

BREAKOUT SESSION:  
CONSTRUCTION INSPECTION  
PROGRAM

# Breakout Session:

## Construction Inspection Program

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- Glenn Tracy
  - Office of New Reactors – Headquarters, NRC
- Russell Bell
  - Nuclear Energy Institute
- Richard Croteau
  - Center for Construction Inspection - Region II, NRC
- Michael Smith
  - Southern Nuclear Operating Company

# Breakout Session:

## Construction Inspection Program (cont'd.)

### □ **Objectives:**

- Provide a comprehensive update on industry and regulatory activities in the areas of new reactors construction
- Provide the latest perspectives on applicants' activities, NRC oversight, and regulatory interactions throughout the new reactor design, manufacturing, fabrication, and construction processes to the 10 CFR 52.103(g) finding

# Breakout Session:

## Construction Inspection Program (cont'd.)

- Panelist contributions have been integrated into a single presentation. The panelists will present their independent views on areas of responsibility or expertise throughout the presentation in an effort to provide:
  - ▣ Useful information on the latest oversight and inspections, tests, analyses, and acceptance criteria (ITAAC) initiatives, and regulatory and industry guidance, and
  - ▣ Key insights regarding regulator-licensee interactions throughout the process

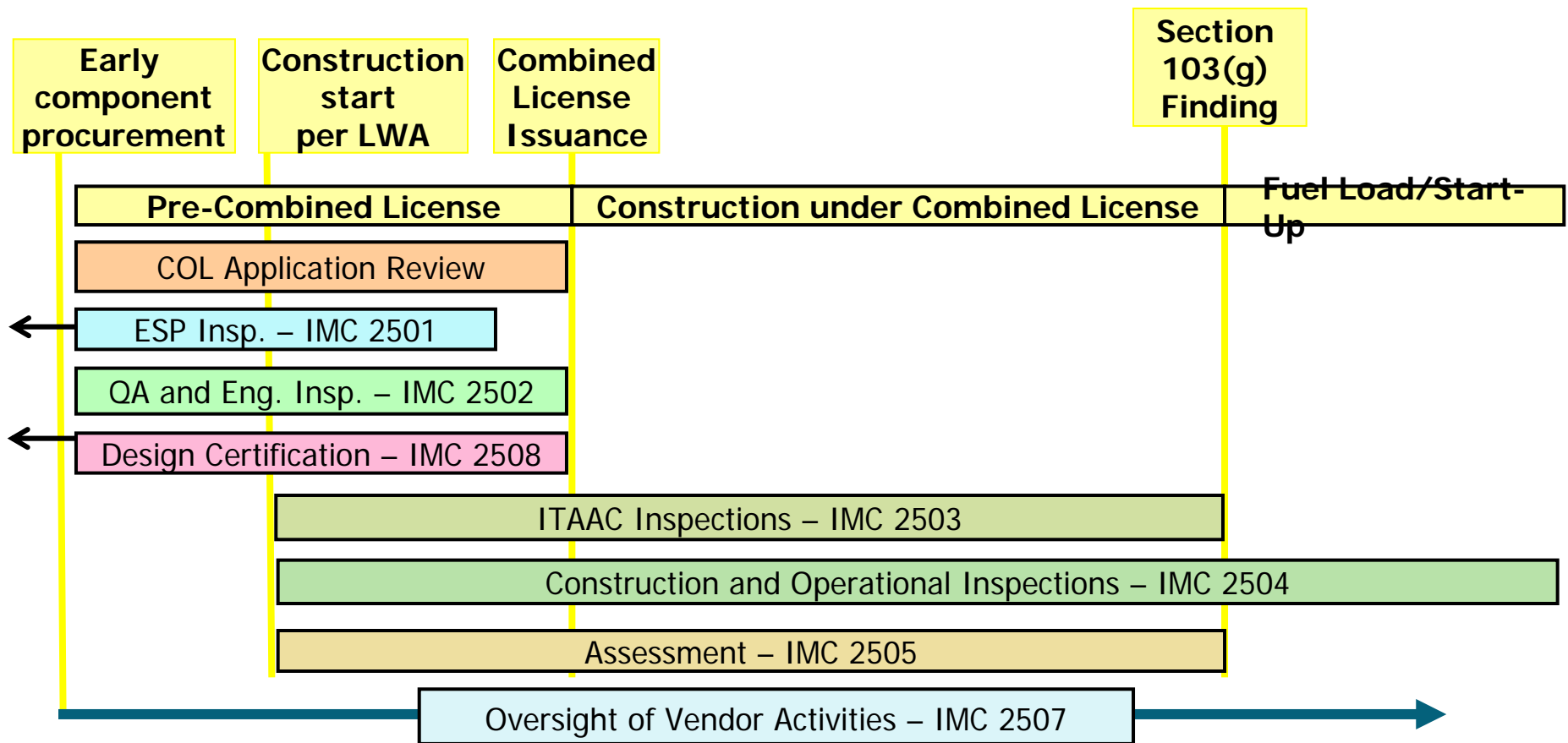
# New Reactors Construction Oversight Program

