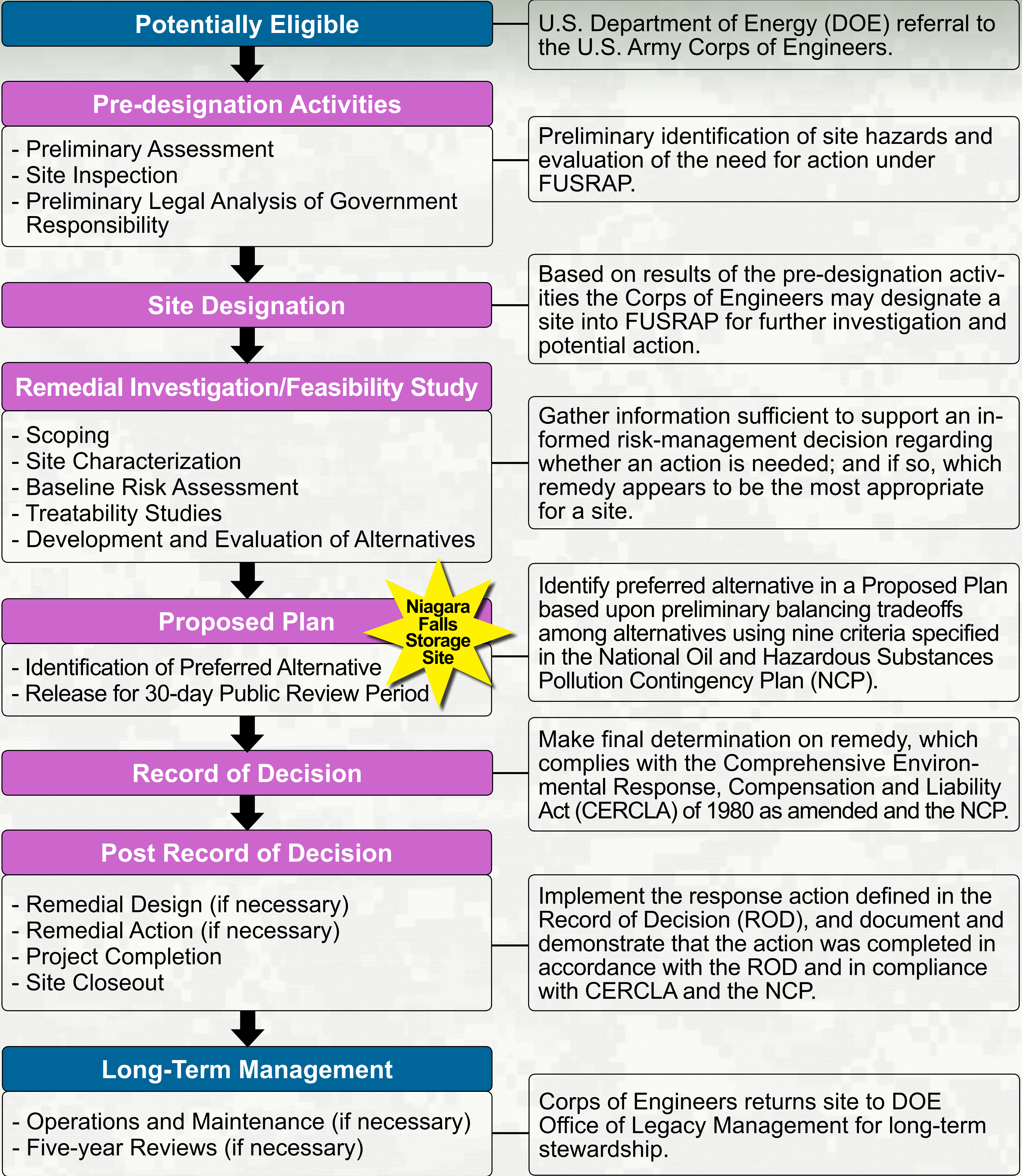




US Army Corps  
of Engineers®  
Buffalo District

# Formerly Utilized Sites Remedial Action Program (FUSRAP) Decision Procedure

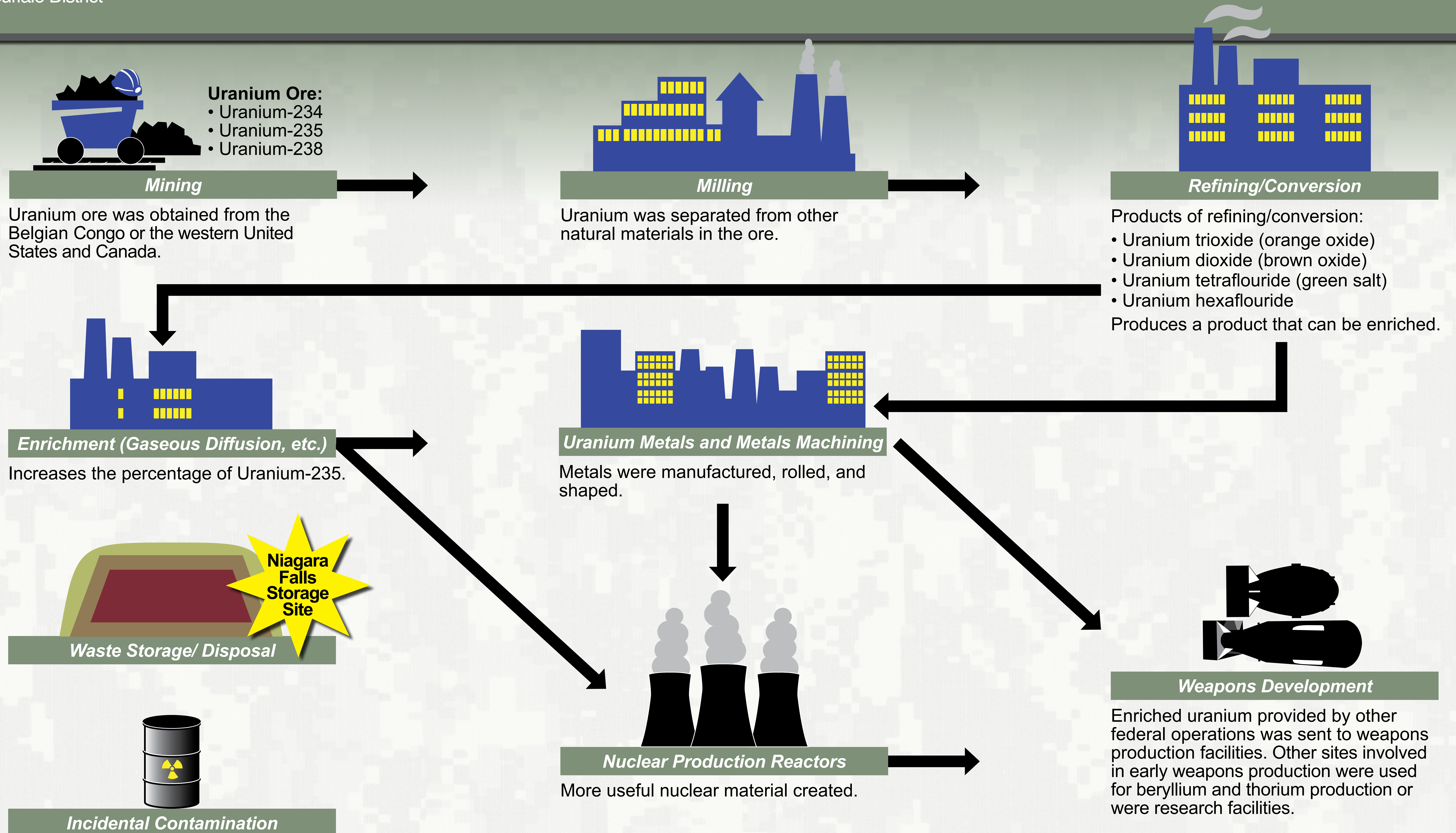






US Army Corps  
of Engineers®  
Buffalo District

# General Overview of the Manhattan Engineer District and Atomic Energy Commission Processes







US Army Corps  
of Engineers®  
Buffalo District

# Niagara Falls Storage Site Timeline 1941-1974

**1941** - Attack on Pearl Harbor (U.S. government officially enters World War II).

**1942** - Under the jurisdiction of the U.S. Army, the Manhattan Engineer District (MED) was established as the lead agency in the development of nuclear energy and given responsibility for the construction aspects of the World War II atomic energy program, which became known as the Manhattan Project.

