U.S. DEPARTMENT OF ENERGY | Legacy Management

Program Update

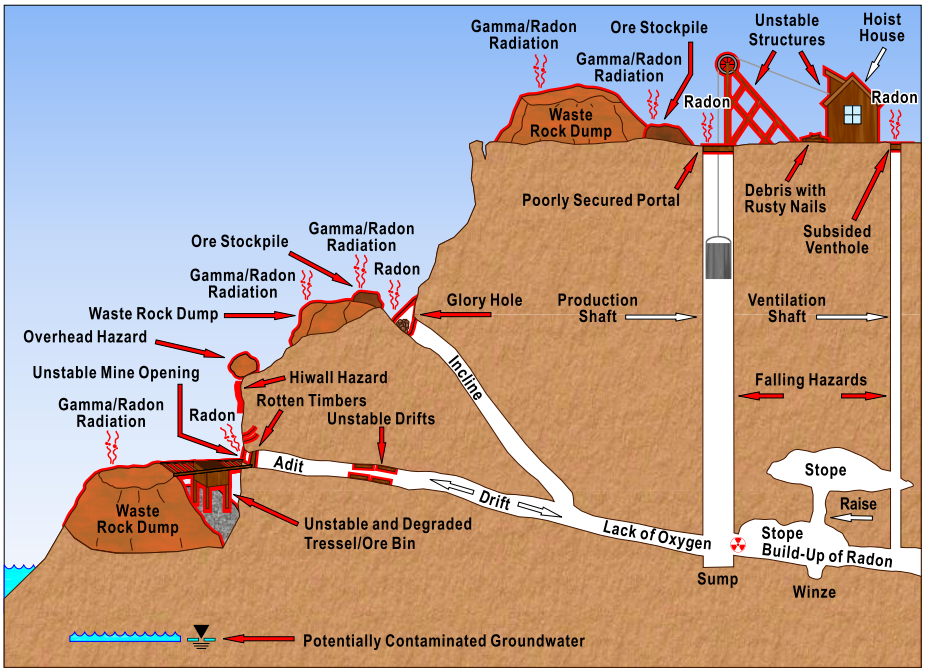
July–September 2013

Welcome to the July–September 2013 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 4

Legacy Management Work Progresses on Defense-Related Uranium Mines Report to Congress

The U.S. Department of Energy Office of Legacy Management (LM) continues to work on a report to Congress regarding defense-related legacy uranium mines. LM was directed by the U.S. Congress in the National Defense Authorization Act for Fiscal Year 2013 to undertake a review of, and prepare a report on, abandoned uranium mines in the United States that provided uranium ore for atomic energy defense activities. The report is due to Congress by July 2014.



Possible physical hazards, exposure pathways, and contamination associated with uranium mine sites.

LM is compiling uranium mine data from federal, state, and tribal agencies for the report. The data is also being used in four topic-specific technical reports that focus on the locations and status of defense-related uranium mine reclamation and remediation, impacts of these mines on public health and the environment, the potential cost and feasibility of reclamation and remediation efforts, and a ranking of priority for reclamation and remediation.

To date, LM has identified approximately 4,213 defense-related legacy uranium mines, primarily located in the western U.S. Data collected indicates that over 500 mines have been closed, reclaimed, or

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Legacy Management Work Progresses on Defense-Related Uranium Mines Report to Congress

remediated. LM's most recent assessment shows that almost three-quarters of all known mines are on public lands managed by the federal government. The majority of mines without detailed location information are in Colorado and Utah (see table below). Although the locations of approximately 580 mines are limited to the county and state, most produced very few tons of uranium ore and only 7 produced over 1,000 tons.

State	Total	Known	Unknown
COLORADO	1,518	1,420	98
UTAH*	1,378	1,009	369
ARIZONA*	413	409	4
WYOMING	319	291	28
NEW MEXICO*	249	242	7
SOUTH DAKOTA	155	133	22
TEXAS	29	20	9
UNKNOWN	28	2	26
CALIFORNIA	26	20	6
NEVADA	24	22	2
NORTH DAKOTA	21	21	
MONTANA	19	16	3
WASHINGTON	17	12	5
IDAHO	7	6	1
OREGON	4	4	
OKLAHOMA	2	2	
ALASKA	1	1	
FLORIDA	1	1	
NEW JERSEY	1	1	
PENNSYLVANIA	1	1	
Total	**4,213**	**3,633**	**580**

Location and status of defense-related legacy uranium mine claims by state.
** Arizona, New Mexico, and Utah include the mines located on the Navajo Nation.*

Field personnel collecting gamma exposure-rate measurements at a subsided mine portal in the Yellow Cat mining area of Grand County, Utah.

