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MAYER,L.O. Northern States Power Co.
RECIP.NAME RECIPIENT AFFILIATION
Office of Nuclear Reactor Regulation

SUBJECT: Ack receipt of NRC 790917 ltr re potential for adverse environ effects causing interaction between nonsafety-grade & safety-grade sys.Submits assessment of reactor plant which identifies no impact on safety actions.

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NORTHERN STATES POWER COMPANY

MINNEAPOLIS, MINNESOTA 55401

October 5, 1979

Director of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

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

Information Concerning Potential for Adverse
Environmental Effects Causing Interaction
Between Non-Safety Grade and Safety Grade Systems

In a letter dated September 17, 1979 from Mr Harold Denton, Director, Office of Nuclear Reactor Regulation, all light water reactor licensees were requested to provide the Commission information related to the effects of adverse environments on non-safety grade systems and the results of these effects on safety systems.

Attached is a report of the results of the assessment we have performed of the Monticello Nuclear Generating Plant relative to the concern outlined in Mr Denton's letter. This report also contains the more specific and comprehensive information and analysis requested by the NRC Staff during a briefing on Thursday, September 20, 1979.

The assessment has not identified any impact on safety actions or analysis conclusions which would increase the consequences (calculated peak cladding temperature, peak containment pressure, peak suppression pool temperature, or radiological release) of any safety analysis report events. In particular, the assessment concludes that:

1. No previously identified safety actions would be negated by the failure of non-safety equipment due to environmental effects of high energy pipe breaks (HEPB's);

2. No previously identified safety limits would be violated by the subject effects; and

3. Some additional operator actions could be helpful to more quickly mitigate the subject postulated effects.

A number of observations should be made even in light of the successful evaluation.

1. It should be noted that the criteria and suggested NRC Staff evaluation basis involved in this assessment are new, recently evolved, requirements from RG 1.70, Rev. 2.

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Previous plant design bases for non-safety equipment established a "fail as is" mode rather than the present "fail in worst position." This is a rather arbitrary and extremely conservative requirement.

2. Evaluation of plant safety as regards HEPB's have been conducted in recent years. Comprehensive analyses were submitted to the NRC Staff and their approval was documented in individual plant safety analysis reports. Reevaluation here for more severe criteria has confirmed the previous safety audit.

3. The BWR includes a number of inherent characteristics which are specifically important to this issue:

   a. Thorough evaluation of outside containment line breaks for radiological reasons has resulted in a set of comprehensive, sensitive leak detection and isolation systems on BWR's;

   b. The BWR does not depend to a great extent on non-safety equipment for safety actions;

   c. The separation of protection systems has long been a rule relative to safety function reliability;

   d. As previously noted, HEPB analyses have been performed and verified physically at BWR facilities;

   e. The BWR has treated intersystem relationships in considerable detail in a standard safety analysis report section, the Nuclear Safety Operational Analysis (NSOA). This systematic evaluation of the BWR system has proven to be very valuable relative to environmental impacts effects analysis;

   f. Transient and accident analysis of BWR's are conservatively bounded in most cases with respect to non-safety system performance.

As noted earlier, our investigation has not identified any condition which would warrant the modification, suspension, or revoking of our operating license. We are continuing to review this matter in conjunction with the General Electric Company. This review will be expanded into the investigation of as yet unidentified instances of non-safety system and safety system if any instances are identified.

Since this issue is included in the scope of future work by the NRC TMI-2 Lessons Learned Task Force, we propose to fully resolve any remaining questions through compliance with licensing requirements established by that group.

Please contact us if you have any questions related to the information we have provided.

L. O. Mayer

L O Mayer, PE
Manager of Nuclear Support Services

LOM/DMM/jh

cc: J G Keppler
G Charnoff

attachment

ENCLOSURE

EFFECT OF NON-SAFETY SYSTEM FAILURES
(POSTULATED DUE TO ADVERSE ENVIRONMENT)
ON PERFORMANCE OF SAFETY EQUIPMENT

Introduction This memorandum report summarizes the response of the Monticello Plant to the concerns identified in IE Information Notice No. 79-22.

Effect of Non-Safety System Failures on Safety System Performance Table 1 identifies non-safety systems in the Monticello Plant, and the effect of their postulated failure on safety system performance, for a variety of postulated high-energy pipe breaks, locations, and sizes. A "1" entry denotes a possible adverse effect.

