UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 11 TO LICENSE NO. DPR-22

(CHANGE NO. 19 TO THE TECHNICAL SPECIFICATIONS)

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

INTRODUCTION

By letters dated August 16, 1974 and July 1, 1975, Northern States Power (NSP) proposed a license amendment to Provisional Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The proposed amendment involves revisions to the Technical Specifications with regard to:

(1) incorporation of operating limits and surveillance for the Monticello reactor vessel based on Appendix G of 10 CFR Part 50,

(2) substitution of a more generalized approach to the licensing of the byproduct, source and special nuclear materials and incorporate those leak testing and related surveillance and reporting requirements for the sealed radioactive sources,

(3) revision of specifications associated with the Augmented Off-Gas System to incorporate planned modifications to equipment and procedures to be implemented within thirty days after the Fall 1975 startup, and

(4) revision of the radioactive iodine (131) release limits based on Regulatory Guide 1.42 and the dispersion factors calculated by the NRC staff. Such revisions would be effective when the modifications to the Augmented Off-Gas System are complete and the system determined to be fully operational.

Our evaluation of each of these subjects follows.

EVALUATION

1. Reactor Coolant System Pressure-Temperature Limitations

The current pressure-temperature limitations for operation of Monticello are based on NDT temperature plus 60°F and do not fully comply with all the requirements of Appendix G, 10 CFR Part 50, "Fracture Toughness Requirements." The proposed pressure-temperature operating limits are based on the requirements of Appendix G, 10 CFR Part 50 and Appendix G to ASME Code Section III. In calcuations to determine these limits the reference temperature, RT_{NDT}, of the vessel material was estimated from impact test data taken in accordance with requirements of the Code to which this vessel was designed and manufactured (1965 Edition including Summer 1966 Addenda). Where the dropweight NDT temperature was known, the reference temperature used was the NDT temperature. Where the dropweight NDT temperature was not known, the reference temperature used was the temperature at which 30 ft-lb of energy was expected to occur on the basis of reported Charpy V notch test data. For areas of the vessel shell remote from the core beltline region, the highest NDT temperature permitted by the vessel purchase specification for any vessel pressure boundary material is +40°F and this value is used for the RT_{NDT} in lieu of certified test results.

Predicted changes in NDT temperature as a function of neutron fluence are given in Figure 3.6.1. of the Technical Specifications. This curve is based on 35 data points from tests on SA 302B and SA 533B steel. It agrees with our prediction for SA 533B steel with 0.15% copper. The percent of copper in the Monticello reactor vessel plate material from the beltline region has not been determined.

Calculations indicate that the maximum neutron fluence on the vessel wall is presently about 2×10^{17} n/cm^2 and will be approximately 2.2×10^{18} n/cm^2 at end of life.

The material surveillance program for Monticello consists of three sets of specimens representing the vessel base, weld and heat affected zone (HAZ) material and conforms to ASTM E 185-66. Northern States Power Company's proposed change to withdraw samples at 1/4 and 3/4 of service life is acceptable to the staff.

We conclude that the proposed temperature-pressure limits, as specified in Figures 3.6.2, 3.6.3, and 3.6.4 of the proposed Technical Specifications filed with the application dated July 1, 1975, for operation of Monticello comply with the requirements of Appendix G, 10 CFR Part 50 and are acceptable until data from the first material surveillance capsule are obtained and reported to the NRC. We require, however, that the phosphorous and copper content of vessel plate and weld material in the vessel core region be determined at that time, and the results included in the report. This requirement has been discussed with the licensee and is acceptable. We also conclude that the proposed changes in surveillance requirements, specifications 4.5.A and B, are acceptable.

2. Byproduct, Source, and Special Material Requirements

By letter dated June 17, 1974, we requested NSP to provide the following information with regard to the Monticello Nuclear Generating Plant: (1) proposed amendments to the conditions of existing Provisional Operating License No. DPR-22 to provide more encompassing limits for the byproduct, source and special nuclear materials which NSP may receive, possess and use in connection with the operation of the facility; (2) proposed Technical Specifications for leakage testing and the related surveillance and reporting requirements for sealed radioactive material sources; (3) update their full-term license application to include the information set forth in Regulatory Guide 1.70.3 entitled, "Additional Information - Radioactive Materials Safety for Nuclear Power Plants," dated February, 1974.

The objective of the requests made in our letter of June 17, 1974 was to add flexibility to the operation of nuclear power plants by extablishing a more generalized approach to the licensing of byproduct, source, and special nuclear materials. This objective would reduce the number of licensing actions required as a result of changes in possession limits of related materials. To assure that adequate safeguards be maintained within the framework of this more generalized approach, provisions for more stringent control, accountability, and leakage testing of byproduct, source and special nuclear materials are being included in the Technical Specifications for the facility.

NSP's letter of August 16, 1974, was submitted in response to our June 17, 1974 letter and later supplemented by NSP's July 1, 1975 submittal. Since the information necessary for our review has been filed, the NRC staff has elected to act thereon now in lieu of awaiting completion of consideration of the full-term operating license application.

The proposed Technical Specification changes have been reviewed by the NRC staff with particular attention to the Radioactive Materials Safety program. We evaluated the personnel qualifications, facilities, equipment, and procedures for handling byproduct, source, and special nuclear material, as described in the August 16, 1974 application and we conclude that they are consistent with the provisions of Regulatory Guide 1.70.3. Based on our review, we also conclude that the comprehensive testing and surveillance program, as established by the proposed Technical Specification changes, provides additional assurance that leakage from radioactive material sources will not exceed allowable limits.

