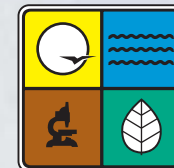


Report
2000

Missouri Department of Natural Resources

Hazardous Waste Program



Federal Facilities Section





Stephen Mahfood
Director, Missouri Department of Natural Resources

John A. Young
Director, Division of Environmental Quality

Cindy Kemper
Director, Hazardous Waste Program

Robert Geller
Section Chief, Federal Facilities Section

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This brochure can be available in alternative formats. For more information, call 1-800-361-4827, for Relay Missouri call 1-800-735-2466, or for TDD call 1-800-735-2966.

Cover photo: The National Atomic Museum, Albuquerque, New Mexico on Kirtland Air Force Base. These are examples of weapons typical of those previously manufactured or housed in Missouri. Photo by Robert Geller.

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DNR photo by Nick Decker

Letter from the Section Chief

For many of us, World War II is something we read about in history books. During the World War II era, continuing through the Korean conflict, Vietnam and the Cold War, extensive military resources were constructed in Missouri to support the defense effort. These included military bases and facilities used to train and house personnel and produce materials needed for the ongoing missions. In addition, Missouri played a key role in the defense effort to develop nuclear weapons.

While the health and safety of the workers was a consideration, environmental concerns were generally not. Issues of national defense and security clearly outweighed these other factors. Today, concerns remain about national defense and security, but our know-ledge has increased about the impacts of these operations on the health and safety of workers and on the environment.

The Missouri Department of Natural Resources is committed to protecting human health and the environment. The Federal Facilities Section staff of the Hazardous Waste Program works with officials from the Department of Energy and the Department of Defense to investigate and appropriately address environmental contamination resulting from their previous activities.

Perhaps a few examples would illustrate the type of defense efforts undertaken in Missouri along with their long-term environmental effects.

Large quantities of a degreasing solvent were used to flush and clean rocket motors in the southwest part of the state when the Air Force was testing missile systems. Lake City Army Ammunition Plant, near Kansas

City, like many other production facilities, also used large amounts of these solvents in manufacturing small arms ammunition and metal parts.

A handshake between the federal government and a chemical manufacturer in St. Louis started a top-secret process, later known as the Manhattan Project. In downtown St. Louis, the project processed large quantities of uranium ore to support the nuclear weapons race. Other similar facilities were located across the United States. When production outgrew the St. Louis downtown facilities, the federal government moved the processing farther west to the site of an old army ordnance works at Weldon Spring. The ordnance works was originally used to produce bulk explosives. From 1957 to 1966, the new Uranium Feed Materials Plant continued assaying and refining uranium ore and

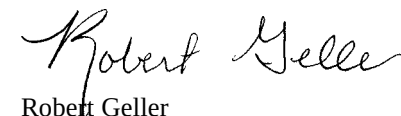
thorium concentrates for use in nuclear weapons.

Nuclear weapons are still an essential component of our defense arsenal. Presently, Honeywell International Inc. at the Department of Energy Kansas City Plant produces or procures nearly all non-nuclear components for our nation's nuclear forces.

Whiteman Air Force Base remains one of the few strategic forces with the B-2 Stealth Bomber, capable of delivering nuclear weapons. Whiteman Air Force Base previously commanded 150 Minuteman II missiles. These missiles were maintained in silos and were capable of being launched from one of the launch control facilities. The missiles and facilities have been dismantled, and the sites are being remediated.

Each of these facilities left behind a legacy of hazardous waste and contamination. The solvents used as degreasers have caused extensive groundwater contamination. The explosives, radioactive wastes and contamination at Weldon Spring are still a major cleanup challenge for the federal government. While the explosives have been incinerated and the majority of the radioactive waste placed in an onsite landfill, the groundwater remains to be addressed.

These are just a few of the environmental issues being addressed and solved today in Missouri related to federal facilities. As we move forward, it is essential that we maintain an understanding of the past. The decisions we make today are the legacies we leave for the future; we must do the best we can because we care. I invite you to read on about some of the various sites, challenges and successes in Missouri.



Robert Geller
Federal Facilities Section Chief



From 1957-66, the federal government processed uranium. Almost 50 years later, the remaining contamination still poses a challenge for the federal government. Since 1991, when this photo was taken, these buildings at Weldon Spring have been dismantled and placed in an onsite disposal cell.

(Photo courtesy of the Department of Energy)

Introduction

Historical perspective

In 1993, the Missouri Department of Natural Resources created the Federal Facilities Section. The Federal Facilities Section provides oversight and review of investigations, management and remediation of hazardous (chemical and radiological) substances at federal facilities in Missouri. Federal facilities include sites both currently and previously owned or operated by the Department of Defense (DOD) or the Department of Energy (DOE). In addition, the Federal Facilities Section provides guidance to ensure that activities conducted at the sites are in accordance with both state and federal environmental laws and regulations.

The ultimate goal of the Federal Facilities Section is to have complete remediation of the contaminated federal sites within Missouri. This section was created as a response to the requests of the DOD and DOE to address their specific needs as they relate to each individual site. The section was also formed to make sure the cleanups meet the requirements set by the department and to ensure that complete and satisfactory cleanups will be accomplished.

Section mission

The mission of the Federal Facilities Section is to ensure the investigation, management and remediation of hazardous and radioactive substances is adequately and effectively conducted at current and formerly used federal facility sites in Missouri.

This is in line with the mission of the Division of Environmental Quality and the Hazardous Waste Program, which is to

protect the well-being of Missourians and their environment in issues related to the generation, management and remediation of hazardous substances.

Purpose

The Federal Facilities Section has three main purposes. They are to assure adherence to Missouri environmental laws and regulations; promote, encourage and provide information exchange with communities; and provide input on the day-to-day operation of the cleanup activities.

The section operates under two main federal laws: the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Federal Facility Compliance Act (FFCA). CERCLA, also known as Superfund, oversees the cleanup of hazardous substances. FFCA is a law that requires federal entities to be subject to the Resource Conservation and Recovery Act (RCRA). This act also requires DOE to develop treatment technology for wastes that are both hazardous and radioactive, known as mixed wastes. RCRA regulates the cradle-to-grave handling of hazardous waste and mandates corrective action at hazardous waste management facilities.

Federal Facilities Section personnel provide state representation in the oversight of the various ongoing cleanups. The cleanups of most of the sites involve the remediation of various contaminants including radioactive wastes, explosives, unexploded ordnance, depleted uranium, solvents and petroleum wastes. The Federal Facilities Section coordinates with other state, local and federal agencies to ensure that human health and the environment are protected.



Excavation continues at the Formerly Utilized Sites Remedial Action Program (FUSRAP). Current estimates show that about 157,340 cubic yards of radioactively contaminated material have been removed.

(Photo courtesy of the U.S. Army Corps of Engineers - St. Louis District)



Federal Facilities staff member Steve Preston samples the Blue River for macroinvertebrates in an ongoing water quality project at the Kansas City Plant.

(DNR photo by Vin Journey)

Current issues

National Priority List

The U.S. Environmental Protection Agency's (EPA) National Priority List (NPL) prioritizes sites that have high levels of contamination and affect many people. The primary purpose of the NPL is to guide the EPA and the Missouri Department of Natural Resources in determining which sites warrant further investigation and cleanup.

Missouri currently has 26 Superfund sites listed on the EPA's priority list. Five of the sites listed on the NPL are federal facilities and are under the jurisdiction of the Federal Facilities Section.

The NPL is the result of Section 105(a)(8)(B) of the Comprehensive

Environmental Response, Compensation and Liability Act (CERCLA), as amended, which requires specific statutory criteria to be used to prepare a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants or contaminants throughout the United States.

Pools Prairie/Camp Crowder, in Neosho, is Missouri's most recent addition to the NPL. It was added on Oct. 19, 1999, after EPA and the Missouri Department of Natural Resources testing indicated that 36 residential drinking wells were contaminated with trichloroethylene (TCE), a solvent used to clean and degrease metals.

All NPL sites are considered high priority for cleanup due to the risk they pose to human health and the environment. When evaluating a site, EPA in conjunction with the Missouri Department of Natural Resources considers the following:

- toxicity of the contamination,
- proximity of the contaminant to human populations,
- potential or actual impact on the environment, especially threatened and endangered species; and
- whether humans or the environment are exposed to the contamination through one or more exposure routes or pathways (air, soil or water).

Other NPL federal facility sites in Missouri are discussed in the activities and accomplishments section of this report.

Stewardship

Stewardship can be defined as activities necessary to maintain long-term protection of human health and the environment from hazards posed by residual radioactivity and



DNR photo by Nick Decker

NRD assessment is used to restore wildlife communities in environmentally compromised areas, such as the Former Weldon Spring Ordnance Works site.

chemically hazardous materials after a cleanup is done. To be good stewards, agencies use institutional controls or administrative or legal mechanisms designed to control future use by limiting development and/or restricting public access to a site where residual contamination is left in place. Many of these institutional controls might be required for hundreds and even thousands of years. Therefore, significant commitments by the federal government and the state are necessary.

Natural Resource Damages

Natural Resource Damages (NRD) allows natural resource trustees, such as the Missouri Department of Natural Resources, to seek compensation for natural resource injuries caused by oil discharges or releases of hazardous substances. Compensation can include a commitment from the potentially responsible parties to perform restoration projects, make monetary payments to be used to restore injured natural resources or a combination of both. NRD actions can be

initiated under federal and state laws including CERCLA; Clean Water Act; Oil Pollution Act; Park System Resources Protection Act; Marine Protection, Resource and Sanctuaries Act; and Missouri's revised statutes.

The NRD process involves collecting and analyzing information to assess injuries to natural resources. One of the goals of the NRD program is to integrate natural resource injury issues into the cleanup process to decrease liability and residual injury. Natural resources include land, fish, wildlife, biota, air, water, groundwater, drinking water supplies and other such resources belonging to the United States, any state or Indian tribe.

