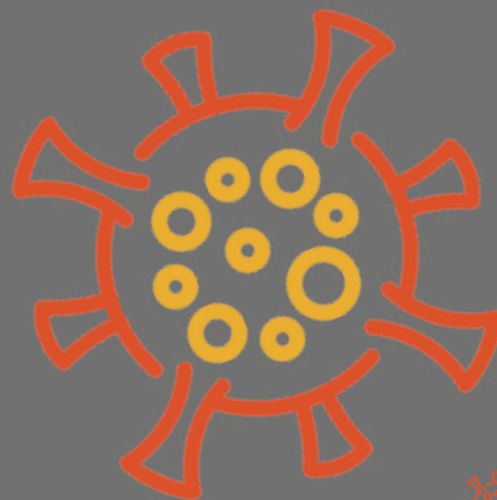
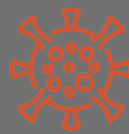


TRTR NEWSLETTER

2020 QUARTER 2

TIME,
DISTANCE,
SHIELDING,
CONFINEMENT



ARE NOT

JUST
FOR

REACTORS.

**DON'T MAKE A
CRITICAL
ASSEMBLY** OF
PEOPLE

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Know More Nukes

Exploration of Blue was inspired by Submerge, ARTECHOUSE NYC's February 2020 installation, in which we featured a highly immersive main piece that explored the psychological and emotional properties of the color blue.



**Clive Townsend, Chair
Purdue University**

Letter from the Chair

The Spring of 2020 challenged facilities and our partner in reactor safety, the NRC, like never before. In a matter of a few short months, the agency and community worked together to provide guidance, regulatory relief, and mutual cooperation as the world responded to COVID-19. Holding weekly phone calls to identify areas of concern and future compliance hot spots, everyone has spent much of their time working remotely as we navigate this crisis. As TRTR Chair, I applaud the work done (remotely) through Rockville as well as by our members to work diligently and effectively together.

As part of the after-shocks of the current pandemic, the 2020 TRTR Annual Meeting will be held remotely. While we had hoped to continue with a scaled back version of the conference in Chicago, a community wide survey

clearly showed the attendance numbers would be insufficient for the meeting to be effective. With approximately 30 facilities or companies responding, over 70% said they would send none or one individual, and over 80% indicated “some” or “very” concerned about the health consequences.

A large benefit to any community event are the side conversations that result in shared knowledge and future partnerships. As we shift to a virtual conference, we will do our best to facilitate these conversations. We will look to other partner organizations such as ANS and NEI to learn the best software and collaboration platforms for a virtual event.

Finally, I am excited to announce testing of a new webinar series to be hosted by TRTR. Starting June 30 at 10am, we will begin hosting a seminar discussing a broad swath of TRTR related topics. The inaugural event will be provided by Morgan, Lewis, & Bockius LLP on compliance with 10 CFR Part 810. As the NNSA is now issuing civil penalties for noncompliant organizations, it is a good time to check in on the posture of all of our facilities. Details for this event will be posted on the TRTR Website and sent to the list-serv.

Please reach out if you or your facility is experiencing any issues and I look forward to seeing you online at the 2020 Annual Meeting.

Clive Townsend
Reactor Supervisor
Assistant Lab Director
Nuclear Engineering
Purdue University

NRC COVID-19 Activities

From the [NRC COVID-19 Regulator Activities for Nuclear Reactor Web Page](#):

Since March 25, 2020 the Division of Advanced Reactors and Non-power Production and Utilization Facilities (DANU) has been hosting informal phone calls to discuss potential impacts of COVID-19 on the TRTR community.

The NRC is offering [temporary exemptions](#) from the requirements of 10 CFR 20.1703(c)(5)(iii), and 20.1703(c)(6) requiring annual fit testing of respirators.

The NRC is offering [temporary exemptions](#) from the requirements of 10 CFR 37.23(b)(2), 37.25(c), 37.43(c), and 37.51(a) requiring recertification of reviewing official, investigations of personnel every 10 years, annual refresher training, and annual testing of security systems.

