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RBG- 47263

July 20, 2012

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

SUBJECT: Supplement to License Amendment Request
Changes to Technical Specification 3.8.1;" AC Sources - Operating"
River Bend Station, Unit 1
Docket No. 50-458
License No. NPF-47

REFERENCES:
1. Entergy Letter to NRC dated December 8, 2011, License Amendment Request, Changes to Technical Specification 3.8.1;" AC Sources - Operating" (RBG-47191)
2. NRC Email dated May 21, 2012, Request for Additional Information PROPOSED CHANGES TO TECHINCAL SPECIFICATION 3.8.1; "AC SOURCES - OPERATING" (TAC NO. ME7695)

Dear Sir or Madam:

In Reference 1, Entergy Operations, Inc. (Entergy) submitted a request for an amendment to the Technical Specifications (TS) 3.8.1;"AC Sources – Operating." This request will revise Technical Specification (TS) 3.8.1 and the associated Bases, to expand its scope to include provisions for testing of the automatic transfer function from the station 22 kV bus to offsite power for Division III.

In Reference 2, the NRC Staff requested additional information concerning this request. This correspondence provides the requested additional information.

This information contains no new commitments.

If you have any questions or require additional information, please contact Mr. Joseph A. Clark at (225) 381-4177.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 20, 2012

Sincerely,

JCR/JAC/bmb

Attachments:
1. Response to Requests for Information

RBF1-12-0105
LAR 2011-07
File Codes; G 9.5, G 9.42

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Attachment 1

RBG- 47263

Response to Requests for Information

The NRC staff has determined that the following additional information is needed to complete our review.

1. Provide a discussion of the effects of supplying power to non-safety related bus 1NNS-SWG1C from the 1STX-XNS1C transformer under both normal and emergent conditions during all MODES of operation. Also discuss the available capacity for this new configuration (e.g., provide the expected loading and the transformer ratings).

Response

The most limiting case is analyzed assuming normal plant loads are running with STX-XNS1C supplying buses NNS-SWG1A, NNS-SWG1B, ENS-SWG1A, ENS-SWG1B and NNS-SWG1C in MODE 1. The loading is shown to be within the capacity of STX-XNS1C (see Table 1).

When the plant is starting up, shutdown or in refuel (MODES 2, 3, 4 and 5) the generator does not produce enough power to supply STX-XNS1C. During these modes, power is supplied to the buses via the Preferred Station Service Transformers (RTX-XSR1C and RTX-XSR1D). Therefore, these conditions are not further analyzed.

During a Loss of Coolant Accident concurrent with a Loss of Offsite Power, the non-safety related loads are shed from the buses, leaving only the safety-related loads from ENS-SWG1A, ENS-SWG1B and E22-S004 to be powered by STX-XNS1C. However, the Loss of Offsite Power results in a reactor scram due to a loss of power to the Reactor Protection System (RPS) with a subsequent turbine and generator trip. When this occurs, power supplied to STX-XNS1C is lost and the Division III safety-related loads are repowered by the buses when power is provided by the emergency diesel generators. Therefore, this condition will not be further analyzed.

If a Loss of Offsite Power occurs with no LOCA, the reactor will automatically scram due to a loss of power to RPS as described above. Power supplied to STX-XNS1C will be lost and safety-related loads are repowered by the buses when power is provided by the emergency diesel generators. Therefore, this condition will not be further analyzed.

If a LOCA occurs with no Loss of Offsite Power, the reactor will automatically scram due to a loss of power to RPS as described above. Power supplied to STX-XNS1C will be lost and loads will automatically transfer to the offsite source. Therefore, this condition will not be further analyzed.

The data shown in Table 1 demonstrates that STX-XNS1C has adequate capacity to supply loads for NNS-SWG1A, NNS-SWG1B, ENS-SWG1A, ENS-SWG1B and NNS-SWG1C in all modes during normal and emergency operations.

The rating for STX-XNS1C is 16 MVA. Table 1 shows the total loading under the most limiting condition is 13.15 MVA. This provides 2.85 MVA of margin on STX-XNS1C, which is 17.8% of the rating of the transformer.

2. On Page 1 of Attachment 1 of the LAR, the licensee stated that REQUIRED ACTION A.2 will state:

   Verify E22-S004 will transfer to the preferred station transformer powered by the OPERABLE offsite circuit.

