January 16, 1984

Docket No. 50-263

Mr. D. M. Musolf
Nuclear Support Services Department
Northern States Power Company
414 Nicollet Mall - 8th Floor
Minneapolis, Minnesota 55401

Dear Mr. Musolf:

The Commission has issued the enclosed Amendment No. 20 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment consists of changes to the Technical Specifications in response to your September 30, 1982 application, as supplemented by letter dated November 4, 1983.

The revisions to the Technical Specifications allow the Source Range Monitors minimum count rate to fall below three counts per second, during full core discharge and subsequent reloading.

A copy of the Safety Evaluation is also enclosed.

Sincerely,

Original signed by/

Helen Nicolaras, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 20 to
   License No. DPR-22
2. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION:	Docket File	NRC PDR	LPDR	ORB#2 Reading	DEisenhut
SNorris	HNicolaras	OELD	SECY	LJHarmon	EJordan
JTaylor	TBarnhart-4	WJones	DBrinkman	ACRS-10	OPA-CMiles
RDiggs	NSIC	Gray	HDenton	Extra - 5	

DL:ORB#2	DL:ORB#2	DL:ORB#2	OELD	DL:AD:OR
SNorris	HNicolaras	DVassallo	Eschmann	GLainas
01/10/84	01/9/84	01/10/84	01/11/84	01/16/84

Mr. D. M. Musolf
Northern States Power Company
Monticello Nuclear Generating Plant

cc:

Gerald Charnoff, Esquire
Shaw, Pittman, Potts and
Trowbridge
1800 M Street, N. W.
Washington, D. C. 20036

U. S. Nuclear Regulatory Commission
Resident Inspector's Office
Box 1200
Monticello, Minnesota 55362

Plant Manager
Monticello Nuclear Generating Plant
Northern States Power Company
Monticello, Minnesota 55362

Russell J. Hatling
Minnesota Environmental Control
Citizens Association (MECCA)
Energy Task Force
144 Melbourne Avenue, S. E.
Minneapolis, Minnesota 55113

Executive Director
Minnesota Pollution Control Agency
1935 W. County Road B2
Roseville, Minnesota 55113

Mr. Steve Gadler
2120 Carter Avenue
St. Paul, Minnesota 55108

Mr. John W. Ferman, Ph.D.
Nuclear Engineer
Minnesota Pollution Control Agency
1935 W. County Road B2
Roseville, Minnesota 55113

Commissioner of Health
Minnesota Department of Health
717 Delaware Street, S. E.
Minneapolis, Minnesota 55440

Auditor
Wright County Board of Commissioners
Buffalo, Minnesota 55313

U. S. Environmental Protection
Agency
Region V Office
Regional Radiation Representative
230 South Dearborn Street
Chicago, Illinois 60604

James G. Keppler
Regional Administrator
Region III Office
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

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

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-263

MONTICELLO NUCLEAR GENERATING PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 20
License No. DPR-22

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Northern States Power Company (the licensee) dated September 30, 1982, as supplemented on November 4, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment. Paragraph 2.C.(2) of Facility Operating License No. DPR-22 is hereby amended to read as follows:

   2 Technical Specifications

   The Technical Specifications contained in Appendix A as revised through Amendment No. 20 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: January 16, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 20

FACILITY OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Insert
207	207
209	209

3.0 LIMITING CONDITIONS FOR OPERATION	4.0 SURVEILLANCE REQUIREMENTS
B. Core Monitoring During core alterations two SRM's shall be operable, one in and one adjacent to any core quadrant where fuel or control rods are being moved. For an SRM to be considered operable, the following conditions shall be satisfied: 1. The SRM shall be inserted to the normal operating level. (Use of special moveable, dunking type detectors during initial fuel loading and major core alterations is permissible as long as the detector is connected into the normal SRM circuit.) 2. The SRM shall have a minimum of 3 CPS with all rods fully inserted in the core except when both of the following conditions are fulfilled: a. No more than two fuel assemblies are present in the core quadrant associated with the SRM, b. While in core, these fuel assemblies are in locations adjacent to the SRM.	B. Core Monitoring Prior to making any alterations to the core, the SRM's shall be functionally tested and checked for neutron response. Thereafter, the SRM's will be checked daily for response.
C. Fuel Storage Pool Water Level Whenever irradiated fuel is stored in the fuel storage pool, the pool water level shall be maintained at a level of greater or equal to 33 feet.	C. Fuel Storage Pool Water Level Whenever irradiated fuel is stored in the fuel storage pool the pool level shall be recorded daily.
D. The reactor shall be shutdown for a minimum of 24 hours prior to movement of fuel within the reactor.	

