

October 15, 1987

Docket No. 50-263

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Mr. D. M. Musolf, Manager
Nuclear Support Services
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

Dear Mr. Musolf:

Enclosed is a copy of the Environmental Assessment associated with your February 14, 1986 amendment application as supplemented August 26, 1987. The proposed amendment would extend the expiration date of Facility Operating License No. DPR-22 from June 19, 2007, to September 8, 2010 for the Monticello Nuclear Generating Plant.

A copy of the Notice of Issuance of Environmental Assessment and Finding of No Significant Impact, which will be published in the Federal Register, is also enclosed.

Sincerely,

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Dominic C. DiIanni, Project Manager
Project Directorate III-3
Division of Reactor Projects

Enclosures:
As stated

cc: See next page

Office: LA/PDIII-3
Surname: PKreutzer
Date: *10/2* /87

DCD
PM/PDIII-3
DDianni/tg
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RAB
OGC
R. Bachmann
10/16/87

DN
PD/PDIII-3
DWigginton
10/15/87

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PDR ADOCK 05000263
P PDR

Mr. D. M. Musolf
Northern States Power Company

Monticello Nuclear Generating Plant

cc:
Gerald Charnoff, Esquire
Shaw, Pittman, Potts and
Trowbridge
2300 N Street, NW
Washington, D. C. 20037

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

Dr. John W. Ferman
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155-3898

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

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

O. J. Arlien, Auditor
Wright County Board of
Commissioners
10 NW Second Street
Buffalo, Minnesota 55313



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

ENVIRONMENTAL ASSESSMENT
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO THE CHANGE IN EXPIRATION DATE OF
FACILITY OPERATING LICENSE NO. DPR-22
NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263

Date:

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1.0 INTRODUCTION

The United States Nuclear Regulatory Commission (the Commission or staff) is considering the issuance of a proposed amendment which would extend the expiration date of the operating license for Monticello Nuclear Generating Plant, Unit 1, from June 19, 2007, to September 8, 2010. The Monticello Nuclear Generating Plant, Unit 1, is operated by Northern States Power Company (the licensee or NSP) and is located in Wright County, Minnesota.

2.0 IDENTIFICATION OF THE PROPOSED ACTION

The current operating license expiration date is 40 years from the date of issuance of the Construction Permit (June 19, 1967). Because approximately 39 months were required to construct the facility to the point of fuel loading and startup testing, the effective period of the license is only 36 years and 9 months. Current NRC policy is to issue operating licenses for a 40-year period dated from the date of issuance. The licensee's application dated February 14, 1986 requested an extension of the expiration date of the operating license to September 8, 2010, 40 years from the issuance of the Provisional Operating License dated September 8, 1970.

3.0 THE NEED FOR THE PROPOSED ACTION

The granting of the proposed license amendment would allow the licensee to operate the Monticello Nuclear Generating Plant, Unit 1, for approximately 3 additional years beyond the currently-approved date.

4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

In November 1972, the Atomic Energy Commission issued the "Final Environmental Statement Related to the Operation of Monticello Nuclear Generating Plant" (FES).

The FES evaluates the environmental impact associated with the operation of Monticello. The Commission's staff has reviewed the FES to determine if any significant environmental impacts, other than those previously considered, would be associated with the proposed license extension.

4.1 Radiological Impacts - General Public

The staff has considered the radiological impacts expected as a result of a hypothetical, design-basis accident at the Monticello Nuclear Generating Plant and from normal plant operation, including the impact of revised population estimates.

In previous documents (Safety Evaluation Report (SER), Monticello Nuclear Generating Plant, March 1970, and Final Environmental Statement, November 1972) the staff evaluated the regional demography for Monticello and found the land area within a 10-mile radius to be predominantly rural. The population density for the 10-mile emergency planning zone has not changed significantly, based on 1980 census data. The area remains and is projected to remain predominantly rural. Based upon a comparison of population projections in the FES and the population trends and census data, the forecasts of population density have been consistent and generally conservative, and would appear to remain so throughout the period of extended operation to the year 2010.

