



# HANFORD FORWARD



COVER STORY **SITE-WIDE**

## Managing **REAL PROPERTY** on Site

**RIVER CORRIDOR**

Washington Closure  
Transforms 300 Area

**TANKS**

New Retrieval Equipment  
Installed in Single-Shell Tank

# ABOUT HANFORD



The Richland Operations Office (RL) oversees cleanup along the Columbia River and in Hanford's Central Plateau, including groundwater and waste site cleanup, management of solid waste, spent nuclear fuel and sludge, facility cleanout, deactivation and demolition, environmental restoration, plutonium management, and all site support services.



CH2M HILL Plateau Remediation Company (CH2M HILL) is the prime contractor for the safe, environmental cleanup of the Central Plateau at the Hanford Site. This task includes decommissioning and demolishing the Plutonium Finishing Plant that once stored secret material for the nation's defense, cleaning up plumes of contaminated groundwater beneath the site, and removing highly radioactive "sludge" away from the Columbia River.



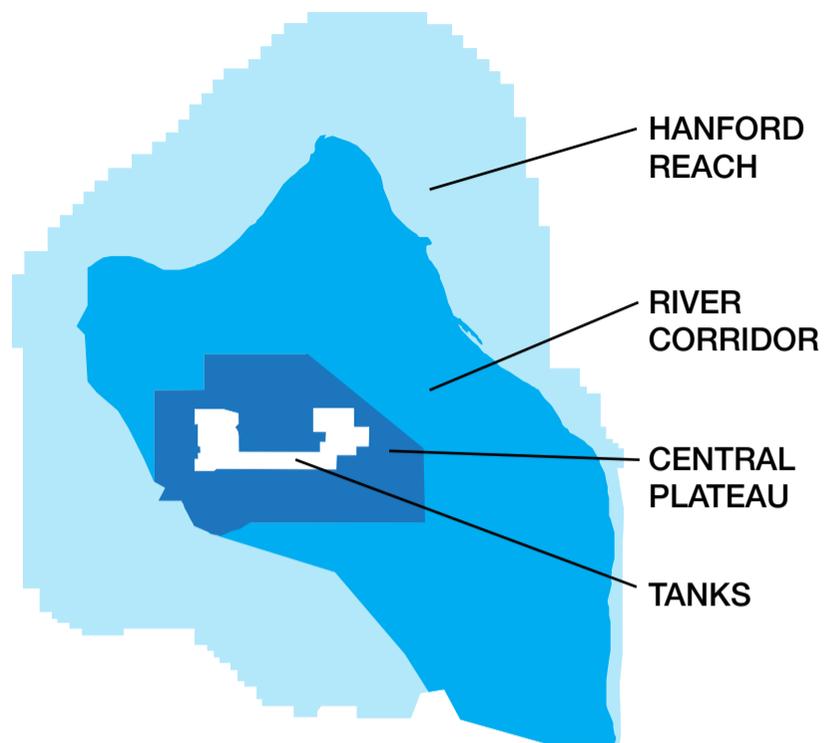
HPMC Occupational Medical Services (HPMC OMS) provides occupational medical services to the Department of Energy and Hanford prime contractors and subcontractors. HPMC OMS has clinics in Richland and in the 200 West area of the site and is responsible for the medical surveillance, medical qualification, health, and wellness needs of more than 7,500 Hanford workers.



A joint venture between Lockheed Martin, Jacobs Engineering and WSI, Mission Support Alliance (MSA) is responsible for safely and effectively managing and operating the infrastructure of the Hanford Site. MSA provides an array of services, including training, site security, roads and utilities, logistics and transportation, information resources, information technology and other services, enabling Hanford contractors to focus on their cleanup efforts.



Washington Closure Hanford (WCH) manages the 220-square-mile River Corridor Closure Project for the Department of Energy's Richland Operations Office at the Hanford Site. The project is the largest environmental cleanup closure project in the nation. Washington Closure, owned by URS, Bechtel and CH2M HILL, is responsible for demolishing 320 contaminated buildings, cleaning up an estimated 590 waste sites, placing two former plutonium production reactors and one nuclear facility in interim safe storage, and managing the Environmental Restoration Disposal Facility.



The Office of River Protection (ORP) is responsible for the retrieval, treatment and disposal of Hanford's 56 million gallons of radioactive tank waste, currently stored in 177 underground tanks in the central part of the site. In support of this mission, ORP manages the Tank Operations Contract and the Waste Treatment & Immobilization Plant Project.



