UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 23, 1997

MEMORANDUM TO: Chairman Jackson
Commissioner Rogers
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan

FROM: L. Joseph Callan
Executive Director for Operations

SUBJECT: IMPLEMENTATION OF STAFF POSITION IN SECY-96-128, "POLICY AND KEY TECHNICAL ISSUES PERTAINING TO THE WESTINGHOUSE AP600 STANDARD PRESSURIZED REACTOR DESIGN," RELATED TO POST-72 HOUR ACTIONS

In SECY-96-128, "Policy and Key Technical Issues Pertaining to the Westinghouse AP600 Standardized Passive Reactor Design," dated June 12, 1996, the Commission was requested to approve staff positions on policy issues pertaining to the Westinghouse AP600 standardized passive reactor design certification. Among the guidance in the staff requirements memorandum on SECY-96-128, dated January 15, 1997, the Commission approved Item IV - Post-72 Hour Actions. The approval specified that the AP600 "site be capable of sustaining design basis events with onsite equipment and supplies for the long term, with replenishment of consumables (such as diesel fuel oil) from offsite suppliers after seven days."

The staff noted in SECY-96-128 that the passive safety-related systems of the AP600 are designed to be capable of establishing and maintaining the plant in a safe-shutdown condition without operator action for the first 72 hours following design basis events, including a loss of offsite and onsite ac power. Since the AP600's onsite, standby ac power is not safety-related and not protected against natural phenomena (such as earthquakes or hurricanes), its availability is not credited in any design basis event analysis or following any severe natural phenomena. For a sustained loss of offsite and onsite ac power beyond 72 hours (as might be associated with severe natural phenomena), the AP600 design required that equipment from off site (and out of the direct control of the licensee) be brought on site to cope with or recover from extended design basis event conditions. However, based on the period of time that the Turkey Point site was without reliable offsite ac power after it was struck by Hurricane Andrew, the staff concluded that local communities struggling with a disaster response should not be given the additional burden of providing for the safety of a nuclear power plant. Therefore, the staff will not give credit for use of offsite equipment or supplies in supporting design basis event safety functions, assuming a loss of offsite and onsite

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power for more than 72 hours. The staff stated in SECY-96-128 that "the equipment required after 72 hours need not be in automatic standby response mode, but must be readily available for connection and protected from natural phenomena including seismic events (per GDC 2)."

During the staff review of AP600 post-72 hour design changes, there has been some misunderstanding of the SECY-96-128 policy regarding classification of the post-72 hour equipment. Because GDC 2 was parenthetically mentioned in SECY-96-128, it could be interpreted that SECY-96-128 required post-72 hour equipment conform to the safety-related application of GDC 2, that the added equipment be designated Seismic Category I, and that it be capable of remaining functional under tornado wind loads and tornado missiles. It was not intended that equipment or design changes made to comply with the post-72 hour actions policy of SECY-96-128 be safety-related. Rather, it was intended that the equipment be available on site (under the direct control of the licensee) and be protected from natural phenomena, including seismic events.

Consequently, the staff has clarified the post-72 hour equipment classification and defined criteria for protecting post-72 hour equipment from the effects of natural phenomena based on the relative importance of the post-72 hour equipment to the overall safety of the AP600 design. The staff believes that this position is consistent with the positions taken in SECY-96-128, and subsequently approved by the Commission. Westinghouse will be required to ensure that the following capabilities are included in the design for post-72 hour equipment:

- The post-72 hour systems, structures, and components (SSCs) are not required to be safety-related. However, additional regulatory oversight consistent with SSCs captured under the regulatory treatment of non-safety-related systems (RTNSS) process will be applied to the post-72 hour SSCs, and therefore, the COL applicant will be required to assure availability controls for the post-72 hour SSCs.

