
Charter: Operator Licensing Process for Cold Plants

Part B Tasks & Recommendations

Following administration of the first AP1000 exams

Date of Report: Part B (September 5, 2018)

Charter: Operator Licensing Process for Cold Plants

The U.S. Nuclear Regulatory Commission (NRC) established the “Charter for Enhancing the Nuclear Regulatory Commission Cold Operator Licensing Process” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17010A081) on April 14, 2017, for a Task Team (the “team”) to formulate and develop near- and long-term recommendations to enhance the operator licensing process for cold plants (i.e., plants under construction).

The Charter was divided into two parts, Part A and Part B. Part A tasks pertain to short-term needs associated with incomplete aspects of the operator licensing process at Vogtle, such as completion of requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) 55.31(a)(4), applicant notification of examination results, inspections and audits required before operator license issuance, and license issuance. Part B tasks pertain to lessons learned during operator licensing examinations administered at Vogtle and V.C. Summer, such as examination development and administration and areas for longer term generic evaluation and resolution to improve the overall efficiency of the operator licensing process at plants under construction.

Charter Team Activities

The team reviewed 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities”; 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants”; and 10 CFR Part 55, “Operators’ Licenses”; NUREG-1021, “Operator Licensing Examination Standards for Power Reactors,” Revision 10, issued December 2014, and Revision 11, issued February 2017; and Nuclear Energy Institute (NEI) 06-13A, “Template for an Industry Training Program Description,” Revision 2, issued March 2009. The team also reviewed and evaluated previous operator licensing documents related to 10 CFR Part 52, such as reports on interaction (ROIs), exemptions, inspection reports, examination materials, multioffice memoranda, and audit reports.

The team met with industry representatives and external stakeholders to solicit feedback. It engaged industry operator licensing subject matter experts during development and formulation of the recommendations. The team held a public meeting to formally communicate and discuss the team’s proposed recommendations for Part A of the Charter (July 6, 2017; Meeting Summary (ADAMS Accession No. ML17194A293)). The NRC presented the goals and a status of the recommendations for Part B of the Charter at the February 2018 NEI National Operator Training Workshop (ADAMS Accession No. ML18103A019). The team evaluated each of the recommendations for possible unintended consequences to the existing operating reactor operator licensing program.

The report also includes the basis and relative importance (high, medium, or low) of each recommendation. High-priority recommendations warrant either (1) prompt action to facilitate the issuance of operator licenses to applicants who have already passed the NRC's examination for Vogtle Unit 3, or (2) long-term regulatory process improvements before the NRC administers examinations at future cold plant sites. Medium-priority recommendations do not warrant prompt action for the issuance of operator licenses at Vogtle Unit 3, but such recommendations may warrant the issuance of internal and external guidance. The NRC can most likely address low-priority recommendations through the next revision to NUREG-1021 without issuing interim guidance.

The recommendations in this report are proposed programmatic changes that may entail further, more detailed evaluation before implementation. Changes to NUREGs and Regulatory Guides will be implemented via the NRC's processes, which include internal NRC staff review, a public comment period, and comment resolution. The team recognizes that revision or development of guidance on how to meet NRC requirements, such as the Regulatory Issue Summary recommended below, will trigger requirements for a Congressional Review Act review by the Office of the General Counsel (OGC) and potential interaction with the Office of Management and Budget.

Tasks & Recommendations

Part B

Task B.1

1. Recommend a timeline of milestones for the cold licensing process. Consider the following elements for guidance:

(a) Develop guidance to enhance the NRC's response to a licensee's request for an operating exam.

- Ensure that process recommendations include the consideration of the ability to generate exam material that is not predictable and does not limit the testable material due to incomplete design, unapproved procedures, and unestablished programs.
- Consider the possible impact of plant construction milestones on the following items when developing recommendations:
 - simulator status
 - potential that in-plant job performance measures (JPMs) may require modification
 - use of draft procedures
 - preliminary schedule for the number and type of licenses (reactor operator (RO), senior reactor operator (SRO)) desired by the licensee
- Evaluate and make recommendations on the incorporation of previous ROIs into guidance document(s).
- Recommend the best vehicle for providing guidance, for example within the existing NUREG-1021 guidance (e.g., a new series), as a standalone document, or within other NRC guidance.

(b) Using operating experience from AP1000 exams already administered, identify known pitfalls and capture them in recommended changes to existing guidance.

- Consider the delineation of differences between the cold licensing process and operating plant NUREG-1021 guidance.
- Evaluate and make recommendations on the incorporation of previous ROIs into guidance document(s).

Task B.1 Discussion: The purpose of Task B.1 was for the team to identify guidance and enhancements needed for the NRC’s response to a facility licensee’s request to schedule the first operating exam at a new reactor technology plant under construction. In Charter Part A, Recommendation A.1.c-1, the team identified NRC, construction, and facility licensee training milestones, beginning with combined license (COL) issuance and ending with fuel load, and recommended that these milestones be included in NUREG-1021, ES-202, “Preparing and Reviewing Operator Licensing Applications,” as a new Attachment 2, “Operator Licensing Milestones for 10 CFR Part 52 Plants Under Construction.”

For Charter Task B.1, using operating experience from completed AP1000 exams, the team identified seven items for staff consideration when a facility licensee asks to administer the first operating exam at a cold plant:

- (1) New Knowledge and Abilities (K/A) Catalog Development. Development and issuance of a K/A catalog is a prerequisite for the NRC to respond to a facility licensee’s request for an NRC exam, as the catalog is needed to implement NUREG-1021, which, in turn, satisfies 10 CFR Part 55 requirements for the development of operator licensing exams. Use of a K/A catalog facilitates uniform conditions and content validity of the NRC’s written exam and operating test.
- (2) Training Program Status. The text of 10 CFR 55.4, “Definitions,” contains definitions used in 10 CFR Part 55, including the definition of *Systems approach to training*, which is also referred to as a “SAT-based training program.” Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition),” provides guidance to COL applicants on the information that should be included in an application to meet the requirements in 10 CFR Part 52. The SRP provides guidance to the NRC staff in performing safety reviews of COL applications under 10 CFR Part 52. SRP Chapter 13.2.1, “Reactor Operator Training Programs,” provides guidance that describes methods or approaches that the staff has found acceptable for meeting NRC requirements. Both 10 CFR Part 52 and 10 CFR Part 50 facility licensees have the option of using the National Academy for Nuclear Training (NANT) as a method of meeting the 10 CFR Part 55 requirement for a SAT-based training program. Inspection Manual Chapter (IMC) 2504, “Construction Inspection Program: Inspection of Construction and Operational Programs,” Appendix B, “Inspection of Operational Programs,” identifies Inspection Procedure (IP) 41501, “Review of Training and Qualification Programs,” as an

inspection the staff conducts before reactor operator training programs receive accreditation at plants licensed in accordance with 10 CFR Part 52.

