Health Assessment for

MAYWOOD CHEMICAL COMPANY

CERCLIS NO. NJD980529762

MAYWOOD, BERGEN COUNTY, NEW JERSEY

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

HEALTH ASSESSMENT
MAYWOOD CHEMICAL COMPANY SITES
BERGEN COUNTY
MAYWOOD, 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

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

BACKGROUND

The Health Assessment for the Maywood Chemical Company Site includes the Maywood Interim Storage Site (MISS), the Ballod property, the Scanel site, residential properties, and the Sears warehouse and its adjacent properties, all of which are located in the towns of Maywood and Rochelle Park of Bergen County, New Jersey (see Figure 1). These sites are at different investigative or remediation stages under the auspices of both the US Environmental Protection Agency (EPA) and the US Department of Energy (DOE). The EPA is responsible for chemical characterization and cleanup operations, whereas the DOE is primarily in charge of radiologic analysis and remediation.

For 40 years, the Maywood Chemical Works Company processed thorium ore for the manufacturing of gas lanterns and mantles. Until cessation of plant operations in 1956, all process wastes were pumped to diked areas west of the facility. In 1932, New Jersey Route 17 was built through the disposal area. Some of these radioactive waste materials were removed from the site and used as fill dirt and mulch for nearby properties. As a result, the Maywood site has led to radioactive and chemical contamination of much of the local area. The site of the former Maywood Company is now owned by the Stepan Chemical Company.

After an accidental discovery of radiologic contamination on property formerly owned by the Stepan Chemical Co. in 1980, testing by the State of New Jersey and the Nuclear Regulatory Commission (NRC) revealed extensive, low level radiologic contamination at several different locations. The 1984 Energy and Water Appropriations Act mandated the DOE to conduct a

decontamination project at the former Maywood Chemical Company (Stepan Chemical Co.) property. As part of this effort, the DOE now owns 11.7 acres of land along the Stepan Chemical Co. property and has constructed the Maywood Interim Storage Site (MISS). The contaminated soils that have been removed from the various Maywood sites are stored at the MISS until a permanent storage facility can be identified.

The Health Assessment for the Maywood site is highly complex due to the inclusion of five different properties, each with different chemical, radiologic and human exposure characteristics. For evaluation purposes, the on-site contamination for each property will be discussed separately in order to clarify the overall analysis.

COMMUNITY CONCERNS

The concerns of the communities involved with the MISS and its associated environmental issues have been extensively documented by DOE, EPA, New Jersey Department of Health (NJDOH), New Jersey Department of Environmental Protection (NJDEP), and through the media. The interests of the municipalities of Lodi, Maywood, and Rochelle Park are interactive and complex in nature, and often the focus of intense discussion and debate. This site is generally considered by concerned citizens to be an ongoing and active threat to the public health and safety.

The general issues of public concern regarding the MISS may be summarized as follows:

* The presence of radioactive and chemical wastes in area soils and groundwater. Although not yet proven, contamination of the Lodi wells is commonly attributed by the public to have originated from the old Maywood Chemical works. Additionally, there is contamination of private and commercial properties in the vicinity of the site.

* The decision to construct an interim storage site for contaminated soils in a relatively densely populated area has met with public resistance and outrage. Governmental assurances of the safety and necessity of this decision have been rejected by area residents and officials.

* The perceived lack of comprehensive characterization of the nature and extent of the radiological and chemical contamination present on the Stepan Chemical Co. property and other suspect areas.

* A dissatisfaction with the remedial investigation and risk assessments performed regarding the site, in light of a publicly perceived condition of incomplete characterization of the nature and extent of contamination.

At a recent meeting (July 1987), that was conducted by NJDOH, the following issues of concern were identified:

* Residents called for the termination of additional storage at the MISS to prevent further contamination of the site. Residents perceive the site as a continuous and growing hazard.

* The immediate commencement of remedial actions.

* The identification of areas within the Stepan property which were utilized for final disposal of hazardous wastes.

* The identification of areas outside the Stepan property which were utilized for the disposal of process wastes.

* Determination of the nature and extent of eight known buried waste deposits associated with the site.

