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)

July 5: Radiological contamination was discovered on the boots of a Fluor Idaho welder who had completed weld-repair activities in a retrieval area (RA) at the Accelerated Retrieval Project. Following the detection of contamination on the boot sole, the boots were covered with booties and the Radiological Controls Technicians assisted the welder out of the area. The welder was properly decontaminated following applicable company procedures. No injuries or equipment damage occurred as a result of this contamination. [EM-ID--FID-RWMC-2016-0001]

July 28: A Radiological Controls Technician (RCT) noticed that a Powered Air Purifying Respirator (PAPR) hose had disconnected from a retrieval operator working in the Retrieval Containment Enclosure (RCE) at the Advanced Mixed Waste Treatment Project. Upon discovery, the RCT notified the operator who then immediately exited the area. Upon egress from the RCE, contamination surveys were performed on the PAPR assembly and inside the PAPR hose and hood, nasal swipes were also performed. All surveys and swipes results indicated less than minimum detectable activity. [EM-ID--FID-AMWTF-2016-0006]

August 1: A fuel handling unit being lowered into a storage bucket became un-grappled during remote underwater fuel handling operations in the Idaho Nuclear Technology and Engineering Center (INTEC) Fuel Storage Area (FSA). While lowering the fuel handling unit into the storage bucket, the bottom edge of the fuel handling unit hung up on the top edge of the storage bucket and the grapple foot disengaged. There was no visible damage to the FHU, handling tools, SLS or any other equipment. [EM-ID--FID-FUELRCSTR-2016-0001]

Notable Accomplishments: Construction Begins on Idaho Site’s Final Building for Waste Retrieval- Construction is under way on the ninth and final waste retrieval building at the Radioactive Waste Management Complex. The building will be used for crews to exhume buried Cold War weapons waste generated decades ago at the former Rocky Flats Plant near Denver.

Crews in 2005 began removing the radioactive and hazardous constituents from drums and boxes buried in unlined trenches between 1954 and 1970. Individual steel-framed buildings with fabric exteriors were erected over specific areas of the landfill containing higher concentrations of the targeted waste material. These buildings provide a barrier to prevent any radiological release to the environment during exhumation and protect the workers. Exhumation of the waste is necessary to protect the underlying Snake River Plain Aquifer, the primary drinking and irrigation water source for more than 300,000 Idahoans.

In 2008, the DOE, the Environmental Protection Agency, and the state of Idaho agreed to remove targeted wastes from a combined area of 5.69 acres of the landfill. Fluor Idaho, EM’s cleanup contractor at the Idaho Site, is currently removing targeted buried waste in the eighth
building erected over the landfill. Waste exhumation in that 1.72-acre building is 52 percent complete and is expected to continue into 2017.

EM awarded an $11 million small-business contract to North Wind Services of Idaho Falls. Construction of the ninth building began this summer, and the 0.69-acre structure is scheduled for completion in late spring 2017, with waste exhumation scheduled to start after a readiness review.

“I am extremely pleased with the waste exhumation work that is being accomplished at the Accelerated Retrieval Project,” said Jack Zimmerman, DOE Idaho Operations Office’s deputy manager for EM. “The Accelerated Retrieval Project is two years ahead of schedule and the workers continue to outperform the baseline. The credit goes to the employees, who continue to work towards completion of exhumation efficiently and safely. It is their continued focus that helps ensure ongoing success of the environmental cleanup program in Idaho.”

Crews have removed waste from 4.18 acres, generating the equivalent of more than 35,000 55-gallon drums of material. Once exhumed, characterized and repackaged, the waste is shipped out of Idaho for permanent disposal. Following the completion of waste exhumation, a soil cap will be installed over the unlined trenches.

Idaho National Laboratory (INL)

July 4: An emergency diesel generator high water temperature shutdown alarm was received in the Advanced Test Reactor (ATR) reactor control room. The generator was not running at the time and the water temperature was reading normal. The generator was taken out of service; the ATR was in a scheduled outage at the time. [NE-ID--BEA-ATR-2016-0020]

July 12: The Specific Manufacturing Capability facility complex phone system lost power when an uninterruptable power supply system failed to transfer during an unscheduled power outage. SMC was without immediate emergency response capability due to the outage, as result compensatory actions were taken. [NE-ID--BEA-SMC-2016-0001]

July 25: An Idaho National Laboratory security police officer twisted his ankle while participating in a training exercise. A medical visit later revealed an ankle fracture. Arrangements have been made for the employee to be further evaluated and treated by an orthopedic specialist. [NE-ID--BEA-MFC-2016-0008]

July 26: A bundle of direct buried cables were discovered during construction related excavation activities in support of the Remote Handled Low Level Waste (RHLLW) project. Excavation activities in the area were suspended and further testing by an electrician and a review of the facility drawing indicated that the cables could be power cables. Management noted their concern of a near miss due to potential exposure to an uncontrolled electrical hazardous energy source. [NE-ID--BEA-ATR-2016-0022]

August 10: Contamination was found on an individual during the exit of the suited entry repair area at the Fuel Conditioning Facility. The individual’s modesty clothing was cut and removed and bagged as contaminated. The individual was then frisked and found to be free of contamination. After evaluating the work activity, it was determined that the event occurred because of personnel perspiration and wicking through the anti-contamination clothing.
Management will evaluate the clothing that is used by employees working in the facility during this type of work and make recommendations for change if necessary. [NE-ID--BEA-FCF-2016-0001]

