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ENCLOSURES:
Proposed Enviro Tech Specs for Appendix B, dtd & notarized 10-29-73.

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PLANT NAME: Monticello

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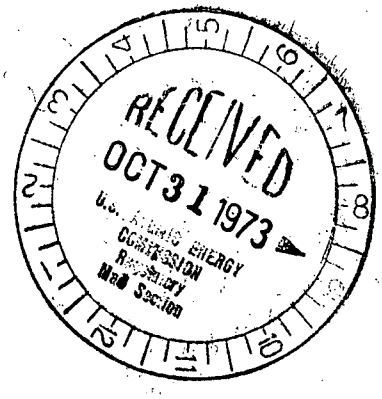
Regulatory File

NSP

NORTHERN STATES POWER COMPANY

MINNEAPOLIS, MINNESOTA 55401

October 29, 1973



Mr. J F O'Leary, Director
Directorate of Licensing
Office of Regulation
U S Atomic Energy Commission
Washington, D C 20545

Dear Mr. O'Leary:

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Submittal of Proposed Environmental
Technical Specifications for Appendix B

A letter dated July 10, 1973 from Mr. Daniel R Muller of the AEC Directorate of Licensing to Mr. A V Dienhart of Northern States Power Company requested that we prepare and submit, to the Directorate of Licensing, proposed environmental technical specifications for the Monticello Nuclear Generating Plant. Attached are three signed originals and 40 conformed copies of the information requested.

If, during your evaluation and development of the environmental technical specifications, you wish further information or discussions on the scope of the proposed technical specifications, we will arrange for appropriate NSP personnel to meet with AEC Directorate of Licensing representatives.

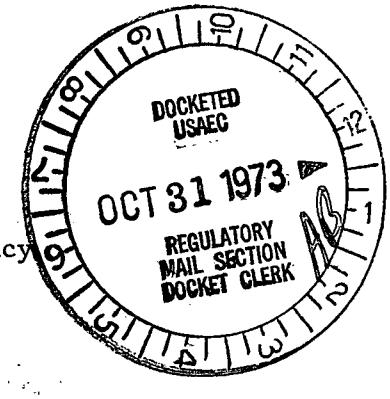
Yours very truly,

L. O. Mayer

L O Mayer, PE
Director of Nuclear Support Services

LOM/br

cc: J G Keppler
G Charnoff
Minnesota Pollution Control Agency



7932

UNITED STATES ATOMIC ENERGY COMMISSION

NORTHERN STATES POWER COMPANY

Monticello Nuclear Generating Plant Docket No. 50-263

SUBMITTAL OF PROPOSED
ENVIRONMENTAL TECHNICAL SPECIFICATIONS
FOR APPENDIX B

PROVISIONAL OPERATING LICENSE NO. DPR-22

(Submittal Dated October 29, 1973)

Northern States Power Company, a Minnesota corporation, herein submits proposed environmental technical specifications for Appendix B of Provisional Operating License No. DPR-22. Exhibit A attached contains the proposed technical specifications.

This request contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By A V Dienhart

A V Dienhart
Vice President - Engineering

On this 29 day of October, 1973, before me a notary public in and for said County, personally appeared A V Dienhart, Vice President - Engineering, and being first duly sworn acknowledged that he is authorized to execute this document in behalf of Northern States Power Company, that he knows the contents thereof and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

John J Smith

John J Smith
Notary Public, Hennepin County, Minnesota

JOHN J. SMITH
Notary Public, Hennepin County, Minnesota
My Commission Expires March 3, 1976

PROPOSED APPENDIX B

ENVIRONMENTAL TECHNICAL SPECIFICATIONS
FOR
MONTICELLO NUCLEAR GENERATING PLANT
NORTHERN STATES POWER COMPANY

1.0 DEFINITIONS

A. Onsite: Any area included within NSP owned property as indicated on Figure 1.0-1.

B. Offsite: All other properties or areas not considered onsite.

C. Discharge Canal: That portion of the plant facilities starting at the cooling tower pump house and extending to its intersection with the river's edge (See Figure 1.0-2).

D. Point of Discharge: End of the discharge canal at the river's shoreline.

E. Ambient River Temperature: The temperature of the river water flowing into the plant intake unaffected by heat discharge from the plant.

F. Environmental Event: Exceeding a protection condition.

G. Protection Conditions: The quantitative specifications as found in Section TS B-2.0.

H. Week: A calendar period commencing on Sunday and extending through the following Saturday.

I. Month: Each of the twelve calendar periods designated as January, February, March, April, May, June, July, August, September, October, November, or December.

