

Long-Term Stewardship at Hanford – 17023

Rick Moren
Mission Support Alliance

Abstract

The Hanford Site's Long-Term Stewardship (LTS) Program is responsible for 220 square miles of the Site's River Corridor, which includes 1,527 waste sites, 6 Manhattan Project Era production reactors that have been placed in interim safe storage, and 46 miles of Columbia River shoreline. More than 24,000 cleanup and historic documents have been identified, indexed, and tagged in the LTS records and document libraries. The LTS program, operated by the Mission Support Alliance, LLC (MSA) manages and provides surveillance and maintenance of facilities and institutional controls and all associated monitoring to ensure continued protectiveness of human health and the environment.

Since 2010, through collaborative efforts with DOE and its prime contractors, land in 14 geographic areas and six cocooned reactor facilities were transitioned (mid-contract) from the River Corridor Closure Contractor to the LTS program. This accomplishment relied heavily on Site contractors and DOE working together to address challenges. Other stakeholders were informed of LTS progress through the Hanford LTS website, presentations, and briefings.

Hanford's LTS program is responsible for ensuring the protectiveness of cleanup remedies and the management of institutional controls once cleanup objectives have been achieved. LTS accomplishes this by adhering to post-cleanup requirements specified in the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and the *Resource Conservation and Recovery Act of 1976* (RCRA) cleanup decision documents.

The LTS program conducted inspection and surveillance and maintenance (S&M) activities of the cocooned 105-F Reactor in October 2014 and the other five reactors in 2015 and 2016. Reactor entries and internal inspections typically are conducted at 5-year intervals to assess the condition of the structures and evaluate potential deterioration of the reactor core, shield walls, and roof. The cocooning process is designed to protect the reactor for 75 years while radioactive decay continues, ultimately making the structures safe for demolition and removal.

The results of the recent 5-year inspections allowed DOE to negotiate an extended 10-year inspection cycle, which led to a \$5 million avoidance in lifecycle inspection costs.

Hanford's LTS program is successfully shifting from a program focused on transitioning land and waste sites to a program focused on data management and S&M activities for those buildings and waste sites within the program.

This paper will highlight the accomplishments and collaborative efforts in addressing the challenges faced by Hanford's LTS program.

INTRODUCTION

The DOE's Hanford Site, established in 1943 as part of the Manhattan Project, is located in south-central Washington State and consists of approximately 1,500 square kilometers (580 square miles) of land (Fig. 1). Hanford workers produced plutonium for our nation's nuclear defense program until the mid-1980's. Between 1943 and 1963, nine graphite-moderated plutonium production reactors were constructed along the Columbia River to support the production of weapons-grade plutonium. In the early 1960s, all nine reactors were operating. Associated with the production reactors are 11 processing facilities, and 177 underground storage tanks that hold approximately 53 million gallons of liquid waste. The Site also houses approximately 685 acres of waste burial grounds, including 43 miles of disposal trenches. The first reactors to end operations were 105-F and 105-H, which ceased operations in 1965. The last reactor to shut down, 105-N, ceased operations in 1987.

Since 1987, DOE has actively engaged in demolition and decontamination, cleanup, and environmental restoration at the Site. As cleanup meets the conditions outlined in the decision documents, including interim and final records of decision (ROD), the cleaned-up area is transitioned to the Hanford Long-Term Stewardship (LTS) program until final transfer to DOE Legacy Management (LM) or other governmental or non-governmental agencies. The LTS program is managed by the mission support contractor, Mission Support Alliance, LLC (MSA).

