TRTR NEWSLETTER

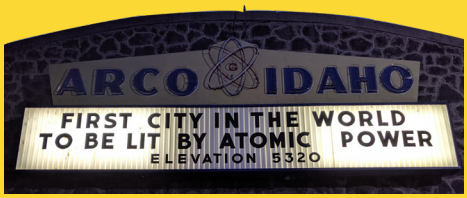
QUARTER 4 2019

IN THIS EDITION

2019 QUARTER 4

ON THE COVER

Top: INL Neutron Radiography (NRAD) reactor core, left: INL Advanced Test reactor core, right: INL Transient Reactor Test Facility (TREAT) reactor core.



BACK PAGE

During the recent TRTR 2019 conference we visited Arco, Idaho where we tried the famous Atomic Burger.

MESSAGE FROM THE OUTGOING CHAIR

Amber asked me to write an outgoing, former Chairs' message. So, first a quote:

> "'All right,' said the Cat; and this time it vanished quite slowly, beginning with the end of his tail, and ending with the grin, which remained some time after the rest of it had gone."
> Lewis Carol, Alice's Adventures in Wonderland

Looking back over 2019, we had some successes but also reminders of the fragility of the DOE support for university research reactors. TRTR facilities were cut out of funding from NEUP for research reactor infrastructure when some DOE funds were redirected for new priorities. Thankfully, the 2020 budget sets a minimum NEUP investment of $40M and requires a quarterly report to Congress on the status of NEUP and the university projects funded.

It is important that university reactors receiving assistance provide detailed status reports to your INL program managers to support these briefings. They need sufficient information to communicate the reliability improvements and strengthening of the basis for long term operation of the university reactors. While there are plenty of advocates for university nuclear engineering programs, those supporting the continued operation of the academic

SEAN O'KELLY
OUTGOING EXECUTIVE COMMITTEE CHAIR

program's research reactors are a smaller group within the Nuclear Energy Department Heads Organization (NEDHO) community and the government. Each facility director or senior manager should continue to communicate to their university the importance of these assets.

Going into 2020, we will continue to work to maintain the confidence from our university or facility management that we place safety as our primary operational focus. This can be shown by the quality of our work as demonstrated in the conduct of operations and maintenance. It is true that an incident or event at any of our facilities reflects on us all. Some of you may remember (for those who don't, it's on-line) the ABC News investigation about security at U.S. university research reactors in 2005. It took more than a year for us to recover from that and it changed risk perception at several universities.

I was glad to serve the TRTR community as Chair in 2019. I hope I made a difference and I look forward to continuing to support TRTR, directly or indirectly, in the future.

Sean O'Kelly
Associate Laboratory Director
Advanced Test Reactor Complex
Idaho National Laboratory

MESSAGE FROM THE CHAIR

Happy 2020 TRTR Community!

There are a lot of exciting things going on with TRTR and I'd like to share a few of those with you. Firstly, preparations are well underway for the 2020 Meeting, to be held on September 27-October 1. Located in downtown Chicago at the Swissotel, it will be a venue with amazing sights and things to do. More information will be posted on the website soon where you can book a room, sign up to sponsor the meeting, and more.

Brenden Heidrich, in conjunction with Jeff Geuther, Matt Lund, Bruce Meffert, and myself finalized our NSUF University Research Reactor Fitness Study Report in December of last year. That report outlined some of the high priority issues facility the community including infrastructure, regulation and licensing, staffing and knowledge transfer, utilization and relevancy.

CLIVE TOWNSEND
EXECUTIVE COMMITTEE CHAIR

The document will be disseminated to the community soon, looking forward in 2020, a TRTR white paper and gap analysis report will be created. If you believe an item was overlooked or understated, please reach out to any of the authors with your concern. New policies approved by the DOE-NE (if any) will hopefully be ready for announcement at the 2020 TRTR Annual Meeting.

2019 also saw the exit of former branch chiefs Al Adams and Tony Mendiola from the research reactor regulatory group. Thank you both for your time in the community!

Finally, I'd like to highlight the great work and service to the community of the 50.59 Working Group led by Tom Newton. A group of individuals have been working to streamline and normalize the 50.59 process for all member facilities. Their document should prove to be an impactful component in the management of the fleet of reactors.

If you ever have any questions, comments or concerns, please reach out to me at clive@purdue.edu.

Thank you and have a great 2020!

Clive Townsend
Reactor Supervisor
Assistant Lab Director
Nuclear Engineering
Purdue University

MESSAGE FROM THE EDITOR

I would like to thank everyone who participated in the newsletter survey. I have very much enjoyed working on this creative effort over the past year and look forward to implementing some changes in the coming year.

The layout has been one of the most fun parts of each newsletter. This year might see the addition of some web content! I am also looking to showcase more of the diverse talent and research that can be found at our reactors.

New in this newsletter is a section on people leaving the community. If you know of someone that should be featured, please send me an email TRTRnewsletter@isotopictopics.com.

Many of you may have heard that Thermo Fisher Scientific discontinued offering Neutron Flux Monitoring Systems effective October 2, 2019. Spares, maintenance, and support are expected to continue through 2024 out of the Thermo Fisher facility in Oakwood Village, Ohio.

AMBER JOHNSON, EDITOR
DIRECTOR
UNIVERSITY OF MARYLAND
RADIATION FACILITIES

LUKE GILDE, CONTENT EDITOR
REACTOR OPERATIONS MANAGER
UNIVERSITY OF MARYLAND
RADIATION FACILITIES

In order to understand how this loss will affect the community, please complete our on-line survey. If you should have any questions, contact Brenden Heidrich, brenden.heidrich@inl.gov.

NEWS

NRC CONSIDERS REDUCING INSPECTION REQUIREMENTS AT POWER REACTORS

The NRC staff has recommended that the inspection requirements at power reactors be reduced as a cost cutting measure. They cite the excellent safety records at most plants; however some are worried about a reduction in performance if inspection requirements are reduced. [More]

NEW LEADERSHIP FOR MIT REACTOR

A team consisting of Gordon Kohse, Jacopo Buongiorno, and Lance Snead will replace David Mocton as director of the MIT Nuclear Reactor Laboratory. [More]

EXPOSURE INSTITUTE AT SYDNEY NUCLEAR FACILITY

2 ANSTO workers exceed dose limits in a Mo-99 contamination incident. [More]

15 OPERATORS LICENSED AT UAE REACTOR

The first 15 Reactor Operators and Senior Reactor Operators for the country's 1st nuclear power plant. [More]

ROYAL MILITARY COLLEGE OF CANADA S SLOWPOKE REACTOR TO BE REFUELED

The Canadian Nuclear Laboratories has been awarded a contract to refuel the Royal Military College of Canada's (RMC) Slowpoke-2 research reactor. The refueling should allow the 20 kW reactor to operate for another 30 years. [More]

NUSCALE TO BUILD 3 SIMULATORS

NuScale has received DOE grants to build reactor simulators at Oregon State University, Texas A&M, and in Idaho Falls for a consortium of Idaho National Laboratory, Boise State University, Idaho State University, the University of Idaho, and the University of Wyoming. [More]

HOMEBUILT RASPBERRY PI REACTOR SIMULATOR

Mark Wright has worked for over 30 years building a PWR power plant simulator. [More]