The low population zone (LPZ) was established to be a 1-mile radius around the plant. The population of the LPZ was low when the operating license was granted, it presently remains low, and it is expected to remain low through the year 2010. The nearest population center with more than 25,000 people still remains St. Cloud (1980 population 42,600), 20 miles northwest of the site. Minneapolis-St. Paul (1980 population 2.4 million) is 30 miles southeast of the site. The 30-mile radius projections for the year 2000, as projected in the FES, remains at 3 million people.

Based on the population considerations, the exclusion area boundary, the LPZ, and the nearest population center distance would likely be unchanged from those used to license the plant. Therefore, the conclusion reached in the March 1970 SER that Monticello meets the requirements of 10 CFR Part 100 remains unchanged.

In addition, the staff concludes that a higher projected population for 2010 would not change the overall conclusions of the FES concerning radiological consequences following accidents.

Finally, the staff has assessed the public risks from reactor accidents per year of operation at other reactors of comparable design and power level (and larger). In all cases, the estimated reactor accident risks of early and latent cancer fatality per year of operation have been small compared to the background cancer fatality risks to which the public is exposed and did not increase with longer periods of operation. If similar risks were estimated for Monticello Nuclear Generating Plant, the staff would expect a similar comparison. Therefore, the staff concludes that the proposed additional years of operation would not increase the annual public risk from reactor accidents.

The staff has also evaluated the radiological environmental effects associated with normal operation of the facility. This evaluation was conducted to assure that the licensee's "as low as is reasonably achievable" (ALARA) measures and dose projections are applicable for the additional years of plant service and are in accordance with 10 CFR Part 20 and the guidance of Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low as is Reasonably Achievable" (Revision 3).

4.1.1 Environmental Impacts - General Public

In the FES, the staff calculated dose commitments to the human population residing around the Monticello Nuclear Generating Plant to assess the impact on people from radioactive material released from the reactor. The annual dose commitment was calculated to be the dose that would be received over a 50-year period following the intake of radioactivity for 1 year under the conditions that would exist 15 years after the plant began operation.

The 15-year operation was chosen as representing the midpoint of plant operation and was incorporated into the dose models by allowing for buildup

of long life radionuclides in the soil. The buildup factor mainly affects the estimated doses for long life radionuclides (i.e., half-lives greater than a few years) ingested by humans. For a plant licensed for 40 years, increasing the buildup period from 15 to 20 years would increase the dose from long life radionuclides via the ingestion pathways by less than one-third. The effect on dose from shorter-lived radionuclides would be much less. Radiological impact of routine plant operation is discussed in Section V.D of the Monticello FES (as modified by R.B Bevan, NRC Staff, during testimony to Atomic Safety and Licensing Board, November 24, 1974).

Individual doses reported in the FES using project plant radioactive effluent releases along with equivalent doses calculated as required by Appendix I for 1986 are reported by the licensee as follows:

<u>Dose Type and Pathway</u>	<u>FES Dose</u>	<u>1986 Actual Dose</u>
Total Body - All Liquid Pathways	0.5 mrem/year	0.0 mrem/year
Maximum Organ - All Liquid Pathways	0.3 mrem/year	0.0 mrem/year
Total Body - Gaseous Pathways at Site Boundary Continuous Occupancy	1.9 mrem/year	0.9 mrem/year (Est)
Skin - Gaseous Pathways at Site Boundary - Continuous Occupancy	3.9 mrem/year	2.0 mrem/year (Est)
Thyroid - Inhalation and Milk Pathways for Infant at Nearby Farm Continuous Occupancy	111 mrem/year	1.2 mrem/year

No routine liquid releases have been made from the Monticello plant for approximately 15 years. There have been a small number of very minor inadvertent liquid releases (e.g., broken hose). These events have been estimated to represent a downstream dose of less than one mrem.

The augmented offgas system discussed in the FES was installed at Monticello in 1976. The system has performed substantially better than assumed in the FES. Fuel integrity has also been substantially better than assumed in the FES. FES source term assumptions for gaseous effluents compared to actual 1986 releases are reported by NSP as follows:

<u>Source Term</u>	<u>FES Ci/Year</u>	<u>1986 Ci/Year</u>
Stack Noble Gas Release	1.10×10^5	1.76×10^3
*Building Vent Noble Gas Release	1.67×10^3	7.67×10^2
Stack I-131 Release	1.67×10^{-1}	1.59×10^{-2}
*Building Vent I-131 Release	5.79×10^{-1}	4.15×10^{-2}

*Reactor building vent release point includes reactor building and turbine building FES source terms.