Advanced Technologies and Laboratories (ATL) International, Inc. is an award-winning technology, engineering, scientific, and project management services provider to the U.S. Department of Energy. ATL operates the 222-S nuclear laboratory that is fully compliant with the most stringent business, safety, health, quality, and technical requirements in the country. In 2008, ATL was awarded DOE's Voluntary Protection Program (VPP) Star award for outstanding health and safety performance at the Hanford Site.



Bechtel National Inc. (BNI) is the prime contractor and URS, Inc. is the major subcontractor, to design, construct, and commission the DOE Waste Treatment Plant (WTP) at the Hanford Site. This mammoth construction project is the largest of its kind in the world. When complete, WTP will be used to transform the 56 million gallons of radioactive and chemical wastes being stored in underground tanks at Hanford into a stable glass form for permanent disposal.



Maintaining the underground waste storage tanks at Hanford falls under the jurisdiction of Washington River Protection Solutions (WRPS). This organization is responsible for storing and retrieving the approximately 56 million gallons of nuclear and chemical waste stored in these tanks at the Hanford Site. WRPS is owned by URS Corporation and Energy Solutions, with AREVA as the primary subcontractor.



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# MANAGING REAL PROPERTY ON THE HANFORD SITE

Facilities Information Management System



*“With many buildings being vacated and demolished at Hanford, management of real property to meet ongoing mission needs creates unique challenges and plays an important part of the DOE mission for cleanup of the Hanford Site.”*

Clark Stolle, MSA Director of Land and Facilities Management

Currently, DOE has ‘real property’ holdings totaling more than 2.3 million acres and 115 million square feet of facilities.

Real property includes land, improvements on the land, or both. So, anything permanently affixed to the land such as buildings, fences and building fixtures are considered real property assets.

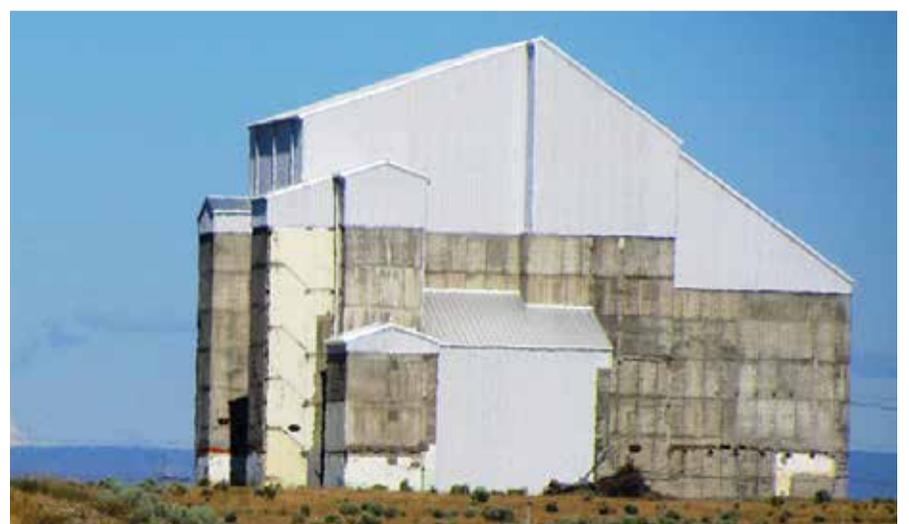
DOE tracks and manages this data using the Facilities Information Management System (FIMS).

A key responsibility for the Mission Support Alliance (MSA), the Hanford Site facilities and integration contractor, is Land and Facilities Management (L&FM). MSA is responsible for managing more than 586 square miles of Hanford site land, including close to 8 million square feet of structures and facilities for DOE-RL and ORP. These structures and facilities range from those dating from the pre-Hanford era that remain on site and cocooned reactors to more recent construction like the LEED Gold-certified Pump and Treat Facility in the 200 Area, which was designed, built and is now operated by CH2M Hill Plateau Remediation Company (CH2M HILL) (photo on page 4).

DOE relies on information contained within FIMS for making daily management decisions as they relate to utilization, disposition, condition, mission dependency, and maintenance. Additionally, FIMS directly supports other aspects of DOE Order 430.1B, including the Ten-Year Site Plan, which is a planning document for real property in support of DOE’s overall strategic plan, and the Long Term Stewardship program.

