NEWSLETTER Q3

2021

TRTR

LETTER FROM THE CHAIR

Dear TRTR Members,

As the summer is ending, I hope that everyone has had a healthy, relaxing, and enjoyable summer season.

At NC State, we remain actively engaged in the preparations for the TRTR 2021 meeting. Due to uncertainties arising from the COVID-19 pandemic, we are seeking your feedback to determine the level of in-person participation to be anticipated at the meeting. Please respond to the survey that was sent recently regarding this matter. We are hopeful that we can still hold an in-person meeting and are exploring virtual access for selected days and events. Of course, we will be adhering to the strictest health rules including the requirements of masking and social distancing at all the meeting's events.

The meeting agenda is very interesting. Sessions are planned that focus on the operations and utilization of research reactors and on the possibilities for enhancement of current utilization levels. In addition, we are holding a session to explore the synergy between advanced reactors and research reactors, where governmental, academic and industrial organizations will present latest views on the subject. We will also continue our discussions with our colleagues at NRC at the meeting to cover progress on all relevant topics. Socially, the in-person meeting will benefit from an enjoyable program, which is supported by the activities and amenities available at NC State, in Raleigh, and the surrounding region. October is a beautiful time in North Carolina, and from Raleigh one could easily access costal and mountain areas.

As you know, an important initiative was launched by TRTR/NEDHO over the past period to support our community and to renew the national academic nuclear science and engineering infrastructure. This effort has resulted in motivating congressional activities and introducing HR 4819 to allocate funding in support of this objective. While the discussions continue, we are highly optimistic that this initiative will result in levels of support that will allow for the revitalization and growth of our research reactor facilities. Using this new support, I strongly feel that our reactors can constructively contribute to science, engineering, and the deployment of advanced nuclear energy tconcepts.

I am currently winding down my term as TRTR chair. This has been an enjoyable experience for me. I certainly had the chance to know all of you and the community at large much better than before. I thank everyone for their insights and collaboration, and I look forward to my continued involvement in TRTR. Also, on behalf of all of us, I welcome the incoming TRTR chairs Jeff Geuther and Leo Bobek and hope that they have a prosperous term.

Ayman I. Hawari, Ph.D.
North Carolina State University
TRTR Chair

LETTER FROM THE EDITOR

Greetings TRTR Community!

We are excited to share our TRTR reactor map in this newsletter. Please reach out with any additions or corrections so that we can up-load a final version to the website. We plan to display a copy for reference during our tours. People are always excited to see the locations of the many research and test reactors in the U.S.

The June workshop regarding medical issues has identified multiple paths forward. A white paper will be drafted for community input, along with updates to ANSI/ANS 15.4. Please share your thoughts or concerns with the executive committee so these documents are acceptable to the entire community.

Continue to stay safe and healthy. As always, reach out with any comments or suggestions for the newsletter.

Best regards,

Amber

Inside this Edition

Amber Johnson
University of Maryland
Editor

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Content Editor

2021

September 26-30, 2021

The European Research Reactor Conference

Helsinki, Finland
Website

October 4-8, 2021

Technical Meeting on Risk Informed In-Service Inspection and Decision Making for Research ReactorsTechnical Meeting on Risk Informed In-Service Inspection and Decision Making for Research Reactors

Vienna, Austria
Website

October 12-13, 2021

Molten Salt Reactor Workshop

Virtual Conference
Website

October 13-14, 2021

NuFor: Nuclear Forensic Conference

London, UK
Website

October 17-21, 2021

TRTR 2021 Annual Conference

Raleigh, NC, United States
Website

October 31-November 4, 2021

American Nuclear Society Winter Meeting

Washington DC, United States
Website

November 30 - December 2, 2021

World Nuclear Expo

Paris, France
Webstite

March 03-04, 2022

International Conference on Nuclear Research Reactors

Rome, Italy
Website

April 25–28, 2022

International Conference on Fast Reactors and Related Fuel Cycles: Sustainable Clean Energy for the Future

Beijing, China
Website

May 15–20, 2022

International Conference on Physics of Reactors 2022

Pittsburgh, Pennsylvania
Website

UPCOMING EVENTS

NRC Inspections

Maryland University Training Reactor

March 22-24, 2021
ML21099A138

The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, design changes, committees, audits and reviews, emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were identified.

Reed Research Reactor

April 19-22, 2021
ML21134A127

The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, design changes, emergency planning, maintenance logs and records, and fuel handling logs and records. One Severity Level IV, Non-Cited Violation was identified for failure of 2 operators to complete the requal program.

