

December 4, 2009

MEMORANDUM TO: Frederick D. Brown, Director
Division of Inspection and Regional Support (DIRS)
Office of Nuclear Reactor Regulation

FROM: John McHale, Chief **/RA/**
Operator Licensing Branch (IOLB)
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE NOVEMBER 23, 2009, PUBLIC MEETING
WITH THE INSTITUTE OF NUCLEAR POWER OPERATIONS
TO DISCUSS GUIDELINES FOR INITIAL TRAINING AND
QUALIFICATION OF LICENSED OPERATORS

On November 23, 2009, the IOLB staff conducted a public meeting with the Institute of Nuclear Power Operations (INPO) at NRC Headquarters in Rockville, Maryland. INPO had requested the meeting to review a proposed revision to the licensed operator eligibility criteria that are described in ACAD-09-001 (formerly ACAD-00-003), "Guidelines for Initial Training and Qualification of Licensed Operators," a document published by the National Academy for Nuclear Training. This meeting was a follow-up to a previous public meeting on the same subject held on July 13, 2009; a summary of that meeting can be found in the NRC's Agencywide Documents Access and Management System (ADAMS) at accession number ML092151007. Enclosure 1 identifies the meeting participants.

The INPO representatives led the discussion by reviewing the summary of significant changes (Enclosure 2) that are planned for ACAD-10-00X (Enclosure 3), which will replace ACAD-09-001 when it is published early next year. Most of the changes involve the addition and clarification of definitions to improve consistency with other regulatory and guidance documents (e.g., ANSI/ANS-3.1, "American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plants") and changes to the flowcharts used by facility licensees to determine whether reactor operator (RO) and direct senior reactor operator (SRO) candidates are eligible to enter the license training program.

The staff continued to support INPO's initiative, including the addition of a "direct RO" flow-path to Figure 2-1, merging the flowcharts for degreed plant staff engineers (Figure 2-3) and degreed supervisors and non-licensed operators (Figure 2-4), allowing all RO and direct SRO applicants to receive up to 18 months of experiential credit based on academic equivalence or related technical training, and encouraging the development of structured orientation programs that would count toward the 6 months of required on-site experience for all license applicants. However, the staff did offer the following specific comments for INPO to consider when preparing the final ACAD revision: (1) the flowcharts use the term "BS degree or equivalent" but it is not defined (Is it the same as ANSI/ANS-3.1?); (2) it should be clear that an applicant who receives 18 months of experiential credit for an BS degree is not eligible for additional credit based on related technical training; (3) the definition of "qualified non-licensed operator" is not consistent with the use of the term in the flowcharts in that the time starts with the first watch qualification rather than the last; (4) references to "active" RO experience in Figure 2-2 should

be qualified as explained in ES-202, D.2.a(2) of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors;" and (5) new Figure 2-3 could include a provision for applicants with experience at a non-comparable commercial power reactor to receive partial credit as they do in Figures 2-2 and 2-4.

No final positions were taken during the meeting, but the staff did agree to consider the need for possible clarifications to NUREG-1021 or other regulatory documents to endorse and implement the revised eligibility criteria. INPO agreed to consider the staff's input and may request another meeting prior to finalizing its ACAD revision.

Please let me know if you have any questions.

Enclosures: As stated

CONTACT: Fred Guenther, NRR/DIRS/IOLB
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Standards for Power Reactors;” and (5) new Figure 2-3 could include a provision for applicants with experience at a non-comparable commercial power reactor to receive partial credit as they do in Figures 2-2 and 2-4.

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Please let me know if you have any questions.

Enclosures: As stated

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ATTENDEES
INPO-NRC Public Meeting, November 23, 2009

Institute of Nuclear Power Operations

Kent Hamlin
Mike Llewellyn

Industry (Operator Licensing Focus Group)

Gregg Ludlam

Nuclear Energy Institute

John Butler

Nuclear Regulatory Commission

John McHale
John Munro
Fred Guenther
Rick Pelton
Jim Kellum
Malcolm Widmann*
Hironori Peterson*

* Via teleconference

Enclosure 1

**COMMENT INCORPORATION – SIGNIFICANT CHANGES IN THIS PROPOSED REVISION
(ACAD 10-00X) AS COMPARED TO EXISTING ACAD 09-001**

