

Health Assessment for

BROOK INDUSTRIAL PARK

CERCLIS NO. NJD078251675

BOUND BROOK, MIDDLESEX COUNTY, NEW JERSEY

SEP 27 1990

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE

Agency for Toxic Substances and Disease Registry

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i) (7) (A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA."

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

BROOK INDUSTRIAL PARK
Middlesex County
Bound Brook, New Jersey

Prepared by:
Division of Science and Research
New Jersey Department of Environmental Protection (NJDEP)
and
Environmental Health Service
New Jersey Department of Health (NJDOH)

Prepared For:
Agency for Toxic Substances and Disease Registry (ATSDR)

OBJECTIVES

The Remedial Investigation and Feasibility Study (RI/FS) of the Brook Industrial Park is being conducted by the United States Environmental Protection Agency (USEPA), and is currently in the second year of the work plan. USEPA and NJDEP have conducted limited sampling on various properties in the Brook Industrial Park. The objectives of this Health Assessment, based on the current stage of site investigation, are to:

- * Assess the nature and magnitude of potential health effects associated with the site, and determine the site's degree of public health concern;
- * Identify, if necessary, immediate actions necessary to minimize exposure to hazards and contamination associated with the site;
- * Identify, if necessary, deficiencies in data and information regarding the site;
- * Evaluate remedial activities within the context of potential public health implications;
- * Identify potential exposure locations where sampling may be necessary to fully evaluate the site's degree of public health concern;
- * Document the concerns of the community with regard to the site;
- * Assess whether additional health study or investigation of the site is warranted.

SUMMARY

The Brook Industrial Park (BIP) site is located in Bound Brook, Somerset County, New Jersey. Located within the industrial park are three facilities that have been identified as potential sources of site contamination: Blue Spruce International, a small, presently inactive, pesticide company; Jame Fine Chemical, a manufacturer of speciality chemicals; and National Metal Finishings, an active plating facility. There have been multiple spills, leaks, and discharges at this site that resulted in the contamination of on-site soil, groundwater, nearby surface water bodies, and on-site structures with 2,3,7,8-tetra-chloro-dibenzo-p-dioxin (2,3,7,8-TCDD), pesticides, heavy metals, and volatile and semi-volatile organic compounds. Significant occupational exposure may be occurring among on-site workers. Exposure of area residents may be occurring through incidental contact with contaminated soils, the potable/domestic use of contaminated groundwater, and inhalation of vapors or dusts. Preliminary remediation has occurred at the Blue Spruce facility to contain TCDD contamination in the alleyway running between the site's buildings. The Brook Industrial Park site was added to the National Priorities List (NPL) in March 1989, and is ranked 13 of 108 NPL sites in New Jersey. ATSDR and NJDOH consider this site to be of potential public health concern. This site is being considered for follow-up health study and evaluation.

SITE DESCRIPTION

The Brook Industrial Park occupies an area of 4.5 acres in the Borough of Bound Brook, Somerset County, New Jersey, and is situated on the northern bank of the Raritan River. This industrial complex, has been active since the late 1800s and includes chemical and insecticide manufacturers, and various metal plating, plastic and steel operations. It is bordered to the north and south by railroad lines. Residential areas lay to the north and west of the site.

Several tenant activities have resulted in environmental and structural contamination of buildings, surrounding soil, ground water and nearby surface water bodies with hazardous substances. In some cases, building and soil contamination has been associated with various occupational health complaints by on-site workers. Three facilities (Blue Spruce Chemicals, Jame Fine Chemical Inc., and National Metal Finishing Inc.) located at the industrial park have been identified as being potentially responsible for the contamination. Currently operating on the site are Consolidated Steel, Jame Fine Chemicals, K.Jabat, National Metal, Rin Star, and Stirling Center Corporation.

From 1971 to 1982, Blue Spruce International formulated, mixed, and stored organic and inorganic pesticides, many of which are banned in the United States. As part of their on-site operations, Blue Spruce stored "Agent Orange," a defoliant comprised of 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) which contains

2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), as a contaminant. This facility was investigated by the New Jersey Department of Environmental Protection (NJDEP) and the Middle-Brook Regional Health Commission because of reports of worker illnesses. The company was cited for inadequate waste disposal and housekeeping practices after it was revealed that frequent spills of pesticides occurred in the basement and surrounding outdoor areas.

