Central Files

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June 9, 1980

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U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region V
Suite 202, Walnut Creek Plaza
Walnut Creek, California 94596

Attention: Mr. R. H. Engelken, Director

DOCKET NO. 50-206
SAN ONOFRE - UNIT 1

Dear Sir:

IE Bulletin 80-12
Decay Heat Removal System Operability

Reference is made to your correspondence of May 9, 1980, forwarding IE Bulletin 80-12. Identified therein was the potential of losing decay heat removal capability in operating pressurized water reactors.

Responses to the individual items specified in the Bulletin are listed below:

ITEM 1

Review the circumstances and sequence of events at Davis-Besse as described in Enclosure 1.

RESPONSE

A review of the circumstances and sequence of events leading to the loss of decay heat removal capability at Davis-Besse Unit 1 has been performed.

ITEM 2

Review your facility(ies) for all DHR degradation events experienced, especially for events similar to the Davis-Besse incident.

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RESPONSE

A review of the San Onofre Unit 1 records resulted in the disclosure of one event in which the DHR capability was degraded for several minutes. This event was reported to you by letter from J. T. Head, Jr. to R. H. Engelken, dated February 18, 1977 transmitting Licensee Event Report 77-03.

ITEM 3

Review the hardware capability of your facility(ies) to prevent DHR loss events, including equipment redundancy, diversity, power source reliability, instrumentation and control reliability, and overall reliability during the refueling and cold shutdown modes of operation.

RESPONSE

A review of the hardware capability at San Onofre Unit 1 to prevent DHR loss events was performed with respect to equipment redundancy, diversity, power source reliability, instrumentation and control reliabilty, and overall reliability during the refueling and cold shutdown modes of operation. The DHR methods discussed below will provide a diverse means of DHR or redundant residual heat removal pumps and heat exchangers during all modes of operation.

The residual heat removal loop at San Onofre Unit 1 consists of piping to and from the reactor coolant system, valves, instrumentation and control, and redundant residual heat removal pumps and heat exchangers. During plant shutdown, main coolant flows from reactor coolant loop C hot leg to the residual heat removal pumps, through the tube side of the residual heat removal heat exchangers and back to reactor coolant loop A cold leg.

If a failure of the residual heat removal system were to occur during initial plant cooldown, i.e., from 350°F to 140°F, heat removal can be initiated through the steam generators by discharging steam or by establishing a constant feedwater flow/letdown rate to the steam generators with the use of auxiliary feed pumps and steam generator blowdown.

If a residual heat removal pump or heat exchanger failure should occur when the reactor vessel head is removed and the redundant component is out for maintenance, a residual heat removal flow path could be established by aligning the refueling water pumps to take suction from the refueling cavity (through the recirculation heat exchanger) and discharging to the reactor coolant system through the cold leg injection flow path. Redundant power supplies are provided since 480 volt bus No. 1 and 2 each supply power to one residual heat removal and one refueling water pump. These busses are normally energized from off-site power, however, backup power is available from the on-site diesel generators. Motor operated valves (MOV's) required for this flowpath may be operated manually if necessary.

To ensure maximum reliability during the time that the reactor vessel head is detensioned with bolts in place, redundant residual heat removal pumps and heat exchangers will be required to be operable.

Reliability of instrumentation and control systems which could affect the ability of the plant to achieve cold shutdown was studied in response to I. E. Bulletin 79-27. It was concluded that failure of a vital instrument bus or utility bus would not prevent achieving cold shutdown. In our response we committed to implement new procedures or change existing procedures prior to return to power to provide for use of alternate indications and/or control circuits and for methods to be used in bringing the plant to a cold shutdown condition.

It should be noted that safety injection and containment spray systems at San Onofre Unit 1 are actuated by two out of three logic, not the two out of four input scheme used at Davis-Besse. Also, the residual heat removal pumps are seperate from the safety injection pumps and do not take a suction from the containment sump.

With the implementation of procedural changes described above and in Item 4, system diversity, redundancy, and administrative controls will provide optimum overall reliability during refueling or cold shutdown conditions with concurrent maintenance activity.

ITEM 4

Analyze your procedures for adequacy of safeguarding against loss of redundancy and diversity of DHR capability.

RESPONSE

A review of the San Onofre Unit 1 procedures has resulted in changes to procedures to ensure safeguarding against loss of redundancy and diversity of DHR capability as follows:

Station Order S-A-107, Equipment Outages, requires all individuals involved in submitting, approving, and implementing equipment outages to review the outage request with respect to its effect upon maintaining either redundancy or diversity in those systems necessary for the safe operation of the plant during all modes of operation.