Annually, the FIMS data undergoes a three- to four-day validation conducted by DOE to assess the process of obtaining the data and the accuracy of the data. At Hanford, a random generator selects 50 managed assets from the more than 1,300 assets on the site. Generally, the first validation day focuses on buildings, trailers and other structures and facilities. The second and sometimes third validation day focuses on land and DOE-leased items. On the last day, validators are in the field assessing how well the data matches the actual assets. Validators review 48 of the current 148 data fields for each asset during the validation, using a red, yellow and green scorecard to assess how well the site is managing the data.

Information populated into FIMS is obtained from a variety of sources, including Hanford contractors, other Hanford databases (Caretaker, Hanford Site Structure List, Sunflower, Condition Assessment Surveys) and other MSA organizations (Site Sustainability Group). ■



Cocooned F Reactor

# Washington Closure – Transforming the 300 Area



During September 2013, WCH employees work simultaneously on the 326 (left) and 3760 demolition projects in Hanford's 300 Area.

The 300 Area was the center of Hanford's radiological research and nuclear fuel fabrication activities during World War II and the Cold War. Nearly every step in the plutonium-production process was first tested in the 300 Area, resulting in highly contaminated facilities and waste sites.

Only a few of the structures scheduled for demolition in the 300 Area remain and demolition work is scheduled for completion in the spring. Recently, the 3760 and 326 Buildings were demolished. Years of planning went into the careful and precise execution of these demolition projects with the safety of the workforce and public in mind.

Built in 1952, the 3760 Building most notably housed the Hanford Technical Library. The library consisted of 200,000 unclassified documents in 1964 and grew to more than 800,000 documents in the 1990s when many were declassified. The large open room on the main floor housed open stacks much like a public library; however, the first floor was also home to a storage vault that contained up to 161,000 classified documents. Washington Closure Hanford (WCH) was the last company to occupy the space.

Built in 1953, the 326 Building is remembered as the Material Sciences Laboratory. The central mission of the laboratory was the support and study of reactor components and fuel elements. The most intense radioactive work was done in the first two years of operation.

*“Our entire team has done an impressive job safely accomplishing some of the most hazardous work on the Hanford Site. The overall progress in the cleanup of the 300 Area has been highly visible and rewarding. There are still some challenges ahead to get us across the finish line, but I’m very confident that our team has the experience and knowledge to meet those challenges.”*

Ruben Trevino, 300 Area Manager



Heavy equipment is used to strategically demolish and remove a HEPA filter from the 326 Building.



The above-ground remnants of the 3760 Building are in the foreground with the demolition of the 326 Building behind it.

Perhaps the biggest challenge associated with both buildings was the asbestos abatement and removal work needed to prepare the buildings for demolition. The 3760 Building had more than 10,000 square feet of transite asbestos paneling located in the walls of the building. Precautions associated with an asbestos regulated area were taken to ensure the safety of the personnel and the environment.

The transformation of the hazardous 300 Area from a radiological research and nuclear fuel fabrication site to a sparsely populated industrial area is a reflection of the tremendous progress made by the WCH’s River Corridor team. Since 2005, WCH has made tremendous progress throughout the 220-square mile River Corridor, safely demolishing 293 contaminated facilities and remediating 442 waste sites. ■

*“Our team at WCH has taken personal ownership in developing a great safety culture where every team member is encouraged to have a questioning attitude and be part of the solution.*

*The key to our success is our people! Every step of the way they are engaged and resourceful. I feel honored to be part of such a dedicated and professional team.”*

Ruben Trevino, WCH 300 Area Manager



# WTP to use Robots

While there are no Transformers hiding at the construction site, Waste Treatment Plant (WTP) facilities will feature two types of specialized robots to help turn 56 million gallons of radioactive and chemical waste into stable glass logs.

WTP robots are mechanical devices capable of performing complex actions on command or by advanced programming. WTP will feature autonomous and nonautonomous robots to perform various tasks in the Low-Activity Waste (LAW) and High-Level Waste (HLW) facilities during the vitrification process.

Autonomous robots are programmed to do a specific job, similar to the ones you see in car commercials. There will be seven autonomous robots in the LAW and HLW facilities to perform canister swabbing and decontamination.

The autonomous robots are customized for use at WTP. For example, most of the autonomous swabbing robots are used in the auto industry, but have been modified for use in the WTP environment.

Nonautonomous robots require an operator to control their actions. WTP operators will use about 70 nonautonomous robots, including through-wall manipulators.

