Westinghouse

Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 412-374-5005
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP_NRC_002556

July 15, 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-20

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. A. 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

D063
NRO

cc:	D. Jaffe	-	U.S. NRC	1E
	E. McKenna	-	U.S. NRC	1E
	S. Sanders	-	U.S. NRC	1E
	T. Spink	-	TVA	1E
	P. Hastings	-	Duke Power	1E
	R. Kitchen	-	Progress Energy	1E
	A. Monroe	-	SCANA	1E
	P. Jacobs	-	Florida Power & Light	1E
	C. Pierce	-	Southern Company	1E
	E. Schmiech	-	Westinghouse	1E
	G. Zinke	-	NuStart/Entergy	1E
	R. Grumbir	-	NuStart	1E
	T. Ray	-	Westinghouse	1E

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-20
Revision: 0

Question:

Please discuss the actions that must be performed to meet long-term requirements following a high wind or external flooding event. All power and water needs for the first 72 hours are satisfied with safety-related systems. An additional four days of water is stored in the passive containment ancillary water storage tank (Seismic Category II as well as capable of withstanding a Category 5 hurricane and associated missiles). Power requirements for this interval are met by ancillary diesel generators and associated equipment located in a similarly qualified part of the annex building. After the seventh day, supplies of fuel and water must be replenished but access to the ancillary equipment may be compromised, for example, by failure of adjacent structures and flooding damage.

a) Describe the procedures by which ancillary ac power will be maintained after seven days. In your discussion, address access to the ancillary diesel generator fuel tank (to replenish the fuel). Also, discuss where transportable generators would come from, where they would be placed, and how their power would be delivered (cable routing and compatibility of connections) to the loads that require ongoing supply of ac power. In addressing access to equipment, consider potential obstruction by debris from failure of non-seismic structures, damage from wind-driven missiles, and problems created by flooding. Address the assumed reliability and availability of these power sources, and actions to be taken to ensure that these assumptions remain valid.

b) Discuss the sources of makeup water to the PCCWST or PCAWST that do not depend on installed ac power. Identify required support systems or equipment. Include a discussion of transportable, engine-driven pumps and the flow path from the source of water to the passive containment cooling water storage tank. Describe how availability of these sources is assured following high wind and external flooding events (including access to connection points and compatibility of connections), and the procedures for their use. Finally, address the assumed reliability and availability of these water sources, and actions taken to ensure that the assumptions remain valid.

Based on this discussion please propose a revision to the DCD describing, where appropriate, features required for long-term supply of water to the PCS and spent fuel pool. Also, ensure that Chapter 19 addresses risk associated with external-event-induced LOSP for more than seven days.

Westinghouse Response:

The issues questioned in the both parts a) and b) above are generically discussed in Section 1.9.5.4 Additional Licensing Issues specifically dealing with Post-72 hour Support Actions. The AP1000 includes safety-related passive systems and equipment that are sufficient to

automatically establish and maintain safe shutdown conditions for the plant following design basis events, assuming that the most limiting single failure occurs.

The AP1000 design includes both onsite Class D equipment and safety-related connections for use with transportable equipment and supplies to provide the support actions that will provide electrical power to supply the post-accident and spent fuel pool monitoring instrumentation and provide makeup water to the passive containment cooling water storage tank. Even though the post 72-hour actions are non-safety related actions, each of the SSCs for post 72-hour actions is considered a risk-significant SSC that is listed in Chapter 17 in the D-RAP program.

There are other support actions that will be accomplished that are also discussed in section 1.9.5.4 of the DCD. These actions are accomplished by the site support personnel, in conjunction with the main control room operators. These actions are performed separate from, but in parallel with, other actions taken by the plant operators to directly mitigate the consequences of an event. Procedures are being written that will address the support actions required in Section 1.9.5.4.

a) As described in Section 1.9.5.4 of the DCD, the ancillary diesel generators or a portable, engine driven ac generator that both connect to electrical connections at the ancillary diesel generator electrical panel will be used to provide power to the monitoring instrumentation, one of the two PCS recirculation pumps, and power to portable fans used for ventilation and cooling.

   As described in Section 8.3 of the DCD, the ancillary generators are classified as AP1000 Class D. They are redundant generators and only one is required to meet the required loads as listed in Table 8.3.1-4 of the DCD. The generators are commercial, skid-mounted, packaged units and can be easily replaced in the event of a failure. The generators are located in the portion of the Annex Building that is a Seismic Category II structure. Features of this structure which protect the function of the ancillary generators are analyzed and designed for Category 5 hurricanes, including the effects of sustained winds, maximum gusts, and associated wind-borne missiles.

   The fuel for the ancillary generators is stored in a tank located in the same room as the generators. The tank is Seismic Category II and holds sufficient fuel for 4 days of operation.

   There are many actions that can be used to either refuel the tanks or replace the generator and hook up the new generator to the same locations as the old generator for greater than 7 day operations. Further description of the ability to hook-up a transportable fuel truck to refuel the tanks and a more detailed description of the electrical connections for the ancillary diesels has been added to Sections 1.9.5.4 and 8.3.1.1.3.

