

**ENCLOSURE 13**

**SHINE MEDICAL TECHNOLOGIES, LLC**

**SHINE MEDICAL TECHNOLOGIES, LLC APPLICATION FOR AN OPERATING LICENSE**

**LICENSED OPERATOR INITIAL TRAINING PROGRAM**

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## **1 INTRODUCTION**

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### **1.1 Purpose**

This program establishes and maintains an initial training program for personnel performing, verifying, or managing licensed operator activities to ensure that suitable proficiency is achieved.

### **1.2 Scope**

This program describes personnel selection, initial training, qualification, and licensing for Operations Department personnel. This program complies with the applicable portions of 10 CFR Part 55 and follows the guidance of ANSI/ANS-15.4-2016, "Selection and Training of Personnel for Research Reactors".

All requirements in this program for licensed operator candidates or trainees are applicable to senior licensed operator candidates or trainees.

Licensed operators will be enrolled into the requalification program within three months after their operating license is issued. Continuing training requirements are described in program 0300-09-02, Licensed Operator Continuing Training Program.

Operations Department personnel may have additional training requirements (e.g., general employee, site access, radiation worker, emergency response, and criticality safety) not described in this program. Additional training requirements are identified, administered, and maintained in accordance with their respective programs and procedures.

### **1.3 Overview**

The Training Manager is responsible for the implementation of this program, with support from the Operations Department.

Training may be implemented by SHINE personnel, subject matter experts, contract staff, and vendor representatives. The Training Department also oversees and reviews/approves vendor courses and topics as applicable.

In general, all programs and topics are administered through instruction, self-study, on-the-job training or vendor supplied efforts. Training is given in the venue and method that best promotes learning with a preference for performance-based methods.

All training material selected is approved by Operations and Training prior to implementation.

All training material is correlated with approved procedures, which reflect current design changes and modifications.

## **2 DEFINITIONS**

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### **2.1 Controls**

- 1) Apparatus and mechanisms, the manipulation of which directly affects the reactivity or power level of an Irradiation Unit (IU).
- 2) Apparatus and mechanisms, the manipulation of which could affect the chemical, physical, metallurgical, or nuclear process of the facility in such a manner as to affect the protection of health and safety against radiation.

- 2.2 Graded Approach to Training:** A method of streamlining parts of the systematic approach to training (SAT) process, tying each of the five phases of SAT together in more efficient information management.
- 2.3 On-the Job Training:** Performance-based training (conducted in environment that replicates as much as possible the actual task conditions) through which trainees learn how to perform a task, and the task related knowledge and skills
- 2.4 Simulation-Based Learning:** A technique to replace and amplify real experiences with guided ones, often “immersive” in nature, that evoke or replicate substantial aspects of the real world in a fully interactive fashion. Simulation-based learning may or may not include an actual simulation device.

### **3 RESPONSIBILITIES**

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#### **3.1 Licensed and Senior Licensed Operator Candidates / Trainees**

1. Attend training and complete training requirements as assigned.
2. Be cognizant of their personal training and qualification status and act in accordance with processes, procedures, and regulations.

#### **3.2 Operations Manager**

1. Responsible for the content of Operations Department training.
2. Assist the Training Manager as necessary to ensure that licensed operators participate in and complete the requirements of this program.
3. Schedule and conduct reviews of changes in the license, facility design, and operating procedures to determine the effect of the change on the operations training programs.
4. Ensure proper operator medical program administration. Ensure changes in license status are enacted and proper notification of regulatory authority is accomplished. Determine licensed operator and senior licensed operator limitations or conditions of licenses related to medical issues.

#### **3.3 Training Manager**

1. Responsible for overall implementation of this program, including scheduling and administering training and examinations, maintaining records, and scheduling.
2. Accountable for developing, implementing, and maintaining operations training programs, including the analysis and identification of functional areas requiring training and the development of training objectives.
3. Accountable for developing, implementing, and maintaining instructions for the uniform development and use of training material.
4. Assist in the preparation of training material, examinations, and retraining lectures or tutoring sessions.
5. Review the graded examinations with the operators and schedule any retraining indicated by the examination results.
6. Determine remediation plans for operators not meeting performance criteria for operator training programs. Perform reviews and audits of program content.

### **3.4 Instructors, Mentors, and Implementers**

1. Champion the processes and programs to which they are assigned and effectively communicate and enforce management expectations of each program.