The NRC is offering [temporary exemptions](#) from 10 CFR 55.21, 55.53(i), 55.57(a)(6), 55.59, and 55.76 for required quarterly operational hours, required biennial medical examinations, license renewal medical examinations, and requalification plan requirements.

The NRC is offering [temporary exemptions](#) from the requirements of 10 CFR 74.19 requiring annual inventories of materials.

The NRC is allowing for [deferred payment](#) of fees.

10 CFR Exemption Requests

From the NRC [COVID-19 web page](#).

Facility	Exemption Request	Date Requested	Date Granted
MIT	Part 55	<u>May 11th</u>	<u>May 15th</u>
MURR	Part 20	<u>May 4th</u>	<u>May 18th</u>
NIST	Part 55	<u>May 11th</u>	<u>May 18th</u>
ISU	Part 55	<u>May 13th</u>	<u>May 22nd</u>
UMD	Part 55	<u>May 13th*</u>	<u>May 22nd</u>

* Submitted using on-line portal

Letter from the Editor

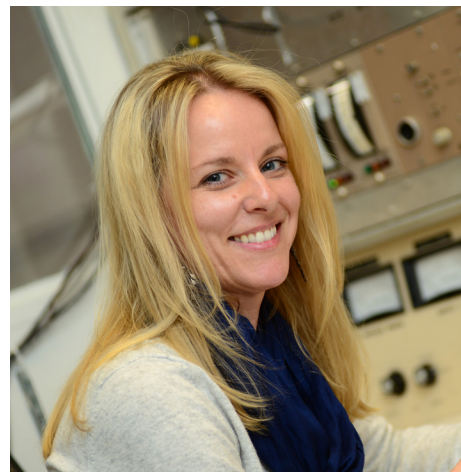
Times have certainly changed since the last newsletter. Our community is continuing to respond to a pandemic. Working together with the NRC, we have been able to ask questions through phone calls, receive exemptions and request guidance. A portal was developed to encourage complete submissions and swift response. All of this information made dealing with the COVID-19 public health emergency less stressful. I appreciate the NEI calls for allowing facilities to share how they are returning to a new normal. I am disappointed that I will not get to see everyone at our annual conference.

While we slowly move forward with operating our facilities in this new era of social

distancing we should also consider how to remove the institutional barriers of the old era. We must commit ourselves to working towards an inclusive community for all. This work will not come easy as it forces us to hold ourselves accountable and to search for concrete actions that can eliminate these barriers. Remember to stand up for what is right and continue to confront unconscious biases. Please take care of yourselves and reflect on these changing times.

Amber Johnson
Director
Radiation Facilities
University of Maryland

Luke Gilde
Reactor Manager
Radiation Facilities
University of Maryland



Amber Johnson, Editor
University of Maryland



Luke Gilde, Content Editor
University of Maryland

On the Cover

Remember to follow CDC guidelines at work and at home to reduce the spread of respiratory diseases.

News

Neutron Imaging Teeth to Improve Dental Implants

Researchers working at the High Flux Isotope Reactor are using neutron scattering techniques to develop better dental implants.

TRIGA Fuel at NIST

As part of the ongoing effort to convert the NIST Center for Neutron Research Reactor (NBSR) to LEU fuel, TRIGA fuel is being evaluated.

Small Military Reactors

The Pentagon has awarded 3 contracts to begin development of small, mobile nuclear reactors. The project aims to begin testing a reactor by 2023.

Aurora Reactor to be Used as a Space for Art

The Oklo Aurora reactor to be built at INL will use its unique building as a canvas for local art.

The Impact of Carbon 14 From Nuclear Weapons Testing

The Atlantic writes about the impact of C-14 produced by nuclear weapons tests on several fields of science.

Working at the HFEF

Brian Frickey works at INL's HFEF preparing samples of irradiated fuels.

A Collection of Reactor Drawings from NEI Publications

Available at the University of New Mexico Library for free.

Jimmy Carter Nuclear Disaster Cleanup

Future president Jimmy Carter helped cleanup the meltdown at Canada's NRX reactor in 1952.

Nuclear Technique Used to Test for Coronavirus

A nuclear based technique, Real-Time Reverse Transcription Polymerase Chain Reaction, is being used to test for the COVID-19 virus.