   However, the TS Markup that the licensee provided for REQUIRED ACTION A.2 on Page 2 of Attachment 2 of the LAR states:

   Verify E22-S004 is aligned to transfer to the preferred station transformer powered by the OPERABLE offsite circuit.

   Please provide the following:

   a) Clarify which of the two proposed versions for REQUIRED ACTION A.2 is being requested.

   b) Explain how either of these proposals will ensure that the automatic transfer function is verified.

Response

This response is in 2 parts.

a) The required action will be as requested in Attachment 2, Technical Specification Mark-ups."

b) This action is not intended to ensure the automatic transfer function is verified. The proposed surveillance in SR 3.8.1.8.b is to verify the automatic transfer function.

The purpose of Action A.2 is to ensure when one offsite circuit is inoperable the transfer to the offsite circuit supplying Division III is aligned to the powered offsite circuit.

3. On Page 2 of Attachment 1 of the LAR, the licensee stated that a new surveillance requirement (SR) will be added as SR 3.8.1.9. Based on its review of this statement and the proposed TS Markup Page 3 of Attachment 2 of the LAR, the NRC staff did not locate any further information for a new SR 3.8.1.9. Clarify whether you intended to reference new SR 3.8.1.8 instead of SR 3.8.1.9.

Response

The correct reference on page 2 of attachment 1 should be SR 3.8.1.8.

4. On Page 2 of Attachment 1 of the LAR, the licensee stated that the new SR will contain the following language:

   Verify automatic transfer of bus E22-S004 through NNS-SWG1A or NNS-SWG1B from the 22 kV onsite circuit to required alternate offsite circuit.

   However, the TS Markup that the licensee provided for SR 3.8.1.8 on Page 2 of Attachment 2 of the LAR states:

   a) Verify manual transfer of unit power supply from the normal offsite circuit to required alternate offsite circuit.

   b) Verify automatic transfer of bus E22-S004 through NNS-SWG1A or NNS-SWG1B from the 22 kV onsite circuit to required offsite circuit.

   Clarify which of the two proposed versions for SR 3.8.1.8 is being requested.

Response

The Surveillance Requirement will be as requested in Attachment 2, Technical Specification Mark-ups."

5. On Page 2 of Attachment 1 of the LAR, the licensee stated that a NOTE will be added to the new SR that states:

   Only required to be met if 22 kV onsite circuit is supplying Division III safety related bus E22-S004 through NNS-SWG1A or NNS-SWG1B 4.16 kV buses from normal power transformer STX-XNS1C.

   However, the TS Markup that the licensee provided for SR 3.8.1.8 on Page 2 of Attachment 2 of the LAR states:

   1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.

   2. SR 3.8.1.8.b is only required to be met if 22 kV onsite circuit is supplying Division III safety related bus E22-S004 from normal power transformer STX-XNS1C.

   Clarify which of the two proposed versions for the SR 3.8.1.8 NOTE is being requested.

Response

The Surveillance Requirement will be as requested in Attachment 2, Technical Specification Mark-ups."

6. In the event of either a Fast or Slow automatic transfer of bus 1NNS-SWG1C, explain how 1NNS-SWG1A and 1NNS-SWG1B will be prevented from cross-connecting to each other.

Response

The current System Operating Procedure for the 4.16kV System (SOP-0046) provides guidance for manually aligning which bus (1NNS-SWG1A or 1NNS-SWG1B) supplies NNS-SWG1C. Only one bus is procedurally allowed to be connected to NNS-SWG1C during modes 1, 2 and 3. Cross-connecting 1NNS-SWG1A and 1NNS-SWG1B is only allowed in modes 4 and 5 when High Pressure Core Spray (HPCS) is not required to be Operable (SOP-0046 Precaution and Limitation 2.6).

The automatic transfer scheme does not automatically open or close the breakers necessary to connect 1NNS-SWG1A and 1NNS-SWG1B to 1NNS-SWG1C. The breakers necessary for cross-connection are:

1NNS-SWG1A-ACB23, 1NNS-SWG1A-ACB29 (1NNS-SWG1A to 1NNS-SWG1C)

1NNS-SWG1B-ACB24, 1NNS-SWG1B-ACB28 (1NNS-SWG1B to 1NNS-SWG1C)

The breakers listed above are not associated with the automatic transfer scheme.

