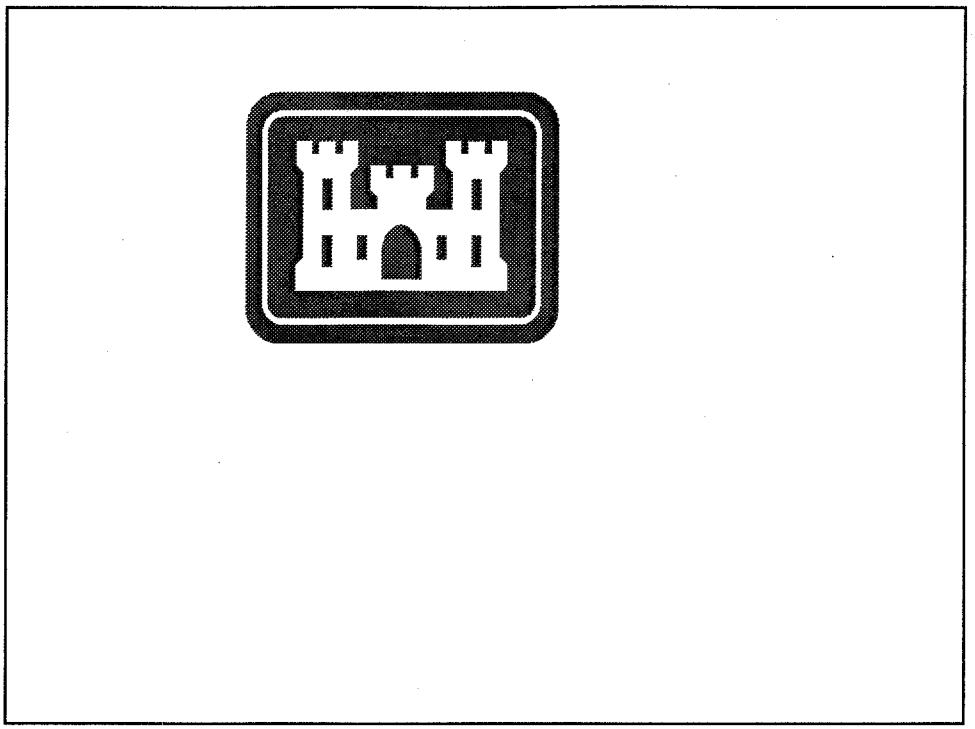


Guterl Specialty Steel Corporation Employee Briefing

December 5, 2000

Diane Kozlowski
Project Manager
Buffalo District
U.S. Army Corps of Engineers

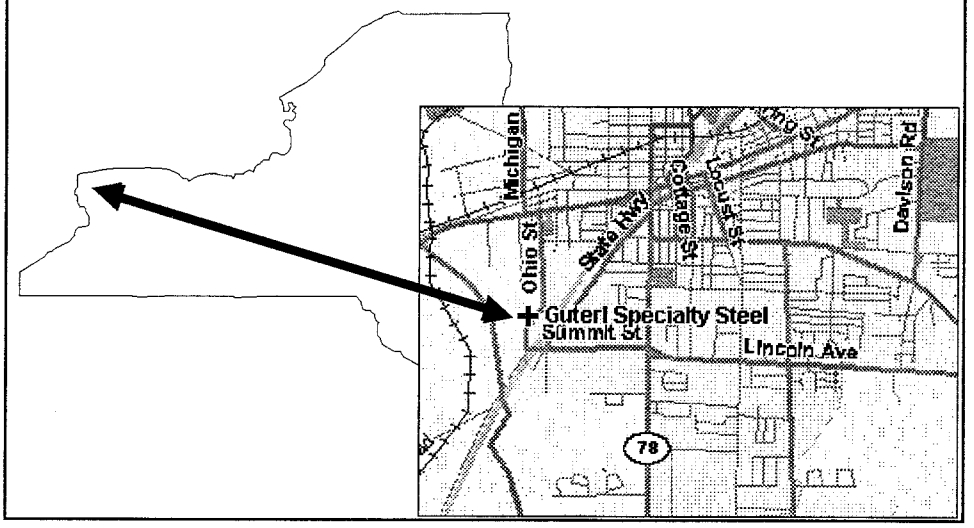
FUSRAP

Briefing Purpose

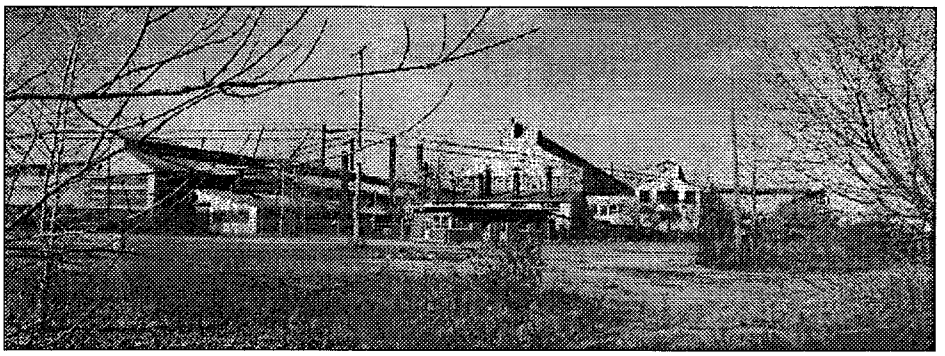
- Provide history and current status of Guterl Specialty Steel Corporation
- Discuss Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process
- Receive comments, concerns and questions from members of the public

FUSRAP

Guterl Specialty Steel Corporation

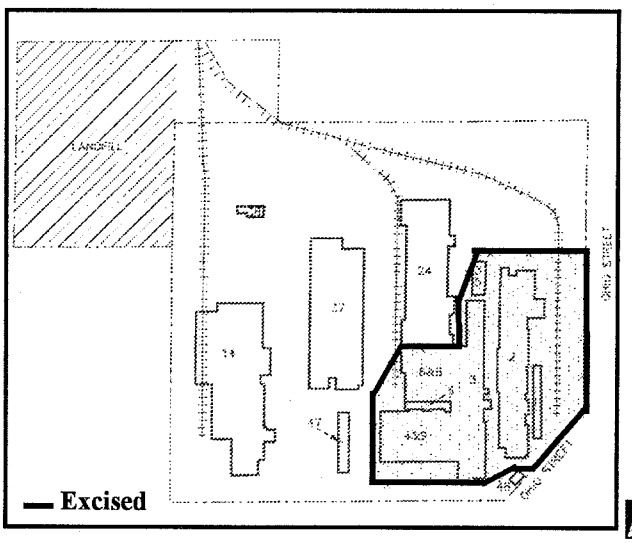


Guterl Specialty Steel Corporation



FUSRAP

Guterl Specialty Steel Corporation



FUSRAP

Guterl Specialty Steel Corporation History

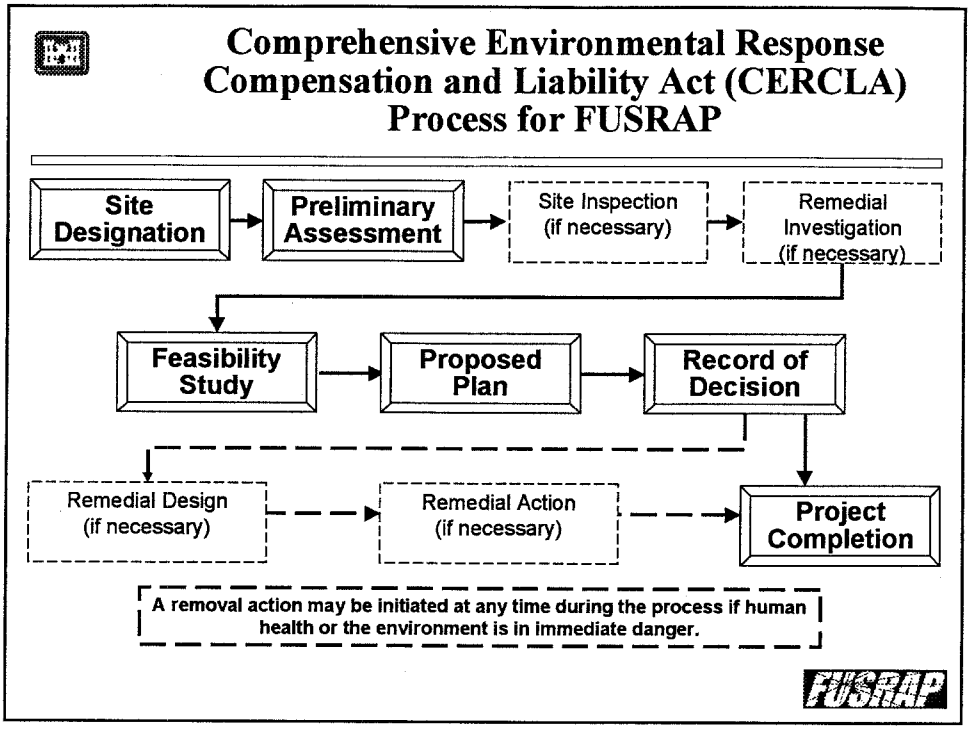
- 1948 - 1956 Simonds Saw and Steel Company milled 25-35 million pounds of uranium and 30-45 thousand pounds of thorium
- 1974 FUSRAP authorized
- 1979 Radiological survey completed for DOE by Oak Ridge National Laboratory

FUSRAP

Guterl Specialty Steel Corporation History (Continued)

- 1997 Corps assigned FUSRAP
- 1999 Property owner commissioned Oak Ridge Institute for Science and Education to perform a radiological survey
- 2000 Preliminary Assessment assigned to Corps by DOE

FUSRAP


Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Process for FUSRAP
Site Designation
Preliminary Assessment
Site Inspection (if necessary)
Remedial Investigation (if necessary)
Feasibility Study
Proposed Plan
Record of Decision
Remedial Design (if necessary)
Remedial Action (if necessary)
Project Completion
A removal action may be initiated at any time during the process if human health or the environment is in immediate danger.
FUSRAP

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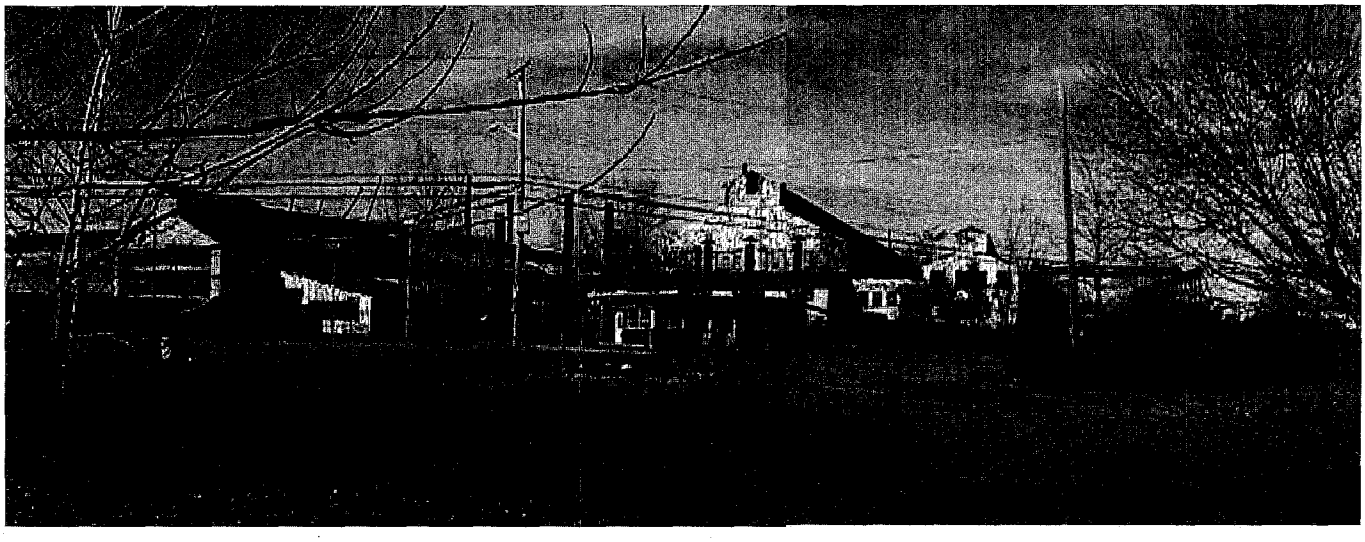
FUSRAP Fact Sheet

