Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: AC Spark Plug
Flint, Michigan

TIME PERIOD: 1946-1947; Residual Radiation 1948-October 2008

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
AC Spark Plug performed beryllium work for the AEC. Records indicate that approximately 10 men worked with beryllium at this location in 1947. Information about AC Spark Plug is found in health hazard surveys, shipping reports and in a MED history. The company continued to receive hundreds of pounds of beryllium for use under government contract into the 1960's. It is possible that some or all of this beryllium was being used for other, non-AEC projects. There was also a small amount of thorium procurement related to AC Spark Plug in the 1946-1947 timeframe.

DISCUSSION:
A memo from March 11, 1947, states that AC Sparkplug received 30 pounds of ThO_3 and 960 grams of U_3O_8. Additionally, specific activities conducted with this material, final accountability or disposition and/or decontamination efforts are not contained within the reviewed documentation. Based on a lack of documentation it can only be assumed that residual contamination exists outside the listed period.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo from March 11, 1947, Shipments to AC Sparkplug

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1948 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Aeroprojects, Inc.
West Chester, Pennsylvania

ALSO KNOWN AS: Sonobond Ultrasonics

TIME PERIOD: 1951-1973; Residual Radiation 1974-1976

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Beginning in 1951, Aeroprojects Inc. performed research and development for the AEC. The company's work included investigation of the use of ultrasonic energy in the areas of instrumentation, welding, filling of tubes with powders, extrusion, solidification and cleaning. Materials used by the company include alloys and compounds of aluminum, beryllium, mercury, thorium and uranium.

DISCUSSION:

It was alleged that small amounts of radioactive material may have been buried on this site. However, radiological surveys of the property performed in 1988 do not indicate exposure levels/rates above natural background. There is documentation that during facility cleaning in 1975 and 1976 (outside the period in which weapons-related production occurred), some uranium shavings and slugs were discovered and buried on the site as well. These items, as described, are deemed significant enough to expand the listed dates through 1976.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Report (ORNL/RASA-90/5), Radiological Survey of the Former Aeroprojects Facility, West Chester, Pennsylvania, October 1990
- Memo regarding historical burial events, July, 1990
- FUSRAP Elimination Reports

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1974-1976

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Ajax Magnethermic Corp.
Youngstown, Ohio

TIME PERIOD: 1958-1962

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Ajax-Magnethermic Corp. was involved in induction heat treatment of various forms of uranium for National Lead Company of Ohio (Fernald) and also for General Electric (Hanford). The company fabricated an induction heating unit for NLO in 1961.

DISCUSSION:
Documents reviewed describe tests performed between 1958 and 1961. There is no documentation indicating that work with radioactive materials occurred past October 31, 1961. Multiple documents and radiological surveys were available demonstrating implementation of radiological contamination controls and representative monitoring during operations, along with descriptions of post-operational decontamination and area monitoring. These actions and documentation demonstrate elimination of the potential for residual radiological contamination.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Reports by National Lead of Ohio to the Facility from 1958 to 1961

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Alba Craft Shop
Oxford, Ohio

TIME PERIOD: 1952-1957; Residual Radiation 1958-1993;
DOE 1994-1995 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1952 to 1957, Alba Craft provided a variety of machine shop services on natural uranium metal for National Lead Company of Ohio (Fernald). Early work at Alba Craft included general and developmental machining of threaded reactor fuel slugs for use at the Savannah River Site. Subsequent production-scale operations consisted of hollow drilling and turning of slugs for the Savannah River and Hanford plutonium-production reactors. Remediation activities under the Formerly Utilized Site Remediation Action Program (FUSRAP) occurred in 1994-1995 under the Bechtel National Inc. (BNI) umbrella site remediation contract. Remediation was certified complete in 1997.

DISCUSSION:

Survey results from 1992 confirm the presence of residual contamination, thirty-five years after operations ceased. While the conditions discovered in 1992 are well defined, there is no method to determine the actual conditions left at the end of operations in 1957. ORNL performed a verification survey between December of 1994 and February of 1995 to confirm that remedial actions were successful. The findings of this survey, published in April of 1996 were that the site met current unrestricted release criteria.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included

- Department of Energy (DOE) Office of Health, Safety and Security Website;
- ORNL Report (ORNL/RASA-92/14), Results of the Radiological Survey at the Former Alba Craft Laboratory Site Properties, Oxford Ohio; issued March 1993.
- ORNL Report (ORNL/TM-12968), Results of the Independent Radiological Survey of the Remedial Action Performed at the Former Alba Craft Laboratory Site Oxford, OH; issued April 1996
- Certification Docket for the Remedial Action Performed at the Alba Craft Laboratory and Vicinity Properties Site in Oxford, Ohio, January, 1997

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1958 - 1993

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Aliquippa Forge
Aliquippa, Pennsylvania

ALSO KNOWN AS: Vulcan Crucible Steel Co.
Universal Cyclops, Inc.

TIME PERIOD: 1947-1950; Residual Radiation 1951-1987; 1989-1992; DOE 1988; 1993-1994 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In the late 1940s, Aliquippa Forge (previously Vulcan Crucible) was a supplier of rolled uranium rods used in Hanford's reactors. The AEC operated a rolling mill, two furnaces and cutting and extrusion equipment at Vulcan. Work at the site ended in 1950.
This site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1983 and remediation work took place was in 1988 and again in 1993-1994. This work was performed under the Bechtel National Inc. umbrella contract for DOE site environmental remediation.

DISCUSSION:

Operations ceased in 1950. However, a subsequent radiological survey of the facility performed in May 1978 identified uranium contamination throughout several areas of the facility. From 1986 through 1988, phase one of a FUSRAP cleanup was begun and the area was isolated from access until 1993 when phase two was begun in June of 1993 and completed in September of 1994.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Certification Docket for the Remedial Action Performed at the Aliquippa Forge Site, November 1996.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1951-1987; 1989-1992

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Allegheny-Ludlum Steel
Watervliet, New York

TIME PERIOD: 1950-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Allegheny-Ludlum Steel rolled uranium billets into rods for the AEC as part of the multi-site process overseen by the New York Operations Office for the production of uranium metal for fabrication into slugs for fueling the Hanford production reactors.

DISCUSSION:
While full records were not immediately available to review, processes, material forms, objectives, oversight by AEC during operations, and contractual requirements to recover and return all uranium-bearing materials, are documented well enough to determine it is unlikely that significant residual radioactive contamination existed after operations. This determination is further supported by radiological survey results from 1976 and 1980, finding no radiation above background levels.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Certification Docket for Al-Tech Specialty Steel Corporation (The formerly Allegheny-Ludlum Steel Corporation)

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Allied Chemical and Dye Corp.
North Claymont, Delaware

ALSO KNOWN AS: General Chemical Div., Allied Chemical and Dye Corp.
Allied Chemical Corp.
Union Texas Petroleum Div.

TIME PERIOD: Early 1950s-late 1960s; Residual Radiation late 1960s-1977

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Allied Chemical and Dye Corp. was involved in research and development and small pilot-scale operations on uranium recovery from a phosphoric acid plant. Former AEC employees estimated that, at most, only a few pounds of uranium concentrate were produced.

DISCUSSION:
Documentation does not specifically identify the periods of operation or quantify the media or uranium concentrations introduced to the processes. There is no known radiological survey data from the operational period, nor is there any known radiological survey data from prior to, or after, the facility having been demolished.

Documentation originating in 1977 does indicates that subsequent facility and operational reviews including interviews with involved parties determined that there was a low potential for residual contamination based on an understanding that only a few pounds of uranium concentrate were reportedly separated and recovered through filtration methods. It is also stated in available documentation that the exact location of the operational facility is unknown and that it was reportedly demolished 1970s.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Memorandum; Keller to Mott; Subject: Report of Findings: Allied Chemical Corporation Sites at North Claymont, Delaware, Marcus Hook, Pennsylvania, and Baltimore, Maryland; December 12, 1977
- DOE Report; FUSRAP Elimination Report for Former Allied Chemical Corporation, Chemicals Company (Now General Chemical Corporation), North Claymont, Delaware; Circa 1987

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
Late 1960s - 1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Allied Chemical Corp. Plant
Metropolis, Illinois

ALSO KNOWN AS: General Chemical Division

TIME PERIOD: 1959-1976; Residual Radiation 1977-October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

After World War II, many companies working for the United States Government produced UF_6 feed for uranium enrichment and diffusion plants. The Allied Plant in Metropolis, Illinois was completed and initial deliveries began sometime in 1959. In 1962, several feed plants were shut down and the privately-owned Allied Chemical Corp. Plant in Metropolis, IL, took over the conversion of U_3O_8 to UF_6. This plant produced approximately five thousand tons of uranium hexafluoride feed for the Paducah Gaseous Diffusion Plant per year. It was shut down in 1964. Though it later reopened, it is not clear that any material after this date was used in the Atomic Weapons Production Process.

DISCUSSION:

Documentation reviewed indicates that AWE related residual contamination exists outside the listed period. Residual contamination from prior AWE related activities is indistinguishable from contamination produced during subsequent operations conducted under the present NRC license. This facility is still operational.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1977 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Allis-Chalmers Company
West Allis, Milwaukee, Wisconsin

TIME PERIOD: 1943-1944

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Allis-Chalmers made vacuum pumps for the Y-12 plant effort. The company also wound magnetic coils for the "calutrons" used in the Y-12 plant to produce highly enriched uranium. In late 1943 General Groves ordered some partially-used coils be sent back to Allis-Chalmers for cleaning. This cleaning effort is how some uranium would have found its way back to Wisconsin.

Allis-Chalmers was also involved in the construction of the K-25 Plant. It provided compressors designed to handle uranium hexafluoride.

DISCUSSION:

It should be noted that the documentation reviewed does not firmly establish that the coils returned to Allis-Chalmers were contaminated internally or externally with uranium. Failure of these components was discovered in late October 1943 during the first testing of the magnet coils during system shakedowns, and prior to startup of the process and/or plant. An NRC License close-out memo state that inspections were performed and concluded that no radioactive materials were used at the West Allis Facility.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- NRC License Close-out memo
- Elimination Report Allis Chalmers

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Aluminum Company of America (ALCOA) (New Jersey)
Garwood, New Jersey

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under subcontract to the Metallurgical Laboratory (University of Chicago), the Garwood facility manufactured casting dies and used them to cast uranium slugs. This work was conducted intermittently between July and November of 1944.

DISCUSSION:
The documents reviewed contain detailed discussions of the die casting activities which took place on approximately 17 days in 1944. The operations were apparently overseen directly by personnel from Metallurgical Laboratory. A memo in November of 1944 states that the efforts of ALCOA are no longer needed and that the metal will be removed from the site. The potential for residual contamination, post-operations, is low.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Die Casting Reports at the ALCOA Plant

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Aluminum Co. of America (ALCOA)
New Kensington, Pennsylvania

ALSO KNOWN AS: Aluminum Research Companies
New Kensington Workers of ALCOA on Pine and 9th Streets

TIME PERIOD: 1943-1945; Residual Radiation 1946-1991

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Aluminum Co. of America (ALCOA) site in New Kensington, Pennsylvania was one of 14 facilities in the early 1940s that produced nuclear fuel for the X-10 pilot plant reactor in Oak Ridge, Tennessee and the production reactors at Hanford, Washington. ALCOA used a unique welding process to "can" and seal uranium slugs produced by these other facilities.

DISCUSSION:

Documentation specifying the exact location of the canning operations conducted within the ALCOA facilities is not available but does indicate that operations began in the spring of 1943 at the Pine and Ninth Street location within Buildings #29 and #44. Radiological survey data from during, or immediately after operations is not available. Radiological surveys were performed in 1991 and did not identify residual contamination. There is a significant potential for residual contamination post operations, therefore the existence of residual contamination cannot be ruled out until the 1991 surveys.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Survey Report (ORNL/RASA-92/4); Results of the Radiological Survey at the Alcoa Research Laboratory, 600 Freeport Road, New Kensington Pennsylvania (ANK001); October 1992.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1946 -1991

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: AMCOT
Fort Worth, Texas

TIME PERIOD: 1961-1962; Residual Radiation 1963

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The American Manufacturing Company of Texas (AMCOT) conducted specialized tube elongation and billet piercing tests on uranium metal for National Lead Company of Ohio (Fernald). The tube elongation tests were conducted from July to September 1961 and involved approximately 7 tons of uranium. The billet piercing tests were conducted from June to September 1962 and involved approximately 23 tons of uranium. Both NLO and AMCOT employees participated in the tests.

DISCUSSION:
There is detailed documentation describing the processes, material handled, radiological controls and monitoring, multiple equipment and area decontamination activities, as well as removal of materials and wastes generated during the processes which ended in 1962. A 1994 survey confirmed these results. However, additional documentation verifies that a final facility decontamination was not conducted until 1963. The presence of residual contamination cannot be ruled out prior to completion of this final task.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Formal Elimination Report for the Former American Manufacturing Company of Texas (AMCOT)
- Final Report-Radiological Survey of the Former American Manufacturing Company of Texas (AMCOT)

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1963

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: American Bearing Corp
Indianapolis, Indiana

TIME PERIOD: 1954–1959; Residual Radiation 1960-1983

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1954, American Bearing Corp. was selected to participate in the machining of a sample lot of four hollow extrusion uranium billets from ingots for National Lead of Ohio (Fernald). Subsequently, National Lead used the Special Products Area of American Bearing to process uranium materials in the late 1950s. In May 1959, National Lead Industries (NLI), Nuclear Division was formed in Albany (Colonie), NY, and this work was moved to this NLI facility.

DISCUSSION:
It is not evident in the available documentation how the facility was used after 1959.
An Oak Ridge Associated Universities (ORAU) report dated Nov. 1983, titled "Radiological Survey of the American Bearings Corporation Indianapolis, Indiana", confirms that a facility survey was performed by Radiation Management Corporation (RMC) in 1981/1982 identifying residual contamination in excess of unrestricted release criteria. This survey prompted decontamination and partial dismantlement of the facility, approximately twenty-two years after cessation of AWE operational activities. Subsequent to that effort, ORAU was requested to and performed a survey as detailed in the referenced report.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Oak Ridge Associated University (ORAU) report dated Nov. 1983 titled, "Radiological Survey of the American Bearings Corporation Indianapolis, Indiana."

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1960 - 1983

FACILITY NAME: American Chain and Cable Co.
Bridgeport, Connecticut

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
American Chain and Cable worked under contract to the Du Pont Company to support the manufacture of uranium slugs during the Manhattan Project. In 1944, the company swaged (reduced the diameter) of uranium rods at its Bridgeport facility.

DISCUSSION:
It is not likely that significant levels of residual radioactive material were present after this operation. Documentation exists supporting that a limited quantity of material was processed (eight uranium rods 1.39 to 1.46 inches in diameter), and that the operation was of a short duration (which contractually included delivery and removal of all material). Additionally, the nature of the activity, swaging (cold-working), would most likely not lead to a high probability of dispersion of radioactive material.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo describing quantity and process, March 10, 1944

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: American Machine & Foundry
Brooklyn, New York

ALSO KNOWN AS: AMF
Lutheran Medical Center
Bus Terminal

TIME PERIOD: 1951-1954; Residual Radiation 1955-1992

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
During the early 1950s, this location designed and produced industrial equipment for the AEC. American Machine & Foundry also performed a large volume of uranium, thorium and possibly zirconium metal machining work from 1951-1954.

DISCUSSION:
This facility was acquired and renovated for occupancy by the Lutheran Medical Center subsequent to AWE related activities. Considering the absence of post operational data, the fact that 200 tons U and Th metal were machined at this facility, coupled with air monitoring data from the time of operations indicating significant dispersal of radioactive material concentrations, there is a high probability that residual contamination existed after the period in which weapons-related production occurred up until the time of the facility renovation. The exact date of the renovation could not be identified.

The present facility was surveyed for/by the DOE in January 1992. No elevated radiation readings were identified at that time.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included

- DOE Office of Health, Safety and Security Website
- ORAU Letter report; Berger to Williams (DOE); Subject: Former AMF Site: Brooklyn, New York; January 29, 1992
- AEC (NYOO-Health and Safety Div.) Report; American Machine & Foundry Company, Occupational Exposure to Radioactive Dust; Issued: February 18, 1952

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1955 - 1992

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: American Machine and Metals, Inc.
E. Moline, Illinois

ALSO KNOWN AS: Vapofier Corp.

TIME PERIOD: 1960

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1960, American Machine and Metals demonstrated a process for National Lead of Ohio (Fernald) that involved dehydration of green salt using a centrifuge process.

DISCUSSION:
Documentation demonstrates that a limited quantity of material was processed during a three day period, May 24-May 26, 1960. Radiation protection controls and monitoring were in place during the tests, and the materials and wastes were returned to NLO (Fernald).

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report describing activities and containing surveys, June 1960

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: American Peddinghaus Corp.
Moonachie, New Jersey

TIME PERIOD: April 3, 1978

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The facility conducted a one-day shear (cutting) test on uranium metal for National Lead of Ohio (Fernald) in 1978.

DISCUSSION:
This one day test took place on April 3, 1978. An April 7, 1978 memo from R. W. Mode and G. C. Coon describes the activities that took place including that the equipment used was decontaminated and the materials used for decontamination were returned to the FMPC.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report describing activity
- Memo describing removal of debris
- Memo describing radiation hazard

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: American Potash & Chemical
West Hanover, Massachusetts

ALSO KNOWN AS: National Fireworks Ordnance Corp.
National Northern Div.

TIME PERIOD: 1959 - 1961

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
American Potash & Chemical conducted uranium metal shaping and uranium-magnesium explosive forming studies for Union Carbide Nuclear Corporation, Oak Ridge, Tennessee. The tests done up to May, 1961 were performed with 430 stainless steel and uranium metal pieces. Work was also done with green and sintered uranium-based powders. The powders were formed in a die into discs approximately 4½ inches in diameter and 1 inch thick.

DISCUSSION:
Documentation reviewed does not specify the exact period activities began.
It should be noted that the "430" above describes the type of stainless steel not the number of pieces handled.
Although there is no radiological survey data available for review, documentation that only test quantities of radioactive materials were handled, with safety oversight involved, establishes that the potential for residual contamination outside the listed period is remote.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- AEC Memorandum; Davis to Polson; Subject: Explosive Forming; May 1, 1961.
- Elimination Report for American Potash and Chemical

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Anaconda Co.
Waterbury, Connecticut

ALSO KNOWN AS: American Brass Co.
Fabric Metal Goods and West Tube Mill
Anamet, Inc.

TIME PERIOD: 1942; 1956-1959

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In 1942, the American Brass Company produced the barriers used in the gaseous diffusion process. In the late 1950s, under contract to Nuclear Metals Inc., the company extruded copper-clad uranium billets into tubes at least two separate times for the Savannah River Site. While the original plans called for work on 500 billets, only around 50 were actually processed. The operations involved plating, heating, extruding, sawing, drilling, deburring, cleaning, testing, crating, and shipping. Work was conducted at the West Tube Mill. AEC Health and Safety Laboratory personnel visited the site in 1956 and 1959, and obtained air quality and surface radiation measurements during the later visit.

DISCUSSION:

Although the period in which weapons-related production occurred is determined to be appropriate, it is questionable as to whether radioactive materials were ever handled during the 1942 operations. Documented activities from the 1956-1959 period includes descriptions of the limited quantity of material handled, the physical form of the material as being copper-clad uranium metals, and radiological surveys of general area ambient dose rates and airborne radioactive material concentrations during operations. Based on an evaluation of this documentation, it is concluded that there was little potential for significant residual contamination after completion of the activities.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Surveys of Anaconda Plant

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Armco-Rustless Iron and Steel
Baltimore, Maryland

ALSO KNOWN AS: Armco Steel

TIME PERIOD: 1948

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Armco-Rustless Iron and Steel Co. rolled eight billets of uranium for the AEC. It was a one-time test of rolling.

DISCUSSION:
Documents reviewed describe that radiological monitoring was in place during the activity. Because of the limited amount of material processed, it is unlikely that residual radioactivity was present outside of the period of operation.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Surveys taken during rolling Operations
- Rolling of Billets at ARMCO Rustless Iron and Steel April 7, 1948

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Armour Fertilizer Works
Bartow, Florida

ALSO KNOWN AS: U.S. Agri-Chemicals Pilot Facility
U.S. Steel Corp.

TIME PERIOD: 1951-1955

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under contract with the AEC, Armour operated a pilot plant which produced uranium from phosphoric acid.

DISCUSSION:
Documentation reviewed described that this site was used for research and development of Uranium recovery by solvent extraction from phosphoric acid and that only gram quantities were produced. A 1977 radiological survey of the facility identified conditions consistent with background, or no greater than expected from normal industrial processing of similar materials.

Given the limited production of material and the results of the 1977 survey, the potential for significant residual contamination is low.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Site operations description
- Preliminary Survey of U.S. Steel Corporation Agri-Chemical (former Armour Fertilizer Works) Bartow Florida, March 1980

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Armour Research Foundation
Chicago, Illinois

ALSO KNOWN AS: ARF
Illinois Institute of Technology
IIT

TIME PERIOD: 1957; Residual Radiation 1958-October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Records indicate that Armour Research Foundation may have tested radioactive materials for National Lead Company of Ohio (Fernald), specifically test quantities of materials other than metal (UF_4 or ThO_2).

DISCUSSION:

Documentation reviewed indicates that work involving radioactive materials for Argonne National Laboratory took place prior to 1957. There is also documentation describing a contamination incident that occurred in 1958. In 1994 the Department of Energy determined that it did not have authority to perform remedial actions at the site due to the fact that the site was licensed to handle radioactive material. There was no documentation available indicating that the areas processing weapons-related material were decontaminated

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Feasibility of Fabricating Metal Fiber-Ceramic Bodies for Irradiation Studies, (ANL-FF-501e) December 7, 1956
- DOE no authority letter, December 1994
- License Information and Contamination Incident Reports

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1958 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Arthur D. Little Co.
San Francisco, California

ALSO KNOWN AS: Merrill Co.
A.D. Little Co.

TIME PERIOD: 1948-1956; Residual Radiation 1957-1977

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under contract to the Atomic Energy Commission (AEC) from 1948-1956, initially as the Merrill Company, Arthur D. Little Co. researched the separation and recovery of uranium from various ores. Specific work included the recovery of uranium and vanadium from alkaline carbonate leach solutions from domestic ores.

DISCUSSION:
Documentation confirms that this facility, owned by Arthur D. Little Co, performed the specified work from 1948 through 1956. There is no known radiological survey data available from during or immediately after the operational period.

A radiological survey was performed for/by the DOE in 1977 with no residual contamination identified. Additionally, documentation describes the facility as having been demolished and removed as part of the San Francisco redevelopment program, at some time prior to 1977. The exact date of the facility demolition was not established.

Based on the nature of the work performed from 1948 through 1956, there is a potential for significant residual contamination after operations ceased.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE letter; Mott to Hurley; Subject: Summary of MED/AEC Activities at A.D. Little Facility; May 2, 1979; Attachment: Summary of MED/AEC Activities at A.D. Little Facility; Circa 1979

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1957 - 1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Ashland Oil
Tonawanda, New York

ALSO KNOWN AS: Ashland #1, Ashland #2
Ashland Oil Company
Haist Property

TIME PERIOD: 1944-1960; 1974-1982; Residual Radiation 1961-1973 and 1983- 2006

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In August 1944, the MED purchased the Ashland #1 property, formerly known as the Haist Property, for use as a disposal site for approximately 7,250 metric tons (8,000 tons) of uranium ore tailings and concentrate refining residues generated at the nearby Linde site. When the uranium residues were transported to the Ashland #1 site, they were spread over two-thirds of the property to estimated depths of 0.3 to 1.5 meters (one to five feet). In 1960, the AEC determined that the levels of residual radioactivity at Ashland #1 site were below then-current criteria and released the land as surplus. The Ashland Oil Company eventually acquired the property. From 1957 to 1982, Ashland Oil used a portion of the Ashland #2 site as a landfill for disposal of general plant refuse and industrial and chemical wastes and materials. Between 1974 and 1982, Ashland Oil transported from the Ashland #1 site an unknown quantity of soil mixed with radioactive residues to the Ashland #2 landfill.

Although the Ashland Oil facility was designated for the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1984, no actual remediation under this program occurred prior to its transfer to the Army Corp.

DISCUSSION:

Based on the conditions described in the documentation reviewed, it appears that significant quantities of uranium-contaminated residues and wastes were deposited on the property referred to as the Ashland #1 site, which at the time was owned by the AEC. The property was subsequently sold to a private enterprise in 1960. Radiological surveys performed for the government in 1958, 1976 and later, all confirmed the presence of uranium contamination and corresponding ambient dose rates well in excess of natural background. Documentation reviewed indicates that the potential for significant residual contamination existed outside of the period in which weapons-related production occurred, specifically in the gaps from 1960-1974 and after 1982. The responsibility for the site was transferred from the Department of Energy to the United States Army Corps of Engineers on October 10,1997. On September 12, 2006, the USACE issued a news release stating that the clean-up had been completed.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE letter transferring ownership to USACE

- USACE News Release of Remediation Completion

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1961-1973; 1983 - 2006

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Associated Aircraft Tool and Manufacturing Co.
Fairfield, Ohio

ALSO KNOWN AS: Force Control Industries
Fairfield
Former Dixie Machinery Ownership

TIME PERIOD: 1956
Residual Radiation 1957-1993
DOE 1994-1995 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From February to September 1956, Associate Aircraft Tool and Manufacturing Company machined hollow uranium slugs for the Hanford and Savannah River plutonium-production reactors under a subcontract from National Lead Company of Ohio (Fernald). Associate Aircraft machined approximately 96,000 slugs during the eight-month contract period. Cleanup activities were performed in 1994-1995 by Thermo Nutech under the Bechtel National Inc. umbrella site remediation contract as part of the Formerly Utilized Site Remediation Action Program (FUSRAP).

DISCUSSION:

Documentation reviewed indicates residual contamination outside of the period until completion of FUSRAP cleanup in 1995.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Report (ORNL/RASA-93/2); Results of the Radiological Survey at the Former Associate Aircraft Tool and Manufacturing Company Site, Fairfield, Ohio (FOH001); Issued March 1993 OH.23-3, 2)
- ORNL Report (ORNL/RASA-95/15); Results of the Independent Radiological Survey at the Former Associate Aircraft Tool and Manufacturing Company Site, Fairfield, Ohio (FOH001); Issued January, 1996 OH.23-6
- DOE (OR-FSRD) Report; Certification Docket for the Remedial Action Performed at the Associate Aircraft Site, Fairfield, Ohio, 1994-1995; January 1996 OH.23-7

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1957-1993

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: B & T Metals

Columbus, Ohio

TIME PERIOD: 1943
Residual Radiation 1944–1995
DOE 1996 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

During the early stages of nuclear weapons production, uranium reactor fuel was produced by a variety of metallurgical techniques including extrusion, casting, and machining. In February, 1943, DuPont, acting as an agent of the MED, contracted B&T Metals to extrude rods from uranium metal billets for the Hanford reactor in Washington State. B&T Metals extruded an estimated 50 tons of uranium between March, 1943 and August, 1943. Environmental cleanup under the Formerly Utilized Site Remediation Program (FUSRAP) was conducted in 1996. This work was performed by employees of SunPro as subcontractors to Bechtel National Inc., the company that held the umbrella contract for DOE site environmental remediation. This site's remedial action was certified complete in 2001.

DISCUSSION:

Environmental cleanup under the Formerly Utilized Site Remediation Program (FUSRAP) was conducted in 1996. This work was performed by employees of SunPro as subcontractors to Bechtel National Inc., the company that held the umbrella contract for DOE site environmental remediation. Preliminary surveys performed in 1988 and 1999 found contamination in excess of requirements. Additional remediation was performed and verification surveys performed in 1996 confirmed that remedial actions brought the site below the guidelines for unrestricted use.

Documentation reviewed indicates residual contamination outside of the period until completion of FUSRAP cleanup in 1996.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Report (ORNL/RASA-89/1), Results of the Preliminary Radiological Survey at B&T Metals, 425 West Town Street, Columbus, Ohio (CO001); October 1990 OH.26-5
- ORNL Report (ORNL/RASA-96/8), Results of the Independent Radiological Verification Survey at B&T Metals, 425 West Town Street, Columbus, Ohio (CO001V); June 1997 OH.26-6
- DOE Report; Certification Docket for the Remedial Action Performed at the B&T Metals Site in Columbus, Ohio; June 2001 OH.26-8.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1944-1995

FACILITY NAME: Baker and Company
Newark, New Jersey

ALSO KNOWN AS: Englehard Industries
Platinum (or Baker) Div. of Englehard Industries
Baker and Williams Co., Inc.

