

Docket No. 50-346
License No. NPF-3
Serial No. 678
January 15, 1981
Attachment A

APPLICATION FOR AMENDMENT
TO
FACILITY OPERATING LICENSE NO. NPF-3
FOR
DAVIS-BESSE NUCLEAR POWER STATION
UNIT 1

Enclosed are forty (40) copies of the requested changes to the Davis-Besse Nuclear Power Station Unit No. 1 Facility Operating License No. NPF-3, together with the supporting Safety Evaluation and Analysis for the requested change. This requested change deals with the proposal to deautomate the valve shifts caused by Incident Level 5 of the Safety Features Actuation System.

The proposed Technical Specifications changes include pages:

3/4 1-17, 3/4 3-13, 3/4 3-48, 3/4 3-50, 3/4 5-3, 3/4 5-6,
3/4 5-7, 3/4 6-11 and B3/4-12.

By cc:/ W. C. Rowles
Director, Nuclear Services

For R. P. Crouse
Vice President, Nuclear

Sworn and subscribed before me this 15th day of January 1981.

Judith Hirsch
Notary Public

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I. Changes to Davis-Besse Nuclear Power Station Unit No. 1 Technical Specifications Appendix A, changes pages:

3/4 1-17	3/4 5-6
3/4 3-13	3/4 5-7
3/4 3-48	3/4 6-11
3/4 3-50	B 3/4 1-2
3/4 5-3	

See proposed changes attached

A. Time Required to Implement

This change will be implemented during the first outage after NRC approval for which the plant will be in Operational Mode 4 for greater than 72 hours.

B. Reason for Change (Facility Change Request 80-278 Rev A) these changes have been proposed during discussion with NRC to address potential problems resulting from inadvertent or premature actuation of SFAS Level 5.

C. Safety Evaluation - attached.

ATTACHMENT A

Safety Evaluation and Analysis for FCR 80-278
Rev. A

Safety Evaluation

At present, the suction to the decay heat (DH) and containment spray (CS) pumps are automatically transferred from the Borated Water Storage Tank (BWST) to the Containment Emergency Sump on a Safety Features Actuation System (SFAS) trip of incident level 5. This occurs at a BWST level between 49.5 and 55 inches. This change proposes the above described automatic transfer of these pumps be changed to manual. Because this modification removes an automated safety feature that would now be manual, the possibility of an accident of a different type not previously in the Safety Analysis Report may be increased. This therefore, identifies a unreviewed safety question. The following analysis is provided to justify this modification.

Analysis

The safety function of this transfer is to protect these pumps from cavitation for lack of proper net positive suction heads and to transfer these pump suction to the containment emergency sump during the recirculation mode of operation. The SFAS incident level 5 trip will be used as an interlock to prevent a premature manual transfer. The following table shows the BWST levels required by this analysis for this suction transfer to be successfully performed as a manual transfer.

Table 1

<u>Description</u>	<u>BWST Level (Inches)</u>	<u>BWST Volume (Gallons)</u>
<u>Develop Minimum Level to Transfer Suction to Containment Emergency Sump</u>		
1. Accident Analysis minimum level to start the transfer per the original analysis	36	
2. Instrument string inaccuracy and drift	<u>13.5</u>	
3. Lowest safe indicated reading to start control room operator action to transfer	49.5	
<u>Develop Minimum Contained Volume</u>		
1. SFAS Incident Level 5 Interlock Trip Setpoint	96	
2. Interlock Trip Tolerance	+ <u>4.5</u>	
3. Highest (lowest) indicated level that interlock trip can occur	100.5 (91.5)	
4. Instrument string inaccuracy and drift	+ <u>13.5</u>	
5. Highest (lowest) actual level that interlock trip can occur (this volume	114 (78)	122,778

