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UniStar
NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

June 17, 2009

UN#09-286

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

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the
Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI No. 110, Offsite Power System

References:
1) John Rycyna (NRC) to Robert Poche (UniStar Nuclear Energy), "RAI No. 110, EEB 1469.doc" email dated April 28, 2009

2) UniStar Nuclear Energy Letter UN#09-265, from Greg Gibson to Document Control Desk, U.S. NRC, Submittal of Response to RAI No. 110, Offsite Power System, dated May 28, 2009

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear Energy, dated April 28, 2009 (Reference 1). This RAI addresses the Offsite Power System, as discussed in Section 8.2 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA), Revision 4.

Reference 1 requested UniStar Nuclear Energy to respond to the RAI within 30 days. Reference 2 provided a schedule for the expected response dates for Questions 08.02-1 through 08.02-8. The Enclosure provides our responses to RAI No. 110, Questions 08.02-1 and 08.02-2 and Questions 08.02-4 through 08.02-8.

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NRO

Our responses to RAI No. 110, Questions 08.02-1 and 08.02-2 and Questions 08.02-4 through 08.02-8 do not include any new regulatory commitments and do not impact COLA content.

If there are any questions regarding this transmittal, please contact me at (410) 470-4205, or Mr. Michael J. Yox at (410) 495-2436.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 17, 2009

Christian Clement
for Greg Gibson

Greg Gibson

Enclosures: Response to NRC Request for Additional Information, RAI No. 110, Questions 08.02-1 and 08.02-2 and Questions 08.02-4 through 08.02-8, Offsite Power System, Calvert Cliffs Nuclear Power Plant, Unit 3

cc: John Rycyna, NRC Project Manager, U.S. EPR COL Application
Laura Quinn, NRC Environmental Project Manager, U.S. EPR COL Application
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application (w/o enclosure)
Loren Plisco, Deputy Regional Administrator, NRC Region II (w/o enclosure)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2
U.S. NRC Region I Office

GTG/JMR/MS

Enclosure

Response to NRC Request for Additional Information
RAI No. 110,
Questions 08.02-1 and 08.02-2 and Questions 08.02-4 through 08.02-8,
Offsite Power System
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No 110

Question 08.02-1

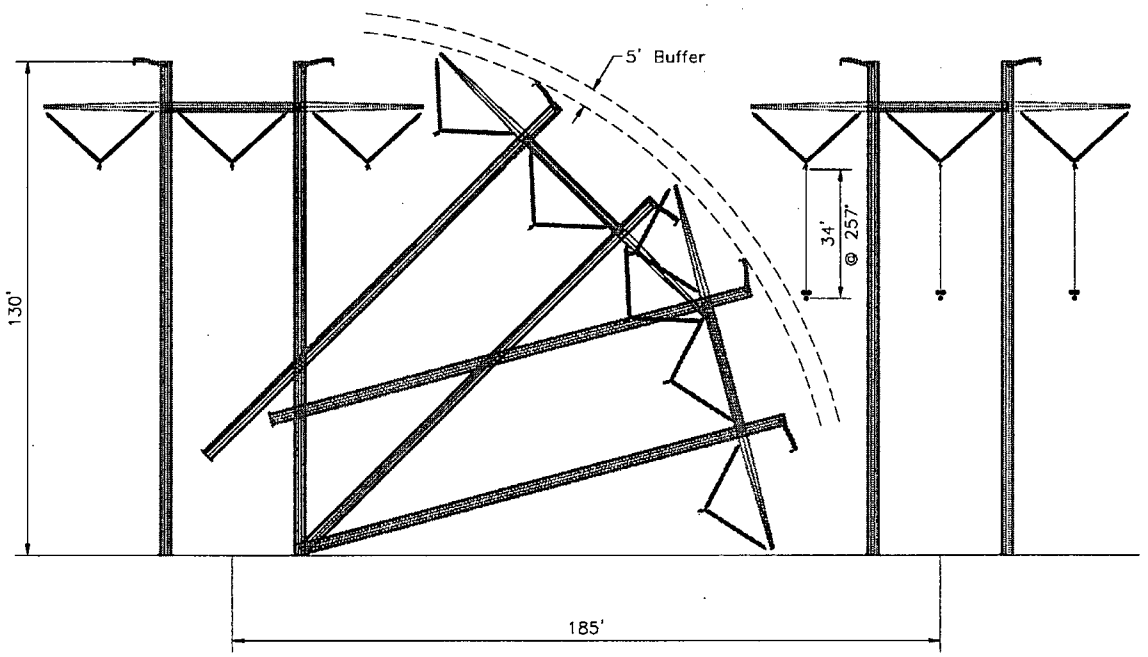
Section 8.2.1.1, page 8-11 of FSAR:
Indicates that the CCNPP3 design contains "four normally energized, physically independent transmission lines, designed and located to minimize the likelihood of their simultaneous failure under operating, postulated accident and postulated adverse environmental conditions including transmission line tower failure or transmission line breaking". In view of this statement, the staff reviewed the 500 kV Switchyard and Transmission line Layout drawing 8.2-1. This drawing shows the four new overhead transmission lines are laid parallel in close proximity with each other on one right-of-way. The close parallel runs show apparent vulnerability to severe natural phenomena or weather events which can cause simultaneous failure such as tower collapse or line breaking. Address this staff concern and provide a highlight of the design bases for the SSCs to reflect appropriate consideration of the most severe of the historically reported natural phenomena. The applicant is requested to amplify their discussion of compliance with the requirements of GDC 2 and 4 to specifically address this concern. This discussion should confirm that the transmission tower separation, line installation, and clearances are consistent with the National Electric Safety Code (NESC).

