JULY 2015

SAVANNAH RIVER NUCLEAR SOLUTIONS

SRNS Today

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A little plutonium goes a long way in space exploration

Also this month

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Carol Johnson
SRNS President and CEO

Welcome
to the July 2015 edition of
SRNS Today

Video: H Canyon

To see the H Canyon segment of our video series "Why SRS Matters," please click here or visit www.savannahrivernuclearsolutions.com/annual/Why_H-AREA_Matters.mp4

To go where no one has gone before. It was the mission of "Star Trek"s U.S.S. Enterprise. And now, science fiction is reality.

As you've probably seen in the media, a small spacecraft called New Horizons is flying by Pluto, sending back amazing images of this on-again, off-again planet from the outside edge of our solar system. Launched nine years ago, New Horizons is powered by plutonium-238 oxide produced in H Canyon at the Savannah River Site. New Horizons will continue its journey beyond Pluto and into space. To know that a power source born at SRS has enabled this tiny speck of technology to sail into the endless universe is nothing short of magical.

Our U.S. space program is fueled by science and inspiration. So are the technologies created and employed at SRS. Savannah River National Laboratory is continually recognized for ingenious methods of improving our world and making it safer. Recently, two SRNL technologies were spotlighted at the 2015 National Innovation Summit and Showcase, a Washington, D.C., event for emerging technologies, start-ups and research. SRNL has also been named to lead the National Analytical Management Program and serve as head of DOE's Environmental Response Laboratory Network Coordination Office, the central point of contact for highly-specialized analytical capabilities in case of a large-scale radiological emergency.

Science and inspiration are also at the heart of the many avenues SRNS explores to bring science, technology, math and engineering education to area students. Although we're deep into summer, educational opportunities never end. SRNS is dedicated to bringing science and students together to inspire the next generation of visionaries.

I hope you enjoy this edition of "SRNS Today." As always, thank you for your interest in Savannah River Nuclear Solutions.

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how SRS went to Pluto

A little plutonium goes a long way in space exploration

Yes, SRS plutonium has gone to Pluto. Pluto-nium. Gotta love it.

The HB Line and H Canyon facilities at SRS processed and produced the plutonium-238 oxide used to power NASA's New Horizons space probe. In July, New Horizons completed an historic flyby of Pluto, providing the world with the first-ever close-up views of our most distant planet.

SRS restarted the plutonium-238 oxide line in 1991 to produce the oxide for NASA's Cassini space mission. Cassini was built to explore the Saturn system. Because this unmanned mission would take many years and needed to travel vast distances, NASA needed a long-lasting, compact and incredibly reliable power source.

To solve that problem, plutonium inside three radioisotope thermoelectric generators (RTGs) was used. RTGs take the heat from the radioactive decay of plutonium-238 and convert it into electricity. The RTG used for New Horizons currently produces about 200 watts of electrical power.

Over 27 space missions have used RTG power sources, including 10 in Earth orbits, five moon missions, three Mars missions and nine planetary missions.

The same type RTG used in Cassini was used to power New Horizons. RTGs are rugged and reliable, with no moving parts to wear out or break, making them the perfect power source for the spacecraft. The Pluto trip was three billion mile journey that has taken 9.5 years.

Both Cassini and New Horizons have completed their primary missions, but they are still functional. Cassini will continue to survey Saturn's rings and New Horizons will continue to probe into deep space for many years to come.

The New Horizons Space Probe (shown in construction) is powered by a radioisotope thermoelectric generator (the black, finned extension at left).

Plutonium-238 radioisotope heater units (RHUs) also use plutonium from SRS. RHUs do not produce electricity; they are only used as a heat source. Mars Rovers Spirit and Opportunity are solar powered, but use RHUs to keep axle grease from freezing.

SRNL chosen to lead national analytical program, DOE environmental response coordination office

With the change in leadership, SRNL Fellow Scientist Cecilia DiPrete is the Program Director and Tony Polk is the DOE Management Sponsor.

Laboratory networking through NAMP supported sample analysis during recovery efforts at the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. NAMP efforts at WIPP also led to biological samples being sent to the Centers for Disease Control for analyses to help restore community confidence. Internationally, NAMP made available a list of network laboratories with radiological capabilities following the nuclear release in Fukushima, Japan.