- (3) Simulator Inspection. IP 41502, “Nuclear Power Plant Simulation Facilities,” is used to verify that a simulator facility for a new reactor has sufficient fidelity to be designated as a plant-referenced simulator (PRS). [Note: Details related to licensees’ declaration of a PRS, including the process for licensees to apply for a Commission-approved simulator (CAS), is beyond the scope of this Charter. The “Charter for Declaration of Plant-Referenced Simulators and Qualification of Commission-Approved Simulation Facilities To Support the Cold Operator Licensing Process” (ADAMS Accession No. ML17079A362) will identify those details.]
- (4) Lead time for scheduling the first operator licensing exam. Section 13.2.1, “Licensed Operator Training,” of the updated final safety analysis report (UFSAR) for Vogtle Units 3 and 4 states the following:

Before initial fuel loading, the number of persons trained in preparation for RO and SRO licensing examinations will be sufficient to meet regulatory requirements, with allowances for examination contingencies and without the need for planned overtime.
- (5) Availability of approved procedures. For plants under construction, the facility licensee may use plant-specific terminology to designate procedures as approved and ready for use before turnover to the Operations Department, or before the facility is required to implement technical specifications in accordance with the COL.
- (6) NUREG-1021, ES-201, “Initial Operator Licensing Examination Process,” Section C.1.e, states the following:

For the purposes of operator training and examination, the facility licensee may “freeze” the plant procedures at a particular revision to facilitate examination development.
- (7) Generic Fundamentals Exam “Shelf Life.” ES-205, “Procedure for Administering the Generic Fundamentals Examination (GFE) Program,” Section B, states the following:

Having passed a GFE as an RO or SRO applicant, an operator will not have to take another GFE unless he or she transfers to a facility of another type OR discontinues participation, for a period exceeding 2 years, in an accredited licensed operator requalification training program that maintains proficiency in the GFE topics.

However, as an alternative to retaking the GFE written examination, ES-204, "Processing Excusals and Waivers Requested by RO and SRO Applicants," Section D.1.k, states that the regional office may waive the requirement to pass another GFE if the applicant, within 24 months preceding the date of application, completed self-study or classroom instruction and passed a prior GFE that was randomly selected from among those on the NRC's GFE Web page and administered, under controlled conditions, by the facility licensee.

Team Recommendations for Charter Part B, Task B.1

B.1.a-1 (Medium Priority, K/A Catalog Development): Include the following K/A catalog development general guidance in a regulatory issue summary (RIS):

- K/A catalog authors should develop and use criteria to assist subject matter experts (SMEs) in determining the scope of systems/procedures to be included in the catalog, and in determining the importance of K/A statements. The scoping criteria should not limit the systems/procedures to those related to protecting the reactor core or containment. The initial catalog scoping criteria should allow for the inclusion of any systems/procedures important to overall safe plant operation.
- A best practice for rating K/A statements is to use SMEs that have prior work experience at an operating nuclear power plant.
- K/A catalog authors should document the method used to determine importance ratings in the catalog and include background information for stem statements to assist examination writers.
- K/A statements must be linked to applicable items from 10 CFR 55.41, "Written Examination: Operators"; 10 CFR 55.43, "Written Examination: Senior Operators"; or 10 CFR 55.45, "Operating Tests," to establish a regulatory basis for examination content validity.

Basis: The team reviewed lessons learned from the development of K/A catalogs for the advanced boiling-water reactor (ABWR), AP1000, and NuScale small modular reactor projects and determined that there is insufficient external and internal guidance for developing K/A catalogs for new reactor technologies. Operating experience from previous K/A catalog development and revisions included the following:

- The lead time for developing and issuing NUREG-2103, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Westinghouse AP1000 Pressurized-Water Reactors," issued October 2011, and NUREG-2104, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Advanced Boiling-Water Reactors," issued December 2011, was 3–4 years.

- A K/A committee was formed to develop the AP1000 and ABWR K/A catalogs, as well as the revision to the operating fleet K/A catalogs (NUREG-1122, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors,” and NUREG-1123, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors”). Committee members included NRC examiners, the vendor, and facility licensee staff with knowledge of the new reactor design and operating reactor experience. A large and diverse pool of industry SMEs was subsequently involved in rating the importance of the K/As in these catalogs.
- Given the advance passive design of AP1000 and ABWR, K/A catalog committee members were challenged to determine which systems should be included in the catalogs. Some stakeholders requested that the K/A catalog only include systems related to safety of the reactor core, whereas other stakeholders requested a broader scope, including systems important to safe plant operation. In the end, the committees chose to include systems important to safe plant operation, provide training to SME importance raters, and allow the SMEs to rate the system’s importance. The first K/A catalogs were issued as “draft” and will be revised after the first refueling outage to refine the K/A catalog content, if necessary.
- During the effort to revise the current operating fleet K/A catalogs (draft revision 3 of NUREG-1122 and NUREG-1123), the basis for why a particular system was or was not included within a safety function, and answers to other questions about previous revisions, were not available. The team determined that documenting the basis for content decisions for new K/A catalogs provides insight for future revisions. The AP1000 and ABWR K/A catalogs include basis statements for K/A stem statements that provide additional information about the knowledge or ability that is useful for examination writers.
- During the development of AP1000 and ABWR K/A catalogs, an effort was made to link every K/A statement to at least one applicable item in 10 CFR 55.41, 10 CFR 55.43, or 10 CFR 55.45. The team determined that catalog authors should link K/A statements to any applicable items in 10 CFR 55.41, 10 CFR 55.43, or 10 CFR 55.45 to establish a regulatory basis for examination content.

The team reviewed various methods to promulgate the general guidance for developing new reactor K/A catalogs and determined that a RIS was an appropriate method to communicate and memorialize the general K/A catalog guidance to internal and external stakeholders. A RIS typically communicates or clarifies NRC technical or policy positions on regulatory matters. They may also request voluntary participation in activities or voluntary submittal of information that will assist the NRC in the performance of its functions. For example, the NRC submits an annual RIS to request operator licensing examination schedule information. Because guidance for K/A catalog development does not currently exist, an RIS can be used to communicate the above

information about K/A catalogs to the nuclear industry. The team considered adding this information to NUREG-1021 but determined that the guidance did not technically fit within this established set of examination standards and wanted to avoid fragmented additions to NUREG-1021. The team also wanted to minimize the chance that this new high-level guidance would be overlooked because it was buried in a NUREG-1021 appendix designed to provide a generic overview of examination development concepts. The team determined that a standalone communication is the best delivery method for this guidance.

B.1.a-2 (Medium Priority, New K/A Catalog Development): Issue a letter to NEI, provide the following proposed revision to NEI 06-13A, Revision 2, Appendix A, “Cold License Training Plan,” Section 1.7, “Initial Licensed Operator Examination Schedule”:

1.7 Initial Licensed Operator Examination Schedule

Developing and issuing a knowledge and abilities (K/A) catalog is a prerequisite to administering NRC exams at cold plants because a K/A catalog is needed to implement examination procedures delineated in NUREG-1021 to meet 10 CFR Part 55 requirements for operator licensing. Facility licensees should work with the NRC to determine a timeline for publishing a K/A catalog for purpose of the NRC examination.

Either a Commission-approved simulation facility or a plant-referenced simulator is a prerequisite for administering NRC exams.

NRC exams should be administered at a point before fuel load that allows for satisfactory implementation of the initial license training program and NRC exam development.

Basis: The team determined that the existing wording of NEI 06-13A, Revision 2, Appendix A, does not provide guidance to stakeholders about developing a K/A catalog. The team also determined that information about examination schedules in Section 1.7 of NEI 06-13A, Appendix A, did not reflect the COL’s actual needs for scheduling AP1000 exams, which were requested and administered well before 18 months prior to fuel load, for the following reasons:

- Administering NRC exams only during the 18 months before fuel load conflicts with the applicant participation in preoperational testing.
- The number of applicants who pass the initial licensing exam (also known as “NRC exam throughput”) within the 18-month window before fuel load may not be sufficient to provide an adequate number of licensed operators in time for fuel load. This could cause preventable delays in a cold plant’s schedule.

