



ACRS Briefing:

Content of Proposed Rulemaking to Align Licensing Processes and Incorporate Lessons Learned from New Reactor Licensing

March 2, 2022

OPENING STATEMENT

Joy Rempe – ACRS Chairman

AGENDA

**Lawrence Burkhardt – ACRS
Technical Support Branch**

PROPOSED DRAFT RULEMAKING

REMARKS

**Vicki Bier – ACRS Subcommittee on
Regulatory Policies and Practices
Chairman**

**Brian Smith – Director, Division of
New and Renewed Licenses, Office
of Nuclear Reactor Regulation**

NRC Staff Presenters



Jim O'Driscoll,
NMSS
Rulemaking Project
Manager



Omid Tabatabai,
NRR
Senior Project
Manager

Today's Meeting

- Discuss the purpose and content of the proposed rule
- Discuss items of interest from the February subcommittee meetings
- Provide an update on next steps and the rulemaking schedule
- Receive ACRS members' perspectives



Purpose of the Rulemaking

- Implement Commission direction in SRM-SECY-15-0002, “Proposed Updates of Licensing Policies, Rules, and Guidance for Future New Reactor Applications,” to:
 - Align Parts 50 and 52 reactor licensing processes
 - Improve clarity
 - Incorporate lessons learned in recent licensing proceedings
 - Reduce unnecessary burden on applicants and staff

Scope of the Proposed Rule

- Number of technical areas: 11
- Number of items in scope: 61
- Items with rulemaking recommendation: 60
 - Number of items with rulemaking and guidance development or revision: 18
 - Number of guidance documents with rule: 13
- Number of 10 CFR parts affected by rulemaking: 9

Alignment of Parts 50 and 52

- The proposed rule addresses four areas where the NRC's policies and direction for new reactors have resulted in requirements and guidance for Part 52 applicants only:
 - Application of Severe Accident Policy Statement (1)
 - Probabilistic Risk Assessment Requirements (3)
 - Three Mile Island Requirements (1)
 - Fire Protection Design Features and Plans (1)



Lessons Learned from Recent Experience

- The proposed rule covers topics for which the NRC's recent experience with new light water reactor licensing has resulted in lessons learned

Operator Licensing (5)	Physical Security (2)	Fitness For Duty (4)	Emergency Planning (7)
Part 52 Licensing Process (21)	Environmental Protection (1)	Applicability of Other Processes to the 10 CFR Part 52 Process (5)	Miscellaneous Topics (9)

Estimates of Costs and Savings

- Total net averted costs to industry and the NRC between \$16.1 million and \$25.5 million
- To account for sensitivity to plant-specific conditions, the NRC staff performed an uncertainty analysis, which found that the chance of net averted costs is greater than 99%
- Rulemaking would yield unquantified benefits as well (regulatory efficiency, public confidence)

Topics for Further Discussion

- Relationship to non-LWRs
- Cumulative effects of changes to the design when the plant is built
- Use of probabilistic risk assessment in design
- Cutoff accident frequency for “credible” accidents
- Flexibility for changes related to digital I&C
- Definition of “essentially complete design”

Relationship to Non-LWRs

- Cross-cutting item
- The item was added in response to public comments on the regulatory basis
- The goal of the discussion and proposed changes is to explain how this rulemaking activity fits with other licensing process efforts and rulemakings that relate to non-light water technology



Cumulative Effects of Changes During Construction

- Part 50 and Part 52 remain distinct processes
- Part 52 is based on:
 - Essentially complete nuclear plant design
 - Final design information
 - Resolution of all safety issues
 - Finality for resolutions in subsequent proceedings



Use of Probabilistic Risk Assessment in Design

- Change: Extend the current PRA requirements in Part 52 to apply to Part 50 power reactor license applicants
- Affected regulations:
 - § 50.34(a), “Preliminary safety analysis report”
 - § 50.34(b), “Final safety analysis report”
- Aligns Parts 50 and 52 on the use of PRA in the design of the facility and ensures that similar risk information is supplied in applications for new power reactor CPs or OLs under Part 50
- Public comments:
 - Ten comments; expressed concern over changes and need for clarification on how to meet requirements
 - In response to comments, NRC changed the cost model to reflect the significant effort required to complete an upgrade prior to loading fuel
- Cost/benefit: Development of PRA, rulemaking; qualitative

