

ELT

Engineering Laboratory Technician

Chemistry Control

Radiation Control

Nuclear Waste Management

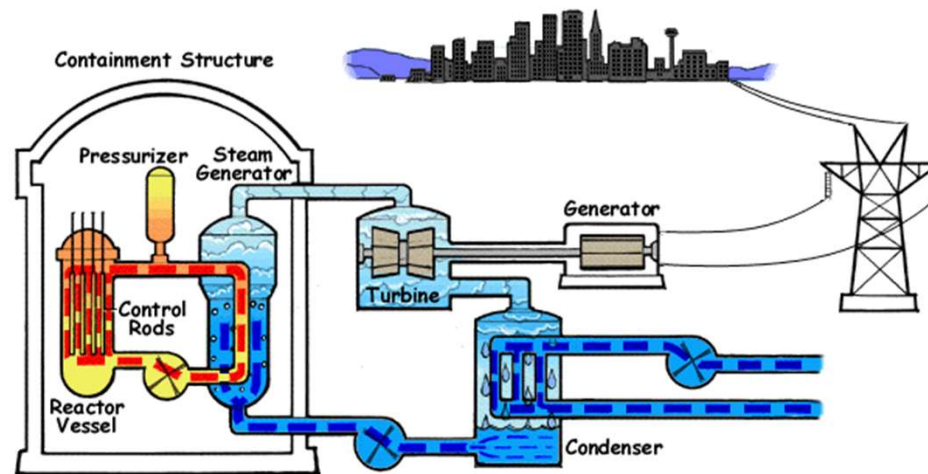
Nuclear Plant Mechanical Equipment Operation

Definitions – What is an ELT?

- ELT is an acronym for Engineering Laboratory Technician.
- MMN is an acronym for Machinist's Mate (Nuclear)
- An MMN has the following responsibilities
 - operate and maintain Naval Nuclear propulsion plants and associated equipment
 - supervise and administer Naval nuclear propulsion plant operations
 - operate and repair systems associated with reactor plants, propulsion plants, and auxiliary support systems
 - perform tests, transfers, and inventories of lubricating oils, fuels, and water
 - maintain records and reports on both submarine and surface ships.
- An ELT is an MMN with additional training in boiler water chemistry control and analysis and reactor plant water chemistry control and analysis. In addition, an ELT is a specialist concerning Nuclear Waste Management and Radiation Detection/Control
- An ELT will qualify to perform operations on mechanical equipment, but does not maintain records and reports or perform in depth maintenance on those systems

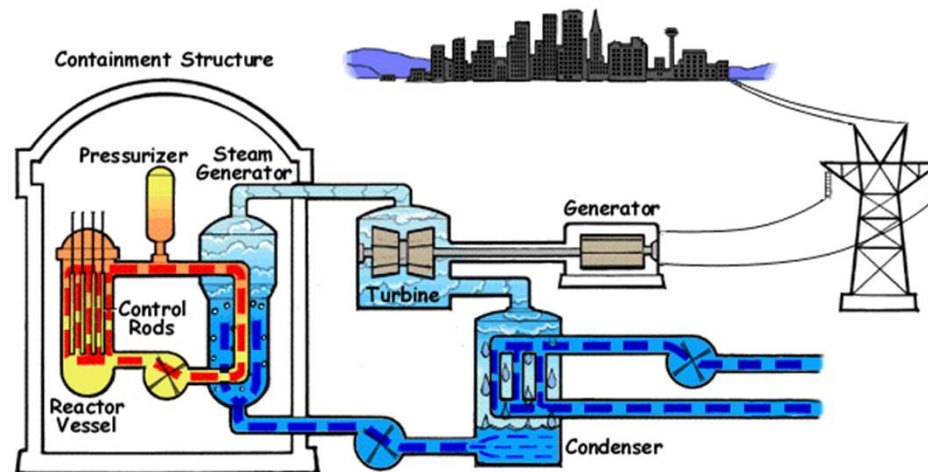
Why Have Separate Jobs? (MMN+ELT)

- A pressurized water reactor plant (the only type currently in use in the Navy) has two independent loops.
 - One loop circulates water through the nuclear reactor to transfer the heat generated by the nuclear reaction to a heat exchanger.
 - The other loop runs through the heat exchanger, turns to steam, and runs the steam turbines.
 - The loops are independent because the loop running through the nuclear reactor becomes radioactive.