1. Defined the timing for incorporating this new Guideline to allow use of either the current ACAD 09-001 or this new Guideline ACAD 10-00X **during 2010**. The new Guideline ACAD 10-00X will supersede ACAD 09-001 on January 1, 2011. This will allow use of the new Guideline for new classes forming during 2010 while acknowledging classes formed in 2009 under the current Guideline ACAD 09-001, thus minimizing confusion when signing FORM 398. **[Need to discuss NUREG 1021 changes or FAQ necessary to support this]**
2. Added new section 2.3, “Definitions,” as suggested in previous meetings with NRC personnel. Definitions are consistent with current regulatory (RG 1.8) and ANS guidance.
3. Based on industry experience and LOFG and NRC personnel feedback, we have defined and outlined an SRO orientation program (in new Appendix A). It is defined such that time spent in a formal orientation program counts towards the 6-month onsite requirement for all flowcharts. Excerpt of this section of Appendix A is as follows:
 - **Successful Preparation of Direct SRO Candidates.** A common weakness with direct SRO candidate throughput is loss of candidates because they do not have sufficiently broad plant system, plant layout, overall plant operations, and plant organizational structure and management knowledge to be successful in licensing class. Consideration should be given to implementing a planned orientation program that includes of the following attributes:
 - Planned observation of operating crews to familiarize candidates with plant systems, plant orientation, and the conduct of operations.
 - Planned observation various site departments, such as work management, clearance and tagging, and outage planning, to familiarize candidates with operations interfaces and responsibilities associated with these functions.
 - Planned interviews with plant support departments to familiarize candidates with plant administrative functions such as corrective action processes, operating experience use, industrial safety expectations, and nuclear oversight functions

Track candidate progress during this orientation by suitable means such as qualification cards and line management mentoring/oversight. Fulfillment of the objectives should be verified by appropriate evaluation methods such checkouts or oral boards.
4. We have added a new expectation for use of the flowcharts in this guideline that states “It is the expectation of the National Academy for Nuclear Training that every effort be made to meet the eligibility requirements as outlined in this guideline. As such, deviations should be infrequent and occur only after careful and thorough examination for need.” The purpose for this statement of expectation is to encourage better long-range operator workforce planning by INPO members, and to reduce the number of waivers received by NRC personnel.

Enclosure 2

5. The clarifying notes for the revised flowcharts (originally intended only to facilitate LOFG/NEI/INPO/NRC discussion) have been retained and inserted into the ACAD, as suggested previously by LOFG, NEI, and NRC personnel.
6. Summary of significant flowchart changes:

a. Figure 2-1, Reactor Operator Eligibility

- Academic equivalency credit commensurate with that allowed for SRO candidates is established for “Power Plant Experience” credit in Flowchart 2-1, Reactor Operator Eligibility. Academic credit for appropriate associate degrees added for the RO.
- Concept of a “direct RO” incorporated into Flowchart 2-1, Reactor Operator Eligibility. This concept allows previous experience as a military RO (or equivalent), RO at another plant, or NLO at another plant to apply towards eligibility. Military credit aligns with that for the direct SRO.

b. Figure 2-3, Senior Reactor Operator Eligibility- Direct SRO for Degreed Personnel

- Combines current Figures 2.3 and 2.4 into one flowchart.
- Increases the amount of time for the degreed engineer in the specific engineering population from the currently-required 12 months to 18 months for SRO eligibility. Eliminates requirement for enrollment in engineering accredited training population.
- Decreases the amount of time for the degreed engineer in “Power Plant Staff” positions from the currently-required 36 months to 18 months for SRO eligibility.
- Decreases the amount of time for the qualified NLO from the currently-required 36 months to 18 months for SRO eligibility.

Draft Guideline ACAD-10-00X
“Guidelines for Initial Training and
Qualification of Licensed Operators”



DRAFT Guideline

Enclosure 3

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ACAD 10-00X
[Month] 2010

Guidelines for Initial Training and Qualification of Licensed Operators

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FOREWORD

These guidelines, used in conjunction with plant-specific job and task analyses, provide the framework for a training and qualification program for reactor operators and senior reactor operators at nuclear power plants. Reactor operators are responsible for operating nuclear plant reactivity controls from a main control room, and senior reactor operators direct the activities of licensed operators.

This document supersedes ACAD 09-001, (January 2009), *Guidelines for Initial Training and Qualification of Licensed Operators* on January 1, 2011. Until January 1, 2011, either ACAD may be used as the basis for initial licensed operator training and qualification.

This guideline addresses the following:

- the licensing of reactor operators and senior reactor operators for operating existing nuclear power plants
- the licensing of reactor operators and senior reactor operators for initial startup and operation of newly constructed nuclear power plants (cold licensing)

The experience and education guidance for the selection of reactor operators and senior reactor operators of existing nuclear power plants, described in Section 2.0, has been updated with new reactor operator and direct senior reactor operator (for degreed personnel) eligibility flowcharts. Clarifying notes for flowchart use have been added to help INPO members consistently implement the flowcharts. A new section defining the terms used in the flowcharts was also added to improve understanding and consistency in determining initial licensed operator eligibility.