It will be noted that there is only one entry where a postulated non-safety system failure could adversely affect safety system performance. This results from the almost complete decoupling of the BWR nucler steam supply and containment system from non-safety balance of plant equipment and functions. All non-safety systems in the plant were included in the assessment. Those systems not listed in Table 1 were found to have no conceivable failures which could affect safety system performance.

The one possible adverse affect is that of the reactor head vent valves opening upon a LOCA. The reactor head vent line is a small line with two 3/4 inch valves, which are air-operated. The vent line is 2 inches in diameter at the reactor head, 3/4 inch between the two valves and one inch downstream of the valves. The line terminates in the drywell equipment drain sump. The probability of a LOCA steam environment causing both of these series valves to open at the start of the event is exceedingly small. To bound the worst case however, GE assumed a LOCA combined with a simultaneous opening of the two valves. Depending on the size of the LOCA there could be a $\pm$ $10^{\circ}F$ impact on Peak Clad Temperature. A later opening of the head vent line would reduce the maximum effect stated above. This is therefore an insignificant event.

TABLE 1 ENVIRONMENTAL INTERATION AT THE MONTICELLO NUCLEAR GENERATING PLANT

COMPONENT	LOCATION	BREAK TYPE AND LOCATION											
		MAIN STEAM LINE				FEEDWATER LINE			LOCA		RWCU	RCIC	HPCI
		INSIDE SMALL	INSIDE LARGE	REACTOR BLDG	TURBINE BLDG	INSIDE	REACTOR BLDG	TURBINE BLDG	INSIDE SMALL	INSIDE LARGE	OUTSIDE	OUTSIDE	OUTSIDE
RECIRC SYSTEM													
PUMPS	DRYWELL	2	2	4	4	2	4	4	2	2	4	4	4
VALVES & OPERATORS	DRYWELL	3	3	4	4	3	4	4	3	3	4	4	4
MG SETS	REACTOR BLDG	4	4	4	4	4	4	4	4	4	4	4	4
MCC	TURB/REA BLDG	4	4	4	4	4	4	2	4	4	4	4	4
FLOW CONTROL SYSTEM	CONTROL ROOM	4	4	4	4	4	4	4	4	4	4	4	4
CONTROL INST TRANSMITTERS	REACTOR BLDG	4	4	4	4	4	4	4	4	4	4	4	4
FEEDWATER DELIVERY SYSTEM													
FLOW ELEMENTS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
LEVEL	DRYWELL/REA BLDG	2	2	4	4	2	4	4	2	2	4	4	4
PUMPS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
VALVES & OPERATORS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
MCC	TURBINE BLDG	4	4	4	4	4	4	4	4	4	4	4	4
FLOW CONTROL SYSTEM	CONTROL ROOM	4	4	4	4	4	4	4	4	4	4	4	4
FW HEATING	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
INSTRUMENT AIR	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
CONTROL INST TRANSMITTERS	REACTOR/TURB BLDG	4	4	4	2	4	4	2	4	4	4	4	4
TURBINE PRESSURE CONTROL													
BYPASS VALVES	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
PRESSURE SENSORS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
CONTROL SYSTEM	CONTROL ROOM	4	4	4	4	4	4	4	4	4	4	4	4
NEUTRON MONITORING SYSTEM													
LPRM's & CABLES	DRYWELL/REA BLDG	2	2	2	4	2	2	4	2	2	2	4	4
APRM's & CABLES	DRYWELL/REA BLDG	2	2	2	4	2	2	4	2	2	2	4	4
RPIS/ROD BLOCK MONITOR	DRYWELL/REA BLDG	2	2	2	4	2	2	4	2	2	2	4	4
TIP	DRYWELL/REA BLDG	2	2	4	4	2	4	4	2	2	2	4	4
REACTOR PROTECTION SYSTEM													
TURBINE SCRAM	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
MG SET	TURBINE BLDG	4	4	4	4	4	4	4	4	4	4	4	4
REACTOR MANUAL CONTROL SYSTEM	REACTOR/CNTRL ROOM	4	4	4	4	4	4	4	4	4	4	4	4
SRV SYSTEM (NON-ADS)	DRYWELL/REA BLDG	3	3	3	4	3	3	4	3	3	4	4	4
RBCCW SYSTEM	REACTOR BLDG	4	4	2	4	4	2	4	4	4	2	4	4
RWCU	DRYWELL/REA BLDG	3	3	2	4	3	2	4	3	3	2	4	4

