Enclosure 2

OAK RIDGE ASSOCIATED UNIVERSITIES:

SITE STATUS REPORT FOR THE FORMER BRYANT ELECTRIC COMPANY AT 485 HOWARD AVENUE, BRIDGEPORT, CONNECTICUT

SEPTEMBER 14, 2017

EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) requested that Oak Ridge Associated Universities (ORAU) perform a radiation survey of the property at 485 Howard Avenue in Bridgeport, Connecticut. This property covers part of the footprint once occupied by the former Bryant Electric Company, which manufactured luminous radium switches in the 1920s. Manufacturing ceased in 1988 and the original factory was demolished in 1996, but soil from the site may be contaminated with radium. The objective of this survey was to locate possible discrete sources of radium, if any, that would be associated with former Bryant Electric Company operations.

ORAU performed the radiation survey on June 22, 2017, and did not identify elevated levels of radiation. Because no elevated levels of radiation were identified, ORAU concludes that discrete sources of radium are not present in surface soils. Based on these results, it is recommended that the NRC not pursue additional action at 485 Howard Avenue property.

SITE STATUS REPORT

Property:	Former Bryant Electric Company-3 485 Howard Avenue Bridgeport, CT 06605
Docket Number:	03038949
Current Property Name(s):	485 Howard Avenue
Current Property Owner(s):	City of Bridgeport
Inspection Dates:	June 22, 2017
Inspector(s):	Laurie Kauffman and Todd Jackson/U.S. Nuclear Regulatory Commission (NRC), supported by Kaitlin Engel and Stephen Pittman/Oak Ridge Associated Universities (ORAU)

1.0 INTRODUCTION

The Energy Policy Act of 2005 amended section 11e.(3) of the Atomic Energy Act of 1954 to place discrete sources of radium-226 (Ra-226) under NRC regulatory authority as byproduct material. The 485 Howard Avenue location in Bridgeport, Connecticut was identified as part of the former Bryant Electric Company property. Bryant Electric Company was a manufacturing facility for electronic devices, which operated from 1888 to 1988 (EPA 2008) and produced radium luminous switches in the 1920s (McGraw-Hill 1922). The objectives of the initial site visit were to determine if discrete sources of Ra-226 and/or distributed Ra-226 contamination are present, to identify the areas of highest contamination, to determine if there are any current health and safety concerns, and to determine if a scoping survey is needed.

Data collected during the initial site visit are used to plan future actions that may be needed to reduce the exposure of Ra-226 to current or future site occupants to levels that do not exceed the applicable regulatory requirement. It is important to note that destructive testing is not generally performed as described within NRC's procedures, Temporary Instruction 2800/043, Revision 1, "Inspection of Facilities Potentially Contaminated with Discrete Radium-226 Sources" (NRC 2016) (Agencywide Documents Access and Management System [ADAMS] Accession number ML16330A678).

2.0 PROPERTY DESCRIPTION AND INITIAL SITE VISIT CONSIDERATIONS

2.1 Property Description and History

The Bryant Electric Company was established in 1888 as a 500,000-square-foot manufacturing facility for electronic devices until operations ceased in 1988 (ORNL 2015). A connection to radium was found from a 1922 advertisement in the *Electrical Merchandising* monthly magazine (McGraw-Hill 1922), which listed Bryant Electric Company as a producer of (radium) luminous flush-type switches. Bryant Electric Company ceased operations in 1988, and the original buildings (pictured in Figure 1) remained unoccupied until being demolished in 1996 (EPA 2008,

ORNL 2015). Currently, three buildings are on the former Bryant Electric Company property (Figure 2).

The City of Bridgeport currently owns the 0.3 acres of the former Bryant Electric Company property at 485 Howard Avenue and has re-developed the area, which now includes a building, asphalt parking lot, and a small grassy area (as seen in Figure 3). Although the original building was demolished, radium contamination from prior luminous switch production may be present in property soils. An extensive internet search of public records did not reveal any information about radium cleanup of the facility, if present (ORNL 2015).

