

Joslyn Manufacturing and Supply Co. Special Exposure Cohort Petition Evaluation Report Addendum

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Brief Site Description

- Joslyn is listed as an Atomic Weapons Employer for the Atomic Energy Commission (AEC) from March 1943 to 1952
- Principal operations included the machining and rolling of uranium rods with limited thorium machining operations
- Joslyn was the primary commercial rolling facility for the AEC prior to Simonds Saw and Steel

Petition Overview

- **Summary of Actions to Date**
 - December 2012 NIOSH and the Advisory Board recommended to add a class to the SEC for all AWE employees who worked at Joslyn for the period March 1943 through December 31, 1947
 - NIOSH proposed at that time that it could perform dose reconstruction beginning January 1, 1948 based on TBD-6000 methods
 - Advisory Board withheld its judgement on the 1948-1952 period and requested SC&A to prepare a report
 - SC&A generated a report which was summarized into 11 issues for resolution (December 18, 2013 Issue Resolution Matrix)

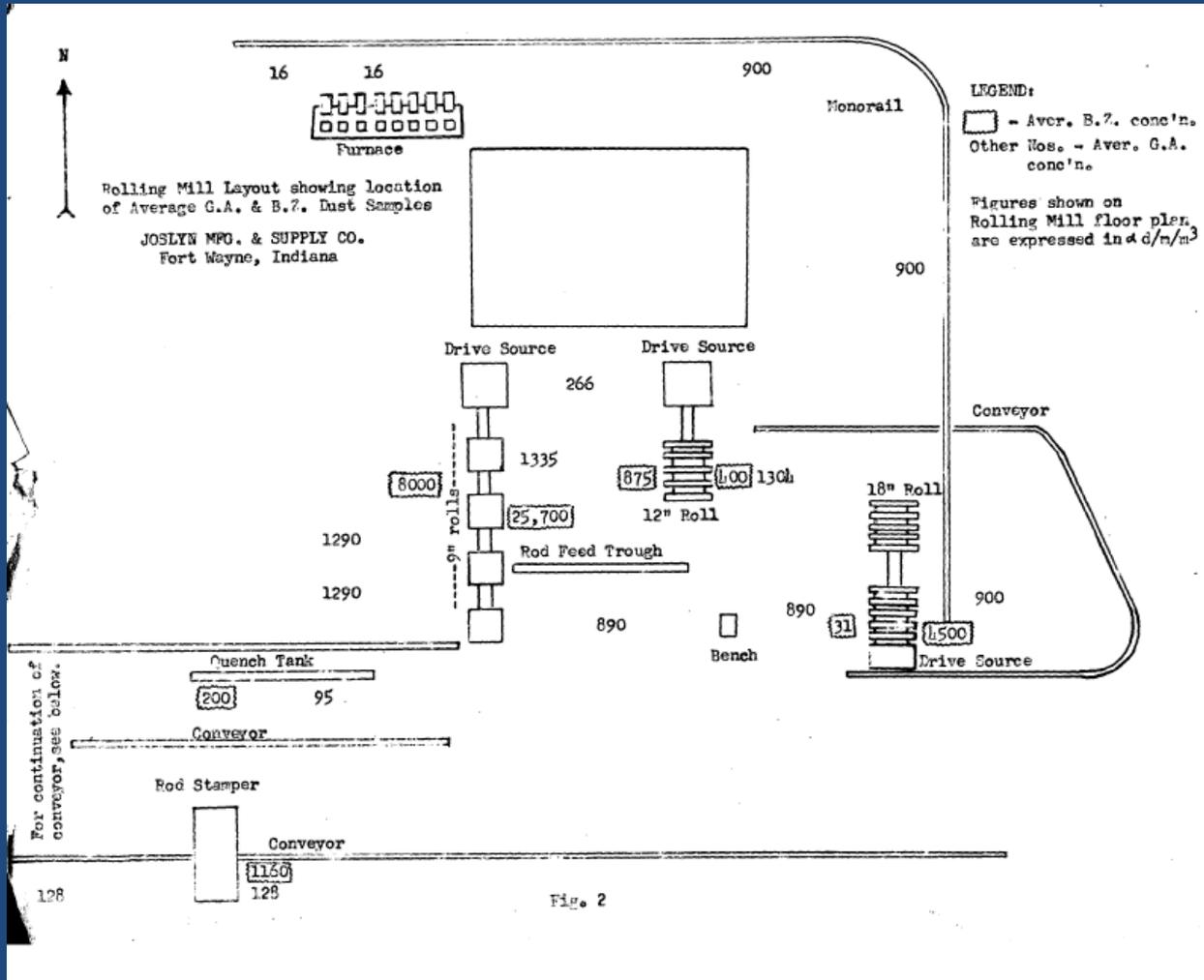
Background

- **Joslyn Manufacturing and Supply Company is located in Fort Wayne, IN with a long history of producing stainless steel**
- **Joslyn participated in a number of radiological operations for the Manhattan Engineer District (MED) and later the AEC including hot rolling, quenching, straightening, cooling, grinding, waste burning, and abrasive cutting of natural uranium billets into metal rods**

Background

