

Health Assessment for

AMERICAN CYANAMIDE COMPANY

CERCLIS NO. NJD002173276

BRIDGEWATER TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

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Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

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, risk assessments, risk evaluations and studies available from the Administrator of EPA."

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

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

**HEALTH ASSESSMENT
AMERICAN CYANAMID COMPANY
SOMERSET COUNTY
BRIDGEWATER TOWNSHIP, NEW JERSEY**

Prepared By:
Environmental Health Service
New Jersey Department of Health (NJDOH)

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

OBJECTIVES

The Phase 1 Remedial Investigation of the American Cyanamid site at Bridgewater, New Jersey is currently in the second year of Remedial Investigation activities, which include an extensive and ongoing groundwater monitoring program at the site. The objectives of this Health Assessment, based upon the current stage of site remediation, are to:

- * Assess the nature and magnitude of potential health effects associated with the site;
- * Identify, if necessary, immediate actions necessary to minimize exposure to hazards and contamination associated with the site;
- * Identify, if necessary, data gaps and deficiencies in information relating to the site;
- * Document the concerns of the community with regard to the site;
- * Review remedial activities in the context of their public health implications; and
- * Assess whether additional health study or investigation of the site is warranted.

SUMMARY

The American Cyanamid facility at Bound Brook comprises an area of approximately 575 acres in Somerset County, New Jersey. During the plant's first 50 years of operation, approximately 800,000 tons of chemical waste was discharged to 27 on-site lagoons

and containment areas. This resulted in severe contamination of underlying groundwater with organic chemicals. In 1981, under an Administrative Consent Order, American Cyanamid removed unlined drainage ditches, and began an extensive groundwater investigation and remediation program which has minimized off-site migration of contaminants. Analyses of on-site groundwater indicate that existing domestic wells are not currently impacted by the site. Contaminated soils and sludges will be addressed in the present RI/FS (Remedial Investigation and Feasibility Study). The American Cyanamid site is considered to be of potential public health concern by ATSDR and NJDOH. The American Cyanamid site is not being evaluated for additional health study and/or evaluation. Future remedial activities (e.g., extensive soil and sludge remediation and proposed incineration) may necessitate a reevaluation of the site's level of public health concern.

SITE DESCRIPTION

The American Cyanamid Company is the owner and operator of a 575 acre active industrial facility in Bound Brook, New Jersey. Contamination has been found on approximately 200 acres of the site, including the area of the main plant and the area across from the railroad tracks. The site is adjacent to the Raritan River and the Elizabethtown Water Company. During approximately 55 years of operation the company has produced over 800 chemicals. These include pharmaceuticals, dyes and textile chemicals, organic pigments, rubber chemicals, and intermediate chemicals.

Throughout Cyanamid's operations at the site, until 1981, unlined lagoons were utilized for the treatment of waste water and sludges. Sludge lagoons were filled to maximum capacity and then covered. Present site data indicates approximately 800,000 tons of chemical waste were buried in this manner at the site. These lagoons are the source of ground and surface water contamination; the groundwater underlying the site is severely contaminated with organic chemicals.

The groundwater contamination resulting from on-site lagoons and containment areas is well documented, and the focus of extensive study and remedial efforts by American Cyanamid. Other remedial activity at the site has included the removal of unlined ditches and the initiation of separate RI/FS processes for numerous impoundments (lagoons) and non-impoundment soils.

American Cyanamid was listed on the National Priorities List in December of 1982 and is currently ranked 28 among New Jersey NPL sites. The site is being remediated under the Resource Conservation and Recovery Act (RCRA), and the New Jersey Pollutant Discharge Elimination System (NJPDDES), as well as under CERCLA (Superfund). Cyanamid has signed two Administrative Consent Orders (ACOs). The

first, signed in December 1981, required Cyanamid to assess the contamination of the underlying groundwater from the on-site impoundments and to design and enforce a remedial plan. This ACO also required Cyanamid to pump and treat groundwater at the rate of 650,000 gallons/day from the Brunswick Formation at the Bound Brook plant. Water from these production wells is utilized by plant operations. Another ACO signed on May 25, 1988, assures approximately \$63 million for ongoing site remediation projects. Cleanup is proceeding, and is estimated by NJDEP to require approximately 10 years for completion.