Suspect Identified in Indonesia Cs-137 Contamination Incident

Indonesian authorities have identified a suspect who was running an illegal decontamination service as the source of Cs-137 contamination at a housing complex in Banten, Indonesia.

Several Japanese Reactors Shut Down Due To Failure to Complete Anti-terrorism In Time

Several Japanese reactors at the Sendai nuclear power station will need to shutdown as they have not yet completed required anti-terrorism measures.

New Reactors Planned for Oak Ridge

Coquí Pharma plans to build two new 10 MW MTR reactors for Mo-99 production in Oak Ridge, Tennessee.

Operator at Reed College Awarded a Watson Fellowship

Stephanie Gee, a Reactor Operator at the Reed Research Reactor was awarded a Watson Fellowship to explore the societal impacts of atomic radiation in Japan, Indonesia, Kazakhstan, South Korea, Spain, and Austria.

NC State Develops Method to Detect Past Presence of Radioactive

Materials

Researchers from North Carolina State University have developed to detect the presence of radioactive materials by the residual gamma radiation signatures left behind in materials such as bricks.

New Problem in Fukushima Cleanup

Sandbags used to help control radioactive materials after the accident now present a cleanup problem themselves as they are emitting 300-400 Rem/hr.

University of Michigan to use VR to simulate reactors

The University of Michigan has granted funding to a project to develop a VR nuclear reactor simulator for use with the University's nuclear engineering program.

EBR-II Dome Repainted

The EBR-II dome, originally scheduled for demolition in 2007 has been repainted and reconditioned and will be used as space for future experiments.

Indian Point Unit 2 Closes

The Indian Point Unit 2 reactor has been shut down after 45 years of operation.

UAE's Barakah-1 to Begin Operations Soon

The United Arab Emirates's first nuclear reactor at the Barakah Nuclear Power Plant will begin operations.

3D Printed Reactor

The Transformational Challenge Reactor project is underway at Oak Ridge National Laboratory with the goal of creating a nuclear reactor using several advanced techniques including additive manufacturing.

[Russian Government Intends to Raise Radioactive Debris](#)

The Russian government intends to raise seven pieces of radioactive debris – including two nuclear submarines – from the bottom of Arctic oceans by 2030.

[DOE Launches Advanced Reactor Demonstration Program](#)

The U.S. Department of Energy has announced the launch of the Advanced Reactor Demonstration Program (ARDP) which will provide initial funding for 2 reactors that can be operational in the next 5-7 years.

[Criticism for Proposed SMR Rules](#)

Many, including NRC commissioner Jeff Barran have criticized proposals to reduce the emergency planning zone requirements for Small Modular Reactors.

[TRISO Fuel to be Tested at MIT](#)

X-energy intends to perform an

irradiation test of TRISO fuel in MIT's reactor later this year.

[C-14 Release at TUM Reactor](#)

A small release of C-14 occurred at the FRM-II reactor due to "An individual error during the installation of the mobile drying unit used for this purpose caused the discharge of the C-14 over a short period of time".

[Dow Reactor Threatened by Flood](#)

After a dam broke near Midland, Michigan the Dow TRIGA reactor was threatened by flooding and declared an Unusual Event. The event was concluded the next day with no damage done to the reactor.

[Report on Seattle Contamination Incident Released](#)

A report on the contamination incident resulting from decommissioning of a Cs-137

irradiator in May 2019 has been released.

[Five Member NRC Commission Complete](#)

Following the Senate confirmation of David Wright and Christopher Hason on May 21, 2020.

[Nuclear Guinea Pigs](#)

During the cold war, the US conducted experiments on citizens using radioactive substances.

[Virtual Tour of EBR-1](#)

EBR-1 will not be open for visitors this year due to the COVID health crisis, but INL is releasing an audio tour of the reactor and Lab.

[Concerns Over Faked Data From Halden Reactor](#)

Concerns have arisen over fabricated data from fuel tests conducted in Norway's Halden Reactor between 1990 and 2005.

