



Carborundum Site Overview and Status Update

Advisory Board for Radiation and Worker Health (ABRWH)

Work Group on Carborundum Company

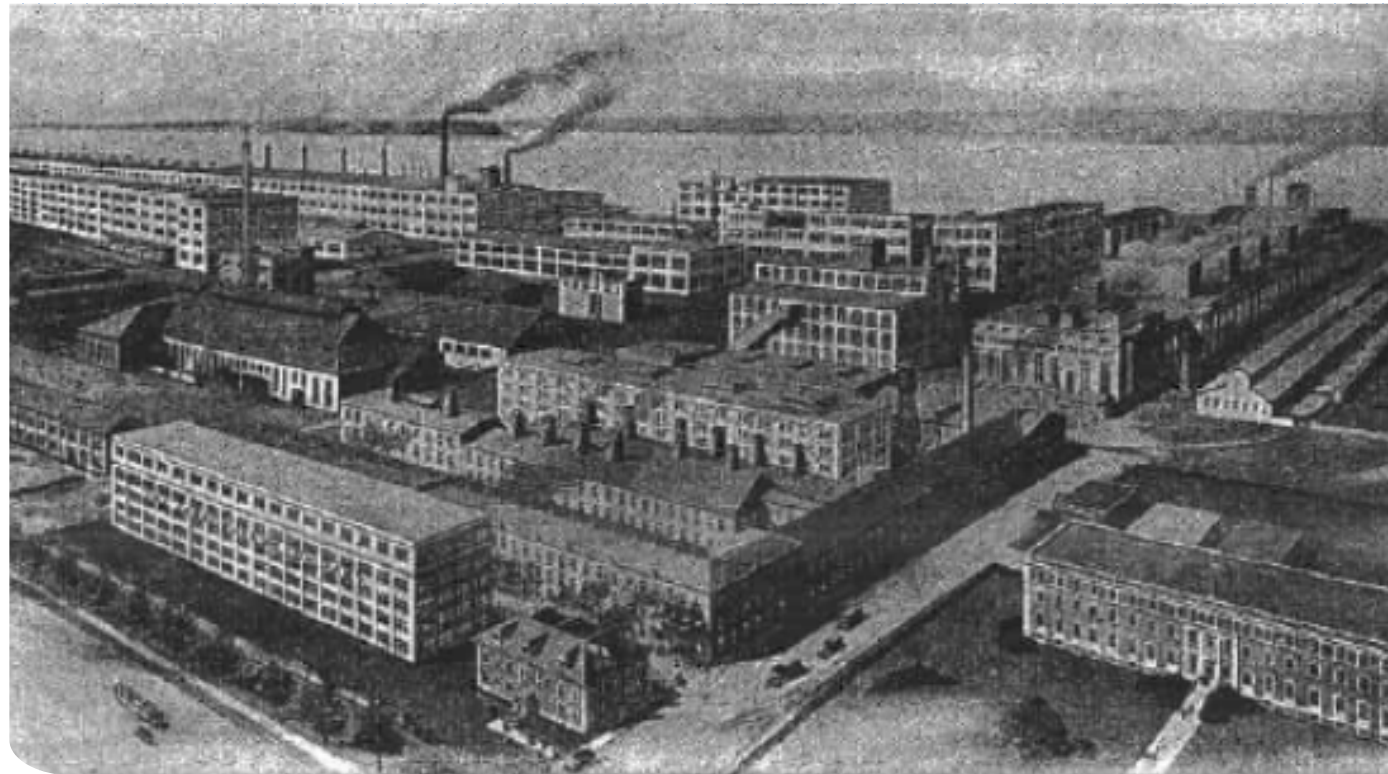
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Overview

- Covered facility listing information
- Company background
- Scope of work during operational periods
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- Carborundum Work Group timeline