## **4 TRAINING**

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Licensed operator initial training, which encompasses initial qualification and training for licensed operators and senior licensed operators, provides the means to train individuals in the knowledge, skills, and abilities needed to perform and achieve proficiency in conducting licensed activities. This program is developed using a Graded Approach to Training, complying with respective regulatory requirements applicable to the individual's position and responsibility.

### **4.1 Program Requirements**

The licensed operator initial training program meets the requirements of 10 CFR 55 and follows the guidance of ANSI/ANS-15.4-2016.

### **4.2 Analysis**

Licensed operator candidates receive training in the topics listed in Attachment A.

Training efforts involved in actual manipulation of facility equipment are conducted under the cognizance of a licensed operator.

### **4.3 Reactivity Manipulations**

Each licensed operator candidate will perform a minimum of five reactivity control manipulations with at least one startup and one shutdown of an IU.

Senior licensed operator candidates may receive credit for supervising and directing the performance of these activities, which will be considered as actual performance.

### **4.4 Exemptions**

4.4.1 Experienced personnel can be considered for exemption from the knowledge and skills portion of initial training. Management review of an individual's prior training records and job performance history provides data for this exemption. This review should consist of the following, or equivalent processes:

- An objective, technical interview of the candidate to determine work experience, history, qualifications and training. This interview process validates resume history and may include contact with previous supervisor(s).
- A review of previous training records and job performance history to determine training received and work accomplished.

4.4.2 The following should be conducted to verify the candidate possesses adequate knowledge and skills.

- An examination or oral board based on learning objectives for the training being exempted. It is not necessary to test all learning objectives.
- An evaluation to verify proficiency of skills necessary to perform the tasks for which training is being exempted. This evaluation may be based on the candidate performing or having performed the task satisfactorily, or it may be a technical "walk-through" or "talk-through" of the tasks.

4.4.3 The Operations Manager shall determine whether the candidate may receive credit for a portion of the initial training program via exemption. Documentation related to the exemption (e.g., examination records, previous training records, etc.) and the results of the Operations Manager determination shall be retained in the candidate's training records.

#### **4.5 Observation and Evaluation of Candidates**

The Training Manager or designee should schedule periodic observations of the candidates and their training.

Oral Boards should be scheduled during initial training to assess candidate progress at points designated by the Training Manager.

Examinations shall be scheduled by the Training Manager or designee.

An NRC Exam Eligibility Review meeting shall be conducted for each candidate to determine if they will sit for the NRC License Exam.

#### **4.6 Training Scope**

The scope of licensee training includes knowledge of topics listed in Attachment A. Sequence and methodology will be based upon training approach (e.g., self-study, classroom, mentoring, simulation) and the individual's previous experience.

Training schedule overview is listed in Attachment B.

The depth of the training is based on the trainees' performance. Training or experience elsewhere may be substituted for fundamentals training.

#### **4.7 Senior Licensed Operator Specific Training**

Senior licensed individuals require additional qualifications. These individuals receive additional training addressing cognitive knowledge and application capabilities in activities where supervisory skills and abilities are required.

The scope of senior licensed operator specific training includes knowledge of topics listed in Attachment A. Sequence and methodology will be based upon training approach (e.g., self-study, classroom, mentoring, simulation) and the individual's previous experience. The depth of the training is based on the trainees' performance. The identified topics are based on the requirements of 10 CFR 55.43 modified for applicability to SHINE.

The topics fit into the following general categories:

- Supervisory Skills
- Administrative Requirements and Procedures
- Emergency Operations

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## **5 MEDICAL CERTIFICATION**

Licensed operator candidates will successfully complete a medical examination and evaluation prior to initial licensing.

Licensed operator medical requirements follow the standards established in ANSI/ANS-15.4-2016, Selection and Training of Personnel for Research Reactors.

## **6 CANDIDATE SELECTION**

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Candidate selection will follow the guidelines established in ANSI/ANS-15.4-2016, Selection and Training of Personnel for Research Reactors. Additional selection criteria will be determined above and beyond the criteria listed and incorporated into individual job postings.

Operation Department supervisors shall have at least the qualifications required of personnel being supervised.

### **6.1 Licensed Operator**

Candidate should have a high-school diploma or have successfully completed a General Education Development (GED) test. Individuals without a high-school diploma or GED are not excluded. Previous job-related experience or education is considered.