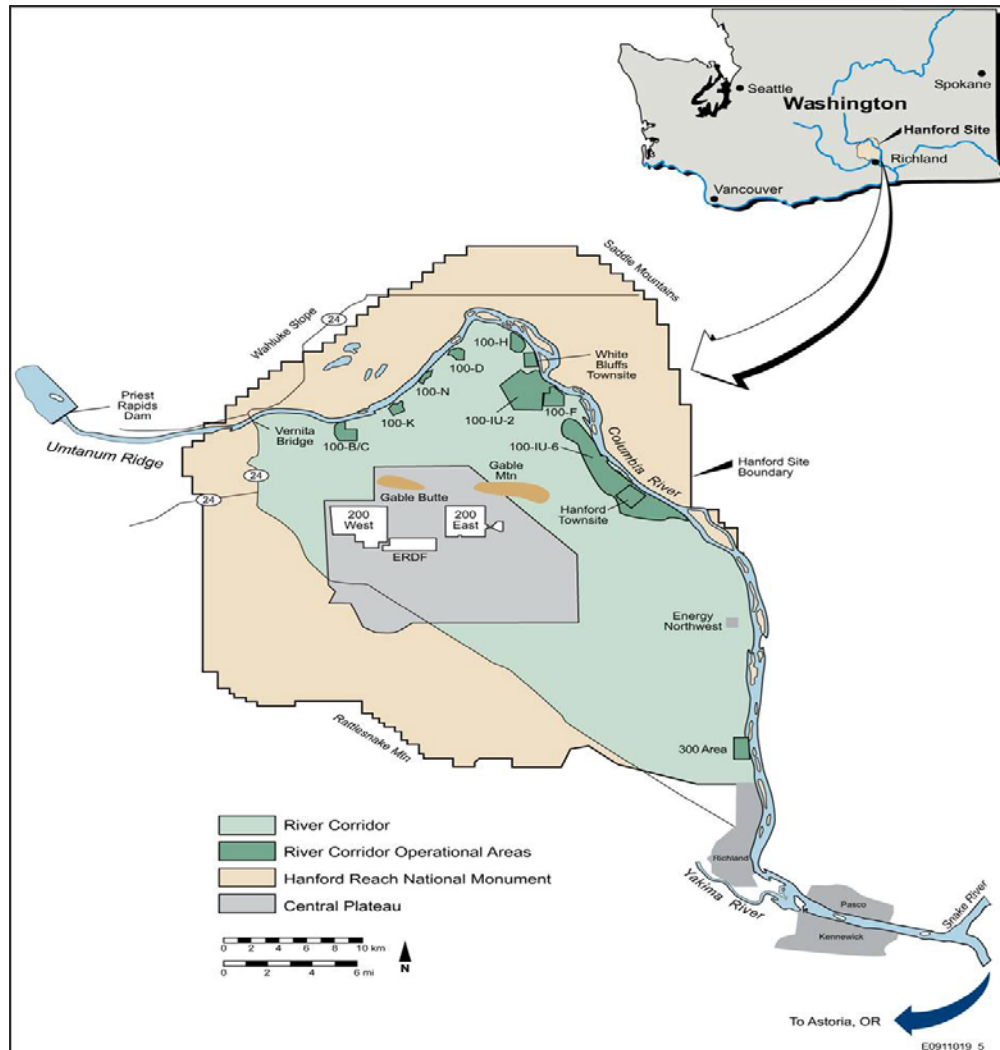


Fig. 1. Hanford Site Location Map.

Beginning in 2011, the Hanford LTS program began to focus specifically on the closure activities associated with the River Corridor. The MSA, had contractual responsibility to accept the land associated with the 220 sq. miles of the River Corridor (Fig. 1) once the CERCLA remedial objectives had been achieved and cleanup completed. The River Corridor Cleanup Contractor, Washington Closure Hanford (WCH) had contractual direction to transition the responsibility for CERCLA post-closure activities (such as surveillance and monitoring) of the remediated waste sites to MSA at the completion of their contract. One significant action taken early on was developing a strategy to transition the River Corridor in segments, as cleanup was completed, allowing DOE and WCH to phase their closure/transition activities and eliminating a costly and inefficient end-of-contract push to transition all post-closure responsibilities at once. MSA worked closely with WCH and DOE to develop a schedule that they followed to develop transition packages in anticipation of the segment transitions. Not to be overlooked in this process was the contractual changes that had to be made to completely transition the River Corridor in a segmented manner over the last 5 years. The following paragraphs briefly describe the process developed for this approach.

