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January 5, 1970 11/5/62

Docket No. 50-263

MRC PDR

Supplemental Report to ACRS

MONTICELLO NUCLEAR GENERATING PLANT

U. S. Atomic Energy Commission  
Division of Reactor Licensing

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1.0 INTRODUCTION AND SUMMARY

In our report to the AGRS, dated November 24, 1969, on the Monticello facility, we reported the results of our safety evaluation. In that report there were a number of items for which the results of our evaluation were incomplete, primarily because we did not have sufficient confirmatory information at the time the report was written. We indicated that we would report to the Committee the follow-up action on these matters. This supplemental report discusses the status of these matters:

- (1) Non-isolable break in the HPCI steam supply line (Section 6.1.1).
- (2) Limitation on HPCI operation (Section 4.7).
- (3) Acceptability of jet pump castings (Section 4.3).
- (4) Vibration monitoring of reactor internals (Section 4.3).
- (5) Seismic design of structures (Section 5.1.2).
- (6) Instrumentation and control items:
  - a. ECCS low pressure auto-relief interlock (Section 9.2.3).
  - b. Remote testing capability of pressure switches on bellows of relief/safety valves (Section 9.2.3.3).
  - c. Single failure criterion (Section 9.2.5).
  - d. Acceptability of standby gas treatment system initiating circuitry (Section 9.2.4).
  - e. Seismic testing of Class I instrumentation (Section 9.2.7).

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Since issuance of our report to the Committee, we have had further discussion with the applicant on the foregoing matters. In addition, further information on some of these matters was provided in Amendments Nos. 23 and 24. The additional information has been reviewed and our evaluation is presented in this report.

Our review of Technical Specifications is continuing and a revised draft proposed by the applicant (Amendment 23) has been provided to the Committee. Subject to resolution of items 1, 4 and 6a above, development of final Technical Specifications, and satisfactory completion of construction and preoperational tests, we conclude that the Monticello plant may be licensed for operation.

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2.0 DISCUSSION2.1 Non-Isolable Break in the HPCI Steam Supply Line

The applicant has not formally submitted any additional information in regard to this matter. However, he has informed us orally that a modification will be made to reduce the spectrum of break sizes over which a break in the HPCIS steam supply line, occurring in the main steamline, will not initiate automatic isolation of the broken line. We understand that this will be accomplished by replacing the pressure taps in the HPCIS steamline with a more sensitive orifice device to measure an increase in steam flow above rated, which would be indicative of a break in the HPCI steamline. Also, the applicant has stated analyses indicate that, in the event of a break which cannot be detected immediately, sufficient time is available to assess an abnormal condition and then manually actuate the auto-relief system without resulting in any significant offsite doses.

As stated in our previous report to the Committee, our position is that the applicant will need to (a) demonstrate that the HPCIS and RCIS steam supply lines have adequate isolation capability with the present design, or (b) present information on changes that could be made so that failures in these steamlines could be detected, and the lines isolated as required.

The applicant plans to discuss this matter with us prior to the ACRS meeting.

## 2.2 Limitation on HPCI Operation

In the FSAR, the applicant indicated that in taking into account all transient stresses expected to occur for the reactor vessel during plant lifetime, five HPCI startups were considered. In Amendment 24, dated December 19, 1969, the applicant stated that each of the five HPCI startup cycles included three hot-cold-hot cycles for a total of 15 thermal cycles. Subsequent analyses, as stated by the applicant, indicate the usage factor would be less than 1.0 for 80 or more thermal cycles.

No supporting information was supplied by the applicant to show the calculated peak stresses associated with the HPCI thermal cycles and thus permit us to evaluate the available margin in the reactor vessel usage factor. Therefore, we still intend to place a limitation on HPCIS operation in the Technical Specifications.

## 2.3 Acceptability of Jet Pump Castings

In Amendment 24, the applicant clarified previous statements made in the FSAR to show that the remaining castings which contain the carburized surface are all part of the removable inlet-mixer subassembly, which consists of the 180° elbow and nozzle castings shown in the attached sketch. The applicant has stated that none of these castings has been found to contain cracks.

We cannot attribute any direct safety significance to cracking of the inlet-mixer assembly. However, we also find that there were obvious deficiencies in the quality assurance program under which the carburized

castings were made. Because of these deficiencies and the record of failure involving these components, we still believe that additional inservice inspection of these castings should be required. We intend to include in the Technical Specifications an inspection program for the remaining carburized castings which will include inspection of all castings following the hot functional test and after the first refueling shutdown, and a lower frequency of inspection thereafter.