Cutoff Accident Frequency for “Credible” Accidents

- A discrete cutoff accident frequency for credible accidents is not defined
- The changes to 10 CFR 50.59(c) would align the Part 50 change process with Part 52 with regard to consideration of severe accidents
- This rulemaking does not further define “credible” or what is “substantial”



Review of Changes Related to Digital I&C

- Endorsement of NEI 96-07 Appendix D unaffected
- RG 1.187 unaffected
- Current interim staff guidance unaffected
- No changes to 10 CFR 50.55a(h) in this rulemaking



Review of Changes Related to Digital I&C (cont'd)

- Staff will ask for the level of detail necessary to meet a safety finding
- Design acceptance criteria are not needed
- Proposed change process for standard design approvals would use current methods



Clarify the Phrase “Essentially Complete Design”

- Change: Add standardized definition of “essentially complete design” to Part 52
- Affected regulations:
 - § 52.1, “Definitions”
- Add clarity and efficiency; reduce scope of information needed for review
- Public comments:
 - Review September 24, 2021 NEI letter to NRC
- Cost/benefit: Cost-beneficial

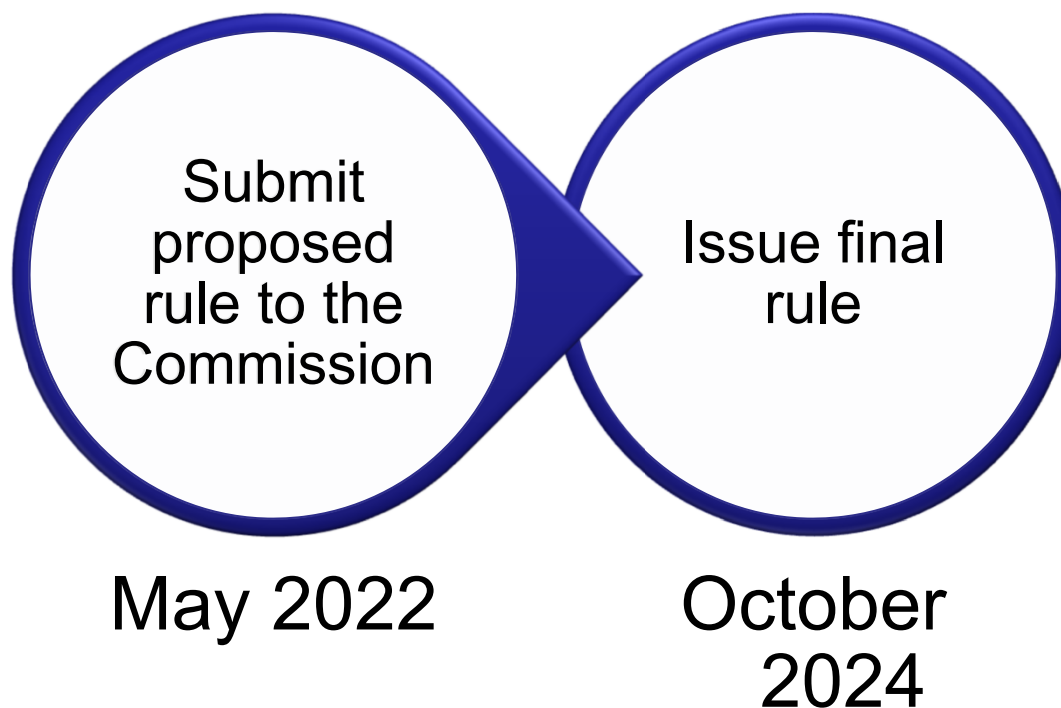
Questions



Recap and Next Steps

- Complete concurrence on draft proposed rule
- Submit the proposed rule to the Commission
- Plan for additional public meeting(s) during the public comment period for the proposed rule

Rulemaking Schedule



Contact Information



Jim O'Driscoll, Project Manager

Division of Rulemaking, Environmental, & Financial Support

Office of Nuclear Material Safety and Safeguards

U.S. Nuclear Regulatory Commission

Email: James.O'Driscoll@nrc.gov

Phone: [301-415-1325](tel:301-415-1325)