TIME PERIOD: 1943-1962; Residual Radiation 1963-1990

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Baker and Company processed radioactive platinum as part of the process of making polonium, which was needed for initiators in nuclear weapons. Baker and Co. also processed unirradiated uranium scrap for the AEC to recover enriched uranium for use in the weapons complex.

DISCUSSION:
Available documentation does not fully describe the processes or amount and/or forms of radioactive materials handled. Considering this absence of detail, in conjunction with no available radiological survey data subsequent to the operations, the presence of residual contamination after completion of the activities cannot be ruled out.

This facility was used from as early as 1943 through the early 1950s for the recovery of platinum from contaminated spent catalyst (platinized granular carbon). Neither the exact nature nor the extent of the contamination is known, but there are indications that it may have involved polonium and/or plutonium.

Documentation reviewed indicates that there is a potential for significant residual contamination outside the covered period. The facility involved with this work was a 20' x 20' lab located at 113 Astor Street. The Astor Street location was reportedly demolished prior to 1990.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memorandum/Checklist; Mackenzie to File; Elimination of Englehard, Ind. From the FUSRAP Program; June 28, 1990
- ORAU Letter; Berger to Wagoner (DOE); Subject: Visit to Potential Sites in Newark and Linden, New Jersey; February 12, 1990

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1963 - 1990

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Baker and Williams Warehouses
New York, New York

ALSO KNOWN AS: Pier 39
Ralph Ferrara Co. Warehouse
Ralph Ferrara Inc.

TIME PERIOD: 1942-1949; Residual Radiation 1950-1990;
DOE 1991-1993 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Manhattan Engineer District and the Atomic Energy Commission used the Baker & Williams site warehouses for short-term storage of uranium concentrates. This material was generated in Port Hope, Canada by milling African ores.
Environmental cleanup under the Formerly Utilized Site Remediation Action Program was conducted in 1991-1993 by Bechtel National Inc. This site's remedial action was certified complete in November 1995.

DISCUSSION:

The presence of radiological contamination was confirmed during a preliminary survey performed in 1990-91, approximately 50 years after use by the MED for storage of material. A verification survey was performed in 1993 and found that all applicable guidelines for unrestricted use had been met.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORAU Report (ORAU 91/L-36); Radiological Survey of the Baker and Willaims Warehouses buildings 513-519 New York, New York; December 1991
- ORAU Report (ORAU 89/L-33); Radiological Survey of the Baker and Williams Warehouses New York, New York; June 1990
- Verification Survey of the Baker and Williams Warehouses Buildings 513-519, June 1994
- DOE (OR-FSRD) Report; Certification Docket for the Remedial Action at the Baker and Williams Site in New York, New York, 1991-1993; November 1995.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1950 – 1990

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Baker Brothers
Toledo, Ohio

ALSO KNOWN AS: Rems, Inc.

TIME PERIOD: 1943-1944
Residual Radiation 1945-1994; 1996
DOE 1995 (Remediation)

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Between June 1943 and July 1944, DuPont and the University of Chicago subcontracted the Baker Brothers company to machine roll metal rods into uranium slugs that were used for fuel in the world's first production reactors located in Oak Ridge, TN and Hanford, WA. Environmental cleanup under the Formerly Utilized Site Remediation Action Program was conducted in 1995. This work was performed under the Bechtel National Inc. umbrella contract for DOE site environmental remediation. This site's remedial action was certified complete in 2001.

DISCUSSION:
There is no evidence of a radiological survey having been performed after completion of operations in 1944. However, radiological surveys performed for the DOE in 1989 and 1990 identified several indoor and outdoor areas with radiation in excess of DOE guidelines, which led to a subsequent FUSRAP cleanup. A verification survey was performed in 1996 and confirmed that all applicable unrestricted use guidelines had been met.

The documentation reviewed indicates that the potential for significant residual contamination existed outside of the period in which weapons-related production occurred, specifically between 1944 and 1994, and1996.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Draft Report – Verification Survey of the Former Baker Brothers, Inc. Site, May 29, 1996

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1945 - 1994; 1996

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Baker-Perkins Co.
Saginaw, Michigan

ALSO KNOWN AS: APV Chemical Company

TIME PERIOD: May 14 – 18, 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In May 1956, Baker-Perkins performed a test of their mixing equipment for NLO (Fernald). The tests involved mixing uranium trioxide (orange oxide) with water and kneading the mixture with the Baker-Perkins "P" and "K" Ko-Kneader machines.

DISCUSSION:
Documentation demonstrates that a limited quantity of radioactive material was used in the process, controls were in place during the process and post-operational decontamination was implemented with radiological surveys having been performed.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Surveys performed during operations and during the process of decontaminating the equipment used

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Battelle Laboratories-King Avenue
Columbus, Ohio

ALSO KNOWN AS: Battelle Columbus Laboratories (BCL)
Battelle Memorial Institute (BMI)

TIME PERIOD: 1943-1986;
DOE 1986-2000; Residual Radiation 2001 – October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1943 to 1986, Battelle Memorial Institute performed atomic energy research and development as well as beryllium work for the DOE and its predecessor agencies. The Battelle Laboratories have two separate locations in Columbus: King Avenue and West Jefferson. Battelle's research supported the government's fuel and target fabrication program, including fabrication of uranium and fuel elements, reactor development, submarine propulsion, fuel reprocessing, and the safe use of reactor vessels and piping.

The following activities were performed at the King Avenue location: processing and machining enriched, natural, and depleted uranium and thorium; fabricating fuel elements; analyzing radiochemicals; and studying power metallurgy. Beryllium work was conducted from 1947 until at least, 1961.

DISCUSSION: Documentation reviewed indicates the King Avenue facility was still in a remediation phase into 2008 with an estimated closure date of March 2008. No documents indicating that closure was completed were identified.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- NRC Battelle Site Document

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

2001-present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Battelle Laboratories-West Jefferson
Columbus, Ohio

ALSO KNOWN AS: Battelle Memorial Institute (BMI)
Battelle Columbus Laboratories (BCL)
West Jefferson Plutonium Facilities

TIME PERIOD: 1956-1975
Residual Radiation 1976-1985
DOE 1986-present (remediation)

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
From 1943 to 1986, Battelle Memorial Institute performed atomic energy research and development for the DOE and its predecessor agencies. The Battelle Laboratories have two separate locations in Columbus, King Avenue and West Jefferson. Battelle participated in research on fabrication of uranium and fuel elements, reactor development, submarine propulsion, fuel reprocessing, and the safe use of reactor vessels and piping.
At the West Jefferson location, Battelle operated a large hot cell facility and a research reactor. Reactor operations began in October,1956, and ended in December,1974. The reactor was defueled and partially dismantled in 1975 and Battelle's license was changed to possession-only status.

DISCUSSION:
Documentation describes initiation of activities for the AEC on or around about 1956. However, the documentation also demonstrates that residual radioactive material was present up until decommissioning activities were started in 1986.

Documentation reviewed indicates that there was residual contamination outside of the period in which weapons-related production occurred. Battelle is undergoing remediation with an expected completion date in 2008.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- NRC Battelle Site Document

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1976 - 1985

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bell Telephone Laboratories
Murray Hill, New Jersey

ALSO KNOWN AS: Western Electric

TIME PERIOD: 1943-1944; Residual Radiation 1945- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
This facility handled a quantity of uranium during World War II, probably in support of its work to develop effective barrier material for the K-25 facility in Oak Ridge, Tennessee. The barrier materials were not radioactive.

DISCUSSION:
Documentation identifies the facility as having and/or using X-metals (uranium) during work being performed in 1943, without identifying the quantities or forms of the uranium.

There has been no specific information found related to the amounts or means by which uranium was handled, there is an accountability record requesting instruction on the transfer of custody back to the AEC of government materials. This document may not be related to the AWE work, but the listing of radioactive isotopes and forms demonstrates that personnel at the facility were knowledgeable about controls and accountability, indicating a limited potential for significant residual contamination post AWE related work.

However, considering the absence of any radiological survey data or information regarding the type and amount of radioactive material used, the presence of weapons-related residual contamination cannot be ruled out.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Bell Telephone Laboratories Letter from M.M. Weiss (Radiation Protection) to USAEC NYOO, J.A. Raffuci - Chief, Property Management Branch

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1945 - present.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bendix Aviation (Pioneer Division)
Davenport, Iowa

TIME PERIOD: 1960

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
On three separate occasions, National Lead of Ohio (Fernald) personnel conducted tests to see how well a Bendix sonic energy cleaning system could clean uranium-contaminated 55 gallon drums. At least 18 contaminated drums were test-cleaned.

DISCUSSION:
Documentation of the processes employed during the surface-contaminated drum cleaning tests, contamination controls, reclamation of contaminated materials and wastes, as well as post-operational decontamination efforts and radiological release surveys, is sufficient to demonstrate no residual contamination existed after the operation.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Reports detailing operation and decontamination of equipment

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Besley-Wells
South Beloit, Wisconsin

ALSO KNOWN AS: Besley Products Co.

TIME PERIOD: May 4-7, 1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Besley was a cutting tool manufacturer. A National Lead Company of Ohio (Fernald) proposal indicates Besley was to machine a trial lot of 500 uranium slugs at its Beloit, WI, plant to evaluate whether the use of the Besley facing and radiusing machine could increase production. An NLO document lists Besley-Wells as the recipient of test quantities of radioactive materials.

DISCUSSION:
An NLO (Fernald) document lists Besley-Wells as the recipient of test quantities of radioactive materials. Available documentation also confirms work was performed during a four day period from May 4 through May 7 1953, involving the machining of 500 uranium slugs through use of a Besley Grinder. The amount of metal removed from each piece was approximately .015 inch.

The report states that "Health, Safety, and Security measures had been anticipated and complied with even beyond our demands." Given the short duration of this activity, the minimal amount of material involved and the statement that Health, Safety, and Security measures were implemented, it has been determined that the potential for residual radioactivity is low.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- National Lead of Ohio document titled, Visit To Besley Welles Corp., Beloit Wisconsin, May 4 – May 7, 1953.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bethlehem Steel
Lackawanna, New York

TIME PERIOD: 1949-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1949, Bethlehem Steel of Lackawanna, New York developed improved rolling mill pass schedules for uranium billets into 1.5-inch rods to be used for reactor fuel rods to later be used at the Fernald plant. Bethlehem also performed uranium rolling experiments to help design the Fernald rolling mill.

DISCUSSION:
Documentation reviewed describes the activities as being limited in scope, principally being performed on weekends, which involved uranium metals being rolled into rods.
Personnel were present during operations and provided Health and Safety coverage including documented monitoring for airborne radioactivity, and contamination surveys after operations.
Radiological surveys were performed before and after cleaning of the equipment after the last rolling and showed no contamination in excess of current guidelines for unrestricted use.
Surveys of the original facility and equipment, which still existed, were performed in 1976 and 1980, both of which identified no residual contamination above natural background levels.
Based on the nature of the activity, accompanied with documented discussion of cropping and residue collection and removal for material accountability purposes; it is reasonable to assume that there was a low potential for widespread or significant contamination.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Survey of Bethlehem Steel, March 1980
- Survey of Rolling Mill Used by Bethlehem Steel Corporation, September 1980
- Investigation Report: Uranium Metal Rolling, 10” Bar Mill, June 1976

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Birdsboro Steel and Foundry
Birdsboro, Pennsylvania

TIME PERIOD: 1951-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1951, eight assorted uranium billets weighing a total of 346 pounds, originating at Birdsboro, were received by the AEC's Lake Ontario Ordnance Works.
In 1952, Birdsboro received 11.5 pounds of uranium wafers for processing.

DISCUSSION:
Documentation is fairly descriptive with respect to material types handled. There is no expectation that significant residual contamination existed after cessation of any handling and/or activities. This is also supported by the limited quantities suspected and/or referenced as having been handled.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Monthly Progress Reports for 1951 and 1952
- Memo Smith to King February 1, 1952
- FUSRAP Elimination Recommendation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bliss and Laughlin Steel
Buffalo, New York

ALSO KNOWN AS: B & L Steel
Niagara Cold Drawn

TIME PERIOD: 1951-1952; Residual Radiation 1953-1999

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Under contract to the National Lead Company of Ohio (Fernald), Bliss and Laughlin Steel rolled uranium rods for the AEC and also provided uranium slug machining services. Bliss and Laughlin was part of a complex called the Buffalo Works that fashioned components for the early weapons program. The functions were transferred to the Albuquerque South Valley Site in 1952.

Although this site was designated for the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1992, no work occurred under this program prior to its transfer to the Army Corps of Engineers.

DISCUSSION:

While activities with radioactive material ended in 1952, a radiological survey performed in 1992 for FUSRAP purposes, identified residual radioactive materials affixed to overhead and floor surfaces. A US Army Corps of Engineers Site Status report states that remediation was completed in March of 1999.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiological Survey of the Former Bliss and Laughlin Steel Company Facility; June 1992
- US Army Corps of Engineers Site Status Report

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1953 - 1999

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Blockson Chemical Co. (Building 55 and related activities)
Joliet, Illinois

ALSO KNOWN AS: Blockson Chemical Group
Olin Mathieson
Olin

TIME PERIOD: 1951- June 1960; Residual Radiation 1962-October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Blockson Chemical Company operated a plant which produced uranium from phosphoric acid. The AEC contracted with Blockson for the recovery of the uranium, which was ultimately used in weapons production. The AEC Uranium production work performed by Blockson was conducted in a one-story brick structure known as Building 55.
This listing is also intended to cover the AEC-funded laboratory, pilot plant and oxidation process, which also occurred at Blockson, and was related to the work in Building 55.

DISCUSSION:
Documentation available for review indicates that large quantities, up to 50,000 pounds per year, of uranium intended for AEC purposes were handled and/or processed at this facility between 1952 and 1962. However, there is no documentation of radiological surveys having been performed during or immediately after cessation of AEC activities. Documentation describes a subsequent radiological survey performed for the DOE in 1978, identifying uranium contamination in excess of natural background levels within the facility used for AEC purposes. Documentation reviewed indicates that significant residual contamination from AEC/DOE activities exists outside the covered period. A December 2000 memorandum received from the Olin Corporation states that "Operations at the site ceased in 1991 and the production buildings were demolished by 1997."

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report (DOE/EV-0005/35 & ANL-OHS/HP-83-103); Radiological Survey of Chemicals Group, Olin Corporation (Formerly Blockson Chemical Company) Joliet, Illinois, March 27-November 28, 1978; May 1983 Il.07-02
- DOE Letter; Baublitz to Snyder; Subject: Elimination of the Olin Corporation from FUSRAP consideration; February 27, 1985 IL.07-1.
- Memo from Olin Corporation to Illinois Department of Nuclear Safety, December 21, 2000

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

July 1960 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bloomfield Tool Co.
Bloomfield, New Jersey

TIME PERIOD: 1947; 1951

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The facility had a small research contract with the AEC in 1947. In 1951, it did some experimental machining of uranium slugs for the AEC. The results were not satisfactory and the work was not expanded.

DISCUSSION:
There was no documentation available describing activities involving radioactive material in 1947.
A memo describes in great detail a one day, June 12, 1951, machining trial. There were a number of problems associated with the quality of the machining attempted. The memo went on to say that some machining would take place the next day but that the operation should be stopped to ensure that the desired quality was met. Based on the process and material descriptions and documented oversight, there is a low probability of residual contamination after cessation of activities in 1951.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website.
- AEC Memorandum; Reichard to Files; Visit to Bloomfield Tool Corporation, Bloomfield, NJ; June 5, 1951
- Machining of Uranium Slugs from the Lackawanna Rolled Rods at the Bloomfield Tool Company June 21, 1951

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bowen Engineering, Inc.
North Branch, New Jersey

TIME PERIOD: May 15-17, 1951

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Bowen Engineering conducted some experimental work at their laboratory in New Jersey on uranium compounds during a two-day period in 1951. The tests were to develop a process for calcining pitchblende raffinates (transforming liquid or sludge-like wastes into a more solid form).

DISCUSSION:
Documentation reviewed contains descriptions of the process and objectives, equipment decontamination and radiological release survey results, with no residual contamination existing post-operation.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Spray Calcining Tests at Bowen Engineering May 15 and 16, 1951

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bridgeport Brass Co.
Adrian, Michigan

ALSO KNOWN AS: Uranium Metals Extrusion Plant
General Motors, Chevrolet Mfg. Div.
National Distillers and Chemical Corp.
Martin
A.C. Spark Plug

TIME PERIOD: 1954-1961; Residual Radiation 1962-1994
DOE 1995 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1954-1961, the Bridgeport Brass Company performed contract work for the AEC. Operations included production of uranium fuel elements for the Hanford and Savannah River Plant reactors and developmental extrusion work on thorium and depleted natural and slightly enriched uranium.

After termination of AEC activities in 1961, most of this plant's functions were transferred to Reactive Metals, Inc. (RMI) in Ashtabula, Ohio. Bridgeport shipped one large extrusion press to RMI and all other equipment was dismantled and scrapped.

Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1985, the only year in which remediation work took place was in 1995. This work was performed under the Bechtel National Inc. umbrella contract for DOE site environmental remediation.

DISCUSSION:

Available documentation demonstrates that AEC operations ceased in 1961-1962, including facility decontamination along with equipment dismantlement and removal from the site. However, a radiological survey of the facility, performed for the DOE in 1976 identified uranium-contaminated dust and dirt throughout the facility requiring an additional cleanup. A subsequent radiological survey of the facility in 1979 identified residual contamination in sub-floor and sump areas, with limited potential for personnel exposure.

A verification survey performed in March of 1995 confirmed that all contaminated areas have been remediated to radionuclide concentrations and activity levels below the applicable DOE guideline limits

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security
- Independent Radiological Verification Survey Results for Remedial Action Performed at the Former Bridgeport Brass Company ORNL/RASA-96/7, August 2002

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1962 - 1994

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Bridgeport Brass Co., Havens Laboratory
Bridgeport, Connecticut

ALSO KNOWN AS: Reactive Metals, Inc.
Piedmont Manufacturing

TIME PERIOD: 1950; 1952-1962

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Bridgeport Brass, at the Havens Laboratory in Connecticut and in Adrian, Michigan, worked to improve the process for extruding uranium. Eventually this work was taken over by Reactive Metals, which operated the AEC/DOE extrusion facility in Ashtabula, Ohio. Bridgeport cut and stored uranium, and may have been involved in the rolling of uranium. Some work of the Havens Laboratory was moved to Seymour, CT, in 1962, to a facility that is now owned by Seymour Specialty Wire.
This listing is intended to cover that portion of the Havens Laboratory known as the Housatonic Pilot Plant, which has also been called the Housatonic Avenue Plant.

DISCUSSION:
The FUSRAP elimination report states that the site had been decontaminated to current standards after operations ceased in 1962. In 1980 a verification survey was performed and found no contamination in excess of unrestricted release guidance which was attributable to weapons-related work. These two documents support the decision that the potential for significant residual contamination is low after weapons-related work ceased.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Radiological Survey of the Former Havens Plant of the Bridgeport Brass Company
- FUSRAP Elimination Report Former Bridgeport Brass Company Havens Laboratory

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Brush Beryllium Co. (Cleveland)
Cleveland, Ohio

ALSO KNOWN AS: Brush Wellman Co.
Motor Wheel Corp.
Magnesium Reduction

TIME PERIOD: 1942-1943; 1949-1953; Residual Radiation 1944-1948 & 1954-1977

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Brush Beryllium Co., Cleveland facility, conducted research on a process for producing uranium metal (1942-1943) through magnesium reduction of molten green salt (uranium tetra fluoride). The facility later conducted research and development with uranium (1949-1953) and extruded thorium billets into slugs which were placed in Hanford production reactors (1952-1953).

DISCUSSION:

This facility involved two buildings, one at Chester Street and the other at Perkins Avenue. Based on the nature of the work, there is a reasonable possibility that significant residual contamination existed after operations ceased. However, both buildings no longer exist. The Chester Street building was demolished in 1946, and since that time has been either a vacant field or a parking lot. It is not clear when the Perkins Avenue building was demolished and replaced. There is no indication that either facility was decontaminated between 1943 and 1949. The Perkins Avenue Facility was also demolished but the date is unknown. The FUSRAP Elimination Report for the Former Brush Beryllium Company, states that a new building was present on the Perkin's Avenue facility in May of 1977.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security
- DOE Report; FUSRAP Elimination Report for the Former Brush Beryllium Company, Cleveland, Ohio; November 14, 1985
- Resurvey Program Brush Beryllium Company, July 1, 1977

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1944 – 1948; 1954-1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Brush Beryllium Co. (Detroit)
Detroit, Michigan

TIME PERIOD: 1942-1950s

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Brush Beryllium Company in Detroit, MI, was one of several companies that rolled or extruded uranium rods for Hanford reactor fuel in the late 1940s and early 1950s. In 1950, Hanford began making rolled uranium rods onsite, but the Atomic Energy Commission shifted the rolling work to the Fernald, OH, Feed Materials Production Center and its supporting contractors in 1952. A number of private companies, including Brush Beryllium Company, contracted with Fernald to provide Hanford with these rolled rods.

DISCUSSION:
Although there were other Brush Beryllium facilities that had documented use of radioactive materials, no documentation was available to confirm that the Detroit site ever possessed or worked with AWE related radioactive material. This facility may have been a corporate office location with no handling of radioactive materials.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: BWX Technologies (Virginia)
Lynchburg, Virginia

TIME PERIOD: 1959; 1968-1972; 1985-2001; Residual Radiation 1960-1967;1973-1984; & 2002 – October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Babcock and Wilcox Company's Nuclear Facilities Plant in Lynchburg, VA, performed work for a variety of AEC and DOE projects. Babcock and Wilcox Company's Nuclear Facilities Plant in Lynchburg, VA, participated in the AEC's Oxide Pellet Fabrication Program, which was managed by the New York Operations Office. Records indicate that shipments of enriched uranium were made to and from the Fernald facility during the years 1968-1972. The company also recovered highly enriched uranium from weapons scrap received from the DOE's Oak Ridge facility between 1985 and 1996. In 1997 the Babcock & Wilcox Company facility in Lynchburg, VA became the BWX Technologies facility. From 1998 to 2000, the company fulfilled a contract for the recovery of enriched uranium from scrap materials containing beryllium. The Lynchburg plant also participated in a DOE-sponsored program called Project Sapphire, under which the plant had responsibility from 1995 to 2001 for downblending enriched uranium obtained from the government of Kazakhstan.

DISCUSSION:

The documentation available for this evaluation is insufficient to rule out the period between 1960-1967, or the period after 1972. There was no available documentation describing the materials, processes and/or objectives of the enriched uranium shipments between Babcock & Wilcox and NLO (Fernald) during the 1968 through 1972 period.

There is no documentation that anything other than routine cleaning was ever performed at this facility, as it appears to have remained and is currently operational. Contamination spread from AWE related activities is currently not distinguishable from non-related contamination.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1960-1967, 1973-1984, 2002 to present

FACILITY NAME: C. G. Sargent & Sons
Graniteville, Massachusetts

TIME PERIOD: 1968

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
C.G. Sargents and Sons Company performed extruder and drying oven tests with thorium for National Lead of Ohio (Fernald). It also conducted a uranium sump cake drying test for NLO. These were apparently one-time tests.

DISCUSSION:
Documentation reviewed described two separate tests that were performed, both involving drying of thorium compounds. One test was performed from February 12 through February 14, 1968. The other was performed November 18 through November 20, 1968. This documentation states that limited quantities of materials were processed and radiological monitoring was implemented during the activities. Trip reports for both tests document that all contaminated materials were packaged and removed and that all potentially contaminated surfaces were decontaminated to background levels immediately following each test. These six days of operation are the only periods in which radiation exposure is likely.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiological Surveys C.G. Sargent and Sons
- Trip Report CG Sargent's Sons Corporation February 12-14, 1968
- Trip Report CG Sargent's Sons Corporation November 19-20, 1968

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: C.H. Schnorr
Springdale, Pennsylvania

ALSO KNOWN AS: Conviber
Premier Manufacturing

TIME PERIOD: 1943-1951 Residual Radiation 1952-1993; DOE 1994 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In 1943, C.H. Schnorr & Company began providing metal fabrication services in support of MED operations. C.H. Schnorr machine extruded uranium for the Hanford Pile Project. Operations may have continued until 1951 when the building was sold.
Although this site was designated for the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1992, the only year in which remediation work was performed was 1994.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Results of Independent Radiological Verification Survey at the CH Schnoor Site-ORNL/RASA/95/1
- DOE Report (OR-FSRD); Certification Docket for the Remedial Action Performed at the C.H. Schnorr Site, Springdale, Pennsylvania, in 1994. November 1996.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1952 - 1993

FACILITY NAME: C. I. Hayes, Inc.
Cranston, Rhode Island

TIME PERIOD: January 7-9, 1964

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1964, C.I. Hayes Inc., handled uranium metal under subcontract to the National Lead Company. The work involved heat-treating uranium in a vacuum furnace in order to test the decontamination and health and safety aspects of this work.

DISCUSSION:
Documentation was available describing the three-day process, which occurred from January 7 to January 9, 1954. It describes the process, material handled, radiological controls and monitoring, equipment and area decontamination, as well as removal of materials and wastes generated during the process, and demonstrates that no residual contamination was likely to have existed post-operation.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to C.I. Hayes January 7-9, 1964

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: California Research Corp.
Richmond, California

TIME PERIOD: 1948-1949

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Using small amounts of plutonium and uranium, the California Research Corp. performed experiments to investigate the use of continuous chelation as a means of separating plutonium and zirconium from uranium. The California Research Corp. performed the work as a subcontractor to the Kellex Corporation which was under contract to the AEC to investigate waste recovery methods.

DISCUSSION:
Documentation demonstrates that limited quantities of material were handled under laboratory conditions and controls, implementing personnel and area monitoring, material accountability and equipment decontamination.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US AEC memo Regarding Quantities of Radioactive Material
- Memo: Visit to California Research Corp, November 17, 1948

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Callite Tungsten Co.
Union City, New Jersey

TIME PERIOD: 1944; Residual Radiation 1945- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
According to a 1944 document, the Callite Tungsten Co., used its machines to cold roll uranium metal rods for the Manhattan Engineer District.

DISCUSSION:
Available documentation continues to be limited. A single document originating in 1944 describes activities at the Callite Tungsten Co. in New Jersey involving the "cold rolling of uranium".
Without documentation describing the activities, amount of materials involved, and/or post operations radiological conditions in more detail, it is determined that there exists a potential for significant residual contamination beyond the specified period.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1945 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Carboloy Co.
Detroit, Michigan

ALSO KNOWN AS: General Electric Metallurgical Products

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1956, the Carboloy Co. conducted operations to turn down the outer diameter of uranium slugs.

DISCUSSION:
Activities conducted related to weapons development, specifically the downsizing of uranium slugs, were performed on June 26-29, 1956. Documents state that the facility was decontaminated on the last of the four days. Later in the same year, General Electric applied for a Special Nuclear Material License from the AEC, to receive and process uranium dioxide for conversion into solid fuel pellets associated with commercial boiling water reactor development. General Electric subsequently notified the AEC that commercial applications associated with the license had ceased and requested termination of the license in 1958. Detailed documentation was available for review demonstrating existence of a comprehensive site radiological control program which would have ensured that the weapons development work did not lead to residual contamination dispersed amongst commercial-purpose contamination. This is further evidenced by a radiological survey performed in 1982 by the NRC, verifying the decontamination and removal of equipment, whereupon all radiological conditions were at background levels and no residual contamination was identified.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security
- Trip Report to Carboloy Company, June 29, 1956
- US NRC Inspection of Carboloy, June 8, 1982

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Carborundum Company
Niagara Falls, New York

ALSO KNOWN AS: N/A

TIME PERIOD: 1943-1944; 1959-1967; Residual Radiation 1945-1958; 1968-1992

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Carborundum Company engaged in various phases of a Manhattan Engineer District program in 1944 designed to determine suitable methods for shaping and engineering uranium rods. This work involved the forming, coating, and canning of uranium rods for the pile process. Between 1960 and 1962, the company fabricated plutonium carbide pellets for the AEC from materials supplied by Hanford. Carborundum also performed work during the 1950s that is not covered under EEOICPA, including: fabricating nuclear fuel elements for commercial purposes and producing zirconium, hafnium, and titanium for the AEC's special reactor materials program.

DISCUSSION:

Nuclear Regulatory Commission (NRC) documentation states that a July 28, 1992 survey of the facility indicated that current decommissioning criteria had been met.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- NRC Terminated License Tracking System -license # SNM00214.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1945 - 1958, 1968 - 1992

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Carnegie Institute of Technology
Pittsburgh, Pennsylvania

ALSO KNOWN AS: Carnegie-Mellon Cyclotron Facility

TIME PERIOD: 1942-1946

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
During the Manhattan Project, Carnegie Institute of Technology was key participant in research on the phases of special metals and their alloys. It also worked on the development of methods for testing materials of construction and the construction of "necessary equipment."

