



# Careers in the Nuclear Power Industry

Nuclear Power: Clean, Safe, and  
Effective

## US Navy Sailor - Nuclear Enlisted (College Degree After) – 6 Year Commitment

- Net Value - **\$618,000** / Gross Profit: **\$340,000** after 6 years
- Resume Bullets After 9 years –
  - College Bachelors Degree (of your choice)
  - 4 Years of Operational Experience of a Nuclear Reactor and Related Systems
  - Multiple Certifications with Hands-On/Logged Experience Based on Rating Specialty
    - Electronics Technician – Reactor Operation, Electronic Component Troubleshooting, Fiber Optics
    - Machinist Mate – Quality Assurance, Refrigeration, Gage Calibration, Emergency Welding, Water Treatment Operator, Machinery Mechanic, Industrial Maintenance
    - Electrician’s Mate – Electrical Journeyman’s License, Power Plant Operator, Electric-Motor Repair
    - Machinist Mate (Engineering Laboratory Technician) – Radiation Detection, Engineering Plant Chemistry Control
  - Salary Negotiation: “If I continue with the Navy, I would have made excess of **6 figures** by the 10 year mark with full benefits”

Gross Profit =  
Money (before taxes) that is  
expected to be deposited to your  
bank account for personal spending

## US Navy Officer (College Degree Before) – 9 Year Commitment

- Net Value - **\$618,000** / Gross Profit: **\$398,000** after 9 years
- Resume Bullets After 9 years –
  - College Bachelors Degree (Based on ROTC Application Acceptance)
  - 5 Years of Service Upon a Navy Vessel with Direct Management of Supporting Personnel
  - Salary Negotiation: “If I continue with the Navy, I would have made excess of **6 figures** by the 10 year mark with full benefits”

Net Value Assumptions:  
G/I Bill / ROTC Scholarship: **\$180k**  
Full Coverage Healthcare/Dental: **\$5k/year**  
Worldwide Travel: **\$5k/year**  
Certification Training Programs: **\$15k**  
Gross Profit Added for Final Total

## US Navy Sailor (College Degree After) – 4 Year Commitment

- Net Value – (E-1 Start) **\$347,000** / Gross Profit: **\$112,000** after 8 years
- Net Value - (E-3 Start) **\$365,000** / Gross Profit: **\$130,000** after 8 years
- Resume Bullets After 8 years:
  - College Bachelors Degree (of your choice)
  - 4 Years of Work Experience in the United States Navy
  - Multiple Certifications with Hands-On/Logged Experience Based on Rating Specialty
    - (Over 90+ Ratings, 70+ Trade Skill Certification Programs)

Full Benefits:  
Free Full Coverage Healthcare/Dental  
401K (TSP)  
20 Year Pension/Retirement  
Life Insurance  
Guaranteed 4 Week/Year Vacation Time  
Free Family Support Programs

# United States Navy (Nuclear Propulsion Program)

\$180,000 - G/I Bill (Tuition/Room/Board)

\$20,000 – Worldwide Travel Expenses

\$20,000 – Full Coverage Healthcare/Dental

**\$38,000** - Enlistment Bonus

\$42,000 - 60 College Credits (77 obtainable) awarded from JST from the first 2 years of education, “Room and Board” during school is paid for

**\$303,000** – Start at E-3, Accelerated to E-4, 6 Year Career, Average Submarine Career

\$15,000 Optional Trade Skill Certification

## TOTAL VALUE

**\$618,000 over 6 Years**

Overall Profit over 6 Years = **\$340,000**

\$27.24/hour averaged over 6 years if you remove all other value

### • Pros

- High employability in electrical power generation careers following the completion of your contract
- Your G/I Bill can be used on ANY degree plan after your contract, with the housing allowance delivered directly to your bank account (apartment, dorms, or mortgage)
- Special pay and bonuses exclusive to the NF
- Fast-Track promotion programs (immediate E-3, E-4 within 3-6 months, high advancement rate compared to all branches)
- Officer Programs are encouraged
  - Prior to Enlistment (ROTC/Naval Academy Dual Enrollment)
  - During Enlistment (STA-21)
  - After Enlistment (OCS)

