Community Involvement as an Effective Institutional Control at the Weldon Spring Site, a U.S. Department of Energy Office of Legacy Management Site

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ABSTRACT

The U.S. Department of Energy (DOE) Weldon Spring Site Remedial Action Project (WSSRAP) was conducted for the purpose of remediating a portion of a former trinitrotoluene and dinitrotoluene production plant that was operational from 1941 to 1945 and a former uranium refinery that was operational from 1957 to 1966. Surface remediation activities concluded in 2001 with the completion of a 45-acre (.18 square kilometer) on-site engineered disposal facility. Long-term surveillance and maintenance activities at the site were officially transferred to the DOE Office of Legacy Management in 2003.

The Weldon Spring Site is located within the St. Louis, Missouri, metropolitan area (population 3 million). DOE's close relationship with surrounding land owners created a need for innovative solutions to long-term surveillance and maintenance issues at the site. Through a Secretarial proclamation, a plan was established for development of a comprehensive public involvement and education program. This program would act as an institutional control to communicate the historical legacy of the site and would make information available about contamination present at the site to guide people in making decisions about appropriate site activities.

In August 2002, the Weldon Spring Site Interpretive Center opened to the public with exhibits about the history of the area, the remediation work that was completed, and a site information repository that is available to visitors. In addition, the Hamburg Trail for hiking and biking was constructed as a joint DOE/MDC effort. The 8-mile trail travels through both DOE and MDC property; a series of historical markers posted along its length to communicate the history of the area and the remediation work that was done as part of WSSRAP activities. A ramp and viewing platform with informational plaques were constructed on the disposal cell to provide an additional mechanism for public education. With a basic marketing program, site visitorship has been steadily increasing. In 2005, approximately 15,400 visitors were associated with Interpretive Center operations and outreach activities. Science-oriented educational programs that directly relate to past remediation activities and present long-term surveillance and maintenance issues have been developed and are presented to St. Louis area school groups and other community-based organizations.

Other innovative programs have been developed to address daily maintenance issues at the site and to promote beneficial community re-use of the property. Approximately 30,000 square feet of the former Administration Building has been transferred through a use-permit to Lindenwood University, a local institution with a total enrollment of about 12,000 students. Lindenwood is establishing a satellite college campus in the building in exchange for providing basic maintenance and payment of utilities for both the Administration Building and Interpretive Center. A volunteer program developed to address maintenance of the native plant gardens that surround the Interpretive Center has a current enrollment of approximately 25 volunteers. Another volunteer group of prairie ecosystem experts has been meeting regularly for the last 3 years to assist the site in long-term management of the established prairie surrounding the disposal cell.

Public support of these community involvement activities at the site is strong. DOE has worked closely with the Weldon Spring Citizens Commission in developing the concepts for this approach and the Commission has helped promote these activities within the community. It is expected that continued public education in this manner will only serve to strengthen the institutional control commitments at the Weldon Spring Site.

INTRODUCTION

The Weldon Spring Site is a U.S. Department of Energy (DOE) Office of Legacy Management (LM) site is currently involved in long-term surveillance and maintenance (LTS&M) activities. The geographical location of the site and the relationship that DOE has with surrounding landowners dictated that innovative solutions to LTS&M issues be developed. A comprehensive program surrounding the concept of beneficial community re-use of the site to strengthen institutional control commitments has been implemented. This program involves development of an Interpretive Center, a hiking and biking trail, a ramp and viewing platform on top of the Weldon Spring Disposal Cell, a use permit with a local university that addresses daily maintenance issues, and various volunteer organizations with specialized areas of interest with regard to the site. Public support of this plan is very strong and serves to strengthen the institutional control commitments at the Weldon Spring Site.

OPERATIONS HISTORY

In 1941, the U.S. Government acquired 17,232 acres (69.74 square kilometers) of rural land in St. Charles County, Missouri, to establish the Weldon Spring Ordnance Works. In the process, the towns of Hamburg, Howell, and Toonerville and 576 citizens of the area were displaced. From 1941 to 1945, the U.S. Army manufactured trinitrotoluene (TNT) and dinitrotoluene (DNT) at the Ordnance Works site. Four TNT production lines were situated on what is currently known as the Weldon Spring Site. These operations resulted in nitroaromatic contamination of soil, sediments, and some off-site springs.