DISCUSSION:
This facility may have performed limited research activities during the time frame of 1941 through 1944, under laboratory controlled conditions. There is no documentation indicating that radioactive materials handled for the MED/AEC would have led to residual contamination.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Abstracts of Miscellaneous Reports

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Carpenter Steel Co.
Reading, Pennsylvania

TIME PERIOD: 1943-1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Beginning in 1943, Carpenter Steel Co. was one of the 14 private contractors and vendors that produced fuel for the Oak Ridge X-10 pilot plant reactor and the full-scale Hanford production reactors. As an alternative to extrusion, the Carpenter Steel Co. of Reading, Pennsylvania experimented with rolled uranium rods in July 1944, but these proved to be inferior to the extruded product. The metal tended to form laps and seams on the surfaces of the rolled bars. Carpenter Steel has since changed its name to Carpenter Technology Corporation.

DISCUSSION:
All available documentation of Carpenter Steel's indicate that work involved experimental rolling in 1944. It was noted that the quality of the rods rolled was not as good as that from other facilities. In 1981, a radiological survey conducted by Argonne National Lab identified several discrete areas of elevated contamination which upon review of additional documentation were in inaccessible areas. This initial survey prompted a comprehensive radiological survey in 1988 performed by ORNL. A review of this survey demonstrates that no residual contamination above background was identified.
The site was eliminated from the FUSRAP system in 1991, based on the survey results.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Project Memo October 2 1944
- Report (ORNL/RASA-89/3); Results of the Radiological Survey of the Carpenter Steel Facility, Reading Pennsylvania; Date of issue - July 1990.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: C-B Tool Products Co.
Chicago, Illinois

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
For a six month period in 1944, C-B Tool Products Co. had a subcontract with the University of Chicago to provide personnel, facilities, and equipment to produce special machining of parts for special equipment, tools, jigs, and fixtures to the Met Lab from materials provided by the University of Chicago. It is unclear whether the company handled radioactive materials.

DISCUSSION:
There is no available documentation to support or substantiate that radioactive materials were handled or involved at any time. Additionally, the building that may have served as the location for machining or tool development was demolished in the 1940s.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Owner Searches for Potential Sites in Chicago
- FUSRAP Elimination report dated January 31, 1990.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Chambersburg Engineering Co.
Chambersburg, Pennsylvania

TIME PERIOD: March 20-21, 1957

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In March 1957, a series of hot uranium forging tests were conducted at the Chambersburg Engineering Co. by the Metallurgical Department of National Lead of Ohio (Fernald). Approximately 150 hot uranium slugs were forged into washers on two Chambersburg air compressor impactors.

DISCUSSION:
This activity took place for only two days, March 20 and 21, 1957, including clean-up. Documentation reviewed describes the processes, materials handled, equipment and area decontamination, recovery of materials as well as safety and health air sampling, all of which indicate that the presence of residual radioactive contamination after the operation is unlikely.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included

- DOE Office of Health, Safety and Security Website
- Trip Report to Chambersburg Engineering Company March 20 and 21 1957

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Chapman Valve
Indian Orchard, Massachusetts

ALSO KNOWN AS: Chapman Valve Manufacturing Co.
Crane Co.

TIME PERIOD: 1948-1949;
Residual Radiation 1950-1994;
DOE -1995 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Chapman Valve supplied valves to the MED and the AEC. In 1948, Chapman Valve machined uranium rods into slugs for the Brookhaven National Laboratory. Uranium slugs were used as reactor fuel. Chapman may also have conducted rolling operations on uranium metal in 1949.

Bechtel National, Inc., with Interstate Nuclear Services and Thermo Nutech as subcontractors, performed remediation in 1995 as part of the Formerly Utilized Site Remediation Action Program (FUSRAP)

DISCUSSION:

Documentation indicates that a radiological survey was performed at this site in 1991 with uranium contamination identified on floors, walls and overhead beams. Remediation actions were undertaken and a verification survey was completed in 1995 and confirmed that the remedial actions were successful in decontaminating the plant to applicable guidelines for unrestricted use.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Results of the Independent Radiological Survey at the Former Chapman Valve Company; Issued July 1992
- Results of the Independent Radiological Survey at the Former Chapman Valve Manufacturing Company; Issued May 1997

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1950 - 1994

FACILITY NAME: Chemical Construction Co.
Linden, New Jersey

ALSO KNOWN AS: Chemico

TIME PERIOD: 1953-1955; Residual Radiation 1956 – October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Chemical Construction Co. conducted research and development activities to recover uranium and other metals from low-grade waste materials. The wastes were generated by uranium processing operations at the Mallinckrodt facility in St. Louis, Missouri.

DISCUSSION:
Documentation briefly describes the process being researched and developed and it would appear that considerable quantities of residues were evaluated for processing but there is no documented evidence that these processes were ever employed. In a DOE Memorandum/Checklist; Young to File dated 12/4/87; the following quote is extracted "Absence of any record of radiological characterization of the property and the volume of material processed suggest that their may be potential for residual contamination. However insufficient info has been found to justify further consideration under FUSRAP." Subsequently, in 1995, it appears that this site was removed from FUSRAP as DOE found they had no authority to perform remediation.

Based on the uncertainties associated with this site, coupled with determinations documented by DOE through internal reviews it is determined that this site has a potential for significant residual contamination outside the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Letter; Wagoner to Gregorio; No Authority to Perform Remedial Action at the Former Linden Pilot Plant of the Chemical Construction Company; February 17, 1995.

Based on the uncertainties associated with this site, coupled with determinations documented by DOE through internal reviews it is determined that this site has a potential for significant residual contamination outside the period in which weapons-related production occurred.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1956 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Cincinnati Milling Machine Co.
Cincinnati, Ohio

ALSO KNOWN AS: Cincinnati Milacron, Inc.

TIME PERIOD: September 17, 1963

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Cincinnati Milling Machine Co. built electro-chemical machining units. In September 1963, the company tested the feasibility of electro-chemical machining of uranium. Eight normal uranium solid cylinders 1-inch in diameter and 1-inch long (approximately 14 pounds) were used in the test.

DISCUSSION:
This was a one day activity that took place on September 17, 1963. Documentation reviewed describes the processes, material handled, radiological controls, monitoring, equipment decontamination and removal of materials and waste. This activity was limited in scope and a post-operation survey identified no residual radioactivity above background levels.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to Cincinnati Milling Machine Company, Cincinnati, OH on September 17, 1963

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Colonie Site (National Lead)
Colonie (Albany), New York

ALSO KNOWN AS: Colonie Interim Storage Site
National Lead Co., Albany, NY
National Lead Co.-Nuclear Division
NL Industries-Nuclear Division

TIME PERIOD: 1958-1968; Residual Radiation 1969-1983, 1999 – October 2009; DOE 1984-1998

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1958-1968, National Lead Industries owned and operated the Colonie site and during this time it produced uranium products under contract to the AEC. This contract was terminated in 1968. Thereafter, National Lead fabricated various products from depleted uranium. The largest customer for these products was the U.S. Department of Defense with its contract for armor penetrator cores. While the AEC was still a customer during these years, the uranium work was for reactors and not weapons based. Therefore, because this work did not constitute "producing or processing material used in a nuclear weapon", it is not eligible for coverage under the Energy Employees Occupational Illness Compensation Program Act. In 1984 ownership of the property transferred to the Department of Energy and from 1984 to late 1997 Bechtel National Inc. served as DOE's contractor at the site. In 1998 the Corps of Engineers took the program over as part of the transfer from DOE to the Corps of the Formerly Utilized Site Remediation Action Program (FUSRAP).

DISCUSSION:

Activities involving radioactive materials began in 1958 and were conducted through 1984, at which time the property was transferred to the federal government and cleanup under FUSRAP was initiated.

A United States Army Corps of Engineer FUSRAP fact sheet for the Colonie site anticipated that remedial action would be complete in FY 2008. There was no documentation available indicating that remediation had been completed.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US ACE Fact Sheet FUSRAP Colonie Interim Storage Site November 2007

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1969 – 1983; 1999 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Combustion Engineering
Windsor, Connecticut

ALSO KNOWN AS: Asea Brown Boveri

TIME PERIOD: 1965-1972; Residual Radiation 1973-October 2009

FACILITY DESCRIPTION

Combustion Engineering (CE) sent shipments of uranium to Fernald between 1965 and 1972 for use in the nuclear weapons production process. It is because of these shipments that this site qualifies as an Atomic Weapons Employer for these years. Combustion Engineering performed substantial work for the Atomic Energy Commission in other years as well, but this work is not covered under EEOICPA because it was either non-nuclear or was not related to weapons production. Starting in the 1940s, this initial work at the site involved non-nuclear components. In 1955, CE began to use highly enriched uranium for its work in supporting the Naval Reactors Program. In the 1960s, CE obtained a license to fabricate fuel elements for power reactors.

Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1994, no work under this program was ever performed on site.

DISCUSSION:

Radiological surveys conducted for DOE confirmed the presence of residual contamination and led to subsequent FUSRAP cleanup activities in 1986. A survey completed in 1993 identified elevated contamination levels. An Army Corps of Engineers Update report indicated that the site was still undergoing remediation as of June 30, 2008.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report (ORAU 89/E-93); Follow-up Confirmatory Radiological Survey of the Drum Storage Area Combustion Engineering Property Windsor Connecticut; May 1989.
- DOE Report (ORISE 94/D63); Designation Survey Combustion Engineering Site Windsor, Connecticut; April 1994.
- US ACE Update Report for Connecticut June 30, 2008

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1973 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Copperweld Steel
Warren, Ohio

TIME PERIOD: 1943-1946

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Copperweld Steel Company of Warren, Ohio, straightened and outgassed a large number of uranium rods for the Hanford and Oak Ridge reactors between May and August of 1943.

DISCUSSION:
Documentation reviewed includes process and material descriptions which, when coupled with the radiological characterization survey results gathered by ORNL in 1990, indicates that the presence of residual radioactive contamination post-operations is unlikely.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Letter; A. Williams to F. Iannizzara; Subject: Summary of Radiological Survey Results and Site Elimination Information; April 5, 1991.
- DOE/Oak Ridge National Laboratory Survey; R Foley and L. Floyd; Subject: Preliminary Site Survey at the Copperweld Steel Co. 4000 Mahoning Avenue, NW, Warren, Oh (CWO 001); ID# ORNL/RASA-90/2; December 1990.
- Trip Report Visit to Copperweld Steel September 17, 1943

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Crane Co.

Chicago, Illinois

TIME PERIOD: 1947-1949

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Crane Co. supplied the AEC with uranium and thorium in the 1940s (and perhaps in the 1950s) and likely used materials containing uranium in manufacturing valves for the AEC. At the completion of one project in 1949, 1,000 pounds of contaminated wastes, including 346 grams of uranium, were shipped from Crane to Oak Ridge. In 1949, Crane also shipped 265 kg of normal uranium to Hanford. In 1954, records indicate government interest in purchasing more uranium and thorium from Crane, but this work has not been verified.

DISCUSSION:

Documentation reviewed indicates that the facility was decontaminated at the end of operations to acceptable levels.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Final Health Physics Survey of the Corrosion Test Area of the Crane Company, dated Sept. 26, 1949, from A.L. Baietti to Dr. J.R. Martin.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Crucible Steel Co.
Syracuse, New York

TIME PERIOD: 1951; Residual Radiation 1952-October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1951, New York Operations office personnel performed a test forging and rolling of 10 thorium billets at Crucible Steel Co.

DISCUSSION:
Documentation reviewed during this evaluation is limited, but what has been available for review indicates that anticipated production of thorium slugs from billet stock may have extended past the 1951 date.

No new information or documentation has been found and what is available is void of any radiological characterization data.

With the absence of adequate information, the resulting determination is that this site does pose a potential for residual contamination outside the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1952 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Dorr Corp.

Stamford, Connecticut

ALSO KNOWN AS: Dorr-Oliver Corp.

TIME PERIOD: 1954; 1963; Residual Radiation 1955-1962; 1964-1969

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Dorr Corp. conducted waste-handling tests on low-level radioactive material (ammonium diuranate). This work was done as a subcontractor to National Lead of Ohio (Fernald). National Lead personnel monitored the tests and took air quality samples.

DISCUSSION:

The radiological status of the facility after operations conducted in 1954 and 1963 are not known, however available documentation indicates additional work was conducted in 1969. At the end of these 1969 activities a radiological survey identified uranium dust throughout the facility. It cannot be discerned whether this contamination was a result of the 1969 activities or existed from prior activities. A subsequent cleanup was performed in 1969. Follow-up surveys identified no further contamination.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US NRC Letter; R. Bellamy to J. Russo; Subject: NRC Safety Inspection and License File Review; May 15, 1996, and attached Inspection Report No. 040-07964/96-001 approved May 8, 1996.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1955 -1962, 1964 - 1969

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: DOW Chemical Company (Madison Site)
Madison, Illinois

ALSO KNOWN AS: Madison Site (Spectrulite)
Spectrulite Consortium, Inc.
Consolidated Aluminum

TIME PERIOD: 1957-1960, Residual Radiation 1961- 2007

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Dow facility in Madison, Illinois, supplied the AEC with materials (chemicals, induction heating equipment, and metal magnesium metal products) and services. Dow received a purchase order from Mallinckrodt in March 1960, for research and development on the extrusion of uranium metal and rod.

Dow sold this facility in 1969 to Consolidated Aluminum, which continued to operate the facility from 1969 through 1986. However, during the period of 1969-1986, the operations were of a purely commercial nature and did not involve AEC or Department of Energy contracts. Spectrulite subsequently purchased the plant from Consolidated Aluminum.

Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1992, no remediation work ever took place under the DOE FUSRAP program prior to that program being transferred to the Army Corps of Engineers in 1997.

DISCUSSION:

A radiological survey was performed in 1989 by ORNL for the DOE which identified residual contamination approximately thirty years after the period in which weapons-related production occurred, which subsequently led to FUSRAP activities.
The Department of Energy recently declared that the thorium alloy made at the facility was weapons-related. The thorium remediation was completed in November of 2007 as documented in the Pangea Group' s *Project Closure Report for the Spectrulite Consortium Inc. Madison, IL Facility* issued in February of 2008.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Report (ORNL/TM-11552); Preliminary Results of the Radiological Survey at the Former Dow Chemical Company Site, Madison, IL; Issued December 1990.
- Project Closure Report for the Spectrulite Consortium Inc. Madison, IL Facility issued in February of 2008

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1961 - 2007

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Dow Chemical Co.
Walnut Creek, California

ALSO KNOWN AS: Pittsburg, California

TIME PERIOD: 1947-1957

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Dow operation involved process studies and experimental investigations on different uranium ores and thorium-bearing ores, including pilot-scale solvent extraction of uranium from phosphoric acid.

DISCUSSION:
Documentation identifies the activities as research and investigative studies conducted under laboratory conditions and controls. A radiological survey in 1976 identified no fixed or removable contamination above background. A radiological survey performed in 1977 identified overall contamination levels no higher than natural background levels, with the exception of relatively low levels of fixed activity discovered in a fume hood, which was subsequently decontaminated and removed. The presence of this contamination posed little, if any, potential for personnel exposure and is not deemed to be significant.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Survey of Dow Chemical Company December 1977
- Survey of Dow Chemical Company October 1976
- FUSRAP Elimination Report for Dow Chemical Co

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: DuPont Deepwater Works
Deepwater, New Jersey

ALSO KNOWN AS: Chambers Chemical and Dye Works
E.I. Du Pont de Nemours and Co.
Dyeworks-Carneys Point
Deepwater Dyeworks

TIME PERIOD: 1942-1949; Residual Radiation 1950-1995; 1997-October 2009; DOE 1996 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In the 1940s, E.I. DuPont de Nemours & Company (DuPont) produced uranium products and conducted research on uranium hexafluoride. These activities were conducted first for the U.S. Office of Scientific Research and Development (OSRD), and later under contract to the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC). DuPont also developed processes to convert uranium dioxide to uranium hexafluoride, and produced uranium oxide and uranium metal which was used to fuel the CP-1 reactor at the University of Chicago. After completion of these activities, the AEC conducted limited decontamination and released the site to DuPont for reuse. DuPont currently operates a chemical plant at this site.

Although DuPont Deepwater Works was designated as part of the Department of Energy's Formerly Utilized Site Remediation Action Program (FUSRAP) in 1980, the only year in which actual remediation was performed under contract to the DOE was 1996. There was decontamination performed in 1997, but this did not involve the Department of Energy.

DISCUSSION:

Documentation reviewed clearly establishes the period of MED/AEC operations as beginning in 1942 and ending in or around 1949, at which time decontamination activities were performed and the buildings were released back to DuPont. Radiological surveys of the properties, performed for the DOE in 1977 and 1983 identified elevated concentrations of uranium in surface and subsurface soils, building rubble areas and structures. These findings of residual contamination led to the subsequent FUSRAP clean-up actions. The potential for residual radioactive contamination exists between cessation of operations in 1949 and initiation of FUSRAP actions, as well as, during operations. Information found on the US Army Corps of Engineers' FUSRAP website indicates that remediation was presently on-going as late as May of 2008.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Dupont Deepwater Works Fact Sheet May 2008

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1950 – 1995; 1997 to present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Dupont-Grasselli Research Laboratory
Cleveland, Ohio

ALSO KNOWN AS: Standard Oil of Ohio

TIME PERIOD: 1943-1945

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Grasselli Laboratory participated in the development of the slug canning and coating processes for the Hanford site.

DISCUSSION:
Documentation reviewed contains detailed descriptions of materials handled and processes being tested, both of which indicate a low potential for dispersion of contamination. No documentation of a radiological survey from the end of operations is known to exist. However, a radiological survey was performed in 1976 for the DOE which identified no radioactivity above background levels. This survey data and available process descriptions are adequate to determine that no significant residual contamination existed at the end of operations.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Elimination Report for the Former DuPont Grasselli Research Lab, Nov 14, 1985
- Visit to Grasselli Chemical Company, October 12, 1943

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Edgerton Germeshausen & Grier, Inc.
Boston, Massachusetts

TIME PERIOD: 1950-1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
EG&G was under contract to the AEC during the period from 1950-1953 for "research and development and manufacturing incident to the installation of scientific test instrumentation at AEC test sites; design, manufacture, test, maintenance of operations systems, weapons systems; and participation in weapons test evaluation." It is unclear from the documentation whether any radioactive materials were handled at the Boston location.

DISCUSSION:
It is evident that radioactive materials were handled at this site. The documentation reviewed does not confirm or substantiate that weapons-related radioactive materials were handled or involved at any time during 1950-1953.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memorandum on Precautions to be Observed in the Handling of M-26 GAPS, October 22, 1948

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Electro Circuits, Inc.
Pasadena, California

TIME PERIOD: 1952-1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Electro Circuits used uranium metal (approximately 300 lbs.) to conduct tests aimed at determining the usefulness of ultrasonics in the detection of pipe in ingots.

DISCUSSION:
The documentation reviewed indicates that this work was completed on December 8, 9 and 10 of 1952. The FUSRAP elimination report states that this material was not returned until 1956. Based on the material form (metal) and the process of non-destructive inspection, there is little potential for residual radioactivity after the operations were completed and the material was returned to the custody of the AEC.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Ultra Sonic Ingot Tests, November 26, 1952
- FUSRAP Elimination Report
- Ingot Samples for Electro Circuits Corp December 2, 1952

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: ERA Tool and Engineering Co.
Chicago, Illinois

ALSO KNOWN AS: Audio-Tex, Inc.

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
From February 1944 through June 1944, ERA Tool and Engineering Company contracted with the University of Chicago to supply services and supplies to the Met Lab, specifically to provide necessary personnel, facilities, and equipment required to produce special machining of parts for special equipment, tools, jigs, fixtures, etc. from materials furnished by the University. It is unclear from the records whether ERA handled radioactive materials as part of its work.

DISCUSSION:
It is reasonable to assume that, if in fact radioactive materials were handled, they would have been of a limited quantity presenting little potential for residual contamination. This assumption is further supported through a radiological survey performed in 1989, which identified no radioactivity above background levels. A contract between ERA tool and the University of Chicago was executed on February 20, 1944 and terminated on June 30, 1944. There is no definitive information of radioactive material being used or handled during this period.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Notice of Termination of Subcontract
- Radiological Survey at 4555 West Addison Street
- FUSRAP Elimination Report Former ERA Tool and Engineering Company

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Extruded Metals Co.
Grand Rapids, Michigan

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
A November 7, 1944 document indicates that Extruded Metals participated in work related to metal fabrication for the Manhattan Project.

DISCUSSION:
The document which includes the Extruded Metals Company describes the need for the availability of fabrication and physical studies for a variety of metal alloys including radioactive and non-radioactive metals. This site does not appear in the Formerly Utilized Sites Remedial Action Program's list of considered sites indicating that the likelihood of handling radioactive material at the facility is low. There was no other documentation identified indicating that the Extruded Metals Company processed or handled radioactive material.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo-Methods and Materials Section November 7, 1944

EVALUATION FINDINGS:
Documentation available indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Fenn Machinery Co.
Hartford, Connecticut

TIME PERIOD: 1950

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Fenn conducted swaging tests on uranium rods to determine if the process could be used to produce properly shaped rods for Hanford's production reactors. Two tests, each lasting less than one day, were conducted in June 1950.

DISCUSSION:
Documents reviewed indicate that these tests were of limited duration and involved limited material. In addition, documentation was reviewed showing that air monitoring was performed during the test. These together indicate that there is little likelihood of contamination after the tests.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Swaging of Uranium Rods April 12, 1950
- Initial Swaging Test at Fenn Machinery on June 1, 1950
- Second Swaging Test at Fenn Machinery on June 5, 1950

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Fenwal, Inc.
Ashland, Massachusetts

ALSO KNOWN AS: Kidde-Fenwal

TIME PERIOD: 1967-1968

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1967 and 1968, National Lead of Ohio (Fernald) asked Fenwal to conduct tests aimed at determining the capabilities of Fenwal's fire extinguishing equipment for suppressing fires originating in uranium contaminated magnesium. The tests were conducted at Fenwal facilities and involved small amounts of uranium. Some Fenwal employees later traveled to Fernald to service fire suppression equipment.

DISCUSSION:
Documentation exists indicating that airborne radioactivity and surface contamination surveys were performed during the operation and resulted in very low radiological hazards. In addition, decontamination was performed and all material was returned to the NLO (Fernald) site.

This was a small-scale operation performed with a well-defined small amount of radioactive material.

The operation was well-defined and posed minimal radiological risks during the operation. Documentation exists indicating that monitoring and decontamination was performed.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiation Protection Services February 15, 1968
- Trip Report to Fenwal Inc February 9, 1968
- Trip Report to Fenwal Inc November 15 and 16, 1967
- NLO Memo July 3, 1967

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Foote Mineral Co.
East Whiteland Twp., Pennsylvania

ALSO KNOWN AS: Exton Cyrus Foote Mineral Co.
Formil
Shieldalloy Metallurgical
Cyprus Foote Mineral Company

TIME PERIOD: 1942-1948; Residual Radiation 1949-October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Foote Mineral had a pilot plant at its East Whiteland Township location which processed monazite sands. Monazite sands are known to have a very high thorium content. Because the AEC needed fairly large quantities of thorium, they were very interested in different methods of extracting it from monazite sands.

Other work performed by Foote Mineral on behalf of the Atomic Energy Commission, including their work with zirconium, is not covered under EEOICPA.

Foote Mineral Company was also a major importer of beryl ore from Brazil. Under contract to the Atomic Energy Commission, Foote Mineral Company procured 500 tons of beryl ore in 1947.

DISCUSSION:

In 2003 the USEPA initial cleanup approach was retracted due to the discovery of low level radioactive contamination in some onsite soils, which was investigated and confirmed as a result of the prior residual contamination determination. As of June 2008 remediation had not been completed.

INFORMATIONAL SOURCES:

The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- USEPA Current Site Information Sheet on the Foote Mineral Company updated June 2008.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1949 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Gardinier, Inc.
Tampa, Florida

ALSO KNOWN AS: U.S. Phosphoric Plant Uranium Recovery Unit
Cargill Fertilizer, Inc.

TIME PERIOD: 1951-1954; 1956-1961; Residual Radiation 1955; 1962-October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under contract to the AEC, Gardinier (under the name U.S. Phosphoric Products) operated a pilot plant from 1951 to 1954 which recovered uranium from phosphoric acid. From 1956 to 1961, it produced uranium by recovery of U_3O_8 from phosphoric acid. Maximum production was 60 tons of uranium concentrate per year. The uranium was ultimately used in weapons production.

DISCUSSION:
Following a site visit in April 1977, ORNL personnel performed a complete radiological survey of the site from December 14-19, 1977. The final report stated that the contamination at this site has been identified as uranium and radium in concentrations exceeding NRC guidelines for the release of property for unrestricted use at some points inside the process building and in the outdoor area near the process building and pilot operations building. Radioactive material other than that used for weapons production was processed during or after the time of DOE contracts and exposure to workers in that facility cannot be clearly attributed to either DOE or non-DOE sources.

Documentation reviewed confirms the presence of residual contamination outside of the period in which weapons-related production occurred, which is indistinguishable from non-related residual contamination. The facility, affected areas and conditions appear to still remain. USDOE documentation indicates that the state of Florida was notified of the conditions, actions taken are unknown.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Survey (DOE/EV-0005/21); Radiological Survey of the Former Uranium Recovery Pilot and Process Sites; Gardinier, Incorporated; Tampa, Florida; March 1981 FL.05-2
- DOE Letter; Wagoner to Freedman; No Authority Determination; November 8, 1994 FL.05-8.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1955, 1962-present

FACILITY NAME: General Atomics
La Jolla, California

ALSO KNOWN AS: GA
Division of General Dynamics
John Jay Hopkins Laboratory for Pure and Applied Science

TIME PERIOD: 1960-1969;
Residual Radiation 1970 – 1995, 2000;
DOE 1996-1999 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

General Atomics was one of a number of private contractors that processed unirradiated scrap for the AEC in the 1960s. In addition, the Hot Cell Facility was used for numerous post-irradiation examinations of Department fuels, structural materials, reactor dosimetry materials, and instrumentation. The Department-sponsored activities at the General Atomics Hot Cell Facility primarily supported the High Temperature Gas Cooled Reactor and the Reduced-Enrichment Research Test Reactor programs. In December 1994, General Atomics notified the NRC and the State of California Department of Health Services of its intent to cease operations in the Hot Cell Facility.

General Atomics was also the operating contractor for the AEC's Experimental Beryllium Oxide Reactor (EBOR) at Idaho National Engineering Laboratory. General Atomics manufactured EBOR fuel elements (UO_2-BeO) on site and examined them in the site's hot cell.

DISCUSSION:

A final closeout survey of the facility was conducted by ORNL in March of 2000, and the site was released for unrestricted use.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website.
- Verification Survey of the Hot Cell Facility Site General Atomics, June 2000

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1970 – 1995; 2000

FACILITY NAME: General Electric Plant (Indiana)
Shelbyville, Indiana

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1956, this facility handled thorium metal under subcontract to National Lead of Ohio (Fernald). The work, which involved 500 pounds of thorium, was a test of compacting and shaping techniques using General Electric's equipment.

DISCUSSION:
Documentation exists which shows that the facility was effectively decontaminated immediately after the DOE work was completed.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to General Electric Plant at Shelbyville IN on June 25 and 26, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: General Electric Vallecitos
Pleasanton, California

TIME PERIOD: 1958-1978; 1981-1982; Res. Rad. 1979-1980; 1983-1997; DOE 1998-present (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In 1958, General Electric Vallecitos constructed four hot cells for post irradiation examination of uranium fuel and irradiated reactor components. The U.S. Government's involvement (through the AEC and later, the DOE) was limited to a single hot cell, Hot Cell No. 4. Between 1965 and 1967, Hot Cell No. 4 was decontaminated, equipped with a stainless steel liner to contain plutonium, and dedicated to the study of mixed oxide fuel rods in support of the AEC's fast breeder reactor development programs. In 1978, Hot Cell No. 4 was placed on standby; it was used by Lawrence Livermore National Laboratory for six months in 1981 and 1982.

DISCUSSION:

According to the Department of Energy Office of Environmental Management website, the General Electric Vallecitos Nuclear Center is scheduled to be completed in 2008. There were no documents available stating that the remediation was complete.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE EM General Electric Vallecitos Nuclear Center

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1979 –1980, 1983-1997

FACILITY NAME: General Electric X-Ray Division
Milwaukee, Wisconsin
TIME PERIOD: 1956-1966; Residual Radiation 1967-October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
General Electric's X-Ray Division performed research and development work which supported its activities as contractor for the Pinellas Site in Florida. This work included the operation of a small pilot plant in Milwaukee. Sandia National Laboratory managed the GE X-ray division contract as part of the nuclear weapons program. The work in Milwaukee continued until 1966 when these activities were transferred to Pinellas and the staff relocated accordingly.

