

# Health Assessment for

SYNCON RESINS

KEARNY, NEW JERSEY

OCTOBER 3, 1988

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

## SUMMARY

The Syncon Resins Site was the location of a producer of alkyd resin carriers that ceased operations in late 1982 and was placed on the National Priorities List (NPL) in December 1982. This inactive site occupies approximately 15 acres in the City of Kearny, Hudson County, New Jersey. It is situated on the peninsula formed by the Passaic and Hackensack Rivers, with the western property boundary being the Passaic River. In addition to the buildings on-site, the site consists of 2 unlined lagoons, numerous large bulk storage tanks, underground storage tanks, at least 2 reactor buildings housing stainless steel vessels, and approximately 12,800 55-gallon drums. There was extensive contamination from a myriad of compounds ranging from raw materials, to finished products, process solvents, polychlorinated biphenyls (PCB's), metals, and pesticides. The interior of some buildings were grossly contaminated, as well as the lagoon areas and the shallow groundwater. At one time, the shallow groundwater was contaminated with at least 24 compounds, 9 had concentrations in the percent range.

This site is of potential health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. The Record of Decision (ROD) is for source control and removal. Any additional remedial actions at Syncon Resins will be the subject of another ROD. This ROD adequately addresses the health concerns associated with the potential for exposures to environmental contamination. The interiors of the buildings should be cleaned such that exposures or the potential for exposures will not exceed all applicable Occupational Safety and Health Administration regulations and standards and/or National Institute for Occupational Safety and Health recommendations.

## BACKGROUND

### A. SITE DESCRIPTION

The 15-acre Syncon Resin Site situated on the Passaic River in Kearny, Hudson County, New Jersey, is in a heavily industrialized area. Bounding the west of the site is the Passaic River; adjacent to the site are two hazardous wastes haulers, one to the north and the other to the south. Across Jacobus Avenue, to the east, is a lacquer manufacturing firm. At one time a fence surrounded the property; however, it has been reported that the fence has been damaged in some areas and access into the property is not totally restricted. The closest residential areas are to the west, across the Passaic River, 1 mile and to the southeast, across the Hackensack River, approximately 1 1/2 miles.

When Syncon Resins was placed on the NPL list, there were 12,824 55-gallon drums on-site in various conditions. Also present were approximately 150 bulk storage tanks ranging in size from 375 gallons to 600,000 gallons and 5 suspected underground storage tanks. There were 2 unlined process wastewater lagoons; lagoon #1 was the larger, and was approximately 40 by 135 feet and about 4 feet deep. Lagoon #2 was about one-third the size of Lagoon #1, and was also, approximately 4 feet deep.

There were 13 buildings on-site, 6 main buildings, and 7 ancillary structures, all in various stages of disrepair. Five of the buildings were sampled during the Remedial Investigation/Feasibility Study (RI/FS) process. The others were not sampled because these buildings apparently housed some of the same industrial processes and because the visible signs of gross contamination were similar to the contamination found in the other sampled buildings. One building was not sampled because its dilapidated condition made it unsafe.

The ROD, signed in 1986, mandated the removal of the contents of the storage tanks and reaction vessels as well as the liquids and sediments in the lagoons. The drums and barrels have been removed from the site, leaving approximately 150 tanks and vessels.

### B. SITE VISIT

The Agency for Toxic Substances and Disease Registry has not conducted a site visit at this time.

## ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

### A. ON-SITE CONTAMINATION

The contamination on-site can be divided into four general categories: organic compounds (volatile and acid/base-neutral extractables), pesticides, PCB's, and metals.

The volatile organic compounds (VOC's) were widespread throughout the facility; however, the highest concentrations were in the lagoon sediments and shallow groundwater. The primary contaminants were toluene, xylene, trichloroethylene (TCE), and benzene. The acid/base-neutral compounds detected were mainly variously substituted phthalates, naphthalene, and methylnaphthalene. The highest concentrations of the phthalates were in the soils around the buildings and the highest concentrations of the naphthalenes were in the groundwater near the tank farm (the 600,000 gallon storage tank area).

The pesticide contamination was mainly DDT and aldrin. It was detected in the shipping and receiving areas, storage areas, and the drum storage areas. It was reported that the distribution of the contamination in the soils suggests that it may have been caused by spillage of stored pesticides.

