

**Conduct of Operations**  
**for the**  
**Accelerator Science {Experiment Name} Experiment**  
*{Experiment Date}*

**Updates and Revisions**

*{Date of change}*

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## 1. Preface

As part of its mission, Jefferson Lab provides the resources necessary for international collaborations of scientists to carry out basic research in nuclear physics and related disciplines. This research must be conducted in a manner that ensures environmental, safety and health (ES&H) concerns receive the highest consideration. At the same time, the programmatic goals of the lab require that it produce the highest quality physics results efficiently.

Guidance on how to balance thoughtful, measured ES&H concerns with efficient operation has been taken from the Director's Office, the Director's Safety Council, and the JLab ES&H Manual. A graded approach is followed in which the measures taken are matched to the scale, cost, complexity, and hazards of the operation.

The Conduct of Operations (COO) for Accelerator Science experiments outlines how the experiment collaboration will operate in a safe and effective manner during the time period that the {Experiment Name} experiment is on the floor. Installation periods are not covered by the Accelerator Science Experiment COO. This document is directed to experiment users, physics staff, and must be read, understood, and followed by all members of the collaboration.

## 2. Documentation

This experiment uses the standard facility's accelerator setup. All procedures to be used during the course of the experiment are contained in the following documents:

- The Accelerator Science Experiment Conduct of Operations (COO) for the {Experiment Name} Experiment
- Experiment Safety Assessment Document (ESAD) for the {Experiment Name} Experiment (referring to the base equipment as well as any experiment-specific changes)
- Radiation Safety Assessment Document (RSAD)
- Jefferson Lab Emergency Response Guidelines (ERG)

The present document shall hereafter be referred to as the **COO**. The Experiment Safety Assessment Document shall hereafter be referred to as the **ESAD**. The Radiation Safety Assessment Document shall hereafter be referred to as the **RSAD**. **ALL THREE DOCUMENTS ARE REQUIRED READING FOR SHIFT PERSONNEL**. Each shift taker will sign-off to acknowledge they have read the documents and participated in a walk-through. Reference copies of these documents are available in the respective control room (MCC Control Room – CEBAF experiments, MCC Control Room and LERF Control Room – LERF experiments, UITF Control Room) for the duration of the experiment. The COO, ESAD, and RSAD may also be available on the web at an experiment-specific website.

A full description of the physics motivation for the experiments, collaboration lists, and general plans for carrying out an experiment can be found in the proposal(s) to the JLab Program Advisory Committee (PAC).

### 3. Shift Personnel Training

#### 3.1. General Training Requirements

All personnel on shift are required to be current in the following JLab safety training:

- ES&H Orientation (SAF100)
- Radiation Worker I Training (SAF801)
- Oxygen Deficiency Hazard Training (SAF103)
- [Tunnel Worker Safety Orientation](#) (SAF132) – CEBAF experiments
- LERF Safety Awareness Walk-Through (SAF143kd) – LERF experiments

All experiment personnel are required to have radiation badges in their possession **at all times** in the CEBAF Tunnel or LERF vault. The Tunnel Worker Safety Orientation will emphasize hazards that are typical to normal CEBAF operations. The LERF Safety Awareness Walk-through will emphasize hazards that are typical of normal LERF operations. While there is currently no safety orientation training for the Upgrade Injector Test Facility (UITF), similar hazards such as ODH, fire, electrical and radiation can be communicated via SAF132 training.

Hazards which are unique to the experimental setup are addressed in the appendices of this document. All shift personnel will be trained in the safety procedures to be followed for access to the CEBAF or LERF or UITF complex. This training will include a brief discussion of the purpose and operation of the Personnel Safety System (PSS) for the CEBAF tunnel segments or the LERF vault. The UITF is only accessed in an “Open” state and does not possess a Controlled Access state like the other two complexes. A brief discussion will be given on UITF PSS state recognition and expectations.

Individuals participating in the experiment collaboration may be required to have other equipment or procedure-specific training. Training needs shall be determined by the experiment spokesperson in consultation with the Director of Accelerator Operations or the LERF Hall Leader or the UITF Hall Leader along with the Accelerator Division Safety Officer (DSO).

#### 3.2. Additional Training Requirements

Experiment personnel must familiarize themselves with the sections of the JLab ES&H Manual relevant for their work in the specific beam enclosures. A reference copy of this document is available in the respective control room (MCC Control Room – CEBAF experiments, MCC Control Room and LERF Control Room – LERF experiments, or UITF Control Room). It is also available via <http://www.jlab.org/ehs/ehsmanual/index.html>

### **3.2.1. Ladder Safety**

Prior to using a ladder at Jefferson Lab, you are required to take [Ladder Safety Awareness \(SAF307\)](#). If your task requires you to wear a safety harness to work from a position other than between the ladder rails, you may be required to take [Personal Fall Protection \(SAF202\)](#) and site specific [Fall Protection \(SAF202B\)](#). Please see your sponsor or supervisor.