The Blue Spruce building is currently abandoned. In 1983, NJDEP conducted testing of the Blue Spruce building and the adjacent area which revealed concentrations of dioxin greater than one part per billion. Under EPA authorization, a RI/FS is being conducted. In addition, the owner of Blue Spruce International has been indicted for unlawful disposal of hazardous wastes generated from the pesticide plant. The on-site remedial action that has taken place to date at Blue Spruce involves the removal of one truckload of soil, the placement of an asphalt patch over soil contaminated with 2,3,7,8-TCDD (in the northern alley outside the Blue Spruce building), and the erection of a fence to prevent vehicular traffic in the 2,3,7,8-TCDD contaminated alleyway. Windows have been closed with cinder block, and a layer of stucco has been applied to the exterior walls of the building.

A second company identified as a potentially responsible party at this site is National Metal Finishings Inc., (NMF), an active metal-plating facility. In 1985, NMF received a citation and civil penalties from the State for the unpermitted discharge of waste into the groundwater over a ten-year period, failure to report such discharges, and failure to comply with state recommendations for clean-up and monitoring actions. It is believed that NMF contributed to the groundwater contamination detected at BIP monitoring wells.

Another industrial facility at the Park, Jame Fine Chemical, Inc., routinely discharged unpermitted waste water into the Raritan River. Analysis of a sample of the discharge, collected by NJDEP in 1980, detected various volatile organics and petroleum hydrocarbons. During that same investigation, NJDEP staff observed spillage and poor housekeeping practices at Jame Fine that had the potential to cause contamination of the Raritan River and local groundwater. Analysis of nearby ponded water samples revealed high concentrations of several volatile organic substances, including methylene chloride and trichloroethylene. In 1980, an Administrative Order was issued to cease discharge of waste water into ground and surface waters of the State and to submit an engineering proposal for treatment and/or disposal of its wastes. In 1981, it was determined that the Jame Fine Chemical facility was no longer a Treatment Storage and Disposal Facility. In September 1982, following NJDEP sampling of Brook Industrial Park, a Civil Action Order was filed against Jame Fine Chemicals and National Metal for liability of cleanup. In 1984, and again in 1986, Jame Fine Chemical was cited for Resource, Conservation, and Recovery Act (RCRA) violations.

SITE VISIT

A site visit was conducted by NJDOH and NJDEP personnel in the spring of 1989. At the time of the visit, the Blue Spruce building was closed off and unauthorized entry appeared improbable. Adjacent areas were not secured and there was evidence of worker activity as would be expected in an active industrial park. Single family and duplex row houses are located in proximity to the perimeter of the industrial park. Many of these dwellings are at least sixty to seventy years old and would have depended exclusively upon groundwater for domestic and potable water supply before the advent of a municipal water system.

COMMUNITY CONCERNS

The concerns of the community with regard to the Brook Industrial Park site focus upon two existing circumstances: the continuing use of contaminated ground water for potable and domestic purposes, and the exposure of workers to hazardous substances in active facilities or areas immediately adjacent to the Blue Spruce building. The site is perceived by the Bound Brook Health Department as contributing, through environmental and occupational pathways, to the incidence of cancer in Bound Brook (personal communication, Health Officer).

In 1981, the Bound Brook Health Department advised residents of Bound Brook against the consumption of private well water. However, current water utility records indicate not all homes are supplied by public sources and it is probable that the use of private wells in the area of the site continues at this time.

Health officials have also expressed concern over the possible occupational exposure of workers in the Brook Industrial Park to the hazardous substances known to exist there. The Blue Spruce building was used by the health officer as an example that little has been done to effectively secure and segregate known contaminated areas of the site from remaining active areas; at the Blue Spruce building, employees work in physical proximity with adjoining facilities known to be contaminated with dioxins.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

Blue Spruce International Site

In 1983, EPA contractors conducted a four-phased sampling program in and around the Blue Spruce site for possible 2,3,7,8-TCDD contamination. Eleven surface soil samples collected in the northern alley contained 2,3,7,8-TCDD contamination ranging from 0.77 to 5.17 parts per billion (ppb). In addition, three samples from the southern side of the building contained 2,3,7,8-TCDD concentrations ranging from 2.7 to 6.2 ppb. Within

the building, soil samples taken at the ground level and the basement contained 5.7 and 6.1 ppb 2,3,7,8-TCDD, respectively. The State of New Jersey considers 1 ppb the action level for soil contamination by 2,3,7,8-TCDD.

Investigations by the NJDEP and the Bound Brook Health Department in 1980 reported visual signs of chemical spills on the outside grounds which were associated with run-off problems. Analysis of water runoff samples taken from behind the Blue Spruce building revealed contamination by 4,4'-dichlorodiphenyltrichloroethane (DDT) and its breakdown products, malathion, lindane, and aldrin, all in the ppb range.