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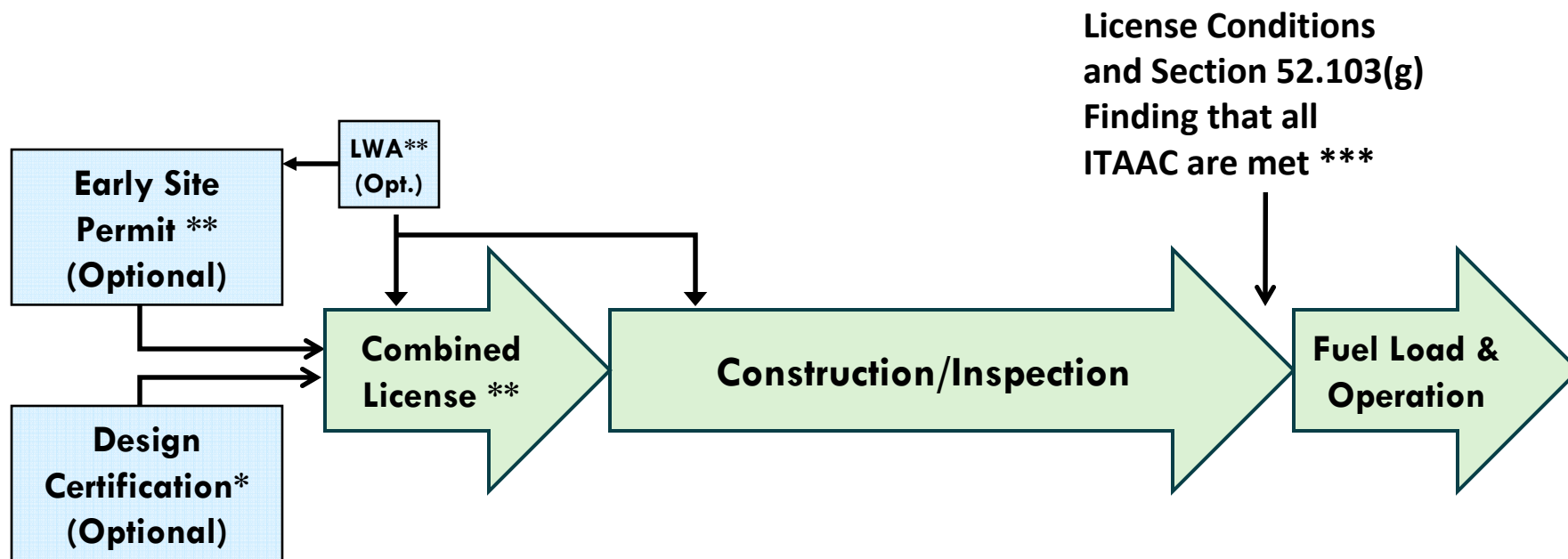
- Ensure that plants are constructed in accordance with approved designs, safety, and security regulations
- Ensure operational readiness
- Communicate results to all stakeholders
- Ensure that a well constructed unit is ready for safe operation and transition to the Reactor Oversight Program