The PCB contamination, identified as Aroclor 1248 and 1254, was generally in the lagoon sediments and the production buildings. Further contamination was detected in the soils in the northeast corner of the site, away from the lagoons and production areas. The PCB found there was Aroclor 1260.

Metal contamination was detected over the entire site and within the buildings. The higher concentrations were detected in the soils of the western one-third of the property. The metals of concern were lead, cadmium, nickel, and chromium.

The shallow groundwater was also highly contaminated with compounds from the site. However, in general, the contamination was limited to approximately the upper 10 feet.

The following Table of Contaminants is a summary of site contamination using maximum concentrations in parts per million (ppm) and general location at site.

Table of Contamination <sup>1</sup>

Compound	Soil	Shallow Groundwater	Lagoon #1 Sediment	Lagoon #2 Sediment
Toluene	2,400	280	26,000	7,900
Xylenes	1,600	12,000	270	3,300
TCE	---	2	---	---
DDT	120	---	---	---
aldrin	0.17	---	---	---
PCB 1248	31	---	1,200	41
PCB 1254	---	---	410	13
Lead	4,900	0.018	372	1,980
Cadmium	31	---	97	106
Nickel	89	0.13	ND	52
Chromium	829	ND	117	160

Note: All results reported in parts per million (ppm)

1 Data from the 1985-1986 site investigations.

--- no information was available.

ND Not detected.

The data from the limited site investigation in 1982 indicated PCB concentrations of greater than 33,000 ppm, and shallow groundwater contamination by VOC's was in the percent range. The 1985 RI/FS data indicated a marked reduction of these contaminants. It is unclear as to reason for the inconsistencies of the analytical results.

The interiors of the buildings were contaminated with metals, VOC's, pesticides, and PCB's. The metal contamination is of primary public health concern. Although other contaminants were detected, the proposed remedial activities for metal contamination removal should also remove the other

contaminants to concentrations which will be of minimal health concern. The following table indicates the concentrations of the contaminants of concern.

Table of Contaminants, Building Interiors

<u>Compound</u>	<u>Bldg-1</u>	<u>Bldg-7</u>	<u>Bldg-10</u>	<u>Bldg-11</u>	<u>Bldg-Red</u>
Barium	4,650	6,090	3,820	5,200	852
Chromium	428	162	64	288	313
Cadmium	17	96	7	14	146
Lead	4,379	3,360	3,540	1,540	1,780
Zinc	10,500	7,250	3,140	1,460	6,710
TCE 1.5	1.5	1.6	2.6	1.7	
Toluene	1.2	1.8	---	---	---
Xylene	1.0	15.0	---	0.6	---
PCB's	17	2.7	---	24	---

Note: All values are reported in ppm

#### B. OFF-SITE CONTAMINATION

From the available information, it appears there was no off-site sampling.

#### C. PHYSICAL HAZARDS

The condition of the buildings were reported as structurally sound with the exception of one, which was called the Oil Building. The Oil Building was scheduled to be destroyed during the cleanup. The other buildings are in various states of disrepair (i.e., broken windows and doors, etc.). These conditions may be corrected during the site remediation. More than 12,800 55-gallon drums have been removed; however, there were approximately 150 other tanks of various sizes remaining, which may pose a hazard.

The site was fenced with a chain link fence; however, it has been damaged and is down in some places which may allow unauthorized entry onto the site. The site is in a heavily industrialized area, away from residential sections; therefore, trespassing by children would probably be minimal. The tanks and buildings may pose physical, as well as health, hazards to those who venture on-site for whatever reason.

#### DEMOGRAPHICS OF POPULATION NEAR SITE

The Syncon site is located on Jacobus Avenue in Kearny. This area is an industrial area containing various manufacturers, chemical companies, hazardous waste haulers, oil refineries, and storage terminals. The closest residential area is 1 mile to the west, in the City of Newark, New Jersey. There are no municipal water supply wells in the immediate

area. The available information indicates there was no use of the shallow groundwater in the area and the deep aquifer groundwater was for industrial use only.

## EVALUATION

### A. SITE CHARACTERIZATION

#### 1. Environmental Media

The site has been adequately characterized through numerous monitoring well, tank, soil and test pit samples, and samples from the building interiors. Additional information is unnecessary.

#### 2. Land Use and Demographics

Additional information is unnecessary.