The curriculum for reactor operators and senior reactor operators (sections 3.0 and 4.0) remains unchanged from the superseded guideline.

The evaluation of candidates described in Section 5.0 remains unchanged from the superseded guideline.

The cold licensing of new plant operators described in Section 6.0 remains unchanged from the superseded guideline.

This guideline incorporates the recent learning from additional industry operating experience and continual industry review of licensed operator training program success factors and key elements. A new Appendix A has been added to this guideline to describe key success factors for licensed operator initial training.

Members of the National Academy for Nuclear Training (NANT) should use these guidelines in conjunction with plant-specific job and task analysis results when establishing, upgrading, or validating reactor operator and senior reactor operator training programs. Use plant-specific information to select appropriate training program content and to reflect unique job duties, equipment, operating experience, and candidate entry qualifications.

Members of NANT may use different approaches or methods than those defined herein, but members are expected to meet the intent of the guidelines. Members should note that these guidelines are referenced by Nuclear Regulatory Commission (NRC) personnel when

determining the eligibility of candidates for licensing, as described in NUREG 1021, *Operator Licensing Examination Standards for Power Reactors*. As such, proposed deviations from these guidelines for operator license candidate eligibility should be discussed with appropriate NRC operator licensing personnel early in the candidate selection process. It is the expectation of the National Academy for Nuclear Training that every effort be made to meet the eligibility requirements as outlined in this guideline. As such, deviations should be infrequent and occur only after careful and thorough examination for need.

INPO and the National Academy for Nuclear Training welcome suggestions for improving these guidelines as members gain experience in their use.

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1.0 INTRODUCTION

This document provides guidelines for the development of initial reactor operator and senior reactor operator training and qualification programs. Although these guidelines

use the terms *reactor operator* and *senior reactor operator*, operations department organizations, job classifications, titles, and responsibilities vary among plants.

Candidates must meet the medical requirements outlined in industry standards and regulatory requirements.

These guidelines describe major subject areas and topics to define the reactor operator and senior reactor operator training and qualification programs. Plants should determine the plant-specific content of each program and the associated subject areas and topics in the design phase of the training program.

The sequence and methods of training are established during the design phase of the training program. Training programs may use the classroom, simulator, and laboratory as well as the plant to train and qualify candidates effectively for licensed operator positions. Information regarding training design and development can be found in INPO 85-006, *Principles of Training System Development*. The continuing training program for licensed operators is discussed in INPO 07-001, *Guidelines for Continuing Training of Licensed Personnel*.

2.0 EDUCATION AND EXPERIENCE

The educational and experience requirements in this document are based on those requirements initially developed as a result of the lessons learned from the reactor accident at Three Mile Island Nuclear Station Unit 2. The experience requirements may be met by experience gained at the site reactor, other commercial reactors, military reactors, or other large-scale reactors. In all cases, they are a combination of both experience and education requirements.

2.1 Reactor Operator (RO) Education and Experience Eligibility Requirements

2.1.1 Education – The candidate should possess a high school diploma or equivalency certificate.

2.1.2 Experience – The candidate should have at least three years of power plant experience, as defined by Figure 2-1, and at least six months at the facility for which the license is being sought. Additional nonlicensed operator, commercial reactor operator, or military reactor operator experience is required as defined in figure 2-1.

2.2 Senior Reactor Operator (SRO) Education and Experience Eligibility Requirements

Candidates with a current reactor operator license at a nuclear plant are considered to be *RO upgrade* candidates. All other candidates, including those who have held licenses at other commercial nuclear plants, are considered to be *direct SRO* candidates.

2.2.1 Education – All candidates should possess a high school diploma or equivalency certificate.

2.2.2 Experience – All candidates should spend at least six months at the facility for which the license is being sought. Eligible candidates for senior reactor operator fall into five general categories:

- individuals with current experience as licensed reactor operators at the candidates' site - Personnel in this group are considered *RO upgrade* candidates. (See Figure 2-2.)
- individuals with equivalent experience as licensed reactor operators at other commercial or military reactors—(Experience at other large-scale reactors may also qualify on a case basis.) Personnel in this group are considered *direct SRO* candidates. (See Figure 2-2.)
- individuals with engineering degrees or the equivalent and who have had experience as power plant staff. These candidates are all *direct SRO* candidates. (See Figure 2-3.)
- individuals who have significant experience as senior reactor operator certified instructors involved in the training and evaluation of licensed operators at commercial nuclear plants—These individuals maintain their technical skills current through continuing training, including licensed operator continuing training, in-plant activities, and appropriate time on the simulator. These candidates are all *direct SRO* candidates. (See Figure 2-4.)

