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Energy/
Environment
Systems Division

December 31, 1990

Mr. Mark C. Roberts
Region I
Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19400

Subject: **PROPOSED SURVEY OF REMEDIATED AREAS - WESTINGHOUSE
ELECTRIC CORPORATION - BLOOMFIELD, NEW JERSEY**

Dear Mr. Roberts:

Enclosed is a copy of ORAU's proposed confirmatory radiological survey plan for the remediated areas at the Westinghouse Electric Corporation facility in Bloomfield, N. J. The survey is tentatively scheduled to be performed in January 1991, and will take approximately seven working days to complete. The survey will consist of alpha, beta, and gamma surface scans and surface activity measurements and sampling at all remediated locations between Arlington Avenue and MacArthur Avenue (Buildings 1 through 6), the garage (located on the south side of MacArthur Avenue), and on the surrounding grounds west of Arlington Avenue.

Comments and requests for additional information may be referred to me at FTS 626-0065.

Sincerely,

Wade C. Adams
Health Physics Project Leader
Environmental Survey and
Site Assessment Program

WCA:jls

Enclosure

cc: D. Tiktinsky, NRC/NMSS 6A4
J. Kinneman, NRC/ Region I
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**PROPOSED
CONFIRMATORY RADIOLOGICAL SURVEY PLAN
FOR PORTIONS OF THE
WESTINGHOUSE ELECTRIC CORPORATION BLOOMFIELD LAMP PLANT
BLOOMFIELD, NEW JERSEY**

I. INTRODUCTION

The Bloomfield Lamp Plant, owned by Westinghouse Electric Corporation (WEC), located in Bloomfield, NJ is comprised of eleven principal buildings and several smaller structures (Figure 1). The facility contains approximately 1,000,000 ft² (93,000 m²) of usable floor space and is located on 14 acres (5.7 ha) in a mixed industrial residence area. WEC operated this facility under NRC License No. SMB-1527. The facility was owned and operated by WEC until 1982, when it was leased by North American Phillips Corporation.

The plant operations were devoted principally to the development and manufacture of electric lamps; however, radioactive materials were utilized in various processes during the plant operation. Thorium was used in a variety of studies and manufacturing processes related to the production of metallic wire for filaments. Uranium was employed in work related to the Manhattan Project (Manhattan Engineer District) during World War II and in projects prior to and following that period. The primary area of uranium use was in the basement of Building 7 which will not be part of this confirmatory survey.

Prepared by the Environmental Survey and Site Assessment Program of Oak Ridge Associated Universities, Oak Ridge, TN, under interagency agreement (NRC Fin. No. A-9076) between the U. S. Nuclear Regulatory Commission and the U. S. Department of Energy.

December 27, 1990

The facility is in the process of being decontaminated and decommissioned for unrestricted use. At present, WEC is responsible for overseeing the decontamination of the facility and has contracted several organizations to perform characterization surveys, remedial decontamination activities, and final radiological surveys. At present, Buildings 1 through 6, the garage, and property on the west side of Arlington Avenue, have been remediated and are awaiting final NRC approval for release without radiological restrictions. Buildings 7 through 10A are currently in the process of being remediated. It is expected that all remedial actions will be completed in 1992.

In May, June, and July of 1986, Radiation Management Corporation (RMC) (currently Canberra/RMC), performed a radiological characterization survey of the WEC facility (Reference 1). The purpose of the survey was to identify areas within the facility that contained radioactive materials or contamination. The survey also provided quantitative and qualitative information involving these materials. In addition, the survey identified areas that exceeded prescribed limits of contamination for unrestricted release and provided additional information as to the level of decontamination effort that would be required to meet release criteria.

Scientific Ecology Group, Inc. (SEG), a subsidiary of WEC, performed the remediation work in the areas identified by RMC. During the process of remediation, SEG traced contaminated piping and venting systems to other areas and also performed remedial actions there. The remedial action included the removal of tile and scabbling concrete floor areas; excavation of soil to expose and remove contaminated piping; the removal of overhead pipes, ductwork, filters, and blower units; the removal of fire brick from the incinerator; removal of railroad ties and rails; and the removal of vessels that contained radioactive materials. Other remedial actions involved vacuuming and wiping of contaminated surfaces. Asbestos and mercury were also found in some of these locations. Asbestos was found,

primarily in floor tile and pipe insulation. Mercury was found along the railroad tracks, the reservoir and in some building locations.