### **3.2.2. Lead Safety**

Prior to handling lead bricks, sheets, pellets or solder, you are required to take [Lead Worker Safety Awareness \(SAF136\)](#).

### **3.2.3. Electrical Safety**

Prior to working on electrical equipment, beyond just plugging it into 120 Volts or below, you are required to take [Electrical Safety Awareness \(SAF603A\)](#). This training is required so that you can make a proper hazard assessment of the electrical equipment you are working on and know the requirements for locking out a piece of equipment prior to working on it.

If the staff/user will be switching a circuit breaker, switching a motor control center, switching a disconnect/safety switch, or switching a main disconnect on Class 2 or Class 3 equipment (contact equipment owner if unsure of equipment classification), you are required to take [Switching of Electrical Equipment \(SAF603S\)](#). This training applies only to electrical equipment in a closed cover scenario. [Arc Flash: Live to Tell \(SAF603N1\)](#) and [Electrical Safety: Beware the Bite \(SAF603N2\)](#) is required for any activity beyond simple switching of equipment.

If the staff/user will be performing maintenance on electrical or mechanical equipment which cannot be physically and verifiably isolated from an energy source, you are required to take [Lock, Tag, and Try \(SAF104\)](#).

## **3.3. High School and Undergraduate Students**

In addition to the above guidelines, JLab has special policies for high school and undergraduate students working in the CEBAF Tunnel or LERF Vault:

- No one under 18 (student or otherwise) may work in the CEBAF Tunnel, LERF Vault or LERF Labs or UITF Cave where tasks require medical qualifications (exposure to acids, lasers, hearing loss, radiation, etc.).
- No high school student may work outside regular working hours.
- Undergraduates working outside regular working hours must be pre-approved by the Division Safety Officer
- Graduate school students are considered users

During their first three months, working in conjunction with JLab or the JLab User community, undergraduate students 18 and over are permitted to work in the beam

enclosures (following all other aforementioned rules) **ONLY** under the supervision of an authorized mentor (i.e. a buddy); that person may not be another undergraduate. A fully trained JLab staff member or member of the JLab User community must be cognizant of the work to be done and must approve the authorized mentor that is supervising the undergraduate student. At the end of the 3-month “trial period”, undergraduates demonstrating that they are responsible and safety conscious are permitted to work in the beam enclosure or LERF Labs under the same guidelines that apply to other users.

## 4. Organization and Administration

### 4.1. Experiment Organization

The operation of the experiment is directed by the Experiment Lead Scientist(s) and the Experiment Hall Leader. The {**Experiment Name**} leadership structure is shown here (replace Example below and insert experiment functional organization flow chart):

