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United States
Environmental Protection
Agency

Solid Waste and
Emergency Response
(5502G)

EPA

Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Radium Chemical Site Profile

Site Description: Light industrial site in an urban section of Queens, New York

Site Size: One-third of an acre

Primary Contaminant: Radium-226

Potential Range of Health Risks: Exposure can cause radiation sickness, topical burns and respiratory disorders

Nearby Population Affected: 300,000 people within three miles

Year Listed on NPL: 1989

EPA Region: II

State: New York

Congressional District: 7

Success In Brief

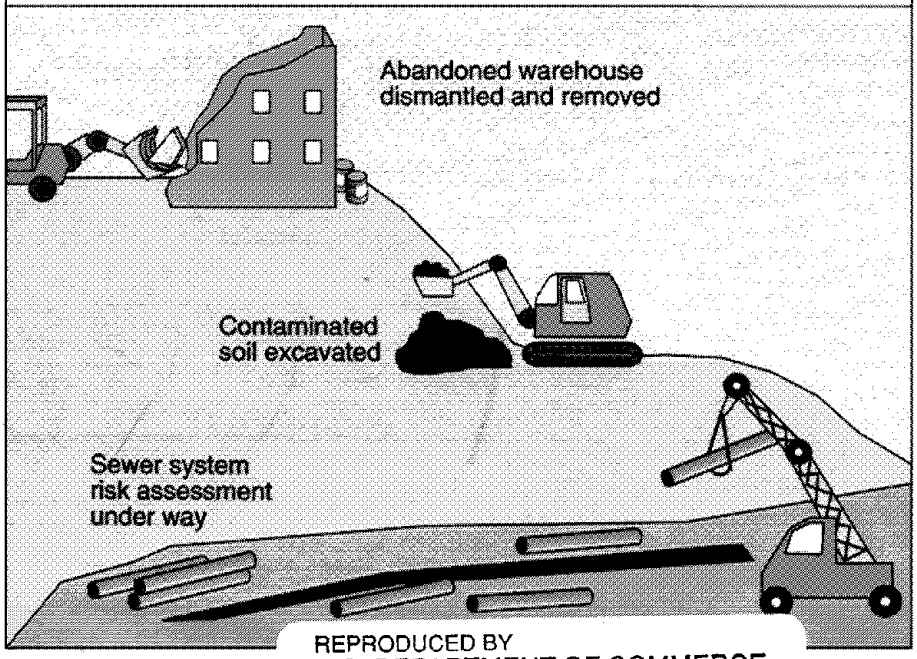
EPA Actions Abate Community Exposure to Radium Facility

The Radium Chemical hazardous waste site in Queens, New York was contaminated with radium, posing a grave potential threat to the community. The U.S. Environmental Protection Agency (EPA) used the Superfund program to design a long-term cleanup for the site using input from citizens and the business community. Superfund staff:

- Mobilized a quick cleanup action to remove 10,000 small containers of radium;
- Developed a streamlined approach to long-term cleanup;
- Secured the site to reduce the possibility of radiation exposure to the local residents;
- Cooperated with the community to design a well-organized emergency response plan; and
- Educated local citizens about site hazards, incorporating community concerns into the cleanup process.

The Radium Chemical site is a clear example of EPA's effective management and problem-solving strategies at Superfund sites.

Radium Chemical Site Cleanup Plan



The Site Today

The majority of the cleanup actions at Radium Chemical are complete. The abandoned building was dismantled and removed in October 1991, when soil excavation began.

Soil disposal was completed in March 1992; a risk assessment is underway on the sewer system to determine how much of it must be removed. This study will be completed in spring 1993. The site will be seeded for grass and considered safe for a variety of productive uses by June 1993.

A Site Snapshot

An abandoned building and grounds known as the Radium Chemical site cover about one-third of an acre in a light industrial area of Queens, New York. Some small businesses and residences lie within half a mile, and the Brooklyn/Queens Expressway passes within seven feet of the site. Approximately 300,000 people live within three miles.

The building stored radium, a radioactive substance used in cancer treatment. The radium was stored in lead casks that housed about 10,000 small metal containers commonly used to store radioactive materials.