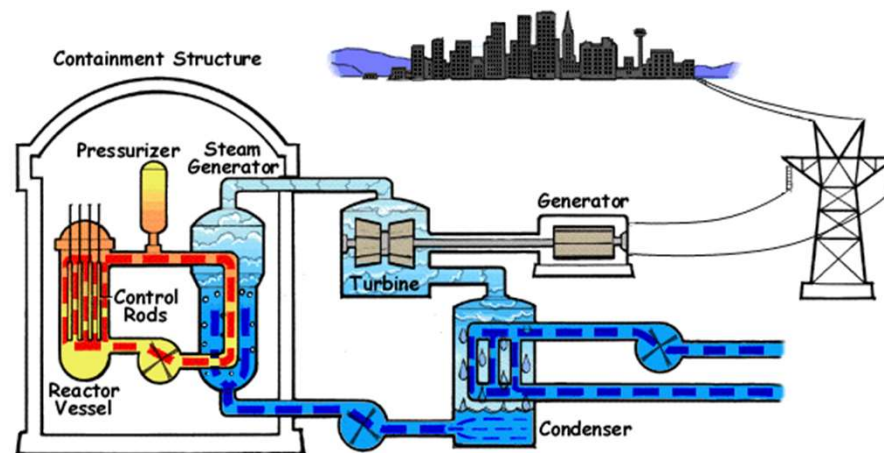
Chemistry Control

- Things in contact with water tend to corrode (rust). (This is a VERY simplified view)
- To minimize corrosion, we add chemicals to the water. ELT's control the water in the **reactor loop (called the primary loop)** differently than the water in the **steam plant loop (called the secondary loop)**.
- One of the jobs of the ELT is to know what chemicals to add and to periodically monitor the water to determine whether or not to add more water or more chemicals to the plant.



Radioactivity

- The water in the primary loop becomes radioactive.
- Ideally, the water in the secondary loop is not radioactive.
- Another job of an ELT is to perform radiochemical analyses to determine the level of radioactivity and what isotopes are causing the radioactivity in the **primary loop**, and also to test the **secondary loop** to ensure none of the radioactive water has leaked from the **primary side** to the **secondary side**.