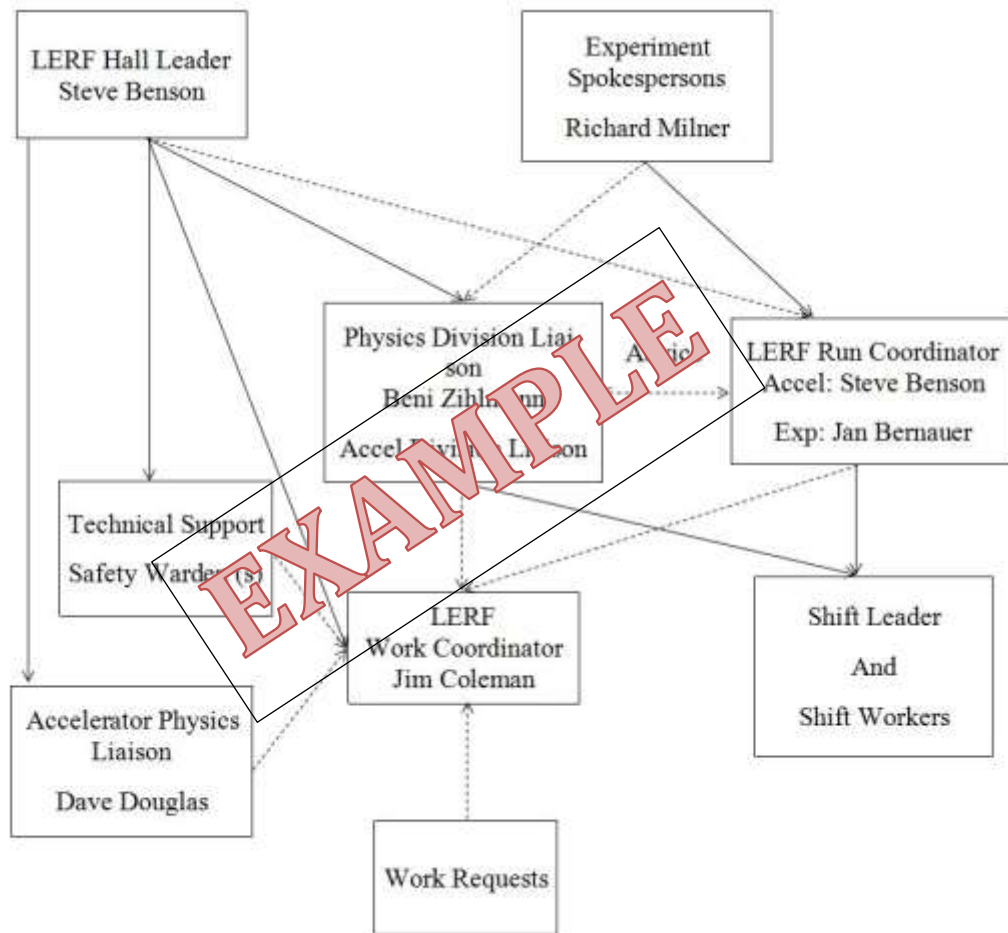


Figure 1: Functional Organization of the LERF Team. Dashed lines = information flow. Solid lines = responsibility.

#### **4.2. Director of Accelerator Operations (CEBAF)/Hall Leader (LERF and UITF)**

The Director of Accelerator Operations/Hall Leader (LERF and UITF) coordinates with a variety of internal stakeholders and outside entities to ensure that the intended facility best accommodates potential users and to ensure the operating program is well defined and supported with appropriate resources. Currently, the Director of Accelerator Operations/Hall Leader responsibilities include:

- Serve as the designated spokesperson for the facility.
- Set high-level programmatic goals and priorities in consultation with JLab Management and present those goals and priorities to the appropriate scheduling authority.
- Work directly with the Accelerator Division Leadership to approve potential outside funded experiments.
- Meet with representatives of potential outside-funded experiments to determine if their requirements are in line with the capabilities of the facility and help move appropriate experiments through the approval and scheduling process. This includes working directly with the Experiment Lead Scientist to address all safety and technical requirements for the experiment.
- Refer to the ESH&Q division for special review of any potential outside-funded experiment with requirements that fall outside the normal facility operating envelope as defined in the FSAD and facility ASE.
- Verify that all outside-funded experiments have completed the appropriate Experiment Safety Review Process before scheduling beam time.
- Present the appropriate safety documents for potential experiments to the Division Safety Officer (DSO) before moving to the design phase of the Experiment Review Process.
- Maintain programmatic balance for the facility by prioritizing activities and working with the various stakeholders.
- Maintain records for each experiment in an electronic database, including safety documentation such as the COO, ESAD, and LOSP as applicable.

#### **4.3. Experiment Lead Scientist/UITF Experiment Principal Investigator**

Each proposed Accelerator Science Experiment is required to have an associated Experiment Lead Scientist, who supplies all experiment-specific information necessary for the design and safety review process. The Experiment Lead Scientist is often a non-JLab employee. Responsibilities include:

- Work with experiment representatives and the Experiment Hall Leader to conduct a thorough design and safety analysis of all experiment equipment and proposed operating conditions, especially those unique to the experiment.
- Work with the Experiment Hall Leader to guide the experiment through all phases of the readiness and safety review process; including primary responsibility for completion of the steps defined in [ES&H Manual Chapter 3130 Accelerator Science Experiment Safety Review Process](#).



- Work with the Experiment Hall Leader to prepare and submit the final ESAD and COO for the experiment.
- Organize the experiment collaboration to fabricate any new experimental apparatus and develop the work control documents for reviewing, installing, commissioning, and operating the apparatus.
- Work with the area Work Coordinator to safely install any new experiment equipment.
- Organize the decommissioning of any equipment that is to be removed and arrange for removal at the conclusion of the experiment.

#### **4.4. CEBAF Program Deputy/LERF Run Coordinator (CEBAF and LERF only)**

CEBAF Program Deputies (PD) and LERF Run Coordinators are staff appointed by the Director of Accelerator Operations to serve for a two-week period during beam operations within a facility. During his or her tenure, the PD/LERF Run Coordinator is responsible for all shifts of the operating facility program they are in charge of and is expected to communicate with each shift on a daily basis to direct the scheduled program. The PD/LERF Run Coordinator keeps others informed of the program status by conducting/attending the CEBAF 0800 Daily Summary Meeting and commenting as appropriate; the LERF Run Coordinator also conducts the LERF 0830 Daily Summary Meeting. Detailed responsibilities are described in the respective Operation Directives for each accelerator facility ([AOD](#) or [LOD](#)).