Natural resource damage is a relatively new concept designed to return an injured area to its baseline condition. Currently, the Missouri Department of Natural Resources and other state and federal agencies are working with the DOD and the DOE to assess Missouri's natural resources and to determine how best to return them to their original condition.

Federal facility sites on the National Priority List

Pools Prairie/Camp Crowder
Newton County

Lake City Army Ammunition Plant
Jackson County

St. Louis Airport Site/Hazelwood Interim Storage Site/Futura Coating (Formerly Utilized Sites Remedial Action Program)
St. Louis County

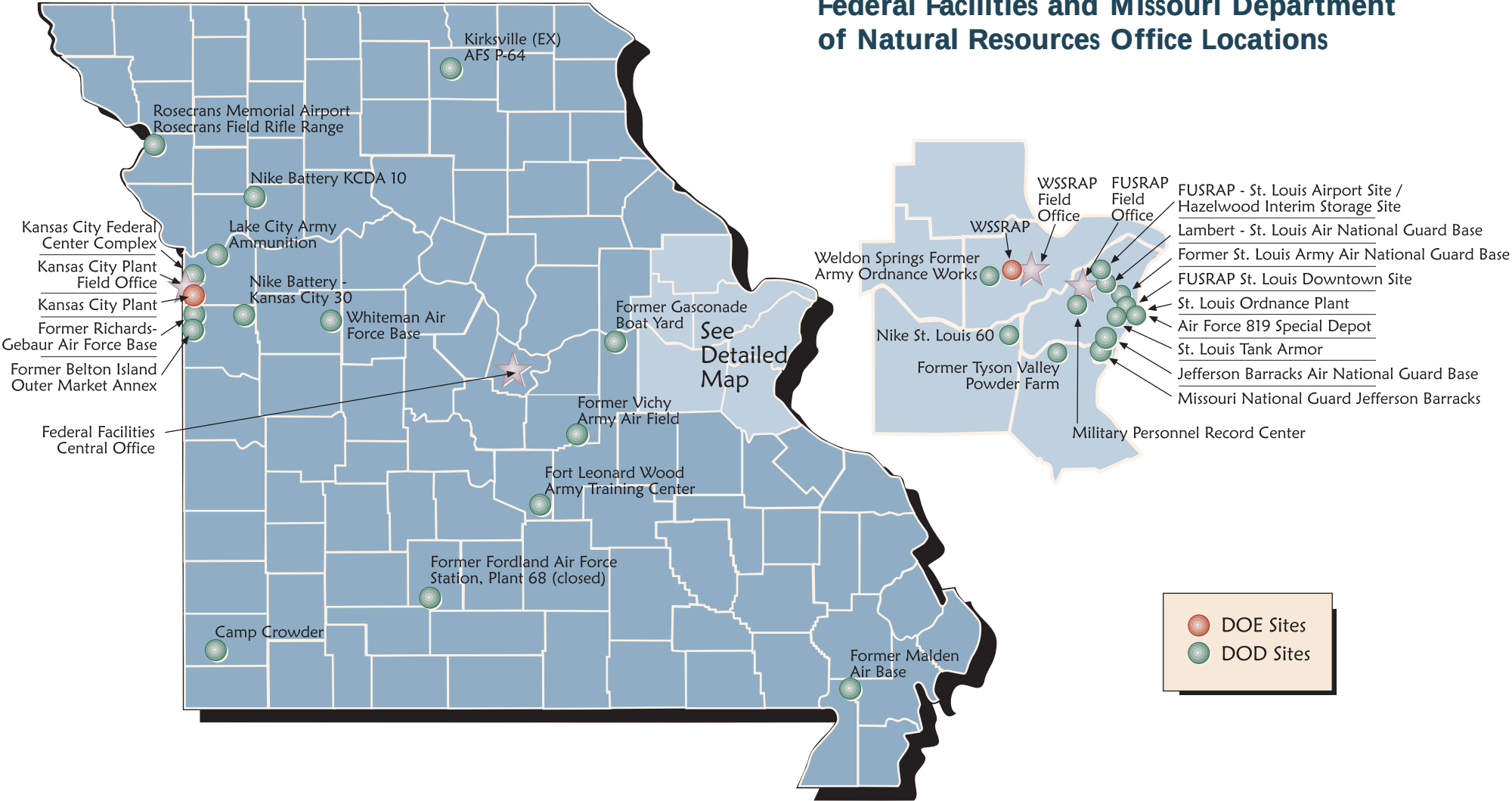
Former Weldon Spring Ordnance Works
St. Charles County

Weldon Spring Quarry, Plant and Pits (Weldon Spring Site Remedial Action Project)
St. Charles County

Current status of federal facilities

Facility	County	Phase	Potential Contaminants of Concern
Department of Defense Sites			
(Former) Air Force 819 Special Depot	St. Louis	Preliminary	Unknown
(Former) Air Force Plant 65			
Camp Crowder/Fort Crowder	Newton	Investigation	Petroleum products, solvents, PCBs*
(Former) Fordland Air Force Station, Plant 68	Cass	Complete	Landfill activities
Forest Park Restoration Camp	St. Louis Metro	Preliminary	Unexploded ordnance
Formerly Utilized Sites Remedial Action Program (SLDS, SLAPS, HISS, vicinity properties)	St. Louis Metro	Investigation/ Remediation	Radium, thorium, uranium, (also at SLDS: arsenic, cadmium)
Fort Leonard Wood Army Training Center	Pulaski	Investigation	Landfill activities, various hazardous waste
(Former) Gasconade Boat Yard	Gasconade	Investigation	Petroleum products
Jefferson Barracks/Air National Guard Base	St. Louis	Remediation	Unexploded ordnance, petroleum products/waste, chemical warfare material
Kansas City Federal Center Complex	Jackson	Investigation	Solvents, metal, petroleum products/waste, pesticides
(Former) Kirksville Air Force Station	Adair	Investigation	Petroleum products/waste, solvents, organic material
Lake City Army Ammunition Plant	Jackson	Remediation	Depleted uranium, unexploded ordnance, PCB, oil, grease, solvents, metals*
Lambert-St. Louis Air National Guard Base	St. Louis	Preliminary	Solvents, waste oil, detergents
(Former) Malden Air Base	New Madrid	Preliminary	Petroleum products/waste
Military Personnel Record Center, St. Louis	St. Louis	Preliminary	Petroleum products
Nike Battery - Kansas City 30	Cass	Remediation	Petroleum products/waste, solvents, metals, pesticides, mercury
(Former) Nike Battery KCDA 10, Lawson	Clay	Preliminary	Asbestos, petroleum products/waste, solvents
(Former) Nike Hercules SL 60, Pacific	Jefferson	Preliminary	Asbestos, petroleum products/waste, solvents
(Former) Richards-Gebaur/Air Force Base	Jackson, Cass	Investigation	Petroleum products/waste, unexploded ordnance, metals, PCB, solvents, low-level radioactive waste, pesticides*
Rosecrans Air National Guard Base	Buchanan	Investigation	Petroleum products/waste, aircraft fuel, solvents, waste oils, polynuclear aromatic hydrocarbons, organic chemicals, arsenic, cadmium, chemical warfare material
Rosecrans Memorial Airport	Buchanan	Preliminary	Heavy metals
(Former) St. Louis Army Ammunition Plant	St. Louis	Preliminary	PCB, petroleum products/waste, solvents, metals*
(Former) St. Louis Ordnance Plant/Army Reserve	St. Louis	Preliminary	Explosive residue, heavy metals
(Former) St. Louis Tank Armor	St. Louis	Preliminary	PCB, heavy metals, solvents*
(Former) Tyson Valley Powder Farm	St. Louis	Investigation	Nitroaromatics, explosives, unexploded ordnance, medical wastes, mercury
(Former) Vichy Army Air Field	Maries	Preliminary	Heavy metals, petroleum products/waste
(Former) Weldon Spring Ordnance Works	St. Charles	Remediation	TNT, DNT, lead, asbestos*
Whiteman Air Force Base and Minuteman II Sites	Johnson	Investigation/ Long-term monitoring	petroleum products/waste, unexploded ordnance, metals, PCB, solvents, low-level radioactive waste, pesticides*
Department of Energy Sites			
Kansas City Plant	Kansas City	Investigation	Solvents, PCB, petroleum products/waste, metals*
Weldon Spring Site Remedial Action Project (Chemical Plant and Quarry)	St. Charles	Remediation	TCE, Nitrate, TNT, DNT, radium, thorium, uranium, PCB*

Federal Facilities and Missouri Department of Natural Resources Office Locations



★ ★ Office Addresses ★ ★

Department of Natural Resources
Federal Facilities - Central Office
1738 E. Elm St.
Jefferson City, MO 65101
(573) 751-3907
FAX: (573) 526-5268

Department of Energy
Kansas City Plant / DNR - AIP
2000 E. Bannister Rd.
P.O. Box 410202
Kansas City, MO 64141-0202
(816) 997-5790
FAX: (816) 997-3261

Weldon Spring Site Remedial Action
Program (WSSRAP) Field Office
7045 Hwy 94 S.
St. Charles, MO 63304
Phone (636) 441-8030 or 8033
FAX: (636) 447-0729

Formerly Utilized Sites Remedial
Action Program (FUSRAP)
Field Office
917 N. Hwy 67, Ste. 104
Florissant, MO 63031
(314) 877-3250 or 3251
FAX: (314) 877-3254

Activities and accomplishments

The Federal Facilities Section is composed of two units, the Department of Defense (DOD) Unit and the Department of Energy (DOE) Unit. These units focus on assisting the respective federal agencies to remediate sites. This report will focus on a few select sites within each unit.

