



Technology-Savvy Robotic Arm to Help in Decontamination Project

WEST VALLEY, N.Y. – The West Valley Demonstration Project (WVDP) in New York has a powerful ally in its American Recovery and Reinvestment work to prepare one of its facilities for decontamination. It's known as the robotic arm, and has a set of jaws, a 600-pound grip force, reciprocating saw, impact wrench, and hydraulic shears capable of cutting pipes up to 3 feet.

The robotic arm begins work this summer to dismantle and remove more than one mile of process piping and nine vessels from Extraction Cell-1, a 57-foot-tall hot cell inside the former fuel reprocessing facility at WVDP. The highly radioactive cell, which only has a ceiling hatch as an access point, is being prepared for decontamination.

Engineers at West Valley Environmental Services, which is preparing WVDP for eventual closure under a DOE con-



A worker oversees pre-deployment testing for the robotic arm at West Valley Demonstration Project.

tract, worked with manufacturer Nu-Vision Engineering to devise the robotic arm.

The robotic arm travels on a mast along the entire height of the cell and removes debris through the hatch.

Fully hydraulic, the robotic arm is equipped with three rotating joints and three linear actuated joints. It has a 150-pound capacity when fully extended at eight feet from its vertical mast.

To prepare for the robotic arm's deployment, engineers removed the cell's existing hatch covers and installed a rolling hatch cover for easier access. Workers drilled through the 5-foot-thick cell walls and installed cameras to support installation of the

arm. A docking area was made to park the robotic arm safely out of the way as debris is removed.

"The decontamination of this Extraction Cell is one of the largest challenges in getting the Main Plant demolition ready," DOE Project Manager Bryan Bower said. "With the infusion of the Recovery Act funds, we have been able to hire and train additional workers that will use the XC-1 Arm to accelerate cleanup work."

The idea for the robotic arm comes from a mast tool delivery system used in the West Valley Waste Tank Farm more than a decade ago.

That system operated inside the highly radioactive 8D-2 underground high-

“With the infusion of Recovery Act funds, we have been able to hire and train additional workers that will use the XC-1 Arm to accelerate cleanup work.”

– DOE Project Manager
Bryan Bower

EM Recovery Act Payments Cross the \$2 Billion Mark

Site	Spend Plan	Obligated Contracts	Outlaid (Payments) to Date
Argonne National Laboratory	\$79,000,000	\$79,000,000	\$20,732,148
Brookhaven National Laboratory	\$70,810,000	\$61,855,000	\$33,258,727
ETEC	\$54,175,000	\$54,162,338	\$41,202,378
Hanford (Office of River Protection)	\$326,035,000	\$323,835,000	\$98,914,082
Hanford (Richland)	\$1,634,500,000	\$1,518,764,000	\$536,050,063
Idaho	\$467,875,000	\$442,775,000	\$201,097,205
Los Alamos National Laboratory	\$211,775,000	\$206,075,000	\$74,018,516
Moab	\$108,350,000	\$108,350,000	\$41,039,883
Mound	\$19,700,000	\$17,900,000	\$10,672,548
Nevada Test Site	\$44,325,000	\$44,299,521	\$23,982,473
Oak Ridge	\$755,110,000	\$614,869,483	\$212,397,671
Paducah	\$80,400,000	\$38,843,000	\$33,150,716
Portsmouth	\$119,800,000	\$119,800,000	\$48,626,438
Savannah River	\$1,615,400,000	\$1,363,480,470	\$621,982,401
SLAC	\$11,800,000	\$7,925,000	\$5,616,005
SPRU	\$56,775,000	\$51,775,000	\$18,682,418
WIPP	\$172,375,000	\$169,736,623	\$63,089,395
West Valley	\$62,875,000	\$62,875,000	\$25,552,974
Title X Uranium/Thorium Reimbursements	\$69,650,000	\$69,650,000	\$45,629,019
Management & Oversight	\$30,000,000	\$19,800,740	\$12,948,251
Unallocated	\$9,270,000	\$0	\$0
Total	\$6,000,000,000	\$5,375,771,175	\$2,168,643,311

June reports show payments to EM Recovery Act sites have passed the \$2 billion mark, creating jobs and accelerating environmental cleanup.



Technology, Innovation Spark Progress in Recovery Act Projects



p.1

Technology-Savvy Robotic Arm to Help in Decontamination...



p.5

Recovery Act Helps Maintain a Safe Environment for Workers...



p.7

Out-of-the-Box Solutions Arise for In-House Disposal...



p.12

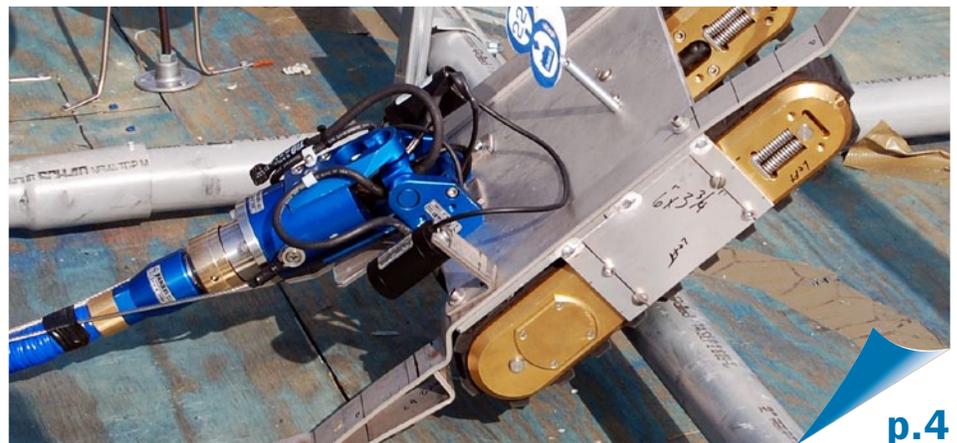
Specialized Equipment Probes Cold War Waste Site at Hanford...



p.14

Half-century Old Reactor Gets "Wired" for Technology...

In this 14th issue of Recovery News, we showcase a theme of technology and innovation, and how they help the Office of Environmental Management's sites create new jobs and clean up the environmental legacy created by five decades of nuclear weapons development and government-sponsored nuclear energy research.



p.4

Newest Robot 'Tizzy' Supports Waste Tank Closures

EM Recovery Act Payments Cross the \$2 Billion Mark page 2

Innovative Technologies Energize Groundwater Project page 6

Recovery Act Funds Spur Progress at Brookhaven page 8

Department of Energy Agreement Leads to Recovery page 10

Next Generation of Treatment to Enhance Groundwater Cleanup ... page 13

Expertise Ensures that Quality Data Drives the Decision page 15

SRS Technology Creates Success, Five Billion Times..... page 17

DOE's New Mixer to Process Salt Waste, Accelerate Clean Up..... page 18

WIPP Prepares for \$5.5 Million in New Equipment page 19

Recovery Act Funds New Equipment page 20

SPRU Draws on Innovation, Recovery Act to Speed..... page 21



A throng of onlookers, including a film crew, photographers and other admirers, watched as “Tizzy” debuted at the Savannah River Site (SRS) while readying for its mission of nuclear waste removal.

