U.S. DEPARTMENT OF ENERGY | Legacy Management

# Program Update

## July–September 2015

*Welcome to the July–September 2015 issue of the U.S. Department of Energy (DOE) Office of Legacy Management (LM)* Program Update. *This publication is designed to provide a status of activities within LM. Please direct all comments and inquiries to lm@hq.doe.gov.*

*Goal 5*

## Draft LM 2016–2025 Strategic Plan

We invite you to read the *Draft Office of Legacy Management (LM) 2016-2025 Strategic Plan*, now posted for public comment. This will be our fourth strategic plan since the office was established in December 2003 and will replace the current strategic plan that covers 2011–2020. The comment period will close December 4, 2015.

The 2016–2025 Strategic Plan is similar to our 2011–2020 version. We continue to learn and grow as an organization, adopting more effective and efficient ways to carry out our responsibilities to you and to the environment.

To give you a quick idea of how this plan has evolved over the years, we'll start by observing that the job of the Strategic Plan is not to suggest we keep on doing the same things as before. The Strategic Plan is a resource allocation plan on behalf of our mission and toward our vision.

We would appreciate you making the time to read and provide any comments on our draft strategic plan at http://energy.gov/lm/downloads/draft-lm-2016-2025-strategic-plan.

Comments can be made by email to
LM_Strategic_Plan_Comments@hq.doe.gov
or sent to
Mr. Tony Carter, LM-1
1000 Independence Ave. SW
Washington, DC 20585

We know that you'll tell us where you think we've gone astray, and we need that. We would also appreciate hearing about instances where you found us doing something right.

### Inside this Update:



The point is not maintaining the status quo, but rather to put our efforts – your money – where it can have the greatest impact on accomplishing our mission and goals. You'll see that we're now planning to do **more** of some things, **less** of others, **none** of some things we used to do, and some **new** things entirely.

### More

- Today, we have 90 sites. We anticipate receiving an additional 39 sites over the 10-year period of this plan. That would bring us to 129 sites by 2025.
- We believe more effective collaboration with other government agencies, non-profit organizations, and the public, will improve our ability to achieve our goals and objectives. This plan emphasizes that commitment by including a new goal focused on public and intergovernmental engagement.
- The President and the Congress have challenged the federal government to operate more effectively and sustainably. We will need to find ways to meet these new goals and requirements.

### Less

- DOE has authorized our contractors to terminate contractor pension plans by converting retiree benefits to either lump sum payments or insurance

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*Goal 1*

## Applied Studies and Technology: The Third Dimension—Variation in Groundwater Aquifers

*Scientist measuring specific conductance at an LM site monitoring well as part of the Variation Project.*

The U.S. Department of Energy Office of Legacy Management (LM) collects groundwater samples at a number of the 90 sites we manage. Some samples are taken solely to help us better understand the groundwater system, while many are required to demonstrate compliance with applicable environmental regulations. To meet required groundwater compliance goals, we perform sampling activities at least once every 5 years and, at many sites, annually or even semiannually. To ensure that human health and the environment are protected, we follow strict protocols for groundwater sampling (how samples are collected) and laboratory analysis, which can be found in various American Society for Testing and Materials (ASTM) procedures—or which adhere to U.S. Environmental Protection Agency (EPA) methods. Adherence to these methods is important because we use groundwater sample results to interpret trends over time, and consistency in sampling and analytical approaches is paramount.

Because contaminant concentrations are important success indicators of groundwater cleanup, in spring 2012, LM scientists were trying to understand why groundwater contaminant concentrations were increasing at a Shiprock, New Mexico, Disposal Site monitoring well. As a first step to discovery, the scientists decided to do something fairly simple. They inserted into the well a probe that measures specific conductance (SC)—water's ability to conduct an electrical current (a measure of the concentration of chemicals dissolved in the water). As more solids are dissolved in the water (increasing salinity), the water conducts more electrical current, which is measured as higher SC.[1]

Rather than taking a measurement from only one point in the well (a typical sampling approach), the scientists lowered the probe slowly into the water column, recording SC and temperature at every half-foot interval. Over a span of just 12 feet, SC increased by over 60 percent, from about 12,000 microsiemens per centimeter (µS/cm)—in the uppermost part of the water column—to more than 20,000 µS/cm near the bottom of the well.[2] Later sampling indicated the same pattern of increasing concentration with depth for site contaminants (uranium and sulfate). These findings marked the beginning of the Variation Project, an Applied Studies and Technology (AS&T) project aimed at understanding *Variation in Groundwater Aquifers*.

At LM sites with groundwater contamination, most compliance decisions are based partly, or largely, on groundwater sampling data. These data are used during site studies to propose a groundwater cleanup method and to estimate how quickly cleanup may occur. At many sites, samples are collected routinely and the results are submitted to stakeholders and regulators and used as the basis for interpretations regarding cleanup progress. Since 2014, groundwater samples have been collected from nearly 1,300 wells at about 40 LM sites. As part of routine reporting, the results are plotted on a map or included in a table. While the samples' geographic locations are well known, the Variation Project is looking at differences in results due to the depth at which a sample is collected.

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[1] Pure water, $H_2O$, without any dissolved chemicals, is a very poor conductor of electricity. Water's ability to conduct electricity is due to the amount of positively and negatively charged particles (ions) from chemicals dissolved in the water.

[2] A siemens (symbolized S) is the Standard International (SI) unit of electric conductance; a microsiemens (1 µS) is equal to one-millionth of a siemens. The conductivity of drinking water generally ranges between 50 and 500 microsiemens per centimeter (µS/cm), whereas that for sea water is about 50,000 µS/cm.

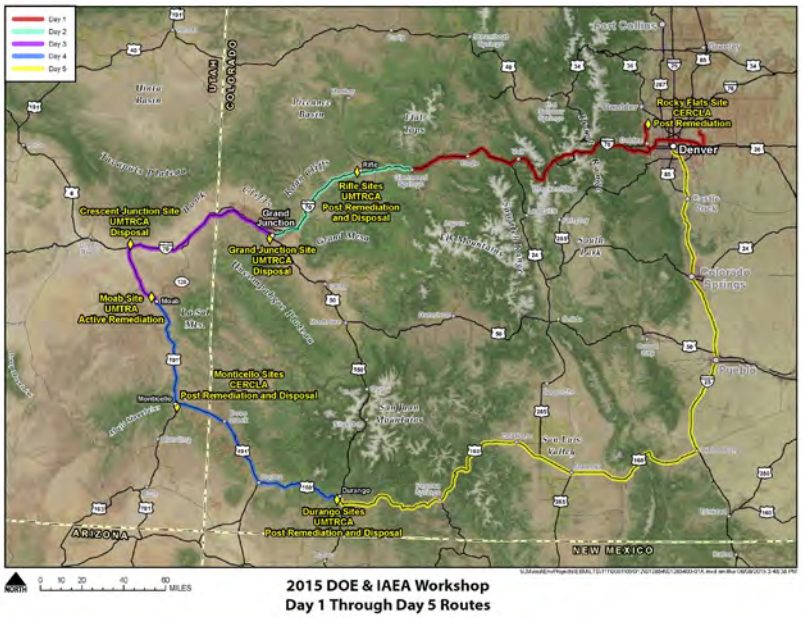
*Goal 1*

# Fostering International Discourse

## Sharing Knowledge and Lessons Learned at the IAEA Regional Workshop

*Application of Technologies of Specific Remediation Conditions at Uranium Production Legacy Sites*

