

Site Review And Update

U.S. RADIUM

ORANGE, ESSEX COUNTY, NEW JERSEY

CERCLIS NO. NJD980654172

SEPTEMBER 7, 1993

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Site Review and Update: A Note of Explanation

The purpose of the Site Review and Update is to discuss the current status of a hazardous waste site and to identify future ATSDR activities planned for the site. The SRU is generally reserved to update activities for those sites for which public health assessments have been previously prepared (it is not intended to be an addendum to a public health assessment). The SRU, in conjunction with the ATSDR Site Ranking Scheme, will be used to determine relative priorities for future ATSDR public health actions.

SITE REVIEW AND UPDATE

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CERCLIS NO. NJD980654172

**Prepared by:
The New Jersey Department of Health
Under a Cooperative Agreement with
The Agency for Toxic Substances and Disease Registry**

SUMMARY OF BACKGROUND AND HISTORY

Several areas in Essex County have been found to contain above background levels of radiation resulting from the presence of radon-222, polonium-218, thorium-230, radium-226. These areas are noncontiguous and comprise the National Priority List site; U.S. Radium Corporation (Figure 1).

The U.S. Radium Corporation Site consists of approximately 25 acres in the Township of Orange (Figure 2). It contains approximately 40% single family homes, 40% multi-family homes, and 20% commercial businesses. There are no parks or schools in the study area. Some of the properties in this study area contain contaminated building materials such as paint and bricks containing radium (2).

Between 1915 and 1926, the U.S. Radium Corporation (Previously called the Radium Luminous Materials Corporation) extracted and purified radium from carnotite ore ($K_2(UO_2)_2(VO_4)_2 \cdot 3H_2O$) and then painted watch and instrument dials, gun sights, and survey equipment with luminous paint. The company employed more than 100 workers, the majority of them women who painted the equipment. U.S. Radium instituted a cottage industry where many women did the work at home. Thus far, twenty-two locations were identified where individuals either worked at satellite facilities or in their homes doing piecework.

During an investigation of former radium processing facilities in the State of New Jersey, the New Jersey Department of Environmental Protection and Energy (NJDEPE) realized that wastes could have been disposed at locations distant from these facilities. The NJDEPE then requested that the United States Environmental Protection Agency (USEPA) conduct an aerial gamma radiation survey in eastern Essex County. This survey was done in 1981. Several areas were detected with elevated levels of gamma radiation. This was confirmed by ground investigations conducted by the NJDEPE in 1983. Several houses were identified with high radiation levels.(2)

The residential development of the area has been well documented by compiling historical tax records, atlas maps, old photographs, sewer and road design drawings, and local historical writings. From this information, a "core area" of contamination for each study area was identified.

The only surface water passing through the U.S. Radium study area is Wigwam Brook which is located along the southwest boundary of the High and Alden Street Properties where the brook flows within a concrete channel in an easterly direction towards the Second River, about two miles east of the site. Storm water runoff is discharged to the municipal sanitary sewer system.

The sites are above a superficial overburden layer. Beneath this shallow aquifer is a deep fractured bedrock aquifer which supplies water to public wells for several communities. The City of Orange supply their residents with city water.

The U.S. Radium site has been divided into two operable units (OU's). The October 15, 1992 Remedial Investigation/ Feasibility Study (RI/FS) (2) addresses the first OU, consisting of the non-contiguous residential properties where radium-contaminated material has been identified. Neither the Record of Decision nor the Community Action Plan has yet been signed. (3) A second operable unit RI/FS is planned for the summer of 1993 and will address the former U.S. Radium Corp. processing plant, several commercial properties not addressed in OU1, and the municipal sanitary sewer system. The USEPA believes that further contamination exists at this site.

The Centers for Disease Control (CDC) issued a Health Advisory on December 6, 1983 quantifying the risks for residents and setting specific time periods to implement remedial actions. The USEPA then began preliminary investigations to determine the extent of contamination and to implement emergency remedial actions. These actions consisted of installing ventilation systems in houses with elevated radon decay product concentrations and placing lead shielding in houses with elevated gamma radiation levels.

A Health Assessment for this site was prepared by the Agency for Toxic Substances and Disease Registry (ATSDR) in January 1989 (1). The primary exposure pathway appears to be airborne particulate radiation, gamma radiation in air, radioactive materials, and surface deposits of radioactive materials. The health assessment concluded that the site is of public health concern ranging from potential to imminent, depending on the individual area in question, because of the risk to human health resulting from possible exposure to radioactive materials via inhalation of contaminated particulate and gaseous radiation, ingestion of contaminated particulates, and external exposure to gamma radiation. Previous public health and community concerns focused on radiation exposure and property values. Current community concerns are focused on the length of time necessary to remediate the contaminated homes.

