
Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

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of Engineers®**

Health Consultation

MAYWOOD CHEMICAL COMPANY
(RESIDENTIAL AND MUNICIPAL VICINITY PROPERTIES)
MAYWOOD/ROCHELLE PARK, BERGEN COUNTY, NEW JERSEY
CERCLIS NO. NJD980529762

DECEMBER 1995

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Office of Regional Operations
Atlanta, Georgia

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

HEALTH CONSULTATION

**MAYWOOD CHEMICAL COMPANY
(RESIDENTIAL AND MUNICIPAL VICINITY PROPERTIES)**

MAYWOOD/ROCHELLE PARK, BERGEN COUNTY, NEW JERSEY

CERCLIS NO. NJD980529762

Prepared by

The Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Federal Facilities Assessment Branch
Energy Section

STATEMENT OF ISSUES

On July 30, 1990, the Agency for Toxic Substances and Disease Registry (ATSDR) released a public health assessment for the Maywood Chemical Company Site in Bergen County, New Jersey. Staff members of the New Jersey Department of Environmental Protection and the New Jersey Department of Health prepared the assessment [1]. The public health assessment concluded that humans had probably been exposed to hazardous substances at this site at concentrations that may result in adverse health effects and that characterization and remedial projects should incorporate off-site evaluation and assessments of the potential effects these contaminants could have on the surrounding population. Extensive radiological surveys and characterizations have been done on the vicinity properties in Maywood, Lodi, and Rochelle Park since the data were reviewed for the assessment.

Local governments and residents in these three communities have expressed health concerns related to past and present exposures to the radiological and chemical contaminants on the vicinity properties. To address the immediate health concerns of residents living on or near the properties that have been designated for remediation and the health concerns of residents living on properties remediated before 1987, we evaluated 1980s and 1990s environmental sampling data for residential and municipal properties. We used worst-case exposure scenarios to determine whether current radiological contaminants could pose a health risk to residents of the area. We also considered public works employees who may be exposed to contamination while performing their normal duties. Data for chemical contaminants on these properties were limited; however, we performed evaluations for chemical contaminants when possible. The scope of this consultation does not cover exposures prior to the 1980s.

Our findings are as follows:

- 1. Current levels of radiological contaminants in surface soils on residential properties do not pose a public health hazard. Most of the surface soil contamination is in discrete spots, and the properties are well vegetated or covered. Although this surface soil contamination is not considered a significant health concern, the concentrations exceed the current clean-up levels agreed to by the Department of Energy (DOE) and the Environmental Protection Agency (EPA) [2], and contamination could be spread to other properties. Therefore, we agree with Alternative 2 (expedited removal of contaminated materials from the vicinity properties and permanent disposal at an appropriately licensed commercial facility) proposed by DOE in "Engineering Evaluation/Cost Analysis for the Cleanup of Residential and Municipal Vicinity Properties at the Maywood Site, Bergen County, New Jersey" [2].*
- 2. Under current conditions, levels of radiological contaminants in subsurface soils on residential properties do not pose a public health hazard.*

3. *Under the current conditions at the Lodi (Jet Age) Municipal Park, the Fireman's Memorial Park, Fire Station No. 2, and the John F. Kennedy Municipal Park, the radiological contaminants in the surface and subsurface soils do not pose a health hazard as long as soil-disturbing activities do not occur. Persons planning to dig on any of these properties or work on the storm sewers under the properties should notify the DOE or its contractor. Mowing grass and maintaining these properties without significant soil-disturbing activities should not be a health concern.*
4. *Although it does not appear that chemical contaminants are currently flowing down Lodi or Westerly brooks in a manner that would contaminate residential or municipal properties, anyone who has a need to enter the underground culverts should notify DOE or its contractor and should be properly trained by their employer to enter confined spaces.*
5. *The DOE chose three residential properties in Lodi to perform limited chemical analysis of the soils. A soil sample collected at 0 to 2 feet deep on one of the residential properties had 1,000 milligrams of lead per kilogram of soil(mg/kg). This concentration of lead in surface soils on a residential property could be a health hazard. We do not believe it is related to the Maywood Chemical Company Site, since these levels of lead are not found in other areas contaminated with waste from the former Maywood Chemical Company operations. Since there are children living at the residence and the concentration of lead could be higher in the surface soil (0 to 3 inches), we forwarded information on the lead levels to the Bergen County Health Department for follow-up. County representatives agreed to arrange for blood-lead level testing of the children.*