In 1956, 205 acres (.83 square kilometers) of the former ordnance works property was transferred to the U.S. Atomic Energy Commission (AEC) for construction of the Weldon Spring Uranium Feed Materials Plant (WSUFMP). The plant converted processed uranium-ore concentrates to pure uranium trioxide, intermediate compounds, and uranium metal. A small amount of thorium was also processed. Wastes generated during these operations were stored in

four raffinate pits located on the plant property. Uranium processing operations ceased in 1966 and resulted in radiological contamination of the same locations previously contaminated by former Army operations.

The Weldon Spring Quarry was mined for limestone aggregate used in construction of the ordnance works. The Army also used the quarry for burning wastes from explosives manufacturing and disposal of TNT-contaminated rubble during operation of the ordnance works. These activities resulted in nitroaromatic contamination of the soil and groundwater at the quarry. In 1960, the Army transferred the quarry to AEC. AEC used the quarry from 1963-1969 as a disposal area for uranium and thorium residues from the WSUFMP and for disposal of contaminated building rubble, process equipment, and soils from demolition of a uranium processing facility in St. Louis. Radiological contamination occurred in the same locations as the nitroaromatic contamination.

In 1967, AEC returned the former WSUFMP to the Army for use as a defoliant production plant. In preparation for production, the Army removed equipment and materials from some of the buildings. Because of schedule and budget constraints, the defoliant project was canceled before any process equipment was installed.

From 1968-1985, AEC, and subsequently DOE, managed the site under caretaker status. Caretaker activities included site security oversight, fence maintenance, grass cutting, and other incidental maintenance. In 1984, the Army repaired several of the buildings at the site; decontaminated some of the floors, walls, and ceilings; and isolated some equipment. In 1985, the Army transferred full custody of the site to DOE, at which time DOE designated control and decontamination of the main site and quarry as a major remedial action project.

REMEDIAL ACTION HISTORY

The U.S. Environmental Protection Agency listed the quarry on the National Priorities List (NPL) in 1987, and the listing was expanded in 1989 to include the area currently known as the Weldon Spring Site. Consequently, DOE conducted remediation of the site in accordance with regulations promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and incorporated values from the National Environmental Policy Act (NEPA).

DOE identified four operable units for which remedies were selected and remedial actions were conducted. These operable units addressed remediation of the former WSUFMP, 17 off-site vicinity properties affected by WSUFMP operations, the bulk and residual wastes in the quarry, and groundwater associated with the former WSUFMP and quarry areas. Remediation of the Southeast Drainage, an impacted off-site drainage, was addressed as a separate action under CERCLA.

One of the primary goals of remedial action at the Weldon Spring Site was to construct an engineered disposal facility on site to provide long-term isolation and containment of the contaminated materials. Construction of the disposal cell began in 1997 and was completed in 2001. Final conditions at the site and surrounding areas are

- An on-site disposal cell contains approximately 1.48 million cubic yards of contaminated material (Figure 1).
- Residual groundwater contamination remains in the shallow aquifer beneath the Weldon Spring Site and the quarry, and at some surrounding areas.
- Several springs near the Weldon Spring Site discharge residually contaminated groundwater.
- Residual soil and sediment contamination remains in the Southeast Drainage.
- Contamination remains at two culvert locations along the Missouri State Route 94 and Highway D.
- Residual soil contamination remains at inaccessible locations within the quarry.

Fig. 1. The Weldon Spring Disposal Cell and site infrastructure

Under current land use conditions, the remaining contamination does not pose unacceptable risks to public health and the environment. However, institutional controls have been established and are addressed in the site Long-Term Surveillance and Maintenance Plan to maintain protectiveness. Under this plan, institutional controls consist of non-engineering measures, primarily legal controls and real estate agreements, with surrounding landowners that limit activities to prevent or reduce exposure to hazardous substances. Institutional controls can also be a mechanism for ongoing education of the public.