The manipulator operators will perform maintenance and change-out of equipment in the Analytical Laboratory and Pretreatment, LAW and HLW facilities. The nonautonomous wall-mounted manipulators are off-the-shelf products manufactured in Minnesota and are used in 25 countries around the world that employ nuclear technology. ■



Autonomous and nonautonomous robots will be used to perform tasks in WTP facilities during operation.

# Firefighters *HONE* Medical Air Transport Landing Zone *SKILLS*

Hanford Fire Department (HFD) received medical air evacuation landing zone training at the Emergency Vehicle Obstacle Course (EVOC) located on the HAMMER Federal Training Center. Northwest MedStar, a local critical care transport service, provided the classroom instruction and crew.

While Hanford's firefighters have been involved in several mock trainings with MedStar over the years, this was the first 'official' classroom training. "This forum allowed us to provide more focused training in a non-emergency setting," said HFD Lieutenant Anthony Lovato, Jr., who was responsible for setting up and coordinating the training with MedStar.

During the classroom portion, firefighters learned how to activate an air transport call and to safely select and mark a landing zone for the pilot. They also were instructed on how best to direct a helicopter to the scene and provide landing zone information, as well as the basics involved in helicopter hazards and safety.

The second half of the training placed attendees outside as the MedStar helicopter flew in from its hangar base. The crew, comprised of a pilot, a registered nurse, and a respiratory therapist, gave participants a firsthand look and overview of the aircraft and explained the importance of obtaining certain information from emergency responders such as terrain, electric lines in the area and where to land.

"This is great training for our guys," said Lovato. "This training and exposure allows Hanford's firefighters and emergency medical services personnel to shorten the ground time for MedStar, providing better patient care and increases the safety awareness of our crews. Not everyone has been on a call involving medical air transport, so this gives them a better idea of what to expect and to learn what is expected of them on these kinds of calls." ■



Hanford firefighters spent time with Northwest MedStar staff to hone their landing zone safety skills for medical airlift evacuations. Pictured are HFD Firefighters Lester (Shag) Williams (left) and Kyle Lockhaven.



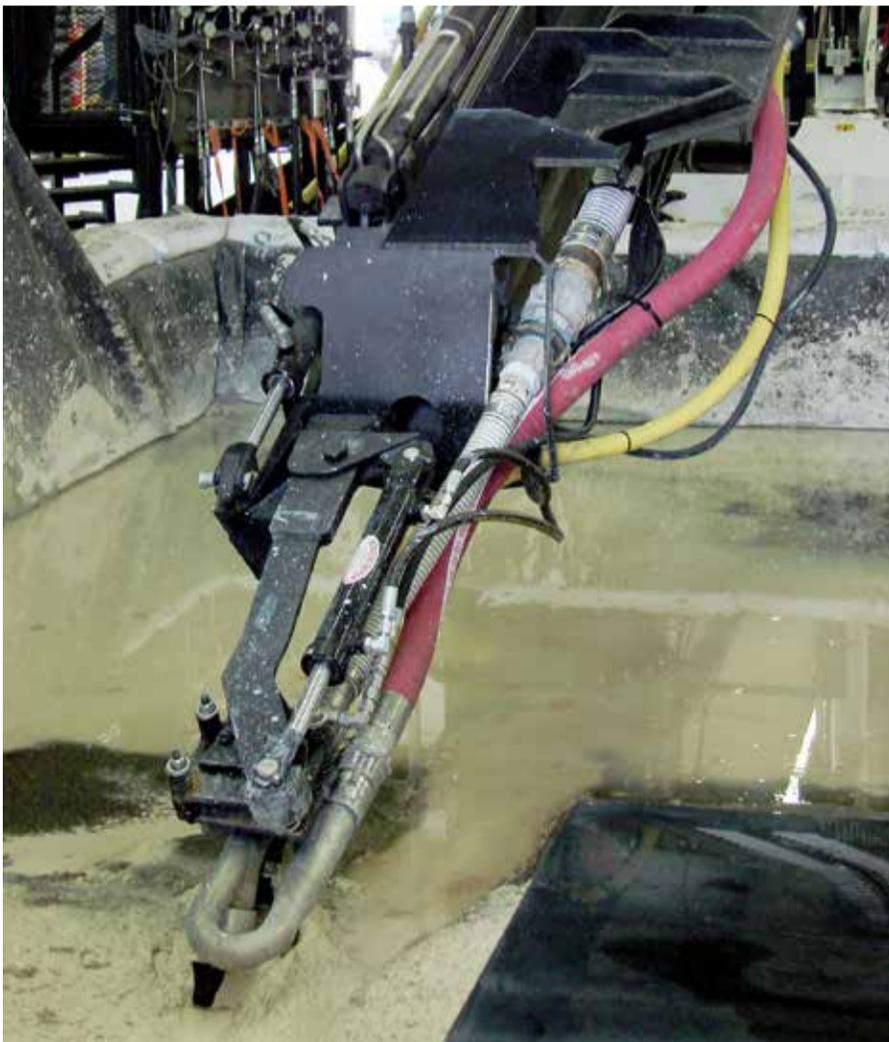
Hanford firefighters listen to MedStar's onboard flight nurse and respiratory therapist on what they need to know about the patient before they arrive on scene.