* The identification and remediation of buried drummed wastes cited by members of the community.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. On-Site Contamination for the Sears Property

Sears, Roebuck and Co. presently owns a long-term lease on 31 acres of property that is bounded on the west by NJ Route 17, on the north by the MISS and Stepan Co. and by other commercial facilities to the east and south (see Figure 1). One third of the property is occupied by the Sears warehouse which is surrounded by concrete parking and storage areas. Approximately 225 employees work at this location, most of whom spend the majority of their work day inside the warehouse. The remaining area is grass covered with a swampy section off to the east of the building. The southern portion of the property houses several commercial facilities, including two gasoline stations and additional warehouse facilities. Through a consent agreement between the Stepan Company and the EPA, a Remedial Investigation/Feasibility Study (RI/FS) will be

conducted on the Sears property. The Stepan Co. and their contractor, CH2M Hill, are presently developing the RI/FS work plan.

Gamma radiation levels on the property ranged from background levels (5,000 counts per minute (cpm)) to 244,000 cpm. Radioactivity was detected in an area of approximately 940,000 square feet. Sediment samples were also taken from the swamp areas which contained standing water. Water in these locations contained low levels of gross alpha contamination which fell below DOE guidelines. In addition, tests for radiologic contamination were conducted in the subsurface soils below the Sears facility. The maximum contamination level detected in the various soil samples are compared below to the Department of Energy's remedial action guidelines.

TABLE 1: RADIOLOGIC CONTAMINATION OF SOIL MEDIA AT THE SEARS SITE

Radionuclide	Location	Maximum Concentration (pCi/g)	DOE Guideline
Thorium-232	surface soil	70.0+8	5
Thorium-232	sediment	93.0+2	5 (a)
Thorium-232	bldg. soil	180.0+13	15 (b)
Radium-226	surface soil	10.0+1	5
Radium-226	sediment	9.0+2	5 (a)
Radium-226	bldg. soil	37.0+10	15 (b)

Footnotes:
(a) There are no DOE guidelines for radiologic contamination of sediment; guidelines for soil are used for comparison purposes.
(b) The DOE guideline for any 15 cm. thick soil layer below the surface layer.

Chemical analysis of the Sear's soil using soil boring techniques revealed primarily six classes of contaminants: 1) volatiles; 2) base/neutral compounds; 3) pesticides (primarily organochlorines); 4) heavy metals; 5) gasoline and fuel oil contaminants; 6) essential and ethereal oils and caffeine. Almost all contaminants were detected at surface level in the northwest quadrant of the site and the grassy area located across from the Sears building areas. The exception was the gasoline and fuel related contaminants which were found subsurface in the 3- to 11-foot depth range. Table 2 below illustrates the maximum soil contamination levels which exceeded the applicable or relevant and appropriate requirements (ARARs).

TABLE 2: CHEMICAL CONTAMINATION OF SOIL AT SEARS/MAYWOOD SITE

Contaminant	Maximum Concentration (ppm)	ARARS (ppm) a
Methyl ethyl ketone	6.2	1.0
Total Petroleum Hydrocarbons		100.0
Benzene	81	
Toluene	9.4	
Ethylbenzene	55	
Xylene	120	
Arsenic	27	20.0
Cadmium	4.3	3.0
Chromium	439	100.0
Lead	8420 (R)	250-1,000
Mercury	30	1.0

Footnotes:
(R) Rejected for exceeding of laboratory hold time (see QA/QC section for explanation).

In particular, the Sears on-site contamination patterns associated with benzene, toluene, xylene and ethylbenzene, which are common octane-boosting additives to gasoline, lead one to surmise that much of the chemical contamination may be due to a nearby underground gasoline storage tank. There are several gasoline stations nearby which may have either surface spillage or a leaking underground gasoline tank. All on-site contaminants were near surface, with the exception of gasoline-related contaminants, which indicates contamination was due to surface spillage or the use of contaminated fill. Most surficial contamination is located in the grassy areas across from the Sears parking lot.

During the boring operations for soil samples at the Sears site, buried drums containing sludge-like material were discovered. Analysis revealed high levels of benzene, toluene, xylene, and bis (2-ethylhexyl) phthalate in the containers. After drums were pierced from the bores, the holes were temporarily plugged to prevent further volatile release of the contaminants. Through both drilling and the use of metal detectors, it appears that barrels had previously been discarded in former creek channels on the property.

To date, no groundwater samples have been taken from this site. These samples are necessary to accurately characterize the site.

Quality Assurance/Quality Control

All chemical contamination data for the Sears site was validated by Ebasco using EPA data validation guidelines for organic, pesticides/PCBs and inorganic compounds. In the case of lead, data that may have been rejected because it exceeded laboratory holding time requirements was included in this document because it would only result in a lower estimate of chemical concentration. Since the levels are still high, this data is reported even though it reflects an underestimation of the actual concentration.