Liquid and gaseous source terms are significantly lower than those assumed in the FES. Integrated population dose in the surrounding 50-mile region which results from plant operation will, therefore, be a small fraction of the population dose assumed in the FES and well below the Appendix I guidelines.

4.1.2 Environmental Impacts - Uranium Fuel Cycle

The impacts of the uranium fuel cycle are based on 30 years of operation of a model light water reactor (LWR). The fuel requirements of the model LWR were assumed to be 1 initial core load and 29 annual refuelings (approximately one-third core). The annual fuel requirement for the model LWR averaged out over a 40-year operating life (1 initial core and 39 refuelings of approximately one-third core) would be reduced slightly as compared to the annual fuel requirement averaged for a 30-year operating life. The net result would be approximately a 1.5% reduction in the annual fuel requirement for the model LWR. This small reduction in fuel requirements would not lead to significant changes in the impacts of the uranium fuel cycle when a 40-year period of operation is considered.

4.1.3 Environmental Impacts - Occupational Exposures

The staff has evaluated the licensee's dose assessment for the years 2007 to 2010 (the additional years during which Monticello would operate), and compared it with current Monticello and overall industry occupational dose experience.

The average annual dose for Monticello over the past 10 years covering 1977-1986 has been 741 person-rem as compared to a 1980-1986 industry average for BWR's of 981 person-rem. Special modification work in 1981, 1984, and 1986 related to feedwater nozzle safe end improvements, replacement of recirculation piping, and replacement of core spray piping, resulted in higher than normal exposures in those years. Adjusting for those 3 years lowers the average annual dose less than 490 person-rem.

Dose rates are expected to increase somewhat in the future as a result of higher radiation levels of corrosion films on reactor coolant system components and hydrogen water chemistry. Plant maintenance activities are also expected to increase. Dose rates could, however, be reduced through the use of state-of-the-art technologies, including some robotics, enhanced chemistry control and modern decontamination. The staff expects that increased doses from maintenance and corrosion product buildup will be offset by a continually improving ALARA program, dose-saving plant modifications and fewer major modifications.

One specific example of modifications made to reduce exposure are new inspection doors provided in the reactor biological shield for gaining access for inservice inspection. This modification was completed in 1984. The time spent in a high radiation area to prepare vessel nozzles for inspection has been significantly reduced.

Improvements in ALARA measures and a reduction in plant modification activities are expected to offset increased dose due to increased exposure levels and increased maintenance. An estimate of projected dose for the 2007-2010 time frame would put it at the 10-year average value of 741 person-rem per year.

The staff concludes that the licensee's occupational dose assessment is acceptable, and its radiation protection program is adequate to ensure that occupational radiation exposures will be maintained ALARA and in continued compliance with the requirements of 10 CFR Part 20.

4.1.4 Environmental Impacts - Transportation of Fuel and Waste

The staff reviewed the environmental impacts attributable to the transport of fuel and waste to and from the Monticello site. With respect to the normal conditions of transport and possible accidents in transportation, the staff concludes that the environmental impacts are bounded by those identified in Table S-4, "Environmental Impact of Transportation of Fuel and Waste To and From One Light Water-Cooled Nuclear Power Reactor" of 10 CFR Part 51.52. The bases for this conclusion are that: (1) Table S-4 is based on an annual refueling and an assumption of 60 spent-fuel shipments per reactor year. Presently, Monticello is on a 16-month refueling cycle which would require less than 20 spent fuel shipments per reactor year. Reducing the number of fuel shipments will reduce the overall impacts related to population exposure and accidents discussed in Table S-4; (2) Table S-4 represents the contribution of such transportation to annual radiation dose per reactor year to exposed transportation workers and to the general public. Presently, Monticello is authorized to slightly exceed the fuel enrichment and average fuel irradiation levels that are specified in 10 CFR 51.52(a)(2) and (3) as the bases for Table S-4. The radiation levels of the transport fuel casks are limited by the Department of Transportation and are not dependent on fuel enrichment and/or irradiation levels. Therefore, the estimated doses to exposed individuals per reactor year will not increase over those specified in Table S-4.