LTS Transition Process

The Hanford LTS Program and the life-cycle process, from planning/integration with DOE and other Hanford contractors through transition from active cleanup to post closure monitoring and eventual transfer to LM or other governmental or non-governmental agency, is shown in Fig. 2.

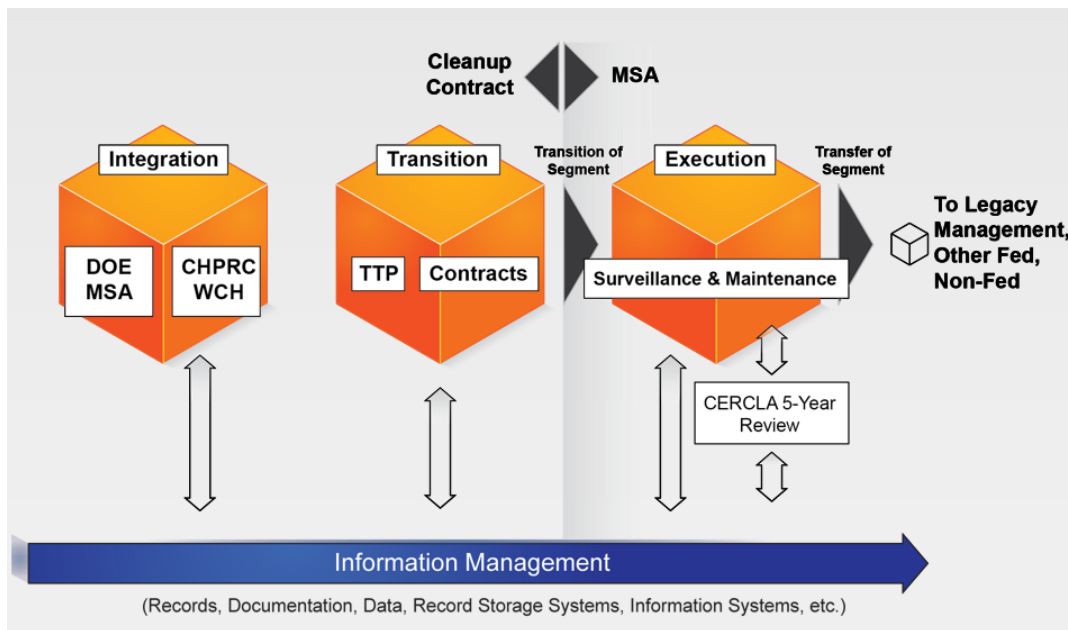


Fig. 2. LTS Process Flow Diagram.

The transition phase of this process has been used successfully to transition the River Corridor from active remediation under CERCLA closure to the MSA LTS Program. MSA continues to follow the process into the execution phase.

Through integration meetings with closure contractors and the DOE Richland Operations Office (DOE-RL), the LTS Program initiated the documentation necessary to transition each cleaned-up segment. This documentation, known as a transition and turnover package (TTP), was prepared for each segment or area transitioned to LTS. In addition, while the TTP was being prepared, contract modification packages were initiated to contractually facilitate the seamless transition of responsibility.

The TTP was used to document the condition of the land at transition and to convey relevant information about the area to LTS. The TTP covers the following:

- Site assessment
- Cleanup activities
- As-left conditions
- Remaining regulatory actions
- Resource management
- Information management
- Ongoing S&M requirements.

The TTP includes a reference list of cleanup documentation along with other pertinent information, including a list of remediated waste sites, remaining facilities,

demolished facilities, remaining infrastructure, and real estate agreements pertaining to the area. In addition, the TTP verifies and documents sources used to gather this information. Information gathering is a key component of the transition process. Obtaining information as interim cleanup actions are completed aids in identifying requirements and remaining actions (e.g., S&M and institutional controls). At Hanford, because one contract was ending with no follow-on contract, potential loss of information was a serious threat to maintaining a knowledge base. The TTP process was designed, in part, to mitigate this serious risk.

