

UTILITY Northern States Power Co.

SITE Monticello

ENCLOSURES answers to questions

- attachment 1) MSP Environmental Monitoring
- & Ecological Studies Program 1989 Annual Report
- 2) Water Monitoring Summary
- 1987 Annual Report
- 3) Tables
- 4) Creel Survey 1982 Annual Report
- 5) 316(a) Type I Demonstration
- _____
- _____

RESPONSE TO QUESTIONNAIRE TO SUPPORT
PART 51 RULE CHANGE

MONTICELLO NUCLEAR GENERATING PLANT

Note: Monticello Nuclear Generating Plant is a one-unit boiling water reactor located on the Mississippi River.

WASTE MANAGEMENT QUESTIONS

A. Spent fuel questions:

1. Which of the following current techniques for at-reactor storage are you using and how?
 - A. Reracking of spent fuel
 - B. Control rod repositioning
 - C. Above ground dry storage
 - D. Longer fuel burnup
 - E. Other (please identify).

ANSWER: A. Monticello is reracked to the maximum extent possible. The plant expects current storage space to be adequate until the year 2005.
D. The fuel cycle is managed to between 13 and 17 months for maximum economy and coordination with the company's other nuclear plants.

2. Do you plan on continuing the use of these current techniques for at-reactor storage of spent fuel during the remaining time of your operating license or do you expect to change or modify them in some way?

ANSWER: The plant expects to continue using the current techniques until approximately 2005.

3. Which of the following techniques for at-reactor storage do you anticipate using until off-site spent fuel storage becomes available and how?

- A. Reracking of spent fuel
- B. Control rod repositioning
- C. Above ground dry storage
- D. Longer fuel burnup
- E. Other (please identify)

ANSWER: Reracking of spent fuel (A) and longer fuel burnup (D) will be used. The spent fuel pool is already reracked to the maximum extent possible and the fuel cycle will continue to be managed.

4. Will the techniques described above be adequate for continued at-reactor storage of spent fuel for the operating lifetime of the plant, including a 20-year period of license renewal, or are you developing other plans?

ANSWER: It is anticipated that dry cask storage may be added to handle storage of spent fuel if and as necessary to support operation during the license renewal period.

5. Do you anticipate the need to acquire additional land for the storage of spent-fuel for the operating lifetime of the plant, including a 20-year period of license renewal? If so, how much land? When would this acquisition occur? Where?

ANSWER: No acquisition of additional land is anticipated.

6. Do you anticipate any additional construction activity on-site, or immediately adjacent to the power plant site, associated with the continued at-reactor storage of spent fuel for the operating lifetime of the plant, including a 20-year period of license renewal?

ANSWER: Yes, additional construction is anticipated.

7. If you answered yes to question 6, briefly describe this construction activity.

ANSWER: Additional construction may involve building an above ground dry storage facility.

B. Low-level radioactive waste (LLRW) management questions:

1. Under the current scheme for LLRW disposal (i.e. LLRW Policy Amendments Act of 1985 and regional compacts) is there currently or will sufficient capacity for wastes generated during the license renewal period be available to your plant(s)? If so, what is the basis for this conclusion?

ANSWER: Monticello expects the three operating LLRW disposal facilities to remain available for disposal through 1992. Beginning in 1993, Monticello plans to store its LLRW on site for approximately three years. Michigan, the first host state for the Midwest Compact, plans to begin operation of its disposal facility in 1996. Michigan will operate its facility for 20 years, after which another midwest state will be chosen to host another facility.

2. If for any reason your plant(s) is/are denied access to a licensed disposal site for a short period of time, what plans do you have for continued LLRW disposal?

ANSWER: If denied access, Monticello plans to store its LLRW on site until a disposal facility is available.

3. In a couple of pages, please describe the specific methods of LLRW management currently utilized by your plant. What percentage of your current LLRW (by volume) is managed by:
- A. Waste compaction?
 - B. Waste segregation?
 - C. Decontamination of wastes?
 - D. Sorting of waste prior to shipment?
 - E. Other

ANSWER:

- A. Compaction-75% Most dry active waste is compacted using a stock barrel compactor or a box compactor.
- B. Segregation-0% Packaging and other non-essential material is removed or segregated before it enters contaminated areas.
- C. Decontamination-5% Essentially all LLRW that will be decontaminated is sent off site to a decontamination vendor.
- D. Sorting-0%
- E. Other-20% The resins are dewatered to aid in disposal.