#### **4.5. LERF Operations Coordinator (LERF only)**

The LERF Operations Coordinator organizes execution of the scheduled LERF program and addresses associated operational issues. This role requires a high level of familiarity with all aspects of the LERF program, including technical details of LERF accelerator operations and planned experiments. Detailed responsibilities are described in the LERF Operations Directives.

#### **4.6. Control Room Staff (Crew Chief and Operators)**

Facility control room staff are trained as Crew Chiefs, CEBAF Operators, LERF Operators, Laser Operators, Assigned Radiation Monitors (ARMs), and Safety System Operators (SSOs). Control room staff also includes the physicists, engineers, experimenters, and others who operate the machine controls to commission new hardware or software, diagnose problems, and perform specific experiments, test plans, or beam studies. All must comply with the directives specified herein, regardless of group or institutional affiliation.

CEBAF staffing requirements for normal operations are described in [Accelerator Operations Directives \(AOD\)](#). LERF staffing requirements for normal operations are

described in [LERF Operations Directives \(LOD\)](#). UITF staffing requirements for normal operations are described in [UITF Operation Directives \(UOD\)](#).

A listing of qualified staff is maintained on the MCC and LERF Information Bulletin Boards. The MCC Operations Group Leader posts this list of qualified Crew Chiefs, CEBAF Operators, LERF Operators, ARMs, and SSOs. The LERF Laser System Supervisor posts a list of the qualified FEL Laser Operators on the LERF Information Bulletin Board. The LERF Hall Leader posts a list of those qualified as a LERF Scientist on Shift (LSOS) also on the LERF Information Bulletin Board.

In addition to the usual accelerator operations control room staff, an Accelerator Site Security Guard must also be present during beam operations. The Accelerator Site Security Guard is responsible for performing specific duties related to accelerator operations.

#### **4.6.1. Crew Chief (CEBAF and LERF only)**

**NOTE:** Unless otherwise specified, the term Crew Chief is used throughout this document to refer to the on-duty Crew Chief. Under certain circumstances, staffing requirements may allow for the Crew Chief to be on-call, rather than on site.

The Crew Chief provides oversight responsibility for both the LERF and CEBAF accelerators. During LERF running, the Crew Chief determines which control room will be used for LERF operations (LERF or MCC). The Crew Chief helps guide the overall program execution for both the CEBAF and LERF accelerators.

The Crew Chief and Crew Chief On-Call roles are described in the [Accelerator Operations Directives \(AOD\)](#). A summary of Crew Chief LERF-related responsibilities is listed in the [LOD](#).

#### **4.6.2. Crew Chief On-Call (CEBAF and LERF only)**

A qualified Crew Chief is designated as the Crew Chief On-Call and is on duty 24 hours a day during the assigned period, when neither LERF nor CEBAF have a scheduled operations program (i.e., the control rooms are not staffed). The Crew Chief On-Call can be contacted at all times via the Crew Chief cell phone (630-7050). An online schedule of on-call assignments is maintained at <http://opweb.acc.jlab.org/internal/OPS/batphonepss.html> and posted in the Guard House. Responsibilities are defined in the [AOD](#).

#### **4.6.3. Operators (CEBAF Accelerator, LERF and UITF)**

The Operator (Accelerator, LERF or UITF) controls and monitors acceleration systems to deliver the beam required for scheduled and alternate beam programs. The on-duty Operator is supervised and directed by the Crew Chief (CEBAF and LERF only). Based on overall JLab priorities or in case of emergency situations, the Crew Chief may redirect the LERF Operator to other non-related duties at any

time; provided the LERF is first placed in a safe state of operation (Beam Off/Power Permit or lower).

When staffing does not require a Crew Chief to be present in the Control Room, the Operator assumes a more prominent role for oversight of the program within the Control Room. However, a Crew Chief On-Call will be available during these times should an issue arise that the Operator cannot address or due to procedural protocol. This does not apply to the UITF Control Room, as there is only the UITF Operator and they are the primary oversight of the program there. All control system manipulations that could affect electron beam must take place in the presence of the Operator (i.e. in the same control room), who can open channel access privileges to qualified staff as appropriate. All other manipulations under channel access that do not directly affect the electron beam delivery at the same time can be made remotely but must be made under the Operator's full knowledge.

LERF operations can be conducted from either the MCC Control Room or the LERF Control Room. When the Crew Chief is not available, the LERF Operator assumes a more prominent role for oversight of the program and control room staff. All LERF control system manipulations that could affect electron beam must take place in the presence of the LERF Operator (i.e., in the same control room), who can open channel access privileges to qualified staff as appropriate.