Also attached is a change to Figure 8.3.1-3. As was pointed out by the reviewer there are notes in the DCD Rev 17 Figure 8.3.1-3 and no description as to what those notes mean. The notes have been deleted from the Figure.

b) As described in Section 1.9.5.4 of the DCD, makeup water to the passive containment cooling water storage tank (PCCWST) post 7 days can be obtained by using one of the two PCS recirculation pumps powered by an ancillary diesel or a portable engine driven pump that connects to a safety-related makeup connection. For the time frame from 72 hours to 7 days the PCS pumps are used to refill the PCCWST.

As described in DCD Section 6.2.2, there is a flanged fire-connection on the outside of the auxiliary building that can be used for a fire-truck to provide a make-up water source to the PCCWST and PCAWST as necessary. As described in Section 6.2.2.2.4, the flanged connection is an installed safety-related seismic piping connection that is located in the yard area. The connection can be seen in Figure 6.2.2-1 (sht 2 of 2) in the DCD and is described in Note 2 of that Figure.

The post-72 hour connections that are incorporated into the passive safety-related design to allow for long-term accident management are mentioned in Section 19.59.9.2.1. The electrical and water connections are discussed in Chapters 1, 6 and 8 and no further changes are required in Chapter 19.

Design Control Document (DCD) Revision:

Revision to Section 1.9.5.4

Five paragraphs before this wording remain unchanged.

The AP1000 design includes both onsite equipment and safety-related connections for use with transportable equipment and supplies to provide the following extended support actions:

- Provide electrical power to supply the post-accident and spent fuel pool monitoring instrumentation, using the ancillary diesel generators or a portable, engine-driven ac generator that both connect to electrical connections at the ancillary diesel generator electrical panel. See Section 8.3 for additional information.

Revision to Section 8.3.1.1.3

Power for Class 1E post-accident monitoring, MCR lighting, MCR and divisions B and C I&C room ventilation and for refilling the PCS water storage tank and the spent fuel pool when no

other sources of power are available is provided by two ancillary ac diesel generators located in the annex building. The ancillary generators are not needed for refilling the PCS water storage tank, spent fuel pool makeup, post-accident monitoring or lighting for the first 72 hours following a loss of all other ac sources.

The generators are classified as AP1000 Class D. The generators are commercial, skid-mounted, packaged units and can be easily replaced in the event of a failure. Generator control is manual from a control integral with the diesel skid package. These generators are located in the portion of the Annex Building that is a Seismic Category II structure. Features of this structure which protect the function of the ancillary generators are analyzed and designed for Category 5 hurricanes, including the effects of sustained winds, maximum gusts, and associated wind-borne missiles.

The fuel for the ancillary generators is stored in a tank located in the same room as the generators. The fuel tank, piping, and valves are analyzed to show that they withstand an SSE. The tank includes provisions for venting to the outside atmosphere and for refilling from a truck or other mobile source of fuel. The tank is Seismic Category II and holds sufficient fuel for 4 days of operation.

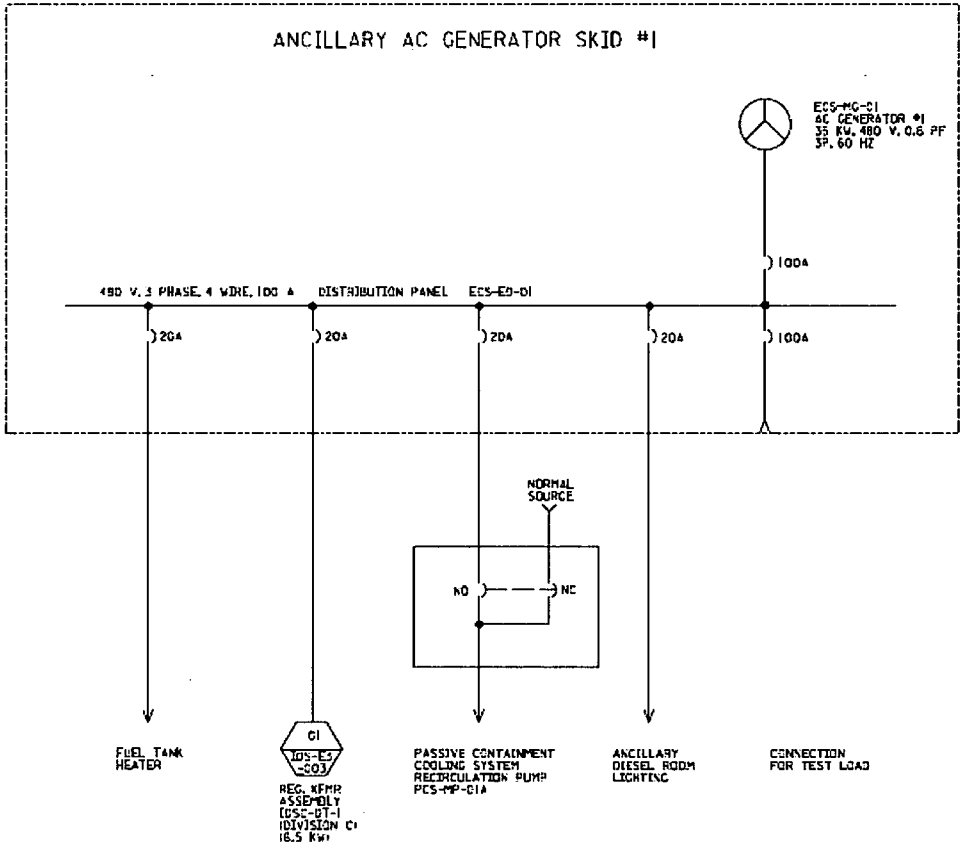
Each ancillary generator output is connected to a distribution panel located in the same room as the generators. Each distribution panel has an incoming circuit breaker and outgoing feeder circuit breakers. The outgoing feeder circuit breakers are connected to cables that are routed to the divisions B and C voltage regulating transformers and to the passive containment cooling system recirculation pumps (see Figure 8.3.1-3).