4. In a couple of pages, please describe the anticipated plans for LLRW management to be utilized by your plant(s) during the remainder of the operating license and through the license renewal term. What percentage of your anticipated waste (by volume) will be managed by:
- A. Waste compaction?
 - B. Waste segregation?
 - C. Decontamination of wastes?
 - D. Sorting of waste prior to shipment?
 - E. Other

ANSWER:

- A. Waste compaction-50 to 60% Off-site incineration may be used which would reduce the compaction volume and the total LLRW volume.
- B. Waste segregation-0%
- C. Decontamination-5%
- D. Sorting-0%
- E. Other-30% The resins volume (which will remain the same) will be correspondingly a larger percentage of the total volume because of the decrease caused by the incineration.

5. Do you anticipate the need to acquire additional land for the storage of LLRW for the operating lifetime of the plant, including a 20-year period of license renewal? If so, how much land? When would this acquisition occur? Where?

ANSWER: No additional land acquisition is anticipated to store LLRW for the operating lifetime of the plant.

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6. To provide information on the timing of future low-level waste streams, if you answered yes to question #9, over what periods of time are these activities contemplated?

ANSWER: Not applicable

7. Do you anticipate any additional construction activity, on-site, or immediately adjacent to the power plant site, associated with temporary LLRW storage for the operating lifetime of the plant, including a 20-year period of license renewal?

ANSWER: Depending on the length of storage, Monticello may have to build a shielded structure for its highly radioactive components (i.e., control rod blades).

8. If you answered yes to question 7, briefly describe this construction activity.

ANSWER: The material described in question 7 would probably be stored in casks.

9. To provide information on future low-level waste streams which may effect workforce levels, exposure, and waste compact planning, do you anticipate any major plant modifications or refurbishment that are likely to generate unusual volumes of low-level radioactive waste prior to, or during, the relicensing period for the plant? If so, please describe these activities. Also, what types of modifications do you anticipate to be necessary to achieve license renewal operation through a 20-year license renewal term?

ANSWER: No major plant modifications are seen as hinging on license renewal. Replacement of components will be carried out as the need is identified as is the usual action at Monticello.

AQUATIC RESOURCE QUESTIONS

1. Post-licensing modifications and/or changes in operations of intake and/or discharge systems may have altered the effects of the power plant on aquatic resources, or may have been made specifically to mitigate impacts that were not anticipated in the design of the plant. Describe any such modifications and/or operational changes to the condenser cooling water intake and discharge systems since the issuance of the operating license.

ANSWER: In 1980, an overflow weir structure (fish barrier) was installed at the end of the discharge canal. The structure consists of an earthfill dike with a vertical sheet-pile overflow section. It permits normal overflow of cooling water and inhibits fish from entering the canal where they could be subjected to cold shock during rapid plant shutdown. The number and magnitude of fish kills has decreased substantially since the canal was closed off.

2. Summarize and describe (or provide documentation of) any known impacts on aquatic resources (e.g., fish kills, violations of discharge permit conditions) or National Pollutant Discharge Elimination System (NPDES) enforcement actions that have occurred since issuance of the Operating License. How have these been resolved or changed over time?

ANSWER: The following is a list of the number of fish lost in fish kills and the date of their occurrence.

<u>DATE</u>	<u>NUMBER OF FISH</u>
1/08/75	63
2/19/76	28
10/17/76	90
11/15/76	150
2/23/77	700
12/15/77	176
7/20/77	unavailable
2/14/79	13
2/24/81	10
1/09/87	43
12/22/88	320

The NPDES permit violations occur periodically due to equipment failure or operator error. Examples of violations include elevated turbidity and most commonly exceeding the halogen limit. Equipment and procedural changes are usually recommended as responses to the violations.

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3. Changes to the NPDES permit during operation of the plant could indicate whether water quality parameters were determined to have no significant impacts (and were dropped from monitoring requirements) or were subsequently raised as a water quality issue. Provide a brief summary of changes (and when they occurred) to the NPDES permit for the plant since issuance of the Operating License.

ANSWER: On May 23, 1985, the Minnesota Pollution Control Agency (MPCA) concurred with changes to the Monticello environmental monitoring program. The changes were:

1. Elimination of the creel census at Monticello.
2. Elimination of terrestrial vegetation and avian population inventories.
3. Expansion of the aquatic bioaccumulation study.

The creel census provided somewhat auxiliary information on the fish population and there were several years worth of data available. The terrestrial vegetation and avian studies did not show any trends due to the Monticello Nuclear Plant influence. The bioaccumulation studies appeared to be a more timely and important issue in 1985.