Newest Robot ‘Tizzy’ Supports Waste Tank Closures

AIKEN, S.C. – Movie theater-goers may have Iron Man 2, but the Savannah River Site (SRS) in South Carolina has its own superhero called “Tizzy,” a new, tank-cleaning robot.

When deployed, Tizzy will remove high-level solid radioactive material from the tank floor and transfer the material to nearby waste processing facilities.

Funded by the Recovery Act, Tizzy, a celebrity in its own right, debuted before a throng of onlookers including a film crew, photographers and other admirers while readying for its mission of nuclear waste removal earlier this year. SRR’s Recovery Act funding totals \$200 million and has created about 520 fulltime equivalent jobs.

Tizzy and an older sibling, “Frankie,” are motorized robotic crawlers being used by Savannah River Remediation (SRR) LLC to assess and clean remaining waste material inside large underground liquid waste storage tanks at the DOE facility.

“Applying robotic technology significantly accelerates our ability to cost effectively close waste tanks and enhance the safety margin for our workers and the public,” said Waste Disposition Operations Division Director Phillip Giles, who observed Tizzy’s debut.

The cost of the entire Tizzy project totaled about \$100,000. The robotic crawler was designed so that it can successfully negotiate the internal maze of cooling pipes, risers and other impediments.

Mark Hasty, SRR’s Waste Removal and Tank Closure Director, was on hand to observe the Tizzy debut. He called construction of the Tank 5 mockup and assembling of the crawler a “job well done,” crediting mechanics Leon Holloway and Danny Grenade.

Tank 5 is one of 15 tanks scheduled for closure at SRS in the next eight years. That represents the highest number of waste tanks undergoing closure in SRS history.



“Tizzy,” pictured here, is a motorized robotic crawlers being used by Savannah River Remediation (SRR) LLC to assess and clean remaining waste material inside large underground liquid waste storage tanks.

Tizzy was named for Andy Tisler, the Deputy Engineering Manager for Tank Closure, who spearheaded the mockup and demonstration project. □



An open house held earlier this year inside one of the enclosures on Material Disposal Area B (MDA-B) at Los Alamos National Laboratory gave visitors the opportunity to receive information about the project and ask questions. Displays included the remote control excavator and emergency alert siren. Subject matter experts on MDA-B history, air quality monitoring, and radiological protection, were on hand. Radiation Protection Manager Marty Peifer, pictured here, far left, shows children some equipment, including radiological protection gear.

Recovery Act Helps Maintain a Safe Environment for Workers, Community

LOS ALAMOS, N.M. – If it's possible for a waste disposal site to have a colorful history, then Material Disposal Area B (MDA-B) certainly qualifies.

The oldest waste disposal site at Los Alamos National Laboratory (LANL), MDA-B, was used from 1944 to 1948 during the Manhattan Project.

As LANL scientists raced the clock to develop a weapon to end World War II, they disposed of waste the only way they knew how: by digging a trench and burying it.

During the latter days of MDA-B, waste caught on fire three times. And in the 1970s, after being paved and fenced, the site served as a parking lot for recreational vehicles.

The colorful and sometimes fiery history of MDA-B will end this year, when Recovery Act funds totaling \$94 mil-

lion will be used to excavate this 60-year-old waste disposal site and restore the land to residential standards.

Sixty years ago, MDA-B was located on the outskirts of Los Alamos. Due to the city's growth, businesses now are located directly across the street from MDA-B and a residential area is in close proximity to the site.

That closeness poses unique challenges for the project team, even though the excavation of this World War II-era waste dump will occur inside sturdy metal buildings.

"Safety is always our first priority, and even though we do not anticipate an incident that cannot be contained within the buildings, we wanted to be prepared for any eventuality," said Project Director Andy Baumer. "Due to the proximity of businesses and residences to our excavation, we

wanted a warning system capable of alerting people quickly in case we have an emergency."

Working closely with the Los Alamos County Office of Emergency Management, the project team purchased a \$50,000 mobile siren with Recovery Act funds that can be used to warn residents of an incident. The county also has a reverse 911 system capable of calling selected sections of the city to warn residents of an emergency.

"In the event of an actual emergency, people in the immediate vicinity of the work site are instructed to stay inside, shut doors and windows and secure air intakes, outside ventilation and air conditioners, said Phil Taylor of the county's emergency management office. "We're certainly not trying to alarm citizens. We're simply being prudent." □

Innovative Technologies Energize Groundwater Project at the Nevada Test Site

LAS VEGAS – Scientists at the Nevada Test Site (NTS) have undertaken an ambitious project to identify pathways for potential groundwater contamination from the 828 underground nuclear tests that were conducted at the site from 1951 to 1992. Finding innovative technologies to expedite this work has been a key to success.

These groundwater characterization activities, along with ongoing efforts to cleanup soil and facilities at the site, were accelerated after the National Nuclear Security Administration Nevada Site Office (NSO) Underground Test Area (UGTA) Sub-Project received more than \$44 million in Recovery Act funding. This has translated into more than 545 “lives touched” for NTS employees.

Special computer technology has been instrumental in helping the UGTA team visualize the complex subsurface environment of the NTS and gain a better understanding of contaminant movement. Innovative modeling software known as EarthVision has allowed scientists to incorporate complex geophysical information from different sources, formats, and locations, and produce three-dimensional visual models that can be viewed at a variety of angles and directions.

“This kind of computer modeling helps us bring together all of the geologic and hydrologic elements so that we can get a more complete picture of the subsurface,” Navarro Nevada Environmental Services (NNES) UGTA Modeling Manager, Greg Ruskauff, said.

NNES, a small business based in Las Vegas, oversees nearly \$10 million of soil characterization, industrial sites remediation, munitions/explosives cleanup, and groundwater modeling for NSO, and depends on innovative technologies to do work more efficiently.

“This is a complex effort that takes many hands with numerous specialized skills,” NSO UGTA Sub-Project Director

