Docket No. 50-346

License No. NPF-3

Serial No. 669

Attachment 2

I. Change to Davis-Besse Nuclear Power Station Unit 1, Appendix A Technical Specifications 3.4.1.1, 3.4.1.2, 3.9.8.1, 3.9.8.2 and Bases concerning Decay Heat Removal capability.

   A. Time Required to Implement
   This change is to be effective upon NRC approval

   B. Reason for Change (Facility Change Request 80-248)
   This is to comply with D. E. Eisenhut's letter dated June 11, 1980, Log No. 567

   C. Safety Evaluation
   See attached

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Safety Evaluation for Technical Specification Changes Relating to Reactor Decay Heat Removal Capability

By letter dated June 11, 1980, the NRC requested Toledo Edison to amend the Technical Specifications for Davis-Besse Nuclear Power Station Unit 1 (DB-1) with respect to reactor decay heat removal capability. The basis of NRC's request was founded in a number of events that have occurred at operating PWR facilities where decay heat removal capability was degraded due to inadequate administrative controls utilized when the plants were in shutdown modes of operation. One of these events occurred at DB-1 on April 19, 1980 wherein decay heat removal capability was completely lost. In IE-Bulletin 80-12 (dated May 9, 1980) NRC requested Toledo Edison to immediately implement administrative controls which would ensure availability of proper means to provide redundant methods of decay heat removal. In the June 11, 1980 letter, NRC emphasized that it was considered necessary to amend the Operating License for DB-1 to provide for permanent long term assurance that redundancy in decay heat removal capability will be maintained.

The safety function achieved by the affected system(s) is to remove energy from the core in operational modes 1 and 2 and to remove decay heat from the core in modes 3 through 6 (shutdown). During shutdown modes, the affected systems also prevent boron stratification and minimize the effects of a boron dilution incident.

The proposed additions/modifications to the technical specifications are based on the model technical specification (standard technical specifications for B&W plants) enclosed with the NRC letter referenced above and are more conservative than the existing technical specifications in that they provide added redundancy in the operability of decay heat removal capability in modes 1 through 6. For modes 1 through 5 the format of the Technical Specifications is also being revised in compliance with the model technical specifications provided by the NRC. The existing format is inadequate, since it requires entry into an ACTION statement whenever any reactor coolant loop or any reactor coolant pump is not in operation in modes 1 throuth 5. It should be noted that after switching to Decay Heat system (Modes 4 and 5), reactor coolant pumps are no longer required to be in operation. Per the proposed technical specifications, as long as any two of the proposed coolant loops are operable no action statement is entered in modes 3, 4 and 5. As stated in the modified bases, in modes 3, 4 and 5, a single reactor coolant loop or DHR loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops be operable. Thus, if the reactor coolant loops are not operable, two DHR loops are required to be operable.

If the reactor coolant pumps are not operating, a minimum secondary side level of 35 inches above the lower tube sheet is maintained in the required steam generator. This ensures that natural circulation flow will be available to provide reactor coolant circulation. If the reactor coolant pumps are operating, the associated loop is considered to be operable if at least 18 inches of water is present above the lower tube sheet in the associated steam generator. This provides adequate heat sink and reactor coolant flow through the Reactor Coolant System.

Natural Circulation flow or the operation of one reactor coolant pump or DHR pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the reactor coolant system. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control. Since, the requirement for operability of coolant loops in the proposed technical specifications (for modes 1 through 5) is more restrictive, better redundancy is provided by this technical specification change.

The proposed changes also add surveillance requirements to ensure operability of the subject coolant loops in modes 3, 4 and 5. It is believed that the surveillance frequency is adequate to ensure continued operability of the coolant loops.

