# Clinton Engineer Works Special Exposure Cohort Petition Evaluation Report

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# Petition Overview

- Petition received on July 28, 2010
- Petitioner proposed class definition:
  - All guards and service workers who worked in any area at Clinton Engineer Works from January 1, 1943 through May 18, 1947
- Covered period for the Clinton Engineer Works (CEW) is from 1943 to 1949

# Petition Overview—cont.

- Petition qualified for evaluation on October 20, 2010
- Affidavit provided by survivor in support of the petition basis indicated:
  - Employees were not monitored
- The class evaluated by NIOSH:
  - All guards and service workers who worked in or around the warehouses at the Elza Gate area of Clinton Engineer Works from January 1, 1943 through December 31, 1949

# Petition Overview—cont.

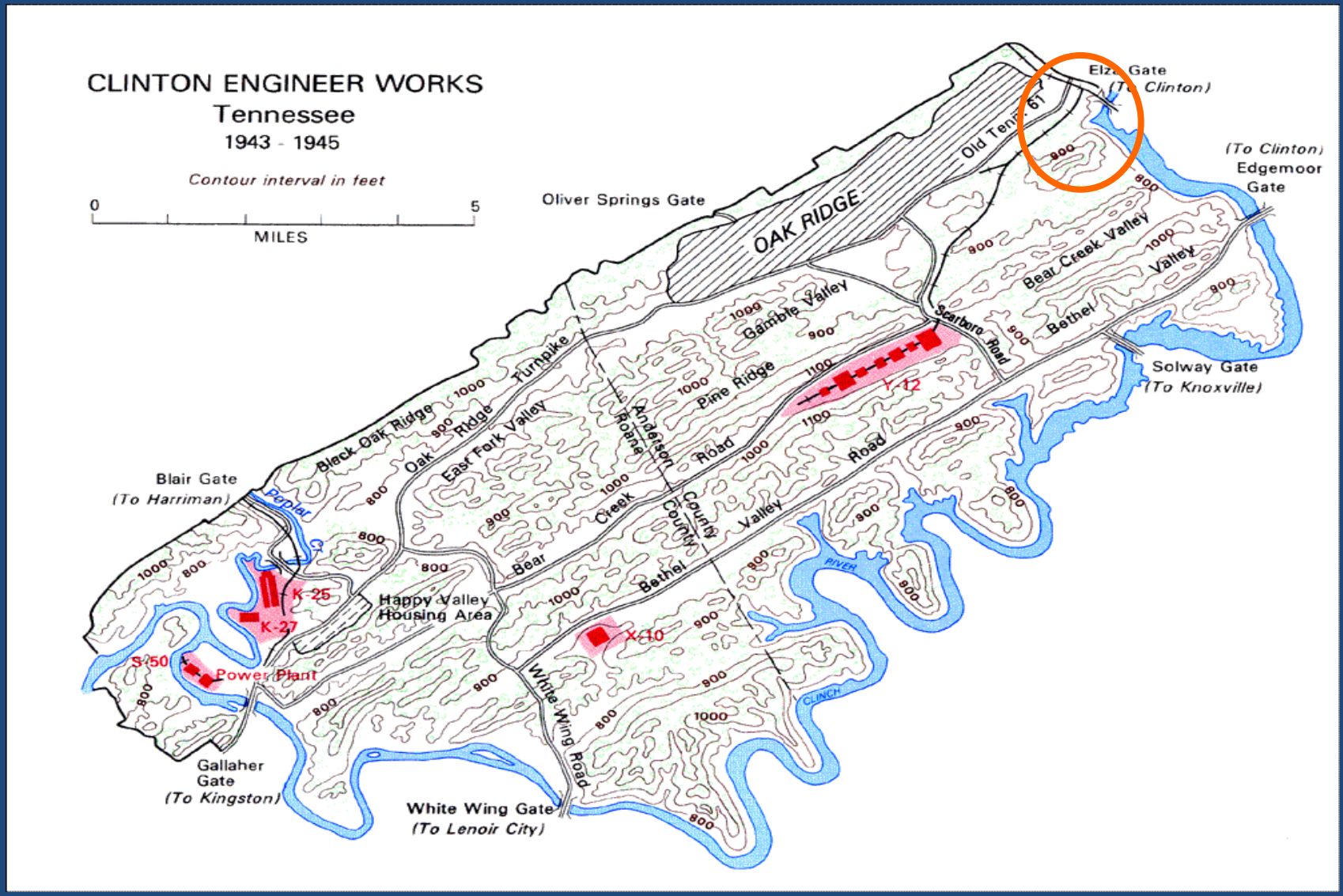
- **NIOSH proposed class to be added to the SEC:**