The end of the Cold War and the collapse of the Soviet Union opened opportunities for communication about radioactive and chemical contamination from closed and abandoned uranium mills and other production facilities across many former Soviet Republics and associated states. Although many nations are in the process of remediating their contaminated sites, limited resources and access to technology have greatly increased the challenges they face.



2015 DOE & IAEA Workshop
Day 1 Through Day 5 Routes

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) and the International Atomic Energy Agency (IAEA) technical cooperation program for the Europe Region teamed to host a workshop on former uranium site cleanup and long-term care programs. Representatives from nations in Central Asia, Eastern Europe, and Russia, who are addressing their legacy sites, were selected by the IAEA to participate. Exchanging information and experience related to remediating uranium production legacy sites, including long-term care programs, were the workshop's main objectives.

Participants in the Regional Workshop on the Application of Technologies of Specific Remediation Conditions at Uranium Production Legacy Sites traveled more than 700 miles while touring six DOE sites in Colorado and Utah, from June 15 to 19, 2015.

"It's rewarding to be able to share our experience and the lessons we've learned over the years remediating and maintaining our own legacy sites," said Jalena Dayvault, LM Site Manager and lead for the workshop. "Our greatest hope is that the IAEA members will be able to take back some knowledge that will help them better address the challenges of their legacy sites back home."

During the workshop, 18 scientists and engineers from nine nations, two IAEA staff members, and an interpreter visited DOE sites where uranium or other nuclear materials were once processed, and have been or are being remediated. At each site, DOE briefed participants on the remediation and long-term care activities required and demonstrated

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*LM and contractor staff demonstrate groundwater sampling and monitoring techniques at the Rocky Flats, Colorado, Site.*

*DOE Environmental Management staff describe the ongoing construction and waste disposal at the Moab project disposal site in Crescent Junction, Utah.*

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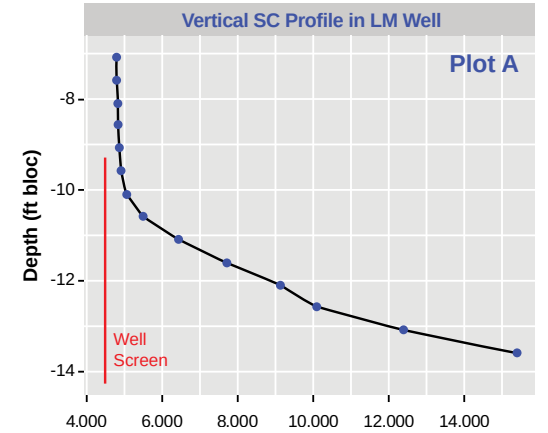
## AS&T: The Third Dimension—Variation in Groundwater Aquifers

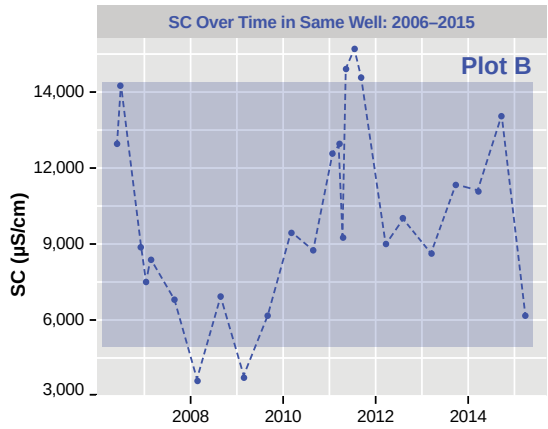
One might think that there is just one number representing the amount of dissolved chemicals in a well (i.e., that one number would apply no matter where the sample is collected), but at some LM site wells, that is not true. Concentrations do differ depending on how shallow or deep the sample is collected.

Since the early 2012 work, SC profiles have been taken at 400 wells at 15 LM sites in the western U.S. Most of the wells profiled (about 70 percent) had low variation, a finding that is encouraging with respect to interpretations of historical trends. Nonetheless, every site has at least one well with an SC profile variation high enough to warrant further examination. In some cases, as in the example above, the variation in the vertical SC profile measured in a single afternoon can explain the variation in historical sampling results. These results suggest that understanding the vertical changes in contaminant concentrations is important at some LM sites.

In these cases, changes to our groundwater sampling methods may be warranted, even though our approach (low-flow sampling) adheres to current EPA protocols.

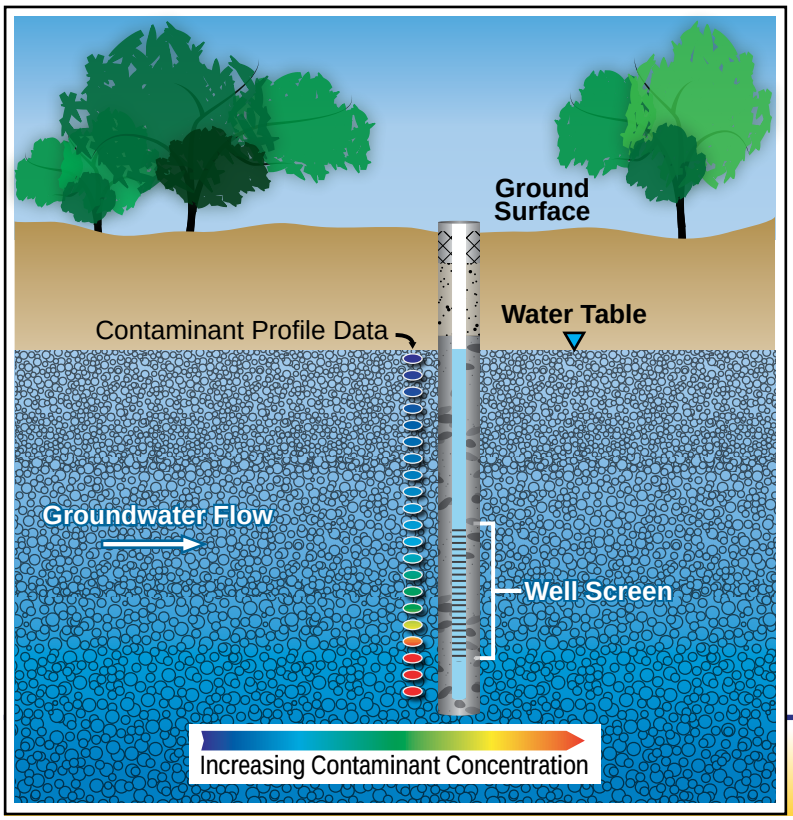
As part of LM's goal to be proactive and better understand groundwater aquifers, the next phase of this study will assess whether the same vertical variation in SC applies to other site contaminants. This was found in some wells, but it is too early to draw conclusions. These research results highlight the fact that, when interpreting groundwater data, it is important to fully account for the third dimension. In other words, depth matters! ❖