[9th International Topical Meeting on Neutron Radiography](#)

October 12-16, 2020
Buenos Aires, Argentina

[International Conference on Radiation Safety](#)

November 9-13, 2020
Vienna, Austria

[Nuclear & Space Radiation Effects Conference](#)

December 1-4, 2020
Santa Fe, New Mexico

[World Nuclear Exhibition](#)

December 8-10, 2020
Paris, France

[US Women in Nuclear](#)

July 27-28
Virtual Conference

[International Group Operating Research Reactors Conference](#)

September 1-4, 2020
Kazan, Russia

[14th International Conference on Radiation Shielding and 21st Topical Meeting of the Radiation Protection and Shielding Division](#)

September 13-17, 2020
Seattle, WA

[TRTR Annual Meeting](#)

Virtual Meeting
Sept. 22 - Oct. 1, 2020

Upcoming Events

NRC INSPECTIONS

Due to the ongoing COVID-19 Public Health Emergency the NRC temporarily suspended Licensee inspections for Research and Test Reactors from late March to early June.



RHODE ISLAND NUCLEAR SCIENCE CENTER *March 3 - 6, 2020*

The inspection included a review of audit and design change functions, radiation protection, effluent and environmental monitoring, emergency preparedness, transportation activities, and follow-up on a reportable occurrence. One inspection follow-up item (IFI) was identified regarding annual audits. A Severity Level IV non-cited violation was issued for a licensee identified failure to perform the TS required drop time surveillance of the shim safety blades within the required annual interval. The complete inspection report is [ML20078L009](#).



MARYLAND UNIVERSITY TRAINING REACTOR *March 9-11, 2020*

The inspection included a review of security and material control and accounting of special nuclear material. The inspection report is [ML20083J629](#).



OREGON STATE UNIVERSITY *February 24-27, 2020*

The inspection included a review of operations logs and records, requalification training, surveillance and limiting conditions for operation (LCO), experiments, emergency planning, maintenance logs and records, and fuel handling logs and records. The complete inspection report is [ML20077M361](#).



UNIVERSITY OF CALIFORNIA-DAVIS *January 6-8, 2020*

The inspection included a review of effluents and environmental monitoring, organization, operations, and maintenance activities, review and audit and design change functions, procedures, radiation protection, and transportation activities. The complete inspection report is [ML20023A350](#).



UNIVERSITY OF WISCONSIN *February 11-12, 2020*

The inspection included a review of security and material control and accounting of special nuclear material. The inspection report is [ML20055E77Z](#).



GENERAL ELECTRIC VALLECITOS NUCLEAR CENTER *January 27-29, 2020*

The inspection included a review of security and material control and accounting of special nuclear material. The inspection report is [ML20054A241](#).

Interview with Hilary Lane, NEI

TRTR is happy to partner with Hilary Lane, Director, Fuel and Radiation Safety at the Nuclear Energy Institute (NEI) for support with issues that face our community.



Hilary comes from a military family. She spends her free time working with an organization called Honor Flight, which focuses on paying respects to surviving WW2, Korean, and Vietnam Veterans.

meaning. My dad presented me with an old Gieger counter when I was 10 years old and the rest is history. Because my alma mater, University of Maryland, did not have an undergraduate program for Nuclear Engineering at the time, I chose to study Materials Science and Engineering.

The materials world has evolved so much since I graduated, especially in the area of “Advanced Manufacturing.” Advanced manufacturing methods have the potential to transform the nuclear industry by contributing to the production of high-quality components faster and at significantly lower cost. This is something we are closely following at NEI.

After graduating (Go Terps!), I started my career at the National Nuclear Security Administration (NNSA). Working at NNSA provided unique exposure to our world-class national laboratories and production plants. After my time at NNSA, I worked

Since 2017, Hilary has been hosting quarterly calls to keep the Executive Committee informed of regulatory actions and practices that are of interest to research and test reactors. With the declaration of the public health emergency, those calls increased in frequency in an effort to provide a responsive forum to discuss our concerns. The newsletter thought it would be nice

to meet the person hosting those calls.

What is your name?

Hilary Lane

What is your title?

Director, Fuel and Radiation Safety

Brief background?