J. Year: The calendar period commencing on January 1 and extending through December 31.

2.0 PROTECTION CONDITIONS

2.1 Thermal

2.1.1 Maximum Change in Temperature (delta T) Across the Condenser

Objective: To reduce possible entrainment loss by limiting the delta T across the inlet and outlet of the condenser.

Specification: During any consecutive seven-day period the arithmetic mean delta T shall not exceed the limits of Table 2.1.1-1.

Table 2.1.1-1

Calendar Period	Maximum delta T
April 1 - October 31	35°F
November 1 - March 31	43°F

Basis: Mortality of entrained organisms is dependent on the upper incipient lethal temperature. For the period April through October, the delta T of 35°F should provide sufficient protection. The period November through March represents low ambient temperature during which corresponding higher temperatures can be tolerated for short-term durations.

2.1.2 Maximum Receiving Water Temperature

Objective: To limit the maximum Mississippi River temperature downstream of the point of discharge.

Specification: The maximum temperature of the river as a result of plant operation, shall not exceed 90°F over more than one-half the surface width of the river.

Basis: The environmental analysis as found in the Final Environmental Statement (FES) related to operation of Monticello Nuclear Generating Plant, Northern States Power Company, November 1972, published by USAEC Directorate of Licensing, has determined that the protection condition is sufficient for protection of the environment.

2.1.3 Rate of Change of Discharge Temperature

Objective: To limit the rate of temperature decrease for protection of fish in the discharge canal during scheduled reductions in power during the months of October through April.

Specification: For the months of October through April, the rate of temperature decrease shall not exceed 5°F per hour at the point of discharge during scheduled power decreases of 15% or more. This specification does not apply to emergency shutdown, testing procedures, or initiation of cooling tower operation.

Basis: A fish kill due to cold shock during plant reductions in power is most likely in the wintertime. The protection condition is sufficient to protect the natural fish populations from cold shock during normal power operation.

2.2 Hydraulic

2.2.1 Flow Rate Restrictions

Objective: To limit the amount of water appropriated.

Specification: Whenever the river flow at the plant is less than 860 cfs but greater than 240 cfs, the maximum allowable appropriation from the river shall not exceed 75% of the river flow at the intake. During river flows above 860 cfs the plant shall withdraw no more than 645 cfs.

Basis: The Mississippi River at Monticello experiences a high variation in flow rates. The specification allows for plant flow rates in proportion to river flow such that the present quality of the river's biota is maintained.

2.3 Chemical

2.3.1 Chlorine

Objective: To regulate the use of chlorine for cleaning of the condenser and service water system.

Specification: During chlorination periods the free chlorine residual at the point of discharge to the river shall not exceed a concentration of 0.05 ppm for more than two hours per day or 0.1 ppm for more than 30 minutes per day. If continuous chlorination is utilized, the free chlorine residual at the point of discharge shall not exceed 0.002 ppm.

Basis: The main condenser and service water system is normally treated four times per day for 30 minutes during each treatment. The residuals as specified provide sufficient protection of the indigenous aquatic biota.

2.3.2 Retention Basin Effluent Chemicals

Objective: To limit the amount of chemicals released from the retention basin.

Specification: The following maximum limits shall apply to discharges from the chemical retention basin:

	lbs/month	lbs/year
Sulfate (as SO_4)	2,000	12,000
Sodium (as Na_2)	1,000	6,000
Phosphate (as P)	1	6
Calcium (as Ca_2)	250	1,200
Bicarbonate (as HCO_3)	350	1,500

In addition the effluent from the retention basin shall not exceed an arithmetic monthly mean of 30 ppm added suspended solids and 25 Jackson Turbidity Units (JTU's).

Basis: The amounts of chemicals as listed in the protection condition allow for monthly variations in chemical discharges, yet insure protection because the facility cannot discharge continuously, year round, at levels equal to the monthly maximum.

2.3.3 pH

Objective: To limit the range of pH levels due to plant additions in water discharged to the river.

Specification: The pH of water discharged to the river shall be no lower than 6.5 nor greater than 8.5.

Basis: A pH range of 6.5 to 8.5 provides sufficient protection of the river's natural plant and animal populations.

3.0 MONITORING REQUIREMENTS

3.1 Thermal

3.1.1 Maximum Change in Temperature (delta T) across the condenser.

Objective: To measure the delta T across the condenser.

Specification: The delta T across the condenser will be monitored once per day.

Basis: The delta T across the condenser does not fluctuate greatly over a 24-hour period during constant plant power levels. Thus, measurement of the delta T once per day will provide the necessary monitoring frequency.

3.1.2 Maximum Receiving Water Temperature

Objective: To measure the maximum receiving water temperature.

