



Seaway FUSRAP Site

Town of Tonawanda, New York

**U.S. Army Corps of Engineers
Buffalo District**

Building Strong®

June 2015

Formerly Utilized Sites Remedial Action Program (FUSRAP)

FUSRAP was initiated in 1974 to identify, investigate, and clean up or control sites throughout the United States that were part of the Nation's early atomic weapons and energy programs during the 1940s, 1950s, and 1960s. Congress transferred the management of FUSRAP from the U.S. Department of Energy to the U.S. Army Corps of Engineers in 1997. When implementing FUSRAP, the Corps follows the investigation and response framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan.



Seaway Site with Area Identifiers

Site Description

The Seaway Site is located within the 100-acre Seaway Industrial Park located along River Road in the Town of Tonawanda, Erie County, NY, north of Buffalo and just south of the Niagara River. The site was operated as a landfill by Browning-Ferris Industries (BFI) through 1993. After ceasing operations, most of the landfill was capped by BFI in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC).

Site History

The Seaway Site was created when Formerly Utilized Sites Remedial Action Program (FUSRAP)-related materials containing low levels of residual radioactivity were disposed of on the adjacent property, Ashland 1, leased by the federal government. These radioactive residues were the result of activities conducted at the former Linde Site to support the Nation's nuclear weapons program. This material was later relocated by Ashland Oil to the Seaway Site Areas A, B, C, and the Ashland 2 Site. These residues contained radium, thorium, uranium and uranium daughter products.

Area A is about an 11-acre area. It is estimated that 40 percent of Area A is covered by a layer of fill material and refuse up to 10-feet thick. Areas B and C combined are about four acres. It is estimated that portions of Areas B and C have been covered with up to 80 feet of fill.

As a result of remediation of the sites adjacent to Seaway (Ashland 1 and Ashland 2), two additional areas of contamination along the Seaway property were identified. These new areas are identified as Seaway Southside and Seaway Northside.

The Corps of Engineers conducted additional studies and issued an addendum to the 1993 Feasibility Study performed by the Department of Energy. This Feasibility Study Addendum (FSA), completed in 2008, incorporates the results of subsequent Corps assessments of groundwater, radon emissions and land-use controls. The FSA also incorporates additional sampling results and improved volume estimates, updates the radiological risk posed by the FUSRAP contaminants, and develops and evaluates remedial alternatives. The Corps concluded that CERCLA action is necessary for site soils to be protective of human health and the environment considering future industrial/commercial users. The site and adjacent areas are zoned industrial/commercial. A Proposed Plan was released for public comment on August 25, 2008. A Public Meeting was held on September 24, 2008; and the public comment period ended on November 28, 2008.

The Great Lakes and Ohio River Division Commander, Major General John W. Peabody, executed the Record of Decision for the Seaway FUSRAP Site on October 25, 2009. The comments received during the public comment period and the responses to them are included in the Responsiveness Summary portion of the Record of Decision.

The Selected Remedy is Alternative 6 - Containment with Limited Offsite Disposal. The Selected Remedy requires excavation of FUSRAP-related material in Seaway Northside and Southside that are located outside the landfill boundaries that exceeds the cleanup criteria and requires shipping it off-site for disposal. It also requires the capping of Investigative Areas A, B, and C within the landfill boundaries. The cap for the FUSRAP-related material will be constructed of multiple layers of various types of soil, fabric, and geomembranes at least 4.5 feet thick.

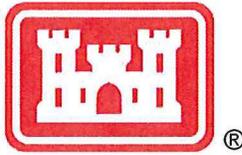
Long-term monitoring of FUSRAP-related materials in capped areas, surveillance, and maintenance will be performed by the federal government. The federal government will ensure that land-use controls are in place to prevent future access to and disturbance of the contained FUSRAP-related materials. This remedy will be protective of human health and the environment, and complies with Applicable or Relevant and Appropriate Requirements.

Status of the Site

Two remedial action scopes of work for the selected remedy are being prepared: 1) for the excavation and disposal of FUSRAP-contaminated soil in Seaway Northside and Southside and 2) for the capping of Areas A, B, and C within the landfill boundaries. During 2014 an investigation to further delineate the extent of contamination in the Northside area was conducted, which identified the presence of less FUSRAP-contaminated soil than previously estimated. Remediation of the FUSRAP-contaminated soil in the Northside and Southside areas will be completed in 2015, while capping of Areas A, B, and C will occur later pending the completion of currently ongoing cleanups at other FUSRAP sites and the availability of program funding.

Administrative Record

The Administrative Record File for the Seaway Site contains the Record of Decision and all supporting documents. It is available for your review by appointment at the address below. Information about the site is also available on web at the address below.



Radiation at FUSRAP Sites

U.S. Army Corps of Engineers
Buffalo District
June 2015

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

The Nature of Radiation

Radiation is the emission of energy in the form of waves or particles through space or through a material medium. Radioactivity is the emission of radiation (energy) that occurs when an atom, the basic unit of matter, is unstable and decays into a more stable form.

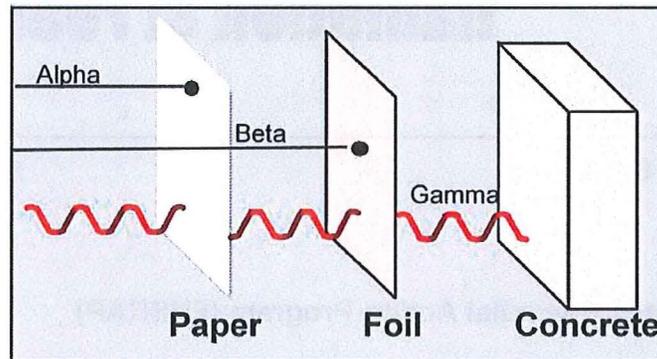
Radiation is classified into two main categories, non-ionizing and ionizing, depending on its ability to ionize matter. Ionization is the process by which an atom or molecule acquires a negative or positive charge by gaining or losing electrons to form ions. At FUSRAP sites the primary focus is on ionizing radiation, which has the ability to ionize matter directly or indirectly.