SRNL is uniquely qualified to assume leadership of NAMP because of the laboratory's proven experience supporting nuclear science, environmental management and security missions. SRNL is also experienced with successful strategic partnerships and influence on national policy councils.

"SRNL and NAMP will strengthen the preparedness for a large-scale radiological emergency response, develop innovative ideas, and devise workable solutions to ensure the next generation of nuclear and radiochemists is adequately trained and prepared," said DiPrete.

As part of its new responsibilities, SRNL will help promote NAMP through both national and international partnerships with private companies, laboratories and governments. Future objectives of NAMP include identifying strategic opportunities for enhancing the network, and addressing technological and resource needs such as laboratory standards and the standardization of laboratory methods.

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>
> Cecelia DiPrete

Disposal of concrete culverts completed ahead of schedule

SRNS has safely disposed of nearly 100 large concrete culverts, and saved space in the process. The culverts are eight feet in height and seven feet in diameter, and resemble concrete storm water drainage piping. Most of the culverts are slightly contaminated because of previously stored radioactive waste.

"This is a good example of how we work smart at SRS."

James Folk

By carefully breaking the culverts into smaller pieces, their overall size and shape was reduced. SRNS then safely disposed of the culverts in half the amount of space than originally expected.

The disposal areas are covered with a deep protective layer of soil within an engineered trench. All aspects of the project were conducted according to regulatory standards.

DOE-Savannah River Operations Office Acting Assistant Manager for Waste Disposition James Folk believes that this space-saving concept was a clever idea. "This is a good example of how we work smart at SRS, wisely using the resources at hand when possible," said Folk.

Al Rodriguez, First Line Manager, SRNS Solid Waste, inspects concrete culverts.

The original schedule provided a year to complete the disposal of the first 100 culverts; however, the task was finished five months ahead of schedule. One hundred culverts continue to be stored at the Site's E Area and will also be processed and buried, when a plan and schedule have been created and approved.

BioTiger™ increases oil yield from oil sands

SRNL technologies featured at national showcase

Two innovations from SRNL have been featured at the 2015 National Innovation Summit and Showcase, a Washington, D.C., event that spotlights emerging technologies, start-ups and research.

BioTiger™, is a biocatalyst made up of a proprietary, carefully balanced combination of bacteria that destroys or mitigates complex petrochemicals and heavy metals. BioTiger™ can remove oil residues on surfaces such as concrete and building foundations, and has commercial potential for increasing oil recovery from oil sands without adding chemicals. BioTiger™ has been licensed by Opportunities Group, LLC, an Aiken, S.C., startup company.

Titanium-Based Materials as Bactericides, an SRNL patent, shows promise for the health care industry as a means of safely suppressing the growth and formation of bacterial infections. The research is an offshoot of collaborative work by SRNL that led to chemical processing efficiencies for radioactive waste disposal.

Michalske named national lab director of year by DOE small business office

Dr. Terry Michalske

Dr. Terry Michalske has been selected National Laboratory Director of the Year by the Department of Energy's Office of Small and Disadvantaged Business Utilization (OSDBU) for his work encouraging and promoting small businesses at SRNL.

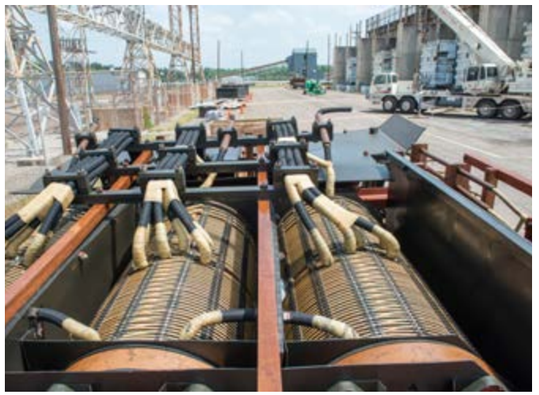
"I've had the opportunity to work with Terry, and I appreciate his hands-on leadership in SRNL's support of small businesses," said OSDBU Director John Hale III. "He uses collaborative approaches to engage small businesses so they can help the laboratory perfect its technologies and processes in the nuclear environment."