COMMUNITY CONCERNS

The concerns of the community regarding the American Cyanamid site at Bound Brook focus upon the company's proposal to construct and operate a commercial hazardous waste incinerator on the property. To date, Cyanamid has been unsuccessful in gaining required State legislative approval because the proposed location for the incinerator is located upon a 100 year flood plain.

There is apprehension among local residents regarding the possible selection of on-site incineration as the preferred remedial alternative for dealing with the solid wastes contained in the lagoons. According to NJDEP Bureau of Community Relations information, there is suspicion among the community that Cyanamid will expand remedial incineration into a commercial operation.

Ongoing Resource Conservation and Recovery Act (RCRA) activities on the site have complicated community relations efforts, as the mechanism to provide community input in the Superfund and RCRA programs differ substantially. Members of the community have had trouble distinguishing RCRA from Superfund activities.

SITE VISIT

A site visit was conducted by NJDOH, NJDEP and American Cyanamid personnel in August of 1989. The American Cyanamid site is fenced and restricted, and there were security personnel at the entrance of the site to restrict unauthorized entry onto the facility. There have been incidences of persons entering the site by cutting the fence. Trails left by dirt-bikes were observed at various locations on the site, and there was evidence of hunting activity. Trespassers on the south side of the site could easily get onto a number of the impoundments in that area. Trespassers on the site could be subject to exposure to hazardous substances associated with various lagoons and fill areas (via direct contact and inhalation), and to physical hazards.

Several buildings on the site were in various stages of

demolition and may pose physical hazards to personnel on-site.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

The American Cyanamid site contains some 27 lagoons, land fills, and disposal areas. According to the Phase IV Source Assessment and Remedy Program Report, the contents of these lagoons may be characterized generally to contain either organic tars or wastewater treatment sludges. These lagoons have been identified as the source of contamination of the soil, ground water, and surface water media.

To date, remedial efforts have addressed surface and groundwater contamination. Unlined drainage ditches have been removed, and an on-site dike system has been repaired and extended to control surface water run-off. Present surface water controls are sufficient to prevent run-off except under the most severe storm or flood conditions.

Table 1 identifies contaminants of concern in groundwater, based on data reported in the fourth quarter 1988 Ground Water Monitoring Program report. Table 2 identifies contaminants of concern in several lagoons, based on analyses performed by American Cyanamid's consultant and presented in the Source Assessment and Remedy Program Report.

American Cyanamid is currently in the process of reducing the number of employees working on-site and scaling back production activities. Consequently, several areas of demolition exist which may present physical hazards. However, site security and supervision serve to minimize these risks.

QUALITY ASSURANCE/QUALITY CONTROL

Information regarding Quality Assurance/Quality Control (QA/QC) was not available in site literature for review and evaluation. QA/QC review of data generated by American Cyanamid as part of the Ground Water Monitoring Program is performed routinely by NJDEP according to established guidelines and methodology. According to conversations with NJDEP personnel, groundwater data has passed QA/QC reviews. Any QA/QC problems encountered in analyzing groundwater are not appreciable enough to impact the conclusions of this Health Assessment.

Analysis of samples from impoundments were reported in the Source Assessment and Remedy Program report (1983) to have been conducted in accordance with recommended United States Environmental Protection Agency (USEPA) guidelines presented in "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater,."

(USEPA/EMSL, EPA-600/4-82-057, July 1982).

DEMOGRAPHICS

The population within a three-mile radius of the American Cyanamid facility at Bound Brook is reported to be approximately 14,000 people. The closest private residence is approximately 1/2 mile from the site (ATSDR Site Summary, 1988). The area in which American Cyanamid is located is zoned industrial. Other chemical corporations (i.e., John-Manville and National Starch) are located nearby.

The Elizabethtown Water Company has a surface water intake for public water supplies approximately 2,000 feet from the American Cyanamid's settling impoundment. This intake dam is located on the Raritan River upstream from the site. The Elizabethtown Water Company supplies water to 500,000 people in the area. Current data indicates approximately 30 private domestic wells are located in proximity to the site.

The site visit and available site literature did not identify the presence of susceptible subpopulations or facilities in the adjacent community which might be at increased risk from activities at the site.