Omid Tabatabai, Senior Project Manager

Division of New Reactor Licensing

Office of Nuclear Reactor Regulation

U.S. Nuclear Regulatory Commission

Email: Omid.Tabatabai@nrc.gov

Phone: [301-415-6616](tel:301-415-6616)

SUPPORTING INFORMATION

Abbreviations

ACRS	Advisory Committee on Reactor Safeguards	LAR	License Amendment Request
ADAMS	Agencywide Documents Access and Management System	LWR	Light-Water Reactor
AEA	Atomic Energy Act of 1954, as amended	ML	Manufacturing License
CFR	Code of Federal Regulations	NEI	Nuclear Energy Institute
COL	Combined License	NEIMA	Nuclear Energy Innovation and Modernization Act
CP	Construction Permit	NMSS	Office of Nuclear Material Safety and Safeguards
DAC	Design Acceptance Criteria	NRC	Nuclear Regulatory Commission
DC	Design Certification	NRR	Office of Nuclear Reactor Regulation
DG	Draft Regulatory Guide	OL	Operating License
ECCS	Emergency Core Cooling System	PRA	Probabilistic Risk Assessment
EP	Emergency Planning	RG	Regulatory Guide
ESP	Early Site Permit	SDA	Standard Design Approval
FFD	Fitness For Duty	SECY	Office of the Secretary
FRN	<i>Federal Register</i> Notice	SRP	Standard Review Plan
FSAR	Final Safety Analysis Report	SSC	Structure, System, and Component
I&C	Instrumentation and Controls	STP	South Texas Project
ISG	Interim Staff Guidance	TMI	Three Mile Island
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria		

References

Document Title	ADAMS Accession Number/FR Citation
Regulatory Guide 1.70, Revision 3, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," dated November 1978	ML011340122
SECY-90-241, "Level of Detail Required for Design Certification Under Part 52," dated July 11, 1990	ML003707877
IEEE Std. 603-1991, "Standard Criteria for Safety Systems for Nuclear Power Generating Stations," dated December 31, 1991	https://ieeexplore.ieee.org/document/159411
NEI 01-01/EPRI TR-102348, Revision 1, "Guideline on Licensing Digital Upgrades," dated March 2002	ML020860169
NEI 00-04, Revision 0, "10 CFR 50.69 SSC Categorization Guideline," dated July 2005	ML052910035
Regulatory Guide 1.201, Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance," dated May 2006	ML061090627
NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 13.3, Revision 3, "Emergency Planning," dated March 2007	ML063410307
NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 19.1, Revision 3, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," dated September 2012	ML12193A107
Regulatory Guide 4.7, Revision 3, "General Site Suitability Criteria for Nuclear Power Stations," dated March 2014	ML12188A053
NEI 96-07, Appendix C, Revision 0 – Corrected, "Guideline for Implementation of Change Processes for New Nuclear Power Plants Licensed Under 10 CFR Part 52," dated March 2014	ML14091A739
"Results of Periodic Review of Regulatory Guide (RG) 1.201," dated April 23, 2015	ML15091A788

References (cont'd)

Document Title	ADAMS Accession Number/FR Citation
Interim Staff Guidance COL-ISG-025, "Changes During Construction Under 10 CFR Part 52," dated July 2015	ML15058A377
NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 19.0, Revision 3, "Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors," dated December 2015	ML15089A068
International Atomic Energy Agency, Specific Safety Requirements No. SSR 2/1, Revision 1, "Safety of Nuclear Power Plants: Design," dated February 2016	https://www.iaea.org/publications/8771/safety-of-nuclear-power-plants-design
NRC Letter to NEI Related to the Public Meeting of March 28, 2018, Regarding Avoiding Delays in Issuance of U.S. Nuclear Regulatory Commission Combined Licenses, dated May 9, 2018	ML18123A245
Regulatory Issue Summary (RIS) 2002-22, Supplement 1, Clarification on Endorsement of Nuclear Energy Institute Guidance in Designing Digital Upgrades in Instrumentation and Control Systems, dated May 31, 2018	ML18143B633
Regulatory Guide 1.206, Revision 1, "Applications for Nuclear Power Plants," dated October 2018	ML18131A181
DI&C-ISG-06, Revision 2, "Licensing Process," dated December 2, 2018	ML18269A259
NEI 18-04, Revision 1, "Risk-Informed Performance-Based Technology Inclusive Guidance for Non Light Water Reactor Licensing Basis Development," dated August 2019	ML19241A472
NEI Letter to the NRC, "Part 50/52 Lessons Learned Rulemaking," dated March 9, 2020	ML20108F543
NEI 96-07, Appendix D, Revision 1, "Supplemental Guidance for Application of 10 CFR 50.59 to Digital Modifications," dated May 2020	ML20135H168