Specification: The receiving water temperature shall be calculated once per day whenever the temperature of the circulating water at the point of discharge is equal to or greater than 90°F.

Basis: If the discharge temperature does not exceed 90°F the protection condition of TSB 2.1.2 cannot be exceeded. Compliance with the protection condition will be made with the use of a plume model developed and verified with physical data by January 1975. The model will be used once per day to demonstrate compliance when the discharge temperature is in excess of 90°F. Periodic verification of the model temperatures will be made throughout the year.

3.1.3 Rate of Change of Discharge Temperature

Objective: To measure the rate of temperature drop at the point of discharge during the months of October through April.

Specification: The rate of temperature drop at the point of discharge will be measured during normal plant power decreases of 15% or greater during the months of October through April. This specification does not apply to emergency shutdowns, testing conditions, or initiation of cooling tower operation.

Basis: Decreases in power levels of 15% or less are not expected to cause any appreciable effect on the resident fish population in the discharge canal.

3.2 Hydraulic

3.2.1 Flow Rate Restrictions

Objective: To monitor the water appropriated from the river.

Specification: Once per day the amount of water appropriated from the river and river flows will be recorded.

Basis: Changing river flows require daily monitoring of the river to determine circulating water system operating modes to minimize aquatic environmental impacts.

3.3 Chemical

3.3.1 Chlorine

Objective: To ensure the amount of free residual chlorine discharged during chlorination does not exceed the protection condition.

Specification: Once each month during a chlorination cycle, a sample will be taken at the point of discharge and analyzed for free residual chlorine.

Basis: During normal power operation, the service water system will be chlorinated to control slime growth in the system. Curves for chlorine concentrations just after passage through the condenser, feed rates and concentrations at the point of discharge will be developed. The feed rates will be tested to insure that the free residual chlorine does not exceed the protection condition. The test will consist of taking three samples at the start, half way through, and at the end of a chlorination cycle. These samples will be taken at the point of discharge to the river. If the free residual chlorine at this point is

found to be greater than the protection condition, the feed rate will be reduced until the concentration is less than or equal to the protection condition. Once the established feed rates or condenser outlet concentrations have been verified to produce free residual chlorine concentrations less than or equal to the protection condition, it will not be necessary to sample the discharge water during every chlorination cycle as long as the chlorine injection feed rate or condenser outlet concentration remains less than or equal to the maximum verified feed rate. A monthly sample at the point of discharge will be taken during a chlorine injection cycle to verify that the protection condition is not exceeded. All analyses will be made by the appropriate sampling technique and analytical methods as outlined in the most recent edition of Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association.

3.3.2 Retention Basin Effluent Chemicals

Objective: To measure the amount of chemicals discharged from the retention basin.

Specification: Once per month, the amount of chemicals within the retention basin will be determined. Once per week, the suspended solids levels and turbidity of the retention pond effluent will be determined and the monthly arithmetic mean will be calculated from the weekly samples.

Basis: Carefully controlled releases from the retention basin will provide the necessary control of chemical releases. The monitoring frequency provides for sufficient sampling to determine compliance with the protection conditions.

3.3.3 pH

Objective: To measure the pH levels at the point of discharge to the river.

Specification: The pH value of the discharge water prior to entering the river will be measured two times per week.

Basis: A measurement frequency of two times per week will insure control of pH value and monitor compliance with the protection condition.

4.0 ENVIRONMENTAL SURVEILLANCE AND SPECIAL STUDIES

4.1 Biological

4.1.1 Aquatic

A. General Ecological Survey

Objective: To evaluate the impact of the facility on the biotic environment.

Specification:

1. Investigate any changes in the biota that may occur when comparing preoperational data to operational data and control stations to experimental stations.

2. Identify any change in the ecosystem induced by operation of the plant.

3. Evaluate the significance of induced changes, if any, on the sustenance of a healthy ecosystem as determined in preoperational studies or as defined by regulatory standards.

Basis: A general ecological survey was initiated in May 1968, three years prior to the beginning of plant operation in June 1971. This program has been extensively expanded since its inception. Information gathered from preoperational environmental studies was published in the 1968, 1969

and 1970 Monticello Nuclear Generating Plant Annual Environmental Monitoring and Ecological Studies Program Reports.

1. The program may be modified as necessary to accommodate sampling requirement changes. This program has been continually reviewed and reevaluated since its conception. After 60 months of data have been obtained from the beginning of commercial operation, some of the special studies in Section TS B-4.1.1 may be eliminated if the results of these studies are conclusive and show no significant harmful environmental effects.

2. These changes and results will be presented in the Annual Environmental Monitoring and Ecological Studies Program Report for the facility.