The final radiological survey report (Reference 2) to release Buildings 1 through 6, the garage, and property on the west side of Arlington Avenue was produced by Canberra Nuclear Services Division in May of 1990. Canberra surveyed all areas that had been remediated by SEG (Figures 1 and 2). The radiological survey report by the licensee's representative indicates that most parts of the facility satisfy NRC guidelines for unrestricted use. However, the licensee may ask the NRC for special permission to release some areas that exceed guideline levels.

The Nuclear Regulatory Commission (NRC) has requested that the Environmental Survey and Site Assessment Program (ESSAP) of Oak Ridge Associated Universities (ORAU) perform a confirmatory radiological survey of those portions decontaminated in and around Buildings 1 through 6 and the garage north of Building 1.

II. PURPOSE

The purpose of the survey is to confirm the results of the licensee's decommissioning survey by providing sufficient data to evaluate the radiological condition of the facility relative to the NRC guidelines for unrestricted use.

III. RESPONSIBILITY

Work described in this survey plan will be performed under the direction of J. D. Berger, Director of the Environmental Survey and Site Assessment Program of the Energy/Environment Systems Division of ORAU. The cognizant site supervisor has the authority to make appropriate changes to the survey plan as

deemed necessary as the survey progresses.

IV. **PROCEDURES**

- A. ORAU will review the licensee's final survey results and supporting documentation concerning site decommissioning activities. Information will be evaluated to assure that areas identified as exceeding site guidelines have undergone decontamination and that residual activity levels satisfy the established guidelines.
- B. A survey team from ORAU will visit WEC and perform a visual inspection, independent measurements, and sampling. Survey activities will be conducted in accordance with the ORAU ESSAP Survey Procedures Manual. These procedures are listed in Section VIII of this survey plan. Deviations to this plan will be documented in the site log book.
- C. Background exposure rates will be determined for the building interiors at a minimum of 6 measurements in locations of similar construction but without a history of radioactive materials use. Also, a minimum of 6 locations for area background measurement and sampling will be selected within a 0.5 to 10 km radius of the site. Exposure rate measurements will be performed using a pressurized ion chamber and a NaI probe, cross calibrated with a pressurized ion chamber. Baseline soil samples will be collected from each location of external background measurement.
- D. The areas that will be surveyed will include the remediated areas, 10% of the areas immediately adjacent to the remediated areas, and other known use areas. Cursory spot checks may be performed in other locations. The number of remediated locations that are to be sampled may be increased or

decreased based on initial sampling results. ORAU will notify the licensee of any areas noted during the survey as exceeding the established guidelines.

E. Survey Procedures

1. Indoor measurements and sampling in the remediated and immediately adjacent areas will be referenced to a 2 m x 2 m grid established by ESSAP on the floors and lower walls (up to 2 m). Areas of residual contamination approaching guidelines will be sub-divided into 1 m x 1 m grids to enable a more definitive survey and comparison with guideline averaging criteria. Upper walls and ceilings will not be gridded but will be referenced to floor grid coordinates or pertinent building features. Outdoor remediated areas to be surveyed, greater than 100 m², will be gridded in 10 m intervals. In areas of low potential activity and areas less than 10 m², a grid will not be established. Measurements and sampling will be referenced to grid block locations, prominent facility features, existing land marks, or nearby gridded surfaces.
2. Gridded indoor surfaces will be scanned using NaI (TI) gamma scintillation, thin window beta-gamma GM, alpha scintillation, and/or large area alpha/beta proportional detectors. All detectors will be coupled to countrate meters with audible indicators. Particular attention will be given to cracks and joints in the floors and walls, ledges, ducts, drains and other locations where material may have accumulated. Cursory scans will be conducted on floor areas adjacent to remediated areas. Outdoor soil surfaces will be scanned using NaI (TI) gamma scintillation detectors. Locations of elevated direct radiation levels will be identified for further investigation.