U.S. government acquires 7,500 acres in the Towns of Lewiston and Porter, New York, and constructs a trinitrotoluene (TNT) production facility, called the Lake Ontario Ordnance Works (LOOW) which was capable of producing 240,000 pounds of TNT per day utilizing four process lines.

**1943** - U.S. War Department stopped production at LOOW due to an oversupply of TNT (an estimated 41,656,000 pounds of TNT had been produced during the nine-month period of production).

**1944** - Chief of Engineers, MED, requested authorization to store low-level radioactive residues (L-30, L-50, R-10, and F-32) and other materials on a portion of the LOOW. These residues and wastes were to be stored on 1,500 acres of the LOOW which when transferred to MED was termed the Lake Ontario Storage Area (LOSA). Due to the shortage of manpower and metal containers during the war, it was believed that bulk storage would be more efficient than barrel storage.

MED used the site as an interim storage location for various wastes, including radioactive residues that resulted from the processing of uranium ore during the development of the atomic bomb. Wastes stored ranged from building and office materials to process sludge.

**1944 - 1946** - L-30 residues are transferred from Linde Ceramics and placed in Building 411; L-50 residues are placed in Buildings 413 and 414. R-10 residues stored on open ground north of Building 411. In 1946, the Tonawanda refinery was decommissioned and contaminated portions of the plant were disposed of at the LOSA.

**1946** - The Manhattan Engineer District was deactivated and its responsibilities were transferred to the newly established Atomic Energy Commission (AEC), under the Atomic Energy Act of 1946 to control the future of the atomic weapons mission including responsibility for all aspects of the development and regulation of nuclear technology.

**1948** - The Department of Defense decommissioned the LOOW and the AEC acquired approximately 1,511 acres of the original 7,500 LOOW which included the original residue storage areas (LOSA).

**1949** - K-65 residues from refining Belgium Congo uranium pitchblende ores owned by African Metals Corporation (Afrimet) at the Mallinckrodt Chemical Works (St. Louis, Missouri) were railed to the LOSA and temporarily stored in drums along roadways/railways, in igloos north of Balmer Road, and inside buildings on the site.

**1950** - Animal carcasses from radiation safety tests conducted at the University of Rochester (Rochester, New York) and wastes from Knolls Atomic Power Lab (KAPL) comprised of spent fuel rods, reactor waste, and combustible material were transferred to the LOSA.

During this time the LOSA was also utilized as a staging point for uranium metal billets being processed at local steel mills.

**1952 - 1953** - K-65 residues were transferred from drums to Building 434 which was a 165-foot tall reinforced concrete silo that was originally constructed at LOOW for water storage. The remainder of the K-65 residues from the St. Louis operations and that processed in the later years at the Feed Materials Production Center, Fernald, Ohio, was stored in two cylindrical concrete tanks at the Fernald Site.

**1954** - Building 401 (former steam plant for TNT manufacturing) was used as a boron-10 isotope separation plant (the non-radioactive boron-10 isotope became of interest in the early 1950s in the developing nuclear industry for use as a shielding material in nuclear reactors). The plant was placed on standby in 1958 and restarted in 1964 (when boron supplies were low) and again put on standby in 1974.

The AEC adopted a policy to cease use of the site for the storage of any additional contaminated material. A major cleanup of the entire site, including the consolidation and removal of surface debris was completed (1954-1955).

**1955** - The AEC declared 1,298 acres excess and was disposed through the General Services Administration leaving 213 acres on the AEC site.

**1958** - At the termination of the ore procurement contracts 25-year lease agreements were negotiated with Afrimet for the continued storage of residues. The original procurement contracts stipulated that the residues could be abandoned by Afrimet when the contracts terminated in 1958 but Afrimet wished to retain the radium-rich residues stored at the AEC storage site in Lewiston, New York, and the Feed Materials Production Center in Fernald, Ohio. The residue storage lease agreements negotiated in 1958 did not permit abandonment by Afrimet when the contracts expired in 1983.

