PROGRAM ACHIEVEMENTS IN THE FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP)

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ABSTRACT

The U.S. Army Corps of Engineers (USACE) has extensive experience and expertise in environmental restoration of hazardous, toxic and radioactive wastes. USACE executes an annual billion-dollar environmental restoration program for a number of federal agencies. These agencies include the U.S. Department of Defense, Army, Air Force, Environmental Protection Agency, National Aeronautical and Space Agency and more. The Formerly Utilized Sites Remedial Action Program (FUSRAP) is a part of the USACE Environmental Restoration Program. FUSRAP became a USACE managed program in October 1997 as a result of Congressional direction contained in the Energy and Water Development Appropriations Act of 1998. The purpose of the FUSRAP program is to remediate sites where residual low-activity radioactive contamination remains. These sites were part of our nation's early atomic energy program and were used for uranium processing, extrusion, and machining; thorium processing; and radioactive materials storage. This paper summarizes the USACE FUSRAP program challenges and accomplishments realized over the last three years.

INTRODUCTION

The Atomic Energy Commission (AEC) initiated the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 under authorities granted by the Atomic Energy Act of 1954, as amended. The U.S. Department of Energy (DOE) managed FUSRAP from 1981 to 1997 after assuming the responsibilities of the Atomic Energy Commission. On October 13, 1997, Congress transferred management of FUSRAP to the U.S. Army Corps of Engineers (USACE) under the Energy and Water Development Appropriations Act of 1998 and tasked it to review and assess the program and complete it quickly and efficiently.

Why USACE? The USACE has extensive experience and expertise in environmental remediation and restoration work. The USACE executes about $1.3 billion dollars annually in environmental remediation work. The USACE environmental remediation program consists of a number of federal clients, the U.S. Department of Defense (DOD), Army, Air Force, Environmental Protection Agency (EPA), National Aeronautics and Space Administration (NASA) and more. The FUSRAP is part of the USACE Environmental Remediation Program. USACE has encountered many challenges and accomplished many successes since the program was transferred.

BACKGROUND

During the 1940s, 1950s, and 1960s, many federal and commercial sites in the United States were used to process and store uranium and thorium ores or for other work supporting the atomic

energy program. Most FUSRAP sites were involved in work for the Manhattan Engineering District (MED) during World War II or later in peacetime activities for the AEC. Congress has also added several sites where industrial contamination is similar to the material from MED/AEC sites.

Established in 1942 under the jurisdiction of the Army as the lead agency in development of atomic energy, MED was responsible for process development, engineering design, materials procurement, and site selection for the nation's atomic weapons program. The MED responsibilities were transferred to AEC in 1946.

Contracted work was conducted at national laboratories; universities such as the University of Chicago and the University of California at Berkeley; and industrial chemical processing facilities such as Linde Air Products Division of Union Carbide in Tonawanda, NY, Mallinckrodt, Inc., in St. Louis [known as the St. Louis Downtown Site (SLDS)], and E.I. du Pont de Nemours & Company (DuPont & Company) in Deepwater, NJ. Facilities such as the Middlesex Sampling Plant (MSP) in Middlesex, NJ were used for sampling, shipment, and storage of ores prior to processing. Contractors also used offsite storage locations and landfills for storage and disposal of process residues and other radioactive wastes. Examples include the St. Louis Airport Site (storage of residues from Mallinckrodt operations); Ashland 1 in Tonawanda, NY (storage of residues from operations at the Linde facility); and the Middlesex Municipal Landfill (disposal of construction wastes from activities at the Middlesex Sampling Plant). A number of smaller commercial sites were used in uranium metal machining and fabrication under subcontracts issued by prime contractors.

As a result of these activities, materials, equipment, buildings, and soil became contaminated, primarily with naturally occurring radionuclides. When the sites were no longer required for nuclear programs, they were decontaminated and released for use without radiological restrictions or stabilized in accordance with survey methods and guidelines then in existence. Radiological criteria governing release of sites for unrestricted use changed significantly between the 1950s and the 1970s and are still undergoing development.

In 1974, AEC initiated a survey program to identify and reevaluate formerly used nuclear program sites to determine whether additional decontamination was required. This survey program was the primordial FUSRAP. In 1975, the Energy Research and Development Administration (ERDA), which assumed AEC's programmatic responsibilities, including the activities of the survey program replaced AEC. The Department of Energy Organization Act of 1977 transferred responsibilities of ERDA to DOE. DOE formalized the program, developed a generic plan for identifying and surveying sites, and managed FUSRAP until October 1997, when Congress transferred the program to USACE.