Department of Defense Unit *Lake City Army Ammunition Plant*

Located in Independence, in Jackson County, this site is one of the largest government-owned, small-caliber ammunition manufacturing plant in the world. The installation is about 3,900 acres. With the exception of the five-year period between the end of World War II and the beginning of the Korean conflict, this

government-owned, contractor-operated facility has been in continuous production since October 1941. During World War II, 5.7 billion cartridges were produced; during the Korean conflict, 1.1 billion; and during the Vietnam conflict, 14.4 billion. The plant still produces 500 million rounds a year.

Historic waste handling and disposal practices of hazardous substances including oil, grease, solvents, explosives and metals have led to widespread contamination of the site and the subsequent placement of the site on the Superfund National Priority List (NPL) on Aug. 21, 1987.

To assist with decision-making for environmental cleanups, Lake City Army Ammunition Plant is divided into three operable units: Area 18, Northeast Corner and Installation-Wide. The Area 18 Operable Unit has several old burn pits and

trenches contaminated with organics and metals, as well as a groundwater contamination plume. The Northeast Corner Operable Unit contains heavily contaminated oil and solvent pits; a 17-acre abandoned landfill with contaminated leachate seeps (water that is or has been in contact with waste); a waste glass, paints and solvents area; and a metals and explosives contaminated burning ground. The Installation-Wide Operable Unit has a number of areas with surface and subsurface contamination, primarily by metals.

In 1985, 24 groundwater-monitoring wells at seven sites were sampled. Samples from all seven areas detected contaminants in the groundwater, including volatile chemicals, semivolatile chemicals, explosives and metals. Since that time, various remediation techniques have been instituted including air stripping, monitoring and a pump and treat system.

Jefferson Barracks

Jefferson Barracks was once the largest military reservation in the United States and has been a significant U.S. military site since 1826. Used by the Army, Navy, Air Force, Coast Guard, National Guard, other federal agencies and the Red Cross, it has been used for induction, recruitment, training, mobilization and separation of troops. It was the first Army basic training camp and was also home of the first U.S. Cavalry. It was a major munitions depot for both the Army and the Navy, and it still

Lake City Army Ammunition Plant, pictured here, was placed on the National Priority List in 1987.

(Photo by DNR)



Unexploded ordnance may pose a public safety hazard. This ordnance was found at the Jefferson Barracks site.

(DNR photo by Ramona Huckstep)

contains a national cemetery and the largest U.S. military hospital. Running two miles along the western bank of the Mississippi River at the southern boundary of St. Louis is 135 acres of ground used by the Air National Guard Station.

At Jefferson Barracks, the Army Corps of Engineers accepted responsibility for buried fuel tanks that appear on old site maps and for possible unexploded ordnance along the riverfront, where hundreds of ordnance items have been found since 1996. Discoveries included live fragmentation and white phosphorous grenades, some Stoke's mortar rounds and hundreds of cartridges and fuses. Because of the large amounts of military debris and its proximity to the Mississippi River, it would have been difficult to remove unexploded ordnance. Therefore, the Corps of Engineers opted to leave it in place.

To address the remediation issue at the site, in the summer of 1999, the Army Corps of Engineers began placing large rocks over the beach and posting warning signs about the possible presence of unexploded ordnance. Plans for long-term monitoring of the site are being developed to protect the public from encountering unexploded ordnance.



Base Realignment and Closure Sites (BRAC)

Bases are selected for realignment or closure according to a process in the Defense Authorization Amendments, Base Closure and Realignment Act of 1988, and the Defense Base Closure and Realignment Act of 1990. Once a base has been approved for closure or realignment, laws and regulations identify the environmental requirements to be followed. The Federal Facilities Section participates in the review process and provides input to ensure that the properties are cleaned up to the appropriate reuse standards outlined between DOD and the community. There are currently 112 BRAC sites throughout the United States. Four of those sites are located in Missouri:

- Richards Gebaur Air Force Base
- Aviation and Troop Command at the former St. Louis Army Ammunition Plant
- Nike Battery Kansas City - 30

For more information on BRAC, visit www.epa.gov/swerffrr/about.htm.

Richards Gebaur Air Force Base

This site is 18 miles south of downtown Kansas City. The base has served a variety of functions since Kansas City originally built it as an auxiliary airport in 1941. The site comprises 426 acres of land distributed in 11 parcels. Two larger parcels, the Cantonment Area and the Belton Training Complex are 208 and 184 acres, respectively. The remaining acreage is subdivided into nine parcels ranging between one and 13 acres.

The Aerospace Defense Command leased the airport in 1952, and the following year Kansas City transferred the property to the U. S. government. Since that time the base has successively been under the command of the Aerospace Defense Command, the Air Force Communications Command, the Military Airlift Command and the Air Force Reserve.

During the Air Force's tenure at the base, industrial activity consisted of maintaining aircraft and ground support equipment. In the early 1990s, that portion of the base, still under Air Force Reserve control, was slated for closure under the base realignment and closure acts. Contaminants associated with the site include petroleum, solvents and heavy metals.

The Air Force closed the airport in early 2000, and Kansas City Southern Railroad has completed construction of an intermodal rail freight center. Currently, the Kansas City Council is studying whether a new runway should be built to continue aviaional use of the airport site.

Although owned by the U.S. government, Richards Gebaur Air Force Base falls within the jurisdiction of three separate government entities: Kansas City, the City of Belton and Cass County.

Whiteman Air Force Base/ Minuteman II

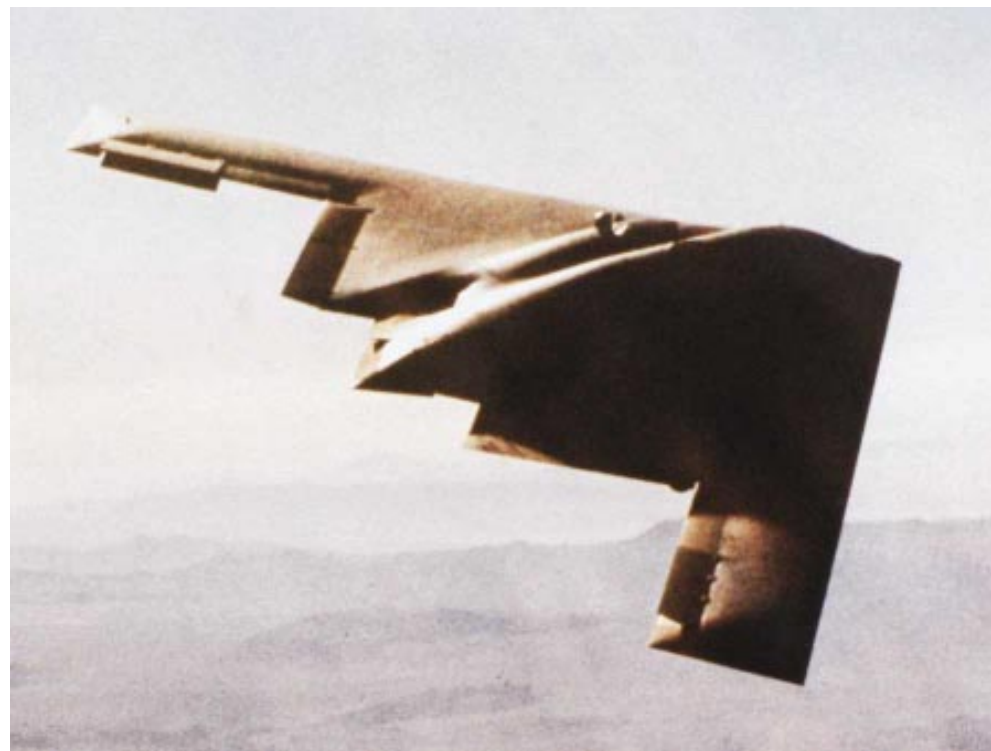
Whiteman Air Force Base is located in west central Missouri, nine miles east of Warrensburg. The base is about 4,677 acres, which is a combination of government-owned, leased and easement land. The Sedalia Air Force Base was constructed in 1942. The base served as a training site for glider tactics and paratroopers. On Dec. 3, 1955, Sedalia Air Force Base was renamed Whiteman Air Force Base. The base is currently home to the 509th Bomb Wing and is the home of the B-2 Advanced Technology Bombers.

Whiteman has about 27 contaminated sites consisting of landfills, firing ranges, underground storage tanks, disposal areas and lagoons. The contaminants of concern at these sites are petroleum products and waste, chlorinated solvents, unexploded

ordnance, low-level radioactive waste, metals, pesticides and polychlorinated biphenyls (PCBs).

Whiteman was headquarters for the 351st Strategic Missile Wing, consisting of 150 Minuteman II Intercontinental Ballistic Missile silos and 15 launch control facilities spread throughout 14 counties in west-central Missouri.

Between 1996 and 1998, the missile silos were deactivated and dismantled under the Strategic Arms Reduction Treaty and are now going through a minimum five-year environmental monitoring process, which involves groundwater monitoring and annual sampling. The contaminants of concern for these sites are diesel fuel and PCBs. Additionally, other potential contaminants have also been used on site with resultant wastes generated including oils, lubricants, solvents and coatings.



The B-2 Bomber is housed at Whiteman Air Force Base.

(Photo courtesy of the 509th Bomb Wing)

Projected and Completed Federal Facilities Section Activities

Activity	1999	2000	2001*	2002*
Sites Assessed	5	3	3	3
Sites Characterized	6	3	5	5
Cleanup Decisions	9	12	15	10
Sites Complete or Closed	3	8	10	5
Totals	23	26	33	23

* Projected activities

Summary of terms

Sites Assessed: When historical information indicates that actual or potential contamination exists, a site is assessed. At this phase new sites are evaluated and accepted into the program and assigned to a Federal Facilities Section project manager.