- Delaying the start of initial licensing training and exams to the 18-month period before fuel load does not allow for the early identification and timely incorporation of lessons learned into the operator licensing process for cold plants. More time allows for a safer and more deliberate approach to administering several exams in succession.
- NRC staff resources may not be able to support the administration of new reactor exams to a large number of applicants during the 18-month period before fuel load.

In a letter dated December 5, 2008 (ADAMS Accession No. ML082950140), the staff informed NEI that the NRC accepted NEI 06-13A, Revision 1, and stated, "If future changes to the NRC's regulatory requirements affect the acceptability of NEI 06-13A, NEI will be expected to revise NEI 06-13A appropriately, or justify its continued applicability for subsequent referencing." The NRC staff has identified changes to the cold licensing process that should be reflected in this NEI document. As a result, the team recommends engaging NEI to revise this document or justify its continued applicability to cold plant licensing.

B.1.a-3 (Medium Priority, Training Program Plan and Status): Revise Chapter I.13.2, "Training," of Regulatory Guide 1.206 for the final safety evaluation report (FSAR) description of the training program for ROs and SROs to include the following:

The FSAR should include whether the applicant/licensee will pursue licensed operator training program accreditation from the National Academy of Nuclear Training (NANT) or describe how the applicant will meet 10 CFR 55.31(a)(5) requirements for a Commission-approved training program that is based on a systems approach to training.

Basis: The basis for this recommendation is covered in the basis for Recommendation B.1.a-4 (next).

B.1.a-4 (Medium Priority, Training Program Plan and Status): Revise SRP Chapter 13.2.1 to add the following to Section I.2, as a new line item for COL applications after item "d," before the licensed operator training program description:

For COL applications, the NRC staff will review how the applicant will comply with 10 CFR Part 55 requirements for a systems approach to training (SAT)-based training program, including whether or not the applicant will seek accreditation from the National Academy of Nuclear Training (NANT). NANT Accreditation is one method that the staff finds acceptable to meet 10 CFR Part 55 training requirements for licensed operators. If applicable, the application should also include a commitment to inform the NRC once training program accreditation is achieved for the first time.

Basis: The team reviewed lessons learned from the implementation of IMC 2504, Appendix B, during AP1000 construction activities. Specifically, the team noted that IP 41501 was not performed at V.C. Summer and Vogtle. Instead, the NRC staff observed accreditation activities for the operations training programs for V.C. Summer Units 2 and 3 and Vogtle Units 3 and 4. The basis for this approach (oversight of accreditation in lieu of inspection) is documented under Recommendation B.1.a-5.

While the NRC staff was conducting other IMC 2504, Appendix B, inspections at AP1000 sites, Region II requested that AP1000 licensees submit a letter to the NRC stating whether or not their operator initial license training programs were accredited by NANT. The staff requested this as a means to document the basis for not performing an IP 41501 inspection. The Office of New Reactors (NRO) approved this approach. V.C. Summer and Vogtle provided letters to Region II, stating that their operator training programs were accredited by NANT (ADAMS Accession Nos. ML15040A556 and ML15079A020). Region II acknowledged these letters and thus documented the basis for not performing the IP 41501 inspection in a reply to the AP1000 licensees (ADAMS Accession Nos. ML15295A200 and ML15062A148).

As stated in Recommendation B.1.a-5, IP 41501 contains conflicting information about when the IP is to be performed. In Recommendation B.1.a-5, the staff seeks to resolve this conflict by recommending that NRC inspection of a facility licensee training program via IP 41501 is not necessary if the facility licensee achieves accreditation by NANT during the time period leading up to the first NRC examination.

Regulatory Guide 1.206 provides guidance to COL applicants on the information that should be included in an application to meet the requirements of 10 CFR Part 52. Chapter I.13.2, "Training," of this regulatory guide directs applicants to include a description and schedule of the training program for ROs and SROs. The team determined that this regulatory guide should contain guidance for COL applicants to include information about whether or not they will seek NANT accreditation for these training programs. The SRP provides guidance to the NRC staff in performing safety reviews of COL applications under 10 CFR Part 52. The SRP is intended to be a comprehensive and integrated document that provides the reviewers with guidance that describes methods or approaches that the staff has found acceptable for meeting NRC requirements. The team determined that the SRP should contain guidance for the NRC staff to review how the COL application meets the training program requirements in 10 CFR Part 55. This recommendation is aligned with similar information for applicants in Recommendation B.1.a-3. Recommendation B.1.a-5 discusses how the NRC staff can plan inspections or observations based on this information.

The team recognizes that future COL holders may use a method other than accreditation for complying with the training program requirements in 10 CFR Part 55.

B.1.a-5 (Low Priority, Training Program Inspection): The team determined that IP 41501 should be revised to clarify the following:

For new reactor technologies, the NRC is not required to perform an inspection of the facility licensee’s initial license training program if the training program was accredited by the Institute for Nuclear Power Operations (INPO). However, NRR/NRO should observe initial INPO accreditation team visits to the site and the accreditation board for the facility licensee’s initial licensed operator training program, prior to the administration of the first NRC examination.

If a facility licensee chooses not to seek initial license training program accreditation through the NANT, then this procedure should be used to inspect the facility licensee’s initial licensed training program before the administration of the first NRC examination.

Basis: The team found that IMC 2504, Appendix B, identifies IP 41501 as a required inspection before training program accreditation. The team determined that the revised history table for IP 41501 indicates that the NRC revised the IP (issued April 27, 2016; ADAMS Accession No. ML16103A237) to indicate that training program accreditation negated the need for a planned training inspection before fuel load. However, the team found that IP 41501 contains conflicting information on whether a planned training inspection is required for the initial licensed operator training program. Specifically, Section 41501-01, “Inspection Objectives,” states the following:

INSPECTION OBJECTIVES: To ensure, **prior to training program accreditation** [emphasis added] by the National Nuclear Accrediting Board (NNAB), that the training and qualification programs for licensed operators and non-licensed staff are analyzed, designed, developed, implemented, evaluated, and maintained as required by regulatory requirements and licensee commitments.

Contrary to the above, Section 2.03, “Accreditation,” states the following:

The staff recognizes that NNAB accredited training programs developed in accordance with INPO guidelines have been developed using SAT principles. The NRC has endorsed NNAB accreditation as a method of complying with the requirements of 10 CFR Part 55 for licensed operator training and of 10 CFR 50.120 for non-licensed staff training.

The regulations in 10 CFR 55.31(a)(4) require operator license applicants to provide details of the training administered by the facility licensee on NRC Form 398, “Personal Qualification Statement,” unless the applicant completed a Commission-approved training program based on SAT and through the use of a simulation facility acceptable to the Commission under 10 CFR 55.45 (b). In the “Commission Policy Statement on Training and Qualification of Nuclear

Power Plant Personnel” (50 FR 1147–48 (March 20, 1985)), the NRC endorsed the training accreditation process managed by INPO for the initial licensed operator training program. To monitor the health of industry training programs and the accreditation process, the NRC sends a representative to attend and observe selected NNAB meetings and accreditation team site visits. For the Vogtle and V.C. Summer AP1000 initial license training programs, NRO staff observed the INPO accreditation team visits at the site, and the accreditation board; no NRC training inspection was performed.

