

FUSRAP Maywood Site - Remediation of a Residential Property at 61 Trudy Drive, Lodi, NJ-17533

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ABSTRACT

The Formerly Utilized Sites Remedial Action Program (FUSRAP) is the U.S. government program started in 1974 to identify, investigate and clean up or control sites that became contaminated as a result of the nation's early atomic programs. The FUSRAP Maywood (New Jersey) Superfund Site (FMSS) consists of 92 designated property parcels known as vicinity properties. 61 Trudy Drive in Lodi, New Jersey is one such vicinity property. Construction planning for a recently-completed remedial excavation at 61 Trudy Drive was predicated on a fundamental question: to remediate the property with the existing home remaining in place or to demolish the existing home. Answering this question involved detailed engineering and cost analyses, programmatic considerations, and stakeholder input.

61 Trudy Drive was originally addressed under FUSRAP in 1985 by the U.S. Department of Energy (DOE). However, subsequent remediation on an adjacent property by the U.S. Army Corps of Engineers (USACE) in 1998 suggested that residual contamination remained at depth at 61 Trudy. The property owner at that time declined to allow FUSRAP access to the property. However, a property transfer in 2012 presented USACE with an opportunity to address this property. Characterization of the property began in 2013; remedial activities were completed in 2015.

The 61 Trudy Drive remediation required an intensive stakeholder communications program tailored for several audiences, including the affected property owner, local government officials and the neighboring community

This paper will present the FUSRAP history at 61 Trudy Drive, to provide context for recent FUSRAP actions there. It will then focus on the challenges and complexities of performing environmental remediation in a suburban residential setting, focusing on both construction and communications.

INTRODUCTION

FUSRAP is the U.S. government program to address waste generated by atomic research and production during the 1940s, 1950s and 1960s. The program was administered and executed by the DOE from its inception in 1974 until 1997, when it was transferred to the USACE by congressional action.

The FMSS is located in a highly developed part of Bergen County, New Jersey (NJ), approximately 13 kilometers west of New York City. The primary contaminant of concern at the FMSS is thorium, a naturally occurring radioactive rare earth element that was extracted from monazite sand at a chemical plant in Maywood from about 1916 to 1959. This process generated a sludge-like byproduct material that was pumped into holding ponds or otherwise disposed onsite. Some of this material migrated offsite through surface water sediment deposition by way of a surface stream known as the Lodi Brook that was routed to an underground storm drain pipe in the 1960's. The property at 61 Trudy Drive became contaminated in this manner. Other material was taken from the plant site for use as fill on nearby properties. The FMSS consists of 92 designated properties known as vicinity properties, including residential, commercial and some government-owned properties. Figure 1 locates FMSS properties and the 61 Trudy Drive property that is the subject of this paper. While the scale of Figure 1 lends itself to highlighting whole property parcels, contamination is known or suspected to exist in discrete areas of the individual parcels highlighted.

Site properties are located in three communities: the Boroughs of Maywood and Lodi and the Township of Rochelle Park. The combined population of these communities is 39,441, with a population density of approximately 3,285 persons per square kilometer. This compares to New Jersey's statewide density of 459 per square kilometer (ranking the state first in the US) and a national figure of 33.7 per square kilometer [1]. All residential site properties have been remediated in compliance with applicable regulatory cleanup standards. USACE is currently addressing three commercial properties and one government-owned property; all of the commercial locations currently house active businesses. FUSRAP activities at the Maywood Site are being conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended [2].