Carefully evaluate, using the flowcharts in this section, the education and experience of license candidates.

2.3 **Definitions**

2.3.1 **Power Plant Experience** -- Applicable work performed in fossil-fueled or nuclear fueled electric power production plant during preoperational, startup testing, or operational activities. Note that periods of observation of others performing work do not count towards power plant experience time.

2.3.2 **Responsible Nuclear Power Plant Experience** -- Responsible nuclear power plant experience for a Senior Reactor Operator (SRO) is having actively performed as a licensed nuclear control room operator (RO) or as power plant staff (described below) involved in the day-to-day activities at a commercial nuclear power plant facility.

2.3.3 **Power Plant Staff** – A manager, supervisor, or staff engineer responsible for the coordination and implementation of any of the following at the current or a comparable (BWR/PWR) facility:

- plant equipment controls,
- integrated operations procedures,
- operations,
- maintenance,
- radiological support,
- plant modifications
- maintenance planning
- work control
- chemistry

- accredited training

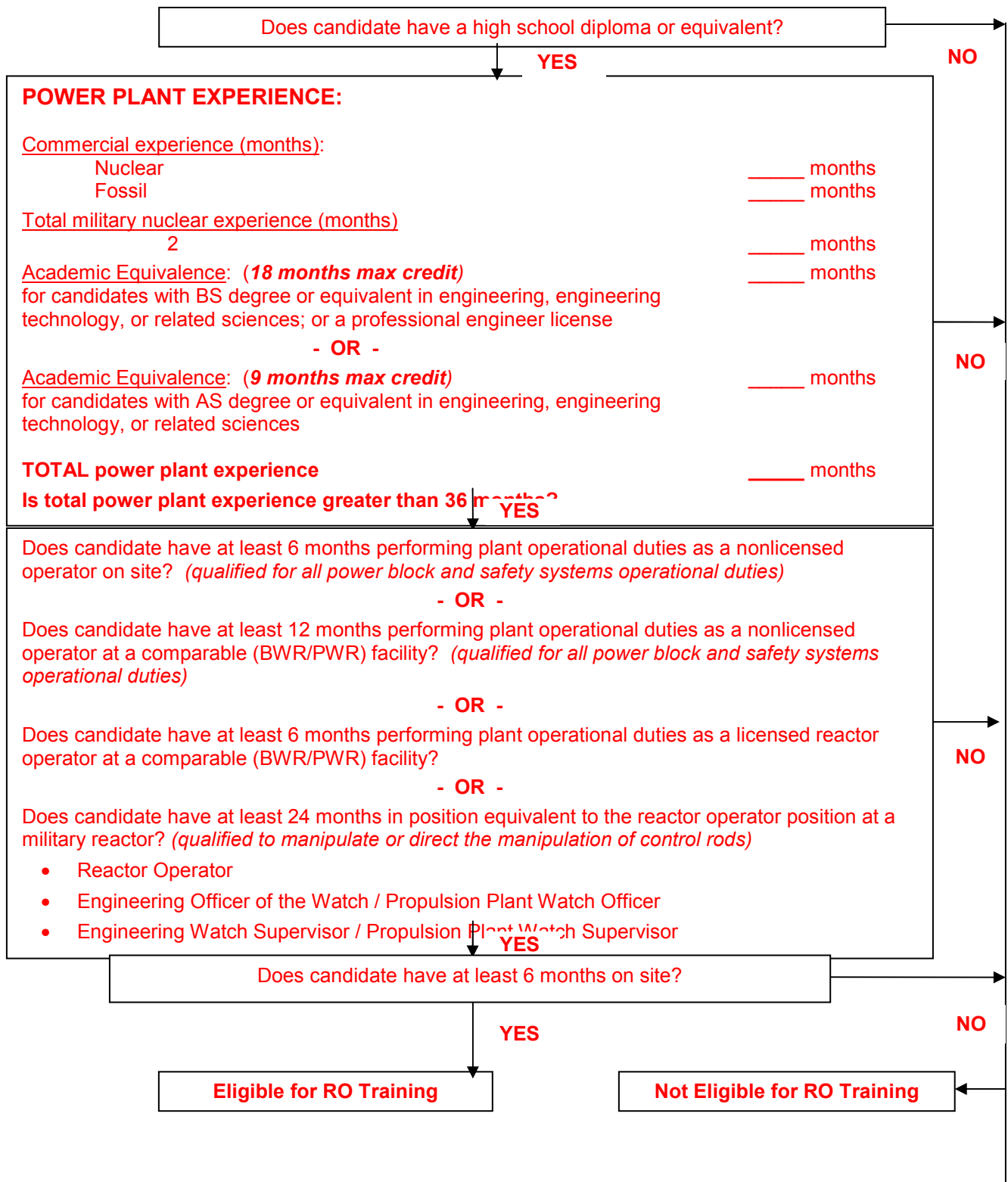
2.3.4 **Total Military Nuclear Experience** -- the start date for calculating total military nuclear experience is that date when military nuclear power plant-related initial training is completed. For United States Navy personnel, this is the date that the candidate graduates from nuclear power school prototype training. For other military personnel, similar dates for candidate training completion are used for calculation. End dates are calculated using military discharge dates or dates the candidate transferred to a non-nuclear power plant military position.