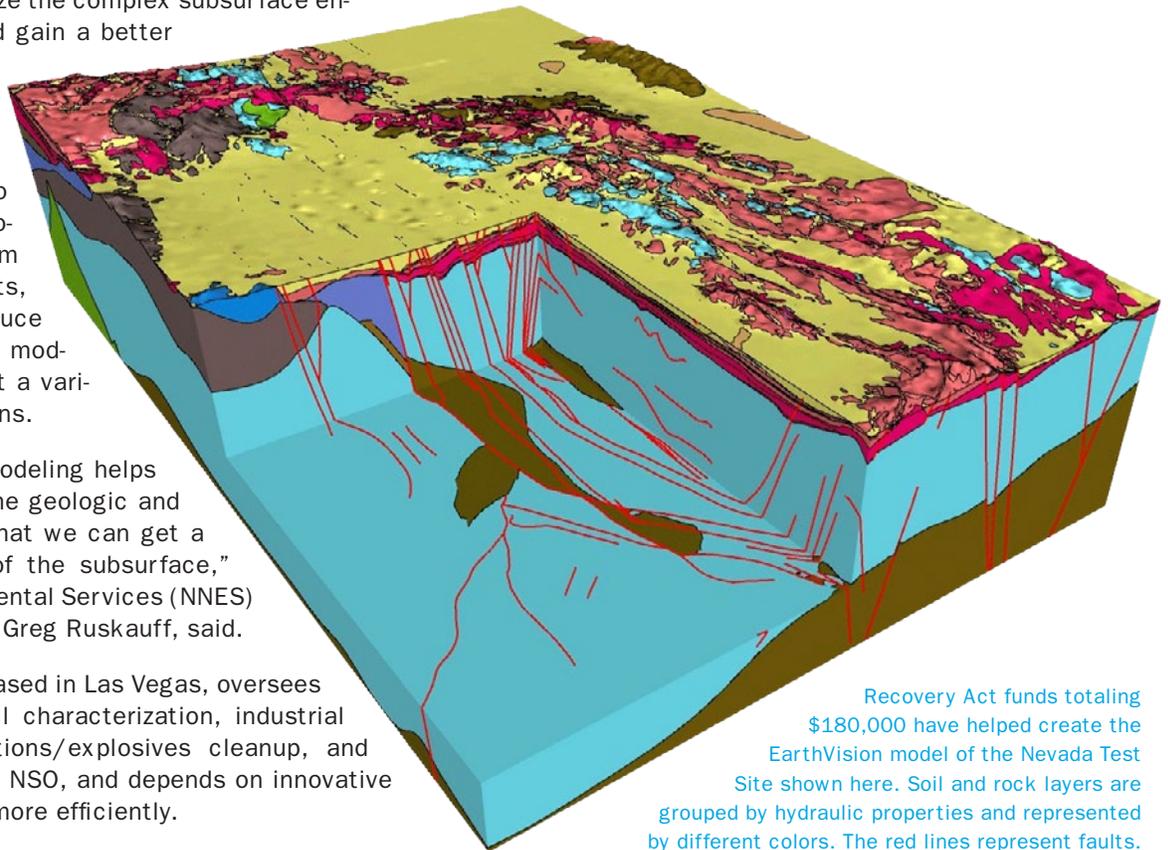
Bill Wilborn said. “Technology helps us streamline our efforts and reach our long-term goals faster.”

Another small business known as Geohydros provides expert guidance with the EarthVision software. The Reno-based company is part of a niche technology market that government sites, such as NSO, have been able to tap into with Recovery Act money.

“Companies like ours are helping sites understand how past testing has affected the area’s natural resources and determine future land uses,” said Kevin Day of Geohydros.

Subsurface modelers, like Geohydros, depend on sampling data to generate accurate visuals. To help UGTA widen the breadth of its sampling efforts, the Recovery Act is funding two wells as part of a larger drilling campaign that will place a total of nine new characterization wells in the north-western region of NTS known as Pahute Mesa.

National Security Technologies (NSTec), the management and operating contractor for NTS, has subcontracted well construction to several small businesses, including United Drilling, B & L Casing Service, and K & R Drilling Tools. Drilling is scheduled to be completed in 2012. □



Recovery Act funds totaling \$180,000 have helped create the EarthVision model of the Nevada Test Site shown here. Soil and rock layers are grouped by hydraulic properties and represented by different colors. The red lines represent faults.

Out-of-the-Box Solutions Arise for In-House Disposal

OAK RIDGE, Tenn. – Seven cleanup projects supported by nearly \$280 million in Recovery Act funds are currently underway at the Y-12 National Security Complex at Oak Ridge.

As the projects move toward completion, focus has shifted to efficiently disposing of large quantities of waste. Recovery Act funds have created or saved more than 884 jobs at Y-12.

Continued on page 10

A shipment of waste from the Y-12 National Security Complex at Oak Ridge arrives at the Environmental Management Waste Management Facility.





DOE Deputy Secretary Daniel Poneman speaks during an “all hands” meeting at Berkner Hall at Brookhaven National Laboratory (BNL) during his June 1 visit. BNL employees attended the meeting.

Recovery Act Funds Spur Progress at Brookhaven

UPTON, N.Y. – Recovery Act funding is advancing environmental cleanup projects at Brookhaven National Laboratory (BNL), including the decommissioning of the Brookhaven Graphite Research Reactor (BGRR).

DOE Deputy Secretary Daniel Poneman and EM Recovery Act Program Director Cynthia Anderson recently joined a celebration at BNL, where they announced that DOE and BNL reached a major milestone in the cleanup of the BGRR.

As a result of \$30.5 million in Recovery Act funding designated for the BGRR decommissioning, DOE and BNL were able to accelerate and complete the most difficult part of the decommissioning process — safely removing more than 700 tons of radioactive graphite from the core of the reactor — while providing jobs for approximately 175 workers.

“Today represents a significant milestone in the Department of Energy’s cleanup efforts at Brookhaven National Laboratory, and we are on track to complete the overall site cleanup next year,” said Deputy Secretary Dan-

iel Poneman. “The investment we’ve made here through the Recovery Act is having a big impact, both accelerating the cleanup of the Brookhaven Graphite Research Reactor and putting people to work here in the community.”

The Graphite Reactor, which operated from 1950 to 1968, was the world’s first reactor designed and built solely for peaceful research purposes. It produced large quantities of neutrons – a type of subatomic particle – that scientists used to study the atomic structure of a wide range of materials, leading to advances in physics, materials science, and medicine.

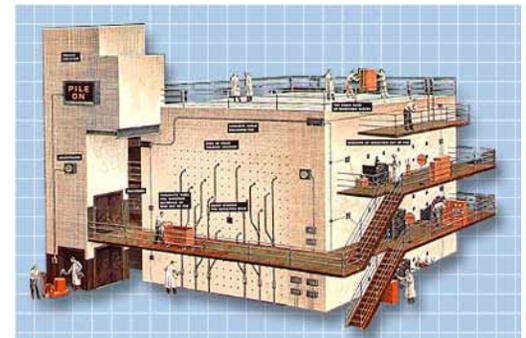
At the reactor’s core was a 25-foot cube of graphite made up of more than 60,000 individually machined graphite blocks. These blocks, which slow down the neutrons within the reactor, became radioactive as a result of normal operations. As a result, removing the blocks posed a significant engineering challenge to the decommissioning team, which began its work in February using a remote-controlled excavator and crane.

Using the excavator, workers loaded

the graphite blocks into “super sacks” made of a heavy-duty polypropylene that were then transferred into steel shipping containers by crane. The project team filled approximately 250 of these boxes for shipment to the Nevada Test Site for disposal.

During his visit, Poneman also announced that BNL will receive an additional \$28 million in Recovery Act funds from the Office of Environmental Management to complete legacy cleanup at the site.

[Continued on next page](#)



The Brookhaven Graphite Research Reactor pile consisted of a 700-ton, 25-foot cube of graphite fueled by uranium. A total of 1,369 fuel channels were available, with roughly half in use at any given time. Reactor power was controlled by insertion and removal of boron steel control rods. Cooling was supplied by one or more of five fans which provided air flow through the core.