*Plot A (top). Specific conductance (SC) measured vertically in a well in 1 day. SC more than triples, even within the screened interval.*

*Plot B (bottom). SC measured over time (2006–2015) in the same well. The blue-shaded region denotes the range of SC measured in 1 day (from Plot A). The vertical variation found in 1 day could explain most of the variation over time (nearly a decade).*




*Simplified schematic of a groundwater monitoring well showing an example contaminant profile.*

*In this example, which is typical of many wells in this study, SC increased with depth. At this well, this same vertical trend (i.e., the same degree of variability) was found for site contaminants.*

*If you're limited to collecting only one sample, from where should it be collected? Typically, wells are sampled within the screened portion. In this example, concentrations differ within even the screened part of the well, which can affect data interpretations.*

*Goal 1*

# Creating LTS&M Efficiencies While Protecting Human Health and the Environment

The Fernald Preserve environmental monitoring team implemented work efficiencies and cost savings while following their prime goal to protect human health and the environment. The team works to increase efficiencies in the collection of environmental data and samples. Improvements include reliable long-term surveillance and maintenance (LTS&M) at the Fernald Preserve while reducing program costs and material use. The documented cost savings from these efforts exceeds $286,000.

The adopted efficiencies can be categorized into four different types of improvements: Programmatic, Regulatory, Procedural, and Material.

## Programmatic Improvements

Program improvements since 2010 reduce costs while continuing to protect human health and the environment.

- In 2011, wells were installed to supplant annual drilling of temporary wells at two locations for the next 10 years, based on remedy projections in 2011.
- The environmental monitoring team suggested elevations program modifications, adopted in 2012, that reduce the number of wells used to collect data by 32 percent.
- In 2013, an agreement was secured from state regulators to discontinue stream flow monitoring, citing that enough reliable data had been collected.

These one-time and recurring efficiencies in environmental monitoring programs have resulted in real and projected savings of $173,568.

## Regulatory Improvements

The team has worked closely with the U.S. Environmental Protection Agency (EPA) and Ohio EPA to streamline sample programs while continuing to meet regulatory requirements for monitoring present and past activities at the Fernald Preserve.

- In 2013, the team successfully negotiated an abbreviated constituent list during the National Pollutant Discharge Elimination System (NPDES) permit review process, based on historical data and changed field conditions.

*New agreements with regulators allow for reductions in the frequency and number of reports and sampled constituents at the On-Site Disposal Facility (OSDF).*

- For the 2015 NPDES permit renewal the team was able to secure an agreement to further reduce the constituents.
- During the 2015 negotiation, regulators agreed to abbreviate sample constituents and sampling frequency regarding non-permit, surface water program sampling.

These negotiated reductions enable the team to focus sampling efforts on the constituents that are most relevant to the present and past activities at the Fernald Preserve. The associated cost savings to date and until the 2020 permit and program revision is required total $50,000.

Also of note, new agreements with EPA and Ohio EPA for additional reductions in the frequency and number of accumulation data reports and sampled constituents at the On-Site Disposal Facility (OSDF) will result in significant savings in the future. Total monetary savings have not been assessed for these cutbacks, though it is expected to be significant.

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*Goal 2*

## LM Business Center Receives Yucca Mountain Licensing Information

U.S. Department of Energy (DOE) Office of Legacy Management (LM) personnel have processed an information technology media and equipment collection used to support the Yucca Mountain, Nevada, Project (YMP) licensing effort.

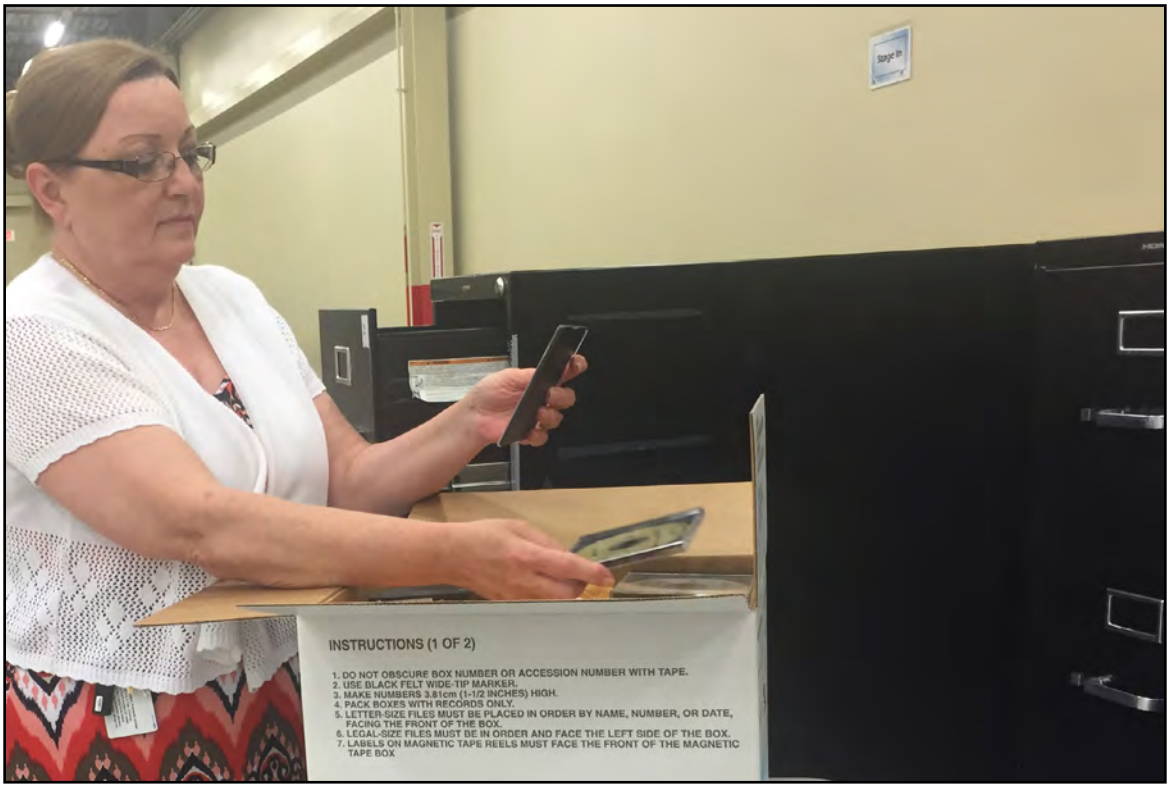
The Automated Document Image Indexing System (ADIIS) materials collection had been maintained by former YMP contractor CACI International, Inc. at their offices in Alexandria and Chantilly, Virginia.