Y-12 SUPPORTING MO-99 PRODUCTION FACILITY

The Y-12 National Security Complex is supporting Coquí Radio Pharmaceuticals to develop a Mo-99 production facility at the Heritage Center in west Oak Ridge. [More]

FUEL ORDERED FOR VOGTLE UNIT 3

Georgia Power has ordered fuel for Vogtle unit 3, the reactor under construction in Georgia. When completed, the reactor will be the first new power reactor in the US in over 30 years. [More]

UPCOMING EVENTS

JANUARY 16–17, 2020

International Conference on Nuclear Engineering and Nuclear Technology
July 28-31, 2019

Bangkok, Thailand

JANUARY 31, 2020

Women in Nuclear UK Conference

London, England

FEBRUARY 10–14, 2020

International Conference on Nuclear Security

Vienna, Austria

MARCH 22–26, 2020

European Research Reactor Conference

Helsinki, Finland

MARCH 29–APRIL 2, 2020

Physics of Reactors Conference

Cambridge, England

APRIL 8–9, 2020

International SMR and Advanced Reactor Summit

Atlanta, Georgia

APRIL 23–26, 2020

USA Science and Engineering Festival

Washington, DC

REED COLLEGE LEADS THE NATION IN PERCENTAGE OF GRADUATES WHO EARN PHDS

A new study has found that Reed College, home of the Reed Research Reactor, has the highest percentage of its graduates go on to earn PhDs. Roughly 38% of Reed graduates go on to get PhDs. [More]

SANDIA DEVELOPS NEW METHOD FOR COOLING CORIUM

Scientists at Sandia National Laboratory have developed a new method for cooling molten corium by using granular carbonate materials to make the material porus and cool it down. [More]

SHINE LICENSE APPLICATION ACCEPTED

The NRC has accepted SHINE's Operating License Application to operate its medical isotope production facility. The NRC will now begin its technical review of the license application. [More]

KANSAS STATE REACTOR FEATURED

The Kansas State reactor was profiled in Electronic Design. [More]

FUKUSHIMA 50 FILM DUE TO BE RELEASED IN 2020

A new movie on the workers who stayed behind to manage the Fukushima Daiichi Power Plant following the 2011 disaster is due to be released in 2020. [More]

HFIR RESTARTS

Following a nearly year long shutdown due to a damaged fuel element, the High Flux Isotope Reactor at Oak Ridge National Laboratory has been restarted. During the shutdown significant upgrades to neutron scattering instruments were made that will improve capability and reliability. HFIR is one of only 3 major neutron scattering facilities in the US. [More]

ABILENE CHRISTIAN UNIVERSITY BUILDS MOLTEN SALT TEST LOOP

Researchers at Abilene Christian University have constructed a molten salt test loop in order to study characteristics for advanced reactors. [More]

IDAHO AND DOE REACH A DEAL ON SPENT FUEL

The state of Idaho and the Department of Energy have reached a deal that will allow small amounts of spent nuclear fuel into the state for research purposes. The state has been blocking such shipments since 2013. [More]

IS NUCLEAR POWER WORTH THE RISK

The New Yorker looks at the impact of the Fukushima Disaster. [More]

CONGRESS FUNDS REACTOR DEMONSTRATIONS

Congress has appropriated $1.49 billion for the DOE's Office of Nuclear Energy with the expectation that the department will "act aggressively" on the demonstration of new reactors in the "near- and mid- term". [More]

MAY 10–15, 2020

International Symposium on Reactor Dosimetry

Lausanne, Switzerland

MAY 20–22, 2020

Nuclear Energy Assembly

Washington, DC

JUNE 7–11, 2020

ANS Annual Meeting

Glendale, Arizona

JUNE 23–25, 2020

World Nuclear Exhibition

Paris, France

JULY 20–24, 2020

Nuclear & Space Radiation Effects Conference

Santa Fe, New Mexico

JULY 26–31

US Women in Nuclear
Richmond, Virginia

SEPTEMBER 1–4, 2020

International Group Operating Research Reactors Conference

Kazan, Russia

SEPTEMBER 22–26, 2020

TRTR Annual Meeting

Chicago, Illinois

NOVEMBER 9–13, 2020

International Conference on Radiation Safety

Vienna, Austria

PAL REACTOR PROFILED

ANSTO's (Australian Nuclear Science and Technology Organisation) OPAL Reactor was profiled by Create. [More]

BIZARRE PHENOMENON OF LIGHT FLASHING FROM HUMAN EYES CAUGHT ON CAMERA FOR FIRST TIME

Scientists have verified the long suspected production of Cherenkov light in the patient's eyes during radiation therapy. [More]

JOKES, RIDDLES, PUNS

Did you hear about the U235 atom who ran into a neutron?
It split!!

A neutron walks into a bar and asks how much for a drink?
The bartender responds, "For you, no charge!"

LEFT – THE OBELISCO DE BUENOS AIRES NEAR THE SITE OF THE 2019 IAEA CONFERENCE ON RESEARCH REACTORS

BOTTOM – IDAHO FALLS ON THE SNAKE RIVER NEAR THE SITE OF THE 2019 TRTR ANNUAL MEETING

GONE FISSION

ANTHONY MENDIOLA

CHIEF NON–POWER PRODUCTION AND UTILIZATION FACILITY OVERSIGHT BRANCH – UNPO
DIVISION OF ADVANCED REACTORS AND NON–POWER PRODUCTION AND UTILIZATION FACILITIES – DANU
OFFICE OF NUCLEAR REACTOR REGULATION

LAST DAY AS OFFICIAL NRC EMPLOYEE IS DEC. 31, 2019 BUT WILL CONTINUE ON TO HELP WITH THE TRAINING OF HIS REPLACEMENT.

WHEN DID YOU JOIN THE TRTR COMMUNITY

When I became NRC's RTR Oversight Branch Chief in January 2016.

FAVORITE HIGHLIGHT FROM YOUR CAREER

Considering my whole NRC career, the opportunity to directly interact with knowledgeable and talented regulators, operators, engineers, managers, and dedicated workers of a very complex and diverse industry. I honestly believe that I have never had a dull day at the work.

NRC INSPECTIONS

UNIVERSITY OF MISSOURI–COLUMBIA

An inspection of the Missouri University Research Reactor was carried out from May 20-23, 2019. The inspection included a review of effluent and environmental monitoring, experiments, review and audit and design change functions, procedures, radiation protection, and transportation. No violations were found. The complete inspection report is ML19163A020.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY REACTOR FACILITY

An inspection of the Missouri University of Science and Technology Reactor Facility was carried out from June 3-5, 2019. The inspection included a review of organization and staffing, procedures, health physics, design changes, committees, audits, and reviews, and transportation of radioactive material. No violations were found. The complete inspection report is ML19177A008.

UNIVERSITY OF MASSACHUSETTS LOWELL

An inspection of the University of Massachusetts Lowell Reactor was carried out from June 18-20, 2019. The inspection included a review of organization and staffing, operations logs and records, requalification training, surveillance and limiting conditions for operation (LCO), emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19191A046.

MCCLELLAN NUCLEAR RESEARCH CENTER

An inspection of the McClellan Nuclear Research Center was carried out from August 12–14, 2019. The inspection included a review of operator licenses, requalification, and medical examinations, experiments, organization and operations and maintenance activities, review and audit and design change functions, procedures, fuel movement, surveillance; and emergency preparedness. No violations were found. The complete inspection report is ML19233A309.