DISCUSSION:
Because there is no information available describing the activities at this facility, or whether or not it was decontaminated, the assumption is made that contamination still exists at the site.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1967 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: General Steel Industries

Granite City, Illinois

ALSO KNOWN AS: Old Betatron Building
General Steel Castings

TIME PERIOD: 1953-1966;
Residual Radiation 1967-1992;
DOE 1993 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1953 through 1966, General Steel Castings/Industries performed quality control work for the AEC. Specifically, it x-rayed uranium ingots and betatron slices to detect metallurgical flaws for Mallinckrodt Chemical Company. This work was performed in a facility located at 1417 State Street, which was part of what was later known as the "South Plant" of Granite City Steel. This listing is intended to cover only the South Plant, identified by the State Street address, and not any other facility that may have been owned by Granite City Steel prior to or after its purchase of the General Steel Industries facility in the early 1970s. For example, this listing does not cover Granite City Steel facilities on Madison or 20th Street.

DISCUSSION:

No documentation reviewed indicated that the facility was adequately decontaminated after DOE work was discontinued in 1966. Survey results showed small amounts of residual radioactivity in excess of federal guidelines remained in several areas of the x-ray building. The residual radioactive material at the site was likely the result of operations, such as the rubbing off of oxidized uranium during handling. DOE cleanup of the site was completed in June 1993.

INFORMATIONAL SOURCES:

The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Certification Docket for the Remedial Action Performed at the Granite City Site, June 1993

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1967 - 1992

FACILITY NAME: Great Lakes Carbon Corp.
Chicago, Illinois

TIME PERIOD: 1952-1958

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1952, the Great Lakes Carbon Corp. studied graphite for the Atomic Energy Commission and in 1958 it did some Transient Reactor Test Facility (TREAT) fuel work for Argonne National Laboratory (ANL). As part of the contract, ANL agreed to decontaminate the facility used. It handled radioactive uranium and radioactive thorium under AEC contract.

DISCUSSION:
Documentation exists which shows that the facility was effectively decontaminated immediately after the DOE work was completed (September 12, 1958).

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Report on Decontamination of Great Lakes Carbon Corporation following Completion of Treat Fuel Fabrication

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Gruen Watch
Norwood, Ohio

ALSO KNOWN AS: Gruen Watch Co., Time Hall

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Gruen Watch Co. conducted cold shaving and stamping and hot stamping washer tests for National Lead Company of Ohio (Fernald) in May and June 1956. The tests involved shaving and stamping uranium washers on a 60-ton mechanical press and stamping washers from strips of uranium heated in a salt bath. Only small quantities of radioactive materials were handled.

DISCUSSION:
A radiological survey was performed during this activity which was reported as lasting 26 minutes on June 14, 1956.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiological Survey During Washer Stamping

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME GSA 39th Street Warehouse
Chicago, Illinois

ALSO KNOWN AS: Resco Air Conditioning and Heating Co.

TIME PERIOD: 1942-1949

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The 39th Street Warehouse was occupied by the Metallurgical Laboratory and Argonne National Laboratory until approximately 1949. Activities in the building included the storage of radioactive materials.

DISCUSSION:
A radiological survey of this property, including soil surface, sheds, and loading platforms in the rear yard, was completed on July 7, 1949. After decontamination, the building and grounds were determined to be below acceptable levels. ANL re-surveyed the site from July 11-14, 1977, and found no radioactivity above natural background.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Radiological Survey of the Former GSA 39th Street Warehouse January 1979
- Final Survey of the 39th Street Warehouse July 19, 1949

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Harshaw Chemical Co.
Cleveland, Ohio

ALSO KNOWN AS: Harshaw Filtrol Partners
Uranium Refinery

TIME PERIOD: 1942-1955
Residual Radiation 1956-October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Harshaw Chemical Co. of Cleveland, Ohio refined black oxide and sodium diuranate to orange oxide and then to brown oxide for the Manhattan Project during World War II. The final result was a "green salt," which the Manhattan Project used to produce uranium hexafluoride for enrichment into weapons-grade fuel for nuclear weapons at the gaseous diffusion plants. Harshaw also produced uranium hexafluoride during the war. This production activity was expanded in 1947. Harshaw production was reduced in 1951, and by May of 1953 the green salt plant was dismantled and the hexafluoride plant was placed on standby. The contract for removal of AEC equipment continued until September 30, 1955.This designation is limited to the Harshaw facility located at 1000 Harvard Avenue, Cleveland and generally referred to as the Harvard-Denison plant..

DISCUSSION:

Available documentation indicates that Harshaw Chemical Co. provided significant quantities of uranium, in various chemical forms, to the MED/AEC during the period of 1942 through 1955. There is also documentation that radiological decontamination of the area and equipment was undertaken, potentially as late as 1960. However, subsequent radiological surveys performed in 1976 through 1979 for the DOE, and then again in 1984, identified widespread uranium contamination that could be attributed to MED/AEC activities. Widespread contamination was identified by Argonne in 1976-79, particularly in "Plant C," the building that was used for AEC/MED activities.

Documentation reviewed indicates that there is AWE related residual contamination outside of the period. This facility is currently undergoing a FUSRAP cleanup.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report (DOE/EV-0005/48 and ANL-OHS/HP-84-104); Formerly Utilized MED/AEC Sites Remedial Action Program, Radiological Survey of the Harshaw Chemical Company, Cleveland, Ohio; April 1984 OH.04-2
- USACE Harshaw Site, Missions status sheet.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1956 - present

FACILITY NAME: Heald Machine Co.
Worcester, Massachusetts

TIME PERIOD: May 16–20, 1960

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
National Lead of Ohio (Fernald) conducted tests on a drilling machine at the Heald facility. The tests involved drilling a few uranium slugs on the machine which Fernald intended to purchase.

DISCUSSION:
This activity took place from May 16 to May 20, 1960. Existing documentation shows that contamination surveys and decontamination were conducted immediately after the DOE work was completed.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to Heald Machine Company

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Heppenstall Co.
Pittsburgh, Pennsylvania

ALSO KNOWN AS: Tippins Inc.

TIME PERIOD: 1955; Residual Radiation 1956-1989

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under contract to the Mallinckrodt Chemical Co., the site was used to heat, press and water quench uranium "dingots". Approximately 100,000 pounds of normal uranium metal was shaped at Heppenstall over about a 6-month period. Records indicate that the forging was done on a 1000 ton press on a schedule of two days per month by a Heppenstall crew of eight men.

DISCUSSION:
Although the work dates are well-documented in the existing documentation, there is no documentation indicating that the facility was adequately decontaminated after DOE work was discontinued. There are indications that HASL may have performed radiological surveys during the operations. Documentation related to the radiological conditions at the end of operations has not been located.

A subsequent radiological survey was performed and documented in 1989, for the DOE, identifying no residual contamination.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Worker Advocacy Website
- Oak Ridge National Laboratory Report (ORNL/RASA-89/19); "Results of the Radiological Survey at the Former Heppenstall Company site, 4620 Hatfield Street, Pittsburgh, Pennsylvania"; Issued January 1991.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1956 -1989

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Herring-Hall-Marvin Safe Co.
Hamilton, Ohio

ALSO KNOWN AS: Diebold Safe Co.

TIME PERIOD: 1943-1951
Residual Radiation 1952-1993;
DOE (remediation) 1994-1995

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Intermittently from 1943 to 1951, the Herring-Hall-Marvin Safe Co. machined natural uranium metal slugs from rolled stock under subcontract to DuPont and the University of Chicago.

DISCUSSION:
There is no documentation which indicates that the facility was adequately decontaminated after work was discontinued. However, there is documentation showing radiological surveys were conducted in 1988 and 1989. Both surveys indicated that there was a small amount of uranium contamination found. This small amount was decontaminated when found. In 1993, public attention was drawn to this facility by former workers who stated that the earlier surveys did not include the portion of the third floor where actual machining work was conducted. Surveys were conducted and radioactive residues were found to be in excess of DOE guidelines on over 25 percent of the third floor. Restricted access to the third floor was recommended to the current owner at this time. Decontamination of the surface contamination on the third floor was completed February 1995.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Results of the Radiological Verification Survey at the Former Herring Hall Marvin Safe Company, November 1995

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1952 - 1993

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Hooker Electrochemical
Niagara Falls, New York

ALSO KNOWN AS: Hooker Chemical Co.
Occidental Chemical Corp.
Occidental Chemical Corp., Specialty Chemical

TIME PERIOD: 1943-1948; Residual Radiation 1949-1976

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In January 1943, Hooker began work for the Manhattan Engineer District to manufacture fluoridated and chlorinated organic chemicals. The by-product of this work was hydrochloric acid that was subsequently used in the chemical processing of a uranium-bearing slag as a precursor of uranium recovery. This work was continued until shortly after World War II. Activities related to this contract ended June 1948. Hooker Electrochemical's relationship with the AEC resumes between 1953 and 1958 as the Management and Operating Contractor for the Lake Ontario Ordnance Works, listed separately in this database.

DISCUSSION:
There is no documentation identifying the radiological conditions at the cessation of operations or information that can be used to determine if the facility was adequately decontaminated after DOE work was discontinued.

There is documentation of radiological surveys during the period of October 11- 15, 1976. This survey concludes that residual radioactivity levels were within current Federal and State guidelines for unrestricted use.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Report, Formerly Utilized MED/AEC Sites Remedial Action Program Radiological Survey of the Hooker Chemical Company Niagara Falls, New York, January 1977
- Report, FUSRAP Elimination Report for Occidental Chemical Corporation (Former Hooker Electrochemical Company) Niagara Falls, New York September 30, 1985

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1949 -1976

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Horizons, Inc.
Cleveland, Ohio

ALSO KNOWN AS: Celcon Metals Co
Lamotite, Inc.

TIME PERIOD: 1952-1956
Residual Radiation 1957- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Starting in 1952, Horizons, Inc. was under contract with the AEC for the production of granular thorium metal and conducted some thorium research work for Savannah River. Earlier work performed by Horizons, Inc. for the AEC did not involve radioactive substances.

DISCUSSION:
Documentation reviewed indicates residual contamination from AWE work still exists at this facility. DOE identified contamination in a 1977 survey but determined that they had no authority to remediate this facility under FUSRAP.

Documentation also demonstrates that USDOE informed USEPA of the conditions. Facility status and/or remediation activities conducted at this point are unknown.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Final Report (DOE/EV-0005/10); Formerly Utilized MED/AEC Sites Remedial Action Program Radiological Survey of the Former Horizons, Inc., Metal Handling Facility, Cleveland, Ohio; February, 1979 OH.05-3

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION:
1957 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Hunter Douglas Aluminum Corp.
Riverside, California

ALSO KNOWN AS: Bridgeport Brass Co.

TIME PERIOD: 1959-1963

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1959, Hunter Douglas Aluminum extruded approximately 1600 pounds of solid uranium stock for National Lead Company of Ohio (Fernald). In a subsequent subcontract, the company fabricated uranium-zirconium billets for the GE Evendale Plant.

DISCUSSION:
The facility did not have the potential for significant exposure during operations due to the small amount of uranium (1,600 lbs) used. Also, it is noted in the NLO (Fernald) contract that Hunter Douglas was responsible for the decontamination and cleanup of facilities and equipment.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- National Lead of Ohio Contract with Hunter Douglas

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: International Minerals and Chemical Corp.
Mulberry, Florida

ALSO KNOWN AS: Pilot Facility
Uranium Recovery Unit at the Bonnie Plant
Phosphate Chemicals Division, Bonnie Uranium Plant
C.F. Industries, Inc.

TIME PERIOD: 1951-1961; Residual Radiation 1962- October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

International Minerals and Chemical Corp. produced uranium as a byproduct of the recovery of phosphate chemicals and fertilizers. In 1951, AEC contracted with International Minerals and Chemical Corp. for the recovery of uranium, which was ultimately used for the production of weapons. The original production plant was shut down in 1959. During the years of operation, 100 tons of U_3O_8 were produced, with a peak production of 2-3 tons per month. Starting in 1954, the uranium recovery unit was located at the Bonnie Plant. In 1955, it switched to the phosphoric acid process. International Minerals and Chemical Corp. became Central Farmers (now C.F.) Industries. In 1969, C.F. Industries became C.F. Chemicals, Bartow Phosphate Works. The phosphoric process was shut down in 1961.

DISCUSSION:

A 1977 survey by ORNL identified radium in the soil up to 28 pCi/gram. This was not considered unusual at a phosphate plant, as these levels are apparently within expected ranges at commercial phosphate recovery facilities. While the origination of the existing soil contamination cannot be determined, it does not appear to be significant. At the time of this survey the facility where operations were conducted had already been demolished and the radiological conditions prior to demolition could not be assessed.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Survey of International Minerals and Chemical Corporation Mulberry, Florida; March 1980 FL.02-1.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1962 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: International Nickel Co., Bayonne Laboratories
Bayonne, New Jersey

TIME PERIOD: 1951-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
International Nickel plated uranium slugs with nickel for use in the nuclear weapons production system during the early 1950s.

DISCUSSION:
It appears this was test work that was conducted, and not production levels. There was no specific information regarding exactly how many uranium slugs were processed. However, available documentation suggests that this facility was not one of the four facilities chosen to plate larger numbers of cylinders for the Hanford site. The DOE determined that further review of the site was not warranted due to the limited scope of activities performed. Because of the limited amount of material processed, there is little likelihood of residual contamination outside the stated dates.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Nickel Plating of Uranium Cylinders
- Nickel Plating of Uranium Slugs
- DOE Memo No Further Evaluation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: International Rare Metals Refinery, Inc.
Mount Kisco, New York

ALSO KNOWN AS: Canadian Radium and Uranium Corp.
Pregals Mt. Kisco Refinery
Pregal

TIME PERIOD: 1942-1949; Residual Radiation 1950-1966

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The International Rare Metals Company processed pitchblende ores for the African Metals Corporation to extract radium. The same ores were processed for the Manhattan Engineer District to recover uranium. Other than the coordination of the shipments of ores and sludge, there was no MED involvement at this site. The company did apparently ship a 1 milligram and a 5 milligram source of radium to Chicago.

DISCUSSION:
Radiological surveys were reportedly conducted by the AEC at this facility during 1952 and 1956, identifying significant radiation levels, removable contamination and airborne radioactive material concentrations. These surveys were conducted in an effort to assist the state of New York evaluate the site conditions. The building was demolished in 1966, and contaminated debris and dirt were transported to another facility. Elevated radiation levels were identified in 1979 by a local reporter. These areas were localized and contained within a locked chain-link fence. The site was reportedly remediated sometime prior to 1996 with state of New York involvement. There was no survey data available regarding close-out or the present status of the facility.

Documentation available for review does not clearly substantiate that this facility was involved with AWE related activities other than being a private enterprise from which the MED purchased radium sources. A 1987 Department of Energy Memo states that the MED purchased a significant number of radium sources from the company in the early 1940s. However it does not appear they had any connection with the operation of the facility.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Westchester County Letter; Curran to EPA Radiation Branch (Feldman); forwarding copy of radiation survey, report of survey attached; April 30, 1979

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1950 - 1966

FACILITY NAME: International Register
Chicago, Illinois

ALSO KNOWN AS: Intermatic, Inc.

TIME PERIOD: 1943

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
International Register was involved in the development of uranium machining techniques for the Metallurgical Lab and the Manhattan Project. Records indicate that a test of centerless grinding equipment took place at International Register in February 1943. Uranium rods (1" in diameter and 6" long) were ground with the accuracy of about .001" for the Met Lab.

DISCUSSION:
There were no radiological surveys performed during or after the test that were available in the provided documentation. However, given limited nature of this work, the likelihood of significant facility contamination is remote.
There was a FUSRAP elimination recommendation made in 1987, indicating little likelihood of contamination, and no further action being necessary.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- Met Lab Memo: Centerless Grinding at International Register, July 28, 1943

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Ithaca Gun Company
Ithaca, New York

TIME PERIOD: 1961-1962

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
During 1961-1962, Ithaca Gun conducted tests involving the forging of hollow uranium billets into tubes for the metallurgical group at National Lead Company of Ohio (Fernald).

DISCUSSION:
Documentation exists which shows that the facility was effectively decontaminated (immediately) after the DOE work was completed. The document titled, "Authority Review for Ithaca Gun Co." reveals that the testing site was vacuumed down to background levels after the completion of the test. According to the purchase order with National Lead of Ohio, all equipment was decontaminated using rags and solvents. All material was returned to NLO (Fernald). A confirmatory survey was performed in 1995 and found no contamination or radiation in excess of current guidelines.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Purchase Order Rotary Forging at Ithaca Gun Company
- Trip Report Ithaca Gun Company July 4-7, 1961
- Trip Report Ithaca Gun Company May 21- June 8, 1962
- Radiological Survey of the Gun Forging Machine Building Ithaca Gun Company, October 1995

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: J.T. Baker Chemical Co.
Phillipsburg, New Jersey

ALSO KNOWN AS: Subsidiary of Vick Chemical Company

TIME PERIOD: 1948; 1957 - 1958

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
J. T. Baker Chemical Co. was licensed by AEC to process and distribute refined source material (uranium). The company had previously sought to purchase uranium compounds during World War II, but these were diverted for wartime use.

DISCUSSION:
A November 5, 1957 memo illustrates that the J.T. Baker Chemical Co was interested in purchasing 1 kg of uranium metal, there is no indication that the material was ever purchased. Based on the available documentation there is no known or described activity that would have resulted in residual contamination.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Memo: Source Material License November 5, 1957

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Jessop Steel Co.
Washington, Pennsylvania

TIME PERIOD: 1950-1954

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In the early and mid 1950s, the Jessop Steel Company was under contract to the AEC for metal fabrication with some work through DuPont. In the early 1950s, records indicate that uranium metal in nickel scrap was sent to Jessop to make stainless steel piping for Fernald. In 1954, tentative plans were made for Jessop to roll uranium for Fernald billet production.

DISCUSSION:
Documentation reviewed indicates that Jessop Steel was involved in the processing of nickel scrap that was contaminated with uranium, for the purpose of making piping for the Fernald facility. It appears that Jessop processed between 2 and 3 tons of uranium-contaminated nickel scrap during the month of December 1952. In addition, Jessop Steel sheared an unknown number of uranium plates for DuPont on March 2, 1954. Jessop was interested in rolling uranium metal for Fernald, but this memo ended with the statement that the rolling would be suspended and would proceed instead at the Fernald facility. There is no indication of any additional work at this facility.

Follow-up surveys performed in 1989 found no contamination in excess of guidelines for unrestricted use.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Oak Ridge National Laboratory Report (ORNL/RASA-89/20); "Results of the Radiological Survey at the Jessop Steel Company site, 500 Green Street, Washington, Pennsylvania (JSP001)", April 1991.
- Memo: Distribution of Uranium Plates Sheared at Jessop Steel Company March 2,1954
- Memo: Transfer of Nickel Scrap, December 2, 1952
- Trip Report-NLO-DuPont to Jessop Steel December 6, 1954

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Joslyn Manufacturing and Supply Co.
Ft. Wayne, Indiana

ALSO KNOWN AS: Joslyn Stainless Steel Co.

TIME PERIOD: 1944-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Joslyn rolled uranium rods from billets for use by the MED and the AEC in weapons production.

DISCUSSION:
The billets were received by rail. Work was conducted under MED/AEC constant supervision, and scraps and ash generated were retained by MED/AEC personnel for uranium accountability. Small furnaces were used to heat the material. Three mills and straightening, cutting, threading, and grinding equipment were used in the operation. An outdoor area was used to burn waste.

Documentation reviewed indicates that there was a comprehensive radiological survey performed at the end of AEC activities (1949), for the purpose of identifying contamination levels for a facility cleanup. While no post decontamination surveys are available for review, description of the removal of equipment and handling of accountable materials at the end of the operations, in conjunction with the conditions identified in subsequent DOE preliminary FUSRAP surveys (1976) indicates that residual contamination did not exist beyond the listed period.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Residual Contamination Survey at Joslyn Steel, August 22, 1949
- DOE Report (ORNL); Preliminary Survey of Joslyn Stainless Steel Company, Fort Wayne, Indiana; March 1980
- ERDA Memorandum; Thornton to Kennedy; Subject: ERDA Resurvey Program: Joslyn Stainless Steel Company, Fort Wayne, Indiana; March 10, 1977.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Kaiser Aluminum Corp.
Dalton, Illinois

TIME PERIOD: 1959

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In March 1959, Kaiser performed the extrusion of three CP-5 type fuel elements containing normal uranium oxide for Argonne National Laboratory. Documentation indicates that Kaiser was under consideration to participate in a program to develop alternate sources of uranium, but it is unclear whether that work ever took place.

DISCUSSION:
Documentation exists which shows that the facility was effectively decontaminated (immediately) after the DOE work was completed.

INFORMATIONAL SOURCES
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Extrusion of Billets, Kaiser Aluminum Corporation March 20, 1959

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Kellex/Pierpont
Jersey City, New Jersey

ALSO KNOWN AS: Vitro Corp. of America
Kellex Corp.

TIME PERIOD: 1943-1953; Residual Radiation 1954-1978, 1981-1983; DOE 1979- 1980 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In 1943, the M.W. Kellogg Company established the Kellex Corporation to design and construct the first gaseous diffusion uranium enrichment facility, the K-25 Plant, in Oak Ridge TN. This work was conducted under contract to the Manhattan Engineer District and later to the Atomic Energy Commission. In the 1940s and early 1950s, Kellex conducted research and development on fuel reprocessing and component testing using uranium hexafluoride, and uranium processing and recovery techniques. In 1951, the Vitro Corporation of America assumed all the rights and obligations of the Kellex Corporation. In 1953, Kellex discontinued all AEC contract work at the Kellex/Pierpont site.

Remediation activities under the Formerly Utilized Site Remediation Action Program (FUSRAP) occurred in 1979 and 1980 by Tobar Construction and Envirosphere Co. The cleanup was certified in 1983.

DISCUSSION:

Remediation activities under the Formerly Utilized Site Remediation Action Program (FUSRAP) occurred in 1979 and 1980 by Tobar Construction and Envirosphere Co. A survey completed in 1982 found that there were several areas in excess of unrestricted release criteria. Additional remedial actions were taken and the cleanup was certified complete in 1983.

INFORMATIONAL SOURCES:

The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- DOE Report (DOE/EV-0005/29 and ORNL-5734); Radiological Survey of the Former Kellex Research Facility, Jersey City, New Jersey; February 1982
- Certification Docket for the Former Kellex Corporation September 1983

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1954 -1978; 1981-1983

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Kerr-McGee
Guthrie, Oklahoma

TIME PERIOD: 1963-1973; Residual Radiation 1974- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Kerr-McGee processed uranium for the AEC as part of the nuclear weapons production process. The Recycled Uranium reports show material being shipped from Kerr-McGee to both Fernald and Savannah River.

DISCUSSION:
Available documentation describes this facility as having handled recycled uranium as part of the nuclear weapons production process. Current NRC decommissioning documentation indicates the facility has completed the majority of decontamination activities necessary for unrestricted release and license termination with the exception of groundwater remediation which indicates uranium and technetium-99 contamination.

Estimated completion for these activities is identified as January 2017.

INFORMATIONAL SOURCES:
The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- US NRC Site Status Summary

NRC Sites Undergoing Decommissioning - Complex Materials - License No. SNM-928, Docket No. 70-0925.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1974 - present

FACILITY NAME Koppers Co., Inc.
Verona, Pennsylvania

TIME PERIOD: 1956-1957; Residual Radiation 1958-1996

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:
In conjunction with the Kennecott Copper Co., Koppers conducted pilot plant tests for the production of uranium hexafluoride. In 1956, Koppers was licensed receive 2000 pounds of refined source material for use in studies toward the preparation of uranium dioxide for reactor fuel elements and 6,150 pounds of refined source material for use in research and pilot plant investigations on feed material processing. In October 1957, they were authorized to receive 110 pounds of normal uranium hexafluoride. Most of the research work appears to have taken place at the Koppers Research Department in Verona, PA.

DISCUSSION:

Documents reviewed suggest that the work which the Koppers Co., Inc. was licensed and could have been strictly a commercial venture. This work may not have been AWE related. There are indications this may have been an attempt to develop a commercial UF_6 production process. On that basis, they were not considered under FUSRAP.

Based on the described activities, amounts of material involved, and the absence of radiological survey data from the period when operations were ceased, there is a potential for significant residual contamination outside the covered period.

In 1996, the NRC performed a facility safety inspection and found that general area dose rates were within natural background levels and that uranium concentrations from excavations within the building were within environmental concentrations.

INFORMATIONAL SOURCES:

The sources of information reviewed included:

- DOE Office of Health, Safety and Security Website
- Proposal to Provide Feed Materials Plant October 30, 1956
- NRC Summary

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1958 - 1996

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: La Pointe Machine and Tool Co.
Hudson, Massachusetts

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
National Lead of Ohio (Fernald) conducted a single test involving the use of uranium metal on a broaching machine and an arbor press at the La Pointe Machine Tool Company facility.

DISCUSSION:
Documentation exists which shows that the facility was effectively decontaminated after DOE work was completed.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security
- Trip Report to LaPoint Machine and Tool on July 9, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Landis Machine Tool Co.
Waynesboro, Pennsylvania

ALSO KNOWN AS: Teledyne Landis Machine

TIME PERIOD: 1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1952, National Lead of Ohio (Fernald) personnel performed tests involving the machining of uranium slugs at Landis Machine Tool Company. The tests were performed over a two day period.

DISCUSSION:
Documents available for review illustrate that air sampling was performed over the two day operation of September 18 and 19, 1952. Due to the limited operations and the evidence that radiological conditions were being monitored during operations, the potential for residual contamination outside the period of weapons-related production is remote.

INFORMATIONAL SOURCES:
The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radioactive Air Dust Survey at Landis September 18 and 19, 1952

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Latty Avenue Properties
Hazelwood, Missouri

ALSO KNOWN AS: Contemporary Metals Corporation
Continental Mining and Milling
Commercial Discount Corporation
Futura Coatings, Inc.
Jarboe Realty and Investment Company
Hazelwood Interim Storage Site
HISS
Futura Coatings Site

TIME PERIOD: 1967-1974; Residual Radiation 1975-1983; 1987- October 2009; DOE 1984-1986 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Mallinckrodt Chemical Company conducted uranium milling and refining operations under contracts with the Manhattan Engineer District and the Atomic Energy Commission at the St. Louis Downtown Site in Missouri. Mallinckrodt transported process residues to the St. Louis Airport Site (also in Missouri) for storage until the Commercial Discount Corporation of Chicago purchased them in 1967; Commercial Discount transported the residues to the Latty Avenue Properties for storage and processing. This material was sold to the Cotter Corporation in 1969 and was dried and shipped to their facilities in Canon City, Colorado. By 1974, most of the material had been sold and removed from the Latty Avenue Properties, leaving only residual contamination.

The 1984-1986 work was performed under the Bechtel National Inc. (BNI) environmental remediation umbrella contract for the DOE.

DISCUSSION:

The 1984 Energy and Water Appropriations Act directed DOE to conduct a decontamination research and development project at four sites throughout the nation, including 9200 Latty Avenue and properties in the vicinity. Although contamination in Hazelwood did not result directly from atomic energy programs, Hazelwood properties were added to the DOE's FUSRAP by Congress to expedite decontamination. A review of the FUSRAP web page suggested that Latty Avenue Properties remedial action is ongoing at the present time.

INFORMATIONAL SOURCES:

The sources of information used in performing this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Website page for Hazelwood Interim Storage and Latty Avenue Properties

EVALUATION FINDINGS:
Documentation reviewed indicates that there is potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1975 – 1983; 1987 - present

FACILITY NAME: Linde Air Products
Buffalo, New York

ALSO KNOWN AS: Linde Air Products Div. Of Union Carbide
Linde
Linde Center
Chandler Plant
Chandler Street Plant
Linde Chandler Plant

TIME PERIOD: 1945-1947

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Linde Air Products facility, also known as the Chandler Plant, was involved in the development and production of barrier for the Oak Ridge Diffusion Plant. During World War II, Linde was part of the Carbide and Carbon Chemical Corporation, later known as Union Carbide.