Following the completion of this health consultation, DOE informed ATSDR that five additional properties in Lodi have been remediated for the radioactive contamination: 90 Avenue C, 79 Avenue B, 108, 112 and 113 Avenue E. One of the properties contained the elevated lead concentrations in the soil (described above). No reports containing surveys or sampling of these properties have been reviewed by ATSDR at this time.

We recommend the following:

1. *Continue removal of contaminated materials from the residential and municipal vicinity properties and permanent disposal of the contaminated materials at an appropriately licensed commercial facility.*
2. *Notify DOE (or its contractor) before digging on any of the designated properties or working on the storm sewers under these properties. Radioactive contaminated soils should not be removed or disposed of except by representatives of DOE or by its contractor.*

3. *Train anyone who has a need to enter the underground culverts in accordance with the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations cited in Title 29 of the Code of Federal Regulations, Part 1910.120, Hazardous Waste Operations and Emergency Response, and Part 1910.146 for entry into confined spaces. This training should be provided by the individual's employer.*
4. *Follow up to assure that children living on the property with elevated lead in the soil have not been adversely affected.*

This health consultation is based on data and information made available to ATSDR. The conclusions and recommendations are based on current levels of contaminants in the surface and subsurface soils of characterized properties and surface water and sediment in Lodi Brook headwaters and Westerly Brook. If additional information is received, ATSDR scientists will evaluate it. The analyses of additional data could alter the conclusions and recommendations presented here.

BACKGROUND

From 1916 until 1959, the former Maywood Chemical Company extracted thorium and rare earth metals from monazite sands for the manufacturing of gas lantern mantles and other industrial products [3,4]. The company also produced other chemical compounds. Process waste from the thorium and other chemical processes was piped to diked areas west of the plant. Although the process removed some of the thorium, unextracted thorium, other naturally occurring radioactive materials, and rare earth metals were still present in the waste. Radioactive contaminants were spread to neighboring properties when the waste products were used as mulch and fill material and by apparent migration associated with the drainage of Lodi Brook. Highway 17, which separates the disposal area to the west from the rest of the property, was built in 1932. The Stepan Company bought the company in 1959 but never processed any radioactive materials. Stepan removed waste from west of Highway 17 in 1966, 1967, and 1968, but it was later discovered that not all the waste had been removed. An aerial radiological survey and subsequent ground surveys in 1981 identified additional contamination north and south of the plant. The contaminated areas included commercial, residential, and municipal properties in Maywood, Lodi, and Rochelle Park [3,4].

The Energy and Water Development Appropriations Act of 1984 authorized the DOE to undertake a decontamination project at the Maywood site [3]. As part of this project, DOE had numerous properties in the three communities surveyed and characterized for radioactive contamination [5 - 48]. Some of the residential properties were remediated before 1987, and the waste was stored at DOE's Maywood Interim Storage Site in Maywood [3,5,6 and 7]. Some properties were designated for cleanup but have not yet been remediated, and some properties were surveyed but were not designated for cleanup. (Refer to Attachments 1 and 2.) DOE representatives chose three residential properties to test for metals, polychlorinated biphenyls, and total petroleum hydrocarbons [3]. The remaining residential and municipal properties have not been tested for any chemicals. DOE is only responsible for chemicals used during the processing of thorium ores. Other chemicals are the responsibility of EPA.

During ATSDR site visits and public availability sessions, residents in these three communities and local government officials have expressed health concerns related to past and present exposures to the radiological and chemical contaminants on the vicinity properties [49,50,51]. Some families with young children were unaware that they were living on contaminated properties and had immediate concerns about the health of their children. ATSDR staff members addressed these concerns in separate letters to these individuals. To address the health concerns of residents living on or near the contaminated properties and residents living on properties that were remediated before 1987, we evaluated 1980s and 1990s sampling data for residential and municipal properties [5 - 43,45,47 and 48].