Directly ionizing radiation particles are particles which carry a charge such as beta or alpha particles and can directly ionize matter. Indirectly ionizing radiation is photons (i.e. gamma rays) or neutrons (neutral particles) which interact with the medium and produce directly ionizing charged particles (i.e. alpha/beta particles) which will then cause ionization.

Alpha particles are large subatomic particles consisting of two protons and two neutrons (identical to a Helium nucleus) which are ejected from the nucleus of some unstable (radioactive) atoms. They can travel only a few inches through air and can be stopped by a sheet of paper or the outer layers of skin. Materials that emit alpha particles are potentially dangerous if they are inhaled or swallowed, but external exposure generally does not pose a danger. These particles are directly ionizing and interact with matter by collisions or through electromagnetic interactions (alpha particles are positively charged).

Beta particles are subatomic particles (equivalent to an electron) that are ejected from the nucleus of some unstable (radioactive) atoms. Beta particles are smaller and faster than alpha particles but can travel further in air. They can easily be stopped by a thin shield such as a sheet of aluminum foil. These particles are directly ionizing and interact with matter by collisions or through electromagnetic interactions (beta particles are negatively charged).

Gamma rays are photons which are emitted from some unstable (radioactive) atoms to rid an unstable nucleus of excess energy after most nuclear reactions. Gamma rays are a type of electromagnetic wave, much like X-rays, and move at the speed of light. Gamma rays do not have a mass or an electric charge and, as a result, penetrate much further through matter than either alpha or beta radiation. These rays can be stopped by a thick shield of lead, steel, or concrete.



Radiation cannot be detected by human senses. For example it cannot be seen, heard, smelled, or tasted. However, it can be detected by instruments specifically designed to measure the type and energy of radiation released during a radioactive decay. Examples of such detectors used at FUSRAP sites include geiger counters, scintillators, gamma spectroscopy detectors and personnel dosimeters.

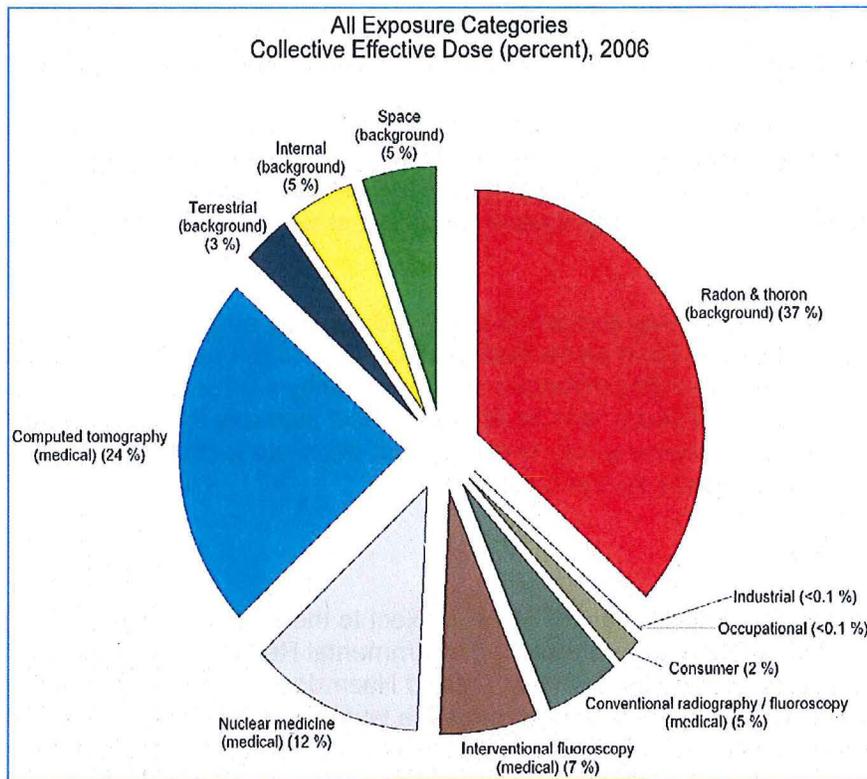
The international unit for radioactivity is the becquerel (Bq) which is defined as one decay or disintegration per second. The traditional unit used in the United States for radioactivity is the curie (Ci) which is defined as 3.7×10^{10} Bq. At FUSRAP sites the concentration of radioactivity in soil (activity/gram) or water (activity/liter) is typically on the order of picocuries per gram (pCi/g) or picocuries per liter (pCi/L) where pico is the prefix denoting a factor of 10^{-12} or one billionth of one curie per gram or liter, respectively. Guidelines for remediation of soil at FUSRAP sites are commonly expressed in units of pCi/g and regulatory limits of radionuclides in drinking water are commonly presented in pCi/L.

The dose equivalent is a measurement of the biological damage to living tissue as a result of exposure to radiation. This measurement is expressed in the international units of sieverts (Sv) and as rems in the traditional units (United States). Regulatory limits of radiation dose to the general public are expressed in millirems (thousandths of a rem), abbreviated as mrem.

