

2019 QUARTER 2  
No. U-238

# TRTR NEWSLETTER

**CONTAINS DOZENS OF EXCITING ARTICLES!**  
**FOR THE NUCLEAR SCIENTIST**



“...a well-laid-out, snappy, color version with working links and everything. Well done!”

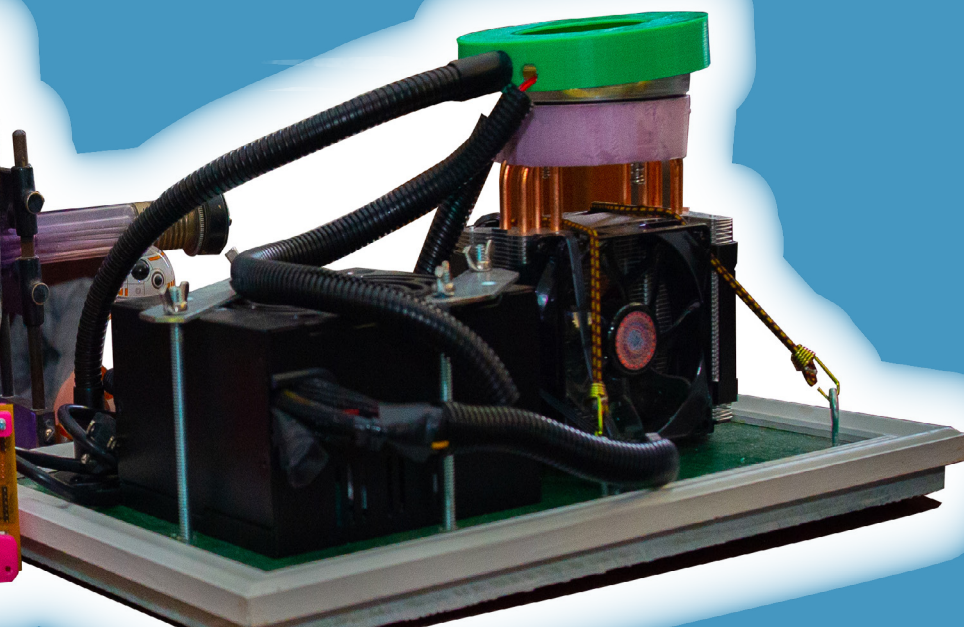
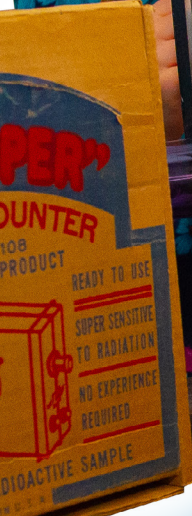
“I love it”

“Like!”

“:)”

“Love the new format and content too!”

EXPLORE THE SECRETS OF THE ATOM!



*Exciting! Safe!*

ANOTHER TRTR COMMUNITY UPDATE



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## MESSAGE FROM THE CHAIR

There have been a number of actions by the TRTR Executive Committee (EC) over the past few months to communicate the value of research reactors to education and research in the United States. The EC recently updated our previous single pager for distribution to interested federal and congressional staff. As TRTR is a relatively small community it is important that all members have access to our talking points and be able to contribute to the conversation at all levels. We will be posting the one-pager on the TRTR website. The more it is shared, the better for us all. Locally, you can develop a similar value proposition and talking points to inform your university or agency of the direct value of your research reactor. It's always better to keep management informed of the good things happening at your facility before they start asking for us to provide reasons for the facility to remain in operation or to defend your budget.

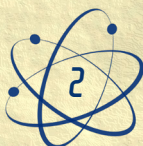
Cover page: Gwyneth marvels at the collection of "toys" curated over the years by University of Maryland's Tim Koeth. Want your photo featured in a future edition? Send high-resolution photos to [TRTRnewsletter@isotopictopics.com](mailto:TRTRnewsletter@isotopictopics.com).