The CEBAF Operator cannot serve simultaneously as a LERF operator. When there is more than one Operator on shift, the Crew Chief designates a Lead Operator.

A summary of Accelerator Operator responsibilities are defined in the [AOD](#); LERF Operator responsibilities are defined in the [LOD](#) while UITF Operator responsibilities are defined in the [UOD](#).

#### **4.6.4. LERF Hot-Standby Operator**

The LERF Hot-Standby Operator is authorized to perform a limited subset of the regular duties of a LERF Operator during periods when the LERF PSS system state is Power Permit or lower. A LERF Hot-Standby Operator can simultaneously serve as a CEBAF Operator. Responsibilities are summarized in the [LOD](#) and in the [AOD](#).

### **4.7. Technical Support**

#### **4.7.1. Work Coordinator (CEBAF or LERF)**

Responsibilities include:

- Act as the single point of contact for all work in the assigned facility.

- Determine if scheduled activities can be safely accomplished. Coordinate these activities with Physics and Accelerator Division Liaisons and the Run Coordinator. Upload tasks into the [work task lists](#).
- Ensure workers are properly trained, familiar with all significant hazards, and aware of all applicable work control documents associated with the project.
- Coordinate with Physics and Accelerator Division Liaisons to ensure the LERF apparatus is in safe mode (e.g., turn OFF unused magnets, install protective shields as needed, fulfill specific requirements in the ESAD, etc.) before authorizing transition to Restricted Access.

#### **4.7.2. Geographic Integrator**

The Geographic Integrator helps coordinate system integration and readiness to meet the scheduled program. The Engineering Liaison serves as the primary communication point for the Geographic Integrator. Detailed responsibilities are described in the respective Operation Directives for each accelerator facility.

#### **4.7.3. System Owners**

System Owners oversee all aspects of an accelerator facility system (e.g., SRF, RF, magnets, BPMs) to assure system performance in support of the scheduled program. Detailed responsibilities are described in the respective Operation Directives for each accelerator facility.

### **4.8. Accelerator-Physics Experiment Liaison (APEL)**

The Accelerator Physicists Experiment Liaison serves as the primary contact on LERF beam physics issues for the Physics, Accelerator and Engineering Divisions. The Accelerator-Physics Experiment Liaison (APEL) is an accelerator scientist appointed by the Director of Accelerator Operations to serve as a liaison for the CEBAF or LERF programs. This liaison owns the process of establishing physics quality beam to the experiment including developing beam optics configurations capable of meeting the experiments requirements, identifying tools needed to diagnose, monitor and verify beam performance during the experiment as well as developing beam startup, setup and commissioning plans. Detailed responsibilities are described in the respective Operation Directives for each accelerator facility.

### **4.9. Accelerator Operations Liaison (CEBAF and LERF only)**

Both the CEBAF and LERF machines have an Accelerator Operators assigned as an Operations Liaison. The Operations Liaison helps facilitate information exchange between experimenters and the MCC Operations Group, both in advance of and during the experiments. The Operations Liaison is responsible for ensuring

experiment-specific information, procedures and requirements are available to all other operators and Crew Chiefs so that beam delivery can proceed efficiently.

An Accelerator Operator or Crew Chief is assigned as the Operations Liaison in order to serve as a link between experimenters and the Operations Group. Responsibilities include:

- Help facilitate information exchange between the experiment organization and the MCC Operations Group, both in advance of and during actual experiments.
- Remain engaged with the experiment organization, attend planning meetings, and proactively search for experiment-specific information to forward to the MCC Operations Group.
- Maintain and update experiment-specific binders within the MCC or LERF Control Rooms before the start of each experiment. Documentation includes ESAD, RSAD, COO and ERG. For LERF and UITF experiments, identical binders are located in the MCC Control Room (original documents) and the LERF or UITF Control Rooms (document copies).

#### **4.10. Engineering Liaison**

Each experiment conducted at JLab will be evaluated to determine if its complexity requires facilitation with the Engineering Division to help ensure a successful outcome. Experiments that require facilitation will be assigned an individual from the Engineering Division to act as liaison between the Division and the associated Experimental and Physics Division staff. The liaison acts as a single point contact in order to facilitate information exchange between the experimenters and those in the Engineering Division responsible for systems requirements, design, scheduling, fabrication, installation, testing, documentation, and budgeting. The liaison is aware of all work conducted by Engineering for the experiment and ensures the appropriate resources are defined and allocated. Any issues and/or concerns are identified, documented, and tracked. For the current run period, the review found that no such liaison was required.