Hale, who introduced the laboratory director award as a new category this year in the Secretarial Small Business Program, chose Michalske for the honor. It recognizes successful directors who display leadership and commitment to maximizing small business utilization through policies, procedures, outreach and the creation of an atmosphere of "small business first" in their organizations.

"Small businesses are the cornerstone of our nation. As a national laboratory, it is our responsibility to encourage economic development and foster good relationships with our small businesses," said Michalske. "The strength of a national laboratory is its people and partnerships. By joining hands with small business, we are able to have the flexibility and attention necessary for advances in clean energy, national security and environmental management. Without our small business partners, we would not be able to successfully fulfill our role in advancing science for the nation."

U.S. House Science Committee visits SRNL, H Canyon

Members of the U.S. House Science Committee visited SRS on July 17. Welcomed by SRS executive team members, the committee received an overview and tour of SRNL followed by a drive-by tour of H Canyon. Pictured are (from left) Terry Spears, Deputy Manager, DOE-Savannah River Operations Office; Mark Marin, Director of Operations, Subcommittees on Energy and Environment; Collin Carr, Legislative Assistant for Congressman Loudermilk; U.S. Congressman Barry Loudermilk of Georgia; Dr. Terry Michalske, SRNS Executive Vice President and Director, Savannah River National Laboratory; U.S. Congressman Randy Weber of Texas; U.S. Congressman John Moolenaar of Michigan; Sarah Beaulieu, Aiken-Barnwell Region Director; Congressman Joe Wilson of South Carolina; Aaron Weston, Counsel, Subcommittee on Energy; and Sharon Marra, SRNS Senior Vice President and Deputy Director, SRNL.



SRNS subcontractor workers remove huge, industrial transformers used for decades at a now closed powerhouse at SRS.

Something to CRO about

Excess equipment at SRS bolsters CSRA economic vitality

One man's trash is another man's treasure. In this case, the Savannah River Site's unneeded equipment and excess materials are financially benefiting the local area.

SRNS is working with the Department of Energy (DOE) in partnership with the Savannah River Community Reuse Organization (SRCRO), a non-profit organization, to turn no longer needed equipment and material into money to benefit Aiken, Allendale and Barnwell counties in South Carolina, and Richmond and Columbia counties in Georgia.

"There are items for nearly all types of applications within an industrial setting," said Andy Albenesius, SRNS Site Services Program Manager. "Examples could include small items such as office equipment to large items of potentially much greater value like electrical turbines, diesel powered pumps, fire engines and tons of metal. Many of these are quite old and use antiquated technology."

"By taking items in excess of Site needs, the SRSCRO serves as our interface organization that sells them and uses the proceeds for the economic good of numerous businesses found throughout a large region surrounding SRS," added Albenesius.

Approximately $400,000 annually was generated in recent years through the sale of surplus items. The proceeds are invested back into the five-county region near SRS for clearly defined economic development and workforce related purposes.

Last year alone, the SRSCRO was able to disburse $1 million for designated infrastructure improvement projects in the region.

Examples of funding use include assisting with site preparation work for the construction of a 100,000 square foot speculation (spec) building within the Sage Mill Industrial Park near Graniteville, S.C. Funds were also used to help purchase land to add to the Pointe Salkehatchie Industrial Park in Allendale County, S.C., and to assist with the construction of a spec building in the South Carolina Advanced Technology Park in Barnwell County, S.C.

SRNS is working with the SRSCRO on an "assets for services" test project to remove and dispose of aged trailers formerly used as temporary offices at SRS. This project involves SRSCRO removing the trailers at no cost to taxpayers and in return, receiving assets such as transformers from a now-closed power plant in D Area.

Normal disposal costs for a single SRS trailer are as high as $45,000. "The resources needed to remove utilities, uninstall support infrastructure, demolish and transport a trailer to a landfill is costly," said Albenesius. "With this initiative, the program has achieved nearly $300,000 in cost avoidance for SRS."

The SRS locomotive is lifted up so that old wheels could be removed (photo below) and new wheels installed.

Need a lift?