  **All employees of the Tennessee Eastman Corporation (1943-1947) and the Carbide and Carbon Chemicals Corporation (1947-1949) who were employed at the Clinton Engineer Works in Oak Ridge, Tennessee, from January 1, 1943 through December 31, 1949 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**

# Background

- CEW is located in the Oak Ridge Area of TN, consisting of ~ 59,000 acres and encompasses Y-12, X-10, and K-25 facilities and the community of Oak Ridge
- CEW site is about 17 miles long and 9 miles wide at their greatest width and length, respectively
- City of Oak Ridge occupied approximately 8 square miles in the northeast corner of CEW
- EEOICPA covered facility of CEW does not include the separately covered sites within the CEW boundary

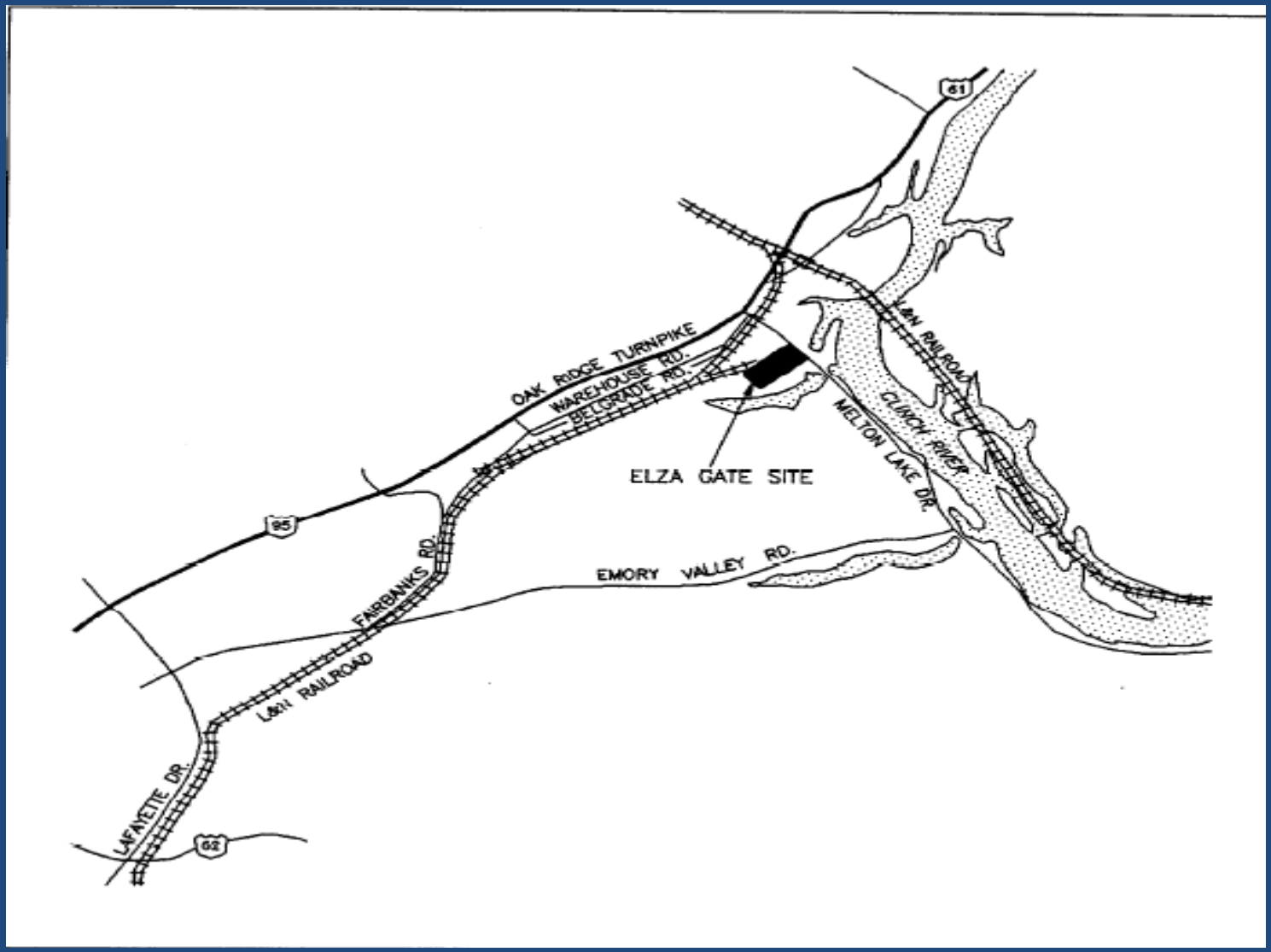
# Map of CEW


CLINTON ENGINEER WORKS
Tennessee
1943 - 1945
Contour interval in feet
0
5
MILES
OAK RIDGE
Oliver Springs Gate
Elza Gate
(To Clinton)
(To Clinton)
Edgemoor
Gate
Old Tenn. 61
Bear Creek Valley
Bethel Valley
Scarboro Road
Solway Gate
(To Knoxville)
Gamble Valley
Pine Ridge
Turnpike
Black Oak Ridge
Oak Ridge
East Fork Valley
Roane Anderson
Bear Creek
County Road
Bethel Valley Road
Blair Gate
(To Harriman)
Poplar Creek
K-25
K-27
S-50
Power Plant
Happy Valley
Housing Area
X-10
Y-12
White Wing Road
Gallaher
Gate
(To Kingston)
White Wing Gate
(To Lenoir City)
CLINCH RIVER

# Background: Elza Gate Warehouse Area

- 20-acre site with five warehouses used for storage of radioactive materials
- Located near the Elza entrance gate to Oak Ridge
- The warehouses are the only buildings within CEW where radioactive materials are known to have been stored or handled during the CEW covered period
- Workforce of warehouses provided by Y-12 contractors Tennessee Eastman Corporation through 1947 and Carbon and Carbide Chemicals Corporation thereafter

# Background: Elza Gate Warehouse Site



# Background: Stored Materials

- High- and low-grade uranium ores from Africa
- Slag and residues from uranium processing to be shipped back to African Metals
- Various radioactive materials and surplus equipment parts from the operation of Y-12

# Previous Dose Reconstructions

## NIOSH OCAS Claims Tracking System

**Information available as of January 25, 2012**

- **CEW claims submitted to NIOSH** — **38**
- **Claims that meet the class definition** — **34**
- **Dose reconstructions completed for claims that meet the class definition** — **27**
  - **Cases with a PoC > 50%** — **5**
  - **Cases with a PoC < 50%** — **22**
- **Claims containing internal dosimetry** — **0**
- **Claims containing external dosimetry** — **0**

# Sources of Available Information

- ORAU Team Technical Information Bulletins (TIBs) and Procedures
- Interviews with two individuals knowledgeable about Oak Ridge history
