EPRI Update

Procurement Engineering and Supply Chain

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Technical Executive

Readily Accessible Parts Information Directory Conference and Technical Exhibit
May 21, 2018
## Recently Completed EPRI Products (www.membercenter.epri.com)

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Use of Reverse Engineering Techniques – 3002011678 – Available at end of May</td>
<td></td>
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<tr>
<td>Procurement Engineering Safety Classification CBT (PESC CBT), PC and LMS Version 1.0 - 3002011679</td>
<td></td>
</tr>
<tr>
<td>Critical Spares Program Implementation and Lessons Learned - 3002010685</td>
<td></td>
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<tr>
<td>Prevention and Detection of Undeclared Digital Content – 3002008010</td>
<td></td>
</tr>
<tr>
<td>Undeclared Digital Content CBT, version 1.0 – 3002009558</td>
<td></td>
</tr>
<tr>
<td>Counterfeit, Fraudulent, and Suspect Items CBT (CFI), version 2.0 - 3002007381</td>
<td></td>
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</tbody>
</table>
Technical Evaluation Efficiency Improvement - Develop information that can be used to decrease the amount of time required to complete certain types of procurement engineering evaluations.

Advanced Commercial Grade Dedication Seminar - Instructor-led seminar that presents the detailed commercial grade dedication process in its entirety and provides students with the opportunity to complete a dedication technical evaluation over the course of the seminar.

10CFR50.69 RISC-3 Procurement Treatment – Develop alternative treatment guidance for procurement of low-risk items
Other industry initiative-related work in 2018

**Acceptance of Commercial Digital Devices using Safety Integrity Levels** – Determine how safety integrity levels (SILs) might be used to facilitate acceptance of commercial digital devices for use in safety-related applications

**Standard Equivalency Evaluation Procedure** – Post-development roll-out and refinement of a procedure that can be used by licensees to promote standard equivalency evaluation practices – can benefit everyone, even with partial implementation

**10CFR50.69 Risk-based Safety Classification** – Determine appropriate special treatment for items that are classified as safety-related, low-risk (SR-R3)

**IAEA Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant Applications** – Guidance to enable the use of commercial digital equipment in safety-related applications
EPRI JUTG Pending Obsolescence Response Protocol

1. JUTG Member / Affiliate Receives Notification of Pending Supplier / Product Unavailability

2. Notify JUTG Steering Committee Member

3. Steering Committee contacts supplier for more information and meets to develop response plan

4a. Notify involved / impacted organizations (NSCSL, USA STARS, NUPIC, NOC, ERWG)
4b. Discuss options with supplier
4c. Search for alternative product(s)
4d. Assess aggregate need and possibility of collaborative industry-wide solution

5. Develop funding plan, action plan, interface agreements, schedule

6. Execute

7. Assess results, check and adjust process
EPRI JUTG Pending Obsolescence Response Protocol

- Dietrich Standard, Inc – Not renewing ASME N-Certificate
  – JUTG POP Notification sent to impacted members.

- Invensys/Foxboro – Acquired by Framatome, limited impact anticipated

- Swagelok – Not renewing ASME N-Certificate and discontinuing 10CFR50, Appendix B-compliant QA program for valves
  – JUTG POP Notification sent to impacted members.
Emerging U.S. Regulatory Concerns related to Procurement

- NRC contends that “current interrupt rating” is a critical characteristic for electrical devices
  - Significant cost and lead-time impact
- NRC concerns with maintaining / establishing environmental qualification
  - Challenging validity of existing technical bases and methodology
  - Challenging shelf-life, storage conditions, control of elastomers
- NRC concerns with implementation of reverse engineering activities (NRC IN 2016-09)
  - Should be addressed in EPRI 3002011678
Emerging U.S. Regulatory Concerns related to Procurement

- NRC staff have asked how “alternative treatments” for procurement of 10CFR50.69 RISC-3 SSC’s will help provide *reasonable confidence* that the items will be capable of performing their safety functions
  - Potential for inspection questions related to procurement
10CFR50.69 Alternative Treatment Guidance