# New Retrieval Equipment Installed in Hanford Single-Shell Tank

Crews successfully installed vital components of the MARS Vacuum into Tank C-105, paving the way for upcoming waste-retrieval activities.

Crews for Washington River Protection Solutions (WRPS) successfully installed new waste-retrieval equipment in one of Hanford's underground storage tanks.

Vital components of the Mobile Arm Retrieval System Vacuum (MARS-V) have been lowered into Tank C-105.



Initial testing of the MARS Vacuum has shown it is capable of removing sludge, rocks, sand and the hard-packed waste found at the bottom of some tanks.

Workers inserted the arm, strong back, the end effector and wrist assembly. These are the core pieces of the waste-retrieval system that will be used to begin removal of more than 132,000 gallons of waste from the tank.

*“During mockups, this was the most challenging part of the installation with the highest exposure risk. The installation crew performed well—building on the training they did at the Columbia Energy Cold Test Center—and got the equipment in with minimal risk.”*

Gary Hopkins, WRPS Single-Shell Tank Retrieval & Closure Construction Manager

The equipment was installed through a 47-inch riser placed inside a 55-inch diameter hole cut into the dome of C-105.

## **MARS Vacuum**

The MARS-V is equipped with a waste vacuum system, rather than a sluicing system, to limit the liquid added to the tanks. The system will use recycled liquid waste in a closed loop to create a vacuum to suck up the waste. If it hits a hard layer of waste below the sludge in the tank, it will use a high-pressure water nozzle to break up the waste, with the water quickly vacuumed up.

During testing, the MARS-V demonstrated it can remove sludge, rocks, sand and the hard-packed waste found at the bottom of some tanks. ■

# GREEN LIVING EVENT AWARD



CH2M HILL Plateau Remediation Company (CH2M HILL) hosted its second zero-waste employee picnic in September 2013 and successfully diverted 98 percent of the waste from landfills. The goal was to reduce and reuse the amount of waste generated at the event using the company's environmental and pollution prevention principles. The result was 1,700 pounds of trash being diverted from local landfills—80 bags of trash reduced to two bags! ■



The City of Richland, Washington awarded CH2M HILL Plateau Remediation Company with a Green Living Event of the Year award for hosting a zero-waste employee picnic. A total of 95 percent of the waste (more than 1,200 pounds) generated by 2,800 attendees was diverted from local landfills at the event in 2012. The company's second zero-waste picnic in 2013 successfully diverted 98 percent of the waste from landfills.

To see a video of the event, navigate to <http://www.youtube.com> and enter **CH2M Green Living Event Award**.

# Hanford Site SHARES LESSONS LEARNED in Retrieving Highly Radioactive Material

CH2M HILL Plateau Remediation Company (CH2M HILL) welcomed the Oak Ridge National Laboratory Transuranic Program Team from Tennessee to the Hanford Site to share lessons learned in the retrieval and processing of highly radioactive material, called sludge.

*“Nuclear sites like Hanford and Oak Ridge were once part of a similar mission and now have similarly challenging wastes. The consistency of waste streams like sludge may be somewhat unique to sites, but many of the solutions we have used, and are planning to use, can be of benefit to other sites. We are glad to share our lessons learned and best practices across the DOE complex to help further the overall cleanup mission.”*

Ty Blackford, Vice President of Decommissioning, Waste, Fuels and Remediation Services for CH2M HILL

Just 400 yards from the Columbia River, which flows through the Hanford Site, approximately 30 cubic meters of sludge is stored under water in an aging reactor basin. Thirty cubic meters is approximately equal to the size of a 20-foot cargo shipping container. DOE and CH2M HILL have been working together to develop a better understanding of the sludge and developing and testing the best engineered approach to remove, treat, package the sludge for interim storage and final disposition in the future. Much of this process is in final demonstration testing at this time.

