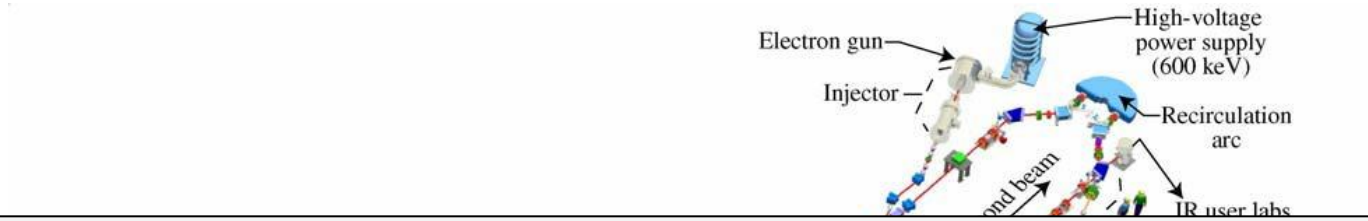
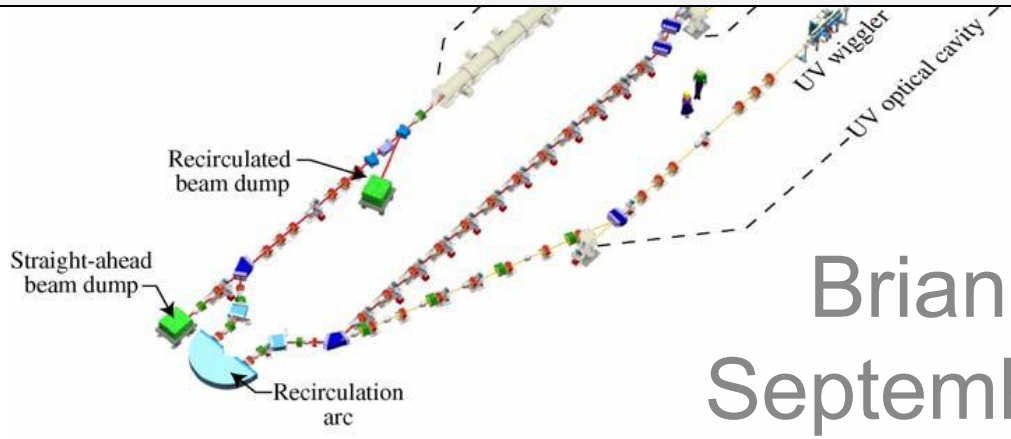


Operator Training

(LERF Readiness Review)