Most recently, LM visited 84 defense-related legacy uranium mine sites located within 11 uranium mining districts in 6 western states. At these sites, photographs and global positioning location data were collected on mine features including, adits; shafts; mine-waste-rock dumps; large, open-pit mines; drill holes; ventilation shafts; access roads; and structures (see photos above and on page 12). Radon and gamma exposure-rate data were also collected at mine features and locations near the mines. Data obtained in the field will be used to improve historic data and assumptions such as those used to calculate risk associated with exposure pathways at uranium mine sites.

As directed by Congress, LM will continue to consult with the U.S. Environmental Protection Agency and the U.S. Department of the Interior on this effort. LM is also engaging other relevant federal agencies, affected states and Tribal Nations, and the interested public. Public webinars are planned to occur in late fall to provide information and to seek input on the four topic-specific technical reports.

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Goal 1

Water Monitoring Flume Replaced at the Rocky Flats, Colorado, Site

In August of this year the U.S. Department of Energy (DOE) Office of Legacy Management (LM) Rocky Flats, site took advantage of an existing water diversion structure that was no longer needed, to replace an aging water monitoring flume and avoid future repairs that could interrupt data collection.

The flume for Rocky Flats Legacy Management Agreement (RFLMA) Point of Evaluation (POE) monitoring location GS10 in South Walnut Creek was located at the bottom of fairly steep channel banks. The bank on the south side shows localized slumping and sliding toward the creek and GS10. Although the GS10 metal flume was operational, the aging structure and hillside movement to the south could compromise the quality of data collected in the future.

The GS10 flume was originally installed in 1993. DOE considered replacing the flume in 2000, when flumes for several other monitoring locations were replaced, but the project was a low priority in relation to other cleanup and closure work at the time, and due to the hillside slumping, replacement would have been costly and difficult.

The GS10 flume was slightly upstream of a massive, deeply anchored, approximately 50-foot-wide concrete diversion structure in the stream channel. The diversion structure had openings to allow creek water that had already been monitored at GS10 to flow through to underground corrugated metal pipes. The pipe openings were fitted with gate valves, or "head gates," to control the flow of the water. One head gate controlled flow through a pipe into former Pond B-1. The other two head gates controlled flow into a bypass line around former retention ponds B-1, B-2, and B-3 and then into B-4. Once the B-1 through B-4 dams were breached, the bypass was no longer required, since water was being routed through the former ponds. This allowed for an innovative and cost-effective reuse of the diversion structure.

RFLMA POE sampling location GS10 and the downstream diversion structure prior to beginning the replacement project.

Construction contractors used heavy equipment to remove the sections of the diversion structure concrete that were sawn for the new notch.

LM removed the old GS10 flume and installed a new flume on the downstream side of the diversion structure after cutting a notch to accept the new flume. The new flume is a fiberglass H-flume, better suited to measure the lower post-closure flow rate ranges in this portion of South Walnut Creek. After grouting the two pipes at the diversion structure, the creek channel upstream was filled and graded to raise the channel elevation to the elevation of the new flume. Creek water now flows through the diversion structure notch and into the new flume, instead of through the diversion structure via the pipes.

The new flume was installed prior to removing the old flume then a temporary coffer dam was installed upstream to hold creek flow so it could be pumped to the new flume, ensuring continuous monitoring while the old flume structure was being removed.

The new flume is approximately 35 feet east of its former location. Because of the proximity of the new

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Goal 4

Mound, Ohio, Site Property Transfer

Improvements to the Mound Site property by the Mound Development Corporation included the construction of a roadway through the site which increases access to the various property plots, sidewalks, and parking lot upgrades.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for long-term stewardship of the Mound, Ohio, Site in Miamisburg. The site was remediated to industrial use standards in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986. The industrial use standard made it possible for the site to be redeveloped as a technology and industrial park, known as the Mound Advanced Technology Center.

In 1998, the DOE Office of Environmental Management (EM) and the Mound Development Corporation (MDC), an economic development arm of the City of Miamisburg, signed a memorandum of agreement and a cooperative sales agreement allowing transfer of land parcels once all CERCLA requirements had been completed. The early property transfers gave the MDC a head start to make site improvements, lease buildings, and sell property. LM and EM worked as a team during the site's transition from cleanup to long-term monitoring for the benefit of the community. This teamwork continues as the final parcels of land are being transferred. EM has allowed MDC to defer acceptance of the remainder of the site for up to 5 years until 2017. During the deferral, EM is leasing the Mound site in its entirety to MDC.

The transfer of federal property to MDC is an excellent example of DOE's Asset Revitalization Initiative (ARI), as it demonstrates a successful reuse of government property in a way that benefits communities affected by site closures. ARI is a DOE-wide effort to advance the beneficial reuse of its unique and diverse mix of assets, including land, facilities, infrastructure, equipment, technologies, natural resources, and highly skilled workforce. ARI promotes a more efficient business environment to encourage collaboration between public and private resources.