SRNS Site Services heads team puts new wheels on an SRS locomotive

When a 130-ton locomotive needs a new set of wheels, it's no simple task.

The locomotive in question is used at SRS to transport shipments of spent nuclear fuel and low level waste to different areas on Site. The wheel replacement required the locomotive to be hoisted five feet into the air so the old wheels could be removed.

"Because we've never done a job like this, we looked at several options," said Freddie Hartzog, manager of SRNS Site Services (SS) Rigging and Crane Operations and Inspections. Hartzog's team consulted off-site vendors who perform this type of work routinely.

"They are the experts when it comes to jobs like this, so it was important to hear their recommendations," said Hartzog. "And they were more than willing to offer their support, which was great. We really wanted to know how they would tackle a job of this size. Their eagerness to answer questions and provide guidance was invaluable."

Renting a crane can be expensive, and most require a three- to six-month lease at an average cost of $50,000 per month. Fortunately, the team was able to coordinate with E Area Burial Ground personnel to use a 275-ton Kobelco crane and Mantowoc 41000 crane which were staged and available.

The actual lift only took a matter of days from staging equipment to the lift itself. The wheels from the train were released to an off-site vendor for repair.

A number of SRNS organizations teamed up to complete the change-out, including SS Rigging, SS Planning, Safety, E Area Operations, SS Portable Equipment Commodity Management Center and Engineering.

"You read about it and hear it in meetings, but to see a true example of teamwork and coordination in the field was impressive," said Paul Mura, SS Rigging First Line Manager. "Different crews, different crafts working seamlessly together…It was an extraordinary experience."

Hundreds of students benefit from the "SRS Traveling Science Program," in which volunteers conduct demonstrations and experiments for area educators and students.

Making the grade

SRNS Education Outreach programs enlighten students, equip teachers

The total impact SRNS has had on the Central Savannah River Area's education systems each year is immeasurable. During the past school year, hundreds of schools and more than 27,000 students and teachers were directly affected by SRNS education outreach programs and events.

"They impact an amazing number of teachers and students each year through grants, scholarships and inspiring learning opportunities," said Dr. Liz Stewart, Public Education Partners Board Chair. "The SRNS Education Outreach Program is a highly valued resource that enhances our school systems in many ways."

Since SRNS became the management and operating contractor in 2008, more than 175,000 students and teachers throughout the eight counties near SRS have benefitted from their dedicated efforts to help local students and assist area educators.

SRNS President and CEO Carol Johnson noted that investing in local students is also an investment in those who one day may be SRS employees. "Our programs are developed to enlighten young minds and further equip our talented teachers. Ultimately, the heart of any school is their teachers," said Johnson. "We must continually look for ways to help them be successful."

Many programs offered annually by SRNS are based on learning through friendly competition. They include the CSRA Science Fair, DOE Savannah River Regional Science Bowl and the Future City Competition.

The Innovative Teaching Mini Grants Program provides financial assistance to area teachers through corporate funding provided by SRNS community giving. This competitive program provides grants

> *"Ultimately, the heart of any school is their teachers. We must continually look for ways to help them be successful."*
>
> **Carol Johnson**

to CSRA public and private elementary and middle school teachers for innovative ideas. During this past school year, grants for more than 150 teachers, totaling $75,000, were awarded.

Thousands have benefited from SRNS education outreach programs which stress the importance of science, technology, engineering and math (STEM). These STEM-intensive initiatives include the Traveling Science Demonstration Program, Science & Technology Enrichment Program, Innovative Teaching Mini-Grants, Introduce a Girl to Engineering and various workshops, tours, lectures and demonstrations.

One of the SRNS events that reach the most students each year is the popular CSRA College Night, coordinated and managed by SRNS personnel. Last year, over 6,000 area high school students participated in this annual event held in Augusta, Ga. More than 150 colleges and universities typically attend College Night. Over the years, more than $275,000 in scholarship funding has been offered to students attending CSRA College Night.

With the help of hundreds of caring volunteers, SRNS is proactively striving to assist local educators to help children grow in knowledge while learning important life lessons.