LM records management staff received the ADIIS media, software, and database material in May 2015, and began re-boxing the collection for long-term storage at the LM Business Center records storage facility in Morgantown, West Virginia. The completed effort ensures ongoing preservation and maintenance of this valuable YMP records collection.

ADIIS—the digital image management software application—served as the primary database and workflow tool used to determine whether YMP information was relevant to the site's licensing application. All relevant information was added to the site's Licensing Support Network (LSN) for stakeholder access. A duplicate copy of the external hard drive containing ADIIS supplemental environmental impact statements is being created for storage at the Grand Junction, Colorado, office.

The ADIIS and LSN materials help document DOE's license application with the U.S. Nuclear Regulatory Commission, seeking authorization to build the YMP high-level waste repository. In previous related efforts, LM ensured preservation of LSN's 3.6-million-documents collection.

The ADIIS material joins a large collection of physical YMP records and other information technology infrastructure maintained at the LM Business Center. ❖




*A records management contractor employee at the LM Business Center prepares ADIIS media for long-term storage in the records storage facility.*

*Goal 5*

## 2015 LM All-Hands Training

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) 2015 All-Hands Training was held the week of July 27, 2015, in Dayton, Ohio. The week included presentations from LM staff and managers, communications and contracts training, and LM visits to sites in southwest Ohio.

Tuesday began with a Fernald Preserve site tour. The preserve is located on the former Feed Materials Production Center site, a facility that processed high-purity uranium metal products as the first step in America's nuclear weapons production cycle. The 1,050-acre Fernald site has been restored to pre-settlement conditions, using native plants and grasses. Tuesday afternoon, participants listened to co-worker presentations on LM's latest projects.

On Wednesday, attendees discussed issues related to the new LM Strategic Plan and participated in table exercises inspired by the book "Thanks for the Feedback" by Douglas Stone and Sheila Heen. In the afternoon, a trip was made to the Mound site in Miamisburg. The Mound site once served as an important location for integrated research, development, and production that supported U.S. Atomic Energy Commission (AEC) weapons and energy programs. AEC was a predecessor agency to DOE. The site is now a business park, operated by the Mound Development Corporation. Staff toured several facilities, including the Mound Science and Energy Museum.

The final training day, representatives from DOE's Office of Management trained LM staff on topics concerning contracts and grants oversight. Later, attendees went to the Piqua decommissioned reactor site. The 45.5-megawatt, organically cooled and moderated thermal reactor was built by AEC as a demonstration project, operating from 1963 to 1966. The facility is now used as a police substation and by the local water utility for offices and equipment storage.

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*LM contractors describe Fernald's wastewater treatment process.*

*LM staff tour the Converted Advance Wastewater Treatment Facility at the Fernald Preserve.*

*LM staff are briefed on the draft of the new LM Strategic Plan.*

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## Creating LTS&M Efficiencies While Protecting Human Health and the Environment

### Procedural Improvements

Several procedural improvements have promoted efficiency and saved operational costs. The environmental monitoring team self-performed many technical activities that once relied on sub-contracted drilling and consulting. The team has made the following procedural improvements at the Fernald Preserve:

- Self-performed well installations and well abandonments using an LM-owned Geoprobe® drilling machine.
- In 2012, an innovation was developed and proceduralized for investigative sampling of the Converted Advanced Waste Water Treatment (CAWWT) plant process tanks that eliminates the need to purchase/rent new equipment and train sampling technicians.

Savings in training, oversight, labor, and equipment costs over the past four years total $10,000.

### Material Use Improvements

The environmental monitoring team is always looking to minimize materials usage and eliminate generated wastes. Estimating the proper amount of needed materials is essential to ensure that bulk purchases are appropriate and adequate, while not leaving large and burdensome stocks of left-over items. These best-practice purchasing methods are difficult to precisely measure in dollars saved, but do result in efficiency, cost savings, and environmental/energy conservation. Below are some specific materials savings made to field operations during the past 5 years:

- The LM-owned Geoprobe® drilling machine that was purchased in 2002 during clean up and closure efforts at the Fernald Preserve (now used at other sites to support LM activities) was scheduled for replacement in 2010. Though its use had expanded to include sites and projects beyond groundwater and soil sampling at the Fernald Preserve, environmental monitoring team members opted to have the manufacturer refurbish the old machine rather than replace it with a new drilling machine. Refurbishment extended the life of the machine by at least 5 years, saving costs and delaying the need to purchase new equipment.


*Self-performed well installations and abandonments are conducted using a Geoprobe® drilling machine.*

- Through the reuse program, a stock of unused sample tubing was acquired from the Weldon Spring, Missouri, Site and is used during sampling activities.
- Team members recognized that desiccant used for technical equipment could be dried and reused bi-annually rather than relying on disposal and purchase of new desiccant.
- Technicians adjusted sampling techniques to reduce the use of costly disposable filters during annual sampling activities.

These documented improvements result in a savings of $51,000.

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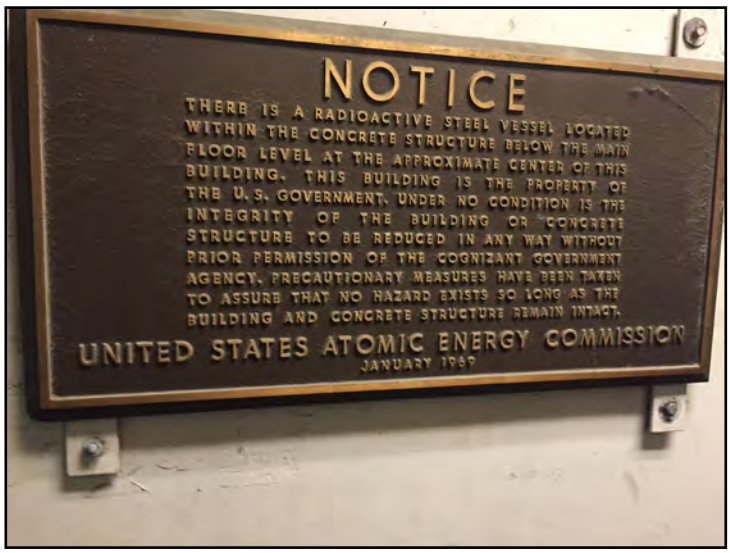
## 2015 LM All-Hands Training

All three sites visited during the week reflect different aspects of LM's work to protect human health and the environment and optimize the use of land and assets.