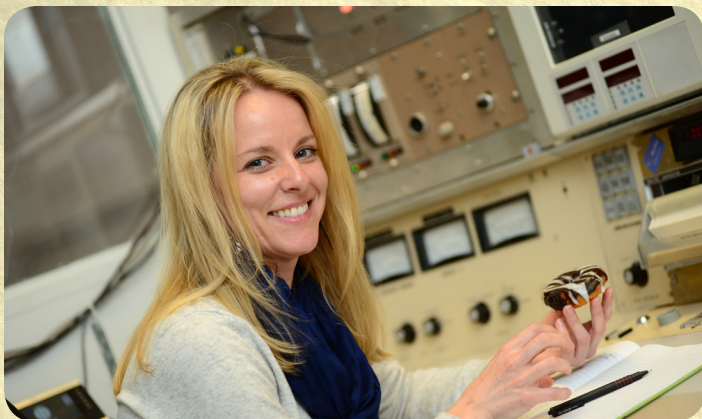
Sean O'Kelly  
Executive Committee Chair

By this point, many of our TRTR members have renewed their NRC operating license to operate for another 20 years. The new NPUF rule will change those license periods to an unlimited period but it does put a burden on all facilities to maintain their Safety Analysis Reports (SAR) up to date. Each of our facilities have their own procedures and process and I'm suggesting you start considering how you will create a process for maintaining your SAR to minimize the effort or cost. This might be a great topic for our upcoming TRTR meeting in September.

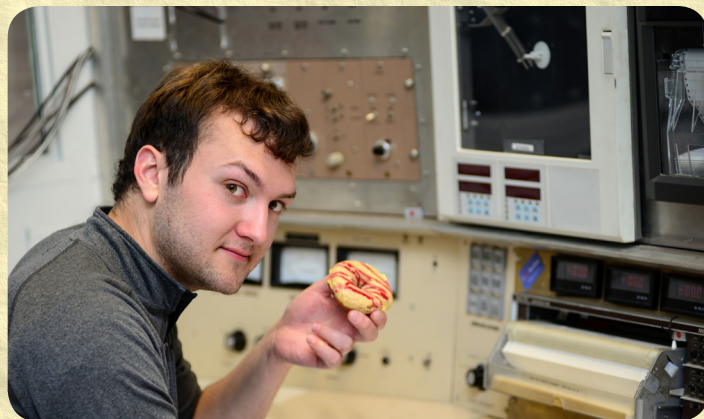
As our facilities look to the future we should all develop a facility-specific strategy or plan for maintaining our reactors and the infrastructure to keep them operating safely and reliably for many years into that future. What is your priority for equipment upgrades or replacement necessary to keep your facility operating for at least another 20 years? As I noted in my previous message, Brenden Heidrich is coordinating a data call and a workshop this summer to develop a document that can be used to support the annual reactor infrastructure budget and perhaps grow that budget in the future. Please give serious effort to provide the best information and participate in this very important survey.







Amber Johnson  
Editor



Luke Gilde  
Content Editor

Finally, I recently sent out a call for abstracts to the next TRTR meeting in Idaho Falls this September. You need to go to the TRTR homepage to register and to submit those abstracts. We are looking forward to the meeting and seeing you in Idaho. Don't forget that we have a special student rate for the meeting.

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

## MESSAGE FROM THE EDITOR

With the release of the President's budget request, we are reminded of the importance of the infrastructure grants to the TRTR community. For an explanation of how the federal budget process should work, the AAAS [Federal Budget Process 101](#) is a great primer. Included in this newsletter is a historical look at the funding levels from the NEUP grants. We are interested in covering the specific grants in future editions of the newsletter. Please send an email if you would like to be included in this effort.

The TRTR community is always available to

provide support and consultation should you have any questions or concerns. A [form](#) is available on the website that will help you connect with the community members most able to provide assistance. An email to a staff member at any facility will not go unanswered!!

As a reminder, the newsletter provides a forum for the exchange of general facility information. If you have suggestions for topics to be covered, sections you would like to see, or articles that you would like shared, please send an email to [TRTRnewsletter@isotopictopics.com](mailto:TRTRnewsletter@isotopictopics.com).

Amber Johnson, Editor  
Director, Nuclear Reactor and Radiation Facilities  
University of Maryland

Luke Gilde, Content Editor  
NIST Center for Neutron Research  
University of Maryland Radiation Facilities





## NEWS

### PENN STATE EXPANDS NUCLEAR ENGINEERING PROGRAM

Thanks to a recent donation, Penn State will be expanding its nuclear engineering program, growing the number of faculty from 8 to 15.

### NASA RECEIVES \$100 MILLION TO DEVELOP NUCLEAR ROCKETS

In the recent spending bill passed by congress, NASA received \$100 Million to develop nuclear rocket engines, something the agency has been pursuing on and off since the 1960s. NASA intends to flight test the new engine by 2024.

