



Nuclear Engineering
& Science Center

TEXAS A&M ENGINEERING EXPERIMENT STATION

Establishing Radiation Safety Culture at the Nuclear Engineering & Science Center

Abby Kurwitz

NESC Radiation Safety Officer

- NESC Overview
- Past Radiation Safety Culture
- Changing the Culture
- New Radiation Safety Training Program
- Lowering The Dose
- NESC Radiation Safety Culture Now

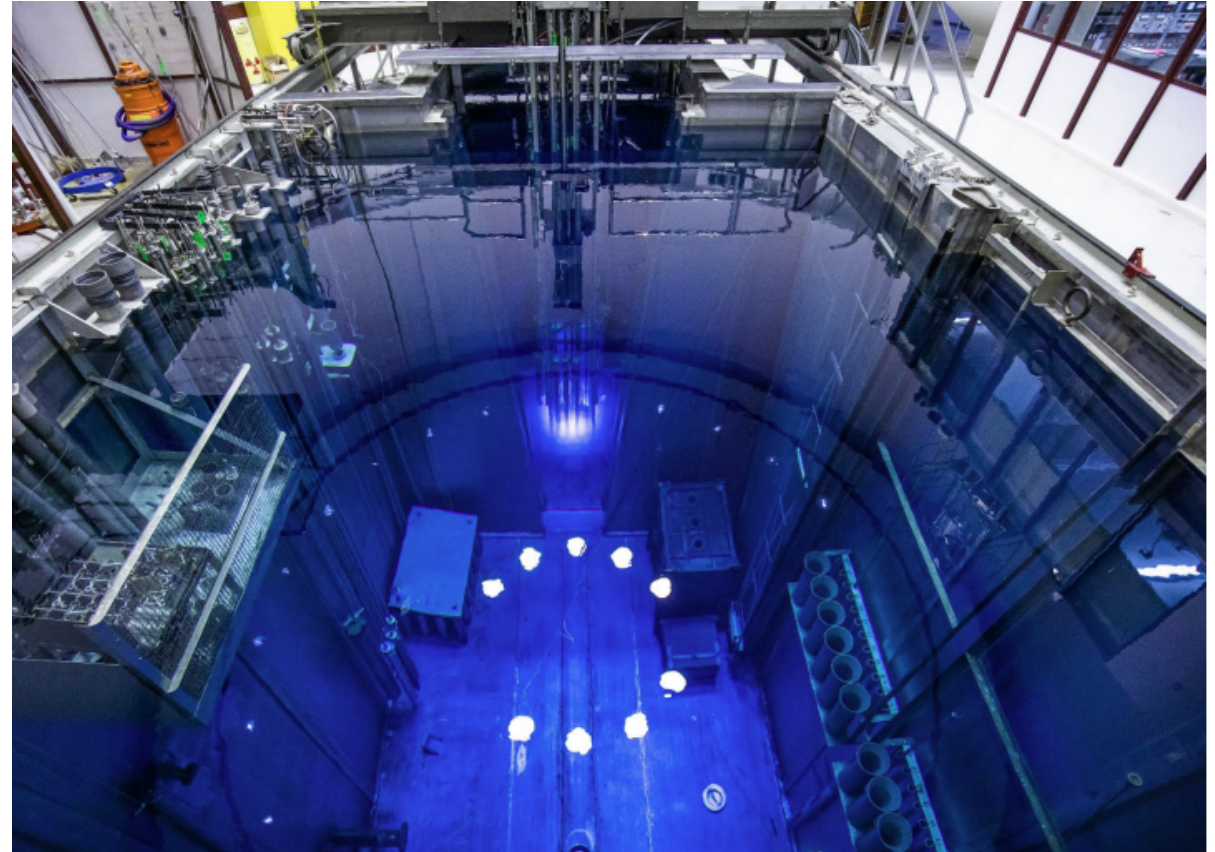


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Nuclear Engineering & Science Center Overview

- The Nuclear Engineering & Science Center is home to Texas A&M University's two research reactors.
 - 1 MW TRIGA[®] Conversion
 - First criticality in December 1961
 - Isotope production, irradiation services (neutron, gamma, neutron+gamma), training & teaching
 - 5-Watt AGN 201M
 - Non-operational – expected to resume in 2026/2027



- NESC Staff
 - 16.5 Full-Time Staff
 - 20 Student Technicians
- NESC Departments
 - Operations
 - Radiation Safety
 - Engineering
 - Facilities



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Past Radiation Safety Culture

Past Culture Overview



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Over the past ten to twelve years, the radiation safety culture and the practice of ALARA (As Low As Reasonably Achievable) at the NESC became almost obsolete.



