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Your ref: Docket No. 52-006
Our ref: DCP/NRC2411

March 26, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 19)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 19. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following RAI(s):

RAI-SRP19.0-SPLA-18

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,

D. O. Lindgren /for

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

/Enclosure

1. Response to Request for Additional Information on SRP Section 19

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NRO

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 19

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP19.0-SPLA-18
Revision: 0

Question:

The staff evaluated the analysis of the AP1000 response to external events according to the SRP, which states that the applicant's analyses should be comprehensive in scope, and address all applicable...external events and all plant operating modes. The applicant's analysis is documented in TR101 and described in the DCD; however the applicant did not address the case of high winds while in MODE 5 and 6. This may be of particular concern when maintenance conditions increase the risk significance of active SSCs and external events increase the vulnerability of motive energy (electric power).

Please provide a basis for screening such scenarios from consideration, amending the design to address them, or otherwise controlling the associated risk.

Westinghouse Response:

High wind events, including tornados and hurricanes, at the plant site are assumed to cause a loss of offsite power (LOSP) because the plant switchyard is not designed to withstand high winds. The degree to which these high wind events affect plant safety (in terms of core damage) is influenced by the ability of various plant systems and equipment to remain operational following a high wind event. Although the Standby Diesel Generators (DG) are non-safety grade, they are designed and installed to robust standards that increase the probability of their being available following unusual events such as high winds. The structures housing the standby DGs and the DG main fuel supply tanks are constructed in accordance with the Uniform Building Code (UBC) which provides a level of confidence that these structures will maintain their integrity for the majority of storms (lower intensity). The fuel transfer pipes (main storage tanks to the DG day tanks) are underground and would be unaffected by high winds. Similarly, the structures housing non-safety systems (Chemical and Volume Control System, Normal Residual Heat Removal System, SFW, Diverse Actuation System) are also constructed per the UBC and should not fail as a consequence of the majority of high wind events.

The Shutdown PRA documented in the AP1000 PRA Report includes calculations of core damage frequency (CDF) for LOSP events considering both "drained' and "non-drained" Reactor Coolant System (RCS) conditions. The CDF is somewhat higher for the drained events because the reactor is provided with the least amount of redundancy for core cooling during cold shutdown mid-loop conditions. With the reactor at cold shutdown mid-loop conditions, the reactor is shutdown (rods inserted), the Reactor Coolant Pumps are stopped and Reactor Coolant System (RCS) cooling is provided by the Normal Residual Heat Removal System (RNS). In this case the RCS is assumed to be in a reduced inventory condition with the water level in the Hot Leg (HL). In mid-loop operation, with the RCS drained and the pressure

boundary open, core cooling is provided by gravity injection from the In-containment Refueling Water Storage Tank (IRWST). The containment is closed except for the personnel air locks which may be open, but must be capable of being closed prior to any boiling of the coolant. The Technical Specifications (LCO 3.4.13) require the Automatic Depressurization System (ADS) Stage 1/2/3 to be open when in mid-loop operations.

Recognizing the increased vulnerability to risk with the plant in the "drained" condition, emergency response requirements or Emergency Action Levels (EALs) will require that the RCS be taken out of, or not enter into mid-loop operation mode in anticipation of a potentially severe high wind event. The risk associated with high winds while in MODE 5 and MODE 6 can also be controlled by relying on operator actions associated with Investment Protection Short-Term Availability Controls (as defined in Section 16.3 of the AP1000 Design Control Document), Abnormal Operation, Emergency Operation, and/or Refueling and Outage Planning Procedures as required in Section 13.5.1 of the DCD.

In the event that the diesel generators are not available, the RNS is not available. As a result, the RCS temperature will increase and the RCS water may start to boil depending on decay heat load and ability to restore power to the diesel generators. When the hot leg water level drops to a low level, the IRWST MOV isolation valves and ADS stage 4 valves are opened through the Protection and Safety Monitoring System (PMS) or Diverse Actuation System (DAS). In conjunction with the open ADS Stage 1, 2, 3 valves, this provides for effective RCS makeup and venting. The steam generated in the RCS will leave via the ADS valves into the IRWST where it is condensed.

In MODE 5 and MODE 6, the IRWST, with one injection flow path and one containment recirculation flow path, is required to be maintained OPERABLE per LCO's 3.5.7 and 3.5.8 so maintenance cannot be performed on those trains while in those modes. Therefore, adequate core cooling is maintained in MODE 5 and MODE 6 with the RNS system but there is enough redundancy in the system and through operator actions to maintain that same core cooling in MODE 5 and MODE 6 if the diesel generators are not available.

Design Control Document (DCD) Revision: None

PRA Revision: None

Technical Report (TR) Revision: None