Brian Freeman

September 30, 2015

Overview

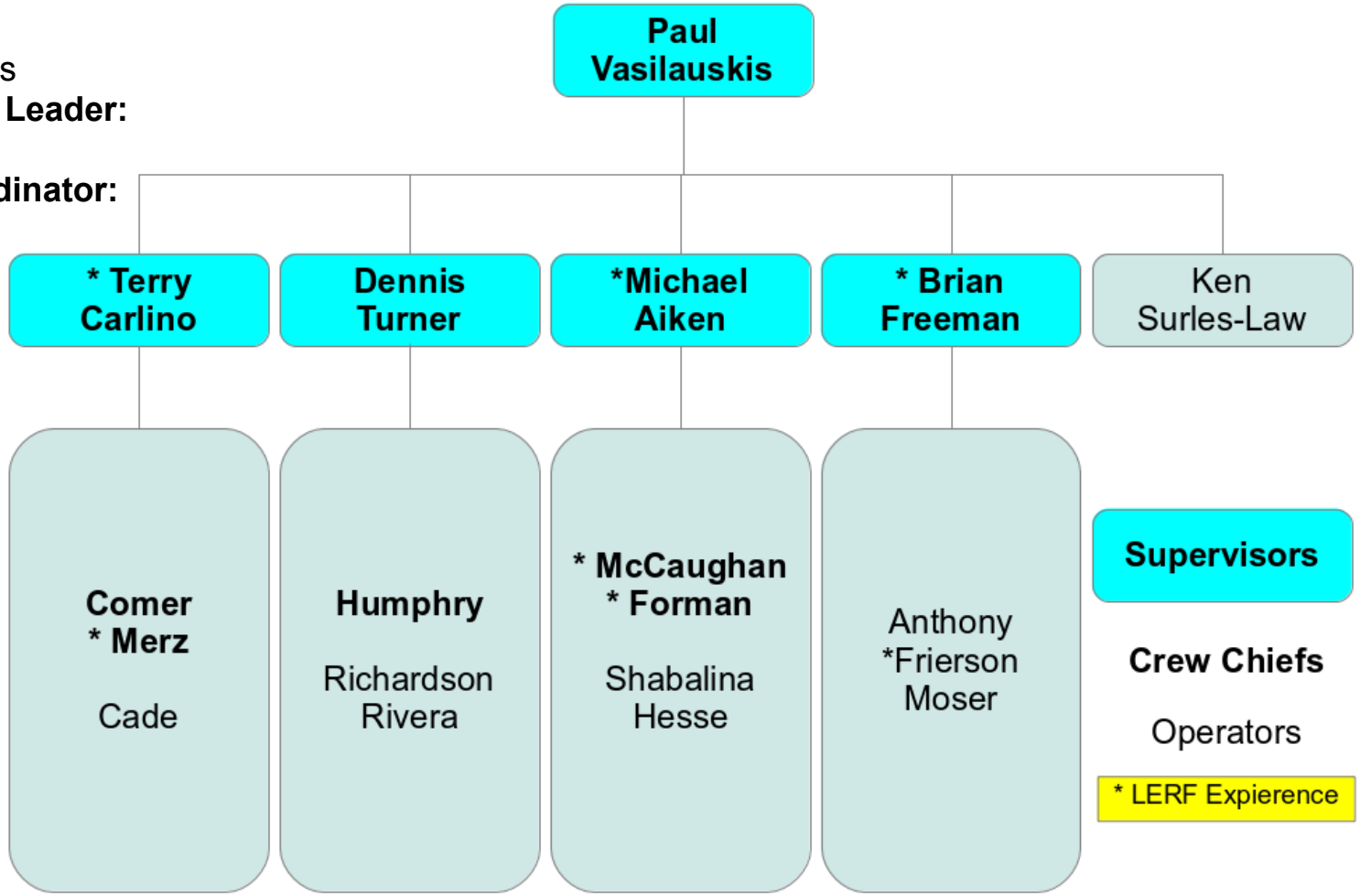
- Who is Who in Ops
- How We Train CEBAF Operators
- LERF Training Plans
- Status
- Upcoming Run
- Summary

Who is Who in Ops

- **Group Leader:** Paul Vasilauskis
- **Deputy Group Leader:** Brian Freeman
- **Training Coordinator:** Terry Carlino

9 - Crew Chiefs
9 - Operators

***Note:** Crew Chiefs also act as Operators



Operator Training Requirements

- **Operator training consists of:**
  - JLab Safety training (SAF and MED)
  - Online training modules (Moodle)
  - On-the-job-training
  - Lecture style training

JLab Baseline Training

- Baseline SAF and MED training (52 of them):

Course #	Course Name	Course #	Course Name
MED01	Medical Monitoring for Hazardous Work	SAF136	Lead Worker
MED02	Certified Eye Exam for Laser Safety	SAF141	Personal Safety System Operator
MED03	Bloodborne Pahtogens awareness	SAF143kd	LERF Safety Awareness Training
MED13	ODH-2 & respirator Medical Certification	SAF144	Know When and Why to Bypass an Interlock
SAF103	Oxygen Deficiency Hazards	SAF210	5-min Escape Pack Use
SAF104	Lock, Tag, and Try	SAF307	Ladder Safety
SAF105	CPR/AED USE	SAF505	Familiarity with Duties of E M Team Members
SAF108	Fire Safety	SAF603A	Electrical Safety Awareness
SAF110	Hall A safety Knowledge	SAF603N1	Arc Flash: Safety Awareness
SAF111	Hall B safety Awareness	SAF603N2	Elec. Safety:Beware of the Bite (ELE5EFV)
SAF112	Hall C safety Awareness	SAF603N3	Elec. Safety Qualified Worker (ELECEFV)
SAF113	Hall D safety	SAF800	General Employee Radiation Knowledge
SAF114O	Laser Safety Orientation	SAF801C	Rad. Worker I Knowledge--Information
SAF116kd	Work Governance (Long Shutdown)	SAF810P	Rad. Worker I Knowledge--Implementation
SAF123	Oil Worker Training	SAF801T	Radiation Worker I Knowledge--Assessment
SAF130A	Pressure System Safety Awareness	SAF801kd	General Access RWP (SAF801kd - 423)
SAF132	Tunnel Worker Safety Orientation	SAF803	Comprehensive Knowledge for ARMs
		SAF803kd	General Access RWP for ARMs