3. These studies are performed as follows:

   The program for aquatic ecological studies of the Mississippi River in the vicinity of the Monticello Nuclear Generating Plant has been designed to establish ecological characteristics prior to and following plant operation. The preoperational data are being compared with operational data to verify that the plant is not deleteriously altering the aquatic ecosystem. This study began 3 years prior to plant operation and will continue until the specific effects of the plant can be determined and the data show a stabilized aquatic environment. The monitoring program is funded entirely by NSP.

   The studies are organized to investigate the aquatic biota and the physical and chemical composition of the environment. Species are identified and their population and size are determined. The food habits and reproductive cycles of the dominant species are studied

whenever possible. Due to the seasonal fluctuations of these factors, most sampling programs are carried out on a scheduled year-round basis. It should be noted that this program is designed to remain flexible, so that changes can be made immediately if required. Factors to be studied are:

Biotic Communities

- Periphyton
- Benthic Macroinvertebrates
- Fish
- Aquatic Plants

Physical and Chemical Water Parameters

- Dissolved Oxygen
- Biological Oxygen Demand
- Temperature
- pH
- Conductivity
- Turbidity
- Current Velocity
- Total Dissolved Solids
- Total Alkalinity
- Total Phosphate
- Ortho-phosphate
- Nitrate Nitrogen
- Chlorides
- Iron
- Sulfates

Basic procedures for these studies are:

a. Periphyton

Periphyton sampling was initially conducted at 13 locations at the Monticello facility. Five of these sites were upstream. At present, there are 7 sampling locations retained from the original program. The locations are shown in Figure TS B-4.1.1.

There is one control station upstream from the discharge canal and six downstream stations. Two of these downstream stations are outside the thermal plume. The samples are analyzed every two weeks except when floods destroy sampling devices. Data on chlorophyll content are determined from the samples. Ice conditions may restrict sampling during the winter months.

b. Benthic Macroinvertebrate Study

In the original program there were 8 sampling transects. However, since no significant population changes were noted due to plant operation, the program has been reduced to one control transect upstream from the discharge canal and two downstream transects. Each transect consists of at least three stations spaced equidistant from each other. Four artificial substrates are located on the bottom at each station (Figure TS B-4.1.1-2). These are removed monthly for enumeration and identification of attached organisms. Some stations may not be sampled in the winter when unsafe ice conditions exist or when floods remove some sampling devices.

In addition, qualitative invertebrate sampling is conducted monthly along the shoreline during the open water portion of the year.

c. Fish

Electro-fishing and seining are the dominant methods used in the fish study. In the future trapnetting will be used as an additional sampling method. Fish

are measured and weighed and some scales are removed for age and growth studies. Some fish are marked with plastic or metal tags and returned to the river to study their movement and migration patterns. A creel census of the river fishery is being conducted, with the temporal length of census dependent upon angler presence. Generally, the census runs from April to November.

A weekly fish census will be conducted in the discharge canal during the winter months to determine species distribution and abundance. This data will be used to predict possible harm should a winter shutdown occur.

d. Physical and Chemical Water Quality Parameters

The water quality study includes the physical and chemical parameters of water which might affect aquatic life. The chemical factors studied and their frequency of measurement is as follows:

Parameter	Frequency
Dissolved Oxygen	Every two weeks
Biological Oxygen Demand	Every two weeks
Temperature	Continuous
pH	Every two weeks
Conductivity	Every two weeks
Turbidity	Every two weeks
Current Velocity	Every two weeks
Total Dissolved Solids	Every two weeks
Total Phosphate	Every two weeks
Ortho-phosphate	Every two weeks
Nitrate Nitrogen	Every two weeks
Chlorides	Every two weeks
Iron	Every two weeks
Sulfates	Every two weeks

A subsurface sample of one gallon of water is taken from each of three stations. One of these stations is above the intake structure. Two are downstream from the discharge canal on the plant side of the river. Oxygen determination is made on site; all other parameter determinations are made in the laboratory. River temperatures are monitored by 9 continuous recorders upstream and downstream from the plant discharge canal.

B. Impinged and Entrained Fauna

Objective: To determine monthly variations in species, weight, size and numbers, of all life stages of fish entrapped; to identify and count any other impinged vertebrates and to record that portion of the entrained fauna which is killed due to passage through the plant.

Specification: Impingement and entrainment studies shall be carried out for two years after the Appendix B Environmental Technical Specifications are in effect. Impingement studies shall be conducted every two weeks when the plant is operating. Entrainment studies shall be conducted monthly when the plant is operating, except for that portion of the study which assesses mortality. Assessment of the mortality of entrained organisms shall be conducted monthly from April through September and once every three months from October through March when the plant is operating.