University of Florida Training Reactor

April 19-21, 2021
ML21127A285

The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, and maintenance logs and records. No violations were identified.

Rhode Island Nuclear Science Center

April 27 - 29, 2021
ML21144A045

The inspection included a review of security compliance. No violations were identified.

Kansas State University Nuclear Reactor Facility

June 1-3, 2021
ML21161A139

The inspection included a review of organization and staffing, procedures, health physics, design changes, committees, audits and reviews, and transportation activities. No violations were identified.

Purdue University Reactor Number One

June 14 - 16, 2021
ML21186A005

The inspection included a review of security compliance. One Severity Level IV violation was identified.

June 14 - 16, 2021
ML21189A289

The inspection included a review of organization and staffing, procedures, health physics, emergency planning, and transportation activities. One Severity Level IV violation was identified for failure to properly report argon 41 releases to the NRC.

Washington State University Nuclear Science Center

June 22-24, 2021
ML21207A008

The inspection included a review of operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCO), experiments, emergency planning, maintenance logs and records, and fuel handling logs and records. No violations were identified.

Dow Chemical Research Reactor

June 28-30, 2021
ML21194A411

The inspection included a review of organization and staffing, procedures, experiments, health physics, design changes, emergency planning, and transportation activities. No violations were identified.

Armed Forces Radiobiology Research Institute

July 12 - 14, 2021
ML21202A433 (inspection report)
ML21235A473 (NRC slides regarding violation)

The inspection included a review of organization and staffing, procedures, 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. One Severity Level IV non-cited violation was identified for failure to maintain staffing requirements; the only licensed reactor operator retired leaving AFRRI unable to meet license requirements. AFRRI is working with the NRC to restore compliance and the NRC will not cite the violation at this time.

July 12 - 14, 2021
ML21203A065

The inspection included a review of security compliance. No violations were identified.

GE Nuclear Test Reactor

August 3, 2021
ML21238A395

The inspection included a review of security compliance. One Severity Level IV violation was identified.

Idaho State University Fines

On July 26, 2021, the NRC proposed a $45,000 fine for Idaho State University (ISU) for violations identified during a March 2020 inspection. The identified violations included failures to provide approved written procedures for safety significant licensed activities, failures related to special nuclear material inventories

and reporting to the Nuclear Materials Management and Safeguards System, and failure to comply with the provisions of a Confirmatory Order. These violations relate to ISU's Radioactive Materials and Special Nuclear Materials licenses, not their reactor license.

The Confirmatory Order was issued in May 2019 following an inspection conducted in September 2018. The deficiencies found in the 2018 inspection include failure to properly label and inventory license materials, failure to perform and properly document all required surveys, failure to perform required reviews and surveillances, failure to properly post and control access to contamination areas, Failure to receive proper approvals for radioactive materials transfers, failure to receive proper approvals for radioactive materials transfers, and failure to ensure that potential opportunities for radiation exposures were evaluated by the radiation safety officer.

A Corrective Action Plan to implement the Confirmatory Order was developed by ISU and actions taken were reviewed in September 2020 and April 2021.

In the 2018 and 2020 inspection reports note that there is a recent history of problems with the ISU radioactive materials program with lost sources in 2010 and 2017 which resulted in Severity Level III violations. Additionally, security related violations were identified in 2015.

A Predecisional Enforcement Conference was held in May 2021 with presentations by the NRC and Idaho State University to discuss the enforcement actions to be taken.

On August 18, 2021, ISU notified the NRC that they chose not to participate in an alternative dispute resolution process, did not contest any of the violations, and will pay the fines proposed by the NRC.

On August 31st, 2021, the NRC accepted the corrective actions taken by Idaho State University.

Reportable Occurences

Purdue Power Calibration

On July 20th, 2021 Purdue University reported that on February 28th, 2021, the reactor was operated in excess of its licensed power level due to an improper power calibration. A follow up report details that the reactor has not been operated since that time, and an investigation into the circumstances is ongoing.

MURR Control Rod Drive Failure

On July 28, 2021 University Of Missouri declared a Reportable Occurrence for a failed Control Rod Drive Mechanism (CRDM) during an operation. A follow up report states the cause of the CRDM failure was a broken roll pin.

Utah Pool Water Conductivity

On August 6th, 2021 University of Utah declared a Reportable Occurrence due to exceeding Technical Specification limits for pool water conductivity and pH following an operation. This is believed to be due to an algaecide water treatment added to the pool several days prior to the operation.