In March of 1988, the MPCA approved the termination of the annual Chemical and Physical (temperature monitoring) Water Monitoring Studies at the Monticello plant. The MPCA determined that after 20 years, the chemical and thermal analyses had demonstrated that the only parameter showing a continuous long term variation between ambient and affected waters was the temperature, which was within the NPDES permit limitations. Routine NPDES water monitoring is conducted by the plant chemistry laboratory and continues as a permit requirement.

4. An examination of trends in the effects on aquatic resources monitoring can indicate whether impacts have increased, decreased, or remained relatively stable during operation. Describe and summarize (or provide documentation of) results of monitoring of water quality and aquatic biota (e.g. related to NPDES permits, Environmental Technical Specifications, site-specific monitoring required by federal or state agencies). What trends are apparent over time?

ANSWER: Environmental monitoring programs have determined that there were no long-term detrimental trends to aquatic resources at the Monticello plant site. Thermal input is the only demonstrated effect on the river system and it has remained within permit limits. Water quality monitoring under the environmental program has been eliminated, but the Monticello plant continues to do routine NPDES water quality monitoring as required.

Attachment 1 is a copy of the 1989 Environmental Monitoring and Ecological Studies Program for Monticello.

Attachment 2 is copies of sections of previous years of the Monticello Nuclear Generating Plant Environmental Monitoring Program Annual Reports. These sections summarize the various monitoring programs conducted at the plant in the past. The most recent version of each study has been included. Sections pertaining to monitoring programs that have been eliminated were summarized in the final year of inclusion in the report.

5. Summarize types and numbers (or provide documentation) of organisms entrained and impinged by the condenser cooling water system since issuance of the Operating License. Describe any seasonal patterns associated with entrainment and impingement. How has entrainment and impingement changed over time?

ANSWER: Entrainment and impingement at the Monticello plant were not deemed to be significant by the 316(b) studies so these parameters have not been monitored since the 316(b) studies were completed. Attachment 3 is data from the 316(b) Demonstration report and the Annual Environmental Monitoring Reports that discuss the issue of entrainment and impingement.

6. Aquatic habitat enhancement or restoration efforts (e.g., anadromous fish runs) during operation may have enhanced the biological communities in the vicinity of the plant. Alternatively, degradation of habitat or water quality may have resulted in loss of biological resources near the site. Describe any changes to aquatic habitats (both enhancement and degradation) in the vicinity of the power plant since the issuance of the Operating License including those that may have resulted in different plant impacts than those initially predicted.

ANSWER: The only change to or enhancement of fishery habitat was the discharge canal modification described in question 1 of this section. The modification reduced the number of fish susceptible to cold shock by closing off the discharge canal to access by fish from the river. No specific aquatic habitat enhancement or restoration efforts have been made at the Monticello plant.

7. Plant operations may have had positive, negative, or no impact on the use of aquatic resources by others. Describe (or provide documentation for) other nearby uses of waters affected by cooling water systems (e.g., swimming, boating, annual harvest by commercial and recreational fisheries) and how these impacts have changed since issuance of the Operating License.

ANSWER: The area directly below the discharge canal outlet is open to the public for fishing and is available year round because of the warm water discharge. The warm water attracts fish during the cold

seasons making this a popular spot for sport bank and boat fishing. The Minnesota Department of Natural Resources has established special harvest limits to protect some species from over exploitation on this reach of the Mississippi River. Attachment 4 is a copy of the last Creel Survey report from Monticello.

8. Describe other sources of impacts on aquatic resources (e.g., industrial discharges, other power plants, agricultural runoff) that could contribute to cumulative impacts. What are the relative contributions by percent of these sources, including the contributions due to the power plant, to overall water quality degradation and losses of aquatic biota?

ANSWER: The nearest large city to the Monticello Plant is St. Cloud (population approximately 50,000) which is located 20 miles upstream. Monticello, a smaller community of approximately 7000 people, is located 10 miles downstream. Both municipalities have modern waste water treatment plants that discharge to the Mississippi river. A paper mill in Sartell, just north of St. Cloud, operates a small hydroelectric plant and uses river water in the paper making process but also has water treatment facilities. Northern States Power operates the SHERCO Generating complex about 5 miles upstream of the Monticello Nuclear Plant. This three-unit fossil fuel electric generating station has a closed cycle cooling system and withdraws an average of 50 cfs and discharges 35 to 40 cfs of river water, concentrated 7 to 10 times normal. The surrounding area is primarily agricultural which is likely to be responsible for the chemical input to the river in the form of water and wind induced erosion. The percents are not quantifiable.