Overall, the 2015 LM All-Hands Training was a great success, bringing together LM staff from across the country and offering many learning and development opportunities. ❖

See related article, **Ohio and the Manhattan Project**, on page 10.




*Plaque at the Piqua Decommissioned Nuclear Reactor.*

*LM staff heading into the Piqua Decommissioned Nuclear Reactor.*

*LM staff tour the "Copper Room" in the T Building at the Mound, Ohio, Site.*

*A Mound Science & Energy Museum volunteer shows a model radioisotope thermoelectric generator.*

*Goal 5*

## Ohio and the Manhattan Project

After a briefing regarding the Manhattan Project, Nobel Laureate Niels Bohr said to physicist Edward Teller, "I told you it couldn't be done without turning the whole country into a factory." Of course, the state of Ohio didn't need to be turned into a factory, since by that time it already had a long history of industrialization. In fact, many of the state's factories were put to use making the first nuclear bombs.

This past July, U.S. Department of Energy Office of Legacy Management (LM) employees learned about the roles Ohio legacy sites played in the nation's early atomic energy program, during their 2015 All-Hands Training that took place in Dayton.

Ohio had become a major industrial center, largely because of its location between the iron-ore deposits of the upper midwest United States, and the rich coal fields of the Appalachian Mountains. With iron and coal, Ohio could forge steel, and steel fostered other industries. For instance, Dayton was home to early automakers, Speedwell Motor Company and Dayton Electric Car Company. It was the city where the Wright brothers manufactured their airplanes. By the mid-twentieth century, Ohio was a major industry hub, producing a wide array of goods, ranging from toys to tires.

Upon the outbreak of World War II, many Ohio manufacturers converted to war production, helping to make the U.S. the "Arsenal of Democracy." In Cincinnati, Aluminum Industries, Inc., switched from making toys cars to making ammunition for anti-tank guns. In Dayton, National Cash Register started making magazines for anti-aircraft guns. In Akron, Goodyear started making assault boats for the U.S. Marine Corps.

The country's wartime production soon included the race to build nuclear bombs, after the Manhattan Project was established in 1942. Harshaw Chemical Company in Cleveland started refining uranium compounds to provide feed for the gaseous diffusion plant in Oak Ridge, Tennessee. B&T Metals—a significant African American-owned business in Columbus—began making uranium rods and Baker Brothers in Toledo machined uranium rods into slugs for fuel reactors in Hanford, Washington; and

*B&T Metals, in Columbus, extruded uranium rods for the Manhattan Project.*

*The Fernald Feed Materials Production Center, constructed near Cincinnati in 1951, consolidated uranium work that had been conducted at numerous sites during the Manhattan Project.*

Oak Ridge, Tennessee. Meanwhile, the Monsanto Chemical Company Central Research Facility laboratory in Dayton was tasked with producing polonium for the bombs. Needing more space, the company expanded its facilities to include a former seminary and a playhouse.

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## Draft LM 2016-2025 Strategic Plan

company annuities. This has lowered the Department's liability and reduced the financial risk to other LM commitments.

- Funding requests for retiree pension plans were reduced from $40 million to $0; retiree pension plan assets now equal or exceed liabilities.
- DOE contractors have implemented health reimbursement arrangements for Medicare-eligible retirees at two sites. This has expanded insurance options for retirees while lowering the cost to the taxpayer.

### None

- LM shutdown, and no longer supports, the Job Opportunities Bulletin Board and Workforce Information systems. The functions previously provided by these systems were either discontinued or are now supported by other DOE programs or the contractor community.
- All funds appropriated for economic development and workforce restructuring have been spent and we received approval to discontinue an Annual Report to Congress on Workforce Restructuring.

### New

- LM is the Department's lead for an interagency effort to address the environmental impact of over 4,000 uranium mines that provided ore to the Atomic Energy Commission.
- LM is responsible for managing the records and information systems associated with the Yucca Mountain project.
- We are evaluating the potential impacts of climate change on remedy performance and the management of natural resources on LM sites.
- LM is responsible for auditing claims submitted by uranium/thorium mill site licensees to determine if costs are eligible for reimbursement under the Title X program. ❖

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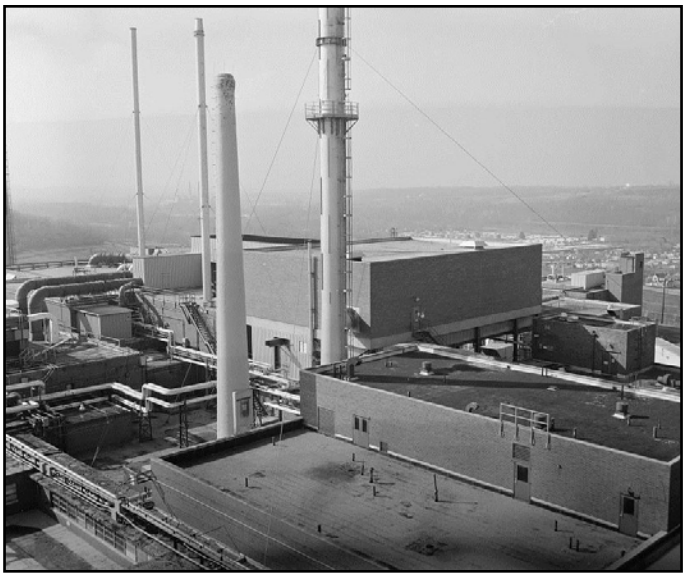
## Ohio and the Manhattan Project

After World War II, Ohio continued to play a major part in the nation's atomic energy program. However, much of the work that had been contracted out to privately owned businesses was consolidated into government-owned facilities. Mound Laboratories took over the polonium work that Monsanto had conducted in Dayton. The Fernald Feed Materials Production Center took over uranium work previously performed by Harshaw Chemical, B&T Metals, and Baker Brothers.