In Mode 6 the existing surveillance requirements on the DHR flow rate have also been modified by this license amendment request (see revised 4.9.8.1). The surveillance frequency for verification of this flow rate has been increased from once per 24 hours to once per 12 hours. This provides added assurance that adequate coolant circulation is maintained at all times. The surveillance requirements have also been modified to address the flow requirements in the cases when no change to reactor coolant system boron concentration is being made. In such a case, adequate coolant flow to maintain core outlet temperature below 140^{o} F is required to satisfy the requirement of the associated basis in the Technical Specifications. Since no boron concentration change is to be made in this case, boron stratification and boron dilution criteria in the basis are unaffected. However, when boron concentration reductions are being made, a minimum coolant flow of 2800 gpm through the core is required to provide core cooling and to minimize the effects of a dilution incident and to prevent boron stratification.

This license amendment request also modifies the technical specifications requirement of decay heat removal capability in mode 6. Specifically, a new technical specification is being added to ensure operability of two independent decay heat removal loops in mode 6 when the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 23 feet.

As stated in the modified bases, the requirement of having two DHR loops operable when there is less than 23 feet of water above the core ensures that a single failure of the operating DHR loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and <u>more</u> than 23 feet of water above the core, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating DHR loop, adequate time is provided to initiate emergency procedures to cool the core.

In conclusion, by making the above changes to the unit technical specifications, redundancy in the reactor decay heat removal capability will be enhanced to mitigate the consequences of a design basis accident requiring this capability. Pursuant to the above, it is concluded that the technical specification changes proposed by this license amendment request do not involve an unreviewed safety question.

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3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 ~~REACTOR~~ COOLANT LOOPS ~~AND COOLANT CIRCULATION~~

STARTUP AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

3.4.1.1

~~3.4.1~~ Both reactor coolant loops and both reactor coolant pumps in each loop shall be in operation.

APPLICABILITY: ~~As noted below, but excluding MODE 6.*~~ MODES 1 and 2*.

ACTION:

~~MODES 1 and 2:~~

a. With one reactor coolant pump not in operation, STARTUP and POWER OPERATION may be initiated and may proceed provided THERMAL POWER is restricted to less than 80.2% of RATED THERMAL POWER and within 4 hours the setpoints for the following trips have been reduced to the values specified in Specification 2.2.1 for operation with three reactor coolant pumps operating:

   1. High Flux
   2. Flux-ΔFlux-Flow

SURVEILLANCE REQUIREMENTS

4.4.1.1 The above required reactor coolant loops shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

4.4.1.2 The Reactor Protective Instrumentation channels specified in the applicable ACTION statement above shall be verified to have had their trip setpoints changed to the values specified in Specification 2.2.1 for the applicable number of reactor coolant pumps operating either:

a. Within 4 hours after switching to a different pump combination if the switch is made while operating, or

b. Prior to reactor criticality if the switch is made while shutdown.

*See Special Test Exception 3.10.3.

SHUTDOWN AND HOT STANDBY

LIMITING CONDITION FOR OPERATION

3.4.1.2 a. At least two of the coolant loops listed below shall be OPERABLE:

1. Reactor Coolant Loop 1 and its associated steam generator,
2. Reactor Coolant Loop 2 and its associated steam generator,
3. Decay Heat Removal Loop 1,*
4. Decay Heat Removal Loop 2,*

b. At least one of the above coolant loops shall be in operation.**

c. Not more than one decay heat removal pump may be operated with the sole suction path through DH-11 and DH-12 unless the control power has been removed from the DH-11 and DH-12 valve operator, or manual valves DH-21 and DH-23 are opened.

d. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

APPLICABILITY: MODES 3, 4 and 5

ACTION:

a. With less than the above required coolant loops OPERABLE, immediately initiate corrective action to return the required coolant loops to OPERABLE status as soon as possible, or be in COLD SHUTDOWN within 20 hours.

b. With none of the above required coolant loops in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.2.1 The required decay heat removal loop(s) shall be determined OPERABLE per Specification 4.0.5.

SURVEILLANCE REQUIREMENTS (continued)

4.4.1.2.2 The required steam generator(s) shall be determined OPERABLE by verifying secondary side level to be greater than or equal to (a) 18 inches above the lower tube sheet once per 12 hours if an associated reactor coolant pump is operating, or, (b) 35 inches above the lower tube sheet once per 12 hours if no reactor coolant pumps are operating.