  - Procurement considerations are included
    - For RISC-3 SSC’s the licensee may voluntarily comply with 10CFR50.69 as an alternative to certain other regulations including 10CFR50, Appendix B; 10CFR21; and 10CFR50.49
    - “The licensee or applicant shall ensure, with reasonable confidence, that RISC–3 SSCs remain capable of performing their safety-related functions under design basis conditions, including seismic conditions and environmental conditions and effects throughout their service life. . . inspection and testing, and corrective action shall be provided for RISC–3 SSCs.”
It is important to note that this rulemaking effort, while intended to ensure that the scope of special treatment requirements imposed on SSCs is risk-informed, is not intended to allow for the elimination of SSC functional requirements or to allow equipment that is required by the deterministic design basis to be removed from the facility (i.e., changes to the design of the facility must continue to meet the current requirements governing design change; most notably §50.59). Instead, this rulemaking should enable licensees and the staff to focus their resources on SSCs that make a significant contribution to plant safety by restructuring the regulations to allow an alternative risk-informed approach to special treatment. Conversely, for SSCs that do not significantly contribute to plant safety on an individual basis, this approach should allow an acceptable, though reduced, level of confidence (i.e., “reasonable confidence”) that these SSCs will satisfy functional requirements. However, continued maintenance of the health and safety of the public will depend on effective implementation of §50.69 by the licensee or applicant applying the rule at its nuclear power plant.
Per 10CFR50.69, Licensees can voluntarily comply with 10CFR50.69 for RISC-3 & RISC-4 items as an alternative to compliance with:

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Assurance (QA)</td>
<td>10CFR50, Appendix B</td>
</tr>
<tr>
<td>Reporting of Deficiency &amp; Noncompliance</td>
<td>10CFR21</td>
</tr>
<tr>
<td>ASME Section XI Replacements (limited)</td>
<td>10CFR50.55a(g)</td>
</tr>
<tr>
<td>Seismic Qualification</td>
<td>10CFR100, Appendix A (partial)</td>
</tr>
<tr>
<td>Environmental Qualification</td>
<td>10CFR50.49</td>
</tr>
<tr>
<td>Applicable Portions of IEEE standards</td>
<td>10CFR50.55a(h)</td>
</tr>
<tr>
<td>Local Leak Rate Testing</td>
<td>10CFR50, Appendix J</td>
</tr>
<tr>
<td>In-Service Inspection</td>
<td>10CFR50.55a(g)</td>
</tr>
<tr>
<td>Maintenance Rule</td>
<td>10CFR50.65</td>
</tr>
<tr>
<td>Event Reporting</td>
<td>10CFR50.55(e)</td>
</tr>
<tr>
<td>In-Service Testing</td>
<td>10CFR50.55a(f)</td>
</tr>
<tr>
<td>Notification Requirements</td>
<td>100CFR50.72, 50.73</td>
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</tbody>
</table>

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Other special requirements remain in effect

- Design basis functional requirements
- Design basis accidents
- Fracture toughness requirements
- Technical Specification
- Fire protection
- General Design Criteria
10 CFR 50.69 also says:

(2) RISC–3 SSCs. The licensee or applicant shall ensure, with reasonable confidence, that RISC–3 SSCs remain capable of performing their safety-related functions under design basis conditions, including seismic conditions and environmental conditions and effects throughout their service life. The treatment of RISC–3 SSCs must be consistent with the categorization process. Inspection and testing, and corrective action shall be provided for RISC–3 SSCs.

(i) Inspection and testing. Periodic inspection and testing activities must be conducted to determine that RISC–3 SSCs will remain capable of performing their safety-related functions under design basis conditions; and

(ii) Corrective action. Conditions that would prevent a RISC–3 SSC from performing its safety-related functions under design basis conditions must be corrected in a timely manner. For significant conditions adverse to quality, measures must be taken to provide reasonable confidence that the cause of the condition is determined and corrective action taken to preclude repetition.

(e) Feedback and process adjustment—(1) RISC–1, RISC–2, RISC–3 and RISC–4 SSCs. The licensee shall review changes to the plant, operational practices, applicable plant and industry operational experience, and, as appropriate, update the PRA and SSC categorization and treatment processes. The licensee shall perform this review in a timely manner but no longer than once every two refueling outages.
EPRI RISC-3 Procurement Guidance

- Provides a new procurement option for SR-R3 items
- Accurate, clear communication is essential
- New terminology for Alternate Procurement Treatment?
  - Safety Related
  - Safety-Related Commercial Grade
  - Safety-Related RISC-3?
  - Non-Safety-Related
  - Non-Safety-Related Augmented Quality
- Information system changes?
- Qualification terminology
  - Qualification
  - RISC-3 Qualification?
Alternative approach based on obtaining reasonable confidence and cost-effective procurement

- Maximize procurement savings
- Establish reasonable confidence in other areas
- Same/Alternative maintenance
- Same/Alternative testing
- Non-safety procurement

- Maximize maintenance savings
- Establish reasonable confidence in other areas
- Reduced Maintenance
- Reduced Testing
- Same/alternate procurement controls
- Same/alternate qualification activities
Alternative Treatment for 1 IN Air-operated diaphragm Globe Valve

