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Jerry C. Roberts
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GNRO-2003/00075

December 18, 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Additional Information
Shutdown Cooling System Isolation Instrumentation
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES:

1. Letter from USNRC to Mr. William T. Cottle, Grand Gulf Nuclear Station, Unit 1 - Issuance of Amendment RE: Cold Shutdown and Refueling Conditions (TAC No. 76758), dated September 24, 1990.

2. Letter GNRO-2003/00032 from Mr. Jerry C. Roberts to USNRC, Grand Gulf Nuclear Station, Unit 1 - License Amendment Request, Shutdown Cooling System Isolation Instrumentation, dated May 12, 2003.

3. Letter GNRO-2003/00072 from Mr. George A. Williams to USNRC, Grand Gulf Nuclear Station, Unit 1 – Revised License Amendment Request, Shutdown Cooling System Isolation Instrumentation, dated December 5, 2003

Dear Sir or Madam:

By letter submitted via Reference 2 as supplemented by Reference 3, Entergy Operations, Inc. (Entergy) proposed a change to the Grand Gulf Nuclear Station, Unit 1 Technical Specification (TS) 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" to add a provision to the APPLICABILITY function that will eliminate the requirement that the Residual Heat Removal (RHR) System Isolation, Reactor Vessel Water Level – Low, Level 3, be OPERABLE under certain conditions during refueling outages.

Entergy and members of your staff held several calls to discuss the proposed changes.

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As a result, four questions were determined to need formal response. Entergy's response is contained in the Attachment.

There are no technical changes proposed. The original no significant hazards consideration included in Reference 2 as revised by Reference 3 is not affected by any information contained in the attached response. There are no new commitments contained in this letter.

If you have any questions or require additional information, please contact Matt Crawford at 601-437-2334.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 18, 2003.

Sincerely,

JCR/MLC/amt

Attachment: Response to Request For Additional Information

cc: Mr. Bruce S. Mallett
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U. S. Nuclear Regulatory Commission
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Mr. T. L. Hoeg, GGNS Senior Resident
Mr. D. E. Levanway (Wise Carter)
Mr. L. J. Smith (Wise Carter)
Mr. N. S. Reynolds
Mr. H. L. Thomas

Attachment

To

GNRO-2003/00075

Response to Request for Additional Information

Response to Request for Additional Information Related to Shutdown Cooling Isolation Instrumentation at High Water Level Conditions

Question 1:

The final paragraph on page 3 of 7 of Attachment 1 to the License Amendment Request states that your request deviates from the improved Standard Technical Specifications (STS) requirements for the RHR isolation function. The requirements for this function formed a basis for the NRC staff approval of Grand Gulf License Amendment 70 (dated September 24, 1990) which addressed the topic of Alternate Decay Heat Removal System (ADHRS) shutdown cooling. Amendment 70 added TS, administrative controls for use of the ADHRS, automatic isolation of the reactor vessel, and automatic injection of water into the vessel. Justify changing any commitments made in support of Amendment 70 for placing ADHRS into permanent service.

In addition, in the staff safety evaluation for the ADHRS, the staff specifically gave credit for the Level 3 isolation. Also, ADHRS is applicable for MODES 4 and 5. The proposed changes are also for MODE 5 with high water level. Confirm whether the ADHRS will be in operation during MODE 5 with high water level. There may be conflict in the operating conditions for the ADHRS and MODE 5 operation with high water level. Please clarify.

Response 1:

The RHR isolation function simply supports actions to ensure that the RPV water level does not drop below the top of the active fuel during a vessel draindown event through valves 1E12F008 and 1E12F009 (i.e., pipe break or inadvertent valve opening) in the shutdown cooling (SDC) system. This function works in conjunction with the Emergency Core Cooling System (ECCS) to mitigate reactor vessel draindown events through all drainage paths.

The NRC staff's concern when the ADHRS was added centered on operability of an ECCS that could be manually re-aligned to inject from the suppression pool in the event of a draindown event. The draindown events evaluated by Entergy included all possible drain paths including the SDC flow path. During this evaluation, Entergy recognized that some draindown scenarios could not meet the 20 minute response time to manually re-align an ECCS. In response, Entergy requested that the Level 3 SDC isolation be added to the Technical Specifications (TS). When added, the isolation function included all of MODE 5 to bound the worst case condition (low water level). The requested changes essentially segregate out the high water level condition during MODE 5 and demonstrates why the isolation is not needed in this condition. No administrative controls for use of the ADHRS and automatic injection of water into the vessel are affected by the proposed changes. Thus, the operation of ADHRS in MODE 5 during high water level conditions is not affected.

Question 2:

Operation with the RHR Level 3 low level isolation disabled creates an operation with the potential for draining the reactor vessel (OPDRV) condition by eliminating the automatic protective action in TS. What was your basis for determining that this loss of automatic isolation capability did not create an OPDRV condition?

Response 2:

As discussed in the response to Question 1, the isolation function essentially protected all of MODE 5 conditions by bounding the worst case condition (low water level). At the time of the original submittal, inoperability of the low water level SDC isolation constituted an operation with the potential to drain the reactor vessel (OPDRV) as defined in the GGNS Technical Requirements Manual. The analysis for the high water level condition during MODE 5 established that the RHR system automatic isolation was not needed to mitigate a draindown event with the reactor cavity flooded. At high water level, additional inventory of over 400,000 gallons of water is available which gives the operators over 4 ½ hours to detect and mitigate the loss of inventory during the postulated worst case draindown event prior to reaching the reactor vessel flange. Therefore, the proposed change, in itself, is not a condition that would result in the release of fission products. Since radiological releases are not postulated to occur, additional systems used to mitigate releases (such as those that apply during operations with an increased potential for draining the reactor vessel) are not required during this condition.