Guterl Specialty Steel Corporation

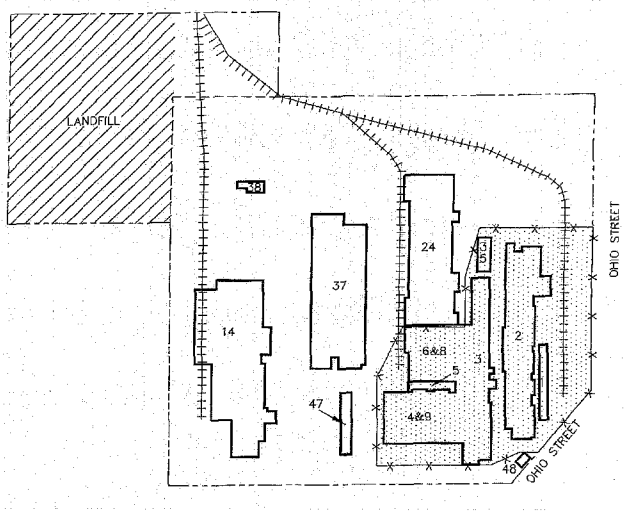
U.S. Army Corps of Engineers • Buffalo District • December, 2000

The Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated by the Atomic Energy Commission in 1974 to identify and cleanup contaminated sites used in the early years of the nation's atomic energy program. Management of the program was transferred to the U.S. Army Corps of Engineers from the U.S. Department of Energy in October 1997.



Former Guterl Specialty Steel Corporation Description and History

The former Guterl Specialty Steel Corporation is located west of Ohio Street and south of Crosby Street in Lockport, New York. The areas under investigation include nine buildings that existed during site operations, adjacent exterior land areas, and a landfill area.



The former Simonds Saw and Steel Company performed rolling mill operations on uranium and thorium metal during the period from 1948 to 1956 under contract with the Atomic Energy Commission to support the Nation's early atomic energy program.

The former Simonds Saw and Steel Company was sold to Wallace and Murray and then sold to Guterl Specialty Steel Corporation. In March 1984 Allegheny International (now known as Allegheny Ludlum Corporation) bought out the assets of the Guterl Specialty Steel Corporation. Allegheny Ludlum Corporation purchased the entire site with the exception of areas of the site that had been used during the Manhattan Engineer District activities.

In 1974, the Formerly Utilized Sites Remedial Action Program (FUSRAP) was created to ensure radioactive residuals from activities associated with the Nation's early atomic energy program, met current guidelines. Under this program, the U.S. Department of Energy (DOE) determined the site is eligible for potential inclusion into FUSRAP on May 19, 2000. Under the Memorandum of Understanding between the U.S. Army Corps of Engineers and the DOE, once this determination has been made by the DOE, responsibility for action is transferred to the Corps. The Buffalo District of the U. S. Army Corps of Engineers was assigned this investigation on September 22, 2000.

Current Status

The Buffalo District is evaluating the former Guterl Specialty Steel Corporation to determine what actions are required under FUSRAP, to ensure the protection of human health and the environment. Evaluation will follow the Comprehensive Environmental Response Compensation and Liability Act process (CERCLA).

The Corps has visited the site, and is performing a Preliminary Assessment by reviewing available site documents to determine the necessity of further action under FUSRAP. USACE has undertaken this preliminary assessment as the first step in the CERCLA process. If at any time during the review process it is determined that human health or the environment are in immediate danger, a removal action may be initiated.

For More Information

For more information, please call the FUSRAP toll-free public access line.

Toll-free Telephone Number: 1-800-833-6390

FUSRAP also has a home page on the Internet.

Home Page Address: http://www.lrb.usace.army.mil/fusrap

You may e-mail us at: **fusrap@usace.army.mil**

You may also contact us by writing to:

U. S. Army Corps of Engineers
FUSRAP Public Information Center
1776 Niagara Street
Buffalo, NY 14207

(716) 879-4438

HOW DOES FUSRAP WORK?

FUSRAP sites undergo several steps that lead to cleanup. During a preliminary assessment, information about the site is collected and reviewed. If it appears there may be contamination on site, an investigation with testing is performed to determine whether contamination is present on site. The next step is a remedial investigation/ feasibility study. The purpose of the remedial investigation/feasibility study is to identify the contamination at the site and its exact location. The feasibility study develops and evaluates cleanup alternatives. Throughout the remedial investigation/ feasibility study process, the public is informed about the progress toward a decision concerning cleanup alternatives and is encouraged to make comments.

When a cleanup alternative/option/action is chosen, a proposed plan is written that explains the rationale and details of the selected alternative. Members of the public are asked to comment on all of the cleanup options, including the selected alternative. After public comments are considered, a final decision is made and documented in a record of decision. The remedial design follows the record of decision and includes preparation of technical drawings and specifications that direct how the cleanup will be conducted. Cleanup begins after the remedial design is complete. This phase involves site preparation and construction activities. When these activities are completed, testing is conducted to ensure that cleanup objectives for the site have been met.

HOW IS FUSRAP ORGANIZED?

Administrative, and financial management of FUSRAP activities are the responsibility of the USACE Headquarters in Washington, DC who delegates the work to the divisions. The Buffalo District is within the Great Lakes & Ohio River Division. Project management of the Buffalo District FUSRAP sites is done with a team approach with all team members reporting to the project manager for each site. The team members include experts from many different districts. Most site investigations and cleanups are done by contractors under the supervision of Corps. The Corps ensures that all FUSRAP activities comply with CERCLA requirements.

HOW CAN I GET MORE INFORMATION?

The Buffalo District Team wants to keep you informed and involved in the decision making process for its FUSRAP sites. We have developed fact sheets for each of our sites that are available for your use. We will also hold Information Sessions for our sites as new information becomes available.

Each site has an Administrative Record File which contains reports USACE has developed and references they have used. These documents support the decisions that are made for the site. The Administrative Record Files are maintained in a library near the site and at the USACE Buffalo District compound.

Telephone:

Please call the FUSRAP toll-free public access line with any questions.
Toll-free telephone number: 1-800-833-6390

Internet:

Information on FUSRAP is also available on the internet. The Buffalo District home page address is:
http://www.lrb.usace.army.mil

Mail:

Additional information can be obtained by contacting:
U.S. Army Corps of Engineers
FUSRAP Public Information Center
1776 Niagara Street
Buffalo, New York 14207-3199

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FUSRAP

BUFFALO DISTRICT

Fact Sheet

July 2000

Formerly Utilized Sites Remedial Action Program

WHAT IS FUSRAP?

The Formerly Utilized Sites Remedial Action Program (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 energy program during the 1940s, 1950s, and 1960s. Activities at the sites were performed by the Manhattan Engineer District (MED) or under the Atomic Energy Commission (AEC). Both MED and AEC were predecessors of the Department of Energy (DOE). In October 1997, management of FUSRAP was transferred to the U.S. Army Corps of Engineers.

When a site is identified, records are reviewed by DOE. The Corps then does a Preliminary Assessment/Site Investigation to determine if contaminant's are present and further investigation is necessary. If contamination is found that is connected with MED or AEC activities, exceeding guidelines, cleanup is authorized under FUSRAP. Congress has also added other sites to FUSRAP. The Buffalo District has been assigned eight FUSRAP sites within its district boundaries in New York and Ohio.

Generally, sites that became contaminated during the early atomic energy program were cleaned up and released for use under the cleanup guidelines in effect at that time. The cleanup guidelines used were not as strict as today's revised standards; as a result, trace amounts of low level residual radioactive materials remain at some of the sites. In addition, with the demolition of buildings and movement of materials, over several years contamination may have spread to other locations, or eroded onto vicinity properties near some of the sites.

HOW HAZARDOUS ARE FUSRAP SITES?

Even though FUSRAP sites contain levels of radioactive contamination above current guidelines, none of these sites pose an immediate health risk to the public or environment under current land uses. The contaminated materials have very low concentrations, and people are not exposed to them for long periods of time. Although these materials are not an immediate hazard, they will remain radioactive for thousands of years, and health risks could increase if the land use were to change. Under FUSRAP, each site is cleaned to a standard that considers possible future uses for the land.

WHAT ARE FUSRAP'S OBJECTIVES?

The objectives of FUSRAP are to:

- Evaluate sites that supported MED/AEC nuclear work and determine whether the sites need cleanup and/or control.
- Cleanup or apply controls to these sites so that they meet current guidelines.
- Dispose of or stabilize contamination in a radiologically and environmentally acceptable manner.
- Complete all work in a manner consistent with appropriate Federal laws and regulations and state and local environmental land use requirements (to the extent permitted by Federal law).

LAWS THAT GOVERN FUSRAP

Every step of the FUSRAP cleanup process is regulated by a number of Federal and State laws and their implementing regulations. Chief among these is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

CERCLA provides the framework for a systematic investigation, remedial design, and cleanup of contaminated sites. CERCLA requires that the public be informed and involved in the decision making process.

It is typical for many FUSRAP sites to be subject to multiple laws, depending upon the type and extent of contamination at the site. Other laws may include the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Atomic Energy Act, the Uranium Mill Tailings Radiation Control Act, and state and local laws.

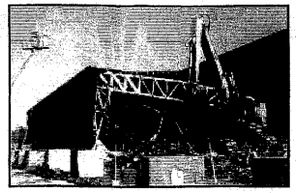
Niagara Falls Storage Site
Lewiston, New York

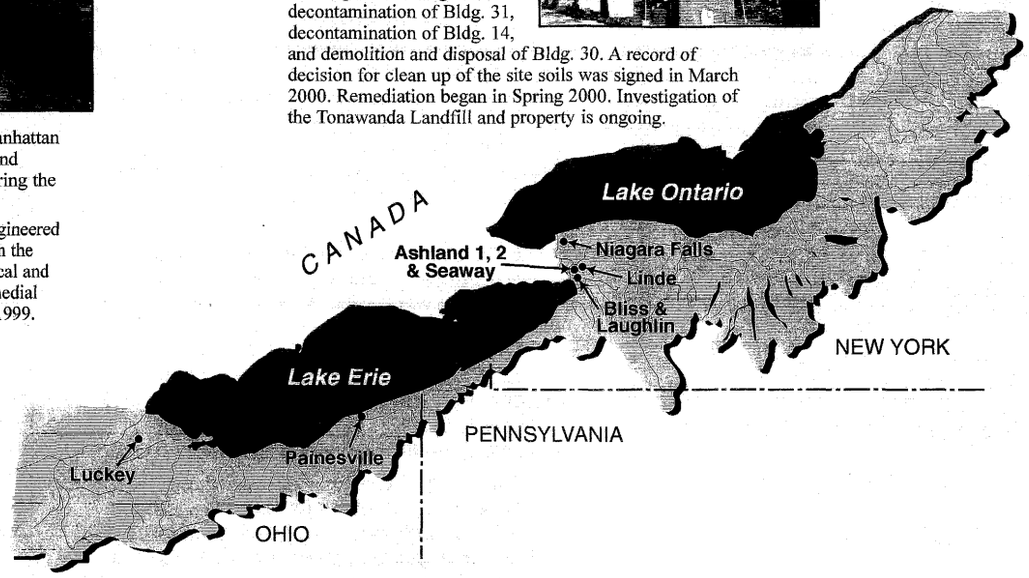
The Niagara Falls Storage Site (NFSS) is located in the Township of Lewiston (Niagara County), in northwestern New York about 10 miles north of the City of Niagara Falls, New York. The site encompasses 191 acres with a three-story building, three adjacent silos, an office building, a small storage shed, a storage building, and an engineered cell containing 250,000 cubic yards of radiologically contaminated soils and approximately 4,000 cubic yards of radium-bearing residues. This storage facility is located on part of the former Lake Ontario Ordnance Works, a site used for producing explosives during WWII. During the war this part of the facility was used by the Manhattan Engineer District for storing radioactive residues and wastes from uranium ore processing conducted during the development of the atomic bomb.