The most significant danger to the community was a potential leak of radiation. This led EPA to place Radium Chemical on the National Priorities List (NPL) on November 21, 1989. The NPL is EPA's list of the most serious uncontrolled or abandoned sites identified for comprehensive cleanup under the Superfund program, which had been enacted in 1980.

Improperly handled radium poses a serious occupational threat to workers. If touched, it causes radiation burns and can even result in the loss of limbs. In addition, inhaling radon gas can cause chronic bronchial diseases.

The surrounding area shows no signs of contamination

Only the site building and a nearby structure were affected. The surrounding area showed no signs of contamination. Nevertheless, EPA fenced the site, mounted a 24-hour security guard, and installed a monitoring system to prevent a potential release into the community. The site's auxiliary sewer system was polluted with radium, but its discharge was contained, and did not affect water flowing through the piping.

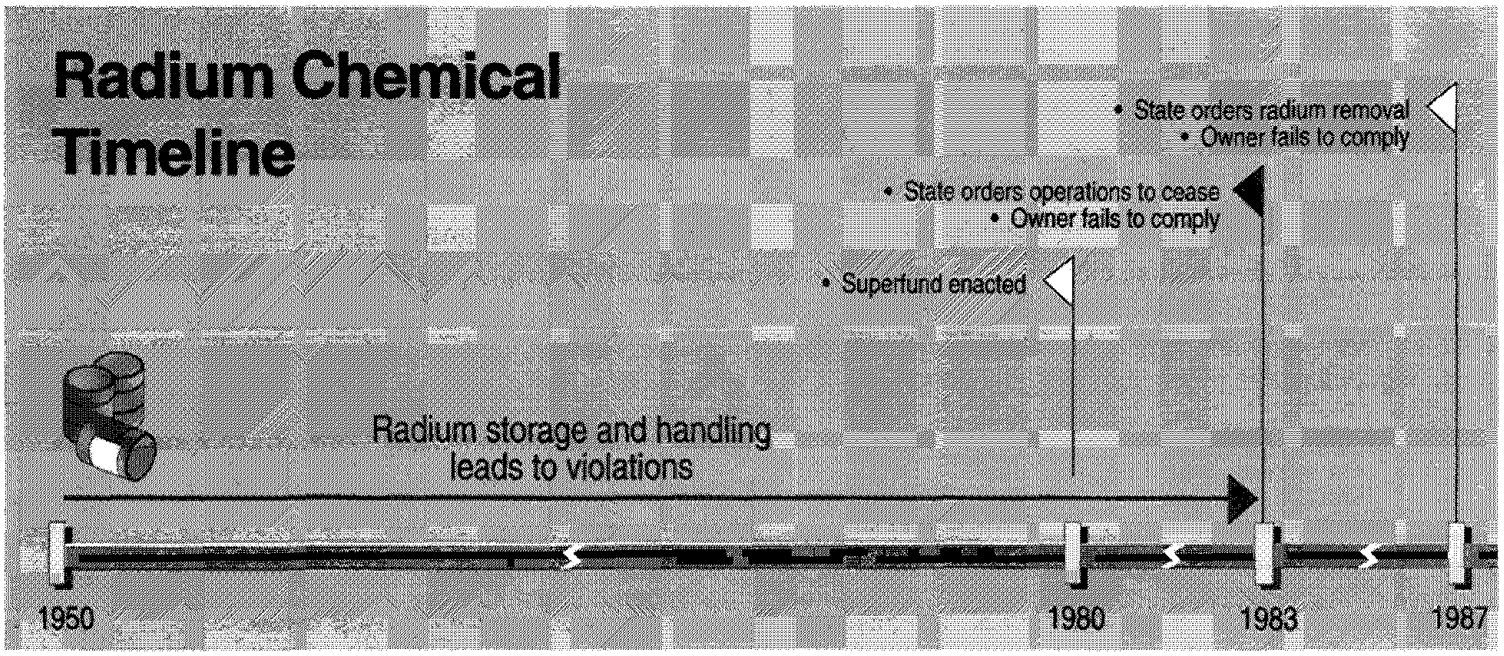
The Radium Chemical: A Dangerous Site

Poor Waste Handling Practices Draw Legal Actions

The Radium Chemical site stored radium beginning in the 1950s and ceased operations in 1988. About 10,000 small metal containers, storing a total of 120 curies of radium, were found in the building.