In all, roughly 60 sites in Ohio were involved in the nation's atomic energy program. Today, LM is responsible for sites in Ashtabula, Columbus (including Columbus East), Fairfield, Fernald, Hamilton, Mound, Oxford, Piqua, and Toledo. Over the coming years, we anticipate accepting responsibility for additional sites in the state. While many of the structures are now gone, LM retains knowledge about the important work performed at its Ohio sites. ❖



*The Mound Plant, in Miamisburg, opened in 1948 to continue polonium work that had been conducted throughout Dayton during World War II.*

*Goal 4*

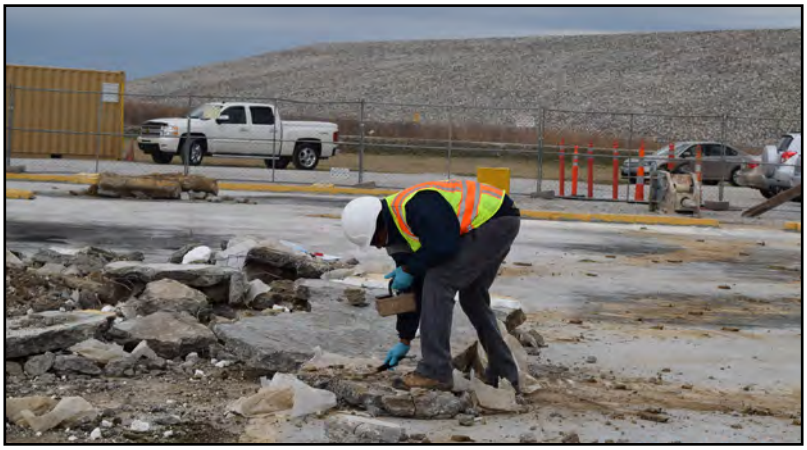
## Recycling Building Foundation at the Weldon Spring, Missouri, Site

A 32,635-square-foot administration building was built in 1990 to provide office space for hundreds of Weldon Spring, Missouri, Site Remedial Action Project workers. The structure was demolished during the 2012 fall season, when it was no longer needed to support U.S. Department of Energy Office of Legacy Management (LM) long-term surveillance and maintenance (LTS&M) activities. The building's concrete foundation slab was left in place until a decision for its removal could be made and any disposal concerns could be addressed.

LM decided that the concrete slab should be removed and processed through a rock crusher to recycle it for reuse. On March 4, 2015, the work was awarded to Premier Demolition (the same subcontractor that had demolished the administration building and the old wastewater treatment plant). The subcontractor mobilized on March 19 and began excavating the slab March 23. The slab was surveyed to verify and document that radiation was below background levels and that there were no radiological contamination issues. The portable rock crusher (permitted according to Missouri State regulations) began operating on April 6.

Project specifications required controls ensuring that dust stay within a specific area, identified as the Fugitive Dust Boundary. Orange cones delineated the boundary, which was closely monitored by contractor personnel. The controls requirement (stricter than State regulations) was instituted to protect site visitors. Dust was suppressed with water spray, aided by prevailing rains in the days leading up to the operation. Dust monitoring was conducted at several locations, including the Interpretive Center, near the office buildings, and inside the construction area. Monitoring results showed that dust was not a concern at the Interpretive Center or near the office buildings. Dust levels inside the construction area occasionally showed short-term spikes. When spikes occurred, dust suppression methods were either increased or repositioned to return dust to an appropriate level. Workers were not exposed to dust levels exceeding the action level for a continuous 8-hour period.


*Foundation removal at the previously demolished administration building area.*



*Concrete ruble surveys identified no radiological contamination issues.*

Safety-yellow marking paint was identified on a small portion of concrete. The paint had been sampled during an environmental assessment, conducted prior to administration building demolition, and found to contain lead. LM contacted the Missouri Solid Waste Program regarding the regulatory requirements for managing this concrete portion. They responded that the area contained de minimus lead quantities and could be run through the crusher with no additional management or disposal requirements. However, to ensure the lead-based paint would not be hazardous if inhaled, lead monitoring was conducted during the 3-day activity to remove, segregate, and crush lead-painted concrete items. All lead

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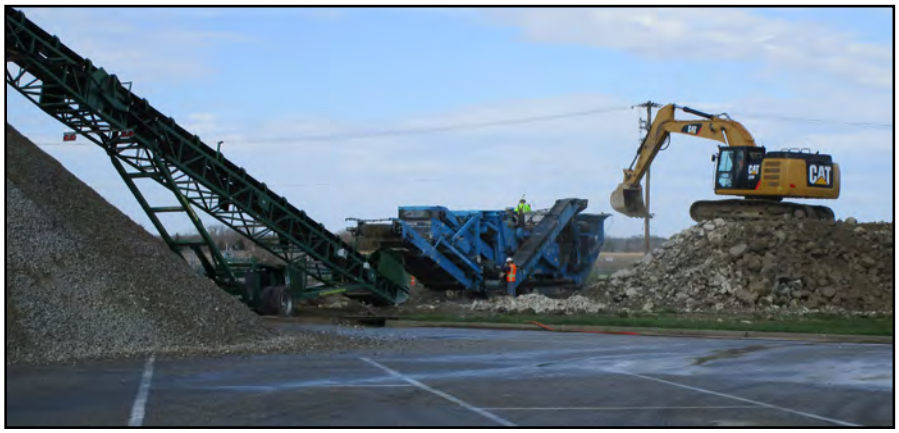
## Recycling Building Foundation at the Weldon Spring, Missouri, Site

sample results were well below Occupational Safety and Health Administration regulatory requirements.

Noise-level monitoring was another project safety measure. Readings taken in and around the construction area, including the Interpretive Center, and near the office building, showed that activity noises traveling beyond the construction area were at acceptable levels. Levels near heavy equipment operating within the construction area required that workers use hearing protection.

Workers put the rock crusher to further use by breaking down concrete from past projects, which had been stored at an onsite debris-storage pad. Between the administration building foundation slab and concrete from former projects, approximately 2,157 cubic yards of gravel were produced. The gravel was used to backfill the concrete slab removal area. A total of 54,640 pounds of metal rebar, which was automatically separated from the concrete by the rock crushing machine, was sent offsite for recycling.

The administration building concrete-foundation removal project was completed April 22, on schedule and incident free. ❖




*Rock crushing operation.*

*Rock crushing operations produced 2,157 cubic yards of gravel.*

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## Creating LTS&M Efficiencies While Protecting Human Health and the Environment

Material use improvements notwithstanding, many LTS&M activities continue to generate waste. Fernald Preserve employees actively pursue a variety of recycling or reuse activities to reduce waste volumes. Since early 2011, Fernald has recycled approximately 46,000 pounds of assorted metals that have passed required screening processes, including aluminum, copper wiring, iron, steel, and stainless steel. Most of the materials have come from fence removal and obsolete equipment. These recycling efforts have generated a cash flow of approximately $7,000, which the Fernald Preserve has sent to the U.S. Treasury Department.