It was recommended that further environmental characterization and sampling of the site and impacted off-site areas should be designed to address the environmental and human exposure pathways previously mentioned. Further ATSDR review may be warranted when additional information and data become available.

CURRENT SITE CONDITIONS

On July 6, 1993, a site visit was conducted by Jim Pasqualo and Howard Rubin of the NJDOH, the Regional Representative from the ATSDR, and the Case Manager from the USEPA. There were no unusual or outstanding features. The site consisted of the former

U.S. Radium Corporation site and well-maintained residential areas that were indistinguishable from surrounding areas.

The former manufacturing site was adequately fenced off with no signs of trespassing. There was a large sign indicating that this is a superfund site. The buildings were properly boarded up and locked to prevent entry and vandalism.

The average age of the residents is about 40 years old. This suggests that current occupants of these dwellings are not original owners. The current residents earn an average annual household income in the mid forty thousand dollar range. The average value of the houses in this area is in the low \$80,000 range.

The study area is densely populated and is in one of the most densely populated parts of the United States. These areas were once highly industrialized, but the industrial base has progressively diminished with time. This has corresponded to an increase in the residential/commercial base. However, a small diverse manufacturing and service base still exists.

In the original health assessment for U.S. Radium (1), the ATSDR correctly concluded that the site is of public health concern ranging from potential to imminent, depending on the individual area in question. However, potential public health concern would more accurately be described on a house by house basis. These conclusions are still valid as indicated by the updated information available. Once the USEPA has remediated the contaminated homes, no further action needs to be taken because remediation will be performed until exposure is less than the action level of the particular radionuclide.

CURRENT ISSUES

Out of 124 homes that were screened, 61 homes were found to be exposed to elevated radiation levels from contaminated soil and/or contaminated building debris. However, there could be higher numbers because investigations are ongoing. The USEPA estimates that about 206 additional houses in the study area are to be screened. They estimate that approximately 50 homes will be contaminated above radiation action levels. Thus, estimates of potentially affected populations shall likewise increase. Contamination has been found in commercial areas and residential areas. No schools or hospitals are located in the study area. The actual demarcations for the study area may change because investigations are ongoing. (2)

Community concerns existed prior to site stabilization and remediation and focused on the health threat posed by the radioactive contamination, property values, and the length of time necessary to remediate the homes. The Health Officer for Orange indicated that the only new community concern for the site was regarding when remediation efforts were to commence. Public health concerns associated with the site were partially addressed when

some of the contaminated homes were temporarily abated. However, temporary abatement is expected to continue once the ROD is signed.

CONCLUSIONS

- 1. The original health assessment for the US Radium site concluded that: 1) The site is of public health concern, ranging from potential to imminent, depending on the individual area because of the risk to human health resulting from exposure to radioactive materials via inhalation of contaminated particulate and gaseous radiation, ingestion of contaminated particulates, and external exposure to gamma radiation; and 2) It cannot be concluded from the available information if those properties having high levels of radioactivity and exposed people have been remediated so that exposure has been removed or reduced to acceptable levels. In light of the existing data, the previous public health assessment conclusions are still valid.**
- 2. Based upon current conditions at the site, there probably are completed human exposure pathways associated with the U.S. Radium site. Temporary abatement procedures have been performed for some residences known to have radiation contamination. However, many other houses in the study area found to be contaminated with above action levels of radiation have not yet been abated while others have not been screened.**
- 3. The only new community health concern is wanting to know when the remediation work is to begin. The previous community health concerns have been addressed except for those houses having above action levels of radiation and were not abated.**