### NUCLEAR ENERGY LEADERSHIP ACT REINTRODUCED

A bipartisan group of senators have reintroduced the Nuclear Energy Leadership Act. The act aims to boost development of fast reactors, promote the development of High Assay, Low Enriched Uranium fuels, and establish a university nuclear leadership program.

### NEI'S 2019 ANNUAL BRIEFING PRESENTED BY MARIA KORSNICK

NEI President and Chief Executive Officer Maria Korsnick discussed the future of nuclear energy and what it will take to get there at the 2019 Annual Briefing.

### FLOATING NUCLEAR PLANT DISMANTLED

The floating nuclear power plant, Sturgis, built in the 1960's and decommissioned in 1976 has finally been disassembled. Sturgis was the world's first floating nuclear power plant and supplied power to installations around the Panama Canal.

### CHERNOBYL: DATA WARS AND DISASTER POLITICS

A review of Kate Brown's Manual for Survival: A Chernobyl Guide to the Future and Adam Higginbotham's Midnight in Chernobyl: The Untold Story of the World's Greatest Nuclear Disaster. Brown's book seeks to provide a better representation of the health effects of the Chernobyl disaster, and Higginbotham's book provides an in depth profile of the accident and the people it affected, as well as the successes and failures of the Soviet response.

### MIT ENGINEER BUILT A SEMI-AUTONOMOUS SNOWBLOWER

MIT Senior Reactor Operator Dane Kouttron was recently featured by the Boston Globe for building his own semi-autonomous snowblower, Chomper.

### INDIA RECOMMISSIONS APSARA RESEARCH REACTOR

India has recommissioned its Apsara research reactor. The reactor, built in 1955, was shut down permanently in 2009. However, after a number of upgrades and a conversion to LEU fuel, the reactor was recently restarted.





## VERSATILE TEST REACTOR PASSES FIRST STAGE APPROVAL

The DOE's proposed Versatile Test Reactor passed the first of 5 "critical decisions" on the road to its construction. The proposed reactor is a 300MW sodium cooled fast reactor to be built at Idaho National Labs. If built, it would replace the McClellan Nuclear Research Center Reactor at UC Davis as the newest research reactor in the US.

## PEACH BOTTOM NUCLEAR POWER PLANT APPLIES FOR SECOND LICENSE RENEWAL

Peach Bottom Nuclear Power Plant has applied for a subsequent relicensing that would enable the plant to operate until 2054, when it is 80 years old. Part of the plants ongoing upgrades would include a new digital control system.

## COMPETITORS ABOUND TO PRODUCE KEY MEDICAL ISOTOPE

Currently, the production of Molybdenum-99, an important medical isotope is extremely limited. In order to ensure its continued supply, DOE is working with companies to create a new supply chain. Northstar Medical Radioisotopes, BWXT, Northwest Medical Isotopes, and Coqui RadioPharmaceuticals are working on reactor based methods, while SHINE Medical Technologies and Niowave are using particle accelerators to make the isotopes. Northstar is also working on an accelerator based production method.

## MOLTEN SALT REACTOR MATERIALS TO BE TESTED AT PETTEN REACTOR

Terrestrial Energy, a company working to build a molten salt reactor entered into an agreement with the Petten High Flux Reactor in the Netherlands to perform testing.

## BREAZEALE NUCLEAR REACTOR FEATURED BY PENN STATE NEWS

The Breazeale Nuclear Reactor and its recent upgrades were highlighted by Penn State.

## NUCLEAR IN SPACE

The Nuclear And Emerging Technologies For Space conference, organized by ANS took place at Pacific Northwest National Laboratory in February. Members of NASA, National Laboratories, industry, and academia discussed the future use of nuclear reactors in space as power plants and propulsion systems.

## NEW SUBSIDY PROPOSED FOR PENNSYLVANIA NUCLEAR PLANTS

A controversial new subsidy has been proposed to help unprofitable nuclear power plants in Pennsylvania. Its proponents say that it will correct market flaws that make the plants unprofitable, while others note it will provide unnecessary subsidies to profitable plants.





## AEROTEST REQUESTS REIMBURSEMENT OF NRC FEES

Aerotest Operations, in a letter to the NRC dated January 22nd, 2019, requested a reimbursement for nearly \$2.5 million in fees paid to the NRC since 2005. Aerotest claims that the NRC has not satisfactorily performed services related to the re-licensing of the ARRR, and that this has, in part, lead to the decision to shut the reactor down.