Revision to Figure 8.3.1-3.

There were references to notes in the DCD Rev 17 Figure 8.3.1-3 and no description as to what those notes meant. The references to the notes have been deleted from the Figure.

PRA Revision: None

Technical Report (TR) Revision: None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100A
480 V, 3 PHASE, 4 WIRE, 100 A
DISTRIBUTION PANEL
ECS-ED-01
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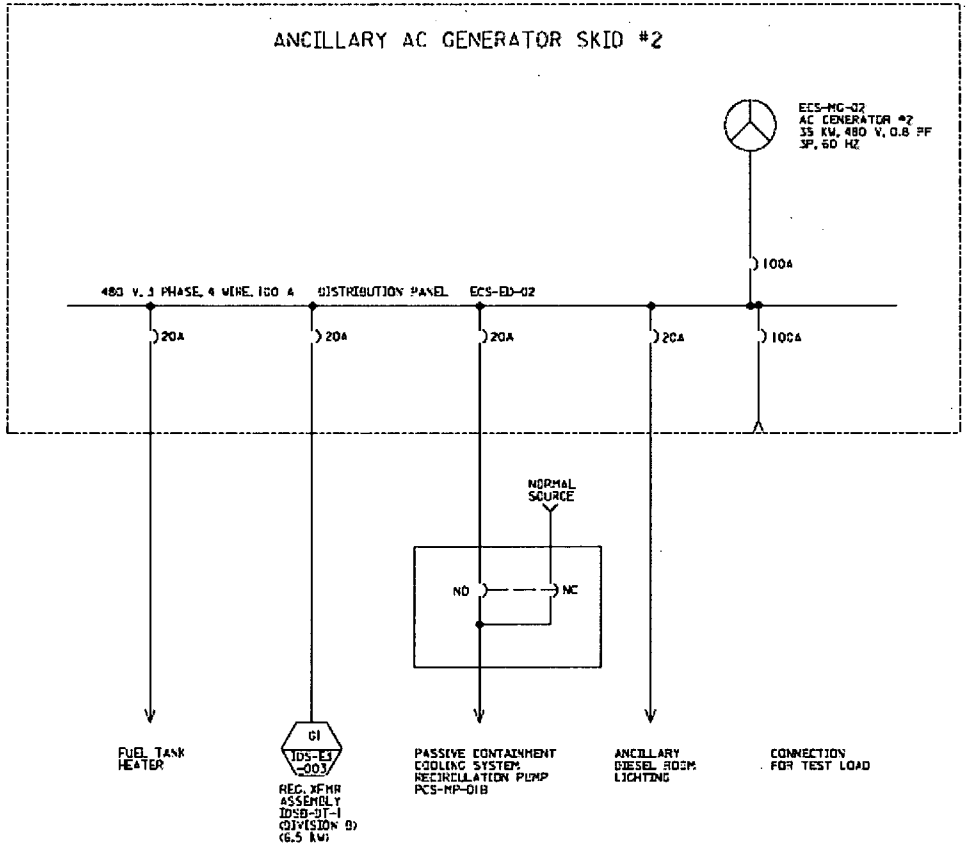
20A
20A
20A
100A
NORMAL SOURCE
NO
NC
FUEL TANK HEATER
01
IDS-E3 -003
REG. XFMR ASSEMBLY
PASSIVE CONTAINMENT COOLING SYSTEM RECIRCULATION PUMP
PCS-MP-01A
ANCILLARY DIESEL ROOM LIGHTING
CONNECTION FOR TEST LOAD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ECS-MG-02
AC GENERATOR #2
35 KW, 480 V, 0.8 PF
3P, 60 HZ
100A
480 V, 3 PHASE, 4 WIRE, 100 A
DISTRIBUTION PANEL
ECS-ED-02
20A
20A
20A
20A
100A
NORMAL SOURCE
NO
NC
FUEL TANK HEATER
01
IDS-E3 -003
REG. XFMR ASSEMBLY
PASSIVE CONTAINMENT COOLING SYSTEM RECIRCULATION PUMP
PCS-MP-01B
ANCILLARY DIESEL ROOM LIGHTING
CONNECTION FOR TEST LOAD