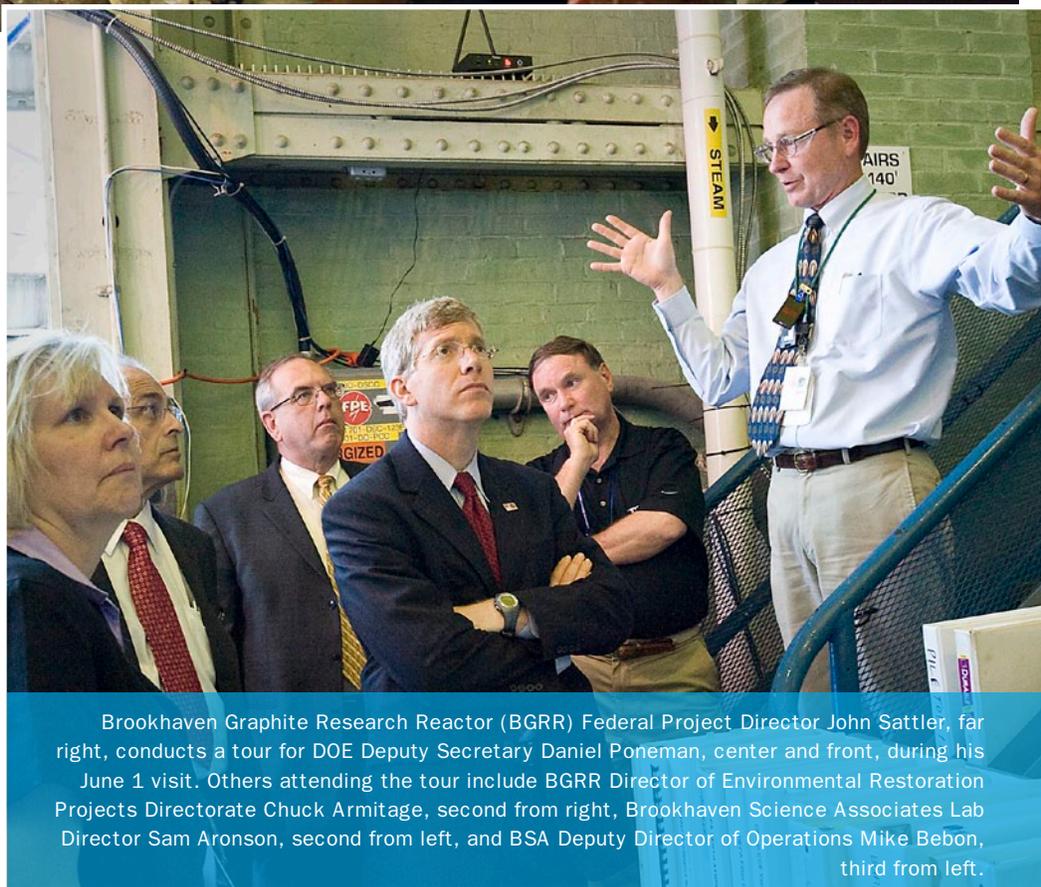


The additional \$28 million will help fund the final stages of the project – dismantling the concrete and steel “biological shield” that surrounded the graphite cube, removing the complex’s 100-meter tall “stack,” and placing an impermeable cap around the base of the building. The entire project is scheduled to be completed in 2011.

Including the additional \$28 million, BNL has received nearly \$71 million

“ The investment we’ve made here through the Recovery Act is having a big impact, both accelerating the cleanup of the Brookhaven Graphite Research Reactor and putting people to work here in the community.”

– *DOE Deputy Secretary Daniel Poneman*



Brookhaven Graphite Research Reactor (BGRR) Federal Project Director John Sattler, far right, conducts a tour for DOE Deputy Secretary Daniel Poneman, center and front, during his June 1 visit. Others attending the tour include BGRR Director of Environmental Restoration Projects Directorate Chuck Armitage, second from right, Brookhaven Science Associates Lab Director Sam Aronson, second from left, and BSA Deputy Director of Operations Mike Bebon, third from left.

through the Recovery Act to help clean up the BGRR and other radiologically contaminated facilities and structures on the Lab site.

U.S. Rep. Tim Bishop attended the celebration, and praised the BGRR project.

“This stimulus-funded project is putting Long Islanders to work and pro-

tecting our environment,” Bishop said. “Cleaning up this reactor also solidifies Brookhaven National Lab as a good neighbor and valuable asset in the community.” □



Out-of-the-Box Solutions...

Continued from page 7

Recovery Act team members work to develop modified approaches and creative solutions to quickly and efficiently accomplish Recovery Act projects. In the case of waste disposal, these efforts are eliminating steps and cutting schedules, while meeting all compliance guidelines.

Cleanup at Y-12 will enhance safety and reduce the site's footprint. The projects will produce nearly 90,000 cubic meters of waste upon completion. A portion of that waste is transported to off-site disposal facilities such as the Nevada Test Site in Las Vegas, but the goal is to send as much of the waste as possible to Oak Ridge's disposal site, the Environmental Management Waste Management Facility (EMWMF).

Located in East Bear Creek Valley, EMWMF is a 120-acre facility for low-level radioactive waste. The facility is managed by Bechtel Jacobs Company and co-owned by DOE, the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC).

Before waste from Recovery Act projects can be sent to EMWMF, it must meet certain waste acceptance criteria, which requires it to be sampled and analyzed. Joe Birchfield, the on-site DOE representative for Recovery Act projects, and his team, have devised solutions to handle the large influx of waste.

One of those solutions, a biased-sampling approach, saved time and accelerated the project schedule for Buildings 9769 and 9211.

"The traditional approach is statistically-based sampling, which requires a large number of samples to be collected," Birchfield said. "The biased-sampling approach finds and detects the highest levels of radioactivity,

thereby minimizing the number of samples to be collected. After the samples are collected by sampling crews, they are analyzed by a certified laboratory. Then, a determination is made as to whether or not the waste meets waste acceptance criteria and can be disposed of at EMWMF."

Y-12's Old Salvage Yard also presented its share of waste-sampling challenges, such as limited access to sampling areas. To resolve this predicament, Birchfield and his crew used the "onion-peel" approach.

In this method, each layer of waste is sampled, analyzed, and transported to a disposal site. When the outer layer is removed, the next layer is sampled, analyzed and sent for disposal.

Typically, samples are gathered and analyzed from the entire pile, separated into various waste categories, and cleared away. By slightly changing the process, multiple steps were eliminated, ultimately saving time and resources.

The Alpha 5 building provided team members yet another opportunity to dispose of waste on-site. When analyzing the old, dilapidated equipment in the facility, Birchfield's team identified the hazardous components in need of removal to meet EMWMF disposal requirements. The team took the initiative to expedite consistent and compliant shipments of waste, and their efforts paid off.

"The Alpha 5 waste handling plan was approved by DOE, TDEC and EPA with zero comments, which is very rare," Birchfield said. The waste from Alpha 5 became the first Recovery Act waste shipment to EMWMF. □

Department of Energy Agreement Leads to Recovery Act-Funded Project

CANOGA PARK, Calif. – The Recovery Act is providing more than \$38 million for a study that will lead to the cleanup of a former remote site for nuclear research and testing of rocket engines.