# New Reactors Construction Oversight Program

*Oversight will assure plants are constructed as designed.*



# 10 CFR Part 52 Licensing Process



ITAAC is short for Inspections, Tests, Analyses and Acceptance Criteria

\*\*\* Public Hearing Opportunity

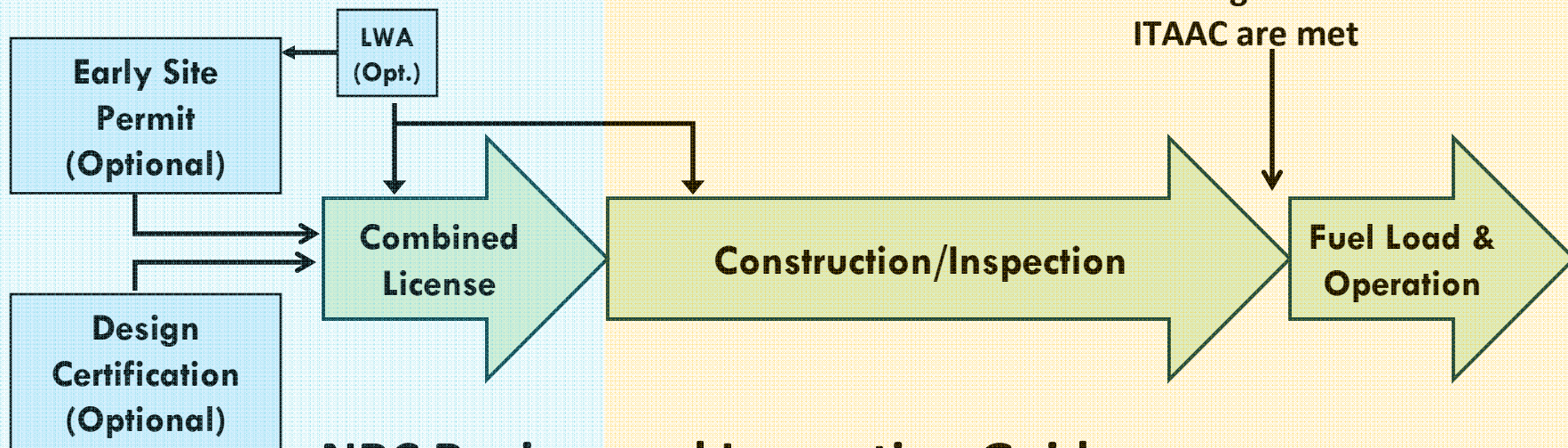
\*\* Mandatory Public Hearing

\* Public Comment Opportunity

# 10 CFR Part 52 Licensing Process

## Guidance for Applicants & Licensees

- Regulatory Guide 1.206
- Interim Staff Guidance
- NEI Guides & Templates



## NRC Review and Inspection Guidance

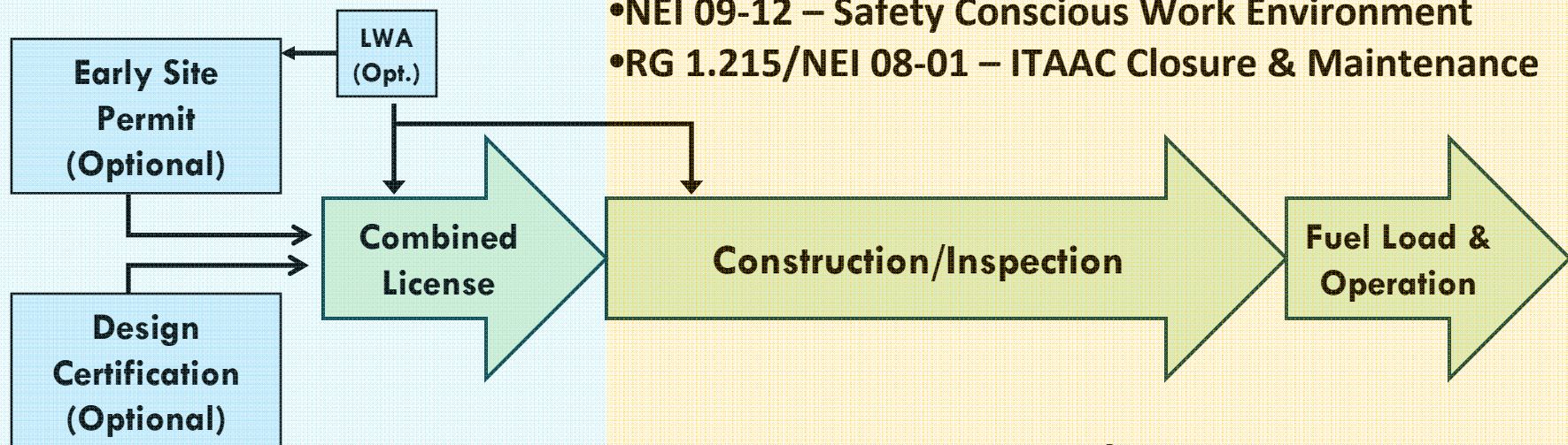
- NRC Standard Review Plan
  - IMC-2501 (ESP)
  - IMC-2502 (Pre-COL)
  - IMC-2508 (DC)



# 10 CFR Part 52 Licensing Process

## Guidance for Applicants & Licensees

- NEI 06-14 – Quality Assurance Program
- NEI 08-02 – Corrective Action Processes
- NEI 09-12 – Safety Conscious Work Environment
- RG 1.215/NEI 08-01 – ITAAC Closure & Maintenance