## **5. Operating Procedures**

### **5.1. Shift Routines**

There are two types of shifts for active experiments. **Operating Shifts** are the normal status when beam is available for the experiment. **Standby Shifts** are periods designated by the LERF Run Coordinator when beam is not available or not in use in the LERF and certain equipment (RF, magnets, or target) requires continuous monitoring. Standby status may result from normal operational planning or from abnormal conditions such as a major down time due to equipment failure. All staffing requirements are defined in the associated facility Conduct of Operations document (AOD, LOD or UOD) as well as within the respective Accelerator Safety Envelopes (ASE's).

### **5.1.1. Operating Shifts**

Full-time occupation of the accelerator Control Rooms and its associated areas will be maintained during each of the three 8 hour shifts as defined within the associated facility Conduct of Operations (AOD, LOD, or UOD).

#### **5.1.1.1. CEBAF Operating Shifts**

Accelerator operations refers to the activities associated with operating the CEBAF accelerator in order to carry out the scheduled program. CEBAF operations are conducted in or directed from the MCC by qualified staff as described in AOD Chapter 3.1 Personnel and Responsibilities. During beam delivery to the experimental halls, there is close coordination between the MCC Control Room staff and the personnel staffing the respective experimental hall control rooms. The Crew Chief can be reached in the MCC Control Room at 269-7045. The shift schedule may be available at {[experiment-specific website](#)}. The Program Deputy may also designate and supervise other teams for duties such as offline analysis. The current Program Deputy cell phone number is {(757) 876-7997}.

#### **5.1.1.2. LERF Operating Shifts**

One person per shift is designated as the Shift Leader. The number of persons assigned to a shift will depend on the tasks assigned during the shift but at least one LERF Operator shall be in attendance. A shift schedule will be posted in the LERF Control Room listing the times and names of personnel on shift and identifying the Shift Leader and LERF Run Coordinator. The Shift Leader can be reached at the LERF Control Room at 269-6662. The shift schedule may be available at {[experiment-specific website](#)}. The LERF Run Coordinator may also designate and supervise other teams for duties such as offline analysis. The current LERF Run Coordinator cell phone number is {(XXX) XXX-XXXX}.

#### **5.1.1.3. UITF Operating Shifts**

UITF operations refers to the activities associated with operating the UITF. UOD Chapter 3.1 UITF Operations Overview describes the roles and responsibilities of the operating staff and others involved with UITF program execution, provides protocol for critical event response, and lists directives that govern specific aspects of the conduct of operations. UITF operations are conducted from the UITF Control Room by authorized staff. The UITF Operator (the shift lead) controls and monitors the UITF beam acceleration systems. The UITF Operator can be reach in the UITF Control Room at {(757) 269-7354 or (757) 269-6142}.

### **5.1.2. Standby Shifts**

During Standby Shifts, standby shift personnel may not be required to be on site at JLab, but must be available through telephone contact to come in if needed. Gun conditioning is one example when personnel may not be required on site at JLab based on machine state or operability condition.

When an accelerator is in an operable state as defined in the ASE, minimum staffing is required. More restrictive staffing requirements may be defined within each of the facilities (refer to AOD, LOD or UOD as needed.) The LERF has a LERF Hot Standby Operator which can continuously monitor systems in the LERF from the MCC Control Room while the LERF is in Power Permit. This allows for systems, which may take a long time to regenerate, to be left in an ON state, but the machine is rendered incapable of delivering beam before the Hot Standby Operator takes over. Monitoring the target system can require the presence of a Target Operator on site at JLab during a standby shift. The Target Operator then also acts as Shift Leader.

The CEBAF Crew Chief, LERF Run Coordinator or UITF Facility Manager will ensure the shift checklist is executed at least once every 24 hours.

### **5.1.3. Operations Turnover**

The [electronic log book](#) is a very effective means of remotely obtaining information about experimental operations. Experimenters can log in remotely and view all logbook entries prior to commencing their shift. Information which can only be recorded in the paper logbook should be noted accordingly in the electronic logbook, and directly communicated between incoming and outgoing shift personnel.

Efficient and effective shift changeovers during experiment operation are enhanced by overlapping shifts. There are two standard shift-turnover (passdown) meetings for the Accelerator and LERF Operations crews: one for Crew Chiefs and one for operators. The shift-turnover meetings are held at the end of each shift so that the off-going control room crew can transfer information to the oncoming control room crew. Formal transfer of operator or Crew Chief responsibility takes place at the conclusion of the respective shift-turnover meeting, not when an operator or Crew Chief stamps in. The Operations shift-turnover meetings are held in the control room and usually last less than fifteen minutes. Attendance by anyone other than the members of the two affected shifts, the Program Deputy, and Operations Department leadership is discouraged.

Whenever possible, experiment shift leaders and workers are scheduled in shifts that are staggered by four hours, leading to an overlap of half a shift. If this is not the case, shift members must show up at least ten minutes prior to shift start and plan to stay ten minutes after for the purpose of information exchange to those



taking over the same tasks. In all cases, incoming shift leaders must discuss the experiment and facility status with the outgoing experiment shift leaders.

