrchloroethane were found in samples of potable well water (**Table III**). There are no ATSDR MRL's or USEPA RfD's and no ATSDR toxicological profiles for these compounds. Therefore, exposure doses were not calculated. These compounds are considered to be at insufficient concentrations to cause adverse health effects for the exposed population based on existing information.

Formaldehyde

Site data indicate that exposure to formaldehyde occurred in the residences along Station Road that used well water. Also, any workers on Station Road and any A.O. Polymer employees who drank well water were also potentially exposed to formaldehyde. Thus, a maximum of approximately 70 people were exposed to formaldehyde for up to 20 years.

Formaldehyde is used as a disinfectant and is used in the production of phenolic, urea, melamine, and acetal resins. It is also used in textiles, embalming fluids, fungicides, air fresheners, and cosmetics. Formaldehyde is irritating to mucous membranes and sufficient direct contact may cause dermatitis. Ingestion may cause abdominal pain, hematemesis, hematuria, proteinuria, anuria, and acidosis. Formaldehyde was detected in domestic well water samples at a maximum concentration of 100 ppb. No chronic oral MRL or RfD is available for formaldehyde to evaluate the potential for non-carcinogenic health effects.

Formaldehyde is considered a probable human carcinogen by the USEPA (limited human, sufficient animal studies). Based on calculated exposure doses, the lifetime excess cancer risk (LECR) associated with the chronic oral exposure route for formaldehyde present a low increased risk of cancer. The cancer risk associated with formaldehyde exposure obtained by drinking contaminated well water may be interpreted according to the following example. If 10,000 residents were exposed through ingestion of 2 liters of water a day for 20 years to the maximum concentration detected in the potable well water samples, approximately one additional case of cancer may occur in 70 years.

Trichloroethylene (TCE)

Site data indicate that exposure to trichloroethylene (TCE) occurred in the residences along Station Road that used well water. Also, any workers on Station Road and any A.O. Polymer employees who drank well water were also potentially exposed to TCE. Thus, a maximum of approximately 70

people were exposed to TCE for up to 20 years. There have been no studies on chronic oral human exposure to TCE. Chronic exposure to TCE has been found to cause adverse neurological, renal and hepatic effects in mice and rats via the ingestion route of exposure. No chronic oral MRL or RfD is available for trichloroethylene to evaluate the potential for non-carcinogenic health effects. However, Estimated Exposure Doses (EED) calculated from the maximum reported concentration of trichloroethylene in potable well water samples (**Table III**) were well below the No Observed Adverse Effects Level (NOAEL) for ingestion exposures of prolonged duration cited for animal studies in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

Currently there is scientific debate regarding the carcinogenicity of TCE in humans. However, animal studies have shown that tumors can result from oral exposure to TCE. TCE is under consideration for placement into either probable human carcinogen or possible human carcinogen by the USEPA. NJDOH concur with USEPA regarding TCE's potential carcinogenicity in humans. Based on calculated exposure doses, the lifetime excess cancer risk (LECR) associated with the chronic oral exposure route for trichloroethylene at the site present insignificant or no increased risk of cancer. The cancer risk associated with TCE exposure obtained by drinking contaminated well water may be interpreted according to the following example. If 1,000,000 residents were exposed to the maximum detected concentration of TCE through ingestion of 2 liters of water a day for 20 years, approximately five additional case of cancer may occur in 70 years. For the approximately 70 residents who were exposed to TCE, it is, therefore, unlikely that they will develop cancer as a result of their exposure.

B. Health Outcome Data Evaluation

Health outcome data was not reviewed for this contamination site. There were no more than 70 people exposed to the contamination both on and off-site. Of these, approximately eight were full time residents. Thus, health outcome data for the site were not reviewed because the population size was too small for the application of relevant data bases to yield statistically significant results.

C. Community Health Concerns Evaluation

Community health concerns are addressed as follows:

1) Do the odors pose a health problem? What is the quality of the ambient air?

Intermittent odor complaints were received by the Local Health Officer and the regional NJDEP office while the facility was in operation. The air in and around the A.O. Polymer site while the facility was in operation was never sampled. Thus, the air contaminants and their concentrations are unknown. Further, standard air sampling methods do not exist for all of the volatile chemicals that were used at the site. Without this information, it is not possible to assess the potential adverse health impacts from the air.

2) Is the water in existing private potable wells, or in the supply water supply safe for drinking?

