

M-627

Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for the Maywood Site, New Jersey



**US Army Corps
of Engineers®**



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M-627

Department of Energy

Oak Ridge Operations
Post Office Box E
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October 15, 1987

Mr. Steven Luftig
Director, Emergency and
Remedial Response Division
USEPA Region II
26 Federal Plaza
New York, New York 10278

Dear Mr. Luftig:

NOTIFICATION THAT RI/FS HAS BEEN INITIATED AT THE FORMER MAYWOOD CHEMICAL WORKS SITE IN MAYWOOD, NEW JERSEY

Section 120(e)(1) of the Superfund Amendments and Reauthorization Act of 1986 (SARA) requires that owners or operators of sites on the National Priorities List (NPL) initiate a Remedial Investigation/Feasibility Study (RI/FS) by October 17 of this year. The objective of this communication is to demonstrate that the U.S. Department of Energy (DOE) has met the requirement. The former Maywood Chemical Works and its vicinity properties were proposed for inclusion on the NPL in 1983. DOE has been investigating and remediating the site and vicinity properties since 1984 as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). FUSRAP has adopted a structured approach to plan, characterize, design, and remediate designated sites. This letter and enclosures describe the history of the site, activities conducted to date, and plans for further investigation and remediation.

Previous Actions

Under the Energy and Water Appropriations Act of fiscal year 1984, Congress authorized DOE to initiate a research and development decontamination project for the former Maywood Chemical Works facility (currently the Stepan Company) and the associated vicinity properties. These properties were assigned to FUSRAP, a DOE effort to identify, decontaminate, or otherwise control sites where residual radioactive contamination (exceeding current DOE guidelines) remains from the early days of the nation's atomic energy program. Since inclusion in the FUSRAP, several actions have been instituted at the site and the following briefly describes these actions.



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- o Available background documents describing the former operations conducted at the site have been compiled and reviewed. Based on these reviews, a working knowledge of the processes previously used at the site has been gained. Enclosure 1 briefly summarizes some of this information.
- o In 1984, DOE began negotiation with Stepan Chemical to lease the land on which the Maywood Interim Storage Site would be established for the storage of radiologically contaminated materials removed during remedial activities. The land was transferred to DOE ownership in September 1985.
- o An environmental monitoring plan was implemented at the site in 1984. Fifteen (15) wells were installed. The monitoring program consists of quarterly sampling and analysis of air, groundwater, surface water, sediment, and external gamma levels. All samples are analyzed for radionuclides applicable to the original thorium processing. Groundwater samples are also analyzed for chemical constituents specified by the New Jersey Pollution Discharge Elimination System (NJPDDES) permit.
- o Complete characterization of radiological contamination and limited characterization of chemical contamination has been performed on-site. Essentially all the site is radiologically contaminated with depths varying from surface to at least 13 feet. Numerous vicinity properties have been radiologically characterized and more are in the process of being characterized.
- o Several vicinity properties have been remediated with the radiologically contaminated material being brought back to the Maywood Interim Storage Site. In 1984, remedial action was conducted at eight residential properties in Maywood and nine residential properties in Rochelle Park. Remedial action in 1985 was conducted at eight residential properties in Lodi and a portion of a Rochelle Park commercial property (Ballou Property).
- o All waste removed from the vicinity properties will be maintained at the Maywood Interim Storage Site in interim storage until a permanent State disposal site is available. Waste stored at the Maywood Interim Storage Site is placed in cells complete with berm, liner, leachate collection system, and impermeable cover designed to safely contain the material for the interim period. Currently more than 34,000 cubic yards of contaminated material are stockpiled.
- o The State and local government, as well as the public have been kept informed via our public relations program.

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Current Actions

At the present time, completion of the vicinity property characterization is the primary activity. Site maintenance and environmental monitoring including NJPDES permit compliance continue. The site itself is essentially in a standby condition with continued evaluation, surveillance, and maintenance pending resolution of issues relative to the disposition of contaminated material from the Lodi vicinity properties and availability of a permanent State disposal site.

Conclusion

Based on the significant amount of work accomplished to date; DOE believes that the requirements of SARA have been met. We would like to arrange a meeting with you and the appropriate individuals within EPA to discuss our plans for future activities at the site. In order to facilitate your understanding of DOE's work at the site, Enclosure 2 is a matrix which compares the work products completed by DOE to the work products required for the RI/FS process.

If you have any questions concerning our efforts at Maywood, please contact Robert Atkin at (FTS) 626-1826.

