



**Consumers
Power
Company**

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March 23, 1984

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

MIDLAND ENERGY CENTER PROJECT
MIDLAND DOCKET NOS 50-329, 50-330
REACTOR VESSEL HEAD VENT
SER OPEN ITEM #9
FILE B5.1, M1.50 SERIAL 27160

REFERENCE: LETTER FROM T M NOVAK TO J W COOK DATED 10/25/83

In previous discussions and correspondence, Consumers Power Company (CPCo) has proposed venting the reactor vessel head through a small line connected to the top of the hot leg. The Staff position provided in the referenced letter requests the applicant to demonstrate by test or analysis that steam vented from the reactor vessel head will not stratify in a hot leg and adversely affect core cooling by natural circulation. We, therefore, plan to utilize the Multiple-Loop Integral System Test (MIST) facility to perform specific tests on the interconnected head-hot leg vent design to address this concern.

Testing of the interconnected head-hot leg vent design at the MIST facility will apply to the operation of both the Midland and the Davis-Besse plants. The MIST tests will be performed on a lowered loop configuration and the interconnected vent design will be essentially identical to the Midland design (ie, interconnection above the hot leg U-bend). These tests will be utilized to benchmark the computer codes used to analyze the design and to verify the adequacy of operator actions to deal with system voids. Final Abnormal Transient Operating Guidelines (ATOG) and operating procedures will reflect the results of the MIST testing when it is completed in 1986.

Having reviewed several alternate design modifications, including remotely isolating the line connecting the head vent to the high point vent, we firmly believe that the advantages of the proposed interconnected vent design far outweigh any potential disadvantages. In summarizing the basis for our position, we believe that the assumption that excessive steam will collect in the hot leg U-bend does not allow credit for the ability of the operators to vent steam from the system. Correspondingly, if credit is not allowed for

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operator action, then separate head vents represent a less desirable design since operator action is required to vent either point. However, if credit is allowed for operator action, then the concern regarding the accumulation of steam in the hot leg U-bend is diminished and the advantages of the interconnected vent design can be realized without the complication of additional lines and remotely operated valves. Operating procedures will provide several methods to reduce system voids. These methods will include venting from the high point vent, establishing or increasing high pressure injection (HPI) flow, and starting or bumping reactor coolant pumps.

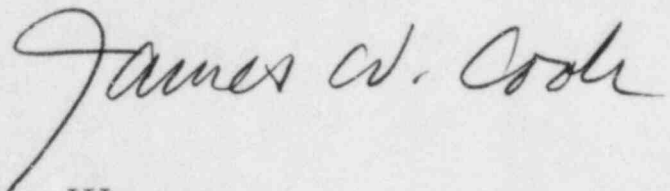
With respect to the possibility that steam venting from the head to the hot leg could cause an earlier loss of natural circulation than otherwise expected, we believe that based on the relatively low capacity of the vent and the area available for condensation in the hot leg, an early loss of natural circulation will not occur. Even if an early loss of natural circulation cooling occurs, a total loss is precluded since the vent connection only goes to one hot leg U-bend. Loss of all natural circulation cooling due to stratification in one hot leg U-bend could only occur coincident with the loss of the opposite steam generator.

It appears that in previous submittals, CP Co has not adequately pointed out the advantages of the proposed interconnected vent design. In arriving at this vent design, there were four important features which were considered desirable.

1. The proposed design provides a method for extracting heat from the head region to allow a more rapid natural circulation cooldown and depressurization of the system, without drawing a steam bubble in the head. This significant advantage is achieved because of the continuous flow of coolant from the reactor vessel upper head to the hot leg U-bend through the interconnection.
2. The proposed design should reduce the frequency and quantity of steam and fluid vented into containment from the primary system. This feature is desirable as it minimizes the extent of potential contamination and the consequential creation of a harsh environment in the containment.
3. Likewise, the proposed design addresses margin to inadequate core cooling which, among other parameters, is dependent on system inventory. The interconnected vent conserves inventory and maintains margin by:
 - a. Any steam collected in the reactor head will be directed to the primary side of the steam generator and condensed rather than being vented out of the system under normal recovery modes.
 - b. In the event of a loss of natural circulation due to stratification in the hot leg U-bend, the boiler-condenser mode of natural circulation cooling would occur with a significantly greater liquid inventory in the primary system than for designs without the interconnected vent. This additional margin in inventory is due to the upper reactor vessel region being filled with water rather than steam at onsets.

4. The proposed design considers human factors enhancement during an accident by simplifying the procedure required for the operator to monitor the primary system inventory for inadequate core cooling. The interconnected vent design requires the operator to track only one level measurement (ie, the hot leg level) to determine system inventory because the hot leg and head or vent line levels will be the same.

It is CPCo's intention to proceed with the installation and development of procedures for operation of the interconnected head-hot leg vent in order to resolve SER Open Item #9. If the Staff has any questions regarding this design or the proposed testing to confirm its adequacy, we would like to meet with you as early as possible to attempt to resolve such concerns.



JWC/JRW/MFC/bjw

CC JGKeppler, Administrator, NRC Region III
DSHood, US NRC, Licensing Branch No 4
RJCook, Midland Resident Inspector

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

Letter Serial 27160 Dated March 23, 1984

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 a commitment to utilize the Multiple-Loop Integral System Test facility to test the interconnected head-hot leg vent design.

CONSUMERS POWER COMPANY

By JW Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 26 day of March, 1984

Barbara B. Bunsen
Notary Public
Jackson County, Michigan

My Commission Expires Sept 8, 1984