**1964 - 1965** - R-10 residue storage pile was covered with soil and seeded to provide a grass-covered sod layer.

**1970 - 1972** - Radiation surveys performed on the LOSA and its vicinity properties indicated that radioactivity exceeded the AEC guidelines. Off-site radiological surveys and decontamination was performed on vicinity properties as well as the Central Drainage Ditch (using a dose-based criteria) and the material removed from off-site properties was brought onto the LOSA and placed in the area of the R-10 pile, known as the spoil pile.

**1974** - Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated by the AEC to identify, investigate, and, if necessary clean up or control sites that became contaminated as a result of the Nation's former Atomic Energy Program.

The AEC was dissolved in the Energy Reorganization Act of 1974 and its functions were split between two organizations, the Nuclear Regulatory Commission and the Energy Research and Development Administration (predecessor agency to the Department of Energy).





US Army Corps  
of Engineers®  
Buffalo District

# Niagara Falls Storage Site Timeline 1975-1997

**1975** - After the AEC was dissolved the responsibility for FUSRAP and the Niagara Falls Storage Site was transferred to the Energy Research and Development Administration (ERDA).  
ERDA declared the 22-acre waste water treatment plant excess, leaving 191 acres on the now termed Niagara Falls Storage Site (NFSS).

**1977** - The Department of Energy Organization Act was signed into law, which eliminated ERDA and created the Department of Energy (DOE).  
The DOE assumed responsibility for NFSS under the Surplus Facilities Management Program and the NFSS vicinity properties under FUSRAP.

**1979** - The DOE and its subcontractors performed comprehensive radiological surveys of on-site/off-site properties and drainage ditches. During this year the DOE also began the Environmental Surveillance Program to monitor water and air on the storage site to provide information about radionuclides in the off-site environment.

**1982** - Soil near the R-10 spoil pile was moved onto the R-10 pile and a dike cutoff wall was constructed which marked the commencement of the construction of the Waste Containment Structure (WCS) at the NFSS.  
DOE prepares the Long-Range Planning Study to identify feasible alternatives for the NFSS wastes; concludes that entombing the Afrimet residues is the most favorable disposition.  
Radiological surveys of vicinity properties were conducted and excavated soils were consolidated in the WCS.

**1983** - DOE took title of the pitchblende residues and released Afrimet from its obligations with respect to the residues when the 25-year contract expired.

**1983 - 1984** - Start of K-65 residue transfer by hydraulic mining from Building 434 to eastern half of Building 411. Buildings 410, 412 and 415 were demolished.

**1984** - A detailed geologic study of the WCS area concludes that the NFSS is suitable for long-term storage of low-level radioactive waste and the Final Implementation Plan for the Environmental Impact Statement for Long-Term Management of Existing Wastes and Residues at the NFSS was released.  
Ore residues are transferred into former-LOOW water treatment Buildings 411, 413, and 414 which were to be included in the WCS.

**1985** - Remainder of K-65 residues transferred to Building 411; demarcation layer installed to identify the location of the K-65 residues.  
Additional materials excavated from on-site and off-site areas were transferred to the WCS (including rubble from demolished on-site buildings).  
Buried drums removed from a vicinity property were stored on NFSS for waste characterization.

**1986** - The cap over the residues and waste in the IWCS was closed and completed.

**1988** - Several places of residual radioactivity at NFSS and isolated areas of radioactivity identified from verification surveys were excavated and placed in temporary storage at NFSS.

**1990** - Responsibility for NFSS was transferred to FUSRAP from the Surplus Facilities Management Program.  
A limited chemical characterization was conducted at NFSS to identify non-radioactive contaminants.

**1991** - A 325 ft. by 192 ft. waste containment cell was excavated within the northern portion of the Interim Waste Containment Structure (IWCS). Soil from on-site remediation and 63 drums from the vicinity properties remediation were consolidated into the IWCS. In addition, remaining radioactive material at the NFSS such as contaminated soil samples, pipes, scrap metal and debris were also added into this excavation and subsequently covered with clay and the IWCS cap was reconstructed.