- 150 lb ANSI Class
- Containment Isolation valve
  - Rad monitor sample line
  - Normally open
  - Fail closed
- ASME Section III, Class 3
- Schedule 40 socket weld ends
- EQ Solenoid Valve to vent diaphragm
- EQ limit switches for position indication
<table>
<thead>
<tr>
<th>Special Treatment</th>
<th>Savings Target</th>
<th>Approach to Alternate Treatment</th>
<th>Interdependencies / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>10CFR21</td>
<td>Yes</td>
<td>Purchase same valve &amp; actuator sans nuclear QA</td>
<td>Procurement Spec.</td>
</tr>
<tr>
<td>ASME Section XI</td>
<td>Yes</td>
<td>ANSI B31.1 in lieu of ASME Sec. II, Class3 (same size, pressure) Purchase ASTM materials identical to ASME for pressure retaining items (body, bonnet, studs, nuts)</td>
<td>PE or DE Document via SIEM. Procurement Spec.</td>
</tr>
<tr>
<td>Seismic Qualification 10CFR100, App. A</td>
<td>Yes</td>
<td>Verify weight and center of gravity</td>
<td>Purchasing identical materials, model, size</td>
</tr>
<tr>
<td>Environmental Qualification, 10CFR50.49</td>
<td>No</td>
<td>Use existing EQ solenoid valves and limit switches</td>
<td></td>
</tr>
<tr>
<td>IEEE 10CFR50.55a(h)</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Leak Rate Testing 10CFR50, App. J</td>
<td>Yes</td>
<td>Eliminate Type C LLRT. Require manufacturer to perform seat leakage test with licensee source verification</td>
<td>Procurement Specification</td>
</tr>
<tr>
<td>In-Service Inspection 10CFR50.55a(g)</td>
<td>Yes</td>
<td>Perform post-installation functional / stroke testing</td>
<td>Maintenance Work Order instructions</td>
</tr>
<tr>
<td>Maintenance Rule 10CFR50.65</td>
<td>Maybe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event Reporting 10CFR50.55(e)</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-service Testing 10CFR50.55a(f)</td>
<td>Maybe</td>
<td>Supplier seat leakage test</td>
<td></td>
</tr>
<tr>
<td>Notification Requirements 10CFR50.72, 50.73</td>
<td>No</td>
<td></td>
<td></td>
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</tbody>
</table>
Alternative approach based on maximum savings

Maximize procurement, LLRT, ISI, IST savings

- Eliminate Type C LLRT
- Purchase ANSI in lieu of ASME
- Purchase Actuator non-QA
- Eliminate in-service inspection, IST

Establish reasonable confidence in other areas

- PO requires witnessed seat leakage testing
- Use existing EQ limit switches & solenoid valves
- Verify mass and center of gravity
- Perform post-installation testing

Perform post-installation testing

Verify mass and center of gravity

Use existing EQ limit switches & solenoid valves

PO requires witnessed seat leakage testing

Eliminate Type C LLRT

Purchase ANSI in lieu of ASME

Purchase Actuator non-QA

Eliminate in-service inspection, IST
Critical Spares Implementation and Lessons Learned

- EPRI 3002010685 published November 2017
  - Update to EPRI 1019162
  - Value-based approach
    - Balance risk and cost to manage critical spares

- Ensure that the spare and replacement items needed to support operation of critical equipment are evaluated and if appropriate are available to minimize equipment unavailability and optimize generation
Critical Spares Implementation and Lessons Learned

- Updated definition of “Critical Spares”
  - Spares that support critical component functions or support utility-specific equipment reliability goals
  - Other factors for inclusion/exclusion as a critical spare may vary by utility based on integrated risk, to include:
    - Supplier performance
    - Probabilistic risk assessment insights
    - Spare costs
    - Lead-time
    - Usage, and so forth.
Critical Spares Implementation and Lessons Learned

- Crux of a critical spares program is definition of scope
  - Wider scope dilutes focus on equipment and associated spare and replacement items
- Senior management should be involved in establishing and adjusting scope
  - Scope should reflect tolerance for risk, mitigation strategy, regulatory requirements, and condition of equipment
- Critical spares may be thought of as insurance against the impact of unexpected equipment failures
  - Establishing the scope of a critical spares program can be likened to choosing the type of insurance policy and level of coverage to purchase
Critical Spares Implementation and Lessons Learned

- Careful consideration is warranted when identifying critical spares
  - Additional inventory valuation can directly impact financial results and external obligations, such as ad valorem taxes.