Today the Mound Advanced Technology Center is home to over a dozen commercial businesses, including many that are at the forefront of research and development. With numerous site improvements, including a new main road, parking lots, sidewalks, street lights, landscaping, and building improvements, MDC is developing the former government property as a private business and technology park that will continue to provide valuable jobs and important tax revenue for the City of Miamisburg. ❖

Goal 4

Weaving Community and Science: *Former Summer Intern Is Investigating Plant Uptake of Contaminants on Disposal Cell Covers*

Carrie Nuva Joseph, a former U.S. Department of Energy (DOE) summer intern at the Grand Junction, Colorado, office; current graduate student in the University of Arizona's Department of Soil, Water, and Environmental Science; and a Native American community stakeholder, is helping the Office of Legacy Management (LM) understand the effects of plant growth on engineered disposal cell covers.

Mother Nature fills a vacuum—plant encroachment happens!

Cover designers spread and compacted thick layers of clayey soil over tailings piles to limit both the escape of radon gas into the atmosphere and the seepage of rainwater into the tailings. Designers then used durable, rock riprap to armor the clay barriers and tailings against wind and water erosion.

Plants have found homes on many of LM's rock covers in diverse climates across the country. LM has learned through years of field investigations that many plants send their roots down into the clayey soil layers. The rock riprap acts as a mulch holding rainwater near the soil surface, wetting the clayey soil more than normal, trapping dust and nutrients, and thus creating pockets favorable for plant germination and growth. Ponderosa pine at Lowman, Idaho; Japanese knotweed at Burrell, Pennsylvania; sagebrush at Lakeview, Oregon; rabbitbrush at Split Rock, Wyoming; and fourwing saltbush at Bluewater, New Mexico, are examples of plants that have taken up residence on disposal cell covers.

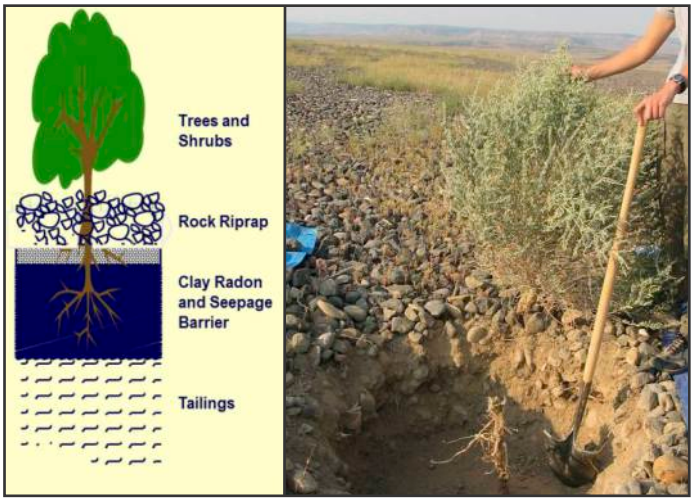

Illustration and excavation of a fourwing saltbush plant rooted in a disposal cell cover.

Plants can be both friend and foe when they grow on LM disposal cell covers. Plant roots can take up rainwater stored in cover soil layers and return it to the atmosphere, a process called transpiration. Plant transpiration, in concert with evaporation of water from cover surfaces (evapotranspiration), can prevent seepage of rainwater into tailings. Plants also aid in erosion protection by absorbing raindrop impact and by aggregating soil particles. Although plant roots take up water and help protect against erosion they also enhance natural soil-forming processes that can leave fine cracks in the clayey soil, potentially increasing radon escape and water seepage. Plant roots may also take up contaminants if they become rooted in tailings.

LM has only a partial understanding of plants on disposal cell covers. The long-

Examples of trees and shrubs growing on rock-armored disposal cells: Ponderosa pine at Lowman (left) and fourwing saltbush at Bluewater (right).

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Goal 4

Fernald Preserve Mini BioBlitzes

A BioBlitz is a blending of both scientific research and education. It's the best of both worlds and involves a subject matter expert to search for and identify species while simultaneously educating the community about each one. BioBlitz attendees walk away from an event with a better appreciation for natural history, the interrelationship of species, and valuing biodiversity.

A BioBlitz is typically a 24-hour species inventory designed to involve the public in helping to locate as many species of flora and fauna as possible.

In 2009, a BioBlitz was held at the Fernald Preserve where 224 visitors participated. In 2011, another expanded BioBlitz was held. Although good information was gathered and new species located, record rainfall during the event prevented a number of inventories from taking place and significantly limited public participation. Only 122 people braved the intermittent thunderstorms during this 24-hour event.

Fernald Preserve staff decided to mix things up a bit this year, and created a series of Mini BioBlitzes. These are 2-hour species inventories conducted at different times throughout each season. The results to date have been amazing!

The success of this program can be measured in two ways. More species are being located because a group of taxa can be searched for during its optimal time of year, and more visitors can participate since surveys are spaced out throughout the season. This greatly enhances the educational component of the program, which has always been a primary goal. One of the most rewarding aspects of presenting these Mini BioBlitzes is the willingness of so many experts to participate and share their knowledge. The wide range of topics allows the public to participate in the programs that most interest them.