Data collected during plant operation will be compared with appropriate control station data, thereby providing information to help determine the effect of the plant upon the impinged and entrained biota.

Basis:

1. Fish Impingement

Presently the plant is designed to return all impinged fish from the intake traveling

screens to the river via a low gradient sluice canal. Impinged fish are removed from the screens by periodic washings. All screen washed material is sampled by placing a ¼-inch mesh net in the sluice canal. All fish collected will be identified, counted and measured to determine monthly and seasonal trends in impingement and survivorship.

2. Impingement of Other Vertebrates and Macroinvertebrates

If aquatic or semi-aquatic vertebrates (such as salamanders, frogs and snakes) or macroinvertebrates (including crayfish and clams, but excluding insects) are impinged, they will be identified, counted and reported.

3. Entrainment

a. Estimates on the number of entrained ichthyoplankton, including organisms up to 3/8 inch in diameter, shall be made monthly when the plant is operating. These organisms shall be collected over a 24-hour period from the discharge gatewells, identified, counted and reported.

b. In conjunction with the above program, studies shall be conducted monthly from April through September, and once every three months from October through March when the plant is operating to assess the survivorship of entrained macroinvertebrates, ichthyo and zooplankton. Additional studies may be carried out, particularly if abnormally large numbers of a specific organism are entrained (e.g., greater than that found in an equivalent volume of river water from the main channel). Representative samples of the intake and discharge waters will be collected. These samples shall be

examined at the two locations. The difference between the intake and discharge mortality values shall be the mortality figure attributable to plant passage.