The annual radiation dose to individuals would not be changed by the extended period of operation. Although some integral risk with respect to normal conditions of transportation and possible accidents in transport would be attributed to the additional years of operation, the integral risk would not be significant because the annual risk for such transportation is small. The Monticello spent fuel storage pool has been reracked to maximum capacity. The pool has a total storage capacity of 2237 assemblies. The current number of assemblies in storage is 198. Spent fuel provided under contract by General Electric for approximately the first 10 years of plant operation (1,058 assemblies) has been shipped to the General Electric storage facility at Morris, Illinois. Approximately 30 rail shipments were required over about a 2-1/2 year period with the final shipment being made early in 1986.

There are 484 fuel assemblies in the Monticello core. Approximately one-fourth of the assemblies are removed at the end of each cycle (approximately 14 months long). The 2004 outage will be the last refueling that can accommodate a full core discharge in the spent fuel pool. The 2010 refueling will be the last refueling that can take place if full core discharge capability is not required.

4.2 Nonradiological Impacts

Reexamination of the staff's FES of November 1972 reveals that the assessments of nonradiological impacts were based on several considerations depending on the type of impact being addressed. For some types of impact, the assessments

were based on a fixed life-of-plant; for other types, the assessments were based on plant design features, on relative loss of renewable resources, or on relative loss or degradation of available habitat.

A number of plant modifications have been made since the FES was issued. These modifications tend to improve plant reliability, and it has been shown that the environmental impact has been minimal. The plant modifications are described in the Updated Safety Analysis Report, which is revised annually. In addition, the 40-year plant operating life is considered part of the design and construction of the modifications. Components associated with the modifications that are expected to wear out during plant life are subjected to a surveillance and maintenance program so that component degradation will be identified and corrected. Extending the operating life as proposed by the licensee will have no detectable environmental impact resulting from the plant modifications.

All potential impacts have been identified, described, and evaluated in previously issued environmental impact statements and/or appraisals by the NRC and reviews by the National Pollutant Discharge Elimination System (NPDES) permitting authority under the Clean Water Act. All operational nonradiological impacts on biological resources have been assessed by the staff on bases other than life-of-plant. The staff concludes that the proposed extension would not cause a significant increase in the impacts to the environment and would not change any conclusions reached by the Commission in the FES.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

The principal alternative to issuance of the proposed license extension would be to deny the application. In this case, Monticello would shut down upon expiration of the present operating license.

In Chapter XII of the FES, a cost-benefit analysis is presented for Monticello. Included in the analysis is comparison among various options for producing an equivalent electrical power capacity. Even considering significant changes in the economics of the alternatives, operation of Monticello for an additional 3 years would require only incremental yearly costs. These costs would be substantially less than the purchase of replacement power or the installation of new electrical generating capacity. Moreover, the overall costs per year of the facility would decrease since the large initial capital outlay would be averaged over a greater number of years. In summary, the cost-benefit advantage of Monticello compared to alternative electrical power generating capacity improves with the extended plant lifetime.

6.0 ALTERNATIVE USE OF RESOURCES

This action does not involve the use of resources not previously considered in connection with the "Final Environmental Statement Related to Operation of Monticello Nuclear Generating Plant" dated November 1972.

7.0 AGENCIES AND PERSONS CONSULTED

The Commission's staff reviewed the licensee's request and did not consult other agencies or persons.

8.0 BASIS AND CONCLUSION FOR NOT PREPARING AN ENVIRONMENTAL IMPACT STATEMENT

The staff has reviewed the proposed license amendment relative to the requirements set forth in 10 CFR Part 51. Based on this assessment, the staff concludes that there are no significant radiological or nonradiological impacts associated with the proposed action and that the issuance of the proposed amendment will have no significant effect on the quality of the human environment. Therefore, pursuant to 10 CFR 51.31, an environmental impact statement need not be prepared for this action.

Dated at Bethesda, Maryland this day of , 1987.