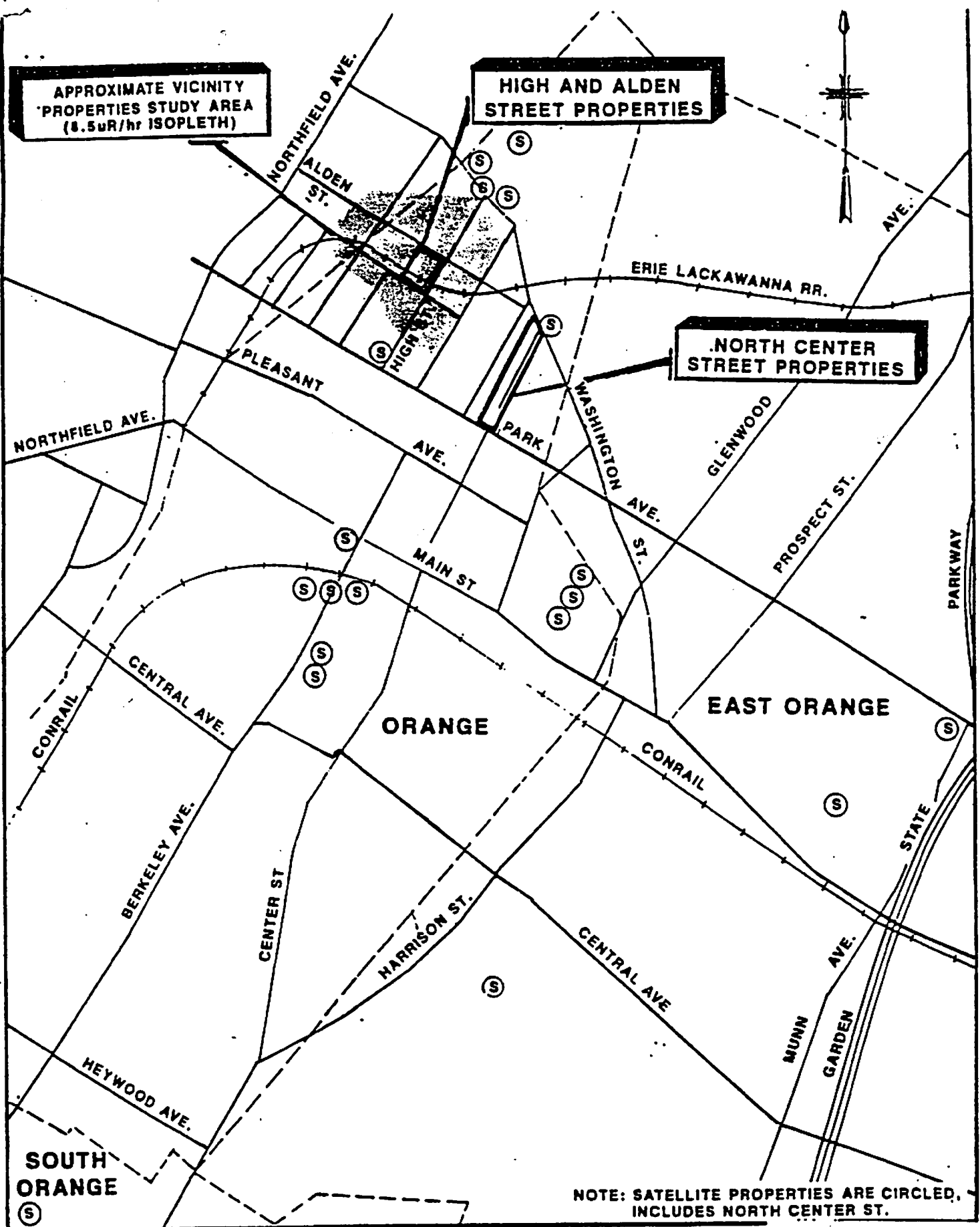
RECOMMENDATIONS

- 1. Screening of the 206 designated homes should be accomplished as soon as practical. Further, all houses found to contain above action levels of radiation should be temporarily abated or the occupants should relocate until the houses can be remediated.**
- 2. The original health assessment recommended that: 1) Further characterization and sampling during the RI/FS should be designed to address the environmental and human exposure pathways; and 2) When additional information and data become available a further public health assessment of the site should be conducted. These recommendations are still valid.**

3. After review of current site conditions and the public and community concerns associated with the site, the ATSDR and the NJDOH recommends that a public health assessment for the U.S. Radium site be conducted after all of the designated residences have been screened for elevated radiation levels.
4. The data and information developed in the Site Review and Update have been evaluated to determine if follow-up actions may be indicated. Further site evaluation is needed to determine appropriate public health actions.