<u>Description</u>	<u>BWST Level (Inches)</u>	<u>BWST Volume (Gallons)</u>
may not be available for the decay heat or containment spray pump)		
6. Instrument String drift	± 1.2	
7. Highest (lowest) allowable interlock trip	101.7 (90.3)	
8. 360,000 gallons required to be added for Emergency Core Cooling System (ECCS) analysis	<u>334.3</u>	360,000
9. Lowest safe indicated level for ECCS Analysis in Modes 1, 2, 3, & 4	448.3	482,778

As shown in the above table, a control room operator will manually perform this transfer when the safety grade level indicators in the control room indicate between 49.5 and 96 inches (4.125 and 8 feet) of BWST level. This will give a control room operator about 4 minutes to make the transfer safely. Since the plant under the conditions existing at this point will be in an emergency situation for a minimum of 23 minutes, the station procedures will instruct a control room operator to be looking at the BWST level indicators to initiate the manual transfer. As observed from the above calculation table, the minimum level requirements of BWST will be met if the transfer is initiated within 4 minutes after the indicated BWST level drops to 8 feet.

A control room operator will manually perform this transfer about 23 minutes after the initial SFAS trip that started all high pressure injection, low pressure injection and containment spray pumps assuming at their maximum flow. The accident analysis requires 360,000 gallons to be added for ECCS analysis when in modes 1, 2, 3 & 4. As shown in the above table, this condition will still be met and the attached Technical Specifications are changed accordingly.

This change to manual transfer will provide the same safety function as performed by the present automatic transfer as discussed above. Hence, no adverse environment will be created by the change and the safety function of the DH and CS pumps will not be affected. This analysis is considered justifiable to support this proposed modification.

Charles K. Dornik
1-14-81

BWST LOLO LVL, XFER TO EMER SUMP

1. SYMPTOM

- 1.1 This alarm is generated when any one of the four SFAS BWST level bistables trips.
- 1.2 Setpoint: 8 feet water
- 1.3 Source Designation: LSL 1525A, LSL 1525B, LSL 1525C, and/or LSL 1525D

2. IMMEDIATE OPERATOR ACTION

- 2.1 Verify that the BWST level is at 8 feet per LI 1525 A, B, C, and D.
- 2.2 Verify a LOCA condition exists.

2.3

Transfer pump suction to the emergency sump by blocking SFAS incident level 2 for DH9A and DH9B and then opening DH9A and DH9B using HISDH9A and HISDH9B. Verify that the BWST outlet valves DH7A and DH7B start to close as DH9A and DH9B start to open. Verify the transfer is complete by checking the indicating lights on DH7A and B and DH9A and B and by checking that low pressure injection flow has not substantially changed.

3. SUPPLEMENTARY ACTIONS

- 3.1 Refer to EP 1202.06, Loss of Reactor Coolant, Reactor Coolant Pressure

DH 831 (DH 830) when DH Pump 1-1 (1-2) line flow is higher. Then balance the flow to 1500 gpm per line by adjusting the flow control valves DH14A and DH14B. If no air is available to DH14A and DH14B, the DH injection valve DH1B (DH1A) can be throttled under emergency conditions. This motor operated valve only moves while control switch is held.

9.2.3 Deleted

10. RECIRCULATION FROM THE CONTAINMENT VESSEL EMERGENCY SUMP

→ Following a LOCA, the BWST level will decrease until at the 8 feet level the operator must manually transfer the suction of the DH and CS Pumps to the emergency sump. The operator will open the emergency sump outlet valves DH9A and DH9B and close the BWST outlet valves DH7A and B. This operation must be completed before the level falls below 5 feet.

No operator signoff is required for Section 10.

10.1 Prerequisites

- ___ 10.1.1 Low Pressure Injection in progress.
- ___ 10.1.2 Borated Water Storage Tank water level has reached the low level transfer setpoint (8 feet) as read on LI1525A, B, C, or D.
- ___ 10.1.3 The annunciator "BWST LOLO LVL, XFER TO EMER SUMP" may or may not have been received.