The Corps has erected a security fence around the engineered cell, has removed the radiological contamination from the office building, and has conducted periodic radiological and chemical sampling at the site. The Corps began a remedial investigation/feasibility study of the 191 acre site in 1999.

Linde Site
Tonawanda, New York

The Linde Site is in an industrial area of about 105 acres that is currently owned by Praxair, Inc. Between 1942-46 the former Linde Air Products Division of Union Carbide was contracted by the Manhattan Engineer District to separate uranium from ore. Interim actions that have been completed at the site are: Decontamination and demolition of Bldg. 37, demolition and disposal of Bldg. 38, decontamination of Bldg. 31, decontamination of Bldg. 14, and demolition and disposal of Bldg. 30. A record of decision for clean up of the site soils was signed in March 2000. Remediation began in Spring 2000. Investigation of the Tonawanda Landfill and property is ongoing.



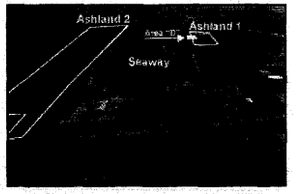


Ashland 1, Ashland 2 & Seaway
Tonawanda, New York

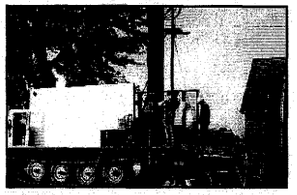
Ashland 1, Ashland 2, and Seaway are located along the Niagara River on River Road in Tonawanda, New York. Between 1944-46 residues consisting primarily of low grade uranium ore tailings were deposited at Ashland 1. Records indicate that approximately 8,000 tons of residues were spread over roughly 2/3 of the property. In 1960, after environmental testing indicated the site met cleanup guidelines in effect at that time, the property was transferred to the Ashland Oil Company. A Record of Decision was issued in April 1998 detailing the remediation plans to remove trace amounts of low level residual radioactive materials for Ashland 1, 2 and Seaway Area D.

Ashland 1:
Remediation of the Ashland Site began on July 11, 1999. Completion of excavation is projected for 2000.

Ashland 2:
Records indicate that from 1974-82 approximately 6,000 cubic yards of soil containing low-level radioactive residues was transferred from the Ashland 1 site to an area referred to as Ashland 2. Remediation of this site began on July 10, 1998 with the excavation of soils contaminated with low-level radioactive material. This phase was completed in 1999.



Seaway:
Known as Seaway Industrial Park, became contaminated during the transfer of contaminated soil from Ashland 1 and 2 from 1974-82 . The site is owned by Sands Mobile Park, Inc. Area D was included in the Record of Decision issued in April, 1998. A proposed plan for Areas A, B and C will be released in 2000.

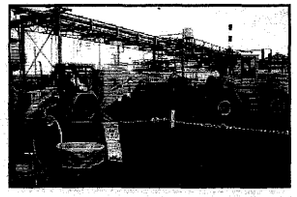


Luckey Site
Luckey, Ohio

The Luckey Site covers approximately 40 acres and is located 22 miles southeast of Toledo, Ohio at 21200 Luckey Road, Luckey, Ohio. The facility processed magnesium during WWII. In 1949 a beryllium production facility was built on the site. The waste solutions and sludge from the beryllium operation were stored on the plant property in three lagoons ranging in depth from 1.5 feet to 6 feet. In 1958, beryllium processing ceased and a disposal area was constructed in the northeast corner of the property. Material from the lagoons was moved to the disposal area and then capped, graded, and seeded. Recent surveys showed that the area still contains radiological beryllium contamination. The Corps is currently preparing a remedial investigation report and started a feasibility study for the site in Spring 2000.

Painesville Site
Painesville, Ohio

The Painesville Site is approximately 50 acres with large buildings and rail lines. It is located at 720 Fairport-Nursery Road in Painesville, Ohio, approximately 22 miles northeast of Cleveland, Ohio. In the 1940's, the Defense Plant Corporation constructed a magnesium production facility on property owned by the Diamond Magnesium Company. Diamond Magnesium received about 1650 tons of radioactive scrap steel - mostly iron drums - which was used to control chlorine emissions in the production of magnesium. The contamination is restricted to outside soils which contain residual uranium, radium, and thorium. Surveys conducted indoors found no evidence of radioactive contamination. A removal action was conducted in 1998. The Corps is performing a focused remedial investigation/feasibility study for the site.



Former Bliss & Laughlin
Buffalo, New York

The Former Bliss & Laughlin Site is located at 110 Hopkins Street in Buffalo, New York. The site consists of one building which is still used today for steel production. Contamination was located primarily on the floor area. In 1952, the Bliss & Laughlin Steel Company machined and straightened uranium rods under contract to National Lead of Ohio. The facility is currently operated and owned by the Niagara LaSalle Corporation. A Record of Decision was issued in December 1998 and remediation of the site was completed in March 1999.

US Army Corps of Engineers

FUSRAP Fact Sheet
CERCLA

U.S. Army Corps of Engineers • Buffalo District • December 2000

This is one in a series of fact sheets that provides information about regulatory, technical, and other issues considered in decision-making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discusses the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The Department of Defense's hazardous waste cleanup activity responsibilities are derived from CERCLA; the Resource Conservation and Recovery Act (RCRA); state and local requirements; standards, and guidance documents.

What is CERCLA?

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) was passed in December 1980 in response to the discovery in the late 1970s of a large number of abandoned, leaking hazardous waste sites that posed a serious threat to both human health and the environment. CERCLA was designed to impose cleanup and reporting requirements on the private sector, as well as federal facilities, by:

- identifying those sites where releases of hazardous substances had occurred or might occur, and pose a serious threat to human health, welfare, or the environment;
- taking appropriate action to remedy those releases; and
- seeking that the parties responsible for the releases pay for the cleanup activities.

CERCLA is a response and reporting act, not a regulatory act. It does not make conduct unlawful. Instead it provides the framework for addressing hazardous waste sites.

CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) in 1986. SARA introduced more stringent cleanup standards and created a new independent regulatory program - the Emergency Planning and the Community Right-to-Know Act.

The primary CERCLA regulation is the National Oil Hazardous Substances Pollution Contingency Plan (NCP). The NCP sets forth the basic criteria that governs response to releases and threatened releases and oversees the development of appropriate remedies.

What does CERCLA do?

CERCLA authorizes cleanup responses when there is a release or threat of a release of a hazardous substance into the environment, and sets a framework for accomplishing those actions. Two types of response actions are authorized: removal and remedial action. Removal actions are undertaken to immediately stop, prevent, minimize, stabilize, mitigate or eliminate the release or threatened release that may pose a threat to public health or welfare or the environment. Such events concern not only listed hazardous substances but also any pollutants or contaminants with the exception of oil and gas. Remedial actions provide a more permanent solution to hazardous substance threats and generally involve a more extensive study and action period.

Pursuant to CERCLA, remedial action must attain applicable or relevant and appropriate requirements (ARARs). ARARs determine the technical standards for cleanup activities at a CERCLA site. The applicable requirements are federal or state environmental or public health laws and regulations or cleanup standards specific to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. If a requirement is not directly applicable, it may still be relevant and appropriate. Those requirements may address problems or situations sufficiently similar to those encountered at the CERCLA site that their use may be well-suited to the particular site. A relevant requirement, however, may or may not be considered appropriate.

CERCLA also provides a means for insuring that those responsible for causing hazardous substance releases pay the cost of cleanup.

What is Community Right-to-Know?

Contained in the 1986 SARA was the Emergency Planning and Community Right-to-Know Act. The Right-to-Know Act creates emergency planning, reporting, and notification requirements intended to protect the public in the event of a release of a hazardous substance. Facilities are required to report the presence of hazardous chemical substances in addition to those listed as extremely hazardous.

Emergency release notice is only required by the act if the release is of an USEPA-listed substance extending beyond the facility's boundaries. The Right-to-Know Act also includes a system of administrative, civil, and criminal penalties to enforce notification requirements. USEPA may order governments and commercial facilities into compliance. In addition, both USEPA and private citizens may bring a civil action against them and request that a court impose monetary penalties for violations or the USEPA may seek criminal sanctions.

How do I get more information?

To learn more about CERCLA and other aspects of the Formerly Utilized Sites Remedial Action Program, please contact the U.S. Army Corps of Engineers FUSRAP Public Information Center at **(716) 879-4438**. Or you may call the toll-free public access line at: **1-800-833-6390**.

FUSRAP also has a home page on the Internet at ***http://www.lrb.usace.army.mil/fusrap***