Response

The 500KV transmission line towers for the four lines originating from the CCNPP3 500KV Switchyard will be installed by Baltimore Gas and Electric (BGE) and spaced such that even if a tower collapses due to severe natural phenomena it cannot fall on the adjacent line or tower. A typical sketch of a falling tower indicating adequate clearance to adjacent lines is provided. This sketch indicates that there is no vulnerability of the 500KV Transmission Line Layout shown in FSAR Figure 8.2-1. Installation and clearances are consistent with the National Electric Safety Code.

This configuration ensures that appropriate considerations were applied to the design bases of the SSCs important to safety. These considerations include severe natural phenomena, the combination of effects of normal and accident conditions with the effects of severe natural phenomena, and the importance of the safety function being provided. Additional consideration was given to the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, and the protection of the SSCs to ensure compliance with NRC GDC 2 & GDC 4.

CCNPP Unit 3 FSAR Sections 8.2.2.1 and 8.2.2.2 incorporate by reference the U.S. EPR FSAR Sections 8.2.2.1 and 8.2.2.2 discussion of GDC 2 and 4 for offsite power. FSAR Section 8.2.2.4 Subsections titled "Transmission Line Tower Failure Mode Evaluation" and "Transmission Line Conductors Failure Mode Evaluation" indicate compliance with the National Electrical Safety Code in the analysis. Therefore, no further discussion of the topic is provided in the FSAR.



500kV TANGENT
CENTERLINE SPACING
MAX. STR. HEIGHT OF 130'

COLA Impact

The COLA FSAR will not be revised as a result of this response.

Question 08.02-2

The drawing 8.2-2 of FSAR shows a "Site Specific Aux Transformer" connected to the Red Bus. Please provide the purpose/application/ and connection details of this transformer.

Response

The "Site Specific Aux Transformer" feeds electric power for the desalinization plant, wastewater treatment facility, and circulating water system cooling tower dryer fans, as described in Revision 4 of FSAR, Subsection 8.3.1.1.7. Also the FSAR Figures 8.2-1 and 8.3-3 respectively show the physical location and connection details of this transformer.

COLA Impact

The COLA FSAR will not be revised as a result of this response.