The Oak Ridge team selected the Hanford Site because Hanford is leading the way by developing technology to solve the complex challenge of retrieving this highly radioactive sludge. They visited the Hanford Site to find potential solutions since both groups are dealing with similar problems.

The team visited the Maintenance and Storage Facility (MASF), an excess storage facility where CH2M HILL constructed a full-scale replica of the reactor basin that contains the sludge. CH2M HILL workers at the facility design, develop, test, and train for sludge retrieval, mastering the retrieval tools, processes and techniques



The Oak Ridge National Laboratory Transuranic Program Team observes a mock-up reactor basin at the Hanford Site where CH2M HILL is testing equipment that will be used to retrieve highly radioactive sludge.

for final sludge retrieval in a safe, radiologically clean environment. The team met with CH2M HILL workers who are designing, constructing and training with the equipment and systems that will be used in the actual basin to retrieve sludge. ■



The Oak Ridge National Laboratory Transuranic Program Team observes equipment that will be used to retrieve highly radioactive sludge. This pump was modified to fit the underwater environment where the sludge is currently stored.



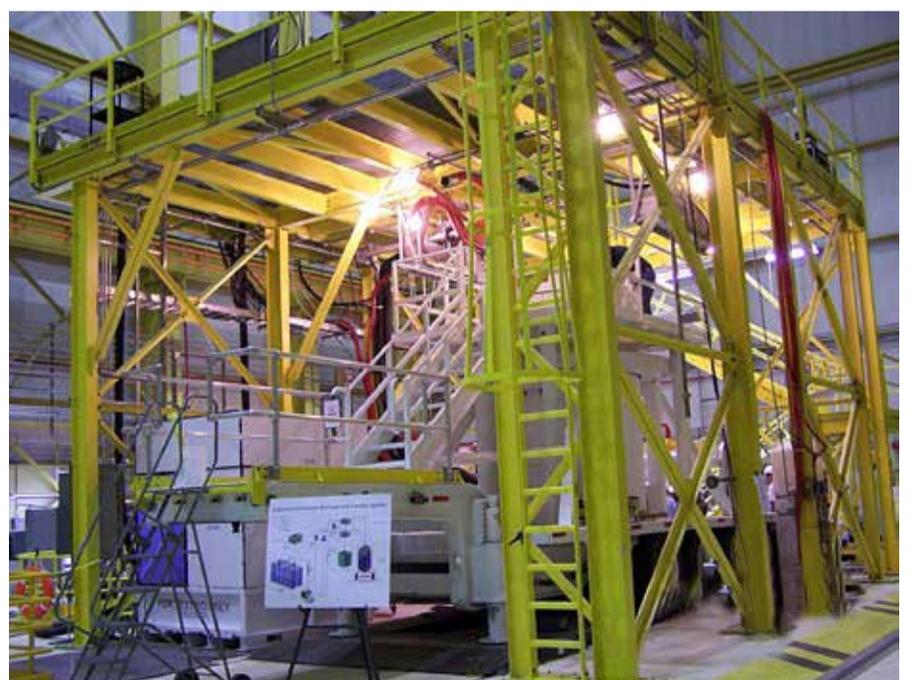
A mock-up engineered container. Actual engineered containers in the K West Reactor Fuel Storage Basin contain highly radioactive material called sludge.



The interior of the Maintenance and Storage Facility (MASF) where CH2M HILL constructed a replica of the K West Reactor Basin to allow workers to practice tools and techniques for sludge retrieval in a non-hazardous environment.



The Oak Ridge National Laboratory Transuranic Program Team observes a mock-up reactor basin at the Hanford Site where CH2M HILL is testing equipment that will be used to retrieve highly radioactive sludge.



A structure and equipment that will be used to safely package and transport highly radioactive sludge away from the Columbia River for safe storage at the center of the Hanford Site.



# Special HEALTH and SAFETY MESSAGE

from Energy Secretary Moniz and Deputy Secretary Poneman

Energy Secretary Moniz and Deputy Secretary Poneman issued a letter voicing their personal commitment to health and safety through leadership, employee engagement and organizational learning. The Secretary and Deputy Secretary describe that DOE is committed to pursuing a safety culture, protecting employees and the environment, worker and management personal responsibility for safety, fostering a questioning environment and learning from mistakes and experiences.