WASHINGTON STATE UNIVERSITY

An inspection of the Washington State University Research Reactor was carried out from July 8–11, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCOs), experiments, design changes, committees, audits, and reviews, emergency preparedness, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19203A182.

Considering my time with the TRTR community, the highlights has always been the TRTR conferences I have attended. The opportunity to interface with representatives of the entire community, to work together and resolve issues in a face to face manner to mutual satisfaction is my personal highlight from these conferences.

WHAT WILL YOU MISS

The opportunity to contribute in some manner to all that we do here at the NRC and within the nuclear community.

BEST TRTR CONFERENCE DESTINATION

San Diego (Personal bias, as I was born and raised there)

ADVICE FOR PEOPLE IN THE COMMUNITY

Recognize, appreciate, and respect the importance of the community to our quality of life. The mentoring you provide, the isotopes you create, the experiments you complete, and the expertise that you enhance, all will have a lasting effect on parts of our society that are not cognizant of your efforts, until that one day when your successes supports their career choices, cures a loved one, improves their life, and answers their prayers.

Someone once said that “You have not lived today until you have done something for someone who can never repay you”. I believe that this silent gratitude of others will bring joy and fulfillment to the community.

WHAT DID YOU FIND MOST FULFILLING ABOUT YOUR CAREER

Making a difference and improving the process, so those who will come behind me can be better at their job than I have been.

IDAHO STATE UNIVERSITY

An inspection of the Idaho State University Reactor was carried out from July 29-31, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCOs), experiments, design changes, committees, audits, and reviews, emergency preparedness, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19227A326.

GENERAL ATOMICS TRIGA REACTOR FACILITY

An inspection of the General Atomics TRIGA Reactor Facility was carried out from August 5-8, 2019. The inspection included a review of decommissioning activities. No violations were found. The complete inspection report is ML19247C512.

UNIVERSITY OF FLORIDA TRAINING REACTOR

An inspection of the University of Florida Training Reactor was carried out from May 7-9, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCOs), and experiments. No violations were found. The complete inspection report is ML19255E598.

UNIVERSITY OF NEW MEXICO

An inspection of the University of New Mexico Research Reactor was carried out from December 18-20, 2018. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, health physics, design changes, committees, audits and reviews, emergency planning, maintenance logs and records, fuel handling logs and records, and transportation of radioactive materials procedures. No violations were found. The complete inspection report is ML19255E713.

MARYLAND UNIVERSITY TRAINING REACTOR

An inspection of the Maryland University Training Reactor was carried out from April 2-4, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, health physics, design changes, committees, audits and reviews, emergency planning, maintenance logs and records, fuel handling logs and records, and transportation of radioactive materials procedures. No violations were found. The complete inspection report is ML19255E331.

UNIVERSITY OF UTAH

An inspection of the University of Utah Research Reactor was carried out from August 19-22, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation, experiments, design changes, committees, audits, and reviews, emergency planning, maintenance logs and records, and fuel handling

WHAT DO YOU PLAN TO DO IN RETIREMENT

When finally retired, travel with my wife to those places we have not been yet, and a couple of places we would want to experience again. Otherwise, visit the grandkids, sleep in, spring training, sleep in, and of course, sleep in.

ALEXANDER ADAMS JR.

SENIOR PROJECT MANAGER
NON–POWER PRODUCTION AND UTILIZATION FACILITY LICENSING BRANCH
DIVISION OF ADVANCED REACTORS AND NON–POWER PRODUCTION AND UTILIZATION FACILITIES – DANU
U.S. NUCLEAR REGULATORY COMMISSION

LAST DAY AS OFFICIAL NRC EMPLOYEE IS DEC. 31, 2019

WHEN DID YOU JOIN THE TRTR COMMUNITY

Don't remember exactly but I did go to meetings in the early 1980s while at the University of Buffalo. HEU-LEU conversion was the all consuming topic of the day.

FAVORITE HIGHLIGHT FROM YOUR CAREER

Being able to see the world while helping IAEA and efforts to convert reactors to LEU.

logs and records. No violations were found. The complete inspection report is ML19248C724

PURDUE UNIVERSITY REACTOR

A non-routine, announced safety inspection of the Purdue University Reactor was carried out from August 21-29, 2019. The inspection included a review of operating logs and records, procedures, requalification training, surveillance and limiting conditions for operation, committees, audits and reviews; and, fuel handling logs and records. No violations were found. The complete inspection report is ML19282B996.

DOW CHEMICAL TRIGA REACTOR

An inspection of the Dow Chemical TRIGA Reactor was carried out from September 9-13, 2019. The inspection included a review of health physics, design changes, emergency planning, maintenance logs and records, experiments, fuel handling logs and records, and inspection of transportation activities. No violations were found. The complete inspection report is ML19294A090.

UNIVERSITY OF NEW MEXICO

An inspection of the University of New Mexico AGN-201 Reactor was carried out from October 21-24, 2019. The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operations, experiments, design changes, committees, audits, and reviews, emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19304C605.

KANSAS STATE UNIVERSITY

An inspection of the Kansas State University Research Reactor was carried out from October 7-11, 2019. The inspection included a review of organization and staffing, procedures, health physics, design changes, committees, audits and reviews, and transportation of radioactive materials. A pair of Severity Level IV violations were identified, one for failure to submit an annual report in the proper time frame, and one for failure to perform semi-annual surveys as required. The complete inspection report is ML19296D152.

Kansas State also self reported a failure to fully meet their fuel inspection requirements: " Due to an inspection tracking sheet sorting error, four fuel elements were not marked to be inspected and are currently outside of the required surveillance frequency."

RHODE ISLAND NUCLEAR SCIENCE CENTER

An inspection of the Rhode Island Nuclear Science Center was carried out from November 4-7, 2019. The inspection included a review of operator licenses, requalification, and medical examinations, experiments, organization and operations and maintenance activities, review and audit and design change functions, procedures, fuel movement, surveillances, and emergency preparedness. No violations were found. The complete inspection report is ML19319B661.

The Rhode Island Nuclear Science Center also self reported a failure to fully meet their

WHAT WILL YOU MISS

The people. This is a special community. I really enjoyed running a research reactor. I have about 400 start-ups and 3000 hours at the controls. I grew to understand the important of the work that research reactors do. The folks I worked with at NRC are the best at what they do.

BEST TRTR CONFERENCE DESTINATION

The MIT meetings on Cape Cod.

ADVICE FOR PEOPLE IN THE COMMUNITY

Stay focused on safety and the rest will be easy. A safe reactor is a productive reactor.

WHAT DID YOU FIND MOST FULFILLING ABOUT YOUR CAREER

How we addressed security after 9-11. We had to get it right for the community and we did.

WHAT DO YOU PLAN TO DO IN RETIREMENT

Travel a bit. Work on my 85 Corvette and 63 Olds Cutlass. Hang around in Buffalo (home) more (in the summer).