Amendment No. 20

Bases:

A. Refueling Interlocks

During refueling operations, the reactivity potential of the core is being altered. It is necessary to require certain interlocks and restrict certain refueling procedures such that there is assurance that inadvertent criticality does not occur.

To minimize the possibility of loading fuel into a cell containing no control rod, it is required that all control rods are fully inserted when fuel is being loaded into the reactor core. This requirement assures that during refueling the refueling interlocks, as designed, will prevent inadvertent criticality. The core reactivity limitation of Specification 3.3 limits the core alterations to assure that the resulting core loading can be controlled with the reactivity control system and interlocks at any time during shutdown or the following operating cycle.

Addition of large amounts of reactivity to the core is prevented by operating procedures, which are in turn backed up by refueling interlocks on rod withdrawal and movement of the refueling platform. When the mode switch is in the "Refuel" position, interlocks prevent the refueling platform from being moved over the core if a control rod is withdrawn and fuel is on a hoist. Likewise, if the refueling platform is over the core with fuel on a hoist, control rod motion is blocked by the interlocks. With the mode switch in the refuel position only one control rod can be withdrawn.

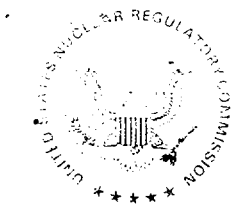
For a new core the dropping of a fuel assembly into a vacant fuel location adjacent to a withdrawn control rod does not result in an excursion or a critical configuration, thus adequate margin is provided.

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's, one in and one adjacent to any core quadrant where fuel or control rods are being moved, assures adequate monitoring of that quadrant during such alterations. Requiring a minimum of 3 counts per second whenever criticality is possible provides assurance that neutron flux is being monitored. Criticality is considered to be impossible if there are no more than two assemblies in a quadrant and if these are in locations adjacent to the SRM. In this case only, the SRM or dunking type detector count rate is permitted to be less than 3 counts per second.

C. Fuel Storage Pool Water Level

To assure that there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. The minimum water level of 33 feet is established because it would be a significant change from the normal level (37'9") and well above a level to assure adequate cooling.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 20 TO FACILITY OPERATING

LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 Introduction

By letter dated September 30, 1982, Northern States Power Company (the licensee) proposed changes to the Technical Specifications (TS) of Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The revisions to the Technical Specifications would allow the Source Range Monitors (SRM) minimum count rate to fall below three counts per second (cps), during full core discharge and subsequent reloading. The SRMs monitor the core during periods of station shutdown and guide the operator during refueling operations and station startup. Requiring a minimum of 3 cps whenever criticality is possible provides assurance that neutron flux is being monitored. The licensee has proposed this change to allow full unloading of the fuel from the core. In the process of removing all the fuel from the core, the count rate on the SRMs will drop below 3 cps, without supplemental neutron sources. The proposed amendment is supported by a September 30, 1982 letter from General Electric, the reactor vendor.

2.0 Evaluation

The proposed changes to the TS would allow the count rate in the SRM channels to drop below 3 counts per second (cps) when both of the following conditions are met:

1. No more than two fuel assemblies are present in the core quadrant associated with the SRM; and

2. While in the core, these fuel assemblies are in locations adjacent to the SRM.

The present TS require that a count rate of at least 3 cps be maintained whenever one or more fuel assemblies are present in the core.