## U.S. DEPARTMENT OF ENERGY ANNOUNCES SCHOLARSHIP AWARDS FOR THE NEXT GENERATION OF NUCLEAR SCIENTISTS AND ENGINEERS

More than \$5 million was awarded by the DOE in the form of undergraduate scholarships and graduate fellowships to students pursuing degrees relevant to nuclear energy.

## OUTAGE AT BROWNS FERRY

An off-site power outage at the Browns Ferry Nuclear Plant caused a shutdown of unit 3. The incident will have to be reported to the NRC as a Notice of Unusual Event.

## NRC TO ISSUE NEW RULE CODIFYING POST-FUKUSHIMA ENHANCEMENTS

In spring 2019, the NRC will issue the Mitigation of Beyond-Design-Basis Events rule which will require US power reactors to maintain more resources to ensure Fukushima like accidents cannot be repeated.

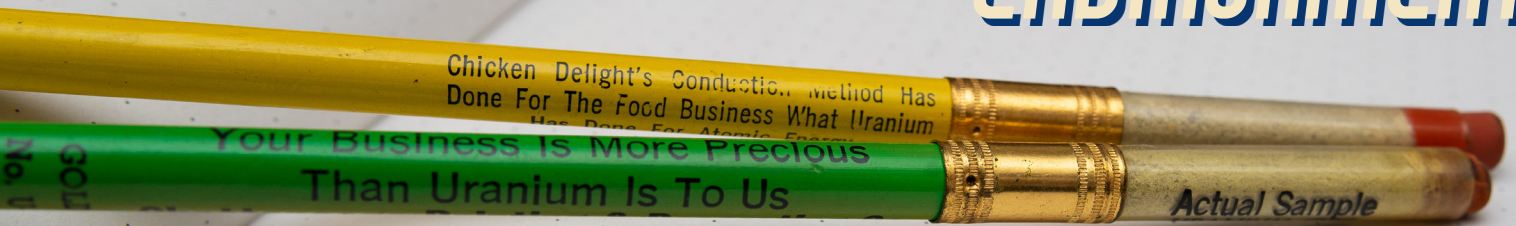
## HBO RELEASES TRAILER FOR CHERNOBYL MINI-SERIES

Chernobyl, a six part mini-series that dramatizes the 1986 nuclear disaster will premier May 6th on HBO. Chernobyl stars Jared Harris as Soviet nuclear physicist Valery Legasov, Emily Watson as Soviet nuclear physicist Ulana Khomyuk and Stellan Skarsgård as Soviet Deputy Prime Minister Boris Shcherbina.





# SAFETY CONSCIOUS WORK ENVIRONMENT



An important aspect of nuclear safety culture is a commitment to a Safety Conscious Work Environment (SCWE). When reviewing and updating your training this year, we wanted to remind you of the resources available on the [NRC website](#).

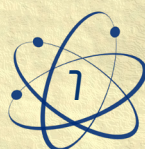
All employees should feel safe raising a nuclear safety concern. A documented training session ensuring that each employee understands their roles and responsibilities in reporting an issue should be completed regularly.

## *An Effective SCWE Policy Includes an Environment Where...*

- ☼ Everyone has a responsibility to promptly raise a safety concern.
- ☼ Concerns may be reported orally, in writing, or anonymously.
- ☼ No one should be required to do anything that makes them feel uncomfortable.
- ☼ Retaliation for raising safety concerns is not tolerated.
- ☼ The person receiving the report of a safety concern shall investigate.
- ☼ Safety concerns are promptly reviewed.
- ☼ The right of an individual to report a nuclear safety concern to the NRC is protected under law.

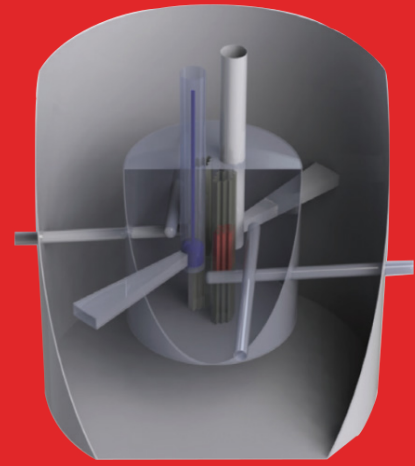
## *Documents Staff Should Be Aware of...*