Information management activities continue during the entire process to ensure that documents cited in the TTP are identified, located, stored, protected, and made accessible. These documents demonstrate the completed cleanup actions and show what, if any, residual contamination remains. The documents also provide information about ongoing institutional controls and post closure surveillance and maintenance requirements.

While the process was established to systematically transition post-clean-up responsibilities to LTS, it allowed for flexibility and real-time decision making that formed a foundation for innovation and creative thinking.

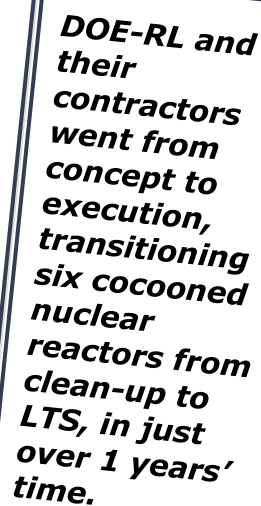
The Reactors

While the Hanford LTS Program Plan [1] defines the requirements of the program and outlines the actions necessary to transition land and facilities from the closure contractors to the LTS Program, it is flexible enough to handle unknowns and mid-stream changes. The addition of the interim safe storage (ISS) TTP is one example. When the LTS Program was envisioned, the six cocooned reactors were to have been transitioned (over a 3- to 4-year period) together with the large land parcel associated with each reactor. Later, the MSA LTS Program personnel identified an economic and management efficiency associated with handling the reactors under a single transition. The single transition idea was socialized with the appropriate

entities, including contracting officers and regulatory agencies. As the team explained the pros and cons, the idea's merit was rapidly recognized and the LTS Program moved forward under the existing program plan with no immediate contract changes and no program document changes. Once all the reactors were covered under one contract, the LTS program proposed that all the required 5-year inspections be carried out in the same year to minimize costs and safety risks.

In fiscal years 2015 and 2016, the LTS program safely conducted the 5-year inspections of all 6 cocooned reactors and prepared the associated inspection reports. Based on the inspection results, the LTS program recommended, through a series of change notices to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) [2], extending the inspection cycle from 5-to-10 years. DOE-RL, EPA, and Washington State Department of Ecology approved the recommendation, resulting in a

life-cycle cost avoidance of over \$5 million.



DOE-RL and their contractors went from concept to execution, transitioning six cocooned nuclear reactors from clean-up to LTS, in just over 1 years' time.

Fig. 3 shows the original 5-year surveillance schedule based on the year each reactor was cocooned. The revised surveillance schedule, also shown in Fig. 3, which the LTS Program proposed and enacted in calendar year 2013, demonstrates a much more cost-efficient and orderly surveillance approach.