### • Cons

- You must use college credits from your JST to finish your degree, you are not awarded a degree automatically
- Extended - 6 year contract (normally 4 for enlisted contracts)
- Withdrawal from the program will still maintain your contract obligation to 6 years and in another Navy rating
- You are only allowed to serve on a Submarine or an Aircraft Carrier
- You cannot specify your rating prior to enlistment (ET/EM/MM (ELT in prototype))
- You are not given a DOE reactor operator license for completion of qualifications during your time in the USN

# United States Naval Officer (ROTC/Academy)

\$180,000 – College ROTC Scholarship

**\$7,800** – (Total NROTC stipend amount during college given to midshipmen)

\$20,000 - Full Coverage Healthcare/Dental

\$20,000 - Worldwide Travel

**\$390,000** - Average 5-Year Officer Career

## TOTAL VALUE

**\$618,000 over 9 Years**

Overall Profit over 9 years = **\$398,000**

\$21.26/hour averaged over 9 years if you remove all other value

- Pros

- You **MUST** have a college degree prior to commissioning
- Allowed to serve on any class of ship if you are chosen for it
  - (exceptions for specialty programs like NUPOC, WC, Medical, Pilot)
- 1<sup>st</sup> year is free, regardless of withdrawal status

- Cons

- College choice is limited, you must attend a specified college for the NROTC program or the Naval Academy (Annapolis)
- Room/Board fund is **NOT** provided to your bank account, but given directly to the college instead by the USN
- Your specialty/assignment and location is based upon the needs of the Navy, your college performance, and degree plan
- Tier 1/2/3 degrees may influence the job you choose and where you are stationed
  - Not allowed to have a degree outside of these tiers
- Required classes in college (1 year of calculus, 1 year of calculus-based physics, Naval Science, etc.) on top of your normal required credit hours necessary for graduation
- Withdrawal after the first year will incur charges upon the student for tuition/room/board
- Any degree plan over 4 years will be paid for out of pocket by the student (scholarships/grants acceptable)

# Does the Math Add Up? (Gross Profit)

Check it yourself! All information concerning the average career for these choices are readily available online.

## Surface Warfare Officer

Navy Officer	Time	Annual Salary	\$/hour
ROTC (\$250/month)	Year 1	1500	
ROTC (\$300/month)	Year 2	1800	
ROTC (\$350/month)	Year 3	2100	
ROTC (\$400/month)	Year 4	2400	
O-1	Year 5	62760	30.17
O-1	Year 6	62760	30.17
O-2	Year 7	76944	36.99
O-2	Year 8	87204	36.99
O-3	Year 9	100416	48.28
	Total	397884	

- O-1/O-2/O-3 BAH Zip Code 23701 (Norfolk, VA)
- <2% of all Navy officers are on submarines (NUPOC)
- Assume officer career is at sea

## Electronics Technician Nuclear

Sub Nuke ET	Time	Annual Salary	\$/hour
E-3/E-4 \$38k Bonus	Year 1	64860	31.18
E-4 BAH (Prototype)	Year 2	39556	19.02
E-4	Year 3	35052	16.85
E-5 (BAH Start)	Year 4	61812	29.72
E-5	Year 5	68196	32.79
E-6	Year 6	71316	34.29
	Total	340792	

- 6 months of BAH Zip Code 29445 while training at prototype (Charleston SC)
- E-5/E-6 BAH Zip Code 23701 (Norfolk, VA)
- 30% of nuclear field applicants volunteer for submarine service

# What is your Career Goal? (In Nuclear Power)

Listed below are the jobs that are in demand in the Nuclear Power Generation Field

## Operations

- Reactor Operation
- Electrical Power Distribution
- Machinery Operation and Monitoring
- Engineering Plant Chemistry

## Maintenance and Repair

- Electronic Component / Circuit Card
- Computer Program System Monitoring
- Valves/Pipe/Pump/Turbine
- Switchboard Operation / Wiring

## System Engineer

- Determine problems based on your system specialty for maintenance and repair teams
  - (“The Valve Guy”)
- Manage existing hardware and resources to recommend fixes and replacement options

## Supply / Receipt

- Provide the necessary materials and equipment to maintenance and repair teams

## Research and Development / Design

## Radiation Detection / Waste Management

- Monitor radioactive systems to limit the spread of radiation to personnel/environment
- Internal monitoring and dosimetry
- Radioactive worksite management and oversight
- Radioactive Waste Disposal

