

**NUCLEAR REGULATORY COMMISSION**

**[NRC-2013-0215]**

**Compliance with Order EA-13-109, Order Modifying Licenses with Regard  
to Reliable Hardened Containment Vents Capable of Operation  
Under Severe Accident Conditions**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Draft Japan Lessons-Learned Project Directorate guidance; request for comment.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is issuing this draft Japan Lessons-Learned Project Directorate Interim Staff Guidance (JLD-ISG), JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions." (ADAMS Accession No. ML13247A417) This draft JLD-ISG provides guidance and clarification to assist nuclear power reactors applicants and licensees with the identification of measures needed to comply with requirements to mitigate challenges to key safety functions.

**DATES:** Comments must be filed no later than **[INSERT DATE 30 DAYS FROM DATE OF PUBLICATION]**. Comments received after this date will be considered, if it is practical to do so, but the NRC staff is able to ensure consideration only for comments received on or before this date.

**ADDRESSES:** You may submit comment by any of the following methods (unless this document describes a different method for submitting comments on a specific subject):

- **Federal Rulemaking Web site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2013-0215**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-3422; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov). For technical questions, contact the individual(s) listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Office of Administration, Mail Stop: 3WFN, 06-44M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

For additional direction on accessing information and submitting comments, see “Accessing Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

**FOR FURTHER INFORMATION CONTACT:** Rajender Auluck, Japan Lessons-Learned Project Directorate, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-1025; e-mail: [Rajender.Auluck@nrc.gov](mailto:Rajender.Auluck@nrc.gov).

## **SUPPLEMENTARY INFORMATION:**

### **I. Accessing Information and Submitting Comments**

#### **A. Accessing Information**

Please refer to Docket ID **NRC-2013-0215** when contacting the NRC about the availability of information regarding this document. You may access publicly-available information related to this action by the following methods:

- **Federal Rulemaking Web site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2013-0215**.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may access publicly-available documents online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced. The draft JLD-ISG-2013-02 is available in ADAMS under Accession No. **ML13247A417**.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

- **NRC's Interim Staff Guidance Web site:** JLD-ISG documents are also available online under the "Japan Lessons Learned" heading at <http://www.nrc.gov/reading-rm/doc-collections/#int>.

## B. Submitting Comments

Please include Docket ID **NRC-2013-0215** in the subject line of your comment submission, in order to ensure that the NRC is able to make your comment submission available to the public in this docket.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC posts all comment submissions at <http://www.regulations.gov> as well as entering the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment submissions into ADAMS.

## II. Background Information

The NRC staff developed this draft JLD-ISG-2013-02 to provide guidance and clarification to assist nuclear power reactor applicants and licensees with the identification of methods needed to comply with requirements to mitigate challenges to key safety functions. These requirements are contained in Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" (ADAMS Accession No. ML13130A067). The draft ISG is not a substitute for the requirements in Order EA-13-109, and compliance with the ISG is not a requirement. This ISG

is being issued in draft form for public comment to involve the public in development of the implementing guidance.

The events at the Fukushima Dai-ichi nuclear power plant following the March 2011, earthquake and tsunami highlight the possibility that events such as rare natural phenomena could challenge the traditional defense-in-depth protections related to preventing accidents, mitigating accidents to prevent the release of radioactive materials, and taking actions to protect the public should a release occur. At Fukushima Dai-ichi, limitations in time and unpredictable conditions associated with the accident significantly hindered attempts by the operators to prevent core damage and containment failure. In particular, the operators were unable to successfully operate the containment venting system. These problems, along with venting the containments under challenging conditions following the tsunami, contributed to the progression of the accident from inadequate cooling of the core leading to core damage, to compromising containment functions from overpressure and over-temperature conditions, and to the hydrogen explosions that destroyed the reactor buildings (secondary containments) of three of the Fukushima Dai-ichi units. The loss of the various barriers led to the release of radioactive materials, which further hampered operator efforts to arrest the accidents and ultimately led to the contamination of large areas surrounding the plant. Fortunately, the evacuation of local populations minimized the immediate danger to public health and safety from the loss of control of the large amount of radioactive materials within the reactor cores.