EXPOSURE PATHWAYS

The American Cyanamid site, in its present state of remediation, exhibits contamination of groundwater, soil, and surface water media. Potential air contamination has not yet been characterized, but future remedial activities at the site (eg., the excavation and possible incineration of the contents of lagoons) have the potential to impact air quality.

Ground water in the area of the site is part of the Brunswick aquifer, New Jersey's second largest source of drinking water. The Elizabethtown Water Company supply intake is located on the adjacent Raritan River, upstream from the site, and approximately 2,000 feet from one of Cyanamid's settling lagoons. According to information contained in American Cyanamid's Groundwater Monitoring Program Status Report, (submitted quarterly to NJDEP) a groundwater control system has been effective in minimizing the off-site migration of contaminants into the aquifer. American Cyanamid has undertaken an extensive ground water monitoring and contamination control program, under the supervision of NJDEP. Although monitoring wells indicate substantial groundwater contamination by organic chemicals, off-site migration of contaminants has been effectively minimized by pumping and treating 650,000 gallons per day drawn from perimeter production

wells screened in underlying bedrock. Hydrogeologic data indicates such pumping has created a cone of depression, of sufficient size and magnitude, to influence local hydraulic gradients and consequent flow direction.

Although American Cyanamid's pumping of production wells induces much of the contamination from site sources to flow to bedrock formations where they are removed and treated, they are not completely effective in containing and eliminating contaminants in groundwater. According to the "Report on Groundwater Investigations at the American Cyanamid Facility at Bound Brook", contaminants originating on-site, that are not captured by the production wells, will ultimately discharge into the Raritan River. Lagoons 6, 7, and 24 are cited as contributing 0.5 ppb. Total Organic Carbon (TOC) into the Raritan river, while lagoons 17 and 18 contribute 0.6 ppb. TOC, under average streamflow conditions. These concentrations reflect the practical limit of the contaminant containment efforts of the on-site groundwater control program. Although the contamination of the surface water appears to be minimal, the Raritan River is used for recreation. There are potential exposure pathways associated with the recreational use of the Raritan River.

Data and information indicate that domestic wells in the area or the source intake of the Elizabethtown Water company have not been impacted by the site.

Contact with lagoon contaminants and associated contaminated soils by authorized and unauthorized persons on-site is a possible human exposure pathway. Remote parts of the site may be utilized for off-road motorcycle riding and hunting of game. Contaminants and/or contaminated soils may be ingested, deposited on the skin, or inhaled during exposure to clouds of dust generated from soil disturbance. Ingestion of game may also represent a human exposure pathway.

ENVIRONMENTAL DATA GAPS

American Cyanamid's ground water investigation and treatment program has generated a great quantity of data on the hydrogeology under the site, and the nature and extent of groundwater contamination plumes. Information regarding the groundwater media is comprehensive. However, there is a lack of information available on the quality of groundwater in domestic wells near the site.

Additional media that need to be characterized include the water contained in lagoons and the air. In addition, the impact of the lagoons that are south of the railroad tracks on the quality of the River needs to be better addressed.

PUBLIC HEALTH IMPLICATIONS

American Cyanamid began depositing chemical wastes in on site lagoons during the mid 1930's. Although there is no supporting data from that period, it is reasonable to assume groundwater contamination has been present for a similar length of time. The impact on the public health of area groundwater contamination for the approximately 45 years before a groundwater control program was initiated is unknown.

American Cyanamid's current efforts to minimize off-site migration of ground and surface water contamination have significantly diminished the public health concern associated with these media. According to available data from the monitoring wells, existing domestic wells in the area have not been affected by the site. While the site does impact the Raritan River, TOC contributions have been minimized. A refurbished dike and flood control system minimize transport of contaminants by surface run-off.

There is a public health concern surrounding trespassing near or on the lagoon that are south of the railroad tracks. Air quality may be impacted during the remediation of lagoons and on-site soils. Excavation, removal, and possible on-site incineration of sludge and contaminated soil has the potential to release contamination into the air.

CONCLUSION AND RECOMMENDATIONS

On the basis of information reviewed, ATSDR and NJDOH have concluded that this site is of potential public health concern because humans may be exposed to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Pathways and Public Health Implications Sections above, human exposure to hazardous substances may occur and has probably occurred in the past via the use of contaminated groundwater for potable and domestic purposes and trespassing on site.