The shift-turnover meeting shall not be interrupted by telephone calls, pages, or by anyone outside the experiment or operations staff, except when the safety of personnel or the integrity of the facility are in jeopardy.

Since the UITF is a test facility, the need for a shift turnover meeting will be rare. The shift-turnover meetings are held at the end of each shift so that the off-going staff can transfer information to the oncoming staff.

The shift-turnover meetings are held in the UITF Control Room and usually last less than fifteen minutes.

#### **5.1.4. Timely Orders to Operators**

The initial run plan is the responsibility of the Program Deputy, the LERF Run Coordinator, or the UITF Facility Manager and shall be clearly recorded in the logbook. This plan specifies the tasks to be performed in the next 48 - 72 hours; including any special conditions or data runs, updated documentation and its location and/or alternate plans. Any changes to the run plan shall be recorded in the logbook and the white board in the MCC Conference Room, or the LERF Break Room. The UITF Facility Manager will communicate any orders or changes to the operational plan in the UITF Logbook under the “*Operational Plan for the Day.*”

#### **5.1.5. Operator Aid Postings**

The day-to-day schedule, contact instructions for key personnel, and any other information relevant to current activities are located on either the white board in the MCC Conference Room, the LERF Break Room, or in the UITF Logbook under “Operational Plan for the Day.” Shift personnel should consult the white board or appropriate logbook, especially at the beginning of their shift, to be aware of any updates to current running conditions.

Information pertaining to daily activities within the facility must be posted in the appropriate logbook Conference room whiteboard or on bulletin boards within the LERF or UITF control rooms or written on the white board at the entrance to either the LERF Vault or the UITF labyrinth entrance.

### **5.2. Access to the {**Experiment Name**} Experiment within the Experiment Facility**

Work in designated radiation areas will be carried out in accordance with the [JLab RadCon Manual](#). No material may be removed from the CEBAF Tunnel or the LERF Vault after beam delivery without proper approval from the [RadCon Group](#). There are no RadCon restrictions on removing items from the UITF caves after beam operation due to the low energy of the machine is insufficient to activate material.



After appropriate RadCon area surveys following normal operations, no experimenter is allowed in the CEBAF Tunnel or LERF Vault without being accompanied or informing operations shift personnel and checking in on a regular basis.

During a running experiment, the CEBAF Tunnel, or LERF vault will normally be in Beam Permit. When temporary access to the CEBAF Tunnel or LERF Vault is needed the Experiment Shift Leader can ask the MCC to bring the CEBAF Tunnel segment or the LERF Vault to Controlled Access. The same process follows in the UITF, however, the UITF caves can only be accessed in one Personnel Safety System state, Open State. If long-term access to the CEBAF Tunnel or LERF Vault is required, the Experiment Shift Leader may request the CEBAF Tunnel segment or the LERF vault be brought to Restricted Access. Such a request requires prior approval from the Physics Division Liaison, while the actual transition will be supervised by the area Work Coordinator.

Restricted Access or Open State (in UITF) is a state where delivery of beam and/or RF power is not permitted, and entry to and exit from the beam enclosures is not controlled by the Personnel Safety System. This is the normal state of the CEBAF Tunnel, LERF Vault and UITF caves when the accelerator is off. Access is “restricted” only in the sense that the facility’s beam enclosures are not open to the general public. Well-defined checklist procedures are to be followed whenever the beam enclosures are brought to and from Restricted Access (or Open State for UITF).

Restricted Access or Open State is the period when all major work must be completed in the beam enclosure. All activities require advanced planning and must be scheduled for resources and safe operation. In order to streamline activities in the beam enclosure and ensure everyone has ready access to the current status and requirements for work, there are two important resources:

- Single point of contact, which is the area Work Coordinator. All work must be scheduled through the area Work Coordinator.
- Information board at the entrance to the LERF Vault or UITF cave entrance.

The content on the information board is the responsibility of:

**LERF**

LERF Safety Wardens and the LERF Work Coordinator.