Sites Characterized: When the nature and extent of contamination have been defined, the site has entered the characterization phase.

Cleanup Decisions: Plans are submitted to the Missouri Department of

Natural Resources for review. These plans relate to the cleanup and how to address the contamination. Then a decision is identified. Based on plans approved by the department, the site can move forward with remediation.

Sites complete or closed: Once a decision has been implemented and the contamination has been remediated, the final phase of a project involves sending a closure letter from the department, indicating that the contamination associated with the site has been remediated.



Historic photo by Rocketdyne

The component buildings, used to test rocket engines at Camp Crowder during the 1940s and 1950s are still present on the site.

Fordland Air Force Station

On Nov. 9, 1998, the Federal Facilities Section, in cooperation with the Army Corps of Engineers, determined that no further action was warranted at Fordland Air Force Station. The determination was based on site-specific investigations, which included geophysical and radiological surveys, soil, leachate and groundwater sampling. This Formerly Used Defense Site (FUDS) is the first site officially closed by the Federal Facilities Section. In the fall of 1996, the Corps of Engineers conducted a site investigation and determined that the soils, sediments and groundwater did not appear to have been adversely impacted by suspected DOD landfill disposal activities.

Fordland Air Force Station is located in Webster County three miles east of the town of Fordland. The site area consists of over 85 acres used by the Air Force as a radar and communication site. The land was originally acquired in 1951. On April 26, 1962, the U.S. Department of Health, Education and Welfare deeded the property to the state of Missouri for exclusive use by the Missouri Department of Corrections, Division of Inmate Education. The site is

currently named Ozark Correctional Center and is used as a medium security state prison.

Pools Prairie/Camp Crowder

The former Fort Crowder Military Installation is located in Newton County about three miles southeast of the city of Neosho, in southwest Missouri. In 1941, the DOD originally used Fort Crowder, now referred to as Camp Crowder Training Facility, as a Signal Corps Training Center. By 1943, the DOD had acquired 42,786 acres in Newton and McDonald counties. The Missouri National Guard has a license from the Corps of Engineers to use 4,358 acres for a training area. The remainder of the land has been given to various public and private interests.

Past operations include rocket engine testing and manufacturing, aircraft maintenance, industrial waste treatment facility operations, landfilling, underground fuel storage, burn pits and lagoons. Most of the contamination is attributed to the former rocket engine and components testing operations at Former Air Force Plant 65, a portion of Camp Crowder.

The rocket engines of two well-known missiles were tested at this site. Atlas was developed by the U.S. Air Force as America's first intercontinental ballistic missile. Its first successful flight was in December 1957. Thor, an intermediate range ballistic missile, was capable of carrying a thermonuclear bomb 1,500 miles, the distance from England to Moscow. The end of the Cold War resulted in the United States dismantling its nuclear deterrent force, and today these missiles are retired or are used to put satellites in orbit.

Groundwater and soil contamination has been identified in various areas of the base's original property boundaries. Trichloro-ethylene (TCE) contamination in soils and groundwater has been documented at the site and includes off-site

contamination in a number of private wells. Waste materials generated from the former fort include aviation and vehicular fuels, oils, greases, metals, paints and solvents.

In October 1999, this site was listed on the NPL. The Pools Prairie Site encompasses a federal facility and property that was owned by several different companies. The site consists of at least two TCE groundwater plumes that have been identified through residential well sampling. To date, sampling has identified numerous residential wells with TCE contamination. Initially, bottled water was provided to residents. Later, as a temporary measure, residents were provided with a system that treats the contamination from the wells. Efforts are currently underway to extend the Neosho Municipal Water System to affected



An incinerator was constructed at the former Weldon Spring Ordnance Works site to treat soil contaminated by TNT.

(DNR photo by Nick Decker)

Restoration Advisory Boards give communities a voice in environmental protection and remediation

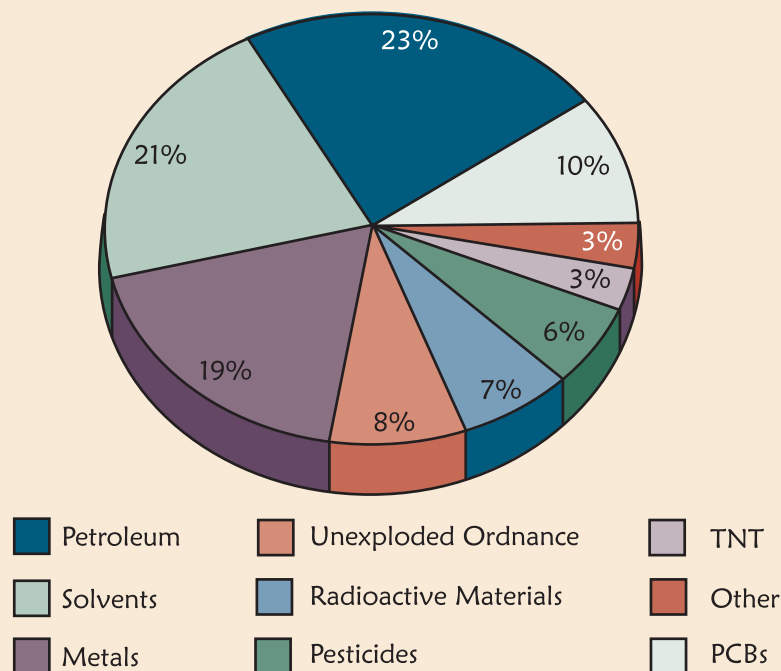
A Restoration Advisory Board (RAB) provides a forum through which members of the public can provide input to the Department of Defense's (DOD) environmental restoration program. A RAB is co-chaired by a DOD representative and a community member. The RAB promotes the exchange of information between government officials and members of the local community on installation cleanup issues. In addition to regular meetings, other activities may be conducted by the RAB to enhance this process.

RABs are being established at operating installations, closing or realigning installations and formerly used defense sites where there is sufficient and sustained community interest. Currently there are over 300 DOD installations participating in RABs nationwide. In Missouri, the DOD has established five RABs to date: Lake City Army Ammunition Plant, Richards-Gebaur Air Force Base, Whiteman Air Force Base, Nike Battery-Kansas City 30 and the Former Weldon Spring Ordnance Works. The establishment of other RABs is being considered at other sites. Members of a RAB may include local citizens, representatives of the U.S. Environmental Protection Agency and state, local and tribal governments.

The RAB team should reflect the diverse interests of the community and help identify possible issues associated with an installation's environmental cleanup program. RABs provide a link between the community and decision-makers and should complement other community involvement activities, such as public meetings, distribution of informative mailings to the public on installation cleanup activities and the establishment of local information repositories. RAB meetings are open to the public, and some installations make their meeting minutes publicly available.

Public interest is the key to making the RABs work. With many resources available through the state and federal government, the public can be kept informed and contribute to the decision-making at a site. Other federal facilities in Missouri may have RAB equivalents headed by other agencies. At other sites these groups may be known as Community Advisory Groups (CAGs), in which the EPA is the lead agency; Site-Specific Advisory Boards (SSABs), in which the Department of Energy is the lead agency; or Community Assistance Panels (CAPs), in which the Agency for Toxic Substances and Disease Registry is the lead agency.

Common contaminants found at federal facilities sites



Metals: Heavy metals; like mercury, chromium, cadmium, arsenic and lead; can damage living things and tend to accumulate in the food chain.

PCBs: Polychlorinated biphenyls (PCBs) are toxic, persistent chemicals used in electrical transformers and capacitors for insulation and in gas pipeline systems as a lubricant.

Pesticides: These are substances intended to repel, kill or control any species designated a "pest."

Petroleum: Gasoline, kerosene, diesel, lubricants and fuel oil.

Radioactive Materials: Any waste that emits energy as rays, waves or streams of energetic particles.

Solvents: Solvents are capable of dissolving or dispersing one or more other substances.

TNT/DNT: Trinitrotoluene (TNT) is produced only at military arsenals and is used in ordnance. Dinitrotoluene (DNT) is used to produce ammunition and explosives. DNT is not a natural substance and can remain in the environment for a long time.

Unexploded Ordnance: Includes anything related to munitions designed to cause damage through explosive force, incendiary action or toxic effects.

residents. Contaminated soil removal and groundwater containment are also planned for the site.

Weldon Spring Ordnance Works

This site, a Superfund NPL site, located 14 miles southwest of the City of St. Charles, was one of many munitions plants manufacturing TNT and dinitrotoluene (DNT) for the armed services during World War II. During peak operations, the Ordnance Works had more than 1,038 buildings and 5,200 employees. The facility was composed of 18 TNT and two DNT production lines, in addition to various plants and buildings. It is estimated during operation of the plant, over 710 million pounds of TNT and 31 million pounds of DNT were produced. Termination of production was ordered on V-J Day, the day of victory for the Allied forces over Japan in World War II, Sept. 2, 1945.

In the years since the Ordnance Works was closed, TNT and DNT contamination was discovered in the soil and groundwater. In cooperation with the Missouri Department of Natural Resources and EPA, the Army conducted several investigations to locate the contamination. Based on these findings, the Army defined the amount of contaminated soil to be removed and cleaned. The Army selected incineration as the best method of treating the contaminated soil, and plans were made to bring a transportable incinerator to the site. The incinerator operated from July 23, 1998, to March 31, 1999, treating 73,074 tons of soil.

Various amounts of TNT and DNT contamination were also detected in the groundwater at the site. The Army and DOE have installed monitoring wells across the site to determine the amount and extent of contamination. Currently, the Army, in cooperation with EPA and the Missouri Department of Natural Resources, is evaluating the possible cleanup options to remove this contamination.