Question 08.02-4

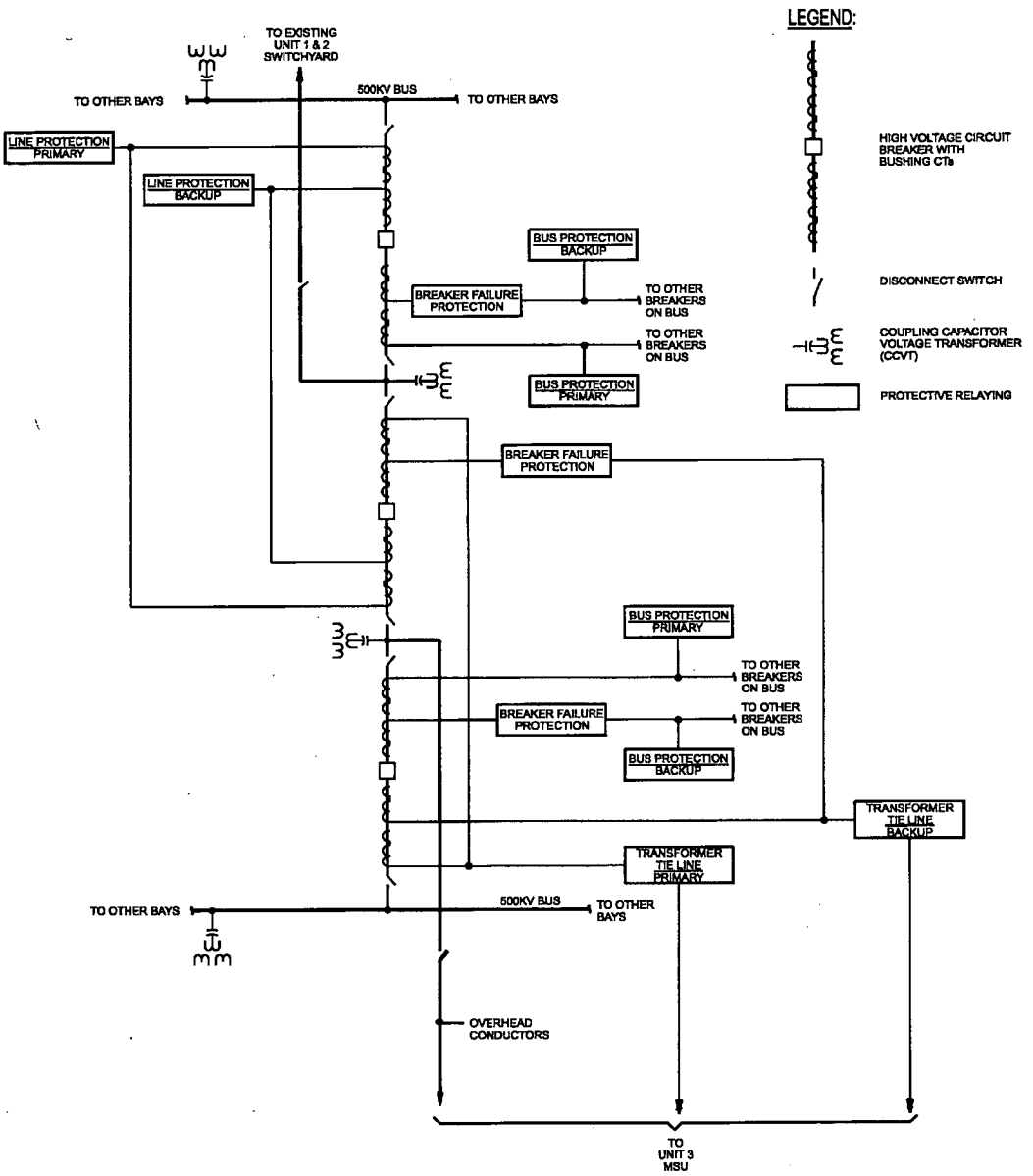
Section 8.2.2.4, page 8-20 of FSAR: 500 kV switchyard primary and secondary relaying system - Provide a relay protection scheme/single line diagram for understanding of the primary and secondary protection scheme and zone of protection. Explain how the typical zone of protection will include main step up transformers, essential auxiliary transformers and normal auxiliary transformers.

