Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Station
600 Rocky Hill Road
Plymouth, MA 02360

Stephen J. Bethay
Director, Nuclear Assessment

June 5, 2006

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket 50-293
License No. DPR-35

Response to NRC Request for Additional Information Regarding Unresolved Inspection Item 05000293/2005003-01 from NRC Integrated Inspection Report 05000293/2005003 (TAC No. MD0178)

REFERENCE: 1. NRC Letter, 1.06.052, Pilgrim Nuclear Power Station - Request for Additional Information Regarding Unresolved Inspection Item 05000293/2005003-01 from NRC Integrated Inspection Report 05000293/2005003 (TAC No. MD0178), dated April 24, 2006.

LETTER NUMBER: 2.06.046

Dear Sir or Madam:

By Reference 1, the NRC requested additional information regarding Unresolved Inspection Item 05000293/2005003-01 from NRC Integrated Inspection Report 05000293/2005003. Entergy has evaluated the request and the response is provided in Attachment 1.

This letter contains no commitments.

If you have any questions or require additional information, please contact Mr. Bryan Ford, Licensing Manager, at (508) 830-8403.

Sincerely,

Stephen J. Bethay
Director, Nuclear Safety Assurance

ERS/dm
Attachment: 1: Entergy Response to NRC Request for Additional Information Regarding Unresolved Inspection Item 05000293/2005003-01 from NRC Integrated Inspection Report 05000293/2005003. (3 pages)

IE01

cc: Mr. James Shea, Project Manager
Plant Licensing Branch I-1
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
One White Flint North O-8C2
11555 Rockville Pike
Rockville, MD 20852

Regional Administrator, Region 1
U.S. Nuclear Regulator Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Pilgrim Nuclear Power Station

Mr. Robert Walker, Director
Massachusetts Department of Public Health
Radiation Control Program
90 Washington Street, 2nd Floor
Dorchester, MA 02121

Ms Cristine McCombs, Director
Mass. Emergency Management Agency
400 Worcester Road
Framingham, MA 01702

Entergy Response to NRC Request for Additional Information Regarding Unresolved Inspection Item 05000293/2005003-01 from NRC Integrated Inspection Report 05000293/2005003

NRC RAI #1

The Pilgrim FSAR Section 8.5.5 states that "Readiness can best be demonstrated by periodic testing, which insofar as practical, simulates actual emergency conditions." A) What was your basis for determining that it was not practical to sequence load one RBCCW Pump and one SSW Pumps on the Emergency Diesel Generator (EDG) during surveillance testing (TS SR 4.9.A.1.b and SR 4.9.A.1.c)?
B) Also, explain why equivalent loads in lieu of RBCCW and SSW pumps were not added in order to have required DG Loading.

Entergy Response

A) The "B" trains of RBCCW and SSW were not available during the surveillance test of the "B" EDG conducted during RFO 15. Procedure 8.M.3-1 "SPECIAL TEST FOR AUTOMATIC ECCS LOAD SEQUENCING OF DIESELS AND SHUTDOWN TRANSFORMER WITH SIMULATED LOSS OF OFF-SITE POWER AND SPECIAL SHUTDOWN TRANSFORMER LOAD TEST" was performed while the RBCCW & SSW systems were out of service. The RBCCW heat exchanger was out of service for channel repairs and eddy current testing. When the RBCCW heat exchanger is out of service, both of the associated trains RBCCW & SSW must be isolated. Procedure 8.M.3-1 was actually performed on April 28, 2005 from 0000 to 0600. The RBCCW & SSW systems were returned to service as follows:

- SSW returned April 29, 2005 @ 1200
- RBCCW Heat exchanger PWT April 29, 2005 @ 1200
- RBCCW returned April 30, 2005 @ 0400

The "A" trains of RBCCW and SSW were available and were included in the surveillance test of the "A" EDG.

B) Since this test does not prove the load capability of the EDG, additional load was not added to simulate the RBCCW and SSW pumps. The load capacity of the EDG is proven monthly by performance of procedure 8.9.1.