Under an interagency agreement with DOE, the U.S. Environmental Protec-

Continued on next page



Environmental Protection Agency (EPA) Senior Technical Advisor for the ARRA-funded Radiological Characterization Study, Gregg Dempsey, second from left, demonstrates the fork-lift mounted gamma-scanning equipment during the opening ceremony for the EPA Santa Susana Field Laboratory Field Office.

“The Department of Energy was able to meet this challenge by funding through the American Recovery and Reinvestment Act.”

– *EM Recovery Act Program Deputy Director Thomas Johnson*

tion Agency (EPA) is conducting a radiological characterization study at the Santa Susana Field Laboratory (SSFL) Area IV at the Energy Technology Engineering Center this year. The study will create at least 28 jobs.

The highly-detailed study will serve to determine the nature and extent of radiological contamination at the site.

As part of the study, EPA contractors will perform a Gamma survey this summer, and groundwater and soil testing will follow later this year.

At an opening ceremony for the new EPA SSFL Field Office earlier this year, EM Recovery Act Program Deputy Director Thomas Johnson, who represented EM Assistant Secretary Inés Triay, discussed details of the study.

“I still recall the early discussions with EPA as we were trying to get the interagency agreement in place to allow this very important characterization study to be developed,” said Johnson, who formerly served as ETEC’s federal project director.

“This effort was an extreme challenge as the funding need was equivalent to three to four years of normal project funding. The Department of Energy was able to meet this challenge by funding through the American Recovery and Reinvestment Act.”



The DOE Office of Environmental Management Recovery Act Deputy Director Thomas Johnson spoke during the opening ceremony for the new Environmental Protection Agency Santa Susana Field Laboratory (SSFL) Field Office in Canoga Park, Calif. The DOE provided \$38 million in Recovery Act funds to the EPA to conduct a radiological characterization study of portions of SSFL where the Atomic Energy Commission conducted research.



Lance Martin, left, an employee at the Environmental Energy Technology Engineering Center, explains equipment used for the radiological characterization study to a participant at the opening ceremony for the new Environmental Protection Agency Santa Susana Field Laboratory Field Office.

Results of the study will be used for a DOE Environmental Impact Statement (EIS) for Area IV cleanup. Radiological data is critical to completing the EIS and will provide DOE with information needed to satisfy requirements set by the State of California.

Located on 2,900 acres of land in hills between Chatsworth and Simi Valley, SSFL was developed as a remote site to test rocket engines and conduct re-

search by DOE’s predecessor agency, the Atomic Energy Commission.

Cleanup of ETEC began in the 1960s as unnecessary facilities were decommissioned. Nearly 250 facilities have been decommissioned and removed, and 24 structures remain at ETEC. Boeing is DOE’s contractor for cleanup of ETEC and the majority land owner. □

Specialized Equipment Probes Cold War Waste Site at Hanford

RICHLAND, Wash. – Supported by Recovery Act funding, Washington Closure Hanford is using innovative technology to solve the mystery of what is hidden in one of the most hazardous waste sites at the Hanford Site in southeastern Washington state.

From 1954 to 1963, the waste site, known as the 618-10 Burial Ground, received waste from fuels development work and laboratories supporting the nation's nuclear weapons program. The burial ground contains 23 trenches and 94 buried vertical pipes, which were constructed by welding five, 55-gallon bottomless drums together and buried 10 feet apart.

Because disposal records of the burial ground are limited, Washington Closure needed more information before workers could safely begin cleaning up the burial ground. In late 2009, Washington Closure began performing nonintrusive characterization activities. The term “nonintrusive” means that the burial ground's contents are not exposed to personnel or the environment.

To accomplish that, subcontractor North Wind Inc. used a multi-detector probe. The multi-detector probe was specifically designed by North Wind for use at 618-10 and another highly contaminated site at the Hanford site, the 618-11 Burial Ground.

The multi-detector probe measures a wide range of radiation sources and activities through the walls of narrow, steel cylinders called cone penetrometers. The project team precisely drove four cone penetrometers about 6 to 8 inches around each of the vertical pipes to a depth of about 24 feet. The multi-detector probe was then lowered into each of the cone penetrometers and measurements were recorded.

The probe is made up of two gamma-ray detectors, two neutron detectors, and a gross rate meter. The use of multiple detectors provides redundancy, and allows the probe to operate for a broad range of radiation fields and types. The data provided by the probe supports remedial design and planning for the burial ground.

From 1944-1989, the 586-square-mile Hanford Site was a plutonium production complex with nine operating nuclear reactors and associated processing facilities. Hanford played a pivotal role in the nation's defense for more than 40 years, beginning in the 1940s as part of the Manhattan Project. □



A multi-detector probe is lowered into a narrow steel tube called a cone penetrometer to measure radiation activity at one of the most hazardous waste sites at the Hanford Site.



Ion exchange tanks shown here will be installed in the buildings that will make up the 100-DX Groundwater Treatment System at the Hanford Site. The tanks will house the innovative ion exchange resin with increased capacity to remove hexavalent chromium contamination from the groundwater.

Next generation of treatment to enhance groundwater cleanup efforts at Hanford

RICHLAND, Wash. – The DOE and contractor CH2M HILL Plateau Remediation Company (CH2M HILL) are using Recovery Act funding to install the next generation of groundwater treatment systems at the Hanford Site that will remove contaminants and protect the Columbia River, which runs through the site.

Construction of one system, called 100-DX, is expected to be completed this summer and is being supported by \$20 million in Recovery Act funds. The system will use an innovative ion exchange resin to remove hexavalent chromium from water pumped from the ground for treatment.

While ion exchange has been used at other treatment facilities on the Hanford Site, engineers are currently optimizing ion exchange applications and testing different resins to minimize the cost of cleanup.

The ion exchange process exchanges one ion for another as the contaminated groundwater percolates downward through the resin, removing the contaminant. Using the newer resin in treatment is expected to save \$20 million in facility operating costs over its lifetime, because the newer resin can hold much more contamination before it is replaced. □

Half-century Old Reactor Gets “Wired” for Technology

AIKEN, S.C. – After more than a half century since its construction, Savannah River Site’s (SRS) R Reactor has taken a leap forward with the introduction of a local wireless Intranet service, even as it undergoes final closure.

Supported by \$200,000 in Recovery Act funds, the new Intranet service allowed for the first email to be sent from within the remote boundaries of R Area earlier this year. The e-mail was addressed to Mary Flora, director of Area Completion Projects, whose simple response summed up the event. “Welcome to the 21st century!” the e-mail said.

The R Reactor has not operated since 1964. It was the first reactor at SRS to be deactivated, so utilities and other services have been shut down.

Prior to the introduction of the Intranet service, logistical challenges emerged as teams descended on two of SRS’s retired weapons-grade nuclear reactors to complete their final closure. Savannah River Nuclear Solutions (SRNS), LLC., SRS’s lead operating contractor, worked to overcome communication and productivity challenges at R Area.