The site summary included in the *Historical Non-Military Radium Sites Research Effort Addendum* report (ORNL 2015) provides known site details about the type, form, history, potential locations, and other information related to discrete sources of Ra-226 used at the site.

2.2 Initial Site Visit Considerations

Prior to commencing survey activities, the land area was examined for consistency with historical information and to identify impediments to conducting the survey and/or health and safety considerations. No health or safety concerns were identified. The inspection team had full access to the land areas surrounding the building except for areas immediately north and west of the building, which were inaccessible due to tall weeds and storage of items.

Figure 1. Photos of Former Bryant Electric Company Structures Prior to Demolition in 1996 (ORNL 2015)

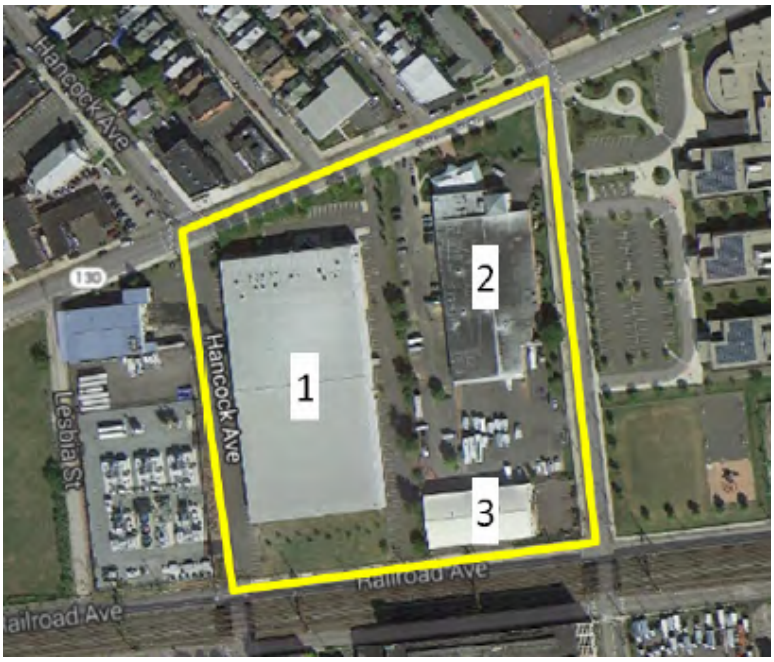

Figure 2. Footprint of Former Bryant Electric Company (Building 3 is 485 Howard Avenue.) (ORNL 2015)

Figure 3. Aerial View of 485 Howard Avenue (Google Maps, June 2017)

3.0 SITE OBSERVATIONS AND FINDINGS

3.1 Summary of Activities

The inspection team conducted an initial site visit at the 485 Howard Avenue property on June 22, 2017. A pre-inspection meeting was held with Kaitlin Engel and Stephen Pittman (ORAU), Laurie Kauffman and Todd Jackson (NRC), and Scott Appleby (Connecticut Department of Emergency Services and Public Protection). Participants discussed the inspection team's intention to perform general land area surveys around the property.

Radiological surveys performed by the inspection team consisted of gamma radiation scans using a Ludlum model 44-10 2-inch by 2-inch (2×2) sodium iodide detector connected to a Ludlum model 2221 ratemeter/scaler and radiation exposure rate measurements using a Ludlum model 192 NaI-based microRoentgen (μR) ratemeter[1]. Table 1 presents the specific instruments used during the site visit.

Table 1. Bryant Electric Survey Instruments

Radiation Type (units)	Detector Type	Detector Model (Number)	Ratemeter (Number)
Gross gamma (cpm)	Sodium Iodide	44-10 (639) Calibrated 04/13/2017 44-10 (1151) Calibrated 04/13/2017	2221 (395) Calibrated 04/11/2017 2221 (505) Calibrated 03/16/2017
Gross gamma (μR/h)	Exposure Meter	192 (1127, 1128) Calibrated 06/02/2017	N/A

N/A = not applicable
Number = ORAU equipment barcode
cpm = counts per minute
μR/h = microRoentgen per hour

The inspection team arrived at the 485 Howard Avenue property at 0950 and began surveying the land area around the building. Surveyed areas consisted of mostly asphalt parking lots, small grassy areas near the building and along the fence line, as well as a sidewalk on the southern edge of the property. The inspection team used 2×2 sodium iodide detectors connected to global positioning system (GPS) equipment and model 192 exposure ratemeters to acquire gamma radiation data. Approximately 75 percent of accessible land area was surveyed. No discrete locations of elevated response were identified during the survey. The inspection team departed the property at 1030.