Viceroy Butterflies near the Fernald Preserve Visitors Center that could be part of a Mini-BioBlitz.

Mini BioBlitz programs that have already been conducted include: woodland plants, amphibians, reptiles, aquatic life, woodland birds, lichens, mosses and ferns, fireflies, wetland and prairie plants, beetles, butterflies, dragonflies, insects, and spiders.

More than 330 visitors have participated and helped to locate several species never before inventoried at the Fernald Preserve. ❖

As environmental stewards, LM is continually seeking opportunities to protect tomorrow's future. One simple step we can take toward improving environmental consciousness is to distribute the *Program Update* newsletter via e-mail instead of sending a printed copy.

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

Thank you for your assistance.

Goal 1

Construction of MV-6 Well Pad at the Central Nevada Test Area Completed

A new groundwater monitoring/validation (MV) well was installed at the Central Nevada Test Area (CNTA) in September 2013. LM proposed this well to the Nevada Division of Environmental Protection (NDEP) to enhance the existing monitoring network and to expedite the Federal Facility Agreement and Consent Order (FFACO) closure process for the CNTA Subsurface Corrective Action Unit. CNTA is located in Hot Creek Valley in Nye County, Nevada, adjacent to U.S. Highway 6, about 30 miles north of Warm Springs, Nevada. CNTA was the site of "Project Faultless," a test site where a nuclear device was detonated at a depth of 3,200 feet below ground surface by the U.S. Atomic Energy Commission.

The new well (MV-6) is designed to monitor the alluvial groundwater system down gradient of the detonation and have a completion depth of approximately 1,000 feet. Work scope included a cultural resources survey, necessary permits for well installation and water use, constructing the well pad, procuring equipment for well pad construction, pre-fieldwork planning, procuring a drilling subcontractor, and completing the new well by the end of fiscal year 2013.

A cultural resources survey was conducted to ensure that the well pad could be constructed at the location that was agreed to by NDEP. Results from the cultural resources survey indicated that no artifacts were present and supported approval for the construction at the planned location.

After receiving approval, the well pad design was completed, necessary permits were obtained, and field personnel and equipment were mobilized to the site on August 18 to construct the well pad. The well pad was constructed with an infiltration basin that was designed to contain approximately 80,000 gallons of drilling-related fluids and borehole cuttings. Construction water, for compaction purposes and dust suppression, was obtained from an onsite well. Construction activities were completed on August 24, without any incidents and ahead of the scheduled completion date.

The new well will be incorporated into the monitoring and sampling network during the annual sampling event in October. Analytical results and depth to groundwater data will be included in the annual Groundwater Monitoring Report that will be provided to NDEP in early 2014. ❖

Initial grading and construction of the MV-6 well pad, Central Nevada Test Area, Nevada.

Final well pad for well MV-6, Central Nevada Test Area, Nevada.

Goal 4

Flag Raising Ceremony at Grand Junction Office

From time to time it is good to remember what the United States flag represents.

The United States Flag Code specifies that as a symbol of a living country, the flag is considered itself a living thing and should be properly displayed and cared for. In commemoration of events on and after September 11, 2001, the U.S. Department of Energy Grand Junction, Colorado, Office Site Manager, April Gil, and Grand Junction Office of Legacy Management (LM) personnel military veterans, Tim Vanek (U.S. Army) and Debbie Barr (U.S. Air Force), participated in a dedication ceremony to raise a new American flag on a recently-installed flag pole.

The new, 30-foot pole replaced a smaller pole that had been attached to a wall near the LM Grand Junction office site entrance. Dr. Gil expressed appreciation for the flag as a symbol of the freedom we enjoy every day as Americans and as a reminder of the sacrifices made by our military and their families in protecting that freedom.

A quiet but proud dedication took place as the Pledge of Allegiance was recited while participants stood at attention, facing the flag with right hands over hearts, to wit: "I pledge allegiance to the Flag of the United States of America, and to the Republic for which it stands, one Nation under God, indivisible, with liberty and justice for all." ❖

Debbie Barr (left), April Gil (middle), Tim Vanek (right).

Goal 1

Environmental Justice Activities

Community Leaders Institute Held at Savannah State University

Left to right: Community Leaders Institute, Savannah State University panelists Mr. Bent Subbs, Ms. Abena Ajanaku, Mr. Quinton Robinson, and Dr. David Rivers

A Community Leaders Institute (CLI) was held September 6 and 7, 2013, in the King Frazier Student Center at Savannah State University in Savannah, Georgia. Sponsors included the Medical University of South Carolina, South Carolina State University, Savannah State University, Southeastern Virtual Institute for Health Equity and Wellness, the U.S. Department of Energy, and the U.S. Department of Defense.

CLI focuses on the unique relationship between environmental protection, human health, environmental justice, and economic development. The topics discussed at this CLI included the role of federal, state, and local governments; the challenges experienced by community youth and the development of resources to meet those challenges; creating a plan to stimulate the retention, expansion, and attraction of businesses and economic development to the community; and health disparities and health issues.