NRC RAI #2

Explain why starting the last sequenced load(s) RBCCW & SSW will not adversely affect the performance of the EDG. Specifically, address KW and KVAR requirements and available DG margin in KW and KVAR.

Entergy Response

In this test, the RHR and CS pumps are run at minimum flow. Actual loading on the EDG at the point when all three of these pumps are running (which includes all other loads normally powered in this configuration) is:

Current = 1.5 A (recorded CT current) x 600/5 CT ratio = 180 A

Voltage = 120.64 V (recorded PT voltage) x 4200/120 PT ratio = 4222 V

Entergy Response to NRC Request for Additional Information
Regarding Unresolved Inspection Item 05000293/2005003-01 from
NRC Integrated Inspection Report 05000293/2005003

Entergy Response to NRC RAI #2 (continued)

Apparent power (kVA) = 4.222 kV x 180 A x $\sqrt{3}$ = 1316 kVA

Real power (kW) (assuming 80% power factor) = 1316 x 0.8 = 1053 kW

The capability of the EDG is 2600 kW (continuous rating). The power available is 2600 – 1053 = 1547 kW.

The additional power to start a 100 HP SSW pump is approximately 560 kW and to start an RBCCW pump approximately 336 kW determined as follows:

SSW pump is 100HP x 0.746 kW/HP x 6 (inrush) / 0.8 efficiency = 560 kW
Steady state = 100 HP x 0. 746 kW/HP / 0.8 efficiency = 93.25 kW

RBCCW pump is 60HP x 0.746 kW/HP x 6 (inrush) / 0.8 efficiency = 336 kW
Steady state = 60 HP x0.746 kW/HP / 0.8 efficiency = 55.95 kW

With 1547 kW available, there is sufficient capacity on the EDG to start the SSW pump, which develops 560 kW during inrush, then 93.25 kW during steady state. After the SSW pump is started, the available margin is 1453.75 kW (1547 – 93.25) to start the RBCCW pump load of 336 kW during inrush, then 55.95 kW during steady state.

In terms of KVA:

At the point where all three CSCS pumps are running, EDG kVA is 1316 kVA (4.222 kV x 180 A x $\sqrt{3}$).

EDG capacity is 3250 kVA, Therefore, the available margin is 1934 kVA (3250 – 1316 kVA) for starting the SSW and RBCCW pumps.

The inrush and running KVA of each of these pumps is:

SSW nameplate kVA code = F = 5.59 kVA /HP (from National Electric Code)
Starting inrush kVA: 100 HP x 5.59 kVA / HP = 559 kVA.
Running kVA: 480 V x 113.4 A x $\sqrt{3}$ = 94.3 kVA

RBCCW nameplate kVA code = G = 6.29 kVA / HP (National Electric Code)
Starting inrush kVA: 60 HP x 6.29 kVA / HP = 337 kVA.

Running kVA: 480 V x 74.5 A x $\sqrt{3}$ = 62 kVA.

The EDG's remaining available margin of 1934 kVA is sufficient to start and run both the RBCCW and SSW pumps.

Entergy Response to NRC Request for Additional Information
Regarding Unresolved Inspection Item 05000293/2005003-01 from
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NRC RAI #3

A) What does Entergy consider a "small" EDG load?
B) Would this include the RBCCW and SSW pumps?
C) Explain why these loads would not impact EDG performance when taken in total during the sequence load of the emergency diesel.

Entergy Response

A) Loads less than or equal to 5% of the EDG capacity. 2600 x 0.05 = 130 kW (175 HP)

B) Yes.

C) After starting the EDG and loading it with the normal loads for a simulated LOCA w/LOOP, and after all three CSCS pumps have started, the total load on the EDG as measured is 1053 kW. At this point in the test, when the SSW and RBCCW pumps would sequence on, the EDG load is 1053 kW. This leaves (2600 – 1053) = 1547 kW available on the EDG which is more than adequate to start the SSW and RBCCW pumps in sequence