The breakers associated with automatic transfer are:

1NNS-SWG1A-ACB06, 1NNS-SWG1A-ACB07

1NNS-SWG1B-ACB14, 1NNS-SWG1B-ACB15

7. On page 8-5 of NUREG-0989, "Safety Evaluation Report related to the operation of River Bend Station," the staff identified a concern with the potential interaction between the automatic transfer schemes at the 4160 volt non-safety related buses and the automatic starting logic of the diesel generators on the safety-related buses. Provide a detailed discussion that explains how you have resolved the NRC staff's concerns.

Response

The NRC staff was concerned about the potential interaction between the automatic transfer schemes at the 4160 V non-safety buses and the automatic starting logic of the diesel generators on the safety buses. If the Division I or II buses are connected to their alternate offsite power supply through the non-safety buses and a low or no voltage condition occurs on the non-safety bus, this will be seen at both the safety and non-safety bus. The staff questioned the applicant (RBS) on the interaction of the diesel start logic and upstream bus transfer logic during this event. The staff also questioned the interaction of the Division III diesel generator start logic and upstream bus transfer logic.

In a letter dated February 10, 1984, RBS provided an analysis of the diesel starting logic and normal bus transfer logic. The results of the analysis indicate there will be no detrimental interaction between the diesel starting logic and normal bus transfer logic. This analysis resolved the NRC staff's concerns regarding the interaction between the bus transfer logic and diesel starting logic for the Division I and II buses.

The NRC staff's concerns with regards to Division III was resolved by changing a statement in the FSAR that originally indicated there was an automatic slow transfer at the non-safety bus that feeds the Division III (HPCS) bus. The FSAR currently states that only manual transfer capability is provided at this bus.

The purpose of this License Amendment Request, in part, is to validate the use of the automatic transfer function at the non-safety bus that feeds the Division III bus. This requires analysis of the fast and slow transfer schemes and how they interact with the Division III Diesel Generator starting logic. The fast and slow transfer scheme was analyzed in the original License Amendment Request submittal. This analysis focuses on describing the Division III Diesel Generator start logic and the interaction between the automatic bus transfer logic and the Division III Diesel Generator starting logic.

Upon loss of power supply to STX-XNS1C (generator trip) with E22-S004 being fed from NNS-SWG1A or NNS-SWG1B through NNS-SWG1C, the following will occur:

1. NNS-SWG1A and NNS-SWG1B normal feeder breakers (ACB06 and ACB14) will trip.
2. If bus voltage on NNS-SWG1A and NNS-SWG1B is greater than 70% and other permissives are met, NNS-SWG1A-ACB07 and NNS-SWG1B-ACB15 will close and fast transfer to the preferred source will occur. There is no effect on bus E22-S004 for this condition.
3. If fast transfer does not occur, slow transfer will initiate when a loss of voltage (<80% Voltage + 2 second time delay) is detected if residual bus voltage on NNS-SWG1A and NNS-SWG1B drop below 25% and other permissives are met.
    a. Relays 62-1NNSA08 and 62-1NNSB08 block the fast transfer and permit slow transfer after 2 seconds. The tolerance is +/- 0.04 seconds. Therefore, the slow transfer scheme can start as late as 2.04 seconds.
    b. Relays 62S3-E22-S004 and 62S4-E22-S004 initiate the Loss of Voltage sequence on the Division III 4160 VAC bus. The Technical Specification minimum allowable value is 2.67 seconds (TS Table 3.3.8.1-1).
    c. Breaker switching times are as follows:
        i. Opening: 0.025 seconds (1.5 cycles)
        ii. Closing: 0.1 seconds (6 cycles)
    d. Based on the above times, it is concluded that initiation of a slow transfer will occur prior to initiation of the loss of voltage sequence on the Division III bus with 30 cycles of margin. (2.67 – 2.04 – 0.025 – 0.1 = 0.505 seconds = 30 cycles)
4. If neither a fast nor slow transfer initiates, the respective diesel generator will start and supply the safety-related loads on a loss of bus voltage with no additional time delay.

8. In NRC Inspection Report 50-458/40-200, dated August 1, 1990, NRC inspectors found potential issues that could exist at RBS in relation to the postulated failures of the high pressure cooling system pump motors and standby service water 3 pump motors that could result from high transient currents generated during the fast transfer of the Division 3 bus to offsite power. Provide a detailed discussion that explains how you have analyzed and resolved the issues described in this document. For additional information the licensee can review Task Interface Agreement (TIA) 2007-02 (ML073440280), where the NRC staff evaluated a fast transfer scheme of the Palisades Nuclear Plant. In the TIA, the NRC staff discussed the potential for excessive current transients and shaft torques which can damage operating essential equipment and the potential for the safety-related buses to experience greater than 1.33 per unit volts/hertz ratio due to the fast transfer scheme.