Subsequent to the original submittal, the OPDRV definition was revised under the provisions of 10 CFR 50.59 to reflect the results of this analysis and to reflect the analysis of draindown events through all flow paths that could potentially drain the reactor vessel. The revised definition also credits the advantages of the large water inventory available during the high water level condition for mitigating draindown events. Using this revised definition, inoperability of the shutdown cooling flow path automatic isolation does not constitute an OPDRV condition at the high water level condition.

This conclusion is consistent with the bases for the ECCS requirements during the same conditions. As discussed in the bases for TS 3.5.2, ECCS Shutdown, draindown events in MODE 5 with the reactor cavity flooded are not a concern (i.e., ECCS is not required) since the condition "provides sufficient coolant inventory to allow operator action to terminate the inventory loss prior to fuel uncovery in case of an inadvertent draindown." As outlined above, this capability continues to be the case without the SDC suction flow path Level 3 isolation function.

Question 3:

You have proposed to rely on operator actions based on alarms as initiating information. Control room annunciators are not Class 1E qualified. What qualified instrumentation will you use and how do you propose to monitor it to ensure the operator actions will be accomplished successfully, and in time, when reactor cavity water level is lowered?

Response 3:

In the original request (Reference 2), Entergy described several methods that are readily available to identify an event where significant water inventory is being lost during a refuel outage. At high water level conditions, with the upper reactor cavity flooded, the alarms delineated below will annunciate if a draindown event occurs. The Control Room alarm annunciators are not Class 1E, however, the instrumentation (e.g., switches and transmitters) associated with the alarms are safety related and classified as Seismic Category 1. Entergy periodically establishes the functionality of these alarms. Additionally, Entergy proposed to

verify the upper containment pool level every four hours to further enhance operations personnel capability to detect an inventory loss (Reference 3).

1. Fuel Pool Drain Tank Level Low

   This level alarm (Fuel Pool Drain Tank Level Low) is annunciated on the Main Control Room panel 1H13-P680, at location P680-4A2-D6. This is not a direct pool level monitoring alarm, but is a Fuel Pool Cooling and Cleanup system (FPCCU) drain tank level alarm. As such, it is often more sensitive to level changes than a direct fuel pool level monitor. The system operation of the FPCCU system has the upper pool water levels maintained by overflowing the skimmers into the drain tank, where the FPCCU pumps take suction. The normal water level is approximately at elevation 207 ft 10 inches. The elevation corresponding to the 22 ft 8 inches (minimum level) required by proposed SR 3.3.6.1.9 is 207 ft 7 inches. A pool level drop of a few inches would cause the drain tank level alarm to annunciate within minutes.

2. Fuel Pool Drain Tank Level Low-Low

   This level alarm (Fuel Pool Drain Tank Level Lo-Lo) is annunciated on the Main Control Room panel 1H13-P680, at location P680-4A2-C7. In addition to the low level alarm described in item 1 above, the low-low level alarm alerts the control room operators to a trip condition for the FPCCU pumps on the loss of level in the drain tank.

3. Fuel Pool Level Trouble

   This level alarm (Fuel Pool Level Trouble) is annunciated on the Main Control Room panel 1H13-P680, at location P680-4A2-A6. This alarm annunciates when the upper pool level drops approximately 0.33 feet below normal operating level. This is a direct indication of Fuel Pool level, and indicates that either a high or low level condition exists (it also alarms on high pool level).

Entergy is revising the applicable Alarm Response Instructions (ARI) for the above listed alarms to indicate a loss of water from the Upper Containment Pool as a new "possible cause" for the alarm.

Question 4:

Your request indicated that the occurrence of actuating the isolation logic causing one or both of the isolation valves to automatically close is "infrequent and recoverable." Do you have data on the number of times that this has occurred, as well as the root cause of such occurrences, and any corrective actions that you have taken to prevent re-occurrence? Do other plants that have this level-3 isolation also experience similar operational problems? If so, how are industry corrective action programs addressing the inoperabilities?

Response 4:

Grand Gulf has experienced several automatic isolations of the RHR Shutdown Cooling system, none due to a valid isolation signal. Since 1986, there have been nine instances of a spurious isolation of the shutdown cooling valve isolation logic at Grand Gulf, the last two of

which occurred in 1993. The predominant cause of these isolations was human error, such as inadvertently grounding a circuit or lifting the wrong control power lead. Greater care has been exercised in the scheduling of surveillances and tasks that have a potential to impact the shutdown cooling isolation valve logic. Also, corrective actions to prevent recurrence have included improving human performance using tools such as peer checks, better procedural guidance, and increased awareness of risks.

A review of industry data indicates several instances of a loss of SDC occurring since the year 2000. The search results indicate that the RHR SDC isolation logic inadvertently actuates, causing loss of the decay heat removal system for a short period of time. The search results identified no instances of isolation due to a valid actuation signal. This data indicates that the industry continues to experience spurious isolations of the RHR shutdown cooling valves. Grand Gulf knows of no generic industry initiative to address these issues.