The only input to the Mississippi river from the Monticello Nuclear Generating Plant is heat which has been demonstrated to have negligible effect on the river except to reduce ice cover in the winter and seasonally attract or repel fish. Water quality is not degraded by the plant nor has fishery habitat been lost.

9. Provide a copy of your Section 316(a) and (b) Demonstration Report required by the Clean Water Act. What Section 316(a) and (b) determinations have been made by the regulatory authorities?

ANSWER: The 316(a) and (b) Demonstration Report was partially responsible for the discharge canal modification (see question 1) done at the Monticello Plant. Attachment 5 includes copies of the Table of Contents and Summary and Impacts Sections of the 316 studies. The reports are too extensive to facilitate providing complete copies. Selected sections of the reports can be supplied if required.

SOCIOECONOMIC QUESTIONS

1. To understand the importance of the plant and the degree of its socioeconomic impacts on the local region, estimate the number of permanent workers on-site for the most recent year for which data are available.

ANSWER: Permanent staff on-site 1989 360 workers
Staff at nearby (but offsite)
training center 38 workers

2. To understand the importance of the plant to the local region, and how that has changed over time, estimate the average number of permanent workers on site, in five-year increments starting with the issuance of the plant's Operating License. If possible, provide this information for each unit at a plant site.

ANSWER: The numbers given include security staff which are contracted employees, but are always required to be onsite by the plant. Listed as a separate category are the employees of the training center. The center is not directly onsite but within the area of the plant and affects the local region.

1971	120 employees onsite
1976	140 employees onsite
1981	220 employees onsite
	8 employees training center
1986	355 employees onsite
	32 employees training center

3. To understand the potential impact of continued operation for an additional 20 years beyond the original licensing term, please provide for the following three cases:
A) a typical planned outage;
B) an ISI outage; and
C) the largest single outage (in terms of the number of workers involved) that has occurred to date
an estimate of additional workers involved (for the entire outage and for each principal task), length of outage, months and year in which work occurred, and cost. Also, estimate occupational doses received by permanent and temporary workers during each principal task.

ANSWER: Monticello has not developed a pattern of typical outages, but the 1986 outage was selected as an example. The plant also does not have separate ISI outages. A portion of the ISI work is done each refueling outage.

A) A typical planned outage
Additional workers 300 (not able to break down per task)
Length of outage 76 days
Months and year of outage April 30 to July 15, 1986

Cost--The estimated cost given does not include: (a) replacement energy (b) normal base load operating cost (such as permanent employees salaries) (c) Non-recurring items, (d) costs associated with fuel cycle design and analysis and (e) fuel cost. It does include (a) radwaste (b) plant labor and NSP support groups (c) consulting and service contracts and (d) percentage of capital costs.

Approximate Cost of 1986 outage \$21,400,000

Doses--The following are the estimates of the occupational doses received by permanent and temporary employees during the work on each 1986 outage principal task.

Automatic Shutdown System modification	3 man-rem
Reactor level modification	5 man-rem
Replacement of core spray piping	96 man-rem
Seismic review program	30 man-rem
Painting of the torus	10 man-rem
Inservice Inspection	11 man-rem
Refueling	27 man-rem

C) The largest single outage
Additional workers 400 (not able to break down per task)
Length of outage 350 days
Months and year of outage 2/2/84 through 1/17/85

Cost--The estimated cost given does not include: (a) replacement energy (b) normal base load operating cost (such as permanent employees salaries) (c) Non-recurring items, (d) costs associated with fuel cycle design and analysis and (e) fuel cost. It does include (a) radwaste (b) plant labor and NSP support groups (c) consulting and service contracts and (d) percentage of capital costs.

Approximate cost of 1984 outage \$87,500,000

Doses--The estimates of the occupational doses received during the work on the major projects during the 1984 outage are:

Recirculation pipe replacement	1583 man-rem
Condenser retube	5 man-rem
Reactor Water Cleanup heat exchanger modification	69 man-rem
Inservice Inspection work	19 man-rem
Refueling	11 man-rem

4. To understand the plant's fiscal importance to specific jurisdictions, for 1980, 1985, and the latest year for which data are available, estimate the entire plant's taxable assessed value and the amount of taxes paid to the state and to each local taxing jurisdiction.

Distribution of Tax	1980	1985	1990
Market Value	\$ 81,424,761	\$167,935,000	\$251,098,300
City	650,261	1,151,243	2,056,651
County	823,354	1,202,785	2,792,939
School District 882	1,324,693	2,422,405	5,191,625
Hospital	0	182,867	357,408
Total	\$ 2,798,308	\$ 4,959,300	\$ 10,398,623