Entergy

Entergy Nuclear Operations, Inc.
Vermont Yankee
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Christopher J. Wamser
Site Vice President

BVY 13-058

June 26, 2013

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: License Amendment Request; Changes to 10 CFR 50.63 Licensing Basis, Supplement 5
Vermont Yankee Nuclear Power Station
Docket No. 50-271
License No. DPR-28

REFERENCES:

1. Letter, Entergy Nuclear Operations, Inc. to USNRC, "License Amendment Request; Changes to 10CFR50.63 Licensing Basis," BVY 12-084, dated December 21, 2012

2. Letter, USNRC to Entergy Nuclear Operations, Inc., "Vermont Yankee Nuclear Power Station – Request for Additional Information Regarding Change to Licensing Basis for Station Blackout Diesel Generator (TAC No. MF0422)," NVY 13-041, dated April 8, 2013

3. Letter, Entergy Nuclear Operations, Inc. to USNRC, "License Amendment Request; Changes to 10CFR50.63 Licensing Basis, Supplement 3," BVY 13-038, dated May 7, 2013

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (Entergy) submitted a request for an amendment to the 10 CFR 50.63 (Station Blackout) licensing basis for Vermont Yankee Nuclear Power Station (VYNPS). In Reference 2, the NRC requested additional information (RAI) regarding the proposed change. In Reference 3, Entergy provided the RAI responses to all questions except for RAI-1. On June 6, 2013, a teleconference was held between Entergy and NRC staff to discuss the RAI responses. Attachment 1 to this submittal provides supplemental information to address NRC staff comments.

This supplement to the original license amendment request does not change the scope or conclusions in the original application, nor does it change Entergy's determination of no significant hazards consideration.

A001
NRR

This letter contains no new regulatory commitments.

Should you have any questions concerning this letter or require additional information, please contact Mr. Robert Wanczyk at 802-451-3166.

I declare under penalty of perjury that the foregoing is true and correct. Executed on June 26, 2013.

Sincerely,

CJW/plc

Attachments: 1. Response to Request for Additional Information
2. Voltage and Frequency Response of Test Motor

cc: William M. Dean
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Attachment 1

Vermont Yankee Nuclear Power Station

Response to Request for Additional Information

STATION BLACKOUT DIESEL GENERATOR ENCLOSURE

The Station Blackout Diesel Generator (SBO DG) enclosure is designed to the requirements of the International Building Code (IBC), 2009 edition and is analyzed and certified as such by the enclosure manufacturer. The environmental forces (snow, wind, and seismic) applicable to the installed location (Vernon, VT) were ascertained from the IBC and applied to the enclosure.

The two (2) enclosure air inlet louver hoods are an integral part of the analyzed enclosure and provide a level of physical protection for the enclosure air inlet louvers against the effects of a likely weather-related event that may initiate a loss of off-site power event, including rain, snow, and high winds. The hoods are located 90 degrees apart, with one hood installed on the end of the enclosure and the other installed on the side of the enclosure, minimizing the likelihood of simultaneous failure caused by wind-borne debris. The air inlet section, located on the bottom of each hood, will be located approximately five (5) feet above grade and includes an integral mesh screen, providing assurance that the air inlet will not become blocked due to accumulation of snow or debris and that debris will not be introduced into the enclosure. There are no material storage areas in the vicinity of the hoods, providing additional assurance that the enclosure air inlets will not become blocked by debris. The engine combustion air inlets are physically located on the top of the engine within the enclosure, which provides protection against the effects of a likely weather-related event.

The engine exhaust is routed through a silencer located directly above the engine within the enclosure. The exhaust is then routed via a rigid metal pipe through the enclosure roof. The exhaust pipe is of robust construction to limit physical damage from environmental hazards, including wind-borne missiles, and only extends above the roof by approximately two (2) feet, minimizing the potential for the exhaust pipe to be damaged by wind-borne debris. The exhaust pipe includes a rain shield to prevent the introduction of rainwater. This rain shield also provides protection against wind-borne debris entering the exhaust piping.