B. On-Site Contamination of the Maywood Interim Storage Site

The Maywood Interim Storage Site (MISS) has been designated by the Department of Energy as a temporary storage facility for the radioactive waste gathered from the Maywood-related remedial action operations. The MISS is a fenced vacant lot occupying 11.7 acres. An on-site storage pile of low-level radioactive waste covers approximately two acres of land and an additional area has been prepared for use as a second storage pile. The MISS is located in a highly developed residential and industrial area which runs along the border of the towns of Maywood and Rochelle Park. The population density of the area is approximately 10,000 people per square mile. Residential areas lie north of the site roughly 300 yards from the railroad that bounds the MISS property. The waste presently stored on the site is from remedial actions performed in 1984 and 1985 at several nearby properties, including twenty-five Maywood, Lodi and Rochelle Park residential properties and portions of the Ballod property in Rochelle Park.

The Department of Energy's characterization of the site reveals the presence of both radiologic and chemical contamination. Near surface gamma radiation measurements on the property ranged from a background level of 5000 cpm to approximately 994,000 cpm. (A gamma reading of 11,000 cpm is approximately equal to the DOE's guideline of 5 pCi/g). Subsurface measurements from borehole sampling revealed radiological contamination ranging between 2000 cpm and 4,300,000 cpm. (A gamma reading of 40,000 cpm is equivalent to the DOE guideline of 15 pCi/g for subsurface contamination.) Thorium-232 was identified as the primary radioactive material on-site with elevated levels of radium-226 and uranium-238 also detected. Table 3 reports the maximum soil values which exceed the DOE's remediation action guidelines.

TABLE 3: RADIOLOGIC CONTAMINATION OF THE MISS SOIL

Radionuclide	Location	Maximum Concentration (pCi/g)	DOE Guidelines
Radium-226	surface	7.9+1.9a	5
Thorium-232	surface	95.2+9.4	5
Thorium-232	sediment	18.3+2.6	5
Radium-226	subsurface (c)	447.0+10.0	15
Thorium-232	subsurface (c)	1699.0+512.0	15

Footnotes:

(a) The level of detectability varied with these soil samples because it is proportionally based on the quantity of the sample, its heterogeneity, the moisture content, and the counting geometry.

(b) There are no DOE guidelines for radiologic contamination of sediment; soil guidelines are used for comparison purposes.

(c) Samples were taken between 1 and 15 feet below the MISS surface.

Volatile organic compounds, such as benzene and toluene, were detected in soil samples but not at levels above NJ Recommended Soil Guidelines. Certain heavy metal concentrations were detected in the soils above the NJDEP Cleanup Objectives, as illustrated below.

TABLE 4: SOIL CONTAMINATION OF MAYWOOD INTERIM STORAGE SITE

Compound	Maximum Concentrations (ppm)	ARARs (ppm)
Arsenic	51	NJ Soil Guideline: 20
Cadmium	20	NJ Soil Guideline: 3
Chromium	3920	NJ Soil Guideline: 100
Lead	790	NJ Soil Guideline: 250-1000
Mercury	93	NJ Soil Guideline: 1

The DOE monitoring activities at the site, as required by the NJ Pollution Discharge Elimination System permits, included installation of eleven groundwater monitoring wells. Some of the higher levels of contamination were detected in a monitoring well upgradient from the site, indicating that another contamination source may exist. These groundwater samples were tested only for chemical contamination in 1985 and 1986; the

maximum reported results which surpassed New Jersey's Standards for drinking water are shown in Table 5.

TABLE 5: CHEMICAL CONTAMINATION IN GROUNDWATER AT THE MISS

Contaminant	Maximum Conc. (ppb)	Standards (ppb) (a)
Methylene chloride	1087	2
Trichloroethylene	66	1
Benzene	1240	1
Tetrachlorethylene	170	1
t-1,2-Dichloroethylene	2964	10
Vinyl chloride	220	2
Arsenic	381	50
Cadmium	47.1	10
Chromium	372	50
Lead	325	50
Mercury	229	2
Selenium	29.4	10
Zinc	12,900	5,000 (b)

Footnotes:

(a) New Jersey Safe Drinking Water Act, NJAC 7:10-5 and 7:10-16.7

(b) New Jersey Safe Drinking Water Act, NJAC 7:10-7, Secondary Drinking Water Regulations.

Quality Assurance/Quality Control

QA/QC procedures were followed for both the sampling and laboratory analysis. Method/reagent blanks were simultaneously analyzed to avoid false positives and duplicates were performed to demonstrate the reproducibility of results.