References (cont'd)

Document Title	ADAMS Accession Number/FR Citation
Public Meeting to Discuss the Status of Rulemaking to Align Licensing Processes and Apply Lessons Learned from New Reactor Licensing [NRC-2009-0196; RIN 3150-AI66] held April 29, 2020, dated May 26, 2020	ML20141L609
Regulatory Guide 1.233, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors," dated June 2020	ML20091L698
NRC Letter to NEI, "Part 50/52 Lessons-Learned Rulemaking: U.S. Nuclear Regulatory Commission Transparency and Stakeholder Engagement," dated September 8, 2020	ML20156A308
Regulatory Guide 1.200, Revision 3, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," dated December 2020	ML20238B871
Regulatory Guide 1.237, Revision 0, "Guidance for Changes During Construction for New Nuclear Power Plants Being Constructed Under a Combined License Referencing a Certified Design Under 10 CFR Part 52," dated February 2021	ML20349A335
"Design Review Guide (DRG): Instrumentation and Controls for Non-Light-Water Reactor (Non-LWR) Reviews," dated February 26, 2021	ML21011A140
NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," last reviewed/updated March 9, 2021	https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800/index.html
NEI, "Industry Comments on the Regulatory Basis for Alignment of Licensing Processes and Lessons Learned from New Reactor Licensing (Docket ID: NRC-2009-0196)," dated May 14, 2021	ML21144A164



References (cont'd)

Document Title	ADAMS Accession Number/FR Citation
Regulatory Guide 1.187, Revision 3, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," dated June 2021	ML21109A002
NUREG-1021, Revision 12, "Operator Licensing Examination Standards for Power Reactors," dated September 2021	ML21256A276
Draft Interim Staff Guidance; Request for Comment, "Safety Review of Light-Water Power-Reactor Construction Permit Applications," dated December 14, 2021	86 FR 71101
Draft FRN to Support ACRS Subcommittee Meeting – 10 CFR Part 50/52 Rulemaking to Align Licensing Processes and Lessons Learned from New Reactor Licensing, dated January 27, 2022	ML22020A002
ACRS Subcommittee Public Meeting – NRC Presentation for 10 CFR Part 50/52 Rulemaking to Align Licensing Processes and Lessons Learned from New Reactor Licensing, dated February 1, 2022	ML22020A001
Draft Guidance Documents to Support ACRS Subcommittee Meeting Regarding Part 50/52 Proposed Rulemaking, dated February 15, 2022	ML22040A074
ACRS Subcommittee Public Meeting – NRC Presentation for 10 CFR Part 50/52 Rulemaking to Align Licensing Processes and Lessons Learned from New Reactor Licensing, dated February 18, 2022	ML22046A035



ACRS

**ITAAC
PRESENTATION**

MARCH 2, 2022



Atomic Energy Act's ITAAC Requirements

- Section 185b. (42 U.S.C. 2235(b)) of the Atomic Energy Act of 1954, as amended (AEA), and 10 CFR 52.97(b) require that the Commission identify within the combined license the Inspections, Tests, and Analyses (ITAs), including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the AEA, and the Commission's rules and regulations. To fulfill this requirement, the Commission included ITAAC in Appendix C to the combined license (COL) for VEGP Units.
- Following issuance of the combined license, Section 185b. requires that the Commission ensure that the prescribed ITAs are performed and, before operation of the facility, find that the prescribed acceptance criteria are met. The NRC codified the requirement to ensure completion of the ITAs in 10 CFR 52.99(e) and codified the requirement to find that the acceptance criteria are met in 10 CFR 52.103(g).
- In the July 19, 2013, Staff Requirements Memorandum for SECY-13-0033, "Staff Requirements – SECY-13-0033 – Allowing Interim Operation Under Title 10 of the Code of Federal Regulations Section 52.103" (ADAMS Accession No. ML13200A115), the Commission delegated the responsibility for the 10 CFR 52.103(g) finding to the staff.



