



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

April 8, 2013

Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
P.O. Box 250
Governor Hunt Road
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - REQUEST FOR
ADDITIONAL INFORMATION REGARDING CHANGE TO LICENSING BASIS
FOR STATION BLACKOUT DIESEL GENERATOR (TAC NO. MF0422)

Dear Sir or Madam:

By letter dated December 21, 2012 (Agencywide Document Access and Management System (ADAMS) Accession No. ML12362A041), as supplemented by letter dated March 19, 2013 (ADAMS Accession No. ML13085A079), Entergy Nuclear Operations, Inc. submitted a license amendment request to revise the licensing basis relative to how Vermont Yankee Nuclear Power Station (VYNPS) satisfies the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.63, "Loss of all alternating current power." Entergy proposes to replace the Vernon Hydroelectric Station with an onsite diesel generator as the alternate alternating current power source providing acceptable capability to withstand a station blackout under 10 CFR 50.63(c)(2). The proposed change would involve revisions to the VYNPS facility and procedures described in the Updated Final Safety Analysis Report.

The Nuclear Regulatory Commission staff is reviewing the information provided in your letter and has determined that additional information is needed to support its review. Enclosed is the NRC staff's request for additional information (RAI). The RAI was discussed with your staff on April 8, 2013, and it was agreed that your response would be provided by May 8, 2013.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Guzman", is written over a horizontal line.

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure:
As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION FOR
LICENSE AMENDMENT REQUEST RE: REVISION TO LICENSING BASIS FOR
REPLACING THE VERNON HYDROELECTRIC STATION WITH A
STATION BLACKOUT ONSITE EMERGENCY DIESEL GENERATOR
ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

By letter dated December 21, 2012 (Agencywide Document Access and Management System (ADAMS) Accession No. ML12362A041), as supplemented by letter dated March 19, 2013 (ADAMS Accession No. ML13085A079), Entergy Nuclear Operations, Inc. (Entergy or the licensee) submitted a license amendment request (LAR) to revise the licensing basis relative to how Vermont Yankee Nuclear Power Station (VYNPS) satisfies the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.63, "Loss of all alternating current power." Entergy proposes to replace the Vernon Hydroelectric Station with an onsite emergency diesel generator (DG) as the alternate alternating current (AAC) power source providing acceptable capability to withstand a station blackout (SBO) under 10 CFR 50.63(c)(2). The proposed change would involve revisions to the VYNPS facility and procedures described in the Updated Final Safety Analysis Report. The Nuclear Regulatory Commission (NRC) staff is reviewing the LAR and has determined that additional information as requested below will be needed to support its review.

RAI-1

The licensee stated the following in Attachment 1, Page 7 of the LAR:

The SBO DG will not include an air start system, but does include redundant electric starting motors (DC). As discussed above, the SBO DG system will be equipped with independent DC battery systems for operation of the DG and the 4,160 VAC circuit breakers in the SBO DG bus. AC power to the DC system battery chargers will normally be provided from a source that is independent of the preferred and Class 1E power system. AC power is not required to be available to start the SBO DG or operate the SBO DG bus breakers necessary to align the AAC power source to the plant shutdown buses; the DC battery systems provide power to start and operate the SBO DG and to operate the SBO DG bus breakers.

- a) Provide the capacity requirements for the SBO DG batteries and the basis for the required battery capacity.
- b) Provide the rated capacity of the SBO DG batteries.
- c) Explain how the SBO DG direct current (DC) power system will be demonstrated to be functional capable of performing its design function (e.g., periodically tested).

Enclosure

RAI-2

Provide a discussion of the minimum and maximum temperature requirements for the proposed SBO DG and its support systems. In your response, include a discussion of the potential for common cause failure of the emergency alternating current (AC) power sources and the SBO DG as a result of minimum and maximum temperatures.

RAI-3

Provide a discussion of the SBO DG building's ventilation system. In your response, include a discussion of the SBO DG's exhaust system and explain how external exhaust outlets are protected against environmental hazards.

RAI-4

The licensee stated the following in Attachment 1, Page 7 of the LAR:

The SBO DG will include a dedicated fuel oil storage tank with a capacity sufficient for operation of the DG at 100% rated load for at least 36 hours, which provides significant margin over the existing design basis eight hours coping time.

- a) Provide the current SBO load profile and describe any differences between the current SBO profile and the SBO profiles that have been previously reviewed by the NRC.
- b) Explain how you determined the 'at least 36 hours' duration with the DG operating at 100% rated load.
- c) Provide the minimum fuel oil requirement for the SBO DG to perform its design function for the SBO specified duration. In your response, include a discussion of the fuel consumption rate that you assumed in your calculations and the basis for the consumption rate.

RAI-5

Provide a drawing showing the physical location of major components/enclosures of the SBO DG system.

RAI-6

The licensee stated the following in Attachment 1, Page 5 of the LAR:

An operator interface panel (OIP) will be installed in the VY Control Room to provide monitoring and control capability for the AAC power system when it is in service. The OIP is non-safety related and will be located in Control Room Panel 9-8. It will be supplied by a power supply located within the panel which will be protected by a 5 ampere Class 1E fuse located within panel 9-8. The power supply is, in turn, supplied by a 15 ampere Class 1E circuit breaker located in 120 VAC Vital Distribution Panel VAC-A.

- a) Describe control capability of the AAC power system when in service from the OIP.
- b) Describe the load impact due to the addition of the OIP on the Class 1E vital AC system and/or the DC system.

RAI-7

The licensee stated the following in Attachment 1, Page 6 of the LAR:

The auxiliary equipment needed to start and operate the SBO DG (e.g. battery chargers, DG heaters, etc.) will normally be powered from the 4,160 VAC SBO DG bus, which will normally be energized via the VHS tie line connection from the Vernon Hydro Station switchyard.

- a) Provide a one line diagram of the distribution panel which will feed the auxiliary equipment to start and operate the SBO DG.
- b) Provide a discussion of control room alarms to indicate loss of power to the distribution panel or other relevant indications to ensure timely operator response to an SBO condition.
- c) Explain how proper control and operation of the SBO DG will be insured (e.g., an operator will be stationed near the 4,160 VAC SBO DG switchgear).

RAI-8

The licensee stated the following in Attachment 1, Page 9 of the LAR:

Acceptance testing of the SBO DG unit will include starting of an unloaded 4kV induction motor that provides a starting current equal to or higher than the largest motor on safety Bus 3 or safety Bus 4, which is the 1000 HP Residual Heat Removal (RHR) pump motor. The generator output voltage and frequency will be monitored during the motor start to ensure that allowable limits are not exceeded. This one-time testing will demonstrate the ability of the new generator to start the RHR pump while maintaining operating voltage and frequency within the limits established for safe shutdown components.

Describe how the limiting SBO diesel generator output voltage and frequency will be derived for monitoring during the largest motor start test.

April 8, 2013

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Sincerely,

/ra/

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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*RAI provided by memo

NRR-088

OFFICE	NRR/DORL/LPLI-1/PM	NRR/DORL/LPL1-1/LA	DE/EEEB/BC(A)*	NRR/DORL/ LPL1-1/BC(A)
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DATE	4/8/13	4/8/13	3/21/13	4/8/13

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