One of the major challenges associated with the dual-closure of the reactors was accessibility to the SRS network for workers in the R Area. That system, known as SRSnet, is used for radiological data collection, time-keeping, safety documentation, and other essential business needs.

“This is an exciting time at SRS,” Recovery Act Project Director Zach Smith said. “In addition to putting hard-working Americans back on the job, we are improving communications



Area Completion Projects (ACP) Field Supervisor Kenny Barrineau sends the first email from the R Reactor Complex to ACP Director Mary Flora after the complex became wired with local wireless Intranet service

and ultimately, the productivity at some of our most remote work sites. The implementation of wireless technology at R Reactor will undoubtedly showcase the benefits of incorporating technology across the Site, allowing us to improve safety, accountability and productivity while ensuring that we continue to make each tax dollar go as far as possible.”

Prior to the installation of the Intranet service, 17 teams were required to report to P Area twice a day. The P Area is two miles away, and the team conducted radiological control accountability there using software that could only be accessed via the SRSnet.

Understanding those challenges, SRNS management devised a plan to bring current technology to R Reactor, a plan that catapulted the aged reactor complex from the days of black, hard-wired telephones and public address systems to wireless access to SRSnet.

Looking beyond the essential productivity needs at R Area, management quickly realized that other scopes of work could also benefit from the use of the technology. Steps are being taken to permit workers in F and H Tank Farms to collect radiological data via

SRSnet, rather than traditional data gathering performed with hand-held instruments. This improvement will also reduce health risks associated with data collection in radiological areas.

The new system not only solves an immediate and complex business problem, but also the easy-to-configure system can be relocated to other areas in the future, saving time and tax dollars without sacrificing worker safety and productivity. □

Technology-Savvy...

[Continued from page 1](#)

level waste tank that formerly stored liquid waste at WVDP. In 2002, WVDP completed vitrification of the high-level waste, a process of converting the liquid waste into solid glass. As waste levels lowered, engineers deployed the mast tool delivery system to install tools to wash the tank walls and internal structures, take samples from the carbon steel tank wall, and obtain readings with radiation probes. □

An employee of Oak Ridge Institute for Science and Education (ORISE) performs radiation detection at one of the many Oak Ridge cleanup sites.



Expertise Ensures Quality Data Drives the Decision

OAK RIDGE, Tenn. – The Recovery Act has quickened the clean-up of radioactively contaminated sites nationwide, including at Oak Ridge, where \$755 million has been allocated for environmental management activities.

The Oak Ridge Institute for Science and Education (ORISE), which is managed by Oak Ridge Associated Universities for DOE, has been tapped to provide independent characterization surveys of waste at three Oak Ridge sites: Oak Ridge National Laboratory, East Tennessee Technology Park, and Y-12 National Security Complex.

A fundamental aspect of all decontamination and decommissioning projects, characterization surveys provide guidance to determine the best remediation procedures and are a cost-effective method of ensuring a site meets preliminary regulatory standards.

“We at the Department of Energy Oak Ridge Operations are leveraging ORISE to jump-start field work ahead of demolition work,” said Oak Ridge Office American Recovery and Reinvestment Act Portfolio Manager Lee McGetrick. “This is a real advantage due to the time involved in the award and mobilization of the new task orders under the EM National ID/IQ Contract. We are gaining valuable information on these facilities which is being shared with the new contractors.”

ORISE brings continued commitment to a solid quality assurance program that ultimately builds public trust and confidence in cleanup efforts by ensuring the collected

[Continued on page 16](#)



Expertise Ensures...

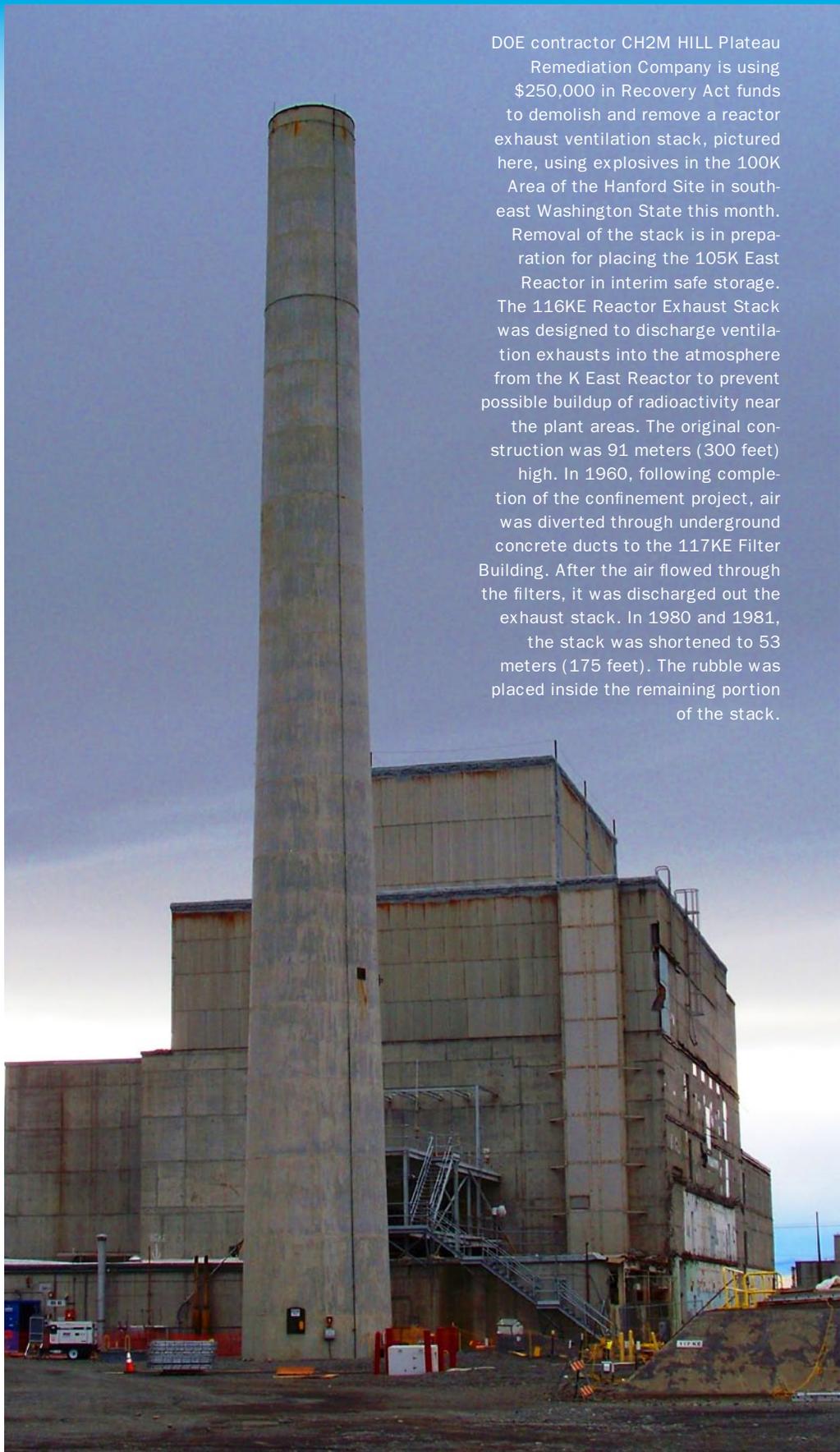
Continued from page 15

“ We at Department of Energy Oak Ridge Operations are leveraging ORISE to jump-start field work ahead of demolition work. ”

– Oak Ridge Office American Recovery and Reinvestment Act Portfolio Manager Lee McGetrick.

data drives the decision on how the contamination will be cleaned up.