FOR THE NUCLEAR REGULATORY COMMISSION



David L. Wigginton, Acting Director
Project Directorate III-3
Division of Reactor Projects

UNITED STATES NUCLEAR REGULATORY COMMISSION
NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263
NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. DPR-22, issued to Northern States Power Company (the licensee), for operation of the Monticello Nuclear Generating Plant, located in Wright County, Minnesota.

Identification of Proposed Action:

The amendment would consist of a change to the operating license to extend the expiration date of the operating license for Monticello Nuclear Generating Plant from June 19, 2007 to September 8, 2010. The license amendment is responsive to the licensee's application dated February 14, 1986, as supplemented on August 26, 1987. The Commission's staff has prepared an environmental assessment of the proposed action, "Environmental Assessment by the Office of Nuclear Reactor Regulation Relating to the Change in Expiration Date of Facility Operating License No. DPR-22, Monticello Nuclear Generating Plant, Docket No. 50-263," dated October 1987.

Summary of Environmental Assessment:

The Commission's staff has reviewed the potential environmental impact of the proposed change in the expiration date of the operating license for Monticello Nuclear Generating Plant. This evaluation considered the previous environmental studies, including the "Final Environmental Statement Related to

Operation of Monticello Nuclear Generating Plant," (FES) November 1972, and more recent NRC policy.

Radiological Impacts

Based on the 1980 census, the population within 10 miles of the plant has not changed significantly over what was forecast in the FES. The actual permanent population within the low population boundary (a 1-mile radius) was 8 in 1970, 24 in 1986 and is estimated not to change significantly in 2010. The staff concludes that the Low Population Zone and the nearest population center distances will likely be unchanged from those used for licensing the unit. Therefore, the conclusion reached in the staff's Safety Evaluation in 1970 that Monticello Nuclear Generating Plant meets the requirements of 10 CFR Part 100 remains unchanged.

Station radiological effluents released to unrestricted areas during normal operation have been well within Commission regulations regarding as-low-as-is-reasonably-achievable (ALARA) limits, and are indicative of future releases. In addition, the proposed additional years of reactor operation do not increase the annual public risk from reactor operation. Thus, environmental impact findings in the FES are not changed.

With regard to normal plant operation, the licensee complies with Commission guidance and requirements for keeping radiation exposures "as low as is reasonably achievable" (ALARA) for occupational exposures and for radioactivity in effluents. The licensee would continue to comply with these requirements during any additional years of facility operation and also apply advanced technology

when available and appropriate. Accordingly, radiological impacts on man, both onsite and offsite, are not significantly more severe than previously estimated in the FES and our previous cost-benefit conclusions remain valid.

The environmental impacts attributable to transportation of fuel and waste to and from the Monticello Nuclear Generating Plant, with respect to normal conditions of transport and possible accidents in transport, would be bounded as set forth in Summary Table S-4 of 10 CFR 51.52, and the values in Table S-4 would continue to represent the contribution of transportation to the environmental costs associated with the reactor.

Nonradiological Impacts

The Commission has concluded that the proposed extension will not cause a significant increase in the impacts to the environment and will not change any conclusions reached by the Commission in the FES.

FINDING OF NO SIGNIFICANT IMPACT:

The Commission's staff has reviewed the proposed change to the expiration date of the Monticello Nuclear Generating Plant operating license relative to the requirements set forth in 10 CFR Part 51. Based upon the environmental assessment, the staff concluded that there are no significant radiological or nonradiological impacts associated with the proposed action and that the proposed license amendment will not have a significant effect on the quality of the human environment. Therefore, the Commission has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement for the proposed amendment.

For further details with respect to this action, see (1) the application for amendment dated February 14, 1986, as supplemented August 26, 1987, (2) the Final Environmental Statement Related to Operation of Monticello Nuclear Generating Plant, issued November 1972, and (3) the Environmental Assessment dated October 1987. These documents are available for public inspection at the Commission's Public Document Room, 1717 H Street, Washington, D.C., 20555 and in the local public document room located at Minneapolis Public Library, Technology and Science Department, 300 Nicollet Mall, Minneapolis, Minnesota 55401.

Dated at Bethesda, Maryland, this day of October, 1987.

FOR THE NUCLEAR REGULATORY COMMISSION



David L. Wigginton, Acting Director
Project Directorate III-3
Division of Reactor Projects