4.4.1.2.3 At least one coolant loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

*The normal or emergency power source may be inoperable in MODE 5.

**The decay heat removal pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause dilution of the reactor coolant system boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

3/4.9.8 DECAY HEAT REMOVAL AND COOLANT CIRCULATION

~~COOLANT CIRCULATION~~

LIMITING CONDITION FOR OPERATION

3.9.8.1

~~3.9.8~~ At least one decay heat removal loop shall be in operation.

APPLICABILITY: MODE 6 when the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is ≥23 feet.

ACTION:

a. With less than one decay heat removal loop in operation, except as provided in b below, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

b. The decay heat removal loop may be removed from operation for up to one hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel (hot) legs.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.1 Surveillance at least once per 12 hours shall verify

~~4.9.8~~ at least one decay heat removal loop ~~shall be determined~~ to be in operation and circulating reactor coolant through the reactor core:

a. at a flow rate of ≥2800 gpm, whenever a reduction in Reactor Coolant System boron concentration is being made.

b. at a flow rate such that the core outlet temperature is maintained ≤140°F, provided no reduction in Reactor Coolant System boron concentration is being made.

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent DHR loops shall be OPERABLE.*

APPLICABILITY: MODE 6 when the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 23 feet.

ACTION:

a. With less than the required DHR loops OPERABLE, immediately initiate corrective action to return the required loops to OPERABLE status as soon as possible.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.2 At least one ~~The required~~ DHR loop shall be determined to be in operation ~~OPERABLE~~ per Specification 4.9.8.1. The inactive loop shall be determined to be OPERABLE per Specification 4.0.5.

*The normal or emergency power source may be inoperable for each DHR loop.

3/4.4.1 REACTOR COOLANT LOOPS

The plant is designed to operate with both reactor coolant loops in operation, and maintain DNBR above 1.30 during all normal operations and anticipated transients. With one reactor coolant pump not in operation in one loop, THERMAL POWER is restricted by the Nuclear Overpower Based on RCS Flow and AXIAL POWER IMBALANCE, ensuring that the DNBR will be maintained above 1.30 at the maximum possible THERMAL POWER for the number of reactor coolant pumps in operation or the local quality at the point of minimum DNBR equal to 22%, whichever is more restrictive.

In MODES 3, 4 and 5, a single reactor coolant loop or DHR loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops be OPERABLE. Thus, if the reactor coolant loops are not OPERABLE, this specification requires two DHR loops to be OPERABLE.

Natural circulation flow or the operation of one DHR pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capacity of operator recognition and control.

3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psig. Each safety valve is designed to relieve 336,000 lbs. per hour of saturated steam at the valve's setpoint.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psig. The combined relief capacity of all of these valves is greater than the maximum surge rate resulting from any transient.

The relief capacity of the decay heat removal system relief valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that this relief valve is not OPERABLE, reactor coolant system pressure, pressurizer level and make up water inventory is limited and the capability of the high pressure injection system to inject water into the reactor coolant system is disabled to ensure operation within reactor coolant system pressure - temperature limits.

Demonstration of the safety valves' lift settings will occur only during shutdown and will be performed in accordance with the provisions of Section XI of the ASME Boiler and Pressure Code.

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The requirement to have two DHR loops OPERABLE when there is less than 23 feet of water above the core ensures that a single failure of the operating DHR loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating DHR loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9.6 FUEL HANDLING BRIDGE OPERABILITY

The OPERABILITY requirements of the hoist bridges used for movement of fuel assemblies ensures that: 1) fuel handling bridges will be used for movement of control rods and fuel assemblies, 2) each hoist has sufficient load capacity to lift a fuel element, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - FUEL HANDLING BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly in a failed fuel container over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 COOLANT CIRCULATION

The requirement that at least one decay heat removal loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effect of a boron dilution incident and prevent boron stratification.

ADD.

3/4.9.9 CONTAINMENT PURGE AND EXHAUST ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment purge and exhaust penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL AND STORAGE POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.