Staff's two-pronged approach to fulfill the requirements

- First, the staff reviews 100 percent of the licensee's ITAAC Closure Notifications (ICNs) submitted under 10 CFR 52.99(c)(1). These reviews verify that the licensee provided a sufficient basis to demonstrate that the ITAs were performed as required and that the results met the prescribed acceptance criteria. The staff also reviews 100 percent of the ITAAC Post Closure Notifications (IPCNs) submitted under 10 CFR 52.99(c)(2) to verify that the ITAAC are still satisfied notwithstanding new, material information.
- Second, the staff performs independent inspections of a carefully selected sample of ITAAC to independently verify (1) the licensee's performance of the ITAs and (2) that the obtained results met the prescribed acceptance criteria.
 - Additionally, these inspections also verified that the licensee (1) had quality construction programs, processes, and procedures; (2) provided adequate quality assurance (QA) oversight of construction activities; and (3) identified and corrected conditions adverse to quality.
 - Moreover, a sample of the ICNs were inspected against their associated closure packages to verify the accuracy of the information reported in the ICNs.



ITAAC Prioritization Process

While the scope of the NRC's inspection programs is comprehensive, 100-percent inspection is neither necessary nor efficient when evaluating licensee performance. For this reason, the NRC historically has relied on a risk-informed sample-based inspection program. For VEGP, the Construction Inspection Program (CIP) focused on a select sample of predefined inspection targets (i.e., "targeted ITAAC").

The methodology for prioritizing the ITAAC for inspection was based in part on a quantitative process called the Analytic Hierarchy Process (AHP). AHP is a method of comparison used to reduce the subjectivity in prioritization and provide structure to the decision-making process.

The prioritization process was managed such that the rating given each ITAAC correlated to the amount of assurance one could obtain from inspecting that ITAAC. In this way, **it was not the ITAAC that was prioritized, but rather the value of inspecting that ITAAC, to maximize the agency's ability to detect any significant construction flaw.**

The "Technical Report on the Prioritization of Inspection Resources for Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)" (ADAMS Accession No. ML060740006), contains further detail on the AHP process. The process for prioritizing the ITAAC for inspection is described in OI NRR-LIC-210, "Prioritization of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for Inspection" (ADAMS Accession No. ML20057D521).



ITAAC Prioritization Process (cont'd)

The first step in the prioritization process classifies and groups the ITAAC into families to facilitate ITAAC inspection sampling within each family. ITAAC are classified based on (1) the activities performed to implement it, and/or (2) its acceptance criterion. The ITAAC Matrix (see next slide) establishes a logical way to group the ITAAC into families for inspection sampling purposes, but it does not provide directions on what ITAAC to inspect.

ITAAC are grouped by selecting the single best combination of a matrix column (i.e., construction program) and a matrix row (i.e., construction process or system, structure, or component) that best covers the ITAAC's construction activities. For example, all ITAAC for the as-built inspection of instrumentation and control components will be binned in the matrix family [A10] formed by the intersection of column (A) and row (10).

The use of the ITAAC Matrix provides a consistent framework for developing the inspection program for each new or advanced reactor design and establishes a sound, efficient, inspection sampling approach. Because the ITAAC within a family are similar, an equivalent licensee performance can be expected for each of them.