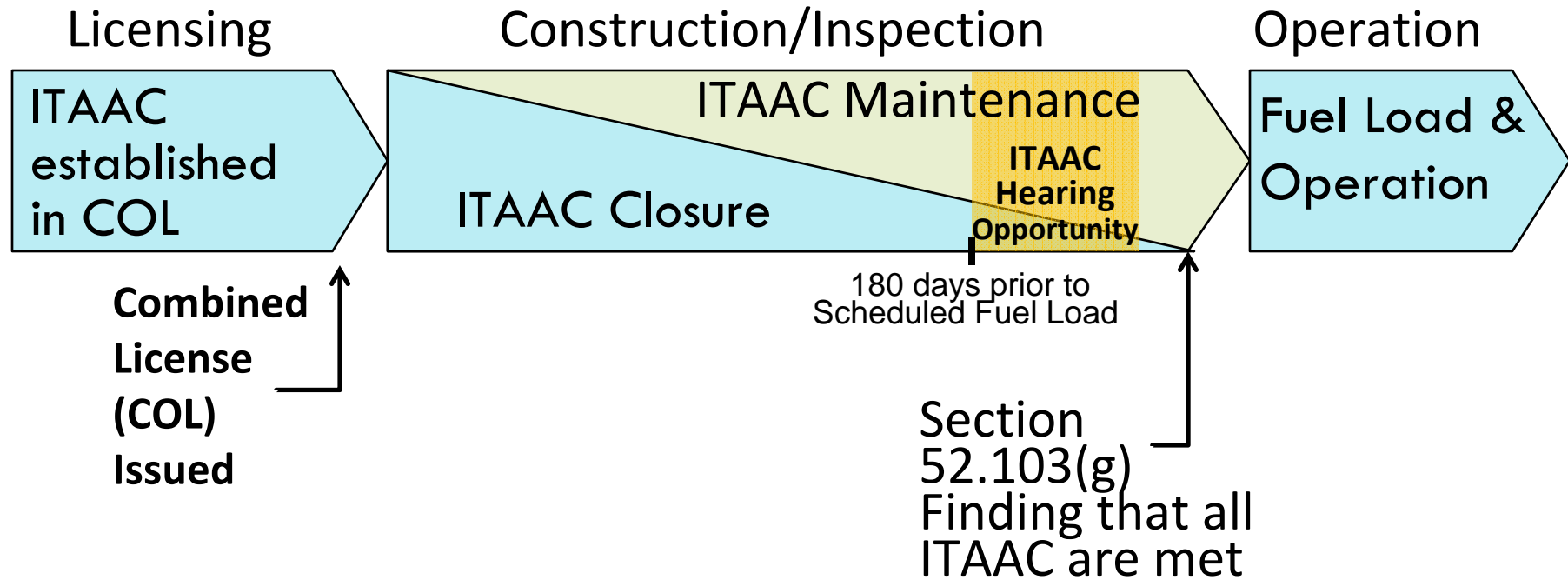
## NRC Inspection Guidance

- IMC-2503 (ITAAC)
- IMC-2504 (Construction & Operational Programs)
- IMC-2505 (Construction Assessment)
- IMC-2507 (Vendor Inspection)

# Construction Reactor Oversight Program – cROP

- IMC 2505 revision was issued on December 2009
- Program will be implemented soon at Vogtle
- Staff Requirements Memoranda dated December 5, 2008 directed the staff to consider additional options
- NEI proposal received on July 2009
- Information SECY-09-0113 detailing next steps was submitted in August 2009
- Senior level Construction Inspection Assessment Program Workshop in November 2009
- Options to be provided to the Commission by November 2010

# Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Process



# ITAAC Maintenance

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- After ITAAC are completed, licensees must maintain the validity of ITAAC conclusions to support the Section 52.103(g) finding that all ITAAC are met
  - ▣ Quality Assurance Program
  - ▣ Corrective Action Program
  - ▣ Design/Configuration Control Program
  - ▣ Construction/Maintenance Program

# ITAAC Maintenance Process

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- Licensee is responsible for ITAAC maintenance
- Licensees to notify NRC of activities that materially alter ITAAC Determination Bases
  - Supplemental ITAAC Closure Letter
  - Notification thresholds are being defined in NEI 08-01 (revision in progress)
- Licensee submits All ITAAC Complete Letter
- NRC will assess Licensee's implementation of ITAAC maintenance program

# Criteria for Section 103(g) Finding

- All ITAAC were met at one time
- Licensee provides confidence that ITAAC determination bases are maintained and ITAAC continue to be met
  - ▣ Structure, systems, and components (SSCs) may be out for maintenance at the time of the Section 52.103(g) finding
  - ▣ No unresolved conditions that exceed threshold for Supplemental ITAAC Closure Letters
- NRC staff makes recommendation regarding the completion status of ITAAC