[1] NOTE: Roentgen is a unit of exposure (energy absorbed in air), whereas a rem is a unit of dose delivered to a person (resulting from the radiation energy absorbed in that person). While Roentgen and rem are related, these are different units. Because they are similar for gamma ray energies from Ra-226, NRC makes the simplifying assumption in this case that these units are equivalent (1 Roentgen = 1 rem).

3.2 Summary of Results

In general, detector responses were lowest over parking lot areas and highest over the concrete sidewalk. These results are not unexpected given the differences in naturally occurring radioactive materials (NORM) associated with these media. Table 2 presents summary statistics of survey data collected during the initial site visit. For the 2×2 sodium iodide detector survey, the mean was close to the median; there were no anomalies; and over 98 percent of the data points fell within three standard deviations of the mean. Likewise, model 192 exposure rate data demonstrated similar statistical characteristics with 100 percent of the data points falling within three standard deviations of the mean. These results are consistent with the survey data from an un-impacted (background) property. Gamma radiation measurements using the 2×2 sodium iodide detectors and exposure rate data using the model 192 ratemeters are mapped in Appendix A.

Table 2. Radiation Measurement Summary Statistics

Detector	No. of Meas.	Units	Min. Value	Max. Value	Mean	Median	St. Dev.
2x2	3,080	cpm	4,564	12,321	7,269	6,949	1,224
Exposure Ratemeter	28	µR/h	6.0	10.0	7.6	8.0	1.2

3.3 Summary of Dose Assessment Results

To date, a site-specific dose assessment has not been performed for the property at 485 Howard Avenue occupying part of the former Bryant Electric Company site. Because no elevated radiation levels were detected above background and no contamination was encountered, a dose assessment attributed to discrete sources of Ra-226 was not necessary.

4.0 OBSERVATIONS AND RECOMMENDATIONS

Based on the data collected, the former Bryant Electric Company property at 485 Howard Avenue does not contain discrete sources of Ra-226 in excess of regulatory requirements, as determined by the following observations:

- Gamma radiation levels across the site were consistent with background; the absence of gamma radiation anomalies suggests there are no sources of Ra-226 present.
- Risk of potential contamination on the site is low and, if present, would most likely be found at a significant depth in the subsurface soil.

Based on the above observations, it is recommended that the NRC not perform a more detailed scoping survey. The rationale behind this recommendation is that the initial site visit generated a robust dataset that already meets the scoping survey purpose. Furthermore, it is also recommended that the NRC staff should not pursue additional action at the former Bryant Electric Company property given no elevated radiation levels (relative to background) were identified in the surface soils.

5.0 REFERENCES

McGraw-Hill 1922. *Electrical Merchandising—The Monthly Magazine of the Electrical Trade*, Vol. 27, No. 1, p. 106, New York, January.

NRC 2016. *Inspection of Facilities Potentially Contaminated with Discrete Radium-226 Sources*, Temporary Instruction 2800/043, Revision1, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Washington, D.C., October. (Agencywide Documents Access and Management System [ADAMS] Accession No. ML16330A678).

ORNL 2015. *Historical Non-Military Radium Sites Research Effort Addendum*, "Bryant Electric Company: Site Summary," pp. 36-41, Oak Ridge National Laboratory, Oak Ridge, Tennessee, November 24. (ADAMS Accession No. ML16291A488).

APPENDIX A
SURVEY RESULTS FROM THE BRYANT ELECTRIC COMPANY SITE VISIT
AT 485 HOWARD AVENUE