The picture is from my retirement. The flag is from Naval Reactors and NRC. It was flown above the USS SEAWOLF, USS VIRGINIA, USS GERALD R. FORD (the propulsion plants I was involved

surveillance requirements: “The facility identified a missed annual surveillance for their shim safety blades drop time as required by TS 4.2.1. The facility, a Materials Testing Reactor used for research, was not in operation. The licensee stated the last surveillance was performed in August 2018. Additionally, they stated the reactor will not be operated until the surveillance is completed and meets the shim safety blades requirements in TS 3.2.2.”

OHIO STATE UNIVERSITY

An inspection of the Ohio State University Research Reactor was carried out from October 21-24, 2019. The inspection included a review of organization and staffing, operations logs and records, requalification training, surveillance and limiting conditions for operation (LCO), emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19309D628.

UC IRVINE

An inspection of the UC Irvine TRIGA Reactor was carried out from November 5-7, 2019. The inspection included a review of organization and staffing, operations logs and records, requalification training, surveillance and limiting conditions for operation (LCO), emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were found. The complete inspection report is ML19333B907.

NIST CENTER FOR NEUTRON RESEARCH

An inspection of the NIST Center for Neutron Research Reactor (NBSR) was carried out on November 15, 2019. The inspection included a review of operator licenses and re-qualification training, organization, operations, and maintenance activities, and surveillances. No violations were found.

UNIVERSITY OF MISSOURI–COLUMBIA

An inspection of the Missouri University Research Reactor was carried out from November 4-7, 2019. The inspection included a review of operator licenses, requalification, and medical examinations, experiments, organization and operations and maintenance activities, review and audit and design change functions, procedures, fuel movement, surveillances, emergency preparedness, and event follow up. Three self identified Severity Level IV violations related to the inoperability of the containment, anti-siphon system, and shim blades were reviewed and closed. An inspection follow up item related to the implementation of work control training was also opened.

in), Naval Reactor headquarters and NRC. The other picture is on the Navy helicopter on the way to the FORD in the Atlantic.

If you know of anyone else entering or leaving the community, please let us know so we can include them in a future newsletter!!

trtrnewsletter@isotopictopics.com

TURKEY POINT NUCLEAR POWER PLANT LICENSE EXTENDED TO 80 YEARS

The reactors at the Turkey Point Nuclear Generating Station have had their licenses extended for another 20 years by the NRC. This makes them the first reactors to be granted a 2nd license extension bringing their total license term to 80 years.

There are a number of other power plants that are working towards license extensions to 80 years, and the average age of nuclear power plants in the US is now 39 years.

Currently, work is ongoing to add 2 AP1000s to the Turkey Point Nuclear Generating Station.

TURKEY POINT NUCLEAR GENERATING STATION

STAFF PROFILE

MEAGAN NYDEGGER WAS HIRED TO BE THE CHIEF OF REACTOR OPERATIONS AT THE NIST CENTER FOR NEUTRON RESEARCH IN EARLY 2019. BEFORE THAT SHE WORKED IN SEVERAL ROLES IN THE NUCLEAR POWER INDUSTRY. HERE SHE ANSWERS SOME QUESTIONS ABOUT HERSELF.

WHAT IS YOUR BACKGROUND WHAT LEAD YOU TO THE NUCLEAR INDUSTRY

My interest in nuclear first began when I was 14 years old. We had an assignment when I was in high school physics to write a 5 page paper on a physics topic of our choice; I chose nuclear physics. I fell in love with the science and had the hardest time containing my paper to 5 pages.

I spoke with my teacher after that assignment on the career possibilities involving nuclear physics, she suggested nuclear engineering and nuclear power. I did a bit more research on my own into those and knew that was where I wanted to be.

So, I attended Missouri University of Science and Technology for nuclear engineering. After graduating, I worked for Exelon Nuclear in the Chicago-land area for about 3 years as a system engineer, then moved to Southern Company to go into operations at Plant Hatch.

After standing shift as an SRO and working my way up on the plant side, I was transferred to a corporate oversight role. In this role I oversaw the operations of Plant Hatch, Plant Farley, and Plant Vogtle. I was the plant to corporate liaison and was responsible for ensuing all three sites operated most efficiently. I had was responsible for briefing and advising the senior executive vice presidents and Chief Nuclear Officer of the company on events that took place at each plant.

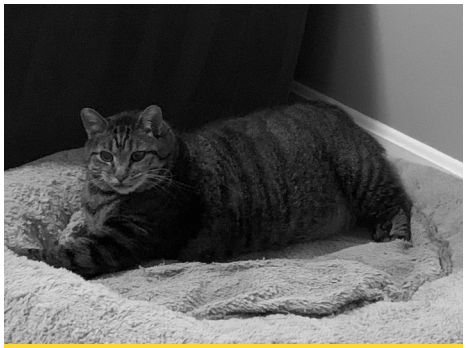
From the corporate oversight position, an opportunity came up for me to transfer to the public side of nuclear here at NIST as the Chief of Reactor Operations.

WHAT IS YOUR FAVORITE THING ABOUT BEING AT NIST SO FAR

Hands down, the best thing is being able to see operations department have a direct impact on facilitating such remarkable scientific advancements.

WHAT DO YOU SEE AS THE BIGGEST CHALLENGE MOVING FROM A POWER REACTOR TO A RESEARCH REACTOR

The biggest challenge is the difference in the regulation of power vs research. The amount of regulation that I am used to is hard to shake. I have had to make a conscious effort to realize this is not the power industry and does not have to be treated as such.



TO THE LEFT IS ME, EEVEE, AND MY FRIEND KEVIN. ABOVE IS MY CAT CHARLIE. ON THE FOLLOWING PAGE IS BULBASAUR ON THE LEFT AND EEVEE ON THE RIGHT.

IF NUCLEAR REACTORS DIDN T EXIST, WHAT WOULD YOUR DREAM JOB BE

Being an attorney and specializing in business, environmental, and energy law.

WHAT IS THE BIGGEST DIFFERENCE YOU HAVE NOTICED BETWEEN WORKING AT A POWER REACTOR AND A RESEARCH REACTOR

The biggest difference is the frequency of outages. I was used to being in an outage once every 12 months (2 units were at my pervious site and their outages were on a staggered 24 month cycle). I remember attending my first outage planning meeting on the research side and thinking, “man, only one hour to go over the whole outage schedule?”. I was used to outage schedule review being at least a full day long task.

WHAT IS A FUN FACT ABOUT YOURSELF

I am a big nerd, always have been. I was the kid who played with pokemon cards, pogs, video games (like the good ole sega genesis and N64), and magic cards. I have to keep a piece of that with me, so I named my dogs Eevee and Bulbasaur (after pokemon).

WHAT IS SOMETHING YOU WANT TO ACCOMPLISH WHILE AT NIST

I would love to be able to improve the efficiency of the department, but my first step is increasing the staffing numbers and creating succession plans for key developmental positions in the organization.

WHAT LEAD YOU TO THIS JOB

I wanted to step out of my comfort zone of nuclear power and go back to my educational roots and facilitate scientific advancement.

WHAT IS A GOOD STORY FROM YOUR TIME AT A POWER PLANT

There are so many good stories from my time in the power industry, it’s hard to pick just one! I’ll tell you about a moment that has since become a story the training department tells individuals going through initial license training.

In the power industry, initial license training is a lengthy 18-24 month process and the exams are laid out differently than they are in the research world. There are three sections, which is similar to how we do business in research, but the sections are different.

The first is a written test (just like how we do in research), the second is the job performance module section, and the third is an operating evaluation in the simulator.