In 1980, NJDEP installed four monitoring wells downgradient of the Blue Spruce facility. In addition, samples were taken from an industrial production well at the Jame Fine site. These wells showed that volatile organic, inorganic, and pesticide compounds were present in the groundwater. Table 1 lists the maximum reported concentrations of contaminants of concern found in the monitoring wells, as compared to New Jersey health-based drinking water standards, at the Blue Spruce facility.

The structural integrity of the building is questionable and it has been sealed in order to prevent unauthorized access. Qualitative analysis indicated pesticide contamination in the part per million (ppm) range throughout the building. The most frequently detected pesticides were 4,4'-DDT, o,p-DDT, chlordane, 4,4'-DDE, lindane, and methoxychlor. According to one report, some containers of chemicals remain on the site, including Warfarin (a rodenticide), Synthrin (an insecticide), and Algae-Go (a copper sulfate based algaecide).

Jame Fine, Inc.

Jame Fine's past practice of discharging waste water to the ground has led to contamination of the groundwater, nearby surface water, and the potential contamination of other environmental media, such as soil. In 1980, analysis of the discharge water from the facility contained the following contaminants: trichloroethane (2,400 ppb), tetrachloroethylene (6,300 ppb), trichloroethylene (80 ppb), toluene (175 ppb), ethyl benzene (65 ppb), m,p-xylene (200 ppb), and o-xylene (65 ppb). Ponded water samples behind the site were found to contain methylene chloride (14,640 ppb), chloroform (10,000 ppb), trichloroethylene (40,000 ppb), cumene (450 ppb), toluene (82 ppb), ethylbenzene (546 ppb), m,p-xylene (786 ppb) and o-xylene (460 ppb).

In 1980 and 1982, NJDEP sampled the production well at the Jame Fine site in order to determine if groundwater contamination had occurred. The results from these analyses are listed in Table 2 and compared to NJ and Federal health-based drinking water standards.

National Metals, Inc.

As part of the company's routine operations, metal plating wastes were dumped directly into unlined pits. Groundwater and soil contamination by heavy metals and solvents has occurred from these practices. Presently, there are no specific environmental data available on this facility, although it is believed that National Metals' discharges have contributed to the groundwater contamination detected at other BIP wells.

Worker exposure to metal plating solvents and chromic acid was documented at National Metals in September 1982 by the Middle-Brook Regional Health Commission. Safety measures to protect workers were reported to be inadequate at that time.

Off-Site Environmental Contamination

Limited off-site environmental testing has occurred. As part of the Blue Spruce evaluation for 2,3,7,8-TCDD contamination, samples of four vacuum bags and an air conditioner filter were taken from nearby residences. No 2,3,7,8-TCDD contamination was detected. In a separate investigation of residential drinking water supplies, the Middle-Brook Regional Health Commission tested several nearby private wells and reported contamination by organic chemicals. Specific results from the Middle-Brook Regional Health Commission investigations were not available for review and evaluation.

In 1980, the NJDEP qualitatively detected lindane and aldrin in water samples from the Raritan River collected downstream of the Brook Industrial Park.

QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) information was not available for review and evaluation. In preparing this health assessment, ATSDR and NJDOH relied on the information provided in the referenced documents and assume that adequate quality assurance and quality control measures exist with regard to chain of custody, laboratory procedures, and data reporting. The validity of the analysis and conclusions drawn for this health assessment is determined by the availability and reliability of the referenced information.

DEMOGRAPHICS

The area surrounding the Brook Industrial Park is moderately populated, consisting primarily of single unit and two-family homes. The population within a 1-mile radius of the site is approximately 11,300. The population within a 3-mile radius is estimated at 44,587.

The nearest residence is across the railroad tracks, approximately 500 yards from the site. There is a school within a half mile of the site. The Elizabethtown Water Company reports that 149,864 subscribers to their system draw from public supply wells. The nearest private well used for domestic purposes is 0.25 mile away from the site. A municipal well is 1.25 miles from the site. The section of the Raritan River which runs along the Brook Industrial Park is reportedly used for recreational purposes, i.e., fishing and swimming.

The population with the greatest potential for exposure to site contaminants are the on-site employees of various companies located at the Brook Industrial Park. Approximately 50 workers are employed at the National Metals, Inc., where it has been reported that inadequate occupational safety measures exist. Health complaints associated with chemical exposures have been documented at both this facility and at Consolidated Steel Fabricators, which is located adjacent to the Blue Spruce Facility.