Sincerely,



S. W. Ahrends, Director
Technical Services Division

Enclosures:

As Stated

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ATTACHMENT 1
SUMMARY OF MAYWOOD INTERIM STORAGE SITE BACKGROUND

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1.0 INTRODUCTION

In 1985, the Department of Energy (DOE) assumed ownership of property owned by the Stepan Company in Maywood/Rochelle Park, New Jersey. The site was added to the Formerly Utilized Sites Remedial Action Program (FUSRAP) by DOE after Congress authorized that DOE undertake the work. The property is presently on the National Priorities List - a document that sets priorities for cleanup of the nation's inactive waste sites. The facility is presently called the Maywood Interim Storage Site (MISS).

2.0 SITE BACKGROUND

2.1 LOCATION AND DESCRIPTION

The MISS is located in the Borough of Maywood and the Township of Rochelle Park, New Jersey, in Bergen County, New Jersey, approximately 19.2 km (12 mi) north-northwest of downtown Manhattan (New York City) and 20.8 km (13 mi) northeast of Newark, New Jersey (Figures 2-1, 2-2). Figure 2-3 is an aerial photograph of the MISS and vicinity. The MISS is bounded by New Jersey Route 17 on the west, a railroad line on the northeast, and commercial/ industrial areas on the south and east. The site occupies 4.7 ha (11.7 acres) of a 12-ha (30-acre) property owned by the Stepan Company (formerly Maywood Chemical Works). The MISS is a fenced vacant lot; the Stepan Company property is an operating chemical manufacturing facility also enclosed by a fence.

The MISS currently consists of a storage pile encompassing approximately 2 acres and containing approximately 34,000 yd³ of low-level radioactive waste, and an area that has been prepared for a second storage pile. The site has two buildings (Building 76 and the pumphouse) and a reservoir. A vehicle decontamination facility is located adjacent to the storage pile on the Stepan Company property. The majority of the 3-in. diameter and smaller vegetation