Existing and/or available information is not sufficient to evaluate the significance of the impact of all existing lagoons and impoundments on the site to groundwater quality. Data gaps as described above need to be filled. A reevaluation of off-site groundwater quality, and existing area domestic wells identified as being in close proximity to the site, is needed to insure the effectiveness of ongoing pumping programs designed to minimize off-site groundwater contamination. It is likely that the contamination contribution which occurred in the past before ground water pumping began was significant and occurred over an extended period of time.

Unauthorized access to the site can result in significant human exposure. The site perimeter needs to remain secured and posted as to the health hazards within. Better security is needed in the area south of the railroad tracks.

Remedial actions that have been taken to date have served to minimize some of the exposure to contaminants from the site. A change in site physical or hydrological conditions or ongoing remedial activities, in particular the presence of an on-site incinerator (commercial or temporary), may necessitate the reevaluation of the site's public health concern.

In accordance with CERCLA as amended, the American Cyanamid site has been evaluated for appropriate follow-up with respect to health effects studies. Since a population exposed to on-site and off-site contaminants at a level of public health concern has not yet been identified, the American Cyanamid site is not being considered for community follow-up health studies at this time. If data become available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has occurred in the past, ATSDR and NJDOH will reevaluate this site for any indicated follow-up.

This Health Assessment was prepared by the State of New Jersey, Department of Health, Environmental Health Service, under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concur with its findings.

REFERENCES

Superfund Documents:

Administrative Consent Order (ACO): In the Matter of American Cyanamid Company and NJDEP. Signed December 21, 1981.

Agency for Toxic Substances and Disease Registry (ATSDR) Site Summary, June 1988.

Blasland & Bouck, Report for the Fourth Quarter 1988 NJPDES/DGW Permit Ground-water Monitoring Program: American Cyanamid Company; December 1988.

Camp Dresser & McKee Inc., "Report on Ground Water Investigations at the American Cyanamid Facility at Bound Brook, New Jersey.", September 1985.

New Jersey Department of Environmental Protection (NJDEP), Hazardous Waste Program Status Report: October 1988.

O'Brien & Gere Engineers, Inc., Source Assessment and Remedy Program; February 1983.

O'Brien & Gere Engineers, Inc., Final Report Source Assessment and Remedy Program; December 1984.

United States Environmental Protection Agency (USEPA), Hazardous Ranking Scoring Information, August 17, 1982.

Interviews/Telephone Communication:

American Cyanamid Company, Bound Brook, New Jersey:
Environmental Project Manager

NJDEP/Division of Hazardous Waste Management:
Case Manager
Former Case Manager

TABLE 1 - Contaminants of Concern in Ground Water; American Cyanamid Site.

Maximum Reported Concentrations (ppb)

Compound	Production Wells	Bedrock Wells	Overburden Wells	MCL
Chloroform	54	320	26	NA
Trans-1,2-Dichloroethene	57	90	-	10
Benzene	4,900	2,000	2,700	1
Tetrachloroethylene	10	39	-	1
Chlorobenzene	1,400	10,000	2,000	4
Methylene Chloride	11	-	300	2
Trichloroethylene	11	16	-	1
Bis(2 Ethyl Hexyl)Phthalate	94	1,100	93	NA
1,2-Dichlorobenzene	18	260	65	75
1,2-Dichlorobenzene	90	2,400	300	600
Nitrobenzene	520	32,000	-	NA
1,2,4-Trichlorobenzene	130	560	210	8
Napthalene	22	4,200	3,900	NA
Total Phenols	140	85	5,876	NA
1,2-Dichloroethane	-	25	33	2
2,4-Dimethylphenol	-	-	3,600	NA
Arsenic	-	-	53	50
Chromium	-	-	60	50

NA = Not Available

MCL = Maximum Contaminant Level.

Data From Ground Water Monitoring Program Report, 4th. Quarter: 1988.

TABLE 2 - Contaminants of Concern in Lagoons; American Cyanamid Site.

Compound	Maximum Concentrations (ppm)			
	Lagoon			
	3	5	9A	14
Benzene	4,100	7,200	6.3	610
Toluene	1,300	12,000	-	1,200
M-Xylene	190	3,500	-	330
Xylene	370	6,400	-	590
Chlorobenzene	-	15,000	-	3,200

Data from ATSDR Site Summary; June, 1988.