- To ensure that post-72 hour SSCs can withstand the effects of a safe-shutdown earthquake (SSE) without the loss of capability to perform required functions, the SSCs should be analyzed, designed and constructed using the method and criteria for seismic Category II building structures defined in Sections 3.2.1 and 3.7.2 of the AP600 Standard Safety Analysis Report (SSAR). In these two SSAR sections, Westinghouse committed that seismic Category II structures are designed for the safe shutdown earthquake using the same method and criteria as are used for seismic Category I structures and are constructed to the same requirements as the nonseismic structures. The post-72 hour SSCs include two ancillary diesel generators (~15 kW each), two makeup pumps (~100 gpm each), four ancillary fans (~1,500 scfm each) for I&C/MCR ventilation, a grade level water storage tank (~350,000 gal), and associated piping, valves, cables, and instruments. For these systems and components, the design of equipment anchorages must be consistent with the SSE design of

equipment anchorages of Seismic Category I items and there should be no spatial interaction with any other non-seismic SSCs that could adversely interact to prevent the functioning of the post-72 hour SSCs following an SSE; but no dynamic qualification of active equipment is necessary.

- To ensure that the post-72 hour SSCs can withstand the effects of high winds of severe hurricanes, the SSCs shall be analyzed and designed for Category 5 hurricanes including the effects of sustained winds, maximum gusts, and associated wind-borne missiles. The use of a Category 5 hurricane for analyzing the effects of wind and wind-borne missiles for the design of the post-72 hour SSCs is based on the following considerations:

  - NUREG-1474 classifies the most severe hurricane as Category 5 with wind speeds greater than 155 mph. Staff review of hurricane data has determined that there have been two Category 5 hurricanes this century (a Florida Keys Hurricane in 1935 and Hurricane Camille in 1969). Hurricane Andrew was classified as a less severe Category 4 hurricane with estimated sustained wind speeds of 145-155 mph and wind gusts to at least 175 mph.

  - One acceptable approach for addressing Category 5 hurricanes would be by utilizing wind gust factors specified in ANSI/ASCE 7-93. This would result in design basis wind speeds of 200 mph. The 200 mph wind speed would then be used in conjunction with existing staff guidance in Standard Review Plan sections 3.3.1 and 3.5.1.4 to analyze the post-72 hour SSCs. It is noted that a 200 mph wind speed is considerably less than the 300 mph wind speed used for the design basis of AP600 safety related SSCs.

  - The staff concludes that designing post-72 hour SSCs to withstand a Category 5 hurricane is reasonable and practical based on historical hurricane data and available design guidance. The post-72 hour SSCs will not be required to withstand tornado loads or tornado missiles but wind-borne missiles for the hurricane winds would have to be considered.

- The post-72 hour SSCs will be protected from floods.

- The QA requirements applied to the post-72 hour SSCs will be subject to the RTNSS QA program provisions described in Westinghouse letter NSD-NRC-96-4670, dated March 26, 1996, and identified in Chapter 17 of the AP600 Standard Safety Analysis Report (SSAR), "Quality Assurance."

The staff is reviewing the AP600 post-72 hour design changes that Westinghouse has proposed and will ensure that the above criteria are applied to the post-72 hour SSCs. The staff does not consider this action to be a change in the policy position identified in SECY-96-128 and will send a letter to Westinghouse (see attached draft) detailing the post-72 hour equipment classification

and criteria for protection from natural phenomena. The staff intends to proceed with its review in accordance with the information submitted in this memorandum.

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Attachment: As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Mr. Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Analysis
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, PA 15230

SUBJECT: AP600 POST-72 EQUIPMENT DESIGN BASIS

Dear Mr. Liparulo:

The Nuclear Regulatory Commission (NRC) staff has been reviewing the design changes to the AP600 resulting from the staff requirements memorandum (SRM) for SECY-96-128, dated January 15, 1997, on post-72 hour actions. Based on information provided in Westinghouse letter NSD-NRC-97-5024, dated March 14, 1997, the staff questioned if the design basis for the post-72 hour structures, systems, and components (SSCs) was consistent with the SECY-96-128 SRM. Following additional discussion with Westinghouse on the application of GDC 2 to the post-72 hour SSCs, Westinghouse made a presentation at an AP600 senior management meeting on April 22, 1997, concerning how the post-72 hour SSCs are being protected from natural phenomena. Westinghouse supplemented this information with a letter on the post-72 hour equipment design basis dated April 30, 1997.