### **6.2 Senior Licensed Operator (Instant)**

Candidate shall have a minimum of three years nuclear experience. A maximum of two years of full-time academic training may be substituted for two years of nuclear experience. Candidate shall have a high-school diploma or have successfully completed a GED test.

### **6.3 Senior Licensed Operator (Upgrade)**

Candidate shall have a minimum of one year experience as a licensed operator at the SHINE facility or meet the selection requirements for a senior licensed operator (instant) candidate. Candidate shall have a high-school diploma or have successfully completed a GED test.

## **7 EXAMINATIONS**

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### **7.1 Methods**

Demonstration of knowledge and proficiency is accomplished throughout the initial training program. Evaluation preferentially includes methods consistent with the training activity delivery method (i.e., a task performance in the field should be evaluated with an in-the-field performance).

The initial training program uses written, oral, and on-the-job evaluation methods to determine competencies. Administration is conducted at key points throughout the progression of the course or after specific training activities. Periodic written exams may be administered to check operator cognition throughout the program.

### **7.2 Acceptance Criteria and Review**

The acceptance criteria for all graded exams is 70% and all operators are required to complete each exam satisfactorily. Remediation training will be assigned if <70% and a reexamination exam given.

A score on any examination equal to or greater than 70% will require no formal remediation training.

The Training Manager or designee shall review the results of all exams including missed questions with the licensed operator candidates to ensure proper understanding.

## **8 TRAINING REVIEW AND EVALUATION**

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The Licensed Operator Initial Training Program is periodically evaluated and revised to reflect industry experience and to incorporate changes to the facility, procedures, regulations, and

quality assurance requirements and, if needed as determined by performance, by management for effectiveness.

Post training feedback is utilized during training and after each license class to make program improvements.

The Licensed Operator Initial Training Program is assessed at least once every three years by the Review and Audit Committee.

## **9 RECORDS**

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Both programmatic and individual training records are retained in accordance with the SHINE records management program. Records will be stored in the electronic data management system and may be in the form of attendance sheets, proficiency logs, or other suitable forms. The required information may be contained in single or multiple records, or a combination thereof.

Records of training and qualification of Operations Department personnel shall be maintained for the duration of the currently valid license.

### **9.1** Programmatic records should include:

- Training material
- Operational and written exams
- Program assessments

### **9.2** Individual records should include:

- On-the-Job training and qualifications (including reactivity manipulations)
- Operational and written exam scores
- Exemption documentation

## **10 REFERENCES**

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**10.1** NUREG-1537, Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors

**10.2** ANSI/ANS-15.4-2016, "Selection and Training of Personnel for Research Reactors"

**10.3** 0300-09-02, Licensed Operator Continuing Training Program



**ATTACHMENT A**

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**Licensed Training Material (LO, SLO)**

1. Nuclear theory and principles of operation (fundamentals of nuclear physics)
2. Design features (theory and principles of the radioisotope production process involving Special Nuclear Material (SNM), theory and principles of radioisotope extraction and purification process, critical control features and management measures required for each process involving SNM)
3. Facility design including safety and emergency systems and applicable operating characteristics
4. Reactivity, alterations and control systems
5. Uranium handling
6. Shielding
7. Operating procedures and limits
8. Emergency and abnormal operating procedures
9. Radiation monitoring
10. Radiation control and safety
11. Handling and Disposal of radioactive material
12. Authorizing Changes
13. Technical Specification
14. Other Facility Training as deemed applicable
15. Conditions of License (i.e., medical, proficiency, job observations)
16. Material Needed Based on Performance Deficiencies

**Senior Licensed Training Material (SLO)**

1. Conditions of facility license and limitations
2. Technical Specifications basis and operability
3. Procedures and authority to make changes
4. Radiation hazards
5. Assessment of facility conditions
6. Supervisory training
7. Emergency Plan
8. Security Plan

**ATTACHMENT B**

Initial License Training Schedule Overview (Durations are Estimates)

Training Course / Activity	Duration
Fundamentals / Training	6 Weeks
Administrative Requirements	1 Week
Radiation Protection	1 Week
Systems Training	6 Weeks
Plant Evolutions	6 Weeks
Pre-NRC Exam	6 Weeks
Supervisory Training (Senior Licensed only)	4 Weeks