#### 3. Quality Assurance and Quality Control

There were quality control samples included in the sampling program used during the RI. The results of the splits, spikes, and blanks were reported to be within the acceptable range. It was assumed that the analytical data has been reviewed by U.S. Environmental Protection Agency and has met their acceptability criteria. The conclusions in this Health Assessment were based on the information received. The accuracy of these conclusions is determined by the completeness and reliability of that information.

### B. ENVIRONMENTAL PATHWAYS

Based on the available information, of the approximately 150 tanks that remain on-site, nearly half are empty. The contents of the other tanks are known, and the tanks have been divided into two groups, hazardous and nonhazardous. The leaking of these tanks may cause further soil contamination. The ROD stated that the removal and proper disposal of tank contents, then dismantling and removal of the tanks should be an effective remediation.

The soils over the entire site are contaminated. Some areas were more contaminated than others, such as the soils around the tank farm and the sediments of the process wastewater lagoons. The ROD remedial action provides for excavation of soils in the grossly contaminated areas and disposal in approved hazardous waste landfills. These areas will be covered with "clean fill".

The dirt and dust inside the buildings were contaminated with metals, VOC's, and in some buildings, PCB's. Most of the contamination was associated with the production processes. The cleanup of the buildings will be conducted during the remedial activities and several different methods may be employed. However, depending on future use, all buildings should be cleaned in accordance with applicable regulations and standards.

The geology of the site is such that the original surficial soil is a fine to coarse sand approximately 10 feet thick. However, much of the site contains soils consisting of rubble and debris. Beneath the surficial soil layer is a clay layer between 8 and 10 feet thick which underlies the entire site. This clay layer, acting as an aquitard, had not allowed for site contamination to penetrate deeper into the ground or lower aquifers. The shallow groundwater on-site is contaminated with a variety of compounds. This aquifer, which is not known to be used for any purpose, discharges into the Passaic River. While the flow of the river may dilute the contaminants to negligible levels, the contaminated groundwater still contributes to the overall contamination of the river.

Some contaminants found in the groundwater can bio-accumulate in the biota. There are health advisories in effect for fish and shellfish in the Passaic and Hackensack Rivers. However, these advisories were not issued specifically because of the contamination at Syncon Resins.

### C. HUMAN EXPOSURE PATHWAYS

It was reported that the shallow groundwater was not being used and that the remedial alternative will pump and treat this water with subsequent discharge to the Passaic River. The potential for exposure to the shallow groundwater should be minimal.

The groundwater from the deep aquifer is used for industrial purposes. The analytical results did not indicate the presence of site-related contaminants in the deep groundwater. Therefore, the potential for exposure to site contaminants through the use of the deep groundwater appears to be minimal.

There is the potential for exposure to the indoor contaminants through inhalation. The air monitoring results did not detect metals or VOC's in the outdoor air.

The food chain pathway may present a human health concern through the consumption of shellfish. This may not be directly related to this site's contaminants. A health advisory previously issued warning consumers about the consumption of contaminated fish and shellfish harvested from the Passaic and Hackensack Rivers may minimize the exposure to contaminants by this route.

The remedial workers are a population of concern and may be exposed to the contaminants through dermal contact, inhalation, and inadvertent ingestion of soils. However, through the use of proper personal protective equipment, all of these exposure routes can be mitigated.

Trespassers on the site are also of concern, especially children. Exposure through inadvertent soil ingestion and inhalation are of health concern particularly for the more susceptible populations. There are numerous physical hazards on site which could result in an injury. The future land use of the site was not discussed; however, it is assumed



that after proper remediation the site will become a marketable business property. If commercial activity at the site resumes without adequate remediation, there may be further exposure to contaminants at concentrations of public health concern.

Assuming the site will become a business property, there is potential for future employee exposure to metals, VOC's, and PCB's through inhalation and ingestion if interior building remediation is incomplete. Exposure to VOC's and some metals may occur by dermal contact, ingestion, or inhalation of soils and sediments from around the site.

Some of the contaminated surface soils and lagoon sediments will be removed during remedial activities and clean fill brought in cover a majority of the site. This should reduce the potential for exposure through through contact, inhalation, and/or inadvertent ingestion of contaminated soil.

#### PUBLIC HEALTH IMPLICATIONS

The primary contaminants inside the buildings were lead, chromium, cadmium, zinc, and barium.