C. On-Site Contamination of the Ballod Properties

Waste sludge produced from Maywood's thorium processing operations was originally pumped to settling lagoons located on the present Ballod property. When the Stepan Company purchased the Maywood Chemical Co. works, these waste materials were removed from the southern portion of the property and and the property was approved for unrestricted use by the Atomic Energy Commission. It was accidentally discovered in 1980 that elevated levels of radiation still existed on the property. A follow-up survey by the Nuclear Regulatory Commission revealed radiologic

contamination in excess of DOE guidelines. NJDEP analysis revealed low levels of chemical compounds which fell below state and federal guidelines.

Remediation efforts were initiated in 1985 in areas which were contaminated above guideline levels. Contaminated soils were removed in the northern section of Ballod and stored at the MISS. Control measures were employed to avoid human exposure to contaminants during excavation via inhalation of dusts, including continual moistening of soil during the removal procedures. The DOE states that there is no area [at Ballod] where radioactive contamination still exists in excess of the remedial action guidelines. The Ballod property was cleared for unrestricted use, even though low level radiation is still detectable on-site, and a senior citizen's home was built on it.

D. On-Site Contamination of the Scanel Property

The Scanel property is located in the city of Maywood, east of the Sears site. It is believed that waste material from the Maywood Chemical Works thorium processing operation was either disposed or included in fill at the Scanel site. Investigations conducted in 1981 and 1983 noted elevated concentrations of thorium-232 and radium-228 and -226 in the Scanel soils. The Department of Energy is conducting a radiologic survey of the property which will include analysis for chemical contaminants.

E. On-Site Contamination of Residential Properties

Certain residential properties (8 along Davison and Latham Street in Maywood, New Jersey and 9 on Grove and Parkway in Rochelle Park, NJ) were identified by NRC surveys as having radiologic contamination. Contamination consisted primarily of thorium-232, with lower levels of uranium and radium-226 also detected. These sites had become contaminated when "organic mulch" -- which actually contained thorium residues -- was removed from the Maywood Chemical Works facility and used as fill for nearby residences. Excavation procedures, similar to the Scanel clean-up operation, were employed to minimize possible human exposure to radiologically contaminated soils. These sites have been certified for unrestricted use by the DOE because radiologic levels are now below remediation action guidelines.

F. On-Site Contamination of the Stepan Chemical Co. Property

As part of their monitoring of the MISS, the DOE has drilled monitoring wells on the Stepan Co. property. Results

of these monitoring operations are currently undergoing a QA/QC review and not available, but early indications are that this area is also contaminated by radionuclides and chemical materials. There is currently no official investigation at the Stepan Co. property even though its proximity to the MISS and its status as the former site of the Maywood Chemical Works would make it a likely candidate for contamination.

G. Off-Site Contamination of the Maywood Area

1. Lodi, New Jersey

The Maywood sites have been implicated as a possible source of the extensive chemical and radiologic contamination in the Lodi Municipal wells, a site on the National Priority List. All eleven of the public water wells in Lodi, New Jersey have been permanently closed and residents are now supplied by an alternative water purveyor. Other local industries, aside from the neighboring Maywood Superfund site, are under investigation as possible sources of contamination. Table 6 lists the maximum concentration of contaminants found in the underground water - supplies of Lodi, including both private and public wells, and compares them to appropriate government standards.

Table 6: Maximum Contamination Detected in Lodi Water Wells and the Drinking Water Standards

CONTAMINANT	Maximum Concentration (ppb)	Standards (ppb) (a)
Carbon tetrachloride	49.0	2
Chlorobenzene	200.0	4
1,2-Dichloroethane	3.34	2
trans-1,2-Dichloroethene	220.0	10
Methylene chloride	4.7	2
Tetrachloroethylene	32.0	1
Trichloroethylene	324.0	1
Total Trihalomethanes	115.8	100 (b)

Footnotes:

(a) New Jersey Safe Drinking Water Act, NJAC 7:10-5 and 7:10-16.7

(b) US Safe Drinking Water Act Maximum Contaminant Levels; MCL for total trihalomethanes applies only to chlorinated water.

Elevated levels of gross alpha and beta radiation have been detected in several of the well sites and in a few samples taken from the tap water at commercial establishments located in Lodi. The alpha contamination is attributed primarily to uranium isotopes (U-234, U-235, U-238) and Radium-226 which may have been a result of either manmade or natural sources. The sites where radiologic contamination exceed existing federal Safe Drinking Water Act (SDWA) standards are listed in Table 7.

