

**Gallagher, Carol**

**From:** Melton, Michael A [melto1ma@westinghouse.com]  
**Sent:** Monday, May 14, 2012 3:48 PM  
**To:** McKirgan, John; McKenna, Eileen  
**Cc:** 'Giddens, John M.'  
**Subject:** RE: Transmittal of NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision B, dated May 2012  
**Attachments:** A-4.pdf; A-4.doc

77 FR 33780  
6/7/12

Eileen, John,

Looks like we missed some unintended changes for Appendix A-4.

(4)

Attached is our approved guidance for SFP responses. I'll get NEI to get this right in their next revision or we will send a separate letter if needed. Please let me know if you have any comments.

-Thanks, Mike

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**From:** Melton, Michael A  
**Sent:** Monday, May 14, 2012 10:48 AM  
**To:** McKirgan, John; McKenna, Eileen  
**Cc:** Giddens, John M.  
**Subject:** FW: Transmittal of NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision B, dated May 2012

John, Eileen,

For your use and review. AP1000 guidance is contained in Appendix A-4 for SFP Order. .

I, along with John Giddens (SNC and APOG lead for Fukushima Response), will be at the FLEX meeting tomorrow. As of now, we know of no comments from the staff on the FLEX guidance for Appendix F. We are working to obtain NRC endorsement of the AP1000 guidance in the final Order ISG's. If we have to comments for tomorrow, let discuss a better opportunity then to go over the Guidance for AP1000 before May 31<sup>st</sup>.

-thanks, Mike

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**From:** KRAFT, Steven  
**Sent:** Friday, May 11, 2012 4:48 PM  
**Subject:** Transmittal of NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision B, dated May 2012

May 11, 2012

Ms. Lisa M. Regner  
Senior Project Manager  
Projects Management Branch  
Japan Lessons-Learned Project Directorate  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

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U.S. NUCLEAR REGULATORY COMMISSION

SCANSI Review Complete  
Template = ADM-013

E-R105 = ADM-03  
Add = L. Regner (LMR2)

**Subject:** Transmittal of NEI 12-02, *Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,"* Revision B, dated May 2012

**Project Number:** 689

Dear Ms. Regner:

The Nuclear Energy Institute (NEI), on behalf of the nuclear industry, is pleased to submit to the U.S. Nuclear Regulatory Commission (NRC) NEI 12-02, *Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,"* Revision B, dated May 2012. The guidance contained in this document will be used by NRC licensees to implement the requirements of NRC Order EA-12-051. We request that NRC review and endorse NEI 12-02.

The NEI Used Fuel Fukushima Response Task Force would be pleased to meet with NRC Staff in public to discuss NEI 12-02 and respond to clarifying questions. Please let us know at your earliest convenience if such a meeting will be scheduled.

If you have any questions or require additional information, please do not hesitate to contact me at (202) 739-8116; [spk@nei.org](mailto:spk@nei.org).

Steven P. Kraft  
Senior Director, Fukushima Response Coordination & Strategy

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## **A-4. AP1000 Spent Fuel Pool Instrumentation Guidance**

### **A-4-1 Introduction**

AP1000 is required to provide reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

### **A-4-2 Background**

The design bases of AP1000 address many of these attributes of spent fuel pool level instrumentation. The NRC staff reviewed these design features prior to issuance of the combined licenses for these facilities and certification of the AP1000 design referenced therein. The AP1000 certified design largely addresses the above requirements by providing two safety-related spent fuel pool level instrument channels. The instruments measure level from the top of the spent fuel pool to the top of the fuel racks to address the range requirements listed above. The safety-related classification provides for the following additional design features:

- Seismic and environmental qualification of the instruments
- Independent power supplies
- Electrical isolation and physical separation between instrument channels
- Display in the control room as part of the post-accident monitoring instrumentation
- Routine calibration and testing

### **A-4-3 Requirements**

AP1000 is required to address the following requirements that were not specified in the certified design.

#### **A-4-3.1 Arrangement**

##### *Order Requirement*

The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the safety-related instruments to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.

