



Consumers
Power
Company

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June 30, 1983

Harold R Denton, Director
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND NUCLEAR COGENERATION PLANT
MIDLAND DOCKET NOS 50-329, 50-330
NATURAL CIRCULATION TESTING
FILE: 0928.6 SERIAL: 23227

This letter provides information on the subject of natural circulation testing addressing concerns on boron mixing and use of reactor vessel head vent temperature indication. The information, which was requested by the NRC during a telephone conference call on June 17, 1983, responds to topics related to Open Items #7 and #9 and Confirmatory Issue #7.

Open Item #7; Boron Mixing During Shutdown With Natural Circulation

Use of the letdown line during natural circulation tests should not perturb the test results for two reasons:

- a) Letdown constitutes less than one percent of expected natural circulation flow and therefore should not affect results.
- b) The longterm cooling analysis presented in BAW-10103A indicates that a core flow of 3000 gpm (416 lbs/sec) will prevent the boron from concentrating. Natural circulation flow should exceed 3000 gpm and ensure mixing in the vessel. A six weight percent solution will be provided as the source of borated water during this mixing test.

Open Item #9; Reactor Vessel Head Vent Temperature Indication

The reactor vessel head vent temperature will be used to determine the direction of natural circulation flow. Flow direction will be determined as follows:

- a) For reactor vessel head vent temperature greater than hotleg temperature, flow is in the positive direction.

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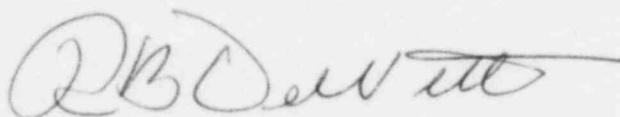
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- b) For reactor vessel head vent temperature equal to hotleg temperature, (plus or minus 10°F), flow is in the negative direction.
- c) For reactor vessel head vent temperature less than hotleg temperature, (temperature differential of at least 10°F and increasing), flow is stagnant.

Included as an attachment is a copy of an approved FSAR Change Notice on the topic above to be included in the next FSAR revision.

It is expected that the information provided in addition to the approved FSAR Change Notice should provide the NRC with the information necessary to complete Open Items 7 and 9 and Confirmatory Issue 7.



RBD/MFC/dlm

CC RJCook, Midland Resident Inspector
JGKepler, Administrator, NRC Region III
MAMiller, NRC

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 23227 Dated June 30, 1983

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information on boron mixing and reactor vessel head vent temperature indications during natural circulation testing.

CONSUMERS POWER COMPANY

By R B Dewitt
R B Dewitt, Vice President
Nuclear Operations

Sworn and subscribed before me this 30 day of June, 1983.

Barbara Blawie
Notary Public
Jackson County, Michigan

My Commission Expires September 8, 1984



QUALITY ASSURANCE PROGRAM
SAR CHANGE NOTICE

1. ~~PCAR~~
FSAR
3. No. 4038

JOB NO. 7220

2. DISCIPLINE/COMPANY CPCo

4. ORIGINATOR JR WEBB

5. DATE 6/28/83

6. REFERENCED SECTIONS OF SAR 19A.4.22 FSAR Cross Reference Index has been checked and affected FSAR pages are attached which reflect appropriate changes.

Attachment

7. DESCRIPTION OF CHANGE

Is the purpose of this change for anything other than: Closing an ACRS/SER open item, correcting an editorial error or providing information already committed to in NRC correspondence? ~~Yes~~ No

If yes, provide further justification for the change in Block 9.