Occupational doses for both full-time staff and student technicians climbed to monthly cumulative doses of close to 100 millirem (mrem) or greater consistently.



The training was inadequate, and both employees and students were taught that high dose and contamination were “just part of the job.”

Past Culture Overview Contd.



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Radioactive material, radiation areas, and even high radiation areas left unlabeled and not posted.



In 2018, NESC staff purged over half of the health physics/radiation safety procedures, in violation of the Nuclear Science Center Reactor (NSCR) technical specifications and 10 CFR 50.59.



There was not a team environment. The departments were very separated, and respect was not given to others.

What This Led To



- Because the radiation safety culture was weak, and the training was inadequate:
 - Getting dose was seen as a game. Who could get the high score?
 - Contamination incidents soared at the facility.
 - No efforts were made to develop new processes or experiment devices to make activities safer.
 - Other employees not feeling safe at the facility.
 - No checkpoints or following of procedures.
 - Violation of Technical Specifications
 - Poor or nonexistent documentation



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How Did This Change?

Changing The Culture



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- Staff turnover
- By-In from staff and fostering a team environment
- Resurrecting the health physics procedures
- Starting meetings with safety minutes and/or past violations
- New NESC Radiation Safety Training Program
- Developed new processes
- Accountability
- Results



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NEESC Radiation Safety Training Program

- Followed guidance provided in ANSI/HPS-13.36, *Ionizing Radiation Safety Training for Workers*
- Our radiation safety training program has four levels
 - General Employee Radiological Training (GERT)
 - Radiation Worker 1 (RW1)
 - Radiation Worker 2 (RW2)
 - Qualified Health Physicist (QHP)

- All employees and visitors who will be entering restricted areas.
- Provides general knowledge associated with the hazards of radioactive material and radiological areas, the limitations as a trained general employee, emergency preparedness, and the employee responsibility for complying with radiological requirements.
- Lecture
- Quiz

- For workers who will be entering radioactive material and radiation areas, and handling sealed sources, but not handling unsealed radioactive material or entry into high radiation areas.
- Consists of radiation fundamentals, contamination, radioactive material control, radiation monitoring, and general emergency preparedness.
- Lecture
- Quiz
- Practical

- For radiation workers whose job assignments involve, unescorted entry to High Radiation Areas (HRAs), handling RAM in forms other than sealed sources, performing decontamination of surfaces, instrument calibration, waste disposal.
- Consists of posting requirements for RAM, RAs, and HRAs, performing work in RAM, RAs, and HRAs, radioactive sample handling, contamination and decontamination, instrument calibration, and radioactive waste.
- Lecture
- Quiz
- Practical

- Intended to provide a higher knowledge of health physics to radiation workers that will be performing health physics calculations, assisting with managing radioactive experiments, audits, quarterly and annual environmental reports, radioactive material inventory and tasks designated by the RSO.
- Consists of health physics calculations, radioactive source management, state and federal rules and regulations, NESC technical specifications and Standard Operating Procedures (SOPs) related to health physics, as well as NESC specific tasks.
- Lectures
- Quiz
- Practical



