STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of a Consolidated Public Hearing on Seven National Pollutant Discharge Elimination System Permit Applications from Seven Separate Northern States Power Company Electric Generating Plant.	STIPULATION AGREEMENT ON CHLORINE ISSUES FOR THE MONTICELLO NUCLEAR GENERATING PLANT

A. Recitals

1. Parties. The parties to this Stipulation are the Minnesota Pollution Control Agency (hereinafter MPCA) and Northern States Power Company (hereinafter NSP).

2. Permit Application. NSP has applied for a National Pollutant Discharge Elimination System permit for its Monticello Nuclear Generating Plant. In response to that application, a proposed permit was drafted and public notice of the application was issued by the MPCA. NSP requested a public hearing with respect to several conditions of the proposed permit including the proposed limitations on the discharge of chlorine. The MPCA authorized a public hearing on those issues raised by NSP in its request for hearing.

3. Stipulation. This stipulation shall constitute a settlement between the MPCA and NSP of all issues relating to the discharge of chlorine from the Monticello Nuclear Generating Plant.

B. Agreement

Therefore for the purposes of settling all issues relating to the discharge of chlorine from the Monticello Nuclear Generating

Plant, the MPCA and NSP stipulate and agree as follows:

1. The NPDES permit for the Monticello Nuclear Generating Plant shall contain limitations on the discharge of chlorine as follows:

(a) From the effective date of the permit until July 1, 1978, the discharge of chlorine from outfall 001 shall not at any time exceed a concentration of .2 mg/l measured as total residual chlorine and the discharge of chlorinated water shall not exceed a total of 2 hours per day.

(b) Notwithstanding subparagraph (a) above, for the purpose of avoiding condenser fouling, on not more than 30 days per year beginning with the effective date of the permit the Permittee may discharge chlorine at concentrations above that specified in subparagraph (a) but in no event above a maximum of .5 mg/l and an average of .2 mg/l measured as free available chlorine with the discharge of chlorinated water not to exceed a total of 2 hours per day. The Permittee shall notify the Agency at least 24 hours in advance of commencing chlorinations under this subparagraph (b).

(c) From July 1, 1978, to the expiration of the permit the discharge of chlorine shall not at any time exceed a concentration of .2 mg/l measured

as total residual chlorine and the discharge of chlorinated water shall not exceed a total of 2 hours per day. This limitation is subject to the results of the study provided in paragraph B.2. of this stipulation. If the results of the study demonstrate that NSP cannot comply with the limitation of this paragraph (c), then NSP shall construct facilities or implement procedures to comply and shall be granted the shortest feasible period of time within which to construct such facilities or implement such procedures. During any construction or implementation period, the limitations of paragraphs 1(a) and (b) shall remain in force and effect until the construction or implementation is complete at which time the limitation of this paragraph shall become effective.

2. NSP shall by July 1, 1978, ascertain the minimum concentrations and dosage time of total residual chlorine which it requires for the cleanliness and efficient operation of its condensers. This study shall be conducted as set forth in Exhibit A which is attached hereto and incorporated herein by reference. This study shall be submitted to the MPCA by July 1, 1978, and shall include an opinion as to whether or not NSP can comply with the limitation of paragraph B.1.(c).

3. If NSP is unable to comply with the limitations of paragraph B.1.(c) of this agreement through minimization of chlorine usage as required to be studied under paragraph B.2. of this agreement, then NSP agrees to install within the shortest feasible period pollution abatement equipment or implement procedures which will achieve compliance with the limitations of paragraph B.1.(c). No later than April 1, 1978, NSP shall submit to the MPCA a study identifying and analyzing methods for achieving compliance with the limitation of paragraph B.1.(c). The analysis of each method shall include an estimate of the cost of each method and a schedule for implementation of each method. If NSP cannot comply with the limitation of paragraph B.1.(c), it shall indicate by July 1, 1978, which method for achieving compliance it will implement and construct such facilities or implement such procedures in the shortest feasible period.

