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U.S. Nuclear Regulatory Commission
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Your ref: Docket No. 52-006
Our ref: DCP/NRC2198

July 11, 2008

Subject: AP1000 Response to Request for Additional Information (SRP8.3.1)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 8.3.1. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A response is provided for RAI-SRP8.3.1-EEB-03 as sent in an email from Billy Gleaves to Sam Adams dated May 22, 2008 and a revised response is provided for RAI-SRP8.3.1-EEB-02 as discussed in a conference call between Billy Gleaves and Sam Adams on May 20, 2008. This response completes all requests received to date for SRP Section 8.3.1. A response to RAI-SRP8.3.1-EEB-01 and -02 was submitted under letter DCP/NRC2123 dated April 22, 2008.

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

John T. DeBlasio

for/ Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 8.3.1

D063
NRO

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 8.3.1

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP8.3.1-EEB-02
Revision: 1

Question:

In Section 8.3.1.1.1 of the DCD it is stated that in the event of a loss of voltage on these buses, the diesel generators are automatically started and connected to the respective buses and in the event of a fast bus transfer, the diesel generator connection to the bus is delayed such that the fast bus transfer is allowed to initiate. The above statement implies that the diesel generator is already running during the fast bus transfer and its connection to the bus is delayed. Explain why the diesel generator would start during fast bus transfer.

Follow-up clarification requested by the NRC:

Revise DCD Rev.16 Subsection 8.3.1.1.1 to clarify why the diesel generator would start during a fast bus transfer.

Westinghouse Response:

The AP1000 bus transfer scheme has both the immediate transfer capability and a residual voltage transfer scheme based on medium bus voltage degrading adequately to allow for a second attempt (automatic) at a level where the motor field voltage has degraded adequately to allow for the motors to be connected to a source without damage.

Between the first attempt (the first few cycles) and the second attempt (after motor field voltage has sufficiently degraded to allow closure) the undervoltage setpoint of the diesel generator busses may be reached allowing for a diesel generator start (undervoltage initiation) while the bus transfer scheme will complete a residual transfer before the diesel generator connects to the switchgear bus, thereby having the result of a powered bus from a reserve source, a running diesel, and no need to have the diesel connect to the bus. As the time between diesel generator start and loading onto the bus is relatively long (120 sec), all automatic bus transfers will have completed operation long before (diesel) generator connection to the bus is attempted.

Design Control Document (DCD) Revision:

Revise Subsection 8.3.1.1.1 of DCD Rev.16 as follows:
~~In the event of a fast bust transfer, the diesel connection to the bus is delayed such that the fast bus and residual transfer is allowed to initiate.~~ In the event where a fast bus transfer initiates but fails to complete, the diesel generator will start on an undervoltage signal, but if a successful residual voltage transfer occurs, the diesel generator will not be connected to the bus, as the successful residual voltage transfer will provide power to the bus prior to the diesel connection time of 2 minutes.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP8.3.1-EEB-03
Revision: 0

Question:

SRP 8.3.1-01 Section 8.3.1.1.1 of the DCD discusses the AP1000 design capability to sustain a load rejection from 100 percent power with the turbine generator continuing stable operation while supplying the plant house loads. The staff notes that in such instances, the voltage spike from the main generator during islanding could go as high as 130%. In this regard, describe the provisions provided in the design that will ensure that the onsite auxiliary power equipment including battery chargers and uninterruptible power supplies can withstand such voltage spike from the generator for the duration of its susceptibility without tripping or causing any damage to the equipment.

The basis for this additional information is that Westinghouse must provide enough information in its application for the staff to conclude that the application meets the requirements in General Design Criterion 17.

Westinghouse Response:

The battery charger function is to provide isolation between input ac and the dc system and to provide dc power when ac power is available. Safe shutdown of the plant does not require the support of the battery chargers. (DCD rev 16, 8.3.2.1 paragraph 3, 8.3.2.1.1.1 paragraph 7, table 8.3.2-7 item 1, table 8.3.2-7 item 1)

While Westinghouse makes no claim with regards to the maximum momentary overvoltage during the 100% load rejection event (it is our belief based on developing design that the overvoltage spike will be less than 130%), it will be demonstrated by the testing performed under the requirements of NEMA PE5 section 8.2 "dielectric tests" of 1000 volts plus twice the rated primary voltage and in ANSI / IEEE C37.90.1 (referenced as C37.90a in section 8.13 of NEMA PE5) section 8.3 testing at 2.5KV oscillatory and 4KV fast transient that the battery chargers will not be affected adversely by the momentary voltage increase due to the 100% load rejection.

The output of the inverters is isolated from the normal AC system surge by the battery charger. This (inverter output) source is not directly connected to the plant busses.

Other plant auxiliaries such as motors also undergo surge/ dielectric type testing.

Sensitive electronics are typically on the downstream side of inverters. The safety related controls are specifically downstream of the safety related inverters.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None