- ☼ NRC RIS 2005-18, "[Guidelines for Establishing and Maintaining a Safety Conscious Work Environment](#)"
- ☼ 1996 NRC Policy Statement, "[Freedom of Employees in the Nuclear Industry to Raise Safety Concerns Without Fear of Retaliation](#)"
- ☼ [Chilling Effect Letter Guidance](#), Section 5.2.j.6 of the Allegation Manual
- ☼ SECY-04-0111, "[Recommended Staff Actions Regarding Guidance in the Areas of Safety Conscious Work Environment and Safety Culture](#)"





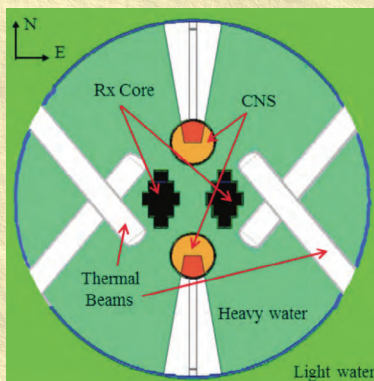
# NEW REACTORS



The two major reactor based neutron scattering facilities in the US, DOE's High Flux Isotope Reactor (HFIR), and the Department of Commerce's NIST Center for Neutron Research (NBSR) recently underwent extended shutdowns; NIST shut down due to the 2018-2019 government shutdown, while HFIR is still shut down due to a faulty fuel element. The absence of these facilities highlighted the lack of neutron scattering facilities in the US as called out in a 2018 APS report.

Both NIST and the DOE are exploring the possibility of building new reactors. DOE recently received approval to start work on a conceptual design for the proposed Versatile Test Reactor. NIST is exploring options to upgrade or replace the NBSR (pg 56-57) and has proposed a new design for the reactor.

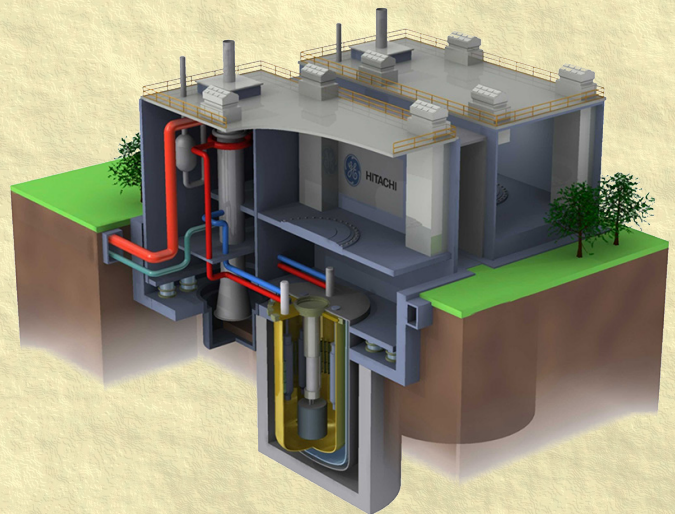
The APS study found that the US needs to increase its neutron research capabilities. Currently, the newest research reactor in the US is the McClellan Nuclear Science Center at UC Davis which was built in 1992.



The proposed split core layout of the new NIST reactor

NIST is proposing to build a new, split core, reactor at the current site of the NBSR to take advantage of the existing facilities. Construction is expected to take about 15 years and cost about \$1 billion dollars. The new reactor will feature 2 cold neutron sources and will be one of the world's premier neutron scattering facilities.

DOE's Versatile Test Reactor is expected to be a sodium cooled fast reactor built at the Idaho National Laboratory. If built, it would be the first fast reactor in the US since the Experimental Breeder Reactor-II shut down in 1994. It is hoped that the reactor will be operational by 2026 for a cost of approximately \$3 billion.



GE-Hitachi's PRISM Reactor, which may serve as a basis for the VTR design





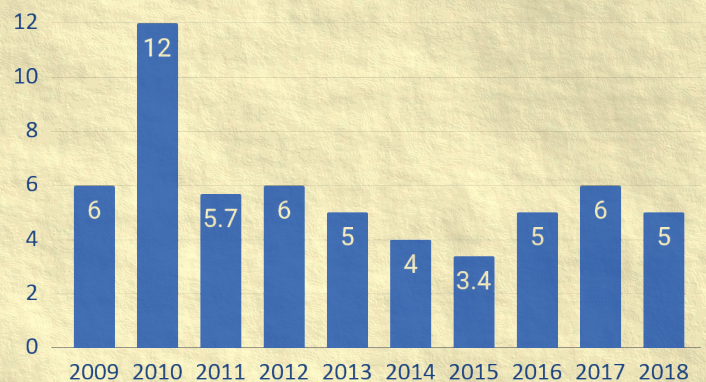
# INFRASTRUCTURE FUNDING

The 2020 President's budget request was released. Relevant to the TRTR community is the DOE Nuclear Energy University Program (NEUP) funding to support research reactor infrastructure and general scientific infrastructure. This support is critical in maintaining the role of research reactors in cutting edge research and teaching. Funding has remained at an almost flat level of \$5 million since 2009.