Table 7: Radiologic Contaminants in the Lodi Area Water Supplies

Water Site	Range of Gross Alpha Contamination (pCi/L)	Federal SDWA Standard (pCi/L)
PUBLIC WELL (a)	ND - 150 +/-50	15
PRIVATE WELL (b)	ND - 210 +/-105	15
COMMERCIAL TAP (c)	10.2 - 51 +/-32	15

ND = nondetectable

Footnotes:

(a) Sample dates were between 9/13/83 and 7/15/84.
(b) Analysis of Inmont Chemical Co. Monitoring Well, 7/15/84.
(c) Analysis of the tap water at a commercial eating establishment in Lodi, 7/15/84.

2. Maywood Municipal Pool

Because of the concern about contaminated groundwater supplies in Maywood, the NJDEP received a request from the Maywood Board of Health in 1986 to test the Maywood Municipal Pool during its annual multi-day filling process. While no radiologic contamination was found in the water being piped into the pool, three volatile organic compounds were detected: tetrachloroethene (42 ppb); trans-1,2-dichloroethene (3.7 ppb); and trichloroethene (3.9 ppb). No standards or guidelines exist for nonpotable recreational waters but a risk assessment performed by the NJDEP indicated that these levels may be unacceptable. Due to this concern, the City of Maywood now has the pool filled by the Hackensack Water Company and no longer uses the public water supply.

3. Maywood Residential Area

The groundwater supplies of the city of Maywood have not been tested for chemical or radiologic contamination as part of

any site investigation. A residential well in the vicinity of the Maywood site was tested originally to determine conditions upgradient from the site. Analysis revealed a contamination profile similar to the Maywood municipal pool. One volatile organic compound exceeded the New Jersey Maximum Contaminant Level for drinking water; tetrachloroethylene was found at a concentration of 52.2 ppb. This data was reviewed and accepted by the NJDEP's Office of Quality Assurance.

As part of the DOE investigation of Maywood, the Saddle River, which is the major water body in the Maywood/Rochelle Park area, was tested for radionuclide contamination. All results were negative. None of the brooks which actually run through the MISS, Sears, or other satellite site have been tested for possible contamination. These surface waterways eventually feed into the Saddle River.

There is some concern that low levels of volatile organics may be migrating through the soil in certain residential areas in Maywood, possibly from volatilization of contaminated groundwater. In one case, benzene and ethyl acetate were tentatively detected in the low ppb range in soil gas above a residential property. Soil gas may be occurring in other areas, exposing residents to low levels of hazardous airborne substances.

POTENTIAL ENVIRONMENTAL AND HUMAN EXPOSURE PATHWAYS

A. Environmental Pathways

There is substantial evidence of radiologic and chemical soil contamination, both above and below the surface, at the various Maywood sites. Soil contamination appears to have led to pollution of the local aquifer, as demonstrated by the results from the monitoring wells located on the MISS property. It is further suspected that this contamination may have migrated across town boundaries to contaminate the local water supplies of neighboring Lodi and other communities. For this same reason, there is a potential for surface waters in the area, such as the Westerley and Lodi Brook which run through the Maywood sites, to be contaminated by leachate from the site.

B. Human Exposure Pathways

Because of the extensive soil contamination around the Maywood site, dermal exposure to chemical and low-level radiologic materials is possible. While the MISS is properly fenced so that access to the public is restricted, there are other contaminated areas around the Sears site, and possibly around the Stepan Co. sites, that are accessible. The grassy

areas to the north of the Sears warehouse, which employs approximately 225 people, are known contamination spots. Dermal and oral exposure are possible, especially to workers eating lunch or relaxing in the area. In addition, since these areas are not fenced, there is a potential for local children to play in these areas and become exposed to chemical and radiologic contaminants.

There is evidence that the Maywood sites have caused contamination of the underground aquifer, which would lead to human exposure if this water is tapped for public or private well use. Exposure could occur through dermal contact while bathing or swimming, ingestion of drinking water, inhalation of chemicals during showering. The extent of exposure through this media is uncertain and will depend on numerous factors, including the number of well users in the area, the municipal supply source for water, and the extent of the contaminant plume.

Exposure to hazardous substances associated with the Maywood sites can also occur through the inhalation route. Although MISS is currently covered with a tarpaulin (which appreciably reduces dust resuspension), dust or soil particulates with radiologic contamination could potentially become airborne from the sites. Furthermore, there is limited evidence that volatile organic chemical gases have been emanating from soils in residential areas where the shallow aquifers have been contaminated by Maywood-related leachate. Since highest concentrations of these gases would be found at ground level, children may have the greatest levels of exposure to these substances.