Since FUSRAP began, surveys and/or record reviews have been conducted for more than 400 sites. At the time of transfer the program included 46 sites in 14 states. The DOE had completed radiological cleanup at 25 FUSRAP sites in 12 states and partially remediated 13 additional sites. USACE inherited cleanup responsibilities at the 21 remaining FUSRAP sites.

Recently, Congress added one more site to FUSRAP bringing the total to 47 sites in 14 states. See the FUSRAP site map in Figure 1.

MISSION AND OBJECTIVES

FUSRAP's mission is to identify, evaluate, and clean up or control sites where residual radioactivity exceeding current guidelines remains from MED/AEC contract activities and other sites assigned by Congress. USACE program objectives are to safely, effectively and efficiently:

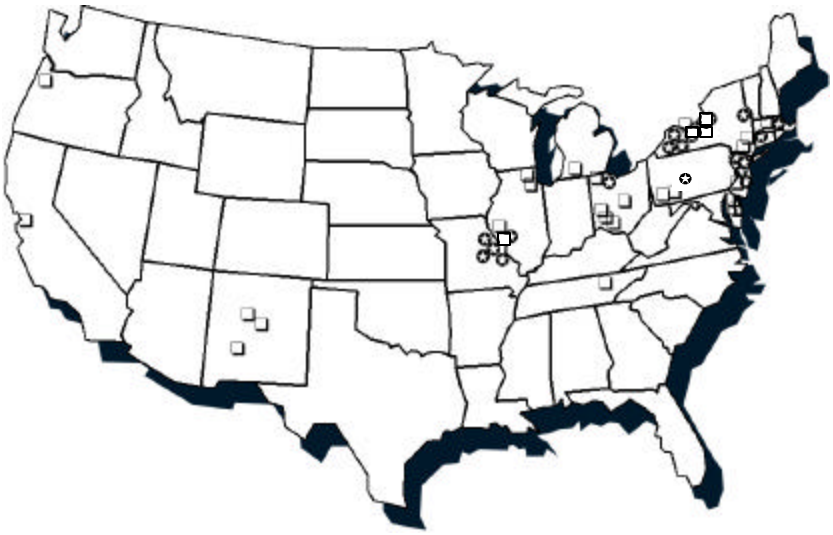
- Identify and evaluate sites where authority and a need for response action exists
- Clean up or control the sites to ensure protection of public health and the environment
- Dispose of or stabilize radioactive material in a way that is safe for the public and the environment
- Perform work in compliance with applicable federal, state, and local environmental laws and regulations
- Release sites for appropriate future use

USACE's mandate from Congress included identifying ways to meet FUSRAP's commitment to the public to clean up the remaining sites as quickly and cost effectively as possible. Key USACE initiatives identified to meet Congress' challenge included:

- Following the CERCLA process to achieve necessary final remedies at the sites
- Exploring alternative disposal options
- Using less expensive USACE commercial disposal contracts
- Using industrial (baseline) rather than residential (conservative) cleanup standards at sites where projected future use clearly does not include residential development
- Using risk-based assessments to justify less conservative release levels where appropriate
- Streamlining the reporting and decision-making process to accelerate work
- Using district offices near sites to more effectively manage project activities and meet stakeholder expectations
- Utilizing the Technical Project Process (TPP) to set goals for project completion in the beginning of our work and establish a cooperative working process with regulators and other stakeholders
- Using site specific remediation contracts
- Pursuing potential Potentially Responsible Parties (PRP) for contribution of equitable share of response costs under CERCLA

CHALLENGES

USACE is facing many challenges in executing FUSRAP. Key challenges are: USACE does not have the same authorities and regulatory status as its predecessor, DOE; USACE and the Nuclear Regulatory Commission (NRC) need to determine and examine regulatory implications; USACE and DOE need to define roles and responsibilities; and USACE needs to develop cleanup standards with EPA and state regulators. USACE is working to resolve these challenges.



