EDITOR’S NOTE: The following is a summary of contractor operations at the Idaho National Laboratory Site, managed by the DOE-Idaho Operations Office. It has been compiled in response to a request from stakeholders for more information on health, safety and environmental incidents at DOE facilities in Idaho. It also includes a brief summary of accomplishments at the Site. POC: Danielle Miller, (208) 526-5709.

Idaho Cleanup Project (ICP)

May 10: An unexpected increase in airborne contamination levels were noticed by a Radiological Control Technician monitoring routine debris box repackaging activities at the Accelerated Retrieval Project VII. Operators were immediately directed to place the work in a safe configuration and to egress from the service bay to the transition room. Personnel were surveyed and assisted in the doffing process to the step-off pad. Four workers were found to have clothing or skin contamination. Decontamination was successfully performed and a fact finding was held. [EM-ID--CWI-RWMC-2016-0001]

May 11: An operator at the Advanced Mixed Waste Treatment Project failed to document independent verification of a manual waste drum barcode entry into operating logs following a malfunction of the drum assay barcode reader. Not following the prescribed procedure steps resulted in a lack of Technical Safety Requirement completion documentation for assayed drums, resulting in a Technical Safety Requirement violation. [EM-ID--ITG-AMWTF-2016-0005]

Notable Accomplishments: Idaho Site Cleanup Employees Look Forward to Handling Robotic Arms

Shirley Perez may be the most excited person ready to get her hands on new robotic arms when they are installed in the EM Idaho Site’s Advanced Mixed Waste Treatment Project (AMWTP) boxlines this fall.

Perez is certified to operate the robotic arms and supercompactor in AMWTP, a transuranic waste treatment plant at the Radioactive Waste Management Complex (RWMC), where she has worked since 2004. During that time, Perez estimates she’s cut, ripped apart, and smashed more than 2,000 containers of transuranic waste that came to the Idaho Site from the former Rocky Flats Plant near Denver, a weapons facility EM closed in 2006 after completing a complex environmental cleanup project there.

“That’s the best part of the job, being in control of a robotic arm that can break things up into smaller pieces,” Perez said. “We operate in pairs, with our partner watching and recording every container that we break apart. Who wouldn’t love being able to be productive while flattening containers?”

EM is working to better leverage technology development to reduce time and life-cycle costs associated with its cleanup across the DOE complex. EM focuses on the use of robotics in some of the cleanup’s most hazardous, challenging environments. The program believes there is an
important role for robotics in monitoring, and detecting abnormal conditions, and conducting cleanup, reducing the potential for human exposure to hazardous operations.

Built by a Swedish company, the Idaho Site’s robotic arms will replace existing older model arms that have operated over the past 12 years to help with the treatment of the legacy waste. The arms are located in the AMWTP Treatment Facility’s boxlines, huge concrete and metal hot cells where the containers of radioactive waste are opened and sorted without exposing workers to the hazardous materials inside.

Perez says it takes three months to qualify as a robotic arms operator and at least another three months to become proficient in moving them and using the shear and super clamshell tools designed to perform different functions.

“We’re very skilled in the operations of these arms,” Perez said. “Even to the point where we’re able to turn the individual pages of a magazine with the super clamshell tool.”

EM plans to replace other key AMWTP equipment, including portions of the conveyor system that moves drums, the robotic computer control system for the cranes and drum lidding machines, and new components for the ventilation system, as funding permits.

While the ripping and smashing work will continue with the new robotic arms, Perez is most looking forward to the ease with which the arms’ tools can be changed.

“When Assistant Secretary Monica Regalbuto visited in mid-June, she asked what was the hardest activity operating robotic arms,” Perez said. “Hands down, it’s changing tools on the current arms. It’s a difficult, multi-step process, about as easy as standing on your head. The new arms have the capability of changing tools with a single click and that’s going to make an operator’s life much easier.”

The new robotic arms will increase the productivity of Perez and other employees at AMWTP.

“We’re really, really good at what we do at the RWMC-AMWTP,” Perez said. “RWMC-AMWTP has safely and compliantly treated more transuranic waste than any other project in the country. It’s the only facility in DOE’s complex that has this type of equipment, including our supercompactor. Without a doubt, we’re poised to help the rest of the nation safely and compliantly treat its remaining transuranic waste.”

AMWTP employees have treated and shipped over 57,300 cubic meters of waste out of Idaho.

**Idaho National Laboratory (INL)**

May 2: Life safety system technicians at the Advanced Test Reactor (ATR) Complex discovered that fire alarm signal and receipt transmission capabilities were being interrupted to the Idaho National Laboratory (INL) Alarm center. Compensatory measures were put in place and notification about the fire alarm signal impairment was sent to INL employees in the form of a Facility and Site Services Advisory. [NE-ID--BEA-CFA-2016-0002]

May 2: The Advanced Test Reactor (ATR) Control Room Supervisor declared the confinement function of a confinement door inoperable after receiving a report that the latching mechanism on a personnel door leading into the confinement area was not latching consistently. The ATR
Shift Supervisor requested maintenance support to repair the latch. The ATR was in a planned maintenance outage at the time of failure and the confinement system was not required to be operable. [NE-ID--BEA-ATR-2016-0012]

May 5: The ATR Shift Supervisor declared the confinement function of a confinement door inoperable and requested maintenance support to repair the latch. The ATR was in a planned maintenance outage at the time of failure and the confinement system was not required to be operable. [NE-ID--BEA-ATR-2016-0013]