Intern and Georgia Regents University senior Zuhib Daud (right) explains the features of a newly designed SRS intranet web site to mentor Jerrod Farrel of SRNS Information Technology. Daud is one of more than 100 student interns employed this year at SRNS.

SRNS intern program provides well-rounded experience, career pathway to students

Since 2008, on average, over 100 student interns have been employed annually to assist SRNS with management and operations responsibilities.

"We recruit high-value interns with the intent of developing them into future members of the SRNS family," said Nate Diakun, SRNS Intern Program. "We just completed the process of hiring 113 college students, both undergraduates and postgraduates, as interns at SRS. Most will be with us throughout the summer months."

Last year alone, 41 former interns were hired as full-time employees.

"We've found word of mouth to be the best form of advertising. Word has spread that SRNS treats their interns as professionals, essentially, as equals to their full-time coworkers," said Diakun. "We know that the interns are evaluating us as well, looking us over very carefully as potential employers. The caliber of students we're attracting has been impressive."

Diakun explained that, for the most part, the recruiting process starts at college career fairs held locally. "We believe it's important to look locally first, and then visit about eight to ten universities outside the greater Aiken-Augusta area," said Diakun.

Though SRNS interns are usually trained within one specific professional discipline, such as engineering, finance or laboratory research, each is also exposed to multiple missions associated with SRS. This approach has yielded well-rounded new employees who understand the complete work scope at the Site, not just one small part.

According to SRNS intern and Georgia Regents University senior Zuhib Daud, as he grew up he found he had a love for art and computers. As an adult, he has combined the two and has shared his expertise involving website development with SRNS. To date, Daud has created multiple new sites for the SRS intranet and plans to pursue a career in this field.

Daud noted that working at SRNS as an intern has opened new worlds of knowledge and skill. His mentor, Jerrod Farrel of SRNS Information Technology, said he was pleased with Daud's contributions, stating that Daud has brought much needed abilities to the group, fulfilling an important and valued role.

CREATEng students participate in a timed experiment involving helium-filled balloons, paper clips and rice at Aiken High School, all part of an S.C. Governor's School program to encourage careers in engineering.

SRNS donates funds to support engineering camp

SRNS recently donated $15,000 to help ensure the success of "CREATEng," a program developed and conducted by the S.C. Governor's School for Science and Mathematics (GSSM). CREATEng is a one-of-a-kind, four-day immersion into engineering and design-based thinking for students across South Carolina.

Working in teams at host site Aiken High School, students engaged in a problem-based curriculum where they applied principles of engineering designed to solve daily challenges. Participating eighth and ninth grade students were exposed to skills needed to pursue careers related to science, technology, math and engineering (STEM).

The GSSM mission and SRNS' goal to sponsor and manage highly effective and dynamic programs complement one another. Educational programs like CREATEng actively engage and provide students with a wealth of opportunities to learn about careers in engineering and other STEM-based occupations.

"We are thrilled to be a primary sponsor for CREATEng," said Candice Dermody, Manager, SRNS Education Outreach and Talent Management. "We want to fan the embers of learning into flames early in life, proving the value of a good education, and in the process, hopefully, placing these amazing young men and women on a path that will ultimately lead to a career at SRS."

SRNS salutes Tom Hightower for 45 years of service

Tom Hightower was recognized recently for 45 years of service at SRS.

Hightower is an SRS Fellow Engineer, and during his career, has worked in varied roles in SRS organizations including Reactor Technology, the Savannah River National Laboratory, Waste Management and Environmental Remediation, High Level Waste Division, Closure, and Management and Operations.

"For the past 45 years, Tom has led a well-rounded career, developing and executing plans to ensure our nuclear facilities operate safely. His lifetime of experience and expertise is an invaluable asset to our company," said Carol Johnson, SRNS President and CEO.

For the first half of his career, Hightower supported Reactor Operations, serving as the P Reactor Area Engineer where he developed automated methodology for performing reactor safety analyses and managed safety analyses and associated operating limits for monthly P, K and C Reactor fuel cycles. He also supported the development and implementation of "Diagnosis of Multiple Alarms Logic System," the first practical application of artificial intelligence to nuclear reactors in the U.S. Hightower served on the select DuPont Corporate team supporting the Nuclear Regulatory Commission Licensing Branch in the aftermath of Three Mile Island.

