



JENSEN HUGHES

*Making Our World*  
SAFE, SECURE + RESILIENT

From Buzzword to Bottom Line: Bridging the AI Implementation Divide

Andrew Miller, Market Director

9/24/2025

*jensenhughes.com*

# C-Suite Directive

“We’re leveraging AI to holistically synergize our digital transformation strategy, creating a scalable intelligence ecosystem that future-proofs our operational bandwidth and redefines value across the enterprise stack.”



TRANSLATION

“Go do AI stuff because I hear everyone else is doing AI stuff and we can’t be left behind”



# The Choice of Where to Start

## *Solve a Big “P” Problem*

Moonshots  
Departmental Overhauls  
Enterprise-wide Initiatives  
Very Complex Workflows or Processes

“Let’s transform our entire workflow, start to finish, and point AI at the data to be more efficient!”

## *Solve a Little “p” Problem*

Targeted Problems for People Who Do the Work  
Quick Implementation with minimal disruption  
Measurable ROI  
Few Key Stakeholders that Become Champions

“I really hate digging for specific requirements in a document that could be multiple places and with different criteria, can you help with that?”



## Curated Document Collections



## Large Language Model (LLM)



## Web Interface including Mobile

# You Can Ask All Kinds of Cool Stuff

## Regulatory Guides & Inspection Manuals



What does Regulatory Guide DG-1279 provide as staff regulatory guidance?



Regulatory Guide DG-1279 (which became Revision 4 of Regulatory Guide 1.31) provides the following staff regulatory guidance regarding the control of ferrite content in stainless steel weld metal:

### 1. Verification of Delta Ferrite Content of Filler Materials:

- Prior to production usage, the delta ferrite content of test weld deposits from each lot and heat of weld filler metal should be verified for each process to be used in production. This applies to welding of austenitic stainless steel core support structures, reactor internals, and Class 1, 2, and 3 components.
- Delta ferrite verification should be performed through tests using magnetic measuring devices on undiluted weld deposits for all processes.
- For submerged arc welding processes, verification tests for each wire and flux combination may be made on a production weld or simulated production weld.
- All other delta ferrite weld filler verification tests should be made on weld pads containing undiluted layers of weld metal.

The guide also states that the staff concludes the ferrite content in the weld metal, as depicted by a ferrite number, should be between 5 and 20. The lower limit provides sufficient ferrite to avoid microfissuring in welds, while the upper limit provides adequate ferrite content to offset dilution and reduce thermal aging effects.

### References:

1. [ML13211A485.pdf](#) - Regulatory Guide 1.31, "CONTROL OF FERRITE CONTENT IN STAINLESS STEEL WELD METAL", Section C. STAFF REGULATORY GUIDANCE
2. [ML13211A485.pdf](#) - Regulatory Guide 1.31, "CONTROL OF FERRITE CONTENT IN STAINLESS STEEL WELD METAL", Section B. DISCUSSION

### Sources:

ML13211A485.pdf  
ML12024A004.pdf



Conversation History

# Still a Gap in Users

## Younger Staff

Embraced the Technology  
Found Value in Learning the Tool  
Interacted, Explored, Tried Different Questions  
Known for Fluid Intelligence<sup>1</sup>



Filled the Gap in Lack of Crystallized Intelligence

## Older Staff

Hesitant to Accept Answers (hallucinations)  
Prompts Like a Search Engine  
Did not want to ask follow ups or clarifying prompts  
Known for Crystallized Intelligence<sup>1</sup>



Did not fill a gap or need  
How do we get it to be applicable  
for everyone?



We read a lot of complex, long,  
and nebulous guidance  
documents. Can it help with that?