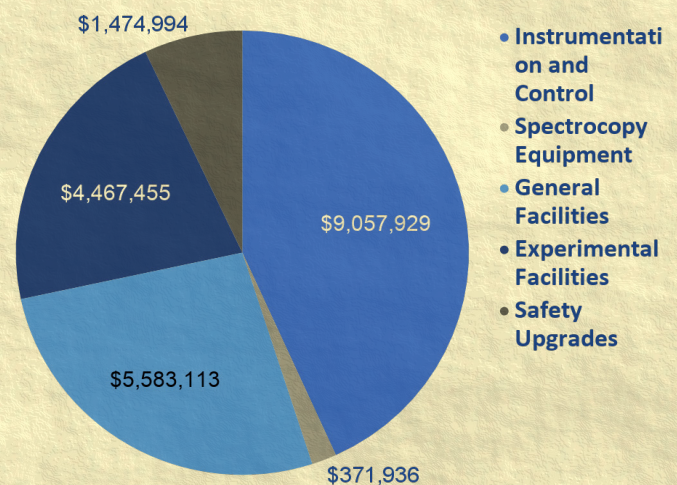
Since 2011, approximately \$21 million has been awarded to university research reactors for infrastructure upgrades. The largest percentage of this, about \$9 million, has gone to instrumentation and control upgrades. This includes all new control consoles for Penn State, University of Utah, Kansas State University, and Purdue (soon to be licensed as the first reactor with all digital control system). Significant upgrades to experimental facilities including new hot cells for University of Florida, MIT, and NC State, beam-line upgrades for Ohio State, and an Internet connected spectrometer at Missouri S&T. The program has also funded numerous general infrastructure and safety improvements at reactors around the country.

Cut this year from the President's budget request is the Integrated University Program (IUP). This program typically awards up to \$5 million in

support through undergraduate scholarships and graduate fellowships. In FY18, over 40 scholarships and over 30 fellowships were awarded.



Total Infrastructure Funding (Millions)



NEUP Reactor Infrastructure Upgrades Since 2011





# NRC INSPECTIONS



## **Ohio State University Nuclear Reactor Laboratory**

November 27-29, 2018

An inspection of the Ohio State University Reactor (OSUR) was carried out from November 27-29, 2018. The inspection included a review of procedures, experiments, health physics, design changes, committees, audits, and reviews, and transportation of radioactive materials. No violations were found. The complete inspection report is [ML18361A646](#).

## **Oregon State University Radiation Center**

January 14-17, 2019

An inspection of the Oregon State University TRIGA Reactor (OSTR) was carried out from January 14-17, 2019. The inspection included a review of procedures, experiments, health physics, design changes, committees, audits, and reviews, and transportation of radioactive materials. No violations were found. The complete inspection report is [ML19031C929](#).

## **Rhode Island Nuclear Science Center**

January 15-17, 2019

An inspection of the Rhode Island Nuclear Science Center (RINSC) was carried out from January 15-17, 2019. The inspection included a review of operator licenses, re-qualification, 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 [ML19030B852](#).

## **Texas A&M Nuclear Science Center**

December 10-13, 2018

An inspection of the Texas A&M Nuclear Science Center was carried out from December 10-13, 2018. The inspection included a review of procedures, experiments, health physics, design changes, committees, audits, and reviews, and transportation of radioactive materials. No violations were found. The complete inspection report is [ML18361A656](#).





# NRC INSPECTIONS



## **McClellan Nuclear Research Center**

January 28-31, 2019

An inspection of the UC Davis McClellan Nuclear Research Center was carried out from January 28-31, 2019. The inspection included a review of procedures, experiments, health physics, design changes, committees, audits, and reviews, and transportation of radioactive materials. No violations were found. The complete inspection report is [ML19036A886](#).

## **Armed Forces Radiobiology Research Institute**

February 12-14, 2019

An inspection of the Armed Forces Radiobiology Research Institute TRIGA Reactor was carried out from February 12-14, 2019. The inspection included a review of operator licenses, re-qualification, and medical examinations, experiments, organization and operations and maintenance activities, review and audit and design change functions, procedures, fuel movement, and surveillances. No violations were found. The complete inspection report is [ML19057A199](#).