FUSRAP 47 Sites in 14 States

- ✪ Remedial Action Ongoing or Planned
- ❑ Remedial Action Complete
- ▲ Owned or Leased Site
- ✣ Assigned by Congress
- ✯ NPL Site

ST. LOUIS DISTRICT (MVS)

- ▲✣✯ Latty Avenue Properties Hazelwood, MO
- ✣✯ St. Louis Airport Site, St. Louis, MO
- ✯ St. Louis Airport Site Vicinity Properties, St. Louis, MO
- St. Louis Downtown Site St. Louis, MO
- ❑ Madison Site, Madison, IL

PHILADELPHIA DISTRICT (NAP)

- DuPont & Company, Deepwater, NJ (Philadephia)

BALTIMORE DISTRICT (NAB)

- W.R. Grace & Company, Curtis Bay, MD

NEW ENGLAND DISTRICT (NAE)

- CE Site, Windsor, CT (New England)
- ✯ Shpack Landfill, Norton, MA (New England)

NEW YORK DISTRICT (NAN)

- ▲✣✯ Maywood Site, Maywood, NJ
- ▲✣✯ Wayne Site, Wayne, NJ
- ▲ ✯ Middlesex Sampling Plant, Middlesex, NJ
- ▲✣ Colonie Site, Colonie, NY

BUFFALO DISTRICT (LRB)

- ▲ Niagara Falls Storage Site Lewiston, NY
- Ashland 1, Tonawanda, NY
- ❑ Ashland 2, Tonawanda, NY
- Linde Air Products, Tonawanda, NY
- Seaway Industrial Park, Tonawanda, NY
- ❑ Bliss & Laughlin Steel, Buffalo, NY
- Luckey Site, Luckey, OH
- Painesville Site, Painesville, OH
- ✣ Shallow Land Disposal Area, Parks Township, PA

DOE COMPLETED SITES (25)

Kellex/Pierpont, Jersey City, NJ (1981)
Acid/Pueblo Canyon, Los Alamos, NM (1982)
Bayo Canyon, Los Alamos, NM (1982)
University of California, Berkley, CA (1982)
Chupadera MEsa, White Sands Missile Range, NM (1984)
Middlesex Municipal Landfill, Middlesex, NJ (1984)
Niagara Falls Storage Site Vicinity Prop., Lewiston, NY (1986)
University of Chicago, Chicago, IL (1987)
National Guard Armory, Chicago, IL (1988)
Albany Research Center, Albany, OR (1991)
Elza Gate Site, Oak Ridge, TN (1992)
Seymour Specialty Wire, Seymore, CT (1993)
Baker and Williams Warehouses, New York, NY (1993)
Granite City Steel, Granite City, IL (1993)
Aliquippa Forge, Aliquippa, PA (1994)
C.H. Schnoor, Spingdale, PA (1994)
Alba Craft, Oxford, OH (1995)
HHM Safe Co., Hamilton, OH (1995)
Associate Aircraft, Fairfield, OH (1995)
General Motors, Adrian, MI (1995)*
Chapman Valve, Indian Orchard, MA (1995)
Baker Brothers, Toledo, OH (1996)*
B&T Metals, Columbus, OH (1996)*
New Brunswick Site, New Brunswick, NY (1996)*
Ventron, Beverly, MA (1997)*

*Requires Elimination Report and Final Notifications

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Fig. 1. FUSRAP Sites and USACE Organization

Since USACE does not have the same authorities and regulatory status as DOE, it has turned to Congress and the NRC for guidance. In the Energy and Water Development Appropriation Acts of 1999 through 2001, Congress directed USACE to clean the FUSRAP sites under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Initially, this created confusion for some regulators that were used to following the NRC and DOE criteria. Other regulators, like the EPA and equivalent state agencies, were very comfortable with the change. USACE has briefed and explained CERCLA to those regulators and stakeholders with questions or concerns.

Soon after USACE assumed responsibility of FUSRAP, the NRC determined that it does not regulate residuals of ore processing for the production of uranium or thorium source material that occurred prior to November 8, 1978 at sites not licensed by the NRC. Much of the FUSRAP material on several sites falls into this category. This determination permitted USACE to dispose of lower activity FUSRAP materials meeting these requirements in some state permitted Resource Conservation and Recovery Act (RCRA) facilities rather than NRC licensed facilities. This has created some controversy in California and elsewhere prompting a U.S. Senate Hearing on July 25, 2000. As a result of concerns raised by California Senator Barbara Boxer, the Assistant Secretary of Army for Civil Works initiated an audit of this disposal by the U.S. Army Audit Agency. Preliminary findings indicate that the disposal is safe and in accordance with all laws and regulations. Final findings are due this fiscal year. Furthermore, after an extensive review, the California Department of Toxic Substances Control and Department of Health Services both acknowledged in a letter to State Assemblyman Dean Florez, dated August 25, 1999, that there are no known safety or health risks to the community as a result of this disposal.

