

REMEDIAL ACTION PROGRESS BY THE U.S. DEPARTMENT OF ENERGY IN NEW JERSEY

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ABSTRACT

The U.S. Department of Energy's (DOE) Formerly Utilized Sites Remedial Action Program is responsible for identifying, evaluating, and decontaminating sites used during the Manhattan Engineer District's project that has resulted in residual radioactive contamination at 29 sites in 12 states. New Jersey contains five (or 17 percent) of these sites, all in differing stages of completing remedial action. Two of these sites have not been included in recent program activities. This paper, therefore, will focus on the three active sites and discuss the contrasts in the attitudes of the public and local governments, the quantities of contaminated materials, and the mechanisms by which the contaminants have migrated to vicinity properties. Additionally, several factors affecting the planning and completion of the program, i.e., lack of a permanent disposal site and the Environmental Protection Agency's role, will be presented.

The U.S. Department of Energy (DOE), through its Formerly Utilized Sites Remedial Action Program (FUSRAP), is responsible for evaluating and decontaminating, as necessary, 29 sites in 12 states. These sites were primarily associated with the former Manhattan Engineer District (MED) program dating back to World War II and remain radioactively contaminated above levels currently considered acceptable for unrestricted use. Bechtel National, Inc. (BNI) is the project management contractor for DOE. FUSRAP in New Jersey consists of five sites, or 17 percent of all FUSRAP sites. Two of these sites, Kellex in Jersey City and DuPont in Deepwater, have not been included in recent program activities. Remedial action at Kellex was completed in 1981, and is planned for the future at DuPont. Fig. 1 shows the three other sites that are the focus of this paper one in Middlesex, one in Wayne, and one in Maywood. Each of these is being used as an interim storage site for contaminated material from vicinity properties, until a permanent disposal site can be identified and brought to operational status. Middlesex and Wayne are complete, and Maywood is in the remedial investigation/characterization stage, although some response actions have been completed.

The State of New Jersey brings to mind a number of images, most of which are associated with its proximity to New York City. It is not only, however, a state of big city problems and industrialization. It is a state of striking contrasts, and similarly, FUSRAP in New Jersey is a program of contrasts. These contrasts range from drastically different attitudes towards FUSRAP by the public and local governments to significant differences in the quantities of contaminated materials and the mechanisms by which these materials migrated to vicinity properties. But in each case, the main concern of the public is the lack of a permanent disposal site. These issues as well as the history, objectives, and accomplishments at each site are described in this paper.

MIDDLESEX, NEW JERSEY

The MED established the Middlesex Sampling Plant (MSP) (Fig. 2) in 1943 as a facility for the sampling, storage, and/or shipment of uranium, thorium, and beryllium ores. Ores received at the facility were routinely packaged, weighed, and shipped to processing facilities.

Operation of the MSP was terminated in 1955 by the Atomic Energy Commission (AEC), successor to the MED. Later, the AEC used the site for the storage and limited sampling of thorium residues.

All AEC activities at the MSP ended in 1967. On-site structures were decontaminated, and the site was certified for unrestricted use under the guidelines in effect at that time.

In 1968, the AEC returned the MSP site to the General Services Administration, which transferred the property to the Department of the Navy. The site served as a reserve training center for the U.S. Marine Corps from 1969 to 1979. In 1980, the MSP was returned to DOE custody (as successor to the AEC). That same year DOE initiated remedial action to clean up properties in the vicinity of the MSP.

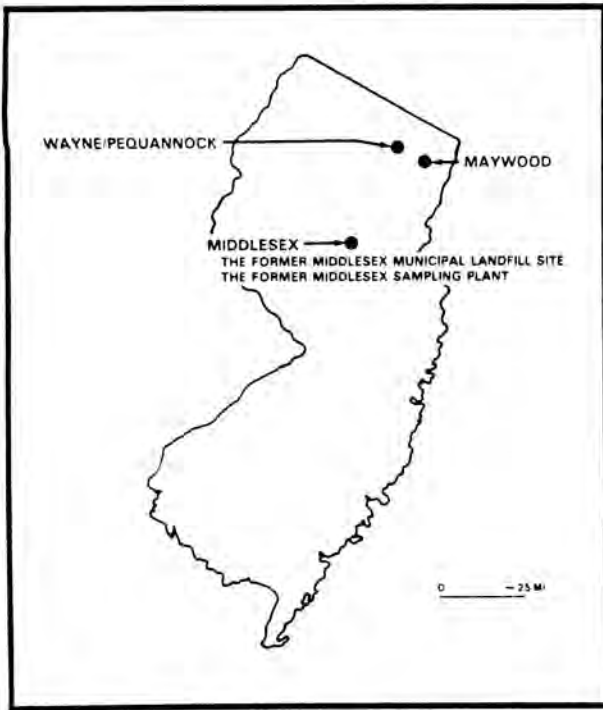


Fig. 1. Active Sites in New Jersey.