2.3.5 **Qualified Nonlicensed Operator** -- Qualified for all power block and safety systems operations/watchstations. Time required by any flowchart as a qualified nonlicensed operator can start from the first day the first such power block or safety system operation qualification is attained, but all power block and safety system operations/watchstation qualifications must be attained prior to becoming eligible for RO or SRO candidacy.

2.3.6 **Comparable (BWR/PWR) Facility** --a commercial power reactor of either BWR or PWR design regardless of vendor or vintage within that reactor design type.

2.3.7 **Six Month On Site Requirement** -- Time spent in plant access, radworker, and utility new employee training cannot be counted towards the six month requirement. Time spent in a planned licensed operator orientation program **for the RO or SRO , such** as that described in Appendix A, can be counted towards this six month on site requirement for all flowcharts.

Figure 2-1: Reactor Operator Eligibility



NOTES:

These notes are intended to help clarify flowchart implementation.

1. This flowchart aligns with direct SRO flowchart in that it allows 18 months academic credit towards the 36 month Power Plant Experience requirement for RO candidates with BS degree or equivalent in engineering, engineering technology, or related sciences; or a professional engineer license.
2. This flowchart allows 9 months academic credit towards the 36 month Power Plant Experience requirement for RO candidates with AS degree or equivalent in engineering, engineering technology, or related sciences.
3. The 6-months onsite requirement for the RO candidate matches that required for the SRO candidate. This is consistent with ANS 3.1 which requires 6-months onsite for the RO candidate.
4. This flowchart allows candidates (1) with military ≥ 24 months as an RO or direct supervisor of an RO - **or** – (2) those candidates qualified for ≥ 12 months as an NLO at a comparable facility - **or** – (3) those candidates with a prior RO license for ≥ 6 months at a comparable facility, to **NOT** have to qualify as an NLO at the facility for which RO license is sought. These candidates would be allowed to enter RO program once they meet the 6 months onsite requirement.
5. A BS degree candidate hired upon graduation would need 18 months additional power plant experience (to get to 36 months required) and, during that 18-month period, would need to qualify and spend at least 6 months as a qualified NLO.
6. An AS-degree candidate hired upon graduation would need 27 months additional power plant experience (to get to the 36 months required) and during that 27-month period, would need to qualify and spend at least 6 months as a qualified NLO.

Figure 2-2: Senior Reactor Operator Eligibility, RO Upgrade or Direct SRO, Licensed Reactor Operator or Military Equivalent