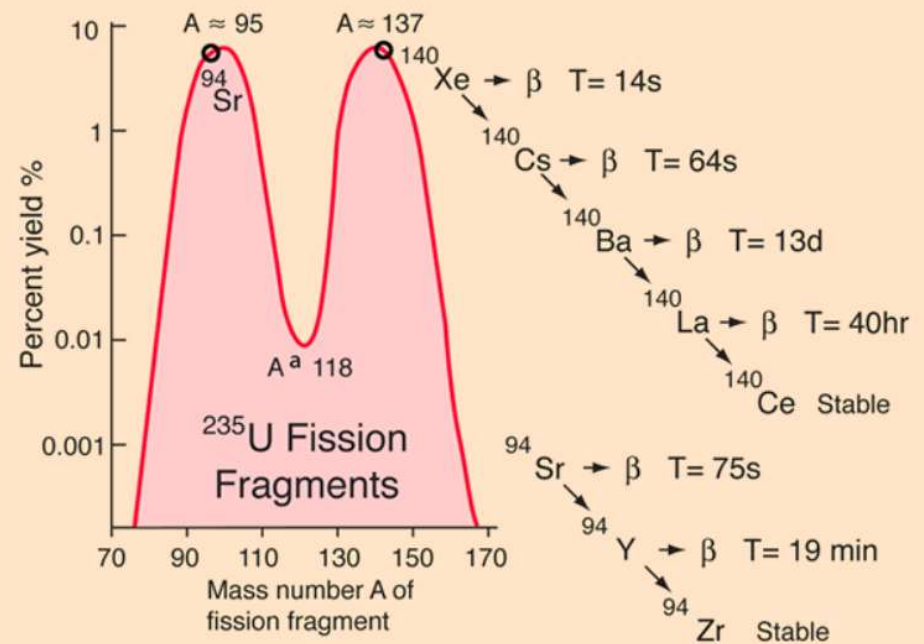


Radiation vs. Contamination

- The third job of the ELT is to monitor the radioactivity released by the nuclear reactor plant.
- First is to monitor the radiation produced by the reactor plant. This is by using instruments such as a Geiger-Mueller counter (among several other instruments)
- The second is to monitor the contamination that might have escaped from the primary plant.
- (Radiation is like the heat given off, contamination is like dirt or dust which is left when water evaporates.)

Fission Fragment Decay

This particular set of [fragments](#) from [uranium-235 fission](#) undergoes a series of [beta decays](#) to form stable end products.





Can Mechanics Do The Same Job?

- Typically, these tasks are performed exclusively by ELTs. (Chemistry Control, Radiation Control, Nuclear Waste Management)
- In the fleet, non-ELT MMNs can be trained by ELTs to perform boiler water analyses, however the ELT must add the chemicals.
- The MMNs do this because it is part of their watchstanding duties.
- MMNs can also perform radiation and contamination surveys, but usually do not because, with a few exceptions, the surveys are not part of their watchstanding duties.
- Primary plant analyses are only performed by ELTs (with some exceptions, such as supervisory watchstation qualifications).

In the Navy Nuclear Field, Everyone Learns Everyone's Job

- An important part of nuclear qualifications is cross rate training.
- Everyone will learn the theory behind what an ELT does (what chemicals are used, what the water specifications are, what the radiation and contamination levels mean), but generally, only the ELT will perform those tasks.
- Radiation Control effects every Nuclear Rating
 - Electronics Technicians
 - Higher level of nuclear power operation => more fission => more neutrons, gammas, and fission product decay => more radiation
 - If radiation is too high, that could be indicative of a larger problem in the plant that might not be detectable by electronic instruments
 - Electrician's Mate
 - Electronic/Electrical equipment in the Reactor Compartment may be contaminated or radioactive.
 - Lack of understanding could lead to higher than appropriate radiation exposure or risk the spread of contamination and generating a large amount of Nuclear Waste when repairing/maintaining electrical equipment
 - Machinist's Mate
 - Operation of Primary (radioactive system) equipment could lead to the spread of contamination if operated incorrectly
 - Repair and replacement of Primary systems could lead to the spread of contamination if operated incorrectly
- Chemistry Control if unmonitored could cause corrosion or other problems, leading to the failure of high pressure steam systems or radioactive water systems.

Careers after the USN? Experience Matters

- <https://www.nukeworker.com/forum/index.php/topic,4395.0.html>

Author

Topic: Acceptable Experience and Training for HP Technicians at Nuclear Power Plants (Read 67556 times)

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Posts: 8945

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Acceptable Experience and Training for HP Technicians at Nuclear Power Plants

< on: Feb 08, 2005, 09:36 >

Article by Jerry W. Hiatt and William H. Barley
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INTRODUCTION

In commercial nuclear power stations, health physics (radiation protection) technicians are primarily responsible for evaluating station radiological conditions and for supporting the work of other station departments in radiological areas. Stations are committed (via Technical Specifications and other modes) to ensuring that technicians in "responsible positions" (i.e., technicians who must make significant radiation protection decisions on their own, without immediate review by supervisors) are qualified as "technicians" in accordance with designated industry standards. Qualification, in this sense, consists of meeting the experience and training criteria specified in the applicable standards. Unfortunately, these criteria are quite general, and major differences in interpretation exist throughout the nuclear power industry. A more consistent approach to interpreting the qualification criteria would benefit utilities and contractors.