- Existing claimant files
- Documentation provided by petitioner
- NIOSH Site Research Database
- Data capture

# Data Capture Efforts

- DOE Opennet (OSTI database)
- Internet search
- DOE Comprehensive Epidemiological Data Resource (CEDR)
- NARA Atlanta
- Oak Ridge Operations Office

# External and Internal Sources of Exposure

- Direct radiation from handling or working near the ore and tailings
- Inhalation of radon and radon decay products
- Dust inhalation and ingestion from handling ore and slag materials (e.g., loading, unloading, and re-bagging dry materials)

# External Sources of Exposure

- **Photons**
  - Uranium and progeny
  - Radium, radon and shortlived progeny
- **Beta**
  - Uranium progeny (protactinium)

# Internal Sources of Exposure

- Uranium and progeny
- Radium and radon and its short-lived progeny

# Available Internal Monitoring Data

- Various radon in air samples from 1944 and 1945, some before and after installation of ventilation equipment
- There is no information that workers at the Elza Gate warehouses were undergoing bioassay sampling
- No internal monitoring data has been found

# Available External Monitoring Data

- Film badge data available for a limited number of workers and time periods (1945 and 1946 only)
- University of Rochester provided film badge service
- Limited number of area gamma surveys from 1944 and 1945

# Feasibility of Dose Reconstruction

- **There are insufficient monitoring and source-term data from which to draw conclusions regarding potential magnitude of internal and external doses for the period from January 1, 1943 through December 31, 1949**
  - **Limited film badge data available**
  - **Lack of radon, air sampling, and personal bioassay for uranium progeny through 1949**
  - **Inconsistent source-term and varied unknown activities prevent modeling or using surrogate data**

# Summary of Feasibility Findings

| Sources of Exposure | January 1, 1943 – December 31, 1949 | |
|---|---|---|
| | DR Feasible | DR Not Feasible |
| **Internal** | | X |
| Radon | | X |
| Uranium | | X |
| Radium | | X |
| Thorium | | X |
| **External** | | X |
| Gamma | | X |
| Beta | | X |
| Neutron | NA | NA |
| X-ray | X | |

# 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 employees of the Tennessee Eastman Corporation (1943-1947) and the Carbide and Carbon Chemicals Corporation (1947-1949) who were employed at the Clinton Engineer Works in Oak Ridge, Tennessee, from January 1, 1943 through December 31, 1949 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 January 1, 1943 – December 31, 1949, NIOSH finds that radiation dose estimates cannot be reconstructed for compensation purposes

| Class | Feasibility | Health Endangerment |
|---|---|---|
| January 1, 1943 – December 31, 1949 | No | Yes |