Online Training (Moodle)

- Moodle - Web based learning framework
- Open source software package used worldwide. (https://moodle.org/)
- Gives the ability to set up courses.
- Courses can have quizzes and practicals, and all is trackable for each student through the system.
- We also coordinate through the training department and all classes are added, and tracked on an Operator's JLab SRL.

Moodle Class Creation

1. Operations sees a need for a new class.
2. Lesson Plan is developed with Learning Objectives.
3. MOTC (Moodle Training Committee) reviews Lesson Plan.
4. Teacher (Senior Operator or Crew Chief) is assigned to create course content based on the lesson plan.
5. MOTC reviews course when completed.
6. Feedback changes to the teacher.
7. MOTC does 2nd review of changes (Iterate 5,6, and 7 as many times as needed).
8. The course is then released.

Operator On-the-Job-Training

- Experience is gained through doing required Moodle training, through practicals.
- An Operator will do this under the supervision of a supervisor, mentor, or on duty Crew Chief
- Experience is also gained through performing procedures, test plans, or expert instructions
  - That have well defined steps.

Lecture Based (Just-in-Time)

- Usually done before a run begins, after a SAD.
- Topics have included lectures on:
  - What's new in Hardware and Software
  - Procedural changes
  - SSO refresher
- Also done as needed throughout a run period.
  - New Experiments
  - New Hardware, Software, or Procedural changes.
  - Other emerging topics.

Moodle Class Overview

Level	Description	Total Count	Unreleased
100	New Operator	55	5
200	Advanced Operator	39	36
300	Crew Chiefs in Training	24	23
400	Qualified Crew Chiefs	0	0
500	New LERF Training	21	21
600	First Action Response	33	7
700	Just in Time	36	0
	TOTALS	**208**	92
	TOTAL RELEASED	**116**	

Message to take away:

- An Operator has an enormous amount of training.
- **We will not treat the LERF any differently ….**
- I will scroll quickly through the lists of some courses.

MCC Ops Operations Training

Course #	Course Title	Course #	Course Title
MCC100	Initial Workplace Orientation	MCC127	Dumps
MCC101	Introduction to the MCC	MCC128	Locks
MCC103	MCC Operations Manual	MCC129	Rasters
MCC104	Accelerator Operations Directives	MCC130	Introduction to the Alarm Handler
MCC105	Introduction to the CEBAF Site	MCC131	Input Output Controllers (IOC)
MCC106	Emergency Response Procedures	MCC132	MYA Viewer (Archiver)
MCC107	Introduction to the JLab Computer Network	MCC134	Guard Alarm Screen
MCC108	Nomenclatures and Buzz words	MCC135	The Wall
MCC109	Beamline Drawings	MCC136	QE Measurement
MCC110	Operator Screens	MCC137	Fast Optics (FOPT)
MCC112	Log Books and Log Entries	MCC138	Machine Update
MCC113	Intro to the CEBAF Accelerator Technology	MCC139	SRF Control Screens
MCC114	Beam Operation Basics	MCC140	PSS Sweep
MCC115	Backup and Restore Tool (BURT) Saver	MCC141	Web On-Call
MCC-116	Elegent Download Tool (eDT)	MCC142	Personnel Safety Systems Simulator
MCC117	Linac Energy Management (LEM)	MCC143	How to Make a Paper PSS Logbook Entry
MCC118	Harps	MCC144	CARMs
MCC119	Viewers and Video Cross Point Switchers	MCC145	Channel Access Control
MCC120	Beam Position Monitor (BPM)	MCC147	Operational Restrictions
MCC121	Synchrotron Light Monitors (SLMs)	MCC148	The Operator's Workstation
MCC122	Path Length	MCC149	Accelerator Bypass Interlock Log (ABIL)
MCC123	Fast Shutdown Device (FSD)	MCC150	Preparing for Shift and Stamping in
MCC124	Beam Loss Monitor (BLM)	MCC151	General Tools Screen
MCC125	Beam Loss Accounting (BLA)	MCC152	Downtime Manager
MCC126	Beam Current Monitor (BCM)	MCC-153	Hot Checkout