C. Demographics

Presently there is little information provided regarding the demographic make-up of the Maywood area. The only information that could be found for this health assessment was the 1980 census. According to this census the populations of Maywood Borough, Lodi Borough, and Rochelle Park Township are 9,895, 23,956, and 5,603, respectively.

More demographic information is needed to accurately characterize the sites, determine appropriate remedial actions, and conduct a health assessment. This information, which needs to be presented in the remedial investigation report(s), includes the size of the population within a 2-3 mile radius of each site (or within a radius that could be effected by the site), the number of potable wells within a 2-3 mile radius of each site (or within a radius that could be effected by the site), the closest residence and the closest downgradient well to each site, and a characterization of the population around each site (i.e. identification of sensitive populations, playgrounds, schools, etc.).

D. Site Visit

Representatives from the New Jersey DOH and the DEP visited the Maywood Sears site and the Maywood Interim Storage Site on October 5, 1988. The MISS is highly secured from the public with a fence surrounding the facility and security guards nearby at the Stepan Chemical site. The site, which contains primarily radiologically contaminated soil from the Ballod property clean-up operation, is structurally engineered to prevent leachate from escaping into the environment. This temporarily stored pile of waste material is completely encased with a synthetic cover and leachate collection devices are fully employed. A pile of organic material removed from the Ballod site -- which consists of trees, shrubbery and boulders -- is left uncontained on the MISS. This was not placed in the contained area of the MISS and is left uncovered because it was considered too bulky for the site and not of concern. There was no information available about this material's radioactivity.

The Stepan Chemical Co. which owns the property leading into the MISS is responsible for the security around the site. As the original site of the Maywood Chemical Works, it is highly probable that this facility was contaminated from past thorium-processing operations. While the MISS, Sears, Ballod and numerous residential locations have been investigated for chemical and radiologic contamination, the Stepan site has not come under the same scrutiny. Both the EPA and DOE have initiated preliminary surveys of the property, but the results are undergoing a QA/QC review and have not been officially released.

The day after the site visit, the DOH was notified by a Maywood resident that a large children's party, sponsored by a local newspaper and the Stepan Co., was to be held that weekend (Oct. 8, 1988) on the company's parking lot. The event, involving several hundred children, was scheduled to take place in an area officially under investigation as a Superfund site. Though no official contamination information was available, it was considered inappropriate by the staffs of the DOH and DEP for children to be brought onto an uncharacterized Superfund site. Stepan initially declined to relocate the party until a NJDEP radiation assessment team went to the facility and detected above background levels of radiation along cracks in the asphalt of the parking lot. Stepan then voluntarily moved the children's balloon-launching to the Maywood Fire Department property.

The Sears property was a large commercial facility with substantial truck activity at the warehouse. The outside grassy areas do not appear to be likely locations for lunch/recreational

activities. Nor is this area likely for children's activities. Most activity appears to occur inside the facility though there are numerous truck drivers found sitting around the parking lot in their cabs. Access to the site is fairly simple though a guard is stationed at one of the facility's numerous entries.

EVALUATION AND DISCUSSION

Limited environmental characterization data is available on most of the Maywood sites. The Sears and the MISS sites both have evidence of radiologic and chemical contamination of the soil. Thorium-232 and radium-226 were the primary radionuclides found whereas chemical contamination consisted of heavy metals and some petroleum hydrocarbons. For the MISS, monitoring wells around the site indicate that extensive chemical and heavy metal contamination of the groundwater is occurring in that area. Methylene chloride, benzene, trans-1,2-dichloroethylene, and zinc were detected at the highest levels, all of which exceeded NJ drinking water standards. It is uncertain as to how far this contaminant plume has migrated into the aquifer and how the drinking water supply of local communities may have been affected. The environmental data available for both the Sears and the MISS sites focuses only on on-site conditions; off-site contamination information is essentially nonexistent.

The Stepan Co. site has not been fully investigated for potential radiologic and chemical contamination even though this area was likely the original location of the pollution source. Characterization efforts should be expedited for this site, especially since there is a significant working population on-site. The preliminary survey results from the EPA and the DOE on contamination in this area should be included in the Health Assessment as soon as it is available.

Limited information is available on the Ballod and residential properties that have been remediated by the DOE for radiologic contamination. This contamination resulted from use of fill dirt which had been gathered from the waste piles of the Maywood thorium processing operation. The DOE has certified these properties for unrestricted use. A senior citizen home was built on the Ballod property. It was never determined if these contaminated lands had any off-site impact via surface water run-off or groundwater contamination. In addition, it has also not been determined if other residential sites still need to be remediated.

