



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 27, 2014

Mr. Michael J. Pacilio
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION - REQUEST FOR
ADDITIONAL INFORMATION REGARDING REQUEST FOR EXTENSION TO
COMPLY WITH NRC ORDER EA-13-109: ORDER MODIFYING LICENSES
WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE
OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS
(TAC NO. MF4352)**

Dear Mr. Pacilio:

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A694), the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-50 to All Operating Boiling-Water Reactor Licensees with Mark I and Mark II Containments. The order, in part, required licensees to install a reliable hardened containment vent system. By letter dated June 6, 2013 (ADAMS Accession No. ML13143A334), the NRC superseded the requirements of Order EA-12-050, with Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions."

Section IV of Order EA-13-109 states that licensees proposing to deviate from requirements of the order may request that the Director, Office of Nuclear Reactor Regulation, relax or rescind certain requirements. By letter dated June 6, 2014 (ADAMS Accession No. ML14153A421), Exelon Generation Company, LLC (Exelon, the licensee) requested an extension of the final compliance dates of Order EA-13-109. Specifically, the licensee requested an extension to comply with the requirements in Section IV of NRC Order EA-13-109 concerning implementation of the Phase 1 (wetwell vent) and Phase 2 (drywell vent) at Oyster Creek Nuclear Generating Station (OCNGS) until January 31, 2020.

By letter dated January 7, 2011 (ADAMS Accession No. ML110070507), the licensee notified the NRC of Exelon's intent to permanently shut down OCNGS and cease operation no later than December 31, 2019. The licensee's extension request dated June 6, 2014, also stated that Exelon will submit a request for relief from NRC Order EA-13-109 no later than January 31, 2020, based on the shutdown condition of the plant at that time.

M. Pacilio

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The NRC staff has reviewed the June 6, 2014, extension request submitted by the licensee and has determined that a request for additional information is needed to complete its technical review. The specific information requested is addressed in the enclosure to this letter. The NRC staff requests that Exelon provide a response within 30 days from the date of this letter.

If you have any questions regarding this letter, please feel free to contact me at (301) 415-3204.

Sincerely,

A handwritten signature in black ink, reading "John D. Hughey". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

John D. Hughey, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
RELATED TO EXTENSION REQUEST REGARDING
COMPLIANCE WITH NRC ORDER EA-13-109
OYSTER CREEK NUCLEAR GENERATING STATION
EXELON GENERATING COMPANY, LLC
DOCKET NO. 50-219

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A694), the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-50 to All Operating Boiling-Water Reactor (BWR) Licensees with Mark I and Mark II Containments. The order, in part, required licensees to install a reliable hardened containment vent system. By letter dated June 6, 2013 (ADAMS Accession No. ML13143A334), the NRC superseded the requirements of Order EA-12-050, with Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions."

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As stated in Order EA-13-109, BWRs with Mark I and Mark II containments shall have a reliable, severe accident capable hardened containment venting system (HCVS). In Phase 1, licensees of BWRs with Mark I and Mark II containments shall design and install a venting system that provides venting capability from the wetwell 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.

Enclosure

The NRC staff has reviewed the June 6, 2014, submittal by the licensee and determined that the following Request for Additional Information (RAI) is needed to complete its technical review. Each of the requests below correspond to a requirement of Attachment 2 of Order EA-13-109 and/or an excerpt from the Nuclear Energy Institute (NEI) guidance document NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109: BWR Mark I & II Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions" (ADAMS Accession No. ML13316A853), which was endorsed by Japan Lessons-Learned Project Directorate (JLD) Interim Staff Guidance (ISG) Document, JLD-ISG-2013-02 (ADAMS Accession No. ML13304B836).

EA-13-109, Attachment 2, Requirement 1.1.2: (NEI 13-02 Section 4.2.5 and 4.2.6)

The HCVS shall be designed to minimize plant operators' exposure to occupational hazards, such as extreme heat stress, while operating the HCVS system.

Section 6.2.7.2.2 of OCNGS Updated Final Safety Analysis Report (UFSAR) describes the operation of the Hardened Vent System and states in part:

To start the venting operation, an operator will be dispatched to align the hardened vent system by closing the Nitrogen line butterfly valve (V-23-357) and opening the vent line butterfly valve (V-23-358). Once these valves are aligned manually, the venting operation can be performed by opening either the Drywell isolation valves V-23-13 and 14 or the Torus isolation valves V-23-15 and 16 from the Control Room.