<sup>1</sup>Horn, J. L. (1965). *Fluid and crystallized intelligence: A factor analytic and developmental study of the structure among primary mental abilities.*

# Digging Into the Gaps

Can't require  
a lot of typing

Shouldn't  
require a lot  
of follow up

Must conduct  
a thorough  
analysis of  
the topic

# Customized Agentic Workflows

## Content Generation

Upload Documents

Drag and Drop regulatory documents or utilize existing document collections

Extract Key Requirement

Use the LLM to extract key requirements – User prompt for specific requests

Review/Edit/Save Requirements

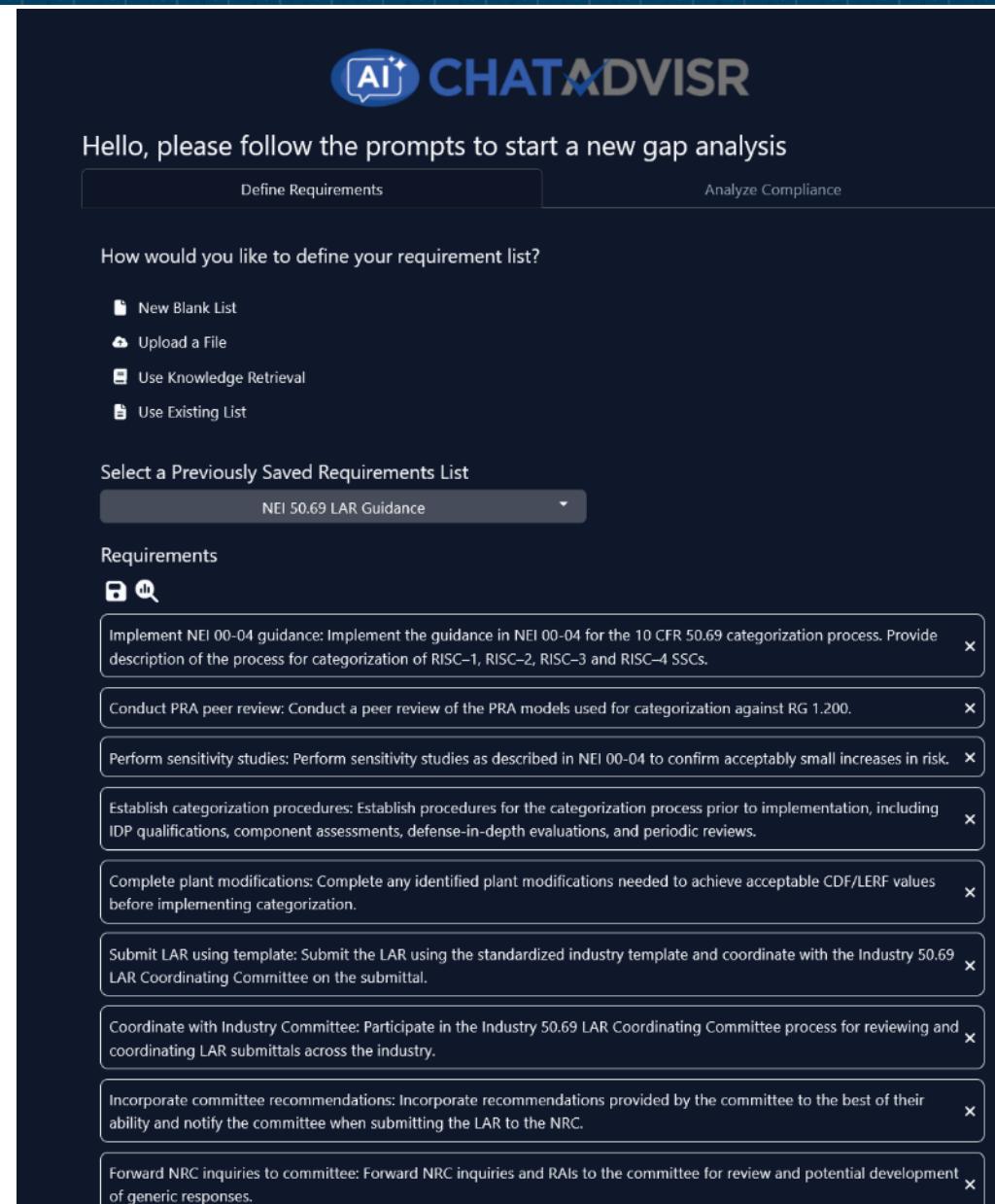
List can be reviewed, edited and saved for future, repeatable use