Station Order S-A-107 also requires that the following conditions be met before a residual heat removal pump or heat exchanger can be taken out of service:

1. During cold shutdown conditions without the refueling cavity flooded, either two (2) RHR pumps and heat exchangers shall be operable or in service or one (1) RHR pump and heat exchanger shall be in service and a minimum of one (1) steam generator shall be available for decay heat removal.

2. With the refueling cavity flooded, one (1) RHR pump and/or heat exchanger may be removed from service only if an alternate means of decay heat removal is provided. The alternate means of decay heat removal shall be a minimum of one (1) refueling water pump and the recirculation heat exchanger available for service.

3. During the time that the reactor vessel head is detensioned with bolts in place, both residual heat removal pumps and heat exchangers will be required to be operable.

Station Order S-O-111, Equipment Testing Before and After Maintenance, requires testing of redundant residual heat removal equipment before and after a residual heat removal pump is removed from service.

Operating Instruction S-3-2.12, Placing Residual Heat Removal Loop In Service; Operating Instruction S-3-1.7, Draining the Reactor Coolant System; and Operating Instruction S-3-1.5, Plant Hot Shutdown to Cold Conditions, have been revised to include a caution describing the minimum DHR requirements during cold shutdown conditions.

ITEM 5

Analyze your procedures for adequacy of responding to DHR Loss events. Special emphasis should be placed upon responses when maintenance or refueling activities degrade the DHR capability.

RESPONSE

A review of the San Onofre Unit 1 procedures for adequacy of responding to DHR loss events has resulted in a revision to Emergency Operating Instruction S-3-5.35, Loss of Residual Heat Removal. This instruction now includes the process for placing the refueling water pump and recirculation heat exchanger in service for the purpose of DHR. The procedure for initiating heat removal through the steam generators had previously been included in S-3-5.35. The changes discussed in our response to Item 4 will ensure that maintenance activities do not degrade DHR capability.

ITEM 6.a

Implement as soon as practicable administrative controls to assure that redundant or diverse DHR methods are available during all modes of plant operation. (Note: When in a refueling mode with water in the refueling cavity and the head removed, an acceptable means could include one DHR train and a readily accessible source of borated water to replenish any loss of inventory that might occur subsequent to the loss of the available DHR train).

RESPONSE

The changes to procedures as described in Item 4 will provide the necessary administrative controls to assure that redundant or diverse methods of DHR are available during all modes of plant operation.

ITEM 6.b

Implement administrative controls as soon as practicable, for those cases where single failures or other actions can result in only one DHR train being available, requiring an alternate means of DHR or expediting the restoration of the lost train or method.

RESPONSE

Since redundancy or diversity are requirements of the procedures described in Item 4, prompt restoration of a lost train or method will be assured. The revised procedures will be implemented by June 30, 1980.

ITEM 7.a

Describe changes to procedures (e.g., emergency, operational, administrative, maintenance, refueling) made or initiated as a result of your reviews and analyses, including the scheduled or actual dates of accomplishment; (Note: NRC suggests that you consider the following: (1) limiting maintenance activities to assure redundancy or diversity and integrity of DHR capability, and (2) bypassing or disabling, where applicable, automatic actuation of ECCS recirculation in addition to disabling High Pressure Injection and Containment Spray preparatory to the cold shutdown or refueling mode.)

RESPONSE

The revised procedures will limit maintenance activities to assure redundancy or diversity, and integrity of DHR capability as discussed previously in the response to Items 3 and 4. The DHR methods discussed in Item 3 are not subject to change in system alignment due to the automatic actuation of other systems or safety features during cold shutdown.

ITEM 7.b

Describe the safeguards at your facility(ies) against DHR degradation, including your assessment of their adequacy.

RESPONSE

The revised procedures will provide for a review of activities which could potentially lead to a loss of DHR redundancy or diversity. In addition to existing administrative controls governing safety related equipment, the actions taken at our facilty as described above are considered adequate to safeguard against DHR degradation.

If you have questions regarding these items, please call me.

Subscribed on this 10th day of June 1980.

By K P Baskin
K. P. Baskin
Manager, Nuclear Engineering and Licensing

Subscribed and sworn to before me on this 10th day of June 1980.

OFFICIAL SEAL
AGNES CRABTREE
NOTARY PUBLIC - CALIFORNIA
PRINCIPAL OFFICE IN
LOS ANGELES COUNTY
My Commission Exp. Aug. 27, 1982

Agnes Crabtree
Notary Public in and for the County of Los Angeles, State of California

cc: Director, Office of Inspection and Enforcement