- Much of the early work at Joslyn (pre-1948) was related to production of uranium for the Hanford site
- Also used for numerous experiments to develop procedures for rolling uranium metal for use in nuclear reactors
- Performed rolling operations associated with testing uranium metal rods at the Chalk River reactor in Canada
- Prepared uranium metal for the British government

Background



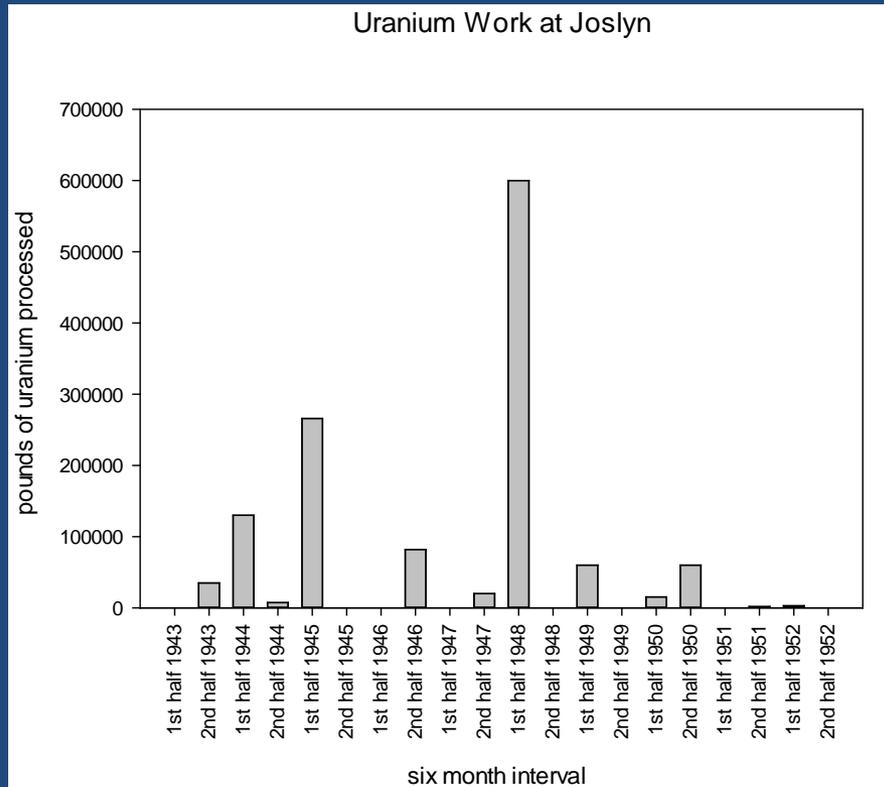
Sources of Exposure

- Principal source for workers included the inhalation and ingestion of natural uranium oxide from the production and shaping of uranium metal rods
- Joslyn was a hand-operated shop, rods were manually reinserted into the mill the required number of times and then dragged to the next process
- Joslyn operated three rolling mills (18 inch, 12 inch, and 9 inch) which were co-located and used for various operations simultaneously
- Rolling of uranium was conducted on rollers which had water-cooled bearings which produced steam and high levels of contamination

Sources of Exposure

- Additional machining and preparation steps (i.e. centerless grinding, cutting, heat treating and quenching, and threading) were carried out on uranium metal prepared at Joslyn as well as from other facilities
- Billets were stored onsite for relatively long periods of time in a storage area
- Uranium waste was noted to be collected and burned outside
 - Worker interviews supported the burning of waste
 - Document reviewed describes an offsite explosion of a drum of uranium metal from Joslyn which had not been properly treated