The purpose of CLI is to help community leaders learn more about accessing and obtaining the information necessary for making good decisions and communicating that information to the citizenry.

Over 300 participants attended this CLI. ❖

Congressional Black Caucus Foundation's 43rd Annual Legislative Conference

The Congressional Black Caucus (CBC) held an Environmental Justice (EJ) Braintrust during the 43rd Annual Legislative Conference on September 20, 2013, in Washington, DC. During this conference, lawmakers, stakeholders, and concerned citizens came together to examine critical issues impacting African Americans. This year's EJ Braintrust focused on the implementation of Executive Order 12898, which was issued in 1994 to address EJ issues in minority and low-income populations. The EJ Braintrust also addressed how far we have come and how far we still have to go and the unique relationship between human health, EJ, and economic development, and how to improve the quality of life in challenged communities nationwide.

Panelists at this year's CBC included the U.S. Department of Energy EJ Program Manager, the U.S. Environmental Protection Agency Administrator and Chair of the Interagency Working Group on EJ, representatives from the grass roots and tribal community, industry, and private sector. ❖

SAVE THE DATE

2014 National Environmental Justice Conference and Training Program

Howard University School of Law
2900 Van Ness Street, NW, Washington, DC 20008

Washington Marriott at Metro Center
775 12th Street, NW, Washington, DC 2005

To volunteer, or for sponsorship opportunities and additional information, contact Lloyd Moore, Conference Coordinator, at email@thenejc.org or Melinda Downing, U.S. Department of Energy Environmental Justice Program Manager, melinda.downing@hq.doe.gov

www.thenejc.org

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Environmental Justice Activities

DOE Participates in Teaching Radiation, Energy, and Technology (TREAT)

Representatives of the U.S. Department of Energy (DOE) Environmental Justice Program participated in a TREAT workshop sponsored by Savannah State University and the DOE Savannah River Site (SRS) in Aiken, South Carolina, July 22 through 24, 2013. The goal of the TREAT Workshop is to educate kindergarten through 12th grade math and science teachers and local community leaders who reside near the SRS facility about radiation, sources of radiation, radioactive waste management, the effects of radiation on environmental health, and the impact of environmental radiation exposure to humans. The workshop is designed to educate the teachers so they can take the radiation education message to their students and ultimately to the community.

One of the workshop highlights was an announcement made by Mrs. Leona B. Guyton, a local elementary school arts teacher who had applied for, and received, an Innovative Teaching Mini Grant from Savannah River Nuclear Solutions (SRNS). This grant was awarded from the topic, "STEM + Arts = STEAM—Tessellations? A Familiar Association through Technology-Yupik."

Mrs. Guyton stated that an advocacy for the arts, and an interesting editorial regarding the importance of integrating the arts into the curriculum, inspired her to write the SRNS Innovative Teaching Mini Grant. After reading an article in *Art Education* regarding Science, Technology, Engineering, and Math (STEM) +Art, Mrs. Guyton's instinct was to "utilize this study as a basis for writing the grant. It is important to note according to the new version of *Bloom's Taxonomy*, creating is considered the top level of high order thinking skills. Designing, composing, and creating are familiar words with the arts and therefore acknowledging the significance of the arts and how they can enhance learning is gratifying. Many industries are looking for innovative ways to manufacture or create new products. As an arts teacher there are many challenges to displaying how the arts are important and through successful grant writing, demonstrate how collaborative skills can produce extraordinary innovations." ❖

Teachers, students and community participants at the TREAT Workshop.

Save the Date

THE SEVENTH ANNUAL
CONFERENCE ON
HEALTH DISPARITIES

Reducing Health Disparities Through Sustaining and Strengthening Healthy Communities.

November 13–16, 2013
St. Thomas, U.S. Virgin Islands
Register at: www.nationalhealthdisparities.com

Goal 2

Data Safer than Ever with FM-200 Installation

The consolidated data center at the Legacy Management Business Center (LMBC) in Morgantown, West Virginia, is now guarded by a state-of-the-art FM-200® Fire Suppression System. Installation of the new system began on June 11, 2013, and the system became operational on July 18.

The "Clean Agent" system offers several advantages over traditional fire suppression. FM-200 is a clean, colorless, and environmentally friendly fire suppressant that is electronically non-conductive and safe for humans. The fire suppression system extinguishes flames primarily through heat absorption and is safe for use in occupied areas. It leaves no residue, minimizing system downtime and cleanup costs in the event of a fire. The U.S. Department of Energy (DOE) and the LMBC also chose a patented rupture disc valve design for the storage and delivery system of the FM-200, because it offers flexibility, effectiveness, safety, and speed.

In the unlikely event of an FM-200 failure, the original water-based fire suppressant system is still operational.