TABLE 1 ENVIRONMENTAL INTERACTION AT THE MONTICELLO NUCLEAR GENERATING PLANT (CONTD)

COMPONENT	LOCATION	BREAK TYPE AND LOCATION											
		MAIN STEAM LINE				FEEDWATER LINE			LOCA		RWCU	RCIC	HPCI
		INSIDE SMALL	INSIDE LARGE	REACTOR BLDG	TURBINE BLDG	INSIDE	REACTOR BLDG	TURBINE BLDG	INSIDE SMALL	INSIDE LARGE	OUTSIDE	OUTSIDE	OUTSIDE
SUPPRESSION POOL													
TEMPERATURE MONITORING	REACTOR BLDG/TORUS	4	4	4	4	4	4	4	4	4	4	4	4
LEVEL MONITORING	REACTOR BLDG/TORUS	4	4	4	4	4	4	4	4	4	4	2	2
CIRCULATING WATER SYSTEM (NON-SAFETY)	INTAKE/TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
HVAC SYSTEM	ALL	2	2	2	2	2	2	2	2	2	2	2	2
NON-IE BATTERY SYSTEM	TURBINE BLDG	4	4	4	4	4	4	4	4	4	4	4	4
AC AUXILIARY ELECTRIC	REACTOR/TURB BLDG	4	4	4	4	4	4	4	4	4	4	4	4
CONDENSATE TRANSFER & STORAGE	TURBINE BLDG	4	4	4	3	4	4	2	4	4	4	4	4
MAIN TURBINE & CONTROLS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
MAIN CONDENSER & CONTROLS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
INSTRUMENT AIR SYSTEM													
COMPRESSORS	TURBINE BLDG	4	4	4	2	4	4	2	4	4	4	4	4
PIPING & CONTROLS	TURB/REA/DRYWELL	2	2	2	2	2	2	2	2	2	2	2	2
FIRE PROTECTION SYSTEM	TURB/REA/CONT RM	4	4	2	2	4	2	2	4	4	2	4	4
CRD HYDRAULIC SYSTEM (NON-SCRAM)	REACTOR BLDG	4	4	4	4	4	4	4	4	4	4	4	4
RV HEAD VENT	DRYWELL	2	2	4	4	2	4	4	1	1	4	4	4
SLC SYSTEM	DRYWELL/REA BLDG	3	3	4	4	3	4	4	3	3	4	4	4

1 - ENVIRONMENTAL INDUCED MALFUNCTION MAY PROVIDE ADVERSE RESPONSE, I. E. INCREASE IN PREVIOUSLY REPORTED PEAK DRYWELL PRESSURE, WETWELL PRESSURE, SUPPRESSION POOL TEMPERATURE, OR FUEL CLAD TEMPERATURE.

2 - ENVIRONMENTAL INDUCED MALFUNCTION WILL NOT PROVIDE ADVERSE RESPONSE.

3 - SYSTEM IS QUALIFIED FOR ADVERSE ENVIRONMENT

4 - SYSTEM WILL NOT EXPERIENCE ADVERSE ENVIRONMENT

UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT — Docket No. 50-263

License No. DPR-22

LETTER DATED OCTOBER 5, 1979
RESPONDING TO NRC REQUEST
FOR INFORMATION ON ADVERSE ENVIRONMENTAL EFFECTS ON
NON-SAFETY GRADE INSTRUMENTS AND CONTROLS

Northern States Power Company, a Minnesota corporation, by this letter dated October 5, 1979, hereby submits a response to the NRC request dated September 17, 1979 for information on the potential for adverse environmental effects causing interaction between non-safety grade and safety grade systems.

This request contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By L J Wachter
L J Wachter
Vice President, Power Production
& System Operation

On this 5th day of October, 1979, before me a notary public in and for said County, personally appeared L J Wachter, Vice President, Power Production and System Operation, and being first duly sworn acknowledged that he is authorized to execute this document on 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.

Jeanne M Hacker
Jeanne M Hacker
Notary Public - Minnesota
Hennepin County
My Commission Expires May 6, 1986

JEANNE M. HACKER
NOTARY PUBLIC - MINNESOTA
HENNEPIN COUNTY
My Commission Expires May 6, 1986