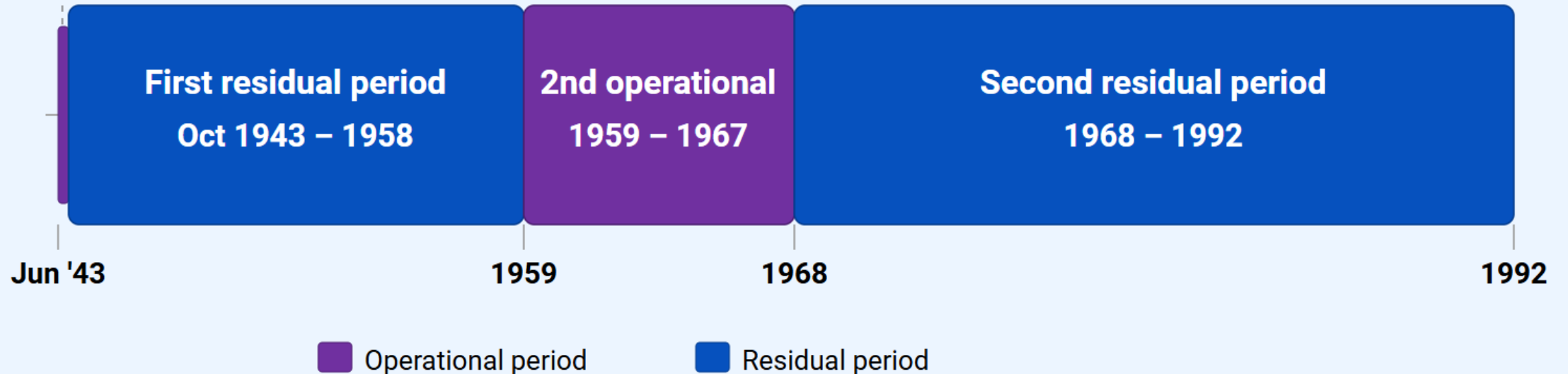
Covered Facility Listing

Name	Type	Location
Carborundum Company	Atomic Weapons Employer (AWE)	Niagara Falls, New York

Covered Time Period

- Two operational periods: June–September 1943, 1959–1967
- Two residual periods: October 1943–1958, 1968–1992

Jun–Sep 1943
1st operational



Covered Facility Listing Description (1/2)

“In June of 1943, the Carborundum Company at its Global Plant and Buffalo Avenue locations performed experimental grinding of uranium metal using a centerless grinder. Uranium slugs were received in June and return shipped in September 1943. From 1959 through 1967, the company used powder fabrication techniques to manufacture uranium, plutonium, and carbide pellets for an AEC [Atomic Energy Commission] research program. The Hanford facility supplied Carborundum with materials during that period.”

Covered Facility Listing Description (2/2)

“Carborundum also performed work during the 1950s that is not covered under EEOICPA [Energy Employees Occupational Illness Compensation Program Act], including fabricating nuclear fuel elements for commercial purposes and producing zirconium, hafnium, and titanium for AEC's special reactor materials program.

During the period of residual contamination, as designated by the National Institute for Occupational Safety and Health and as noted in the dates above, employees of subsequent owners and operators of this facility are also covered under EEOICPA.” (U.S. Department of Energy, “DOE Covered Facilities Search,” Office of Environment, Health, Safety and Security)

Carborundum Company Background

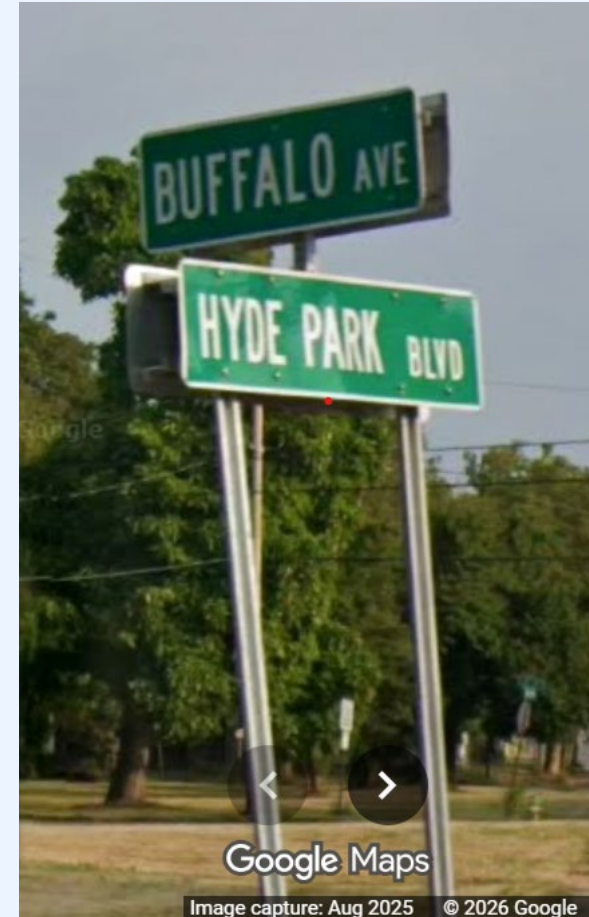
- Company was founded after the discovery of silicon carbide in 1891
- Silicon carbide used as abrasive material on sandpaper, grinding wheels, and sharpening stones
- Employed approximately 6,000-7,000 employees during the 1940s
- Expanded product line and established international locations
- Purchased by Kennecott, Standard Oil, British Petroleum, and St. Gobain