#### *Guidance*

Protection against missiles should be described, noting the protection that may be provided by location of the safety-related instruments and their associated connections below the operating deck. Describe the arrangement and basis for why the operating deck provides protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. Alternatively, provide description of the features for additional protection that may be provided by the location the safety-related instruments to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.

### **A-4-3.2 Qualification**

#### *Order Requirement*

The level instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period.

#### *Guidance*

Provide a description of the instrumentation sensors and their capability to operate in the environmental conditions that they will experience during design basis events, noting that for the AP1000 design basis conditions include a SBO with steaming in the SFP. The environmental conditions to be addressed should include appropriate consideration for temperature, humidity, steaming, radiation, and seismic activity (SSE) levels where the sensors are located. Provide information to demonstrate the reliability of the instrument under these conditions.

Appropriate evaluations should also be provided to demonstrate the operability of these sensors for indefinite SBO durations.

### **A-4-3.3 Power Supplies**

#### *Order Requirement*

Instrumentation channels shall provide for power connections from sources independent of the plant alternating current (ac) and direct current (dc) power distribution systems, such as portable generators or replaceable batteries. Power supply designs should provide for quick and accessible connection of sources independent of the plant ac and dc power distribution systems. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

#### *Guidance*

Provide a description of the design features provided to ensure continuous power supply to the instrumentation for extended loss of power conditions. The AP1000 design provides extended SFP monitoring capability with two trains of dedicated class 1E DC power supply for at least 72 hours of post accident monitoring. Beyond the initial 72 hours, the response shall detail how the instrument power supply can be met by the use of offsite portable generators with quick and accessible connection points to the existing ac or dc power distribution system and sufficient capacity to maintain level indication indefinitely. The capability to use both onsite and offsite equipment should be discussed as well as the availability of clear guidance for the operator as part of the AP1000 post-72 hours procedures per AP1000 DCD Section 1.9.5.4.

Alternatively, a description of instrumentation powered locally or a local power independent instrument should be discussed.

#### **A-4-3.4 Accuracy**

##### *Order Requirement*

The instrument shall maintain its designed accuracy following a power interruption or change in power source without recalibration.

##### *Guidance*

As discussed under Section A-4-3.3 in the body of this guide, the AP1000 design provides means for continued power supply to the spent fuel pool level instrumentation, relying for the first 72 hours only on class 1E batteries. The power supply can then be extended indefinitely by various means as described in Section A-4-3.3 in the body of this guide.

Additionally, the potential impact on temporary loss of power to the level instrument shall be discussed and evaluated in this section including confirmation that the DP cells would not need to be re-calibrated following a loss of power.

The instrument should be discussed to address sufficient accuracy during SBO conditions which includes boiling of the SFP water.

#### **A-4-3.5 Display**

##### *Order Requirement*

The display shall provide on-demand or continuous indication of spent fuel pool water level.

##### *Guidance*

For the first 72 hours, provide details regarding the continuous display provided in the Main Control Room with power provided by the class 1E batteries. For Post 72 hours,

describe the features of the Main Control Room display and use of power supplies described in Section A-4-3.3 in the body of this guide. Describe the SFP water level display features. Provide a description of appropriate alarms for low water level. The display requirement may be described by reference to appropriate instrumentation datasheets, specifications, and other relevant documentation.

#### **A-4-4 Programmatic Controls**

##### *Order Requirement*

The spent fuel pool instrumentation shall be maintained available and reliable through appropriate development and implementation of a training program. Personnel shall be trained in the use and the provision of alternate power to the safety-related level instrument channels.

##### *Guidance*

As noted in the background, the safety-related classification of the AP1000 spent fuel level instrumentation ensures routine calibration and testing of the instrumentation, which maintains the equipment as available and reliable. The training program shall be described to provide training to personnel in the use and the provision of alternate power supplies to the existing ac or dc power distribution system to power the instrument channels consistent with the post-72 hours procedures detailed in DCD Section 1.9.5.4. Implemented procedures consistent with the training program shall be summarized and clarified as part of the response.