ADDITIONAL DETAILS INCLUDED IN NC TEST

8. REFERENCED SPECIFICATIONS OR DRAWINGS

NONE

9. JUSTIFICATION

RESOLVE NRC STAFF CONCERNS

10. BECHTEL DISCIPLINE INTERFACE REVIEW:

- ARCH _____
- CIVIL _____
- CONTROL SYS _____
- ELEC _____
- NUCLEAR _____

- PLANT DSN _____
- PQAE _____
- STRESS _____
- OTHER _____

INTERFACING STAFF REVIEW:

- ARCH _____
- CIVIL _____
- CONTROL SYSTEM _____
- ELEC _____
- GEOTECH _____
- M & QS _____
- MECH _____
- NUCLEAR _____
- PLANT DSN _____
- RELIABILITY _____
- STRESS _____
- OTHER _____

All Bechtel interfaces complete MW 6-29-83

<u>N/A</u>	-	<u>M. J. Webb</u>	<u>6/29/83</u>	<u>R. L. Webb</u>	<u>6/29/83</u>
11. REVIEWED BY (Group Supervisor)	DATE	12. REVIEWED BY (SAR COORDINATOR)	DATE	13. REVIEWED BY (NUCLEAR ENGINEER)	DATE
<u>EM WUG</u>	<u>6/29/83</u>	<u>S. P. Forte</u>	<u>6/29/83</u>	<u>NA</u>	
14. CONCURRENCE BY (PROJECT ENGINEER)	DATE	15. APPROVED BY (CPCo)	DATE	16. CONCURRENCE BY (NSSS SUPPLIER)	DATE

14A.4.22 NATURAL CIRCULATION TESTING

1. Purpose

- 1.1 Demonstrate the initiation, maintenance, and recovery from the natural circulation mode.
- 1.2 Demonstrate the performance of the auxiliary feedwater level rate control system.
- 1.3 Demonstrate the RCS can be uniformly borated while in natural circulation.
- 1.4 Demonstrate the capability to cooldown the RCS via natural circulation using the OTSGs. Determine acceptable cooldown rate in natural circulation.
- 1.5 Demonstrate the performance of the subcooling monitor.

2. Prerequisites

- 2.1 The startup test program has progressed to the point where a minimum of 1% rated full power from decay heat is possible.
- 2.2 Reactor is shutdown and subcritical by at least 1% k/k.
- 2.3 Four RCPs running.
- 2.4 OTSG level at low level limit.
- 2.5 Normal RCS temperature and pressure.

3. Test Method

- 3.1 As quickly as possible, trip pressurizer heater banks (1-4), reactor coolant pumps, main steam isolation valves, and main feedwater pump. Isolate letdown. Verify AFW actuates and is raising OTSG levels to natural circulation setpoint. Control RCS pressure with PORV and OTSG pressure with the POAV. Stabilize plant in natural circulation.

- 3.2* Restore equipment to operation with the exception of the reactor coolant pumps and main feedwater pumps.

- 3.3* With the plant in natural circulation (actual decay heat available), a batch addition of ~~Boron~~ to increase RCS Boron concentration by approximately 200 ppm will be initiated.

6 WEIGHT PERCENT
BORIC ACID

- 3.2* Monitor the reactor vessel head vent ~~thermo~~ temperature to ascertain vent flow direction.

3. ~~5~~ Sampling will continue to verify RCS concentration increase of > 100 ppm and trend is as expected.
3. ~~6~~ An RCS cooldown will be initiated using the turbine bypass valves to demonstrate a cooldown in T_{avg} of at least $100^{\circ}F$.

4. Acceptance Criteria

- 4.1 Natural circulation has been established. Indications of natural circulation are:
- A stable loop ΔT with T_C near T_{sat} of the OTSGs.
 - A small or negligible difference between incore thermocouple readings and hot leg temperature readings.
 - RCS pressure and pressurizer level stable prior to cooldown.
- 4.2 Boron has mixed in the RCS to increase the concentration by at least 100 ppm. The RCS concentration is trending as expected toward the calculated equilibrium value.
- 4.3 RCS T_{avg} has been reduced approximately $100^{\circ}F$ by natural circulation cooldown with no void formation in the RCS.
- 4.4 AFW level rate control prevents overcooling ($T_{avg} < 525^{\circ}F$) as predicted.
- 4.5 *Reactor vessel head vent temperature remains above hot leg temperature during test.*

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