We have orally informed the applicant of our intentions. At this time the applicant has not made a commitment to accept this proposed inservice inspection program.

2.4 Vibration Monitoring of Reactor Internals

The applicant has not changed his position from that previously reported to the Committee, i.e., for the Monticello plant, Northern States Power will rely upon the results of the Dresden 2 vibration tests. The applicant stated that the results of the Dresden 2 vibration tests will adequately represent any vibration that may occur in the Monticello reactor, since the fluid velocities within the Dresden 2 vessel are expected to be higher than in Monticello.

As stated in our previous report, we plan to require that the vibration levels of the critical internal and recirculation system components be monitored during plant startup and the initial operation period.

The applicant has stated that he is prepared to discuss this matter in detail with the Committee at the January meeting.

2.5 Seismic Design of Structures

Since the submittal of our report to the Committee, additional information on stress levels in critical piping systems and discussions on analytical methods employed for dynamic analysis have been provided by the applicant in Amendment 24, dated December 19, 1969. This information is being evaluated by our seismic design consultant, and his report will be submitted to the ACRS before the full Committee meeting. We anticipate that the seismic design methods employed will be acceptable.

2.6 Instrumentation and Control Items

2.6.1 ECCS Low-pressure Auto-relief Interlock

The interlock function is provided by an arrangement involving six pressure switches (one switch for each ECCS pump) monitoring pump discharge pressure. The interlock is a permissive-type which allows initiation of auto-relief when one of the six switches responds to either the pressure characteristic or to a circuit failure which produces the same signal to the auto-relief system as the pressure characteristic. Therefore, a single failure which produces a permissive condition would defeat the purpose of the interlock in cases when non-permissive circuit orientation is required. We have concluded that this is not acceptable and that single failure immunity is required. The applicant does not agree to this requirement.

2.6.2 Monitoring Capability of the Integrity of Bellows on the Target Rock Relief/Safety Valves

Because the integrity of the bellows is essential to the self-actuated operating mode of the Target Rock relief/safety valves, we conclude that the testing circuits associated with bellows integrity monitoring should be improved to permit unambiguous testing during operation.

The applicant stated that such capability would be provided in the Monticello design and we conclude this is acceptable. We shall review the specific design details prior to issuance of an operating license to ensure that these requirements are satisfied.

2.6.3 Acceptability of Standby Gas Treatment System (SGTS) Initiating Circuitry

Functionally, the SGTS is designed such that one (filter) train is considered to be the "preferred" system and is actuated initially. If this "preferred" train fails, the redundant filter train is actuated after a time delay of 50 seconds.

Since submittal of our report to the Committee, we have received and reviewed the elementary diagrams for the SGTS. The applicant has stated that the system is designed to those portions of IEEE 279 which relate to testability and the single failure criterion. We conclude that the system is comprised of two electrically independent and redundant initiating systems and have not uncovered any deficiencies.

In response to our questioning concerning the effect on offsite doses resulting from the 50-second delay in transferring operation from one filter train to another, the applicant has informed us orally that this initiation circuitry will be changed. Upon receipt of the initiation signal, both filter trains will be started simultaneously; when operability is assured one train will be manually shutdown. We consider this acceptable.

#### 2.6.4 Single Failure Criterion

At the time we wrote our report to the Committee, some ambiguity existed as to whether the reactor protection and containment isolation systems were designed to meet the single failure criterion as defined in IEEE 279. In Amendment 23 the applicant confirmed that the systems are so designed. This matter is now resolved.

#### 2.6.5 Seismic Testing of Class 1 Instrumentation

In our earlier report to the Committee, we stated that the applicant had not submitted a completion schedule for the seismic test program related to the balance-of-plant systems; i.e., other than General Electric-supplied systems.

In Amendment 17 the applicant stated that the test program for the General Electric-supplied instrumentation similar to that to be installed at Monticello will be completed by December 31, 1969. In Amendment 23 the applicant stated that, purchase specifications for critical items comprising the balance-of-plant equipment contained clauses requiring that the equipment survive possible seismic accelerations without loss

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of function. A program is currently underway to ascertain how the equipment manufacturers are able to assure compliance with that portion of the specifications. The applicant stated that it is currently expected that this effort will be completed by March 15, 1970.

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Jet Pump Assembly (Partial View)