3. Direct measurements for total alpha and beta-gamma activity will be performed on a minimum of 10% of randomly selected grid blocks. Measurements will be collected at the center and four points equidistant from the center and grid block corners. One set of five direct measurements will be obtained from each selected grid block, and one smear for transferable contamination will be taken for each set of five measurements corresponding to the location of highest direct measurement. Direct measurements and smears for transferable contamination will also be performed on ungridded surfaces. The number of such measurements will be determined based on findings as the survey progresses. Representative measurements will be taken in other (unremediated) building areas at a lower frequency. Based on an estimated 600 lower wall and floor 2 m x 2 m grid blocks, approximately 500 direct measurements for surface activity levels will be performed and approximately 150 smears will be taken.
4. Direct measurements and smears will be obtained at locations of elevated contact radiation levels identified by the surface scans of indoor areas.
5. Gamma surface scans (if deemed appropriate) may be performed on the rooftops of a minimum of three buildings. Direct beta-gamma measurements will be performed on ledges and outside windowsills at a minimum of 5 locations and at each elevated location that is identified.

6. Exposure rates at 1 m above the surface will be measured in each indoor area confirmed by ESSAP and at a minimum of 6 outdoor locations, using a NaI gamma scintillation detector cross calibrated with a pressurized ionization chamber.
7. Representative paint samples from wall surfaces and residues from drains, ducts, floor cracks or joints, and ledges will be collected where such material is present or accessible.
8. Direct measurements and smears will be performed in selected drains and ventilation systems, as available.
9. In areas where there is the possibility of subfloor or subsurface contamination, floor coverings may be removed so that samples can be collected. These samples may consist of subfloor construction materials or soil.
10. Compositated surface soil samples will be collected from a minimum of 10% of the outdoor grid blocks. Additional soil samples will be collected at locations of elevated contact radiation identified by outdoor surface gamma scans. Based on an estimated twenty 10 m x 10 m grid blocks, a minimum of 40 soil samples is anticipated. Exposure rate measurements at 1 m will be taken at each soil sample location.
11. Measurement and sampling locations and frequencies may be increased or decreased, based on findings as the survey progresses and at the discretion of the NRC site representative.

V. SAMPLES ANALYSES AND DATA INTERPRETATION

Samples and data will be returned to the ESSAP laboratory at ORAU in Oak Ridge, TN for analysis and interpretation. Smears will be counted using a low background alpha/beta counter to determine gross activity. Direct measurements will be converted to units of $\mu\text{R/h}$ (gamma exposure rate) and disintegrations per minute per 100 cm^2 for alpha/beta total and removable activity measurements. Soil, residue and miscellaneous samples will be analyzed by solid state gamma spectrometry. Analytical analysis for Uranium and Thorium will be performed on selected samples. Data will be compared with the NRC guidelines for this site. Results will be presented in a report and provided to the NRC for review and comment. Data and samples collected as part of this survey will be archived by ORAU.

VI. SITE RELEASE CRITERIA

ORAU will use the following criteria as required in its preparation of the confirmatory survey report that will be provided to the NRC.

Site Release Criteria for Unrestricted Use

	<u>Total Uranium</u>	<u>Total Thorium</u>
Surface Contamination		
Average	5000 dpm/100cm ² alpha	1000 dpm/100cm ²
Maximum	15000 dpm/100cm ² alpha	3000 dpm/100cm ²
Removable	1000 dpm/100cm ² alpha	200 dpm/100cm ²
Soil Concentration	35 pCi/g	10 pCi/g
Water Concentration	5 pCi/l (Ra-226)	15 pCi/l (gross alpha)

VII. TENTATIVE SCHEDULE

Measurement and Sampling	January 21 - 29, 1991
Sampling Analysis	April 1991
Draft Report	June 1991

VIII. LIST OF CURRENT PROCEDURES TO BE USED IN THE SURVEY

Applicable procedures from ORAU ESSAP Survey Procedures Manual include:

Section 5.0 Site Preparation

- 5.1 Clearing to Provide Access
- 5.2 Reference Grid System

Section 6.0 Measurement Techniques

- 6.1 Alpha Radiation Measurement
- 6.2 Beta-Gamma Radiation Measurement
- 6.3 Gamma Radiation (Exposure Rate)
 Measurement
- 6.4 Surface Scanning
- 6.10 Instrument Calibration

Section 7.0 Sampling Procedures

- 7.1 Surface Soil Sampling
- 7.7 Determination of Transferrable
 Contamination
- 7.10 Sample Identification and
 Labeling

Section 8.0

Integrated Survey Procedures

- 8.1 Background Measurements and
Baseline Sampling
- 8.3 Surveys of Open Land Areas
- 8.4 Surveys of Indoor Areas

IX. REFERENCES

1. "Radiological Survey of the Westinghouse Electric Corporation/North American Phillips Corporation Facility at Bloomfield, NJ," Radiation Management Corporation, August 27, 1986.
2. "Decontamination Confirmatory Surveys for the Bloomfield Lamp Plant, Westinghouse Electric Corporation," Canberra Nuclear Services Division, May 1990.