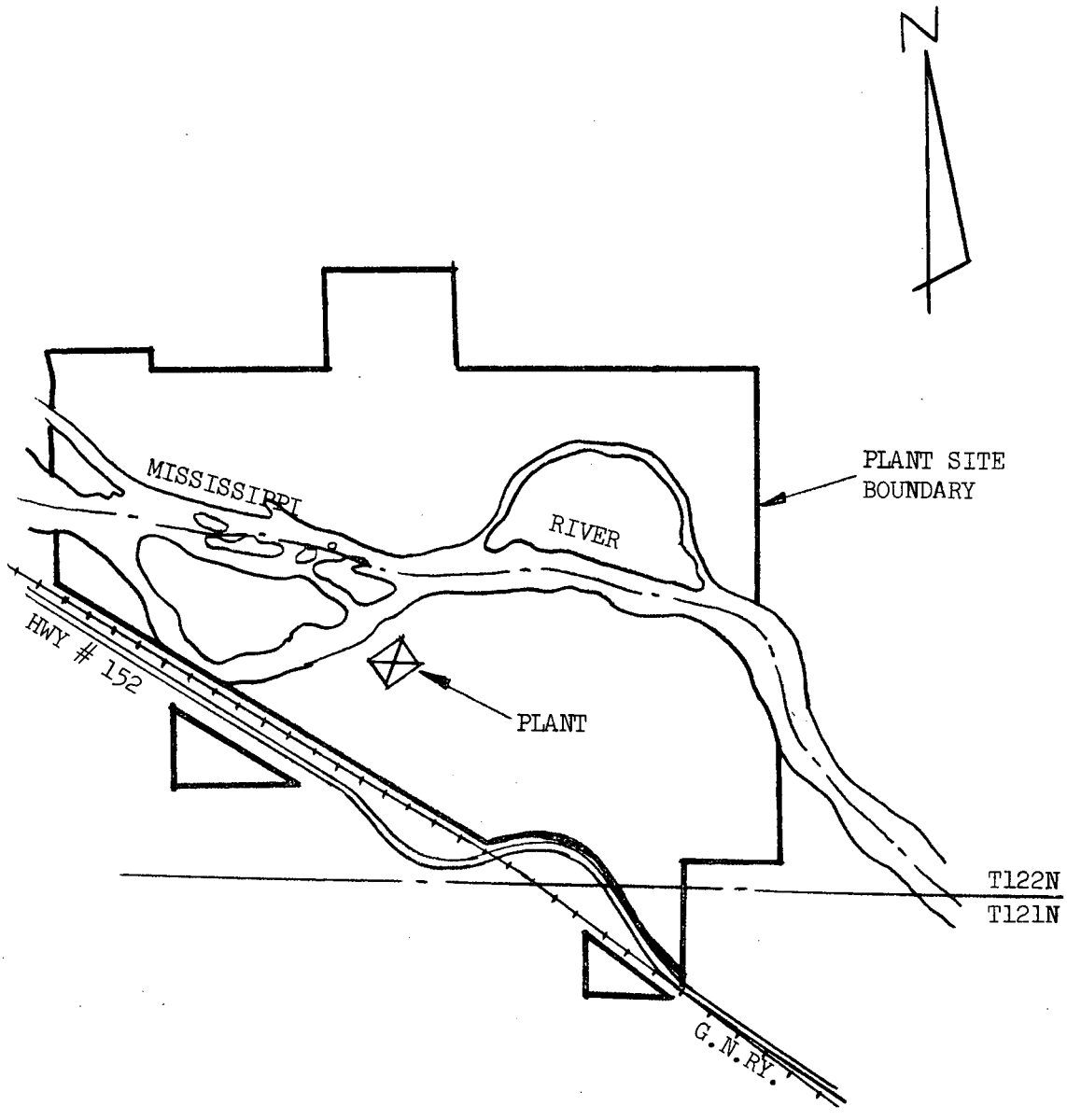
5.0 REPORTING REQUIREMENTS

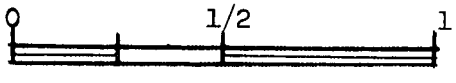
5.1 Routine Reports

A. A Semi-Annual Environmental Studies Report covering the previous six month's surveillance monitoring shall be submitted within 60 days after January 1 and July 1 of each year. This report will include a summary description of any environmental event, summary of data from section TS B-3.0 and a summary of surveys completed within section TS B-4.0.

B. An Annual Environmental Monitoring and Ecological Studies Program Report covering the year's operations and surveillance monitoring shall be submitted by July 1 of the subsequent year.