This commitment is viewed as an uncompromising principle vital to DOE's ability to effectively execute its mission. The Secretary and Deputy Secretary have articulated specific goals that encompass leadership, employee engagement, organizational and educational goals. These goals are profound and reinforce



the ultimate objective of zero accidents, work-related injuries and illnesses, regulatory violations, and reportable environmental releases.

To read a full-length version of the letter, enter <http://goo.gl/cWumP9> in your browser. ■

*“The Department’s ultimate safety objective is to have zero accidents, work-related injuries and illnesses, regulatory violations, and reportable environmental releases. The Department’s Integrated Safety Management policy is the foundation of our approach to safety and health.”*

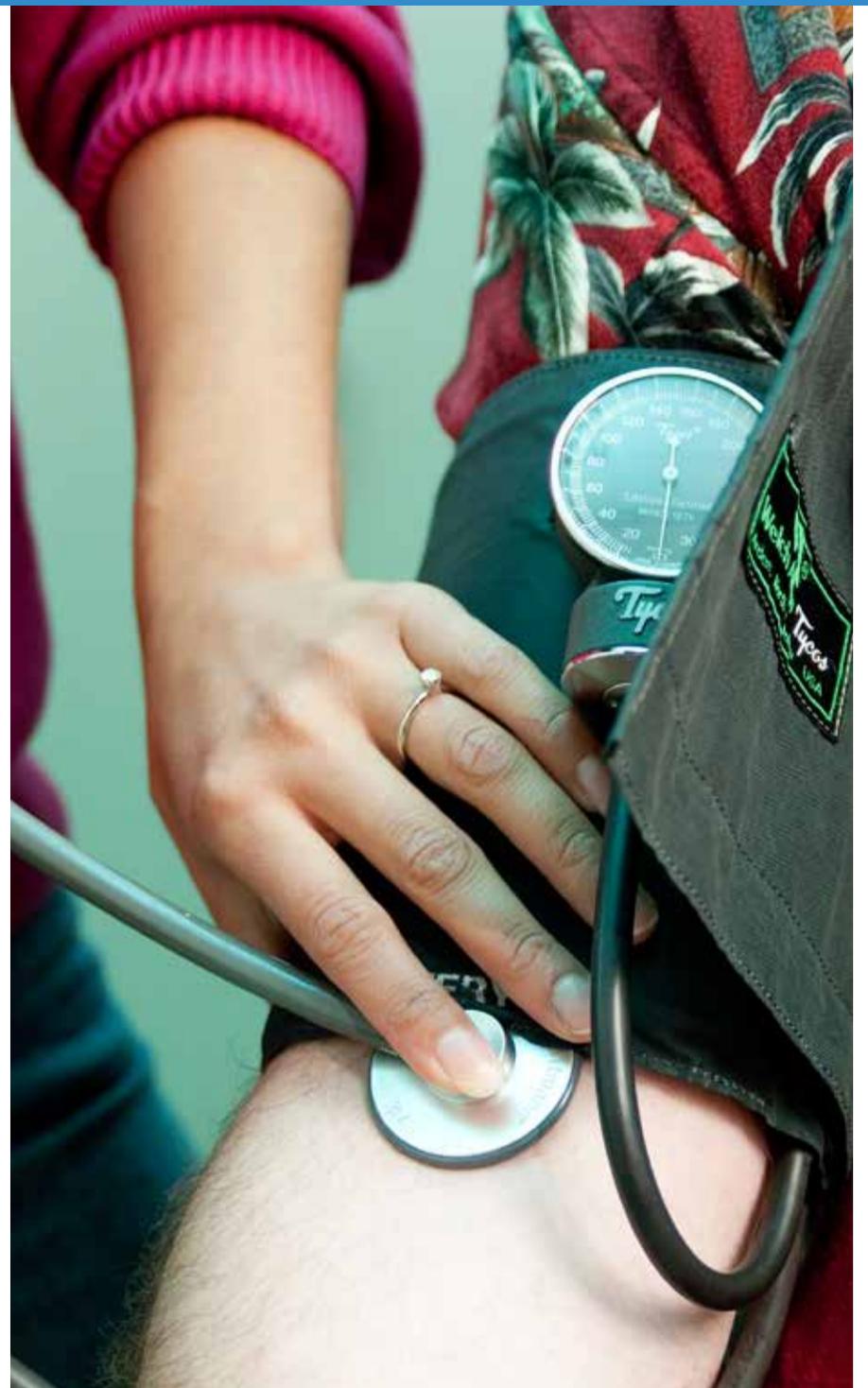
# Health Promotion at Hanford

HPMC Occupational Medical Services (HPMC OMS) provides health services to more than 7,500 workers of the Department of Energy and Hanford prime contractors. Their mission is to continuously improve occupational medical services for patients, in collaboration with stakeholders, while inspiring their staff to excel in providing safe and effective care of the highest quality and value.