The team determined that, if the facility licensee seeks a Commission-approved training program in lieu of NNAB training program accreditation, then an NRC training program inspection should be performed, to inform the Commission’s decision on whether to approve the facility licensee’s training program as a Commission-approved training program.

B.1.a-6 (Medium Priority, Simulator Inspection): In ES-201, Section C.1, page 5 of 32, add the following sentence at the end of the third paragraph of item “j”:

Prior to the administration of the first operating examination at a cold plant, the NRC may perform an IP 41502 inspection to verify conformance with the simulator requirements specified in 10 CFR 55.46 and to assess the adequacy of the facility licensee’s simulation facility for use in operator licensing examinations and applicant experience requirements as described in 10 CFR 55.31(a)(5).

Basis: The team determined that ES-201, Section C.1, item “j” should contain additional information that an inspection may be performed, to verify requirements in 10 CFR 55.46, “Simulation Facilities,” are met before the administration of the first NRC operator licensing examination at a cold plant. IP 41502 provides inspection guidance to verify that the simulation facility for new reactor technology has sufficient fidelity to be suitable for operator licensing examinations and the control manipulation requirements of 10 CFR 55.31(a)(5).

Note: The “Charter for Declaration of Plant-Referenced Simulators and Qualification of Commission-Approved Simulation Facilities To Support the Cold Operator Licensing Process” (ADAMS Accession No. ML17079A362), dated April 14, 2017, will identify details related to licensees’ declarations of PRSs, and NRC actions that would follow such declarations, including the process for licensees to apply for CAS status, and NRC actions upon receipt of such applications.

B.1.a-7 (Medium Priority, Availability of Approved Procedures): In ES-201, Attachment 3, page 22 of 32, third paragraph, include the following sentences:

For plants under construction (i.e., “cold” plants), the facility licensee may use plant-specific terminology (e.g., “Operational Draft” or “Draft”) to designate procedures as approved and ready for use, prior to being turned over to the

Operations Department, or prior to the facility being required to implement technical specifications in accordance with the COL. Regardless of the terminology chosen by the plant to designate the procedure status, procedures that are used to support examination material should receive (1) an administrative review to verify that the procedure meets the facility licensee's writer's guide requirements and satisfies all technical specifications and FSAR requirements, and (2) a technical review, to verify the procedure is correct for proper operations of plant systems and equipment. Additionally, the procedures provided to the NRC for each initial license exam should be approved by the facility licensee's management in accordance with the facility licensee's administrative procedure requirements.

Basis: Based on lessons learned at the AP1000 sites, the team determined that information about the use of construction plant "draft" procedures should contain stipulations to prevent the NRC staff from using an unapproved, or "rough" procedure, for the development, review, or administration of the NRC initial examination. For the recently administered AP1000 examinations, the facility licensee performed administrative and technical reviews, including departmental management approvals, of all "draft" and "operational draft" procedures used for the development and administration of the NRC examination. Facility licensee administrative procedures defined "operational draft" or "draft" procedures as approved procedures that can be used to support preoperational testing, startup, training, and equipment or system testing before the declaration of commercial operation, design finalization, and system turnover. The team determined that, for cold plants, procedures provided to the NRC for the examination should receive the same reviews and approvals as procedures used for commercial operation, with the exception of validation or verification walkdowns, which cannot be performed until after plant construction.

B.1.a-8 (Low Priority, GFE Shelf Life): In ES 204, Section D.1, page 9 of 9, add a new item "l" before item 2 on page 9:

l. Because of the construction timeline, applicants for a NRC license at cold plants will likely exceed the 24-month period of time after passing a GFE. In this situation, the regional office may approve a deferral of the requirements of ES-204, D.1.k, for up to 2 years after the applicant completes the plant-specific NRC exam. The intent of this deferral is to ensure that an applicant does not have to prepare for another GFE while making final preparations to take the plant-specific NRC examination. The regional office may grant this deferral only for those applicants who have previously passed an NRC GFE on a comparable design (PWR/BWR). Any potential deferral requests from applicants who have failed, or not yet taken the comparable GFE, and wish to defer a retake or initial attempt until after the site-specific examination is complete, will be evaluated separately by the applicable Headquarters program office on a case-by-case basis.

A region-approved deferral of GFE requirements of this type shall be granted only if the deferral is consistent with the facility licensee's SAT-based training program. In the event that an applicant has passed the NRC site-specific examination and fails a subsequent GFE or fails to meet the requirements of ES-204, D.1.k, for 2 years after the completion of the NRC site-specific examination, the regional office shall consider that the applicant has failed to meet the requirements for an operating license and therefore issue a denial letter. The applicant will be permitted to reapply in accordance with 10 CFR 55.35 after failure to pass the written examination.

Basis: The team determined that cold plant applicants should not be required to take another GFE examination during the time period preceding administration of the site-specific NRC exam because doing so could negatively impact the applicant's readiness for the site-specific NRC exam. The first scheduled administration of an AP1000 NRC exam at Vogtle was delayed several times for various reasons. During these delays, several applicants, who had already passed an NRC GFE and also passed another GFE randomly selected from the NRC GFE Web page, were concerned about having to take a third GFE exam just before the start of their NRC site-specific examination. The team determined that, in this unique case, it is acceptable for an applicant to defer completion of the third GFE exam until after the plant-specific portion of the NRC exam. The team determined that completion of the third GFE exam, however, is still required before license issuance.

Task B.2

2. Consider, and make recommendations regarding the suitability of, alternative methods and procedures in developing exam material when delays in construction occur.

- Recommend acceptable methods by which to deviate from the defined process and the approving authorities for deviating from prescribed methods.
- Ensure that process recommendations require the consideration of the ability to generate exam material that is not predictable and does not limit the testable material due to incomplete design, unapproved procedures, and unestablished programs.
- Evaluate and make recommendations on the incorporation of previous ROIs into guidance document(s).

Task B.2 Discussion: The regulations in 10 CFR 55.40(a) require the Commission to use the criteria in NUREG-1021 in effect 6 months before the examination date to prepare the written exams required by 10 CFR 55.41 and 10 CFR 55.43 and the operating tests required by 10 CFR 55.45; 10 CFR 55.40(a) also requires the Commission to use the criteria in NUREG-1021 to evaluate the written exams and operating tests prepared by power reactor facility licensees pursuant to 10 CFR 55.40(b).

NUREG-1021, ES-201, Section B, “Background,” states the following:

Facility licensees may propose alternatives to the examination criteria contained here and evaluate how the proposed alternatives provide an acceptable method of complying with the Commission’s regulations. The NRC staff will review any proposed alternatives and make a decision regarding their acceptability. The NRC will not approve any alternative that would compromise the agency’s statutory responsibility to prescribe uniform conditions for the operator licensing examinations.

For Task B.2, the team reviewed internal ROIs that were written to gain agency alignment on alternative methods of exam material development for the first AP1000 exams. The team also reviewed AP1000 Owners Group (APOG) meeting summaries and notes about assessing the adequacy of exam material developed by the facility licensee for the first few exams administered at a new plant. Following these reviews, the team identified three areas that pertain to alternative methods or procedures for developing cold plant exam material:

(1) In-Plant JPMs

In accordance with 10 CFR 55.45(b)—

Operating tests, Implementation—Administration. The operating test will be administered in a plant walkthrough and in either—

- (1) A simulation facility that the Commission has approved for use after application has been made by the facility licensee under § 55.46(b);
- (2) A plant-referenced simulator (§ 55.46(c)); or
- (3) The plant, if approved for use in the administration of the operating test by the Commission under § 55.46(b).