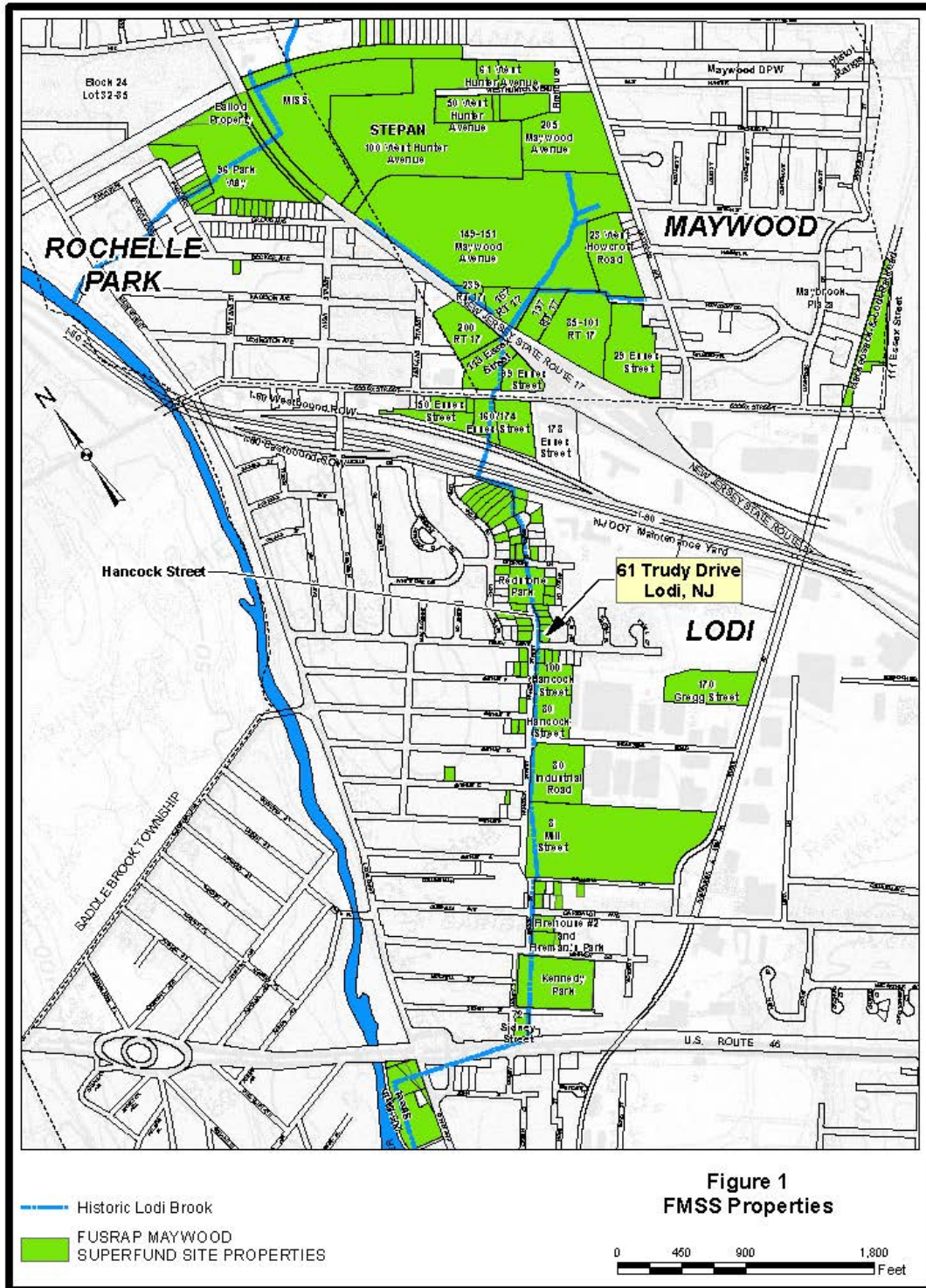


Fig. 1. FUSRAP Maywood Vicinity Properties including 61 Trudy Drive, Lodi

DESCRIPTION OF THE CHALLENGE

Many properties surveyed by DOE early on in the FUSRAP did not merit designation as FMSS vicinity properties since investigation results demonstrated compliance with the action levels in use at the time. The U.S. Environmental Protection Agency (EPA) subsequently conducted a mandatory *Five-Year Review* (FYR) of the FMSS in 2009 [3] to assess the protectiveness for human health and the environment of the selected remedy in the FMSS *Record of Decision for Soils and Buildings* (ROD) [4]. The FYR identified several properties that had been subject to FUSRAP investigation or remediation but still required additional actions such as land use controls or further investigation. In view of the FYR findings, USACE prepared a *Technical Memorandum, FUSRAP Maywood Superfund Site Property Assessment* [5] to consolidate all available data for properties that had been addressed under FUSRAP at the Maywood Site, and to re-evaluate those data against the ROD cleanup criteria as a conservative measure for completeness. That assessment identified 20 properties meriting further action, including the residential property at 61 Trudy Drive, Lodi.