Sources of Radiation

Radiation is naturally occurring and is found in all aspects of our daily lives. Sources of natural radiation include radionuclides in soil (e.g., uranium-238), cosmic radiation, and radioactivity in the food we eat (e.g., carbon-14 and potassium-40). There are also man-made sources of radiation for such as medical diagnostics (e.g., X-rays and fluoroscopy procedures) as well as nuclear medicine procedures.

The National Council of Radiation Protection (NCRP) has determined that the average U.S. resident receives a dose of 620 mrem per year. The amount of radiation at the boundaries of FUSRAP sites is kept to levels as low as reasonably achievable. The exposure a member of the general public can receive as a result of radiation from FUSRAP sites is very low. The maximum allowable exposure is 100 mrem per year above background levels. The following chart, generated by the NCRP, provides a summary of the sources of exposure which lead to this annual background as a reference.



Average annual dose distribution in the U.S. [Total dose received is 620mrem/year].
Reference: National Council on Radiation Protection - Report 160 (2009)

Radioactive Materials at FUSRAP Sites

During the early years of the nation's atomic energy program, many sites were used by the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) [forerunners of the Department of Energy (DOE)] for processing and storing radioactive materials. In 1974, the DOE began FUSRAP to address contamination at sites formerly used for MED and early AEC operations that were not addressed by other programs. In October 1997, Congress transferred FUSRAP to the U.S. Army Corps of Engineers. Several sites with radioactive contamination similar to that produced by MED or AEC activities have also been added to FUSRAP by Congress.

FUSRAP was established to ensure that the public and the environment are not exposed to potentially harmful levels of radiation from these sites. The goal of FUSRAP is to clean up or contain the radioactive material so that the sites may be released for appropriate future use. FUSRAP sites are generally contaminated with low levels of uranium, thorium and radium, and their associated decay products (these decay series emit alpha, beta and gamma radiation). Mixed wastes also are sometimes present, such as chemical contamination comingled with radiologically impacted soil.

It is important to understand that the radioactive materials left at FUSRAP sites are contaminated with low levels of residual radioactivity since the raw product was shipped off site at the time. In most cases, the contaminants on a FUSRAP site currently pose no risk above acceptable limits to human health or the environment given their current land uses. In many

FUSRAP sites, the contamination is in soil that is several inches below ground level, capped with vegetation and/or is in areas that have restricted access to the general public.

Many FUSRAP sites have environmental monitoring programs which take into account potential pathways of exposure that may negatively affect human health or the environment. Examples of environmental media that may be sampled at a FUSRAP site could include some or all of the following: surface water, sediment, groundwater, ambient air (radon) and external gamma radiation.

Even though FUSRAP sites may contain levels of radioactivity above current regulatory guidelines, none of the sites pose an immediate health risk to the public or environment given current land uses. Although these materials are not currently a hazard, they will remain radioactive for thousands of years, and health risks could increase if the use of the land were to change. The Corps of Engineers wants to ensure that each site is protective to a standard that considers possible future uses for the land.

FUSRAP Process

The Corps of Engineers implements FUSRAP subject to the administrative, procedural, and regulatory provisions of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan. The first step is to determine the levels of radioactivity at the site. Air, water, soil, or other routes by which radioactive materials could spread are identified and monitored. Potential human health and ecological risks from the contaminants are assessed. At many sites, access restrictions minimize exposure of the public to radioactive materials. If necessary, remedial response alternatives are developed and evaluated and a preferred remedial alternative is identified. Comments received from the community are considered regarding the preferred alternative. A record of decision documents the selected remedial alternative.

**U.S. ARMY CORPS OF ENGINEERS – BUFFALO DISTRICT
ENVIRONMENTAL PROJECT MANAGEMENT TEAM**

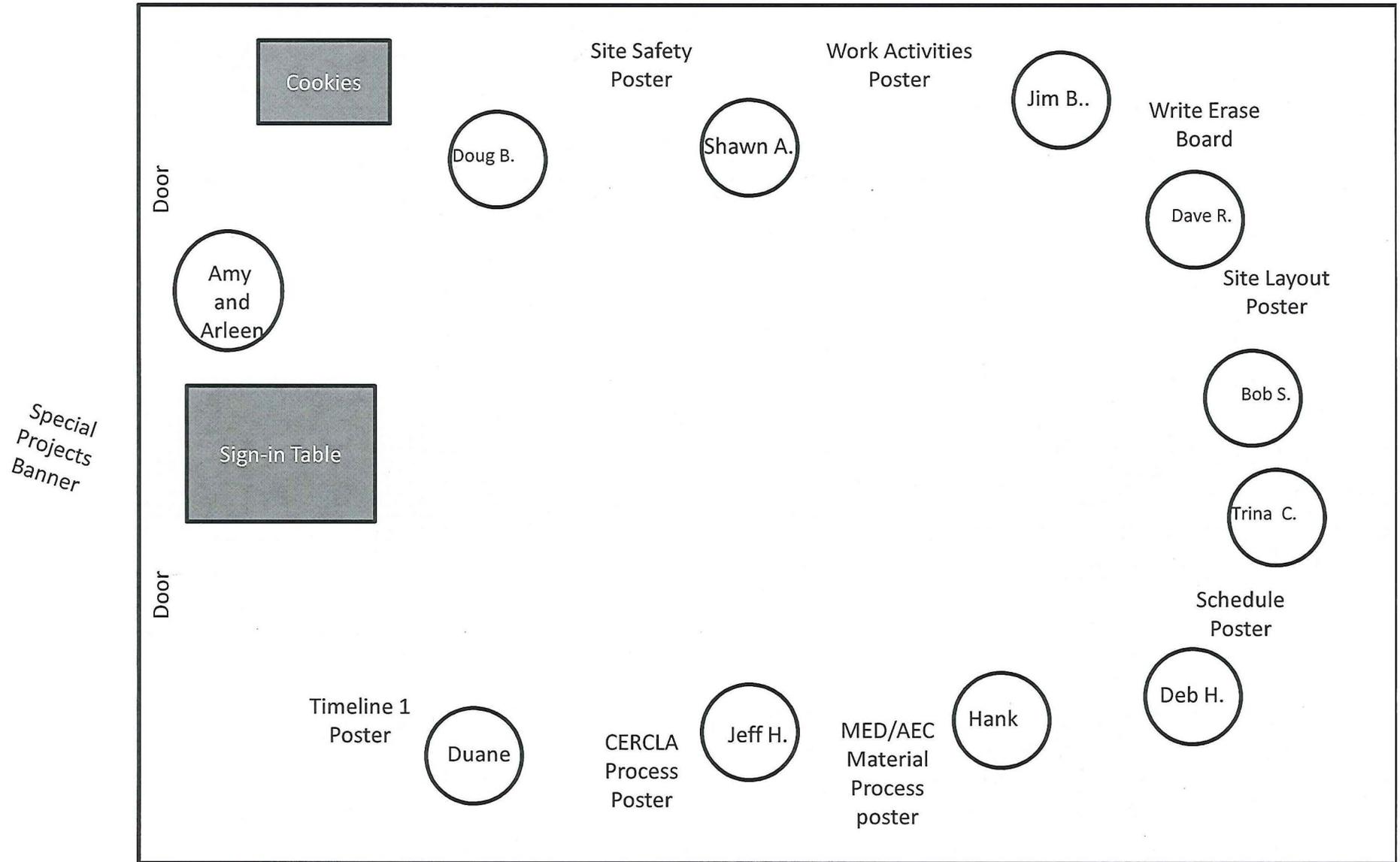
1776 NIAGARA STREET, BUFFALO, N.Y. 14207