August 12: A research subcontract employee working at a Research and Education Campus (REC) facility left their personal lock box key on the table next to the job lock box when he left at the end of the day. The personal lock box key was discovered by another REC employee. The lock box still had his lock and the job lock on the lock box. [NE-ID--BEA-STC-2016-0005]

August 17: While performing oversight of a Lockout/Tagout (LO/TO), at the Specific Manufacturing Capability (SMC) facility it was determined that individuals working under a LO/TO but had not taken the required on-line training. [NE-ID--BEA-SMC-2016-0002]

August 17: A broken buried electrical cable was discovered during excavation activities at the Advanced Test Reactor Complex. The cable was not located by the subsurface identification equipment and no known facility drawings identified the cable. All work was stopped and the area secured for further investigation. [NE-ID--BEA-ATR-2016-0023]

August 24: One of the diesel generators at the Advanced Test Reactor was found to be displaying several out of specification indications. Initial indications are that there is a failure in the control system for the diesel. The ATR was in a scheduled outage and was defueled at the time of discovery. [NE-ID--BEA-ATR-2016-0024]

August 24: While performing frisking activities on an employee exiting a Radiological Material Area at the Fuel Conditioning Facility, contamination was discovered on an employee’s pant leg and the bottom of their shoe. The articles of clothing were removed from the individual's person and the individual frisked clean. [NE-ID--BEA-FCF-2016-0002]

August 29: A subcontracted employee entered a posted contamination area (CA) at the Advanced Test Reactor without signing in on the proper radiological work permit, or donning the proper personnel protective equipment. All work was stopped and the situation assessed. Radiological controls personnel performed surveys of equipment, personnel, and the working area and no contamination was detected. [NE-ID--BEA-ATR-2016-0025]

**Notable Accomplishments:** University collaboration works toward demonstration project

Oil and gas exploration in Wyoming doesn’t bring only oil and gas to the surface. There’s salty wastewater in massive quantities as well, roughly 1.266 trillion gallons a year. That’s enough to cover an area the size of Connecticut a foot deep, with plenty to spare. Until now, the brine has been disposed of by pumping it back into the ground through injection wells. But in a classic case of “what if?” the U.S. Department of Energy is looking at that water as a possible value-add. Instead of injecting it back into the earth, what if some of the water could be desalinized to where it could be used in agriculture and industry? And what if rare earth elements (REEs) and critical materials such as lithium could be economically extracted, boosting the nation’s domestic supply? Rare earth elements are used in everyday devices such as
rechargeable batteries, cellphones, catalytic converters, magnets and fluorescent lighting. Over the past 20 years, there has been an explosion in demand.

In June 2016, DOE announced four projects to assess the occurrence of REEs and critical materials that may be dissolved in higher-temperature geothermal fluids. Projects are eligible to receive up to $4 million in total funding. Two projects involve Idaho National Laboratory and the Center for Advanced Energy Studies. INL is partnering with Lawrence Livermore National Laboratory in California to use bioengineered microbes in the design of a rare-earth enrichment and separation process. In the second, INL/CAES, the University of Wyoming’s Carbon Management Institute, and the U.S. Geological Survey are developing new methodologies to analyze trace elements in high-salinity brines.

CAES researchers Aaron Wilson and Dan Wendt, along with INL geologists Travis McLing and Rob Podgorney, visited the Cowboy State in mid-June to meet with counterparts at the UW, which has close ties to the state’s oil and gas industry. McLing said their hope remains that the university will be able to play matchmaker with the operator of a drilling site that has the right conditions for demonstration projects to be developed between now and 2019. In 2015, INL received $1 million from DOE’s Office of Energy Efficiency and Renewable Energy to study desalinization using switchable polarity solvent forward osmosis (SPS-FO), a patented technology Wilson and his INL colleagues have pioneered. With SPS-FO, water from the brine permeates through a membrane. A more concentrated solution on the membrane’s far side draws freshwater away from the salt, producing water clean – enough to be used at least for irrigation. For the “further processing” to work, however, the process needs an energy input. This is where geothermal heat from the subsurface enters the equation.

For a successful pilot, there is a Goldilocks consideration on two fronts: The water can’t be too hot or too cold, and it can’t be too saline, McLing said. Once the technology is successfully piloted it, can be applied to a wider range of brine conditions. Last of all, they need a willing partner.

The economics makes sense in two ways. “They’re already producing water anyway, and they have to pay to dispose of it,” McLing said. “If they can take the water that’s being produced anyway and process it, it can be used for irrigation instead of being injected. Water has a fair amount of value.”

Sampled from sandstone and dolomite rock reservoirs at subsurface depths of more than 11,000 feet, Wyoming’s brines have been shown to contain elevated concentrations of REEs and other strategic trace metals. But in Wyoming and elsewhere, the concentration and character of REEs in oil and gas thermal waters and many traditional geothermal systems is largely undefined. The project will investigate the REE concentrations in the following ways:

- Refining methodologies for analysis of trace REE concentrations in saline, including the challenge of treating hydrocarbon-based compounds and contaminants, and working with limited sample quantities.
- Characterizing REE concentrations relative to differing reservoir conditions and locations.
• Screening parameters and developing models to identify reservoirs with high REE and geothermal potential. This project will define the REE and trace metal character of produced water in numerous geologic regions, identify subsurface variables that likely affect REE concentrations, and provide screening models to identify high-priority reservoirs.

For McLing, who has had a relationship with UW since he began researching brine salinity in 2007, the projects represent opportunities to pioneer research that has never been done before.

“We need a demonstration project, something without a whole lot of knobs to turn,” he said. “If you’re learning to frame, you want to start with a shed, not a mansion. But we believe it has tremendous potential.”