The Middlesex Municipal Landfill (MML) site was first used as a landfill in the mid-1940s. In 1948, dirt contaminated with pitchblende (high-grade uranium ore) was removed from the MSP and placed on top of the existing fill at the MML. During the course of subsequent landfill operations, layers of cover material were placed over the contaminated material at various depths. The landfill has not been used for solid waste disposal since 1974.

FUSRAP objectives at Middlesex were to decontaminate 44 vicinity properties including the landfill, provide interim storage for the waste material from these properties, transport the material to a permanent disposal site, and decontaminate the MSP to permit its release for unrestricted use. The remedial action at Middlesex was performed over a period of years. In 1980, 15 residential and commercial properties were decontaminated, and 7,200 m³ of waste were transported to the MSP for interim storage. The contaminated soil was transported to the MSP where it was placed in an interim storage area (Fig. 3). Twenty-nine additional properties were decontaminated in 1981 and 1982 and added 19,600 m³ of waste to the interim storage pile. The remedial action at the MML in 1984 and 1986 (Fig. 4) resulted in 23,700 m³ of contaminated waste,

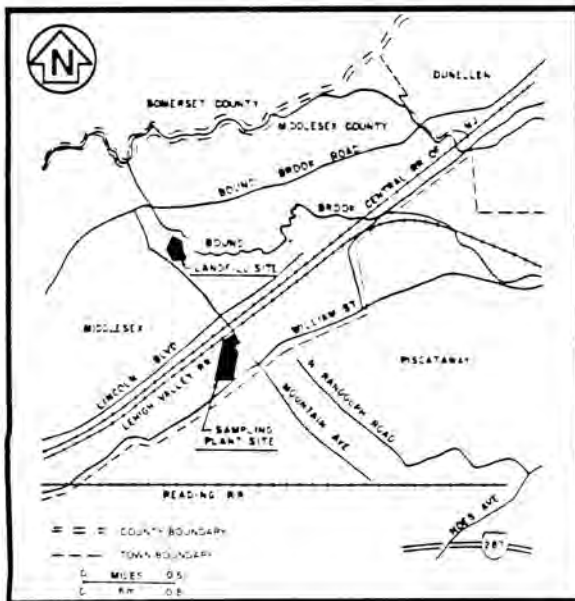


Fig. 2. Location of MSP/MML and Vicinity.



Fig. 3. Construction of Interim Storage Pile at MSP.

bringing the total amount of waste material transported to the MSP to 50,500 m³. Although remedial action at the vicinity properties is complete, no further remedial action can be performed at the MSP until a permanent disposal site is selected. At that time, the contaminated materials will be transported to the permanent disposal site, and the site itself will be decontaminated. Until then, DOE will conduct environmental monitoring to ensure the integrity of the interim storage facility.

WAYNE, NEW JERSEY

The Wayne Interim Storage Site (WISS) (Fig. 5) was established in 1984 to provide interim storage for low-level radioactive contamination found in the vicinity of the former Rare Earths, Inc./W.R. Grace plant located in Wayne, New Jersey. From 1948 through 1971 these companies processed monazite sand for thorium used in manufacturing industrial products such as mantles for gas lanterns. During this time, process wastes from the thorium operations were buried on-site, and some were released to a local storm drain as liquid effluent. The storm drain empties into Sheffield Brook, which overflows its banks