USACE executed a memorandum of understanding (MOU) with DOE in March 1999 to establish roles and responsibilities and facilitate actions between the agencies. DOE is responsible for determining the eligibility of potential new FUSRAP sites, long-term stewardship of sites and maintaining the administrative record after site closeout and transfer to the DOE. USACE is responsible for the cleanup of all active FUSRAP sites, including coordination with regulators and stakeholders, developing and executing investigations, studies and decision documents and site remediation, closeout and transfer to DOE. The process and the cooperation between the two agencies have been successful thus far and both agencies are working to refine and improve the process.

Other ongoing challenges include: resolving conflicting regulatory authorities; resolving conflicting cleanup standards; determining land use controls; resolving long-term stewardship issues; achieving and maintaining productive regulatory relationships; achieving and maintaining good community relationships; and more.

ACCOMPLISHMENTS

The USACE FUSRAP operating philosophy is to assign responsibility for project management and execution to appropriate geographical Civil Works districts (see Figure 1). Thus putting Corps managers, engineers, scientists and construction representatives close to the site and its stakeholders, e.g., the public, regulators, and community leaders. Based on this decentralized approach, FUSRAP sites were assigned to St. Louis, Buffalo, Pittsburgh, New England, New

York, Philadelphia and Baltimore district offices. These seven USACE geographic districts are responsible for FUSRAP project management and project execution supported by USACE's Hazardous, Toxic and Radioactive Waste (HTRW) Design Districts and the HTRW Center of Expertise. The ability of USACE to form Virtual Teams across its organization and the availability of the HTRW Center of Expertise adds significantly to the ability of USACE to manage and execute FUSRAP and ensure that all options are fully evaluated and the best options are selected.

This focus on execution puts the appropriate USACE managers in the field, near the problem and stakeholders, where decisions need to be made. Program and project managers are able to meet as often as necessary with all interested parties to respond to discuss issues, options and questions. Thus facilitating first-hand knowledge and understanding between USACE and FUSRAP stakeholders.

USACE has made significant progress in the three years since assuming management of FUSRAP. Key programmatic and district or site accomplishments in FY 1998 through 2000 are:

PROGRAMATIC ACCOMPLISHMENTS

- Effected seamless transition with no slippage attributable to transition
- Carried out site by site program assessment and provided report of assessment to Congress
- Cleanup being accomplished in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP)
- Migrated to smaller site-specific contracts and delivery orders managed by USACE district and onsite team members. USACE is using a variety of contracts including Total Environmental Remediation Contracts (TERC), Pre-placed Remedial Action Contracts (PRAC) and Site Specific Environmental Remediation Contracts (SSERC).
- Executed memorandum of understanding (MOU) with the Department of Energy in March 1999 to facilitate actions between agencies
- Established and entered into Cooperation Agreements with states where active FUSRAP sites exist, e.g., New York, New Jersey, Ohio, and Missouri. The purposes of the Cooperative Agreements are to provide framework for coordination and Federal funds for states to obtain necessary resources to help expedite the cleanup of FUSRAP sites.
- Identified disposal and the lack of options and competition as key program issues. In FY98, USACE identified and approached a number of potential disposal facilities with NRC licenses to see if they were interested in receiving FUSRAP materials. During this process, the International Uranium Corporation's White Mesa recycling facility was identified during Value Engineering studies at the Ashland 2 site in Tonawanda, New York.
- Soon after USACE assumed responsibility of FUSRAP, the NRC determined that it does not regulate residuals of ore processing for the production of uranium or thorium source material that occurred prior to November 8, 1978 at sites not licensed by the NRC. Much of the FUSRAP material on several sites falls into this category. This determination permitted USACE to dispose of lower activity FUSRAP materials meeting these

requirements in some state permitted Resource Conservation and Recovery Act (RCRA) facilities rather than NRC licensed facilities.