During any core alteration, and especially during core loading, it is necessary to monitor flux levels. In this manner, even in the highly unlikely event of multiple operator errors, there is reasonable assurance that any approach to criticality would be detected in time to halt operations.

The minimum count rate requirement in the Technical Specifications accomplishes three safety functions: (1) it assures the presence of some neutrons in the core, (2) it provides assurance that the analog portion of the SRM channels is operable, and (3) it provides assurance that the SRM detectors are close enough to the array of fuel assemblies to monitor core flux levels.

Unloading and reloading of the entire core leads to some difficulty with this minimum count rate requirement. When only a small number of assemblies are present within the core, the SRM count rate will drop below the minimum due to the small number of neutrons being produced, and due to attenuation of these neutrons in the water and control blades separating the fuel from the SRM detectors. Past practice has been to connect temporary "dunking" chambers to the SRM channels in place of the normal detectors, and to locate these detectors near the fuel. Besides being operationally inconvenient, dunking chambers suffer from signal variations because of their lack of fixed geometry. Moreover, the use of dunking chambers increases the risk of loose objects being dropped into the vessel.

The staff has reviewed the licensee's application and the associated letter from General Electric. In a September 27, 1983 letter to the licensee, the staff requested additional information. In a November 4, 1983 letter, the licensee addressed the staff's concerns and provided information about the core and methods to be used in unloading and reloading the fuel into the core.

Subcriticality of the Intermediate Arrays

The proposed Technical Specification would allow a modified spiral unloading and loading of the core. However, the 3 cps will be maintained unless the two previously stated conditions are met. General Electric has done calculations that show that reactivity of the core decreases as each cell is removed. The particular analysis was done for another reactor. General Electric has stated that the analysis is applicable to Monticello.

Flux Monitoring
Minimum Flux in the Core

A multiplying medium with no neutrons present forms the basis for an accident scenario in which reactivity is gradually but inadvertently added until the medium is highly supercritical. No neutron flux will be evident since there are no neutrons present to be multiplied. The introduction of some neutrons at this point would cause the core to undergo a sudden power burst, rather than a gradual startup, with no warning from the nuclear instrumentation. This scenario is of great concern when loading fresh fuel, but is of lesser concern for exposed fuel. Exposed fuel continuously produces neutrons by spontaneous fission of certain plutonium isotopes, photofission and photo-disintegration of deuterium in the moderator. This neutron production in exposed fuel is normally great enough to meet the 3 cps minimum for a full

core after a refueling outage with the lumped neutron sources removed. There is assurance that a sufficient flux level will be present as long as some exposed fuel is present. The proposed Technical Specification would require that two diagonally adjacent fuel assemblies, be loaded into core positions next to each of the SRMs to provide a minimum of 3 cps before loading any other fuel. We therefore, find the proposed change to be acceptable from the point of view of minimum flux.

SRM Operability

The Technical Specifications normally require a functional check of the SRM channels, including a check of neutron response, before making any alteration to the core and daily thereafter. This would be sufficient for core unloading and reloading, except that the more extensive fuel handling operations involved imply a greater possibility of SRM failure. The licensee has committed to load two assemblies diagonally adjacent to each SRM location before loading any other fuel. This should bring the count rate up to 3 cps and thus continuously verify operability. We find this alternative to be acceptable.

Flux Attenuation

The four SRM detectors are located, one per quadrant, roughly half a core radius from the center. Although these are incore detectors and thus very sensitive when the reactor is fully loaded, they lose some of their effectiveness when the reactor is partially defueled and the detectors are located some distance from the array of remaining fuel. The unloading and loading pattern proposed by the licensee is a spiral unloading or loading centered around one of the SRMs. This approach will assure that there will be adequate detector sensitivity throughout core unloading and loading.

Summary

We have examined the safety issues and found the proposed changes to the Technical Specifications to be acceptable.

3.0 Environmental Considerations

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendment.

4.0 Conclusions

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Chatterton

Dated: January 16, 1984