Previous Investigations at 61 Trudy Drive

A radiological survey was conducted by the DOE - Oak Ridge National Laboratory (ORNL) in August 1984 to determine whether radioactive materials in excess of DOE remedial action guidelines were present. Systematic and biased soil samples were taken from various locations on the property for radionuclide analyses. Thorium-232 concentrations of 16.3 pCi/g and 17.3 pCi/g detected in the northwestern portion of the property in a sidewalk area adjacent to Hancock Street exceeded the DOE guideline of 5 pCi/g. Results of a gamma walkover survey (GWS) of the surface of the property identified areas where gamma exposure rates were in excess of background radiation levels. Gamma exposure rate levels up to 32 microRoentgens per hour ($\mu\text{R/h}$) existed on the ground surface in the same locations as the elevated soil samples. It was recommended that this property be designated for further evaluation [6].

A FUSRAP remedial action was performed at 61 Trudy Drive in 1985. An area of less than 60 square meters in that northwest portion of the property adjacent to Hancock Street that exceeded the guidelines was excavated. DOE post-excavation sampling results indicated that all reported final soil sample concentrations were below the DOE guideline limits. Between January and June 1986, ORNL completed an independent radiological verification survey for the property. Based on the post-remedial action data and independent verification survey data, it was concluded that the site successfully met DOE remedial action objectives in place at the time.

As discussed, the 2009 FYR of the FMSS conducted by EPA prompted USACE to prepare the Technical Memorandum [5]. For 61 Trudy, available surface soil and

GWS data from the previous DOE activities were found to demonstrate that the areas excavated by DOE were successfully remediated to the current FMSS residential cleanup criteria of 5 picocuries per gram (pCi/g) combined radium and thorium in soils and 16 μ R/h gamma.

While the Technical Memorandum evaluation was consistent with DOE's no further action determination, several key factors led the FMSS team to perform a supplemental subsurface investigation in August 2014. These factors included the proximity of the historic Lodi Brook path and culvert (the primary mechanism for transport of FUSRAP contamination into Lodi); the depth of the previous DOE remediation (2.13 meters [m] below ground surface, or bgs); and anecdotal observations from members of the FMSS team who, based on the depth of the completed FUSRAP remediation on the adjacent property at 4 Hancock Street (2.74 m bgs), suspected that contamination was present at depths below 1.83 bgs. The ensuing supplemental survey included a GWS along with sampling at ten direct-push boring locations (11 surface soil samples and 21 subsurface samples total). The survey identified contamination at depths up to 1.9 m bgs on the northern, western and southern portions of the property.

A subsequent *Field Survey Plan, 61 Trudy Drive Additional Investigation* [7] was prepared in October 2014 and implemented in December 2014 to further define the extent of contamination and support a remedial design. Nine additional borings were performed with 10 surface soil and 20 subsurface soil samples collected to ensure a thorough assessment of the property. Seven of the borings were located adjacent to the existing residential structure. Analytical results identified FUSRAP contamination to a depth of up to 2.9 m bgs on the residential property.