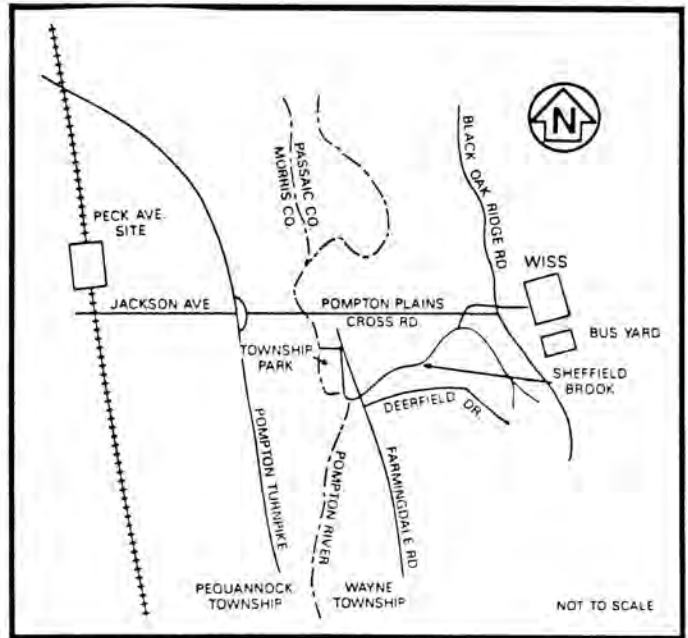


Fig. 5. WISS and Vicinity.

during periods of heavy rain. Contamination has consequently spread to nearby low-lying areas over the years.

In 1948, Rare Earths, Inc. began processing monazite sand at its Wayne Township, New Jersey, facility to extract thorium and rare earths. In 1954, after the Atomic Energy Act was passed, Rare Earths, Inc., received an AEC license to conduct these operations. The Davison Chemical Division of W.R. Grace and Company acquired the facility in 1957, and processing activities continued until July 1971. Wastes and residues from the processing operations included ore tailings, yttrium sludges, and sulfate precipitates. Liquid effluent streams were treated in an on-site waste treatment plant, neutralized, and discharged into Sheffield Brook. Residues were disposed of in an on-site sludge dump.

After processing ceased in 1971, the facility was licensed for storage only. The site was partially decontaminated by W.R. Grace in 1974. Some buildings were razed; the rubble and processing equipment were buried on the property. The remaining buildings were decontaminated, and the on-site disposal areas were covered with clean fill.

In 1974, the U.S. Nuclear Regulatory Commission (NRC) assumed licensing responsibilities formerly held by the AEC. The storage license for the W.R. Grace plant was terminated in 1975 following site decommissioning.

The remedial action objectives at Wayne are similar to those in Middlesex: prepare the site as an interim storage facility, decontaminate 16 vicinity properties, provide



Fig. 4. Excavation of MML.

interim storage for materials from vicinity properties, remove material to a permanent disposal site, and decontaminate the site and a railroad siding in nearby Pequanock, New Jersey.

Preparation for interim storage was accomplished in 1984 (Fig. 6). In 1985, an on-site building was demolished, a building adjacent to the site was demolished and replaced, and a township park was decontaminated. These activities resulted in the storage of 3,100 m³ of contaminated soil and rubble. In 1986, 14,500 m³ of contaminated soil were excavated from Sheffield Brook (Fig. 7), which runs off the site and behind some nearby residences; remedial action along the brook continued to completion in 1987 and resulted in an additional 10,700 m³ of contaminated soil.

MAYWOOD, NEW JERSEY

The Maywood Interim Storage Site (MISS) (Fig. 8) was established to provide an interim storage site for contaminated materials found in the vicinity of the former Maywood Chemical Works. From 1916 through 1956, the Maywood Chemical Works processed monazite sand for thorium used in manufacturing industrial products such as



Fig. 7. Excavation at Sheffield Brook.



Fig. 6. Construction of Interim Storage Pile at WISS.