DOCUMENTS REVIEWED

- 1. Agency for Toxic Substances and Disease Registry. Preliminary Health Assessment for U.S. Radium-West Orange, Orange, New Jersey. January 1989.**
- 2. United States Environmental Protection Agency. Draft Remedial Investigation and Feasibility Study for the U.S. Radium Corporation Site, City of Orange, New Jersey. October 1992.**
- 3. United States Environmental Protection Agency. Record of Decision for the U.S. Radium Corporation Site, City of Orange, New Jersey. June 1993.**



APPROXIMATE VICINITY
PROPERTIES STUDY AREA
(8.5uR/hr ISOPLETH)

HIGH AND ALDEN
STREET PROPERTIES

NORTH CENTER
STREET PROPERTIES



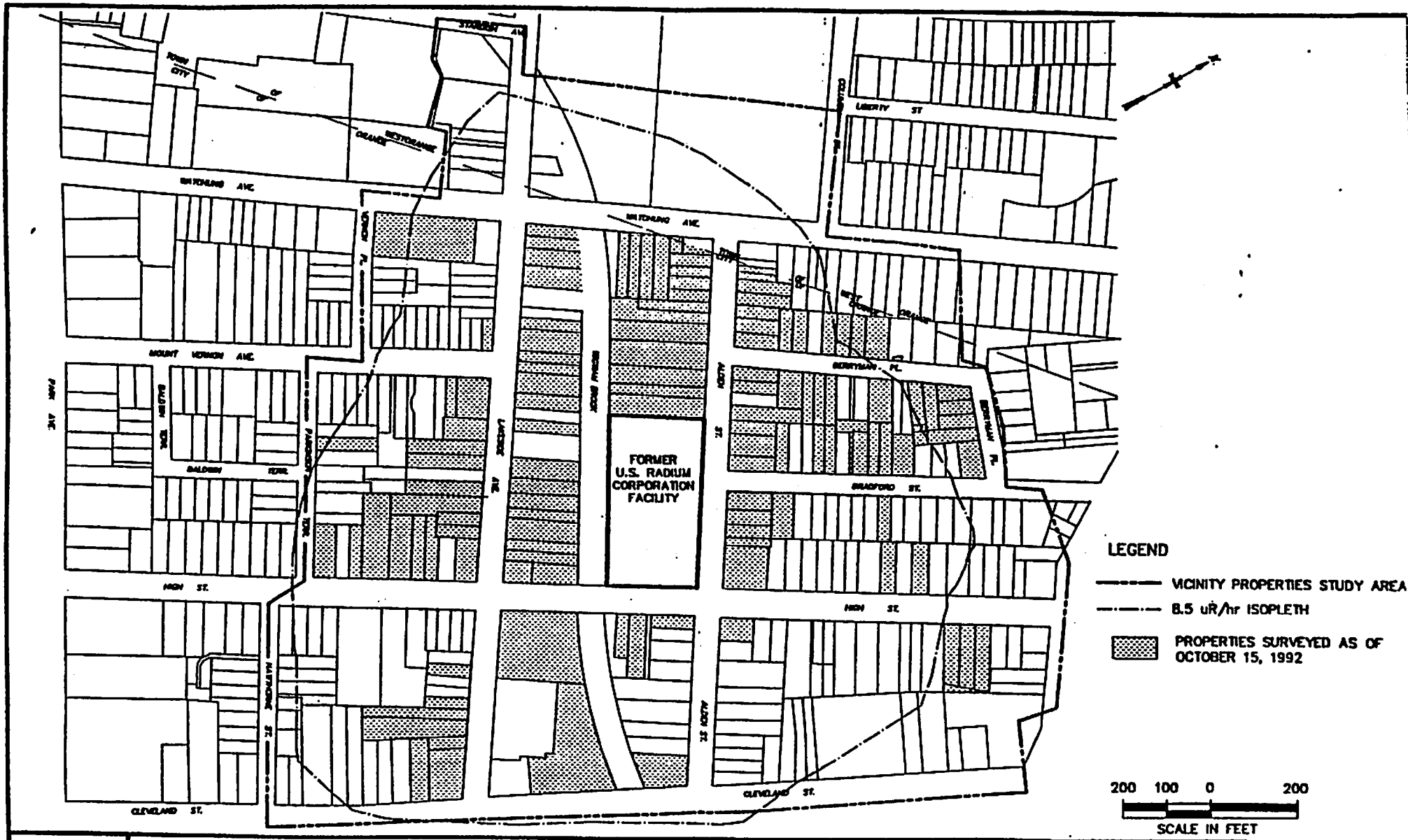
NOTE: SATELLITE PROPERTIES ARE CIRCLED,
INCLUDES NORTH CENTER ST.

**MALCOLM
PIRNIE**

U.S. RADIUM SITE
ORANGE, NEW JERSEY
SITE LOCATION MAP

FIGURE
1

109381



**MALCOLM
PITNEY**

U.S. RADIUM SITE
ORANGE, NEW JERSEY
VICINITY PROPERTIES - SURVEY STATUS

Figure 2