10.2 Procedure

- { ___ 10.2.1 Block SFAS incident level 2 on DH9A and DH9B.
- ___ 10.2.2 Open DH9A and DH9B using HISDH9A and HISDH9B.
- ___ 10.2.3 Verify that DH7A and DH7B start to close as DH9A and DH9B start to open.
- ___ 10.2.4 Verify that the transfer is complete by checking the indicating lights on DH9A and B and DH7A and B and by checking that the Low Pressure Injection flow was not significantly changed.
- ___ 10.2.5 Continue low pressure injection as needed.

NOTE: The preceding three steps establish the "piggyback" mode of operation. If this operation is being formed to provide RCS makeup at high pressure, no further action is required until makeup is no longer needed at which time the pumps may be stopped and DH 63 and DH 64 closed. If this operation is the result of an RCS leak and the BWST level is approaching 8 feet, continue with the remaining steps.

15 | — 11.2.4 Close the high pressure injection pump minimum recirculation valves to the BWST. This is to minimize the contamination of the BWST and maintain off site radiation levels as low as possible.

15 | NOTE: If, DH 64 (DH 63) and HP 32 (HP 31) are both open, computer alarm Q488 (Q489) will occur. Close HP 32 (HP 31).

15 | CAUTION: If the high pressure injection flowrate drops to \leq 35 GPM per pump due to an increase in RCS pressure, stop the high pressure injection pumps 1-1 and 1-2 so as not to damage them.

11.2.5 *SEE ATTACHED SHEET FOR STEP 11.2.5*

15 | — 11.2.6 When Reactor Coolant Pressure is low enough for the Decay Heat Pumps to discharge directly to the Reactor Coolant System at a flow of 2000 gpm, begin Decay Heat System recirculation or the Containment Vessel Emergency Sump as follows:

15 | — 11.2.6.1 Stop the High Pressure Injection Pumps 1-1 and 1-2 if their flow is not needed.

— 11.2.6.2 Shut the Decay Heat Pump discharge valves to the High Pressure Injection Pump Suction Dh 63 and DH 64.

Section 11 Completed _____ Date _____

11.2.5 When BWST level reaches 8 feet, transfer pump suction to the emergency sump by blocking SFAS incident level 2 for DH9A and DH9B and then opening DH9A and DH9B using HISDH9A and HISDH9B. Verify that the BWST outlet valves DH7A and DH7B start to close as DH9A and DH9B start to open. Verify the transfer is complete by checking the indicating lights on DH7A and B and DH9A and B and by checking that low pressure injection flow has not substantially changed.

2.4.1.4 Begin monitoring BWST level on LI1525A, B, C, and D and manually transfer pump suction to the emergency sump when BWST level reaches 8 feet. Transfer pump suction to the emergency sump by blocking SFAS incident level 2 for DH9A and DH9B and then opening DH9A and DH9B using HISDH9A and HISDH9B. Verify that the BWST outlet valves DH7A and DH7B start to close as DH9A and DH9B start to open. Verify the transfer is complete by checking the indicating lights on DH7A and B and DH9A and B and by checking that low pressure injection flow has not substantially changed.

If either the RCS T_{SAT} METERS, the hot leg temperature indications, or the incore thermocouple temperatures indicate super-heated conditions for the existing pressure, refer to AB 1203.06, Inadequate Core Cooling Guidelines. An increase in the source or intermediate range nuclear instrumentation may also indicate an inadequate core cooling situation.

2.4.1.3 If both main and auxiliary feedwater is lost, refer to AB 1203.05, Complete Loss of Main and Auxiliary Feedwater, to aid in restoring auxiliary feedwater in the event both OTSGs are dry.

2.4.1.5 Determine the availability of reactor coolant pumps (RCPs). If any RCPs are running, go to 2.4.2. If all RCPs are off, go to 2.4.3.

2.4.2 Actions with at least one RCP running

2.4.2.1 Maintain one RCP running per loop (stop other pumps).

Continued operation of at least one RCP is desirable. The only conditions requiring RCPs be stopped would be if RCS pressure falls below 1650 psig such that SFAS incident level 2 is actuated or if the RCP vibration as measured by the Bentley-Nevada equipment exceeds 30 mills. Note that the X2 (times-two) switch on the Bentley-Nevada equipment must be used for the expanded range.