DISCUSSION

ATSDR staff members analyzed the available environmental sampling data for soils and outdoor gamma rate measurements for residential and municipal properties, indoor gamma rate and radon-222 measurement results for residential properties, and sampling data for surface water and sediments in Westerly Brook and the headwaters of Lodi Brook [3,5 - 48]. Thorium-232 (Th-232), radium-226 (Ra-226), and uranium-238 (U-238) were the three predominant radioactive contaminants identified. We reviewed data for 25 residential properties previously remediated, 8 residential properties characterized but not requiring remediation, 31 residential properties scheduled for remediation, 4 municipal properties in Lodi scheduled for remediation, and 20 municipal properties and 5 streets in Maywood also not requiring remediation. We also reviewed chemical analysis data for soils from three residential properties in Lodi that were tested during DOE's remedial investigation [3].

Residential Properties

ATSDR staff members reviewed survey reports for 25 properties remediated in Maywood, Lodi, and Rochelle Park before 1987 [5,6,7]. The soil samples were collected from the surface of the bottom of the excavations before clean soil was brought in to replace the removed soils. The radioactive contaminant concentrations and gamma rate levels were not a health hazard.

Eight of the properties that were characterized but not designated for cleanup do not need remediation [3,19,31,38,39,40,41 and 47]. No radioactive contaminants that would present a public health concern were found in the surface or subsurface soils of those properties. One gamma rate measurement was slightly elevated but was still below a level of health concern.

We also reviewed the available data on indoor gamma rates and indoor radon-222 gas measurements for the 31 residential properties scheduled for remediation. None of the results from the indoor radon-222 gas measurements exceeded the EPA's recommendations of 4 picocuries per liter (pCi/L)--0.15 becquerels per liter (0.15 Bq/L)--of radon-222 in air and 0.02 working levels (WL)¹ [52]. Indoor gamma rate measurements were taken in 13 of the 31 designated residences. For an initial screening of these homes, we assumed a worst-case scenario. One home that has radioactive contamination under part of the house has an

¹ A picocurie (pCi) is equal to 2.2 disintegrations per minute. One becquerel (Bq) is equal to 1 disintegration per second or 27 pCi. Both are units used to describe radioactivity.

A working level (WL) is a unit used in measuring radon decay products. One WL is equal to any combination of short-lived radon decay products in a liter (L) of air that will result in 1.3×10^5 MeV (million electron volts) of potential alpha energy.

average measurement of 17 microrentgens per hour ($17 \mu\text{R/hr}$)² including background. For this scenario, we assumed that an individual could be continuously exposed at the average gamma rate measured for an entire lifetime. Assuming this worst-case scenario, this level of exposure would not be a public health hazard [53].

The surface and subsurface soil concentrations for the three predominant radioactive contaminants are as follows:^{3,4}

	<u>Th-232</u>	<u>Ra-226</u>	<u>U-238</u> ⁵
Maximum surface soils	112 pCi/g (4.15 Bq/g)	11.8 pCi/g (0.44 Bq/g)	51.2 pCi/g (1.9 Bq/g)
Average surface soils	6.47 pCi/g (0.24 Bq/g)	1.49 pCi/g (0.06 Bq/g)	8.73 pCi/g (0.32 Bq/g)
Maximum subsurface soils	115 pCi/g (4.26 Bq/g)	10.8 pCi/g (0.4 Bq/g)	37.4 pCi/g (1.39 Bq/g)

During our review of the residential properties, we looked at three age groups (2- to 3-year-olds, 10-year olds, and adults) because of differences in behavior patterns. We considered climatic and vegetation patterns for the area [4]. We looked at the current uses of each property [49,50,51]. We considered ingestion of soils, inhalation of indoor and outdoor dust, and external exposures [54,55]. For the worst-case scenarios, we included exposure through ingestion for a pica child⁶ and exposure through inhalation for an adult working outdoors. We used maximum surface and subsurface soil concentrations. (We learned during the public availability sessions that soil-disturbing activities have occurred on some of these properties [51].) The estimated total doses to an individual were less than 100 millirem per year (mrem/yr), or 1 millisievert per year (mSv/yr),⁷ except for one case [56]. In that case, the maximum concentration of radioactive contaminants in soils 0 to 6 inches is under the

² A microrentgen is equal to 10^{-6} roentgen, which is a unit of exposure to ionizing radiation in air under standard conditions.