During the second half of his career, Hightower has supported non-reactor activities, leading safety documentation activities for Waste Management and Environmental Restoration facilities. He was part of an original team that pioneered the implementation of the SRS Price-Anderson Amendments Act (PAAA) in 1995. He currently serves as the SRNS PAAA Enforcement Officer.

SRNS President and CEO Carol Johnson congratulates Tom Hightower on his 45 years of service at SRS.

Hitting a home run for United Way

Blair Warren (middle) and SRNS employee Nyle Elmquist (right) wait for the pitch while Fred Dohse, SRNS Executive Vice President and Chief Operations Officer, umpires a game during the 11th annual SRS Softball Tournament at Citizens Park in Aiken, S.C. The tournament benefitted local United Way agencies, and raised over $24,000 for the cause. SRNS coordinated the event, which included 15 teams from all five major contractors at SRS.

SRNS intern Garrett Hall demonstrates an ultrasonic flowmeter, a device used to measure water flow, to Nayantara Ojha, math teacher at Allendale Fairfax (S.C.) High School.

Area teachers receive a learning TREAT

Teachers from area schools gathered on July 8-10 for the 18th annual TREAT (Teaching Radiation, Energy and Technology) workshop at the University of South Carolina Aiken.

Sponsored by the U.S. Department of Energy, TREAT workshops provide an opportunity for kindergarten through 12th grade teachers to learn about careers in the engineering, nuclear and environmental fields, so teachers can take information back to their students.

The workshop included an overview by the S.C. Department of Health and Environmental Control, followed by a presentation on "An Overview of SRS Surface Water Flow Monitoring" by Teresa Eddy of SRNS Sample Data Management. During the environmental monitoring session, SRNS intern Garrett Hall gave a demonstration on how to use an ultrasonic flowmeter and use area velocity measurement data to determine water flow.

Teachers also heard a presentation on "The Basics of Radiation" by Buddy Crowder of SRNS Health Physics Services.

"People who grew up in this area may not realize the diversity of job opportunities available. You don't necessarily have to move across the country to find a career that interests you and plays to your strengths. The workshops have allowed me to learn more about careers at the Savannah River Site, and it's right here in the CSRA," added Jennifer Ward, an eighth grade math teacher at Evans Middle School.

SRSLA honors SRNS employees

SRNS leaders were honored at the SRS Leadership Association (SRSLA) annual awards event.

Donald (Donny) Barfield, SRNS H Area Maintenance Manager, was named Leader of the Year. Barfield was nominated by colleagues as "a leader of unmatched integrity who is respected and admired by all in his organization." In the words of his nominator, "He sets high standards for performance, accountability, and ethics, and then leads by example."

Christian Solum of SRNS Packaging and Transport Services was named SRSLA Member of the Year for his spirit, hard work, and dedication, enthusiastically volunteering to assist SRSLA whenever and wherever there was a need.

Lee Schifer of SRNS was also recognized for his service as SRSLA President for 2014-2015.

The awards were presented at SRSLA's annual banquet, held to recognize excellence in leadership from across the various SRS organizations.

College Night is Sept. 10

High school students will have an opportunity to meet recruiters from more than 140 colleges and universities and win scholarships totaling approximately $12,000 at CSRA College Night.

The popular annual event is set for Thursday, Sept. 10, 5-8:30 p.m., at the James Brown Arena, Augusta, Ga. Admission is free and open to the public. Last year approximately 6,000 CSRA students, parents and guidance counselors attended the event.

College Night provides a way for CSRA students and parents to obtain information on educational opportunities, admission requirements and tuition; attend financial aid seminars; visit a career exploration area and a counseling center; and speak with members of various professional societies.

A large number of the College Night volunteers are SRS employees. DOE-Savannah River is a major sponsor of this event.

To qualify for a College Night scholarship, students must be high school juniors or seniors and graduate with a GPA equal or above 2.5 on a 4.0 scale (or equivalent). Students must attend and register in person at CSRA College Night to be eligible.

For more information, visit the SRS web site at http://www.srs.gov, click on Outreach, then Education Outreach Programs, then CSRA College Night.

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