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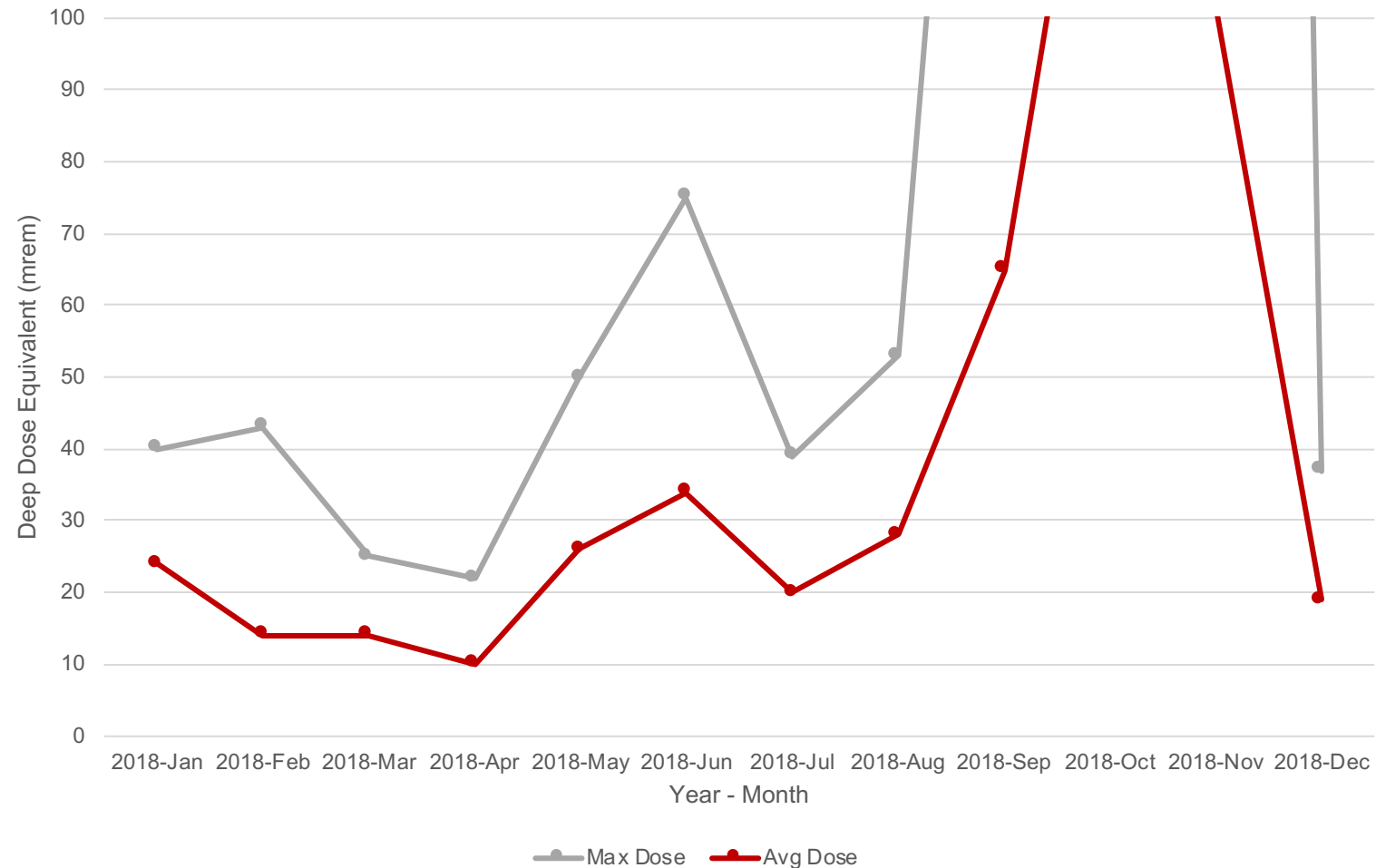
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Lowering The Dose