Response

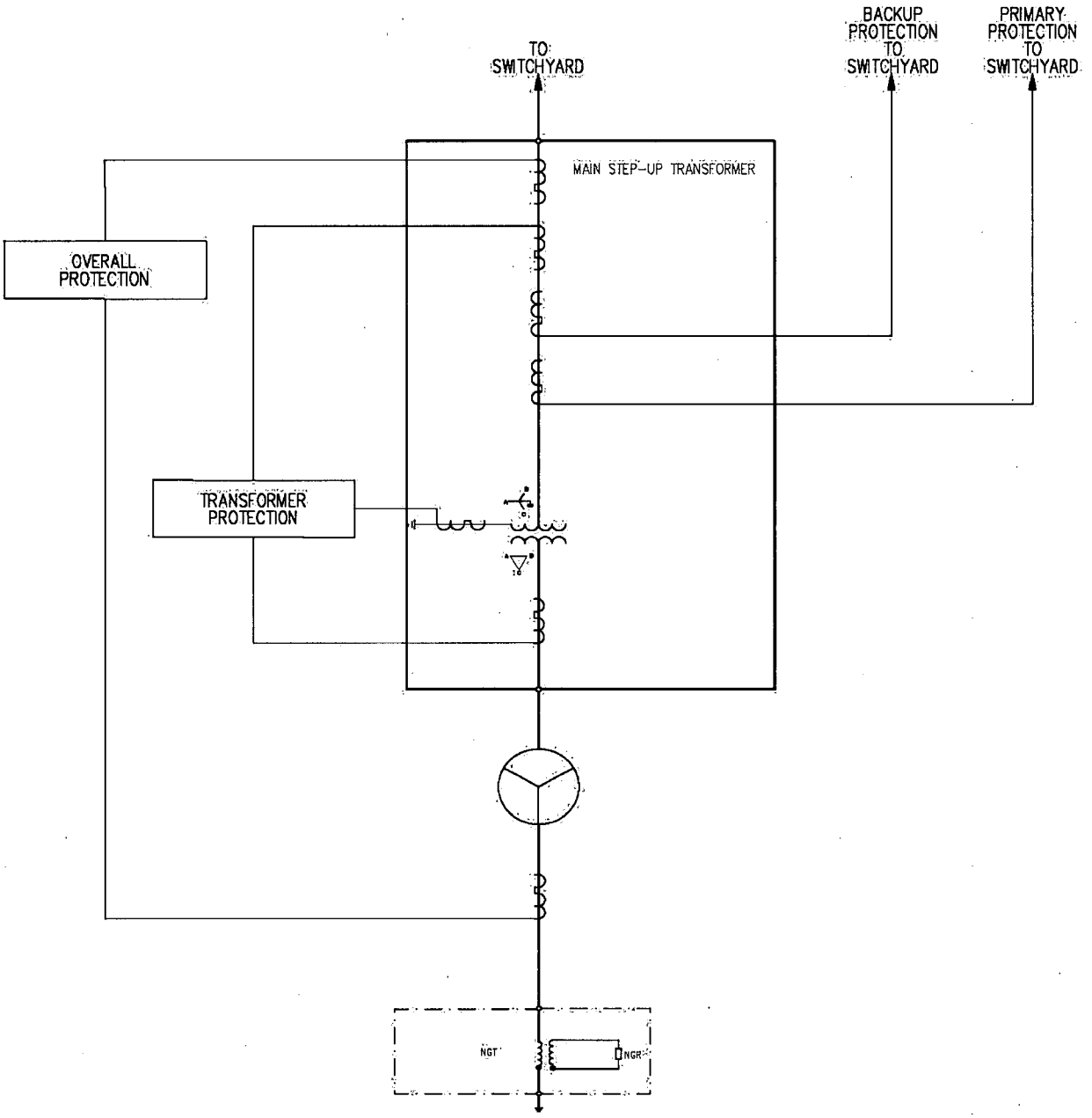
COLA FSAR Subsection 8.2.2.4, page 8-18, provides under "Switchyard Failure Mode Evaluation", a section describing the breaker-and-a-half switchyard arrangement and the primary and secondary relay protection system. Attached Figures 1, 2, and 3 provide typical protection diagrams for the main step up transformers, essential auxiliary transformers and normal auxiliary transformers indicating overlapping protection zones. Each outgoing line to the grid is protected by redundant transmission line protection schemes. Each bus is protected by redundant bus differential protection. Each line between the switchyard and the plant transformers is protected by redundant tie line protection schemes. Each transformer is protected by redundant protection schemes. Faults within the transformers will trip the switchyard breakers to isolate the transformers.