RAI-1:

Discuss the environmental conditions to which the operators would be subjected in order to accomplish these actions. Discuss the availability of operator aids (such as ice vests or self-contained breathing apparatus) needed to perform these tasks, if applicable.

EA-13-109, Attachment 2, Requirement 1.1.3: (NEI 13-02 Section 4.2.5)

The HCVS shall also be designed to account for radiological conditions that would impede personnel actions needed for event response.

RAI-2:

Discuss the operator's ability to complete the tasks in the assumed dose fields. Has a site-specific analysis in accordance with the guidance of NEI 13-02, Appendices F and G been performed to determine the predicted radiological conditions which would be applicable at OCNGS following a severe accident? If not, discuss the differences between the NEI 13-02, Appendices F and G analysis and the dose assumptions used at OCNGS.

EA-13-109, Attachment 2, Requirement 1.2.2: (NEI 13-02 Section 4.1.5.2.3)

The HCVS shall discharge the effluent to a release point above main plant structures.

NEI 13-02, Section 4.1.5.2.3:

The release stack or structure exposed to outside should be designed or protected to withstand missiles that could be generated by the external events that screen in for the plant site using the guidance in NEI 12-06 as endorsed by JLD-ISG-12-01.

Per NEI 12-06 guidance, hurricanes and tornado hazards are applicable to Oyster Creek. In addition, Section 3.5.1.4.1 of the OCNGS UFSAR lists potential missiles.

RAI-3:

Provide a description of the differences, if any, between the guidance stated in NEI 13-02, Section 4.1.5.2.3, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance.

EA-13-109, Attachment 2, Requirement 1.2.4: (NEI 13-02 Section 4.2.2.1.4)

The HCVS shall be designed to be manually operated during sustained operations from a control panel located in the main control room or a remote but readily accessible location.

NEI 13-02, Section 4.2.2.1.4:

The controls/control location design should preclude the need for operators to move temporary ladders or operate from atop scaffolding to access the HCVS valves or remote operating locations.

RAI-4:

For the actions listed in the OCNGS UFSAR Section 6.2.7.2.2 quoted above, clarify whether any of the proposed operator actions require temporary ladders or operations atop scaffolding to accomplish the objectives.

EA-13-109, Attachment 2, Requirement 1.2.6: (NEI 13-02 Section 4.2.2.1.1.1 and 4.2.6.1.2.2)

The HCVS shall be capable of operating with dedicated and permanently installed equipment for at least 24 hours following the loss of normal power or loss of normal pneumatic supplies to air operated components during an extended loss of [alternating current] AC power.

The subject extension request and the OCNGS UFSAR, Section 6.2.7.2.2, each state that in the event of a loss of instrument air, venting operations can be performed a maximum of six times utilizing the permanently installed accumulators.

RAI-5:

Provide a site-specific justification which describes how the six cycles of motive force available in the accumulators is sufficient to support the OCNGS procedural actions to cope with the first 24 hours of a postulated severe accident. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance during the requested period of extension.

RAI-6:

The extension request states that, "Power for the solenoid valves is available as long as "B" battery can supply power and indefinitely once the FLEX generator restores the "B" battery charger." What is the length of time the "B" battery can supply power to the solenoid valves before the FLEX generator is required?

RAI-7:

The extension request states, "If there is a loss of station air, AC, and [direct current] DC power, then the current site B.5.b procedures direct manual opening of the HCVS isolation valves." Provide a description of how the manual opening and keeping open of the containment isolation valves is accomplished.

EA-13-109, Attachment 2, Requirement 1.2.8: (NEI 13-02 Section 4.2.2.)

The HCVS shall include means to monitor the status of the vent system (e.g. valve position indication) from the control panel required by 1.2.4. The monitoring system shall be designed for sustained operation during an extended loss of AC power.

RAI-8:

Provide a description of the differences, if any, between the guidance in NEI 13-02, Section 4.2.2, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance during the requested period of extension.

EA-13-109, Attachment 2, Requirement 1.2.9: (NEI 13-02 Section 4.2.4.1.2.)