³ A pCi of a radioactive contaminant per gram of soil is expressed as pCi/g. A Bq of a radioactive contaminant per gram of soil is expressed as Bq/g.

⁴ DOE and EPA have established clean-up levels for these properties of 5 pCi/g above background at all depths for radium-226 and thorium-232 combined and 100 pCi/g above background for total uranium.

⁵ The maximum and average concentrations for U-238 have to be qualified, since not all properties were tested for U-238 contamination.

⁶ A pica child is a child with a craving for unnatural food, e.g. soils or ashes.

⁷ A millirem (mrem) and a millisievert (mSv) are units of dose equivalent. One millirem is equal to 0.01 millisievert (1 mrem=0.01 mSv).

house, and the maximum subsurface contamination is from 5 to 6 feet deep [3]. If a pica child were chronically exposed to this soil, the child could receive an exposure of slightly higher than 100 mrem/yr (1 mSv/yr) [54,56]. This scenario would be highly unlikely under the current conditions; therefore, we evaluated a more realistic scenario using the average soil concentrations for radioactive materials in contaminated areas. Based on those criteria, the total estimated exposure for a pica child would be less than 10 mrem/yr (0.1 mSv/yr). The total estimated exposure for other individuals, including an adult working outdoors, would also be less than 10 mrem/yr (0.1 mSv/yr). The soil concentrations of radioactive contaminants are not a health hazard; however, remediation will prevent the spread of these radioactive contaminants.

Soils from three residential properties in Lodi were tested for metals, polychlorinated biphenyls, and total petroleum hydrocarbons during DOE's remedial investigation [3]. A composite core sample taken from 0 to 2 feet below the surface on one of these properties contained 1,000 mg lead/kg soil. Since the concentration of lead in the surface soil (0 to 3 inches) could be higher and since children are living on this property, we believe that this concentration of lead is a public health concern. Therefore, ATSDR staff members contacted the Bergen County Health Department for appropriate followup. ATSDR scientists do not believe this concentration of lead is related to the former Maywood Chemical Company Site, since similar lead concentrations have not been found on other parts of the site where thorium contamination was measured. Since there were no other chemical data available on the residential properties, we looked at other information to determine whether further chemical testing should be performed. Lodi Brook begins on the Sears and adjacent commercial properties, and Westerly Brook flows under the Maywood Interim Storage Site and collects surface water runoff. Therefore, we evaluated water and sediment data from samples collected at the headwaters for Lodi Brook and samples collected along Westerly Brook and its confluence with Saddle River [3,44 and 57]. Chemicals have been detected above background levels in Westerly Brook and in the headwaters of Lodi Brook; however, they were not at levels that would be of public health concern to occupants of the neighboring residential and municipal properties. As a safety measure, anyone who has a need to enter the underground culverts should notify DOE or its contractor and should be properly trained on entry to confined spaces.

Municipal Properties

We reviewed survey reports for 20 municipal properties and 5 streets in Maywood [37,42,43]. The properties are listed in Attachment 1. Gamma rates were not elevated to a level of public health concern.

