

From US Navy Mate to Division Leader for Accelerator Operations

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

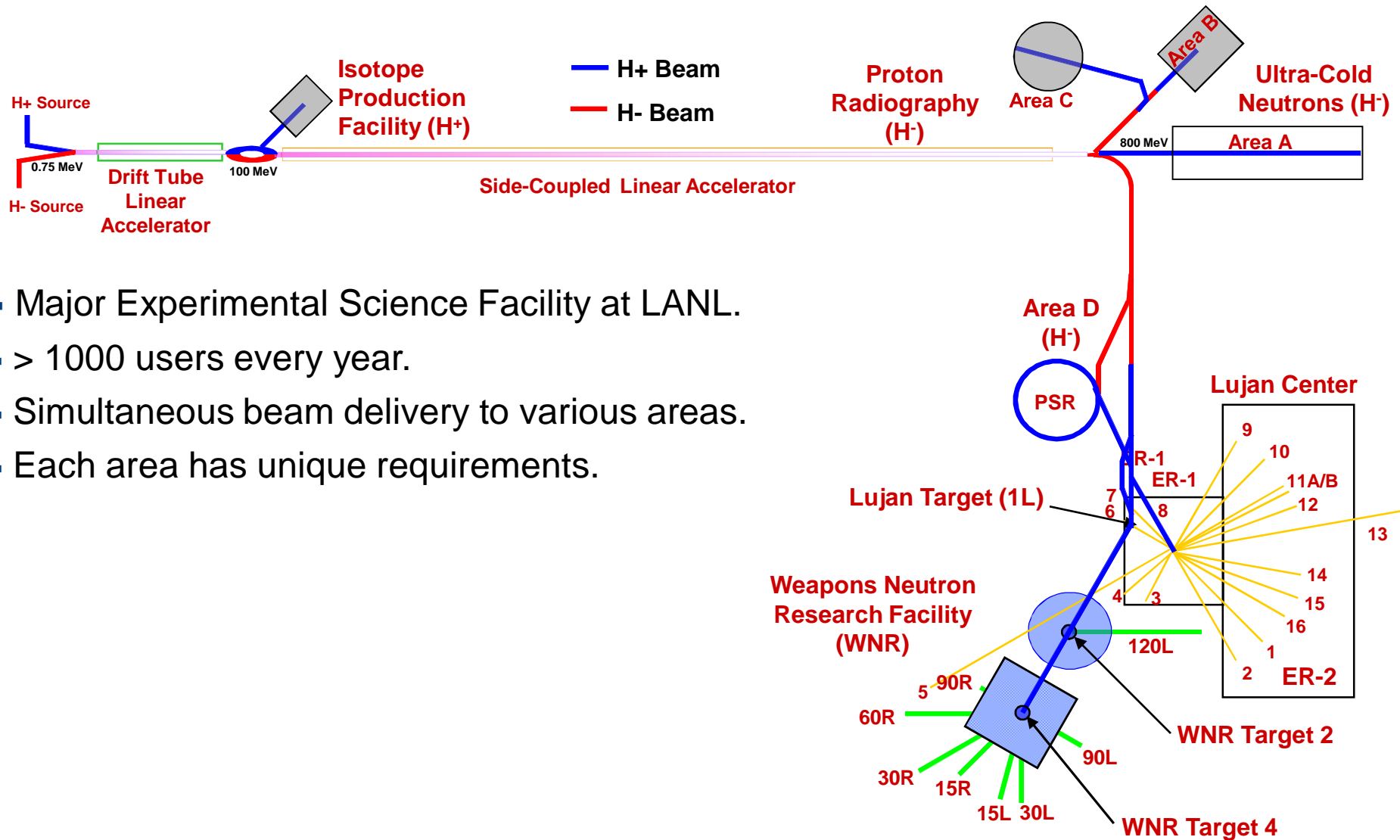
T. Spickermann, LANL AOT-OPS Group

WAO 2012

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.