SECRETARIAL PROCLAMATION

In keeping with this plan to address institutional controls, innovative solutions for long-term surveillance and maintenance issues were developed for the site. Innovative solutions were necessary for a variety of site-specific reasons. The Weldon Spring Site is located within the St. Louis, Missouri, metropolitan area (population 3 million) and within St. Charles County, the second fastest growing county in the United States. DOE has also developed and maintained close relationships with surrounding land owners, such as the Missouri Department of Conservation (MDC), the Missouri Department of Transportation, the U.S. Army 89th Readiness Reserves, the Francis Howell School District, and the Missouri Department of Natural Resources. Through a Secretarial proclamation, a plan was established for development of a comprehensive public involvement and education program. The proclamation was signed on August 4, 1999, by DOE Secretary Bill Richardson, the director of the Missouri Department of Conservation, and the director of the Missouri Department of Natural Resources. This public involvement program would act as an institutional control to communicate the historical legacy of the site and would make information available about contamination present at the site to guide people in making decisions about appropriate site activities.

One portion of the Secretarial proclamation called for the design and construction of an Interpretive Center to communicate these issues to the public. In development of the Interpretive Center, DOE organized a large group of stakeholders, surrounding landowners, contractor personnel, and a museum design firm to establish an appropriate layout and design for displays to maximize public understanding of site issues. An existing on-site building that was formerly utilized as a warehouse and access control for the site during remediation was remodeled as a display area, a public meeting room, and an office/storage area. This approach resulted in a significant cost savings compared to new construction. In August 2002, the Weldon Spring Site Interpretive Center (Figure 2) opened to the public with exhibits about the history of the area, the remediation work that was completed, and a site information repository that is available to visitors. With a basic marketing program, site visitorship has been steadily increasing. Approximately 15,400 visitors were associated with Interpretive Center operations and outreach activities in 2005. Science-oriented educational programs that directly relate to past remediation activities and present long-term surveillance and maintenance issues have been developed and are presented to St. Louis area school groups and other community-based organizations.

Another portion of the proclamation identified the development of the Hamburg Trail for hiking and biking (Figure 3). This 8-mile trail was constructed primarily along the former haul road used for quarry remediation activities as a joint DOE/MDC effort and travels through both DOE and MDC property with a series of historical markers posted along its length that communicate the history of the area and the remediation work that was done as part of WSSRAP activities. The trail provides recreational and educational opportunities to some of the 1 million users each year of the surrounding August A. Busch Memorial Conservation Area and Weldon Spring Conservation Area. The Hamburg Trail also connects with the Katy Trail State Park, a 225-mile rails-to-trails conversion that travels across the state along the Missouri River.

Fig. 2. The Weldon Spring Site Interpretive Center

Fig. 3. The Hamburg Trail and ramp to the top of the disposal cell

The final action called for in the proclamation was the construction of a ramp and viewing platform with informational plaques on the disposal cell to provide an additional mechanism for public education. The viewing platform is the highest accessible point in St. Charles County. Four plaques provide information about the local area, the history of the site, and the construction of the disposal cell.

BENEFICIAL COMMUNITY RE-USE PROGRAMS

Other innovative programs have been developed to address daily maintenance issues at the site and to promote beneficial community re-use of the property. Approximately 30,000 square feet of the former Administration Building has been transferred through a use-permit to Lindenwood University, a local institution with a total enrollment of about 12,000 students. The use-permit allows Lindenwood the use of the building space and related infrastructure, such as parking lots and storage buildings, to establish a satellite campus. In exchange, Lindenwood pays for all utilities and provides maintenance and repair for both the Administration Building and the Interpretive Center. Maintenance includes providing capital improvements for the Administration Building, general maintenance of both building structures and heating, ventilation, and air conditioning systems; janitorial services; parking lot maintenance including snow removal; and grounds maintenance in a defined area. Signed in August of 2003, the use-permit provides a unique way for DOE to allow beneficial community re-use of the site while lowering long-term operating costs of the Interpretive Center and portions of the Administration Building that will continue to be occupied by contractor and subcontractor staff supporting DOE's LTS&M efforts. The use-permit agreement results in a substantial reduction in annual LTS&M costs and has proven to be a successful beneficial re-use program.

