

# Ventron Corporation Special Exposure Cohort Petition Evaluation Report

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# Brief Site Description

- **Ventron Corporation (originally Metal Hydrides Corp) is currently listed as an Atomic Weapons Employer for the AEC from 1942 to 1948 with residual radiation period from 1949 to 1985; 1987 to 1995. It is listed as DOE for 1986 and 1996 to 1997 during remediation.**
- **Principal operations included the conversion of uranium oxide to uranium metal powder and primary facility for the recovery of uranium scrap for the AEC.**

# Status of Claims

(Current Cases)

- Total number of claims submitted: 19
- Total number of claims who worked during proposed (SEC): 9
- Total number with a DR (at DOL): 9
- Total number claims with internal or external records: 0

# Petition Overview

- Petition SEC 00198 received December 5, 2011
- Petitioner proposed class definition:
  - All metallurgical operators and electric furnace operators who worked at Ventron Corporation in Beverly, Massachusetts from January 1, 1942 to December 31, 1948

# Petition Overview—cont.

- Petition qualified for evaluation on January 20, 2012
  - Employees never monitored
- Class evaluated by NIOSH:
  - All Atomic Weapons Employees who worked at Ventron Corporation site in Beverly, Massachusetts, from August 13, 1942 through December 31, 1948

# Background

- The Ventron site is located in Beverly, Massachusetts and occupies 3 acres on Massachusetts Bay, at the confluence of the Bass and Danvers rivers. The property is bordered by Congress Street on the north, the Boston and Maine Railroad on the east, the Bass River on the west, and the Danvers River on the south.
- The site was originally developed to produce metal for the Office of Scientific Research and Development (December 31, 1941 to November 1, 1942).

# Background—cont.

- 7,460 lbs of metal produced under this initial contract with the OSRD.
- Manhattan Engineer District (MED) took over the OSRD contract in November 1942.
- Metal production from ores and oxides ceased on September 1, 1943.
  - Metal was used for the first reactor, CP1
- Foundry was used to re-cast scrap metal and remaining equipment to be maintained in stand-by mode.
- Ventron was the principal scrap recovery facility for the MED during this early time period.

# Background—cont.

- Scrap re-casting contract expired on December 31, 1947.
  - Following this date, all scrap was sent to Hanford for re-casting.
- June 1947 contract called for the development of a controllable source of neutrons
  - Used 100 pounds of high-grade pitchblende



# Background—cont.

## ■ Refinery Operations:

- November 1, 1942 – September 1, 1943
- Estimated workforce of around 107 individuals, plant-wide
- Production rate topped out at about 350 lbs of metal per day on a three shift schedule

## ■ Scrap Casting Operations:

- September 1, 1943 – December 31, 1947
- Project employed 16 individuals
- Production rate of 3,000 – 3,200 pounds of material per day
- Rate reduced to 1,800 pounds per day in April 1947

# Background—cont.

- **Three primary facilities:**
  - **Building A/A-1 (conjoined structures) contained furnaces, kilns, leaching equipment and machine shop**
    - Uranium activities were not separated from other activities in the building
  - **Foundry and machine shop**
    - Wooden structure South of Building A
    - Demolished sometime between 1948 and 1950

# Sources of Exposure

- Processing of black ore (later brown oxide) by calcium hydride process
  - Potential for radium contamination from black ore use
- Production of uranium metal and oxide
- Later melting and re-casting of scrap uranium metal

# Sources of Exposure—cont.

- No discreet incidents involving high-levels of radiation
- Spontaneous fires from uranium oxidation were routine
  - Ignition of powder as it was being hand-scooped into tins
  - Material was thrown outside and allowed to burn
  - Spontaneous ignition of metal left in leaching liquid discharged to outside settling basin – happened once every few weeks