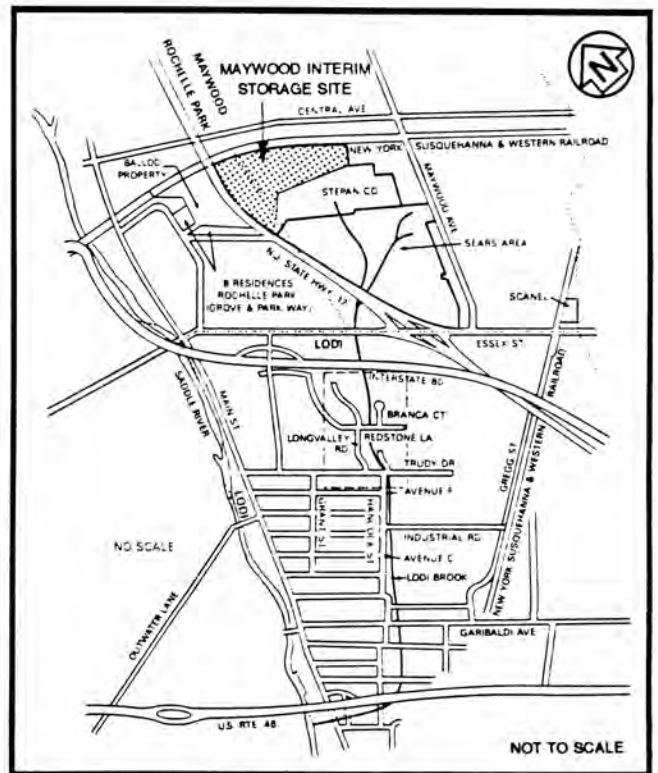


Fig. 8. MISS and Vicinity.

mantles for gas lanterns. During this time, slurry containing process wastes from the thorium operations was pumped to diked areas west of the plant. Some of these process wastes were removed from the Maywood Chemical Works for use as mulch and fill on nearby properties, thereby contaminating them with radioactive thorium. In 1932, New Jersey Route 17 was built through this disposal area. In 1954, the AEC issued a license to the Maywood Chemical Works, thereby allowing it to continue to possess, process, manufacture, and distribute radioactive materials under the auspices of the Atomic Energy Act of 1954. The Maywood Chemical Works stopped processing thorium in 1956 after approximately 40 years of production. The Maywood Chemical Works was sold to the Stepan Company (SC), formerly the Stepan Chemical Company, in 1959.

Based on AEC inspections and information regarding the property on the west side of New Jersey State Route 17, the SC agreed to take certain remedial actions. The cleanup began in 1963. In 1966, 6,400 m³ of waste were removed from the area west of Route 17 and buried on-site in an area now overlain by grass. In 1967, 1,600 m³ of waste were removed from the same general area and buried on-site in an area which is now a parking lot. In 1968, the SC obtained permission from the AEC to transfer an additional 6,600 m³ of waste from the south end of the property across Route 17 and bury it on-site in an area where a warehouse was later built.

At the request of the SC, a radiological survey of the south end of the property across Route 17 was conducted by the AEC in 1968. Based on the findings of that survey, clearance was granted for release of the property for unrestricted use. At the time of the survey, the AEC was not aware that contaminated materials were present in the northeast corner of the property. In 1968, this portion of the SC property was sold to a private citizen who in turn sold it to a real estate developer.

In 1980, the U.S. Nuclear Regulatory Commission (NRC) was notified of elevated radiation levels on this property. This information prompted the NRC to conduct a survey in late 1980 and then request a comprehensive survey to assess the radiological condition of the property. The survey was performed in February 1981 by Oak Ridge Associated Universities with the assistance of a representative from the Region I office of the NRC. In addition, an aerial radiological survey of the SC site, the property across Route 17, and the surrounding area was conducted by EG&G Energy Measurements Group for the NRC in January 1981. This aerial radiological survey resulted in the discovery of other anomalies.

In 1984, Oak Ridge National Laboratory surveyed the Lodi area, which is to the south of Maywood; several properties, known as the Lodi vicinity properties, were

found to be contaminated with materials from the former Maywood Chemical Works.

The 1984 Energy and Water Appropriations Act authorized DOE to conduct a decontamination research and development project at the site of the former Maywood Chemical Works and properties in its vicinity. During that year, DOE negotiated with the SC to obtain a lease on the land on which the MISS would be established for the interim storage of contaminated materials removed from these properties. The land was transferred to DOE ownership in September 1985 to provide the interim storage site for the waste from vicinity properties (other than the SC) until such time as a decision is made regarding its final disposition.

The MISS is the least complete of the New Jersey FUSRAP sites. While some vicinity properties have been decontaminated, characterization activities have only recently reached a point where the total volume of material subject to removal can be confidently estimated. As with Middlesex and Wayne, this site will provide interim storage for materials from the vicinity properties (Fig. 9), the material will be removed from MISS when a permanent disposal site is selected, and the site will be decontaminated.



Fig. 9. Construction of Interim Storage Pile at MISS.



Fig. 10. Excavation at Maywood Residence.

To date, 27 residential and commercial properties in the Maywood area have been decontaminated (Fig. 10). Eighteen were completed in 1984 resulting in 3,600 m³ of waste, and an additional 23,100 m³ were excavated from nine properties in 1985.