Department of Energy Unit Formerly Utilized Sites Remedial Action Program (FUSRAP)

Nuclear weapons were developed during World War II. For protection, the nation's weapons production facilities were built in remote areas across the country. Also, during and after the war, the government contracted with universities and private companies to research and produce certain items because it was both faster and cheaper than building new government factories or laboratories. Many of these sites are being cleaned up by the Formerly Utilized Sites Remedial Action Program (FUSRAP).

The FUSRAP project covers multiple sites in the St. Louis area and throughout the United States that were involved in the development and production of nuclear materials. The sites in Missouri include the St. Louis Downtown Site, the St. Louis Airport Site and the Hazelwood Interim Storage Site. About 90 vicinity properties that contain various levels and amounts of contamination are also included in the Missouri FUSRAP cleanup. To date, about half of the vicinity properties have been addressed.

The sites listed above were contaminated with radium, thorium and uranium through processing, transportation, storage and management practices from 1942 to 1973. The St. Louis Airport Site and the Hazelwood Interim Storage Site were placed on the Superfund NPL in 1989. The total estimated volume of contaminated soils, sediments and debris is in the range of one million cubic yards. DOE predecessor agencies, the Manhattan Engineering District and the Atomic Energy Commission, were responsible for the waste material. The U.S. Congress initially assigned the FUSRAP cleanup project to DOE, but that responsibility was transferred to the U.S. Army Corps of Engineers on

Oct. 13, 1997, with the signing of the 1998 Energy and Water Appropriations Bill.

Federal Facilities Section staff in the FUSRAP project office, located in Florissant, represent the state's interests and oversee cleanup of the St. Louis FUSRAP remediation sites. Field personnel visit the site regularly to observe and document the status of remedial actions, environmental monitoring, off-site migration controls and site conditions as they pertain to excavations and sampling. In addition to reviewing sampling practices and results obtained by the Corps of Engineers, Federal Facilities Section staff also sample the soil and groundwater. Samples have been taken from Coldwater Creek, soil in excavations and from other areas of interest. Most importantly, the Federal Facilities staff provide coordination between the EPA, the Corps of Engineers and the various programs within the Missouri Department

of Natural Resources. Section staff also respond to requests for information, comments and concerns of the FUSRAP Oversight Committee and other interested parties. The Oversight Committee is an active public group that is kept informed of cleanup activities and provides comments on the remediation process.

St. Louis Downtown Site

The St. Louis Downtown Site is a 45-acre active chemical manufacturing facility, operated by Mallinckrodt Inc., located about 300 feet west of the Mississippi River and north of the St. Louis downtown area. The Mallinckrodt Chemical Company Plant processed uranium at that site for the U.S. government nuclear weapons complex between 1942 and 1957.

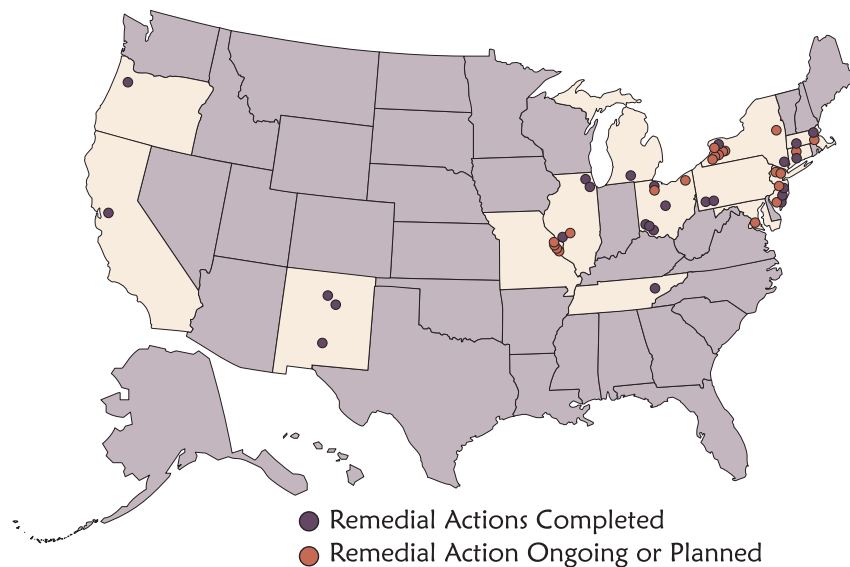
Currently, about 10,200 cubic yards of contaminated material have been excavated



In the 1940s, the Atomic Energy Commission/Manhattan Engineer District used the St. Louis Airport Site to store radioactive waste in drums. These drums have since been removed.

(Photo courtesy of the U.S. Army Corps of Engineers - St. Louis District)

FUSRAP sites in the United States



There are 46 FUSRAP sites throughout the U.S. As of 1999, 24 have been completed with some ongoing operation maintenance and monitoring. The others are in various stages of remediation.

(Base map courtesy of the U.S. Army Corps of Engineers)



Contaminated soil is cleaned up and removed from the St. Louis Airport Site.

(DNR photo by Nick Decker)



Contaminated soil from the St. Louis Airport Site is being loaded onto rail cars to be sent to an out-of-state hazardous waste processing facility.

(Photo courtesy of U.S. Army Corps of Engineers - St. Louis)

from the Mallinckrodt Plant. Remedial work was delayed temporarily in 1999 when unexploded Civil War ordnance were discovered during excavation activities. The ordnance were removed, and a safety plan is being drafted to address the possibility of encountering additional ordnance.

St. Louis Airport Site

This 22-acre property is located in St. Louis County, north of Lambert-St. Louis International Airport. Starting in the mid-1940s, the Atomic Energy Commission/Manhattan Engineer District used the airport site to store radioactive waste and residues from manufacturing operations at the downtown site. The waste and residue were stored in uncovered bulk storage piles and in drums. The waste material at the St. Louis Airport Site was sold in 1956 and shipped to a facility at 9200 Latty Ave. A majority of the material was dried and shipped to an out-of-state reprocessing

facility known as the Cotter Corp. Processing Facility in Canon City, Colo.

In September 1999, the U.S. Army Corps of Engineers dug test pits in a portion of the St. Louis Airport Site, called the radium pits, which were considered to be the area of highest risk as a result of high concentrations of radionuclides in a large volume of soil. This site is located next to McDonnell Boulevard in St. Louis. The test pits were dug in preparation for the large-scale removal of contaminated soil. Concentrations of contaminants in the soil were compared to dose- and air-sampling monitoring to evaluate worker protection methods. The Corps of Engineers, in conjunction with the Missouri Department of Natural Resources and EPA, is currently in the process of removing contaminated soils. About 323,800 cubic yards of soil will be excavated at the St. Louis Airport Site. Contaminated soil is loaded onto rail cars and shipped to licensed out-of-state

hazardous waste disposal facilities in Utah and Idaho.

Hazelwood Interim Storage Site

The material left from the transfer of waste from the St. Louis Airport Site facility was eventually stockpiled elsewhere creating the Hazelwood Interim Storage Site, which is 3.2 miles northeast of Lambert-St. Louis International Airport within an industrial/commercial area in the city limits of Hazelwood. About 138,000 cubic yards of soil will eventually be removed from this site. To date, half of the contaminated soil has been removed.

Kansas City Plant

This DOE site is part of the Bannister Federal Complex and is located 13 miles south of downtown Kansas City, within the city limits. The facility is located at the intersection of Bannister Road (95th Street) and Troost Avenue on 136 acres. DOE shares the facility with the U.S. General Services Administration, which leases to other federal agencies, including the Internal Revenue Service. The Kansas City Plant is a government-owned facility operated by Honeywell International Inc.

The plant produces and procures non-nuclear parts for nuclear weapons, including electrical, electronic, electromechanical, mechanical, plastic and non-fissionable metal components.

DOE operations began in 1949 at the Kansas City Plant. Prior to 1949, DOD used the plant as an airplane engine production facility. Onsite releases of hazardous materials have resulted in contaminated soil and groundwater. Releases from an underground tank farm, a trichloroethylene (TCE) reclamation facility, a plating building and other industrial practices have resulted in large soil and groundwater plumes containing solvents, polychlorinated biphenyls (PCBs) and petroleum products.

On March 23, 1995, the department signed an Agreement in Principle with DOE for environmental oversight, monitoring and emergency response associated with the Kansas City Plant. An Agreement in Principle sets guidelines and rules for DOE and the Missouri Department of Natural Resources so they can work together to provide independent oversight and public information on an otherwise restricted site.

Innovative technologies used at Kansas City Plant

Iron Wall Permeable Barrier: iron filings are placed into a trench and breakdown solvents in the groundwater.

Deep Soil Mixing: in-ground soil mixing to reduce solvent contamination in the soil.

Seepage and Restoration Studies: define flow of seepage of contaminated groundwater.

Microwave Demonstration: the use of high-energy microwaves to remove contamination.

Thermal Technologies: heating the soil to remove contamination.

Under the Agreement in Principle, the department's Federal Facilities Section provides assistance, such as emergency response activities, public awareness coordination, evaluation of waste management and technical review of issues and innovative technology projects. By having a field office at the Kansas City Plant, assistance provided by the state is greatly improved. Onsite support is readily available from the Federal Facilities Section personnel, and remediation can progress with more efficiency and effectiveness.

Weldon Spring Site Remedial Action Project (WSSRAP)

From 1941 to 1945, as part of the World War II defense effort, the U.S. Army produced explosives at the Weldon Spring Ordnance Works, a 17,000-acre facility near Weldon Spring, not far from St. Louis. In 1955, the Army transferred some 200 acres to the Atomic Energy Commission (AEC) for construction of the Weldon Spring Uranium Feed Materials Plant. From 1957 to 1966, the feed materials plant assayed and then processed some of the uranium ore concentrates and a small amount of thorium. Wastes generated during these operations were stored in four open-air lagoons called the raffinate pits. Raffinate is defined as a waste product from a refining process. In 1958, the AEC acquired the title to the Weldon Spring Quarry from the Army. The Army had extracted limestone aggregate from the quarry for use in constructing the ordnance works, and later, used the quarry pit to burn wastes from its explosives manufacturing operations. Also, miscellaneous other wastes, including rubble contaminated with TNT, were disposed of there.