Phone: 800-833-6390 (Option 4)

Email: fusrap@usace.army.mil

Website: <http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP.aspx>

Seaway Poster Session Floor Plan and Poster Assignments



Please offer your comments, ask any questions, or request more information regarding Seaway Formerly Utilized Sites Remedial Action Program Site here. You may fill out this comment card now and leave it in the comment box or take this card home with you and mail it back to us at the address below. Please print legibly. Thank you for participating in this outreach. The Corps of Engineers' Buffalo District FUSRAP Team values your input.

Optional Information

Name:
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Phone Number:



US Army Corps
of Engineers
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FUSRAP Team

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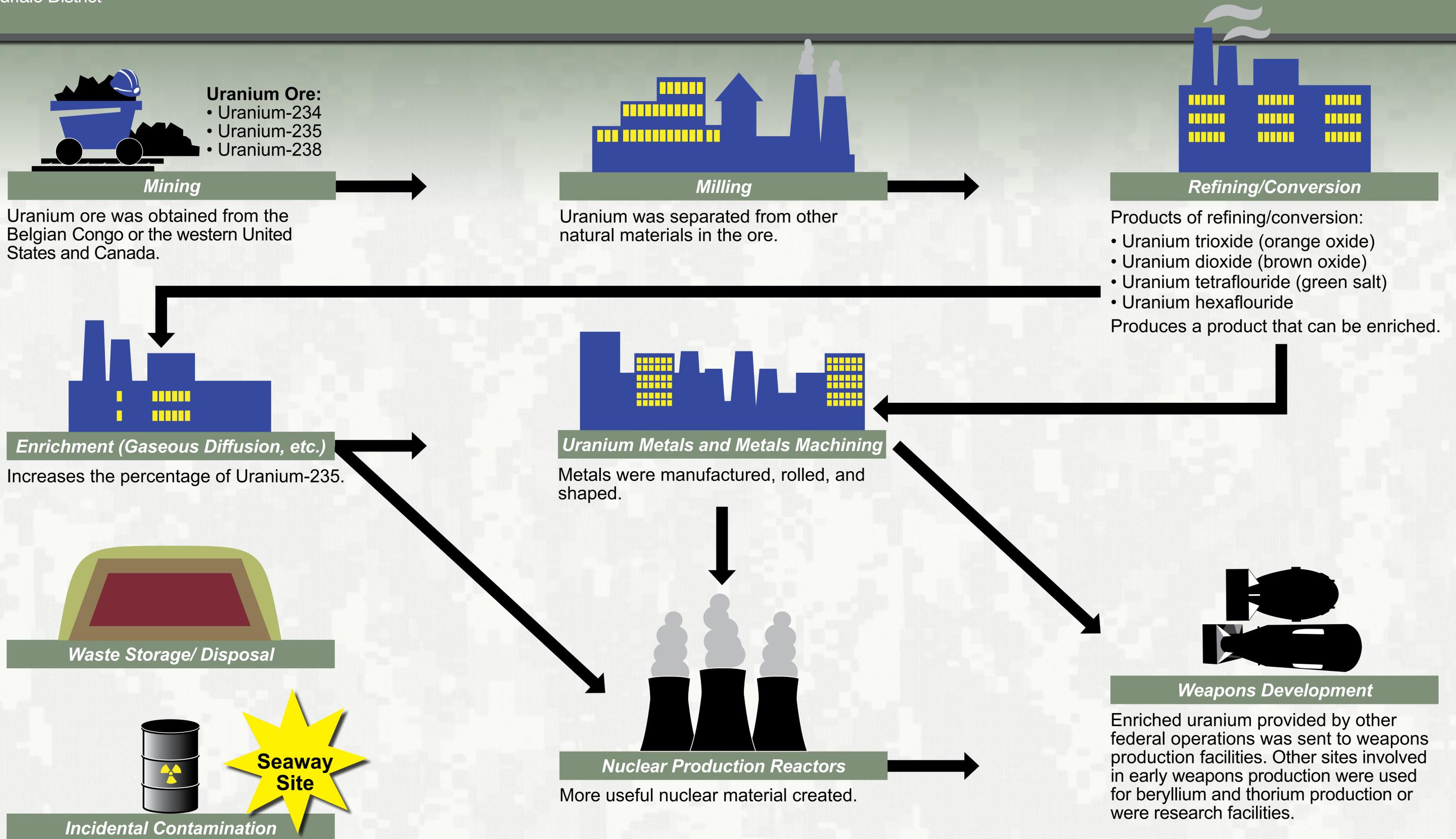
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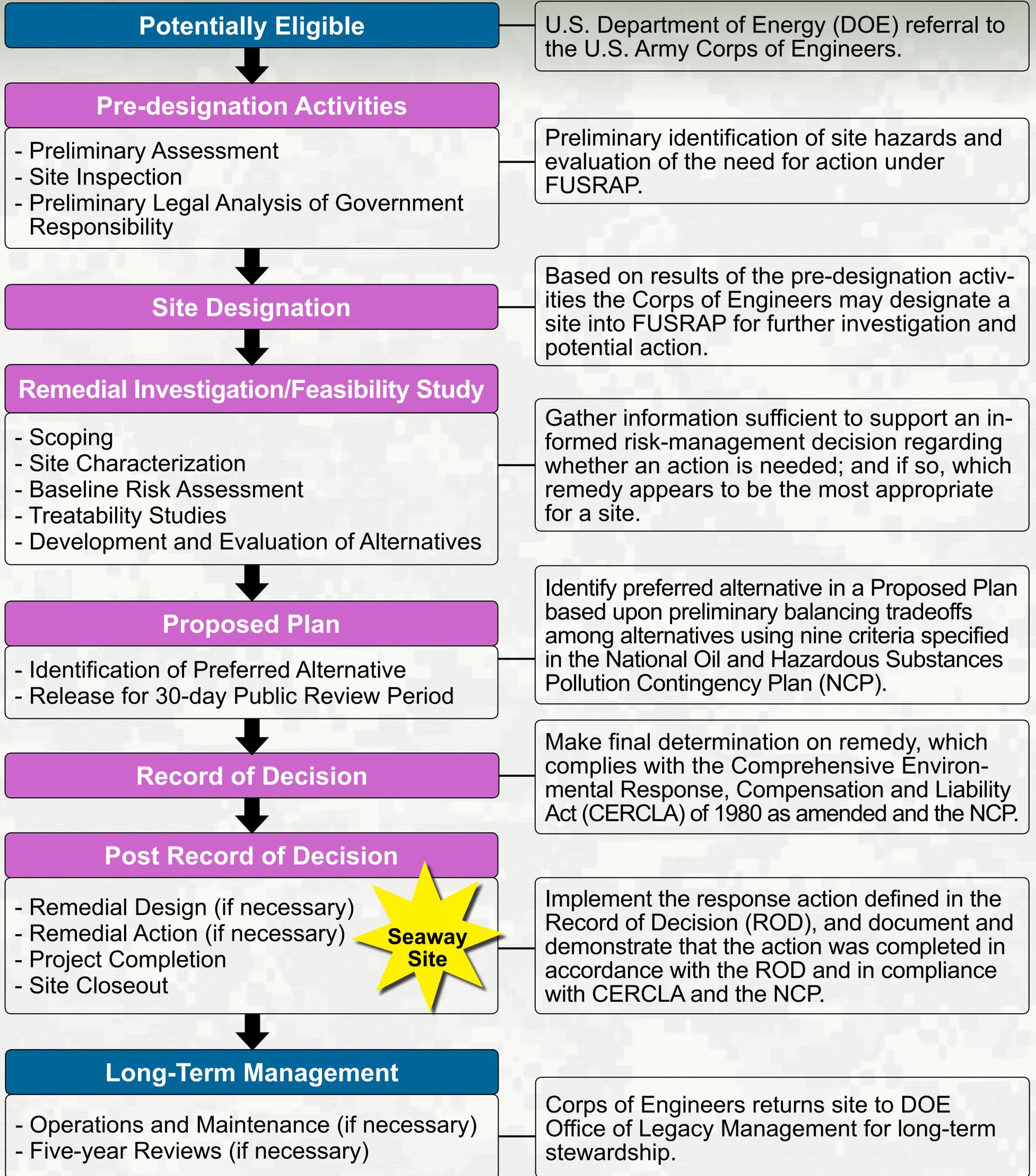
General Overview of the Manhattan Engineer District and Atomic Energy Commission Processes





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Formerly Utilized Sites Remedial Action Program (FUSRAP) Decision Procedure





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Seaway Site Timeline From 1930 to 2014

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Seaway Landfill begins being used for the disposal of various types of waste.

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Mill tailings from Manhattan Engineer District (MED) activities were transported to Ashland 1 from the Linde Site.

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Ashland 1 property owner moved approximately 6,000 cubic yards of MED-related material to the Seaway Site and Ashland 2.

Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated to identify, investigate, and if necessary, clean up or control sites throughout the United States contaminated as a result of MED or early Atomic Energy Commission activities.

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Radiological and gamma walkover surveys of the Seaway Site were conducted. Radiation was measured at depth in core hole samples.

Additional surveys performed in Areas A, B and C that identified FUSRAP-related material.

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The Seaway Site was designated into FUSRAP.