Four Lodi municipal properties are designated for cleanup [15,32,33,34]. Contamination at three of those four properties (J.F. Kennedy Park, Firemen's Memorial Park, and Fire Station #2) is predominantly subsurface. Borough officials and representatives of DOE and its contractor monitored recent modifications to the J.F. Kennedy Park. ATSDR staff members

observed those activities during two visits to Lodi. The majority of the radioactive contamination at the J.F. Kennedy Municipal Park is 4 to 7 feet deep [34]. The backyard of the fire station has a small area of surface contamination that could be remediated easily; however, the subsurface contamination would be much more difficult to address, since it is directly under the firehouse and parking lot [33]. The Firemen's Memorial Park has only subsurface contamination [32]. Under current use conditions, the soil at these properties does not pose a public health hazard. Contamination at Lodi Municipal Park (Jet Age or Redstone Lane Park) is predominantly subsurface ; however, there are also areas of surface contamination [15]. The highest concentrations of radioactive contaminants in the surface soils are toward the back of the property, away from the street. This area is well vegetated and does not appear to be used everyday. The subsurface contamination follows the low contours of the property where the storm sewer line is located. The highest gamma rates are also above the current sewer line. These elevated gamma rates are probably caused by soil contamination. Since we do not know what is in the sewer lines, no one should enter the underground culverts without first measuring gamma rates. Also, no one should enter the culverts without proper training from their employer for entry into confined spaces. Based on observations made at the park during different seasons and through conversations with local residents and public workers, it appears that the amount of time people spend on this property and the type of activities that take place on this property do not indicate that people are exposed to radiation at levels that are a public health hazard; nevertheless, the cleanup of this property should be expedited.

CONCLUSIONS

1. Current levels of radioactive contaminants in surface soils on residential properties do not pose a public health hazard.
2. Under current circumstances, levels of radioactive contaminants in subsurface soils on residential properties do not pose a public health hazard.
3. Under the current conditions at the Lodi (Jet Age or Redstone Lane) Municipal Park, the Firemen's Memorial Park, Fire Station No. 2, and the John F. Kennedy Municipal Park, the radioactive contaminants in the surface and subsurface soils do not pose a health hazard as long as soil-disturbing activities do not occur and if indoor gamma radiation levels at the fire station are not elevated. Mowing grass and maintaining these properties without significant soil-disturbing activities should not pose a health hazard.
4. Residential or municipal properties do not appear to be contaminated by chemicals flowing down Lodi or Westerly brooks.
5. A composite core sample taken at 0 to 2 feet below the surface on one of the residential properties had 1,000 mg/kg concentration of lead, which is a health hazard

for children living on this property. (According to DOE, this property has been remediated for radioactive contamination.)

RECOMMENDATIONS

1. Although current levels of radiological contaminants in surface and subsurface soils on residential properties do not pose a public health hazard, there are no controls over these properties and we agree with DOE's Alternative 2--expedite removal of contaminated materials from the vicinity properties and permanent disposal at an appropriately licensed commercial facility--proposed in the Engineering Evaluation/Cost Analysis for the Cleanup of Residential and Municipal Vicinity Properties at the Maywood Site, Bergen County, New Jersey.
2. Ensure that anyone planning to dig on any of the designated properties or work on the storm sewers under those properties notify the DOE or its contractor before doing so and that only representatives of DOE or its contractor remove or dispose of radioactive contaminated soils.
3. Ensure that anyone who has a need to enter the underground culverts be trained by their employer in accordance with Title 29 of the Code of Federal Regulations, Part 1910.120, Occupational Safety and Health Administration's (OSHA) hazardous waste operations and emergency response regulations and Part 1910.146, OSHA regulations for entry into confined spaces.
4. Follow up to determine whether children living on the property with elevated lead in the soil have been adversely affected.

The interpretation, conclusions, and recommendations provided are based on the data and information referenced. Additional data could alter those conclusions and recommendations. The conclusions and recommendations are site specific and should not be considered applicable to any other situation.