COLA Impact

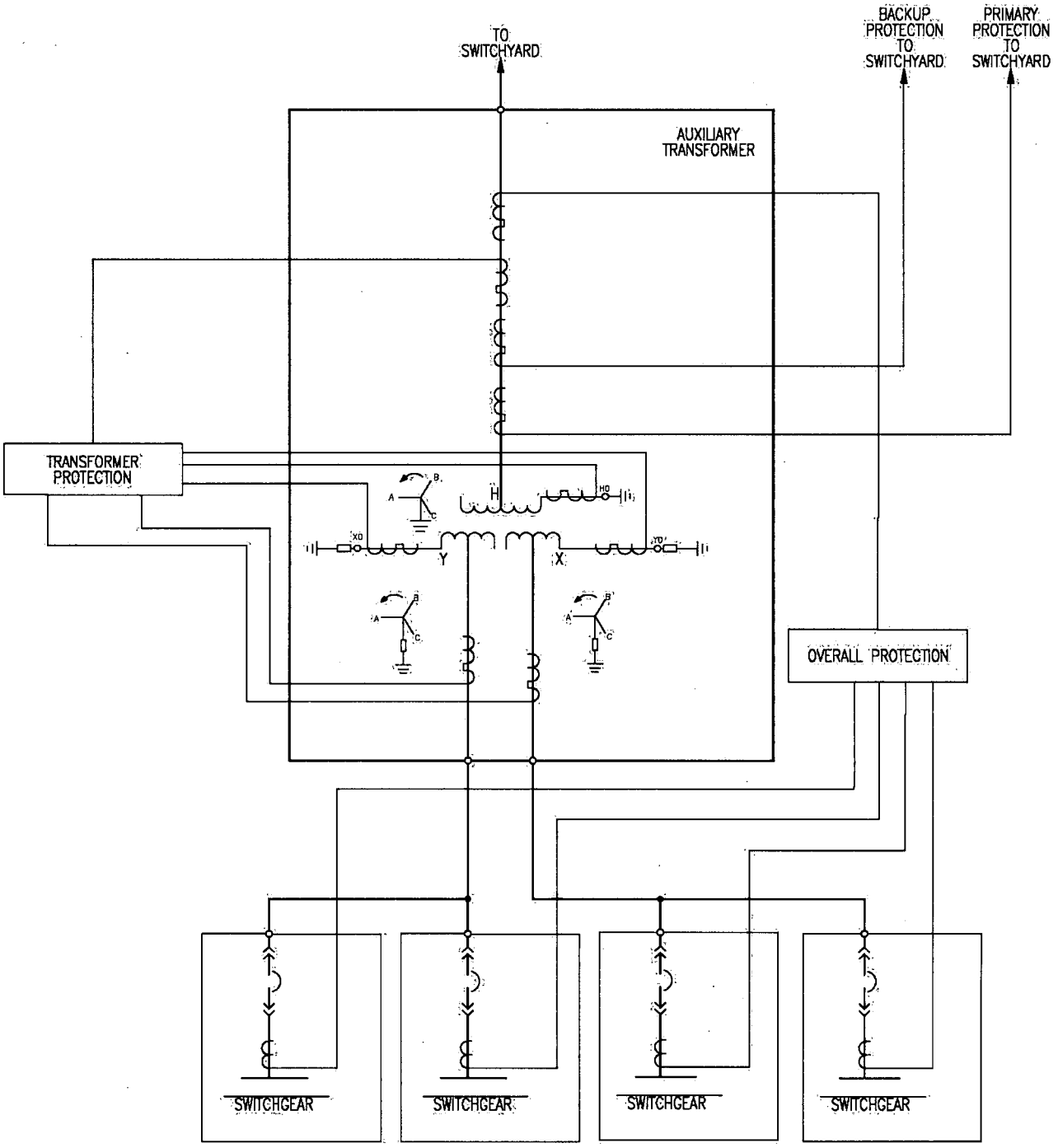
The COLA FSAR will not be revised as a result of this response.



CALVERT CLIFFS UNIT 3
500KV SWITCHYARD
TYPICAL PROTECTION SINGLE LINE
FIGURE 1



CALVERT CLIFFS UNIT 3
MSU TRANSFORMER
TYPICAL PROTECTION SINGLE LINE
FIGURE 2



CALVERT CLIFFS UNIT 3
AUXILIARY TRANSFORMER
TYPICAL PROTECTION SINGLE LINE
FIGURE 3

Question 08.02-5

Section 8.2.2.5, page 8-22 of CCNPP3 FSAR provides a site-specific station switchyard equipment inspection and testing plan. It is noted that an interface agreement will be established to define the interfaces and working relationships between various CCNPP3 site organizations and BGE, who is responsible for maintaining these facilities. Therefore, adequate procedures, administrative controls, and protocols are required to ensure that no modifications to the offsite power system circuits credited for satisfying GDC 17 and GDC 18 are implemented by offsite transmission system operating authorities, responsible for maintenance, modification, and operation of the offsite transmission grid, without the performance of a proper safety evaluation. Provide details of how the above requirements are met.

Response

An Operations Coordination and Interconnection Agreement between CCNPP Unit 3 and Baltimore Gas and Electric (BGE) will be established to ensure adequate coordination and control of activities related to the CCNPP3 switchyard interface. Agreements, procedures, administrative controls, and protocols for maintenance and modifications of facilities, will be modeled after those in place between the operating units CCNPP Units 1&2 and BGE.

The Operations Coordination and Interconnection Agreement between CCNPP Unit 1 and 2 and BGE applies controls to ensure that no modifications to the offsite power system circuits credited for satisfying GDC 17 and GDC 18 are implemented by offsite transmission system operating authorities without the performance of a proper safety evaluation.

