April 11, 1997

Mr. Roger O. Anderson, Director
Licensing and Management Issues
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, AMENDMENT OF COOLING WATER SYSTEM EMERGENCY INTAKE DESIGN BASIS (TAC NOS. M97816 AND M97817)

Dear Mr. Anderson:

By letter dated January 29, 1997 Northern States Power Company (NSP) submitted a request to amend the licensing basis for the Prairie Island cooling water system emergency intake. To review the proposed changes the staff required additional information which NSP provided by letter dated March 10, 1997. After reviewing the provided responses the staff requires further information. Our request for additional information (RAI) is enclosed.

In order to continue our review of your submittal, please provide your response to the staff's RAI as soon as practical. If you have any questions regarding the content of the RAI, please contact me at (301) 415-1355.

Sincerely,

ORIGINAL SIGNED BY

Beth A. Wetzel, Project Manager
Project Directorate III-I
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-282, 50-306

Enclosure: As stated

cc w/encl: See next page

DISTRIBUTION:
Docket File 160047
PD3-1 RF
EAdensam (EGA1)
GBagchi
PUBLIC
J.Roe
OGC
WLeFave
J.Jacobson, DRP, RIII
J.Luehman
ACRS

DOCUMENT NAME: G:\WPDOCS\PRAIRIE\PI97410.RAI
To receive a copy of this document, indicate in the box C=Copy w/o attachment/enclosure E=Copy with attachment/enclosure N = No copy

OFFICE	Intern:PD31	E	PM:PD31	E	LA:PD31	E	D:PD31	
NAME	CMunson:db		BWetzel:bw		CJamerson		JHannon	
DATE	4/11/97		4/11/97		4/11/97		4/11/97	

OFFICIAL RECORD COPY

OFC 1/1

Mr. Roger O. Anderson, Director
Northern States Power Company

Prairie Island Nuclear Generating
Plant

cc:

J. E. Silberg, Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N. W.
Washington DC 20037

Plant Manager
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Adonis A. Neblett
Assistant Attorney General
Office of the Attorney General
455 Minnesota Street
Suite 900
St. Paul, Minnesota 55101-2127

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
1719 Wakonade Drive East
Welch, Minnesota 55089-9642

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Mr. Jeff Cole, Auditor/Treasurer
Goodhue County Courthouse
Box 408
Red Wing, Minnesota 55066-0408

Kris Sanda, Commissioner
Department of Public Service
121 Seventh Place East
Suite 200
St. Paul, Minnesota 55101-2145

Site Licensing
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Tribal Council
Prairie Island Indian Community
ATTN: Environmental Department
5636 Sturgeon Lake Road
Welch, Minnesota 55089

REQUEST FOR ADDITIONAL INFORMATION
ON NORTHERN STATES POWER COMPANY'S REQUEST FOR AMENDMENT
OF COOLING WATER SYSTEM EMERGENCY INTAKE DESIGN BASIS

1. In the staff's first request for additional information (RAI), you were requested to explain why the Cone Penetration Tests (CPT) were not extended to the depths approximately 43 feet (EL 645) to 46 feet (EL 648) below the grade, and how you are certain that there are no liquefiable soil layers below 46 feet (EL 648). You provided a reason (e.g., high refusal at the cone of the CPT device) during the meeting on February 24, 1997, and indicated you are certain that there are no liquefiable soil layers below EL 648 based on the CPT. However, a figure (Drawing No. 21 6197) in the Prairie Island Final Safety Analysis Report (FSAR) shows a liquefaction level from EL 645 (West) to EL 620 (East) under the intake canal. Because of this, you installed the intake pipe line from EL 637 (West) to EL 618 (East) below the liquefaction level. Explain the bases for identifying the liquefaction level in the FSAR and indicate whether you have recently performed enough SPT borings to identify liquefiable soils below EL 648 under the intake canal and embankments.

