Manufacturing Nuclear Components in a Global Environment

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October 8, 2008
Issues and Challenges of the Global Supply Chain

- Shift from mostly domestic to international market for key equipment and components
- Additional lead times need to be considered
- Number of suppliers with Part 50 Appendix B QA programs has substantially declined
• Some manufacturers are unfamiliar with requirements for nuclear-grade components
• New reactor projects in the U.S. may employ multinational modular construction techniques
• Concerns continue to arise regarding counterfeit items
• Resources and access to oversee the global marketplace are critical
Vendor Inspection Program Enhancements

• NRC does inspections of equipment vendors
• Increase inspection frequency and scope
  – Verify QA program implementation
  – Emphasize importance of identifying counterfeit parts and materials
Vendor Inspection Program Enhancements (continued)

• Expand international cooperation in vendor oversight

• Clarify oversight and improve interface with third party industry audits
Overview of Anticipated Oversight

• Modular fabrication
  – Routine vendor and field inspection
  – Potential for resident inspection
• Component fabrication
  – Vendor inspection
  – International regulatory bilateral activities
  – Oversight of third party audit activities
• Design and licensing activities
  – Vendor and QA inspections with technical specialists
NRC Regulations Related to Vendors

• 10 CFR Part 50, Appendix B
  – 18 Quality Assurance Criteria for Nuclear Power Plants

• 10 CFR Part 21
  – Evaluating Deviations and Reporting Defects

• 10 CFR 50.55a
  – Codes and Standards

Codes, Standards and Guidance

• NRC establishes regulatory requirements and issues guidance
• ASME establishes code requirements
• Industry develops programs and technology to meet these requirements
• All participate in an open consensus process
• Common Goals (NRC, ASME, Industry)
  – safe plant operation
  – practical requirements
  – cost-effective technology
Vendor Related Guidance

• NRC Issued
  – Standard Review Plan, Section 17.5 (NUREG-0800)
  – Regulatory Guides (RGs) 1.28, 1.33, 1.123

• NRC Endorsed
  – 10 CFR Part 50, Appendix B
    • QA Program for Nuclear Facilities (ASME NQA-1)
    • QA Program Description (NEI 06-14)
  – Commercial-Grade Dedication
    • Guideline for the Utilization of Commercial-Grade Items in Nuclear Safety-Related Applications (EPRI NP-5652)
Regulations on Codes and Standards

• 10 CFR 50.55a “requires” licensees to use ASME Codes
  – ASME BPV Code, Section III for design
  – ASME BPV Code, Section XI for in-service inspection
  – ASME OM Code for in-service testing

• The NRC approves, conditions, or disapproves ASME Code cases

• NRC regulations allow the use of alternatives to 10 CFR 50.55a when:
  – the alternative provides an acceptable level of quality and safety, or
  – compliance would result in a hardship without a compensating increase in quality and safety.
International Experience

- Imported reactor vessel replacement heads must meet the original design specification requirements.
- Current design certification applications from France and Japan specify the use of ASME Code, Section III.
- Foreign material specifications are approved by ASME or NRC as alternatives to ASME Code material requirements.
- The Multinational Design Evaluation Program (MDEP) is assessing code differences and possible reconciliation.
Suspect, Counterfeit & Fraudulent Parts

• Licensees are held accountable for quality of parts
• NRC issues Generic Communication for counterfeit products
• Potential inspection focus areas:
  – Procurement and commercial-grade dedication programs
  – Industry practices for identifying counterfeit or fraudulent parts
  – Documents that provide traceability for quality-related components
  – Supply chain for a sample of specific components provided to each new reactor project
## Generic Communications Listed in GL 89-02

<table>
<thead>
<tr>
<th>Counterfeit Products</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulletin 87-02 (with supplements)</strong></td>
<td>Fastener Testing to Determine Conformance with Applicable Material Specifications</td>
</tr>
<tr>
<td><strong>Bulletin 88-05 (with supplements)</strong></td>
<td>Nonconforming Material Supplied by Piping Supplies, Inc., at Folsum, New Jersey and West Jersey manufacturing Company at Williamstown, New Jersey</td>
</tr>
<tr>
<td><strong>Bulletin 88-10</strong></td>
<td>Nonconforming Molded-Case circuit Breakers</td>
</tr>
<tr>
<td><strong>Information Notice 88-19</strong></td>
<td>Questionable Certification of Class 1E Components</td>
</tr>
<tr>
<td><strong>Information Notice 88-46</strong></td>
<td>Licensee Report of Defective Refurbished Circuit Breakers</td>
</tr>
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## Inadequate Dedication