Adobe Images

Covered Site Description

- Niagara Falls site estimated to have 30 to 50 buildings across ~200 acres
- First operational period (1943)
 - Work could have occurred at Buffalo Avenue Plant or the Global Plant on Hyde Park Boulevard
- Second operational period (1959-1967)
 - Work occurred in Building 1 of Buffalo Avenue location



Scope of Work: First Operational Period

- Dupont, on behalf of the U.S. Government, subcontracted different companies to perform various types of work turning uranium (U) billets into finished slugs for use in the Clinton and Hanford piles.
- Carborundum received unfinished slugs to perform experimental centerless grinding to determine the optimum speeds and abrasive wheel type
- 10 uranium metal slugs totaling 30 pounds
- Received June 1, 1943
- Returned September 27, 1943
- Exact location of this work is unknown

Scope of Work: Second Operational Period

- Two AEC contracts as part of the Fuel Cycle Development Program
 1. Initial contract for uranium work in 1959-1961
 2. Additional contract for mixed uranium/plutonium (Pu) carbide fuels in 1966-1967
- Five subcontracts 1959-1965 under United Nuclear Corporation (UNC), the AEC prime contractor
 - AEC Fuel Development program
 - Mixed U/Pu carbide fuel to study more economical fuels for fast breeder reactors
 - UNC responsible for design, fuel irradiation, and evaluation
 - Carborundum responsible for fuel fabrication

Research and Development Building

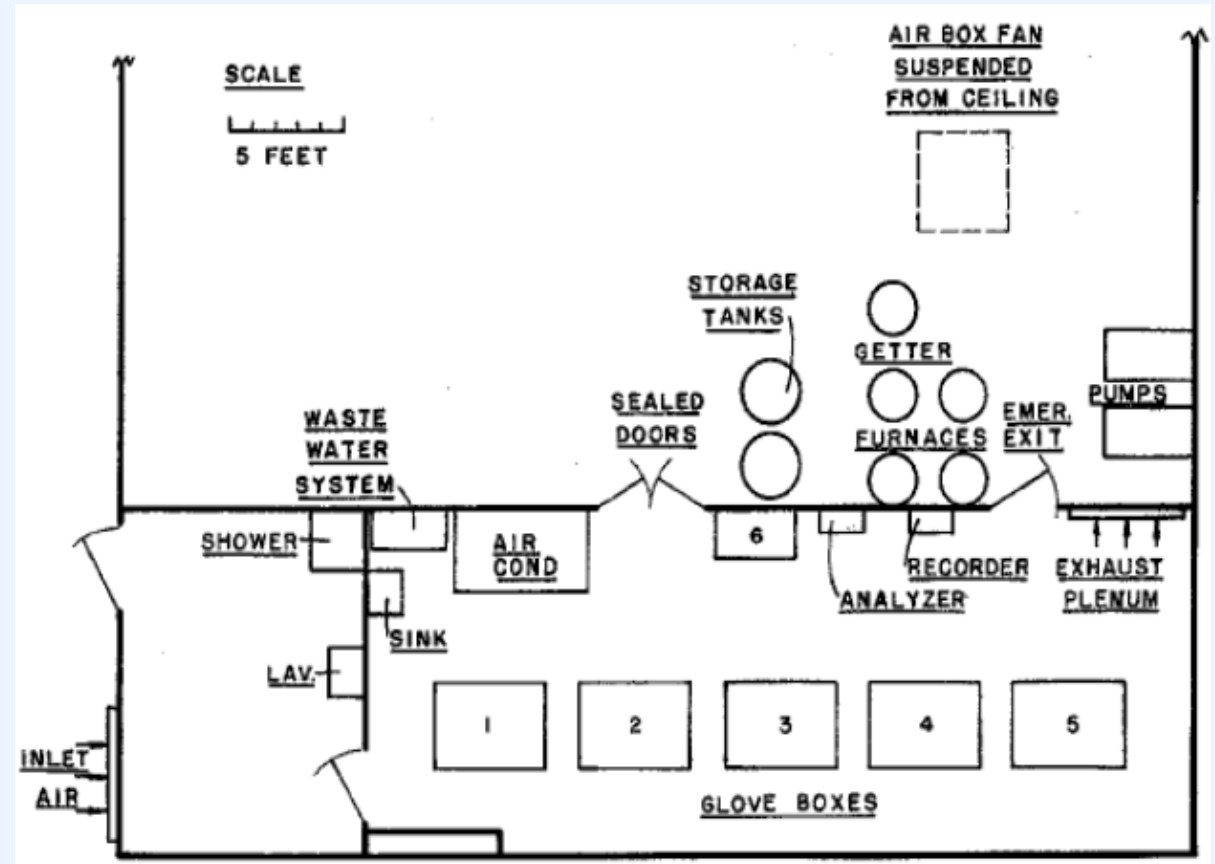
- Research and Development Building (Building 1) was opened in 1953
- Building 1 was the location of uranium and plutonium work in 1957 – 1968
- Building 1 was a four-story building comprising over 60,000 square feet
- New building had experimental high-temperature furnaces, electron microscopes, X-ray installation, gloveboxes, other equipment
- Layout of uranium work areas not available