- After NRC's determination that it doesn't regulate thorium and uranium ore residuals that occurred prior to November 8, 1978 at non-licensed sites, USACE developed a national multiple-award disposal contract. The Kansas City district awarded the contract in June 1999. This was the first national multiple-award disposal contract and it enabled USACE to reduce its national contract disposal costs for residuals of ore processing for the production of uranium or thorium source material from $150 per-cubic-yard (1997 USACE contract) to $84-$104 per-cubic-yard.
- Remediated and disposed over 518,000 cubic yards of FUSRAP contaminated materials in the three years since the programs transfer through FY 2000. The total program cost per-cubic-yard of FUSRAP material disposed or remediated has dropped significantly. USACE achieved $985 per-cubic-yard in its first year, FY 1998, and subsequently reduced the cost down to $802 per-cubic-yard in FY 2000. The average total program cost averaged for all three years is only $826 per-cubic-yard.
- USACE has implemented Technical Project Planning (TPP) to facilitate USACE and stakeholder partnering, communications, understanding of FUSRAP sites, the CERCLA process and site objectives. The TPP process is used by the site team to develop project objectives and for designing data collection programs. It is a critical component of USACE's quality management system. Use of TPP typically saves 10 to 15 percent of project time and costs. TPP has been implemented at the Ashland 1 site, CE site, Colonie site, DuPont site, Linde site, Luckey site, Niagara Falls Storage Site (NFSS), Painesville site, Seaway, St. Louis Airport Site (SLAPS), St. Louis Airport Site Vicinity Properties (SLAPS VPs), St. Louis Downtown Site (SLDS) and W.R. Grace site.
- USACE is reviewing site contract and operational histories to determine if there are other potentially responsible parties (PRP). Reviews have been initiated at most of the FUSRAP sites.
- USACE has or is reviewing and assessing future use scenarios at FUSRAP sites. It has executed RODs at six sites, i.e., Ashland 1 and 2, Linde, SLDS, Bliss and Laughlin and Madison, with commercial or industrial reuse and cleanup standards.
- USACE is using risk-based assessments to establish cleanup criteria.

DISTRICT AND SITE ACCOMPLISHMENTS

- St. Louis District:
  - Completed Record of Decision (ROD) in FY 1998, with EPA concurrence, for cleanup of the St. Louis Downtown Site, Missouri.
  - Achieved the Virtual Team of the Year Award for FY 1998 at USACE's Project Delivery Team Conference. St. Louis District achieved this by integrating the St. Louis, Kansas City and Tulsa Districts and a variety of contractors into a highly successful team.
  - Completed ROD in FY 2000 for cleanup of the Madison Site in Illinois with the state's concurrence.
  - Completed remediation of the Madison Site in FY 2000 with the state's concurrence.
  - Recognized by the Society of Technical Communication with a Technical Communication Award of Merit for its FUSRAP newsletter.

  - Executed 17-percent more work over its FY 2000 baseline plan and removed 83,000 cubic-yards of contaminated material or 33-percent more than the baseline goal of 61,000 cubic-yards.
  - Remediated the programs most contaminated material, thus far, incident free. The radium pits at the St. Louis Airport site in Missouri contained pockets of contamination that reached 80,000 pico-Curies-per-gram. The material was safely removed, transported and disposed of without compromising the safety of the public or the environment.

- New York District:
  - Completed documentation under CERCLA to support interim removal actions at the Wayne site in New Jersey. Initiated and completed removal and disposal of most subsurface contaminated materials.
  - Achieved first FUSRAP potentially responsible party (PRP) settlement. Supported and finalized Department of Justice (DOJ) settlement initiated by DOE with the W.R. Grace Corporation. The settlement required W.R. Grace to pay $30 million for its share of cleanup costs at the Wayne site.
  - Negotiated and executed Cooperative Agreements with the states of New Jersey and New York.
  - Remediated 16 residential vicinity properties at the Maywood site in New Jersey.
  - Accelerated removal and disposal of Middlesex Municipal Landfill interim storage pile at Middlesex site in New Jersey.
  - Awarded Site Specific Environmental Restoration Contract (SSERC) to Stone and Webster for up to $300 million in December 1999 for the Maywood site remediation.
  - Awarded SSERC for Wayne site remediation to Environmental Chemical Corporation or ECC for up to $50 million in December 1999.
  - Achieved the Virtual Team of the Year Award for FY 2000 at USACE's Project Delivery Team Conference. The New York District achieved this by integrating its staff with the Kansas City and Tulsa Districts and a variety of contractors into a highly successful team.
  - Executed a ROD at Wayne site in FY 2000 and gained EPA's concurrence.

