

# Battelle Memorial Institute – King Avenue SEC Petition Evaluation Report

## SEC00229

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# ORAU Evaluation Team

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# Petition Overview

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- NIOSH determined it was not feasible to complete the dose reconstruction for an existing Battelle Memorial Institute – King Avenue claim
- October 19, 2015, claimant was notified and provided with a copy of the Special Exposure Cohort (SEC) Petition Form A



# Petition Overview

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- October 27, 2015, Petition (83.14) submitted to NIOSH
- November 2, 2015, NIOSH SEC evaluation report issued
- Previous SEC class from April 16, 1943 through June 30, 1956
  - Internal exposures to uranium and thorium
  - External exposures prior to February 1951



# Proposed Class

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All Atomic Weapons Employees who worked at the facility owned by the Battelle Laboratories at the King Avenue site in Columbus, Ohio, during the period from July 1, 1956 through December 31, 1970, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.



# Background

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- EEOICPA covered facility from 1943-1986
- The 58.3-acre site, accommodating 13 buildings
- Performed atomic energy research and development for AEC, DOE, NRC, DOD, commercial entities
- Owned and operated by Battelle Memorial Institute (BMI)



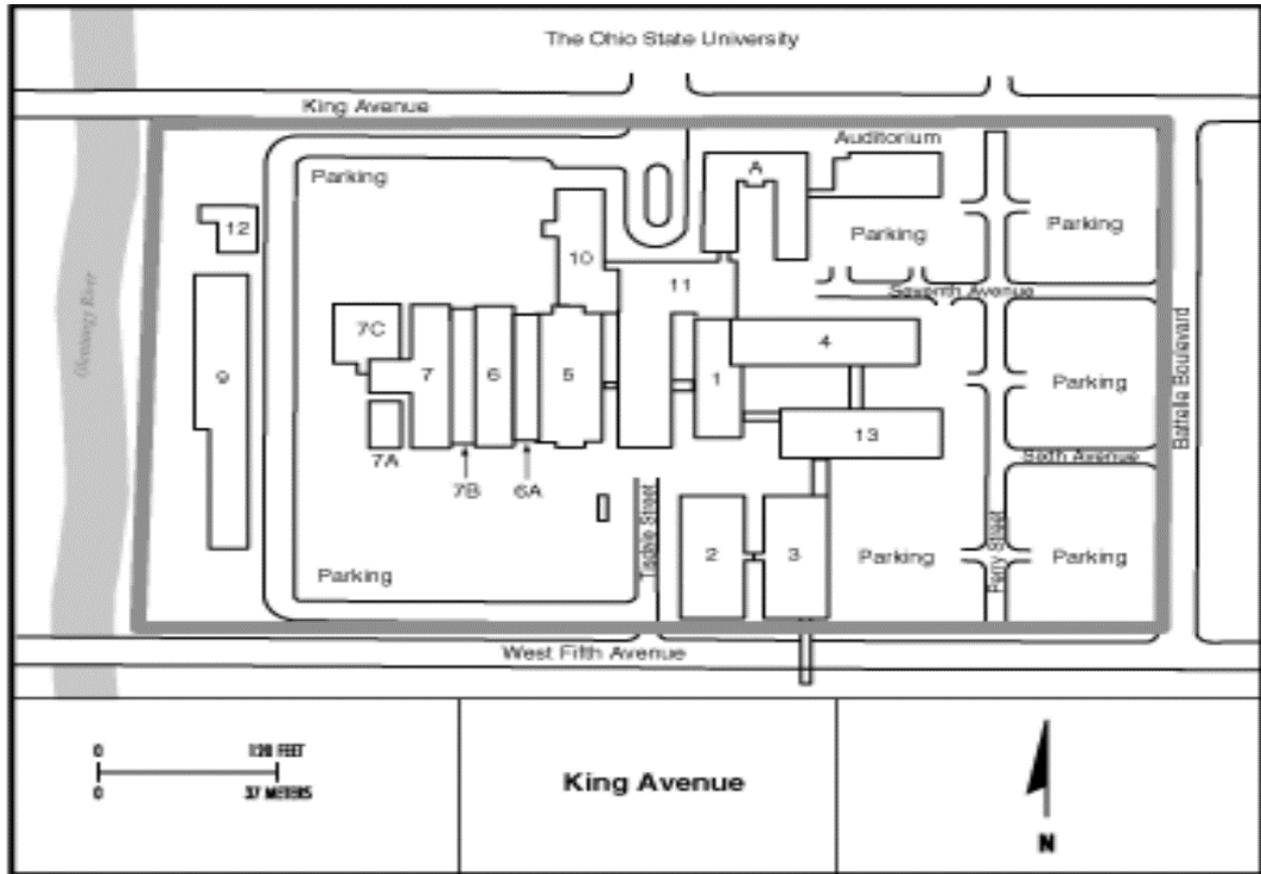
# Radiological Buildings

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- Building A – Corporate Office (Small Laboratories)
- Building 1 – Foundry
- Building 2 – Metalworking Building
- Building 3 – Materials Building
- Building 4 – Radiochemistry Laboratory
- Building 5 – Machine shop
- Building 6 – Chemistry Building
- Building 7 – Chemistry Building
- Building 9 – Mechanical Engineering