**Tech Specs take effect upon Section 52.103(g) finding**

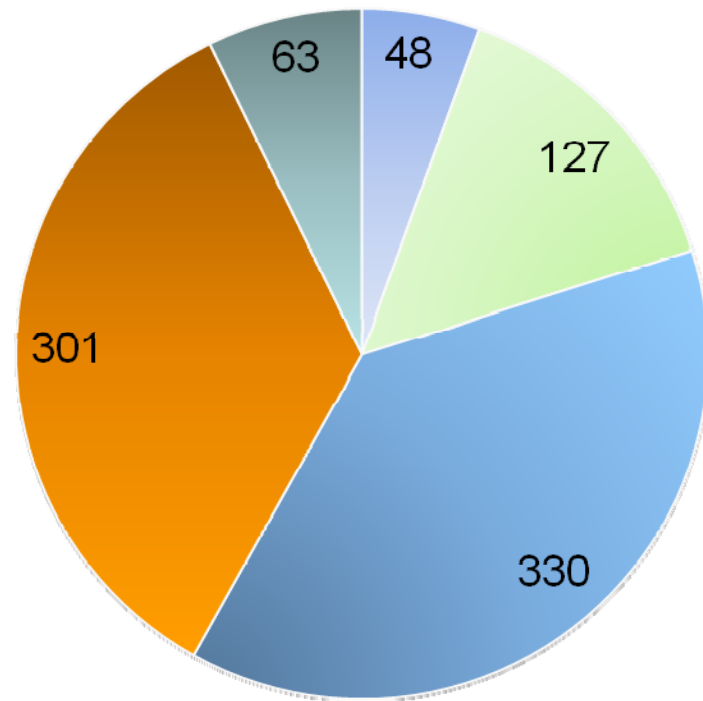
# ITAAC Current Activities

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- NEI 08-01 being revised to include ITAAC maintenance guidance and examples
- Revision to be completed in early 2010
- NRC will revise Regulatory Guide 1.215
- NRC Rulemaking to include ITAAC maintenance period

# ITAAC Overview

~806 AP1000 ITAAC  
~63 Site Specific



## ITAAC Types

- Engineering Analysis
- Components
- Construction Type Test
- Pre-Operational Tests
- Site Specific



# ITAAC Example



- As an example, ITAAC for squib valves in the automatic depressurization system (ADS) for AP1000 reactor will be discussed
- NRC staff continues to develop inspection procedures to verify ITAAC completion during construction of new nuclear power plants

# Targeted ITAAC Selection



- There are 51 ITAAC within the reactor coolant system
- Of those, there are 36 targeted for NRC inspection
- 15 of the targeted ITAAC are on automatic depressurization system Squib Valves
- 3 of these 15 ITAAC were chosen for this exercise

# Targeted ITAAC Selection

<b>ITAAC</b>	<b>Description</b>
2.1.02.02a	The valve is designed and constructed in accordance with ASME Code Section III requirements.
2.1.02.12a.v	The valve performs its active safety-related function of changing position as indicated in the table.
2.1.02.11b.i	The valve performs its active safety function after receiving a signal from the PMS.

# ITAAC 2.1.02.11b.i

<b>Design Commitment</b>	<b>Inspection, Test, Analysis (ITA)</b>	<b>Acceptance Criteria (AC)</b>
The valves identified in Table 2.1.2-1 as having PMS control perform an active safety function after receiving a signal from the PMS.	Testing will be performed on the squib valves identified in Table 2.1.2-1 using real or simulated signals into the PMS without stroking the valve.	The squib valves receive a signal at the valve electrical leads that is capable of actuating the squib valve.

**Pre-Operational testing of valve signal initiation**

# Licensee Construction Oversight of Vogtle 3 & 4

## Pre-construction/Pre-Combined License (COL) Activities

(Grading, clearing, excavation, erection of transmission lines; major procurement begins)

Vendor Surveillance	<ul style="list-style-type: none"> <li>•Applicant site visits to Japan, China, Italy</li> <li>•Applicant resident inspectors in Korea and Louisiana</li> </ul>
Program Implementation	<ul style="list-style-type: none"> <li>•Corrective Action Program</li> <li>•Document Control</li> </ul>
Pre-Construction Oversight	<ul style="list-style-type: none"> <li>•Establish Organization</li> </ul>
Procedure Development	<ul style="list-style-type: none"> <li>•Prepare and approve procedures</li> </ul>
ITAAC Implementation	<ul style="list-style-type: none"> <li>•Squib valve procurement</li> </ul>

# NRC Oversight of New Reactor Construction

## Pre-construction/Pre-COL Activities

Inspection Areas	<ul style="list-style-type: none"><li>•NRC Vendor Inspections (Inspection Manual Chapter (IMC) 2507)<ul style="list-style-type: none"><li>• Vendor Inspection of Squib Valve Manufacturer</li></ul></li><li>•Early Site Permit Inspections, if applicable (IMC 2501)</li><li>•Quality Assurance Inspections (IMC 2502)</li><li>•Inspection of Construction and Operational Programs (IMC 2504)</li></ul>
Public Communications	<ul style="list-style-type: none"><li>•Public Outreach Meetings</li><li>•Publicly Available Inspection Reports</li><li>•Assessment Meeting</li></ul>