From 1963 to 1969, the AEC disposed of uranium and thorium residues in the quarry. Material placed in the quarry during this time included uranium- and radium-contaminated building rubble and soils from

the demolition of a uranium ore processing facility in St. Louis. Other radioactive materials in the quarry included drummed wastes, uncontained wastes and contaminated pieces of manufacturing equipment. The feed materials plant was shut down in 1966, and in 1967 the AEC returned the facility to the Army for use as a defoliant production plant to be known as the Weldon Spring Chemical Plant. In 1968, the Army started removing equipment and decontaminating several buildings. However, the defoliant project was canceled in 1969 before any process equipment was installed. The Army retained responsibility for the land and facilities of the chemical plant, but the raffinate pits were transferred back to the AEC.

The Weldon Spring Site was placed in caretaker status, which means that no production or activity took place from 1981 through 1985, when custody was transferred from the Army to the DOE. In 1985, the DOE proposed designating control and decontamination of the chemical plant, raffinate pits and quarry as a major project to be called the Weldon Spring Site Remedial Action Project (WSSRAP). The quarry was placed on the Superfund NPL in July 1987. The chemical plant and raffinate pits were added to the NPL in March 1989.

The remediation of the WSSRAP site is being conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and as part of DOE's Environmental Restoration and Waste Management Program. This site contains chemical and radiological contaminants in various media from previous operations at the site. This project is executed in two distinct locations, the Chemical Plant area and the Quarry. There are also surrounding properties that historically were part of this site. They have since been transferred to other owners, such as:



The automated manufacturing area at the DOE's Kansas City Plant.

(Photo courtesy of the Department of Energy)



Rail cars are used at a FUSRAP site to transport contaminated soil to a processing facility instead of trucks because it is more efficient and cost-effective.

(DNR photo by Nick Decker)

- Missouri Department of Conservation's for the August A. Busch Memorial Conservation Area
- Missouri Department of Natural Resources for the Katy Trail State Park
- University of Missouri Research Park
- Missouri Department of Transportation
- St. Charles County Water Department
- Francis Howell School District

Chemical Plant

The Chemical Plant area of the WSSRAP site is located about two miles southwest of U.S. Route 40/61 on State Route 94. This 217-acre site housed a uranium feed materials plant and had raffinate pit storage. Remediation of this area included demolition of buildings, raffinate pit cleanup, placement of waste

into an on-site engineered disposal cell and site restoration.

The uranium ore refining process created sludge that needed to be discarded into four large clay-lined raffinate pits at the Chemical Plant. These wastes were later covered by rainwater that became contaminated by contact with waste sludge. The Site Water Treatment Plant was built on

site to treat the contaminated water to meet standards established by the Missouri Department of Natural Resources through the National Pollutant Discharge Elimination System guidelines. After testing by DOE, the Missouri Department of Natural Resources and county laboratories, the treated water is discharged to the Missouri River.

Weldon Spring Site Remedial Action Project Timeline



1941-1945: U.S. Army produced explosives at Weldon Spring Ordnance Works. Prior to 1955, fires were set to structures to demolish them without risking explosion from residual TNT.



1963-1969: Atomic Energy Commission disposed of uranium and thorium residues in the quarry.

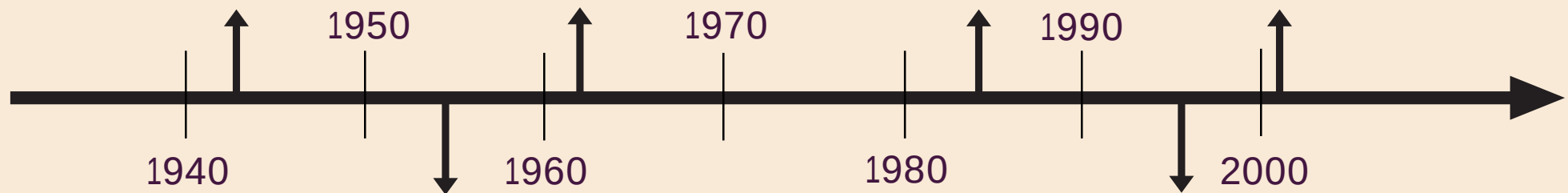


2001: The radioactive waste disposal cell is expected to be completed.

1981: Site is placed in caretaker status.

1987: Quarry is put on the National Priorities List.

1989: Chemical Plant and raffinate Pits are put on the National Priorities List.



1955: The Army transferred 200 acres to the Atomic Energy Commission for construction of a Uranium Feed Materials Plant.



1997: The liner is installed at the disposal cell.

(Photos courtesy of DOE)

The major emphasis of the remediation process at this site is the low-level radioactive waste disposal cell. The disposal cell is a 45-acre area with layers of clay and plastic lining used to contain the waste placed inside of it. Any water or condensation that trickles through the waste is captured in a leachate collection system at the bottom of the cell and is then treated prior to being disposed. Wastes from the quarry and Chemical Plant, as well as the chemical plant building demolition debris, were placed into the disposal cell. The department tests the quality of the treated leachate waters, performs quality assurance testing, and oversees the cell design, construction and waste placement. Cell construction is planned to be complete by the year 2001.

Contaminated materials from the Site Water Treatment Plant, along with sludge from the bottom of the raffinate pits, were solidified into a cement-like grout in the Chemical Stabilization and Solidification Plant. The grout was then pumped to the disposal cell.

Operable Units are separate activities undertaken as part of a Superfund site cleanup. At WSSRAP there are four Operable Units: the chemical plant, quarry residual, groundwater and quarry bulk waste. The Chemical Plant and quarry residual are in the cleanup phase of the process. The groundwater Operable Unit is the focus of the groundwater remediation efforts at the Chemical Plant site. The operation of the original ammunition plant and the chemical plant resulted in the contamination of the soil, groundwater and springs around the site. EPA and DOE are working to complete an agreement to remediate and perform long-term monitoring of area streams and groundwater wells. The Missouri Department of Natural Resources and DOE currently perform quarterly laboratory analyses for the contaminants in the springs and groundwater wells.

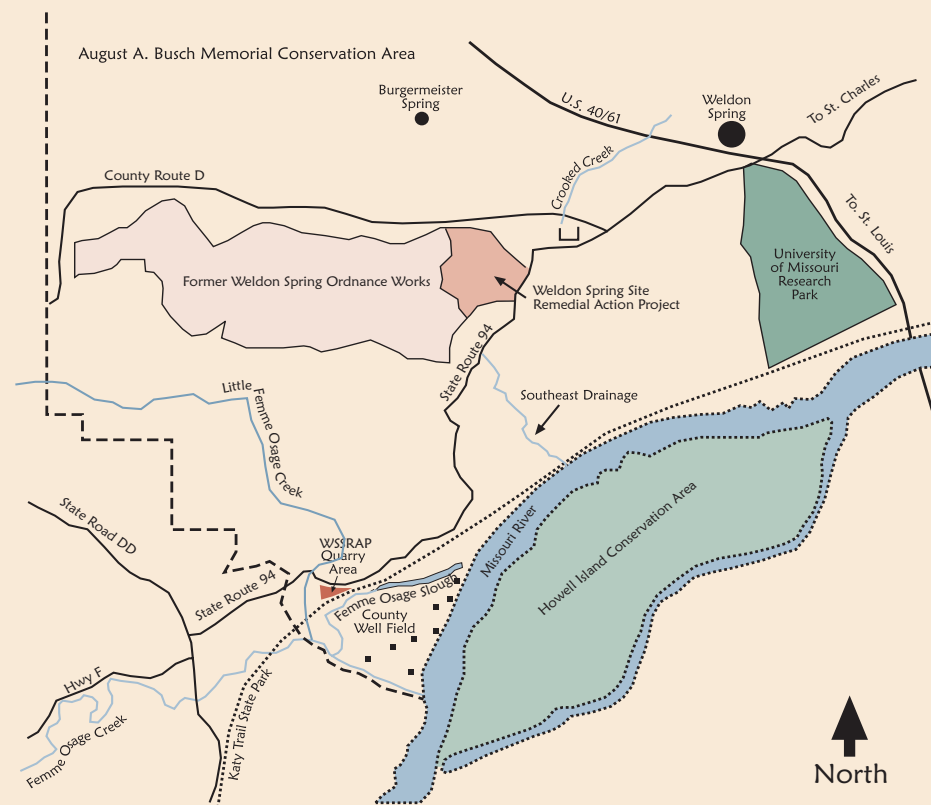
Quarry

The quarry area is located about four miles southwest of the chemical plant. This nine-acre limestone quarry was once used as a limestone gravel supply for operations at the site. Remediation of the quarry includes bulk waste removal, residual waste removal and surface restoration of the area. Under the Quarry Bulk Waste Record of Decision, removal of the bulk waste began in 1993 and was completed by 1995. The bulk material was transferred from the quarry to the disposal cell via a haul road that was constructed along an old rail-spur to prevent the material from being transported down any public roads.

The Quarry Water Treatment Plant treated contaminated water from the quarry pit. The treatment plant was built at the quarry site to treat the contaminated water to meet the DNR's water quality standards. The treated wastewater is discharged via a pipeline into the Missouri River after testing by the Missouri Department of Natural Resources, DOE and St. Charles County laboratories.