Remedial Action Planning and Execution

Figure 2 shows the home at 61 Trudy Drive in 2015 prior to the start of FUSRAP remediation. Construction planning for the remedial excavation of radiologically-impacted soils under and adjacent to the 130 square meter house required a detailed comparison of the estimated costs for underpinning the structure vs. building demolition, conventional remedial excavation and rebuilding the house. Order of magnitude cost estimates for both approaches were comparable; however, underpinning the house was considered to have potential risks (e.g., safety and unknown, potential future repairs to the house post-construction), and reduced efficiency of the remedial action that would not be associated with demolition-remedial excavation-rebuilding. To improve the level of confidence for comparing both approaches, it was decided to solicit competitive pricing for subcontracted underpinning of the house. Preparation of the Scope of Services identified additional construction details, including sequencing/schedule duration increases and clarification of prime contractor vs. subcontractor responsibilities that together,

resulted in a significant increase in bid cost for the underpinning approach that was 50 percent higher than the demolition-remedial excavation-rebuilding approach. Based on this cost analysis, the underpinning procurement was cancelled. Following execution of an agreement between the Property owner and USACE that established the replacement cost of the residence, work proceeded with demolition of the house. The engineering cost evaluation (demolition versus underpinning) and ultimate decision for demolition resulted in an estimated savings of more than \$500,000 US to the FMSS project.

Programmatic Considerations

More than 60 residential properties at the FMSS have been successfully remediated under FUSRAP. However, in cases where soil contamination was found to underlay homes, the existing structures were underpinned to allow for excavation of the contaminated soil below while the structures remained in place. Thus, the decision to demolish the home at 61 Trudy Drive to access the underlying soil was a first for the project and required evaluation from a programmatic perspective.



Fig. 2. 61 Trudy Drive, Lodi, NJ in September 2015. Hancock Street appears at the left of the photo, beyond the fence.

Construction

FMSS personnel and equipment mobilized to the property on September 22, 2015 and proceeded with demolition of the existing house to allow access to the underlying soils. Figure 3 shows the demolition in progress. This was followed by impacted soil removal and final status survey activities, excavation backfilling, and site restoration in accordance with FMSS project specifications. FUSRAP demobilization from the property occurred on March 4, 2016. To accommodate the owner's home reconstruction schedule, FUSRAP personnel returned to the property on September 19, 2016 to complete restoration of sidewalk, curbing and a driveway apron removed during the remedial action. Restoration of street pavement that was disturbed during the sidewalk/curb construction was performed in October 2016. All these activities were completed in coordination with the property owner, and in accordance with the term of the temporary offsite housing lease executed by the USACE Real Estate Division. The total volume of soil removed from the property and ultimately shipped off site to a licensed and/or permitted disposal facility was 1,623 in situ cubic yards (yd³). In addition, 56,781 liters of construction water was collected at the property. The water was treated and discharged in accordance with the project's permit with the Bergen County Utilities Authority, owner of the local publicly-owned treatment works.

Construction management also used the 61 Trudy Drive remediation as an opportunity to remove contaminated soil around a section of the Lodi Brook culvert pipe that runs under Hancock Street (Figure 4). Approximately 21.3 m of the pipe was exposed (nearly the full length of the 61 Trudy Drive property) during this work. The pipe excavation ended at that point as the owner of the adjacent property to the north would not grant USACE access to her property to continue the work.

Construction Scope Expansion - 63 Trudy Drive

During the remedial action at 61 Trudy Drive, soil contamination was found to extend across the property line and onto 63 Trudy Drive, the adjacent residential property to the east. FMSS staff immediately notified the owners of that property and arranged a meeting to explain the findings. After some initial reluctance, the owners granted USACE permission to fully characterize the property, including soil sampling and a GWS of the entire property. Those investigations showed relatively shallow soil contamination (0.61 - 1.07 m bgs) across the front yard of the property, except for a deeper area (1.83 - 2.44 m bgs) in the driveway adjacent to 61 Trudy. Project staff including the FMSS Construction and Community Relations managers met with the elderly property owner and his son in the home to present these findings and a proposed remedial design plan. Negotiations on various logistical matters followed, including staging the work to maintain at least one entry

to the home throughout, and provisions for vehicle parking in the event of a snow event that prevented on-street parking. The owner ultimately authorized the remediation, and the necessary property access agreement was executed. Remedial excavation began on February 1, 2016; excavation, FSS, backfill, compaction testing and driveway restoration was completed in less than 30 days. 244 in situ cy of contaminated soil was removed from the property. FMSS construction personnel re-mobilized to the property on May 31, 16 to complete landscape restoration, including sod placement and landscape planting.