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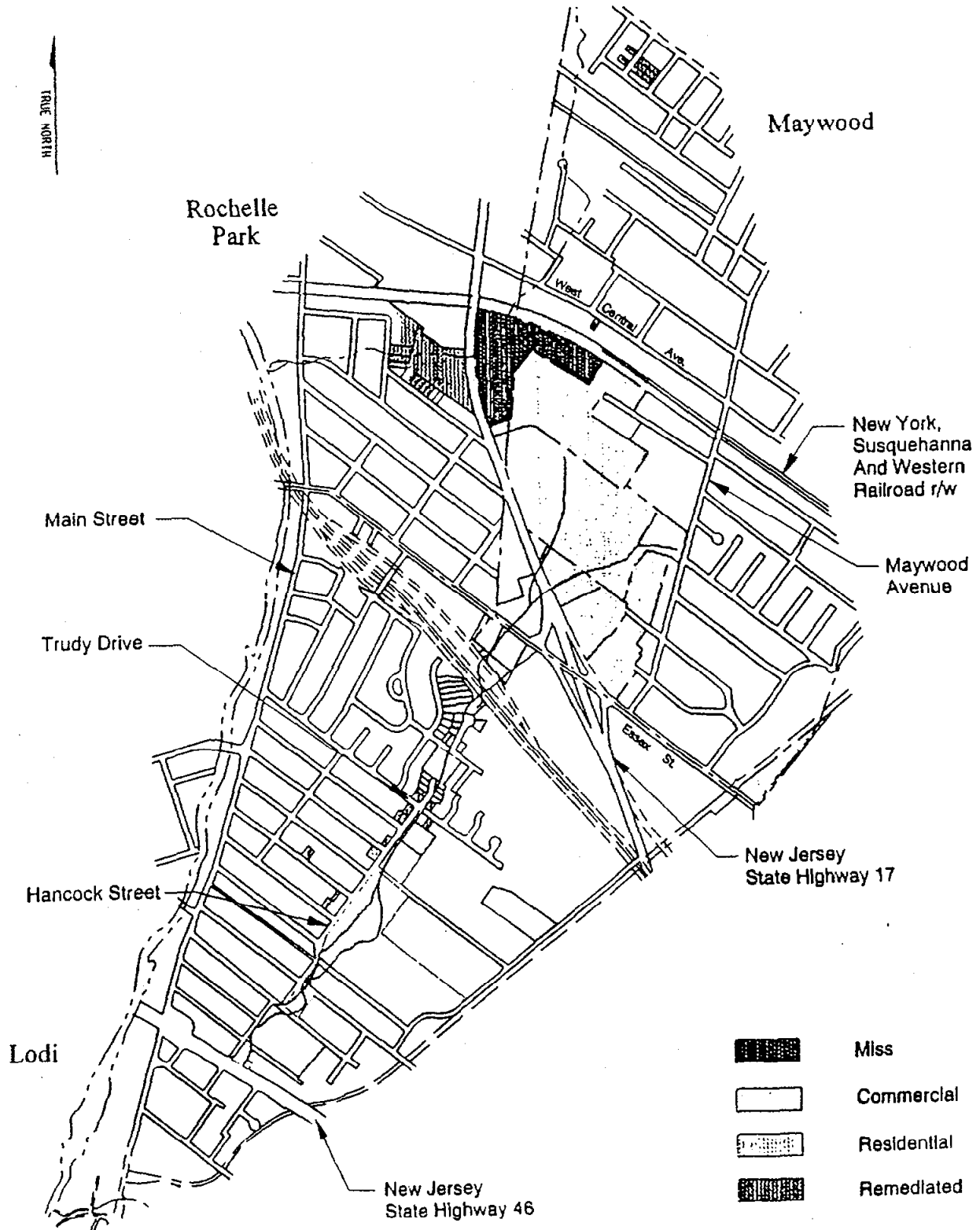
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58. Department of Energy. Letter with attachments to Carol Connell from Susan M. Cange concerning the Maywood Site - Technical Memorandum for Characterization Data in Lodi, New Jersey. August 14,1995.