My background gives the term “nuclear family” a slightly different

at NRC (in the Office of Nuclear Material Safety and Safeguards or “NMSS”), primarily with fuel cycle licensees. Here at NEI, I continue to support regulatory needs of the fuel cycle fleet, and the RTRs as well.

Who is NEI?

The Nuclear Energy Institute (NEI) is the primary trade association for the U.S. commercial nuclear industry, based in Washington, DC. We have a broad global membership base of over 300 members, including utilities licensed to operate commercial nuclear power plants, nuclear plant designers, fuel cycle facilities, architect, engineering, and law firms, universities, national laboratories, and more. We work with our members on generic regulatory, policy, and technical

matters, and in establishing unified industry consensus positions before Congress, Executive Branch agencies, and regulatory bodies. However, our vision is simple: a world powered by clean and reliable energy. And nuclear is the key ingredient.

When did you start supporting Research and Test Reactors?

Since 2017, I have been working with the TRTR Executive Committee. We hold periodic calls as an opportunity for benchmarking and sharing of best practices/lessons learned. We also discuss generic inspection, licensing, and regulatory matters. Once COVID-19 emerged, it felt prudent to expand NEI’s engagement with the RTR fleet, outside of just the Executive Committee. This led to weekly (now bi-weekly) industry calls, including

a facility roundtable. Facilities discuss their current and evolving pandemic posture, exemptions being pursued with the NRC, among other emerging issues. The feedback I have received from licensees has been very positive – our interactions provide a great opportunity to benchmark with peers, gain insights, raise questions, and offer feedback in real time.

What are you looking forward to in your work with RTRs?

NRR’s recent reorganization resulted in RTRs being assigned to the same division as advanced reactors. This was serendipitous, as I believe there are several synergies between RTRs and future microreactors. The conversations are just beginning, but I see NEI as being central to developing and facilitating those relationships.

RROAR Initiative

Starting in 2017, the NRC initiated the “Retrospective Review of Administrative Requirements” (RROAR) with the goal of identifying outdated or duplicative requirements that should be considered for elimination. More information about the evaluation criteria can be found at Regulations.gov and searching Docket ID: NRC-2017-0214.

This year the TRTR Executive Committee joined with NEI to address the medical requirements for research and test reactor operators. Specifically, [10 CFR](#)

[55.53\(a\)](#) to allow for alternate means to determine operator medical qualification at NPUFs. The complete justification can be read on pages 44-47 of response to the initiative, [ML20128J340](#).

Text for proposed addition of (c) to 10 CFR 55.53 is: “Medical qualification for facilities licensed under 104(a), (b), or (c) of this part may be justified at the time of initial application and subsequent renewal by having a valid U.S. driver’s license, by consent of the Level 2 individual, or in accordance with the established

Requalification Plan. An operator shall obtain written statement from a licensed physician, physician’s assistant, or nurse practitioner stating the individual can reasonably be expected to perform operations consistent with those necessary to operate a commercial motor vehicle.”

Flexibility in determining medical qualifications may already exist. NRC Form 396 has a box marked “Other” for guidance used as part of the operator exam.

Right: A rendering of the Oklo Aurora Powerhouse

Bottom: Proposed sites around the Materials and Fuels Complex where the Aurora may be built

Oklo Aurora

The [Oklo Aurora](#) is a new reactor to be built at Idaho National Laboratory (INL) to demonstrate High Assay Low Enriched Uranium (HALEU) fueled micro-reactors.



The [Aurora](#) will be capable of producing 1.5MW of electricity and use heat pipes for cooling. Thus far a good description of the reactor has not been released. A redacted version of the SAR submitted to the NRC is [available](#) and by reviewing this, some details of the reactor can be determined.

The reactor will be built adjacent to the Materials and Fuels Complex at INL. It is a fast reactor utilizing metal fuel composed of an alloy of 90% uranium (19.75% enriched) and 10% zirconium with a stainless steel cladding. The hexagonal fuel elements are arranged in a hexagonal array. At the center of each fuel element is a vertical heat pipe with a potassium working fluid. This differs from many other proposed heat pipe reactor designs which utilize horizontal heat pipes so that both ends may be cooled.