ITAAC MATRIX

	A) As-Built Inspection	B) Welding	C) Const Testing	D) Opn Testing	E) Qual Criteria	F) Design /Fab Req
01) Foundations & Buildings	A01	B01	C01	D01	E01	F01
02) Struc Conc	A02	B02	C02	D02	E02	F02
03) Piping	A03	B03	C03	D03	E03	F03
04) Pipe Spt & Restraints	A04	B04	C04	D04	E04	F04
05) RPV & Int'l's	A05	B05	C05	D05	E05	F05
06) Mech Comp	A06	B06	C06	D06	E06	F06
07) Valves	A07	B07	C07	D07	E07	F07
08) Elec Comp & Systems	A08	B08	C08	D08	E08	F08
09) Elec Cable	A09	B09	C09	D09	E09	F09
10) I&C Comp & Systems	A10	B10	C10	D10	E10	F10
11) Containment Integrity & Pen's	A11	B11	C11	D11	E11	F11
12) HVAC	A12	B12	C12	D12	E12	F12
13) Eqp Handling & Fuel Racks	A13	B13	C13	D13	E13	F13
14) Complex Sys w/ Multi-Comp	A14	B14	C14	D14	E14	F14
15) Fire Prot	A15	B15	C15	D15	E15	F15
16) Engineering	A16	B16	C16	D16	E16	F16
17) Security	A17	B17	C17	D17	E17	F17
18) EP	A18	B18	C18	D18	E18	F18
19) Rad Prot	A19	B19	C19	D19	E19	F19



ITAAC Prioritization Process

The second step involves rank-ordering the ITAAC based upon certain defined attributes that make one ITAAC more or less important to inspect. The defined attributes are:

- (1) safety significance,
- (2) propensity for making errors,
- (3) construction and testing experience,
- (4) the opportunity to verify ITAAC completion by other means, and
- (5) licensee (applicant) oversight. {Not used}

Each attribute is weighted based on its importance in achieving the overall objective of detecting significant construction flaws.



“ITAAC MAINTENANCE RULE” 10 CFR 52.99(c)(2)

ITAAC post-closure notifications. Following the licensee’s ITAAC closure notifications under paragraph (c)(1) of this section until the Commission makes the finding under 10 CFR 52.103(g), the licensee shall notify the NRC, in a timely manner, of new information that materially alters the basis for determining that either inspections, tests, or analyses were performed as required, or that acceptance criteria are met. The notification must contain sufficient information to demonstrate that, notwithstanding the new information, the prescribed inspections, tests, or analyses have been performed as required, and the prescribed acceptance criteria are met.



10 CFR 52.103(g) vs. ITAAC MAINTENANCE

What does “ITAAC are met” mean in 10 CFR 52.103(g)?

At the time of the 52.103(g) finding the staff will consider all acceptance criteria “are met” if both of the following conditions hold:

- All ITAAC were verified to be met at one time; and
- The licensee provides confidence, in part through the notifications in 10 CFR 52.99(c), that the ITAAC determination bases have been maintained and the ITAAC acceptance criteria continue to be met, and the NRC has no reasonable information to the contrary.

This approach will allow licensees to have ITAAC-related structures, systems, or components, or security or emergency preparedness related hardware, undergoing maintenance or certain other activities at the time of the 10 CFR 52.103(g) finding, if the programs credited with maintaining the validity of completed ITAAC guide those activities and the activities are not so significant as to exceed a threshold for reporting.



ITAAC MAINTENANCE THRESHOLDS

- **Material Error or Omission**—Is there a material error or omission in the original ITAAC closure notification?
- **Post Work Verification (PWV)**—Will the PWV use a significantly different approach than the original performance of the inspection, test, or analysis as described in the original ITAAC notification?
- **Engineering Changes**—Will an engineering change be made that materially alters the determination that the acceptance criteria are met?
- **Additional Items to Be Verified**—Will there be additional items that need to be verified through the ITAAC?
- **Complete and Valid ITAAC Representation**—Will any other licensee activities materially alter the ITAAC determination basis?



Post 10 CFR 52.103(g) Finding

Pursuant to 10 CFR 52.103(h), after the Commission makes the 10 CFR 52.103(g) finding, the ITAAC do not, by virtue of their inclusion in the combined license, constitute regulatory requirements for the licensee.

While ITAAC are no longer requirements after the 10 CFR 52.103(g) finding, subsequent changes to the facility or procedures described in the final safety analysis report (as updated) must comply with the requirements in 10 CFR 52.98(e) or (f), as applicable.

The technical specifications in the combined license NPF-91, Appendix A, "Vogtle Electric Generating Plant Units 3 and 4 Technical Specifications," become effective upon a finding that the acceptance criteria in the license (ITAAC) are met in accordance with 10 CFR 52.103(g).