## Management

- Senior Reactor Operator
- Maintenance Supervisor
- Plant Scheduling
  - Personnel
  - Maintenance Availabilities

## Auditing

- Internal Auditing
  - Maintenance
  - Operations
- External Auditing
  - Suppliers
  - Interplant Exchange (Audit other plant programs)

# Nuclear Power Industry

## Careers in the US Nuclear Navy

**(ENLISTED)** – System experts concerning the equipment they are responsible for. The only ones allowed to operate/maintain/repair equipment on a Navy vessel are enlisted personnel. They are also directly responsible for the training and development of junior enlisted personnel.

The principal goal of a Navy career as an Enlisted is to become a system expert in your field, train future system experts, manage/lead other system experts to solve problems expediently, and become a representative for your field to recommend fixes for future problems.

### Electronics Technician (ET)

- Reactor Operation, Electronic Component Troubleshooting, Fiber Optics, Reactor Safety Computer Program Information Technology

### Machinist's Mate (MM)

- Quality Assurance, Refrigeration, Gage Calibration, Emergency Welding, Water Treatment Operation, Machinery Mechanic, Industrial Maintenance

### Electrician's Mate (EM)

- Electrical Equipment Repair, Power Plant Operator, Electric-Motor Repair, Hydro-Electric Machinery Mechanic

### Engineering Laboratory Technician (ELT)

- Radiation Detection, Engineering Plant Chemistry Control, Nuclear Waste Management

**(OFFICER)** – Responsible for the administration, oversight, and supervision of enlisted operation and maintenance. Held directly accountable for all mishaps under their supervision.

The principal goal of a Navy career as an Officer is to ensure procedural compliance, maintain good order and discipline, and (for Navy Line Officers) become an expert at conducting warfare through supplementary or direct command of a Navy vessel, or in the future, a fleet.

# Nuclear Power Industry

## Career Opportunities

### How Will You Gain Experience?

#### Operations

- Reactor Operation (ET)
- Electrical Power Distribution (EM)
- Machinery Operation and Monitoring (MM)
- Engineering Plant Chemistry (ELT)

#### Maintenance and Repair

- Electronic Component / Circuit Card (ET)
- Computer Program System Monitoring (ET)
- Valves/Pipe/Pump/Turbine (MM)
- Switchboard Operation / Wiring (EM)

#### System Engineer

- Determine problems based on your system specialty for maintenance and repair teams (ENLISTED)
  - (“The Valve Guy”)
- Manage existing hardware and resources to recommend fixes and replacement options (ENLISTED)

#### Supply / Receipt

- Provide the necessary materials and equipment to maintenance and repair teams (ENLISTED) (OFFICER)

#### Research and Development / Design

#### Radiation Detection / Waste Management

- Monitor radioactive systems to limit the spread of radiation to personnel/environment (ELT)
- Internal monitoring and dosimetry (ELT)
- Radioactive worksite management and oversight (ELT) (ENLISTED) (OFFICER)
- Radioactive Waste Disposal (ELT)