Courtesy N. Okay via B. Legg (2014)

MCC Ops Senior Operator Training

Course #	200 level Course Title	Course #	200 level Course Title
MCC202	Administrative	MCC270	PSS Certification Field Support
MCC203	Accelerator Facility Overview	MCC271	Fast Feedback System
MCC204	Workplace Safety for Operators	MCC272	Accelerator Energy Management
MCC208	Communication and Customer Service	MCC278	Troubleshooting Methods
MCC-210	Leading the Emergency Field Response	MCC280	Accelerator Optics
MCC-212	Radiation Control for Operators	MCC285	Electron Gun
MCC215	PSS Troubleshooting Methods	MCC287	Injector
MCC220	Magnets	MCC288	FEL Hot Standby Duty Officer
MCC224	SRF	MCC292	Troubleshooting Guides
MCC226	LCW	MCC293	Hall A Hardware, Setup and Beam Transport
MCC230	Beam Diagnostics	MCC294	Hall B Hardware, Setup and Beam Transport
MCC241	CHL	MCC295	Hall C Hardware, Setup and Beam Transport
MCC242	Vacuum Systems	MCC296	Hall D Hardware, Setup and Beam Transport
MCC243	Beam Dumps	MCC297	Mentoring the New Hire
MCC250	UNIX, EPICS, & Software Knowledge	MCC298	Accelerator Operations-Technical
MCC255	Software Tools		

Courtesy N. Okay via B. Legg (2014)

MCC Ops First Action Training

Course #	Description
MCC600	Capture water skid restart procedure
MCC610	Setting the Gun Comparator
MCC611	Reset of the 70MHz Amplifier Chassis
MCC612	Reset of the Injector Gun HV Power Supply (HVPS)
MCC613	Reset of the Chopper Water Skid
MCC614	Reset of BSY Dump Water Skid FSD Interlock Chassis
MCC615	2kW Insertable Dump Reset
MCC631	Local Reset of IOCs
MCC632	Local Check/Reset of a LINAC style Ion Pump
MCC633	Resetting a Box Supply
MCC634	RF Control Module Reset
MCC636	CARM Reset
MCC637	Resetting SRF valves locally
MCC638	SRF Vacuum Ion Pump Power Supply Controller Card Slow Trip Point Adjustment
MCC639	Resetting RF Separator LCW coolant faults
MCC650	Non-SRF Valve Air Hose Repair
MCC653	Replacing Fuses on the Multiple Output Power Supply (MOPS)
MCC654	Bypassing an ODH head
MCC655	Resetting Shunts
MCC657	Replacing Magnet Trim Cards
MCC667	Low Dump Helium Flow
MCC680	Repositioning Dogleg Magnets

Courtesy N. Okay via B. Legg (2014)

LERF Training Plan

- We will implement the same training style for the LERF accelerator.
- A LERF Operator will typically be a CEBAF Operator first, but this is not a requirement.
- There will be additional baseline training (SAF and MCC) for LERF Laser Operators.

Baseline Training for LERF

LERF Baseline Safety superimposed on MCC Ops Baseline Safety (15 on 35)