The plant walkthrough or in-plant JPM portion of 10 CFR 55.45(b) was the subject of the staff's approval (ADAMS Accession No. ML16138A241) of an exemption request (ADAMS Accession No. ML16148A484) from Southern Nuclear Operating Company.

(2) Replacement of K/As when the facility licensee's procedure is not yet approved.

NUREG-1021, ES-201, Attachment 1, "Examination Security and Integrity Considerations," states the following:

The license applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility licensee's examination practices. In other words, the facility licensee staff should not provide information to the applicants or licensed operators regarding examination content that would allow the test takers to either specifically or generally predict what test items will, or will not, be covered on the examination.

NUREG-1021, ES-301, "Preparing Initial Operating Tests," Section D.1.c, page 6 of 33, states the following:

Failure to train the applicants on a particular K/A is not an acceptable basis for rejecting that K/A.

NUREG-1021, ES-401N, "Preparing Initial Site-Specific Written Examinations," Section D.1.b, page 5 of 53, states the following:

All K/A statements that are eliminated after they have been randomly selected to fill an examination outline shall be documented on Form ES-401N-4, "Record

of Rejected K/As,” or equivalent, and replacement K/As shall be requested from the NRC chief examiner or his or her designee as needed.

NUREG-1021, ES-401N (10 CFR Part 52 plants), Section D.2.a, page 7 of 53, states the following:

Any time it becomes necessary to deviate from the previously approved examination outline, discuss the proposed deviations with the NRC’s chief examiner, obtain replacement K/As (if needed) from the chief examiner, and obtain concurrence. Also explain on Form ES-401N-4 why the original proposal could not be implemented and why the proposed replacement is considered an acceptable substitute.

NUREG-1021, ES-501, “Initial Post-Examination Activities,” Section C.2.c, page 3 of 34, states the following:

If seven or more of the questions on the RO examination (or two or more on a SRO-only exam) are deleted during the grading process, the regional office shall evaluate the remainder of the examination to ensure that it still satisfies the test outline sampling requirements in ES-401N, “Preparing Initial Site-Specific Written Examinations.” The regional office shall consult with the NRR/NRO operator licensing program office if the validity of the examination is in question.

If the content validity of the examination is affected (e.g., several K/A topics are not covered, or the majority of the remaining K/As are associated with a small number of systems) as a result of deleting questions, the NRR/NRO operator licensing program office will decide if the examination should be voided.

(3) Evaluation of the facility licensee’s draft examination submittal quality.

Regulations in 10 CFR 55.40(a) also require the Commission to use the criteria in NUREG-1021 to evaluate the written exams and operating tests prepared by power reactor facility licensees pursuant to 10 CFR 55.40(b).

NUREG-1021, ES-501, Section E.3.a, page 11 of 34, states the following:

The final examination report shall document the following:

- The quality of the submitted written examination and operating test material in relation to the range of acceptability expected by the NRC.

NUREG-1021, ES-301, Section E.2, page 18 of 33, states the following:

The NRC chief examiner shall ensure that each operating test is independently reviewed for content, wording, operational validity, and level of difficulty. As a minimum, the chief examiner shall check the items listed on Forms ES-301-3 and ES-301-4, as applicable, and determine the acceptability of the submitted operating test by reviewing every JPM and simulator operating test scenario using Form ES-301-7.

NUREG-1021, ES-401N, Section E.2.c, page 11 of 53, states the following:

If the facility licensee prepared the examination, the NRC chief examiner (or designated NRC reviewer) shall review every examination question using Form ES-401N-9 and review the overall written examination using Form ES-ES401N-9.

Team Recommendations for Charter Part B, Task B.2

B.2-1 (High Priority, In-Plant JPMs): Evaluate rulemaking for changes to 10 CFR 55.45(b) that would allow COL holders the option of developing plant walkthrough test items (i.e., JPMs used for the in-plant portion of the operating exam) using an alternative method for cold plants.

Basis: The team determined that delaying the administration of the NRC operating test, which includes in-plant JPMs, until construction is complete at cold plants is not desirable for the following reasons:

- The NRC examination will likely overlap with preoperational testing activities; applicants may be required to participate in preoperational testing at the same time the NRC exam is administered.
- Insufficient NRC exam throughput (the number of applicants that pass the NRC exam) could cause preventable delays in the facility licensee's ability to begin fuel loading.
- There would be missed opportunities for early identification and timely incorporation of lessons learned into the operator training and licensing process without a safe and deliberate approach of administering exams to smaller groups of applicants in succession.
- The NRC's ability to administer exams for the large number of new reactor applicants necessary to staff a single unit (40–50 operators) in time for fuel load, while also conducting exams and inspections at operating reactor sites, would be challenged.

The NRC staff reviewed and approved an exemption to 10 CFR 55.45(b) for the use of an alternative method for in-plant JPMs (ADAMS Accession No. ML16138A241) in response to Southern Nuclear Operating Company's exemption request (ADAMS Accession No. ML16148A484) in May 2016, just before the first AP1000 exams were given. This alternative method did not require applicants to enter the actual plant during JPMs. The team recognized that 10 CFR 55.45(b) requires a walkthrough in the plant; therefore, a rule change would have to accompany a revision to NUREG-1021 for alternative methods. The team determined that administration of licensed operator NRC exams should begin at a point sufficiently before fuel load that facilitates quality implementation of the initial license training program, exam development, and administration of the exam by the NRC. Without a rule change to 10 CFR 55.45 (b), plant walkthrough exemptions will always be required while the plant is still under construction. The team recommends evaluating a rulemaking to allow for alternative methods for cold plant JPMs. This rulemaking would be designed to eliminate the need for future exemptions.

B.2-2 (Low Priority, Replacement of K/As): In ES-401N, Section D.1.b, page 5 of 53, include a new bullet in the second paragraph to provide guidance and additional information for examination authors and reviewers to use when determining if a K/A statement is appropriate for testing:

For K/A statements that require procedural knowledge, is it possible to prepare a question that is based on a procedure that has received (1) an administrative review to verify the procedure meets the facility licensee's writer's guide requirements and satisfies all technical specifications and FSAR requirements, (2) a technical review to verify the procedure is correct for proper operations of plant systems and equipment, and (3) facility licensee management approval in accordance with the facility licensee's administrative procedure requirements?

Additionally, add the next paragraph after these questions as follows:

If these three questions can all be answered affirmatively, then the approved procedure is adequate for the associated K/A statement. However, if any item cannot be answered affirmatively, then K/A reselection should be discussed with the chief examiner.

In addition to assessing whether the justifications for deselected or rejected K/A statements are appropriate, the chief examiner and regional licensing official, in consultation with the program office, will conduct a comprehensive assessment of all portions of the NRC exam. The purpose of this comprehensive assessment is to ensure that if K/A reselection is approved, the entire exam will continue to appropriately sample K/A categories and items from 10 CFR 55.41, 55.43, and 55.45; and that K/A reselection will not result in over-emphasizing any systems, evolutions, or generic topics; in duplication, overlap, or repetition of items from audit tests or exam sections; or inappropriately limiting the scope of the exam to a

smaller population of procedures. The NRC chief examiner, regional licensing official, and program office will ensure that K/A re-selection will not cause the examination to be predictable. As a result of their comprehensive assessment of the examination, the NRC may choose not to administer the examination.