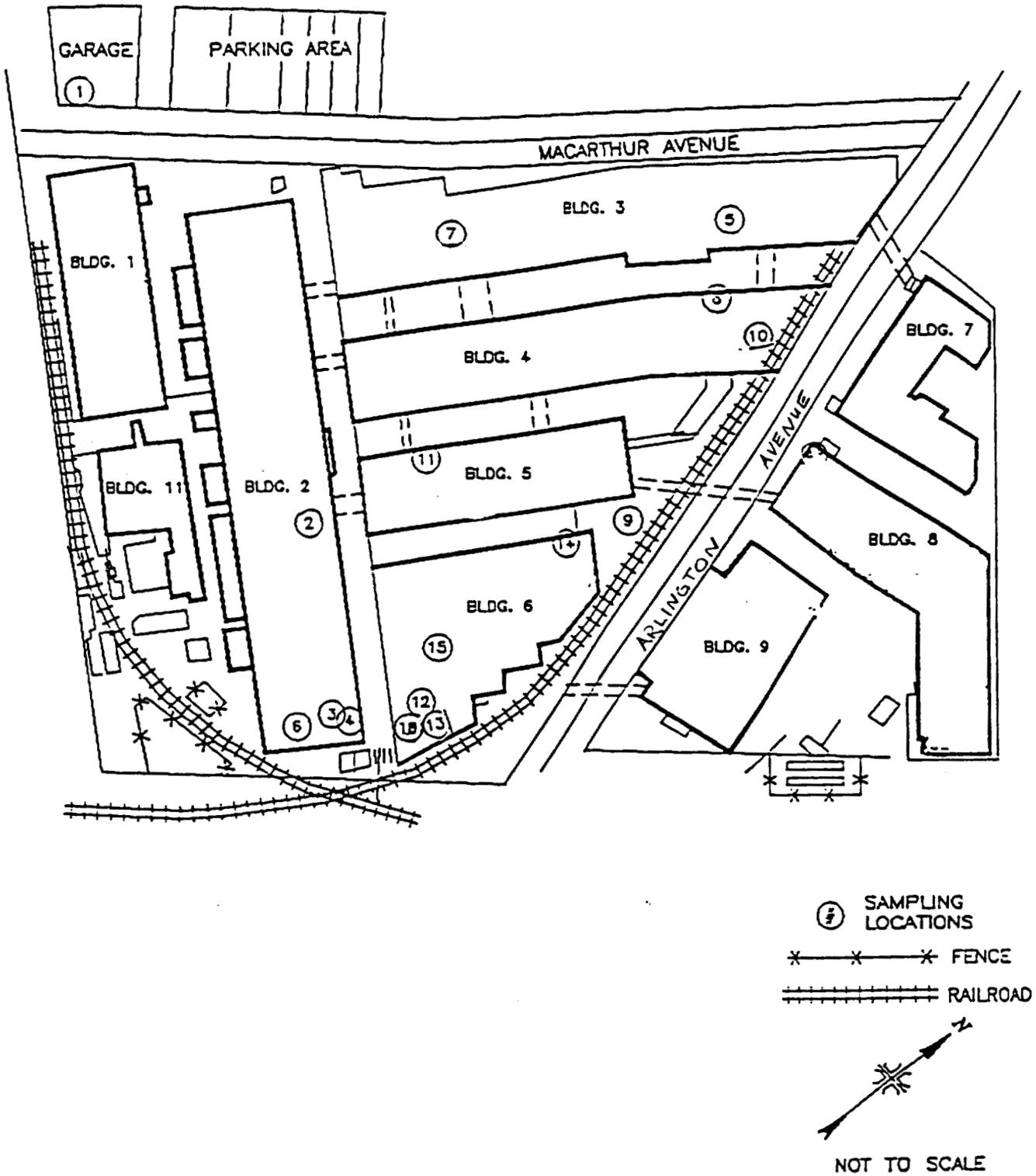


FIGURE 1: Westinghouse Electric Corporation, Bloomfield, New Jersey, Remediated Areas