From US Navy Mate to Division Leader for Accelerator Operations

Requirements, Development and Career Paths of LANL/LANSCE Accelerator Operators

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Content

- The Los Alamos Neutron Science Center
- What LANSCE Operators do
- Central Control Room Crews
- Opportunities for Advancement
- Career Examples of former Operators
- What’s in the Future for LANSCE Operators
- Summary
- Major Experimental Science Facility at LANL.
- > 1000 users every year.
- Simultaneous beam delivery to various areas.
- Each area has unique requirements.
What LANSCE Operators do

- Set up beam delivery to all areas of the complex, tune all beams and monitor beam current and beam quality.
- Restore beam delivery after equipment malfunctions or power outages.
- Perform periodic checks of the Radiation Security System and enable entries and perform sweeps of access-controlled areas, following written procedures.
- Act as first responders in emergencies at TA-53. In this function they carry a particularly high responsibility during off-hours and weekends.
- Work with accelerator physicists during startup and during beam development runs aimed at improving the functionality of the accelerator and quality of the beams.
LANSCE Central Control Room (CCR) Crews

CCR crews work in rotating 12 hour shifts. Each of 4 crews is made up of 4 crew members:

- Operations Shift Supervisor (OSS, "Crew Chief")
- Technical Work Manager, exempt employee.
- Alternate OSS
- 2 Qualified Operators or Trainees

Qualification requirements for applicants:

- High School diploma – No college degree required.
- Experience with complex facility (accelerator, reactor, power plant, etc.)
- US NAVY nuclear reactor operators have the desired technical skills AND are familiar with Formality of Operations.
- At present 13 out of 16 operators are former "Navy Nukes"
I recently was informed that Admiral Rickover was irate over the fact that we had run a single ad in the Navy Times in search for individuals with reactor operating experience and had demanded that we cease. I appreciate his concern but should like someone to point out to him that this is a free country and he does have attention of those individuals who may be interested that there is another program where their training may be utilized to the overall benefit of the United States and that program is here at the LASL.

Several years ago our fast reactor program was cancelled. Among those RIP'd were 4 past naval reactor operators. When Rover was cancelled we RIP'd 4 past naval reactor operators. These people suggested we might be able to keep in touch through the Navy Times. To date we haven't had any luck. If the Admiral thinks he can keep his people in some form of bondage through our not advertising in the Navy Times he is wrong. We don't plan to rerun the ad primarily because to date it hasn't been very effective. However, if we were to decide that it was useful I would not hesitate to take that course because we compete not just with the Admiral but with the whole segment of U.S. industry.

Sincerely,

[Signature]

E. M. Agnew
Director

Encl.

bcc: H. C. Donnelly/H. E. Roser
     C. R. Canfield

AN EQUAL OPPORTUNITY EMPLOYER
Opportunities for Advancement within the Team

Operators advance by

- **Becoming fully qualified.**
  - Following the *LANSCE Accelerator Operator Training Manual*, Operator trainees go through 5 levels of qualification, from *Radiation Security System* to *Experimental Area Operator*. Must obtain *Knowledge* and *Performance* checkouts by an OSS or AOSS, and an *End-of-Card* checkout by the team leader or RSS engineer (level I). Program was inspired by US NAVY qualification program for nuclear reactor operators. Time to complete: 2-2 ½ years.

  - **Fully qualified operators are eligible to apply for vacant (OSS)/AOSS positions.**

  - **Alternatively, experienced operators can sign up for the voluntary Senior Operator Qualification Program.**
    - Must demonstrate in-depth knowledge of all areas of the accelerator complex.
    - Time to complete: 2 – 3 years (Minimum 4 years from fully qualified).
    - Eligible for promotion to level between qualified operator and AOSS.
Continued Education within the Team

Trainees AND qualified operators continue to learn:

- In CCR from senior operators, system experts and physicists.
  - Improving *tuning skills* for LINAC, beam lines and Proton Storage Ring (PSR).
  - Acquiring in-depth knowledge of a particular area.
  - Acquiring the big picture: How does improving one beam mess with another, etc.

- Lectures/Classes during extended maintenance outages.
  - Attending *USPAS* classes (typically “Accelerator Fundamentals” for junior operators)
  - *Beam Delivery Team Outage Lectures*, organized once a week by team leader, with lectures from system experts and users/experimenters.