# Licensee Construction Oversight of Vogtle 3 & 4

## Construction Activities under Limited Work Authorization (LWA)/COL

(Backfill, MSE walls, mudmats and liner; procurement continues; onsite fabrication begins)

Vendor Surveillance	<ul style="list-style-type: none"> <li>•Ongoing</li> <li>•Squib Valve Fabricator Audit</li> </ul>
Program Implementation	<ul style="list-style-type: none"> <li>•Fitness for Duty</li> <li>•Quality Assurance</li> <li>•SCWE</li> </ul>
Construction Oversight	<ul style="list-style-type: none"> <li>•Expand Construction Oversight</li> </ul>
Procedure Development	<ul style="list-style-type: none"> <li>•Prepare and approve procedures</li> <li>•Implement configuration management</li> </ul>
ITAAC Implementation	<ul style="list-style-type: none"> <li>•Site Specific Backfill</li> </ul>

# ITAAC Example

## Site Specific Backfill

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>2.5.4.5.5a Category 1 and 2 backfill soil placed in the power block footprint will consist of sand and silty sand, and shall be placed in maximum 12 inch lifts compacted to a minimum of 95 percent of the maximum dry density according to ASTM D 1557-02 (Modified Proctor), to be able to support the Seismic Category 1 structures as specified within the Early Site Permit 2.5.4.5.3 Backfill Design.</p>	<p>Testing shall be performed to confirm the density of the backfilled soil is a minimum of 95 percent of the maximum dry density according to ASTM D 1557-02 (Modified Proctor). Testing of the Category 1 and 2 backfill shall be done in accordance with the Early Site Permit 2.5.4.5.5 Quality Control and ITAAC.</p>	<p>Category 1 and 2 backfill will be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 1557-02 (Modified Proctor).</p>



# NRC Oversight of New Reactor Construction

## Construction Activities under LWA/COL

<p>Inspection Areas</p>	<ul style="list-style-type: none"> <li>•Inspections of Targeted ITAAC (IMC 2503)               <ul style="list-style-type: none"> <li>•NRC ITAAC Inspection of Squib Valves (for ASME, Seismic, EQ) and Backfill</li> </ul> </li> <li>•Inspection of Construction and Operational Programs (IMC 2504)</li> <li>•Vendor Inspections (IMC 2507)</li> <li>•Resident Inspectors</li> </ul>
<p>Assessment Process</p>	<ul style="list-style-type: none"> <li>•Periodic Construction Assessment Begins (IMC 2505)</li> </ul>
<p>Public Communications</p>	<ul style="list-style-type: none"> <li>•Public Meetings</li> <li>•ITAAC Completion Notices</li> <li>•Construction Inspection Results</li> <li>•Assessment Meetings</li> </ul>

# Licensee Construction Oversight of Vogtle 3 & 4

## Approach to 103(g) and Fuel Load

(complete safety related construction; prepare for operation)

Construction Oversight at Plant	<ul style="list-style-type: none"> <li>•Engineering and Construction personnel engaged.</li> </ul>
Fabrication Oversight at Module Facility	<ul style="list-style-type: none"> <li>•Onsite surveillance</li> </ul>
ITAAC Closure	<ul style="list-style-type: none"> <li>•Reviewed by Southern Nuclear Company (SNC)</li> <li>•Squib Valve Manufacturing Complete – Electrical Testing</li> </ul>
Pre-fuel Activity	<ul style="list-style-type: none"> <li>•Inspections</li> <li>•Plant maintenance and ITAAC maintenance</li> <li>•Program verification</li> <li>•Operator and Plant Training</li> </ul>

# NRC Oversight of New Reactor Construction

## Approach to 103(g) And Fuel Load

Inspection Areas	<ul style="list-style-type: none"> <li>•Targeted ITAAC Inspections completed (IMC 2503)</li> <li>•Pre-Operational inspections (IMC 2504)             <ul style="list-style-type: none"> <li>•Including Automatic Depressurization System</li> </ul> </li> <li>•Verification of Operational Programs (IMC 2504)</li> <li>•Verification of Post-COL Items (Interim Staff Guidance 15)</li> <li>•NRC Vendor Inspections (IMC 2507)</li> <li>•Resident Inspectors, including operational</li> </ul>
Assessment Process	<ul style="list-style-type: none"> <li>•Periodic Construction Assessment Continues (IMC 2505)</li> </ul>
Public Communications	<ul style="list-style-type: none"> <li>•Public Meetings</li> <li>•ITAAC Completion Notices</li> <li>•Construction Inspection Results</li> <li>•Assessment Meetings</li> </ul>