TABLE I

Characterization Results - 1986 and 1987

Type of Property	Number of Properties		Hectares	
	Planned	Actual	Planned	Actual
Commercial	16	20	42.3	45.8
Residential	11	28	1.5	4.2
Municipal	4	6	2.5	4.0
TOTAL	31	54	46.3	54.0

Table I shows the planned and actual totals of commercial, residential, and municipal properties characterized in 1986 and 1987.

CONTRASTS

Although there are similarities between these three sites, e.g., in the approach to the work and the type of work being done, there are important contrasts that affect the planning and execution of the work. Contrasting attitudes toward FUSRAP are apparent among property owners and among the various levels of local government. There are technical contrasts as well, e.g., the manner in which contamination has migrated off of each of the sites has resulted in contrasting patterns of contamination at vicinity properties.

The home owners whose properties are contaminated have been the most cooperative. The cleanup, or planned cleanup, of these properties has eased the home owners' perceived concern about health, and has eliminated concerns about property values and the ability to sell their homes. Because these concerns are considered the most significant, remedial action at residential properties is always given a high priority.

Commercial property owners generally seem to have felt more threatened by remedial action activities, and their attitudes have been mixed: cooperative from the standpoint of wanting their properties certified clean, but cautious in not necessarily believing that everything would go as planned and concerned about the disruption to their operations and thus profitability. Although unspoken, commercial property owners have an additional concern about the potential for lawsuits from employees because of exposure to radioactivity.

The group most resistant to remedial action activities, however, has been those local residents not directly affected by these activities. Their response has ranged from a total distrust of the federal government to a general fear of all things nuclear in particular, having a "radioactive waste dump" in their community with no permanent solution in sight. While resistance to interim storage is intense within municipal boundaries, it increases when discussing transporting contaminated materials across municipal boundaries. The overwhelming opinion favors removal of the material away from the local area.

Contrasts also exist at the various levels of state and local government. The local levels have shown the most contrast. For example, at Middlesex and Wayne, there has been a very cooperative attitude by local elected officials. At these sites, officials have cooperated with DOE/BNI in community relations, planning, and completing the work. They have consistently aided our efforts by maintaining an atmosphere of confidence and cooperation. As a result, they

have generally had the support of their respective constituencies in expediting and completing the work. In contrast to the cooperation in these communities, the situation in Maywood has been different. Through a totally open approach to conducting borough affairs, the mayor and council meetings have provided a monthly, public forum for resistance to every aspect of the work. Even mundane activities like hauling clean fill material on-site are reported with accusations that DOE is bringing in more contamination. As a result, no remedial action was conducted in 1987, and none is planned for next year.

At the state level, officials originally were resistant to suggestions that FUSRAP materials be disposed of within the State of New Jersey. This reluctance was understandable given the popular resistance they have encountered regarding a solution to radium contamination problems experienced by another state project. Through continued negotiations between DOE representatives and state officials, a spirit of cooperation has evolved and a joint effort to identify a repository within the state has been initiated.

Another contrast between these sites is in the quantity of contaminated material that is present on-site, and the quantity that has migrated to off-site vicinity properties. Where nature has provided the mechanism, investigations have been relatively straightforward. Man's intervention, on the other hand, has spread contamination into the vicinity properties and shown no logical pattern. Identifying these pathways of contamination is a constant technical challenge. Table II provides these quantities.

FUTURE PLANS FOR THE FUSRAP SITES IN NEW JERSEY

The interim storage sites in New Jersey will continue to be maintained, and surveillance and maintenance at these

sites will continue to ensure that the contamination is contained. Work will continue in Maywood to resolve the problems that prevent the completion of interim remedial action. A major effort will be to select a permanent disposal site in New Jersey. After this situation is resolved, the material at each of the sites can be transported to the per-

TABLE II

Quantities of Contaminated Material On-Site Versus
Quantities that have Migrated Off-Site

Site	On-Site	Volume (m ³) Off-Site		Total
		Natural Pathways	Man- Moved	
Middlesex	16,800	25,200	25,200	67,300
Wayne	53,500	28,700	0	82,200
Maywood	55,800	66,500	146,800	269,100
TOTAL	126,100	120,400	172,000	418,600

manent disposal site, the sites decontaminated, and then released for unrestricted use.