In 1983, New York State ordered Radium Chemical Company to stop operating due to shipping and handling violations. Further inspections revealed that the on-site radiation levels surpassed allowable standards, indicating that the radium had been improperly stored, and that there were defects in the radium containers. Furthermore, these investigations revealed that the company had lost several shipments of radium.

In 1987, the state ordered Radium Chemical Company to remove its inventory of radium containers and to decontaminate



cal Story: ion Defused Quickly and Safely

the warehouse. The company vacated the site without complying, and in 1988 the site was declared officially abandoned. Radium Chemical Company was

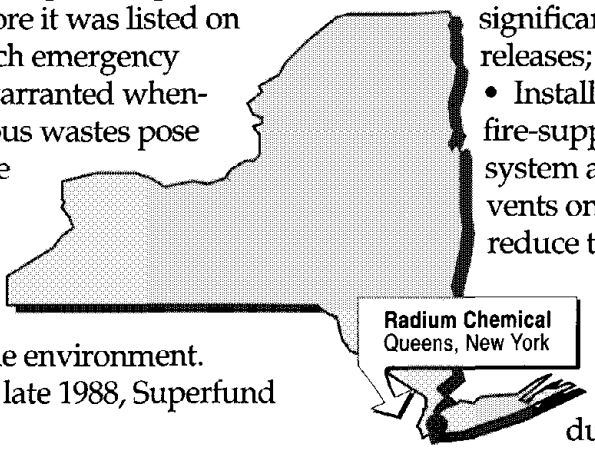
About 10,000 containers housing a total of 120 curies of radium, were found in the building

prosecuted for criminal violations of the state labor law by the State Attorney General and in February 1989 was convicted on four violations and fined the maximum amount permitted by statute.

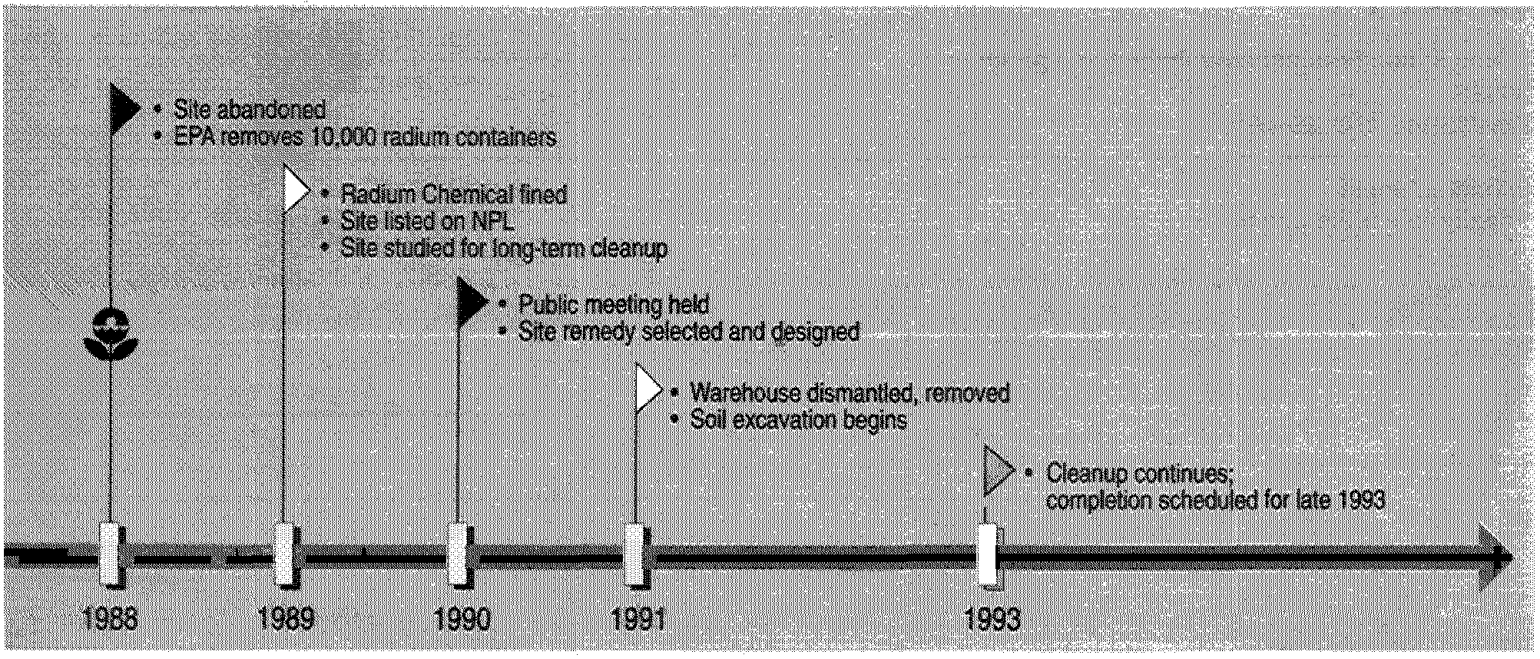
Although investigations reveal that the Radium Chemical Company has no assets, EPA is preparing to place a lien on the owner's property for future recovery of cleanup costs.