The guidelines proposed here provide a means for evaluating the experience and training of health physics technicians versus industry standards. Particular attention is directed towards the amount of experience that can be "credited" for work at non-commercial nuclear facilities and for jobs at commercial power facilities that are related to but are not the same as health physics technicians. These guidelines are intended to be used to assist with the evaluation of an individual's background for consideration as a "senior technician," but they are only one means of doing so. In addition, the individual's technical knowledge should be evaluated through either oral or written testing, past work performance should be evaluated through previous observation or reference checks, and on-the-job performance should be confirmed by supervision. All of the above should be a part of the qualification process for health physics technicians assigned to responsible positions.

Employers Know Who You Are

- <https://jobs.nexteraenergy.com/job/Florida-City-Radiation-Protection-Technician-Nuclear-Special-Crew-FL-33035/1009447800/>

Date: Apr 26, 2023

Location(s): Florida City, FL, US, 33035

Company: NextEra Energy

Requisition ID: 71642

Florida Power & Light Company is America's largest electric company, providing clean, affordable, and reliable electricity to more than 12 million people in Florida. We operate one of the cleanest power generation fleets in the U.S. and our reliability is among the best in the nation. Our goal is to achieve Real Zero carbon emissions from our operations by 2045 by expanding our solar capacity, increasing battery storage and bringing new renewable energy opportunities to Florida, while improving customer affordability and reliability. Are you interested in becoming a game-changer in the energy industry? Join our world-class team today!

Position Specific Description

Plant Turkey Point is looking to hire a Radiation Protection Technician - Nuclear Special Crew! At FPL our employees are our biggest asset if you're looking to work with a productive team this is the place to be!

Job Overview

Minimum requirements for job:

- An ANSI qualified health physics technician shall have a minimum of 6000 hours (PSL) or 5000 hours (PTN) of health physics experience (junior or senior level) in commercial nuclear power plants, of which, a maximum of 50 hours per week may be accumulated in any single year. Related education, training and experience may be credited as defined below.
 - Equivalent health physics technician experience for decontamination technician experience in commercial nuclear power plants may be credited at a rate of no more than 0.5 hours/hour worked up to a maximum of 1000 hours credit
 - A Navy ELT qualification is equivalent to 5000 hours of commercial health physics technician experience
 - Shipyard experience in health physics (108 qualification) is credited on a four hour basis up to a maximum of 5000 hours. Shipyard hours cannot be accumulated at a rate of more than 50 hours per week.

Colleges Understand What Credentials To Certify

- <https://www.tesu.edu/ast/programs/ace-credit-recommendations>

The screenshot shows the Thomas Edison State University website. The header includes the university logo (50th anniversary 1972-2022), navigation links (PARTNERS, ALUMNI, SUPPORT TESU, MYEDISON), and buttons for 'REQUEST INFO' and 'APPLY NOW'. The main navigation bar lists 'Academic Programs', 'Earn Credit for Your Training', 'Women and Minorities in Technology', 'For Students', and 'About'. The left sidebar contains a list of program categories. The main content area displays the 'ACE Credit Recommendations' table.