RESULTS OF STARTING TEST MOTOR ON STATION BLACKOUT DIESEL GENERATOR

In response to RAI-8 in Reference 1, Vermont Yankee Nuclear Power Station (VY) provided details of motor start testing which would be performed before shipment of the SBO DG to the site. VY had previously stated that the acceptance testing of the SBO DG unit will include starting of an unloaded 4 kV induction motor that requires a starting current equal to or higher than the largest motor on safety Bus 3 or 4, which is the 1000 HP Residual Heat Removal (RHR) pump motor.

VY had stated that DG voltage and frequency will be monitored while starting a test motor which is 25% larger than the existing RHR pump motor. The voltage and frequency data would be used to determine the transient response of the SBO DG and to verify that voltage regulation and speed control would be acceptable for the in-plant configuration. The voltage drop would be compared to the voltage drop for the start of a single RHR pump motor from the VY Emergency Diesel Generator (EDG), as described in Updated Final Safety Analysis Report section 8.5.3.

Reference 1 stated that the test "shall verify that voltage recovers to above the minimum RHR pump motor starting voltage of 3200 volts within 0.1 seconds and that the test motor accelerates and that voltage and frequency are restored to nominal limits +/- 0.5%." The RAI-8 response should have stated that "voltage *starts to recover* to above the minimum RHR pump motor starting voltage of 3200 volts within 0.1 seconds and that the test motor accelerates and that voltage and frequency are restored to nominal limits +/- 0.5%."

Discussion of Starting Test Results:

The following is a comparison of the VY RHR Pump Motor and the Test Motor

	VY RHR Pump Motor	Test Motor
Horsepower (HP)	1000 HP	1250 HP
Locked Rotor Current (A)	830 amperes	956 amperes*
Full Load Current (A)	127 amperes	156 amperes
Nameplate Voltage (V)	4000 volts	4000 volts
Orientation	Vertical	Horizontal

* Locked Rotor Current was determined from Locked Rotor KVA Code of "F" (Locked Rotor KVA/HP range 5.0 – 5.59 using the average value of 5.3)

The 1250 HP test motor was started by the SBO DG. Attachment 2 is a trace of the test results. The trace depicts voltage, frequency and starting current. The test results indicate that voltage dipped to a minimum of 2860 volts, a 31.25% dip from nominal 4160 DG voltage. This represents a dip of 28.5% from nameplate motor voltage. This dip is less than the 36% voltage drop to 2662 V when starting a single RHR pump motor on an EDG and is therefore acceptable. Voltage started to recover within 0.1 seconds of the application of the load and recovered to above the RHR pump motor starting voltage of 3200 V within approximately 0.25 seconds from minimum voltage. (Note: The VY RHR pump motor can start its load with a sustained voltage of 3200 V (80 percent of nameplate voltage). The SBO DG voltage recovers well above minimum starting voltage, thus assuring rapid motor start.)

During the starting test, inrush current started to drop, voltage recovered to close to nominal and frequency started to recover approximately 1.5 seconds after load application. This indicated that the motor was nearly at full speed. The motor had fully accelerated when frequency reached 60 Hz, approximately 2.0 seconds after application of the load. Voltage and load current reached steady-state conditions approximately 3.0 seconds after application of the load.

Conclusion:

The motor start test demonstrates that the SBO DG can start the largest load on safety Bus 3 and 4 at VY (with margin). The inrush current for the test motor was significantly higher than the largest load that the SBO DG will be required to start and therefore voltage drop will be less severe than experienced during the test. Loads will be applied manually to the VY SBO DG. Voltage and frequency recovery time will not impact the addition of additional manual loads; however, the test demonstrated that voltage and frequency recovered within a few seconds after application of the much larger test load.