EPA Quickly Reduces Immediate Threats to the Community

To reduce the risk of radium exposure to the community, EPA began organizing cleanup at the site even before it was listed on the NPL. Such emergency actions are warranted whenever hazardous wastes pose an immediate and substantial endangerment to human health and the environment. Beginning in late 1988, Superfund staff:

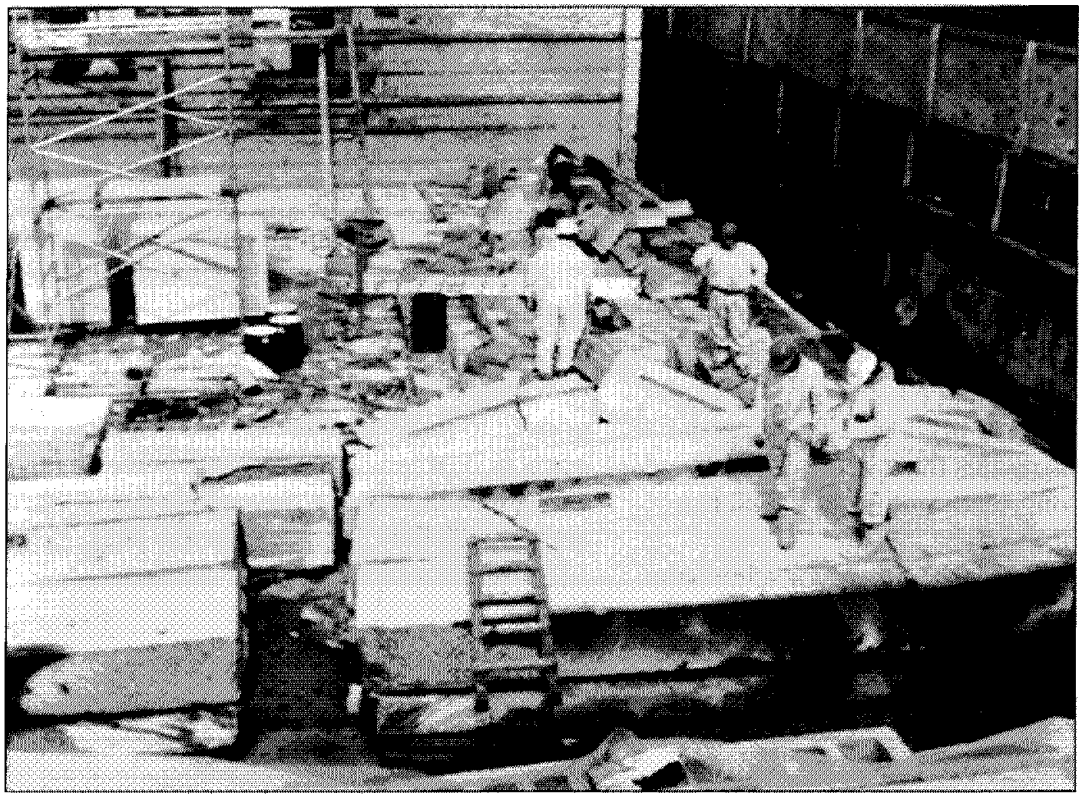


- Supervised the removal of 10,000 small metal containers of radium from the building to an approved waste disposal site, thereby significantly reducing the imminent threat to the community;
- Constructed a fence around the site to restrict public access;
- Mounted round-the-clock security and installed a remote monitoring system designed to warn EPA immediately of significant radiation releases;
- Installed a foam fire-suppressant system and special vents on the site to reduce the spread of contamination in the event of fire or explosion during the cleanup; and
- Developed contingency plans with hospitals and the local fire and police departments to minimize confusion in the event of an emergency.



Cleanup Underway at Radium Chemical

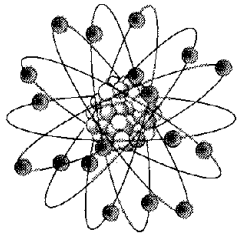
If a fire or explosion had occurred at the Radium Chemical facility prior to EPA's cleanup actions, the radiation released could have affected all of New York City.



A Brief Look at Radium: The Element, The Dangers

When French scientist Madame Curie first gazed at the brilliant white luminescence that would bear the name radium, she could not imagine its use to treat cancer patients or to explore physics, or even its use in glowing paints. She also could not imagine the difficulties present in keeping the element's radiation of alpha particles, nucleons, electrons, and gamma rays in check to limit risks to populations and the environment.