2.4.2.2 Allow RCS pressure to stabilize. If RCS pressure continues to decrease past secondary side pressure, the leak is large and section 3 should be consulted.

2.4.2.3 Establish and maintain OTSG cooling by adjusting steam pressure via the turbine bypass valves and/or atmospheric vent valves. Cooldown at 100°F per hour to achieve an RCS pressure of 250 psig. Track the cooldown on Figures 2 and 3. Isolate core flood tanks when 50°F subcooling (using RCS T_{SAT} METERS) is attained and RCS pressure is less than 700 psig. Block SFAS level 3 when less than 600 psig.

2.4.2.4 Go into LPI cooling described in 2.5.1

2.4.3 Actions with no RCPs running

2.4.3.1 Verify that the OTSG level is maintained at 96" on the startup range by auxiliary feedwater.

NOTE: If desired, the OTSG level may be raised as high as 95% on the operate range to improve RCS cooling but the transition must be slow enough to prevent excessive changes in RCS pressure and temperature.

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2.7 Discussion

For the purposes of this procedure, a medium sized leak is one for which the HPI pump capacity is sufficient to maintain pressurizer level or RCS pressure. If the HPI pumps cannot keep up with the leak, then RC pressure will fall until the LPI system can provide additional makeup; this is defined as a large leak and is discussed in the next section.

Depending on the size of the leak, the RCS pressure will slowly or quickly fall to the 1600 psig pressure setpoint of the SFAS for level 1 and 2 actuation. Note that for small breaks with a complete loss of feedwater, RCS pressure may not fall low enough to actuate SFAS levels 1 and 2. Manual actuation of SFAS could be accomplished by actuating each component in level 1 or 2 or by actuating levels 1, 2, 3, and 4 except C.S. pumps, by means of the manual actuation pushbutton. Manual actuation will result in natural circulation of the RCS and an SFRCS actuation. Operator action shall be taken to re-establish the seal injection and CCW to the MU Pumps to allow continuous operation of the RCPs. Manual actuation should NOT be used unless the SFAS setpoints are reached and the actuation does not occur. Once HPI is initiated and level is restored to enable pressure control, a cooldown can be started. The cooldown should proceed normally with the exception that one of the ECCS pumps must remain in operation in the injection mode to makeup the water lost out of the leak. HPI can be shutdown within the limits of item 6 of 2.6.1.

If possible the depressurization/cooldown will be complete before the BWST low level is reached and the "piggybacking" of the HPI and Decay Heat Pumps will not be necessary. If the depressurization/cooldown cannot be completed in time, the pressurizer level may be maintained by aligning the Decay Heat Pumps to take a suction from the emergency sump and discharge to the suction of the HPI pumps.

A flow path from the RCS hot leg to the DH System must be established within seven days to prevent boron concentration buildup as described in Section 3.4.8. If this flow path cannot be established, an alternate path through the auxiliary spray line must be used.

If an operator blocks an SFAS signal and changes the status of the actuated equipment, he is responsible for assuring proper equipment operation and re-initiation if required until the SFAS is reset. For guidance on resetting the SFAS after a real or erroneous trip, see Section 4.0.

For additional details on possible consequences of a medium sized leak, see The Evaluation of Transient Behavior and Small Reactor Coolant System Breaks in the 177 Fuel Assembly Plant - Section 5 (B&W).

Notes on Step 2.4.3.5

When this step is reached, auxiliary feedwater has established a 96" level in the OTSGs and no RCS flow exists (forced or natural). Depending on the size of the break, the RCS may repressurize enough to reach the code safety valves setpoint. If the electromatic relief is available, the RCS pressure may be reduced manually. If not, the RCS pressure will be relieved by the break and the safeties if the pressure goes that high. At some pressure, the energy escaping from the break (and the electromatic or safeties if used)

The transfer of pump suction to the emergency sump when BWST level reaches 8 feet (but greater than 5 feet) is performed manually. The operator must monitor the BWST level indicators during injection and initiate the transfer at the 8 feet level. An alarm, "BWST LO LO LVL, XFER TO EMER SUMP," will also be received at 8 feet to remind the operator.