Course #	Course Name	Course #	Course Name
MED01	Medical Monitoring for Hazardous Work	SAF136	Lead Worker
MED02	Certified Eye Exam for Laser Safety	SAF141	Personal Safety System Operator
MED03	Bloodborne Pahtogens awareness	SAF143kd	LERF Safety Awareness Training
MED13	ODH-2 & respirator Medical Certification	SAF144	Know When and Why to Bypass an Interlock
SAF103	Oxygen Deficiency Hazards	SAF210	5-min Escape Pack Use
SAF104	Lock, Tag, and Try	SAF307	Ladder Safety
SAF105	CPR/AED USE	SAF505	Familiarity with Duties of EM Team Members
SAF108	Fire Safety	SAF603A	Electrical Safety Awareness
SAF110	Hall A safety Knowledge	SAF603N1	Arc Flash: Safety Awareness
SAF111	Hall B safety Awareness	SAF603N2	Electrical Safety: Beware of the Bite (ELE5EFV)
SAF112	Hall C safety Awareness	SAF603N3	Electrical Safety for the Qualified Worker (ELECEFV)
SAF113	Hall D safety	SAF800	General Employee Radiation Knowledge
SAF114O	Laser Safety Orientation	SAF801C	Radiation Worker I Knowledge -- Informaiton
SAF116kd	Work Governance (Long Shutdown)	SAF801P	Radiation Worker I Knowledge -- Implementation
SAF123	Oil Worker Training	SAF801T	Radiation Worker I Knowledge -- Assessment
SAF130A	Pressure System Safety Awareness	SAF801kd	General Access RWP
SAF132	Tunnel Worker Safety Orientation	SAF803	Comprehensive Knowledge for ARMs
		SAF803kd	General Access RWP for ARMs

- Shows that all MCC Operators already have required LERF baseline training

Additional Laser Safety Training

Course #	Course Name
SAF115O	Laser Orientation FEL
SAF115DLE	Drive Laser Enclosure

And for GTS Laser work ….

Course #	Course Name
SAF115GTS	Laser Operator Gun Test Stand

Courtesy N. Okay via B. Legg (2014)

LERF Core Curriculum

- LERF Core Curriculum. Selected with LERF Management input during Summer 2015 SAD
- Training modules development priority understood.

LERF Operator	
MCC-501	Introduction to the LERF Facility
MCC-502	LERF Operational Directives (LOD)
MCC-503	LERF Acceleraor Safety Envelope
MCC-509	LERF Machine Protection System
MCC-510	LERF Gun Operations
MCC-511	LERF Mini-Phase
MCC-512	LERF Arc 1 Setup
MCC-513	LERF Back Leg Straights
MCC-514	LERF Arc 2 Setup
MCC-515	LERF Phase/Pathlength for Recirc and 10 MeV Dump
MCC-516	LERF BLM Setup
MCC-517	LERF CW Beam Operations
MCC-518	LERF Operational Recovery and Troubleshooting
MCC-519	LERF Optics and diagnostic Tools
MCC-520	LERF FSD Tree
LERF Laser System Operator	
MCC-550	LERF Injector Setup
MCC-551	LERF Optics
MCC-552	LERF Lasing Optimization
LERF SYSTEM EXPERT	
MCC-560	LERF Advanced Injector Setup
MCC-561	LERF Advanced Electron Beam Troubleshooting
MCC-562	LERF Laser Troubleshooting

Status

- Core Modules below:
  - Have assigned teachers.
  - Are in development.
- Will not be ready for October Run, but shooting for Spring run.

Course	Teacher	Description
MCC-501	Anthony	Introduction to the LERF
MCC-502	Anthony	LERF Operational Directives (LOD)
MCC-509	Freeman	Machine Protection System (MPS)
MCC-511	Richardson	Miniphase
MCC-516	Aiken	LERF BLM Setup
MCC-517	Carlino	CW Beam Operations
MCC-520	TDB	LERF FSD Tree

For the Commissioning Run

- One CEBAF Operator or Crew Chief will act as the LERF Operator.
- Operations will:
  - Support CASA scientists and experts
  - Use this run to further develop training and procedures.
- Plan is to provide a small subset of Ops at first
  - All have either operated the LERF previously
  - or, been involved in resuscitation efforts.
- Training shall be on the job training, supplemented with lectures.

Planned Just-in-Time Training

- Plan to have 3 lecture trainings (October 7th):
  - Intro to the LERF (Freeman):
    - Machine Layout Overview
    - Basic concept of ERL
    - MPS overview
    - FSD
    - Administrative limits
  - COO and LOD (Legg):
    - Staffing requirements.
    - Roles
  - Schedule and Plans (Benson)

Summary

- Operations staff have an enormous amount of training.
- The plan is to complete a comprehensive training program for the LERF and use our standard Operator training methods.
- LERF Moodle training will not yet be ready for the Commissioning run.
- We plan to have core set of training complete for Spring run.
- Emphasis will be placed initially on how we will Operate this accelerator and how to be safe while doing so.