We further conclude that the proposed license amendment incorporating provisions relating to leak testing of sealed sources, and their inventory, storage and disposal is acceptable in that it:

a. Complies with the guidance and intent of our letter of June 17, 1974.

b. Provides reasonable assurance that byproduct, source, and special nuclear material will be stored, used, and accounted for in a manner which meets the applicable radiation protection provisions of 10 CFR Parts 20, 30, 40, and 70.

The licensee's radiation protection program, as supplemented by the proposed Technical Specifications additions, has been evaluated. We have concluded that the incorporation of flexible yet controlled licensing provisions for the receipt, possession, and use of byproduct, source, and special nuclear material into the Provisional Operating License for Monticello Nuclear Generating Plant is acceptable. This amendment to the Provisional Operating License does not authorize an increase in the amount of special nuclear material as reactor fuel.

3. <u>Air Ejector Off-Gas System</u>

The Technical Specifications currently require that the air ejector monitor trip setting be less than the equivalent of the maximum permissible stack release rate based on a 30-minute decay period. The 30-minute decay criterion is valid only when the recombiner system is in the bypass mode and is overly restrictive when the recombiner system is in operation. When only the recombiner system is in operation, the decay period ranges from 2 to 10 hours; when the compressed storage tanks are available, the decay period is approximately 50 to 250 hours. Therefore, we conclude that the 30-minute decay criterion is applicable only when the recombiner system is isolated and should be increased to 120 minutes when the recombiner system is in use and that the proposed changes to specifications 3.2.D.1 and 3.2.D.4 to reflect the above rationale are acceptable.

Item No. 5 of the July 1 application proposes (1) revisions to Specifications 3.8.E.2, 3.8.E.3, 4.8.E.2 and 4.8.E.3, (2) incorporation of a new Figure 4.8.1, "Off-Gas Storage Tank Gross Activity Limits," and (3) revisions to 3/4.8.E Bases to reflect the changes in item (1). The changes in item (1) are discussed individually below.

a. Specification 3.8.E.2

At present this specification requires that hydrogen monitors located upstream of the recombiner be operable during power operation. The licensee's proposed change would revise this requirement to monitor the hydrogen concentration downstream of the recombiner. There are three hydrogen monitors located downstream of each recombiner which would alert the operator if the hydrogen concentration exceeded 1% and would automatically isolate the recombiner system if any two of the three monitors indicate a hydrogen concentration in excess of 2%, or if any monitor indicates a hydrogen concentration in excess of 4%. The principal purpose of the hydrogen monitors is to protect the compressed gas storage tanks from a hydrogen detonation since these tanks are not designed to withstand the internal pressure that would be developed by a hydrogen detonation. All piping, valves, instrumentation and components other than the compressed storage tank system are designed to withstand a hydrogen detonation. We conclude that the proposed revision regarding monitoring of hydrogen concentration downstream of the recombiner provides appropriate protection against hydrogen detonation of the compressed storage gas system and is acceptable.

b. Specification 3.8.E.3

This existing specification requires initiation of an orderly reactor shutdown if the hydrogen monitors located downstream of the recombiner are inoperable. As discussed in (a) above, these monitors provide for protection of the compressed gas storage system and need not be operable if the compressed gas storage system is inoperable or isolated. Therefore, we have concluded that the existing specification is overly restrictive and termination of flow to the compressed gas storage system in the event all hydrogen monitors are inoperable is an acceptable precaution and the reactor need not be shut down.

c. Specification 4.8.E.2

During startup testing of the augmented off-gas system, it was determined that the compressed gas storage tank radiation monitors did not meet the design objective of measuring the gross activity of the tank con*ents for the following reasons:

(1) The radiation monitors are exposed to "shine" from adjacent storage tanks which defeats the intended function of monitoring the gross activity of a specific tank.

(2) The individual monitors become saturated as a result of buildup of radioactive particulates such as Rb-88 and Cs-138 and do not respond to changes in the noble gas inventory of the tank.

In addition, grab samples of the tank inventory do not provide a representative sample due to stratification within the tank. The licensee's proposed revision includes monitoring the total system air inleakage and measuring the average air ejector noble gas release rate in conjunction with Figure 4.8.1. We have reviewed and evaluated the methodology used to develop Figure 4.8.1 and find it acceptable and conclude that this revision provides reasonable assurance that the technical specification limit of 22,000 Curie dose equivalent I-133 tank inventory is not exceeded and therefore is acceptable.

d. Specification 4.8.E.3

This existing specification requires sampling and analysis of the compressed gas storage tank contents in the event the tank radiati . monitor is inoperable. As discussed in (c) above, since a representative sample cannot be obtained and an alternate method of determining the tank content is available, we have concluded that deletion of this specification will not reduce the safety of operation and therefore is acceptable.

e. Figure 4.8.1 "Off-Gas Storage Tank Gross Activity"

This change consists of incorporating Figure 4.8.1 into the Technical Specifications which we found to be acceptable in (c) above.

f. Specification 3/4.8.E Bases

The Bases have been updated to reflect the above changes (a) through (e) inclusive.

4. Radioactive Iodine Limits

There have been on-going discussions between NRC and NSP with regard to the equation to be used to determine the maximum release rate of radioiodine 131 and the appropriate time when the equation would be incorporated into the Technical Specifications. We have concluded that the proposed equation conforms with Regulatory Guide 1.42 "Interim Licensing Policy on As Low As Practicable for Gaseous Radioiodine Releases from ght-Water-Cooled Nuclear Power Reactors" dated March, 1974, and the dispersion factors calculated by NRC. This change would become effective when modifications to the augmented off-gas system are complete and the system has been determined to be fully operational.

We have re-evaluated the critical pathway with regard to radioiodine release and concur with the licensee that the farm located 3700 meters from the site in the NNE sector constitutes the critical pathway. We conclude that the proposed changes are acceptable.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the changes does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: SEP 17 1975