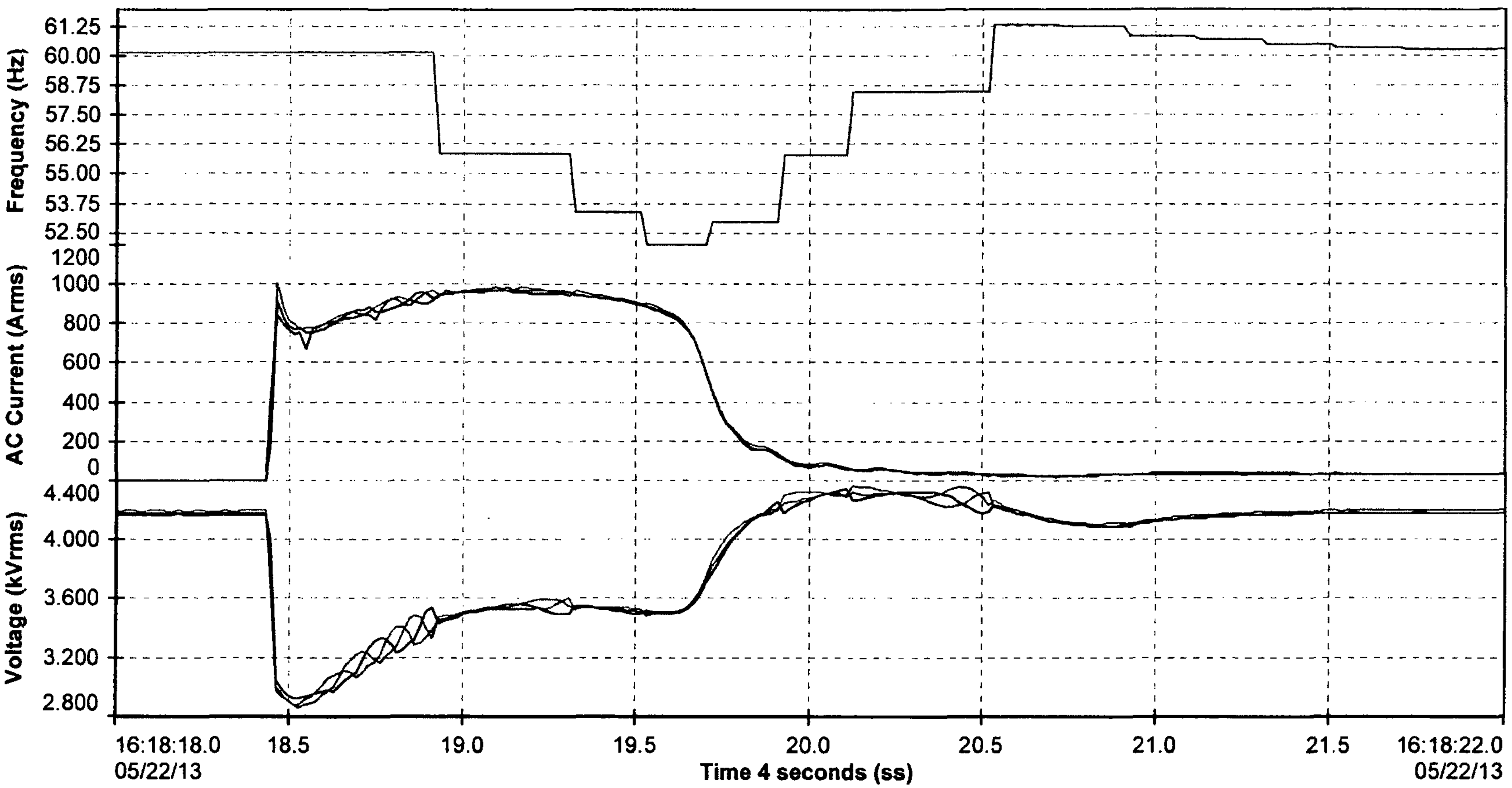
REFERENCE: 1. Letter, Entergy Nuclear Operations, Inc. to USNRC, "License Amendment Request; Changes to 10CFR50.63 Licensing Basis, Supplement 3," BVY 13-038, dated May 7, 2013

Attachment 2

Vermont Yankee Nuclear Power Station

Voltage and Frequency Response of Test Motor

Motor Starting on Generator Set
Frequency & Voltage Response



	Maximum	Minimum	Average
— Frequency	61.28	52.00	58.43
— Ia	967	0	311
— Ib	1007	0	318
— Ic	972	0	313
— Vab	4.344	2.926	3.929
— Vbc	4.324	2.880	3.932
— Vca	4.368	2.860	3.945

Pritchard Brown LLC