Fig. 3. 61 Trudy Drive during demolition. Note the proximity of the neighboring homes (4 Hancock Street on left, 63 Trudy Drive on right).



Figure 4. Soil around the Lodi Brook culvert pipe was also excavated during the 61 Trudy Drive remediation.

Stakeholder Relations

This section presents the broad outlines of stakeholder outreach in support of the 61 Trudy Drive remediation, and also explores and the three principal elements of stakeholder relations program.

The action at 61 Trudy Drive was the first residential property remediation at the FUSRAP Maywood project in over 15 years. As such, executing a soil cleanup in a suburban residential setting was a new experience for most of the project team. From the outset, project management sensitized the entire team to the unique challenges of working in a residential environment. This was made clear when the full team assembled for the first time for a pre-construction kick-off meeting, and was emphasized throughout the project in forums such as daily "tail gate" briefings and weekly status meetings.

Communications in support of the project were tailored to three distinct audiences: the 61 Trudy property owner (and by extension the owners of the two residences bordering 61 Trudy), the surrounding community, and local officials. Each audience had different information needs, concerns and expectations as the project progressed. It was the role of the FMSS Community Relations Specialist to develop and manage the communications program, with support from other project disciplines as needed.

Property Owner Communication

FMSS staff first engaged the 61 Trudy Drive property owners in July 2014, a full 14 months before the start of remedial construction. Initial contacts were to present the findings of the Technical Memorandum [6] and in the process brief the owners on the FUSRAP history of their property, including health risk assessments. Subsequent communications involved executing a property access agreement, scheduling additional site characterization (including two rounds of direct push soil boring sampling), and reporting the results. These communications included an in-person meeting between the FMSS Project Manager and Community Relations Specialist and the property owners at the FMSS public information office, and numerous follow-ups by phone, email, and in writing as appropriate.

The results of the additional investigation showed soil contamination across the property at depths to 2.74 m bgs. Given that scope, the key question for the project became whether to underpin or demolish the structure to gain access to the underlying soils. Once the decision for demolition was made (see **Remedial Action Planning and Execution**), a second in-person meeting was held with the property owner to present that decision and review a remedial design and schedule.

Subsequent communications covered the following topics:

- Negotiation of property access agreements as needed
- Periodic data transmittals and status reports
- Preparations for demolition (utility shutoffs, hazardous materials and pest inspections)
- Property restoration
- Personal meetings with owners of immediately adjacent properties concerning safety and construction impact mitigation
- Relocation (temporary housing for the residents during the action)
- Reimbursement to owner for replacement of the demolished structure

The USACE Real Estate Division took the lead in the last two points listed above. A USACE real estate specialist was dedicated to the project. He immediately engaged a local realtor to identify potential temporary housing locations and prepared and executed a lease once a suitable location was identified. The specialist also managed the market appraisal of the home replacement cost, and prepared the necessary document to formalize that arrangement with the property owner.

In the end, the remedial action was substantially completed in March 2016. The property owner was notified that the site was available for reconstruction of their home at that time. Extensive coordination with the owner's contractor followed, including onsite meetings to discuss matters such as site grading, use of utilities established for the FUSRAP work, and finish restoration items such as sidewalk and curb construction. As of this writing, construction of a new home at 61 Trudy Drive is nearing completion.

Communication with the Community

As noted, the 61 Trudy remediation was the first such action at the FMSS in over 15 years. Some long-time residents of the neighborhood remembered past FUSRAP actions in the 1980s and 1990s when nearly 50 properties (most of them residential) were addressed. Others were newer to the neighborhood and did not have that history. Fact sheets and public notices designed to meet the information needs of both groups were developed, and included background information on past FUSRAP activities in the area and a description of the planned action at 61 Trudy. Three such communications were prepared: prior to the action, during the work when excavation around the Lodi Brook culvert impacted local traffic, and at project completion. These were hand-delivered by the Community Relations Manager to approximately 135 residences in the surrounding neighborhood, and prompted numerous calls from recipients. Door-to-door delivery of these materials provided an opportunity for many individual contacts with residents, during which the

Community Relations Manager was able to personally address questions and concerns. It also allowed the specialist to establish himself as an onsite presence in the community, as opposed to an impersonal point of contact listed on a piece of paper. The fact sheets and notices were also posted on the municipal web site (www.lodi-nj.org) and the project web site (www.fusrapmaywood.com) to keep residents and other interested stakeholders informed of project activities.