- Working with maintenance teams during extended outages.
  - Mutual benefit: outage teams get help, operators improve *troubleshooting skills*.
  - May also affect operator’s career path …
Opportunities for Advancement outside of the Team

- Most LANSCE accelerator operators do not retire as operators.
  - Rotating shift work takes a toll.
  - Operators (both experienced and junior!) are appreciated by their outage maintenance teams.

- Many former operators have obtained an advanced degree and moved on to other jobs at LANL or elsewhere.

- LANL and AOT-OPS group support continuing education, as long as it is potentially useful for LANL’s mission
  - Degrees in Science and/or Engineering are preferred.
  - Operators pursuing a supported advanced degree typically get reimbursed for tuition once they pass for credit.
  - Time off from shift to attend a class may be paid as time worked, at group leader’s discretion, up to a certain number of hours/week.
Opportunities for Advancement outside of the Team

- **Example: Floyd Gallegos**
  - Moved from Beam Delivery Team to Protective Systems Team in 1981.
  - While an operator worked on Electrical Engineering (EE) degree. With one semester sabbatical got degree after about 4 ½ years.
  - Became staff member and Protective Systems Team Leader after getting degree.
  - Eventually became Operations Deputy Group Leader, then Group Leader.
  - New Division Leader coming from Experimenter’s side, needed a Deputy with Operations experience. Floyd became Deputy Division Leader and retired in that role in 2008.

- **Operations experience was obviously important throughout his career.**
  - Desire to continue to learn, as well as LANL support for continuous learning were other important factors.
Opportunities for Advancement outside of the Team

- **Example: Marc Clay**
  - LAMPF/LANSCE Accelerator Operator 1983 – 1993, at last as an AOSS.
  - While an operator, he worked on an Associates degree in Pre-Engineering, then on EE. During extended outages he worked with Protective Systems Team.
  - Moved to a position with LANL Occurrence Investigation team in 1993.
  - BS in Nuclear Technology (more in line with work than EE) in 1999.
  - Master of Engineering Management in 2002. Two-year sabbatical (at the time supported by LANL) helped.
  - Office Director for Contract Assurance in DX-Division from 2004 – ’06.
  - In 2006 new LANL management established Contract Assurance group, with Marc as GL.

- Operations experience was very important for Marc’s career.
  - Accelerator operators need to have strong ability to assimilate complex systems and to understand how systems AND people interact.
Opportunities for Advancement outside of the Team

- **Example: Danny Olivas**
  - Provided Operations Oversight (interface between experimenters and OPS) to various areas until 2005.
  - Worked on Lujan Center Neutron Target Controls since 1998.
  - Since 2006: Works in Instrumentation & Controls group on Controls Hardware and Software.

- **Operations experience was very valuable.**
  - Being an accelerator operator gave Danny a wider perspective on his work: He does not see his job done because “his stuff’ is working, but want’s to see beam delivered.
  - When working on a new piece of controls hardware, or a new controls screen, Danny sees it through the eyes of an operator who will have to deal with it from the control room.
What’s in the Future for LANSCE Operators?

- LANL’s proposed new Signature Facility: Matter-Radiation Interactions in Extremes (MaRIE 1.0)
What’s in the Future for LANSCE Operators?

- Will a more complex facility require a more diverse set of operators?
  - Are college degrees (physics, engineering) the answer?

- Formality of Operations will not go away – College environment not the best preparation for FoO …
  - Maybe a more diverse educational background?

- Maybe Scientists will operate some of the new machines?

- Example: Navy FEL at LANSCE
  - Operators perform interlock checks.
  - Scientist (so far) operate the FEL.
Summary

- LANSCE accelerator operators deal with a complex machine.
- Both technical skills and adherence to Formality of Operations are required.
- Nuclear reactor operators, especially “Navy Nukes” have been the preferred pool for applicants with both these traits.
- Opportunities for advancement exist within the team, within other teams in the Accelerator Operations & Technology division, as well as elsewhere at LANL.
- Adding a science or engineering degree to the resume opens up career opportunities at LANL tremendously.
  - Can be a challenge with rotating shift schedule.
- Future projects may require to “re-think” the LANSCE operator.