The operating portion is similar to how exams are conducted in research, except you are evaluated on actually performing evolutions and responding to events.

The job performance module section is the most different. This is a section that has a number of specific tasks the candidate has to perform or simulate performing. If the task is based in the simulator, it is expected that you perform said task.

Anyways, during my exam I was tasked with reopening the main steam isolation valves (MSIVs) after an event that caused the reactor to scram. I had practiced this numerous times and was confident I knew what I was doing, so I grabbed the procedure and began the process to open these valves.

While I was checking parameters to ensure the differential pressure across the valves was less than 50 psid, I looked at the correct indication, then the incorrect, then back to the correct again. I ended up writing down the reading from the incorrect indication, which read the dP was less than 50 psid.

I opened the first MSIV, watched it open, then it hit me what I just did. I put my palm to my head when I this realization hit, turned to the NRC examiner and told him “hey Joe, we can stop here if you want. I just failed this because I looked at the wrong indication. There’s no point in wasting our time with continuing”.

He looked at me with this bewildered look and responded, “ok, well then we will stop here”.

We discussed what I did wrong and what I should have done, then had a good laugh because that was the first time he had ever had an SRO candidate say ”..we can stop”, that was also the first time anyone in an initial license training at my old plant did that.

So, that moment ended up becoming some of the instructors favorite stories to tell to oncoming initial license training classes of a “what not to do” moment.

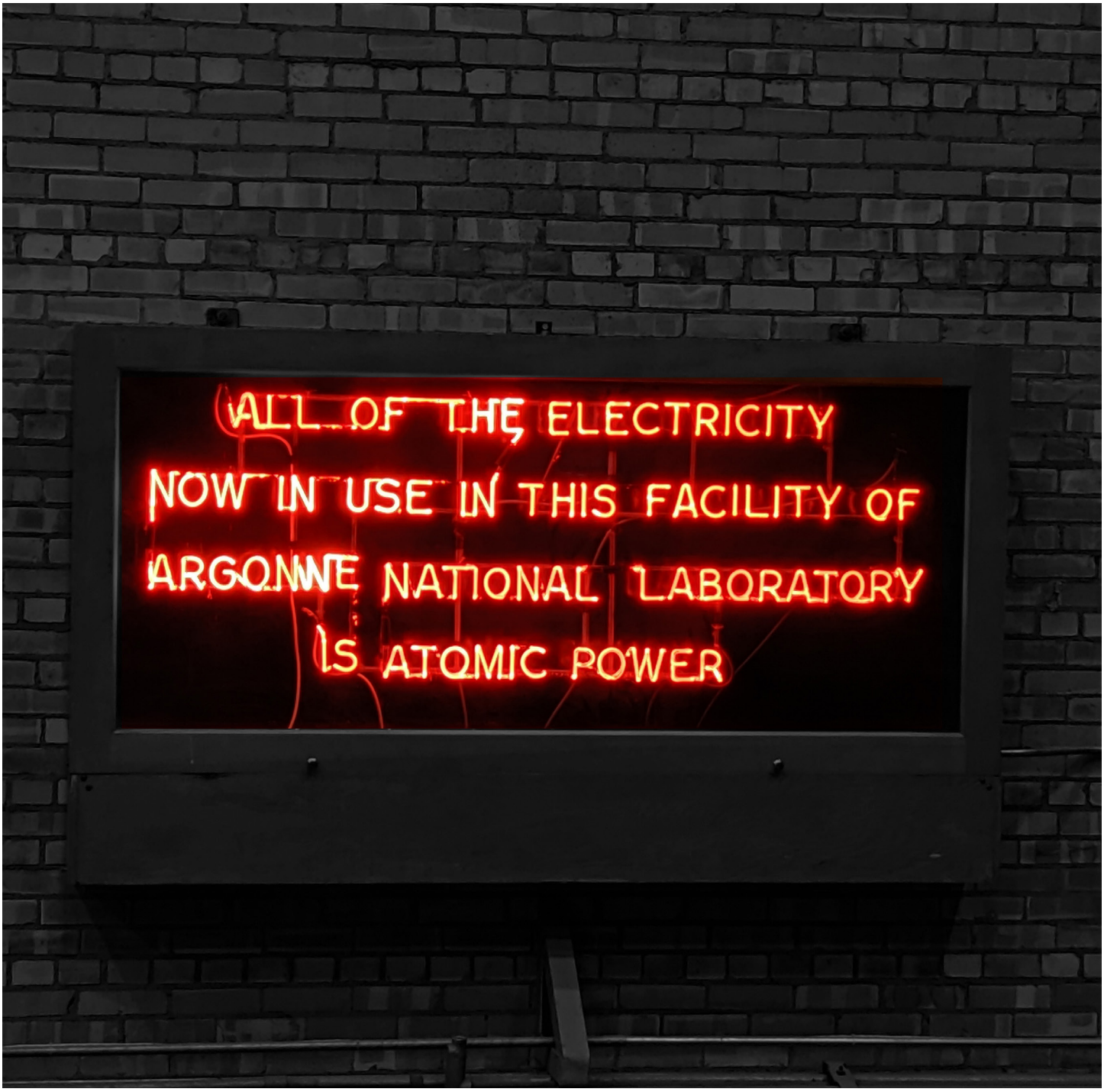
WHAT IS YOUR FAVORITE VACATION

Anywhere I can bring my animals, relax with a hot cup of tea, and enjoy nature.

TRTR 2019 REPORT

The 2019 Training Research and Test Reactor (TRTR) annual meeting was hosted by the Idaho National Laboratory in Idaho Falls, Idaho. The 5 day meeting included approximately 50 presentations by 15 organizations as well as tours of the Advanced Test Reactor (ATR), Advanced Test Reactor Critical Facility (ATR-C), and the Transient Reactor Test Facility (TREAT). A special tour of Experimental Breeder Reactor No. 1 was added on Friday. With so many reactor sites to visit, we only had time for a small subset!

Most of the research and test reactors across the US and



PREVIOUS PAGE – FAMOUS SIGN AT EBR–1 MUSEUM

TOP – EBR–II CONSOLE

MIDDLE LEFT –MARIANNE WALCK, DEPUTY LABORATORY DIRECTOR FOR SCIENCE AND TECHNOLOGY AND CHIEF RESEARCH OFFICER, IDAHO NATIONAL LABORATORY

MIDDLE RIGHT – HEAT TRANSFER REACTOR EXPERIMENT 3 ON DISPLAY AT EBR–1

BOTTOM LEFT – CLIVE TOWNSEND FROM PURDUE UNIVERSITY SPEAKS DURING THE NSUF RESEARCH REACTOR FITNESS WORKSHOP RESULTS PANEL

BOTTOM RIGHT – 2ND ANNUAL TRTR 5K PARTICIPANTS

Canada were represented, and the meeting included a day of presentations by the Nuclear Regulatory Commission.

The TRTR Executive Committee Meeting, ANS Standards Meeting, and TRTR Business Meeting were held and included the election of new officers: Chair- Clive Townsend (Purdue University), Treasurer- Tom Newton (NIST Center for Neutron Research), Secretary- Amber Johnson (University of Maryland) and Chair elect- Ayman Hawari (North Carolina State University).