Communications with Local Officials

Initial contact with local officials was made in October 2013, again well before remedial construction. FMSS management met with the Lodi Borough Manager to present the findings of the property assessment Technical Memorandum [6] as they related to 61 Trudy Drive and another Lodi property. Four such meetings took place over the course of the 61 Trudy work, and included other local officials including public works and public safety management personnel as needed.

Topics addressed at these meetings included:

- Technical issues (nature and extent of contamination, potential health effects)
- Property tax implications of the home demolition and rebuild
- Local permitting for the demolition
- Construction impact mitigation (traffic control, noise, dust, etc.)
- Support for manager briefings to the local mayor and council
- Establishment of a FUSRAP central point of contact

It is noteworthy that a new Borough Manager took office in January 2016. The new manager had limited knowledge of the FUSRAP history in his community or the ongoing action at 61 Trudy. The Community Relations Specialist proactively contacted the new manager to introduce himself and schedule a background briefing by himself and the FUSRAP Maywood Site Project Manager. This was accomplished quickly (within thirty days of his appointment) to maintain the mutually beneficial dialogue between the project and the municipality that had been established with the former manager. Aside from personal meetings with local officials, regular telephone and email communications were established between FUSRAP and local staff to address in real time any issues that arose throughout the duration of the project.

CONCLUSIONS

The experiences described in this paper reinforced some basic rules for effective community relations and public outreach on environmental projects: sensitize your team to the project-specific challenges, establish a central point of contact with the

public, communicate early, often and consistently, and always follow up, even when the news is not good. These efforts are not strictly the purview of the project management, community relations, or real estate staff. In the case of 61 Trudy Drive, technical staff was often called upon to develop engineering plans, construction schedules, and other materials to support communications with the property owners, local officials and the wider community. The additional (and unexpected) remedial action at 63 Trudy Drive demonstrated the need for flexibility and a nimble response in the face of unanticipated field conditions. The seamless transition from the 61 Trudy Drive remediation to the 63 Trudy Drive work is testament to such a response.

On the construction planning side, two markedly different remedial approaches were evaluated: structure underpinning vs. structure demolition. This was new territory for the FMSS project, and the decision to demolish the structure was a departure from past FUSRAP practice on the project. However, the development of comprehensive and reliable cost and schedule estimates for each approach gave project decision makers a firm basis for choosing the demolition option. The decision passed programmatic muster within FUSRAP in large part because of the careful deliberation that supported it. When the remedial action got underway, the benefits of an open site as opposed to maneuvering around and under an underpinned structure were immediately apparent to all.

REFERENCES

1. United States Department of Commerce, US Census Bureau, Population Division, *Population Estimates* (2011).
2. United States Environmental Protection Agency, 42 U.S.C. 9601 et seq., *Comprehensive Environmental Response, Compensation and Liability Act* (1980) as amended.
3. United States Environmental Protection Agency, *Five-Year Review Report, Maywood Chemical Co. Superfund Site, Bergen County, New Jersey* (September 2009).
4. United States Army Corps of Engineers, *Record of Decision for Soils and Buildings at the FUSRAP Maywood Superfund Site, Maywood, New Jersey*, prepared by Shaw Environmental, Inc. (August 2003).
5. United States Department of Energy, *Results of the Radiological Survey at 61 Trudy Drive, Lodi, New Jersey* (1984).
6. United States Army Corps of Engineers, *Technical Memorandum, FUSRAP Maywood Superfund Site Property Assessment* (August 2013).
7. United States Army Corps of Engineers, *Field Survey Plan, 61 Trudy Drive Additional Investigation* (2014).