Home / School Of Applied Science And Technology / Academic Programs / ACE Credit Recommendations

ACE Credit Recommendations

ACE Credit Recommendations/Award	MM (MO)	EM (EO)	ET (RO)	TESU Course
Reactor Physics	3UD	3UD	3UD	NUC-303: Nuclear Physics for Technology
Nuclear Chemistry	2LD	2LD	2LD	NUC-212: Introduction to Nuclear Chemistry
Instrumentation and Control w/lab	3UD	3UD	3UD	NUC-351: Nuclear Instrument and Control
Introduction to Nuclear Systems	3UD	3UD	3UD	NUC-365: Reactor Fundamentals
Applied Physics w/lab	4LD	4LD	4LD	PHY-115: Physics 1 w/lab
Introduction to Radiological Science w/lab	3LD	3LD	3LD	NUC-241: Introduction to Radiation Safety
Concepts of Chemistry w/lab	4LD	4LD	4LD	CHE-121: General Chemistry 1 w/lab
Intermediate Algebra	3LD	3LD	3LD	MAT-115: Intermediate Algebra
Industrial Safety	3UD	3UD	3UD	MFT-376: Industrial Safety
Thermal Sciences w/Lab	4UD	4UD	4UD	EGM-321: Thermodynamics
DC Circuit Analysis w/Lab	4LD	4LD	4LD	ELE-211: DC Circuit Analysis w/Lab
AC Circuit Analysis w/Lab	4LD	4LD	4LD	ELE-212: AC Circuit Analysis w/lab
Technical Mathematics	3LD	3LD	3LD	MAT-101: Technical Mathematics I
Industrial Sensor Circuits	--	--	3UD	ELT-308: Industrial Electronics
Steam Turbines w/lab	3LD	--	--	MRN-223: Steam Generators 1

Do you want to become an officer instead? Colleges are waiting for you.

<https://engineering.oregonstate.edu/Academics/Degrees/Radiation-Health-Physics>

Current STA-21 pickup rate from FY2022 in Nuclear Power School: ~50%

(STA-21 = Seaman to Admiral)
(Get paid to attend College)

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Undergraduate Information

Sample courses and requirements

Radiation Health Physics minor

Pre-Med option

Navy students: Seaman-to-Admiral (STA-21) program

Education through the Seaman-to-Admiral (STA-21) program provides you with the tools to succeed as a commissioned officer, and to later have a promising career as a civilian nuclear engineer or radiation health physicist.

After completion of the Naval Nuclear Power School you can enroll in the STA-21 program to complete a three-year bachelor's of science degree at NSE. Engineering is an academically challenging field, and as a Navy student at Oregon State you'll be held to a higher standard than traditional students. We want to see you make the grade: our world-class faculty, tutoring services and library are available to you.



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Radiation Health Physics



Degree Type

B.S., H.B.S., M.S., MHP, Minor, Ph.D.

Organization

[Nuclear Science and Engineering](#)

Location

Corvallis Campus

Ecampus

Catalog Link

[Radiation Health Physics](#)

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How Do I Become an ELT?

NOTE: IT IS NOT GUARANTEED

1. Become an MMN (rating specialties are chosen in basic training)
 1. ETN and EMN are not eligible to become ELTs
2. Successfully pass A-School and Power School
 1. Get great grades in Chemistry/Radiation/Materials (CMR) classes
3. In Prototype, **put in for an ELT package, get accepted**
 1. They look at your CMR practical skills and your past grades
4. Complete Prototype
5. Complete ELT School (After Prototype)

Personal Opinion (ETN1 Ortiz)

I view the job of ELT as the most challenging position in the US Navy Nuclear Engineering Program. I believe that it has the most career/commercial viability after US Navy Completion.

ETN (Nuclear Reactor Operator) is a great job, but the outcomes show that ELT is just better overall.

- Daily Hands On Work in the Job You Signed Up For
- Major Nuclear Plant Responsibilities (Chemistry and Radiation is Everyone's Problem)
- Extremely Viable Resume after Service

The ONE drawback I see with ELT is that it is not guaranteed at the beginning of your contract. You have to "risk" becoming an MMN to try out for the job.

However in my website: whatisyourplan101.org you can see that even Navy Mechanics get preferential hiring at commercial Nuclear Power Plants for jobs they aren't even "qualified" for.