- Buffalo District:
  - Completed ROD in FY 1998 for cleanup of the Ashland 1, Ashland 2, and Seaway Area D sites in Tonawanda, New York.
  - Completed documentation under CERCLA to support interim removal actions at the Painesville, OH site and initiated interim removal action
  - Negotiated and executed Cooperative Agreements with the states of Ohio and New York.
  - Implemented alternate disposal of Ashland 2 material at International Uranium Corporation's White Mesa, Utah, recycling mill site. Achieved a very low cost of $462 per-cubic-yard for excavation, transportation and disposal. In addition to achieving savings and cost avoidance estimated at $12-16 million, the materials are processed and recycled for reuse for the power industry.

- Completed cleanup of Ashland 2 site in FY 1999 and gained NY State Department of Environmental Compliance concurrence.
- Completed Bliss and Laughlin ROD and gained NY State Department of Environmental Compliance concurrence.
- Remediated the Bliss and Laughlin site, New York, in FY 1999 with the state's concurrence.
- Used safe alternate disposal in FY 1999 for low activity materials from Building 30 at Linde site, Tonawanda, New York. Materials were sent to Safety-Kleen's facility in Buttonwillow, California. Achieved savings and cost avoidance of approximately 35% versus other bids received for the 2,200 tons of material. As a result of concerns raised by California Senator Barbara Boxer, the Assistant Secretary of Army for Civil Works initiated an audit of this disposal by the U.S. Army Audit Agency. Preliminary findings indicate that the disposal is safe and in accordance with all laws and regulations. Final findings are due this FY. Furthermore, after an extensive review, the California Department of Toxic Substances Control and Department of Health Services both acknowledged in a letter to State Assemblyman Dean Florez, dated August 25, 1999, that there are no known safety or health risks to the community as a result of this disposal.
- Completed ROD for remediation of contaminated soils at Linde site in New York in March 2000.
- Implemented alternate disposal of Ashland 1 material at International Uranium Corporation's White Mesa, Utah, recycling mill site. Achieved an extremely low $356 per-cubic-yard for excavation, transportation and disposal. In addition to achieving savings and cost avoidance estimated at around $3 million, the materials will be processed and recycled for reuse for the power industry.
- Remediation of Linde site soils are ahead of schedule with estimated savings of over $7 million through value engineering, alternate disposal and operational changes.
- Linde FUSRAP team received an Award of Excellence from local project advocates.
- Awarded and initiated Feasibility Study Contract to SAIC for the Niagara Falls Storage Site in New York in FY2000.
- Excavated and shipped 61,000 cubic-yards of Ashland 1 material, exceeding FY 2000 goal of 40,000 cubic-yards by 50 percent. As a result, will complete cleanup at Ashland 1 site one year ahead of schedule.

CONCLUSION

USACE has made good on its promise to Congress and the public to execute effective, cost-efficient and compliant remediation of FUSRAP sites while protecting human health and the environment and meeting stakeholder expectations. USACE is demonstrating its competencies in program and project management, engineering, health and safety, and construction management. USACE is meeting and resolving its challenges head on. It is partnering with other agencies, regulators and stakeholders to resolve issues and concerns and expedite FUSRAP.

USACE is accomplishing its planned FUSRAP initiatives. It is following the CERCLA process; exploring and implementing alternative disposal options; using national disposal contracts; using

risk-based assessments; using cleanup standards based upon projected future use; using district offices near sites to more effectively manage project activities and meet stakeholder expectations; pursuing potential Potentially Responsible Parties (PRP); utilizing the Technical Project Process (TPP); bringing to bear its nationwide resources of managers, engineers and scientists in real and virtual team scenarios upon the FUSRAP cleanup process; conducting on-site construction supervision and administration activities; and applying USACE innovative contracting tools to expedite cleanup for fair and reasonable prices. In summary, USACE is executing the FUSRAP program safely, effectively and cost efficiently while meeting the expectations of stakeholders.