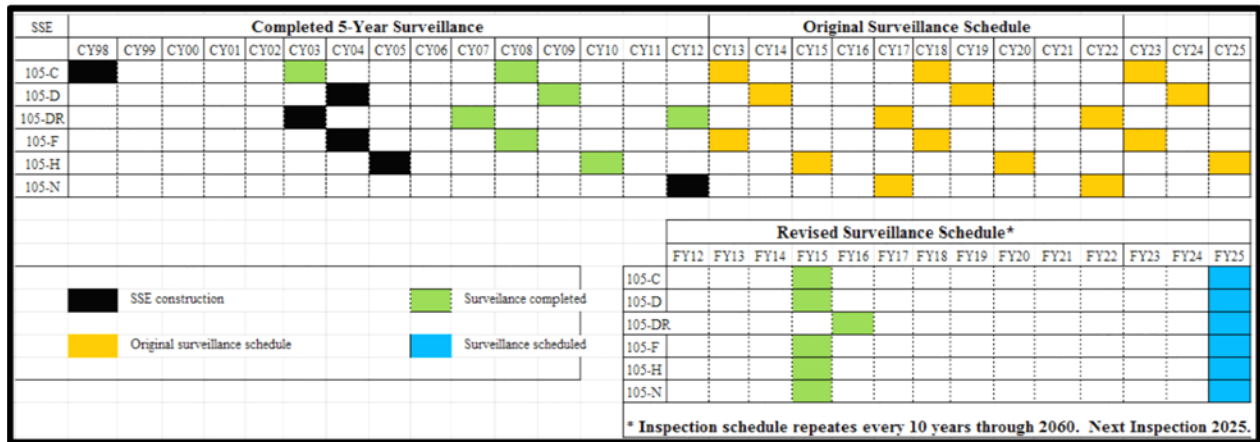


Fig. 3. Original and Revised Reactor Surveillance Schedule.

While the reactors were open for inspection, several DOE-sponsored tours occurred. In November 2015, the MSA LTS Program provided tours of the cocooned H and N reactors to a group of visitors from the UK (Fig. 4). The visitors were touring several sites across the DOE complex to observe first-hand how DOE-EM executed elements of the program and to identify those best practices that may be applicable to their programs overseas. While the environmental and regulatory conditions are different, certain approaches to the cocooning process and ongoing S&M are relevant. Since hosting the onsite visit, the LTS Program continues to support discussions with the visitors on the S&M activities associated with the cocooned reactors. This international dialogue and knowledge sharing helps to strengthen the entire industry.



Fig. 4. UK Visitors Stop at the H Reactor Front Face.

Housekeeping

During the 2015 and 2016 inspections of the cocooned reactors, several housekeeping tasks were identified that the LTS Program completed in 2016 to minimize future deterioration of the cocooned structure and improve protectiveness of human health and the environment (Fig. 5). The tasks included but were not limited to the following:

- Welding steel access plates to prevent unauthorized human intrusion
- Grading the surface and removing vegetation for wildfire protection
- Removing contaminated swallow nests at the 105N Reactor facility
- Installing stainless steel screen material over small openings in the siding to prevent bats from roosting in the cocooned facilities
- Installing bat houses on the sides of the facilities to mitigate loss of roosting locations
- Evaluating remaining transformers in facilities for polychlorinated biphenyls.

Completing the “housekeeping” tasks was part of the negotiations with the TPA agencies to extend the inspection period from 5 to 10 years. Open communication between DOE and agency representatives and the transparency of the LTS program has resulted in strong and productive working relationships.



Fig. 5. Housekeeping Activities.

Communication

Early in the process, the LTS Program established an integrated project team (IPT) that met biweekly to status activities and identify actions. The IPT included the cleanup contractors DOE and MSA LTS personnel. These biweekly meetings were invaluable in forging relationships and building trust among competitor contractors and the DOE client.

In this setting, IPT members often resolved detailed issues at the personal level. They worked side-by-side to solve minor issues and resolve actions assigned at the IPT. These one-on-one interactions kept the TTP process moving forward and provided the opportunity for grassroots innovation that continually improved the program.

During one exchange, the effectiveness of one of the program guidance documents was challenged by the team. Through open discussion, the team determined that the document was not necessary and it was terminated. Eliminating an ineffective program document saved money and time on future revisions and supported streamlining our entire document preparation process.

Collaboration within the program is accomplished at all levels. The companies hold monthly interface meetings to raise issues that might impact scope, schedule, or

budget (contract space). The issues are then vetted for solutions and resolved as appropriate. Issues that require contract modifications are worked with the company's contracting officer and DOE.

The IPT team members encountered numerous learning moments while establishing the Hanford LTS program. The team overcame the natural tendency to shy away from change by thoroughly communicating the process and providing a clear vision with concrete and measurable progress milestones. They aggressively managed the schedule to establish a high level of confidence and hold individuals accountable for their assigned tasks. These actions resulted in a high-performing team that beat nearly every deliverable schedule and has performed within the established budget for 6 years running.