Each fuel element includes a zirconium reflector at the top and bottom and the core is surrounded with a zirconium reflector. There are 3 boron carbide control rods, any one of which is capable

of shutting the reactor down. These rods are supposed to be completely withdrawn during normal operations. Fine control is accomplished with 3 control cylinders at the vertices of the core. These cylinders are half zirconium and half boron carbide and slowly rotate to compensate for burnup over the life of the core.

The core has an active volume of approximately 1m³ and is designed to operate at a thermal power of 4 MW for 20 years. The core operates at a peak temperature of approximately 650 C and ambient pressure. The heat pipes transfer heat from the reactor core to a heat exchanger where it is used to heat supercritical CO₂ to drive a turbine.

The reactor will be located in the basement of the very picturesque [confinement building](#) with the power generation plant above it. The front of the building will house offices and public spaces.

The reactor has been submitted to the NRC for [review](#). Oklo hopes to have it operational by 2025.

NRC Quarterly Executive Committee Call Summary

May 19, 2020

Category 2 public meeting

[ML20127H880](#)

SUMMARY OF INITIATIVES

[NUREG 1537](#) February 1996

4 volume revision to incorporate changes proposed in the draft final rule on Non-Power Production and Utilization Facility License Renewal (NPUF rule).

Expect draft of volume 1 in Fall 2020.

Section 106 of [NEIMA](#)

Proposed rulemaking to determine percentage of costs a research reactor is allowed to recover.

Summary of [presentation](#) at 2019 TRTR annual meeting.

[NPUF Rulemaking](#)

Response to an April 2008 staff requirements memorandum [M080317B](#), "The staff should examine the license renewal process for non-power reactors to identify and implement efficiencies that will streamline this process while ensuring that adequate protection of public health and safety are maintained." Submitted to the commission [February 28, 2019](#).

[NUREG 1478](#) June 2007

Revision to incorporate current practices and address operator licensing exams for irradiation and medical isotope facilities.

Expected draft in Fall 2020.

UPDATED SECURITY INSPECTION PROCEDURES FOR NON-POWER REACTORS - EFFECTIVE JUNE 1, 2020

[IP 81601](#) - Fixed Site Physical Protection of Formula Quantities of Strategic Special Nuclear Material.

[IP 81602](#) - Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance.

[IP 81603](#) - Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance.

[IP 81606](#) - Material Control and Accounting.

[IP 81607](#) - Protection of Safeguards Information and Safeguards Information Modified Handling.

[IP 81608](#) - Reporting of Safeguards Events.

[IP 816012](#) - In Transit Physical Protection of Special Nuclear Material of Moderate Strategic Significance

and Receipt of New Reactor Fuel.

[IP 816013](#) - In Transit Physical Protection of Special Nuclear Material of Low Strategic Significance and Receipt of New Reactor Fuel.

[IP 816014](#) - In Transit Physical Protection of Irradiated Reactor Fuel.