# Licensee Construction Oversight of Vogtle 3 & 4

## Fuel Load to Full Power Operation

(Section 103(g) finding has been received)

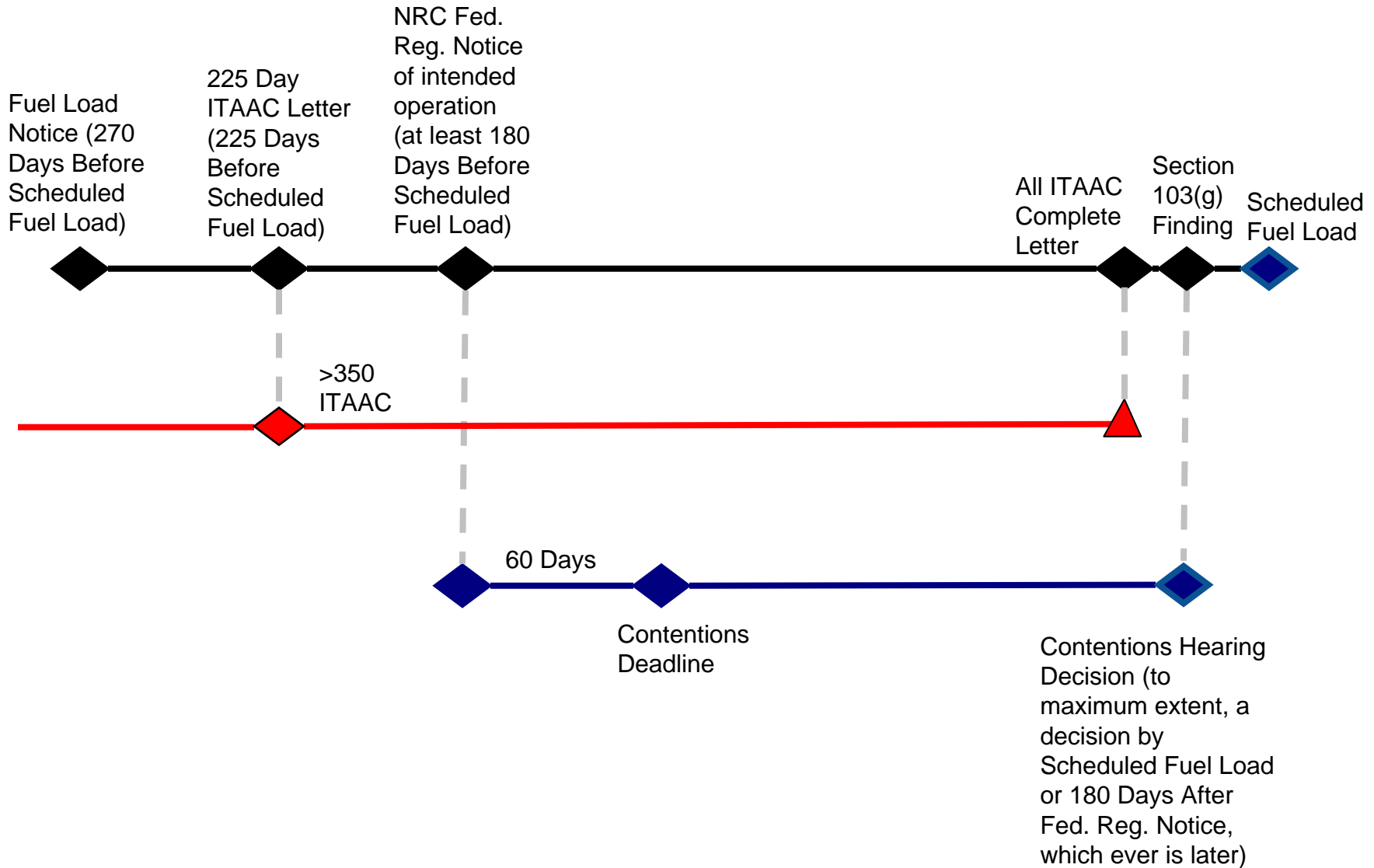
Training Verification	<ul style="list-style-type: none"><li>•Engineering and Construction personnel engaged</li></ul>
ITAAC Closure	<ul style="list-style-type: none"><li>•All ITAAC closed</li><li>•Fuel Load</li></ul>
Start-up Testing	<ul style="list-style-type: none"><li>•Technical Specifications in effect</li></ul>
Independent Assessment	<ul style="list-style-type: none"><li>•Institute of Nuclear Power Operations (INPO)</li><li>•Authorized Nuclear Inspector</li></ul>