The events at Fukushima reinforced the importance of reliable operation of hardened containment vents during emergency conditions, particularly, for small containments such as the Mark I and Mark II designs. On March 12, 2012, the NRC issued Order EA-12-050<sup>1</sup> requiring

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<sup>1</sup> "Order Modifying Licenses With Regard To Reliable Hardened Containment Vents (Effective Immediately)," EA-12-050 (March 12, 2012) (ADAMS Accession No. ML12056A043).

the Licensees identified in Attachment 1 to this order to implement requirements for a reliable hardened containment venting system (HCVS) for Mark I and Mark II containments. Order EA-12-050 required licensees of BWR facilities with Mark I and Mark II containments to install a reliable HCVS to support strategies for controlling containment pressure and preventing core damage following an event that causes a loss of heat removal systems (e.g., an extended loss of electrical power). The NRC determined that the issuance of EA-12-050 and implementation of the requirements of that order were necessary to provide reasonable assurance of adequate protection of the public health and safety.

While developing the requirements for a reliable HCVS in Order EA-12-050, the NRC acknowledged that questions remained about maintaining containment integrity and limiting the release of radioactive materials if the venting systems were used during severe accident conditions. The NRC staff presented options to address these issues, including the possible use of engineered filters to control releases, for Commission consideration in SECY-12-0157, “Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments” (issued November 26, 2012). Option 2 in SECY-12-0157 was to modify EA-12-050 to require severe accident capable vents (i.e., a reliable HCVS capable of operating under severe accident conditions). Other options discussed in SECY-12-0157 included the installation of engineered filtered containment venting systems (Option 3) and the development of a severe accident confinement strategy (Option 4). In the Staff Requirements Memorandum (SRM) for SECY-12-0157, dated March 19, 2013, the Commission approved Option 2 and directed the staff to issue a modification to Order EA-12-050 requiring licensees subject to that order to “upgrade or replace the reliable hardened vents required by Order EA-12-050 with a containment venting system designed and installed to remain functional during severe accident conditions.”

The requirements in this order, in addition to providing a reliable HCVS to assist in preventing core damage when heat removal capability is lost (the purpose of EA-12-050), will ensure that venting functions are also available during severe accident conditions. Severe accident conditions include the elevated temperatures, pressures, radiation levels, and combustible gas concentrations, such as hydrogen and carbon monoxide, associated with accidents involving extensive core damage, including accidents involving a breach of the reactor vessel by molten core debris. This order requires installation of reliable hardened vents that will not only assist in preventing core damage when heat removal capability is lost, but will also function in severe accident conditions (i.e., when core damage has occurred). The safety improvements to Mark I and Mark II containment venting systems required by this order are intended to increase confidence in maintaining the containment function following core damage events. Although venting the containment during severe accident conditions could result in the release of radioactive materials, venting could also prevent containment structural and gross penetration leakage failures due to overpressurization that would hamper accident management (e.g., continuing efforts to cool core debris) and ultimately result in larger, uncontrolled releases of radioactive material.

On August 28, 2013, NEI submitted NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision C2 (ADAMS Accession No. ML13247A403), to provide specification for the development, implementation, and maintenance of guidance in response to the order regarding reliable hardened containment vents capable of operation under severe accident conditions. This ISG endorses, with clarifications and exceptions, the methodologies described in the industry guidance document NEI 13-02.

## **PROPOSED ACTION**

By this action, the NRC is requesting public comments on draft JLD-ISG-2013-02. This draft JLD-ISG proposes guidance related to requirements contained in Order EA-13-109, “Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions”. The NRC staff will make a final determination regarding issuance of the JLD-ISG after it considers any public comments received in response to this request.

Dated at Rockville, Maryland, this 11<sup>th</sup> day of September 2013.

FOR THE NUCLEAR REGULATORY COMMISSION.

/RA/

David L. Skeen, Director  
Japan Lessons-Learned Project Directorate  
Office of Nuclear Reactor Regulation

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/RA/

David L. Skeen, Director  
Japan Lessons-Learned Project Directorate  
Office of Nuclear Reactor Regulation

**ADAMS Accession No.:** ML13226A102

\*via email

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