Plutonium Facility

- Located in the Central Laboratory, 4th floor of Building 1
- Enameled, steel paneled walls and ceiling with vinyl floor
- Fully contained and ventilated work areas
- Included workspace (15 ft by 37 ft) and a change room (15 ft by 11 ft) with 8.5 ft high ceiling

Plutonium Facility Gloveboxes

- Six gloveboxes constructed of welded aluminum plate with full side safety plate glass windows
- All at atmospheric pressure; three with helium, three with air atmospheres
- Materials moved in/out of boxes by pouching technique, or directly through the O-ring sealed sliding door of box 1, which was maintained at a low level of contamination



[Saulino et al., 1962]

Special Exposure Cohort (SEC) Petition 00223 Evaluation Timeline

- **November 19, 2014:** NIOSH received SEC Petition 00223 for all employees at the Buffalo Avenue facility from 1943 through 1976
- **February 2, 2015:** NIOSH qualified petition for evaluation
 - “Petition Basis: Radiation exposures and radiation doses potentially incurred by members of the proposed class were not monitored either through personal monitoring or through area monitoring.”
- **May 21, 2015:** NIOSH issued Evaluation Report (ER) concluding dose reconstruction is feasible for all evaluated periods
- **June 3, 2015:** NIOSH issued revised ER with editorial changes
- **July 23, 2015:** NIOSH presented the ER to the Advisory Board; the Board tasked SC&A with reviewing the report and established the Carborundum Work Group

SEC-00223 Carborundum Work Group Timeline (1/2)

- **January 27, 2016:** SC&A issued its review of the ER, identifying seven major findings/issues regarding dose reconstruction methods
- **August 18, 2016:** The Carborundum Work Group met to discuss SC&A's findings; several issues closed or moved to "Site Profile" status
- **October 27, 2016:** NIOSH issued a memorandum describing bounding approach using surrogate data from Batelle-TBD-6000, Site Profiles for Atomic Weapons Employers that Worked Uranium Metals
- **November 10, 2016:** SC&A reviewed the surrogate data memo, finding that while dose reconstruction is possible, NIOSH's current external dose rates are "implausibly high" and do not satisfy Board criteria for process similarity or plausibility

SEC-00223 Carborundum Work Group Timeline (2/2)

- **November 30, 2016:** At the 114th Advisory Board meeting, the Work Group recommended denying the SEC petition; however, the Board tabled the motion, requesting that NIOSH resolve surrogate data discrepancies and provide a reproducible example dose reconstruction
- **February 22, 2017:** NIOSH issued response paper addressing remaining site profile issues, surrogate data concerns, and updated dose estimates
- **March 13, 2017:** The Work Group met and concluded NIOSH's updated methods and revised surrogate data meet all Board criteria
- **March 22, 2017:** At the 116th Advisory Board meeting, the Board voted unanimously to deny SEC status for Carborundum, concurring that doses can be reconstructed with sufficient accuracy

Carborundum Work Group Site Profile Timeline (1/2)

- **November 28, 2018:** SC&A issued a report on outstanding non-SEC / site profile issues identified during SEC deliberations
- **December 4, 2018:** The Work Group met to discuss resolution of Site Profile Issues for the Carborundum Technical Basis Document (TBD)
- **December 12, 2018:** At the 126th Advisory Board meeting, the Board voted to close out the Site Profile review, while leaving the remaining Monte-Carlo N-Particle (MCNP) Transport Code technical details for the Work Group to resolve

Carborundum Work Group Site Profile Timeline (2/2)

- **June 13, 2019:** The Work Group met to discuss findings on the MCNP Analysis for Carborundum
- **January 18, 2019:** NIOSH provided response paper
- **April 24, 2019:** SC&A provided a reply to NIOSH's response
- **April 23, 2020:** NIOSH issued Carborundum Site Profile, ORAUT-TKBS-0061 Rev 00
- **November 25, 2020:** SC&A provided review of Carborundum Site Profile
- **Current status:** NIOSH to provide response to SC&A's review of Carborundum Site Profile

Thank you.

For more information, contact CDC

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U. S. Centers for Disease Control and Prevention or the National Institute for Occupational Safety and Health.