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A gamma walkover survey of FUSRAP-related material in Area A was performed. Areas B and C were found to be covered by significant fill material and refuse.

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U.S. Department of Energy releases remedial investigation, baseline risk assessment, feasibility study and proposed plan addressing Tonawanda Sites (Linde, Ashland 1, Ashland 2 and Seaway).



Congress transferred management and execution of FUSRAP to the U.S. Army Corps of Engineers.

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U.S. Army Corps of Engineers conducted gamma walkover survey of Areas A, B and C.

U.S. Army Corps of Engineers conducted a limited field investigation in Areas B and C.

U.S. Army Corps of Engineers' remediation efforts of Ashland 1 and Ashland 2 areas obtains additional information about perimeter soil contamination at the Seaway Northside and Southside areas.

U.S. Army Corps of Engineers performed extensive subsurface soil investigation of Areas B and C.



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Addendum to the feasibility study for the Seaway Site complete.

Proposed plan released for the Seaway Site.

Record of decision for the Seaway Site - designates containment of FUSRAP-related material within the landfill and, excavation and off-site disposal of contaminated soil in the Northside and Southside areas.

Remediation scope of work completed for removal of FUSRAP-contaminated soil in the Northside and Southside areas.

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Seaway Landfill Site

TONAWANDA, NY

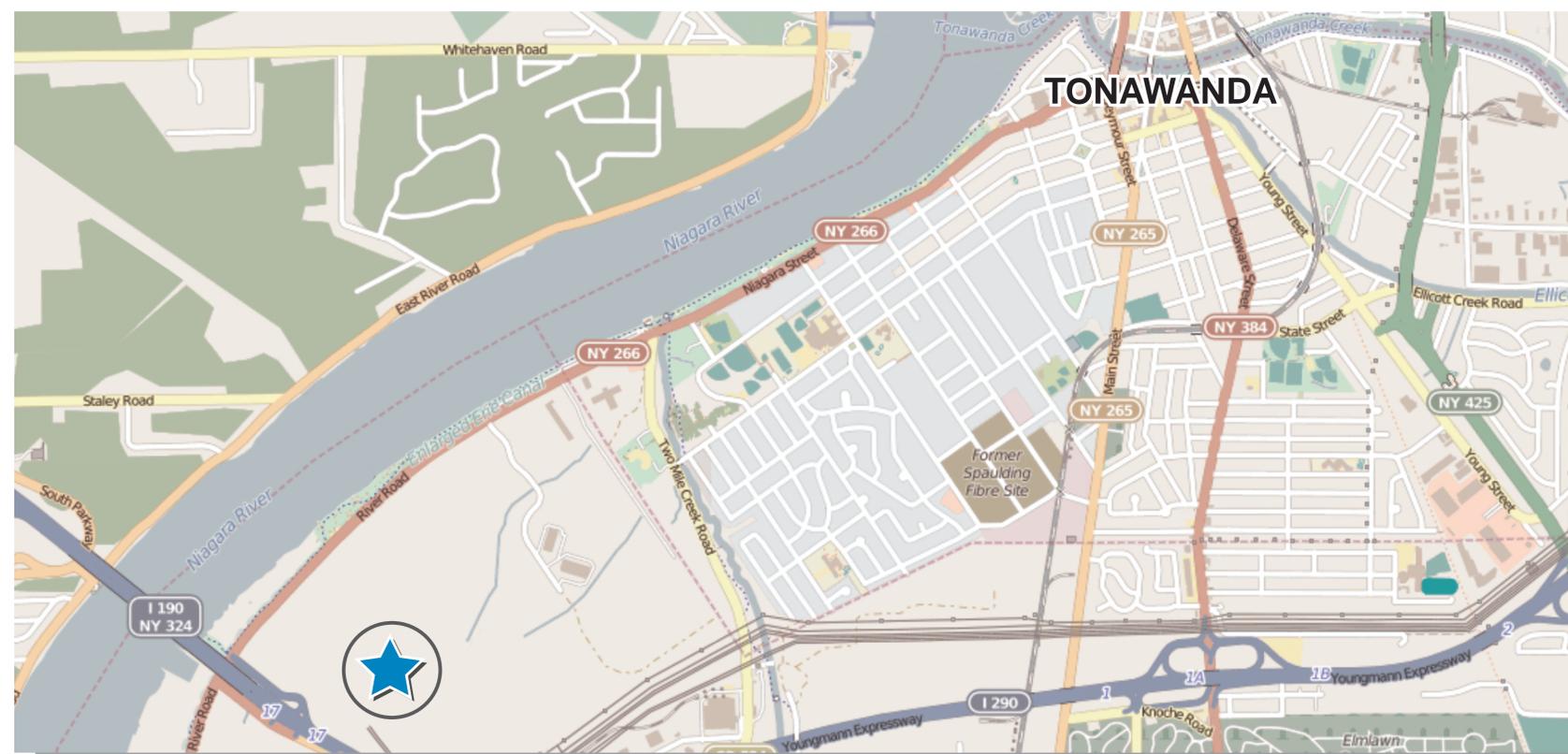
- The Seaway Site property comprises about 100 acres referred to as the Seaway Industrial Park. It is owned by the Sands Mobile Park Corporation and Benderson Development Company.
- The Seaway Site was a commercial landfill used for the disposal of various types of wastes from 1930 to 1993.
- This site became contaminated with Formerly Utilized Sites Remedial Action Program (FUSRAP)-related material when material from the Linde Site that was at the neighboring Ashland I Site was moved by Ashland Oil to the landfill.
- Approximately 90% of the site has been used for disposal, and approximately 67% has been capped by the property owner in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC).
- Areas of known FUSRAP-related material were intentionally left uncapped. Later investigations showed some FUSRAP material in areas that were capped, and some FUSRAP material outside of the footprint of the landfill.
- When implementing FUSRAP, the Corps of Engineers follows the investigation and response framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.