ENVIRONMENTAL DATA GAPS

The Remedial Investigation and Feasibility Study of the Brook Industrial Park site has not been completed. The following site data and information needs are desirable for the formulation of a comprehensive Health Assessment.

In addition to the collection of on-site environmental data, there is a need for investigation into the nature and extent of off-site contamination due to the potential for migration of contaminants via the soil, air, surface water, and groundwater media beyond the facility. There is also insufficient information regarding possible bioaccumulation of chemical contaminants in Raritan River aquatics and water/land use by residents.

EXPOSURE PATHWAYS

Human exposure pathways presently identified at the site are associated with contaminated soils, surface-water, and groundwater. Pathways associated with other media may be significant but lack confirmatory data at this time.

Contact with or ingestion of on-site soils represent a potentially significant human exposure pathway. Several of the chemicals of potential concern at the BIP site include inorganic compounds such as heavy metals and pesticides such as aldrin, gamma-hexachlorocyclohexane (BHC), chlordane, DDT, DDD, DDE, dioxin, and methoxychlor, which have a high propensity for adsorption to organic matter associated with soil particles. Migration of these chemicals from surface soils to groundwater is expected to be limited due to high adsorption potential to soils and low solubility in infiltrating water.

Contact with surface water and surface-water runoff represent a potentially significant human exposure pathway at the site. Surface-water runoff from the site is likely to occur during precipitation events, carrying contaminants into nearby ditches, tributaries, and the Raritan River. Exposure to contaminants may be possible via recreational use of the Raritan River. Pesticides, 2,3,7,8-TCDD, heavy metals and volatile organic compounds (VOCs) in surface water runoff may be entering the river ecosystem and contributing to the bioaccumulation of contaminants in aquatic organisms.

A significant exposure pathway may be associated with contamination of private potable wells. To date, no site-related contamination of public supply wells has been detected. There are presently no available data describing well usage and quality of off-site potable wells. Exposure routes associated with the use of contaminated groundwater would include ingestion, inhalation of volatilized or aerosolized contaminants in indoor air, and, to a lesser extent, dermal absorption.

Personnel working on-site risk exposure to on-site contaminants through inhalation of airborne vapors or particulates and direct dermal contact with liquids or contaminated surfaces. Workers contaminated on-site may transport site-related contaminants to their residences via clothing and footwear. While the Blue Spruce building is uninhabited, its walls abut other operational facilities. During a 1985 inspection, the EPA contractors reported that the fence enclosing the 2,3,7,8-TCDD contaminated alleyway was found rolled back and that tire tracks were present, indicating workers enter the restricted area, and may be risking exposure. The alleyway is presently reported to be paved in an effort to minimize possible exposure in this area.

PUBLIC HEALTH IMPLICATIONS

The Brook Industrial Park worker population faces the greatest potential for exposure to hazardous contaminants from inhalation, dermal contact and ingestion. There is evidence that suggests improper worker safety measures may have contributed to past occupational health incidents at several of the BIP companies. In addition, nearby residents may be exposed to VOCs, heavy metals and pesticides that may have migrated from the site via the Raritan River, surface-water runoff, groundwater, on site vapors and fugitive dusts.

The site has been utilized for industrial activity for a period of at least 80 years; contamination emanating from the site may have been present for a similar period of time. The cumulative effect upon the public health of suspected exposure pathways associated with the site during this period is currently impossible to assess.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information reviewed, ATSDR and NJDOH have concluded that the Brook Industrial Park site is of potential public health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in Environmental Contamination and Physical Hazards section and Exposure Pathways section above, human exposure to heavy metals, pesticides, dioxin, and volatile organic chemicals may occur and may have occurred in the past, via dermal contact with contaminated soils, the potable and domestic use of contaminated groundwater, and through the occupational exposure of on-site employees.

There are a number of data and informational deficiencies regarding this site that are necessary to fully evaluate the site's impact upon the public health, and formulate a comprehensive Health Assessment. Many of these, as described above, will be addressed in the current RI/FS of the site. Of particular importance are the collection of additional off-site samples, along with a survey of activities of the facilities in the area. An up-to-date survey and monitoring of all nearby private wells should be conducted to determine if groundwater contamination has migrated off-site. Both on-site and off-site well monitoring should include analysis for dioxin contamination.

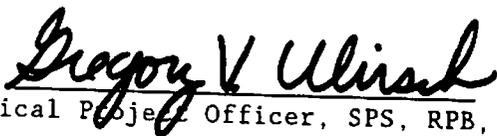
Occupational exposure of employees working in the Brook Industrial Park to on-site contaminants may be significant and merits further investigation and evaluation by the appropriate authorities.