Upload Submittal Doc

Drag and drop draft regulatory submittal document

Review Doc Against Requirements

Output results with full analysis and information supporting the decisions



The screenshot shows the CHAT ADVISR interface. At the top, there is a logo with the text "CHAT ADVISR" and an AI icon. Below the logo, a message says "Hello, please follow the prompts to start a new gap analysis". There are two buttons: "Define Requirements" and "Analyze Compliance". A sub-section titled "How would you like to define your requirement list?" contains four options: "New Blank List", "Upload a File", "Use Knowledge Retrieval", and "Use Existing List". Below this is a section titled "Select a Previously Saved Requirements List" with a dropdown menu showing "NEI 50.69 LAR Guidance". A "Requirements" section follows, containing a list of tasks with small icons and an "X" button to the right of each:

- Implement NEI 00-04 guidance: Implement the guidance in NEI 00-04 for the 10 CFR 50.69 categorization process. Provide description of the process for categorization of RISC-1, RISC-2, RISC-3 and RISC-4 SSCs.
- Conduct PRA peer review: Conduct a peer review of the PRA models used for categorization against RG 1.200.
- Perform sensitivity studies: Perform sensitivity studies as described in NEI 00-04 to confirm acceptably small increases in risk.
- Establish categorization procedures: Establish procedures for the categorization process prior to implementation, including IDP qualifications, component assessments, defense-in-depth evaluations, and periodic reviews.
- Complete plant modifications: Complete any identified plant modifications needed to achieve acceptable CDF/LERF values before implementing categorization.
- Submit LAR using template: Submit the LAR using the standardized industry template and coordinate with the Industry 50.69 LAR Coordinating Committee on the submittal.
- Coordinate with Industry Committee: Participate in the Industry 50.69 LAR Coordinating Committee process for reviewing and coordinating LAR submittals across the industry.
- Incorporate committee recommendations: Incorporate recommendations provided by the committee to the best of their ability and notify the committee when submitting the LAR to the NRC.
- Forward NRC inquiries to committee: Forward NRC inquiries and RAIs to the committee for review and potential development of generic responses.

# Customized Agentic Workflows

## Content Generation

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Output results with full analysis and information supporting the decisions



Hello, please follow the prompts to start a new gap analysis

Define Requirements

Analyze Compliance

Upload Document to Analyze

Augment analysis with knowledge search (e.g. uploaded file cites external documents)



Drag Document Here or Click to Choose File

Limerick 50.69-LAR.pdf x

Compliance Results

Compliant  
 1

Partial  
 6

Non-compliant  
 4

**Implement NEI 00-04 guidance:** Implement the guidance in NEI 00-04 for the 10 CFR 50.69 categorization process. Provide description of the process for categorization of RISC-1, RISC-2, RISC-3 and RISC-4 SSCs.

Based on the document information provided, the Limerick Generating Station application appears to meet the requirement to "Implement NEI 00-04 guidance: Implement the guidance in NEI 00-04 for the 10 CFR 50.69 categorization process. Provide description of the process for categorization of RISC-1, RISC-2, RISC-3 and RISC-4 SSCs." Specifically:

1. The application states that Exelon will implement the risk categorization process in accordance with NEI 00-04, Revision 0, as endorsed by RG 1.201.
2. It provides a description of the overall categorization process consistent with NEI 00-04, including use of PRA models, defense-in-depth assessments, qualitative criteria, sensitivity studies, and an Integrated Decision-making Panel.
3. It describes the approach for categorizing SSCs as RISC-1, RISC-2, RISC-3 or RISC-4 based on safety significance.
4. It outlines the use of PRA models, including internal events, internal flooding, and fire PRAs, as well as other risk insights for seismic and other external hazards.
5. It describes the process for periodic review and update of the categorization.