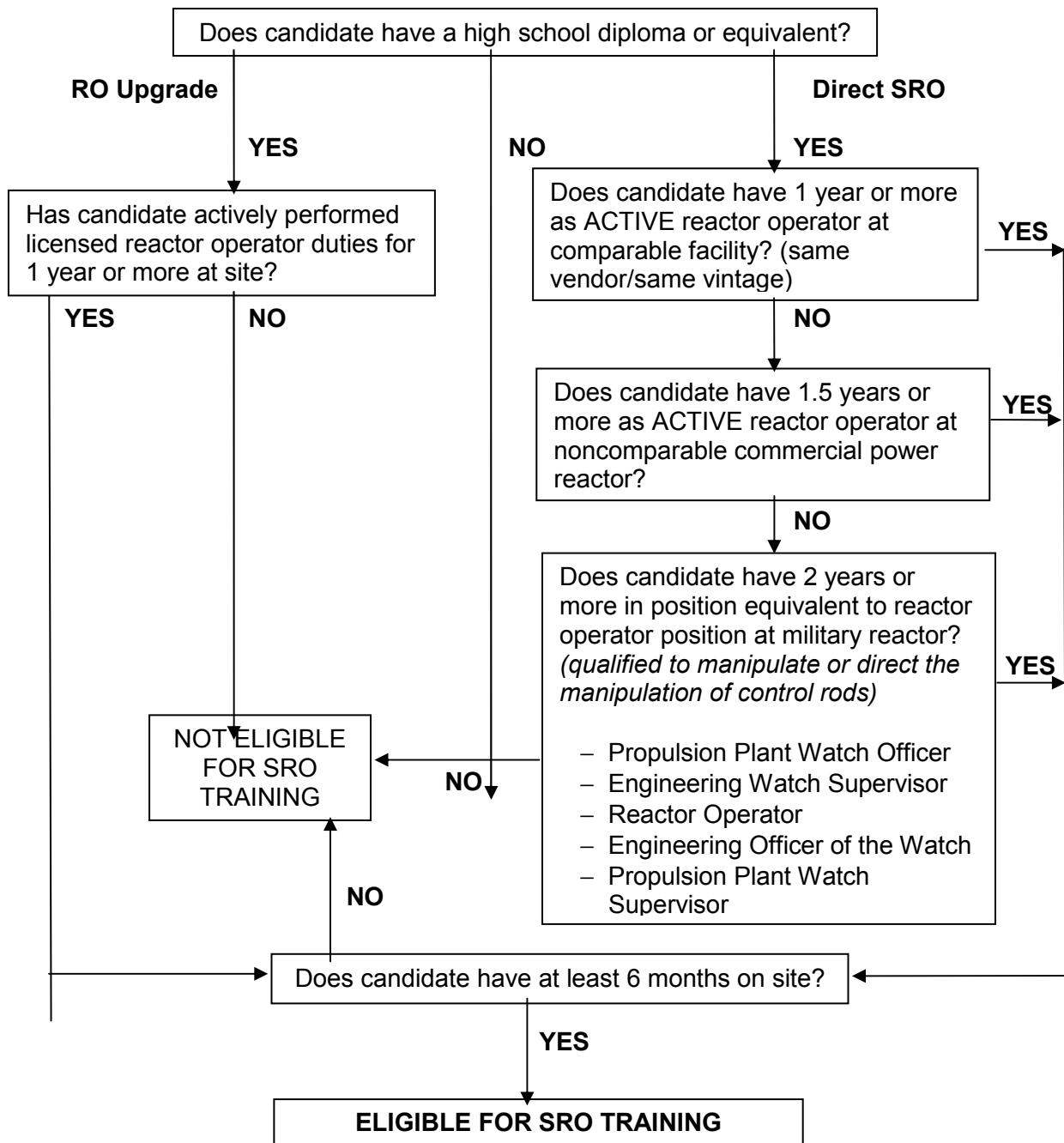
