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SUBJECT: Requests enforcement discretion from TS 3.6.3.a,for 14 days starting on 940915 to allow time to process TS amend under emergency conditions.

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September 16, 1994
G02-94-215

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21 DISCRETIONARY ENFORCEMENT**

On September 15, 1994 verbal enforcement discretion was granted to allow continued operation of WNP-2. This letter provides in writing the information provided verbally. Enforcement discretion is requested from the requirements of Technical Specification 3.6.3.a. This Specification requires that primary containment isolation valves be operable in Operational Conditions 1, 2, and 3, or that each affected penetration be isolated by use of at least one deactivated automatic valve secured in the isolation position. The sixteen primary containment isolation valves associated with the hydraulic lines for the two recirculation flow control valves are not operable in that the isolation logic for these valves does not assure isolation given a single active failure. The valves remain operable for other requirements such as those of the ASME code. The containment isolation logic will be maintained in service and there remains a high confidence that it will provide the necessary isolation if required. The relays in question were replaced this year and the logic, including the containment isolation valves, were functionally and response time tested.

Enforcement discretion is requested for 14 days starting on September 15, 1994 to allow time to process a Technical Specification Amendment under emergency conditions. This Amendment request, if granted, will allow operation of WNP-2 with the identified condition until the next shutdown to a hot shutdown condition. The next scheduled shutdown is in late April, 1995. In addition, the Supply System is evaluating the potential of correcting this condition at power, and is performing a more detailed evaluation of the design requirements. Preliminary evaluation of the potential plant modifications indicates that a potential for a reactor scram exists if implemented at power. A modification will not be made at power if the potential for scram is judged to be too great.

A001

In response to information received over the Institute for Nuclear Power Operations computer network describing a problem with the isolation logic for the valves associated with the containment monitoring system at another plant, the Supply System initiated a review of the WNP-2 containment monitoring system containment isolation logic to ensure that single failure criteria were met. In April, 1994 a similar condition was found at WNP-2 where the isolation logic for containment isolation valves that are part of the containment atmospheric monitoring system did not meet the single failure criteria. This condition was reported in Licensee Event Report 94-009-00 and corrected during the Spring 1994 maintenance and refueling outage. As a corrective action for that LER a review is being conducted of the automatic containment isolation logic.

On September 15, 1994 during performance of the automatic containment isolation logic review, it was determined that the isolation logic for the containment isolation valves associated with the recirculation flow control valve hydraulic lines, does not meet single failure criteria. There are two isolation valves in series located outside containment on each of eight hydraulic fluid lines as previously reviewed and approved. There are four hydraulic lines associated with the control system for each of the two recirculation flow control valves. The design for the sixteen isolation valves is described in FSAR Table 6.2-16, Note 28, as follows:

> Penetrations X-76 and X-77 contain lines for the hydraulic control of the reactor recirculation flow control valve. These lines contain hydraulic fluid used to position the reactor recirculation flow control valve.
>
> The hydraulic control lines are Seismic Category 1 Quality Class I Code Group B from just inside of the containment to outboard of the second isolation valve. The lines are Seismic Category 1, Quality Class II, Code Group D from just inside the containment to the hydraulic flow valve. Each line is provided with two fail-closed solenoid-operated isolation valves which receive an automatic isolation signal on high drywell pressure or reactor vessel low water level.
>
> Both isolation valves are located outside containment to improve reliability because of more favorable environmental conditions (i.e., potential damage to the solenoid valves resulting from humidity, radiation, pressure and temperature transients, and post-LOCA pipe whip and jet impingement is greatly reduced). Also, this location allows for ease of maintenance and manual override operation, if required.

Integrity of the system inside the primary containment is, essentially, continuously monitored since the system is under a constant operating pressure of 1800 psig. Any leakage through this system would be noticed because of erratic operation and because of alarms for abnormal operation provided on the hydraulic control unit.

In order to perform Type C tests on these lines, the system would have to be disabled and drained of the corrosive hydraulic fluid. This is considered to be detrimental to the proper operation of the system in that possible damage could occur in establishing the test condition or restoring the system to normal.

For these reasons, the lines and associated isolation valves are considered to be exempt from Type C testing.

All isolation valves (both inner and outer) for a given set of hydraulic lines supplying one RRC flow control valve are powered from the same Class 1E division. All isolation valves in the set of hydraulic lines to the other RRC flow control valve are powered from the other division. This ensures that no single loss of power can inadvertently close some isolation valves in both sets of hydraulic lines and, thereby, render both RRC loops inoperable. Since the solenoid-operated isolation valves fail closed on loss of electrical power, the reliability of their safety function is not affected by supplying both inner and outer valves from the same division.