News

History of Oregon State AGN-201 Reactor

Celia Oney, Reactor Supervisor for the Oregon State University TRIGA Reactor presented on the history of Oregon State's AGN-201 reactor at the Columbia History of Science Group Annual Conference.

Nuclear Reactor at Catholic University

A brief history of the AGN-201 reactor at Catholic University of America.

Nuclear Reactors in Oklahoma

A brief history of the nuclear reactors to have operated in Oklahoma.

Fuel Damage at Chinese Nuclear Power Plant

The Chinese government has acknowledged damage to fuel rods at the Taishan nuclear plant, but states that no release of radioactivity has occurred.

Report Recomends NASA Update Astronaut Radiation Exposure Limits

The National Academies of Sciences, Engineering, and Medicine recommends that NASA revise radiation exposure limits for astronauts.

Oklo to Build Mircroreactors

Oklo, a new reactor startup company, intends to build a fast microreactor.

University of Liverpool Awarded Grant for MSR Reactor Project

University of Liverpool has been awarded £1.17 million ($1.6 million USD) from the Engineering and Physical Sciences Research Council (EPSRC) to begin development of a Zero Power Molten Salt Reactor. The project will also involve the Universities of Lancaster and Manchester and several national and international industrial partners.

Plans For Decommissioning SM-1A Reactor Finalized

The US Army Corps of Engineers has finalized plans to decommission and preserve the history of a mothballed nuclear reactor at Fort Greely, Alaska. Final decommissioning of the 20.2 MW (thermal) SM-1A pressurized water reactor, which operated from 1962 to 1972, is due to begin next year.

MARVEL Reactor

A new microreactor program is underway at Idaho National Laboratory. The Microreactor Applications Research Validation and Evaluation Project (MARVEL) will involve a 100 kW thermal, NaK cooled, microreactor with stirling engine generators to be built at the TREAT reactor site.

Robots come to the Rescue After Fukushima Daiichi Nuclear Disaster

The robots being used to clean up the Fukushima Daiichi were featured on CBS's 60 Minutes.

NuScale Project at INL Reduced from 12 to 6 Reactors

The Nuscale project to build reactors at Idaho National Laboratory is being scaled down from 12 reactors to 6 reactors; however, due to power uprates, the power output of the plant is only being reduced from 600 to 460 MW.

Why Scientists Plant Sunflowers After Nuclear Disasters

Sunflowers may be useful for removing radioisotopes from the environment following nuclear accidents.

Bruce Power Reactors Violated Terms of Operating License

Higher than normal hydrogen levels were found in the pressure tubes of the Bruce Nuclear Generating Station Unit 3 and Unit 6. Hydrogen equivalent concentration in some regions were found to be nearly twice allowable levels.

Snakes Used to Monitor Fukushima Radiation

Researchers at the University of Georgia are attaching dosimeters to rat snakes to monitor contamination levels around Fukushima.

Penn State Breazeale Reactor Upgrades

The Penn State Radiation Science & Engineering Center is being expanded with approximately $9.8 million in equipment and 5 new neutron beamlines.

Nuclear Power's Reliability Dropping due to Climate Change

A new analysis has found that the climate change is leading to more frequent shutdowns of nuclear power plants due to extreme weather.

New Bolivian Reactor

Construction has begun on a new Research Reactor complex in Bolivia. At 4000 meters above sea level it will be the highest nuclear research facility in the world.

Department of Energy Heavily Redacts Documents on Homer Simpson Blog

Vice finds heavy redactions in drafts of DOE blog post about The Simpsons.

Japan's High Temperature Test Reactor Resumes Operation

The High Temperature Engineering Test Reactor in Japan has resumed operations for the first time since 2011.

David Stanton Recalls Windscale Fire

David Stanton, 90, recalls his experience fighting the Windscale Fire.

Grant to Study UNM's Nuclear Reactor

Christopher Perfetti, assistant professor in The University of New Mexico Department of Nuclear Engineering was awarded funding

from the Nuclear Energy Research and Development Program (NEUP) of the DOE to study the core physics of the university's AGN-201 reactor.

Neutron-scattering equipment for McMaster Reactor

The Canadian Foundation for Innovation (CFI) will fund new neutron beam instruments at the McMaster University research reactor.

Painkillers May Serve as Radiation Dosimeters

Polish physicists have discovered that painkillers may serve as luminescent dosimeters in emergency situations.