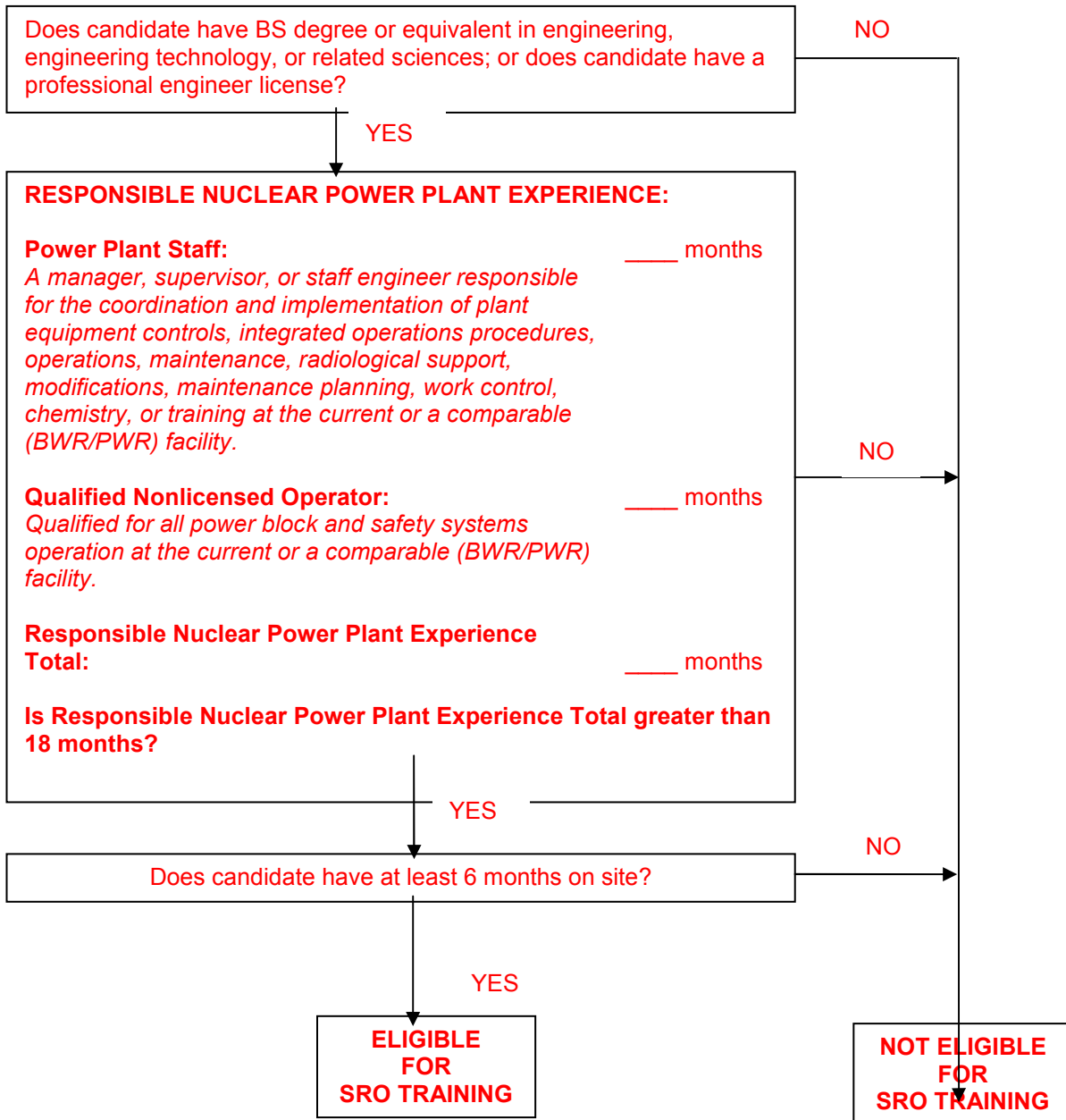