The conference included the awarding of the 2019 Tawfik Raby Scholarship to Garret Wendel of Pennsylvania State University at the banquet, as well as a presentation on the history of the many reactors at INL. The 2020 TRTR Annual Meeting will be hosted by Purdue in Chicago.

IAEA 2019 REPORT

BUENOS AIRES, ARGENTINA
25–29 NOVEMBER 2019

Once every 4 years the IAEA hosts an International Research Reactor conference. The theme for this year was "Addressing Challenges and Opportunities to Ensure Effectiveness and Sustainability."

Presentations were given in 7 categories: Utilization and Applications, Operation and Maintenance, New Research Reactor Programs, Safety of Research Reactors, Security of Research Reactors, Fuel Management and Decommissioning, and Common Management Considerations.

Prof. Kenan Ünlü, Director of the Radiation Science and Engineering Center at Penn State University, gave an invited talk titled: "Strategies for Effective and Sustainable Utilization of Small and Medium Size Research Reactors." Numerous talks were given by various regulatory agencies, including Al Adams from the U.S. Nuclear Regulatory Commission.

Giving a moving talk addressing Operation and Maintenance issues with the resin columns at MURR was Reactor Manager Bruce Meffert. His preferred style to move away from the podium during his presentation might be unconventional but it does help to keep the audience engaged!

Posters were also an important part of every coffee break. Michael Reichenberger, Radiation

ABOVE – THE 30MW RA–10 REACTOR UNDER CONSTRUCTION AT THE EZEIZA ATOMIC CENTRE NEAR BUENOS AIRES

Measurement Scientist from the Advanced Test Reactor(ATR) at INL, presented on the "Modernization of the Radiation Measurements Laboratory at the ATR Complex." Michael recommends this conference for anyone "wanting to become familiar with the wide variety of research reactors around the world."

Luke Gilde, Reactor Operations Manager at the Maryland University Training Reactor (MUTR) had a poster on "Educational Uses of the MUTR." Sarah Don, Superintendent at the MIT Nuclear Reactor Laboratory, found it "valuable to see just how important and versatile research reactors are in global education and research." Both Sarah and Bruce use the IAEA publication on Management of Research Reactor Ageing at their facilities.

The last day of the conference offered either a tour of the construction sites for the RA-10 research reactor at the Ezeiza Atomic Centre or Argentina´s Small Modular Reactor prototype, CAREM.

ABOVE – BRUCE MEFFERT FROM THE UNIVERSITY OF MISSOURI – COLUMBIA GIVES HIS TALK ON ION EXCHANGER REPLACEMENT

BELOW – ATTENDEES OF THE IAEA INTERNATIONAL RESEARCH REACTOR CONFERENCE

KNOW MORE NUKES

MISSOURI UNIVERSITY RESEARCH REACTOR

IN THIS EDITION OF KNOW MORE NUKES WE VISIT THE MISSOURI UNIVERSITY RESEARCH REACTOR AT THE UNIVERSITY OF MISSOURI IN COLUMBIA, MISSOURI. LESLIE FOYTO, ASSOCIATE DIRECTOR REACTOR FACILITIES OPERATIONS AT MURR, HAS PROVIDED THE RESPONSES TO OUR QUESTIONS.

WHAT YEAR DID YOUR REACTOR FIRST GO CRITICAL

The reactor first went critical on October 13, 1966.

WHAT IS THE REACTOR LICENSE NUMBER POWER LEVEL

MURR's license number is R-103. The facility was initially licensed at 5 MW, although the reactor was originally neutronically and thermal-hydraulically designed for 10 MW operation. It was decided at the time that the heat exchange capacity for only 5 MW operation would be initially installed until a time when a power uprate was warranted. In 1974, MURR added the additional heat exchange capacity and uprated to its current power level of 10 MW.

WHAT IS YOUR POSITION AT THE REACTOR HOW LONG HAVE YOU HELD THAT POSITION

I'm the Associate Director of Reactor and Facilities Operations at MURR. I have held this position since 2010.

HAVE ANY MAJOR CHANGES MODIFICATIONS, SUCH AS CONVERSION, POWER UPGRADE, ETC. BEEN DONE

There have been many significant renewal projects over the past 20 years to ensure continued operational reliability of the reactor. Projects ranging from major electrical upgrades, to instrumentation and control replacements, and building additions to support our increase in research activities. We are also actively collaborating with the U.S. National Nuclear Security Administration Office of Material Management and Minimization to find a suitable LEU fuel replacement for MURR. Part of the conversion efforts will also include a power uprate to 12 MW.

WHAT IS A UNIQUE FEATURE OF YOUR REACTOR

Our central flux trap where the peak unperturbed thermal flux is 6×10^{14} n/cm^2-sec. Having a high neutron flux is essential for MURR in order to accomplish its mission of supplying critical high specific activity radioisotopes to the community, both domestic and international.

WHAT IS A FUN FACT ABOUT YOUR REACTOR

There are a couple. Currently MURR is the sole supplier of Mo-99 and I-131- the two most used medical isotopes in the world – in North America. Another interesting fact is that the construction company, B.D. Simon, which built MURR broke ground at the reactor site in July 1963 to begin construction based on a "handshake," while the official contract was still being finalized. I can guarantee that doesn't happen nowadays!

PREVIOUS PAGE – INITIAL CRITICALITY AT MURR ON OCTOBER 13, 1966

RIGHT – MURR CONTROL ROOM

BOTTOM – MURR FACILITY

NEXT PAGE – MURR POOL

WHAT IS THE BIGGEST CHALLENGE FACING YOUR REACTOR

Like most facilities built in the 50s and 60s, ensuring that the facility is proactive in aging management to ensure operational reliability. Also, our research programs have grown to the point that space – office and laboratory – has definitely become an issue. The facility has nearly doubled in size from when it was first built and we are currently looking at additional expansions.

WHAT IS THE MOST UNUSUAL REQUEST SOMEONE HAS HAD TO USE YOUR REACTOR

We have irradiated everything from gemstones to human teeth to a section of the space shuttle Challenger to help determine its failure. But perhaps the most unusual request was from an individual about 15 years ago asking if we could gamma irradiate some dog food. We asked him "what mass" and he said "well I figure between 15 and 20 tons a week." We politely replied that it really wasn't in our wheelhouse for something like that.

WHAT DREW YOU TO YOUR CURRENT POSITION

I originally came to Missouri from the east coast after I got out of the U.S. Naval Nuclear Propulsion Program to go to school at the University of Missouri because of MURR. I thought that I would head back east after I graduated but I was offered a great job at MURR and stayed, so I have gone from an Engineer, to Reactor Manager and now to my current position.

WHAT HAS BEEN YOUR FAVORITE PROJECT

There have been numerous over the years that were very interesting and challenging but I would say the project to produce iodine -131 because there were so many facets of the project – license amendment, building addition – 2 floor – with a floor loading to support 400,000 lbs. of hot cells, laboratory with clean room specifications and a very intricate and complicated exhaust

ventilation filtration system. As they say with regards to making iodine-131…if it was easy everyone would be doing it! I have also really enjoyed working on the new fuel conversion project through RERTR. I have learned more about fuel design and fabrication than I could ever have imagined plus it is really exciting to be part of the team designing a new LEU fuel.