2018 Dose



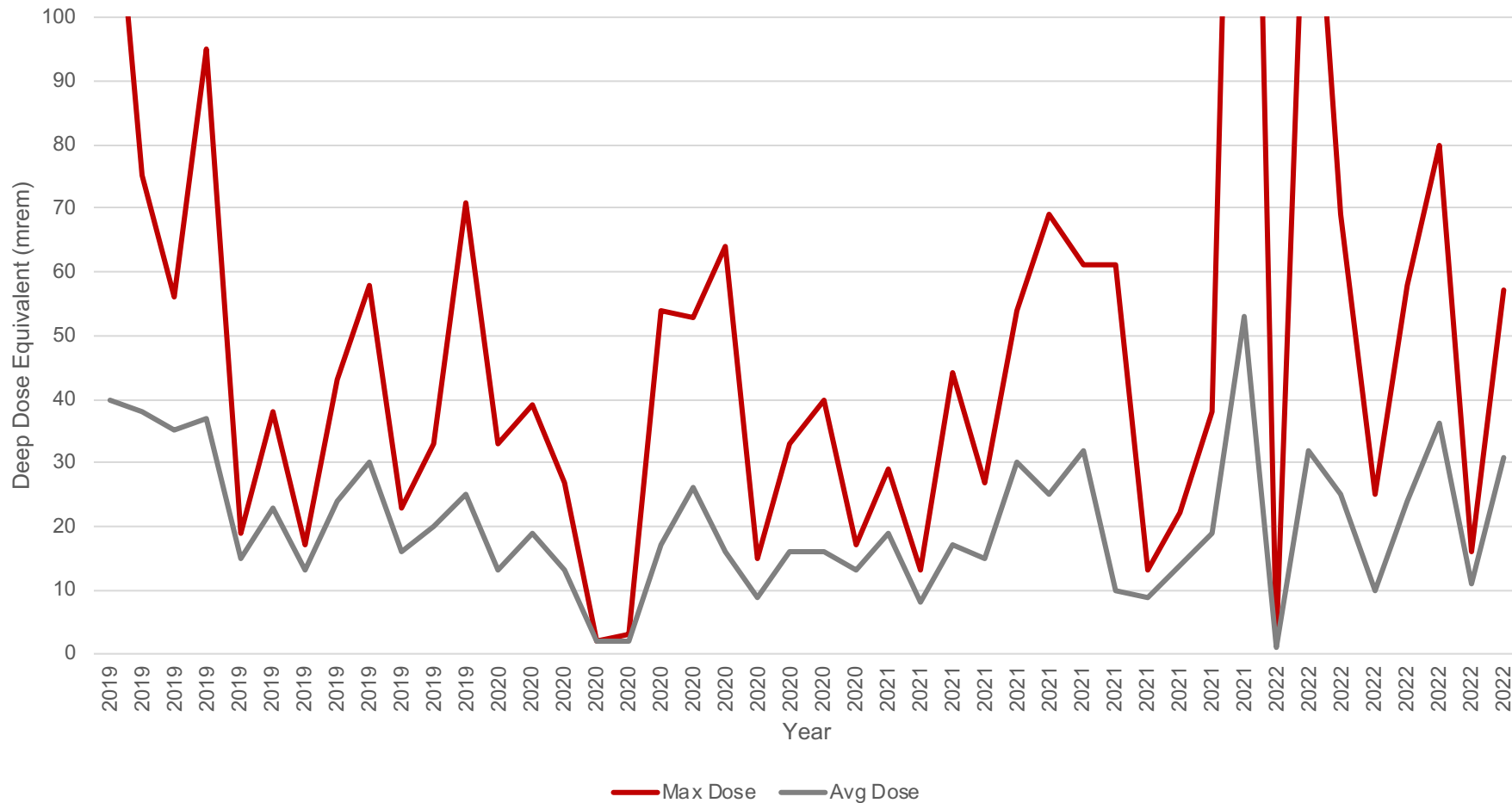
NESC Staff & Student Dose Year 2018



2019 – August 2022 Dose



NEEC Staff & Student Dose 2019 - August 2022

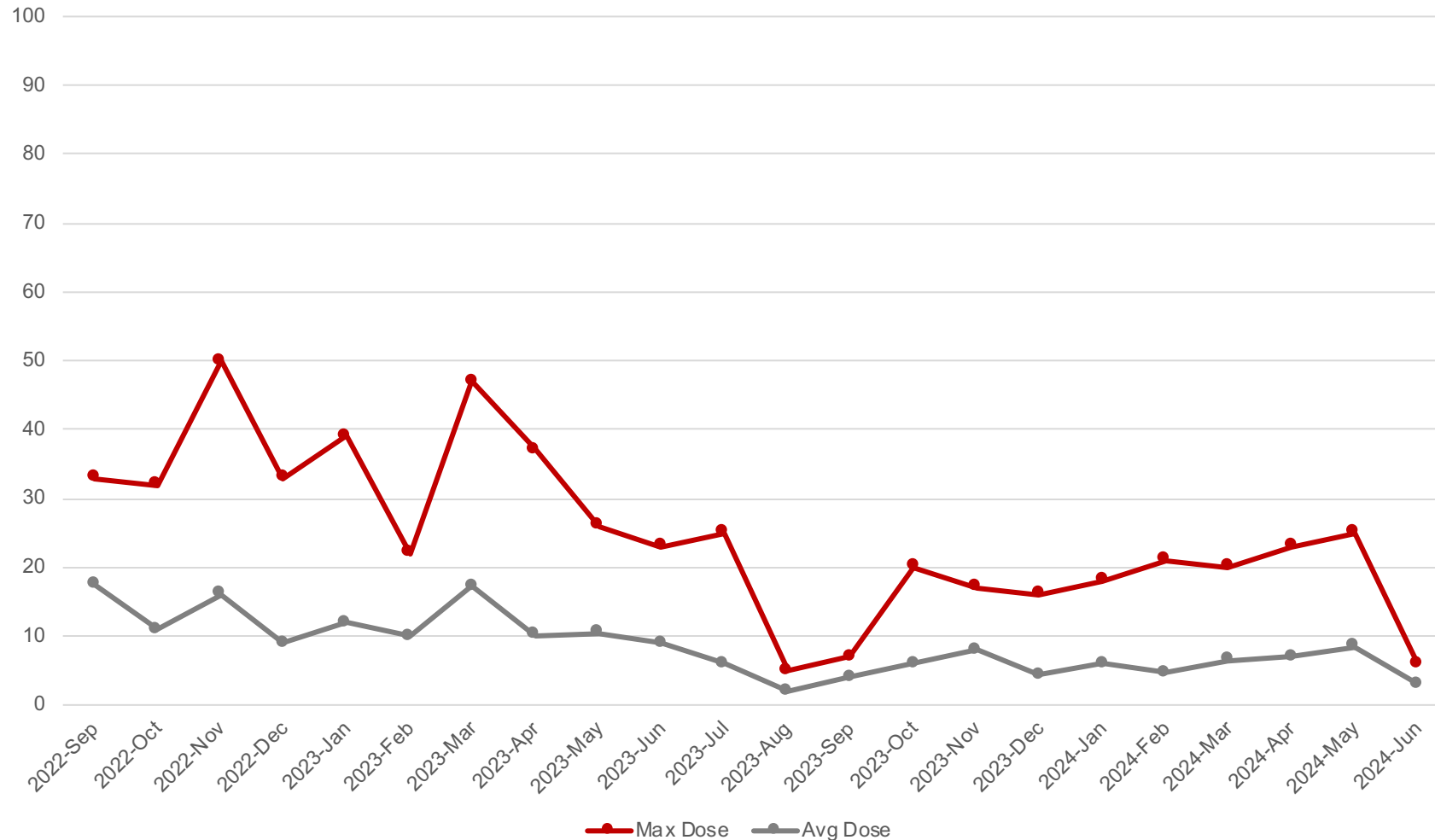


Sep. 2022 – June 2024 Dose



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NESC Staff & Student Dose Sep. 2022 - June 2024





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NESC Radiation Safety Culture Now

How Are We Doing Now?



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- We are a team and have better communication.
- Lab practices are better, and contamination incidents are much lower for both personnel and surfaces.
- Procedures are going through updates.
- Surveillances required by Technical Specifications and procedures are being completed.
- A more radiation safety conscious work environment with questioning attitudes.
- Worker dose received is lower.



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**“I was taught that the way of progress was
neither swift nor easy.” – Marie Curie**