#### Management

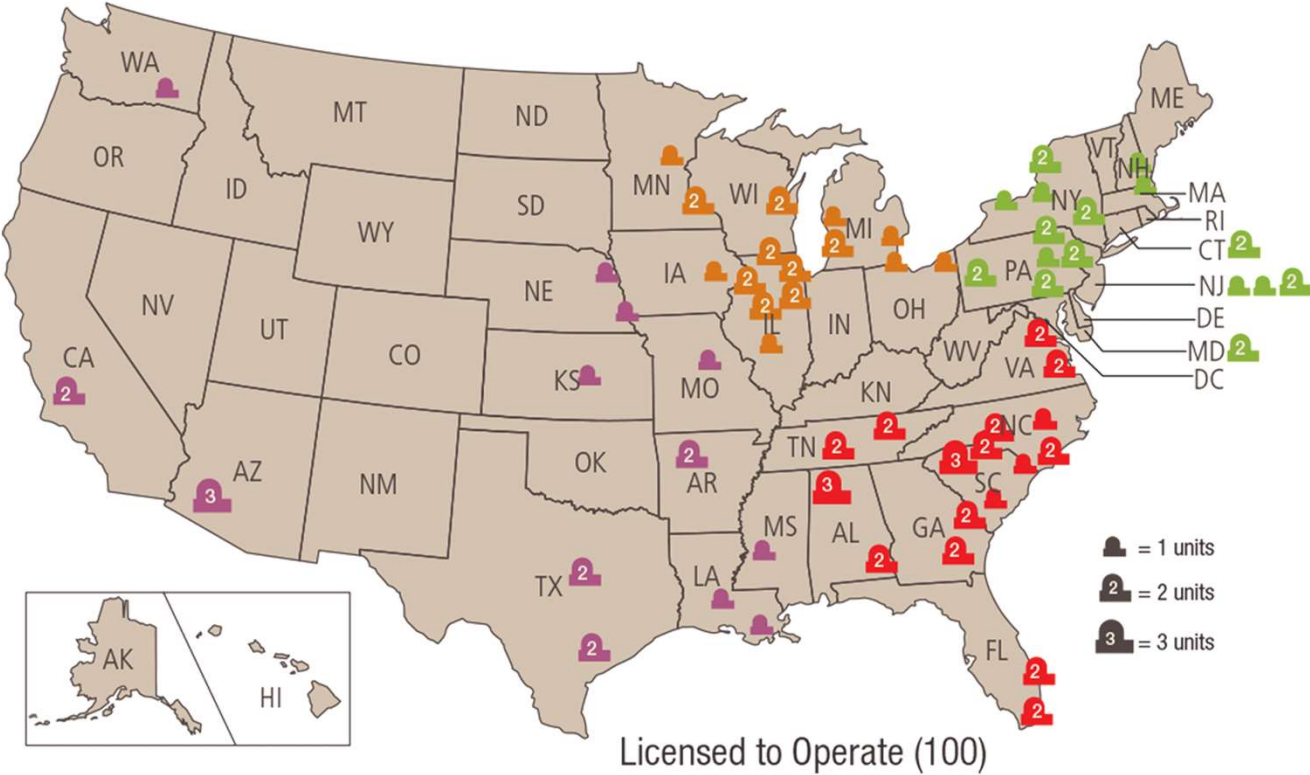
- Senior Reactor Operator (ENLISTED) (OFFICER)
- Maintenance Supervisor (ENLISTED) (OFFICER)
- Plant Scheduling (ENLISTED) (OFFICER)
  - Personnel
  - Maintenance Availabilities

#### Auditing

- Internal Auditing (ENLISTED) (OFFICER)
  - Maintenance
  - Operations
- External Auditing (OFFICER)
  - Suppliers
  - Interplant Exchange (Audit other plant programs)



# Nuclear Power Plants in America



**Nuclear Power: Clean, Safe, and Effective**

# Nuclear Power Industry

## What is the Mission?

### Commercial

Generate power for commercial electrical power grid demand

- Preference to maintain stable power output to maximize lifetime fuel
- Extra energy produced is dissipated as heat
  - (Normally within +/- 5% of nominal production)

### Military

Generate power for:

- Propulsion
- Electricity
- Ship Operations (Steam Catapults)

Power generation is variable dependent on the mission:

- Reconnaissance
- Immediate Escape
- Collision Avoidance
- Long Distance Travel
- Ship Equipment Usage

# Nuclear Power Industry

## Operational Experience Hiring Preference

From the DTE Energy Hiring Department: Ask Them Yourself!

Careers@dteenergy.com

Reactor Operators are hired:

- 98% from the military (Navy Nuclear Enlisted Background Experience)
- 2% from “Internal NO” (Nuclear Operator Non-Licensed Population)
- “Depending on the job classification, military are pretty much the only ones that can qualify”

Senior Reactor Operator Positions (Operational Management)

- Preferred Employment Consideration
  - Navy Nuclear Officer
  - 4-Year Degree with operational experience (Prior Enlisted)

Engineering

- “The leadership team is very adamant on everyone having a 4-year degree.”
  - Engineers with operational experience are preferred over those with only 4-year degrees

# Nuclear Power Industry

## Operational Experience Hiring Preference

From the DTE Energy Hiring Department: Ask Them Yourself!