While there were some open items and documentation issues noted for the PRA models at the time of the peer review, the document information indicates that many of these findings have since been resolved. The overall process for implementing the NEI 00-04 guidance for 10 CFR 50.69 categorization appears to be adequately described. The application provides the key elements of the categorization process for RISC-1, RISC-2, RISC-3 and RISC-4 SSCs as required.

**Conduct PRA peer review:** Conduct a peer review of the PRA models used for categorization against RG 1.200.

Based on the information provided, the document still does not appear to fully meet the requirement to "Conduct PRA peer

# Bringing Some Fluid Intelligence

## Deep Search – Agents

Give Some Context

Still need to write a little bit. More context is better, but a sentence is the minimum

Agents Develop Plan

Agents decide on a multi-step research plan. Starting high level working to details

Multi-prompt Research

Agents carry out each step by dynamically submitting more than one prompt

Long Form Answers

Create a cohesive long-form response that balances detail and too much information

Thorough Review

Output can be used directly into the compliance analyzer for thorough reviews

AI+ I'll help you create compliance requirements and questions for 10 CFR 50.59 procedures based on the NRC inspection procedure. Let me start by gathering information about the key elements that should be covered.

### Step 1: Understanding 10 CFR 50.59 Requirements

Let me first retrieve information about the core requirements of 10 CFR 50.59.

### Step 2: Getting Specific Inspection Criteria

Now let me gather information about the specific inspection criteria and evaluation requirements from the inspection procedure.

### Step 3: Getting Information on the Eight Criteria

Let me gather specific information about the eight criteria in 10 CFR 50.59(c)(2) that are central to the evaluation process.

### Step 4: Information on Documentation and Procedural Requirements

Let me get information about documentation, reporting, and procedural requirements.

### Step 5: Developing Compliance Requirements and Questions

Based on my review of the NRC inspection procedure, I'll now create a comprehensive outline and then develop the detailed requirements and questions.

### Brief Outline of 10 CFR 50.59 Compliance Requirements

1. Programmatic Requirements
  - Overall procedure framework and implementation
  - Training and competency requirements
  - Documentation and recordkeeping
2. Applicability Determination Process
  - Process for determining when 10 CFR 50.59 applies
  - Screening procedures (if used)
3. Evaluation Process
  - Eight criteria evaluation methodology
  - Technical adequacy and documentation
4. Problem Identification and Resolution
  - Integration with corrective action program
  - Trending and lessons learned
5. Reporting and Documentation
  - Record retention and content requirements
  - Biennial reporting to NRC

Now I'll develop detailed compliance requirements and questions for each area:

Based on my comprehensive review of the NRC inspection procedure 71111.17T and related regulatory guidance, I'll now provide detailed compliance requirements and questions for reviewing a licensee's 10 CFR 50.59 procedure.

# Pilot Program with NEI

*Available by the EOY 2025*

- Open to all NEI Members (access from NEI Website)
- Compliance Analyzer Functionality
- Deep Search and File Analyzer
- Secure AWS GovCloud Platform
- No Retention of Company/Proprietary Data



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# Deeper Dive into Compliance

## Validation Workflow

### Curated Specific Requirement Lists

Highly technical requirements utilizing an agentic workflow to validate the LAR complies with the regulation. Much more detailed than simple drag and drop zero-shot approach

### Detailed Analysis and Reasoning

Results feature a systematic approach to determining compliance with a section of the regulations

### Validation of Statements and Facts

Workflow results incorporates functions to allow user to jump right to sections in the document used to generate results.

## License Review Page

[Select Requirements](#)[Upload File](#)[View Report](#)

### Report Viewer Tab

#### Allowed Outage Time for LEFM Instrument

#### Proposed Actions to Reduce Power Level if Allowed Outage Time is Exceeded

#### Identify the Transient or Accident That Is the Subject of the Analysis

##### Requirement

Identify the transient or accident that is the subject of the analysis.