Attachment 1

Locations of Vicinity Properties [58]



ATTACHMENT 2

RESIDENTIAL PROPERTIES PREVIOUSLY REMEDIATED

Lodi

- (1) 58 Trudy Drive
- (2) 59 Trudy Drive
- (3) 61 Trudy Drive
- (4) 64 Trudy Drive
- (5) 3 Hancock Street
- (6) 121 Avenue F
- (7) 123 Avenue F
- (8) 59 Avenue C

Maywood

- (9) 454 Davison Street
- (10) 459 Davison Street
- (11) 460 Davison Street
- (12) 464 Davison Street
- (13) 468 Davison Street
- (14) 459 Latham Street
- (15) 461 Latham Street
- (16) 467 Latham Street

Rochelle Park

- (17) 10 Grove Avenue
- (18) 22 Grove Avenue
- (19) 26 Grove Avenue
- (20) 30 Grove Avenue
- (21) 34 Grove Avenue
- (22) 38 Grove Avenue
- (23) 42 Grove Avenue
- (24) 86 Parkway
- (25) 90 Parkway

PROPERTIES SURVEYED BUT NOT REQUIRING REMEDIATION

Maywood - Borough-owned properties:

- (1) Pumping station, Spring Valley Ave.
- (2) Memorial School, 764 Grant Ave.
- (3) Public Library/Municipal Office, 459 Maywood Ave.
- (4) Maywood Avenue School, 425 Maywood Ave.
- (5) Municipal Pool, Brook Ave.
- (6) Public Safety Bldg. & Parking areas, 15 Park Ave.
- (7) Dept. of Public Works Garage, 205 E. Hunter Ave.
- (8) Pistol Range, E. Hunter Ave.
- (9) Playground & School Parking Lot, Fairmont Ave.
- (10) Fetzer Park, Cedar & Locust Aves.
- (11) Grove Avenue Park, Grove Ave.
- (12) Duvier Park, Duvier Place
- (13) Parking Lot, Albert Street
- (14) Parking Lot, Maywood Ave. & Passaic St.
- (15) Vacant Land, Thoma Ave. & Maple Lane
- (16) Vacant Land, Brook Ave. & Magnolia Lane
- (17) Vacant Land, Duvier Place & Magnolia Lane
- (18) Vacant Land (off frontage), Central Ave & Hergesell
- (19) Vacant Land, Ward St.
- (20) Vacant Land, Brookdale St.

Portions of 5 streets in Maywood

- (1) West Central Ave.
- (2) Lenox Ave.
- (3) West Magnolia Ave.
- (4) Thoma Ave.
- (5) Taplin Ave.

70 West Hunter Avenue

Lodi

- (1) 19 Redstone Lane
- (2) 9 Hancock Street

Rochelle Park

- (1) 27 Schlosser Drive
- (2) 31 Schlosser Drive
- (3) 37 Schlosser Drive
- (4) 48 Schlosser Drive

Hackensack

- (1) 441 Central Avenue

RESIDENTIAL & MUNICIPAL PROPERTIES DESIGNATED FOR REMEDIATION

Lodi

- (1) 14 Long Valley Road
- (2) 16 Long Valley Road
- (3) 18 Long Valley Road
- (4) 20 Long Valley Road
- (5) 22 Long Valley Road
- (6) 24 Long Valley Road
- (7) 26 Long Valley Road
- (8) 2 Branca Court
- (9) 4 Branca Court
- (10) 6 Branca Court
- (11) 7 Branca Court
- (12) 11 Branca Court
- (13) 11 Redstone Lane
- (14) 17 Redstone Lane
- (15) Lodi (Jet Age or Redstone Lane) Municipal Park
- (16) 4 Hancock Street
- (17) 5 Hancock Street
- (18) 6 Hancock Street
- (19) 7 Hancock Street
- (20) 8 Hancock Street
- (21) 10 Hancock Street
- (22) 60 Trudy Drive
- (23) 62 Trudy Drive
- *(24) 108 Avenue E
- *(25) 112 Avenue E
- *(26) 113 Avenue E
- *(27) 90 Avenue C
- *(28) 79 Avenue B
- (29) 106 Columbia Lane
- (30) 99 Garibaldi Avenue
- (31) Fireman's Memorial Park
- (32) Fire Station #2
- (33) John F. Kennedy Municipal Park

* DOE has informed ATSDR that these properties have been remediated for radioactive contaminants. No reports containing surveys or sampling data following remediation activities at these addresses have been reviewed by ATSDR at this time.

Maywood

- (34) 136 West Central Avenue
- (35) 200 Brookdale Street