4. This Stipulation Agreement shall become binding when signed by NSP and the MPCA and shall be enforceable by either party in a court of competent jurisdiction.

5. Nothing herein shall prevent the future adoption of any regulations, standards, statutes or orders relating to the subject of this stipulation.

Dated this 3rd day of August, 1977

NORTHERN STATES POWER COMPANY

LEWIS J. CRAIN

MINNESOTA POLLUTION CONTROL AGENCY

Sandra S. Gardebring,
Executive Director

Marion Watson
Chairwoman

Exhibit A

Chlorine Reduction Study

This study shall determine the optimal use of chlorine at the Monticello Nuclear Generating Plant by reducing the amount of chlorine discharged to the Mississippi River to the lowest concentrations and shortest dosage commensurate with the clean and efficient operations of the condensers. For purposes of conducting this study NSP shall submit a detailed outline to the Director of the MPCA by August 16, 1977, and shall proceed with the study after written approval by the Director of the MPCA. This study shall at a minimum include the following:

I. A Determination of the Relationship Between Chlorine Injection and Discharge Concentrations of Total Residual Chlorine

DEFINITIONS

Lag Time - The period of time during which dye or chlorine is injected into the cooling water before the condenser but is not detected in the condenser cooling water discharge at outfall 001.

Injection Time - The period of time during which dye or chlorine is actually injected into the circulating water.

Contact Time - The period of time (specific to an injection time) during which dye or chlorine is detected at the condenser cooling water discharge at outfall 001.

INTRODUCTION

Many times, chlorine is present in the condenser cooling water discharge in concentrations lower than the detectable limit of the amperometric titration method. As a result, the proposed method for calculating daily average and daily maximum free and total chlorine residual requires information regarding lag and contact times. To effectively estimate lag and contact times in condenser cooling water, NSP will correlate injection time with contact time to determine lag time and if necessary in the judgment of the Agency Director conduct dye studies.

DYE STUDIES

Since condenser cooling water requires time to travel from the point of chlorine injection to the point where grab samples of the discharge water will be taken, dye studies will be conducted to characterize this lag period. The results of the dye studies will be confirmed by the chlorine sampling program.

Dye will be injected into the condenser cooling water via the chlorine pump. Dye will be injected for a time period equivalent to the duration of normal chlorine injection. During the injection of the dye, grab samples will be taken simultaneously at the discharge from outfall 001. Samples will be analyzed as soon as possible for dye using a fluorometer. For each separate injection point, three replicate, dye injection studies will be performed.

Also to be determined by the dye studies will be contact times. Due to diffusion and mixing of dye or chlorine injection,

contact time cannot be equated with injection time. Hence, contact times will be estimated using dye.

SAMPLING PROCEDURES

After lag and contact times have been established for each injection point, sampling procedures for free and total chlorine will begin. At the end of the lag period (See Table 1) samples will be collected every two minutes for a duration equal to the contact time. For example, if a five minute lag time and a seventeen minute contact time have been previously established, sampling for chlorine in the condenser cooling water discharge area would commence five minutes after chlorine injection begins and terminate seventeen minutes later (see Table 1).

Two people will be required during the sampling procedures. One person will collect the samples from the discharge while the other measures the concentration of free and total chlorine residual in the grab samples. The method used in determining chlorine residuals will be the amperometric titration method, which is an approved EPA procedure found in ASTM, 1975. Samples will first be measured for free chlorine residual and then for total chlorine residual since free chlorine dissipates rapidly.

CALCULATION OF THE DAILY AVERAGE

Daily average shall be defined as the arithmetic average of the chlorine concentrations obtained for each chlorination period.

CALCULATION OF THE DAILY MAXIMUM

Daily maximum for total residual chlorine shall be defined as the average of the two highest instantaneous chlorine concentrations obtained for each chlorination period.

TIME-CONCENTRATION RELATIONSHIPS FOR CHLORINE

A time-concentration relationship for chlorine shall be done weekly and displayed as illustrated in Table 1 of this exhibit. The frequency of determining the time concentration relationship may be reduced by the Agency Director upon a showing that this relationship is consistent.