“Obtaining the public’s trust during a cleanup effort is essential for keeping the project on schedule,” said ORISE Director of Independent Environmental Verification and Assessments Sarah Roberts. “Our organization’s ability to operate independent of the contractor tasked with cleaning up the facilities enables us to provide an objective assessment of whether the cleanup meets federal requirements, which is essential for reducing the liability that DOE could face when the facilities are reindustrialized or demolished.” □



DOE contractor CH2M HILL Plateau Remediation Company is using \$250,000 in Recovery Act funds to demolish and remove a reactor exhaust ventilation stack, pictured here, using explosives in the 100K Area of the Hanford Site in south-east Washington State this month. Removal of the stack is in preparation for placing the 105K East Reactor in interim safe storage. The 116KE Reactor Exhaust Stack was designed to discharge ventilation exhausts into the atmosphere from the K East Reactor to prevent possible buildup of radioactivity near the plant areas. The original construction was 91 meters (300 feet) high. In 1960, following completion of the confinement project, air was diverted through underground concrete ducts to the 117KE Filter Building. After the air flowed through the filters, it was discharged out the exhaust stack. In 1980 and 1981, the stack was shortened to 53 meters (175 feet). The rubble was placed inside the remaining portion of the stack.

SRS Technology Creates Success, Five Billion Times

AIKEN, S.C. – After a quarter century, more than 5.325 billion gallons of groundwater – enough to fill 8,065 Olympic-sized swimming pools – has been successfully extracted and remediated from Savannah River Site's (SRS) A and M Areas using the M-1 Air Stripper, an environmental remediation technology.

Thanks to the Recovery Act, SRS has been able to fully fund remedial projects like the M-1 Air Stripper, accelerating the cleanup and closure of numerous waste sites throughout the complex. Approximately \$750,000 of Recovery Act funding will be spent on this effort during the 30 month project ending September 2011.

Historically, the A and M Areas contained facilities that manufactured reactor fuel and target assemblies while providing support and administrative and laboratory services to SRS. During manufacturing activities, which took place from the 1950s to 1980s, a variety of industrial solvents were used to clean and degrease the various equipment and fuel components. These solvents were then discharged to the environment within the A and M Areas, a common practice during the time.

Following the installation of monitoring wells in 1985, it was discovered that the solvents had contaminated the groundwater. The primary contaminants detected were the solvents trichloroethylene (TCE) and tetrachloroethylene (PCE), compounds which are common in industrial sites across the country, as well as dry cleaning establishments.

Solvents were used in this area to remove grease and oils from met-

al components. TCE and PCE are Dense Non Aqueous Phase Liquids, which means that they are heavier than water, an attribute which allows them to seep through the vadose zone and taint the underlying groundwater. The vadose zone is a porous area between the surface and the groundwater. The pores may be filled with water or air, acting as a natural filtration system.

The M-1 Air Stripper, one of two in the area, operates by pumping air and water into its chamber in opposing directions. As the air reaches the contaminants, the TCE and PCE are transformed into a vapor and discharged from the air stripper stack. Air releases are regulated and monitored in accordance with state and federal requirements. The groundwater is then released back to a site stream, free of solvent contamination.

The M-1 Air Stripper was the first full-scale remediation system deployed to remediate groundwater impacted by solvents.

“The M-1 has proven to be a workhorse system for us. It is extremely reliable and requires minimal effort to operate and maintain,” said Jim Kubar, technical lead for this system.

For the 25 years that the M-1 Air Stripper has been in operation, over 470,000 pounds of solvents have been removed from the groundwater. While SRS continues to evaluate and deploy aggressive technologies for volatile organic compounds elsewhere, the consistent efficiency of the M-1 Air Stripper has proven to be a beneficial technology to SRS personnel. □



Pictured here is the M-1 Air Stripper, an environmental remediation technology that has extracted and remediated more than five billion gallons of groundwater from the Savannah River Site's A and M Areas



Workers from Savannah River Remediation LLC and the Savannah River National Laboratory designed a scaled-down of an underground waste storage tank, pictured here, to explore how a mixer pump would perform.

DOE's New Mixer to Process Salt Waste, Accelerate Clean Up

AIKEN, S.C. – Buying a new mixer is a simple shopping task for most, unless you're the Savannah River Site (SRS) in South Carolina. But then, a new mixer at SRS isn't for use in the kitchen. Its job is much larger: to mix

highly radioactive salt waste stored in underground tanks.

A joint project team of Savannah River Remediation LLC (SRR) and Savannah River National Laboratory (SRNL) research scientists and engineers confirmed performance specifications for four first-of-a-kind mixer pumps that will accelerate the processing of radioactive salt waste at SRS. The \$5.2 million initiative funded by the Recovery Act supports a major Salt Disposition Integration project being undertaken by SRR to integrate the Salt Waste Processing Facility (SWPF).

The mixer pumps are necessary to prepare salt feed for the \$1.3 billion SWPF currently being constructed by Parsons Infrastructure and Technology Company at SRS. The SWPF is scheduled to become operational in 2013 and will be capable of processing 6 million gallons of salt waste annually from the more than 36 million gallons of radioactive waste currently held at SRS.

“Recovery Act funding has ensured we have the necessary infrastructure in place to accelerate environmental cleanup at Savannah River Site.”

*– Project Manager
Keith Harp*

“Thanks to Recovery Act funding, adding the capabilities of the new mixer pumps and the SWPF to current liquid waste operations at SRS will sharply accelerate cleanup activities at this DOE site and help us meet our goals more quickly,” said DOE Liquid Waste Recovery Act Federal Project Director Jean Ridley.

“SRR’s goal to be ready to feed when SWPF comes on line is crucial to meeting DOE’s expectation of closing waste tanks,” said Keith Harp, project manager for the initiative. “Recovery Act funding has ensured we have the necessary infrastructure in place to accelerate environmental cleanup at Savannah River Site.”

The mixer pumps will ensure the salt waste material pumped from the liquid waste tanks to SWPF is of the consistency to be processed in the facility.

The SRR-SRNL team developed a prototypical, scaled-down version of the proposed mixer pump. The one-tenth scale pump, about 4 and a half feet in length, was placed in a similarly-sized waste tank to help develop pump procurement specifications and to ensure the pump will operate as expected.