DISCUSSION:
An AEC Realty & Lease holding report shows that the Linde Air facility in Buffalo, New York was acquired in September 1944 and terminated in November, 1947. The contracting period does not precisely correlate with the dates specified as the period in which weapons-related production occurred however documentation indicates that this facility did not handle radioactive materials and should not be mistaken for the Linde Ceramics Plant in Tonawanda, New York.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:
- DOE Office of Health, Safety and Security Website
- Elimination Recommendation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Linde Ceramics Plant
Tonawanda, New York

ALSO KNOWN AS: Tonawanda Laboratory
Linde Air
Paxair

TIME PERIOD: 1942-1953;
Residual Radiation 1954-1987, 1993-1995; 1997-October 2009; DOE 1988 – 1992; 1996 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Linde Air Company performed uranium and nickel processing for the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) at the Ceramics Plant in Tonawanda. African and Canadian ores were milled to black oxides at the plant. Documents indicate that the facility was placed on standby as of March 1, 1950. Linde's contractual agreements with the AEC continued through 1953 for various activities relating to closing out work at the Tonawanda location. Linde was a part of Carbide and Carbon Chemical Corporation (C&CCC), which then became Union Carbide.

In 1980, Linde Ceramics was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) and work under this program was performed during 1988-1992 and then again in 1996. The 1996 work was performed under the Bechtel National Inc. umbrella contract for DOE environmental site remediation.

Buildings 30,31,37 and 38 of the Linde Ceramics Plant meet the definition of a DOE facility for the years 1942 through 1953. This means that employees who worked in these buildings during these years are eligible under both Part B and E or the EEOICPA.

The Tonawanda Laboratory, which is also known as Building 14, meets the definition of an AWE for the years 1942-1953. Under the EEOICPA, employees of AWE facilities are not eligible under Part E of the EEOICPA.

DISCUSSION:

Radiological surveys performed in the 1980s, identified conditions which subsequently led to FUSRAP actions. It is not clear from the available documentation how significant the potential radiological hazards were to workers occupying these areas after 1950. However, the presence of this residual contamination and the need for FUSRAP activities indicates the need for further investigation to determine the potential for residual contamination after 1950. Documentation indicates that FUSRAP activities were initiated in 1990. The FUSRAP webpage for the Linde Site estimates project completion in 2009.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

- FUSRAP Webpage Linde Site

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1954 – 1987; 1993-1995; 1997-present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Lindsay Light and Chemical Co.
W. Chicago, Illinois

ALSO KNOWN AS: Kerr-McGee
Reed-Keppler Park

TIME PERIOD: 1942-1953; Residual Radiation 1954 – October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Lindsay Light and Chemical Co. was a commercial processor of monazite sands, which yield several commercially valuable products, including the radioactive metal thorium. The MED and then the AEC purchased thorium from Lindsay. AEC contractors purchased a variety of products from this firm as well. Documents indicate that the firm supplied thorium to the MED and AEC through at least 1953. The facility received a source material license from the AEC in 1956, and it continued to process radioactive materials for commercial purposes until 1973.

DISCUSSION:

Documentation reviewed confirms the presence of significant residual contamination outside of the period in which AWE operations occurred, this residual contamination is indistinguishable from non-AWE related wastes. Multiple areas/locations are undergoing remedial actions conducted under the USEPA Superfund cleanup process.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US EPA Superfund Webpage Kerr-McGee ILD980823991
- US EPA Superfund Webpage Kerr-McGee ILD980824015

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1954 - present

FACILITY NAME: Magnus Brass Co.
Cincinnati, Ohio

ALSO KNOWN AS: Magnus Metals
Moanes Brass

TIME PERIOD: 1954-1957; Residual Radiation 1958

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The site machined various forms of uranium metal under subcontract to the NLO (Fernald). The work was performed at two locations: Reading Road (from December 1954 through November 1955) and West 7th Street (from December 1955 through December 1957). Total production machining was approximately two or three hundred billets.

DISCUSSION:
Documentation demonstrates that the machining work first performed at the 533 Reading Road facility resulted in equipment and surrounding area which were "heavily contaminated". Operations were then moved to the West 7th Street location. Prior to this move a decontamination effort was reportedly performed but no radiological survey data is available documenting post-decontamination radioactivity levels. The Reading Road facility was reportedly occupied by a new owner and has since been demolished (date unknown).

Documentation reviewed describes multiple trips that were taken from the Fernald Site to Magnus Brass for the purpose of monitoring and decontaminating the equipment used. Decontamination was declared complete in a March 19, 1958 memo to J.A. Quigley from J. F. Wing.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Decontamination of Equipment and Facilities at Magnus Metals Division Cincinnati Ohio December 10, 1957
- DOE Memorandum; Wing to Quigley; Subject: Decontamination of Equipment and Facilities at Magnus Metals Division Cincinnati Ohio in connection with Subcontract S-129, March 19, 1958.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1958

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Massachusetts Institute of Technology
Cambridge, Massachusetts

TIME PERIOD: 1942-1946

FACILITY DESCRIPTION:
The Massachusetts Institute of Technology (MIT) began experimental work on producing uranium metal in the spring of 1942 using a process involving melting and casting. It is this uranium metallurgical work which took place on the MIT campus by MIT employees that supports its designation as an Atomic Weapons Employer (AWE).

MIT is also designated as a beryllium vendor. MIT's work with beryllium was known as the "Metallurgical Project" and started when it entered into a research and development contract with the Manhattan Engineer District (MED). The Metallurgical Project involved studying the characteristics of beryllium metal and attempting to make a satisfactory beryllium-uranium alloy. In addition, beryllium oxide crucibles were made for use by the MED.

After a number of its employees contracted beryllium disease, MIT consolidated the activities described above in an off-campus site known as the Hood Building, which is a separate covered facility under the EEOICPA. The transition to the Hood Building was complete by the fall of 1946.

DISCUSSION:
Documentation indicates uranium extraction research was performed by MIT in Cambridge, Massachusetts from 1942 through 1946. In 1946, MIT reportedly transferred the operations to the Watertown Arsenal (Bldg 421). Documentation is not clear as to what activities were conducted at the MIT Cambridge site from 1946 through 1954 when operations were moved to the Hood Building.

The Hood building was recently reclassified as a Department of Energy facility and is not considered in this report.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Mathieson Chemical Co.
Pasadena, Texas

ALSO KNOWN AS: Pasadena Chemical Corp.
Olin Mathieson Chemical Co.
Mobil Mining and Minerals Co.

TIME PERIOD: 1951-1953; Residual Radiation 1954 – October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Mathieson Chemical extracted uranium oxides out of phosphoric acid compounds in a pilot study for the Atomic Energy Commission.

DISCUSSION:
Documentation describes the activities as bench-top type experiments for extracting uranium oxides from phosphoric acid compounds, which would most likely have been conducted under laboratory controls. This site was used for a pilot plant operation for extracting uranium from phosphoric acid. It is estimated that no more than 50 pounds of yellow cake was produced during this test. An Olin Mathieson memo from April of 1979 states that all materials associated with the uranium extraction were removed after the project was completed.
The Texas Department of Health performed a survey in September of 1978 and found no contamination that could be attributed to the uranium extraction operation and that the radiation levels were not atypical of phosphate plants.
A radiological survey was performed for the DOE in 1977, with the only finding of residual contamination on inside surfaces of one sink and possibly the drain line. The survey report recommends that this sink be disposed of as radioactive material prior to the site being released for unrestricted use. There was no documentation that this was ever done.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Survey of Olin Mathieson Chemical Corp, March 1980
- Olin Mathieson Memo April 12, 1979
- Texas Department of Health March 30, 1979
- Elimination Report for Mobil Mining and Minerals Company

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1954 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Maywood Chemical Works
Maywood, New Jersey

ALSO KNOWN AS: Maywood Site
Maywood Interim Storage Site
MISS
Stepan Co.
MCW

TIME PERIOD: 1947-1950; Residual Radiation 1951- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
From 1916 to 1959, Maywood Chemical Works extracted radioactive thorium and rare earth elements from monazite sands for use in commercial products. From 1947 to 1950 the AEC purchased thorium compounds from the Maywood Chemical Company.
Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1983, no work was ever performed under this program prior to its transfer to the Army Corp.

DISCUSSION:
Documentation exists demonstrating the MED/AEC acquired thorium products from Maywood, starting in 1947, due to the "fertile" nature of the material. Documentation is unclear as to the exact quantity of material acquired. Documentation demonstrates that the radioactive material residues associated from these MED/AEC acquisitions constitutes only a portion of the overall residual contamination and potential radiological hazards. However, the inability to disregard these residues and/or distinguish them from non-MED/AEC residues necessitates the determination that a portion of the residual contamination requiring FUSRAP activities beginning in 1984, are attributable to former AWE activities.

Documentation reviewed indicates that significant residual contamination from AEC/DOE activities, exists outside the covered period. The facility and/or affected areas are presently undergoing remediation under agreements established between the USACOE and USEPA. The estimated date for closure as provided in US NRC Docket 40-8610 is 9/01/2010.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US ACE FUSRAP Maywood Project Site September 2007
- US ACE FUSRAP Maywood Project Site August 2008
- US NRC Docket 40-8610, Stepan Chemical Company

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1951 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: McKinney Tool and Manufacturing Co.
Cleveland, Ohio

ALSO KNOWN AS: Parker Rust Proof
Meister-matic Inc.
KC&F

TIME PERIOD: 1944; Residual Radiation 1945-1981

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Between May and August of 1944, McKinney Tool and Manufacturing Co. of Cleveland, Ohio, turned and ground unbonded slugs to provide fuel for the first nuclear reactors, including the three Chicago piles; the Oak Ridge X-10 reactor; and the Hanford B, D, and F production reactors and 305 test pile.

DISCUSSION:

Radiological survey data gathered for the DOE in 1981 and 1991 demonstrates that no residual contamination existed at that time however, there is no documentation identifying the radiological conditions at the end of the operations in 1944.

Based on the nature of the work, the absence of additional documentation, coupled with no radiological survey data until 1981, the presence of residual contamination cannot be ruled out up until the time of the survey.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Results of the Rad. Survey at the Former McKinney Tool and Mfg Co, November 1991
- Elimination Report for Former McKinney Tool Mfg. Co.; January 1994.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1945 -1981

FACILITY NAME: Medart Co.
St. Louis, Missouri

TIME PERIOD: 1951-1952; Residual Radiation 1953 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Medart Company manufactured steel mill machining equipment which was useful in uranium processing. In 1952, Medart conducted broaching machine and arbor tests turning uranium for the National Lead Company of Ohio (Fernald). According to a former Medart employee, the bar turning machine was eventually shipped to Fernald for use at the Feed Materials Production Center.

DISCUSSION:
Records indicate that operations were limited to three tests performed May and August of 1951 and November of 1952. Airborne radioactivity monitoring performed during the operations in November of 1952 indicates that significant airborne radioactive material concentrations were generated during operations. This data indicates a potential for the dispersion of contamination throughout the immediate area of the facility where operations were performed. No documentation has been found to demonstrate that decontamination efforts were initiated, or to describe post-operational radiological conditions.

Documentation reviewed indicates that there is potential for significant residual contamination outside of the period in which weapons-related production occurred. No additional information has been located, and there does not appear to have been any radiological survey of the facility located at 3535 Dekalb Street where the operations were reportedly conducted.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:
- DOE Office of Health, Safety and Security Website
- Record of Contact Medart Company December 4 1990

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1953 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

Facility Name: Metallurgical Laboratory
Chicago, IL

Also Known As: Eckhardt Hall (+ West Stands, New Chem. Lab and Annex, Ryerson Physical Lab, Kent Chem. Lab) , Met Lab

TIME PERIOD: 1942-1946; Res. Rad. 1947 - 1987; DOE 1982 – 1984, 1987

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The University of Chicago Metallurgical Laboratory was involved in early uranium metallurgical work in 1942-1943. The first self-sustaining nuclear chain reaction was achieved at the university in a "pile" called the Chicago Pile 1, built by Enrico Fermi and his Met Lab colleagues. The Met Lab is the direct predecessor of Argonne National Laboratory The University of Chicago continued to perform research and metallurgical work for Atomic Energy Commission until the early 1950s. The University of Chicago site includes seven buildings that were associated with Manhattan Engineer District/Atomic Energy Commission nuclear research and development between 1942 and 1952. These include the new Chemistry Laboratory and Annex, West Stands, Ryerson Physical Laboratory, Eckhart Hall, Kent Chemical Laboratory, Jones Chemical Laboratory, and Ricketts Laboratory. Under the direction of DOE, decontamination activities at the University of Chicago were conducted by Argonne National Laboratory in 1982 and 1983 and by Bechtel National, Inc. (BNI) in 1987. Cleanup of the sites where this work was performed was certified complete in 1989.

DISCUSSION:

Documentation reviewed shows that the remedial actions taken from December 1982 to October 1987 were successful in achieving unrestricted release criteria.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- Certification Docket for the Remedial Action Performed at the University of Chicago , Chicago, Illinois, From December 1982 to October 1987.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1947-1981

FACILITY NAME: Metals and Controls Corp.
Attleboro, Massachusetts

ALSO KNOWN AS: M&C Nuclear
Metals and Controls Nuclear Corp.
M & C
Texas Instruments

TIME PERIOD: 1952-1967; Residual Radiation 1968 - 1997

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Records indicate that the Metals and Controls Corp. fabricated fuel elements for production reactors, but it is unclear whether its work was related to the nuclear weapons complex. For example, Metals and Controls Corp. fabricated uranium foils for reactor experiments and fuel components, fabricated complete reactor cores for the Naval Reactors program, and fabricated uranium fuel elements for experimental and research reactors. Records indicate shipments of depleted uranium between Rocky Flats and M&C during the period from 1955-1958.

DISCUSSION:

Documentation reviewed indicates that there is potential for significant residual contamination outside of the period in which weapons-related production occurred.
A US NRC Document issued in on March 13, 1997 states that *"Based on the actions taken by the licensee, our review of the surveys performed, and the results of the NRC confirmatory survey, the staff concludes that decommissioning has been satisfactorily completed at the TI Attleboro, Massachusetts site and the site now meets the NRC criteria described in the Action Plan for release for unrestricted use"*.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security
- US NRC SECY-97-061, Removal of Texas Instruments, Inc. from Site Decommissioning Management Plan
- Memo: Metals and Controls to US DOE September 28, 1992

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1968 - 1997

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Middlesex Municipal Landfill
Middlesex, New Jersey

ALSO KNOWN AS: MML

TIME PERIOD: 1948-1960;
Residual Radiation 1961-1983; 1985
DOE 1984; 1986

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
From 1948 to 1960, the Middlesex Sampling Plant conducted thorium and uranium activities and disposed of the wastes at the Middlesex Municipal Landfill.
Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1980, the only years in which remediation work took place were 1984 and 1986. This work was performed under the Bechtel National Inc. umbrella site remediation contract and by local subcontractors.

DISCUSSION:
Documentation is available and adequate to determine that the site was used for disposal of contaminated soils in 1948. In 1960, discovery of the contamination was made through observance of abnormal background radiation readings during a civil defense drill. Documentation establishes that subsequent to interactions between local and federal authorities, 650 cubic yards of surface material was removed on May 18, 1961. Residual subsurface contamination still existed after this action, but awareness of this condition and the documented radiation levels is considered to pose no significant exposure scenario. The *Certification Docket for Remedial Action Performed at the Middlesex Municipal Landfill in Middlesex, New Jersey in 1984 and 1986* confirmed that the actions taken in 1986 were successful.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Certification Docket for Remedial Action Performed at the Middlesex Municipal Landfill in Middlesex, New Jersey in 1984 and 1986.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1961 – 1983; 1985

FACILITY NAME: Midwest Manufacturing Co.
Galesburg, Illinois

ALSO KNOWN AS: Maytag Co.

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
A November 7, 1944, document indicates that Midwest Manufacturing Co. worked on the "self lubricating draw die" which was related to metal fabrication for the Manhattan Project.

DISCUSSION:
It is not clear if radioactive material was involved. Nor is it clear what activities were involved in the process development operations.

Review of the available documentation related to this facility, indicates that there is little potential for residual contamination outside of the covered period.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security .
- Memorandum/Checklist; Wallo to the File; Subject; Midwest Manufacturing Co.; November 3, 1987.
- MED Memorandum; Methods and Materials Section to Stearns; Subject; Metallurgical Fabrication and Physical Studies; November 7, 1944.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Mitchell Steel Co.
Cincinnati, Ohio

TIME PERIOD: 1954

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1954, Mitchell Steel Company may have participated in the machining of a sample lot of four hollow extrusion uranium billets from ingots for National Lead of Ohio (Fernald). It is unclear whether Mitchell conducted the test or performed any addition work for NLO or the AEC.

DISCUSSION:
This facility reportedly performed a machining test on 4 uranium billets, and there is no documentation to demonstrate further work was performed. The 1954 National Lead Company of Ohio document "Request for a Subcontract to Produce Hollow Extrusion Billets on a Lump Sum Basis" which identifies Mitchell Steel Company and four other companies suggests that the Magnus Brass Manufacturing Company of Cincinnati was the contractor selected to continue this work.

Due to the limited amount of work performed at this facility, machining of four billets, the potential for significant residual radioactivity outside of the period of weapons related work is considered low.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Request for Subcontract to Produce Hollow Extrusion Billets Nov 22, 1954

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Mitts & Merrel Co.
Saginaw, Michigan

ALSO KNOWN AS: Genesse Packing Co.

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In a test for National Lead of Ohio (Fernald), Mitts and Merrel reduced a thorium metal chunk to small particle size pieces in its Hog Grinder.

DISCUSSION:
The available documentation describes a one day activity, 6/28/1956, in which thorium metal (+10 pounds) was ground into fine particles producing heavy visible dusting outside of the equipment. It is stated that the actual activity took 1 minute and 15 seconds. The document describes a successful decontamination completed that same day. The potential for significant residual contamination outside of this one day period of operation is remote.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Airborne Radioactivity Survey July 2, 1956
- Trip to Mitts and Merrel, June 28, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Monsanto Chemical Co.
Dayton, Ohio

ALSO KNOWN AS: Runnymeade Playhouse
Scioto Laboratory
Dayton Project
Old Schoolhouse
Units I, III and IV

TIME PERIOD: 1943-1949; Residual Radiation 1950

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In 1943, the Manhattan Engineer District began the Dayton Project to investigate the chemistry and metallurgy of polonium. Monsanto was chosen for the project because of its earlier work at its Scioto Research Laboratory (also in Dayton). Work for the MED was initially performed at Monsanto's facility on Nicholas Road in 1943 (Unit I). As the project expanded, it moved into a location on West First Street (Unit III) with all operations being transferred to Unit III by October 1944. By 1944 it was clear that even this space was inadequate, and so the former Runnymeade Playhouse was converted to a laboratory and referred to as Unit IV, to be operated in conjunction with Unit III. When space became too tight in the combined areas of Units III and IV, preparations were made to move the operations to the present day Mound facility in Miamisburg. Processing began at Mound in February 1949 and shortly thereafter Units III and IV were dismantled and decontaminated.

DISCUSSION:

The FUSRAP Combined Preliminary Assessment Site Inspection Report Unit 1, states that The Dayton Unit I site was used for project organization and personnel development. Polonium-210 research and development, or other materials processing was not conducted at Dayton Unit I.

The FUSRAP Combined Preliminary Assessment Site Inspection Report Warehouse states that the Warehouse operations were transferred to the Mound Laboratory in Miamisburg, Ohio in1948/1949. The Warehouse facility was then decontaminated and returned to the building's manager for rental to other clients.

The FUSRAP Preliminary Assessment Site Inspection Report Unit III stated that following decontamination efforts supported by the Atomic Energy Commission in 1948 through 1950, the site was released for unrestricted use.

The FUSRAP Preliminary Assessment Site Inspection Report Unit IV stated that in 1948, all federal activity at Runnymede Playhouse ceased and was subsequently decontaminated by AEC in 1950.

The FUSRAP Combined Preliminary Assessment Site Inspection Report Warehouse states that the Warehouse operations were transferred to the Mound Laboratory in Miamisburg, Ohio in1948/1949. The Warehouse facility was then decontaminated and returned to the building's manager for rental to other clients.

Based on these documents it appears that all residual contamination was removed by 1950.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Combined Preliminary Assessment Site Inspection Report Unit I; September 2004
- Preliminary Assessment Site Inspection Report Unit III; September 2000
- Preliminary Assessment Site Inspection Report Unit IV; September 2000
- Combined Preliminary Assessment Site Inspection Report Warehouse; September 2005

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1950

FACILITY NAME: Museum of Science and Industry
Chicago, Illinois

TIME PERIOD: 1946-1953

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Portions of the East Pavilion of the Museum of Science and Industry were used by employees of the Metallurgical Laboratory and the ANL. Although the facility was primarily used as office space, it is believed that radioactive materials were handled at this facility and that a spill of radioactive material may have taken place near the service elevator on the ground floor.

DISCUSSION:

While a description of specific activities performed and/or material handled is not available, it is clear that work was performed for the AEC by ANL at this facility from 1946 through 1953. Documentation demonstrates that decontamination activities and radiological surveys were performed by ANL in the East Pavilion of the facility in 1949. It should be noted that while no such documentation was available for review relative to the West Court, which ANL occupied through 1953, a radiological survey was performed for the DOE in 1977 resulting in no identifiable residual contamination above normal background readings.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Completed survey for contamination of the East Pavilion of the Museum of Science and Industry Building July 19, 1949
- Final survey of the East Pavilion of the Museum of Science and Industry Building July 19, 1949
- FUSRAP Radiological Survey of the Museum of Science and Industry, February 1979

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: National Guard Armory
Chicago, Illinois

ALSO KNOWN AS: Washington Park Armory

TIME PERIOD: 1942-1951;
Residual Radiation 1952-1986;
DOE 1987 (Remediation)

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In the 1940s, the Manhattan Project leased the National Guard Armory from the State of Illinois for uranium processing and radioactive material storage. In 1951, the site was returned to the State of Illinois.

Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1985, the only year in which remediation work took place was 1987.

DISCUSSION:
A radiological survey was performed for the DOE from September 1977 through October 1978, identifying widespread contamination in several areas of the facility and localized concentrations in others. The Certification Docket for Remedial Action Performed at the National Guard Armory confirmed that remedial actions completed in1987 were successful.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Radiological Survey of National Guard Armory September 19, 1977 – October 11, 1978
- Certification Docket for Remedial Action Performed at the National Guard Armory April 1987 – June 1987

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1952 - 1986

FACILITY NAME: National Research Corp.
Cambridge, Massachusetts

ALSO KNOWN AS: NRC

TIME PERIOD: 1944-1952; Residual Radiation 1953-1987

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
National Research Corp. had Manhattan Engineer District experience in working with vacuum centrifugal castings, in developing jets and baffles for diffusion pumps, and in developing cold trap systems. National Research's work with vacuum centrifugal castings (contract W-7405-eng-293) involved casting tube alloy (uranium metal) using the "lost wax" technique. In 1948, National Research did work for Mallinckrodt involving the vacuum melting of approximately 500 pounds of uranium.
A December 1946 letter indicates that National Research Corp. requested a "leak detector for use in connection with some special development work on beryllium." It is not clear whether this work was ever actually done.

DISCUSSION:
Documentation reviewed indicates a potential for significant residual contamination outside of the period in which weapons-related production occurred. The location and/or facility and associated equipment used for these activities is described as a “shack” adjacent to the 70 Memorial Drive laboratory. Records indicate that the shack was demolished and replaced with an apartment building sometime prior to 1987.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- The Aerospace Corporation memo, title: Elimination Recommendation Former National Research Corporation Site 70 Memorial Drive, Cambridge, Mass.; from Charles D. Young to Andrew Wallo III, dated 5 October 1987
- Telephone Contact 1987

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1953 – 1987

FACILITY NAME: New England Lime Co.
Canaan, Connecticut

ALSO KNOWN AS: NELCO

TIME PERIOD: 1963

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1963, the New England Lime Co. (NELCO) conducted tests on "prill," a magnesium-uranium waste product, to determine the feasibility of recovering these materials for re-use in the nuclear weapons production system. The prill came from the AEC's NLO (Fernald) facility. Six drums of prill were sent from NLO (Fernald) to NELCO for the test.
The New England Lime Co. also provided magnesium and calcium to the MED and AEC from 1944-1956. This work did not involve radioactive materials.

DISCUSSION:
The New England Lime Company was asked to determine the feasibility of extracting magnesium and uranium from contaminated prill. Documentation available for review describes the material handled as sludge containing 1.75% uranium. Documentation also indicates that the workforce involved received fundamental training with respect to radioactive material handling, controls and monitoring, which provides support for the determination that there is little potential for residual contamination after operations. A December 1963 memo states that this process would be cost-prohibitive. There is no indication that anything other than the initial test took place.
Due to the low levels of uranium in the sludge and the fact that this was done only on a test basis, the potential for significant residual radioactivity is very low.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo describing work performed; November 11, 1963
- Trip Report to New England Lime Company on June 11 and 12, 1963
- Memo; Recovery of Magnesium-Uranium Residues at NELCO December 11, 1963

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: New York University
New York, New York

TIME PERIOD: 1946-1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
New York University (NYU) worked on the development of counting equipment for the MED/AEC. NYU handled a small quantity of uranium for research purposes.

DISCUSSION:
Available documentation does not clearly establish that research and development work performed for the AEC involved the handling of radioactive materials. There is documentation describing a request for a small quantity of UO_3 made in 1952, but there is no evidence of receipt or disposition of this material.

Based on the information contained in available documentation, recognizing that laboratory controls would have likely been implemented to prevent cross-contamination of the detector instruments being developed and tested, and the limited amount of radioactive materials handled, there is little potential for residual contamination outside the covered period.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Request for Uranium Oxide for New York University, May 19, 1952

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Norton Co.
Worcester, Massachusetts

TIME PERIOD: 1945-1957; Residual Radiation 1958 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Norton manufactured refractory products from boron, beryllium, uranium, thorium, and magnesium oxide for the MED and the AEC.
As early as 1943, Norton was providing boron to the SAM laboratory. Documents show that Norton began working with beryllium for the MED in approximately September 1944 and that work with beryllium continued through 1956. Work with thorium and uranium continued through 1957 at Norton's Worcester location.
Norton continued to manufacture refractory products until at least 1965 for the AEC weapons complex, including Rocky Flats, Hanford and Y-12. However, after 1957 these contracts specified that the refractory products were to be made out of magnesium oxide. Since magnesium oxide is not radioactive, Norton's work with it does not qualify it as an Atomic Weapons Employer for these years.

DISCUSSION:
Norton also provided thorium and uranium products to the MED/AEC. The company produced uranium crucibles for Argonne and fused thoria slugs that were irradiated in Hanford reactors. Contracts indicate Norton continued to produce refractory materials for the AEC until 1961.

Documentation reviewed indicates work with radioactive materials, performed for the AEC may have ended sometime in the late 1950s. Norton received an AEC license in the mid 1950s.

A US NRC Document, SECY 97-067, states that remediation of the interior of the building had been completed, and the NRC surveys confirmed that the interior satisfies NRC criteria for release for unrestricted use. However, NRC evaluation of the company's remediation activities for the buried sewer pipe is ongoing.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:
- DOE Office of Health, Safety and Security Website
- US NRC SECY 97-067, March 26, 1997

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1958 - present

FACILITY NAME: Nuclear Materials and Equipment Corp. (NUMEC)
Apollo, Pennsylvania

ALSO KNOWN AS: Babcock & Wilcox
Atlantic Richfield Corp. (ARCO)

TIME PERIOD: 1957-1983; Residual Radiation 1984-1995

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Nuclear Materials and Equipment Corp. (NUMEC) began operations at the Apollo and Parks Township facilities in the late 1950s. The Atlantic Richfield Corp.(ARCO) purchased the stock of NUMEC in 1967. In 1971, Babcock & Wilcox (B&W) purchased NUMEC and is the current owner of the Apollo and Parks Township facilities.

NUMEC processed unirradiated uranium scrap for the AEC in the 1960s. This facility also provided enriched uranium to the naval reactors program and included a plutonium plant, plutonium plant storage area, high-enriched uranium fuel facility, metals and hafnium complex and a uranium hexafluoride storage area. The facility also fabricated plutonium-beryllium neutron sources.

The B&W Apollo facility ceased manufacturing nuclear fuel in 1983.

DISCUSSION:

Documentation reviewed indicates residual contamination existed outside of the period in which weapons-related production occurred. Facility remediation was completed in 1995, under NRC license termination with partial funding through the DOE.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US NRC Document SECY-97-015, *Removal of the Babcock & Wilcox Apollo Site from the Site Decommissioning Management Plan*.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1984 -1995

FACILITY NAME: Nuclear Materials and Equipment Corp. (NUMEC)
Parks Township, Pennsylvania

ALSO KNOWN AS: Babcock & Wilcox
Atlantic Richfield Corp. (ARCO)

TIME PERIOD: 1957-1980; Residual Radiation 1981-2004

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Nuclear Materials and Equipment Corp. (NUMEC) began operations at the Apollo and *Parks Township facilities in 1957. The Atlantic Richfield Corp.(ARCO) purchased the stock of NUMEC in 1967. In 1971, Babcock & Wilcox (B&W) purchased NUMEC and is the current owner of the Apollo and Parks Township facilities.*

The primary function of the NUMEC Parks Township facility was the fabrication of plutonium fuel, the preparation of high-enriched uranium fuel, and the production of zirconium/hafnium bars. The Parks Township facility ceased fuel fabrication activities in 1980.