The most common form of the element is radium-226, which was stored at the Radium Chemical site. While a useful tool in both technical and medical fields, radium also contains an element of danger. If improperly stored and handled, or if the substance is not carefully contained and monitored, the health risks to nearby residents can be extreme.



The Element

In the range of radiation sicknesses, those derived from radium exposure are among the most devastating. Physical contact with radium immediately begins to cause cells to mutate. In one case, a small amount of radium-tainted gold was mixed with unaffected materials to make rings; some unsuspecting wearers lost fingers from the radium contact.

Physical contact is relatively easy to control; a threat to a far greater population comes from inhalation of radium's by-product, radon gas. Even short exposures to radon can lead to chronic bronchial diseases and long-term exposure can be fatal.

Long-Term Threats Eliminated Through Expeditious Decision-Making

Once the radium containers were removed, EPA sought to streamline cleanup of the remaining site contamination. In the fall of 1989, Superfund staff conducted a rapid yet comprehensive investigation of potential remedies that would reduce long-term pollution problems at the site.

EPA undertook conscientious community relations efforts that assured citizen and business input to decision-making (see story on page 6). The selected approach for long-term cleanup of Radium Chemical involved the following steps:

1) Decontaminating the building and then dismantling it;
2) Excavating contaminated soil;
3) Removing the contaminated sewer system, which affected the site and one other adjacent building;
4) Transferring contaminated materials to an approved waste disposal site; and
5) Seeding the lot for grass and removing the security fence.

After these steps are complete, the site area will be safe for a variety of productive uses.