Information Management

Providing transparent information about what the Hanford LTS Program does is accomplished using the Hanford LTS web site (<http://www.hanford.gov/page.cfm/LongTermStewardship>) Figure 6. This site provides information on LTS management, transitions, background, and Surveillance and Maintenance (S&M) actions. Planning and program documents, S&M reports and Fact sheets are also provided. The site also includes a photo gallery and a short video of the 105-F 5-year inspection.

Figure 6 Hanford LTS Home Page

The screenshot shows the Hanford LTS Home Page. At the top, there are logos for HANFORD, RICHLAND, and RIVER PROTECTION. Below the logos is a search bar and a navigation menu with links: About Us, Contracting, Newsroom, Outreach, Documents, and Helpful Links. The main content area is titled "Long-Term Stewardship" and includes a "Welcome" section with text about the program's responsibilities. There is a photo gallery section titled "Long-Term Stewardship Photogallery" and a "Hanford Long-Term Stewardship Program" section with five sub-sections: Project Management, Transition, Execution, LTS Background, and Fact Sheets/Briefings. Each sub-section has a "Learn More" button.

While the web site provides a public facing cache of information, the LTS program also maintains an internal library of documents referenced in the TTPs and additional information that may be relevant to the closure history. These are the documents that tell the story. The vast majority of these documents are in the Hanford Administrative Record, however, the LTS library also includes Official Use Only (OUO) documents that have not yet been released to the public. Currently in the LTS information systems there are over 24,000 documents and 22,000 photos and more are added as the program continues to evolve.

Near the end of the River Corridor Closure Contract (August 2016), MSA and WCH worked together to transfer the WCH Stewardship Information System (SIS) to the LTS program and the system was installed on the Hanford Local Area Network (HLAN). SIS provides historical information on the closure process and easy access to CERCLA investigation, guidance and decision documents that contain regulatory signatures of approval. This type of closure information is critical to LTS in the CERCLA the post-closure world. Being able to quickly and confidently answer the questions of 1) what was there? 2) What was removed? and 3) what is left? are central tenants of our information management approach.

CERCLA five-year Review

The implementation of remedial actions established in records of decision (ROD) are required to be reviewed every five years to evaluate their effectiveness in protecting human health and the environment. At Hanford, the fourth CERCLA five-year review was completed by the LTS program. This was a change from previous five-year reviews that were completed by the site environmental group and reflects the similar goals of long-term protectiveness of human health and the environment.

Past reviews at Hanford have included evaluation of actions that were not implemented under existing RODs and, therefore, not subject to the requirement. While commendable for its transparency, discussing these out-of-scope actions created confusion and elicited comments that required time and effort to resolve. The fourth CERCLA Five Year Review (FYR) at the Hanford Site under LTS embraces the EPA guidance designed to streamline the process and focuses on the specific objectives of the review. This guidance and the training materials developed jointly by multiple federal agencies including EPA, DOE, DOD, and Department of the Interior (DOI), demonstrate a focused approach to the FYR process and offer real-world examples for streamlining this important document. LTS implemented changes that reduced the size and complexity of the document and provided the DOE with an efficient, effective template for preparing subsequent reviews. One key change was a thorough evaluation of what operable units were discussed and what operable units were not discussed in the five-year review. **This process resulted in a reduction of 14 operable unit discussions.** Additionally, extensive referencing of previously published CERCLA documents including closure reports and periodic groundwater monitoring reports minimized the amount of analytical data tables necessary to support the discussion. The Hanford five-year review made good use of technology and provided internet links to existing documents where detailed information and voluminous analytical data reside. This eliminated the use of extensive data tables and summaries.

Moving Forward

As the initial goal of transitioning the River Corridor to LTS was met, the program was able to begin focusing on other aspects of ongoing support and finding ways to drive innovation into the overall management, and surveillance and maintenance (S&M) process. Similar to aligning and extending the reactor inspection schedules, the LTS program began looking at some of the items and issues identified during transition and evaluating potential resolutions.