Approximate Quantities of Uranium Processed at Joslyn



Internal Dose Monitoring Programs and Data Availability

- No routine air monitoring or bioassay program
- Limited air samples taken on three different occasions (December 1943, May 1944, October 1951)
 - Very limited in scope
 - Mostly General Area (GA) samples
 - Early data taken using equipment (electrostatic precipitator) which would not be comparable to HASL equipment
- Much more substantial study performed January 8, 1952: HASL conducted a time weighted average study of various production operations at Joslyn

So Why Add Seven Months?

- NIOSH had previously recognized that the TBD-6000 approach needed validation for specific practices and methods used at the Joslyn facility performed under MED supervision
 - Extensive data collected in 1952 which was shown to be bounded by a TBD-6000 approach: How far back can NIOSH justify that they represent the conditions and practices at the site?
- NIOSH recognizes that practices and standards were evolving rapidly during the period 1943-1948.
 - For Joslyn, the same oversight continued through the high production rolling period (until the end of July 1948)
 - Operations after July of 1948 are clearly done under the auspices of the AEC (including contracts and presence of AEC officials)
 - The tie to AEC (and hence HASL) provides consistency with monitoring procedures, representativeness of sampling,

So Why Add Seven Months?

- **Joslyn had three closely co-located rolling mills (see earlier diagram)**
 - **The pre-August 1948 practices include documented rolling of multiple rods simultaneously on the same or adjacent mills whereas the 1952 study was done one station at a time.**
 - **For early 1948: this practice was needed to handle the nearly 600,000 lbs of uranium rods that were processed in 42 operating days (January to July 31, 1948)**
 - **NIOSH does not feel that that the data collected in 1952 are directly comparable to this high production phase which required different operational practices**

So Why Add Seven Months?

- Most of the rolling days (and the only days with substantial rolling efforts) in 1949 and 1950 were in support of the AEC at the Chalk River reactor Canada (alpha phase uranium dimensional stability)
 - Required careful temperature control
 - Represented smaller efforts (approximately 30 tons in both 1949 and 1950)
 - These two efforts represent were specifically done using only the 18 inch rolling mills
 - The 18 inch rolling mill was shown in the 1952 study to have substantially lower air concentration levels that the 9 inch mill.
 - Previous electrostatic precipitation air sampling also showed the 9” mill produced much higher air concentrations than the other mills

Post July 1948 Internal Dose

- Beginning with August 1, 1948 NIOSH proposes to use the data from TBD-6000 and known rolling days to determine internal and external dose
- Dose reconstruction approach summarized in a white paper (currently in classification review)
- Standard approach to medical X-ray dose using OTIB-0006
- TBD-6000 tabulated data converted from per calendar day to per rolling day exposures for ingestion and inhalation (assuming 250 work days per year)
- In addition to rolling operator, NIOSH will include uranium machining as a method using TBD-6000 to assess the considerable amount of machining operations conducted during the Joslyn operational period

Proposed Class

“All Atomic Weapons Employees who worked in any buildings/area owned by the Joslyn Manufacturing and Supply Co. in Fort Wayne, Indiana, from March 1, 1943 through July 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 other classes of employees included in the Special Exposure Cohort.”

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- **Why the class?**
 - **Workers were potentially exposed to uranium and thorium who were not monitored nor does a suitable dose reconstruction method exist prior to 1948 at Joslyn.**
 - **Decision was based on lack of adequate biological monitoring data, sufficient air monitoring information, and differences in operational characteristics from other metal working (no appropriate surrogate data exists)**

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- **Why everyone?**
 - Based on reports by the AEC and facility layout, the process areas were broadly distributed and controls for preventing movement in these areas was not enforced
- **Why stop in July 1948?**
 - NIOSH feels that the surrogate data from TBD-6000 coupled with the known operational data and source term information provides support that a realistic dose can be determined

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- **What about employees not included in the SEC?**
 - **NIOSH intends to use any internal 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 Joslyn site during the period from March 1, 1943 through July 31, 1948, but who do not qualify for inclusion in the Special Exposure Cohort, may be performed using these data as appropriate.**