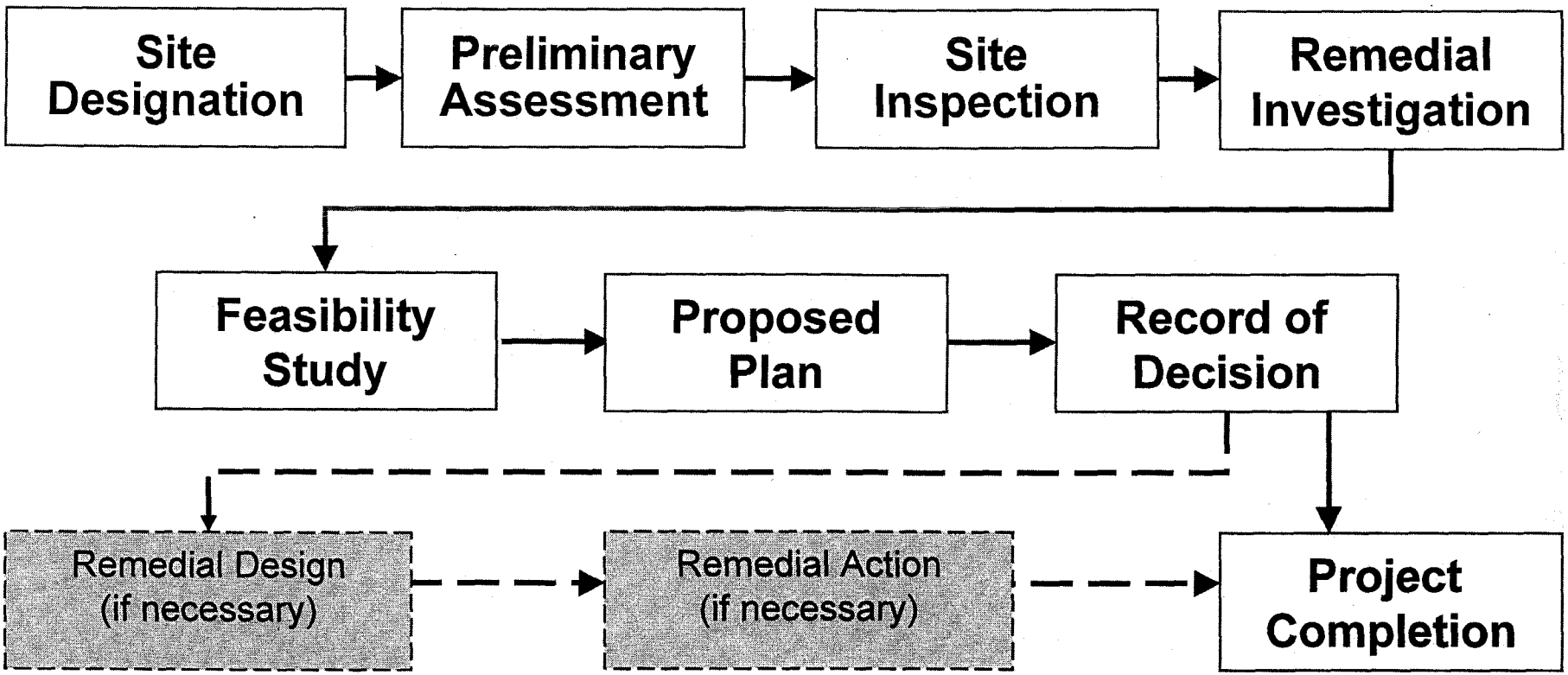
You can also e-mail us at fusrap@usace.army.mil

Or visit the Information Center at:

U. S. Army Corps of Engineers
FUSRAP Public Information Center
1776 Niagara Street
Buffalo, NY 14207

US Army Corps of Engineers
Buffalo District

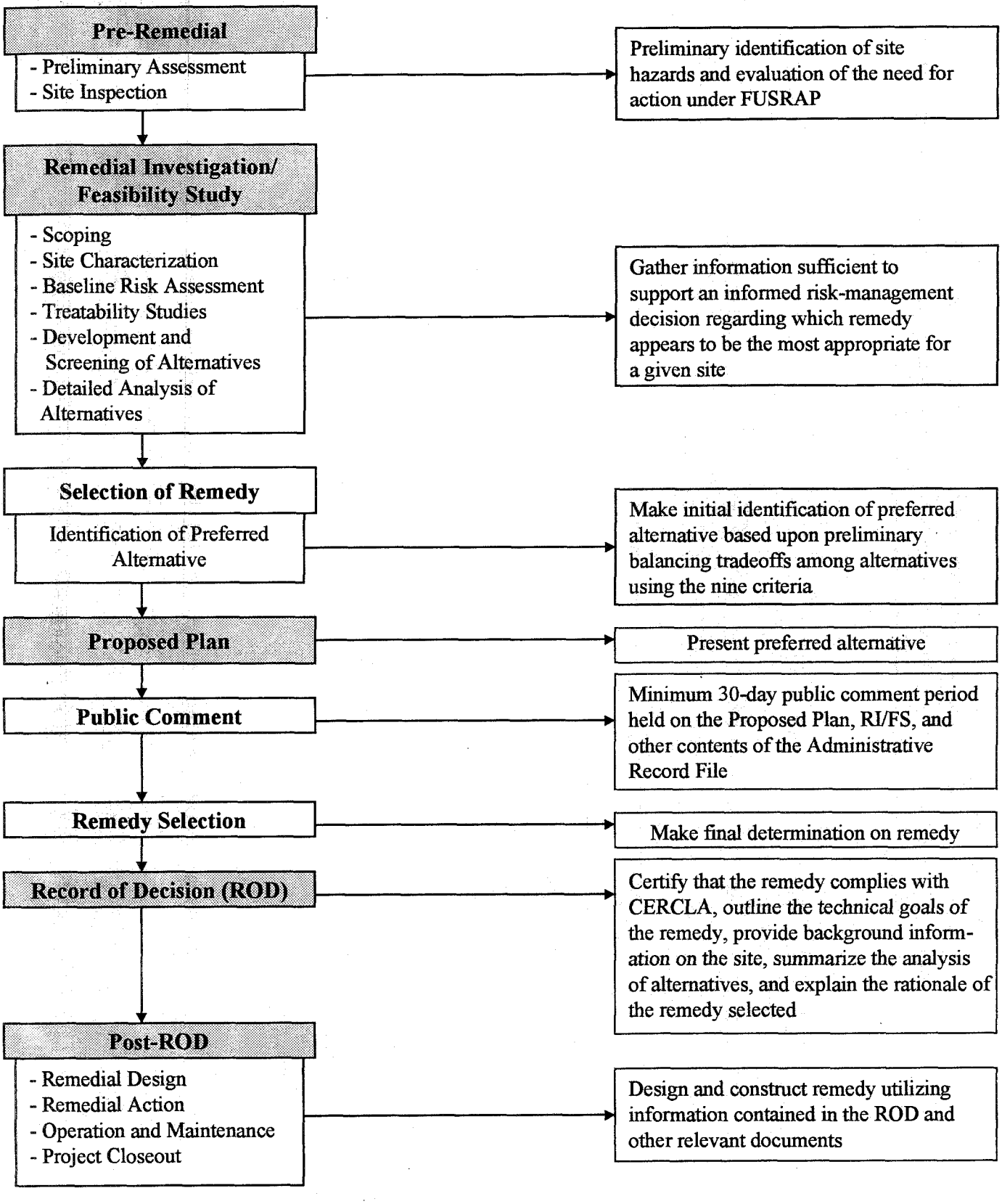
Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Process for FUSRAP



A removal action may be initiated at any time during the process if human health or the environment is in immediate danger.

US Army Corps of Engineers
Buffalo District

The CERCLA Decision-Making Process for FUSRAP



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FUSRAP Fact Sheet

Radiation

U.S. Army Corps of Engineers • Buffalo District • December, 1999

The Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated by the Atomic Energy Commission in 1974 to identify and clean up contaminated sites used in the early years of the nation's atomic energy program. Management of the program was transferred to the U.S. Army Corps of Engineers from the U.S. Department of Energy in October 1997. This is one in a series of fact sheets that provide information about regulatory, technical, and other issues considered in decision making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discussed low-level radiation: what it is and how it is measured.

What is radioactivity?

Simply put, radioactivity is a process in which an atom's nucleus spontaneously disintegrates, or "decays," and releases energy. The rate of decay is called the "activity," and is measured as the number of disintegrations per second.

Many isotopes in nature are stable, which means they never change. Other isotopes — both natural and manmade — are radioactive, meaning that they are unstable and can change into another form. For example, uranium is composed of two main isotopes that have mass numbers of 235 and 238. Uranium-238 decays to thorium-234 and an alpha particle. And Radium-226 decays to radon-222 and an alpha particle.

The decay of radium to radon is one step in a long radioactive process, starting with Uranium-238 and ending, ultimately, with lead. The rates of decay vary, ranging from a fraction of a second to billions of years, depending on the isotope. It is measured in half-lives, or the time it takes for half of the radioactive atoms in a radionuclide to decay to another form. Radium-222, for example, has a half-life of 1,599 years. Radon-222, though, has a half-life of 3.82 days.

What are the types of radiation?

The term "radiation" is very broad, and includes visible, infrared and ultraviolet light and radio waves. However, it is most often used to mean "ionizing" radiation: radiation that changes the physical state of atoms it strikes, causing them to become electrically charged or "ionized." In some circumstances, the presence of such ions in living tissues can disrupt normal biological processes. Ionizing radiation may therefore represent a health hazard to man.

There are various types of ionizing radiation, and each has different characteristics:

- *Alpha radiation* consists of heavy positively charged particles emitted by atoms of elements such as uranium and radium. Alpha radiation may just penetrate the surface of the skin, and it can be stopped completely by a sheet of paper. However, if alpha-emitting materials are ingested or inhaled, they can expose internal tissues directly and be a potential hazard.
- *Beta radiation* consists of electrons. These are more penetrating than alpha particles, requiring a sheet of aluminum a few millimeters thick to stop them completely. Tritium, which is present in fallout from nuclear tests, is a source of beta radiation.
- *Gamma rays* are a form of electromagnetic radiation, similar to X-rays, light and radio waves. They can be very penetrating, and can pass right through the human body. But they are almost completely absorbed by one meter of concrete.
- *X-rays* are a more familiar form of electromagnetic radiation, with limited penetrating power. X-rays generally are focused into a beam, and lead stops their penetration.
- *Neutrons,* which are released during processes such as the splitting of atoms in the fuel of nuclear power plants, also can be very penetrating. But efficient shielding against neutrons can be provided by water.

Some exposure to ionizing radiation cannot be avoided. Exposures can be natural or man-made. Natural sources include cosmic rays and naturally-occurring radionuclides in the earth and air, and are considered "background" radiation. Man-made sources include medical X-rays and coal-fired power plants. Other sources of radiation include fallout from nuclear explosives testing and radionuclides emitted from nuclear installations in the course of normal operation.

What is a radiation dose?

The term "dose" describes the amount of radiation or energy transmitted to cells. Sunlight, for example, feels warm because its energy is absorbed by the body. The amount of radiation and the type absorbed are easily measured using instruments, and the biological effect of absorbing a given amount of radiation varies, depending on its type.

Dose equivalent is the term used to express the amount of effective radiation received by an individual. A dose equivalent considers the type of radiation, the amount of body exposed, and the risk of exposure. It is measured in Roentgen equivalent man units (or rems) to measure the amount of damage to human tissue from a dose of ionizing radiation.

How do we protect against radiation exposure?

Radioactive particles can enter the body by ingestion – by eating, drinking and breathing. When a particle of radiation penetrates the human body and passes through and out without interacting with bodily tissue, no damage is inflicted. It is when the particles deposit some of their energy in tissue that damage could occur. To protect against a radiation hazard, it is necessary to isolate the source of radioactivity or to render it harmless. At present there is no way to eliminate radioactivity through treatment, but there are measures that can be taken.

To provide protection against radiation that is external to the body, three factors can be used: *distance, time,* and *shielding.* A person is safer the farther from the source of radiation, the shorter the time of exposure and the thicker the shielding. Exposure to radiation from wastes is prevented by using protective containers and shielding, and by isolation of the radioactive material.

Approaches to radiation protection are similar throughout the world because most governments have accepted the recommendations of the International Commission on Radiological Protection, an independent group of experts. One of the commission's principles is "As Low as Reasonably Achievable" (ALARA), which is the practice of keeping all doses as low as possible. In recommending maximum dose limits, the commission also recognizes two categories of people: adults exposed through their work and members of the public.

In this country, these exposure limits are found in Code of Federal Regulations 10 Energy, Part 20. The document, which is reissued annually, includes regulations of the Nuclear Regulatory Commission, which are based on specifications of the U.S. Environmental Protection Agency.

The maximum occupational dose is 5 rems per year, although somewhat higher limits are allowed for the lens of the eye and the skin, hands, and feet (15 and 50 rems per year, respectively). For the general public, the limits are 0.1 rem (100 millirems) per year.

How do I get more information?

For more information about radiation or other FUSRAP issues, please contact the FUSRAP Public Information Center at **(716) 879-4438**, or call our toll-free telephone number at **1-800-833-6390**.