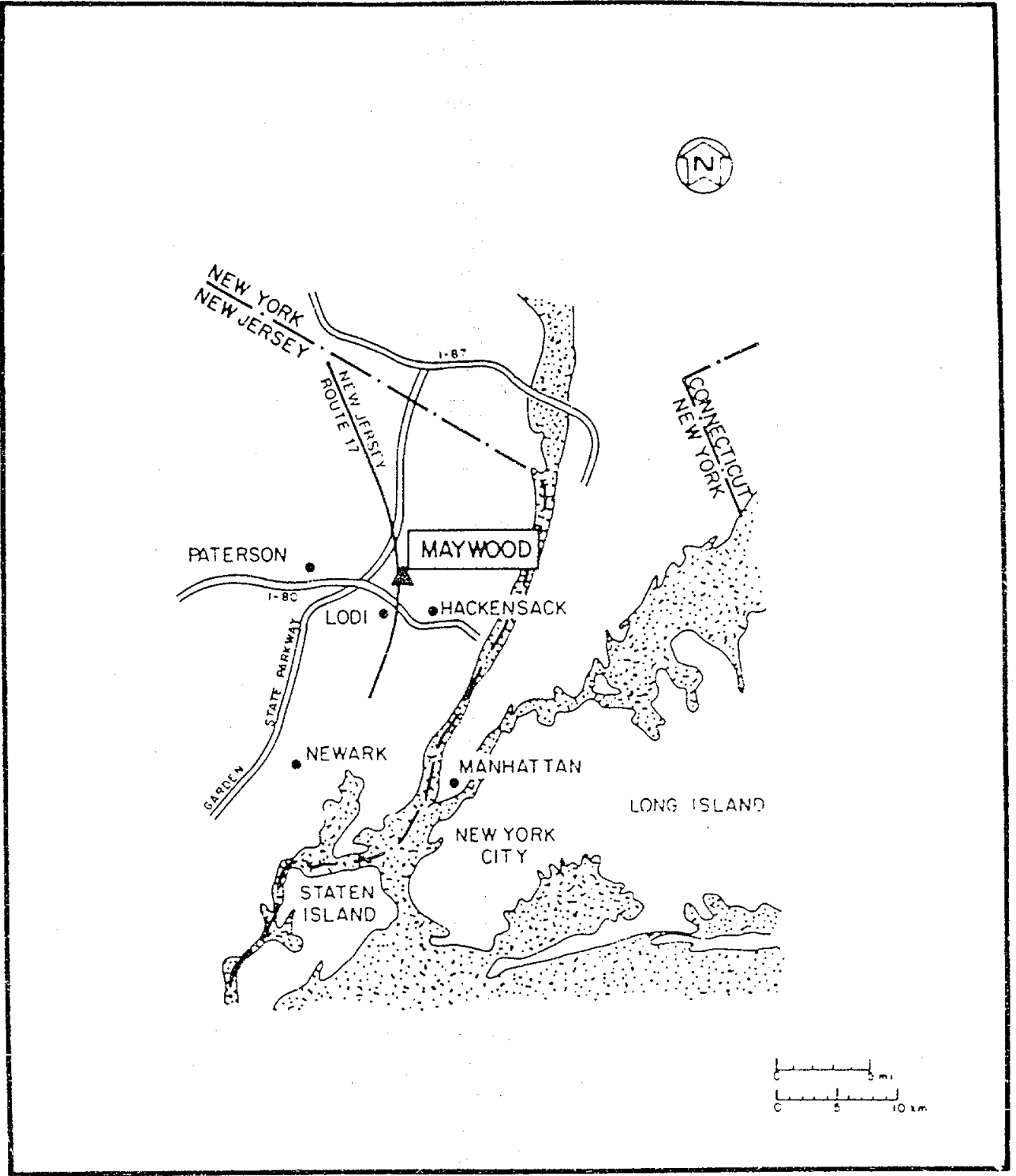


FIGURE 2-1 LOCATION OF MAYWOOD, NEW JERSEY

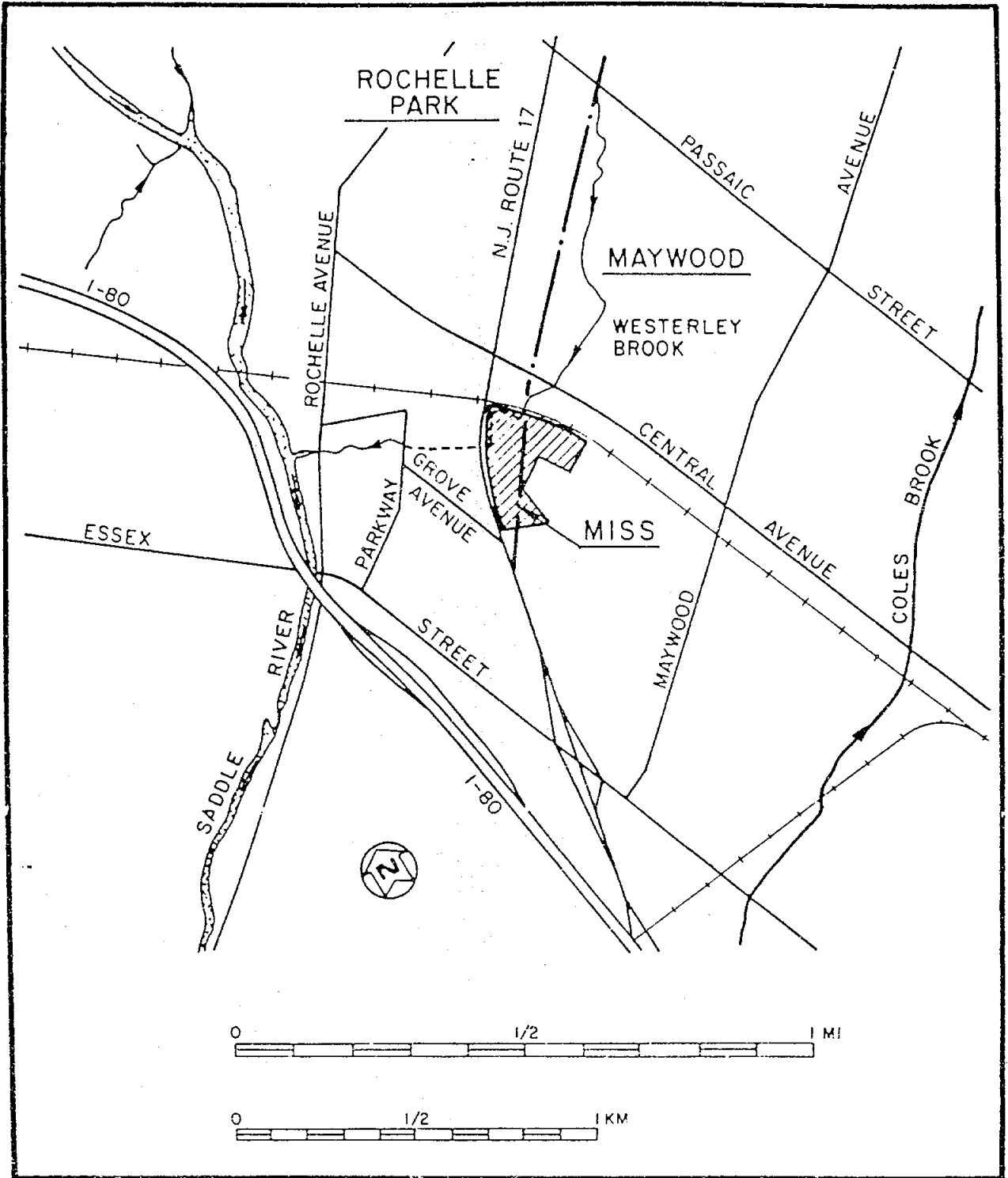


FIGURE 2-2 LOCATION OF THE MISS



FIGURE 2-3 AERIAL VIEW OF THE MISS AND ITS VICINITY

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was cleared from the site before the characterization work to facilitate site activities. Some of this vegetation grows back each spring.

The MISS is located within the glaciated section of the Piedmont Plateau of north-central New Jersey (Ref. 1). The terrain is generally level with intermittent shallow ditches and slight mounds (Ref. 2). The MISS slopes gently toward the Saddle River, which is located west of the site (Figure 2-2). The site is underlain by sedimentary sandstone, mudstone, and siltstone of the Brunswick Formation (Refs. 3 and 4). The bedrock surface lies near to the ground surface and is overlain by 1 to 4.5 m (3 to 15 ft) of weathered bedrock and unconsolidated glacial deposits of clay, silt, sand, and gravel. The depth of the glacial deposits varies considerably in the vicinity of the site. In addition, fill materials consisting primarily of soil and building rubble were placed on the site during its many years of industrial use (Ref. 3).

The MISS is located within the Saddle River drainage basin (Figure 2-2), approximately 0.8 km (0.5 mi) east of the Saddle River (a tributary of the Passaic River) and approximately 1.6 km (1 mi) west of the drainage divide of the Hackensack River basin (Ref. 3).

The MISS is poorly drained. Precipitation runoff enters Westerly Brook and flows under the site through a concrete storm drain, and under New Jersey Route 17. Neither the Saddle River nor Westerly Brook is used as a source of drinking water (Ref. 5). Bechtel National, Inc. is not aware of drinking water sources from the Passaic River downstream of the Saddle River.

The groundwater table is generally shallow, lying 2.1 to 3 m (7 to 10 ft) below the ground surface (Ref. 3). Groundwater in the Maywood area is available primarily from a bedrock aquifer with minor quantity available and from unconsolidated surficial deposits; the former is generally considered to be the more significant

groundwater resource. In the surrounding area, wells that draw from the unconsolidated surficial deposits have generally low yields and are used for domestic purposes. However, some wells located in areas with thicker surficial deposits of stratified glacial drift have high yields and have been utilized for industrial and public use.