Basis: During exam development for the first AP1000 exam at V.C. Summer, the facility licensee's procedure for emergency plan event classification was not yet approved. Consequently, Region II requested NRO program office assistance for an agency policy determination of the following two questions:

- (1) Can randomly selected K/As be rejected on the written exam solely because of unapproved procedure(s)?
- (2) Are test items acceptable if the accompanying procedure is not approved, but the test item is supported by training materials (on a case-by-case basis)?

A policy determination was never issued because the exam development team was able to overcome these challenges without rejecting K/As or delaying the operating test administration. However, the team recognized that this situation may occur again and that it may not be limited to a facility licensee's emergency plan procedure.

In Recommendation B.1.a-5, the team determined that use of cold plant procedures should be clarified to prevent the use of an unapproved, or "rough" procedure for the development, review, or administration of the NRC initial examination. Specifically, the team determined that procedures provided to the NRC to support examination material should receive the following:

- administrative review, to verify the procedure meets the facility licensee's writer's guide requirements and satisfies all technical specifications and FSAR requirements
- technical review, to verify the procedure is correct for proper operation of plant systems and equipment
- approval by the facility licensee's management in accordance with the facility licensee's administrative procedure requirements

The team considered two aspects of this recommendation: if applicants could predict or narrow the scope or content of the NRC written exam, and if the NRC written exam still satisfies content guidelines in NUREG-1021 if K/As are rejected because of the unavailability of approved facility licensee procedures.

The team noted that, in the case of V.C. Summer, where a facility licensee procedure was not yet approved, the applicants were not able to narrow or predict the scope or content of the NRC

written exam because applicants used draft versions of the procedures in the training program and the audit exam contained test items on the draft procedures. If K/A statements had to be replaced because of the unavailability of an approved facility licensee procedure, the replacement K/A is required to be randomly selected. The team determined that during the V.C. Summer exam, it was possible for the developers to write questions for the original sample of K/As; scope and predictability were not a concern. However, for future exams like this, the team determined that the chief examiner, regional licensing official, and program office need to evaluate the exam scope and predictability.

Regarding written exam content validity, the team determined that, if K/A statements have to be replaced because of the unavailability of an approved facility licensee procedure, content validity is not a concern as long as the final point total for each group and tier on Form ES-401N-2, "AP1000 Examination Outline" (or similar), is not exceeded. Furthermore, Form ES-201-2, Exam Outline Quality Checklist, Item 4.e requires the chief examiner to check the entire exam for balance of coverage, including the operating test.

The team determined that, if there are limited procedures, the regional office and the program office should perform an evaluation on all portions of the exam to determine whether or not the examination should be administered.

B.2-3 (Low Priority, Evaluating Submittal Quality in Exam Report): In ES-501, Section E.3.a, page 11 of 34, add a note for the section on determining the quality of the submitted written examination and operating test after the phrase:

Note: For the first NRC examination at a cold license facility, the NRC may determine that it is appropriate to forgo the calculation of the submitted written examination and operating test material replacement percentage in accordance with E.3.a, because of the NRC's level of involvement in the development of an exam for the first time at a new reactor. For these special situations, state in the examination report that the NRC determined that calculating the percentage of submitted written examination and operating test items that required replacement is not necessary because of the increased involvement of the NRC during the development of this first NRC exam at this site/reactor technology. Also state that the NRC evaluated each item to ensure that appropriate changes were made in order for the operating test and written examination to meet the NUREG-1021 exam quality criteria.

Basis: During development of the first two AP1000 exams, APOG and the NRC agreed that calculating the percent of exam material that required replacement or significant modification after licensee submission was not necessary because of the increased interaction between the NRC staff and the licensee staff during initial exam development for the first-of-a-kind new reactor technology. Through interviews with the NRC examiners involved in the first two AP1000 exams,

the team learned that both the NRC and the licensee acquired the skills needed to create technically accurate examination material for a new technology after one AP1000 exam. The team determined that the examination report should state why this percentage, in accordance with NUREG-1021, ES-501, Section E.3.a, was not reported. Additionally, the team agreed that use of the existing Form ES-401N-9, "Written Examination Review Worksheet," provides the licensee with sufficient feedback on examination items.

Task B.3

3. Assess the definitions for applicant eligibility, training, and experience, including criteria for determining when deferrals are appropriate. Make recommendations for changes or clarifications resulting from this assessment.

- Make recommendations for the establishment of a clear hierarchy of guidance/procedure requirements for applicant eligibility elements that may exist in a licensee's licensing basis. For example, a hierarchy (high to low) of:
 - 10 CFR Part 50, 10 CFR Part 52, and 10 CFR Part 55
 - NUREG-1021, Revision 11
 - NEI 06-13A, Revision 2
 - NANT Guidelines

Task B.3 Discussion: Operator training programs accredited by NNAB follow NANT guidelines for RO/SRO license eligibility (i.e., experience, training, and education). These guidelines are outlined in NANT Academy Document (ACAD) 10-001, "Guidelines for Initial Training and Qualification of License Operators," issued November 2016. Section 6.0 of ACAD 10-001 provides specific guidance on cold license eligibility to address inherent limitations imposed by the unique conditions of new plant construction on hot license eligibility. For example, the actual timeline for cold plant physical construction milestones may not support the availability of structures, systems, and components necessary to complete certain experience items before administration of the first initial license examinations. Such was the case at both Vogtle and V.C. Summer, most notably with respect to the conduct of preoperational testing activities under the 6-month practical and meaningful work experience criteria. The origin of information in Section 6.0 of ACAD 10-001 can be traced to Appendix A to NEI 06-13A, as evidenced by the following statement in that document:

The guidance is based on Appendix A of NEI 06-13A, "Template for an Industry Training Program Description," Revision 1, March 28, 2008, which was accepted by the Nuclear Regulatory Commission (NRC) in December 2008 for reference in combined operating license applications for proposed new plants.

NEI 06-13A provides a generic training program description for use with COL applicants. In addition, Appendix A to NEI 06-13A provides specific guidance for operator cold license eligibility. Appendix A is referenced in NUREG-1021, ES-202, Section D.4, "Cold License Eligibility," and was directly incorporated into Section 13.2A of the UFSARs for Vogtle Units 3 and 4 to reflect the commitments made by the facility licensee to follow NEI 06-13A.

Team Recommendations for Charter Part B, Task B.3

B.3-1 (Low Priority. Differences between NEI and ACAD): Document the following differences between NEI 06-13A, Appendix A, and ACAD 10-001, Section 6.0, in a letter to INPO and NEI. Identify the need for revisions to these documents and request that INPO and NEI revise their guidance to resolve the differences.

Difference #1: The same items that are identified as experience in NEI 06-13A, Appendix A, Section 1.1, “Licensed Operator Experience Requirements Prior to Commercial Operation,” are identified as training in ACAD 10-001, Section 6.3, “Cold License RO and SRO Candidate Additional Training Requirements.” Experience and training are separate aspects of license eligibility.