The HCVS shall include a means to monitor the effluent discharge for radioactivity that may be released from operation of the HCVS. The monitoring system shall provide indication from the control panel required by 1.2.4 and shall be designed for sustained operation during an extended loss of AC power.

Section 6.2.7.3 of the OCNGS UFSAR describes the design evaluation of the Hardened Vent System and states in part:

During venting operation coincident with the loss of offsite power, the flow to the stack is less than the design cut-off flow of 94,000 CFM of the RAGEMS [Radioactive Gaseous Effluent Monitoring System]. At this flow condition the RAGEMS will go to automatic default mode using the low range monitor. Since there is no fuel damage when venting on TW sequence [loss of decay heat cooling capability] is performed, the radiation level of the releases will be within the range of the low range monitor.

RAI-9:

Provide a description of the differences, if any, between the guidance in NEI 13-02, Section 4.2.4.1.2, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance during the requested period of extension.

EA-13-109, Attachment 2, Requirement 1.2.10: (NEI 13-02 Section 2.4.4.1)

The HCVS shall be designed to withstand and remain functional during severe accident conditions, including containment pressure, temperature, and radiation while venting steam, hydrogen, and other non-condensable gases and aerosols. The design is not required to exceed the current capability of the limiting containment components.

NEI 13-02, Section 2.4.4.1, states in part:

The PCPL [Primary Containment Pressure Limit] and 545°F, is recommended as the design pressure and temperature for the drywell vent system and any common and shared portions of the vent line...

RAI-10:

Provide a description of the differences, if any, between the guidance in NEI 13-02, Section 2.4.4.1, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities, as required by the order and described in the guidance during the requested period of extension.

EA-13-109, Attachment 2, Requirement 1.2.11: (NEI 13-02 Section 4.1.7)

The HCVS shall be designed and operated to ensure the flammability limits of gases passing through the system are not reached; otherwise, the system shall be designed to withstand dynamic loading resulting from hydrogen deflagration and detonation.

RAI-11:

Provide a description of the differences, if any, between the guidance in NEI 13-02, Section 4.1.7, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance during the requested period of extension.

EA-13-109, Attachment 2, Requirement 2.2: (NEI 13-02 Section 5.2 and 5.3)

All other HCVS components shall be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. These items include electrical power supply, valve actuator pneumatic supply and instrumentation (local and remote) components.

In addition, the OCNCS UFSAR Section 6.2.7.4 describes the Failure Modes and Effects Analysis (FMEA) of the Hardened Vent System and states in part:

The 10" vent pipe which is not seismic, is provided with anti-fall down pipe supports. In the event of a seismic event, failure of the hardened vent pipes (8" and 10") may occur.

Given the severe accident conditions associated with the order, address the potential failure of the hardened vent pipes in the response to RAI-12 below.

RAI-12:

Provide a description of the differences, if any, between the guidance in NEI 13-02, Section 5.2 and 5.3, and the actual, physical configuration and/or capabilities of the containment venting system which will be in operation during the requested period of extension. Include a description of compensatory measures, if any, which will be utilized to achieve equivalent or similar capabilities as required by the order and described in the guidance during the requested period of extension.

EA-13-109, Attachment 2, Requirement 3.1:

The Licensee shall develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures shall be established for system operations when normal and backup power is available, and during an extended loss of AC power.

EA-13-109, Attachment 2, Requirement 3.2:

The Licensee shall train appropriate personnel in the use of the HCVS. The training curricula shall include system operations when normal and backup power is available, and during an extended loss of AC power.

RAI-13:

Provide a description of procedure changes and/or changes to the training curricula, if any, to support the use of the containment venting system during the requested period of extension.

M. Pacilio

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Sincerely,

/RA/

John D. Hughey, Project Manager
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Japan Lessons-Learned Division
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Docket No. 50-219

Enclosure:
Request for Additional Information

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*DORL concurrence for UFSAR SUNSI review.

OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/DORL/LPL1-2/PM*	NRR/JLD/JCBB/TR
NAME	JHughey	SLent	JLamb	BTitus
DATE	08/13/14	08/13/14	08/13/14	08/13/14
OFFICE	NRR/JLD/JCBB/BC	NRR/JLD/JOMB/BC(A)	NRR/JLD/JOMB/PM	
NAME	SBailey	MHalter	JHughey	
DATE	08/13/14	08/15/14	08/27/14	

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