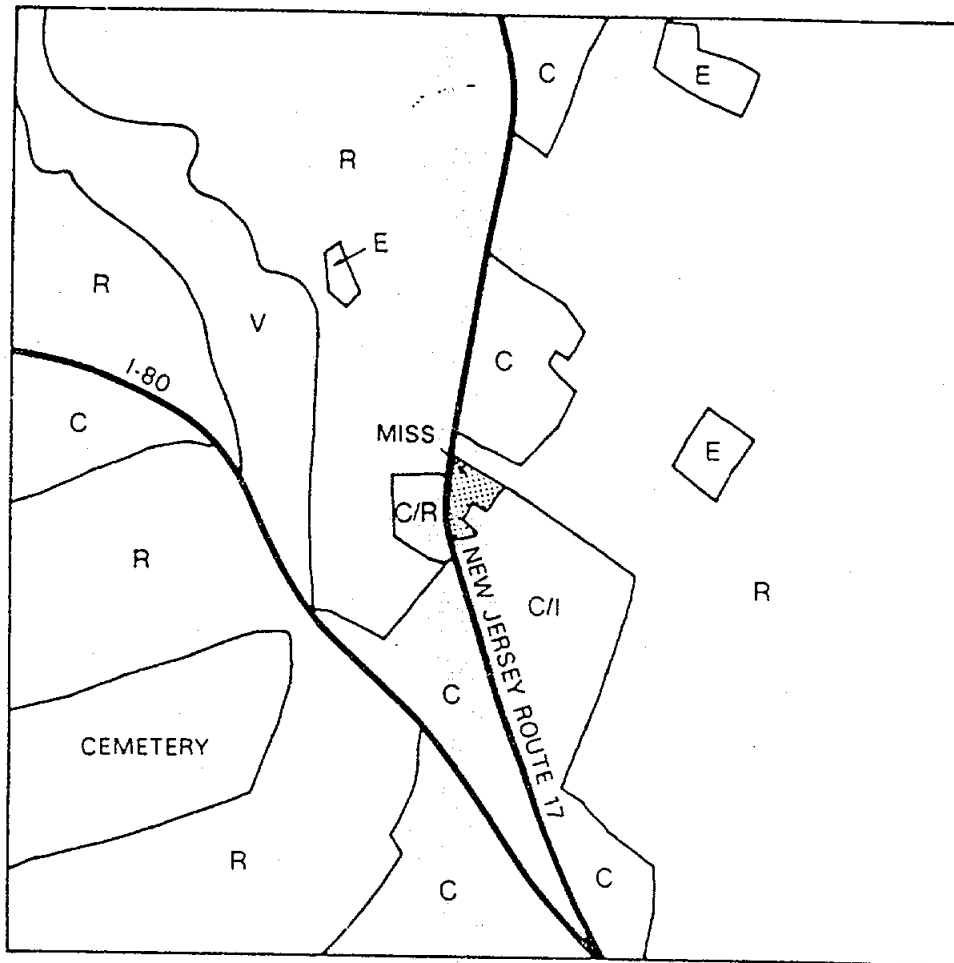
The average frequency of precipitation in New Jersey is 120 days/yr; the mean annual precipitation is approximately 120 cm (48 in.), with an average annual snowfall of 72.8 cm (29.1 in.) Winds in the area blow predominantly from the southwest at a mean speed of 16.3 km/h (10.2 mph) (Refs. 6 and 7).

The 1980 populations for Maywood and Rochelle Park were approximately 9,900 and 5,600, respectively, a decline from their respective populations of 11,000 and 6,400 in 1970. Within Bergen County, the 1970 and 1980 populations were approximately 898,000 and 845,000, respectively. The population in this county is expected to increase over the next 20 years (Ref. 1).

The MISS is zoned for commercial and industrial use. The areas adjacent to the site are zoned primarily for limited commercial, light industrial, or single family residential use although a high occupant density nursing home complex now occupies the Ballod property (Figure 2-4). With the exception of one house located on the east border of the Stepan Company property, the areas to the east and south of the site are used for industrial and restricted commercial purposes. The New York, Susquehanna and Western Railroad runs along the northern border of the MISS.

2.2 SITE HISTORY

The MISS was established to provide an interim storage site for low-level radioactive waste materials found in the vicinity of the former Maywood Chemical Works. From 1916 through 1956, the Maywood



BASED ON AERIAL PHOTOGRAPHS, SITE VISITS AND USGS TOPOGRAPHIC MAP 1:24000 SCALE, HACKENSACK, NJ QUADRANGLE (PHOTO REVISED 1981)

- | | |
|---------------------------------|----------------------------------|
| R RESIDENTIAL | E EDUCATIONAL |
| C COMMERCIAL | V VACANT |
| C/I MIXED COMMERCIAL/INDUSTRIAL | C/R MIXED COMMERCIAL/RESIDENTIAL |



FIGURE 2-4 GENERALIZED LAND USE IN THE VICINITY OF THE MISS

Chemical Works processed monazite sand to extract thorium and rare earths for use in the manufacture of industrial products such as mantles for gas lanterns. Building 76 was constructed on top of the area formerly used for thorium processing (Figure 2-2). 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 those properties with radioactive elements (Ref. 8). Some of the material also migrated off-site via the natural drainage provided by the former Lodi Brook. In 1932, New Jersey Route 17 was built across the diked disposal area (Figure 2-2).

In 1954, the Atomic Energy Commission (AEC) issued License R-103 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 (Ref. 9). The Maywood Chemical Works stopped processing thorium in 1956 after approximately 40 years of production. During this time, the process wastes from the operations had been pumped to the diked areas west of the plant. The Maywood Chemical Works was sold to the Stepan Company in 1959 (Ref. 8).