Materials processed through SWPF will be separated into a high-activity waste stream and a low-activity waste stream. The high-activity waste stream will be converted into a glass form at the Defense Waste Processing Facility while the lower activity waste will be mixed with a concrete-like substance in the Saltstone Processing Facility and stored in nearby vaults. □



WIPP Prepares for \$5.5 Million in New Equipment Paid By Recovery Act Funds



Waste handlers maneuver a 41-ton forklift to place a facility cask on an emplacement machine. These two pieces of equipment will be replaced with Recovery Act funding and maintained for backup purposes.

valve, and a horizontal emplacement machine. RH-TRU waste emits penetrating radiation and must be handled and transported in shielded casks.

Funding for the new equipment is part of the \$172 million WIPP has been allocated from the \$6 billion Recovery Act package.

As of March 2010, Recovery Act funding had employed more than 500 workers at WIPP since the start of Recovery Act projects in April 2009. That figure represents prime contractor and

subcontract workers who have worked on a full-time, part-time, and temporary basis.

Located in the Chihuahuan Desert of southeastern New Mexico, approximately 26 miles east of Carlsbad, WIPP is used to store transuranic waste remaining from nuclear weapons research and testing operation from previous defense activities in the U.S. Waste at WIPP is disposed of in rooms mined from ancient salt formations located nearly a half mile below the surface. □

Carlsbad, N.M. – Using Recovery Act funds, the Waste Isolation Pilot Plant (WIPP) in Carlsbad, N.M., has purchased \$5.5 million worth of new equipment to improve efficiency and reduce downtime while repairs are carried out.

The new equipment, which will arrive in coming months, will replace old equipment that will be maintained for backup purposes.

Designed for use in the disposal of remote-handled transuranic (RH-TRU) waste, the new equipment includes a lightweight facility cask, an alignment fixture assembly shield



Savannah River Nuclear Solutions (SRNS) President and Chief Executive Officer Garry Flowers, updates about 125 stakeholders and members of the nuclear community on the Recovery Act Program at the Savannah River Site. In his presentation to Citizens for Nuclear Technology Awareness (CNTA) on June 15 in Aiken, S.C., Flowers shared strategies for SRS' focus on safety, major Recovery Act projects and first-year progress in terms of Recovery Act workforce investment and completed projects. Flowers explained major Recovery Act projects, including shipping more than 800 cubic meters of transuranic waste to the Waste Isolation Pilot Plant in Carlsbad, N.M., reducing the height of the 293-F Stack, characterizing 24 waste units, remediating 11 release sites, using in-situ decommissioning on three reactors, and the May 25 implosion of K Cooling Tower, the second-largest cooling tower to be demolished worldwide.



Workers excavate and remove a ventilation header that exhausts tank ventilation to the existing ventilation system. It will be replaced with new stainless steel piping.

tanks and vaults. The design is based on the liquid levels that are present now, expected levels based on historic trends, and the equipment's performance rates," said Dan Meess, West Valley Environmental Services Chief Engineer. Meess is leading the Tank and Vault Drying Project.

The two 750,000-gallon carbon steel tanks are encased in their own concrete vaults. The two smaller 14,000-gallon stainless steel tanks share a single vault. They were all installed in the mid-1960s and are connected by an original underground ventilation piping network composed of carbon steel.

The heart of the new system is a dehumidifier that has a moisture-removing substance or "desiccant," on a rotating wheel. It's similar to equipment used to dry air to maintain low humidity levels in convention centers where human breath contributes to overall humidity, or in ice skating rinks where dry air is required to maintain firm ice.

Recovery Act Funds New Equipment

WEST VALLEY, N.Y. – In the fairly humid climate of western New York, where annual rainfall is more than 40 inches, water management is an ongoing concern for the West Valley Waste Tank Farm, which houses four underground waste tanks in three concrete vaults.

High-level waste was removed from the tanks in 2002, but residual low-level radioactive liquids remain. The tanks and vaults also are vulnerable to groundwater infiltration.

With approximately \$4 million of Recovery Act funding, workers at the West Valley Demonstration Project (WVDP) are installing a tank and vault drying system to evaporate the remaining liquids in the tanks and vaults, and maintain a low relative humidity. Drying the waste tanks will eliminate any potential for liquid leaking from the

tanks, and the low, relative humidity will reduce or eliminate future corrosion of the steel tanks.

"The simplest way I can say it is that dry tanks can't leak," stated Bryan Bower, the West Valley Demonstration Project Director.

With an operational design life of 30 years, this system will provide needed time for WVDP officials to make and implement long-term decisions about the decommissioning of the Waste Tank Farm.

Once the system starts up later this year, calculations indicate it will take about three years to remove the remaining humidity from the underground structures.

"We're confident in this system's ability to remove the humidity from the air and dry the remaining liquids in the

At WVDP, the unit is being hooked to an existing high efficiency air ventilation system to safely discharge the moisture removed from the tanks and vaults. Workers are also excavating and removing the 16-inch ventilation header that exhausts tank ventilation to the existing ventilation system. They are replacing it with new stainless steel piping. □



SPRU Draws on Innovation, Recovery Act to Speed Project's Completion

A "rototiller-type" excavator tool led to improved precision in excavation of contaminated soil at the North Field project at SPRU.

NISKAYUNA, N.Y – Innovative equipment and Recovery Act funding are helping advance a project that will remove more than 6,000 cubic yards of radioactively contaminated soil at the Separations Process Research Unit (SPRU).

The North Field soil remediation project at SPRU, which is located at the Knolls Atomic Power Laboratory, was originally slated for completion in 2014. However, \$14.8 million in Recovery Act funding provided for a much earlier completion in November 2010, and also created about 25 jobs.

Accelerated Remediation Company (ARC) has been removing contaminated soil from the North Field area since November 2009 and shipping the waste for disposal to Energy Solutions in Clive, Utah, since December 2009.

While removing the contaminated soil in a frigid New York winter, ARC faced frozen ground in the work area and soil stockpiles, leading to reduced production efficiency. But this obstacle was overcome with the use of innovative equipment.

A "rototiller-type" excavator tool was attached to the arm of an excavator, resulting in improved precision in excavation. This process allowed workers to break up frozen soil to the desired depth, minimizing over-excavation. It also was used to break up frozen soil in stockpiles, making the process of filling lift bags more efficient.

The innovative equipment allowed the project to remain within budget and on schedule. The project is scheduled to be completed by November 2010.

The North Field project is part of a much larger, \$51 million Recovery Act project at SPRU. Additional projects include the decommissioning and decontamination of buildings, which will be completed as part of all Office of Environmental Management legacy work at SPRU in September 2011. □

**FOR MORE INFORMATION ON
EM RECOVERY ACT WORK PLEASE VISIT:**

<http://www.em.doe.gov/emrecovery/>

<http://www.recovery.gov>

<http://recoveryclearinghouse.energy.gov>

EMAIL ANY QUESTIONS OR COMMENTS TO:

EMRecoveryActProgram@em.doe.gov



**U.S. DEPARTMENT OF
ENERGY**

**OFFICE OF
ENVIRONMENTAL
MANAGEMENT**

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)

U.S. Department of Energy

<http://www.em.doe.gov>

1000 Independence Avenue, SW

Washington, DC 20585