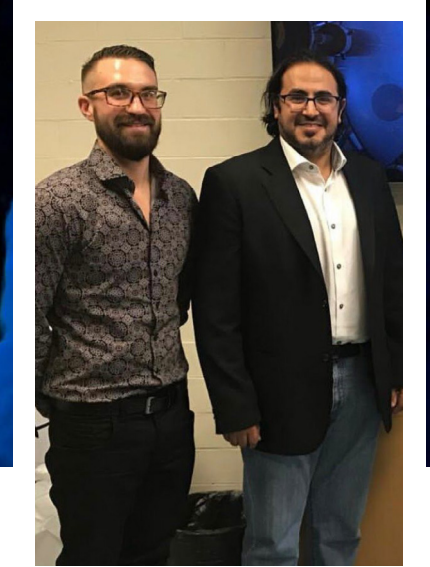
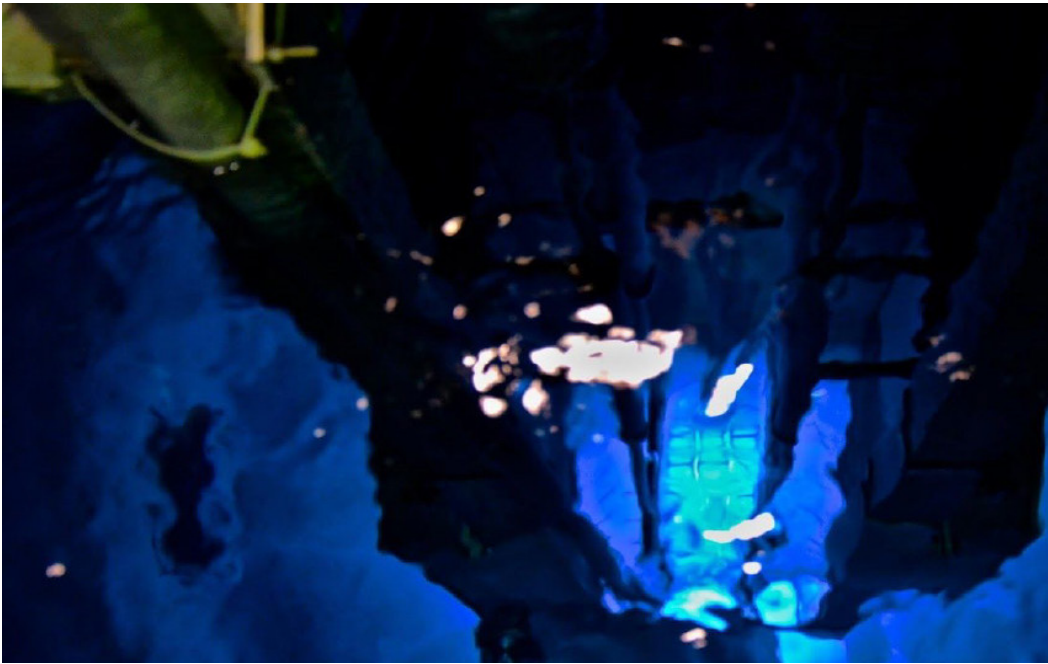
[IP 816021](#) - Fixed Site Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material.

[IP 816022](#) - In Transit Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material and 100 Grams or Less of Irradiated Reactor Fuel.

LICENSING ACTIVITIES IN PROGRESS

Facility	Activity	Acceptance Date	Schedule
MIT	Changing title of Level 1	March 2020	10 Months
MURR	TS Changes	December 2019	Completed May, 2020
RPI	Reducing exclusion zone size	April 2020	7 months
GE	Emergency Plan	July 2019	1 Year
KSU	Fuel weight %	April 2012	9.3 years
PSU	HVAC LAR	May 2019	1 Year
Aerotest	Possession Only License	July 2019	2 years
UMD	Increase Core Size	April 2018	Completed May, 2020
UC-Davis	License Renewal	July 2018	3.3 Years
NC State	License Renewal	April 2017	4 Years
UMass Lowell	License Renewal	October 2015	5 Years
UT Austin	License Renewal	January 2012	9.5 Years

Pre-submittal meetings and audits have been helpful to reduce review timelines and align staff and licensee.



Know More Nukes

Rhode Island Nuclear Science Center

In this edition of Know More Nukes we visit the Rhode Island Nuclear Science Center in Narragansett, RI. Matthew Marrapese, Principal Reactor Operator, has provided the responses to our questions.

What year did your reactor first go critical?