In 1961, the Stepan Company was issued an AEC radioactive materials license (STC-130) (Ref. 10). Based on AEC inspections and information related to the Ballod property on the west side of Route 17, the Stepan Company agreed to take remedial actions. The cleanup began in 1963. In 1966, $6,354 \text{ m}^3$ ($8,360 \text{ yd}^3$) of waste were removed from the area east of Route 17 and buried on the Stepan Company property site at Burial Site No. 1, an area which is now covered by grass. In 1967, $1,560 \text{ m}^3$ ($2,053 \text{ yd}^3$) of waste were removed from the same general area and buried on the Stepan Company property site at Burial Site No. 2, which is now a parking lot. In 1968 the Stepan Company obtained permission from the AEC to transfer an additional $6,536 \text{ m}^3$ ($8,600 \text{ yd}^3$) of waste from the south end

of the Ballod property and bury it on the Stepan Company property site at Burial Site No. 3, an area where a warehouse was later built (Ref. 9). Figure 2-5 shows the approximate locations of these burial sites. The location of an area formerly occupied by thorium processing facilities is also shown in Figure 2-5; this area is known to be contaminated with radioactive materials (Ref. 3).

At the request of the Stepan Company, a radiological survey of the south end of the Ballod property west of 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 (Ref. 9). At the time of the survey, the AEC was not aware of contaminated waste materials still present in the northeast corner of the property. In 1968 the portion of the Stepan Company property west of Highway 17 was sold to a private citizen who later sold it to the current owners, Ballod and Associates (Ref. 9).

In 1980 the U.S. Nuclear Regulatory Commission (NRC) was notified that elevated readings were obtained on the Ballod and Associates property (Ref. 9). This information prompted the NRC to request a comprehensive survey to assess the radiological condition of the property. The survey was performed by Oak Ridge Associated Universities (ORAU) with the assistance of a representative from the Region I office of the NRC in February 1981 (Ref. 2).

The NRC also requested that an aerial radiological survey of the Stepan Company site, the Ballod and Associates property, and the surrounding area be conducted. This survey, which was conducted by EG&G in January 1981, resulted in the discovery of other anomalies (radiation readings distinctly higher than those of surrounding areas) (Ref. 11). Elevated gamma readings (greater than the local background level) were detected directly over the Stepan Company chemical plant, as well as immediately to the west and south of the plant. Two other points of elevated background gamma radiation were detected approximately 0.8 km (0.5 mi) from the center of the