While characterization efforts have focused on site specific concerns, there is minimal information available on groundwater or surface water contamination. All the Maywood Superfund sites have focused solely on the individual on-site contamination.

With the exception of DOE's current sampling of the former creek channel on the Maywood/Lodi border, potential off-site impacts have not been evaluated. Even though the Maywood Superfund site consists of numerous properties around the town, there is no overall summary, report, or characterization of the environmental effect this site has had on the nearby and surrounding communities via air, groundwater, or surface water contamination.

Human exposure to these contaminants may occur from a variety of routes. Exposure via ingestion is possible through contaminated drinking water supplies. Dermal contact may occur with soils and surface/pool/bathing waters. Inhalation of radiologically contaminated dust particles, volatilized chemicals during showering, and volatilized gases released from contaminated groundwater are all possible exposure routes. These potential exposure routes for the nearby populations have not been appropriately investigated and represent a significant gap in the assessment work for the Maywood sites.

Problems with the investigations of these sites have been exacerbated by the involvement of many different government agencies and their outside contractors with the Maywood project. As a federal lead, EPA and DOE have been responsible for the respective chemical and radiologic characterization and remediation at the sites. NJDEP and NJDOH have also been involved to varying degrees. Each federal agency has a separate contractor (EPA: Ebasco; DOE: Bechtel) performing characterization and remediation work plan development. In addition, through a consent decree, the Stepan Co. is responsible for the remediation of the Sears site and has hired the CH2M Hill Co. as its outside contractor.

When no one group assumes the oversight role, there is a high potential for overlap, redundancy, or omission. The most recent example of this problem was the scheduled children's event on the Stepan Chemical property. Although there was general agreement that the activity should not occur, some of the agencies were unclear as to their role/authority in stopping the event. Many groups are also involved in the characterization and cleanup of the Maywood sites; there is no one group responsible for the overall contamination problem.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information reviewed, ATSDR and NJDOH have concluded that the Maywood Chemical site is of public health concern because humans have probably been exposed to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Contamination and Physical Hazards section above, human exposure to chemical and

radiological contamination is probably occurring and has probably occurred in the past via the use of contaminated groundwater and contact with contaminated soils.

As noted previously, high levels of volatile organic and radionuclides have been found or are suspected to be in the soils of several sites in the Maywood vicinity. Results from analysis of the monitoring wells at the Maywood Interim Storage Site, local private wells, and the Lodi municipal wellfield indicate that extensive groundwater contamination is occurring in the area. In addition, the Maywood municipal swimming pool, when being filled with groundwater, was found to have high levels of tetrachloroethylene.

Before suspected areas of contamination are developed, both on-site contamination and the potential off-site migration of contaminants need to be fully evaluated. Developing an area, without characterizing potential contamination could lead to an adverse impact on the public health.

The independent investigations for each of the different Maywood sites highlight the need for a coordinated assessment of the total impact the individual sites have on the Maywood community and vicinity groups. It is essential that remedial and characterization projects currently underway incorporate off-site evaluation and assessments of the potential effects these contaminated sites have on the surrounding population. This includes an extensive evaluation of the groundwater quality in the area, demographic analysis, and an assessment of the surrounding water supply usage (i.e. private well v. public well).

In accordance with CERCLA as amended, the Maywood Chemical Company 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 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.

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:

Ebasco, Final Report for the Maywood Chemical Company Site: Sears and Vicinity Properties, Remedial Planning Activities, February 1987.

Ebasco, Final Report for the Maywood Chemical Company Site: Sears and Vicinity Properties, Remedial Planning Activities, February 1987, Revised.

Bechtel National, Inc., Characterization Report for the Maywood Interim Storage Site, Formerly Utilized Remedial Action Program, June 1987.

Bechtel National, Inc., Characterization Report for the Sears Property, Formerly Utilized Remedial Action Program, May 1987.

CH2M Hill, Work Plan Remedial Investigation/Feasibility Study and RI Operations Plan: Maywood and Vicinity Sites, Prepared for Stepan Company under Consent Agreement with USEPA, December 1987.

Stokman and Dime, Soil Cleanup Criteria for Selected Petroleum Products, Proceedings of the National Conference on Hazardous Wastes and Hazardous Materials, March 4-6, 1986.

Bechtel National, Inc., Post-Remedial Action Report for the Residential Properties on Davison and Latham Streets, Maywood, NJ, Formerly Utilized Remedial Action Program (FUSRAP), February 1986.