Access to a suite of occupational health services is still quite rare for the majority of U.S. workers. Hanford Site employees are fortunate to have a comprehensive on-site occupational medical program, including medical surveillance, behavioral health, and health and wellness services. The Occupational Health and Wellness program is available to all employees through DOE and Hanford prime contractors. HPMC OMS works with individual contractors to develop initiatives that are specific to the needs of their workforce. Educational presentations, health improvement challenges, health fairs and classes have all been customized to meet the needs of all site contractors.

The Hanford workforce continues to face the challenges of inactivity, lack of reliable access to healthy foods, and lifestyle-related chronic health conditions. Therefore, prevention strategies and health interventions are required. While HPMC OMS promotes the adoption of healthy workplace practices by the contractors, they also aim to educate and assist employees in making healthier lifestyle choices. For example, the Weight Loss Convoy weight management program has helped 55 employees lose more than 2,000 pounds, greatly improving their health and productivity.

HPMC OMS also helps improve and protect employee health by providing prevention, evaluation and



rehabilitation of musculoskeletal injuries. Their focus on fitness, biomechanics and education give employees a clear picture of health risks and work hazards which may lead to injury or illness. HPMC OMS exercise physiologists offer early assessment and intervention, which is important to prevent injury and illness, minimize lost work time, and ensure a safe return to work.

Hanford employees can contact HPMC OMS for more information at (509) 376-3939, by email at [omchew@rl.gov](mailto:omchew@rl.gov), or on the web at [www.hanford.gov/health](http://www.hanford.gov/health). ■



# CLEANUP PROGRESS at Hanford



## Hanford Site Cleanup By the Numbers

The Hanford Site sits on 586 square miles of desert in southeastern Washington state, adjacent to the Columbia River. From 1943 to 1987, chain reactions inside Hanford’s nine nuclear reactors changed uranium’s chemical composition by exposing it to extra neutrons, producing plutonium that went into nuclear weapons used during World War II and stockpiled during the Cold War.

Hanford’s last reactor was shut down in 1987, but 44 years of plutonium production at the site generated millions of tons of solid waste and contaminated soil, as well as billions of gallons of contaminated liquids. In 1989, the Energy Department’s current mission at Hanford – cleaning up the waste – began.

**SIX**

of Hanford’s nine reactors have been “cocooned” – or demolished down to the reactor building and covered with steel and cement. With this process, the radioactivity in the reactors will continuously and safely decrease over many decades, making the reactor cores easier and safer to dismantle in the future.

**TWO**

more reactors will be cocooned in coming years, with the final – B Reactor – remaining as a National Historical Landmark.

**743**

buildings have been demolished.

**100**

percent – or about 2,300 tons – of the site’s spent fuel, a type of radioactive waste, has been removed from areas around the Columbia River and placed in safe, secure dry storage.



U.S. DEPARTMENT OF  
**ENERGY**

RICHLAND OPERATIONS  
OFFICE



UNITED STATES DEPARTMENT OF ENERGY  
**OFFICE OF RIVER PROTECTION**



## Hanford Site Cleanup By the Numbers

823

waste sites along the Columbia River's southern and western shores have been remediated to ensure future protection of human health and the environment.

12K

cubic meters of waste stored underground have been removed for disposal.



40K

visitors from across the globe have toured the B Reactor National Historical Landmark since the start of public tours in 2009. B Reactor was the world's first full-scale plutonium production reactor, built secretly in less than 11 months in 1943. Plutonium produced at Hanford in 1944 was used in the "Fat Man" bomb dropped on Nagasaki, Japan.

7.5  
MILLION

gallons of pumpable liquid waste have been removed and transferred from underground single-shell tanks to safer double-shell tanks, completing the interim stabilization project for the 149 single-shell tanks. These tanks vary in size from 55,000 to 1 million gallons each.

1.25  
MILLION

gallons of highly radioactive thick sludge and saltcake waste have been retrieved from 10 single-shell tanks, reducing the risk to workers and the environment.

8   
BILLION

gallons of contaminated groundwater have been treated near the Columbia River and in the center of the Hanford Site.

Hanford.gov