## **Purdue University Research Reactor**

March 5-7, 2019

An inspection of the Purdue University Research Reactor was carried out from March 5-7, 2019. The inspection included a review of organization and staffing, operating logs and records, procedures, re-qualification training, surveillance and limiting conditions for operation, 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. No violations were found. The complete inspection report is [ML19074A26](#).





# 2019 EVENTS

**MAY 1, 2019**

**APPLICATIONS DUE FOR GLENN T. SEABORG CONGRESSIONAL SCIENCE AND ENGINEERING FELLOWSHIP**

**MAY 1, 2019**

**APPLICATIONS DUE FOR CHRNS SUMMER SCHOOL ON THE FUNDAMENTALS OF NEUTRON SCATTERING (JULY 22-26)**

GAITHERSBURG, MD

**JUNE 3 - 7, 2019**

**RADIATION SAFETY OFFICER TRAINING**

REED RESEARCH REACTOR, PORTLAND, OR

**JUNE 3-5 2019**

**NEI NUCLEAR ENERGY ASSEMBLY**

WASHINGTON, D.C.

**JUNE 9-13 2019 2019**

**ANS ANNUAL MEETING**

MINNEAPOLIS, MN

**JUNE 30 - JULY 5, 2019**

**EUROPEAN CONFERENCE ON NEUTRON SCATTERING**

ST. PETERSBURG, RUSSIA

**JULY 8-11, 2019**

**INTERNATIONAL MEETING FOR THE UNION FOR COMPACT ACCELERATOR-DRIVEN NEUTRON SOURCES**

PARIS, FRANCE

**JULY 28-31 2019**

**U.S. WOMEN IN NUCLEAR**

CHICAGO, IL

**AUGUST 4 - 7, 2019**

**UTILITY WORKING CONFERENCE AND VENDOR TECHNOLOGY EXPO**

AMELIA ISLAND, FL

**AUGUST 19 - 30, 2019**

**NUCLEAR INNOVATION BOOT CAMP**

PARIS, FRANCE

**SEPTEMBER 4 - 6, 2019**

**WORLD NUCLEAR ASSOCIATION SYMPOSIUM**

LONDON, UK

**SEPTEMBER 22 - 26 2019**

**TRTR ANNUAL MEETING**

IDAHO FALLS, ID





# 2019 EVENTS

**OCTOBER 6-10 2019**

**INAUGURAL MATERIALS IN  
NUCLEAR ENERGY SYSTEMS (MINES)  
CONFERENCE**

BALTIMORE, MD

**NOVEMBER 25-29 2019**

**IAEA INTERNATIONAL CONFERENCE ON  
RESEARCH REACTORS: ADDRESSING  
CHALLENGES AND OPPORTUNITIES  
TO ENSURE EFFECTIVENESS AND  
SUSTAINABILITY**