Or visit the USACE-Buffalo District homepage address: ***http://www.lrb.usace.army.mil.***

References and Further Reading

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US Army Corps of Engineers
Buffalo District

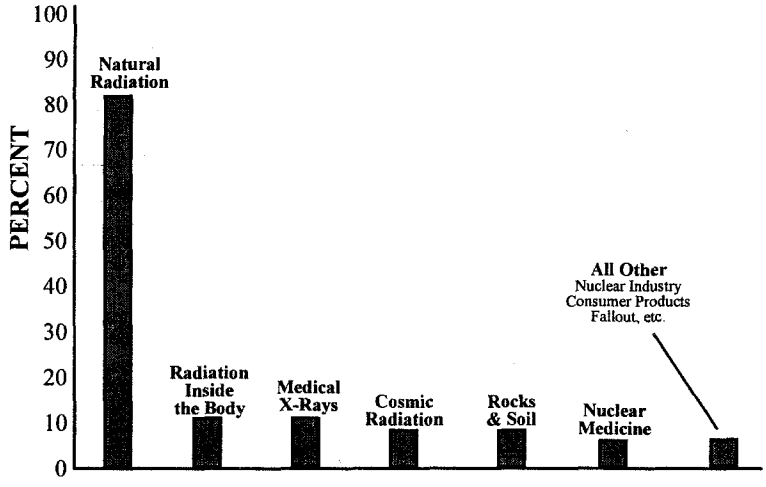
FUSRAP

Radiation in the Environment

Radiation is a natural part of our environment. When our planet was formed, radiation was present — and radiation surrounds it still. Natural radiation showers down from the distant reaches of the cosmos and continuously radiates from the rocks, soil, and water on the Earth itself.

During the last century, mankind has discovered radiation, how to use it, and how to control it. As a result, some manmade radiation has been added to the natural amounts present in our environment.

Many materials — both natural and manmade — that we come into contact with in our everyday lives are radioactive. These materials are composed of atoms that release energetic particles or waves as they change into more stable forms. These particles and waves are referred to as *radiation*, and their emission as *radioactivity*.



As the chart on the left shows, most environmental radiation (82%) is from natural sources. By far the largest source is radon, an odorless, colorless gas given off by natural radium in the Earth's crust. While radon has always been present in the environment, it's significance is better understood today. Manmade radiation — mostly from medical uses and consumer products — add about 18% to our total exposure.

Types of Ionizing Radiation

Radiation that has enough energy to disturb the electrical balance in the atoms of substances it passes through is called ionizing radiation. There are three basic forms of ionizing radiation.

Alpha

Alpha particles are the largest and slowest moving type of radiation. They are easily stopped by a sheet of paper or the skin Alpha particles can move through the air only a few inches before being stopped by air molecules. However, alpha radiation is dangerous to sensitive tissue inside the body.

Beta

Beta particles are much smaller and faster moving than alpha particles. Beta particles pass through paper and can travel in the air for about 10 feet. However, they can be stopped by thin shielding such as a sheet of aluminum foil.

Gamma

Gamma radiation is a type of electromagnetic wave that travels at the speed of light. It takes a thick shield of steel, lead, or concrete to stop gamma rays. X-rays and cosmic rays are similar to gamma radiation. X-rays are produced by manmade devices; cosmic rays reach Earth from outer space.

Units of Measure

Radiation can be measured in a variety of ways. Units of measure show either (1) the total amount of radioactivity present in a substance or (2) the level of radiation being given off.

The radioactivity of a substance is measured in terms of the number of transformations (changes into more stable forms) per unit of time. The *curie* is the standard unit for this measurement and is based on the amount of radioactivity contained in 1 gram of radium. The amounts of radioactivity that people normally work with are in the millicurie (one-thousandth of a curie) or microcurie (one-millionth of a curie) range. Levels of radioactivity in the environment are in the picocurie or pCi (one trillionth) range.

Levels of radiation are measured in various units. The level of gamma radiation in the air is measured by the *roentgen*. This is a relatively large unit, so measurements are often calculated in milliroentgens. Radiation absorbed by humans is measured in either *rad* or *rem*. The *rem* is the most descriptive because it measures the ability of the specific type of radiation to do damage to biological tissue. Typical measurements will often be in the millirem (*mrem*), or one-thousandth of a rem, range.

Radiation in the Environment

Cosmic Radiation

Cosmic radiation is high-energy gamma radiation that originates in outer space and filters through our atmosphere.

Sea Level.....26 mrem/year
Atlanta (1,050 ft)..... 31 mrem/year
Denver (5,300 ft).....50 mrem/year
Minneapolis (815 ft.....30 mrem/year
Salt Lake (4,000 ft).....46 mrem/year

Terrestrial Radiation

Terrestrial sources are naturally radioactive elements in the soil and water such as uranium, radium, and thorium. Average levels of these elements are 1 pCi/g of soil.

U.S. (average).....26 mrem/year
Denver, CO.....63 mrem/year
Nile Delta, Egypt.....350 mrem/year
Paris, France.....350 mrem/year
Kerala, India.....400 mrem/year
McAlpe, Brazil.....2,448 mrem/year
Pocos de Caldas, Brazil.....7,000 mrem/year

Buildings

Many building materials, especially granite, contain naturally radio-active elements.

U.S. Capitol Bldg.....85 mrem/year
Statue of Liberty.....325 mrem/year
Grand Central Sta.....525 mrem/year
The Vatican.....800 mrem/year

Radon

Radon levels in buildings vary, depending on geographic location, from 0.1 to 200 pCi/liter.

Average indoor radon levels....1.5 pCi/liter
Occupational working limit...100.0 pCi/liter

Because the radioactivity of individual samples varies, the numbers given here are approximate or represent an average. They are shown to provide a perspective for concentrations and levels of radioactivity rather than dose.

mrem = millirem
pCi = picocurie

Food

Food contributes an average of 20 mrem/year, mostly from potassium-40, carbon-14, hydrogen-3, radium-226, and thorium-232.

Beer.....390 pCi/liter
Tap Water.....20 pCi/liter
Milk.....1,400 pCi/liter
Salad Oil.....4,900 pCi/liter
Whiskey.....1,200 pCi/liter
Brazil Nuts.....14 pCi/g
Bananas.....3 pCi/g
Flour.....0.14 pCi/g
Peanuts & Peanut Butter.....0.12 pCi/g
Tea.....0.40 pCi/g

Medical Treatment

The exposures from medical diagnoses vary widely according to the required procedure, the equipment, and film used for X-rays, and the skill of the operator.

Chest X-Ray..... 10 mrem
Dental X-Ray.....100 mrem

Consumer Goods

Cigarettes-2 packs/day...8,000 mrem/year (polonium-210)
Color Television..... <1 mrem/year
Gas Lantern Mantle.....2 mrem/year (thorium-232)
Highway Construction..... 4 mrem/year
Airplane Travel-39,000 ft....0.5 mrem/year (cosmic)
Natural Gas/Heating and Cooking (radon-222).....2 mrem/year
Phosphate Fertilizers.....4 mrem/year

Natural Radioactivity in Florida Phosphate Fertilizers (in pCi/gram)

	xxxxx	xxxxx	xxxxx
Ra-226	21.3	21.0	33.0
U-238	20.1	58.0	6.0
Th-230	18.9	48.0	13.0
Th-232	0.6	1.3	0.3

Porcelain Dentures.....1,500 mrem/year (uranium)
Radioluminescent Clock.....<1 mrem/year (promethium-147)
Smoke Detector.....0.01 mrem/year (americium-241)

International Nuclear Weapons Test Fallout

From pre-1980 atmospheric tests
(average for a U.S. citizen.....1 mrem/year

US Army Corps of Engineers®

FUSRAP Fact Sheet

Radiation at FUSRAP Sites

U.S. Army Corps of Engineers • Buffalo District • December, 1999

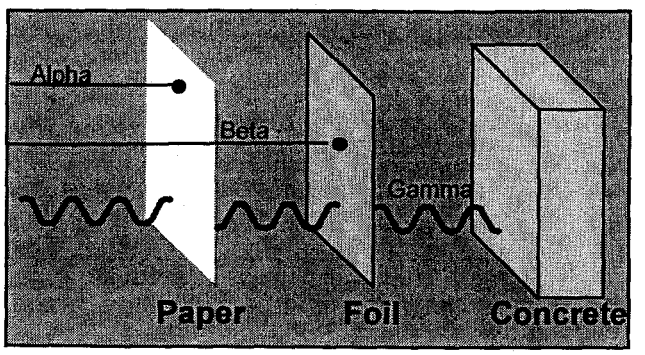
This is one in a series of fact sheets that provides information about regulatory, technical, and other issues considered in decision-making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discusses the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or Superfund. The Department of Defense's hazardous waste cleanup activity responsibilities are derived from CERCLA; the Resource Conservation and Recovery Act (RCRA); state and local requirements; standards, and guidance documents.

The Nature of Radiation

Radiation is a naturally occurring type of energy. It is released by unstable forms of atoms, the basic units of matter, as they change into more stable forms. The energy released is emitted as waves or particles.

• Alpha particles are the largest and slowest atomic particles. They can travel only a few inches through air. They can be stopped by a sheet of paper or the outer layers of skin.

• Beta particles are smaller and faster than alpha particles but can travel only about 10 feet through air. They can easily be stopped by a thin shield such as a sheet of aluminum foil.



• Gamma radiation consists of gamma rays rather than atomic particles. Gamma rays are a type of electromagnetic wave, much like X rays, and move at the speed of light. They travel farther through air than alpha or beta particles but can be stopped by a thick shield of lead, steel, or concrete.

Radiation cannot be seen, heard, smelled, or tasted. However, it can be detected and measured by instruments such as Geiger counters, dosimeters, and similar devices. Levels of radiation are expressed in several different units. One of the most useful is the rem, which measures radiation dose in terms of its potential health effects on persons who might be exposed to it.

Small amounts of radiation dose are expressed in millirems (thousandths of a rem), abbreviated as mrem. For example, a chest X ray produces a dose of about 40 mrem, a back X ray about 3,000 mrem, and a dental X ray about 150 mrem.

The amount of radiation that can leave 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. By comparison, the average American receives about 360 mrem per year from background radiation and medical exposure.

Sources of Radiation

Sources of radiation include the soil and the food we eat. It also reaches us as cosmic radiation from outer space. For example, a resident of Denver, Colorado, receives about 50

mrem per year from cosmic radiation and another 63 mrem per year from the ground surface. Food accounts for about 20 mrem of our annual radiation exposure.

Natural and synthetic substances that emit radiation are called radioactive materials. Many buildings contain naturally occurring radioactive materials. For example, radioactive elements in the granite in the U.S. Capitol Building emit radiation producing an exposure of about 85 mrem per year. The human body itself contains substances that contribute about 11 percent of the average annual radiation exposure.

Some consumer products are also sources of radiation. A person who smokes two packs of cigarettes per day receives 8,000 mrem per year. Smoke detectors produce about 1/100 mrem per year. Certain household appliances such as color television sets and microwave ovens also produce very small amounts of radiation. On the average, consumer products account for about 3 percent of our annual exposure.

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 and the Atomic Energy Commission [forerunners of the Department of Energy (DOE)] for processing and storing radioactive materials. Congress later authorized DOE to clean up the radioactive material at these sites. In October 1997, Congress transferred FUSRAP to the U.S. Army Corps of Engineers.