II. Chlorine Reduction

A. NSP shall reduce the amount of chlorine used to a level at which the discharge of chlorine from outfall 001 does not exceed .2 mg/l measured as total residual and a total chlorinated discharge time of 2 hrs. per day. This reduction shall not eliminate the use of chlorine from March through June without the approval of the Director of the MPCA.

B. Monitoring. In addition to the weekly determination of the time concentration for chlorine, NSP shall monitor as follows:

Parameter	Location	Frequency
Total residual chlorine	Outfall 001	daily during contact time
Free available chlorine	Condenser in let	daily sample shall be taken in accordance with 1975 practice

Parameter	Location	Frequency
Chlorine feed	Chlorine Feed	daily
Chlorine demand of intake water	Intake	weekly
River NH_3	Intake	weekly
pH	Intake	daily
River temperature	Intake	daily
Back pressure	-----	daily all daily monitoring shall be exclusive of weekends & holidays.

C. Reporting. NSP shall report the results of the chlorine reduction program quarterly. The report shall include a table of monitoring results and an evaluation of the ability to meet the limitations stated in B.1.(c) of the Stipulation.

Table 1

Calculation of Daily
Average Concentrations for Free and
Total Residual Chlorine: A Hypothetical Case

Hypothetical Assumptions:

1) Chlorine (Sodium Hypochlorite) is injected for 15 minutes, (i.e., injection time = 15 min.).

2) It takes 5 minutes from the point of chlorine injection for dye to reach the Discharge area where samples are collected, (i.e., the lag time = 5 minutes).

3) Contact Time = 17 minutes as determined by the dye study.

	Time After Injection (minutes)	Discharge Chlorine Concentrations (mg/l) (Example Data)
5 min. Lag Time	0	<0.02
	2	0.03
	4	0.34
Injection Time	6	0.30
	8	0.20
	10	0.05
	12	0.02
	14	<0.02
17 Minute Contact Time	16	<0.02
	18	
	20	
	22	

Arithmetic Average of these values = Daily Average

Ms. Sandra S. Gardebring
Executive Director
Minnesota Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113

Dear Ms. Gardebring:

In accordance with the procedures designated in 40 CFR 124 and the NPDES Memorandum of Agreement and pursuant to the Federal Water Pollution Control Act, we have reviewed the proposed permit and stipulation for the discharger listed below as submitted to us in your letter of August 4, 1977.

Northern States Power Company
Monticello Nuclear Generating Plant
Monticello, Minnesota
MN 0000853

The proposed permit as noticed is approved for issuance by the State of Minnesota immediately following the public notice comment period, provided the agreed modifications are incorporated in the permit. This approval is conditioned upon the premise that no objections or questionable comments are received, and that no further modifications of any nature are made without further review and concurrence for permit issuance by this office.

This US EPA approval of the subject permit is contingent upon consistency of the proposed permit limitations and conditions with any applicable promulgated Effluent Guidelines which may become effective between now and the actual date of issuance of the subject permit.

Further, we would like to note that any study initiated as part of the Stipulation Agreement signed by the Minnesota Pollution Control Agency and the Northern States Power Company on August 3, 1977, regarding the subject facility, should be of such scope as to provide for the eventuality that, if the chlorination point has to be moved to ensure compliance with 0.2 mg/l total chlorine limitation and to ensure condenser cleanliness, information will be available to do so without initiating a new study. This observation is based on our information that the condenser cooling water is chlorinated at the intake and that there may be significant travel time (up to 2 minutes) prior to discharge from the condenser outlet.

When the final permit is issued under the above conditions, please forward two conformed copies and a summary of all comments received during the public notice period to this office at the above address, Attention: Permit Branch.

Very truly yours,

James O. McDonald, Director
Enforcement Division

cc: Mr. Richard Svanda, Minnesota Pollution Control Agency