BEFORE WORKING AT YOUR REACTOR, WHAT WAS THE MOST UNUSUAL OR INTERESTING JOB YOU VE EVER HAD

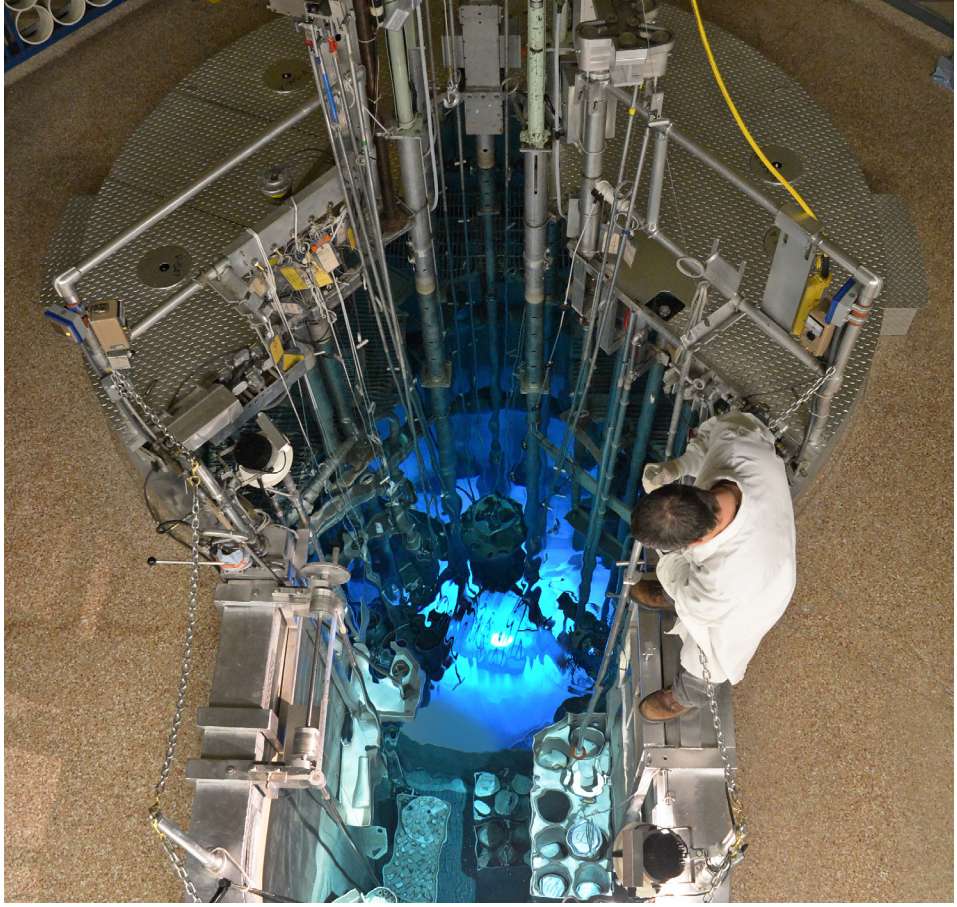
As I stated before, I was in the U.S. Navy for almost 9 years, so that was a very interesting job with lots of travel, which I enjoy a lot. I also worked at a groomer/dog kennel that specialized in working class dogs, like Saint Bernard's, Great Pyrenees, Newfoundland's, etc. One the jobs was cleaning the outdoor dog runs….you can imagine the challenges of cleaning up after 150 pound dogs!

WHAT DO YOU FIND THE MOST CHALLENGING AT REACTOR

One of the things we take the most pride in is our operating schedule, 150 hours per week, every week of the year. Within that approximately 16 hour shutdown window, we must: refuel; remove samples that can only be removed with the reactor shutdown; perform preventative and corrective maintenance; perform Technical Specification surveillances; implement ageing management improvements/ modifications; etc.

WHAT ADVICE WOULD YOU GIVE TO NEW REACTOR OPERATORS

Never stop learning about your facility. Gaining the knowledge to be a successful licensed reactor operator is great and it's the first



step, but taking the next step and going through all of the initial licensing basis documentation provides you a fundamental understanding of why the facility was designed and built the way it was. Also, when you are on a crew, it is extremely important to act as a team, having each other's backs, knowing each of your crew member's strengths and weaknesses.

WHAT ARE THREE CAREER LESSONS YOU VE LEARNED THUS FAR

1. Work hard. I am a firm believer that good things eventually come to those who work hard and show patience for opportunities because you never know when they will present themselves.

2. Understand that not everyone has the same standards as you.

3. Never stop learning…not about your facility or other facilities in the U.S. and internationally. Benchmarking and learning the best practices at other facilities can be brought back and implemented at your facility. While we all like to think we do a great job of running our facility, we are not great at everything and there is a lot to be shared in our community to help improve all of us.

ANYTHING ELSE

The research and test reactor community is small and unique, and we should all try to help and support each other as much as we can. We provide an invaluable service to this country, and also internationally, and we should all ensure that the remaining research and test reactors in the U.S. are around for years to come.

KNOW MORE NUKES

PENN STATE BREAZEALE REACTOR

IN THIS EDITION OF KNOW MORE NUKES WE VISIT THE PENN STATE BREAZEALE REACTOR AT THE PENN STATE COLLEGE OF ENGINEERING IN PENNSYLVANIA. JEFFREY GUETHER, ASSOCIATE DIRECTOR FOR OPERATIONS AT PENN STATE, HAS PROVIDED THE RESPONSES TO OUR QUESTIONS.

WHAT YEAR DID YOUR REACTOR FIRST GO CRITICAL

1955

WHAT IS THE REACTOR LICENSE NUMBER POWER LEVEL

We hold license R-2, and are allowed to operate up to 1.0 MW in steady state. We are also licensed to pulse with a reactivity limit of $3.50.

WHAT IS YOUR POSITION AT THE REACTOR HOW LONG HAVE YOU HELD THAT POSITION

I am the Associate Director for Operations. I've held the position since June 2017. It's my job to manage the operations staff, supervise operations and training, review experiments and procedures, and manage the facility license.

HAVE ANY MAJOR CHANGES MODIFICATIONS, SUCH AS CONVERSION, POWER UPGRADE, ETC..., BEEN DONE

We recently replaced our reactor tower, grid plates, beam ports, and moderator tank. We're working on a new control console and have plans to expand our beam laboratory.

WHAT IS A UNIQUE FEATURE OF YOUR REACTOR

Our reactor core can move along two sets of rails and rotate, giving us the ability to reposition with respect to X, Y, and Θ. This allows us to couple the reactor core to various experimental fixtures in different parts of the pool.