Exhibit A





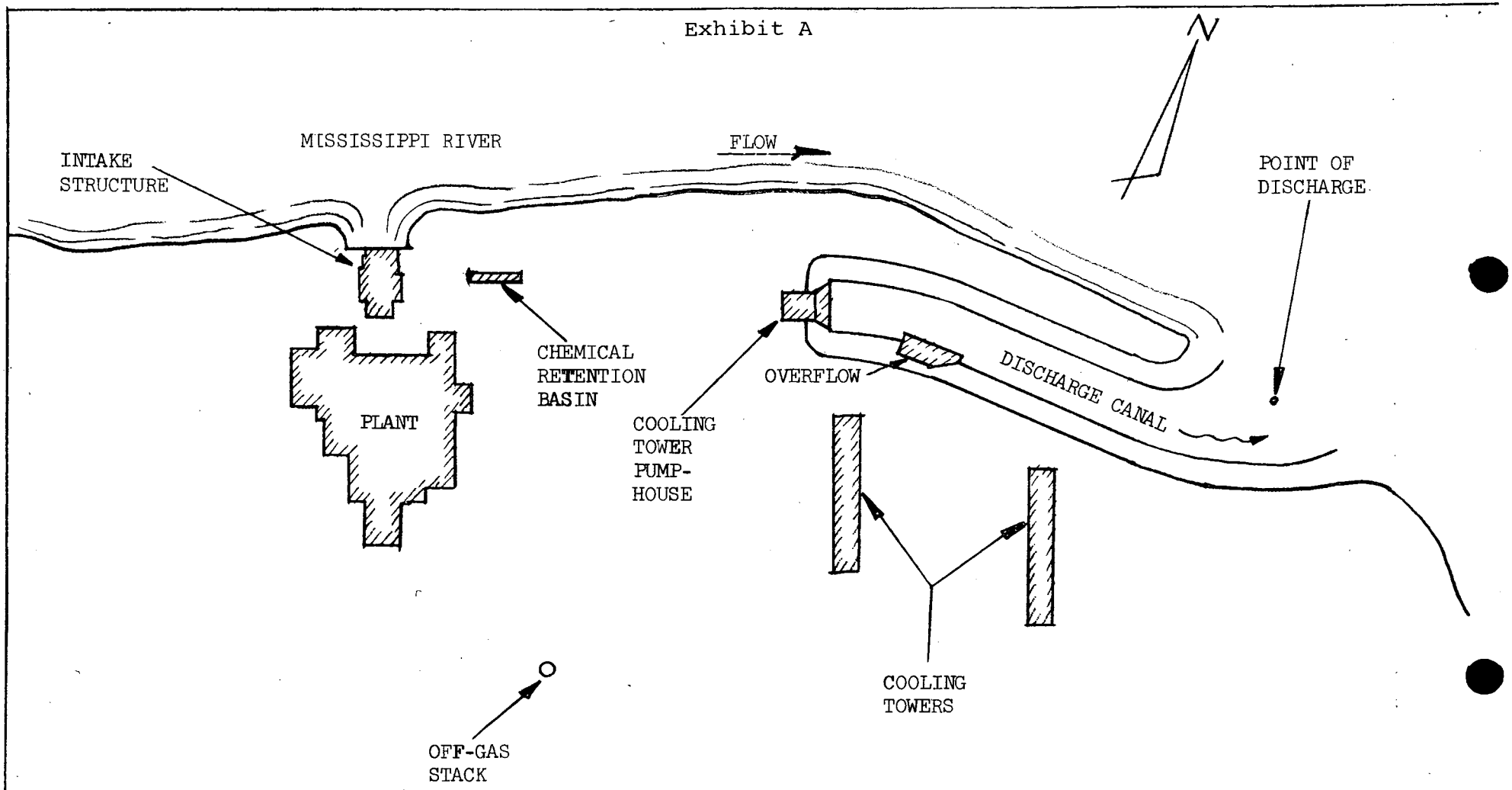
SCALE IN MILES

ON SITE PROPERTY

FIGURE TS B-1.0-1

9-12-73 JLB

Exhibit A

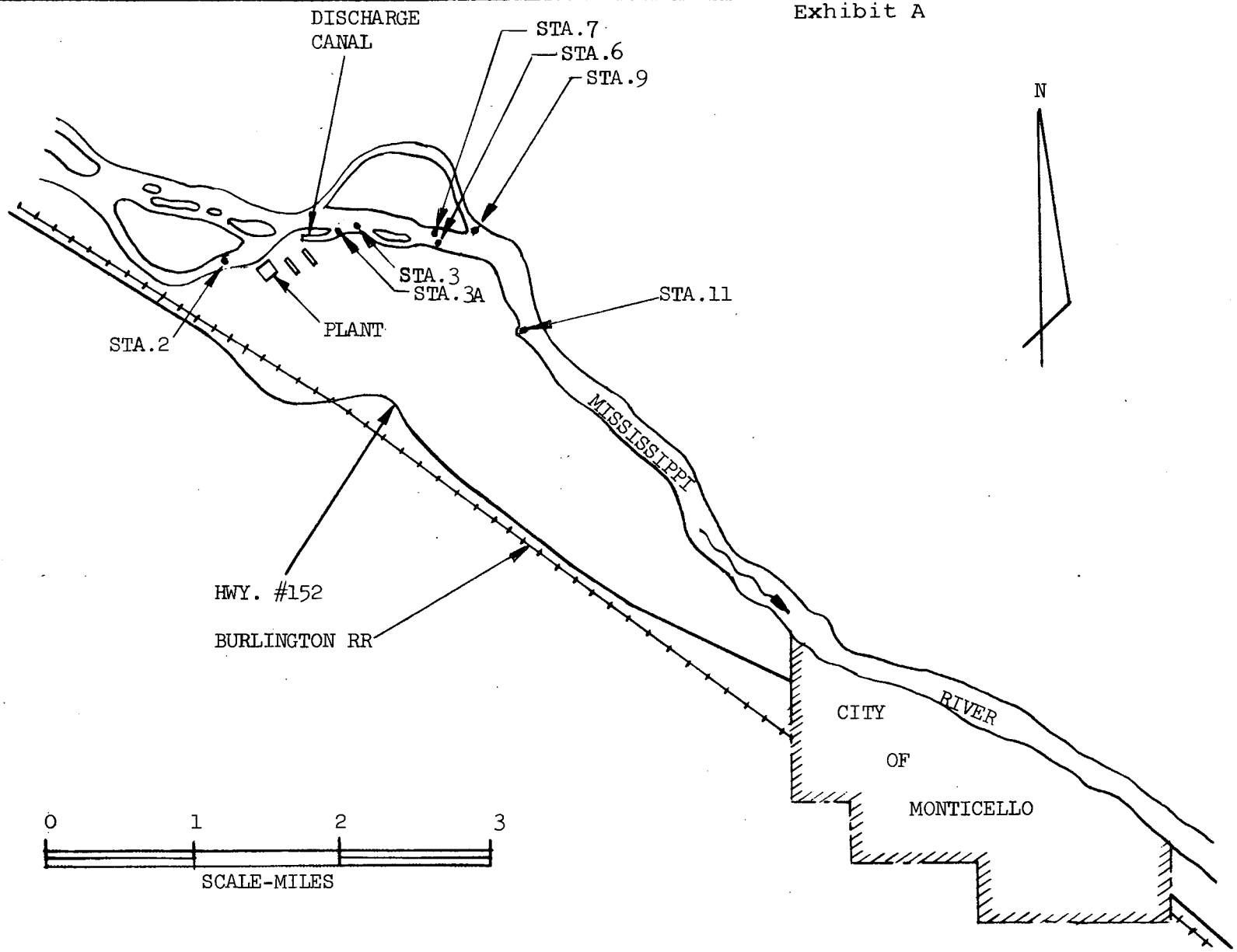


MONTICELLO PLANT FACILITY PLAN

FIGURE TS B-1.0-2

9-12-73 JLB

Exhibit A