Selected Remedy

- The selected remedy for the Seaway Site includes two remedial actions: (1) containment by capping of FUSRAP material within the landfill and, (2) excavation and disposal of FUSRAP-contaminated soils located outside the landfill protective boundary.
- To ensure the long-term integrity of the Seaway Site, monitoring of FUSRAP-related materials in capped areas, and maintenance will be performed.
- The federal government will ensure land-use controls are in place to prevent future access to and disturbance of FUSRAP-related material.

Current Status

- The Corps released the record of decision (ROD) for the Seaway Site in November 2009. The ROD documents the final selected remedy for the Seaway Site, which is Containment with Limited Offsite Disposal.
- A remedial action to remove FUSRAP-contaminated soils outside the landfill containment system has been contracted for completion in 2015.
- Supporting this action for completion in 2015:
 - A pre-remediation investigation was conducted to further delineate the extent of soil requiring remediation.
 - A scope of work was prepared providing design and contractual details for the remedial action.
 - A competitively bid contract was awarded and comprehensive work plans were prepared to safely execute the work.

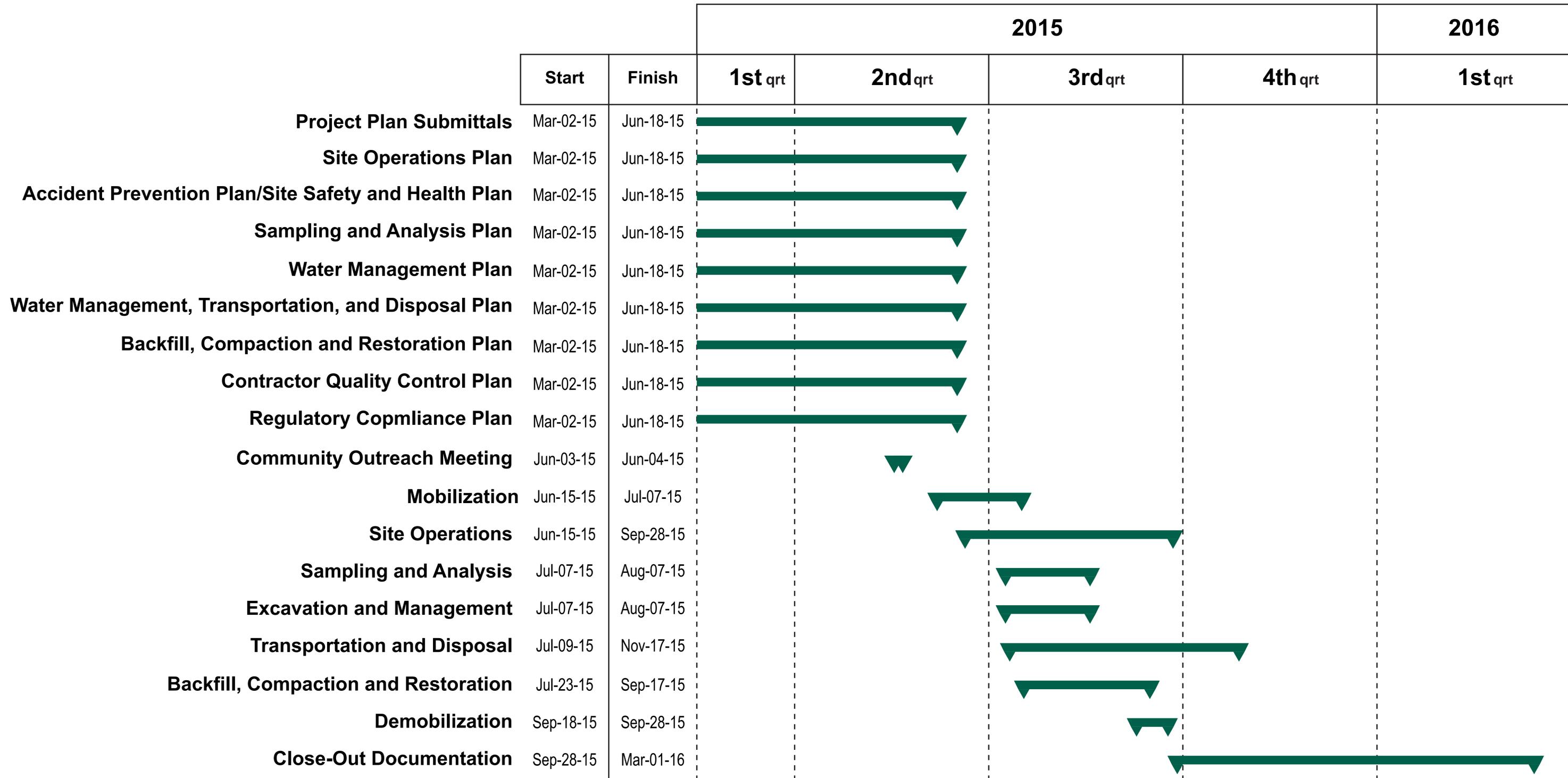




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Seaway Landfill Site

TONAWANDA, NY

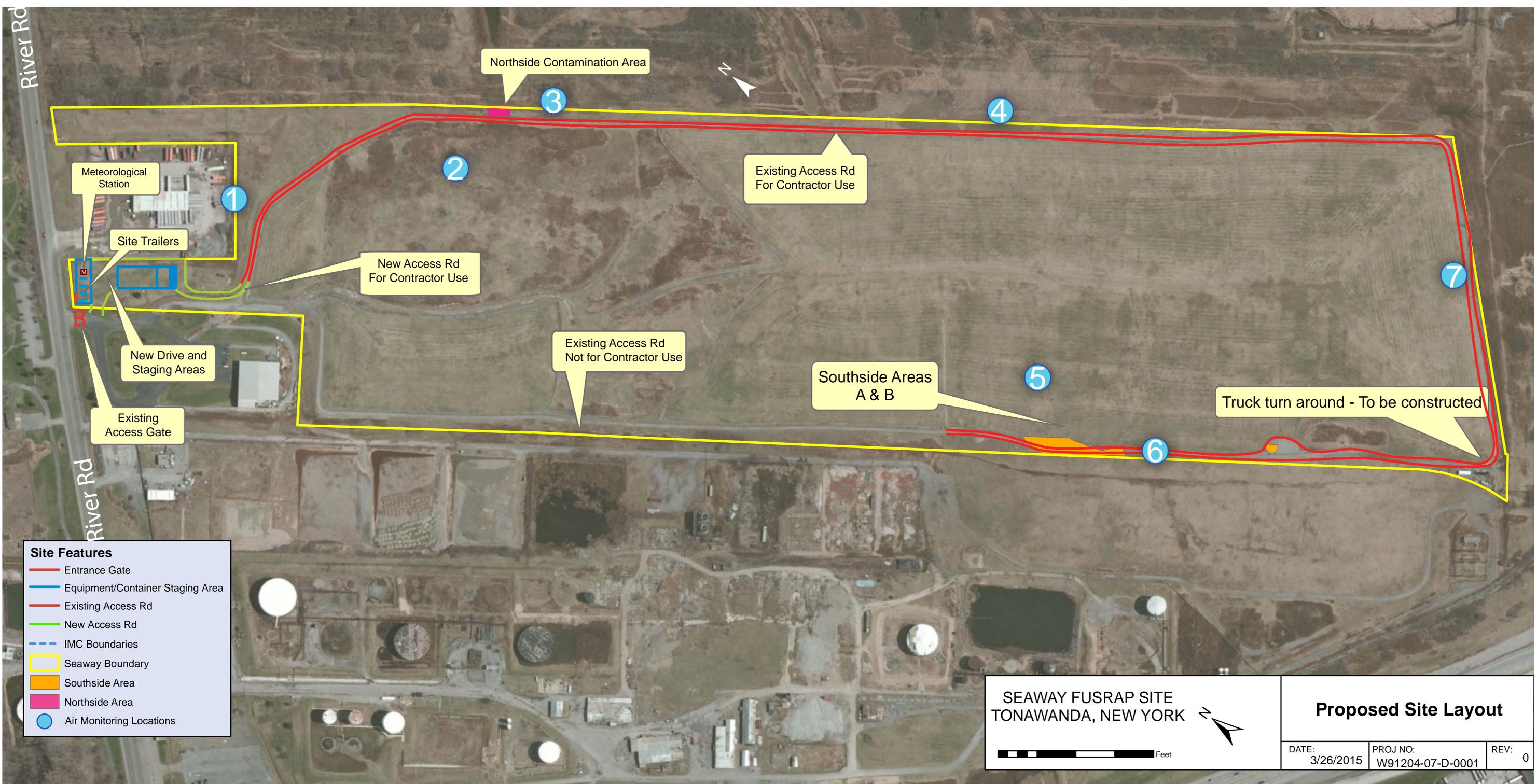




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Seaway Landfill Site

TONAWANDA, NY



Site Features

- Entrance Gate
- Equipment/Container Staging Area
- Existing Access Rd
- New Access Rd
- - - IMC Boundaries
- Seaway Boundary
- Southside Area
- Northside Area
- Air Monitoring Locations

SEAWAY FUSRAP SITE
TONAWANDA, NEW YORK

Proposed Site Layout

DATE: 3/26/2015	PROJ NO: W91204-07-D-0001	REV: 0
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Seaway Landfill Site

TONAWANDA, NY

Safety Measures



Dust Control



Training



**Wastewater
Control**



**Restricted Work
Zones**



Air Monitoring



**Radiological
Surveying**



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Seaway Landfill Site

TONAWANDA, NY

Site Activities



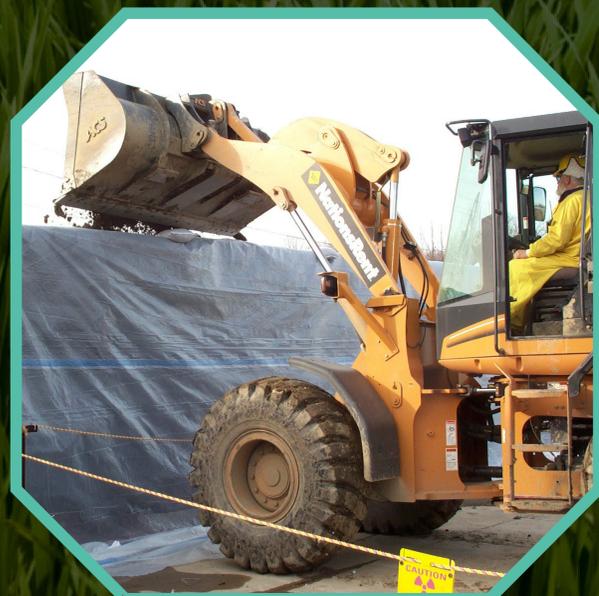
Mobilization



Soil Sampling



Excavation



Waste Loading



**Transportation and
Disposal**



Site Restoration