**UITF**

UITF Safety Warden, UITF Operator, UITF Work Coordinator or UITF Facility Manager

The information board will contain all critical information required for safe entry into the beam enclosure:

- A succinct, one page safety summary covering current safety hazards within the facility and mitigating measures (to be read by all persons working in the beam enclosure)
- Active Operational Safety Procedures (OSPs) and Temporary Operational Safety Procedures (TOSPs)
- Required temporary work permits (e.g., Radiation Work Permits)

- Current activities in the beam enclosure
- Points of contact
- Required training and safety equipment

### **5.3. Collaboration Request for Laboratory Resources**

The collaboration may request additional services from the Accelerator Division through the Accelerator Division Liaison. Alternatively, the collaboration may also request additional services from Accelerator or Engineering personnel through the Physics Division Liaison. These requests should be noted in the logbook. Some requests may require that an OSP or TOSP be developed. Major, abnormal, or unanticipated configuration modifications such as stacking or movement of significant shielding, unanticipated vacuum work, unanticipated beam line modifications, the replacement of a wire chamber, etc., require approval of the appropriate facility program manager (Director of Accelerator Operations or UITF Facility Manager along with the area Hall Leader), and the use of appropriate personnel. The area Hall Leader may require that an OSP or TOSP be prepared.

### **5.4. Scheduling of Work by Outside Groups**

Work in the beam enclosure that is to be performed by groups outside the collaboration such as survey and alignment, plant services, air conditioning, etc., must be scheduled so that it does not endanger personnel or equipment or interfere with the experiment. Non-emergency activities by these groups should be scheduled to coincide with planned accelerator maintenance periods. To maximize efficiency, the Program Deputy or LERF Run Coordinator (representing the collaboration) and the area Work Coordinator (representing the {Experiment Name} experiment) will concur on work scheduling. The area Work Coordinator's job is to coordinate activities in the accelerator facility so that work can take place smoothly and safely and to insure that multiple activities do not interfere. The area Work Coordinator and the Program Deputy (or the LERF Run Coordinator) will meet as needed to plan the work scheduled for the upcoming maintenance period. The product of this meeting will be a list of work in the accelerator facility, the required access state of the experimental area (Controlled or Restricted), appropriate work control documents, and educational or other safety measures (such as escorts) that are needed. The appropriate work scheduling tool (ATLis, UITFList or TATL) should be used for coordinating the cross-divisional work activities <http://www.jlab.org/listsites/>. Configuration changes as outlined above can affect site boundary dose and the production of airborne radioactivity. They require consulting with RadCon or ES&H personnel as appropriate.

### **5.5. Equipment Labeling**

The experiment and {Experiment Name} experiment equipment shall be properly labeled so it can be quickly identified by both shift and maintenance personnel. Proper labeling helps prevent incorrect operation or modification of equipment by non-experts and facilitates proper and efficient operation by qualified personnel.

Labeling also increases the likelihood that proper procedures will be followed in case of emergency. Improper labels should be corrected immediately if possible. Otherwise, the Shift Leader should be notified so that correct labeling can be requested from the qualified expert.

### **5.6. Independent Verification**

The Program Deputy or LERF Run Coordinator will provide the shift crew with a set of measures for checking the quality of the experimental data. The up-to-date {Experiment Name} shift checklist (and instructions) shall be made available to shift personnel at specific sites on the data acquisition computers. The checklist will be completed at least once per shift during operating shifts and once per day during standby shifts. Additional items may be added to the list by the Program Deputy or LERF Run Coordinator or subsystem experts. The area Work Coordinator provides more general checklists for closing the beam enclosure.

### **5.7. Logkeeping**

Shift personnel will update the electronic logbook, which serves as the record of the experiment. The quality of the information recorded in the logbook determines the utility of the data. All data recorded electronically will be referenced in the computer logbook with the appropriate run number and run information. All relevant activities are to be recorded, including all changes of experiment conditions and equipment failures.

Checklists performed using {Experiment Name} specific forms should also be scanned into the computer logbook when completed. The completed paper forms should be stored in a binder in the counting house. All deviations from normal operating parameters shall be recorded in the logbook.

The computer logbook will also serve as the primary reference for the determination of the operational efficiency of the experimental apparatus in the vault. As such, it is essential that it provide an accurate record of the capability of the equipment to carry out the intended research program. The computer logbook is the place of record for all safety issues and introductions of new or updated documentation and procedures.

## **Appendix A – Special Procedures for the Accelerator Science Experiment**

{List the special procedures for the Accelerator Science Experiment here. If none, state, “There are no special operating procedures for the Accelerator Science experiment.”}

## **Appendix B – Special Procedures for Base Equipment Commissioning**

Each shift requires an experiment shift leader and a shift worker, which are assigned according to the {Experiment Name} shift policy. The safe operation of the “standard” facility equipment is described in the facility’s shift documentation and/or Operation Safety Procedures (OSPs). Additional experts may be required to operate or monitor the operation of the specialized equipment.

## **Appendix C – Signature Sheet**

After reading this document, as well as the ESAD, RSAD, and ERG for this experiment, workers need to sign the signature sheet located in the "yellow binder" of the experiment specific documents. This binder can be found in the MCC Control Room and in the LERF Control Room. For experiments in the UTF, this specific binder is located only in the UTF Control Room.