# External Monitoring Programs and Data Availability

- No evidence that a routine monitoring program existed
- Direct surveys June 1944 (listed as Gamma and Beta/Gamma)
  - 3 measurements of outside stockpiled materials June 1944
  - 3 measurements in working areas June 1944
  - 2 additional measurements of stockpiled materials in June/July 1945
- Direct surveys December 1947 /January 1948 (Gamma; Beta/Gamma; Alpha)
  - 24 measurements conducted around Ventron
    - Wide spread contamination evident
  - 25 additional measurements conducted in January after the removal of some of the equipment had occurred

# External Dose Monitoring Programs and Data Availability—cont.

- **December 19, 1947**
  - 25 measurements taken
  
- **January 13, 1948**
  - 24 measurements taken
  
- **Most of the process equipment had been removed before these surveys**

# Internal Dose Monitoring Programs and Data Availability

- No routine air monitoring, uranium urinalysis, or radon monitoring program
- Bioassay results for one individual in June 1945 and again over a 4-day span in August 1945
  - Requested as a result of observed significant weight loss in that individual
- Air samples
  - March 5, 1943: 12 Samples taken
  - June 15, 1944: 4 Samples taken

# Other Results

- 1943 assay by MED discovered the soil at the site was contaminated.
  - Soil contained between 0.1 and 79 percent uranium oxide
  - 120,000 pounds of soil were removed in 1944 and shipped to DuPont for uranium recovery
- NIOSH has further information that thoriated tungsten filaments were produced from thorium powder but complete details are sparse.



# Summary of Monitoring Gaps

- **External**
  - No film badge results
  - Limited area monitoring for a complex source term
  
- **Internal**
  - Virtually no bioassay
  - Very limited air monitoring for single operation
  - Data for refining completely absent
    - No TBD-6000 approach approved for these operations
    - Limitation of TBD-6000 for very hands on operations
  - No evidence that any monitoring is available for the numerous fires and combustion events
    - Fires outside the building further broaden the exposure potential for process and non-process workers

# Ventron SEC Petition 198

## ■ Why the class?

- Workers were potentially exposed to radium, radon, and uranium who were not monitored nor does a suitable dose reconstruction method exist.
- Decision was based on lack of adequate biological monitoring data, sufficient air monitoring information, and/or sufficient process and radiological source-term data to reconstruct dose with sufficient accuracy.

# Ventron SEC Petition 198—cont.

- **Why everyone?**

- **Based on reports by the AEC and facility layout, the process areas were not isolated from the non-process facilities and airborne dust issues from processes were noted to be extending into non-process areas.**

# Ventron SEC Petition 198—cont.

- **What about employees not included in the SEC?**
  - NIOSH intends to use any internal and external monitoring data that may become available for an individual claim (and that can be interpreted using existing dose reconstruction processes or procedures). Therefore, dose reconstructions for individuals employed at the Ventron site during the period from November 1, 1942 through December 31, 1948, but who do not qualify for inclusion in the Special Exposure Cohort, may be performed using these data as appropriate.
  - Furthermore, NIOSH intends to estimate doses from medical x-rays using information from employee medical records and claimant favorable medical dose reconstruction assumptions and methods.

# Ventron SEC Petition 198—cont.

- **Why stop in 1948?**
  - **NIOSH has obtained additional contract information during its data capture for Ventron which may support additional covered period. This information has been submitted to the Department of Labor and the Department of Energy. NIOSH will review the post 1948 period upon receiving the response to this new information by the DOL and DOE.**

# Health Endangerment

- 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

**All Atomic Weapons Employees who worked for the Ventron Corporation at its facility in Beverly, Massachusetts, from November 1, 1942 through December 31, 1948, 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 classes of employees included in the Special Exposure Cohort.**

# Recommendation

- For the period November 1, 1942 through December 31, 1948, NIOSH finds that radiation dose estimates cannot be reconstructed for compensation purposes

Class	Feasibility	Health Endangerment
November, 1942 – December 31, 1948	No	Yes