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<thead>
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<tbody>
<tr>
<td><strong>Information Notice 87-66</strong></td>
<td>Inappropriate Application of Commercial-Grade Components</td>
</tr>
<tr>
<td><strong>Information Notice 88-35</strong></td>
<td>Inadequate Licensee Performed Vendor Audits</td>
</tr>
</tbody>
</table>
Other Generic Communication on Counterfeiting

<table>
<thead>
<tr>
<th>Information Notice</th>
<th>Description</th>
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<tbody>
<tr>
<td>88-48 (with supplements)</td>
<td>Licensee Report of Defective Refurbished Valves</td>
</tr>
<tr>
<td>89-02</td>
<td>Actions to Improve the Detection of Counterfeit and Fraudulently Marked Products</td>
</tr>
<tr>
<td>89-03</td>
<td>Potential Electrical Equipment Problems</td>
</tr>
<tr>
<td>89-39</td>
<td>List Of Parties Excluded From Federal Procurement Or Non-Procurement Programs</td>
</tr>
<tr>
<td>89-45 (with supplements)</td>
<td>Metalclad, Low-Voltage Power Circuit Breakers Refurbished With Substandard Parts</td>
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<tr>
<td>89-56</td>
<td>Questionable Certification Of Material Supplied To The Defense Department By Nuclear Suppliers</td>
</tr>
<tr>
<td>89-59 (with supplements)</td>
<td>Suppliers Of Potentially Misrepresented Fasteners</td>
</tr>
<tr>
<td>89-70 (with supplements)</td>
<td>Possible Indications Of Misrepresented Vendor Products</td>
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</table>
### Other Generic Communication on Counterfeiting (cont’d)

<table>
<thead>
<tr>
<th>Information Notice 90-46</th>
<th>Criminal Prosecution Of Wrongdoing Committed By Suppliers Of Molded-Case Circuit Breakers And Related Components</th>
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<tbody>
<tr>
<td>Information Notice 90-57 (with supplements)</td>
<td>Substandard, Refurbished Potter &amp; Brumfield Relays Represented As New</td>
</tr>
<tr>
<td>Generic Letter 91-05</td>
<td>Licensee Commercial-Grade Procurement and Dedication Programs</td>
</tr>
<tr>
<td>Information Notice 91-09</td>
<td>Counterfeiting Of Crane Valves</td>
</tr>
<tr>
<td>Information Notice 92-22</td>
<td>Criminal Prosecution And Conviction Of Wrongdoing Committed By A Commercial-Grade Valve Supplier</td>
</tr>
<tr>
<td>Information Notice 92-56</td>
<td>Counterfeit Valves In The Commercial Grade Supply System</td>
</tr>
<tr>
<td>Information Notice 92-68 (with supplements)</td>
<td>Potentially Substandard Slip-On, Welding Neck, And Blind Flanges</td>
</tr>
<tr>
<td>Information Notice 93-43</td>
<td>Use Of Inappropriate Lubrication Oils In Safety-Related Applications</td>
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(cont’d)

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<tr>
<th>Information Notice 93-73</th>
<th>Criminal Prosecution Of Nuclear Suppliers For Wrongdoing</th>
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<tr>
<td>Information Notice 95-12</td>
<td>Potentially Nonconforming Fasteners Supplied By A&amp;G Engineering II, Inc.</td>
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<tr>
<td>Part 21 1995-212</td>
<td>Aerofin - Cardinal Industrial Products capscrews</td>
</tr>
<tr>
<td>Part 21 1996-06-4</td>
<td>Aerofin - Cardinal Industrial Products capscrews</td>
</tr>
<tr>
<td>Information Notice 96-40</td>
<td>Deficiencies In Material Dedication And Procurement Practices And In Audits Of Vendors</td>
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<tr>
<td>Part 21 1997-06-0 through 1997-06-3</td>
<td>Limitorque - counterfeit component</td>
</tr>
<tr>
<td>Information Notice 07-19</td>
<td>Fire Protection Equipment Recalls And Counterfeit Notices</td>
</tr>
<tr>
<td>Information Notice 08-04</td>
<td>Counterfeit Parts Supplied to Nuclear Power Plants</td>
</tr>
</tbody>
</table>
Ladish Valve

Counterfeit
Square D Breakers

Press Release:
U.S. Consumer Product Safety Commission
December 27, 2007,

Genuine

Counterfeit
NRC International Activities

• Multinational Design Evaluation Program (MDEP)
  – Member of Codes and Standards and Vendor Inspection working groups
  – Efforts to compare and reconcile codes and standards

• Vendor Inspection Activities
  – Develop a framework for multinational construction and vendor inspection knowledge exchange
  – Joint vendor inspections in Canada and Japan
  – Vendor inspections and technical exchanges in the U.S. by S. Korean and U.K. regulators
  – Observed construction activities in Finland at Olkiluoto 3