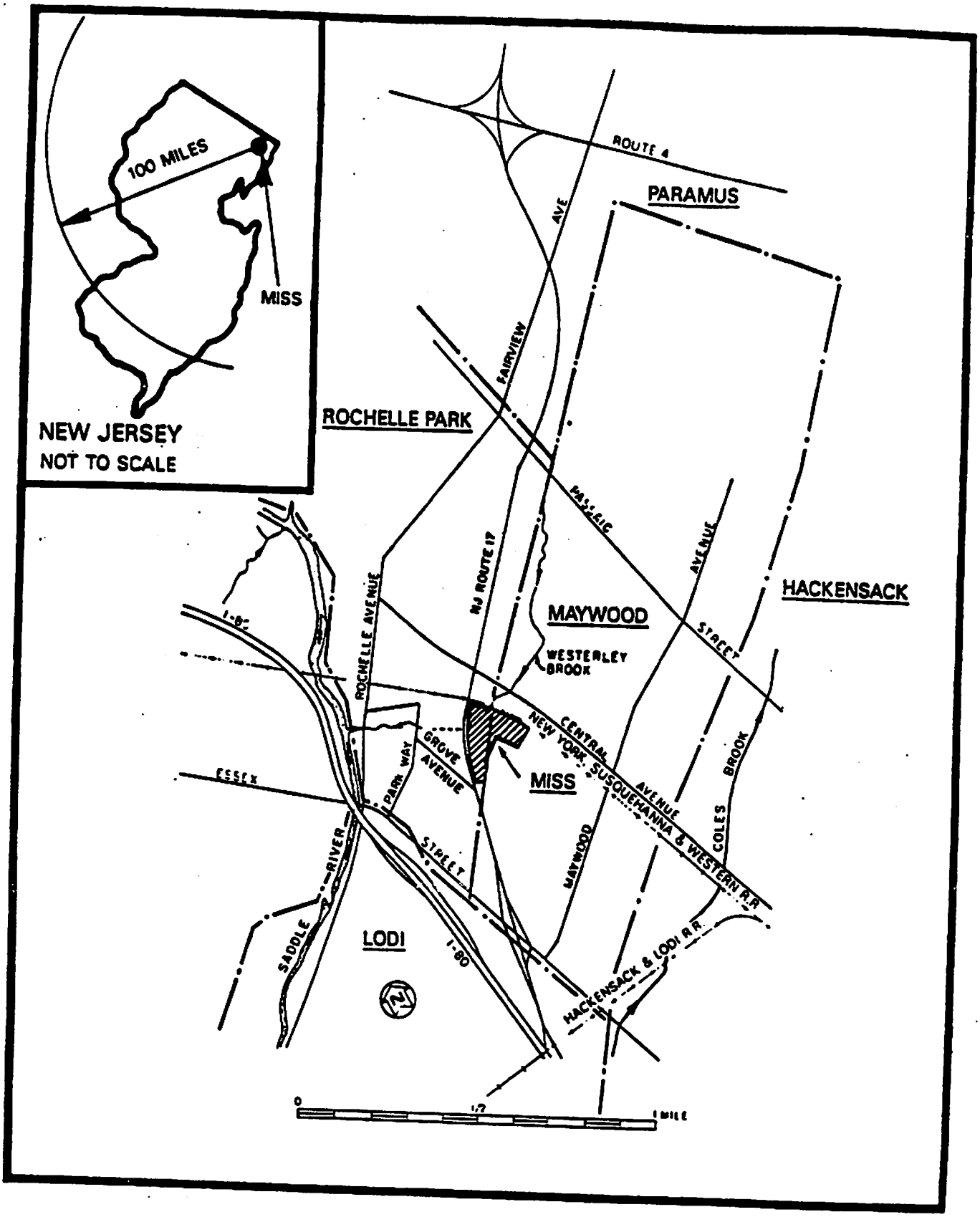
Bechtel National, Inc., Post-Remedial Action Report for the Ballod Associates Properties, Rochelle Park, New Jersey, Formerly Utilized Remedial Action Program (FUSRAP), November 1985.

Federal Register, Vol. 41, No. 133, Friday, July 9, 1976, Environmental Protection Agency, Drinking Water Regulations.

Ebasco, REM III Program, Draft Work Plan, Phase I Remedial Investigation, Lodi Municipal Well, March 1988.

Camp Dresser & McKee Inc., Performance of Remedial Response Activities at Uncontrolled Hazardous Waste Sites, REM II, Lodi Wellfield, Remedial Investigation/Feasibility Interim Report, April 1987.

New Jersey Drinking Water Quality Institute, Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix B, March 26, 1987.



LOCATION OF MISS

FIGURE I