COLA Impact

The COLA FSAR will not be revised as a result of this response.

Question 08.02-6

Section 8.2.2.5, pg 8-22: This discussion of compliance with GDC 18 should expand to include the testing and inspection of the offsite system for switchyard grounding and lightning protection systems. Site-specific design aspects of the switchyard grounding, lightning protection and surge protection devices need be addressed, as discussed in Regulatory Guide 1.204 to safeguard the SSCs from lightning strikes and the resulting secondary effects.

Response

CCNPP Unit 3 FSAR Section 8.2.2.5 incorporates by reference the U.S. EPR FSAR Section 8.2.2.5 with supplemental information added for the COL information item.

The U.S EPR FSAR Subsection 8.2.2.5 describes that the offsite power system is designed to permit periodic testing and inspection of the system and components to assess their performance. U.S EPR FSAR Subsection 8.2.2.5 also states that the lightning protection system and surge arresters are capable of periodic inspection and testing in accordance with Regulatory Guide 1.204, Section C2.

The periodic testing and inspection includes the switchyard grounding and lightning protection systems. The design, inspection and testing of the switchyard grounding and lightning protection systems is in accordance with Regulatory Guide 1.204.

COLA Impact

The COLA FSAR will not be revised as a result of this response.

Question 08.02-7

The CCNPP3 application incorporates the U.S. EPR FSAR without departures for Section 8.2.2.8. The U.S. EPR FSAR, page 8.0-24 refers to section 17.6 (Operational Programs) in addressing these requirements regarding compliance with 10CFR 50.65 (a)(4). CCNPP's section 17.6 notes that NEI Topical Report 07-02, "Maintenance Rule" is incorporated as written.

Please discuss how the plant specific equipment identified in this section is included in the programs for reliability assessment (EPR FSAR 17.4) and maintenance rule program Implementation (EPR FSAR 17.6) for offsite power system/equipment.

Response

The maintenance rule program implementation (EPR FSAR 17.6) for offsite power system/equipment is addressed in CCNPP Unit 3 FSAR Section 17.7.1.5, which incorporates by reference NEI 07-02A, "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52". (Note the NEI 07-02A Template and the FSAR Section numbers are changed from FSAR Revision 4 per UniStar Nuclear Energy response to RAI 62[1]). The template for Section 17.7.1.5, Risk Assessment and Risk Management per 10CFR 50.65 (a)(4), specifically addresses the offsite power system equipment as follows:

> The MR program and procedures reflect, as appropriate, consideration of issues associated with grid/offsite power reliability as identified in NRC Generic Letter 2006-02, items 5 and 6.

The reliability assurance program is addressed in CCNPP Unit 3 FSAR Section 17.4. Presently, UniStar Nuclear Energy is preparing a response to RAI 61, Reliability Assurance Program, which addresses FSAR Section 17.4. The response will include the offsite power system. The response to RAI 61 is scheduled for June 30, 2009.

COLA Impact

The COLA FSAR will not be revised as a result of this response.

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[1] Greg Gibson to U.S. NRC Document Control Desk, "Response to RAI No. 62, Question 17.06-1, Maintenance Rule" UN#09-166, dated April 3, 2009

Question 08.02-8

Section 8.2 : Describe the site specific wetting conditions or submergence, if any, as a result of tidal, seasonal or weather event water intrusion, for underground power cables connecting offsite sources to safety buses or power and control cables to equipment with accident mitigation functions. Also address how the proposed design for cable routing, layout and monitoring is to be implemented to prevent gradual degradation as addressed in GL-2007-01.

Response

The CCNPP3 COLA FSAR Section 2.4 on Hydrological Engineering discusses the detail design considerations for the site specific probable maximum flood (PMF) level. The U.S. EPR FSAR Subsection 8.3.1.1.8 describes that power cables be installed in duct banks or raceways designed to provide a high level of protection against industrial hazards, long term degradation, and other potential risks such as fire, missiles, pipe failure, water spray or earthquakes. Manholes for duct bank access have recesses for temporary sump pumps for water draining. Manholes below ground water line have a permanent sump pump design. Such areas are also sloped so as to provide water drainage. This section also gives examples of cables which are routed in underground duct banks. The capability is provided to perform periodic test, and to detect insulation degradation in underground cables, whether in a duct bank, directly buried or in a conduit. This capability meets the requirements of NRC Generic Letter 2007-01.

COLA Impact

The COLA FSAR will not be revised as a result of this response.