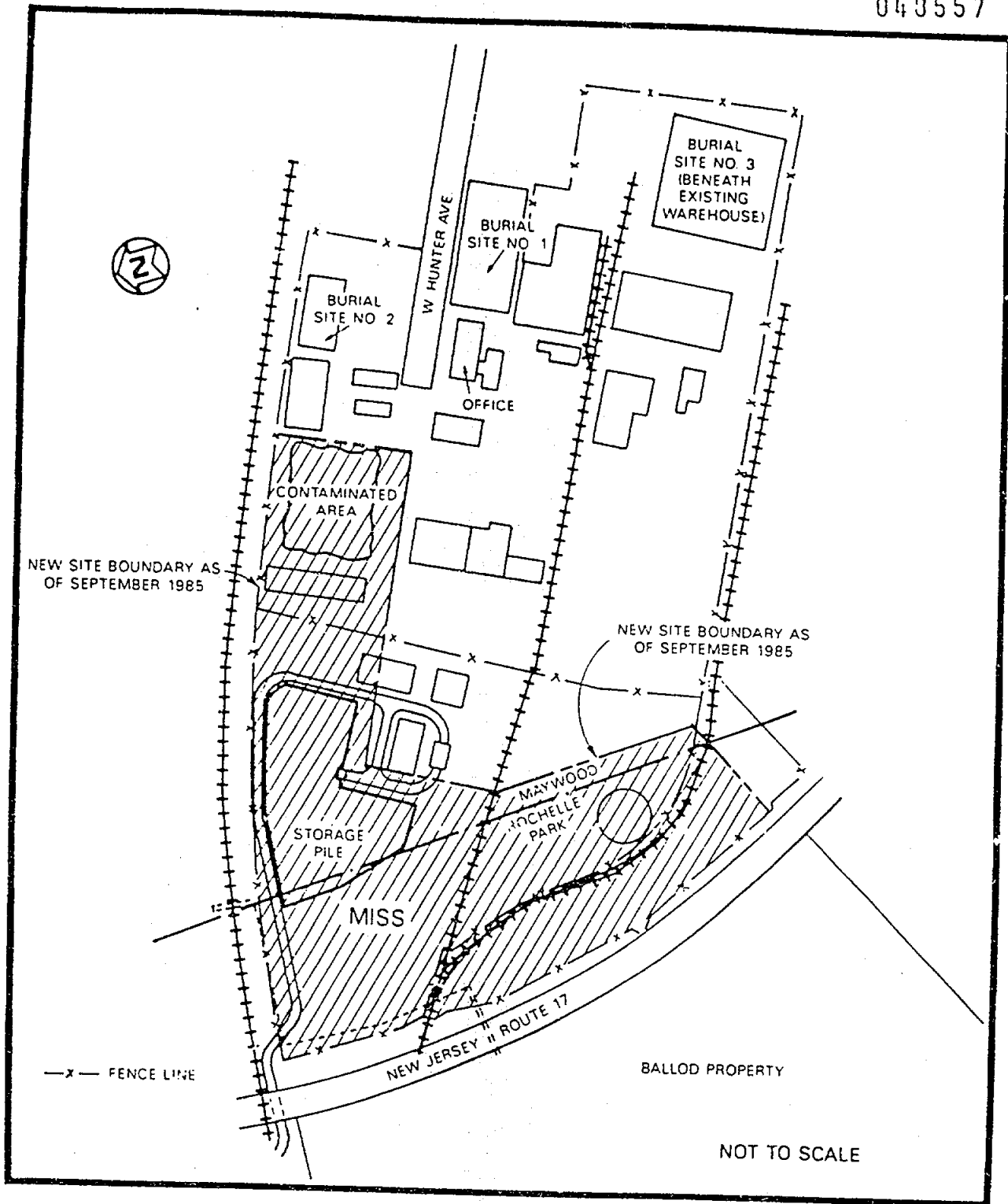


FIGURE 2-5 BURIAL SITE LOCATIONS ON THE STEPAN COMPANY PROPERTY

plant: one to the northeast of the plant and the other to the south of the plant. Follow up ground surveys were performed to determine the nature of these anomalies.

In 1984, Oak Ridge National Laboratory (ORNL) surveyed the Lodi area with a mobile van (Ref. 12). Eight residential properties were found to be contaminated with thorium-232; additional properties were found to be contaminated with radium-226 and uranium. The presence of radium-226 and uranium appears to be associated with the presence of natural uranium ore. In 1985, other potentially contaminated properties were identified.

In 1984, DOE negotiated an agreement with the Stepan Company for access to a 4.7 ha (11.7-acre) portion of the Stepan Company property on which to establish the MISS, pending execution of an agreement to transfer ownership of the site to DOE. Development of the storage site commenced, and contaminated materials removed from 17 vicinity properties in Maywood and Rochelle Park were brought to the site in 1984. In 1985, remedial action was conducted at eight residential properties in the Borough of Lodi as well as at the Ballod property in Rochelle Park. In September 1985, ownership of the MISS property was transferred to DOE. Further remedial action will be performed in subsequent years. In 1986, a radiological/chemical drilling program was conducted at MISS that established the presence of contaminated material throughout MISS and beneath Route 17 in the vicinity of the site.

2.3 PREVIOUS CHARACTERIZATIONS

Since late 1980, various organizations have conducted radiological surveys of the MISS and vicinity properties. The following is a chronology of those characterizations.

In October 1980, the New Jersey Department of Environmental Protection (NJDEP) conducted a survey on the SC and the Ballod properties in response to information that elevated levels of

radioactivity still existed at the Ballod property. The NJDEP verified the information and notified the NRC Region I office of its findings in November 1980 (Ref. 8).

In November - December 1980, January 1981, the NRC conducted its own survey and verified elevated measurements of thorium-232. It found thorium-232 concentrations of up to 3,000 pCi/g on the SC property and as much as 3,975 pCi/g in the formerly diked areas on the Ballod property (Ref. 8).

In January 1981, the NRC requested a comprehensive survey of the SC property and its vicinity. Using the SC plant as the center, a 4-mi² aerial survey conducted by EG&G identified anomalous concentrations of thorium-232 to the north of the SC property (the Davison and Latham properties) and to the south (Ref. 11). An ORAU ground survey of the Ballod property confirmed previous survey results (Ref. 13).

In June 1981, in a separate survey, the SC commissioned Henry W. Morcon and Nuclear Safety Associates to conduct a survey of the SC and Ballod properties (Ref. 8). This survey also corroborated previous survey results.

In June 1981, to investigate the EG&G measurements from the Davison and Latham properties, DOE requested ORNL to conduct a ground survey of them. The survey confirmed the elevated concentrations of thorium-232 (Refs. 14-21). The contamination was found primarily where soil had been used for fill and in gardens as mulch. As a result of the ORNL survey (thorium-232 measurements ranging from 7 to 5,500 pCi/g, eight properties were designated for remedial action.