Careers@dteenergy.com

Maintenance, Operational, and Management Positions:

- 50% from “Internal NO” (Nuclear Operator Non-Licensed Population)
- 50% from the military (Navy Nuclear Operational Background Experience)

Percentage of the US population in the Military: Less than 1%

About 1,195,000 of 329 Million US Citizens

Percentage of the military population in the US Navy: Less than 19%

About 336,000 of 3.29 Million Military Personnel

Percentage of the US Navy in the Nuclear Power Field: Less than 3%

About 10,000 of 336,000 US Navy Personnel

The top **%0.003** of the Nation has first-pick priority to +50% of all commercial Nuclear Power positions.

# Nuclear Power Industry

## Sea Tour Key Differences

### **Nuclear Enlisted**

#### Maintenance

- Build / Follow a Maintenance Schedule
- Prepare Paperwork
- Set-Up the Job Site
- Perform Work
- Perform Re-Tests

#### Operation

- Operate the engineering plant
  - Reactor Operation
  - Water System / Mechanical Operation
  - Electrical Load Distribution
  - Chemistry / Radiation Control

#### Extra Responsibilities

- Perform/practice ship-wide casualty response
- Train / supervise junior enlisted personnel
- Obtain additional certifications to assist maintenance and repair efforts

### **Nuclear Officer**

#### Maintenance

- Approve Maintenance Schedules
- Review Paperwork
- Inspect Job Sites
- Supervise Work
- Supervise Re-Tests

#### Operation

- Supervise the engineering plant
  - Grant Permission for Non-Emergent Evolutions
    - Ensure procedural compliance
  - Manage and Supervise Plant Stabilization for Emergent Evolutions
  - Supervise required plant evolutions

#### Extra Responsibilities

- Qualify as “Officer of the Deck”
  - Command and maneuver the ship
- Support Ship-Wide Divisions and Department Heads
  - Navigation, Weapons, Engineering

# What does the First “Military Tour” Look Like?

## **Nuclear Enlisted**

6 Year Contract

### 20 Month (+/-2 Month) Training Period

- 2 months of Navy Basic Training
- 6 months to learn your engineering specialty
  - (electronics, electricity, machinery)
- 6 months to understand the theory of how a Navy Nuclear Reactor operates
- 6 months of hands on-experience on a Nuclear Reactor with trained instructors

### 46 (+/- 2 Month) Sea Tour

- 1 year to qualify as a supporting Nuclear Operator onboard a Navy Vessel
  - Maintenance Qualifications
  - Supporting Watch Stations
- The remaining time will be spent operating the reactor.
- Supervisor qualifications are optional

## **Nuclear Officer**

5-6 Year Obligation

### 18 Month (+/-2 Month) Training Period

- 3 months to become a Navy Officer (OCS)
- 6 months to understand the theory of how a Navy Nuclear Reactor operates
- 6 months of hands on-experience to supervise Nuclear Reactor operation
- (Optional) 3 months to learn the basic principles of submarines and system management

### 36 Month (+/-4 Month) Sea Tour

- 6 months to qualify as a Nuclear Plant “Watch Officer”
- 1 year to qualify as a Submarine Deck Officer
- 1 year of submarine experience

### 24 Month (+0/-12) Month Shore Tour

- Admiral’s Aid
- NROTC
- Recruiting

# Salary, Benefits, and Experience

## Nuclear Enlisted

### Gross Profit (Initial 6 Year Tour)

- ~\$340,000
  - Start as an E-3, end as an E-6

### Benefits (Exclusive)

- 4+ Years of Nuclear Reactor Plant Operational and Maintenance Experience
- \$180,000 Forever G/I Bill
  - Covers Tuition/Books/Room and Board
  - Room and Board fund given DIRECTLY to bank account of the applicant
- 60-90 College Credit Recommendations
  - Dependent on rank and job specialty
- Trade Skill Certification Programs

### Benefits (Universal)

Tax Free Money for Housing  
Free Medical/Dental Coverage  
Expense Free World-Wide Travel  
Student Loan Repayment Programs (Up to \$65,000)  
Access to VA Home Loans, Discounts, and Small Business Loans  
30 Day/Year Vacation Time (Unused Days Carry Over)