As points of clarification: 1) the Type C test discussed above is the Local Leak Rate Test of the valves as called out in 10CFR50, Appendix J; 2) the inner and outer valves described are both located outside primary containment, and 3) the alarms associated with the hydraulic system are low level in the hydraulic oil reservoir and backup hydraulic pump start on low hydraulic pressure..

The actual primary containment isolation valves in question are:

HY-V-17A,B	HY-V-18A,B	HY-V-19A,B	HY-V-20A,B
HY-V-33A,B	HY-V-34A,B	HY-V-35A,B	HY-V-36A,B

The specific problem identified with the logic is that there are two cases within a logic division where, given a relay single contact failure to open on demand for either of the two relays, both isolation valves in series fail to close on a LOCA signal (high drywell pressure or low reactor water level). A simplified schematic of the logic is provided as Attachment 2. This failure of a single relay contact (from either of two relays per division) actually results in the eight hydraulic line primary containment isolation valves associated with a given recirculation flow control valve remaining open. There are two divisions of isolation logic, one division for each of the eight valves associated with a given recirculation flow control valve. This condition is identical within each division.

As discussed above, the sixteen containment isolation valves listed above are not operable. Technical Specification 3.6.3 requires that eight of the sixteen isolation valves (i.e., one valve on each of the eight lines) be closed and deactivated within four hours. This results in the loss of recirculation flow control valve control. If enforcement discretion is not granted, either the sixteen valves must be closed within 4 hours, or the plant must be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Plant shutdowns result in a plant transient which can lead to unnecessary challenges.

Operations personnel are trained to verify automatic functions occur on demand. If these functions do not occur on demand, manual action is taken to implement these actions. The manual action taken for these valves is to manually close them from the main control room. The relay contact failure to open discussed in this letter, would not interfere with the control room operators ability to manually close these automatic valves.

As a compensatory measure until the plant can be modified during the next forced or scheduled shutdown, plant instructions will be modified to provide Operations personnel with the information necessary to achieve immediate isolation of the sixteen valves in the event of a LOCA inside containment and failure of the containment isolation logic to properly function and cause isolation. This additional information will include the location of fuses within the main control room that, when removed, cause valve closure.

A break of the hydraulic lines either inside or outside of primary containment is considered unlikely. Piping and valves of the hydraulic system for the recirculation flow control valves (system HY(1)) are 3/4" and 1" in diameter up to the second outboard primary containment isolation valve and are Seismic Category I, Quality Class II, and ASME Code Class 2. Piping and valves of HY(1) inside containment and outboard of the second primary containment isolation valve (including HY-HP-3A & 3B) and less than 3/4" diameter are Seismic Category II+, Quality Class II, and ANSI B31.1.

Seismic Category II+ defines those pipe supports that are designed to Seismic Category I requirements, but the piping is analyzed only to remain within elastic limits (i.e., Code upset/Operational Basis Earthquake stress limits need not be maintained.) In other words, the piping operability is not ensured, but the piping will not fail in a manner such that it might impact another Quality Class I system or component.

The HY piping and components have not been identified as "targets" for postulated high energy pipe break inside or outside of primary containment. Therefore, a design basis pipe break of a line inside primary containment is not postulated to damage the hydraulic lines and thus would not breach primary containment integrity even if the HY isolation valves did fail to close.

In addition, the design basis for WNP-2 is that no break or crack need be postulated in piping having a nominal diameter less than or equal to 1" (Reference FSAR sections 3.6.2.1.4.1 and 3.6.2.1.4.2). Since the HY piping is less than or equal to 1" nominal diameter, no pipe breaks are postulated.

The probability of a LOCA, combined with a mechanistic failure of both the hydraulic lines inside and outside containment, and the relay contacts failing to open on demand, is extremely small. Should this unlikely sequence of events occur, the hydraulic lines are 1" at the containment penetration with smaller diameter piping both inside and outside containment. In addition, should the valves fail to close during a LOCA, the operators in the main control room will take action to provide isolation of the sixteen valves. Position indication for the valves is provided in the main control room. Any releases from primary containment must pass through the Reactor Building where the standby gas treatment system is assumed to automatically start and filter all releases within 10 minutes of the time of a LOCA.

As described in Attachment 1 and above, operation with the current plant configuration until April, 1995 will not result in a significant increase in the probability or consequences of an accident previously evaluated; i.e., a large break LOCA. Operation with the current plant configuration will not create the possibility of a new or different kind of accident from those previously evaluated, it directly impacts a previously evaluated accident (large break LOCA). As discussed above and in Attachment 1, the margin of safety is not significantly reduced by this activity since immediate operator action to close the valves will mitigate the potential release. Based on the conditions described, the potential for unacceptable off-site releases is believed to be very low. Thus, the potential for impact on the health and safety of the public or adverse consequences to the environment is considered very low.