Several sites with industrial contamination similar to that produced by MED or AEC activities have also been added to FUSRAP by Congress. The radioactive residues at FUSRAP sites consist mostly of forms of the elements uranium, thorium, and radium that emit low levels of radiation. 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 Radiation Protection

The first step in FUSRAP radiation protection is to determine the levels of radioactivity at the site and in surrounding areas. Air, water, soil, or other routes by which radioactive materials could spread are identified and monitored. At many sites, access restrictions minimize exposure of the public to radioactive materials. Proper storage methods keep contaminants from leaving the site through water or soil. Materials that emit gamma radiation are found in very small amounts at FUSRAP sites and decay more rapidly than materials emitting alpha and beta particles. The radiation produced by gamma-emitting materials decreases over time. FUSRAP provides protection by isolating and shielding them while they decay.

How do I get more information?

To learn more about radiation and other aspects of the Formerly Utilized Sites Remedial Action Program, please contact the U.S. Army Corps of Engineers FUSRAP Public Information Center at 1776 Niagara Street, Buffalo, NY 14207, **(716) 879-4438**. Or you may call the FUSRAP toll-free public access line at **1-800-833-6390**.

The USACE-Buffalo District home page address is ***http://www.lrb.usace.army.mil***

US Army Corps of Engineers®

FUSRAP Fact Sheet

Radioactivity in Common Products

U.S. Army Corps of Engineers • Buffalo District • March, 2000

This is one in a series of fact sheets that provide information about regulatory, technical, and other issues considered in decision-making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discusses how some common household products contain radioactivity.

Around the House

Many household products contain a small amount of radioactivity. Examples include gas lantern mantles, smoke detectors, dentures, camera lenses, and anti-static brushes. The radioactivity is added to the products either specifically to make them work, or as a result of using compounds of elements like thorium and uranium in producing them. The amount of radiation the products gives off is not considered significant. But with today's sensitive equipment, it can be detected.

Lanterns: In a New Light

About 20 million gas lantern mantles are used by campers each year in the United States.

Under today's standards, the amount of natural radioactivity found in a lantern mantle would require precautions in handling it at many Government or industry sites. The radioactivity present would contaminate 15 pounds of dirt to above allowable levels. This is because the average mantle contains 1/3 of a gram of thorium oxide, which has a specific activity (a measure of radioactivity) of approximately 100,000 picocuries per gram. The approximately 35,000 picocuries of radioactivity in the mantle would, if thrown onto the ground, be considered low-level radioactive contamination.

US Army Corps of Engineers

FUSRAP Fact Sheet

How Big is a Picocurie?

U.S. Army Corps of Engineers • Buffalo District

This is one in a series of fact sheets that provide information about regulatory, technical, and other issues considered in decision-making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discusses how radiation is measured.

The *curie* is a standard measure for the intensity of radioactivity contained in a sample of radioactive material. It was named after French scientists Marie and Pierre Curie for their landmark research into the nature of radioactivity.

The basis for the curie is the radioactivity of one gram of radium. Radium decays at a rate of about 2.2 trillion disintegrations (2.2×10^{12}) per minute. A *picocurie* is one trillionth of a curie. Thus, a picocurie (abbreviated as pCi) represents 2.2 disintegrations per minute.

To put the relative size of one trillionth into perspective, consider that if the Earth were reduced to one trillionth of its diameter, the "picoEarth" would be smaller in diameter than a speck of dust. In fact, it would be six times smaller than the thickness of a human hair.

The difference between the curie and the picocurie is so vast that other metric units are used between them. These are as follows:

Millicurie	=	1/1,000 (one thousandth) of a curie
Microcurie	=	1/1,000,000 (one millionth) of a curie
Nanocurie	=	1/1,000,000,000 (one billionth) of a curie
Picocurie	=	1/1,000,000,000,000 (one trillionth) of a curie

The following chart shows the relative differences between the units and gives analogies in dollars. It also gives examples of where these various amounts of radioactivity could typically be found. The number of disintegrations per minute has been rounded off for the chart.

Unit of Radioactivity	Symbol	Disintegrations per Minute	Dollar Analogy	Examples of Rad. Materials
1 Curie	Ci	2 trillion	2 times the annual federal budget	Nuclear Medicine Generator
1 Millicurie	mCi	2 Billion	Cost of a new inter-state highway from Atlanta to San Francisco	Amount used for a brain or liver scan
1 Microcurie	μCi	2 Million	All-Star baseball player's salary	Amount used in thyroid tests
1 Nanocurie	nCi	2 Thousand	Annual home energy costs	Consumer products
1 Picocurie	pCi	2	Cost of a hamburger and Coke	Background environment levels

ENVIRONMENTAL GLOSSARY

This glossary of environmental remediation terms has been prepared as part of the effort to familiarize the public with the specific vocabulary used in discussions about environmental restoration in the Formerly Utilized Sites Remedial Action Program (FUSRAP).

US Army Corps of Engineers.

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM
Buffalo District, U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

ALARA - As Low As Reasonably Achievable, or keeping radiation emissions and exposures to levels set as far below regulatory limits as is reasonably possible in order to protect public health and the environment.

alpha radiation - The most energetic but least penetrating form of radiation. It can be stopped by a sheet of paper and cannot penetrate human skin. However, if an alpha-emitting isotope is inhaled or ingested, it will cause highly concentrated local damage.

aquifer - A permeable body of rock capable of yielding quantities of groundwater to wells and springs.

AR - Administrative Record, a required, comprehensive file of documents that forms the basis of decisions made regarding cleanup.

ARARs - Applicable or relevant and appropriate requirements, a comprehensive set of laws and regulations that are relevant to guide the selection of cleanup activity at a particular site.

USACE - U.S. Army Corps of Engineers, the federal agency managing cleanup of the Formerly Utilized Sites Remedial Action Program.

asbestos - A strong and incombustible fiber widely used in the past for fireproofing and insulation. The small, buoyant fibers are easily inhaled or swallowed, causing a number of serious diseases including: asbestosis, a chronic disease of the lungs that makes breathing more and more difficult; cancer; and mesothelioma, a cancer (specific to asbestos exposure) of the membranes that line the chest and abdomen.

atom - The smallest particle of an element having the chemical properties of that element; the fundamental building block of matter.

background radiation - The natural radioactivity in the environment. Natural radiation consists of cosmic rays, filtered through the atmosphere from outer space, and radiation from the naturally radioactive elements in the earth (primarily uranium, thorium, radium and potassium). Also known as natural radiation.

baseline risk assessment - (See BRA).

BDN - Biodenitrification, the process of breaking down nitrates into harmless elements through the use of living bacteria.

beta radiation - High-energy electrons (beta particles) emitted from certain radioactive material. Can pass through 1 to 2 centimeters of water or human flesh and can be shielded by a thin sheet of aluminum. Beta particles are more deeply penetrating than alpha particles but, because of their smaller size, cause less localized damage.

biological effects - The early or delayed results of biological damages caused by nuclear radiation (alpha, beta gamma).

biosphere - The part of the earth and its atmosphere in which living things exist.

BNI - Bechtel National, Inc., the management contractor for the Formerly Utilized Sites Remedial Action Program.

BRA - Baseline risk assessment, the study and estimation of risk from taking no activity. Involves estimates of probability and consequence.

carcinogen - A cancer-causing agent.

CANiT - Coalition Against Nuclear Materials in Tonawanda, a stakeholder group interested in the Formerly Utilized Sites Remedial Action Program sites in Tonawanda.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund), the federal law that guides cleanup of hazardous waste sites.

CFR - Code of Federal Regulations

characterization - Facility or site sampling, monitoring and analysis activities to determine the extent and nature of a release. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

cleanup - The general term for environmental restoration, the process designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

closure plan - Documentation prepared to guide the deactivation, stabilization and surveillance of a waste management unit or facility under the Resource Conservation and Recovery Act.

conservation - The preservation of resources through efficient and careful use.

contamination - The presence of foreign materials, chemicals or radioactive substances in the environment (soil, sediment, water or air) in significant concentrations.

cubic meters - A unit equal to the volume of a cube measuring one meter in each dimension.

cubic yards - A unit equal to the volume of a cube measuring one yard in each dimension.

comment period - Time provided for the public to review and comment formally on a proposed action or decision.

community relations - The effort to establish two-way communication with the public to ensure public input into the decision-making process related to Superfund and environmental restoration.

curie - A unit of radioactivity that represents the amount of radioactivity associated with one gram of radium. To say that a sample of radioactive material exhibits one curie of radioactivity means that the element is emitting radiation at the rate of 3.7 million times a second. Named after Marie Curie, an early nuclear scientist.

daughter product - An element formed by the radioactive decay of another element; often daughter products are radioactive themselves

decay - The process whereby radioactive particles undergo a change from one form, or isotope, to another, releasing radioactive particles and/or energy.

decontamination - The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleansing or other techniques.

defense wastes - Radioactive wastes resulting from weapons research and development, the operation of naval reactors, the production of weapons materials, the reprocessing of defense spent fuel, and the decommissioning of nuclear-powered ships and submarines.

disposal - Waste emplacement designed to ensure isolation of waste from the biosphere, with no intention of retrieval for the foreseeable future.

dioxin - One of the most hazardous of all chemicals, can cause both acute and long-term effects ranging from chloracne, a skin disease, to cancer, reproductive failures, and reduced resistance to infectious disease.

DOE - U.S. Department of Energy

dose - Quantity of radiation or energy absorbed; measured in *rads*. (See rad).

dose equivalent - A term used to express the amount of effective radiation received by an individual. A dose equivalent considers the type of radiation, the amount of body exposed, and the risk of exposure. Measured in *rems*. (See rem).

dosimeter - An instrument that measures exposure to radiation.

EA - A written environmental analysis that is prepared under the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement.

effluent - A waste discharged as a liquid.

electron - An elementary particle with a unit negative charge and a mass 1/1837 that of the proton. Electrons surround the positively charged nucleus and determine the chemical properties of the atom.

EE/CA - Engineering evaluation and cost analysis, which is a CERCLA document prepared to address interim cleanup activities.

EIS - Environmental impact statement, required by the National Environmental Policy Act. (See NEPA).

element - Any of the 109 substances that cannot be broken down further without changing its chemical properties. Singly or in combination, the elements constitute all matter.

environmental restoration - The process of environmental cleanup designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

erosion control - Methods to control land surface features to prevent erosion by surface water or precipitation runoff.

exposure - A measurement of the displacement of electrons from atoms caused by x-rays or by gamma radiation. Acute exposure generally refers to a high level of exposure of short duration; chronic exposure is lower-level exposure of long duration.

F.A.C.T.S. - For A Clean Tonawanda Sites, a stakeholder group interested in the Formerly Utilized Sites Remedial Action Program sites in New York.

final disposition - Methods for permanent disposal of waste or contaminated media residuals following excavation/treatment.

fission - The splitting of a heavy nucleus into two or more radioactive nuclei, accompanied by the emission of gamma rays, neutrons and a significant amount of energy. Fission usually is initiated by the heavy nucleus absorbing a neutron, but it also can occur spontaneously.

FR - Federal Register

friable asbestos - Asbestos insulation that is loose and capable of becoming airborne.

FS - Feasibility study, the Superfund study following a remedial investigation which identifies, develops, evaluates and selects remedial action alternatives.