The environmental monitoring team members have sought changes, made improvements, and promoted conservation to realize cost savings of over $286,000 while continuing to protect human health and the environment through their work. The team continually strives for quality, innovation, and efficiency. Value added from these examples of continual improvement is amassed technical skill and knowledge, improved schedule, and reduced long-term surveillance and maintenance costs. ❖

*Goal 1*

## Environmental Justice Activities

### Tribal Training: Complying with DOE O 144.1 and EO 12898 for Environmental Justice

Following the Environmental Justice and Tribal Consultation Training session on May 26, 2015, in Washington, DC, two more training sessions were held with Los Alamos National Laboratory in New Mexico and the Western Area Power Administration (WAPA) in Lakewood, Colorado. These two sessions were organized in collaboration with the U.S. Department of Energy (DOE) Office of Congressional and Intergovernmental Affairs and the DOE Office of Environment, Health, Safety and Security.

As with the first training session at DOE Headquarters, these half-day sessions were designed to promote the underlying principles of Executive Order 12898, *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*; DOE Order 144.1, *Department of Energy American Indian Tribal Government Interactions and Policy*; and the *Environmental Justice Five-Year Implementation Plan*. The Department also wanted to advance its policy to support positive and productive tribal government and community relations. While the original focus of the training was staff working on tribal energy programs, the core concepts discussed at these sessions were applicable to all federal staff working with tribal populations on any issue. Its purpose was to help federal staff, decision-makers, and other programs associated with tribal affairs, better understand:

- Federal Indian Law and Policy impacts on tribal communities
- Tribal government authority and structure
- Best practices for working and consulting with tribes on environmental justice
- Cultural awareness, sensitivities, and communication skills

Training sessions were facilitated by Milton Bluehouse, Jr. Former Pueblo de Cochiti Governor, Regis Pecos, served as guest speaker for the Los Alamos training session, which was attended by over 70 people. Administrator Mark Gabriel provided welcoming remarks to over 90 participants at the WAPA session and tribal attorney Melissa Candelaria provided support to the overall presentation. ❖

### Congressional Black Caucus Foundation Environmental Justice Braintrust, Held September 18, 2015, at the Washington, DC, Convention Center

This year's Congressional Black Caucus Foundation Environmental Justice Braintrust—"Shared Impacts of Climate Change and Environmental Justice"—highlighted the Native American community and discussed ongoing efforts to ensure liberty and justice for all, with regard to environmental justice (EJ) in communities, particularly those with tribal, minority, and low-income populations.

Panel discussions focused on enhancing the unique relationships between human health, EJ, and economic development, as well as improving the quality of life in challenged communities nationwide.

Panelists included:

- Vice Admiral Manson Brown, Deputy Administrator for National Oceanic and Atmospheric Administration and Assistant Secretary of Commerce for Environmental Observation and Prediction
- Ann Marie Chischilly, Executive Director, Institute for Tribal Environmental Professionals, Flagstaff, Arizona
- Wahleah Johns, Solar Program Director, Black Mesa Water Coalition in Flagstaff
- Lorenzo Max, Elder and Traditional Medicine Practitioner, Northern Arizona University in Flagstaff
- Derrick Watchman, Chief Executive Officer, Navajo Nation Gaming Enterprise, Church Rock, New Mexico
- Aiko Allen, Tribal Liaison, New Mexico Department of Health in Santa Fe ❖

*Panelists and organizers for the event, from left to right: Derrick Watchman, Ann-Marie Chischilly, Wahleah Johns, Dr. David Rivers, Lorenzo Max, Aiko Allen, Vice Admiral Manson Brown, and Milton Bluehouse, Jr.*

*Goal 1*

## Institutional Controls Protect Remedies at Mound, Ohio, Site

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) completed its 2015 annual assessment of institutional control (IC) effectiveness at the Mound, Ohio, Site in Miamisburg.

ICs are required because some land-use restrictions apply. Mound site ICs are part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedies for the site. They are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and protect the integrity of the remedy. The site has completed all CERCLA Section 120(h) requirements for property transfer as an industrial-use site.

Mound site ICs in the form of (1) restrictions and covenants in quitclaim or limited warranty deeds, or (2) activity and use limitations in the environmental covenant and the lease agreement, remain with the land regardless of ownership.

The annual assessment looked for changed conditions that could indicate an IC violation. This IC assessment included:

- Physical inspections including a walkdown with the U.S. Environmental Protection Agency (EPA), Ohio EPA, Ohio Department of Health, the City of Miamisburg, and Mound Development Corporation
- Contact with all area property owners to ensure that they understand the ICs
- Reviews of records such as building permits, occupancy permits, planning commission records, zoning changes, property records, and well-drilling records

This annual IC assessment determined that Mound site ICs continue to function as designed, adequate oversight mechanisms are in place to identify possible violations of ICs, and adequate resources are available to correct or mitigate any problems if violations occur. ❖

*IC inspectors conducted physical inspections at the Mound site to ensure no unauthorized activities, such as soil removal, had occurred.*

*During the Mound site annual assessment, inspectors examined a special IC area concrete encapsulation inside the T Building, to ensure the integrity of the cap.*

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## Fostering International Discourse

the technology and groundwater treatment systems used to ensure that environmental remedies remain protective. Running commentary was given about geological and historical highlights in each area visited.

The group first visited the Rocky Flats site located 16 miles northwest of Denver, Colorado. The site operated as a nuclear weapons production facility from 1953 to 1989. In 2006, site cleanup was declared complete. LM briefed the participants on particular challenges the cleanup project faced remediating a large nuclear weapons plant located in a major population center. Rocky Flats staff demonstrated groundwater well sampling and monitoring techniques, including recent sampling equipment advances. IAEA visitors were particularly interested in how LM included the public when making cleanup decisions and the long-term care and monitoring regime now being conducted by LM. Following introduction to cleanup and long-term monitoring at Rocky Flats, the workshop focused on LM sites most related to those in the participants' home countries. Most project sites in countries represented by IAEA are in the early cleanup stages. Many have exposed tailings piles and other contaminated materials near surface and groundwater sources that provide drinking water for nearby residents.

The next workshop tour stop provided an example and lessons learned after completing a mill-tailings-site cleanup. Rifle, Colorado, is home to two former uranium mill sites and a separate disposal cell, created to contain the contaminated materials removed from the mill sites during cleanup. At the Rifle processing and disposal sites, staff shared their experiences with LM's disposal cell design and construction, and how institutional controls—including land use controls—are established to help protect the public and environment from residual contamination. The Rifle processing site also has an outdoor laboratory where the DOE Office of Science (SC) Integrated Field-Research Challenge is researching uranium reactions with groundwater and surface water in a Colorado River floodplain. The SC principal investigator explained the project's research approach and the insights gained on geochemical reactions. Participants indicated that these chemical and hydrological processes were likely occurring at their sites.