Because the FM-200 is environmentally friendly, it supports the DOE Office of Legacy Management's (LM) second goal, to "protect human health and the environment." Chlorofluorocarbons, or "CFCs," Halons, and other chemicals used in many fire suppression systems have long contributed to the destruction of the vital ozone layer of the earth's atmosphere.

Non-ozone-depleting HFC-227ea, a Clean Agent fire suppressant trademarked by DuPont as FM-200, safeguards people and vital assets from fire while still protecting the precious ozone layer. FM-200 systems are also designed to discharge in less than ten seconds, decreasing the atmospheric impact of release. The system is also recognized by the United States Green Building Council as Leadership in Energy and Environmental Design–certified.

With the addition of the FM-200 fire suppression system, LM personnel, critical assets, and data are protected from fire better than ever before. ❖

Goal 1

LM Support Contractor Receives VPP Award

From left to right pictured are Jim Siler and Karen Voisard, Stoller, and Brad Davy, DOE, HSS.

The S.M. Stoller Corporation (Stoller) Legacy Management Support (LMS) Team was awarded the Voluntary Protection Program (VPP) Star of Excellence at the 29th Annual Voluntary Protection Program Participants' Association (VPPPA) Conference in Nashville, Tennessee, on August 25, 2013. Jim Siler (Stoller LMS Safety and Health Manager) and Karen Voisard (Stoller LMS VPP Lead) accepted the award on behalf of the LMS Team from Bradley Davy, U.S. Department of Energy (DOE) Office of Health, Safety and Security (HSS) Director for the Office of Worker Safety and Health Assistance.

VPP promotes safety and health excellence through cooperative efforts among employees, management, and DOE. There are three levels of recognition; STAR, MERIT, and DEMONSTRATION. Contractors whose programs meet the requirements for outstanding safety and health programs receive STAR recognition, the highest achievement level. The Star of Excellence is awarded to those companies that achieved reporting injury rates and lost workday injury rates that are at least 75 percent below the Bureau of Labor Statistics national average within the industry. Star of Excellence award winners also demonstrate significant VPP mentoring and community outreach efforts. The LMS Team received this award in their first year of VPP eligibility. ❖

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LM Work Progresses on Defense-Related Uranium Mines Report to Congress

More information about the report to Congress is available on LM's website at www.lm.doe.gov/AUM. To submit questions, comments, or information about defense-related legacy uranium mines, please e-mail AUM@lm.doe.gov.

All input is welcome and appreciated. ❖

Remnants of Lucky Lass Mine, a large open-pit uranium mine, in the mining area of Lake County, Oregon.

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Weaving Community and Science

term benefits of vegetation on covers might outweigh the detriments at some sites but not at others. Understanding the plants on covers on a site-by-site basis will aid vegetation management decisions.

University of Arizona Master of Science graduate, Carrie Joseph (center), her daughter, Kara (far right), and her parents, Charlene and Harold.

Weaving family, community, and science

Ms. Joseph is an active member of Hopi communities in northeastern Arizona. Her evolving perspective of LM's stewardship responsibilities weaves together threads of traditional Hopi environmental values, experience interacting with LM personnel, and the objectivity of a scientist working to help LM answer pertinent and often complex questions that will help LM understand the effects of plant growth on engineered disposal cell covers.

Through her upbringing and the teachings of her family and tribal elders, Ms. Joseph embraces the deep Hopi sense of perpetual interconnectedness with the forces and cycles of nature. Often, after a week of classwork, lab work, and research at the Tucson, Arizona, campus, she and her daughter return home for the weekend to participate in ancient Hopi ceremonies that celebrate an intimate human contact with nature, and in Hopi rituals that strive to keep daily activities and natural forces in harmonious balance.

Ms. Joseph's village community, Moenkopi, sits a few miles from LM's Tuba City, Arizona, Disposal Site. Since childhood, Ms. Joseph had concerns that groundwater contamination from the site was harming her community. She learned otherwise through discussions with her LM hosts and her review of groundwater monitoring reports. "LM has been a great support to my understanding of the environmental problems near Native American communities," says Ms. Joseph. She is grateful to LM "for the opportunity to contribute," and hopes that she has influenced "the development of environmental programs that acknowledge traditional perspectives."

What Ms. Joseph's research is showing LM about plant uptake

Ms. Joseph's research of the uptake of contaminants by plants rooted in disposal cells encompasses both reviews of scientific literature and field investigations. She learned that the scientific literature alone does not provide adequate answers about plant uptake.

Ms. Joseph helped design a field investigation of plant uptake on LM disposal cells located in the proximity of Native American communities. She sampled stem and leaf tissues of deep-rooted plants growing on disposal cells. For comparison, she also sampled the same plant species growing at control sites with soils that were similar to the disposal cell cover soils, but without tailings-related contaminants of concern. She then prepared samples in LM's Environmental Sciences Laboratory in Grand Junction for analysis at the University of Arizona.