Contaminants have not been found in currently operating potable wells. Public water is a blend of groundwater and surface water. The public supply well is not in the path of the identified contaminant plume. However, if the bedrock aquifer becomes contaminated by the groundwater plume, then there is a chance that the city water supply could be impacted by the site. By law, homes in New Jersey must be sampled and analyzed for a limited number of parameters. Most of these parameters do not include chemicals that are on the Priority Pollutant List of toxic chemicals. It is up to the seller and purchaser of the property to decide if additional analyses should be conducted.

3) Why are the wells of homes that are sold not sampled for formaldehyde and other chemicals?

By law, homes in New Jersey must be sampled and analyzed for a limited number of parameters. Most of these parameters do not include toxic chemicals. It is up to the seller and purchaser of the property to decide if additional analyses should be conducted.

4) Isn't inhalation of volatiles from the groundwater a concern for recreational users of Station Park?

Volatilization does not occur directly from sub-surface groundwater. It may, however, occur indirectly by mixing with the surface water and then volatilizing. Due to dilution and degradation of the volatile chemicals, it is unlikely that this is a pathway of concern.

5) If there are chronic effects associated with the active facility or the site, wouldn't a health study be appropriate?

The Health Activities Recommendation Panel (HARP) determined that no follow up actions are currently indicated. However, if additional information becomes available, further actions will be considered.

Public Comment Period

The New Jersey Department of Health (NJDOH) conducted a comment period for the Public Health Assessment Addendum for the A.O. Polymer site from March 28, 1994 to April 29, 1994. The Public Health Assessment Addendum was placed in local repositories to facilitate commentary and reaction from the public at large. Additionally, the Public Health Assessment Addendum was circulated to the Sparta Township Department of Health for the purpose of soliciting commentary by local health officials. A summary of commentary received by the NJDOH and associated responses are contained in **Appendix C**.

CONCLUSIONS

1. Based on current site data and information, the NJDOH and the ATSDR consider the A.O. Polymer site to presently present be no apparent public health hazard as on-going removal actions have secured and stabilized the site.
2. The A.O. Polymer site is evaluated to have presented a public health hazard in the past because completed human exposure pathway existed through ingestion of contaminated well water until 1979. Public water supplies have been made available to residents since 1980. The lifetime excess cancer risk (LECR) associated with the chronic oral exposure route for formaldehyde at the site for a duration of 20 years would present a low increased risk of cancer. Past exposure to TCE is not expected to cause adverse chronic health effects via the oral route of exposure because estimated exposure doses were below the NOAEL for non cancer effects. The lifetime excess cancer risk (LECR) associated with the chronic oral exposure route for trichloroethylene at the site for a duration of 20 years would present insignificant or no increased risk of cancer.
3. Access to the A.O. Polymer site is unrestricted. However, numerous removal actions and securing the buildings on-site has minimized the physical hazards that previously existed.
4. The potential for odors to emanate from the buildings no longer exists as plant operations has ceased on site and hazardous materials have been removed from the buildings.
5. Using a mathematical model, air concentrations were calculated based on the volatilization of chemicals from the groundwater plume. This did not take into account the release of odors from poor manufacturing practices or from the volatilization of contaminants from the buildings themselves. Direct air sampling on-site and off-site were not conducted in the past during plant operation. There are insufficient data to evaluate the air pathway at the site.
6. The bedrock aquifer may become contaminated by the shallow overlying aquifer, resulting in potential risk to the population using the bedrock aquifer for drinking water.

RECOMMENDATIONS

Cease/Reduce Exposure

1. Access to the A.O. Polymer facility needs to be completely restricted. In addition, signs identifying the site as a hazardous waste site should be posted.

Site Characterization

1. Periodically monitoring of the bedrock aquifer should continue until groundwater treatment system is installed as specified in the ROD.

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.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP)

The data and information developed in the Public Health Assessment Addendum for the A.O. Polymer site, Sparta Township, New Jersey have been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow up with respect to health activities. Possible exposure has occurred in the past. The panel determined that no follow up actions are indicated at this time because the exposure levels are unknown. Furthermore, the HARP concurs with the community health education performed in the past by the USEPA. If data or information become available suggesting that human exposure to hazardous substances, at levels that may cause adverse health effects, is occurring or has occurred in the past, ATSDR will reevaluate this site for any indicated follow up health action.

PUBLIC HEALTH ACTIONS

The Public Health Action Plan (PHAP) for the A.O. Polymer site contains a description of actions to be taken by the NJDOH and/or the ATSDR at the site subsequent to the completion of this public health assessment. The purpose of the PHAP is to ensure that this public health assessment not only identifies public health hazards but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included is a commitment by the NJDOH and the ATSDR to follow-up on this plan to ensure that it is implemented.

A. Public Health Actions Taken

1. Environmental data and proposed remedial activities have been evaluated within the context of human exposure pathways and relevant public health issues.