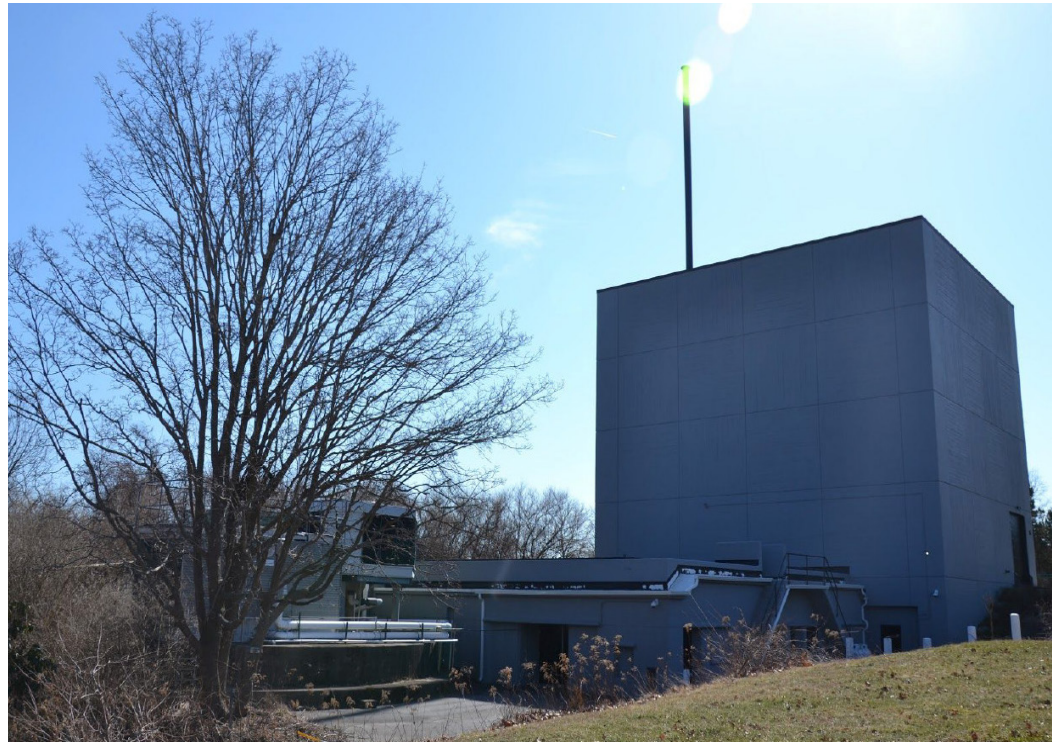
1964

What is the reactor license number? Power level?

RI-95, 2 Megawatts Thermal

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

Principal Reactor Operator and Health Physics Tech. Just over 5 years. (5 years as of March 2020) Soon to be SRO (SRO upgrade in a couple of months)



Top: Bird's eye view of the RINSC reactor core at full power

Right: Matthew Marrapese (left) visit's MIT's NRL

Above: RINSC Reactor building

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

Conversion from HEU to LEU.
Additional Loop of secondary cooling when there was talk of a possible upgrade to 5 MW Reactor.

What is a unique feature of your reactor?

Open pool reactor. The pool is roughly 32 feet deep, aluminum lined containing approximately 40,000 gallons of water. Our core contains 14 fuel elements. The maximum neutron flux in-core is 1.8×10^{13} n/cm² per second.

What is a fun fact about your reactor?

Our facility is built on an old WWII bunker with structural remains within the facility which holds the feeling of a dungeon. We also have 2



turret bases in our basement. The reactor facility is located on the Narragansett Bay, our rooftop views are beautiful.

What is the biggest challenge facing your reactor?

Operating on a small state budget.

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

“Can we Irradiate glass and see what happens to it?” or “Can you swim in the water?”

What drew you to your current position?

Studying Biology in my undergrad led me to find something different with challenges and the nuclear field was a fantastic new look at science as I knew it.

What has been your favorite project?

I really enjoy maintaining the systems critical to reactor operation but as for past projects I liked upgrading components from analog to digital. Also installing and configuring our new Stack Gas/Particulate monitors and area noble gas & particulate monitors.

Before working at your reactor,

What was the most unusual or interesting job you've ever had?

Own and operated a DJ/Photography company I would DJ clubs, bars, and coordinate large events. My nightlife has greatly diminished.

What do you find the most challenging at the reactor?

Operating with only 2 RO's and 3 SRO's. Watch schedules can be a little funky at times.

What advice would you give to new reactor operators?

Fun and challenging world of science. Expands your ways of thinking. The focus on isotopes and particles is much different than taught in grade school. You will learn something new each day. Vast variety of career opportunities in this field.

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

Hard work pays off. Be a sponge and absorb as much as you can, learning happens every day. Just because you go to school, for one thing, doesn't mean you'll end up there. 'Life will take twists and turns, hold on for the ride and enjoy every second of it.



Above: Close-up view of the RINSC reactor core

Right: Matthew Marrapese



Diversity is a critical matter.