May 12: Contaminated soil was discovered outside of a contamination area near the Advanced Test Reactor (ATR) evaporation ponds. Pre-work surveys were being performed in preparation for the ATR Complex Warm Waste Evaporation Pond liner replacement project. A radiological buffer area had been established to support surveys of the area surrounding the evaporation pond contamination area. A normally unoccupied area was surveyed and contamination was found in the soil. Following the discovery, the area was posted as a soil contamination area. Surveys of the road around the evaporation pond were conducted and no additional contamination was found. [NE-ID--BEA-ATR-2016-0014]

May 13: The Advanced Test Reactor Control Room declared the Rod Clutch Coil (RCC) power supply out-of-service following an over/under voltage alarm. A maintenance work request was submitted to troubleshoot and repair the RCC power supply actuator. [NE-ID--BEA-ATR-2016-0015]

May 12: A construction worker at Advanced Test Reactor evaporation pond entered a Radiological Buffer Area (RBA) with a forklift without Radiological Control personnel support or proper dosimetry. Work was stopped and the worker and the equipment were surveyed out of the area. [NE-ID--BEA-CFA-2016-0003]

May 29: The programmable voltage standard for the Advanced Test Reactor data acquisition system computer system was showing indications of failure. Failure of this voltage standard would render the lobe power calculating and indicating system unreliable. Reactor instrument and controls technicians replaced the failed voltage standard with a spare, and indications returned to normal. [NE-ID--BEA-ATR-2016-0017]

June 1: The Advanced Test Reactor Shift Supervisor declared a confinement door inoperable after receiving a report that the automatic closure mechanism on the personnel door into the ATR confinement area had failed. Maintenance support to repair the closure mechanism was requested, the mechanism was repaired, and the door was declared to be operational. [NE-ID--BEA-ATR-2016-0018]

June 8: An employee at the Materials and Fuels Complex (MFC) pulled the manual fire alarm after observing a small flame on top of a refrigerator/freezer located in the MFC cafeteria. The flame self-extinguished in approximately 20 seconds. The building was evacuated. The MFC Fire Department responded and assessed the area for additional hazards. [NE-ID--BEA-MFC-2016-0006]
June 13: The Facility Area Supervisor (FAS) at the Willow Creek Building initiated a step back during an escalator repair after recognizing that hazards present during the repair may require a complex lock-out/tag out rather than the lock-out/tag-out addressed in the Job Safety Analysis.

[NE-ID--BEA-STC-2016-0003]

**Notable Accomplishments: Lab evaluates plan for turning municipal waste into energy**

When it came to finding third-party validation, Hydrocore, a company seeking to build a high-temperature furnace that turns municipal waste into energy and marketable byproducts, went back to its roots.

Founded in 2010, the company holds patents to electric arc furnace technology developed in the early ’90s at Idaho National Laboratory. The furnace can effectively burn municipal waste to make electricity via a steam generator, similar to how coal- or gas-fired plants operate. Unlike traditional plants, however, the furnace can break down unsorted trash into its molecular components, which can then be made into transportation fuels or other products. By effectively recycling trash to make marketable materials, the process could reduce consumption of raw materials, which saves energy.

In preparation for a demonstration project in Sevier County, Tennessee, Hydrocore turned to INL and its Technical Assistance Program for scientific validation of the processes it intends to use. The TAP program exists to help small businesses by providing scientific and engineering expertise not readily available in the private sector.

“The TAP program provides up to 40 hours of technical assistance to small technology-based businesses in the areas of nuclear energy, other energy solutions or national security,” said Stephanie Cook, who leads INL’s technology-based economic development activities. “It’s always fun to see the big impact from TAP projects helping small businesses prepare their technology for market launch.”

There were more deeply rooted reasons for seeking INL expertise as well. Hydrocore’s chief technical officer, Tom Eddy, was technical leader of INL’s plasma processing team in 1988, researching and testing various methods to convert hazardous materials into a glasslike waste form. In the early ’90s he left the lab to form a company called MeltTran, which built a prototype melter in Idaho Falls and a demonstration model in South Korea.

MeltTran folded after 10 years because it could not find the funding to build a full-sized plant in the United States, Eddy said. Yet the technology attracted the attention of John Mark Bardsfield, Hydrocore’s CEO, who had conducted independent research in energy technologies at University of Tennessee and Oak Ridge National Laboratory.

He and Eddy teamed up and enlisted INL to help evaluate the prospects for a U.S. demonstration.

The Misty Mountain demonstration project would use Hydrocore’s submerged electric arc furnace to heat municipal waste to temperatures approaching 1,700 degrees Celsius. Such
temperatures can break the molecular bonds that hold atoms together, separating complex wastes into several classes of products. First, pure metals (mainly iron and aluminum) could be recovered. Second, a liquid that cools into a product they call “glasalt” could be used to make tiles or roadbed material. Finally, a simple synthetic gas (“syngas”) could be refined into diesel or jet fuel.

Eddy said the most important aspect of the technical assistance provided by INL is validation of the gasification process, which would use a series of chemical reactions called the Fischer-Tropsch process to refine syngas from the incinerator. In all, Hydrocore received 40 hours of technical assistance estimated to be worth near $10,000. The company wanted a review of the project and confirmation of Eddy’s calculations.

The concept also is of interest to INL because its excess heat can be used to generate electricity, said Nick Soelberg, one of the INL researchers who evaluated the project. This makes it a serious alternative to fossil fuel-fired power plants, reducing greenhouse gas emissions.

Aside from the prospect of making electricity from trash, the furnace’s ability to consume anything — toxic waste, ash and tires, sludge and wastewater, landfill waste — without any sorting is also intriguing. The Misty Mountain project is designed to handle 500 tons of municipal waste daily, and can generate a net excess 3.8 megawatts of electricity. “There’s quite a lot of revenue in there,” Eddy said.

The proposed plant in Tennessee — estimated to cost $77 million — has all the permits ready. The challenge now is finding investors. “If we can get a small one built, we can prove the validity,” Eddy said.