FUSRAP - Formerly Utilized Sites Remedial Action Program, created in 1974 to study sites used during World War II through the 1950s as part of the nation's atomic energy program. These early sites were decontaminated under guidelines in effect during that period. Using today's more-stringent environmental laws and better technology, the Corps of Engineers will restore these environmentally damaged sites.

gamma rays - Penetrating electromagnetic waves or rays emitted from nuclei during radioactive decay, similar to x-rays. Dense materials such as concrete and lead are used to provide shielding against gamma radiation.

geohydrologic - Pertaining to groundwater and its movements through the geologic environment.

geohydrology - The science dealing with underground water, often referred to as hydrogeology.

groundwater - Water beneath the earth's surface that fills pores between materials such as sand, soil or gravel. Groundwater is a major source of water for agricultural and industrial purposes and is an important source of drinking water for about half of all Americans.

half-life - The time required for a radioactive substance to lose 50 percent of its activity by decay. The half-life of the radioisotope plutonium-239, for example, is about 24,000 years. Starting with a pound of plutonium-239, in 24,000 years there will be one-half pound of plutonium-239, in another 24,000 years there will be one-fourth pound, and so on. (A pound of material remains, but it gradually becomes a stable element.)

hazardous waste - A solid waste or combination of solid wastes that, because of quantity, concentration or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness or pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed, or otherwise managed. About 290 million tons of hazardous wastes are generated in the U.S. each year. About 4 percent is recycled. The rest is treated, stored or disposed. Of the hazardous wastes disposed, most are injected as a liquid into the ground in specially designed injection wells, a large quantity is placed in surface impoundments (pits, ponds and lagoons), and a small portion is placed directly on the land or buried.

heavy metals - Dense metals. Examples include mercury, lead, silver, gold and uranium.

HEPA Filter - High-efficiency particulate air filter

high-level radioactive wastes - Highly radioactive material, containing fission products, traces of uranium and plutonium, and other transuranic elements, that results from chemical reprocessing of spent fuel. Originally produced in liquid form, high-level waste must be solidified before disposal.

IR - Information Repository, where information relating to the Formerly Utilized Sites Remedial Action Program may be found.

ion - Atomic particle, atom or chemical radical bearing an electric charge, either negative or positive.

ionization - Removal of electrons from an atom, for example, by means of radiation, so that the atom becomes charged.

ionizing radiation - Radiation that has enough energy to remove electrons from substances it passes through, forming ions.

isotopes - Atoms of the same element that have equal numbers of protons, but different numbers of neutrons. Isotopes of an element have the same atomic number but different atomic mass. For example, uranium-238 and uranium-235.

leachate - A solution formed when soluble components have been removed from a material.

leaching - To remove a soluble substance from a material by dissolving it in a liquid, and then removing the liquid from what is left.

LLW - Low-level waste, discarded radioactive material such as rags, construction rubble, glass, etc., that is only slightly or moderately contaminated. This waste usually is disposed of by land burial.

MCL - Maximum concentration limit, the regulatory limit for various constituents, usually organics and inorganics; there are different levels for different media, such as air, soil, and water. The MCL cannot be exceeded.

millirem - A unit of radiation dosage equal to one-thousandth of a rem. A member of the public can safely receive up to 500 millirems per year, according to federal standards, but the U.S. EPA ordinarily limits public exposure to 25 to 100 mrem/year.

mixed waste - Contains both radioactive and hazardous components.

mobility - The ability of radionuclides to move through food chains in the environment.

monitoring well - A hole drilled into the ground with a pipe inserted to allow for the collection of groundwater samples.

natural radiation - Radiation that is always present in the environment from such sources as cosmic rays and radioactive materials in rocks and soils. Also known as background radiation.

NCP - National Oil and Hazardous Substances Pollution Contingency Plan, which implements CERCLA

NEPA - National Environmental Policy Act, requires a study of the impacts of activities at federal facilities.

neutron - A particle that appears in the nucleus of all atoms except hydrogen. Neutrons are one of three basic particles that make up the atom. Neutrons have no electrical charge.

NOA - Notice of availability, published when a document on some aspect of cleanup is issued. Documents are available in the administrative record and information repositories.

NPDES - National Pollutant Discharge Elimination System

NPL - National Priorities List, the list of the nation's worst Superfund sites.

NRC - Nuclear Regulatory Commission

NTS - Nevada Test Site, a repository for radioactive wastes.

nuclear radiation - Ionizing radiation originating in the nuclei of atoms; alpha, beta, and gamma radiation.

nucleus - The central part of an atom that contains protons, neutrons and other particles.
OEPA - Ohio Environmental Protection Agency

OSHA - Occupational Health & Safety Act

pathways - The means by which contaminants move. Possible pathways include air, surface water, groundwater, plants and animals.

PCB - Polychlorinated biphenyl, a synthetic, organic chemical once widely used in electrical equipment, specialized hydraulic systems, heat transfer systems, and other industrial products. Highly toxic and a potent carcinogen. Any hazardous wastes that contain more than 50 parts per million of PCBs are subject to regulation under the Toxic Substances Control Act.

picocuries - Measurement of radioactivity. A picocurie is one million millionth, or a trillionth, of a curie, and represents about 2.2 radioactive particle disintegrations per minute.

plume - A defined area of groundwater containing contamination that originates from a particular source such as a waste unit.

plutonium - An artificially produced element that is fissile and radioactive. It is created when an atom of uranium-238 captures a slow neutron in its nucleus.

PP - Proposed plan, a CERCLA document on which the public comments that summarizes what cleanup remedy has been selected, and why.

RA - *Risk assessment*, the study and estimation of risk from a current or proposed activity. Involves estimates of the probability and consequence of an action.

rad - Radiation absorbed dose, a measurement of ionizing radiation absorbed by any material. A rad measures the absorption of a specific amount of work (100 ergs) in a gram of matter.

radiation - Fast particles and electromagnetic waves emitted from the nucleus of an atom during radioactive disintegration.

radioactive - Giving off, or capable of giving off, radiant energy in the form of particles (alpha or beta radiation) or rays (gamma radiation) by the spontaneous disintegration of the nuclei of atoms. Radioisotopes of elements lose particles and energy through the process of radioactive decay. Elements may decay into different atoms or a different state of the same atom.

radioactive waste - A solid, liquid or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities except for radioactive material form post-weapons-test activities.

radioisotope - An unstable isotope of an element that eventually will undergo radioactive decay (i.e., disintegration). Radioisotopes with special properties are produced routinely for use in medical treatment and diagnosis, industrial tracers, and for general research.

radionuclide - A radioactive species of an atom.

radium - One of four primary radionuclides in FUSRAP wastes. They include radium-226, radon-222, thorium-230, uranium-234, uranium-235 and uranium-238.

radon - A radioactive gas produced by the decay of one of the daughters of radium. Radon is hazardous in unventilated areas because it can build up to high concentrations and, if inhaled for long periods of time, may cause lung cancer.

RCRA - Resource Conservation and Recovery Act, the federal environmental law designed to account for and ensure proper management of hazardous wastes, from creation to disposition

rem - Roentgen equivalent man, a unit used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation. Incorporates the health risks from radiation.

remedial action - Long-term cleanup activities

remedial design - A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

remediation - Those activities performed to remove or treat hazardous waste sites or to relieve their effects.

removal action - Interim cleanup activities that are identified as needed to protect public health and the environment.

restoration - (See environmental restoration)

RI - Remedial investigation, the CERCLA process of determining the extent of hazardous substance contamination and, as appropriate, conducting treatability investigations.

RI/FS - Two distinct, but related studies, the remedial investigation and feasibility study. Together, they characterize environmental problems and outline remedial actions to solve those problems.

Risk assessment - (See RA)

risk communication - The exchange of information about health or environmental risks between risk assessors, risk managers, the general public, news media, interest groups, etc.

risk management - The process of evaluating alternative regulatory and non-regulatory responses to risk and selecting among them. The selection process necessarily requires the consideration of legal, economic and social factors.

ROD - Record of decision, a written decision that identifies the selected method for long-term cleanup of contamination at a site.

R.O.L.E. - Residents Organized for Lewiston-Porter's Environment, a stakeholder group interested in the Niagara Falls Storage Site.

SAIC - Science Applications International Corp., the environmental documentation contractor for the Formerly Utilized Sites Remedial Action Program.

SARA - Superfund Amendments and Reauthorization Act

scoping - In CERCLA, scoping is the initial planning phase of the cleanup process, when requirements are discussed and the projects defined. In the NEPA process, scoping relates to public involvement to help identify significant issues early so that efforts can be focused on those areas requiring resolution and to present a balanced environmental impact statement.

sludge - A semi-solid residue from any of a number of air or water treatment processes. Sludge can be a hazardous waste.

slurry - A watery mixture of insoluble matter that results from some pollution control techniques.

Superfund - The program operated under the legislative authority of CERCLA and SARA that funds and carries out the EPA solid waste emergency and long-term removal remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

solidification - The conversion of either liquid or loose hazardous waste into a solid.

solubility - A measure of how much of a given substance will dissolve in a liquid. Usually measured in weight per unit volume.

somatic effects - Effects of radiation limited to the exposed individual, as distinguished from genetic effects, which also affect subsequent, unexposed generations.

stable isotope - An isotope of an element that is not radioactive.

thorium - A naturally-occurring radioactive element and one of four primary radionuclides in FUSRAP wastes. They include radium-226, radon-222, uranium-234, uranium-235 and uranium-238.

threshold dose - The minimum dose of radiation that will produce a detectable effect.

toxic - Relating to a harmful effect by a poisonous substance on the human body by physical contact, ingestion or inhalation.

toxicology - The science that deals with poisons and their effects on plant, animal and human life.

transuranic wastes - Waste materials contaminated with isotopes above uranium in the periodic table. Transuranic waste is long-lived, but only moderately radioactive.

treatment - Any activity that alters the chemical or physical nature of a waste to reduce its toxicity or prepare it for disposal.

uranium - The heaviest element found in nature. Approximately 997 out of every 1000 uranium atoms are uranium-238. The remaining 3 atoms are the fissile uranium-235. The uranium-235 atom splits, or fissions, into lighter elements when its nucleus is struck by a neutron. One of four primary radionuclides in FUSRAP wastes, including radium-226, radon-222 and thorium-230.

U.S. EPA - United States Environmental Protection Agency (sometimes called *EPA*).

UST - Any underground storage tank or associated piping containing hazardous materials.

vitrification - A method of immobilizing waste that produces a glass-like solid that permanently captures the radioactive materials.

VOCs - Volatile organic compounds, chemicals that contain carbon and commonly also contain hydrogen, oxygen and other elements. The prefix "volatile" means that the compound evaporates rapidly. Most industrial solvents are volatile. Found in some liquid and air waste releases.

waste minimization - Employing new techniques to reduce the amount of hazardous and radioactive wastes generated to as low a level as possible.

WIPP - Waste Isolation Pilot Project, a planned disposal facility in New Mexico for transuranic and other radioactive wastes.

x-rays - Electromagnetic radiations used in medical diagnosis; a penetrating electromagnetic radiation, usually generated by accelerating atoms to high velocity and suddenly stopping them by collision with a solid body.