B. Public Health Actions Planned

1. ATSDR and the NJDOH will coordinate with the appropriate environmental agencies to develop plans to implement the cease/reduce exposure and site characterization recommendations contained in this health assessment.
2. 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 assessment, and will be provided to persons who request it.
3. 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.

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APPENDICES

Appendix A: A.O. Polymer Health Assessment, August 3, 1990

Appendix B: A.O. Polymer Area Map

Appendix C: Response Summary

APPENDIX A

A.O. POLYMER HEALTH ASSESSMENT, AUGUST 3, 1990

APPENDIX B

A.O. POLYMER AREA MAP

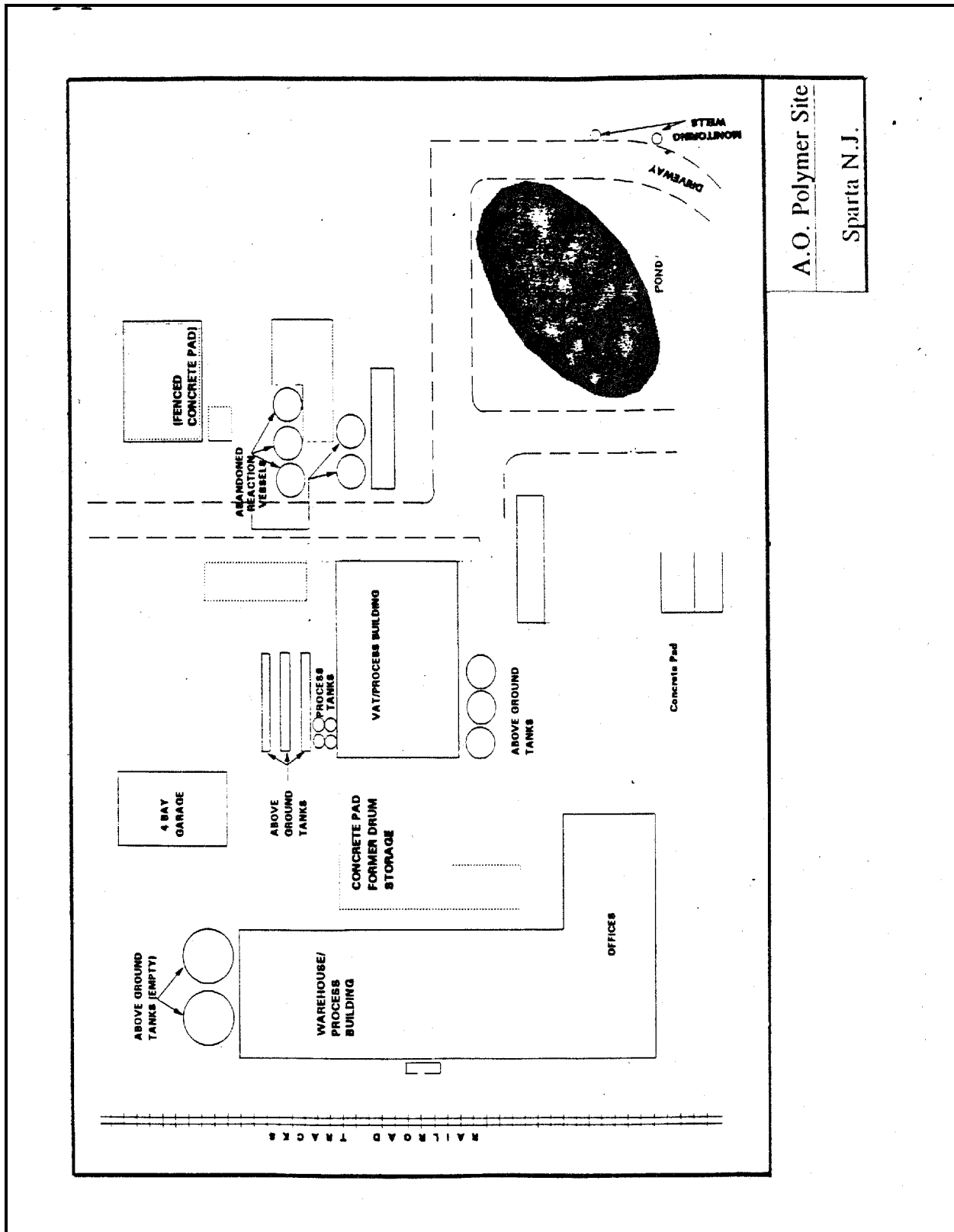


Figure 2 - A.O. Polymer Site Map

APPENDIX C

RESPONSE SUMMARY

RESPONSE SUMMARY

This response summary represents those comments and reactions to the Public Health Assessment Addendum received during the Public Comment Period described in the Community Concerns Evaluation section (March 28, 1994 to April 29, 1994). Comments were received from Health Officer, Township of Sparta and Mr. Harry Broderick representing Citizens for Quality Environment. Comments and concerns have been grouped by content where possible and are followed by the consequent response.