Disposal Cell	Plants
Bluewater, New Mexico	Fourwing saltbush, Siberian elm
L-Bar, New Mexico	Fourwing saltbush, rubber rabbitbrush
Tuba City, Arizona	Fourwing saltbush, kochia
Split Rock, Wyoming	Rubber rabbitbrush
Lowman, Idaho	Ponderosa pine, redosier dogwood
Lakeview, Oregon	Big sagebrush, antelope bitterbrush
Sherwood, Washington	Ponderosa pine, antelope bitterbrush

LM disposal cells and plant species for Ms. Joseph's study.

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Weaving Community and Science

Ms. Joseph's Master of Science thesis focused on results from the Bluewater and L-Bar, New Mexico, disposal sites. Her preliminary results show that for some tailings-related contaminants, levels were higher in plants growing on disposal cells, but for others, levels were higher for plants growing at control sites. Ms. Joseph has decided to continue her graduate studies to better understand the variability in her results, to investigate long-term bioaccumulation processes at these and other LM sites, and to evaluate potential environmental consequences.

Sustainable remedies—the perspective of a Hopi scientist

Ms. Joseph views the sustainability of LM remedies, such as the Tuba City disposal cell, through the lenses of science, community, and Hopi tradition. Her village of Moenkopi was founded in the late 1800s by residents of nearby Old Oraibi as a summer farming community irrigated from local springs. Old Oraibi dates back almost 1,000 years—possibly the oldest continuously inhabited community in the United States. In her words, "understanding the remediation efforts is increasingly important because our community is permanently fixed within a reservation boundary. Furthermore, as Native Americans, we have the stewardship responsibility to ensure our lifestyle continues for generations."

Ms. Joseph hopes to contribute to this effort by combining "my educational background and traditional upbringing," and by combining "modern science and traditional ecological knowledge to define effective and sustainable management practices for the future." Ms. Joseph says scientific knowledge and traditional knowledge "are equally important" as we evaluate the sustainability of LM remedies. After all, she says, "traditional knowledge has allowed our communities to survive under normal to the most-harsh environmental conditions for centuries." ❖

LM contractor Sara Woods (left), and Carrie Joseph sampling fourwing saltbush on the Tuba City disposal cell.

Carrie Joseph preparing plant tissue samples for laboratory analysis.

Goal 5

LM Welcomes New Employees

Karen Lively joined the U.S. Department of Energy (DOE) Office of Legacy Management (LM) on July 15, 2013, as a staff assistant for the Grand Junction, Colorado, office site as part of the Administrative/Human Resources (HR) team. Prior to joining DOE-LM, Karen worked for the U.S. National Forest Service Collbran Job Corps Center, where she worked with disadvantaged youth and mentored over 48 male students, ages 16 through 24.

Karen can be reached at (970) 248-6002 or Karen.Lively@lm.doe.gov.

Patricia Walters joined DOE-LM as a staff assistant at the Morgantown, West Virginia, office, and is part of the Administrative/HR team. Before coming to work with LM, Patricia was employed with the Natural Resources Conservation Service (part of the U.S. Department of Agriculture). She also worked for the U.S. Postal Service and the National Credit Union Administration.

Patricia joined the U.S. Air Force in June 1986, where she worked as a pneudraulics systems specialist and a reprographics system specialist. She earned her bachelor's degree in accounting from West Virginia University.

Patricia can be reached at (304) 413-0812 or Patricia.Walters@lm.doe.gov. ❖

Goal 4

LM Recognizes the Business Incubator Center of Grand Junction

The Business Incubator Center—One of 7,000 Incubators in the World—Wins Incubator of the Year

The Business Incubator Center of Grand Junction, Colorado, at the U.S. Department of Energy Office of Legacy Management site, was a primary tenant as part of the site's transfer to private ownership, and is an example of successful site reuse. The incubator occupied a number of buildings at the site before the property was transferred in 2001, and continuously since the transfer.

During the National Business Incubation Association (NBIA) International Conference in Boston, Massachusetts, the Business Incubator Center received the Dinah Adkins Incubator of the Year award in the General and Special Focus categories. NBIA is the world's leading organization advancing business incubation and entrepreneurship. Each year, the NBIA Incubation Awards honor the business incubation programs, graduates, and client companies that exemplify the best in the industry.

The Business Incubator Center in Grand Junction was named Incubator of the Year in the Industrial and Services Categories in 1995–1996 and is listed as an NBIA Best Practice program. Their mission is to support the launch, growth, stabilization and long-term success of business enterprises. Success is measured by the ability to guide entrepreneurs through sound business decisions and to make a positive influence on economic growth in the region. Over their 25 year history, this structure has generated powerful results, including:

- the launch of more than 260 companies
- the generation of more than $156 million in revenue by these companies
- the funding of more than 330 businesses in the community
- the creation of approximately 10,461 jobs
- the investment of over $58.5 million in capital

For more information about the Business Incubator Center of Grand Junction, please visit www.gjincubator.org. ❖

Goal 1

Injection of Emulsified Soybean Oil at the Pinellas County, Florida, Site

Emulsified soybean oil and the microorganism *Dehalococcoides mccartyii* were injected into 46 subsurface locations at the 4.5 Acre Site in Pinellas County, Florida, in July 2013. The objective of this work was to enhance the anaerobic biodegradation of chlorinated contaminants.