Should you have any questions or desire additional information regarding this matter, please call me or Mr. D. A. Swank at (509) 377-4563.

Sincerely,

J. V. Parrish

J. V. Parrish (Mail Drop 1023)
Assistant Managing Director, Operations

DAS/bk
Attachments

cc: LJ Callan - NRC RIV
KE Perkins, Jr. - NRC RIV, Walnut Creek Field Office
NS Reynolds - Winston & Strawn
JW Clifford - NRC
DL Williams - BPA/399
NRC Sr. Resident Inspector - 927N

Attachment 1

SAFETY ASSESSMENT OF HYDRAULIC LINE FAILURE VS
SAFETY ASSESSMENT OF POTENTIAL CORRECTIVE ACTIONS

This analysis compares the increased risk from continued operation with the current containment isolation logic design (potential containment bypass path) with the increase in risk associated with possible corrective actions. The containment bypass scenario is presented in terms of containment failure probability while the corrective actions are presented in terms of increased core damage frequency. The bypass scenario requires a LOCA and a sequence of equipment failures, the corrective actions involve somewhat more probable events such as loss of feedwater or turbine trip.

Containment Bypass Scenario

Lack of two completely independent, automatically actuated isolation valves on the Recirculation Flow Control Valve (FCV) hydraulic lines implies that during a demand for containment isolation these hydraulic lines could present a direct path from containment to the environment.

Situation: The recirculation FCV hydraulic lines are designed for an internal pressure of 2200 psig and the system is designed and constructed to operate as a closed loop:

o Each of the two FCV Actuator Hydraulic Power Units, HY-HP-3A and -B is installed outside containment

o Supply to the actuators, installed inside containment, is maintained at 1800 psig so the "pre-accident" integrity of the piping is confirmed

o Isolation of the hydraulic supply lines is achieved with two series isolation valves

- isolation of each of the four sets of two series valves in line "A" is dependent upon Div "1" actuation
- isolation of each of the four sets of two series valves in line "B" is dependent upon Div "2" actuation
- valves are functionally tested each refueling

Calculation of Conditional Containment Failure Probability:

o Initiating event: Large LOCA (3E-4/yr)
Probability that Large LOCA originates with Recirculation pump discharge piping = 0.1 (based on estimate that recirculation pump discharge piping represents 10% of large in-containment piping)

SAFETY ASSESSMENT OF HYDRAULIC LINE FAILURE VS SAFETY ASSESSMENT OF POTENTIAL CORRECTIVE ACTIONS

- o Conditional failure probability of hydraulic piping inside containment given failure of recirculation piping = 1.0

  Note: Failure is assumed to result from movement of the pump discharge piping initiating a hydraulic line failure at the actuator - no credit is given for the ameliorating effects of the flexible hose connections between the valve actuators and the hydraulic lines inside containment. There are actually no postulated breaks that would cause failure of the hydraulic lines.

- o Probability that the hydraulic lines will fail outside containment is assumed to be 1.0 (a factor of 1E-2 could be justified for equivalent instrument line break accidents). There are actually no postulated breaks that would cause failure of the hydraulic lines.

- o Probability that one of the two actuation systems fails on demand = 2 * 8.3E-3

  Note: calculated as follows: 1.27E-6/hr[1] * 13,140 hrs between tests (18 mo test interval) * 1/2 (finds average probability over the interval)

[1] Relay failure rate taken from NPDRS, NUREG/CR-2815 gives 1E-6 per hour.

- o Conditional probability of core damage given a Large LOCA = 1E-4

Annual calculated frequency for this containment bypass scenario is 5E-11 per year (less than the Individual Plant Evaluation (IPE) truncation value of 1E-9/yr).

Other LOCA core melt scenarios may be more frequent, but in other scenarios the conditional probability of hydraulic line failure will be lower because there will be less dependency between the initiating event and induced failure of the piping.

Safety Assessment of Corrective Actions

a) Manual Shutdown

The WNP-2 IPE assumes 0.5 manual shutdowns per year. Based on this initiator frequency the total core damage frequency due to manual shutdown events is calculated to be 4.5E-8 per year. Based on a sensitivity study using the WNP-2 IPE model, an increase in manual shutdown frequency to 1.5 per year increases its total contribution to core damage frequency to 15.8E-8 per year.