The following comments were received from the Health Officer of Sparta Township:

Comment

"Throughout the report, the fire that occurred in 1993 is repeatedly reported. This fire was a very small environmental incident as compared to the numerous environmental violations that has occurred over the years. Too much emphasis is placed on the fire."

Response

All the facts regarding the extent of and damage caused by the fire at the site were not known. This report has been modified to accurately reflect the impact of fire on site.

Comment

"This document is titled as an addendum to the 1990 health assessment. Since this document in itself is a complete report, and since the 1990 health assessment is totally outdated, this document should replace the 1990 document."

Response

This recommendation has been noted by the NJDOH and forwarded to the ATSDR for consideration.

Comment

"Throughout the report solvents are listed as the only materials poured on plastic sheets and allow to volatilize. Other chemicals were also poured onto the sheets."

Response

This report has been modified to reflect this comment/concern.

Comment

"It is stated that 75 containers did appear to be an explosive hazard. This is not correct. The containers gave evidence to contents that were flammable."

Response

This report has been modified to reflect this comment/concern.

Comment

"The Health Officer stated that you could 'see soil discoloration and (an) off-odor in the soil'. This is incorrect. During the fire these observations were not made. However, during other site visits, these statements are correct."

Response

This report has been modified to reflect this comment/concern.

Comment

The population of Sparta Township is 15,000 according to the 1990 Census.

Response

This report has been modified to reflect this comment/concern.

Comment

Information is stated regarding exposure to soil and potential concern to children. In the paragraph proceeding this statement the soil samples were taken at 10 feet below grade. How is there an exposure pathway to children.

Response

Appropriate changes were made in this report. However, not all the soil samples were collected from 10 feet below grade . Soil samples were also collected from a depth of 0.5 to 2.5 feet, which showed low levels of contamination with PAHs.

Comment

It is unclear as to what "clean fill" means. Is reference made to the fill placed into the old lagoon? This "clean fill" is not contaminated according to information supplied Sparta Health

Department. Is "clean fill" referenced to existing soil throughout A.O. Polymer site? This term needs to be qualified. The soils surrounding the A.O. Polymer buildings generally have been subjected to spillage from plant operations for many years.

Response

Appropriate changes were made in this report to make it clear that the use "clean fill" is reference made to the clean soil filling placed into the old lagoon.

Comment

"I am pleased to see that the report verified that there is no off-site health risk for the continued use of Station Park and/or the Sparta High School. Your findings reconfirm all of the other studies of the properties and data collected that have reached this same conclusion. With respect to the recommendations, I have the following comments:"

1. Access to the A.O. Polymer facility need to be restricted. In addition, signs identifying the site as a hazardous waste site should be posted. We have reviewed this matter with the EPA and they do not feel that a fence or signs are needed, provided that the on-site cleanup is completed as scheduled. We will follow up on this matter to make certain that any potential risks to trespassers on the property are minimized;
2. Analyses of on-site surface soil samples is necessary to assess potential recontamination of the soil by plant operations. The soil has been analyzed by EPA. There is some evidence of contamination from spillage from plant operations, however, there is no evidence of any "recontamination" of the soils that were previously cleaned by NJDEP in 1981;
3. On site buildings should be sampled to determine if they pose an odor or fire hazard. The EPA has indicated to us that they do not feel that this recommendation is warranted;
4. Periodically monitor the quality of the bedrock aquifer. The bedrock aquifer is presently being monitored and will continue to be analyzed as part of the Super Fund clean-up;

Response

1. Numerous removal actions and securing the buildings has minimized site physical hazard concerns that previously existed. However, access to the A.O. Polymer site is not completely restricted. This report recommends access to the A.O. Polymer site be restricted.
2. Appropriate changes were made in this report.
3. The on-going removal actions has secured and stabilized the site and the site is no longer a potential pathway currently for trespassers via the ingestion, inhalation, and dermal contact

pathways as documented in previous reports. The materials inside the buildings were sampled and classified prior to their disposal by USEPA.

4. Periodically monitoring of the bedrock aquifer should continue until groundwater treatment system is installed as specified in the ROD.

Comment

Multiple comments were received from Mr. Harry Broderick representing Citizens for Quality Environment.

Response

These comments were reviewed and added to the official file for this Public Health Assessment Addendum.