The project used 2,290 gallons of emulsified soybean oil. The oil was diluted with municipal tap water at a 9:1 water-to-oil ratio to maximize distribution in the subsurface, resulting in a total injected volume of approximately 22,900 gallons. A drilling subcontractor used a direct-push rig to inject the oil and the microorganism under supervision by S.M. Stoller Corporation personnel.

The diluted oil mixture was injected through a 4-foot section of perforated rod. Each injection point received about 500 gallons of oil mixture in five 4-foot increments over a 20-foot interval, to depths between 8 and 28 feet below land surface.

Injection pressure generally ranged from 40 to 70 pounds per square inch, with an average of about 55 pounds per square inch. Injection flow rates ranged from 4 to 12 gallons per minute, with an average of 8 gallons per minute.

The microorganism was mixed with the oil in 55-gallon plastic drums. The microorganisms die in the presence of oxygen, so drums were constantly purged with nitrogen to preclude exposure of the microorganisms to oxygen. The municipal tap water was treated to remove dissolved oxygen before being used to dilute the oil.

The soybean oil ferments and produces molecular hydrogen, and the microorganism uses electrons from the hydrogen to break bonds on the contaminant molecules, resulting in innocuous end products. ❖

Top photo: A subcontractor uses a direct-push rig to inject the oil and microorganism mix.

Bottom photo: The microorganism and soybean oil were mixed in 55-gallon plastic drums.

Goal 1

LM Security Guard Saves Life

It was a typical 3:00 p.m. pick up at the Legacy Management Business Center (LMBC) in Morgantown, West Virginia, when the FedEx truck arrived at the gate. The driver knew the routine: stop and wait while his truck was inspected by LMBC security guards.

As security guard Tony Reinhardt rounded the white delivery truck, he noticed driver James "Jamey" Ranajvk spitting water and gasping for air. Tony's first reaction was to ask Jamey if he was choking. With his hands around his own throat, Jamey, unable to utter a word, nodded his head up and down. At that moment, Tony slid behind Jamey, wrapped his own hands around Jamey's stomach, and began thrusting inward and upward. It took two tries before the object ejected from Jamey's throat.

The culprit was a vitamin. When Jamey pulled up to the gate, he popped a vitamin into his mouth and took a big gulp of water. Instead of the vitamin sliding easily down his throat, it turned sideways and became stuck. The water and the lodged vitamin instantly blocked Jamey's airway.

Tony's quick thinking saved Jamey's life. Tony knew and successfully implemented the Heimlich Maneuver, a life-saving abdominal thrusting technique for dislodging foreign obstructions of the airway.

According to the website wikiHow (http://www.wikihow.com/Perform-the-Heimlich-Maneuver), the Heimlich Maneuver is performed by following these steps:

1. Determine if the person is a choking victim.
2. Reassure the victim immediately that you're going to help him or her.
3. Get the victim in a standing position.

FedEx driver James "Jamey" Ranajvk thanks LMBC Security Guard, Tony Reinhardt for his assistance when he was choking.

4. Perform back blows (striking the victim's back with the base of the palm) before proceeding to use the Heimlich Maneuver.
5. Stand behind the victim.
6. Perform the Heimlich Maneuver by wrapping your arms around the victim's abdomen, placing one closed fist wrapped by the other open hand at the base and thrusting inward and upward as though you are attempting to lift the person.
7. Check to see if normal breathing has returned.
8. Call for help immediately if you fail to dislodge the obstruction.

By knowing how to properly perform the Heimlich Maneuver, Tony was able to prevent a tragedy. Taking a few moments to become familiar with the rescue technique could enable you to save a life, too. ❖

Anticipated Legacy Management Sites Through FY 2020

Continued from page 3

Water Monitoring Flume Replacement at the Rocky Flats Site

flume to the previous flume location, this monitoring location will continue to be identified as GS10 and no changes to the tables or figures in the regulatory documents that relate to GS10 are needed.

Excess soil generated by grading the area downstream of the diversion structure and clean, imported fill was used to raise the elevation of the area upstream of the diversion structure to above the current head gate elevation. Pieces of the current GS10 flume, pipes, head gates and associated hardware, and concrete that were removed are being properly managed as waste, or recycled if eligible for recycling. ❖

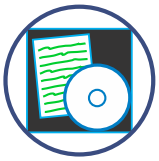
The new GS10 surface water monitoring location with automated sampling equipment installed. The coffer dam used to retain stream flows is visible to the left.

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.

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Office of Legacy Management

Program Update

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