BUENOS AIRES, ARGENTINA

**JUNE 23 - 25, 2020**

**WORLD NUCLEAR EXHIBITION**

PARIS, FRANCE

**TBD**

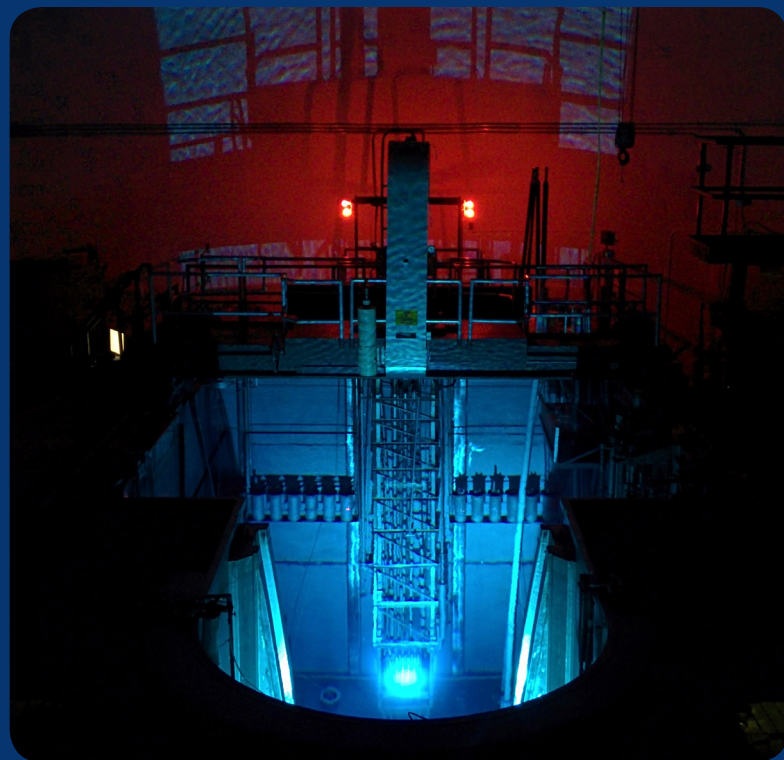
**RADIOACTIVE TEA PARTY**





# KNOW MORE NUKES

*With so many reactors to visit and so little time and travel funds, we are making it easier to get to know another facility with this section. We've sent around a questionnaire with what we think are the most important things to know about every reactor. We look forward to featuring your reactor!!*



Texas A&M University Nuclear Science Center Reactor Pool

## TEXAS A&M NUCLEAR SCIENCE CENTER

located at Texas A&M University in College Station, TX is our featured facility in this edition of Know More Nukes. Jerry Newhouse, Associate Director of the Texas A&M University Nuclear Science Center has provided the responses to our questions.

**What year did your reactor first go critical?**  
December 18, 1961

**What is the reactor license number? Power level?**  
R-83; 1MW

**What is your position at the reactor? How long have you held that position?** I'm the Associate Director. I've had this position for over 5 years, and I've worked at this reactor for over 16 years.

**Have any major changes/modifications, such as conversion, power upgrade, etc..., been done?**  
Our reactor was originally a 100kW MTR reactor. We converted to the 1MW TRIGA in 1968. In the mid-70s we converted from LEU to HEU. Finally, in 2006 we converted back from HEU to LEU.

**What is a unique feature of your reactor?** Perhaps isn't unique, but what I feel is most special about our reactor is the responsibility students have in running it. We operate 50+ hours per week with two staff operators and one staff radiation safety person. The vast majority of our operation and radiation safety tasks are performed by students. As a product of the student worker program myself, I can say that being trusted with reactor operation, maintenance, fuel manipulation, sample handling, etc. as an undergraduate is a very special experience.

**What is a fun fact about your reactor?** Texas A&M also has an AGN-201M reactor. That reactor was





recently moved from its previous site on campus out to our site where a major expansion has just wrapped up to accommodate it. Soon we will have it back up and running, and will operate two research reactors at the same site.

**What is the most unusual request someone has had to use your reactor?** The most unusual request I've received was from a high school student working on a science fair project. It ended up being a really good experience for the student, and a lot of fun to help with.

**What drew you to your current position?** I was interested in having a greater role in determining the direction of our center. So, when the opportunity was available I jumped at the chance.

**What has been your favorite project?** My favorite project was the LEU conversion in 2006. It was the first project of that scale I was involved in. I got to work with some really great and experienced people to complete a complex process.

**Before working at your reactor, what was the most unusual or interesting job you've ever had?** My career has been a bit unusual in that this the only place I've ever worked. I started working here as a freshman and I've been very lucky to be able to stay at the same workplace all this time.

**What advice would you give to new reactor operators?** Be observant. I think the greatest skill you can develop is being able to notice something being a little different than normal that nobody else notices. Many big problems start out as a small difference from what is normal, and if you can catch it then you can fix it before it grows. Being the person who notices things is a good reputation to have.

**What are three career lessons you've learned thus far?** 1 - It's important to care. That goes both ways; it's important for the organization to care about you and for you to care about the organization. In my experience, someone who is a little less skilled but cares about their work does a better job than a higher skilled person who doesn't care.

2 - Feel empowered to speak up. It can be difficult for new people to feel like they can ask probing questions or make suggestions. But, that period of newness is one of the best times to do it. You have a fresh view and will see things in a different way than others. If your supervisors or management are doing their jobs correctly, they'll also recognize this and be glad you shared your thoughts.

3 - You are your best advocate. You can have the best team in the world, but there isn't anyone you work with who cares as much about you as you do. Be willing to advocate for yourself whether it is in safety, career path, compensation, etc. Most times nobody will know something is a problem or isn't working well for you if you don't tell them.

*Want your facility featured in a future edition of Know More Nukes? Tell us more via our [on-line form](#)!*



**Texas A&M Nuclear Science Center Building**