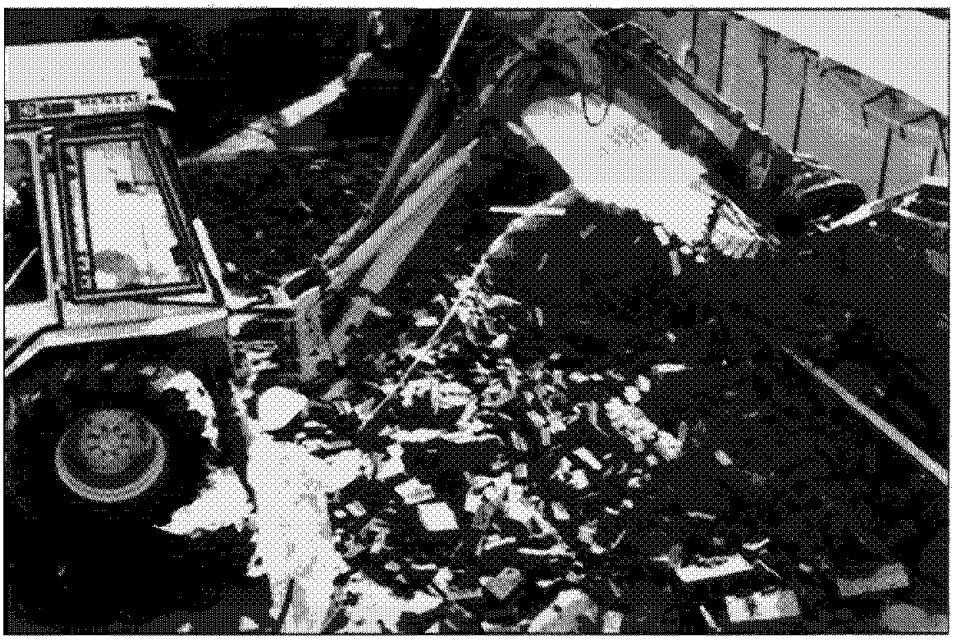
Most Superfund cleanups adhere to the approach of designing the remedy for the site after it has been formalized in a Record of Decision. This design phase can be lengthy, but at Radium Chemical, good planning and community support for the option allowed EPA to merge the selection and design steps. EPA had completed the design effort by the time the remedy was officially approved in 1990.

"Everything involved in EPA's response to this site has been done on a fast-track basis"
-- EPA official

This effective and expedient effort yielded two jobs for the price of one. Furthermore, by completing the study, selection, and design steps in only eight months, EPA saved nearly a year in the cleanup process. On the subject of this unique approach, EPA Regional Administrator Constantine Sidamon-Eristoff remarked, "Everything involved in EPA's response to this site has been done on a fast-track basis.... Even the report on the remaining contamination in the building was completed in near-record time."

EPA saved even more time and money by starting the actual cleanup the day after the remedy was selected. Traditionally, EPA accepts bids by cleanup contractors and selects a firm once the design is complete. This competitive process usually takes about nine months.

Superfund continued its fast-track approach to Radium Chemical by utilizing an existing contract managed by the U.S. Army Corps of Engineers. The Corps, which has a wealth of experience in cleaning up the nation's hazardous waste sites, quickly dispatched its cleanup team to the site.



Demolition of the Radium Chemical facility
Removal of the abandoned building was one element of the long-term cleanup.

EPA Responds to Community Concerns Throughout Cleanup

Outreach Involves and Educates the Community

EPA was quick to address the community's concerns regarding the potential dangers at Radium Chemical, and took a number of measures to reach the public.

Superfund staff set up an on-site community relations trailer. A 24-hour hotline, with recordings in Spanish, Greek, and English, provided up-to-the-minute information to the entire community. EPA also distributed pamphlets in these languages to educate citizens and to assure them protective actions were being taken.

Local businessmen also worked in conjunction with EPA to temporarily close surrounding streets during the cleanup process.

Cleanup Precautions Ease Health Fears

EPA was able to secure the Radium Chemical site efficiently and effectively so that at no time was the Brooklyn-Queens Expressway endangered by the site, despite its proximity to the contamination. No health problems have been reported by site workers or local residents.

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Success at Radium Chemical

EPA's work at the Radium Chemical site protected New Yorkers from a serious radioactive pollutant. Superfund personnel promptly removed the immediate threat, secured the site, and designed a long-term cleanup approved by the community.

EPA studied the site, chose the remedy, and designed the approach in tandem with the business and local community. EPA's streamlined cleanup approach also saved time and money. The site study, cleanup strategy, and cleanup design were combined, and work began the day after the design was selected. These cost-effective innovations saved about 18 months.

EPA

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