# Battelle – King Avenue Facility



# Data Capture Efforts

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- Battelle Memorial Institute, King Avenue
  - August 2014
- National Archives and Records Administration, College Park
  - March 2014
- Office of Science and Technology information (OSTI)
  - February 2013, August 2014
- Idaho National Laboratory
  - January 2015



# Thorium Operations

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- Research and Development (R&D) on uranium and thorium alloys (1955-1959)
- 1961 corrosion resistance testing of thorium under atmospheric conditions, and additional accelerated thorium and uranium corrosion exposure
- 1962 experimental coating of small thorium oxide spheres
- 1966 Preparation of thorium and uranium irradiation and calibration samples
- 1968-1969 experimental work with thorium ceramics



# Radiological Survey Reports

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- July 1957 survey of multiple buildings indicated widespread uranium and thorium contamination
  - *About every lab surveyed contained U or Th samples in some form. These were stored on or in desks where food is eaten. Little care is taken to prevent ingestion. No care is taken to prevent material from entering the sewers.*



# Radiological Survey Reports

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- March 1960 spill resulting in personnel contamination occurred when pressure built up in a flask containing thorium nitrate.
- NIOSH followed up on this incident and requested bioassay records for the individual involved, and there was no record of bioassay or follow-up from this incident.



# Radiological Survey Reports

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- July 1961 air samples were taken in the machine shop grinding room (Bldg. 5) reported concentration was  $2 \times 10^{-10}$  uCi/cc. Worker wore a half face respirator and a note on the survey indicated that a request was made for the worker to leave a bioassay sample.
- NIOSH also followed up on this incident and requested bioassay records for the individual involved, and again there was no record of bioassay or follow-up from this work.



# Radiological Survey Reports

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- February 1963 survey report following clean-up of a spill in Bldg. 5 involving thorium. The spill had been cleaned up with a sponge and the primary spill area (shelf) had just been painted prior to taking the smears, in order to fix the contamination in place.



# Radiological Survey Reports

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- June 1963 First aid alerted the safety office (RadCon) of a melt operation in Bldg. 1 using Mg, Li, and Th metals.
  - *Melting operation started the day before with no Health and Safety oversight, and no respiratory protection.*
  - *The melting furnace was hooded, but the pouring operation was not.*
  - *The men involved said that they would report all future use of radioactive material.*



# Radiological Survey Reports

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- 1964-1965 Surveys for thorium in Bldg. 3 October 14, 1964 memo

*Resmears, taken of all locations showing above permissible alpha or beta-gamma activity on the routine monthly smear survey for September (taken 9/30/64), showed no alpha or beta-gamma contamination present with the exceptions of floor smear location #25 in the 1st floor bay area, and hood smear location #4 in Room 3203. I suggest that the floor smear location #25 be smeared weekly in order to keep closer control on possible spread of contamination from this area. The hood in Room 3203 is higher in alpha activity than should be tolerated for a room in which eating areas are involved. I suggest here that the hood should be cleaned and resmears taken until the  $d/m/cm^2$  is 0.2 or below.*



# Radiological Survey Reports

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- 1966 -1970 infrequent surveys and air samples for thorium, however, these do not correlate well with known or identified operations.
  - Unknown source term – inventory is incomplete
  - Air samples are quite low in the  $10^{-13}$  to  $10^{-15}$  uCi/cc
- April 1970 last thorium operation identified in surveys was clean-up of a grinder.
- No indication of thorium work from 1971 to 1982



# Feasibility of Dose Reconstruction

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- Available internal monitoring records, process descriptions, and source-term data are inadequate to complete dose reconstructions for thorium exposures with sufficient accuracy for the evaluated class of employees during the period from July 1, 1956 through December 31, 1970.
- Uranium bioassay data is available starting in July 1956 for workers in Bldgs. A,1,2,3,4,5, and 6.



# Health Endangerment

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- The evidence reviewed in this evaluation indicates that some workers in the class may have accumulated chronic radiation exposures through intakes of radionuclides and direct exposure to radioactive materials.
- Consequently, NIOSH is specifying that health may have been endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters established for one or more other classes of employees in the SEC .



# Proposed Class

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All Atomic Weapons Employees who worked at the facility owned by the Battelle Laboratories at the King Avenue site in Columbus, Ohio, during the period from July 1, 1956 through December 31, 1970, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.



# Why all workers?

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- Inability to place workers in specific buildings by job title or other identifier.
- Apparent free flow of worker movement within the facility. Only a few noted areas with restricted access.
- Small size of the site,
  - Approx. 1/2 the size of the Idaho Chemical Processing Plant (59 acres vs  $\approx$ 160 acres)
  - Approx. 1/5 the size of H-Area at the Savannah River Site (59 acres vs  $\approx$ 300 acres)



# Questions?