AOM CHAPTERS 1-6

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTERS 1 - 3

ADMINISTRATION
CONDUCT OF OPERATIONS
SAFETY & OPERATING
GUIDELINES

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 5

CENTRAL CONTROL
BOARD RESPONSE
INSTRUCTIONS

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 6
VOLUME 1

RSS PROCEDURES

6.04.01 - 6.04.23

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 6
VOLUME 2

RSS PROCEDURES

6.04.30 - 6.04.50

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 6
VOLUME 3

RSS SWEEP AND
ENTRY PROCEDURES

6.05.01 - 6.05.65

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 6
VOLUME 4

RSS SWEEP & ENTRY
PROCEDURES

6.05.67 - 6.05.102

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 6
VOLUME 5

RSS PROCEDURES
GD, XL, RSS INPUTS

6.08 - 6.23

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 7

RUN PERMIT
PROCEDURES

7.01 - 7.07

LANSCE

CONTROLLED COPY

AOM CHAPTERS 7-11

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 8

FAST PROTECT
PROCEDURES

8.01 - 8.04.10

LANSCE

CONTROLLED COPY

LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTER 9

EQUIPMENT
READINESS CHECKS

9.01 - 9.13

LANSCE

CONTROLLED COPY

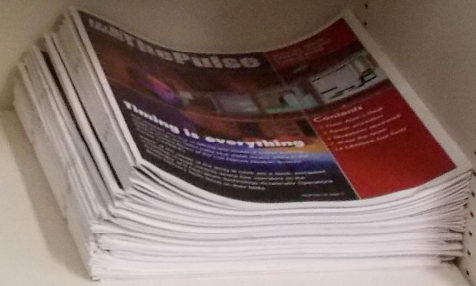
LANSCE ACCELERATOR OPERATIONS MANUAL

CHAPTERS
10 & 11

OPERATING
INSTRUCTIONS
&
ALARM INTERLOCK
CHECK PROCEDURES

LANSCE

CONTROLLED COPY



EMERGENCY RESPONSE KIT

INTERLOCK CHECKS

IPF

CV 2012

ADT - QPS

LANSCE

ADT - QPS

LOS ALAMOS NATIONAL LABORATORY

COMPLETED RSS WEEKLY CHECKS

AOM 6.15

CV 2012

ADT - QPS

LANSCE

ADT - QPS

LOS ALAMOS NATIONAL LABORATORY



LANSCCE C

■ LANL ha

*3.23.74
3.23.74
Wilson*

UNIVERSITY OF CALIFORNIA
LOS ALAMOS SCIENTIFIC LABORATORY
(CONTRACT W-7405-ENG-36)
P. O. Box 1663
Los Alamos, New Mexico 87544

IN REPLY
REFER TO: DIR

April 23, 1974

ukes”:

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 RIF'd were 8 past naval reactor operators. When Rover was cancelled we RIF'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,

Handwritten signature
H. M. Agnew
Director

Encl.

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

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

- US Navy Nuclear Reactor Operator 1970 – '75.
- LAMPF/LANSCE Accelerator Operator 1975 – '81.
- 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

- US Navy Nuclear Reactor Operator 1977 – '83.
- 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.
- Acting Group Leader for Occurrence Investigation in 2004.
- 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

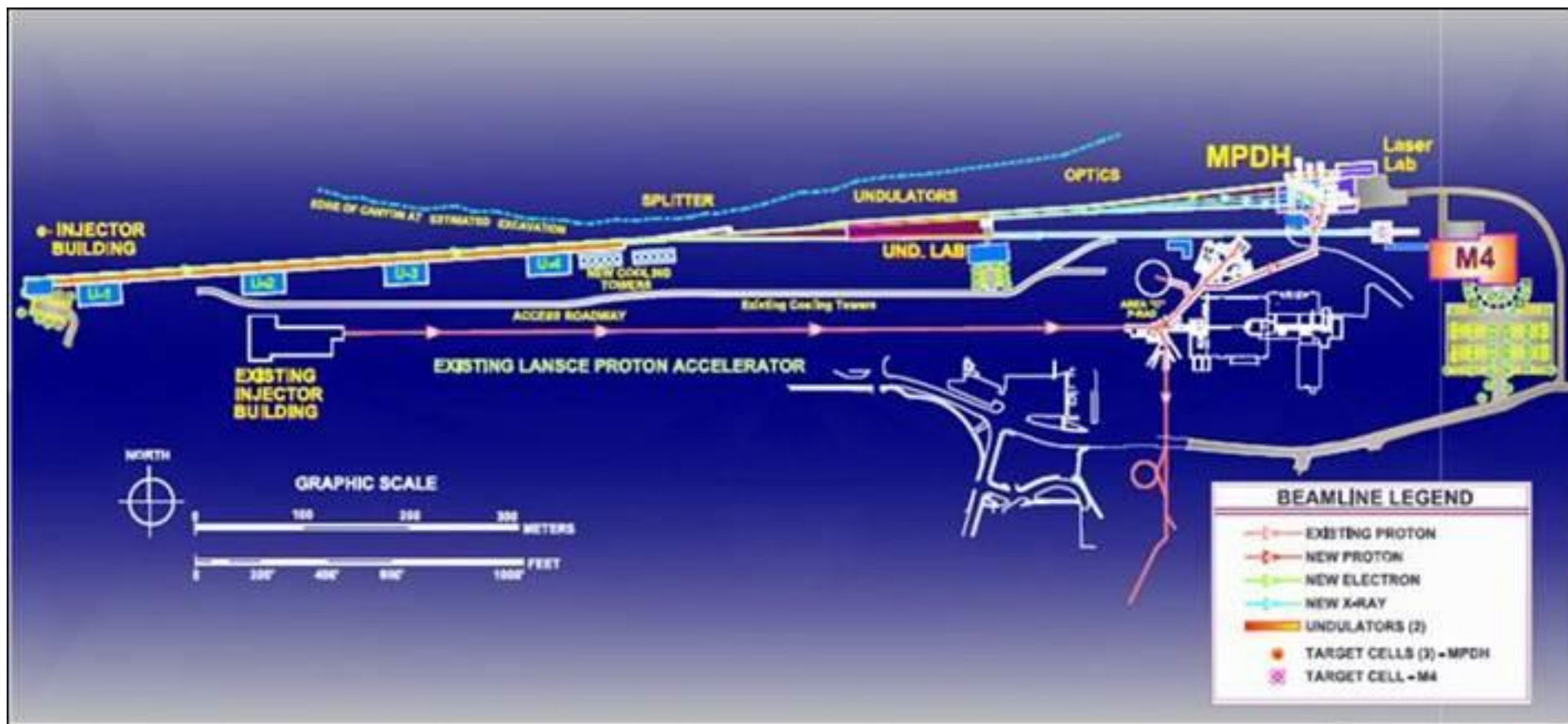
- US Navy Nuclear Reactor Operator 1977 – '83.
- LANSCE Accelerator Operator 1983 – 1988.
- Provided Operations Oversight (interface between experimenters and OPS) to various areas until 2005.
- Worked on Lujan Center Neutron Target Controls since 1998.
- Since 2006: Works in Instrumentation & Controls 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.**