

CONTAMINATED HOMES ORANGE, NEW JERSEY  
FROM 1915-1926 APPROXIMATELY 1/2 TON OF ORE CONTAINING 2-4%  
URANIUM WAS PROCESSED AT ALDEN AND HIGH STREETS IN ORANGE, NEW  
JERSEY.

PRESENTLY, THE ANNUAL MEAN RADON EXPOSURES IN BUILDINGS ON THE  
SITE RANGE BETWEEN 0.03-0.65 WORKING LEVELS. THE GAMMA EXPOSURE  
RATES VARY BETWEEN 20-650 MICROREM PER HOUR.

THE STATE OF NEW JERSEY HAS BEEN STUDYING THE SITE AND THE  
EXPOSURES TO PERSONNEL WORKING IN THE BUILDINGS SINCE THE EARLY  
70'S AND PROBABLY BEFORE THAT. THEY KEEP US INFORMED, BUT HAVE  
NEVER SUGGESTED THAT IT IS AN NRC PROBLEM.

URANIUM CONCENTRATION IN SOIL AND FILL IS VARIABLE DEPENDING ON  
LOCATION, VARYING FROM 0-0.4%. SAMPLING HAS NOT BEEN UNIFORM NOR  
EXTENSIVE.

IN 1979 OR 1980 AN ARMS SURVEY WAS PERFORMED OF THE SITE AND  
SURROUNDING AREA. THE RESULTS WERE NOT CAREFULLY REVIEWED UNTIL  
LATE 1982 WHEN TWO AREA OF ELEVATED RADIATION READING WERE NOTED  
IN RESIDENTIAL AREAS AWAY FROM THE PROCESSING SITE. EXTENSIVE  
SURVEYS WERE MADE OF ABOUT 350 HOMES IN THESE TWO AREAS. ABOUT  
40 HOMES (OR MORE OR LESS) MAY REQUIRE REMEDIAL ACTION.

URANIUM SAMPLES NEAR THE HOMES RANGE 0-0.4%, BUT AVERAGE 0.01%.

STATE HAS EMERGENCY FUNDS FROM EPA WHICH WILL ALLOW CLEANUP OF  
SEVERAL HOMES NOW; HOWEVER SURROUNDING COMMUNITY STRONGLY OBJECTS  
TO PLAN TO STORE WASTE A LOCAL ARMORY. SOME RESIDENTS HAVE ASKED  
WHY NRC IS NOT INVOLVED AND WHY NRC REGULATIONS ARE NOT BEING  
FOLLOWED.

STATE IS UNSURE IF THEY DESIRE NRC INVOLVEMENT

RECOMMEND NO INVOLVEMENT BY NRC:

- o PRE ATOMIC ENERGY ACT
- o WILL SLOW DOWN PROCESS OF CORRECTIVE ACTION
- o EXPEND NRC RESOURCES WITHOUT REASONABLE PAYOFF FOR TAXPAYER
- o STATE IS TAKING ALL NECESSARY ACTIONS TO PROTECT HEALTH AND  
SAFETY

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A1

all other homes in area  
from K. Appelbaum

STAFF L E D G E R

February 23, 1984

# Thorium soil found in another 8 Bergen homes

By MICHAEL ROZANSKY

Low levels of radioactive thorium have been found in soil behind eight homes in Rochelle Park, bringing to 16 the number of properties there and in Maywood that must be cleaned up starting this spring.

John Schlatter, a spokesman for Bechtel National Inc. in Oak Ridge, Tenn., which has been hired to supervise the cleanup, said "very low-level amounts of thorium," were detected last month in test results from the eight homes.

At current levels, he said, the thorium is "not posing an immediate hazard to anyone's health." But long-term exposure—through direct contact, the food chain or water supplies—presents "the potential for health hazards," he said.

Although the site was targeted for eventual cleanup under the superfund program, the work will be done with \$2 million appropriated by Congress

## Experts detect low-level radiation

last year under a federal Department of Energy program.

The Rochelle Park properties are west of Route 17 and adjacent to a large vacant parcel bounded by the highway, Parkway and Grove Street, officials said. Contamination at the seven Maywood properties, on the other side of Route 17, was discovered three years ago.

Bechtel's tests showed concentrations of thorium in the soil at the Rochelle Park properties ranged up to 20 times the normal background level, Schlatter said. Those in Maywood ran to 5,000 times the norm, he added.

In Rochelle Park, radiation exposure levels were about twice the norm, he said.

In properties with lower levels of contamination, the thorium probably came with water runoff, Schlatter said. In higher-level sites, he said, people may have taken "a few wheelbarrows of dirt" from the vacant lot for their yards.

"We tend to keep our children out of our yards," said Maywood Councilwoman Karen McCoy, whose

yard is one of those slated for the cleanup. Although she is satisfied with the proposed cleanup, she said, "Most people are nervous because they raised their children there without knowing this was going on."

The source of the contamination is thought to be the former Maywood Chemical Works, which used thorium in manufacturing mantles for gas lanterns. Founded in 1898, the company sold its facility to the Stepan Chemical Company in 1959, said Stepan's general manager, John O'Brien.