In October 1983, BNI conducted a radiological characterization on the Grove Avenue and Parkway properties to determine whether contamination had migrated from the Ballod property onto these residential lots (Refs. 22-30). On the basis of this survey, nine

properties were designated for remedial action. BNI also performed a characterization of the Ballod property from November 1984 to March 1985 (Ref. 31).

In November 1983, the NJDEP requested DOE to have ORNL conduct a "drive by" survey in the Lodi area using its "scanning van." Although not comprehensive, a scanning van survey identifies areas requiring further investigation (Ref. 32). Based on these results, ORNL and BNI conducted more thorough surveys of the area (Refs. 33-40). Ten properties were characterized, resulting in the designation of one commercial, one state-owned, and eight residential properties.

In July - August 1986, characterization surveys were completed by BNI at the following properties: Bergen Cable (Ref. 41), the New Jersey State Vehicle Inspection Station (Ref. 42), Scanel, North Ballod, the railroad property adjacent to the site (Ref. 43), under the portion of Route 17 adjacent to the site (Ref. 44), the Sears (Ref. 45), and adjacent properties [includes the Gulf and Sunoco station (Ref. 46), Federal Express (Ref. 47), Hunter Douglas (Ref. 48), DeSaussure, and AMF/Voit], and the MISS (Ref. 49).

This characterization confirmed that thorium-232 is the primary radioactive contaminant at the MISS. Analysis also identified elevated levels of radium-226 and uranium-238. The surface soil sample results showed maximum concentrations of thorium-232 and radium-226 to be 95.2 and 7.9 pCi/g, respectively. In sediments, concentrations ranged from background levels to 18.3 pCi/g for thorium-232 and from background levels to 5.4 pCi/g for radium-226. Analyses of subsurface soil samples indicated thorium-232 concentrations ranging from background levels to 1699 pCi/g, radium-226 concentrations ranging from background levels to 447 pCi/g, and uranium-238 concentrations from less than 7 to 304 pCi/g. Gamma logging data showed subsurface contamination ranging from the surface to 15 ft deep (Ref. 49).

2.4 REMEDIAL ACTIONS

In 1984, nine vicinity properties on Grove Avenue and Parkway and a portion of the Ballod Associates property in Rochelle Park, and eight properties on Davison and Latham in Maywood were decontaminated and restored. A total of 4,700 yd³ of material was transported to the MISS for interim storage.

In 1985, eight residences in Lodi and the major portion of the Ballod property were decontaminated and restored. This work resulted in 30,200 yd³ of contaminated material being added to the interim storage pile at the MISS. In addition, site preparation for additional material, including installation of the bottom liner and leachate collection system was completed.

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ATTACHMENT 2
MATRIX OF WORK PRODUCTS

MAYWOOD

TASK 1 - SCOPING

RI/FS	DESCRIPTION OF CURRENT SITUATION	QA/QC PLAN	SAMPLING/ ANALYSIS PLAN	HEALTH & SAFETY PLAN	DATA MANAGEMENT PLAN	COMMUNITY RELATIONS PLAN	ARARs
FUSRAP							
Site Plan	*						
Project Procedures		*			Limited		
Health & Safety Plan				*			
Characterization Plan			R/LC				
Environ Monitor Plan			R/LC				

TASK 2 - REMEDIAL INVESTIGATION

RI/FS	SITE CHARACTERIZATION						POST SCREENING FIELD INVESTIGATION		
	SAMPLE/ ANALYSIS	ANALYTIC INTERPRET	HYDROGEO INVEST	SOILS/ SEDIMENT	SURFACE WATER	AIR INVEST	SAMPLE/ ANALYSIS	ANALYTIC INTERPRET	MEDIA INVEST
FUSRAP									
Characterization/Analysis	R/LC	R/LC	Limited	R/LC					
Characterization Report	R/LC	R/LC	Limited	R/LC					
Drilling/Well Install Rpt			Limited						
Environ Monitoring/Report			R/C	R	R	R			

TASK 3 - FEASIBILITY STUDY

RI/FS	DEVELOP ALTERNATIVES	INITIAL SCREENING OF ALTERNATIVES	TECHNICAL REVIEW	DETAILED ANALYSIS OF ALTERNATIVES	PRELIMINARY REPORT	TECHNICAL REVIEW	FINAL REPORT
	FUSRAP						
Preliminary Engineering Evaluation of Alternatives	R	R	N/A	R	R	N/A	R

* - Meets EPA Requirements; R - Radiological Only; R/LC - Radiological and Limited Chemical; R/C - Radiological and Full Chemical.

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