DISCUSSION:

Documentation reviewed indicates that significant residual contamination existed outside of the covered period in which weapons-related production occurred, which is indistinguishable from non-related contamination. An August 2004 U.S. NRC document indicates that SNM-414 was terminated and the Parks Township facility was released for unrestricted use on August 24, 2004.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- U.S. NRC document, SECY-04-0163, *Weekly Information Report - Week Ending August 27, 2004*.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1981 - 2004

FACILITY NAME: Nuclear Metals, Inc.
West Concord, Massachusetts

ALSO KNOWN AS: NMI
Starmet, Inc.
MIT Met Lab
Whittaker Corp., Nuclear Metals Division

TIME PERIOD: 1958 -1990; Residual Radiation 1991 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Nuclear Metals, Inc. was incorporated in 1954. It's work evolved out of the MIT Metallurgical Laboratory. In 1958, the company moved from Cambridge (where the MIT lab had been) to Concord. The company's current name is Starmet.

In 1958, Nuclear Metals began operating as a facility that produced depleted uranium products, primarily as penetrators for armor-piercing ammunition. It also supplied copper-plated uranium billets that were used to fuel Savannah River's production reactors. Other work at this facility included the manufacture of metal powders for medical applications, photocopiers and other applications. Thorium and thorium oxide were also handled at the site under license to the NRC.

During the period from 1962-1986, Nuclear Metals was the sole source supplier for beryllium alloy end closure fuel element rings used in the "N" Reactor in Richland.

DISCUSSION:

During the period from 1962-1986, Nuclear Metals was the sole source supplier for beryllium alloy end closure fuel element rings used in the "N" Reactor in Richland. Records also indicate beryllium work for the AEC at various times during the 1940s and 1950s. Documentation reviewed indicates that significant residual contamination exists outside of the period in which work was performed with weapons-related material. This facility is on the USEPA National Priority Listing (NPL) and is undergoing cleanup.

INFORMATIONAL SOURCES:

Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US EPA Superfund Site Progress File Nuclear Metals Inc

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1991 - present

FACILITY NAME: Oliver Corp.
Battle Creek, Michigan

TIME PERIOD: 1956-1957; 1961-1962

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Oliver Corporation participated in green salt briquetting testing for the National Lead Company of Ohio (Fernald). Records indicate that testing took place in November 1956, July 1957, May 1961 and May 1962. It is unclear from the documentation whether the company ever performed this work at a production level. The Oliver Corporation AEC license history indicates that it was licensed to receive 350 pounds of normal uranium (40-6977 - 03/08/63) and 20,000 pounds of uranium enriched U-235 (70-646 – 03/26/62) (but comments that records indicate that it is not related to its work for NLO).

DISCUSSION:
Trip reports from this period report that post-work surveys found no detectably contamination above background. These reports detail steps taken to minimize contamination before operations; monitoring that was performed during the activity; and decontamination efforts performed after the activities. Because of these activities the potential for residual contamination is very low.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- Memo, D.E. Carr to J.A. Quigley, M.D., "Trip Report to Oliver Corporation, Battle Creek, Michigan, from October 31 to November 5, 1956," dated Dec 17, 1956.
- Memo, E.M. Chenault to J.A. Quigley, M.D., "Trip Report to Oliver Corporation, Battle Creek Michigan, on July 22-26, 1957," dated Aug 7, 1957.
- Memo, R. L. Bipes to J.A. Quigley, M.D., "Trip Report to the Oliver Corporation, Battle Creek, Michigan, on April 23-27 and May 3-5, 1962," dated May 21, 1962.
- Memo, R.H. Starkey and E.M. Chenault to H. A. Kraus, "Additional precautionary health and safety steps necessary at Oliver Corp.," dated Aug 14, 1961.
- Memo, R.H. Starkey and E.M. Chenault to J.A. Quigley, M.D., "Trip Report to the Oliver Corporation, Battle Creek, Michigan, on April 10-14, 1961," dated May 1, 1961.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Painesville Site (Diamond Magnesium Co.)
Painesville, Ohio

ALSO KNOWN AS: Uniroyal
Lonza Chemical

TIME PERIOD: No longer listed as a covered facility

DISCUSSION:
This facility was removed as a covered facility per Federal Register notice (Vol. 75 No. 148, 45608, Tuesday August 3, 2010).

FACILITY NAME: Penn Salt Co.
Philadelphia/Wyndmoor, Pennsylvania

TIME PERIOD: 1953-1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Penn Salt Co. experimented with samples of fluoride-containing by-products from AEC operations to determine if they could be used for hydrogen fluoride production or to extract uranium from the material. Penn Salt Co. was licensed to receive scrap from AEC operations.

DISCUSSION:
Penn Salt Co. was licensed at one time to receive 2,000 pounds of magnesium fluoride scrap containing 1 to 5 percent uranium. This material was to be used in the production of hydrogen fluoride. Although Penn Salt expressed interest in extracting uranium, documentation shows that this would have to be further considered. There is no indication that uranium extraction ever took place. The site was removed from FUSRAP in 1987 because of low probability for contamination.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- Memo: Sample Received from the Pennsylvania Salt Manufacturing Co June 8, 1953
- Source Material License C-3448 January 20, 1956
- Memo Fluoride-containing by-products from AEC operations, May 11, 1953
- FUSRAP Elimination Recommendation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Podbeliniac Corp.
Chicago, Illinois

ALSO KNOWN AS: Capitol Associates

TIME PERIOD: 1957

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1957, National Lead Company of Ohio (Fernald) used equipment at the Podbeliniac Corp. to conduct an extraction experiment using uranium in solution. NLO later traveled to the site to oversee the decontamination of equipment used in the experiment.

DISCUSSION:
Available documentation includes a National Lead of Ohio, trip summary describing the decontamination efforts and residual contamination levels after completion of a limited scale operation. Based on the available documentation, there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to Podbeliniac Corp on February 14, 1957

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Precision Extrusion Co.
Bensenville, Illinois

TIME PERIOD: 1949-1950; 1956-1959

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Precision Extrusion Co. was involved in several projects for the AEC and ANL. From 1949 to 1950, it extruded experimental fuel channel tubes from aluminum and aluminum-lithium alloys. During 1956 through 1959, Precision Extrusion performed several uranium extrusion projects on a small-scale basis.

DISCUSSION:
It was not clear in the documentation whether the site handled any radioactive material in the1949-1950 timeframe. All the work at that time appeared to be with aluminum and various alloys.

The work in 1956-1959 seemed to be experimental in basis and was not performed on a production scale. All testing operations were accompanied by ANL personnel, and decontamination and surveying of the machinery was conducted after each test.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo, H. Wm. Gaut to John R. Novak, "Extrusion of Uranium Oxide Aluminum Billets in Bensenville, Illinois," dated April 17, 1956.
- Memo, G. T. Lonergan and C. S. McKee to John R. Novak, "Extrusion of Billets, Precision Extrusion Company, May 24, 1958," dated Aug 12, 1958.
- Memo, C. S. McKee to J. R. Novak, "Survey at Precision Extrusion Company Following Extrusion of Billets," dated March 30, 1959.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Purdue University
Lafayette, Indiana

ALSO KNOWN AS: Chemistry Building, Locomotive Lab

TIME PERIOD: 1942-1946

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Purdue University was involved in Nuclear Physics research during the Manhattan Project.

DISCUSSION:
Documentation indicates Purdue University performed work related to "Hydrochlorination of T salts followed by a vapor phase chlorinization of the resulting residue to give satisfactory TCl_4 product with no appreciable loss of T material."

Other work included unspecified testing of what appears to be one pound of uranium metal sawdust, and process development in the manufacture of fluorocarbons.

Materials used appear to be small research quantities. A FUSRAP determination made in 1987 indicates little likelihood for radioactive contamination.

Documentation reviewed suggests that limited research quantities of material were used. There is also documentation of contamination and airborne radioactivity surveys that were performed during operations. Because of the small amount of material handles and the fact that radiological monitoring was being performed, little potential exists for radioactive contamination resulting from AEC/DOE research beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo Study of Precipitation of Hydrochlorination of T Salts March 15, 1945
- Memo Shipment of X Metal Sawdust, May 24, 1944
- Memo Shipment of XF5 to Purdue, May 20, 1944
- Memo Measurement of Dust Samples July 17, 1945
- Documentation of contamination of physics building, June 1944

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Quality Hardware and Machine Co.
Chicago, Illinois
ALSO KNOWN AS: Ravenswood Venture, Marden Manufacturing

TIME PERIOD: 1944-1945

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Quality Hardware and Machine Co. had a contract to support the University of Chicago. The company canned experimental unbonded uranium slugs for Hanford, and may have canned all of the slugs used in the Hanford production reactors during World War II.

DISCUSSION:
The documentation reviewed shows that the Quality Hardware and Machine Company completed work for the University of Chicago for the periods of February 1, 1944 through December 30, 1944 and February 28 1945 through June 30, 1945. There is a potential for removable contamination from the oxidization of the uranium slug prior to nitric acid cleaning. Once the slug was coated in aluminum, the potential for contamination is essentially eliminated.

Although the nature of the work performed would not likely result in significant residual contamination, there was no documentation to confirm this. The site was recommended for a designation survey by ORNL in 1987, and FUSRAP records indicate that a survey was completed in 1989. The results of the 1989 survey indicate that no contamination in excess of current levels was identified. It is believed that little potential exists for radioactive contamination resulting from AEC/DOE research beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included

- DOE Office of Health, Safety and Security Website
- Radiological Survey at 5823-5845 North Ravenswood Avenue, October 1989
- FUSRAP Elimination Report for Former Quality Hardware and Machine Co July 1990
- Memos Visits to Quality Hardware June and August 1944

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: R. Krasburg and Sons Manufacturing Co.
Chicago, Illinois

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1944, R. Krasberg entered into a subcontract with the University of Chicago for services and supplies for the Metallurgical Laboratory. The subcontract required Krasberg to provide necessary personnel, facilities and equipment to produce special machining of parts for special equipment, tools, jigs, fixtures, etc., from materials furnished by the University. It is unclear from the documentation whether Krasberg handled any radioactive materials as part of its work.

DISCUSSION:
The contract reviewed specified Krasberg to provide necessary personnel, facilities and equipment to produce special machining of parts for special equipment, tools, jigs, fixtures, etc. There is no indication that radioactive material was handled at this site.
A radiological survey of the facility conducted by Oak Ridge Associated Universities (ORAU) did not identify any radioactive contamination at the facility above the levels specified in 10 CFR 835. Exposure rates in the facility were well within the range typically considered background levels. The facility was removed from FUSRAP status in late 1989.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiological Survey at 2501 West Homer Street, October 1989
- FUSRAP Elimination Report for Former Krasburg and Sons Co, July 1990

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: R. W. Leblond Machine Tool Co.
Cincinnati Ohio

TIME PERIOD: 1961

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
National Lead Company of Ohio (Fernald) contracted with Leblond Machine for the purchase of a rapid boring machine. In 1961, acceptances tests, using 17 tons of natural uranium, were conducted at Leblond Machine.

DISCUSSION:
It is not clear on the exact quantity of uranium that was used during the first test; however, there are references to fourteen 7-inch x 21-inch billets being successfully drilled. For the second test, documentation exists to support 60,000 pounds of uranium metal being shipped to the R.W. Leblond Machine Tool Co. for the test.

At the conclusion of each test, there is documentation describing decontamination of equipment, and a return of all metal, machining chips, fines, turnings and decontamination equipment to the FMPC. The cutting oil used in the process was released to Leblond after analysis showed that the uranium contamination was 2.4 mg/liter.

There is little likelihood of significant residual contamination remaining at the facility at the conclusion of the September testing period.

Documentation indicates that there were only two tests conducted at the facility. Given the nature of the described decontamination effort, and controls that were put in place during the testing, there is little potential for significant contamination at the facility after the second test was complete.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to Leblond Machine Tool Company on January 16-20, 1961
- Trip Report to Leblond Machine Tool Company on August 21,23 and 25 and September 1, 8, and 11, 1961

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Radium Chemical Company, Inc
New York, New York
ALSO KNOWN AS: J. Kelly

TIME PERIOD: 1943-1950; Residual Radiation 1951-1994

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Beginning in 1943, the Radium Chemical Co. supplied most of the radium required for the Manhattan Engineer District. Combinations of material supplied and/or mixed by the Radium Chemical Company included radium bromide and radium bromide mixed with powdered beryllium. Brass was also used.

DISCUSSION:
The facility was in operation as late as the 1980s. In 1987, the New York State Attorney General issued a Stipulation and Order intended to result in the ultimate decontamination of the facility. Decontamination was initiated in 1988, by the State of New York.

Documentation reviewed indicates there is a potential for residual contamination outside of the covered period, which in part resulted from contracted work with the MED/AEC, and would be indistinguishable from non-AWE work residues. This facility was eliminated from FUSRAP, but added to the National Priority Listing under the USEPA.

In the late 1980s approximately 100 curies of radium needles were removed which were most likely not AWE related. The EPA then selected the final site remedy. This consisted of partial decontamination of the building, followed by its complete dismantling and disposal in appropriate facilities. Cleanup actions began in November 1990 and all work was completed in July 1994.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US EPA Radium Chemical Company

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1951 - 1994

FACILITY NAME: Rare Earths/W.R. Grace
Wayne, New Jersey

TIME PERIOD: 1950-1960; Residual Radiation 1961-1984; 1988-2001; DOE 1985 -1987

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Rare Earths extracted thorium from monazite sands from 1950-1960 under various contracts with the AEC. The AEC needed the thorium for its weapons program. Although the processing of monazite sands continued at Rare Earths through 1971, it was no longer performed under contract for the AEC, but rather was for commercial purposes.

Remediation activities were conducted from 1985-1987 by Thermo Analytical/Eberline and Bechtel National Inc. (BNI) under the BNI umbrella contract as part of the Formerly Utilized Site Remediation Action Program (FUSRAP).

DISCUSSION:

Radiological surveys were conducted at the property in 1981 and 1982, and the site entered the FUSRAP process. The site was added to the National Priorities List in 1985.

Based on the inability to distinguish AEC related contamination from that of commercial operations, results in a determination that AEC related residual contamination existed outside the period in which weapons-related production occurred. A January 2006 Fact Sheet on the US Army Corps of Engineers website indicates that removal of all contaminated materials was completed in December of 2001.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- US Army Corps of Engineers document FUSRAP Wayne Interim Storage Site, January 2006.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1961–1984; 1988-2001

FACILITY NAME: Reed Rolled Thread Co.
Worcester, Massachusetts

ALSO KNOWN AS: Reed Rolled Thread and Die

TIME PERIOD: 1955; Residual Radiation 1956- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1955, Reed Rolled Thread and Die was scheduled to thread roll a test lot of 1500 Savannah River plant slugs for National Lead Company of Ohio (Fernald).

DISCUSSION:
A memo from National Lead of Ohio to C.L. Karl states that 1500 slugs will be thread rolled on September 14 and 15, 1955. Another NLO memo states that 1711 slugs were successfully thread rolled on September 27 and 28 of 1955.

With the absence of any known radiological survey data from this or any other period, based on the assumption that the work did occur, there is a potential for the existence of significant residual contamination after completion of the operations.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo: Resume Activities July 1955
- Memo: Resume Activities September 1955

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1956 - present

FACILITY NAME: Revere Copper and Brass
Detroit, Michigan

TIME PERIOD: 1943-1954
Residual Radiation 1960-1984

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Between 1943 and 1946, Revere Copper and Brass extruded uranium rods in its Detroit plant. During the late 1940s and early 1950s Revere rolled or extruded uranium rods.

DISCUSSION:
Documentation also suggests that thorium metal (presumably Th-232) was formed, rolled extruded, and /or machined by Revere Copper and Brass sometime during the period above. There is no indication of the quantity of material that was processed.

Argonne National Laboratory personnel performed a preliminary survey of the facility in 1981, finding no significant residual contamination in readily accessible areas or equipment. It was recommended in that report that a more detailed and thorough survey be performed to assess overhead and other surface areas for accumulated airborne uranium aerosols/dust based on the nature of the prior work performed and the absence of ventilation systems for control. Information indicates that some of the equipment that was used during the AEC contract was still in use at the facility as late as 1981, but subsequently stolen when the facility was closed and demolished in 1984, prior to a detailed survey having been performed. DOE eliminated the facility from FUSRAP actions in 1990, based on the preliminary survey results (1981) and the absence of the facility due to demolition (1984).

Based on the nature of uranium extrusion work and associated activities with thorium, coupled with the lack of a detailed radiological survey, it is determined that this facility poses a potential for significant residual contamination outside the period in which weapons-related production occurred up to the time that the facility was demolished.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- ANL Preliminary Survey Report; Subject: Notes and Comments Revere Copper and Brass, Detroit, MI, circa 4/22/81
- DOE Report, FUSRAP Elimination Report for the Former Revere Copper and Brass Corporation, 5851 West Jefferson Street, Detroit Michigan, March 30, 1990.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1955 – 1984

FACILITY NAME: Roger Iron Co.
Joplin, Missouri

ALSO KNOWN AS: Roger Iron Works Company

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Roger Iron Company conducted a test operation involving crushing of a dolomite c-liner for the AEC. The liner had trace amounts of uranium and magnesium fluoride. The test involved four individuals, including two employees of National Lead of Ohio (Fernald). NLO also monitored the air during the time of the test.

DISCUSSION:
This was a single point test conducted at the vendor's facility. Air monitoring was performed during the crushing operation, both Breathing Zone and General Area samples were collected.

There is little information regarding the disposition of the material following the test. Given the results of the air monitoring, and the fact that this test was conducted over a short period of time, with material containing only trace quantities of radioactive material, it is doubtful that there was a significant spread of radioactive contamination.

A FUSRAP determination made in 1990, excluded the site from further consideration.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Radiological Survey of Air Dust August 7, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Sciaky Brothers, Inc.
Chicago, Illinois

TIME PERIOD: 1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1953, Argonne National Laboratory suggested that Sciaky Brothers be used to perform a stitch welding operation for a uranium cord, zirconium clad specimen EBR irradiation. The documentation does not indicate whether this work actually took place. The company may also have done electron beam melting or welding of uranium metal on an experimental basis.

DISCUSSION:
This appears to be a single operation involving only one specimen containing 12 to 13 grams of enriched uranium. Given that the uranium was clad when provided to Sciaky Brothers, and the operation apparently only occurred once, there is little potential for radioactive contamination at this facility.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo Stitch Welding of Uranium Cored Zirconium Clad Specimen for EBR Irradiation; May 14, 1953

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Seaway Industrial Park
Tonawanda, New York

ALSO KNOWN AS: Charles St. Plant

TIME PERIOD: 1974; Residual Radiation 1975 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1974, the Ashland Oil Company constructed bermed areas on the Ashland #1 property to hold two petroleum tanks. Some of the soil removed during construction was disposed of in three areas of the Seaway Industrial Park landfill. Subsequent investigations determined that the soil from the Ashland site contained radioactive contaminants exceeding Department of Energy (DOE) guidelines. This soil came from an area used for disposal of radioactive residues from the nearby Linde Air Products site. This company processed uranium for the Atomic Energy Commission and the Manhattan Engineer District, predecessor agencies of the Department of the Energy (DOE).
Although the Seaway Industrial Park was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1984, no work under this program was performed prior to its transfer to the Army Corps of Engineers.

DISCUSSION:
A radiological survey of the property was conducted in 1978 as part of the FUSRAP process. The survey indicated that the site was contaminated in an approximately 13-acre area of the landfill. External exposures ranged from 8-80 microrem per hour, and averaged 36 microrem per hour. DOE cleanup activities were apparently begun, under the FUSRAP program in 1984. There is no documentation identifying when or if that activity was completed.

Documentation reviewed indicates the presence of residual contamination outside of the period in which weapons-related production occurred. Remediation is ongoing under FUSRAP according to a fact sheet issued in August of 2008.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report (DOE/EV-0005/6); FUSRAP Radiological Survey of the Seaway Industrial Park Tonawanda New York; May 1978 (Final Report)
- US ACE FUSRAP Seaway Site Fact Sheet August 2008.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1975 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Seymour Specialty Wire
Seymour, Connecticut

ALSO KNOWN AS: Reactive Metals, Inc.
National Distillers and Chemical Co.
Bridgeport Brass Co.

TIME PERIOD: 1962-1964; Residual Radiation 1965-1991; DOE 1992-1993 (remediation)

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1962 to 1964, the Bridgeport Brass Company performed contract work at the Seymour site for the Atomic Energy Commission (AEC). This work involved developing an extrusion process for natural uranium metal. After 1964, the work was consolidated at the Reactive Metals site in Ohio. Operation of the Seymour site was later taken over by employees and the facility eventually became the Seymour Specialty Wire Company.

Although this site was designated as part of the Formerly Utilized Site Remediation Action Program (FUSRAP) in 1985, remediation only took place during 1992 and 1993. This work was performed under the Bechtel National Inc. umbrella contract or DOE site environmental remediation.

DISCUSSION:

A radiological survey was conducted at the facility in 1964. According to the records, removable contamination ranged from 20-90 dpm/100 cm^2 and fixed contamination ranged from <800 dpm-3200 dpm/60 cm^2. The facility was substantially renovated sometime prior to 1977, to house corporate printing operations and a warehouse. While residual contamination in 1964 met existing standards and a survey in 1977 didn't find a need for decontamination, subsequent surveys in 1985 and 1993 found areas that exceeded then-applicable standards. A December 1985 memo determining that this site should be remediated, also states that the remaining contamination is inaccessible, and therefore if not disturbed poses no threat to anyone.

In 1985, the site was designated under FUSRAP for remedial action because of contamination detected in floor drains, soil contamination and minor surface contamination. Cleanup of the site was completed in 1993 with the removal of approximately 38 cubic yards of waste.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Results of the Independent Radiological Survey at the Former Bridgeport Brass Company; March 1995
- Certification Docket for the Remedial Action Performed at the Seymour Specialty Wire Site in 1992-1993; December 1995

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1965 - 1991

FACILITY NAME: Shattuck Chemical
Denver, Colorado

ALSO KNOWN AS: Dawn Mining Corp
Denn Mining Corp

TIME PERIOD: 1950s; 1963; Residual Radiation 1960-1962; 1964-2006

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Shattuck Chemical prepared uranium compounds and uranium oxide in the late 1950s. (This was probably done under a Source Materials License issued by the Atomic Energy Commission.) Shattuck also processed refined uranium and produced natural uranium oxides on a commercial basis for the private market, and in 1963, supplied a small quantity of uranium to the Rocky Flats plant.

DISCUSSION:
In 1987, a FUSRAP elimination recommendation was made with the basis being "no records found which indicate there were any contracts between MED/AEC and Shattuck."

Available documentation indicates that residual contamination from AWE related work is indistinguishable from non-AWE related contamination. This facility was undergoing soil removal and site remediation under USEPA Superfund projects program. The last step of the remediation process was the removal of all radioactive materials from the site of the former Shattuck Chemical Company Site, OU8, which was completed in July 2006.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- US EPA Superfund Program Denver Radium Site

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1960 - 1962, 1964 - 2006

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Shpack Landfill
Norton, Massachusetts

ALSO KNOWN AS: Metal and Controls Nuclear Corp.
Texas Instruments
M&C Nuclear

TIME PERIOD: 1960-1965; Residual Radiation 1966 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Shpack Landfill began operating as a private landfill in the early 1960s and received both industrial and domestic wastes. The landfill was closed in 1965 under court order. In 1978, a concerned citizen who had detected elevated radiation levels at the site contacted the Nuclear Regulatory Commission. The Commission investigated the site and confirmed the presence of radioactivity in excess of natural background levels for the area. Exactly when these contaminants were deposited at the site is not known. However, the Nuclear Regulatory Commission determined that the Texas Instruments plant (see Metals and Controls Corp.) of Attleboro had used the landfill to dispose of trash and other materials. The Nuclear Regulatory Commission concluded that the contaminants probably resulted from this waste stream.

DISCUSSION:

Residues and waste containing uranium (enriched to > 90%), thorium, and radium have been detected in the soil and groundwater of the site. Radiological surveys taken in the late 1970s revealed extensive contamination at the landfill.

The site was turned over to the Army Corps of Engineers in 1997. The US EPA Waste Site Cleanup website projects the cleanup to be completed in 2009.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- USEPA Waste Site Cleanup and Reuse in New England; Shpack Landfill

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1966-present

FACILITY NAME: Simonds Saw and Steel Company
Lockport, New York

ALSO KNOWN AS: Allegheny-Ludlum Steel Corp.
Simonds Saw and Steel Division
Guteri Special Steel Corp.

TIME PERIOD: 1948-1957; Residual Radiation 1957- October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Simonds Saw and Steel rolled uranium billets into rods for the AEC as part of the multi-site process overseen by the New York Operations Office for the production of uranium metal for fabrication into slugs for fueling Hanford production reactors. Simonds also rolled thorium metal whose most likely use was irradiation in Hanford reactors for the weapons program. Simonds rolled between 25 million and 35 million pounds of uranium and between 30,000 to 40,000 pounds of thorium.

DISCUSSION:

Records indicate that between 25 million and 35 million pounds of uranium, and 30,000 to 40,000 pounds of thorium may have been processed at this facility. Contract activities with AEC ended sometime in the 1957-58 period. As part of contract termination, a large-scale facility decontamination was required to have been performed, but it is unclear whether it was ever performed. A 1976 ORNL survey of the facility identified alpha contamination was within "acceptable "limits, but beta-gamma radiation "...in some areas exceeded the maximum allowable for unrestricted use specified in NRC guidelines."

Documentation reviewed indicates significant residual contamination outside of the period in which weapons-related production occurred. A US EPA FUSRAP website includes a fact sheet published in March of 2008 which states that the clean-up is still underway.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- US ACE FUSRAP Guterl Steel Fact Sheet; March 2008
- FUSRAP Radiological Survey of the Former Simonds Saw and Steel Co; November 1979

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1958 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Southern Research Institute
Birmingham, Alabama

TIME PERIOD: 1955-1958; 1962; 1976; Res. Rad. 1959-1961; 1963-1975; 1977 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Southern Research Institute was involved in several AEC projects. During the period from November 10, 1955 through June 1, 1958, it was licensed (License #C-3417) to receive source material from National Lead Company of Ohio (Fernald) for research on the properties of uranium-liquid metal fuel elements. The Institute performed hot tensile tests on uranium metal and was authorized to receive 300 pounds of normal uranium from NLO. Records also indicate that it handled test quantities of radioactive metals for NLO in 1976. The file also contains a proposal to NLO to test uranium workability at elevated temperature, but does not indicate if the work was done.

DISCUSSION:
There is no mention of the work performed in 1976, other than a FUSRAP document identifying test quantities of uranium. However, there is no mention of this work actually being performed.

From available documentation it appears that the work conducted by SRI was limited in scope and involved small amounts of radioactive material (uranium). No radiological survey data available from during or after the performance of this work is known to exist. It does appear that SRI was aware of, and implemented, appropriate laboratory controls during the work, which would limit the potential for residual contamination. However, in the absence of any radiological survey data, residual contamination cannot be ruled out.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Memo: Hot Tensile Tests of Uranium-Southern Research Institute, June 1, 1962

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1959 - 1961, 1963 - 1975, 1977 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Spencer Chemical Co., Jayhawks Works
Pittsburg, Kansas

TIME PERIOD: 1956-1961; Residual Radiation 1962 - 1964

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Spencer Chemical Company, Jayhawks Works, processed unirradiated uranium scrap for the AEC, recovering enriched uranium from it for use in the weapons complex. By May 12, 1961, Spencer Chemical had ceased operations and disposed of its nuclear materials.

DISCUSSION:
Other information in the provided documentation indicates there was some work with uranium hexafluoride, uranium oxide, and thorium. Uranium enrichments apparently ranged from depleted to 93%.

There were two Special Nuclear Material licenses issued to Spencer Chemical at this facility, #154 and #329. SNM-329 allowed the facility to possess up to 1,000 kilograms of 5% enriched uranium at any one time. SNM-154 was not available for this review, but in the absence of any identified license amendments to SNM-329, higher enriched work and thorium work may have been conducted under SNM-154. Spencer Chemical also had a Source Material License (C-4352) issued, however the specifications of that were unavailable. Spencer Chemical was cited for non-compliance with license conditions as a result of a May 2-5, 1961 inspection by the AEC.