## Nuclear Officer

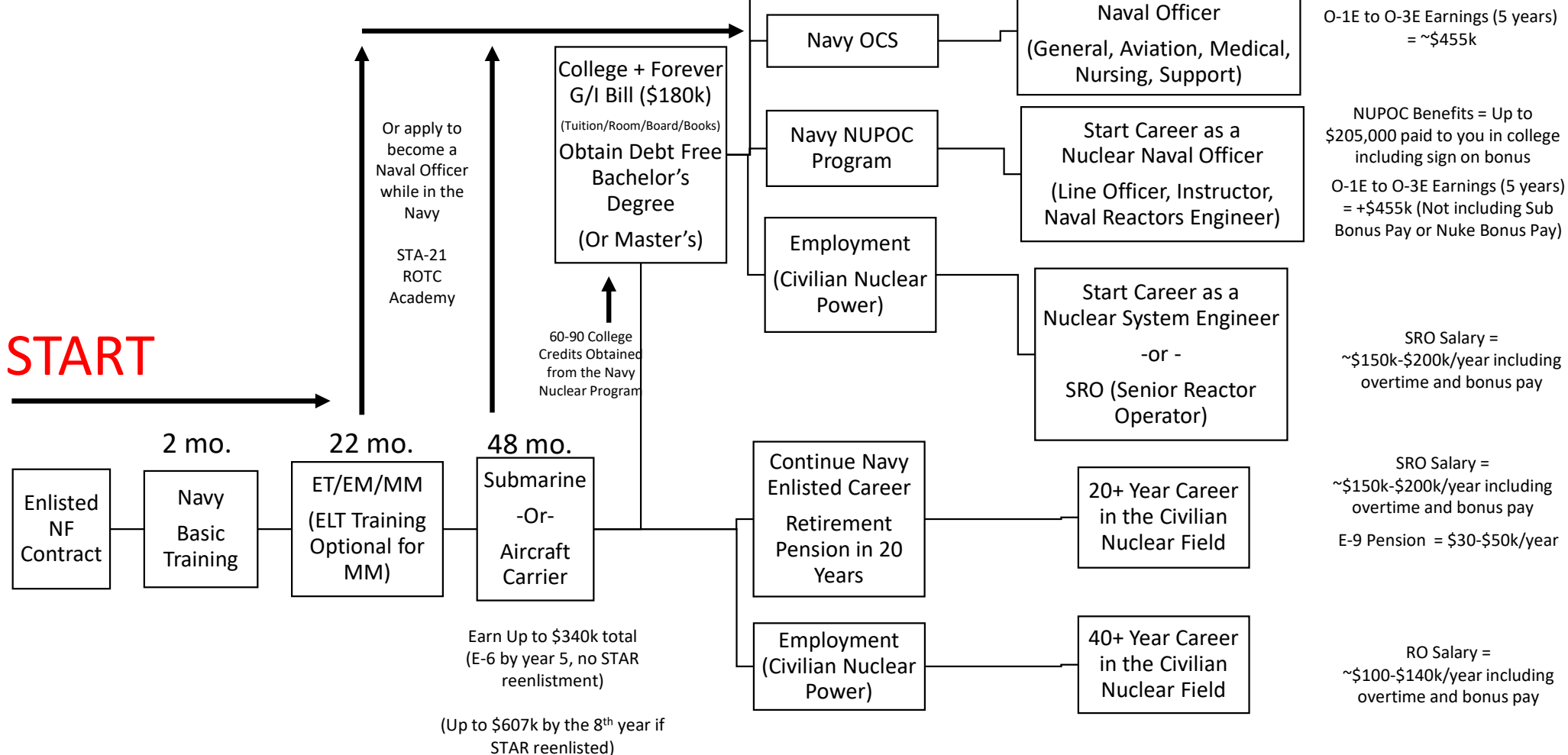
### Gross Profit (Initial 5 Year Tour)

- ~\$390,000 (Potentially ~\$500,000)
  - Start as an O-1, end as an O-3
  - +\$15k-\$100k dependent on NUPOC program acceptance and enrollment period