In accordance with CERCLA as amended, the Brook Industrial Park site has been evaluated for appropriate follow-up with respect to health effects studies. Since human exposure to on-site and off-site contaminants may currently be occurring and may have occurred in the past, this site is being considered for follow-up health effects studies. After consultation with Regional EPA staff and State and local health and environmental officials, the Division of Health Studies, ATSDR, and NJDOH will determine if follow-up public health actions or studies are appropriate for this site. ATSDR will be considering sites for inclusion in the benzene subregistry, and this site will be included in the consideration.

When indicated by public health needs, and as resources permit, the evaluation of additional relevant health outcome data and community health concerns, if available, is recommended.

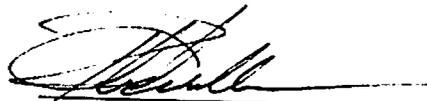
ERTIFICATION

This Health Assessment was prepared by the New Jersey State Department of Health 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 assessment was initiated.



Technical Project Officer, SPS, RPB, DHAC

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



Division Director, DHAC, ATSDR

PREPARER OF REPORT

James Pasquale
Research Scientist II
New Jersey State Department of Health

ATSDR REGIONAL REPRESENTATIVE

William Q. Nelson
Senior Regional Representative
Regional Services
Office of the Assistant Administrator

ATSDR TECHNICAL PROJECT OFFICER

Gregory V. Ulirsch
Environmental Health Engineer
Remedial Programs Branch
Division of Health Assessment and Consultation

REFERENCES

New Jersey Department of Environmental Protection, Division of Water Resources, Administrative Order and Notice of Civil Administrative Penalty Assessment, In the Matter of Jame Fine Chemicals, Inc, April 29, 1980.

NUS Corporation, Draft Work Plan for Remedial Investigation/ Feasibility Study of Blue Spruce International, Inc., Technical Directive Document No. 02-8501-03, July 1985.

NUS Corporation, Draft Field Investigation Team Activities at Uncontrolled Hazardous Substances Facilities - Zone 1, Focus Feasibility Study, Blue Spruce International, Inc., March 25, 1988.

US Environmental Protection Agency, Region II, Emergency Response and Hazardous Materials Inspection Branch, Pollution Report, Blue Spruce International, Inc., July 18, 1983.

US Environmental Protection Agency, Region II, Hazard Ranking System, Brook Industrial Park, Bound Brook, New Jersey, January 31, 1986.

File Reviews:

NJDEP Division of Hazardous Waste Management.

Middle-Brook Regional Health Commission.

Interviews and Meetings:

Middle-Brook Health Department.

RI/FS Scoping Meeting, Brook Industrial Park, Bound Brook, NJ, EPA Work Assignment No. 004-2195, ICF Technology, Inc., June 6, 1989.

Site Manger, NJDEP.

TABLE 1 - Groundwater Contamination at Monitoring Wells Located at the Blue Spruce Facility, Brook Industrial Park site.

| Compound | Maximum Conc. (ppb) | MCL* (ppb) |
|--------------------------|------------------------|---------------|
| Benzene | 260 | 1 |
| Chlorobenzene | 189 | 4 |
| 1,4-Dichlorobenzene | 46 | 75 |
| 1,2-Dichloroethane | 6 | 2 |
| Trans-1,2-Dichloroethene | 28 | 10 |
| Tetrachloroethene | 57 | 1 |
| Trichloroethene | 28 | 1 |
| Xylenes | 3,140 | 44 |
| Chlordane | 1.7 | 0.05 |
| Toluene | 9,000 | NA |
| Lead | 640 | 50 |
| Chromium | 458 | 50 |
| Arsenic | 240 | 50 |

* = N.J. Maximum Contaminant Levels.
 NA = Not Established.

TABLE 2 - Groundwater Contaminants in Production Well at Jame Fine, Inc., Brook Industrial Park Site.

| Compound | Maximum Conc. (ppb.) | MCL* (ppb.) |
|----------------------|-------------------------|----------------|
| Benzene | 42 | 1 |
| Carbon Tetrachloride | 1.2 | 2 |
| 1,2-Dichloroethane | 24.4 | 2 |
| t-1,2-Dichloroethane | 14 | NA |
| Tetrachloroethane | 160 | NA |
| Trichloroethene | 141 | 1 |
| Chromium | 520 | 50 |
| Iron | 3,750 | 300 |
| Lead | 56 | 50 |

* = N.J. Maximum Contaminant Level.
 NA = Not Established.