The total quantities of material handled under these licenses were not identified in the documents reviewed, and in 1962, SNM-154 and SNM-329 were cancelled. As a condition of the license cancellations, Spencer Chemical was required to provide documentation to the AEC that all material had been removed from the facility, and that remaining contamination levels should not exceed specified contamination levels which are consistent with current standards.

An NRC document states that a site inspection was performed on April 30, 1964 and found that the site met conditions for license termination.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Termination of Special Nuclear Material License No. SNM-154

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1962- 1964

FACILITY NAME: Sperry Products, Inc.
Danbury, Connecticut
ALSO KNOWN AS: PCC Technical Industries

TIME PERIOD: 1952-1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1952 and 1953, Sperry developed processes for testing and examining uranium plates for the Sylvania Corp., a major AEC contractor.

DISCUSSION:
Documentation exists supporting that there was only a small quantity of material processed. There is no evidence of work with radioactive material prior to July 15, 1953. The existing documentation confirms receipt of a total of 10,890 grams (less than 24 pounds) of uranium. While there is no documentation containing the results of radiological surveys, little potential exists for radioactive contamination resulting from AEC/DOE testing beyond the period in which weapons-related production occurred.
Based on documentation provided, the testing involved ultrasound of uranium plates. Given the nature of the work and the limited quantity of material used at the facility, there is little likelihood for residual radioactive contamination and subsequent employee exposure.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website along with documentation provided by the DOE ES&H Group, consisting of internal DOE facility evaluation documentation.
- Memo Flat Plate Elements for Ultrasonic Inspection, December 2, 1953
- Memo Flat Plate Samples for Testing at Sperry Products, August 17, 1953

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: St. Louis Airport Storage Site (SLAPS)
St. Louis, Missouri

ALSO KNOWN AS: Robertson Airport
Robertson Storage Area

TIME PERIOD: No longer listed as an Atomic Weapons Employer Facility

DISCUSSION:
This facility was reclassified as a DOE facility per Federal Register notice (Vol. 75 No. 148, 45608, Tuesday August 3, 2010).

FACILITY NAME: Standard Oil Development Co. of NJ
Linden, New Jersey

ALSO KNOW AS: Bayway Exxon

TIME PERIOD: 1942-1945; Residual Radiation 1946 - 1991

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Standard Oil performed a variety of tasks during World War II. It was under contract to coordinate materials for work to be done by the Metallurgical Laboratories of the Manhattan Engineer District. It also conducted studies to develop uranium metal through chemical reduction process, and to develop and construct centrifuges for uranium separation.
The company continued to provide consulting and analytical services for the Atomic Energy Commission, but it is not clear if any radioactive materials were handled there after World War II.

DISCUSSION:

Records dated July, 1945 indicate that the plant was dismantled, decontaminated and stored at a part of the site leased to the Office of Scientific Research and Development (OSRD). A January 18, 1949 memo describes radioactive materials and residues that remained on the site which included 475 pounds of UO_3 packaged and never opened. Residues included 1100 pounds (350-400 gallons) of uranium in process solution and three steel drums of dilute uranium solution. A revised site summary for this site issued March 22, 1991 describes a January 25, 1949 response to this memo that instructed the materials be shipped to Middlesex for subsequent shipment of the trioxide to Harshaw and of the remainder to Vitro. Two 1953 memoranda discuss potential small-scale research work with uranium. There has been no documentation identified showing that this work was ever done at this facility. It should be noted that the DOE has not verified that weapons-related work occurred at this facility after 1945. The revised site summary issued March 22, 1991 states that an NRC inspector had reported that the site had been decontaminated. Because no documentation of when the clean-up occurred could be found, the site is assumed to be contaminated until 1991.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- MED letter from C. Bunker to Trent, A brief Description of Dismantlement and Decontamination Process; July 27, 1945.
- AEC memorandum from W.A. Erickson to F.M. Belmore, Disposition Instruction; January 18, 1949
- AEC Memorandum from Meservey to Kirk, Calcination of UNH to UO3; July 15, 1953
- DOE Office of Health, Safety and Security Website
- Weston OTS Note; Stout to Williams (DOE); Revised Site Summary for the Exxon Company in Linden, New Jersey; March 22, 1991.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1946 - 1991

FACILITY NAME: Star Cutter Corp.
Farmington, Michigan

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Star Cutter Corporation manufactured machine tools. Records indicate that National Lead of Ohio (Fernald) conducted a one-time test of a Star Cutter drill to hollow uranium slugs.

DISCUSSION:
The one day test involved approximately 100 pounds of uranium. There is no evidence of any subsequent operations involving uranium. National Lead of Ohio personnel were present during this test and monitored the air for radioactivity.

Little potential exists for radioactive contamination resulting from processing this material beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included

- DOE Office of Health, Safety and Security Website
- Airborne Radioactivity Survey Results June 29, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Staten Island Warehouse
New York, New York

ALSO KNOWN AS: Archer Daniels Midland Company

TIME PERIOD: 1942

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
This warehouse was used for uranium ore storage from the Belgian Congo. From this warehouse, the ore was transported to various Manhattan Engineer District (MED) sites for long-term storage and/or processing. The ore was the property of the African Metals Corporation and the MED contractor purchased only the U_3O_8 content of the ore while African Metals retained ownership of the radium and precious metals in the ore.

DISCUSSION:
Documentation identifies that ores stored at this location from 1939 through 1942 were a result of an independent speculative business enterprise. The MED learned of this material in 1942 and subsequently purchased and removed the ores at that time. The building where these ores were stored appears to have been demolished after MED acquisition of the materials sometime between 1942 and 1946. A radiological survey of the area of the demolished storage facility in 1980 identified a localized area of potential contamination.

This material was not government controlled or owned, unlike the materials stored at the Baker and Williams Warehouses, until 1942 whereupon it was removed.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Letter; DeLaney to Scaramella; Subject: Information regarding Elimination of the Staten Island Warehouse from FUSRAP Consideration; June 16, 1986

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Stauffer Metals, Inc.
Richmond, California

ALSO KNOWN AS: Stauffer-Tenescal Co.
Tenescal Co.

TIME PERIOD: 1961

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Stauffer performed electron beam melting tests on uranium metal for National Lead of Ohio (Fernald). The company had performed similar tests for Hanford.

DISCUSSION:
Documentation reviewed shows that plans were made to control exposure to uranium and to decontaminate the equipment after the tests. Surveys of airborne radioactivity taken during operations show low concentrations. The potential for significant residual radioactivity after operations is low.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Trip Report to Stauffer-Tenescal Company, Richmond, California, October 19, 1960
- Trip Report to Stauffer Metals Company, Richmond California on April 4 to April 12, 1961
- Airborne Radioactivity Surveys taken during operation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Superior Steel Co.
Carnegie, Pennsylvania

ALSO KNOWN AS: Copper Weld, Inc.
Lot and Block 102J210

TIME PERIOD: 1952-1957; Residual Radiation 1958 – October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Superior Steel produced uranium strip and rolled uranium slabs for use by the Savannah River Laboratory. In 1955, for example, they hot rolled twenty-five tons of uranium into strip.

DISCUSSION:
There is little information in the FUSRAP files regarding Superior Steel Co. The company apparently rolled production quantities of uranium metal for NLO (Fernald) in the time frame identified above.

A 1981 ORNL survey indicated that the site was contaminated in the area where the uranium operations took place, on and under floors, in sumps and on some of the machinery that was used during production.

Documentation reviewed indicates residual contamination from AWE work still exists at this facility. DOE identified the contamination in a 1981 survey but eliminated the facility from FUSRAP.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL/DOE Preliminary Survey; T.E. Myrick and C. Clark; Preliminary Site Survey Report for the Former Superior Steel Mill at Carnegie, Pennsylvania; April 1981
- Authority Review - The Former Superior Steel Corporation Site - AEC Contract No. AT(30-1)- 1412; September 30, 1985 PA.03-1

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1958 - present

FACILITY NAME: Sutton, Steele and Steele Co.
Dallas, Texas

TIME PERIOD: 1951; 1959

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1951, AEC and AEC contractor personnel conducted tests at Sutton, Steele, and Steele, Inc. which were aimed at devising means of recovering uranium from low grade wastes and residues. The tests were to determine the feasibility of separating fused dolomite from magnesium floride slag and uranium. In 1959, National Lead of Ohio (Fernald) personnel evaluated Sutton, Steele, and Steele's dry tabling equipment for the separation of normal uranium shot.

DISCUSSION:
During the first test, 2 tons of C-liner and C-special were processed to determine whether the uranium could be separated from the dolomite and magnesium fluoride. As this was liner material, the uranium concentrations were relatively low, and only about 50 pounds of uranium were processed through the equipment. At the conclusion of the test, the equipment was decontaminated and residues were returned to the AEC.

In 1959, NLO (Fernald) personnel evaluated Sutton, Steele and Steele's dry tabling equipment for the separation of uranium shot. Fifty pounds of normal uranium were processed in a single test to evaluate particle size separation. As in the first test, the equipment was decontaminated and monitored after the operation.

Sutton, Steele and Steele was eliminated from FUSRAP action in 1993 based on the low potential for residual contamination at the facility.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Air Tabling Tests at Sutton, Steele & Steele, Inc., Dallas, Texas, April 9-11, 1951
- Trip Report to Sutton, Steele, and Steele Company, Dallas, Texas, On November 5 & 6, 1959

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Swenson Evaporator Company
Harvey, Illinois

TIME PERIOD: 1951

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Swenson Evaporator was scheduled to perform a raffinate spray drying test for National Lead Company of Ohio (NLO) on March 20, 1951. This test would have involved some radioactive residue. The drums containing the raffinate were shipped to Swenson by Mallinckrodt, but it is believed that they were not opened and the test not performed.

DISCUSSION:
Documentation indicates that because of public relations issues, and health department intervention, the test was never performed. There were approximately 40 drums of raffinate liquor that were delivered to Swenson for the test. Evidence indicates that the drums were never opened and subsequently returned to NLO (Fernald). The exact dates of the shipments are not clear. There is little to no potential for residual contamination remaining at the site as a result of AEC/DOE activities.

A FUSRAP determination made in 1987 recommended the removal of this facility from the FUSRAP process because of low potential for residual contamination.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:
- DOE Office of Health, Safety and Security Website
- FUSRAP Elimination Recommendation

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Sylvania Corning Nuclear Corp.-Bayside Laboratories
Bayside, New York

ALSO KNOWN AS: Sylvania Electric Products, Inc.
Metallurgical Laboratory
Sylvania Electric Corporation, Atomic Energy Division
Sylvania Bayside Laboratories
Sylcor

TIME PERIOD: 1947-1962

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Metallurgical Laboratory of the Sylvania Electric Company investigated uranium and thorium powder metallurgy. It also produced powdered metal slugs, developed bonding techniques, and plated uranium slugs with nickel. The work with slugs included the conversion of uranium metal to uranium hydride using hydrogen. A February 1948 AEC Monthly Summary of Activities indicates that the Lab's "initial program will involve determining the physical properties and the health hazards of beryllium and uranium powders and the applications of powder metallurgy to these metals and their alloys." In 1948, the work required 315 pounds of raw beryllium metal. Beryllium was handled first in the regular metallurgical building and then, after the objections of the AEC medical division, in a special AEC metallurgical development laboratory.

DISCUSSION:

Other work at the facility included UO_2 wafer production, flat plate production, pipe cutting using abrasive wheel cutters, canning slugs, and thorium slug canning.

An ORNL summary of the licenses associated with the AEC work states that “a radioactive materials disposition document from the license dated September 9, 1959 states that all radioactive material procured under this license has been disposed of by decay” and that “A document from the licensee dated November 22, 1957 states that 34-55 gallon drums of radioactive waste containing less than 1 mCi of uranium and thorium was shipped to the U.S. Naval Ammunition Depot in Earle, New Jersey for disposal at sea.”
Surveys completed in 1972 showed that removable alpha contamination levels were within current guidelines for thorium and uranium.
The facility was demolished sometime before 1977. An ORNL survey of the property in 1977 identified no contamination at the site distinguishable from background. The site was removed from FUSRAP in 1993. Based on a description of the survey performed prior to turn-over to GTE Labs in 1962, coupled with results from follow-up surveys in 1973 and 1977, there is no indication that residual contamination existed beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Survey of Sylvania-Corning Metallurgical Laboratory, Bayside, New York, March 1980
- ORNL Site Summary for License 31-02374-01
- Contamination Surveys 1972 and 1973; Fuhrman to Stepina

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Sylvania Corning Nuclear Corp.- Hicksville Plant
Hicksville, New York

ALSO KNOWN AS: General Telephone and Telegraph Laboratories
Sylcor

TIME PERIOD: 1952-1966

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Under Atomic Energy Commission (AEC) contracts, the facility was used for research and development with radioactive materials, principally uranium and thorium. It was also licensed by the AEC to fabricate reactor fuel elements for the AEC, for Sylvania use, for sale, and for research purposes.

DISCUSSION:
There is little information in the file regarding the operations performed or quantities of material that were used at the Hicksville facility.

Documentation reviewed indicates that the Hicksville site was decontaminated and decommissioned for unrestricted use in 1965.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Decontamination of Sylcor 1293 Area, 1965
- AEC (SROO) Letter; Stetson to Pittman; Subject: Decontamination and Decommissioning of AEC Facilities (Your TWX, 10/29/73); November 13, 1973.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Tech-Art, Inc.
Milford, Ohio

TIME PERIOD: 1952

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1952, National Lead Company of Ohio (Fernald) used Tech-Art to grind inserts as part of a study of Firth Sterling HF carbide profile inserts in conjunction with the machining development program. Additional documentation shows that Tech-Art possessed a subcontract with NLO for "[m]achine shop operations on Government owned materials at prescribed hourly rates of pay."

DISCUSSION:
Based on the available documentation, there is little likelihood that this facility handled any radioactive material. There is a reference to "machine shop operations on government-owned materials at prescribed hourly rates of pay," but exactly what was performed is not clear. It appears that the inserts were ground by Tech Art for use in machining operations. The inserts were not radioactive. There is reference to a 1990 memorandum to the file, indicating that this site was to be evaluated by FUSRAP, but there is no documentation indicating that this was ever completed. The site remains classified as FUSRAP-TBD.

With the absence of any information confirming that radioactive material was used at this facility, the presence of residual radioactivity is unlikely.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Tennessee Valley Authority
Muscle Shoals, Alabama

TIME PERIOD: 1951-1955

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
At its National Fertilizer Development Center, the TVA performed research and development on uranium recovery under formal agreement with the AEC. The work involved the extraction of uranium during the production of fertilizer from leached zone phosphate ore. A laboratory and pilot plant were operated at the fertilizer plant, but little uranium (about 2.5 kilograms of uranium concentrate) was produced.

DISCUSSION:
Very little uranium was produced at this facility. A preliminary survey of the facility, conducted in 1980 by ORNL showed that the radiation and contamination levels at the facility did not vary significantly from background.

A FUSRAP determination made in the 1980s recommended elimination from the process based on the limited material processed and low potential for radioactive contamination remaining at the facility after the operation was ceased.

There was limited radioactive material produced at the facility. Little potential exists for radioactive contamination beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:
- DOE Office of Health, Safety and Security Website
- Elimination Report October 13, 1987
- Preliminary Survey of the Tennessee Valley Authority Site March 1980

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Texas City Chemicals, Inc.
Texas City, Texas

ALSO KNOWN AS: American Oil Company
Morden, Incorporated
Smith Douglass
Amoco Chemical Company

TIME PERIOD: October 5, 1953 – September 1955; Residual Radiation 1957 - 1977

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Texas City Chemicals, Inc. produced uranium by recovery of U_3O_8 from a phosphate fertilizer production plant. The AEC contracted with Texas City Chemicals for the recovery of uranium which was ultimately used in weapons production.

DISCUSSION:
Contract specifications identify that as much as 12 tons of U_3O_8 per year may have been produced at the plant during the contract years of 1952-1956.

Texas City Chemicals subsequently declared bankruptcy in 1956, and the facility in which the uranium was produced was demolished at an unknown time after that.

A preliminary survey conducted by ORNL in 1977 (issued in 1980), did not identify radiation/contamination levels above what would normally be expected at a phosphate fertilizer plant in that region of the country. The facilities associated with AWE work had been demolished at some time prior to this survey.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Preliminary Survey of Texas City Chemicals, Inc. (Borden Chemical Division of Borden, Inc.) Texas City Texas; March 1980.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1957 - 1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Titanium Alloys Manufacturing
Niagara Falls, New York

ALSO KNOWN AS: Humphreys Gold Co.
Titanium Alloys Manufacturing Co, Division of NLO
Titanium Alloys Metals
Titanium Pigment Co.

TIME PERIOD: 1950-1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In the early 1950s, Titanium Alloys Manufacturing was under contract to the AEC to provide zirconium tetrachloride. In 1955, TAM was issued an AEC source material license to do work related to the conversion of thorium scrap to anhydrous tetrachloride. Correspondence from Oak Ridge indicates that it was not interested the company's thorium work. In 1956, this division reduced ores and other uranium compounds by arc melting in an induction furnace.

DISCUSSION:
Documentation reviewed includes radiological air and area monitoring data from furnace operations conducted in 1956. These surveys indicate that both airborne radioactivity concentrations and area contamination levels were very low during furnace operations. Therefore the potential for residual contamination after operation ceased are low.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Air Sample Results and Contamination Surveys April, 11 1956
- Air Sample Results July, 10 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Titus Metals
Waterloo, Iowa
ALSO KNOWN AS: Titus, Incorporated

TIME PERIOD: 1956

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Titus Metals performed extrusion of uranium oxide billets into fuel plates for the Argonaut reactor at Argonne National Laboratory on June 29, 1956.

DISCUSSION:
The entire operation may have been completed in one day. A report issued on July 17, 1956 states that, at the completion of the operation, the facility and equipment were decontaminated to non-detectable levels.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security
- Argonne National Laboratory Memorandum; Lonergan to Novak; Subject: Extrusion of Billets, Titus Metals, Inc., Waterloo, Iowa; July 27, 1956

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Tocco Induction Heating Div.
Cleveland, Ohio

ALSO KNOWN AS: Ohio Crankshaft Company
Tocco Heat Testing
Park Ohio Industries

TIME PERIOD: 1967-1968

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Tocco had a contract with National Lead of Ohio (Fernald) to develop induction heating coil equipment for heating uranium fuel cores. Tocco performed operational tests of these units at its Ohio facility, which took place during 1967-1968. The company received 2000 pounds of natural uranium machined fuel cores and 5600 pounds of depleted uranium machined fuel cores from NLO for testing.

DISCUSSION:
The license was amended in 1967 to authorize up to 16,000 pounds of uranium. A 1968 inspection of the facility by AEC identified several areas of low-level contamination on the working area floor (300-1500 dpm/100cm^2) and on the machinery (3,000-4,500 dpm/100 cm^2).

In 1968, the facility sent a letter to AEC stating that all materials had been returned to NLO (Fernald), and questioning whether the license should be cancelled or allowed to expire. In January 1969, the AEC terminated the license. There was apparently no follow-up inspection of the facility.

In 1993, the NRC conducted a survey of the facility and found that the facility met the NRC's standards for unrestricted use.

Documentation reviewed indicates that the facility was licensed to perform work under contract with NLO (Fernald) from 1966 to1969. There is however, no reason to expect that significant radioactive contamination existed at the facility after the 1968 date when it was reported that all materials had been returned to NLO.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Air Sample Results, June 6, 1968
- Urine and Air Dust Samples, 1968
- NRC Inspection June 8, 1993

EVALUATION FINDINGS:

Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Torrington Co.
Torrington, Connecticut

TIME PERIOD: 1951-1953

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Torrington Company performed small-scale swaging experiments on uranium rods in the early 1950s. Torrington conducted this work for two companies: the Bridgeport Brass Company and American Machine and Foundry.

DISCUSSION:
The documentation reviewed indicates that swaging tests on13 rods was completed between 1951 and 1953.

A FUSRAP determination made in 1987 recommended elimination from the process, based on the limited quantity of material and low potential for radioactive contamination.

There was limited radioactive material use, and the resultant tests only lasted a few days. Airborne radioactivity surveys were performed during one of the tests and no detectable airborne contamination was found. Because of the limited amount of material used and the fact that airborne radioactivity surveys conducted during the tests showed no airborne radioactivity, little potential exists for radioactive contamination beyond the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- Swaging Test of duPont Bars at the Torrington Company, March 2, 1951
- Airborne Radioactivity Report August 1952
- Swaging Test at the Torrington Company, February 6, 1953
- Elimination Recommendation May 14, 1987

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Tube Reducing Co.
Wallington, New Jersey

TIME PERIOD: 1952; 1955; 1957

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Tube Reducing Co. conducted tests for National Lead of Ohio (Fernald) on shaping and sizing uranium rods. In January 1952, two uranium rods were processed. More tubes were extruded in a reduction experiment in January 1955. Another test was conducted in 1957. The firm is also mentioned in World War II-era reports as a possible location for uranium machining, but there are no indications that any such work was done at the facility during that time period.

DISCUSSION:
Airborne radioactivity surveys were performed during the tests and a trip report from December of 1957 states that all surfaces were decontaminated and material removed. It is not likely that significant contamination existed after these tests.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- AEC Memorandum; Stroke to Files; Sizing and Reducing Uranium by the "Rockrite " Process; January 11, 1952
- Air Sample results December 17-19, 1957
- Report of Trip to Tube Reducing Corporation, Wallington, New Jersey, December 16-20, 1957

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Tyson Valley Powder Farm
St Louis, Missouri

TIME PERIOD: 1942-1949

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Tyson Valley Powder Farm was a storage site for radioactive materials in the late 1940s. Records show, for example, that at the end of 1946, 206,110 pounds of uranium metal were stored at this location for the Manhattan Engineer District.

DISCUSSION:
There is no indication that there was any type of material processing taking place at this site. It seems to be a storage site only.
The materials were removed from the site in 1948, and records suggest that the site was sold to a local municipality, and subsequently developed into a park.

INFORMATIONAL SOURCES:
Sources of information reviewed during this evaluation included:

- DOE Office of Health, Safety and Security Website
- AEC Memorandum; Koenig to Belmore; Subject: Storage of "C-Special" Material; January 14, 1948

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: U.S. Steel Co., National Tube Division
McKeesport, Pennsylvania

TIME PERIOD: 1959-1960

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Tests at the Christy Park Works, National Tube Division of the U. S. Steel Corporation, conducted in 1959 and 1960, demonstrated that rotary piercing of uranium was possible. The tests were conducted for National Lead of Ohio (Fernald).

DISCUSSION:
There is a 1967 report indicating that the testing phase occurred during the 1959-1960 time-frame. Rotary piercing of uranium was never adopted by NLO (Fernald).

The documentation reviewed includes descriptions the radiological controls that were in place during the operation and the decontamination efforts effort after operations. Post operational surveys indicate that decontamination efforts were successful.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website and internal AEC/DOE correspondence provided by the DOE ES&H Group.
- Halcomb, R. N., to Quigley, "Trip Report to National Tube Division, Christy Parks Works, McKeesport, Pennsylvania on February 15 to March 2, 1960"

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: United Lead Co.
Middlesex, New Jersey

ALSO KNOWN AS: Perry Warehouse; Middlesex Sampling Plant

TIME PERIOD: 1950-1967; Residual Radiation 1968 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1950 to 1955, United Lead Co., a subsidiary of National Lead Company, was the AEC's operating contractor for the Middlesex Sampling Plant. The Middlesex Sampling Plant sampled, assayed, stored, and shipped uranium, thorium, and beryllium ores. The plant discontinued uranium and beryllium assaying and sampling activities in 1955. Until 1967, the site was used as a thorium storage and sampling site.

DISCUSSION:

Documentation indicates that operations began at this facility in 1943 and ended in 1955, at which time the facility was used for storage of radioactive materials through 1967. Work included receiving, storing, crushing, grinding, and sampling of ores received from African Metals and other sources.

In 1969, the property was transferred to the Department of the Navy and used as a Marine Corps training facility. In 1978, the property was transferred back to the DOE for remedial activities.

Documentation states that prior to the GSA transfer, the site was decontaminated. A subsequent survey performed by ORNL in 1976 identified significant residual contamination that led to decontamination and restoration activities at the facility and surrounding properties. A survey performed in 1985 indicated that radioactive contamination exceeded unrestricted release criteria. In 1997 the responsibility for site remediation was turned over to the U.S. Army Corps of Engineers under FUSRAP. A FUSRAP fact sheet of December 2007 does not indicate that the clean-up is complete.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE/OR/20722-20, *Radiological Survey Report for the Former Middlesex Sampling Plant, Middlesex New Jersey, March 1985.*
- FUSRAP Fact Sheet Middlesex Sampling Plant December 2007

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1968 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: United Nuclear Corp.
Hematite, Missouri

ALSO KNOWN AS: Mallinckrodt Chemical Works, Chemical Div.

TIME PERIOD: 1958-1973; Residual Radiation 1974 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The United Nuclear Corporation in Hematite, Missouri, processed unirradiated uranium scrap for the AEC, recovering enriched uranium from it for use in the nuclear weapons complex. Mallinckrodt Chemical Works owned the Hematite plant until 1961.

DISCUSSION:
There is no documentation supporting the radiological status of the site at the end of the contract. However, United Nuclear Corp. was contracted to supply uranium fuel for the commercial nuclear industry as well as the AEC.

Documentation reviewed indicates that residual contamination related to AWE work exists outside of the period in which weapons-related production occurred, which is indistinguishable from non-weapons' related contamination.

This facility is currently owned by Westinghouse/BNFL which is investigating conditions and options with respect to clean-up. Remediation is being conducted under Nuclear Regulatory Commission (NRC) oversight. The Estimated closure date is 3/01/2012

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:
- DOE Office of Health, Safety and Security Website
- U.S. NRC, Westinghouse Electric Company (Hematite Facility)

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1974 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: University of Denver Research Institute
Denver, Colorado

TIME PERIOD: 1963-1965

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The University of Denver Research Institute is listed as a processor of radioactive materials for National Lead of Ohio (Fernald). It appears that the University of Denver handled test quantities of radioactive metal in February 1965. In 1963, a University of Denver Research Institute researcher (F. Perkins) held an AEC contract for work on intermediate-temperature oxidation of beryllides.

DISCUSSION:
From available documentation, the work conducted by the University of Denver was limited in scope and involved test quantities of radioactive material. The University was/is licensed, was aware of, and implemented, appropriate laboratory controls during the work which would limit the potential for residual contamination.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Memorandum E. DeLaney to R. Lynch with NLO Memo enclosure; Subject - Commercial Facilities Used By NLO in Support of Feed Materials Production Center Operations, July 28,1986

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: University of Florida
Gainesville, Florida

ALSO KNOWN AS: J. Hillis Miller Health Center
College of Medicine, Department of Radiology

TIME PERIOD: 1963-1969

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Documents indicate that the University of Florida handled test quantities of radioactive material under a National Lead of Ohio (Fernald) sub-contract between 1963-1969. Upon completion of the project, the material was sent to the Savannah River Site.
The University also obtained licenses to handle radioactive material from the Nuclear Regulatory Commission. Work done under these NRC licenses was not related to nuclear weapons production and is not covered under EEOICPA.

DISCUSSION:
Available documentation indicates that work conducted by the University of Florida was limited in scope and involved test quantities of radioactive material. The University of Florida was/is licensed, was aware of, and implemented, appropriate laboratory controls during the work which would limit the potential for residual contamination.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Letter; Fiore to Sjoblom; Subject: NRC Licensed Sites; June 20, 1990. Attachment: Enclosure 1 - Formerly Utilized Sites Eliminated from FUSRAP; Circa 1990.

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: University of Michigan
Ann Arbor, Michigan

TIME PERIOD: 1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The University of Michigan developed radar fuses and conducted ordnance research to assist Los Alamos in atomic bomb research and production.
Records indicate that small quantities of uranium metal were handled at the University of Michigan under AEC contract. The contract expired April 10, 1944. It is unknown whether or not similar work was performed before or after this date.

DISCUSSION:
The contract involved developing a method for testing the adequacy of coating that had been applied to uranium metal pieces to prevent them from corrosion. The University of Michigan received coated pieces of uranium to test for flaws in or under the coating surface.

The contract which was to expire on April 10, 1944 was extended with a statement that it was estimated that the remaining work could be completed in three months.

Because of the small amount of material handled and the type of work that was performed, there is little potential for significant residual radioactivity at the University of Michigan resulting from MED/AEC activities.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- AEC Letter; Chipman to White; Work to be Conducted Under Proposed Contract Between University of Michigan and University of Chicago; January 6, 1944
- AEC Memorandum; Howe to Cook; Extension of Contract with the Department of Engineering Research, University of Michigan; March 31, 1944

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: University of Virginia
Charlottesville, Virginia

TIME PERIOD: 1942–1949; 1960s; Residual Radiation 1970-1985

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The University of Virginia played an integral role in developing the process to use uranium in the development in nuclear weapons. The Naval Research Laboratory asked Dr. Jesse Beams, of UVA, about the possibility to using isotope separation by centrifuge for the enrichment process of uranium. He was able to successfully enrich uranium by the use of his high-speed centrifuge.