Difference #2: NEI 06-13A, Appendix A, Section 1.3, “Conduct of OJT,” describes nontraditional methods (e.g., discussion, simulation, use of mockup equipment, and virtual reality technology) for the conduct of “on-the-job-training” (OJT), when in-plant training opportunities are not available because of construction. ACAD 10-001, Section 6.0, does not address the use of alternative OJT methodologies.

Difference #3: NEI 06-13A, Appendix A, Section 1.1, specifies that SRO cold license applicants with less than 6 months of “hot” plant experience (i.e., the performance of SRO duties), will complete either a plant operational excellence course that is conducted in a plant simulator or a minimum of 6 weeks observing control room activities at an operating nuclear plant, the purpose of which is to “familiarize the applicant with the operational interfaces encountered by decision makers in a nuclear plant control room.”

Alternatively, ACAD 10-001, Section 6.3, specifies that RO and SRO cold license applicants with less than 6 months of prior commercial nuclear power plant experience as a licensed operator should complete a minimum of 240 hours of structured observation of operating crews at a domestic operating nuclear power plant, the purpose of which is to “familiarize candidates with the licensed operating crew roles, responsibilities, and applied techniques for maintaining the high levels of nuclear professionalism expected in an operating nuclear power plant environment.”

Unlike the NEI document, the ACAD (1) extends the prior commercial nuclear power plant operational experience criteria to RO applicants, (2) does not specify a plant operational excellence course as an alternative to the observation activities, (3) specifies “should complete” versus “will complete” for the number of observation hours, and (4) extends the scope of the observation activities beyond the physical constraints of the main control room enclosure by recommending that the observation of work activities include nonlicensed operators in the plant, work control or work management personnel, clearance and tagging personnel, and the outage planning staff.

Basis: The team determined that NEI 06-13A and ACAD 10-001 should be evaluated for any NRC exceptions based on differences that currently exist between the cold license eligibility guidance sections of these two documents in the areas of (1) training and experience item classification, (2) conduct of OJT, and (3) applicability and conduct of observation activities for applicants who do not meet the requisite commercial nuclear power plant experience criteria. Given that ACAD 10-001, Section 6.0, guidance is based on Appendix A to NEI 06-13A, the team determined that the documents should contain consistent guidance. Differences in these documents caused challenges during the staff's evaluation of deferral requests for the first AP1000 cold license applicants at Vogtle and V.C. Summer and contributed to substantive delays in the administration of examinations at both sites. The team recognizes that the ACAD is only applicable to cold plants that use training program accreditation.

B.3-2 (Low Priority, Add NEI 06-13A to Examination Standards): In ES-102, "Regulations and Publications Applicable to Operator Licensing," Section F, "Industry Standards," page 9 of 9, add a new item No. 6, NEI 06-13A, Revision 2.

Basis: The team determined that NEI 06-13A, Revision 2, is an industry standard that provides guidance for the operator licensing process for new plants and that this reference should be added to the list of industry standards in NUREG-1021.

Task B.4

4. Assess exam administration experience gained thus far at Vogtle and V.C. Summer for lessons learned. Make recommendations for modifications to current exam administration methods based upon this assessment.

- Recommend acceptable methods by which to deviate from the defined process and the approving authorities for deviating from prescribed methods.
- Ensure that process recommendations require the consideration of the ability to generate exam material that is not predictable and does not limit the testable material caused by incomplete design, unapproved procedures, and unestablished programs.
- Consider the possible impact of plant construction milestones on the following items when developing recommendations:
 - simulator status
 - potential that in-plant JPMs may require modification
 - use of draft procedures
 - preliminary schedule for the number and type of licenses (RO, SRO) desired by the licensee

Task B.4 Discussion: For Task B.4, the team compared the NRC examiner operating test administration methods used at operating reactors to the methods used for the AP1000 operating tests. Operating tests consist of JPMs and simulator scenarios. There are three types of JPMs, also referred to as the “walkthrough” portion of the operating test:

- administrative JPMs
- control room JPMs
- in-plant JPMs (“plant walkthrough”)

In accordance with 10 CFR 55.45(b)—

Operating tests, Implementation—Administration. The operating test will be administered in a plant walkthrough and in either—

(1) A simulation facility that the Commission has approved for use after application has been made by the facility licensee under § 55.46(b);

- (2) A plant-referenced simulator (§ 55.46(c)); or
- (3) The plant, if approved for use in the administration of the operating test by the Commission under § 55.46(b).

NUREG-1021, ES-301, “Preparing Initial Operating Tests,” Section D.4, page 14 of 33, states the following:

In addition, at least one of the tasks conducted in the plant shall evaluate the applicant’s ability to implement actions required during an emergency or abnormal condition, and another shall require the applicant to enter the radiologically controlled area. This provides an excellent opportunity for the applicant to discuss or demonstrate the radiation control administrative subjects.

Form ES-301-2, “Control Room/In-Plant Systems Outline,” indicates that at least one JPM must be performed in the radiation-controlled area (RCA).

The NRC staff approved an alternative method to administer the plant walkthrough (in-plant JPMs) (ADAMS Accession No. ML16138A241) in response to Southern Nuclear Operating Company’s exemption request (ADAMS Accession No. ML16148A484); while this alternative method did not require applicants to enter the actual plant, it did allow for evaluation of all aspects of the plant walkthrough.

Team Recommendations for Charter Part B, Task B.4

B.4-1 (High Priority, Guidance for In-Plant JPMs)

This recommendation is contingent on the outcome of the evaluation as to whether to pursue a rulemaking described in Recommendation B.2-1.

In ES-301, Section D.4.b, page 14 of 33, after the first paragraph, add the following new paragraph in item “b”:

At cold plants under construction, where plant systems have not yet been built and there is no radiologically controlled area (RCA), facility licensees may propose alternatives for developing and administering the in-plant JPMs. See Appendix C, “Job Performance Measure Guidelines,” for guidance on in-plant JPMs at plants under construction.

Basis: The team determined that the existing guidance in ES-201, about the use of alternative exam methods was also appropriate to include in ES-301, for cold plants when in-plant JPMs cannot be administered in the actual plant.

B.4-2 (High Priority, Guidance for In-Plant JPMs):

This recommendation assumes that the rulemaking in Recommendation B.2-1 is implemented and thus alternative methods for in-plant JPMs at plants under constructions are allowed by regulation.

In ES-302, “Administering Operating Tests to Initial License Applicants,” Section D.2.e, page 8 of 14, after the first sentence in paragraph “e,” add the following:

At cold plants under construction, when in-plant JPMs are administered via alternative methods such that the actual plant is not entered, the examiner should also evaluate the applicant’s knowledge and/or ability to:

1. locate equipment using plant layout diagrams, equipment diagrams, and/or maps, including how to get to the location in the plant where the task would be performed;
2. operate the equipment and explain how they expect equipment and systems to respond to their actions using props such as pictures of equipment or mockup equipment in lieu of actual equipment in the plant; and,
3. use a simulated radiation-controlled area (RCA) entry checkpoint, with electronic dosimetry, Radiation Work Permits (RWP), and other RCA entry equipment.

See Appendix C, “Job Performance Measure Guidelines,” for guidance on in-plant JPMs at plants under construction.

Basis: The team determined that guidance for examiners on how to administer alternative methods for in-plant JPMs is appropriate to include in ES-302. The proposed guidance in this recommendation represents the process used during construction of Vogtle Units 3 and 4 and reflects the attributes identified in the staff’s approval (ADAMS Accession No. ML16138A241) of Southern Company’s exemption request.