Concentration Comparisons

Parts per million:
- One automobile in bumper-to-bumper traffic from Cleveland to San Francisco
- One drop of gasoline in a full-size car's tankful of gas
- One facial tissue in a stack taller than the Empire State Building
- One pancake in a stack four miles high

Parts per billion:
- One silver dollar in a roll of silver dollars stretching from Detroit to Salt Lake City
- One kernel of corn in enough corn to fill a 45-foot-silo, 16 feet in diameter
- One sheet in a roll of toilet paper stretching from New York to London

Parts per trillion:
- One square foot of floor tile on a kitchen floor the size of Indiana
- One drop of detergent in enough dishwater to fill a train of railroad tank cars 10 miles long
- One mile on a two-month journey at the speed of light

Parts per quadrillion:
- One postage stamp on a letter the size of California and Oregon combined
- The palm of one's hand resting on a table the size of the United States
- One human hair out of all the hair on all the heads of all the people in the world
- One mile in a journey of 170 light years

Sources:
- *Glossary of Environmental Restoration Terms and Acronym List (EPA/OPA-87-017, August 1988)*
- *Glossary of Environmental Restoration (DOE, Office of Environmental Restorations and Waste Management, Oak Ridge Operations, October 1990 and October 1991)*

Guterl Specialty Steel Corporation
Questions for Community Assessment

Introduction. The U.S. Army Corps of Engineers (USACE) Formerly Utilized Sites Remedial Action Program (FUSRAP) is interested in learning more about how the community feels regarding environmental issues and what its informational needs are during the Preliminary Assessment at the Guterl Specialty Steel Corporation. Please take a few moments to fill out the following questionnaire and tell us what you think. Your input is very important to us!

Name (optional)**:**
Address (optional)**:**

Telephone (optional)**:**
E-mail address (optional)**:**

Would you like to be included on our Guterl mailing list and receive fact sheets, newsletters and other information about Guterl Specialty Steel Corporation?
Yes___ No___

Is there anyone else who you feel might be interested in learning more about the Guterl Specialty Steel Corporation and who would want to be on our mailing list?

Name:
Address:

Telephone:
E-mail address:

What special concerns do you have about the Guterl Specialty Steel Corporation?

If you had a question or concern about the Guterl Specialty Steel Corporation, whom would you contact?

What individuals/organizations do you consider most credible when it comes to environmental issues in the community?

How does the community receive information about local events and news? Please check the newspapers and television stations you, your friends, and your family read/watch the most.

____ Buffalo News
____ Lockport Retailer
____ Metro Community News
____ Niagara Gazette
____Tonawanda News
____Union-Sun & Journal

____ WGRZ-TV (Channel 2)
____ WIVB-TV (Channel 4)
____ WKBW-TV (Channel 7)
____ Lockport Community TV
____ Adelphia Cable Community Bulletin Board

____ Other (please list)_____

How would you rate the level of community interest/concern regarding the Guterl Specialty Steel Corporation on a scale of 1 to 10 (1 being very low and 10 being very high)? Please circle a number.

1 2 3 4 5 6 7 8 9 10

How often would you like to be provided with information regarding Guterl Specialty Steel Corporation? Please check one.

Monthly____
Bi-monthly____
Quarterly____
Annually____

How did you hear about the meeting tonight?

Is this location easy for you to get to?

Would the Lockport Public Library be a convenient location for us to place the Administrative Record File, which includes information used in the decision making process for the Guterl Specialty Steel Corporation?

Can you suggest any other locations?

Additional comments:

Questions and Answers from the Allvac Employee Briefing
December 5, 2000

6:00 a.m.

Q: Who owns the property now?
A: Guterl claimed bankruptcy in 1980, and Alleghany Ludlum bought everything except for the excised property. That property belongs to the bankruptcy court.

Q: Will Alleghany Ludlum pay for contamination on the property that is not excised?
A: No, we are required to cleanup all of the radiation, no matter whose property it is on.

Comment: They used to do cleanup around the mill area, and they dumped everything into the landfill area in the back, and bulldozed around there, too.

Q: Are you going to clean the property and leave the buildings intact?
A: It is too early to tell at this time. We will know more after we do more studying. It could be more effective to take them down or to leave them up.

Q: So you aren't going to do any cleaning at this time?
A: No, we haven't had authorization to do it yet, but we are pretty sure that we are going to the next step in the CERCLA process.

Q: Are you going to remove the soil or are you going to cap it? How could the soil be safe anywhere else?
A: At Ashland, they took the soil and shipped it to a licensed disposal facility where they were able to recycle the uranium.

Q: Is there going to be any airborne contamination from your cleanup efforts?
A: That will be factored into the Proposed Plan. We will implement engineering controls to prevent dust from becoming airborne.

Q: Can the contamination get into the ground water if you keep watering it down?
A: The Oak Ridge report states that the probability for groundwater contamination is minimal, but we plan on doing more research.

Comment: The roofs act as funnel with the ground water.

Q: How deep is the contamination?
A: The Oak Ridge report says that there is some depth to the contamination but we don't know if it is consistent. Oak Ridge did grid system sampling but we are going to do our own sampling to be sure.

Q: What do you think will be the preferred method of remediation at this site?
A: Each site has its own method of cleanup because each one is different, so there really is no way to tell.

Q: If you dig up the soil, is it going to be taken out of Western New York?
A: It depends on what's in the soil; not a lot of local processing facilities will take radioactive contamination.

Q: Have you cleaned up any other sites like this one?
A: To date, we have completed or almost completed two sites, which would be Bliss & Laughlin and Ashland. We are currently working on the Linde Site, which is similar to this site because there are people working there.

Q: How would rate the site on contamination in comparison to others, based on a scale from 1 to 10?
A: It is too soon to tell at this point.

Q: How much do local officials influence this site?
A: We have had a lot of interest from Congressman LaFalce and Senator Maziarz, but they don't influence the site as far as cleanup levels are concerned.

7:00 a.m.

Q: Did you find radiation in the plant and where?
A: The Oak Ridge report found radiation in Buildings 6, 8, and 3.

Q: Did you find radiation in the pit area?
A: Yes, and the report also found it on the floors and in the dust.

Q: I spent ten years on the 10 inch mills.
A: We have received calls from people who worked there, and they have given us many valid pieces of information which will help when we get to the RI phase. The Department of Health will be at the public meeting on the 12th, and the number for the DOE is in your packet of handouts.

Q: Is it three years because of funding?
A: No, three years is the average timeframe for similar projects. It is difficult to be develop an exact schedule for completion at this early stage.

Q: I have heard that there are many sites around the country that need cleanup and that they are on a list. How do you get to the top of this list?
A: They are probably at the top of the list because of safety, but the reports indicate that there is no risk to human health and the environment at this time.

Q: What about before?
A: It's hard to tell, we would have to look at historical documents, but we are focused on what is going on now.

Q: So there is no risk now?
A: Not at this time. There is restricted access to contaminated areas.

Q: What if you worked in those buildings during the 70's and 80's?
A: That is almost impossible to tell. There are lots of variables such as toxicology and work habits that we would have to look at.

Q: If I had dust on my clothes and I carried it around, I would have a longer time of exposure.
A: You would have to talk to the Department of Health about that.

Q: Will USACE be doing its own sampling?
A: Yes.

Q: If you drive machinery over the contaminated landfill areas, will it disturb the contamination?
A: The landfill is naturally capped with soil and vegetation, it may be disturbed but it would be minimal. The places of contamination are fenced off and marked. If we need to perform a cleanup, we would wet down the dirt and do air monitoring.

Q: Are you going to monitor around the buildings where people are working?
A: We do real-time spot monitoring and perimeter air monitoring.

Q: For your other sites, what is left after cleanup? Is it still low level?
A: When remediation is complete at Ashland it will be safe for residential use.

Q: What is at the site, is it low level?
A: It is mostly low-level. What's left over is residue from a process, it's not the raw material.

Q: How much does funding determine our method and level of cleanup?
A: Money won't make us comprise our levels. We can always request more money. We have a good track record with getting money from our Headquarters, and we won't go to a lesser standard of cleanup because we don't have the money.

Comment: I used to clean the pits on a weekly basis.

Q: Is there a particular type of cancer that relates to this type of exposure?
A: You would have to ask the DOH about that.

Comment: People that worked in maintenance had a higher exposure for a longer period of time.

Q: Do you have any information about the medical conditions or the cancer rates around the site or in the area?
A: You would have to talk to the DOE and the DOH about that. The DOE has a compensation program for past employees that worked on MED-related activities, and the DOH has a pamphlet about cancer clusters. They will both be at the meeting on the 12th.

Q: Have you had a meeting for neighboring property owners?
A: This is our first meeting for the site. We will be having one on December 12th as well.

2:00 p.m.

Q: Do you have a map that shows where the contamination is?
A: Several maps detailing potential locations of elevated residual radioactivity can be found in the ORISE 1999 report. This report is available upon request.

Q: What would the Proposed Plan be? Would you clean the soil, tear down the buildings, what?
A: Our goal is clean up the radiation and we will do whatever it takes to ensure that.

Q: Will this be a brownfields site when the cleanup is finished?
A: USACE does not make that determination.

Q: Does your website give numbers for radiation levels?
A: The 1999 ORISE report will be online shortly.

Q: Do you have your own crews, or will you hire from the outside to do the remediation?
A: We usually contract out.

Q: Is it three years to develop the plan or for the cleanup?
A: Three years is an approximate estimate from the start to the finish but there are many variables that could prolong or shorten the time. We will know more once more studying is done.

Q: There was talk in the media about a compensation program?
A: The DOE number is on the packet of handouts that we gave you and they will also be at the meeting on December 12, 2000.

Q: On the blue outlined area on the map, who owns it?
A: The blue outline and the landfill are owned by a bankruptcy trustee for Guterl.

Q: If buildings have to be removed does FUSRAP have cooperation with the land owners?
A: The owners are going to be stakeholders so they do have some say, but we have the final say. We go by safety so whatever safety says we do.

Q: Is there radiation in the ground water?
A: According to the report, ground water contamination has potential but it is not likely. We are going to do more samples to be sure.

Q: Are there other contaminants other than radiation?
A: We don't know yet, but there might be. We know of acids, there were quenching tanks. We are going to have to do more studying.

Q: What is a safe proximity to radioactivity?
A: USACE has not reviewed information that suggests an imminent threat to human health through the presence of residual radioactivity.

Comment: Even though the contamination is a few hundred feet away we are here everyday.

Q: Are the fences far enough away that there is still a safe distance from the site?
A: Even if you are inside the fence, you are still OK; what you don't want to do is go into the buildings, because of the asbestos.

Q: Workers were assigned to work in Building 24 fifteen years ago, now we are told that it is hot, the area of contamination is always expanding.
A: In 1958 the site was cleaned up to standards of the time. It appears from the ORISE report that the northern portion of building 24 is not contaminated. The snow fence was put in place to restrict access, and there were limitations with some of the previous studies. Our studies will be more comprehensive.

Q: Is the equipment in the buildings contaminated?
A: After review of the ORISE 1999 report, several items within the building have the potential to be contaminated.

Q: Are the radiation readings above ground or under ground?
A: Both. Most of it is subsurface, but there is some contamination above ground.

Q: How deep does the contamination go?
A: It varies; it goes from around a few inches to about five feet.

Q: When you are cleaning are you going to disrupt normal routines at the plant?
A: We are going to coordinate with Allvac; we will work with them as plans are developed.

Q: Will there be safety issues when you do the cleanup? Are you going to have to evacuate the plant for a few weeks?
A: All activities will be coordinated with the Allvac personnel. Safety is the #1 driving factor in all activities performed by USACE.

Q: Sixteen years ago the problem was identified, what took so long?
A: The site was determined eligible by DOE in May and assigned to the Buffalo District in September.

Comment: I think that the radiation here is more important than the asbestos at Linde.

Q: Who pays for the cleanup?
A: The funds come from Congress.

Q: Is there going to be a disruption in plans because of the election?
A: FUSRAP is a non-partisan program, there is no indication that there will be a problem.

Comment: Keep employees informed because we get questions from the public.