WHAT IS A FUN FACT ABOUT YOUR REACTOR

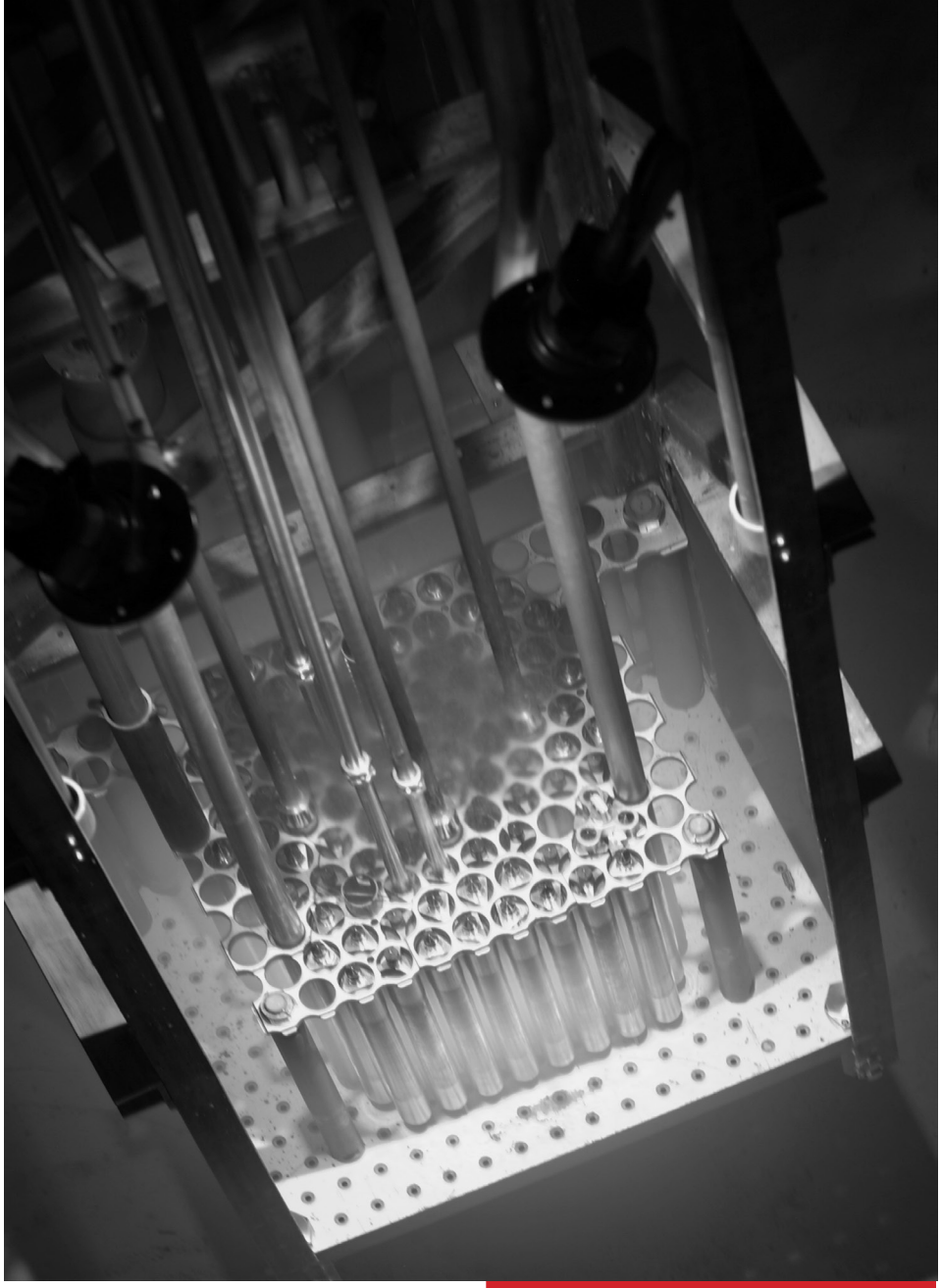
Our reactor went critical when Dwight Eisenhower was the US President. At the time, his brother Milton was the president of Penn State. This convenient family connection helped us get our fuel delivered quickly.

WHAT IS THE BIGGEST CHALLENGE FACING YOUR REACTOR

We have a lot of usable beams, but our beam lab is very small. We need to enlarge it in order to fully realize our potential.

WHAT IS THE MOST UNUSUAL REQUEST SOMEONE HAS HAD TO USE YOUR REACTOR

We get a lot of requests to support unusual experiments. I recently turned down work to measure the effectiveness of a "magic pill" shielding material. More and more, experimenters have been proposing complex experiments that would make use of our large reactor pool and movable core to utilize a novel irradiation fixture, such as a pressurized coolant loop or heated salt.



WHAT DREW YOU TO YOUR CURRENT POSITION

I started my professional career as a nuclear design engineer for KAPL, but I was moonlighting as a reactor staff member at the RPI critical facility. I realized that I enjoyed managing and operating a research reactor more than reactor design. I derive satisfaction from the variety of things that I am called to do, and I like to get a little dirt under my fingernails from time to time.

WHAT HAS BEEN YOUR FAVORITE PROJECT

The beam port replacement outage was my favorite. It was

PREVIOUS PAGE – PRESIDENT EISENHOWER DEDICATING THE BREAZEALE NUCLEAR REACTOR

ABOVE – BREAZEALE NUCLEAR REACTOR CORE, A UNIQUE CONVERSION TRIGA USING INDIVIDUAL ELEMENTS RATHER THAN FUEL BUNDLES.

NEXT PAGE – COMPLETION OF THE NEW MODERATOR AND NEUTRON BEAMLINE ASSEMBLY AT THE BREAZEALE NUCLEAR REACTOR.

an enormous amount of work and required a lot of day-to-day planning and oversight. Our staff were terrific, and everyone worked hard from beginning to end.

BEFORE WORKING AT YOUR REACTOR, WHAT WAS THE MOST UNUSUAL OR INTERESTING JOB YOU VE EVER HAD

I had the pleasure of serving as the Reactor Manager at KSU for seven years. That was a very challenging but fulfilling job.

WHAT DO YOU FIND THE MOST CHALLENGING AT THE REACTOR

I have found it increasingly challenging to find student interns who can take on a full course load and still dedicate enough time to the reactor facility to train, meet their requalification requirements, and do enough ops and other work to make the arrangement mutually beneficial. We are blessed with excellent student operators, but it seems like class takes more and more of their time.

WHAT ADVICE WOULD YOU GIVE TO NEW REACTOR OPERATORS

Be fascinated. That's not just an annihilation peak on your HPGe pulse height spectrum…it's proof that E really does equal mc^2. That TRIGA pulse gave you the data you need to find your prompt neutron lifetime. So much of what we do is set by procedure that we can lose sight of how amazing our jobs are…what we see on daily basis sounds like a science fiction movie to others.

WHAT ARE THREE CAREER LESSONS YOU VE LEARNED THUS FAR

1. At an aging facility, every day presents an opportunity to make the facility a little bit better or allow it to get a little bit worse.
2. After spending some time working with things "as they are," start asking why they shouldn't be changed.
3. Engineers in general, and nuclear engineers in particular, are accustomed to doing high-quality work. We are fortunate to work in a field with so many hard-working, talented people.

Want your facility featured in a future edition of Know More Nukes? Tell us more via our on-line form!

Of course, the main reason for a visit to Idaho is the reactors but one should also make time for the delicious food! From a previous visit to Idaho National Lab, I was familiar with Pickle's Place in Arco ID and knew I had to go back for another Atomic Burger.

Arco is famous for being the first city to be powered entirely by nuclear energy. For two hours on July 17, 1955, the BORAX III reactor provided electricity to entire population for more than 1 hour. After a quick trip to see the Arco sign, we continued on to dinner.

The Atomic Burger is delicious covered in mushrooms and cheese. Be sure to ask for the fry sauce!! After eating, it was dark enough to view the Milky Way near Craters of the Moon National Monument and Preserve.

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