Response

The fast transfer scheme is blocked when either the Standby Service Water Pump (SWP-P2C) or High Pressure Core Spray Pump (E22-C001) is running.

Analysis provided within calculation G13.18.3.6*010, "Transient Analysis of Fast Transfer of Standby and Normal System from Normal to Preferred Supply," shows that during a fast transfer from STX-XNS1C to RTX-XSR1C and/or RTX-XSR1D the resultant Volts/Hertz for HPCS and Standby Service Water Pump C motors is above the ANSI recommended value of 1.33. Therefore, a fast transfer block exists when either of the HPCS or SWP-P2C pump breakers is closed.

This block protects these two high critical safety related motors against damage during the transfer scheme. A slow transfer will not damage the motor as it is within the 3 seconds time delay of the loss of voltage signal for E22-S004.

Table 1, Normal Plant Loading

Name	HP	Eff - Full Load	Eff - 3/4%	Eff - 1/2%	pf - Full Load %	pf - 3/4% Load	pf - 1/2% Load	KVA (per load)	KVA (total)	MVA
CCS-P1A,CCS-P1B,CCS-P1C	400	93	93	93	87	85	79	406.12	812.24	0.81224
C11-C001A,C11-C001B	400	92.6	92	91.5	89.8	88	83.4	391.03	391.03	0.39103
HDL-P1A,HDL-P1B, HDL-P1C, HDL-P1D	1250	94.9	94.7	93.9	87.7	84.8	77.4	1283.05	2566.1	2.5661
HVN-CHL1A, HVN-CHL1B, HVN-CHL1C	1250	95	94.8	94	90	88.5	84.7	1171.22	2342.44	2.34244
HVN-P1A, HVN-P1B	350	92.5	92	89.4	87	83.8	76.4	382.28	764.56	0.76456
HVN-CHL2A RAD, HVN-CHL2B RAD, HN-CHL2C	450	94.5	94.5	93.8	89	88.5	85.5	418.58	837.16	0.83716
EHS-MCC16A									545	0.545
EHS-MCC16B									553	0.553
NHS-MCC102A									189	0.189
NHS-MCC102B									190	0.19
BYS-CHGR1A, BYS-CHGR1B								80	160	0.16
EHS-MCC14A, EHS-MCC14B								181	362	0.362

Name	HP	Eff - Full Load	Eff - 3/4%	Eff - 1/2%	pf - Full Load %	pf - 3/4% Load	pf - 1/2% Load	KVA (per load)	KVA (total)	MVA
EHS-MCC8A									144	0.144
EHS-MCC8B									143	0.143
ENB-CHGR1A, ENB-CHGR1B								80	160	0.16
HVC-ACU1A, HVC-ACU1B								63	126	0.126
HVC-ACU2A, HVC-ACU2B								58.1	116.2	0.1162
HVK-CHL1A, HVK-CHL1B								211.5	423	0.423
HVC-CH1A, HVC-CH1B								65	130	0.13
SFC-P1A, SFC-P1B								72.5	145	0.145
EHS-MCC15A									51	0.051
EHS-MCC15B									52	0.052
EHS-MCC2A									87	0.087
EHS-MCC2C									15	0.015
EHS-MCC2E									25	0.025
EHS-MCC2G									47	0.047
EHS-MCC2J									29	0.029

Name	HP	Eff - Full Load	Eff - 3/4%	Eff - 1/2%	pf - Full Load %	pf - 3/4% Load	pf - 1/2% Load	KVA (per load)	KVA (total)	MVA
EHS-MCC2L									100	0.1
EHS-MCC2B									124	0.124
EHS-MCC2D									17	0.017
EHS-MCC2F									26	0.026
EHS-MCC2H									68	0.068
EHS-MCC2K									32	0.032
HVR-UC1A, HVR-UC1B, HVR-UC1C								80.7	242.1	0.2421
HVR-UC11A, HVR-UC11B								65.6	131.2	0.1312
IHS-CHGR1D									80	0.08
GTS-FN1A, GTS-FN1B								49.6	99.2	0.0992
GTS-FLT1AH, GTS-FLT1BH								85	170	0.17
HVR-FN11A, HVR-FN11B								123.1	246.2	0.2462
E22-S002									209	0.209
NHS-MCC101									184	0.184
Total STX-XNS1C Load									13134.43	**13.13443**