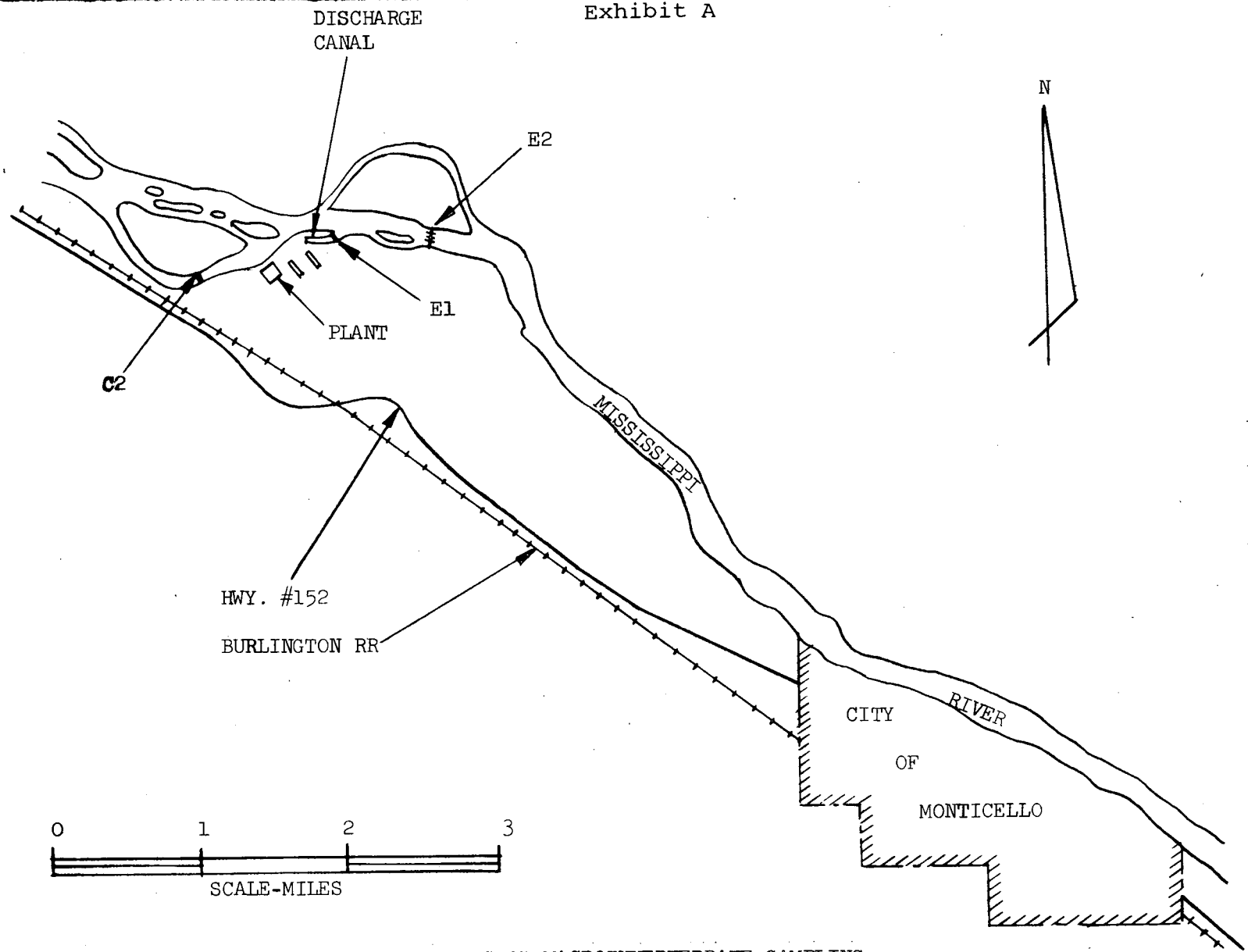


LOCATIONS OF PERIPHYTON SAMPLE STATIONS

FIGURE TS B-4.1.1-1

9-12-73 JLB

Exhibit A



LOCATIONS OF MACROINVERTEBRATE SAMPLING

TRANSECTS AND STATIONS

FIGURE TS B-4.1.1-2

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