During the last few years at Hanford as the River Corridor waste sites were closed under CERCLA , there has been increasing interest in future use and LTS plays an important role in providing insight and information to maintain protectiveness of human health and the environment.

Recently, 1641 acres of the Hanford Site were transferred to the designated community reuse organization and out of federal ownership. Additionally, the newly designated Manhattan Project National Park will occupy multiple areas across the Hanford Site that must be evaluated for public access and protectiveness of the public. In each of these scenarios, the LTS program has been involved, and will continue to be involved, to provide timely and accurate supporting information on the historical processes, the resulting waste sites and status of clean-up and closure process.

In September 2016, a public bicycle tour of portions of the Hanford Site was held. The planning and logistics included an evaluation of the tour route by LTS for possible risks from remaining waste sites with institutional controls and other contamination areas. Using the GIS and information systems, LTS was able to quickly and accurately compare the route map with institutional controls and contamination areas and ensure the ride sponsors that the specific route was safe. Obviously, the ride sponsors had other group's involvement, including site security to ensure the riders stayed on the specified course and did not wander off track.

In 2016, as Hanford automated their site Excavation Permit process, LTS program personnel met with the development team to request that LTS be a mandatory signature on every excavation permit request. With the closure of the River Corridor, the concern about accidentally digging into active infrastructure was greatly decreased. However, the more soft elements of post-closure CERCLA institutional controls and remaining non-CERCLA-type hazards remains real. Using the LTS program's knowledge of these softer systems and GIS mapping, we are helping the Hanford Site transition from a clean-up site to post clean-up site. The differences between the two are very real.

As we move forward toward more public access, the LTS program stays on top of the "what could happen?" scenario. One of the scenarios that comes up most often is the person (Hanford worker or public) walking around and finds something out of the ordinary. Who do they call? What do they do? LTS is working to get the word out that they (LTS or Land managers) should be the first call. LTS operates the most current data sets for Hanford elements. We have the spatial analysis tools and capabilities to evaluate an unknown object and determine if it is a new find, or some feature already documented. The Orphan Tracking Information System

(OTIS) was developed to gather the appropriate information from the person that found the object and quickly and automatically determine if the object is known or unknown. To determine if the object is in a culturally sensitive area requires a secondary inquiry until such time that process is also automated. New objects (non-culturally sensitive) are entered into the tracking system and geo-referenced to ensure the object is not lost and ultimately a decision can be made on final disposition if necessary. To date, most of the objects identified are classified as debris in nature and do not require any kind of CERCLA clean-up action.

Conclusions

The successful model of transitioning post closure S&M activities at Hanford is one of collaboration and transparency between contractors and DOE. The LTS program at Hanford was established to support DOE's 2015 vision and the exit strategy for the cleanup contract. Transitioning land and waste sites early, allowed the cleanup contractor to focus on their strengths of clean-up and not be burdened with the ongoing post closure S&M. Incrementally closing parts of the site through time provided an organized and streamlined contract close-out process benefiting DOE and the RCCC.

Now that the transition of the River Corridor is at completion, new focus on information management and support for the DOE-RL site vision dominates the work activities. The scope of LTS is flexible and the responsiveness and willingness of the LTS team to take on the issues that face DOE in a closure scenario are proven successful.

The challenges overcome to accomplish this success were significant. Establishing a new LTS program, competitive contractors, competing priorities, multiple aggressive schedules, and fiscal realities require all parties to see past the immediate issue at hand and focus on the larger goal. Only then were mutually beneficial agreements reached and progressive actions completed that continue to drive the program forward and challenge each member to improve continuously.

REFERENCES

1. DOE/RL-2010-35, *Hanford Long-Term Stewardship Program Plan*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington (2012).
2. EPA, Ecology, and DOE, *Hanford Federal Facility Agreement and Consent Order*, as amended, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington (1989)

Websites

<http://www.hanford.gov/page.cfm/LongTermStewardship>