- Enhanced acceptance activities can be implemented where appropriate to ensure that in-stock critical spares function reliably when they are installed, such as:
  - Detailed procurement specifications
  - Supplier oversight
  - Pre-receipt inspection and testing
  - Pre-installation inspection and testing
Critical Spares Program Steps

1. Determine Risk Tolerance
2. Identify Program Scope
   - Group in-scope equipment
   - Prioritize logical groupings
3. Identify typical failures
4. Identify PM & CM philosophy/tasks
5. Maintenance review & feedback
6. ID (critical) spares needed to support PM & CM
7. ID Make/Models in each equipment grouping
8. Update BOMs to include critical spares
9. ID quantities needed to support PM & CM
10. Determine critical spares that will be available
11. Document basis for critical spares not available
12. Estimate cost of new inventory plan
13. Review/approve estimated expenses
14. Develop enhanced acceptance requirements
15. Develop sourcing strategy
16. Initiate / track procurement
17. Conduct enhanced acceptance
18. Identify, store & control items as critical spares
May 2018 Critical Spares Survey

Has the DNP critical component/equipment re-categorization (reduction based on updated definitions of single point vulnerability and critical) been completed? Note, this question addressed re-categorization, not identification of critical spares?

Answered: 11  Skipped: 1

Comments:
- It has been started but not completed
- Don’t know, but don’t think so
- Site has completed re-categorization. Critical Spares have not been removed from the program based on this.
- Still ongoing
## Quantities of critical spares

If your organization has completed component/equipment re-categorization (reduction based on updated definitions of single point vulnerability and critical) as a result of DNP, what is the new total number of critical components per plant/site?

Answered: 10 Skipped: 2

<table>
<thead>
<tr>
<th>7000 average per 2-unit station</th>
<th>847</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td></td>
</tr>
<tr>
<td>Plant 1</td>
<td>34</td>
</tr>
<tr>
<td>Plant 2</td>
<td>53</td>
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<tr>
<td>Plant 3</td>
<td>35</td>
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<tr>
<td>Tier 2</td>
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</tr>
<tr>
<td>Plant 1</td>
<td>138</td>
</tr>
<tr>
<td>Plant 2</td>
<td>325</td>
</tr>
<tr>
<td>Plant 3</td>
<td>520</td>
</tr>
</tbody>
</table>

### 2015 survey reported number of critical spares ranged from 31 to 17,921

### Unknown

- Approximately 1500 per unit: 1679
- Not Sure: 2017
- Do not know: 172
- Unknown: 378
- 847

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Post re-categorization critical spares evaluation progress

If your organization has completed critical component/equipment re-categorization (reduction based on updated definitions of single point vulnerability and critical) as a result of DNP, what is the approximate percentage of critical components that have been evaluated by the critical spares program?

Answered: 10   Skipped: 2

Comments:
- We have written a condition report to address the changes in component criticality that has not been evaluated yet.
- Work in progress
Is inventory valuation a consideration?

Does your critical spares program include provisions to consider and account for impact on inventory valuation due to critical spare stocking decisions?

Comments:

- Was performed during initial identification - not revisited
- Yes, we convene a material review board for >$25K items to determine if they will be procured.
- Inventory increase and stocking level increase Performance Indicators do not get impacted by E critical spare decisions. For example, there is a goal for stocking level adds per year. E and Y critical items do not impact this indicator
- Yes, CT review for >$5K, PRG review if greater than $50K
Control of critical spares

What special controls are used to ensure function/reliability of critical spare parts? Please select all responses that apply:

- Preventive maintenance on items, including critical spares, as required by our procedures. (e.g. motors, breakers, etc.)
- First two items as deemed necessary, on a case by case/item by item basis
- Will probably use a 3rd party to obtain the spares and have them do the PQI testing. this way the costs go into the AUP and not an O&M expense.
- ISPM

Other:

- Enhanced design or procurement specification requirements
- Vendor inspection, source surveillance or other vendor oversight
- Tests or inspections at receipt / prior to accepting items for inventory
- Functional tests prior to accepting for inventory
- Burn-in
- Tests or Inspection immediately prior to issue for use
- Tests or Inspection immediately prior to installation
- Other (please describe in the "other" field below)
- Other (please specify)
### Procurement-Related Instructor-Based Training in 2017 Open Sessions at EPRI in Charlotte, NC

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<td>Nuclear Utility Procurement</td>
<td>July 9-11, 2018</td>
</tr>
<tr>
<td>Procurement of Pressure Boundary Items</td>
<td>July 12-13, 2018</td>
</tr>
<tr>
<td>NUPIC Audit Team Leader Training</td>
<td>August 14-16, 2018</td>
</tr>
<tr>
<td>Nuclear Utility Procurement</td>
<td>December 4-6, 2018</td>
</tr>
</tbody>
</table>

Courses are also available on-site  
Please contact Britnie at bmccallum@epri.com for more information
Summer 2018 JUTG

- August 7-9
- EPRI’s Offices - Charlotte, North Carolina
  - Room block / reception at Hilton University Place

Winter 2019 JUTG

- Feb 12-14
- Targeting San Antonio, TX
Together...Shaping the Future of Electricity