For the operating fleet, NUREG-1021 directs that at least one in-plant JPM occur on plant equipment inside the RCA. During this JPM, if the applicant is unable to enter the RCA because of a lack of knowledge of RCA entry procedures, then the applicant cannot successfully complete the task since the equipment required to be operated is inside the RCA.

B.4-3 (High Priority, Guidance for In-Plant JPMs):

This recommendation assumes that the rulemaking in Recommendation B.2-1 is implemented and thus alternative methods for in-plant JPMs at plants under construction are allowed by regulation.

In Appendix C, “Job Performance Measure Guidelines,” Section B.3, page C-3, after the first paragraph, add the following:

When developing in-plant JPMs at cold plants using alternative methods such that the actual plant is not entered, the JPM shall also contain specific performance standards to evaluate the applicant’s knowledge and/or ability to:

1. locate equipment using plant layout diagrams, equipment diagrams, and/or maps, including how to get to the location in the plant where the task would be performed;
2. operate the equipment and explain how they expect equipment and systems to respond to their actions using props such as pictures of equipment or mockup equipment in lieu of actual equipment in the plant; and
3. use a simulated radiation controlled area (RCA) entry checkpoint, with electronic dosimetry, RWPs, and other RCA entry equipment.

Basis: The team determined that guidance on developing alternative methods for in-plant JPMs is appropriate to include in Appendix C. This proposed guidance represents the process used during construction of Vogtle Units 3 and 4 and reflects the attributes identified in the staff’s approval (ADAMS Accession No. ML16138A241) of Southern Company’s exemption request.

In the operating fleet, at least one of the in-plant JPMs is administered on equipment inside the RCA. If the applicant is unable to enter the RCA because of a lack of knowledge of RCA entry procedures, then the applicant cannot successfully complete the task since the equipment required to be operated is inside the RCA.

Therefore, for new reactors where an RCA does not exist, the team determined it is appropriate to include specific JPM performance standards to evaluate the applicant’s ability to enter the RCA using a mockup with standards for entry that are identical to an actual RCA. This represents the process used during construction of Vogtle Units 3 and 4 to administer the plant walkthrough, which was approved by the NRC staff (ADAMS Accession No. ML16138A241) in response to Southern Nuclear Operating Company’s exemption request (ADAMS Accession No. ML16148A484); this “alternative” method did not require entering the actual plant.

Task B.5

5. Review operator licensing program office processes (e.g., Operator Licensing Manual Chapters (OLMCs)) for applicable revisions that will be necessary as a result of the recommended enhancements to the cold licensing process.

- Consider the delineation of differences between the cold licensing process and operating plant NUREG-1021 guidance.
- Evaluate and make recommendations on the incorporation of previous ROIs into guidance document(s).
- Recommend acceptable methods by which to deviate from the defined process and the approving authorities for deviating from prescribed methods.

Task B.5 Discussion: Task B.5 involved (1) identification of specific change methods required to implement Charter recommendations, and (2) a review of existing staff processes for documenting, addressing, communicating, and monitoring key decisions relevant to the operator licensing process for cold plants.

Identification of Specific Change Methods to Implement Charter Recommendations

Recommendations from the “Charter for the Operator Licensing Process for Cold Plants” can be grouped into eight categories:

- (1) rulemaking evaluations (2)
- (2) NUREG-1021 revision items (22)
- (3) IP revision items (2)
- (4) NEI 06-13A, Revision 2, Appendix A, revision
- (5) ACAD 10-001, Revision 1, Section 6.0, revision
- (6) issuance of an RIS
- (7) revision to Chapter 13 of the SRP
- (8) revision to Regulatory Guide 1.206

Review Existing Staff Processes

The team reviewed the following OLMCs for applicability to the cold plant operator licensing process:

- OLMC-110, “Control of Operator Licensing Guidance Documents,” issued July 2016 (ADAMS Accession No. ML16208A461)

- OLMC-160, “Regional Office Interactions,” issued July 2016 (ADAMS Accession No. ML16208A466)
- OLMC-310, “Regional Office Visit Procedure,” issued September 2010 (ADAMS Accession No. ML102560195)
- OLMC-320, “IOLB/HOIB [Operator Licensing and Training Branch]/ [Human Performance, Operator Licensing and ITAAC Branch] Review of Initial Licensing Examinations,” issued July 2016 (ADAMS Accession No. ML16208A481)
- OLMC-330, “Operator Licensing Oversight Program,” issued July 2016 (ADAMS Accession No. ML16209A005)
- OLMC-500, “Processing Requests for Administrative Reviews and Hearings,” issued July 2016 (ADAMS Accession No. ML16209A008)

During this review, the team found that OLMC revisions are not necessary for the purpose of enhancing the cold licensing process.

Team Recommendations for Charter Part B, Task B.5

B.5-1 (High Priority): The team determined that an RIS is needed to communicate the following items to industry stakeholders for new reactors:

- Communicate that AP1000 operating experience for NRC operator license examinations shows that administering several exams in succession is an advantageous approach. However, rulemaking for 10 CFR Part 50 (continuing training) and 10 CFR Part 55 (in-plant JPMs) should be evaluated as an option to ensure exam administration can begin at a suitable period of time before fuel load that will facilitate quality implementation of the initial license training program, exam development, and administration of the NRC exam, while maintaining uniform conditions for completion of all parts of the exam within 30 days.
- Communicate that development and issuance of a knowledge and abilities (K/A) catalog is a prerequisite to administering NRC exams at cold plants because a K/A catalog is needed to implement NUREG-1021, which, in turn, satisfies 10 CFR Part 55 requirements for operator licensing. Also, communicate the Recommendation B.1.a-1 items for K/A catalog development guidance.
- Communicate that a revision to NUREG-1021 is necessary to clarify and enhance the operator licensing process at cold plants.

Basis: Based on operating experience from the administration of the first AP1000 exams, the team determined it was important to communicate the reason why further evaluations of rulemaking for 10 CFR Part 50 (see Recommendation A.1.a-1 for continuing training) and 10 CFR Part 55 (see Recommendation B.2-1 for in-plant JPMs) may be necessary. This information can be added to the RIS in Recommendation B.1.a-1.

Specifically, the administration of licensed operator NRC exams at new reactor sites may begin at a point sufficiently before fuel load to facilitate quality implementation of the initial license training program, exam development, and administration of the exam by the NRC, for the following reasons:

- The 18-month window before fuel load could overlap with the window for the applicants to perform preoperational testing.
- NRC exam throughput (i.e., number of applicants that passed) within the 18-month window before fuel load may not be sufficient to accomplish fuel load, which could possibly cause delays that were foreseeable and preventable.
- Administering several exams in succession before plant construction is complete allows for early identification and timely incorporation of lessons learned into the operator licensing process for cold plants, which is a safe and deliberate approach of administering several exams.
- The ability of the NRC to administer exams to 40–50 applicants needed to staff a single unit in time for fuel load, within the 18-month window before fuel load, while also conducting exams and inspections at operating reactor sites, may not be possible.

The team determined that it is important to communicate with industry that developing and publishing a K/A catalog is an essential milestone in the cold operator licensing timeline. Other significant operator licensing milestones for 10 CFR Part 52 Plants under Construction, such as having an approved simulator for exam administration, were recommended in response to Part A of this charter (ADAMS Accession No. ML18039A945).