2. In the investigation of the intake canal embankments, two Standard Penetration Tests (SPT) were performed near the two CPT locations (i.e., B-3/C-3A and B-7/C-7 borings). The results of N values obtained from the SPT and those calculated from the CPT data agree reasonably well for the B-7/C-7 borings although the CPT shows an unrealistically high N value at the depth of 12 feet (EL 682). However, the results of the SPT and the CPT do not agree very well for the B-3/C-3A borings. Particularly, the SPT results show smaller N values (i.e., 4 to 7) for the soil layer in the depth range of 10 to 20 feet (EL 684 to 674). The staff raised a concern about such low N values during the interaction meeting on February 24, 1997, because the soils may be susceptible to liquefaction. You indicated that there would not be a liquefaction problem since the soil layer is above the water table at EL 673.5 and the soils are not saturated. However, you informed us during the conference call on March 3, 1997, that the normal water elevation of the canal surface is at EL 674.5 and that you will be using that water level for a calculation of the water volume in the supplementary amendment.

   The staff still has a concern about the liquefaction susceptibility of the soil layer considering: (1) the soils are already partially saturated due to the capillarity phenomenon, (2) possible full saturation due to the upward propagation of the pore water pressure from the bottom soil layer (below EL 674.5) during the seismic cyclic loadings, and (3) full saturation of the soil layer due to a higher water table.

   Provide a rationale for using the N values calculated from the results of the CPT, using the relationship developed by Harza Engineering Company, instead of using the SPT N values actually obtained in the field, as is the commonly accepted practice (see Reference 1).

ENCLOSURE

3. In view of the discussions above in Questions 1 and 2, indicate whether you have a plan to do additional SPT borings, possibly with a small spacing interval between the borings and near the toe of the embankments and/or away from the toe on the floor of the canal to identify a liquefiable soil.

4. Your submittal (Reference 2) shows that there are two submerged guide walls in the intake canal near the screenhouse. Provide the following:

   a) The dimensions and the locations of the walls.

   b) Discuss the functionality of the walls with respect to the flow rate.

   c) The effects of the walls on the water flow if the embankment slope fails and fully or partially closes the gaps between the walls.

5. In the meeting on February 24, 1997, you indicated that the Prairie Island design basis ground motion is equivalent to a magnitude 4.5 earthquake. We have checked the relationship between earthquake intensity and magnitude which the NRC has used in licensing nuclear power plants and found that the Modified Mercalli intensity VI used for determining the Prairie Island design basis ground motion is equivalent to a magnitude 5.0 and not 4.5. Does the characterization of the design basis ground motion as a magnitude 4.5 earthquake rather than a magnitude 5.0 earthquake have an effect on your analysis?

6. Discuss how you could compensate for the entrainment of debris and/or fine silty/sandy soil particles in the water when the embankment sluffs off and the bottom floor of the intake canal boils due to soil liquefaction, and the effect that would have on the cooling water pumps and heat exchangers.

7. With respect to the ongoing dynamic analysis for the slope stability, you are requested to consider the following:

   a) If a single artificial time history is generated from the design response spectra defined in the FSAR, demonstrate the adequacy of the artificial time history including a calculation of power spectral density function of the artificial time history.

   b) If multiple (at least four) time histories are generated from the design response spectra defined in the FSAR, develop four response spectra using the four artificial time histories generated and demonstrate that the response spectrum obtained from the average of the four response spectra envelopes the licensing basis design response spectrum.

   c) Provide the four response spectra developed from the four artificial time histories, and compare with the design response spectrum of the FSAR.

References:

1. EPRI Report NP-6041-SL, "A Methodology for Assessment of Nuclear Power Plant Seismic Margin," by Electric Power Research Institute, August 1991.

2. The letter dated March 10, 1997, from Joel P. Sorenson at the Northern States Power Company to the NRC, "Supplement 3 to License Amendment Request Dated January 29, 1997, Amendment of Cooling Water System Emergency Intake Design Bases."

ENCLOSURE