Reed SRO Awarded Goldwater Scholarship

Patrick Park, a Senior Reactor Operator at the Reed Reactor was awarded a Goldwater Scholarship. Patrick is working on a research thesis involving MCNP modeling the Reed reactor.

AFRRI Celebrates 60th Anniversary

The Armed Forces Radiobiology Research Institute is celebrating it's 60th year as a "Unique National Asset".

Illinois Nuclear Plants Saved

The Illinois Senate has approved a clean energy deal which includes subsidies that enable the Byron and Dresden nuclear power plants to remain operational. The Byron plant had been just hours away from permanent defueling.

TRTR- NRC RROAR Meeting

On July 15, 2021, the NRC hosted a public meeting with representatives of TRTR to discuss requirements for medical examinations for licensing of operators and possible options to risk-inform the medical examinations for licensing RTR operators.

NEI provided comments on 10 CFR 55.33(a)(1) as part of the NRC's Retrospective Review of Administrative Requirements process. The slides presented by the NRC are ML21166A165 and by TRTR are ML21165A059.

TRTR identified 3 areas of concern regarding medical qualifications reporting and processes: evaluation of therapeutic and medical device usage, operator health assurance by licensee management, and NRC Form 396, "Certification of Medical Examination by Facility Licensee," submittal timelines.

TRTR representatives also presented training issues that will be discussed at a future workshop. These issues include: NRC residency requirements at the facility for applicants, NRC scrutiny on experience and education supplements for Senior Reactor Operator–Instant applicants, experience justifications required by the NRC, and the amount of time and required information for operator license renewals and new applicants.

TRTR representatives also commented on the extended timeframe with the issuance of examination results and inspection reports from the NRC. A white paper is being prepared by NRC staff to address the medical issues raised. In parallel, NRC staff are working with the community to update ANS/ANSI 15.4 A synopsis of the meeting is ML21195A140.

Please send any comments regarding these important issues to the executive committee so they may be shared for inclusion in the white paper.

2021 NEUP Grant Awards

The DOE has announced the awards of the FY 2021 Nuclear Engineering University Program. Included in the awards were more than $2.25 million for Research Reactor Infrastructure Upgrades:

Facility	Amount Awarded	Description
North Carolina State University	$341,760	Installation of new reactor console instrumentation, radiation protection, and moisture/temperature sensor systems.
Oregon State University	$555,416	Purchase of spare instrumentation and control parts and development of a 3D printing capability for sample tubes.
Pennsylvania State University	$179,715	Installation of a high-temperature molten salt neutron irradiation experimental facility and addition of a mass spectrometer to analyze gases from the irradiated salt experiments.
Reed College	$140,000	Purchase of a spare compensated ion chamber.
The Ohio State University	$73,539	Purchase of spare reactor control system modules.
University of California, Irvine	$74,950	Purchase of a digital chart recorder, upgraded dosimetry system, and underwater camera.
University of Florida	$282,000	Installation of a pneumatic sample transfer system for neutron irradiation.
University of Maryland, College Park	$208,140	Installation of new radiation area monitors, continuous air monitor, upgraded gamma spectroscopy equipment, and radiation safety equipment.
University of Wisconsin-Madison	$222,294	Development of a neutron tomography system.
Washington State University	$302,657	Repair and replace the reactor tank concrete and pool liner.

KNOW MORE NUKES

University of Maryland

Luke Gilde
Reactor Operations Manager

Previous page: The Maryland University Training Reactor pool

Right: Operators measure new TRIGA fuel elements before assembling them into bundles during the 1974 TRIGA conversion. (Note the fuel element in the shopping cart!)

What year did your reactor first go critical?

The University of Maryland Reactor, which was the first reactor in the state, went critical on October 28, 1960 with HEU MTR fuel. From 1973-1974, the reactor was converted from MTR to TRIGA fuel, with the first TRIGA operation occurring on June 13, 1974.

What is the reactor license number? Power level?

License Number: R-070, Power Level: 250 kW

What is your position at the reactor? How long have you held that position?