Figure 2-3: Senior Reactor Operator Eligibility - Direct SRO for Degreed Personnel

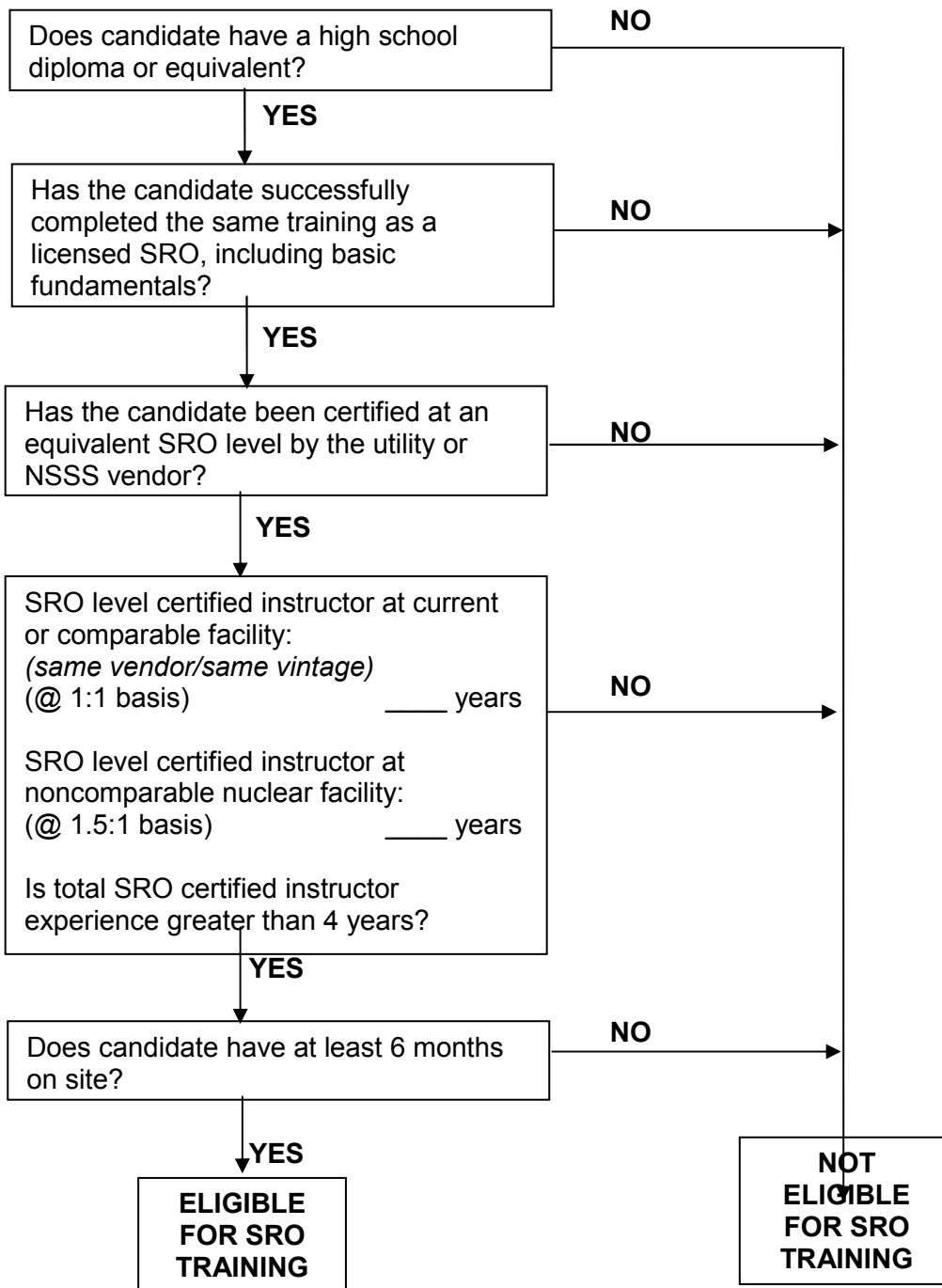


FLOWCHART NOTES:

These notes are intended to help clarify flowchart implementation.

1. This flowchart combines current Figure 2.3 and 2.4 flowcharts of the previous ACAD version into one flowchart.
2. A college graduate with the specified BS degree hired upon graduation into a position covered under the definition of “Power Plant Staff” would be eligible to enter SRO training in 18 months onsite (would meet 6 months onsite within this period).
3. An experienced “Power Plant Staff” employee with the specified BS degree who is hired from another utility from a similar reactor type (BWR/PWR) and has 18 or more months in a “Power Plant Staff” position at the other utility would be eligible for SRO training after meeting the 6 months onsite criteria. If from a different reactor type – they must meet 18 months performing “Power Plant Staff” duties at the site before they are eligible for SRO training (would meet 6 months onsite within this period).
4. An experienced “Qualified NLO” employee with the specified BS degree who is hired from another utility from a similar reactor type (BWR/PWR) and has 18 or more as a “Qualified NLO” would be eligible for SRO training after meeting the 6 months onsite criteria. If from a different reactor type – they must meet 18 months performing “Power Plant Staff” duties (or may opt to qualify as an NLO and spend 18 months of “Qualified NLO” duties at the site) before they are eligible for SRO training (would meet 6 months onsite within this period).
5. An experienced employee with the specified BS degree who is hired from another utility from a similar reactor type (BWR/PWR) who has a **combination** of both “Power Plant Staff” time and “Qualified NLO” time that is equal to or greater than 18 months would be eligible for SRO training after meeting the 6 months onsite criteria. If from a different reactor type – they must meet 18 months performing “Power Plant Staff” duties or “Qualified NLO” duties at the site before he/she is eligible for SRO training (would meet 6 months onsite within this period).
6. An experienced employee with the specified BS degree who is hired from another utility from a similar reactor type (BWR/PWR) who has a **combination** of both “Power Plant Staff” time and “Qualified NLO” time that is less than 18 months would be eligible for SRO training after completing the remaining time necessary to fulfill the 18 month criteria in a “Power Plant Staff” or “Qualified NLO” position at the new site. They must also meet the 6 months onsite criteria.
7. Military personnel with the specified BS degree and military reactor operator experience (qualified in the military to manipulate control rods or supervise the manipulation of control rods) would use flowchart 2.2 to determine direct SRO eligibility. If not in those positions in the military, the employee may use flowchart 2.3 with no credits for military time and would need 18 months in a “Power Plant Staff” position or 18 months as a “Qualified NLO” before becoming eligible for SRO training.
8. If an employee completes the specified BS degree during their employment in a “Power Plant Staff” or “Qualified NLO” position, time spent in that position prior to obtaining the degree will count towards the 18 months needed for SRO eligibility. Also, time spent in a “Power Plant Staff” or “Qualified NLO” position at another utility with similar reactor type (BWR/PWR) would count towards the 18 month requirement. Time spent in a “Power Plant Staff” or “Qualified NLO” position at another utility with a dissimilar reactor type will not count.

Figure 2-4: Senior Reactor Operator Eligibility, Direct SRO, SRO-Certified Instructor



Sections Remaining Unchanged From the Current ACAD 09-001 and; Therefore, Not Included In This Review Version:

- 3.0 Reactor Operator Training and Qualification Program,
- 4.0 Senior Reactor Operator Training and Qualification Program,
- 5.0 License Candidate Evaluation
- 6.0 Reactor Operator and Senior Reactor Operator Candidate Education, Experience, and Training Requirements for Initial Startup and Operation of New Construction Plants (Cold Licensing)