3.4.6 Begin monitoring BWST level on LI1525A, B, C, and D and manually transfer pump suction to the emergency sump when BWST level reaches 8 feet. Transfer pump suction to the emergency sump by blocking SFAS incident level 2 for DH9A and DH9B and then opening DH9A and DH9B using HISDH9A and HISDH9B. Verify that the BWST outlet valves DH7A and DH7B start to close as DH9A and DH9B start to open. Verify that transfer is complete by checking the indicating lights on DH7A and B and DH9A and B and by checking that low pressure injection flow has not substantially changed.

1.4 Supplementary Actions

Implement Site Emergency Procedure, EI 1300.04,

CAUTION: DO NOT BLOCK AND OVERRIDE ANY SAFETY EQUIPMENT EXCEPT AS SPECIFIED IN SECTION 2.4.3.

- 3.4.1 If the flow rate between the two HPI lines for an HPI Pump becomes unbalanced, throttle the HPI valves and split the flow between the injection lines. Do NOT throttle the line with the high flow below the flow rate shown on Figure 4.5. Assure proper HPI operation per Section 5.0 of SP 1104.07, "HPI Operating Procedure".
- 3.4.2 Verify the LPI pumps are injecting into the RCS when RCS pressure decreases to approximately 200 psig by reading FI DH2B and FI DH2A on C5716. No throttling of the LPI valves is required if both LPI pumps are in operation since mechanical stops are installed on the cooler outlet valves. Assure proper LPI operation per Section 9 of SP 1104.04, "LPI Operating Procedure".
- 3.4.3 If a DH Pump has failed and a break does not exist outside of containment, close the suction on the disabled pump, open DH831 or DH830, and balance flows using DH14A and DH14B if available or DH1A and DH1B if DH14A and DH14B cannot be throttled.
- 3.4.4 Stop any non-essential equipment such as reactor coolant pumps, makeup pumps, etc. Although the RCPs will probably trip on a loss of CCW and seal injection, DO NOT STOP MORE THAN ONE RCP PER LOOP UNLESS A MINIMUM OF 3000 gpm TOTAL DECAY HEAT FLOW HAS BEEN ESTABLISHED.
- 3.4.5 If LPI flow is greater than 1000 gpm per pump for 20 minutes, the operator may stop the HPI pumps. Unless the HPI pumps are pigged back, the HPI pumps must be stopped before the suction is manually transferred to the emergency sump on low BWST level (8 feet). If LPI flow is less than 1000 gpm per pump, open HPI to LPI cross-connect as per Section 11 of the DH and LPI Operating Procedure, SP 1104.04 before the suction is transferred to the emergency sump.
- 3.4.7 See Section 4.0 of this procedure for guidance before overriding any other safety equipment.
- 3.4.8 Monitor RB pressure and temperature and if CS Pumps are in operation, assure CS 1530 and CS 1531 throttle when recirculating from the emergency sump.

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ATTACHMENT C

Description of Operation

During normal plant operation the BWST Outlet Valve is open and the corresponding Containment Emergency Sump Valve is closed. An interlock exists between the two valves that would prevent the sump valve from being opened until the BWST Outlet Valve is fully closed.

On a Level 2 SFAS actuation, the valves will remain in their normal position. At this point, the blocking of Level 2 SFAS signals will still not allow the Containment Emergency Sump Valve from being opened until the BWST Outlet Valve is closed. When Level 5 of SFAS is actuated neither valve will move. At this point, if the Level 2 SFAS signal is blocked, the Level 5 signal will block the interlock allowing the operator to manually open the Containment Emergency Sump Valve. When the Containment Emergency Sump Valve begins to open, another interlock between the two valves will start closing the BWST Outlet Valve. The transfer to the sump will be totally manual and no automatic operation will be involved.