"We just inherited all the refuse," O'Brien said. He maintained that the federal government was also responsible to some degree, since the German-owned Maywood company was run by the U.S. government in 1941-46.

One roadblock to a superfund cleanup came from Stepan, which threatened to sue if it were held liable since it never dealt with thorium, O'Brien said. Another came from the federal Environmental Protection Agency, which was sluggish in acting, said Rep. Robert Torricelli (D-9th Dist.).

Torricelli arranged to have the program included in the Energy Department program.

Stepan has agreed to provide an interim burial site for the contaminated soil and provide up to \$3 million for the cleanup, O'Brien said.

In Rochelle Park, said Schlatter, the cleanup entails digging up about 6 inches of topsoil from 10- to 20-ft patches in the rear yards of homes

FOIA-87-533  
A2



N.J. DEPARTMENT OF ENVIRONMENTAL PROTECTION  
U.S. ENVIRONMENTAL PROTECTION AGENCY

INVESTIGATION OF RADIOLOGICAL  
CONTAMINATION IN ESSEX COUNTY, NEW JERSEY

Investigation and Remedial Action Status

The Department of Environmental Protection announced today that all homes within the Montclair/Glen Ridge study areas have been sampled for radon progeny contamination. Individual homeowners have been sent written notification of the sample results. A total of 345 homes were sampled within these two study areas which included parts of West Orange and East Orange. In addition to the homes within the study area, 168 residences from outside the sectors were sampled to aid in establishing the boundary of the contaminated areas and to confirm that contamination did not extend outside defined sectors. Of the 345 homes within the defined sectors, a total of 40 were found to have radon progeny contamination requiring remedial action. Sixteen of these homes were determined to be at a high enough level to require temporary remedial action to reduce radon progeny levels to less than one-tenth of a working level. (The "working level" is a measure of the concentration of radon progeny in air.) As of this date, EPA's contractor, Arix Corporation, has completed installing fresh air ventilation systems in 15 of the 16 homes with the highest levels of radon progeny contamination. An additional 3 homes at the next highest level have also had ventilation systems installed. These remedial efforts have successfully reduced the levels of radon and radon progeny in 18 homes.

Source Characterization Studies

The EPA field investigation team is completing further characterization studies within the two defined Montclair, Glen Ridge areas. These studies, which are designed to characterize the source of contamination, consisted of an initial extensive surface gamma survey, followed by a subsurface investigation. The subsurface investigation involved drilling boreholes in the ground in areas showing elevated surface gamma radiation. Cores from the boreholes have been taken for laboratory analysis. The source characterization studies made extensive use of information provided by the New Jersey Geological Survey as to the underlying geology of the area. The coring program is designed generally to both characterize the source material and provide a preliminary estimate of the volume and location of contaminated material. The results of this preliminary characterization study should be available shortly. Depending on the nature of the source, a more extensive coring program may be needed in the future to provide detailed information needed to guide the physical removal of material.

Additional Surveys and Sampling Studies

On April 23, 1984, personnel from EPA's Montgomery, Alabama radiation laboratory returned to the Montclair/Glen Ridge area to conduct an indoor radiation survey to measure gamma exposure levels in all of the affected homes. This follow-up survey is being conducted to assure that no elevated gamma levels exist where individuals might be exposed above the standard of 500 millirem per year. Results of this survey will be made available to individual homeowners within 3 weeks after completion.

FOIA-B7-533  
A3

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Two other sampling related activities were announced by the EPA on April 23. Through its Field Investigation Team, NUS Corporation, EPA plans to sample all Tier C houses (Those that did not require immediate ventilation such as Tier A & B.) on a quarterly basis to insure that levels of radon have not increased. These homes will be sampled using the 5-day Radon Progeny Integrated Sampling Units (RPISU) previously installed. A second indoor gamma survey, called a "delta gamma" survey, will be conducted by EPA's remedial contractor, Aris Corporation. This survey is designed to pinpoint the location of any contaminated soil around or under Tier C homes. A delta gamma survey has already been performed on all Tier A and B homes.

#### Ground Level Evaluation of Aerial Survey

The DEP has inspected all 51 locations which were identified in the 12-square mile aerial gamma survey. Forty-five of these locations were found to be within the normal range of background radiation. These radiation anomalies appeared on the aerial gamma survey because the natural radiation levels were slightly higher than the surroundings. Normal background gamma radiation levels typically fall within a range of 0.005 to 0.015 milli-Roentgens per hour in this locality. The gamma radiation levels for the forty-five locations were less than 0.012 mR/hr.

Four of the 51 locations were found to have elevated gamma radiation levels outside of buildings. Normal gamma and radon levels were found indoors. Based on the current use of these properties, it is unlikely that any person will be exposed to radiation levels in excess of standards. Further work will be done to characterize the nature and extent of outdoor soil contamination.

The remaining two of the 51 locations had elevated gamma or radon levels inside the structures. One commercial property had elevated gamma radiation levels (up to 0.60 mR/hr) in the basement. Recommendations were made for limiting occupancy in the basement. With the exception of a storage area on the first floor all other areas had radiation levels within the range of normal background.