**1992** - A Site Inspection (following the CERCLA process) was submitted to the Environmental Protection Agency from the Department of Energy which included a Hazard Ranking Score (HRS) for the NFSS. Two sources were evaluated for the HRS; the IWCS which received a score of zero and Building 401 which received a score of 0.533 due to the presence of organic compounds. Since the IWCS had already been constructed at the time of the site inspection and HRS evaluation, the site was not placed on the National Priority List. (Note: Fernald was on the National Priority List, which required an HRS greater than 28.5).

**1994** - DOE performs a failure analysis and determines that with the addition of a long-term cap over the existing cap, the IWCS will isolate the waste from radiological emissions for a 10,000-year period.

**1995** - National Academy of Sciences/National Research Council independent review recommends that the high-level residues be disposed of off-site and other materials remain on site.





US Army Corps  
of Engineers®  
Buffalo District

# Niagara Falls Storage Site Timeline 1997-Present

**1997** - Congress transferred the authority for FUSRAP from DOE to the Corps of Engineers in the Energy, Water Development and Appropriations Act, transferring responsibility for NFSS and Vicinity Property E, E Prime, and G from DOE to the Corps of Engineers. The DOE retained ownership of the NFSS.

**1999** - The Corps of Engineers prepared a Field Sampling Plan to initiate remedial investigation (RI) activities and initiated Phase I RI sampling of the NFSS.

**2000** - Decontaminated, demolished, and safely disposed of Building 403 (former laboratory and office building). Initiated Phase II RI sampling. Conducted extensive background radiological sampling of soils to develop representative background screening levels to use for comparing site data.

**2001** - The Corps of Engineers conducted site-wide gamma walkover and geophysical surveys at NFSS. The Corps of Engineers conducted background gamma walkover survey at Lewiston-Porter School District. Conducted geophysical survey on Vicinity Property G to investigate the former University of Rochester burial area. Initiated Phase III RI sampling.

**2002** - Conducted exploratory trenching activities on Vicinity Property G to investigate the former University of Rochester burial area. Conducted exploratory trenching activities at NFSS.

**2003** - Building 401 was remediated for asbestos contamination. Conducted extensive background radiological sampling of groundwater to develop representative background screening levels to use for comparing site data. Completed Phase III RI sampling.

**2004** - Congress designates ore residues from Fernald and the NFSS as "Byproduct material" as defined by Section 11e.(2) of the Atomic Energy Act of 1954.

**2006** - Radiological sampling of former LOOW underground utility lines.

**2007** - The Corps of Engineers issued a comprehensive, three volume RI Report, which identified the potential nature and extent of contamination, evaluated the risks to human health and the environment, and evaluated the potential movement of contaminants through the groundwater beneath the site.

**2009** - Work Plan for Feasibility Study released, which proposes an operable unit (OU) approach to evaluate remedial action alternatives at the NFSS and prioritizes the IWCS OU. The IWCS Feasibility Study will be initially released in a series of technical memoranda. Historical photo analysis performed.

**2010** - Building 401 deconstruction completed.

**2011** - Meteorological Data Evaluation Technical Report issued. RI Report Addendum released to address public comments on the RI Report. Updated Groundwater Flow and Contaminant Transport Modeling Results Report released. Waste Disposal Options and Fernald Lessons Learned Technical Memorandum released.

**2012** - Radon Assessment Technical Memorandum released. Preliminary Evaluation of Health Effects for Hypothetical Exposures to Contaminants from the IWCS Technical Memorandum released. The Feasibility Study for the Balance of Plant is initiated via release of plan for additional sampling and investigation.

**2013** - Remedial Technologies Development and Screening Technical Memorandum released. Balance of Plant OU Field Investigation Report released.

**2015** - DOE refers Vicinity Properties H Prime and X to the Corps of Engineers for evaluation for eligibility in FUSRAP. Balance of Plant Contamination Extent Investigation Report released. 2015 Interim Waste Containment Structure OU Feasibility Study released. 2015 Interim Waste Containment Structure OU Proposed Plan released.