Later, the University of Virginia's Nuclear Reactor Facility, operated by the Department of Mechanical, Aerospace and Nuclear Engineering, housed the UVAR, a light-water-cooled and moderated research pool-type reactor which began operation in 1960 and ceased operations in 1998.

DISCUSSION:

There were indications that work under AEC contract may not have ceased until 1985 when research into the centrifuge process was terminated by DOE.

Available documentation indicates that small quantities of uranium were enriched through development and testing of an operational centrifuge. The operation was reportedly shut down in June of 1985 and the uranium and equipment, including the centrifuge, were shipped to DOE Oak Ridge, Tennessee.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Times Dispatch Article - Virginia Focus: Secret Nuclear Studies, February 25, 2001

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1970 – 1985

FACILITY NAME: Utica Street Warehouse
Buffalo, New York

ALSO KNOWN AS: Linde Air Products

TIME PERIOD: 1945

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Residues from Linde Air operations were stored and rebarreled at this location.

DISCUSSION:
As of 1945, as much as 355,000 pounds of residues were stored at the facility in steel and wooden barrels. There is no information regarding how long the material was in storage, but it is indicated that several of the drums required repackaging because of deterioration.
A March 1945 memo states that the Chandler Street materials will be removed from the site in 30 days.
A 1981 memo states that the site was occupied by a driveway to a parking garage and was previously occupied by a paved parking lot in the late 1960s.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Army Service Forces - Comments on Residues and By-Products, November 29, 1945
- Memo concerning storage of Chandler Project material at Utica Street Warehouse, March 14, 1945
- Union Carbide Corporation Letter; Hayes to Mott (DOE); Subject: MED Warehousing Locations

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Ventron Corporation
Beverly, Massachusetts

ALSO KNOW AS: Metal Hydrides Corp., Ventron Division
Morton Thiokol, Inc.

TIME PERIOD: 1942-1948; Residual Radiation 1949-1985; 1987-1995; DOE 1986; 1996-1997 (remediation)

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
From 1942 to 1948, Metal Hydrides Corp. was under contract to the Manhattan Engineer District and the Atomic Energy Commission to convert uranium oxide to uranium metal powder. This work, as well as later operations to recover uranium from scrap and turnings from a fuel fabrication plant at Hanford, was conducted at a foundry at the site. During this period, Metal Hydrides was the AEC's primary uranium scrap recovery contractor.
Cleanup activities at this location included the removal of an underground storage tank in 1986. Further remediation was performed between May 1996 and August 1997 by Bechtel National Inc. and a number of local subcontractors as part of the Formerly Utilized Site Remediation Action Program (FUSRAP).
The plant is currently owned by the Ventron Division of Morton International.

DISCUSSION:
The Ventron Site consisted of several buildings that were once used to support AEC contracts. The buildings that were used as the foundry for scrap recovery operations were demolished shortly after the contract with AEC expired in 1948.

The site was surveyed as part of the FUSRAP process in 1982 and found to be significantly contaminated. Remedial cleanup was conducted from 1995 to 1997. On August 8, 1997 DOE determined that the site was clean, and released it for unrestricted use.

Documentation reviewed indicates that the potential for significant residual contamination existed outside of the period in which weapons-related production occurred.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:
- DOE Office of Health, Safety and Security Website
- Certification Docket for Remedial Actions Performed at the Ventron Site, March 2003
- Verification Survey of the Ventron Site, February 2003

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1949-1985; 1987-1995

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Virginia-Carolina Chemical Corp.
Nichols, Florida

ALSO KNOWN AS: Conser Department of Phillips Brothers Div.
Englehard Minerals and Chemical Corp.
Socony Mobile Oil Co.
Virginia-Carolina Chemical Corp.

TIME PERIOD: 1952-1957; Residual Radiation 1958-1977

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

The Virginia-Carolina Chemical Corp. produced uranium as a byproduct of the recovery of phosphate chemicals and fertilizers. The AEC contracted with the Virginia-Chemical Corp. for the recovery of the uranium, which was ultimately used in weapons production.

DISCUSSION:

The Virginia-Carolina Chemical Corp. was under contract to produce 12 tons of U_3O_8 per year during the years 1952-1959. The facility that was used to extract the uranium was disassembled in 1960.

The plant underwent a complete shutdown and abandonment between the years 1969-1973, and as of 1979, was completely remodeled and modified from its original configuration.

Documentation reviewed indicates that there is potential for significant residual contamination outside of the period in which weapons-related production occurred. The facility used for these operations was removed in 1960, a subsequent survey in 1977 identified some residual soil contamination around the remaining pad which was removed and does not appear to be significant.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- FUSRAP Radiological Survey of the Former Virginia-Carolina Chemical Corp; January 1980.
- DOE Memo Potential Remedial Actions; February 27, 1985

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1958 - 1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Vitro Corp of America (New Jersey)
West Orange, New Jersey

ALSO KNOWN AS: Heavy Metals Co.
Vitro Chemical Co.

TIME PERIOD: 1951-early 1960s; Residual Radiation 1960s-1977

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

In December 1951, Vitro was asked to submit a proposal for research on thorium fluoride production, scrap recovery and waste recovery to involve 14 chemists and analysts. Though it is not certain whether this work was undertaken, by the late 1950s and early 1960s, Vitro conducted work under AEC contract converting low-enrichment uranium dioxide to uranium carbide spheres. The uranium dioxide was shipped from Rockwell International (then known as the Atomics International Division of North American Aviation, Inc.) to Vitro for conversion into uranium carbide and was then shipped back to Rockwell. Around 1958, Vitro also conducted work under contract to the AEC Oak Ridge Operations Office for the separation of fission products.

DISCUSSION:

Available documentation indicates that scrap uranium recovery work was conducted and also indicates that production of ThF_4 from thorium nitrate work was being planned. There is an indication that Rockwell International received shipments of enriched uranium from Vitro (assumed to be New Jersey) as late as 1965. The processing facility used for these operations was demolished sometime prior to 1977 when radiological surveys were conducted identifying no radioactivity above what would be considered background. At the time of the survey the property was owned and occupied by the West Orange Tennis club. With the absence of any radiological survey data from the operational period or the facility after operations were completed, it is concluded that there is a reasonable potential that residual contamination existed at the facility up until the time the building was demolished.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Survey Report; Preliminary Survey of Vitro Corporation (Vitro Laboratories) West Orange, New Jersey; March 1980
- FUSRAP Elimination Report for the former Vitro Laboratories Vitro Corporation; West Orange, New Jersey; September 30, 1985.

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

Early 1960s - 1977

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Vitro Corp. of America (Tennessee)
Chattanooga, Tennessee

ALSO KNOWN AS: Chattanooga Site owned by W.R.Grace
Vitro Chemical, a subsidiary of Vitro Corporation
Heavy Minerals Company.

TIME PERIOD: 1957-1968; Residual Radiation 1969 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Records indicate that "Vitro Corporation" of Chattanooga, TN performed some beryllium work for Y-12 during the period 1959-1965. A 1962 document also mentions that the AEC met with members of the beryllium industry, including representatives from "Vitro Chemical" (no address), but does not mention whether any contracts were involved in these discussions. The original owner of this site was Heavy Metals Inc. and possessed an AEC license to process uranium and thorium products beginning as early as 1957. Documentation indicates that the company provided price quotes to the AEC for thorium products as early as 1954, but there is no indication that it received a contract for that work. Vitro Chemical of Chattanooga, TN, a subsidiary of Vitro Corporation, took over the site at the end of 1959 and was under contract to the AEC to produce thorium metal, thorium fluoride and thorium oxide. The current owner, W.R. Grace, purchased the site in 1965 and continued operations until 1983, but records do not reveal any weapons-based link after 1968. The State of Tennessee took over licensing of this site in 1968.

DISCUSSION:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which AWE related activities occurred which is indistinguishable from non-related contamination. There is no radiological data available from the time these activities ceased, and the facility has been under an AEC/NRC or State license since the early 1960s.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1969 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Vitro Manufacturing (Canonsburg)
Canonsburg, Pennsylvania

ALSO KNOWN AS: Vitro Rare Metals Company

TIME PERIOD: 1942-1959; Residual Radiation 1958-1985

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Starting in 1948, Vitro was under contract to recover uranium from scrap. In the period from 1954-1956, Vitro had a contract to process production quantities of radioactive material (UF4) for National Lead of Ohio (Fernald). Vitro also received uranium scrap from the Tyson Valley Powder Farm sometime in 1949. After 1957 the site was used only for storage. Canonsburg was a major uranium milling facility and although the EEOICPA definition of an Atomic Weapons Employer excludes mining and milling, this site is covered because of its scrap processing activities performed under contract to the Atomic Energy Commission. A 1948 document indicates that General Electric shipped scrap containing beryllium to the Canonsburg site. The Canonsburg site is one of 24 former uranium mill sites designated for Department of Energy remediation by the Uranium Mill Tailings Radiation Control Act (UMTRA).

DISCUSSION:

In 1976, an ERDA survey identified "excessive radium contamination" at the facility. The Canonsburg site was designated for DOE remediation by the Uranium Mill Tailings Radiation Control Act

Documentation reviewed indicates that there is significant residual contamination outside of the period in which AWE production occurred. Documentation from the Energy Information Administration reports that surface contamination remediation was completed in December of 1985. Material was disposed of on-site and groundwater monitoring will continue in "perpetuity".

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security
- Energy Information Administration Canonsburg Mill Site, October 9, 2005

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1960 -1985

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Vulcan Tool Co.
Dayton, Ohio

TIME PERIOD: 1959

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
At the request of National Lead Company of Ohio (Fernald), Vulcan Tool Company conducted experiments involving the cutting of normal uranium slugs and tubes on a Brehm cutter in October 1959.

DISCUSSION:
There was a single test performed at the facility. Radiological monitoring was performed during the test and resulted in very low levels of airborne radioactivity therefore the likelihood of significant contamination is remote at this facility.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security
- Air Sample Results from Vulcan Tool 10-20-1959

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: W.E. Pratt Manufacturing Co.
Joliet, Illinois

ALSO KNOWN AS: William E. Pratt Manufacturing Co.
Klassing Handbrake
Altrachem, Inc.

TIME PERIOD: 1943-1946; Residual Radiation 1947-1989

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The W.E. Pratt Manufacturing Company performed metal fabrication tasks (machining and grinding) for the University of Chicago Metallurgical Laboratory beginning in the spring of 1943. The purpose of the machining done by Pratt was to speed up delivery of pieces for the experimental pile and to learn all that could be learned about handing uranium metal in turret lathes and automatic screw machines. In 1944, Pratt was subcontracted by the University of Chicago to finish "short metal rods" by centerless grinding. This work continued until June 30, 1946. The Manhattan Engineer District History indicates that DuPont placed an order with Pratt to turn and grind unbonded Hanford slugs.

DISCUSSION:
The contract with the University of Chicago was terminated in 1946 when operations were consolidated at the Hanford site.

Documentation available for review does not provide enough information to definitively rule out residual contamination at the end of operations in 1946. Radiological survey data from 1989 confirms the radiological status of the facility as being below guideline values.

Based on the nature of the work and absence of radiological survey data until 1989, it is determined that there is a potential for significant residual contamination after the operational period.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Survey Report, Radiological Survey at 18 Henderson Street, Joliet, Illinois, M.R. Landis, October 1989 IL.12-3

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1947 – 1989

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: W.R. Grace (Tennessee)
Erwin, Tennessee

ALSO KNOWN AS: Nuclear Fuel Services
Davison Chemical

TIME PERIOD: 1958-1970; Residual Radiation 1971- October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Davison Chemical Division of W.R. Grace Co. (later Nuclear Fuel Services) processed unirradiated uranium scrap for the AEC, recovering enriched uranium from it for use in the nuclear weapons complex. Correspondence from 1963 also indicates that the company also worked with thorium.

DISCUSSION:
The company received an AEC license to engage in the conversion of UF_6 to forms needed for the fabrication of fuel elements for research and development. It is unclear what the elements were used for, as they may have been part of fuel manufacture for the Department of the Navy.

While it is unclear whether weapons development work was concluded in 1969, there is a potential for significant residual contamination outside of the period in which weapons-related production occurred that is indistinguishable from non AEC/DOE activities which are on-going. Documentation indicates this facility is still in the DOE determination phase with respect to FUSRAP eligibility.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1971 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: W.R. Grace and Company (Maryland)
Curtis Bay, Maryland

ALSO KNOWN AS: Davison Chemical Corp.
Agri-Chemicals Division

TIME PERIOD: 1955-1958; Residual Radiation 1959 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Processing of radioactive materials at W.R. Grace began in July 1955 when Rare Earths, Inc. (W.R. Grace's predecessor) entered into a contract with the Atomic Energy Commission to extract thorium and rare earths from naturally-occurring monazite sands. In 1956, the Atomic Energy Commission contract and Rare Earths' license to possess, transfer, and use radioactive thorium were transferred to W.R. Grace & Company. The facility where thorium processing took place (Building 23) operated until late spring of 1957, when W.R. Grace and the Atomic Energy Commission agreed to terminate the contract, effective January 31, 1958.

DISCUSSION:

The wastes were buried in a landfill-type area covering about 4 acres. The site currently supports commercial activity. In 1978, the landfill area was fenced off, and patrolled by the facility security guards to preclude access. Also in 1978, a radiological survey was conducted indicating that the landfill area was contaminated at depths up to 15 feet. The building where processing took place (Building 23) was also identified as contaminated, indicating "excessive alpha contamination on all five floors" and "radiation levels as high as 3 mr/hr around the vats and hoppers."

Confirmation of residual contamination, 30 years after termination of AEC activities led to subsequent FUSRAP action authorization. This facility is currently undergoing FUSRAP activities.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORNL Report (ORNL/TM-10439); Results of the Indoor Radiological Survey at the W.R. Grace Co. Curtis Bay Site Baltimore Maryland; Issued – July 1989.
- US DOE Environmental Management Website, W.R. Grace Maryland Site

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1959 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: W.R. Grace Co., Agricultural Chemical Div. (Florida)
Ridgewood, Florida

TIME PERIOD: 1954; Residual Radiation 1955 – October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
For one month in 1954, W.R. Grace performed the pilot plant work on solvent extraction for Armour Fertilizer, which used the solvent process to extract uranium from phosphates.

DISCUSSION:
Documentation available for review indicates that a short term (1 month) operational pilot plant was operated and the test facility was subsequently demolished. A radiological survey reported in 1980 found elevated radiation levels in and around the site. There is no documentation indicating that any remediation was performed.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- DOE Report (ORNL); Preliminary Survey of W.R. Grace Company, Ridgewood, Florida; March 1980.
- DOE - FUSRAP Elimination Report; W.R. Grace and Company Agricultural Chemicals Division

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1955 – present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Wah Chang
Albany, Oregon

ALSO KNOWN AS: Teledyne Wah Chang

TIME PERIOD: 1971-1972; Residual Radiation 1973 – October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Wah Chang operations began in 1956 when, under contract with the U.S. Atomic Energy Commission, Wah Chang Corporation reopened the U.S. Bureau of Mines Zirconium Metal Sponge Plant. Construction of new facilities, at the location of the existing plant, began in 1957. These facilities were established primarily for the production of zirconium and hafnium sponge; however, tantalum and niobium pilot facilities were also included. Melting and fabrication operations were added in 1959. Wah Chang may also have been involved in thorium work. In 1971-1972 a subcontract existed with Union Carbide Corporation (Y-12 plant) for melting uranium-bearing material.

DISCUSSION:

Available documentation indicates that process wastes, including naturally occurring radioactive isotopes, generated during AWE related activities still exist at this facility, and are indistinguishable from non-AWE related wastes. This facility is currently undergoing cleanup action through the USEPA Superfund project.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation include:

- DOE Office of Health, Safety and Security Website
- US EPA, Third Five-year Review Report for the Teledyne Wah Chang Superfund Site

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1973 - present

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: West Valley Demonstration Project
West Valley, New York

ALSO KNOWN AS: Nuclear Fuel Services, West Valley
Western New York Fuel Services Center

TIME PERIOD: 1966-1973
Residual Radiation 1974 - 1979
DOE 1980-present

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

From 1966 to 1972, Nuclear Fuel Services, Inc., under contract to the State of New York, operated a commercial nuclear fuel reprocessing plant at the Western New York Nuclear Services Center. The plant reprocessed uranium and plutonium from spent nuclear fuel; sixty percent of this fuel was generated at defense facilities. Spent nuclear fuel reprocessing generated approximately 600,000 gallons of liquid high-level radioactive waste; this waste was stored onsite in underground tanks.

In 1980, the United States Congress passed the West Valley Demonstration Project Act (Public Law 96-368), which authorized the Department of Energy (DOE) to conduct a technology demonstration project to solidify the liquid high-level waste at the Western New York Nuclear Services Center. Under this act, DOE is also responsible for developing containers suitable for the permanent disposal of the solidified high-level waste at an appropriate Federal repository; transporting the containers to this repository; disposing of low level waste and transuranic waste generated by high level waste solidification; and decontaminating and decommissioning facilities used for the solidification. DOE is also responsible for dispositioning the spent nuclear fuel stored at the site.

In 1982, DOE selected vitrification as the treatment process for high level waste. This process solidifies and stabilizes nuclear waste by mixing it with molten glass. Pretreatment of the high-level waste began in 1988 and was successfully completed in 1995. DOE expects to complete the West Valley Demonstration Project by 2005.

DISCUSSION:

Documentation supports the presence of significant residual contamination outside of the period in which weapons-related production occurred. This facility is presently undergoing remedial action under the DOE.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security
- West Valley Demonstration Project Progress Report May 2008

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1974 – 1979

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Westinghouse Atomic Power Development Plant
East Pittsburgh, Pennsylvania

ALSO KNOWN AS: East Pittsburgh Plant

TIME PERIOD: 1942-1944

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Westinghouse prepared uranium metal for Enrico Fermi's Stagg Field experiment and conducted development and pilot-scale production of uranium oxide fuel elements.

DISCUSSION:
Records indicate that at the conclusion of MED activities, all equipment and all of the facilities were decontaminated or shipped to other sites.

A 1976 survey by ORNL did not identify any radioactive contamination above which could normally be considered background at the East Pittsburgh facility. The site was eliminated from FUSRAP consideration in 1985.

Documentation reviewed indicates that this facility was decontaminated at the end of AWE contracted work and that all contamination and/or contaminated items were removed.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report; Certification Docket: Westinghouse Atomic Power Development Plant, East Pittsburgh Plant, Forest Hills Pittsburgh, Pennsylvania; Circa 1985.
- FUSRAP Elimination Report for Westinghouse Atomic Power Development Plant, East Pittsburgh Plant, Forest Hills, Pittsburgh, Pennsylvania; Circa 1985
- Preliminary Survey of Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania; March 1980

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Westinghouse Electric Corp. (New Jersey)
Bloomfield, New Jersey

ALSO KNOWN AS: North American Phillips Lighting

TIME PERIOD: 1942 -1949; Residual Radiation 1944 - October 2009

FACILITY DESCRIPTION:

DOE Office of Health, Safety and Security Website:

Westinghouse Electric Corp., located in Bloomfield, NJ, was one of the large commercial contributors to Manhattan Project research with specific tasks related to uranium metal production and enrichment. Because developing the technology to produce pure uranium metal became a priority for the Manhattan Project, universities and private companies with experience in related chemical processes participated in the task. From 1942-1943, Westinghouse used a photochemical process for metallic uranium and supplied metallic uranium for the first self-sustaining chain reaction in Chicago. In addition to contributing to uranium metal production, Westinghouse Electric participated in activities related to uranium enrichment.

Westinghouse also worked with thorium, but it is unclear if that work took place in Bloomfield, or at another Westinghouse location.

DISCUSSION:

Records indicate thorium work may have occurred as late as 1949 at a Westinghouse facility. Three MED contracts were identified covering the dates August 1942-August 1944. There were two additional MED contracts that were issued in which the dates could not be verified.

A confirmatory survey was requested and performed by ORISE, of Building 7 in 1993 which identified areas of localized residual uranium surface contamination throughout several elevations of the facility, and widespread distribution of residual uranium surface contamination within the basement elevation. These survey results confirm that in 1993, the removable contamination levels were below the regulatory criteria and two areas exhibited direct radiation levels in excess of the regulatory criteria for unrestricted use. There was no documentation available confirming the radiological status of this facility after 1993.

INFORMATIONAL SOURCES:

The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- ORISE 93/H-110 Confirmatory Survey of Buildings 7, 8, 9, and 10A Bloomfield Lamp Plant Westinghouse Electric Corporation Bloomfield, New Jersey dated August 1993.
- Elimination of the Former Westinghouse Electric Corporation

EVALUATION FINDINGS:

Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION

1950 – present

FACILITY NAME: Westinghouse Nuclear Fuels Division
Plutonium Fuel Laboratories and the Advanced Fuel Lab
Cheswick, Pennsylvania

ALSO KNOWN AS: Westinghouse Commercial Manufacturing

TIME PERIOD: 1971-1972; Residual Radiation 1973-1979

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
The Westinghouse Nuclear Fuels Division received shipments of nuclear materials from the AEC nuclear weapons complex in 1971 and 1972. The Cheswick site received a shipment of enriched uranium from the AEC's Fernald plant in 1971. It also received a shipment of plutonium in 1972 from the West Valley facility. This plutonium originated out of Hanford. Because this material came from the nuclear weapons complex, the site qualifies as an Atomic Weapons Employer for these years.
Although the Westinghouse facility in Cheswick, PA, conducted substantial work with radioactive materials in other years, this work is not covered under EEOICPA because it was not related to nuclear weapons production. This includes the fabrication of nuclear fuels and reactor subsystems for naval, space, and civilian applications. Among the projects to which the Cheswick facility contributed were the Naval Nuclear Propulsion Program, the Nuclear Engine for Rocket Vehicle Application (NERVA) program, and the Liquid Metal Fast Breeder Reactor (LMFBR) program.

DISCUSSION:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred that could not be differentiated from contamination originating from non-weapons related work.

Buildings 7 and 8, which were associated with these operations, were decontaminated and decommissioned in 1979, under NRC.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Oak Ridge Associated Universities Report; "Confirmatory Radiological Surveys of Building 10 and Outside Areas Associated with Buildings 7 and 8 Westinghouse Nuclear Fuel Division"; November 1984

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1973 - 1979

ACTIVITY NAME: Woburn Landfill
Woburn, Massachusetts

ALSO KNOWN AS: Winchester Engineering Vicinity Property

TIME PERIOD: 1955-1960

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Fifty 55-gallon drums of low grade uranium ore were buried at the Woburn site. The material came from the AEC Raw Materials Development Laboratory (see the Winchester Engineering and Analytical Center) operated by the National Lead Company under contract from 1955-1960.

DISCUSSION:
Documentation indicates that the material in question had an activity level similar to granite, and was dumped from the drums into a truck for disposition, and subsequently co-mingled with other refuse and waste. The original landfill was excavated in 1974 and was replaced with clean backfill to support construction of a light industrial complex.

Radiological surveys of the old landfill site and the new landfill (where the excavated material was taken to) do not indicate radioactivity greater than expected background levels at either facility.

It appears that the dumping of the contents from fifty drums occurred in 1960, whereupon the drums were reused. Based on the described low-level radiological characteristics of the material and subsequent radiological surveys from the affected areas there is no indication or reason to suspect residual contamination of any consequence existed beyond the date of 1960.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Massachusetts Dept. of Public Health Letter; G.Parker to W.Mott; Subject: Uranium in the Woburn Dump; October 15, 1979
- Oak Ridge National Lab Report; F.Haywood to A.Whitman; Subject: Soil Sample Analysis results; June 20, 1980

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

FACILITY NAME: Wolff-Alport Chemical Corp.
Brooklyn, New York

TIME PERIOD: 1949-1950; Residual Radiation 1951 - October 2009

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Wolff-Alport Chemical Corp. was under contract with the AEC (#AT-30-1-Gen-287) for the procurement of thorium containing sludge for stockpiling by the AEC. A March, 1949 document mentions the "current contract expires June 30, 1949 and will probably be extended for another year. Cost is approximately $50,000 annually." This same document shows that almost 30,000 pounds of thorium oxalate sludge was provided to the AEC that year.

DISCUSSION:
Records further indicate that activities were conducted as early as 1948 and continued on through 1954 when 238 drums of thorium oxalate sludge were sold to the AEC.

Inventory records indicate that each year from 1948 to 1951 a minimum of 3,400 kilograms of thorium oxalate sludge were transferred to AEC.

Documentation reviewed indicates that residual contamination at this facility, if it exists, is not attributable to AWE related work, rather it was a result of commercial operations. Records do however indicate that purchase of sludges began in 1948 and continued through 1954, whereupon the material handling was AWE related.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Letter; Fiore to Solon; Subject; Notification of no DOE authority for Remedial Action at Wolff-Alport Chemical Corp.; 9/29/87. Attachment: FUSRAP Summary Report and Designation/Elimination Analysis for Wolff-Alport Chemical Corp. Brooklyn, N.Y. 1987.
- City of New York Information on Radiation Survey at the Former Wolff-Alport Chemical Corp, September 5, 2007
- Comparative Radiation Dose Table Wolff-Alport

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1951-present

FACILITY NAME: Wolverine Tube Division
Detroit, Michigan

ALSO KNOWN AS: Hermes Automotive
Mamif Corporation
Division of Calumet Consolidated Copper Company

TIME PERIOD: 1943-1946; Residual Radiation 1947-1989

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1943, the University of Chicago subcontracted to Wolverine Tube of Detroit, Michigan, for help in extrusion of metals that were needed as part of the Manhattan Project. Wolverine Tube performed research on the fabrication of aluminum slugs and the process of aluminum canning and also experimented with thorium and beryllium. This contract ended in 1946. Wolverine Tube received other AEC contracts because of its extrusion expertise.

DISCUSSION:
Available documentation does not include information on specific quantities of radioactive materials handled or radiological surveys from the time of, or immediately after, AWE related activities. There are indications that AWE related work may have been performed outside the listed period. Documentation states that "Work probably continued through 1955 under sub-contract with Dupont (Savannah River Operations)."

ORAU performed a radiological survey in October of 1989, verifying the absence of significant residual contamination.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- DOE Report; FUSRAP Elimination Report for Former Wolverine Tube Division 1411 Central Avenue, Detroit, Michigan; June,1990
- DOE (ORAU 90/A-16) Report; Radiological Survey at 1411 Central Avenue, Detroit, Michigan; February 1990

EVALUATION FINDINGS:
Documentation reviewed indicates that there is a potential for significant residual contamination outside of the period in which weapons-related production occurred.

PERIOD OF POTENTIAL RESIDUAL CONTAMINATION
1947 - 1989

FACILITY NAME: Wyckoff Drawn Steel Co.
Chicago, Illinois

ALSO KNOWN AS: Wyckoff Steel Co.
Ferranti Steel and Aluminum Company

TIME PERIOD: 1943

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
In 1943, the Metallurgical Laboratory conducted experiments of center-less grinding equipment on uranium. Wyckoff Drawn Steel Co. surfaced two tubes and one rod; however, its process was deemed to be too expensive and too slow to be used in production.

DISCUSSION:
Given that only one test was conducted using three pieces of metal, the facility is not likely to be contaminated beyond the date indicated on the DOE website.

In 1987, DOE FUSRAP completed an elimination report, removing this facility from FUSRAP activities.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- Metallurgical Laboratory Memorandum; Creutz to Cooper; Subject: Centerless Grinding Equipment; July 28, 1943

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.

Appendix A-2 Residual Radioactivity Evaluations for Individual Facilities

FACILITY NAME: Wykoff Steel Co.
Newark, New Jersey

TIME PERIOD: 1950

FACILITY DESCRIPTION:
DOE Office of Health, Safety and Security Website:
Wykoff Steel conducted tests of methods to straighten and finish uranium rods on September 6, 1950.

DISCUSSION:
There were no radiological surveys performed during or after the test that were available in the available documentation. However, given this was a one-time test, the likelihood of significant facility contamination is remote.

INFORMATIONAL SOURCES:
The sources of information used in this evaluation included:

- DOE Office of Health, Safety and Security Website
- AEC Memorandum; Breslin to Harris; Subject: Uranium Rod Drawing Test at Wyckoff Steel Co.; September 12, 1950

EVALUATION FINDINGS:
Documentation reviewed indicates that there is little potential for significant residual contamination outside of the period in which weapons-related production occurred.