Finally, the ground level survey initially identified an additional home which contained elevated radon levels in the vicinity of the original Montclair/West Orange site. Further investigation of neighboring houses has identified a total of 4 affected residences, 2 in Tier B and 2 in Tier C. The 2 Tier B homes are in the process of being remediated. To insure a reasonable level of certainty in defining the area of contamination, EPA will conduct a radon grab sample and gamma survey of 60 residences surrounding this recently discovered area. Letters requesting access to homes and permission to sample in this West Orange location are currently being distributed to affected homeowners. Activities over the next month will involve indoor air sampling then outdoor surveys and subsurface sampling to determine the source of the contamination. These activities are similar to those which have taken place in Montclair and Glen Ridge over the past few months.



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The Centers for Disease Control (CDC) health advisory, dated December 1983, directed that a number of issues be addressed to better define and characterize the radon and radium contamination in the Montclair/West Orange and the Glen Ridge study areas. Data from the screening of 305 homes in the two study areas and an additional 161 homes outside the study areas along with the outdoor gamma radiation survey data were provided to CDC for evaluation. CDC has concluded that no further screening to delineate the radon problem in the affected areas needs to be done.

The work to determine the source of the radon contamination was performed by EPA's Field Investigation Team, NUS Corporation. For this effort, permission was requested from the homeowners in the study areas to allow outdoor gamma surveys and subsurface coring to determine the extent and depth of radium contamination in soil. Radium decays to radon gas which can migrate into the nearest structure.

Field survey measurements of gamma radiation were made on 330 properties in both the Montclair/West Orange and the Glen Ridge study areas, of which a subset of properties were investigated by coring to determine subsurface contamination. The results of the outdoor survey indicate the elevated gamma radiation levels are in the immediate vicinity of the homes which are affected by elevated radon levels. There were some properties which had normal indoor radon levels but had elevated outdoor gamma levels as a result of soil contamination. A preliminary estimate of contaminated soil volume was made based on the source characterization work. The areal extent of soil contamination at the Montclair/West Orange site is estimated to be 5,400 square meters to a depth of approximately 1.5 meters, with an estimated volume to be considered for removal of 7,400 cubic meters. The areal extent of soil contamination at the Glen Ridge site is estimated to be 4,500 square meters to a depth of approximately 1.5 meters, with an estimated volume to be considered for removal of 6,900 cubic meters. At this time, it is estimated that a total of 73 properties are affected.

In April, the EPA's Montgomery, Alabama, radiological group conducted indoor radiation surveys to measure gamma exposure levels in the Tier A, B, and C homes. These measurements and the outdoor gamma measurements from the subsurface characterization work were provided to Centers for Disease Control (CDC) to evaluate the potential exposure to gamma radiation. The CDC provided a methodology to determine, in a conservative manner, the annual dose to residents due to the gamma radiation on their property. This calculated dose is to be compared to 500 mrem per year, the permissible annual dose to members of the general public. It is not necessary to perform calculations for non-residents since their exposure in the area is intermittent. Based on the CDC methodology, no person in the affected homes exceeds the limit of 500 mrem per year.

FOIA-B7-533  
A4

The CDC and EPA also addressed the issue of growing vegetables in contaminated areas. Based on the non-uniform and limited extent of areas with highly contaminated soils (100 pCi/gm or about 100 times background soil concentrations), no general recommendation to limit gardening is warranted in the study areas. In the few instances where we know of gardens directly in contaminated areas, the EPA and DEP have recommended that these residents refrain from gardening in order to minimize the intake of radium from eating homegrown vegetables. Any homeowners in the contaminated areas contemplating gardening are advised to contact EPA or NJDEP for specific recommendations.

EPA and DEP regard the installation of ventilation systems to reduce indoor radon levels as short term remedial measures. A more permanent remedial action is to remove the radium contaminated soil surrounding the home. A pilot program was developed to determine the feasibility and cost of soil removal. The objective of the program is to demonstrate that techniques for removal of contaminated soil is effective and will reduce radon and radon progeny levels in homes, to determine the engineering feasibility of soil removal given the varying types of house construction and locations of contamination, and to estimate the cost of soil removal at representative properties. Several properties were selected based on the following criteria.

Both isolated separate pockets and larger contiguous areas of contamination should be investigated; different soil contamination locations with respect to the home (under slab, surrounding foundation, under basement, away from structure, etc.) should be investigated; and different house construction types (crawl space, full basement, slab construction, etc.) should be investigated. Also, priority is given to houses which were initially Tier A and B but are still Tier C after initial remedial actions and both the Glen Ridge and Montclair/West Orange areas are included.

We have selected a maximum of five study areas, involving ten properties, for the proposed pilot program. Final selection of the individual properties to be involved in the pilot soil removal study will be contingent on engineering and cost considerations, and the willingness of the homeowners to participate and to deal with the potential disruptions associated with the pilot study. Detailed discussions will be held with each individual homeowner before any characterization work or soil removal begins.