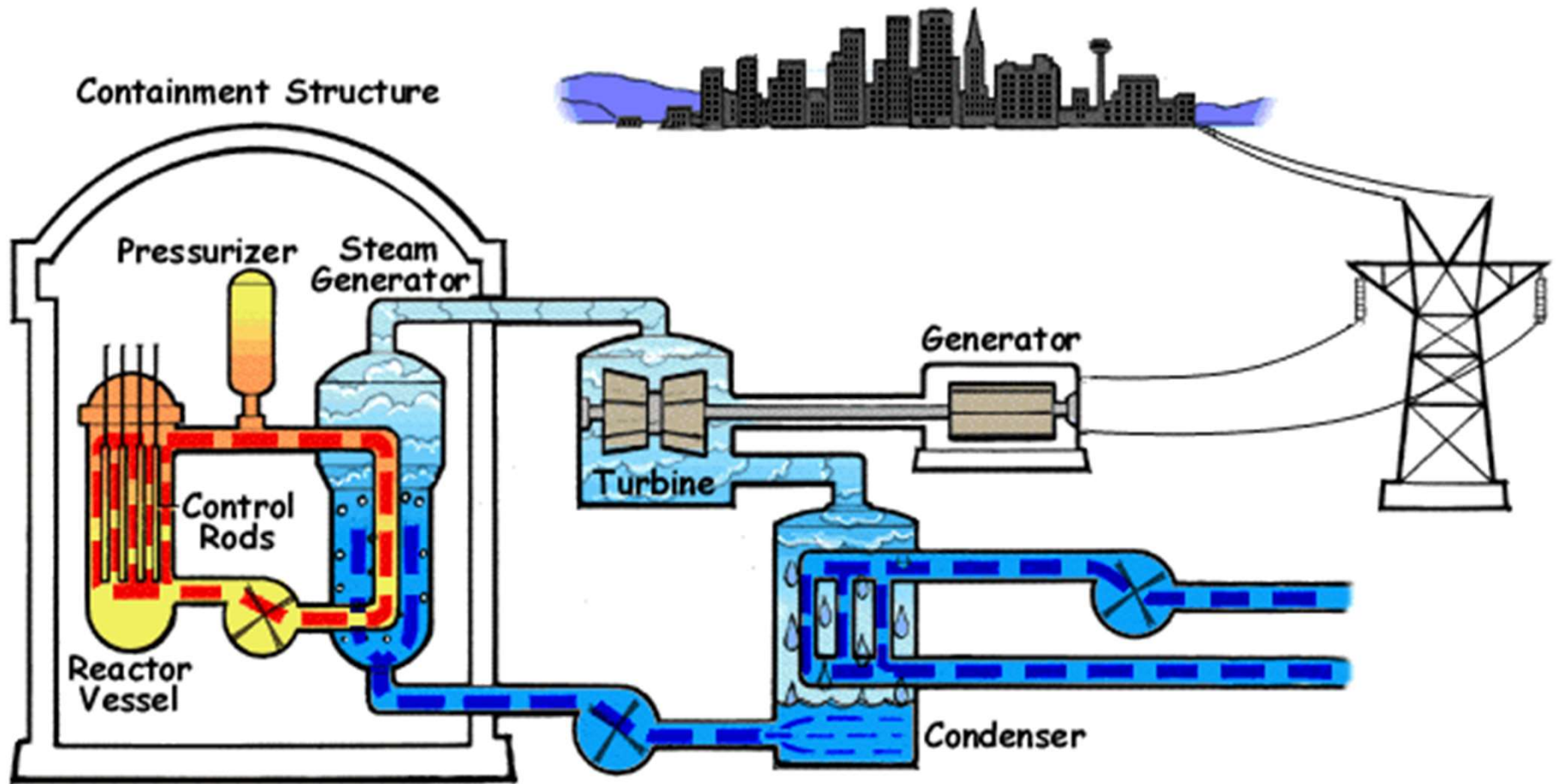
### Benefits (Exclusive)

- 3+ Years of Nuclear Reactor Plant Supervision
- Officer of the Deck Qualification
  - (Command and Maneuver a Submarine or Aircraft Carrier)
- Start the required path to becoming a Navy Captain
  - Submarine or Aircraft Carrier

# As a Nuclear Enlisted Sailor, The Choice is Yours...







Nuclear Power: Clean, Safe, and Effective