Some workshop participants have sites that are in, or close to, communities. Many health effects and risk factors from uranium milling and production weren't well understood in early uranium-production days. In many cases, as was the practice in the western U.S., nearby residents took


*Grand Junction, Colorado, site personnel describe the history of the Grand Junction processing site cleanup and disposal.*

*Disposal cell design, construction, and institutional controls are discussed at the Rifle, Colorado, Disposal Site.*

advantage of the readily available raw-materials byproducts, such as mill tailings and other contaminated materials, to build their homes and roads.

The workshop included a tour of the Grand Junction, Colorado, Disposal Site to share lessons from cleaning up mill tailings from a local uranium mill, which were used in homes, businesses, construction projects, and roads. The cell is the only open and actively operating federal disposal cell receiving mill tailings and radioactive construction materials. It is opened once every 2 to 3 years to receive contaminated materials uncovered by local municipal road or utilities work, and construction materials from cleaning up contaminated buildings at the Grand Junction LM office. The site tour included demonstration of several techniques

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## Fostering International Discourse

*Groundwater treatment is discussed at the Monticello, Utah, Processing Site.*

*IAEA workshop attendees and their LM hosts enjoy a sunshine break at the Durango, Colorado, Disposal Site.*

involved in operating an active disposal cell, including properly using protective clothing, and decontaminating trucks and equipment. LM is working with other federal and state agencies to conduct research on alternative cover designs for disposal cell caps. Although most LM disposal cells are capped with a rock cover, studies suggest that natural ecological and soil-forming processes may improve cell sustainability. Site staff explained the experimental cover areas and showed workshop attendees how the research is conducted.

The next opportunity to share DOE's experience and knowledge came when the workshop group visited an ongoing mill-tailings removal and disposal project adjacent to the Colorado River in Moab, Utah. The Moab project removes tailings from a cell at the former uranium mill site and safely transports and deposits them in a new disposal cell in Crescent Junction, Utah—well away from the Colorado River and residential areas.

The Moab site tour began by observing rail containers previously filled with mill tailings being decontaminated. Participants were able to observe operations, including offloading rail cars carrying mill tailings, removing tailings from rail cars, decontaminating empty rail cars, and placing mill tailings into the disposal cell. Staff briefed the group on siting a cell, constructing a cap, and the equipment necessary to perform the work. Tour dialogue included questions and answers about financing, arranging safety briefings, and interacting with regulatory authorities.

A groundwater treatment process is used to reduce ammonia and uranium discharge into the Colorado River. Contaminated groundwater is pumped from extraction wells and piped to lined evaporation ponds on top of the tailings pile. In addition, fresh water from the river is injected into wells along the river to suppress ammonia and salt influx and protect wildlife habitat along the Colorado River. Lessons learned from this project may be directly applied to several IAEA members' sites that are located in close proximity to large rivers and water supplies.

At the Monticello, Utah, and Durango, Colorado, disposal sites, the visitors learned about the regulatory framework governing remedial activities and were given an overview about long-term care, alternative cover design, vegetative caps, remediation pump stations, and hydrogeology.

Discussions included challenges encountered during remediation activities and the process to reach agreements with local regulatory authorities. Final discussions were about potential long-term reuse opportunities for cleaned sites, including using the top of a disposal cell to locate solar photovoltaic energy production and the potential impacts to long-term care programs when evaluating reuse.

After 5 days on the road, visiting IAEA members returned to Denver to catch their flights back home. Equipped with new information and resources, resulting from the collaborative effort between DOE and IAEA, there is hope that IAEA workshop participants can use what they've learned to support their efforts to successfully and practically remediate and ensure continued protectiveness at legacy uranium sites in their own countries. ❖

# Anticipated Legacy Management Sites Through Fiscal Year (FY) 2021


## *Goal 5*
## LM Support Services Contract

On October 1, 2015, Navarro Research and Engineering, Inc. became the U.S. Department of Energy (DOE) Office of Legacy Management (LM) nationwide support contractor. The contract is a five-year contract (two-year base and three-year option) at approximately $50 million per year. The contract was successfully transitioned from Stoller Newport News Nuclear, Inc. (formerly S.M. Stoller Corporation) on September 30, 2015.

LM is responsible for ensuring that DOE's post-closure responsibilities are met for long-term surveillance and maintenance, records and information management, benefits continuity, property management, and land reuse. LM is responsible for the long-term care of 90 sites in 28 states and Puerto Rico. LM contractor staff primarily work out of offices in Grand Junction and Westminster, Colorado; Monticello, Utah; Tuba City, Arizona; Morgantown, West Virginia; Fernald, Ohio; Weldon Spring, Missouri; and Pinellas, Florida. ❖

# Legacy Management Goals and Objectives

## Goal 1. Protect human health and the environment

**Objectives**

1. Comply with environmental laws and regulations.
2. Reduce health risks and long-term surveillance and maintenance (LTS&M) costs.
3. Partner with other federal programs to make environmental remedies better and last longer.
4. Oversee DOE implementation of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

## Goal 2. Preserve, protect, and share records and information

**Objectives**

1. Meet public expectations for outreach activities.
2. Protect records and make them accessible.
3. Protect and ensure access to information.

## Goal 3. Meet commitments to the contractor work force

**Objectives**

1. Safeguard contractor pension plans.
2. Fund contractor health and life insurance.

## Goal 4. Optimize the use of land and assets

**Objectives**

1. Optimize public use of federal lands and properties.
2. Transfer excess government property.
3. Improve domestic uranium mining and milling operations.

## Goal 5. Sustain management excellence

**Objectives**

1. Renew LM's designation as a high performing organization (HPO).
2. Implement LM's *Human Capital Management Plan*.
3. Operate in a sustainable manner and reduce LM's carbon footprint.

LM is continually seeking opportunities to protect natural resources and the future. One simple step we can take toward improving environmental consciousness is to distribute the *Program Update* newsletter by email instead of sending a printed copy.

Please send your email address and your first and last names to lm@hq.doe.gov so that we can update our database.

Thank you for your assistance.

U.S. DEPARTMENT OF ENERGY | Legacy Management
1000 Independence Avenue, SW
Washington, DC 20585

**U.S. Department of Energy**
**Office of Legacy Management**

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U.S. Department of Energy
Office of Legacy Management (LM-10.2)
1000 Independence Avenue, SW
Washington, DC 20585

**Fax:** (202) 586-1540
**Email:** lm@hq.doe.gov
**Website:** http://energy.gov/lm