The 150-acres (.61 square kilometers) surrounding the disposal cell have been established as a native Missouri prairie (Figure 4). This approach for site re-vegetation provided several benefits. Once established, native grasses and forbs act as an extremely effective and low maintenance erosion control measure for the disposal cell. Because native prairie is considered an endangered ecosystem in Missouri, re-establishing a landscape that once existed in the area prior to European settlement not only ensures an environmentally ethical treatment of the land but also provides additional opportunities for beneficial community re-use. The prairie was named Howell Prairie in keeping with the history of the land and the Howell Prairie Council was formed in 2003. The Howell Prairie Council consists of experts in the field of Missouri prairie ecosystems as well as prairie advocates from the local community and county government. The council meets quarterly and provides necessary assistance in designing seasonal and long-term prairie management strategies at the site.

To complement the prairie and to serve as an educational resource, approximately 8 acres (.03 square kilometers) of gardens containing plants native to the state of Missouri surround the Interpretive Center. Although native species generally require far less maintenance than an ornamental landscape, regular seasonal tasks are still required to maintain the garden area. As part of the site beneficial community re-use philosophy, a volunteer program has been developed to address this necessary maintenance. Volunteers have been recruited from local garden clubs, Master Gardener and Master Naturalist associations, and nature clubs from the surrounding community. Volunteers have the option of "adopting" an individual garden bed that they are responsible for year-round or performing general maintenance tasks in the garden or prairie as needed. The adopt-a-bed program has specific guidelines on what is required from the volunteer, but each individual receives comprehensive ongoing training on native plant identification and care, a recognition sign, and the opportunity to harvest seeds and plants at the appropriate time of the year for the purpose of planting them elsewhere in the community, as desired. The program has a current

Fig. 4. Prairie seeding activities February 2005

enrollment of approximately 25 volunteers at the site and efforts to increase this enrollment are ongoing.

The beneficial community re-use programs at the Weldon Spring Site ensure on-going education and understanding of site-related issues and help to supplement institutional controls.

PUBLIC SUPPORT

Public support of these community involvement activities at the site is strong. The Weldon Spring Citizens Commission (WSCC) organization has been in place since 1995 and is funded through a DOE grant to St. Charles County. The WSCC consists of local volunteer citizens that oversee Weldon Spring Site activities and communicate these activities to the community at large. DOE has worked closely with WSCC in developing the concepts for the approach taken at the Weldon Spring Site and the commission has helped promote these activities within the community. Continued public education is expected to strengthen the institutional control commitments at the Weldon Spring Site.

Providing availability of the Interpretive Center meeting room (dedicated and named for Paul T. Mydler, founding member and current chair of the WSCC) to various community non-profit organizations has further enhanced community involvement. Of special note is the annual gathering of the TNT Reunion Organization, consisting of the original landowners and descendants who were displaced by the U.S. Government in 1941 on short notice and under contentious circumstances. This group of people was collectively so angry that they donated money for a granite monument to enshrine their grievances and wrote a local history titled *The Rape of Howell and Hamburg*. Now, decades later, they meet at the DOE Interpretive Center,

have contributed oral histories for DOE's use, and, through the perspective of time, have concluded that their individual losses have been offset by the gain to the community of a vast tract of open space under the control of state and federal agencies.

CONCLUSION

The Weldon Spring Site was successful as a remedial action project because the DOE recognized the essential role of community involvement at the outset and throughout the decision-making processes. The breakthrough was the realization that perpetual care of a site in a major metropolitan area required an investment in community involvement on a scope and scale that could ensure the long-term success of the remedial actions. This perpetual care evolved into a multi-layered approach to institutional controls, including traditional legal, regulatory, and real estate mechanisms, and a diverse range of community re-use investments. This approach serves DOE's commitment to establish institutional and intergenerational knowledge of cleanup of the site and it is the right thing to do for a community that sacrificed its precious family farms to a nation at war and provided the work force to ensure a lasting peace. The challenge, and it must be met one site at a time, is to strike an appropriate balance, because DOE is not only the steward of the legacy waste but also is the steward of the present and future tax dollars.

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