EPA and DOE established long-term groundwater protection goals in September 1998, though an agreement known as the Quarry Residuals Operating Unit Record of Decision. The primary goal of this project is to protect the St. Charles County public drinking water supply from any possible contamination remaining at the quarry site. Another goal of this project includes the construction of a pilot interceptor trench system, which was installed in early 2000 to collect data and study the feasibility of remediating uranium-contaminated groundwater. The agreement also includes backfilling and surface restoration of the quarry area. Both projects are being designed with input and oversight from the Missouri Department of Natural Resources.

Weldon Spring Site Remedial Action Project St. Charles County



The Weldon Spring limestone quarry supplied gravel to operations at the site.

(Photo by DNR)

Public outreach

New Community Relations Coordinator hired

A new position was added in the Federal Facilities Section in the fall of 1998. This position is the Community Relations Coordinator for the section. The duties of this individual include coordinating with project managers in the section regarding outreach efforts and working with other local, state and federal agencies.

Department Web site is up and running

In March 1999 the Hazardous Waste Program, including the Federal Facilities Section, launched a new Web site, www.dnr.state.mo.us/deq/hwp/ffss.htm. The Web site contains a summary of Department of Defense (DOD) and Department of Energy (DOE) sites with which the Federal

Facilities Section is involved. The Web site will continue to grow and be revised as new information is added. It is a valuable resource for the public and those working on the projects.

St. Louis field office opens

The Federal Facilities Section, on Sept. 23, 1999, officially opened its oversight field office in Florissant. The office was established to better serve the community surrounding the FUSRAP site and to continue to provide oversight to the Corps of Engineers regarding cleanup of FUSRAP sites located near St. Louis. This is the third field office the section has opened near an active remediation site. The other two field offices are located near Weldon Spring and the Kansas City Plant.



Missouri Department of Natural Resources Director Steve Mahfood spoke of the importance of having field offices to provide better assistance to the public.

(DNR photo by Van Beydler)



(From left) State Sen. Ted House, Department of Natural Resources Director Steve Mahfood, Energy Secretary Bill Richardson and WSSRAP DOE Project Manager Steve McCracken announce the development of the Hamburg Trail.

(Photo courtesy of DOE)

Meetings attended

Federal Facilities Section representatives fully participate in DOD, DOE and community-sponsored public meetings and workshops. Section representatives also give presentations when requested or when appropriate. The following list includes established groups with whom section staff regularly interacts.

Restoration Advisory Boards

- Richard's Gebaur Air Force Base
- Whiteman Air Force Base
- Lake City Army Ammunition Plant
- Nike Battery-Kansas City 30
- Weldon Spring Ordnance Works

Other types of active community groups

- Pools Prairie Citizen's Advisory Board

- FUSRAP Oversight Committee
 - Weldon Spring Citizen's Commission
- In addition to participation on site-specific advisory boards, Federal Facilities Section staff also participate on workgroups or advisory boards that provide a national perspective yet have direct implications on actions taken in Missouri. These include:
- Association of State and Territorial Solid Waste Management Officials
 - Federal Facilities Current Issues, Base Closure and Radioactive Waste workgroups
 - State and Tribal Government Working Group
 - Long Term Stewardship and Radioactive Waste Transportation subcommittees
 - National Governor's Association
 - Mixed Waste Task Force
- The Section contributes to numerous publications and reviews various newsletters

and public documents. "Protecting Missouri's Natural Resources" is a free department newsletter, which has a large circulation and is also available on the Internet [www.dnr.state.mo.us/deq/pmnindex.htm]. The section also has fact sheets and other types of informational documents. Staff compiled and printed a 1997 and 1998 Kansas City Plant Annual Report. These reports contain some of the accomplishments related to environmental activities at the Kansas City Plant during those years. It was distributed to citizens and local, state and federal agencies.

Public presentations *FUSRAP open house*

In the spring of 1999, representatives from the Federal Facilities Section, in cooperation with the U.S. Army Corps of Engineers, St. Louis District, attended an open house for the FUSRAP site. The availability session was held at the Henry Clay Elementary School in St. Louis. The representatives met with the public and discussed the section's role in the cleanup of the FUSRAP sites.

State Fair and Earth Day

In 2000, as in years past, the Federal Facilities Section, in conjunction with the Hazardous Waste Program, participated in the Missouri State Fair, which was held Aug. 10-20, in Sedalia. Attendance was up dramatically from 30,919 in 1998 to 36,623 in 2000. People went through the Missouri Department of Natural Resources building to see the displays, pick up information and talk with staff. Federal Facilities Section staff assisted with the creation of a display and also participated in the event.

The 30th annual Earth Day was celebrated on April 20, 2000, at the State Capitol in Jefferson City. This event continues to be one of the most popular events of the year at the State Capitol.

About 1,000 students from more than 40 schools attended. The Federal Facilities Section staff met with the public and answered questions regarding the various federal sites. The section also was represented at the 2000 Earth Day festivities at Whiteman Air Force Base.

Department of Energy Secretary Bill Richardson visits Weldon Spring

On Aug. 4, 1999, DOE Secretary Bill Richardson visited Weldon Spring. Secretary Richardson, together with Steve Mahfood, director of the Missouri Department of Natural Resources, and Gerald Ross, assistant director for the Missouri Department of Conservation, announced plans for a new interpretative learning center. The center, which will be located on the DOE site, will depict the history of the Weldon Spring area.

The Weldon Spring interpretive center will house exhibits explaining the history of the onsite disposal facility, which safely contains the waste from the cleanup operation. The site's rich history dates back to 1941 when the townships of Hamburg, Toonerville and Howell became the Weldon Spring Ordnance Works site, one of the world's largest explosives production plants.

Secretary Richardson also announced that DOE is working with the state to construct a trail linking the learning center to the Katy Trail State Park and the August A. Busch Memorial Conservation Area. Called the "Hamburg Trail," it will expand public accessibility to the Weldon Spring learning center and demonstrate DOE's dedication to environmental stewardship. Secretary Richardson also took the opportunity to present the DOE's highest award for safety performance to the Morrison Knudsen Corp., contractor of the Weldon Spring Site Remedial Action Project.



Sharon Cotner and Colonel Michael Morrow, both of the U.S. Army Corps of Engineers-St. Louis District, discuss the FUSRAP cleanup with state Sen. Anita Yeckel of South St. Louis County.

(DNR photo by Van Beydler)



Ruben Zamarrripa of the Federal Facilities Section talks to a group of third graders in Columbia about water quality. Upon request, Federal Facilities Section staff provide educational information to local schools potentially impacted by federal sites.

(Photo by DNR)

Environmental education

Teaching Rivers in an Urban Environment: The Blue River Watershed Project (T.R.U.E. Blue) began in the summer of 1997. Last year the second annual T.R.U.E. Blue Clean Water Celebration was held April 8, 1999, in Kansas City. The celebration brought together schools, businesses, agencies, community groups and individuals that are concerned about education and the quality of the local environment. This one-day conference provided students the opportunity to learn from experts and to present their own research findings.

Staff from the section were in attendance with an exhibit describing their role and, specifically, oversight provided at the DOE's Kansas City Plant, which is near the Blue River. About 350 students from 14 local schools were in attendance. As the second annual event of its kind, it was well attended, and the celebration is expected to continue to grow in upcoming years.

This year the event focused on activities including stream cleanups, in which students and communities went out and picked up trash in nearby bodies of water. In

coordination with this event, on March 31, 2000, Federal Facilities Section staff in the Kansas City area conducted chemical analysis along the Blue River, Indian Creek and Boone Creek; performed macroinvertebrate sampling on the Blue River; and finished the day picking up trash along the river.

On Saturday April 17, 1999, an exhibit of environmental activities of the Federal Facilities Section including the Kansas City Plant was presented at the Missouri Archaeologists Society annual meeting in Columbia. About 150 professionals from across Missouri and several adjoining states participated in the conference.

Staff from the section have also gone into local classrooms to talk with students regarding federal facilities and various environmental factors involved in the cleanup of a site. On Sept. 11, 2000, section staff participated in the Environmental Awareness Fair at the University of Missouri - Rolla. A display representing the role of the section in cleanups around the state was the focal point.

The Kansas City District of the Army Corps of Engineers hosted a media event on June 30, 1999, for local television and newspaper reporters at the Jefferson Barracks site in St. Louis. The event was scheduled to answer questions regarding the remediation approach at the site. A representative from the Federal Facilities Section was present to answer any questions related to the oversight of the project from the state's perspective.

School students had many educational opportunities at the State Fair exhibits as they learned about cleanups at Federal Facilities.

(DNR photo by Van Beydler)



Internet Sites

Association of State and Territorial Solid Waste Management Office

www.astswmo.org/fedfac.htm

Federal Facilities Section

www.dnr.state.mo.us/deq/hwp/ffss.htm

Former Weldon Spring Ordnance Works

www.mrk.usace.army.mil/weldon/weldon.html

Formerly Utilized Sites Remedial Action Program

www.mvs.usace.army.mil/engr/fusrap/Home2.htm

Fort Leonard Wood

www.flwguidon.com/

Kansas City Plant

www.kcp.com/

Lake City Army Ammunition Plant

www.ioc.army.mil/home/index.htm

Long Term Stewardship Information Center

<http://216.82.16.101/>

U.S. Army Corps of Engineers

Kansas City District

www.nwk.usace.army.mil/

St. Louis District

www.mvs.usace.army.mil/

U.S. Department of Defense

www.defenselink.mil/

U.S. Department of Energy

www.doe.gov/

U.S. Environmental Protection Agency

Federal Facilities Sites

www.epa.gov/swerffrr/sitemaps.htm

Weldon Spring Site Remedial Action Program

www.em.doe.gov/wssrap/

Whiteman Air Force Base

www.whiteman.af.mil

Future objectives

The Federal Facilities Section of the Hazardous Waste Program has a continued commitment to work with the Department of Defense (DOD), the U.S. Department of Energy (DOE) and all interested parties to clean up the environment and protect human health. In the future, this commitment is expected to include the following: reviewing Formerly Used Defense Sites and promoting stewardship issues.