SAFETY ASSESSMENT OF HYDRAULIC LINE FAILURE VS SAFETY ASSESSMENT OF POTENTIAL CORRECTIVE ACTIONS

b) Operation with Hydraulic Isolation Valves Closed

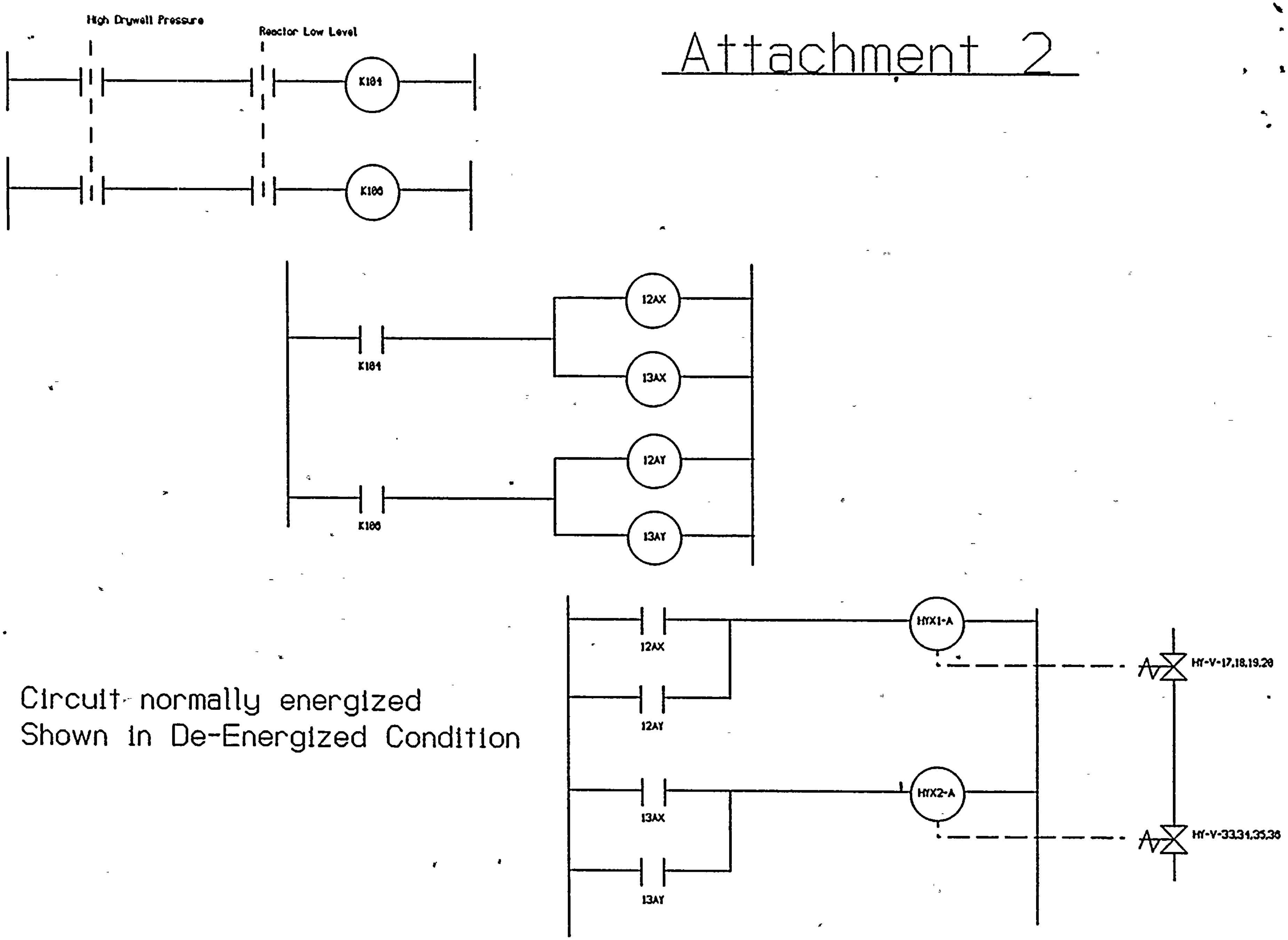
Isolation of the hydraulic lines (closure of the isolation valves) for the rest of this cycle can be used as a compensatory measure, however, this would result in loss of all recirculation flow control. As a result, the plant would be unable to respond to a relatively minor transient in the feedwater system. This means that a feedwater transient would initiate a plant SCRAM and has the potential for increasing risk.

Feedwater transients are typically encountered about 3 times per year, and as a result, plant trips could be expected to increase from a current level of 4 per year to 7 per year. This assumes that the plant would be unable to respond to even a minor transient. Based on a sensitivity study using the WNP-2 IPE model, even a single event increase resulting in a plant SCRAM will increase core damage frequency by approximately 3E-7 per year.

Conclusion:

Manual shutdown and/or isolation of the hydraulic lines is not recommended. The increase in risk from the potential corrective actions is greater than the risk of allowing plant operation in the current configuration.

Attachment 2



Circuit normally energized
Shown in De-Energized Condition