# NRC Oversight of New Reactor Construction

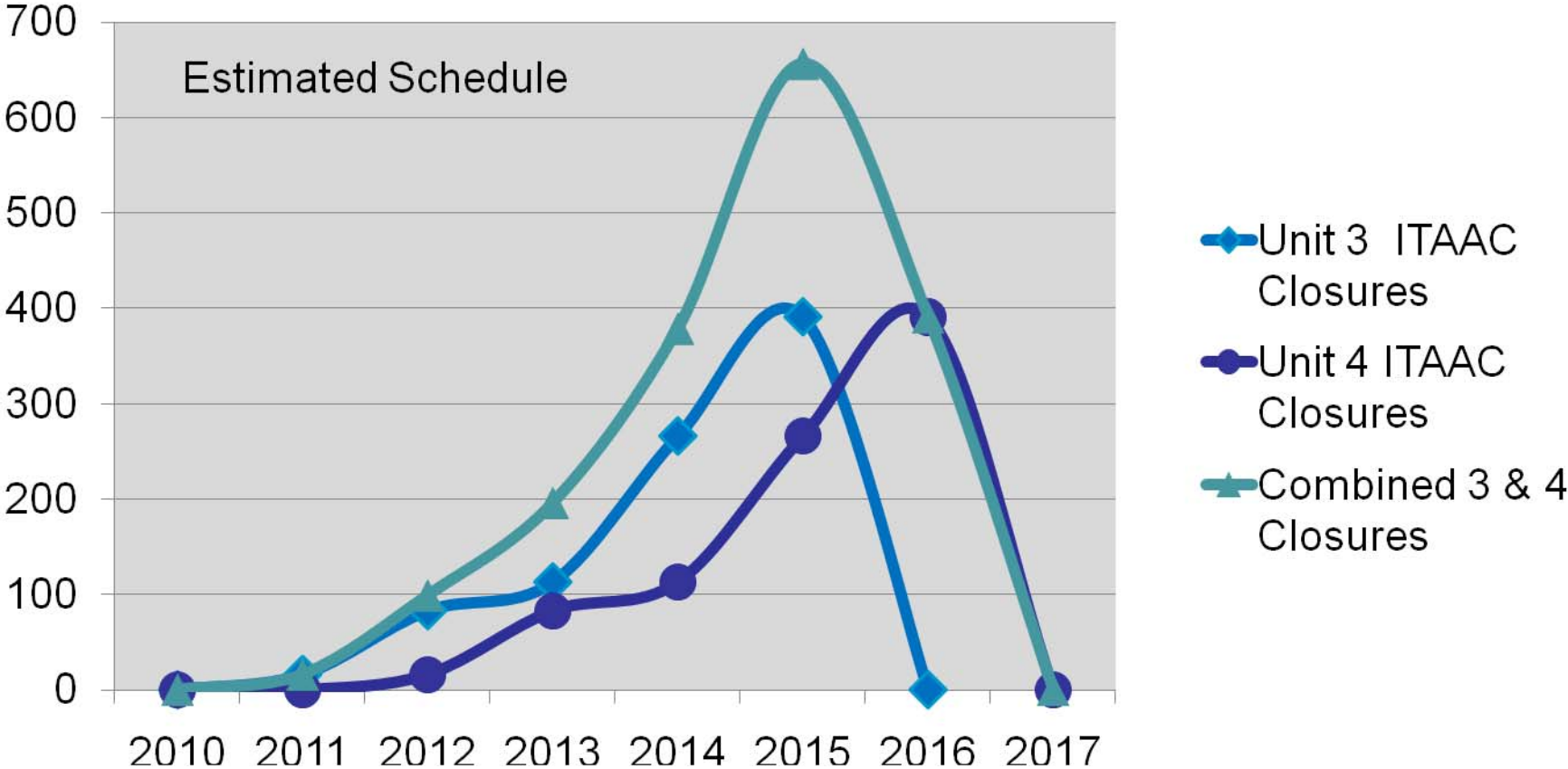
## Fuel Load to Full Power Operation

Inspection Areas	<ul style="list-style-type: none"><li>• Inspection of Startup Test Program (IMC 2514)</li><li>• NRC Vendor Inspections (IMC 2700)</li><li>• Resident Inspectors</li></ul>
Assessment Process	Reactor Oversight Process (IMC 0305)
Public Communications	<ul style="list-style-type: none"><li>• Public Meetings</li><li>• Publicly Available Inspection Reports</li><li>• Assessment Meetings</li></ul>

# ITAAC Timeline



# ITAAC Challenges



# BREAKOUT SESSION: CONSTRUCTION INSPECTION PROGRAM

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