Estimated long-term exposures to lead in ingested soil and building dusts and dirt are of public health concern. Exposure to lead may produce several effects. Lead may inhibit hemoglobin synthesis and decrease red blood cell survival; it may cause renal, peripheral nerve, and hepatic dysfunction; and it may increase blood pressure. There are several sub-populations that are particularly susceptible to lead toxicity. These sub-populations include developing fetuses, children, and individuals with hepatic or renal disorders.

Chromium has been detected in the dust and dirt of the buildings. In some areas the concentration exceeds the background by several orders of magnitude. Chromium exists primarily in two oxidation states, the trivalent and the hexavalent. While trace quantities of trivalent chromium are essential for carbohydrate metabolism, hexavalent chromium is a human carcinogen by the inhalation exposure route. The available data did not indicate which oxidation state(s) was present. The concentrations present may cause, through ingestion, acute effects such as acute renal tubular necrosis. The inhalation of dusts may pose a health problem. Also, dermatitis and allergic skin reactions can occur with dermal exposure to hexavalent chromium compounds.

Cadmium exposure through inhalation may result in lung and/or prostrate cancer but by oral ingestion, cadmium has not been shown to be a carcinogen. However, chronic ingestion may result in renal tubular dysfunction. Other effects on the respiratory tract, which may be proportional to the concentrations and duration of exposure, can range from chronic bronchitis to emphysema.

The concentrations of barium detected inside the buildings exceeded 6,000 ppm in some areas. The toxicity of barium depends upon its solubility, some barium compounds are acid-soluble and toxic, whereas barium sulfate is not soluble and has less potential for adverse effects. Chemical speciation was not performed for the barium compounds. The barium ion stimulates smooth, striated, and cardiac muscle. Inhalation or ingestion of barium dusts may result in violent peristalsis, arterial hypertension, and fasciculations. One distinctive effect of large doses is paresis leading to flaccid paralysis of the extremities and respiratory muscles.

Health effects seen from excessive ingestion of zinc may be gastrointestinal distress and diarrhea. Toxic inhalation of metal fumes or "metal fume fever" is usually the most significant effect from zinc exposure. However, "metal fume fever" would not be expected in this situation because it arises from a different type of industrial exposure.

The concentrations of PCB's in the lagoon sediments are such that long-term exposure to these contaminated media would pose a public health threat. Short-term exposure to PCB compounds may result in chloracne and abnormal liver function tests. Longer term exposure may result in endocrine abnormalities. PCB's have been found to be mutagenic and are considered probable human carcinogens.

#### CONCLUSIONS AND RECOMMENDATIONS

Based on the information reviewed, ATSDR has concluded that this site is of potential health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Pathways and Human Exposure Pathways sections above, there is potential for human exposure to lead, cadmium, and chromium via inhalation and ingestion of the dusts and dirt from the buildings and soil ingestion particularly by children and remedial workers. The potential exists for exposure to contaminants from the sediments of the former lagoons, and to contaminants from the storage tanks and soils from various areas around the site. Potential exposure routes are ingestion, inhalation, and dermal contact and may lead to adverse health effects. There may also be exposure to toxic substances through the consumption of fish and/or shellfish caught in the rivers near the site; however, these contaminants may not be site-related. The ROD has identified and proposed remedial activities for removal and disposal and/or for containment and treatment of the contaminants such that they will not be of human health concern.

The remedial worker is of specific concern; however, this concern may be mitigated through the proper use of personal protective equipment and following all other applicable guidelines and precautions. Future land use and activities inside the current structures may pose health concerns for future employees depending upon the activity and cleanup levels.

The recommendations are as follows:

1. Restrict access to the site.
2. Provide proper safety training and protective equipment to remedial workers and follow all other applicable guidelines and precautions.
3. Remove contamination inside the structures, at a minimum, to concentrations which do not exceed applicable standards.
4. Implement institutional controls to prevent future land use from increasing exposure to remaining contamination (e.g., restrictions on shallow groundwater usage).
5. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act as amended, the Syncon Resins Site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to on-site contaminants had occurred in the past, this site is not being considered for follow-up health studies at this time because the available information indicates there is no current human exposure and there is no adequate way to evaluate the potential past exposures.

PREPARER OF REPORT

Max M. Howie, Jr.  
Environmental Health Specialist  
Health Sciences Branch

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