##### Compliance Assessment

**Status:** PARTIALLY MEETS

##### Technical Evaluation

The submittal provides limited identification of specific transients and accidents that are the subject of analyses for the power uprate. The document identifies one specific transient/accident scenario in detail:

##### Anticipated Transient Without Scram (ATWS)

The submittal clearly identifies ATWS as a key transient requiring analysis for the power uprate (See 1-1) (See 5-5) (See 7-7) . The ATWS analysis is specifically referenced as being performed for the proposed power uprate conditions, with detailed discussion of the SLCS modifications needed to support this analysis (See 20-5) . The analysis assumes only two SLCS pumps are available and is documented in "Attachment 6, Section 9.3.1, Anticipated Transients Without Scram" (See 20-5) .

##### General Reference to Design Basis Events

The submittal provides a summary table indicating that "Design basis events bounded by previous evaluations, special events meet acceptance criteria" are addressed in Section 9 of Attachment 6 (See 16-4) . However, this general statement does not specifically identify individual transients and accidents.

##### Broad Categories Referenced

The document makes general references to various analysis categories

### Document:

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Zoom: 100%

#### ATTACHMENT 1 Evaluation of Proposed Changes

setting. This would divert flow through the relief valve to the pump suction, instead of to the reactor vessel, thus potentially impacting the boron injection capability of the system.

The proposed change will install a modified hand switch for the C SLCS pump, which will allow the operators to inhibit the auto-start ATWS signal to the C SLCS pump. The current hand switch has a stop position; however, this switch is presently spring return to "norm" (center position) from either the "run" or "stop" positions. By modifying the C hand switch to maintain the switch in the "stop" position, the operator can selectively inhibit the auto-start signal to the C SLCS pump. This will limit the auto-start function of SLCS to two pumps (i.e., the A and B pumps) during an ATWS event, with the C pump available for manual start if required. This change reduces the SLCS pressure at the SLCS relief valve during a postulated ATWS event, to ensure that injection assumptions of the ATWS analysis are met by establishing margin between the SLCS pressure and the relief valve setpoint.

The proposed revision to TS Section 3/4.1.5, "Standby Liquid Control System," modifies the Limiting Condition for Operation (LCO) for Operational Conditions 1 and 2 to remove the phrase "a minimum of" from the LCO. The proposed modification to the TS Bases discusses that no more than two pumps shall be aligned for automatic operation in order to ensure that the SLCS relief does not lift following an ATWS event. The Bases further state that if three pumps are aligned for automatic operation, the system is inoperable and that Action statement "b" applies.

##### 3.5.2 Technical Evaluation

The proposed modification preserves all of the assumptions of the applicable safety analyses related to the ATWS event. The A and B SLCS pumps are capable of providing the required flow at the required pressure assumed in the ATWS analysis. The ATWS analysis for the proposed power uprate was performed assuming that only two pumps are available, as discussed in Attachment 6, Section 9.3.1, "Anticipated Transients Without Scram." A single failure does not need to be postulated for the ATWS event. However, if a single failure does occur during a postulated ATWS event, the operators can simply reposition the C SLCS pump hand switch to the "norm" position, and the pump will auto start if the ATWS signal is still present, or the pump can be manually started.

With two pumps operating, the calculated margin between the SLCS relief valve and the SLCS system pressure during a limiting ATWS event is increased as shown in the table below. As noted in the table, with two pumps operating, there is a minimum of 19.7 psi margin beyond that required to account for relief valve tolerance, piping line loss, elevation differences, and pump pressure pulsations. This provides adequate margin to ensure that the relief valve does not lift during postulated ATWS events.



(i)  
**Andrew Miller**  
Market Director

[amiller@jensenhughes.com](mailto:amiller@jensenhughes.com)  
+1 484-260-6939

*jensenhughes.com*