Reviewing Formerly Used Defense Sites

The U.S. Environmental Protection Agency (EPA) has provided a grant to the Federal Facilities Section to review Formerly Used Defense Sites. To date there are 42 sites being reviewed and investigated

to make sure they have been remediated to state standards. Once these sites have been found to be remediated, the state can issue a “no further action” notice.

Stewardship Issues

Stewardship, as defined by a 1998 stakeholder report, is “acceptance of the responsibility and the implementation of activities necessary to maintain long-term protection of human health and of the environment from hazards posed by residual radioactive and chemically hazardous materials.” Stewardship, from this perspective, refers directly to the necessity for the federal government to continue its care and monitoring of contaminated areas that are not fully cleaned up.

Based on current technology, contamination cleanup is limited. Realistically, contaminated sites cannot always be cleaned up to a pristine condition. Stewardship planning ensures responsible long-term management of these areas. Stewardship plans are intended to preserve information on the location and longevity of residual contamination as well as to develop the means to monitor and restrict these sites to ensure that future generations do not inadvertently disturb contaminated areas.

Some of the federal facility sites in Missouri are nearing the end of the cleanup phase and are entering a closure phase that should involve stewardship. For example, some radioactive waste at the Weldon Spring site near St. Charles will remain for millions of years. It is essential to ensure appropriate and necessary measures are established today to monitor and manage all waste areas for the protection of human

Formerly Used Defense Sites being investigated by the Federal Facilities Section

Belton Communications Facility	Mark Twain Industrial Park
Belton Instrumental Landing System	Marquand Gap Filler Annex
Middle Marker Annex	Maulsby Auxiliary Field #2
Outer Marker Annex	Missouri Ordnance Works
Bowling Green Gap Filler Annex	Parkville Products Terminal
Campbell Auxiliary Field #6	Risco Auxiliary Field #3
Chesterfield Satellite POW Camp	Rosecrans Field Radio Range
Cooter Auxiliary Field #4	Sedalia Division Training Area
Dexter Auxiliary Field #1	St. Louis Ordnance Sub Depot
Factory Training/Curtis Wright Field	Springfield National Cemetery
Former O'Reilly General Hospital	Steele Auxiliary Field #1
Gideon Auxiliary Field #4	St. Louis Area Support Center
Grandview Radio Beacon Annex #1	Union Cemetery
Grandview Radio Beacon Annex #2	U.S. Army Reserve Center #1
Hornersville Auxiliary Field #3	U.S. Army Reserve Center/William Woods College
Jefferson Barracks Rifle Range	Vichy Gap Filler Annex
Kansas City Quartermasters Effects	Weingarten POW Camp
Storage Depot	Whiteman Instrument Landing
Kansas City Records Center	System, Middle Marker Annex
King City Gap Filler Annex	Whiteman Radio Beacon Annex
Malden Air Base	

health and the environment. Developing stewardship plans today is the first step in a comprehensive framework to assess and address future impacts.

The Missouri Department of Natural Resources and the federal government are starting to work together to include stewardship planning in their cleanup activities with community input and support. Although the future use of many of these sites may change, long-term stewardship

plans can address or eliminate many of the potential concerns and some uncertainties. For example, at the Weldon Spring Site Remedial Action Project, DOE is working with the EPA, Francis Howell Schools, St. Charles County, Weldon Spring Citizen's Commission, Missouri Department of Natural Resources and the Missouri Department of Conservation to provide for long-term maintenance, institutional controls and monitoring of the site.

Stewardship:
“Acceptance of the responsibility and the implementation of activities necessary to maintain long-term protection of human health and of the environment from hazards posed by residual radioactive and chemically hazardous materials.”

— 1998 Stakeholder Report

Funding sources

Currently, federal monies fund the Federal Facilities Section. Funding mechanisms are provided through agreements with the Department of Defense (DOD) and the Department of Energy (DOE). In addition, the U.S. Environmental Protection Agency provides a limited amount of funds. The section does not receive any grants or funds from the state of Missouri.

The section is funded by eight different sources, which contribute anywhere from about \$20,000 to more than \$900,000 a year. The total of these funds has remained consistent over the past few years. They are used to purchase necessary equipment and to staff the section. Presently within the section, there are about 20 positions, including a Section Chief, two Unit Chiefs, 13 project managers, two support staff, a planner and a community relations coordinator. In addition to staff working out of the central office in Jefferson City, the section maintains three field offices to provide adequate oversight and to better serve the public. There are offices located at the Kansas City Plant, in Kansas City; the Weldon Spring Site Remedial Action Project, in Weldon Spring; and the Formerly Utilized Sites Remedial Action Program, in Florissant.

Department of Defense

In a Fiscal Year 1999 Annual Report to Congress, the Defense Environmental Restoration Program indicated budgets for the various federal facilities in Missouri.

To date at the Weldon Spring Ordnance Works, about \$189 million has been spent to remediate this site. The site is expected to

have a final remedy in place by 2005 with the cost to complete the project estimated at \$60 million.

Lake City Army Ammunition Plant, according to the Fiscal Year 1999 Annual Report to Congress, has spent \$56 million to date. The estimated cost for completion, which is projected to occur in 2028, is about \$83 million. It is expected that a final remedy may be in place sometime after fiscal year 2007.

At Richards-Gebaur Air Reserve Station, \$6.3 million has been used to fund the remediation of the site. The site is expected to be completed in Fiscal Year 2008 with an estimated added cost of \$1.7 million.

Funds spent for the remediation of the Formerly Utilized Sites Remedial Action Program (FUSRAP) is about \$55 million from October 2000 to September 2001.

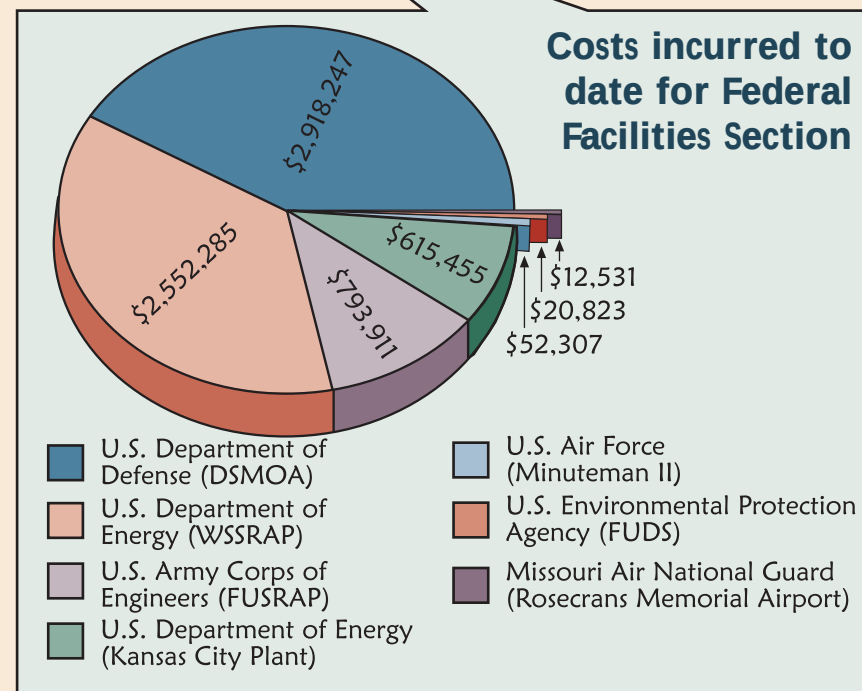
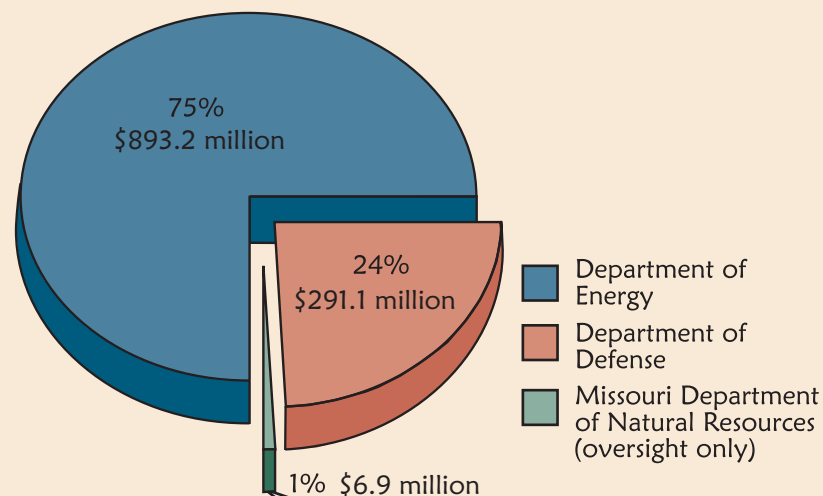
Department of Energy

Currently, the total spent at Weldon Spring Site Remedial Action Project (WSSRAP) to date by DOE is \$771 million. The total budget available for the remediation of WSSRAP is \$905 million. To date, the project is 85 percent complete.

The total estimated funding expenditures for the Kansas City Plant environmental restoration and waste management is as follows:

- Fiscal Year 1996 was \$12 million
 - Fiscal Year 1997 was \$16 million
 - Fiscal Year 1998 was \$14 million
 - Fiscal Year 1999 was \$12 million
 - Fiscal Year 2000 was \$8 million
- (1996 Baseline Environmental Management Report).

Funds spent to date on Remediation of Federal Facilities in Missouri



Organizational chart





Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-3907 1-800-361-4827 www.dnr.state.mo.us



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