The staff has subsequently determined what it believes to be appropriate design criteria for the post-72 hour SSCs based on its judgment of the safety significance of these SSCs. The staff believes that its position is consistent with SECY-96-128 and has sent a memorandum to the Commission informing them of its position on protection of the post-72 hour equipment from natural phenomena.

- The post-72 hour SSCs are not required to be safety-related. However, additional regulatory oversight consistent with SSCs captured under the regulatory treatment of non-safety-related systems (RTNSS) process should be applied to the post-72 hour SSCs, and therefore, the COL applicant will be required to assure availability controls for the post-72 hour SSCs.

- To ensure that post-72 hour SSCs can withstand the effects of a safe-shutdown earthquake (SSE) without the loss of capability to perform required functions, the SSCs should be analyzed, designed and constructed using the method and criteria for seismic Category II building structures defined in Sections 3.2.1 and 3.7.2 of the SSAR. In these two SSAR sections, Westinghouse committed that seismic Category II structures are designed for the safe shutdown earthquake using the same method and criteria as are used for seismic Category I structures and are constructed to the same requirements as the nonseismic structures. The post-72 hour SSCs include two ancillary diesel generators (~15 kW each), two

Attachment

makeup pumps (~100 gpm each), four ancillary fans (~1,500 scfm each) for I&C/MCR ventilation, a grade level water storage tank (~350,000 gal), and associated piping, valves, cables, and instruments. For these systems and components, the design of equipment anchorages must be consistent with the SSE design of equipment anchorages of Seismic Category I items and there should be no spatial interaction with any other non-seismic SSCs that could adversely interact to prevent the functioning of the post-72 hour SSCs following an SSE; but no dynamic qualification of active equipment is necessary.

- To ensure that the post-72 hour SSCs can withstand the effects of high winds of severe hurricanes, the SSCs shall be analyzed and designed for Category 5 hurricanes including the effects of sustained winds, maximum gusts, and associated wind-borne missiles. The use of a Category 5 hurricane for analyzing the effects of wind and wind-borne missiles for the design of the post-72 hour SSCs is based on the following considerations:

  - NUREG-1474 classifies the most severe hurricane as Category 5 with wind speeds greater than 155 mph. Staff review of hurricane data has determined that there have been two Category 5 hurricanes this century (a Florida Keys Hurricane in 1935 and Hurricane Camille in 1969). Hurricane Andrew was classified as a less severe Category 4 hurricane with estimated sustained wind speeds of 145-155 mph and wind gusts to at least 175 mph.

  - One acceptable approach for addressing Category 5 hurricanes would be by utilizing wind gust factors specified in ANSI/ASCE 7-93. This would result in design basis wind speeds of 200 mph. The 200 mph wind speed would then be used in conjunction with existing staff guidance in Standard Review Plan sections 3.3.1 and 3.5.1.4 to analyze the post-72 hour SSCs. It is noted that a 200 mph wind speed is considerably less than the 300 mph wind speed used for the design basis of AP600 safety related SSCs.

  - The staff concludes that designing post-72 hour SSCs to withstand a Category 5 hurricane is reasonable and practical based on historical hurricane data and available design guidance. The post-72 hour SSCs will not be required to withstand tornado loads or tornado missiles but wind-borne missiles for the hurricane winds would have to be considered.

- The post-72 hour SSCs will be protected from floods.

- The quality assurance (QA) requirements applied to the post-72 hour SSCs will be subject to the RTNSS QA program provisions described in Westinghouse letter NSD-NRC-96-4670, dated March 26, 1996, and identified in Chapter 17 of the AP600 Standard Safety Analysis Report, "Quality Assurance."

If you have any questions on this matter, please contact Bill Huffman at (301) 415-1141.

Sincerely,

Marylee M. Slosson, Acting Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

cc: See next page