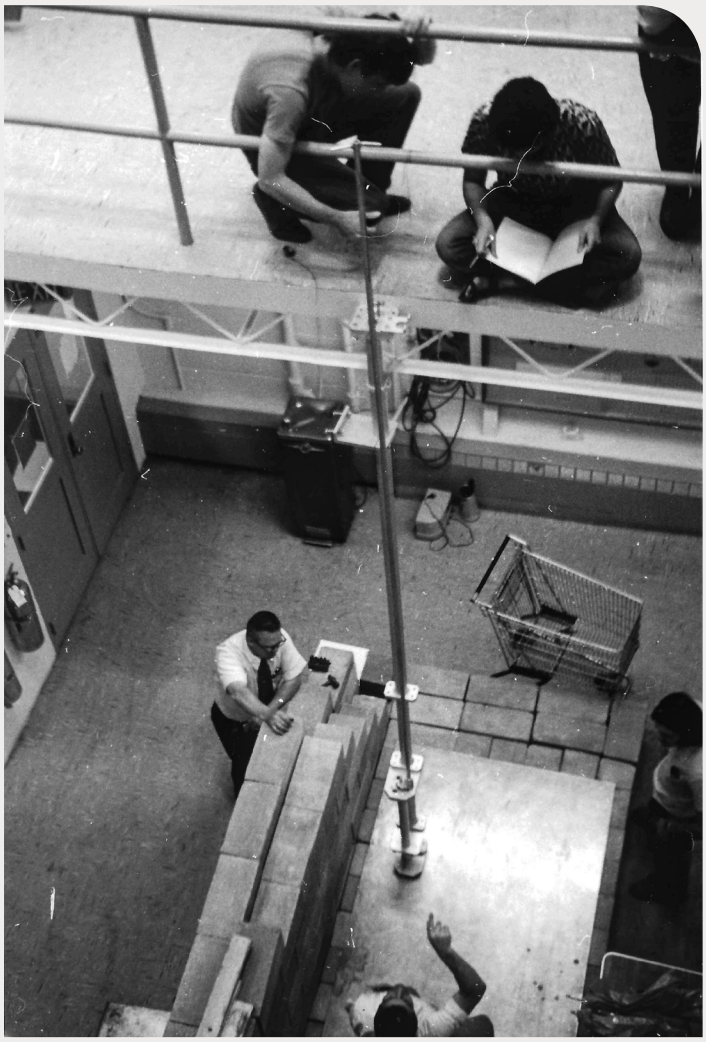
I have been the Reactor Operations Manager for about two and a half years.

Have any major changes/modifications, such as conversion, power upgrade, etc..., been done?

The reactor was upgraded from a 10 kW MTR to a 250 TRIGA from 1973-1974. At that time, a pneumatic rabbit was added which has proved to be the Maryland University Training Reactor's (MUTR) most used experimental facility.

What is a unique feature of your reactor?

The location of our reactor is advantageous; being less than 20 miles from 2 other research reactors enables many more opportunities for collaboration than would otherwise be possible. At one point there were 5 research reactors in the state of Maryland, although only 3 (UMD, NIST, and AFRRI) are still operational today.



What is a fun fact about your reactor?

It was built by Allis-Chalmers, a company known today primarily for their tractors...

What is the biggest challenge facing your reactor?

Currently, our reactor is underutilized; developing more educational and experimental uses for the reactor has been a significant challenge for the last several years.

What is the most unusual request someone has had to use your reactor?

A few years ago, we irradiated mouse heart cells in order to test if a cancer drug would increase their resistance to radiation. In the past, the reactor has been used for gunshot residue

detection and staff members were called upon to testify at a murder trial in 1985.

What drew you to your current position?

I've been interested in nuclear reactors since high school, and the opportunity to get to work with a reactor was a big part of my decision to attend UMD. Becoming an undergraduate reactor operator worked out better than I could have hoped and led to a full time job.

What has been your favorite project?

I have really enjoyed working on upgrades to the reactor control system. In the last 2 years we've replaced large portions of the reactor control system, greatly reducing noise and increasing operational reliability.

Before working at your reactor, what was the most unusual or interesting job you've ever had?

I worked in a ceramics research lab for several years where most of my job consisted primarily of breaking glass.

What do you find the most challenging at reactor?

Time management, we have 3 staff members responsible for the reactor, a large cobalt 60 irradiator facility, and a linear accelerator. Between operations, maintenance, and training, it can be a challenge to keep up with everything.

What advice would you give to new reactor operators?

Never stop trying to learn something new. There's a good chance that something that seems irrelevant will one day be useful.

What are three career lessons you've learned thus far?

I tend to agree with the cliche "Find a job you enjoy doing, and you will never have to work a day in your life." Documentation is important! You will usually wind up revisiting everything! Don't be afraid to ask for help; in my experience, the TRTR community has been tremendously supportive.

Mike Hottinger and Luke Gilde assemble used fuel into a bundle in the MUTR pool.

RESEARCH AND TEST REACTORS IN THE US