Centralfiles

Consumers Power Company

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US Nuclear Regulatory Commission
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DOCKET 50-255 - LICENSE DPR-20 -
PALISADES PLANT - IE BULLETIN 79-06B

Consumers Power Company's response to IE Bulletin 79-06B, which was received on April 18, 1979, is provided in the attachment to this letter.

David P Hoffman (Signed)

David P Hoffman
Assistant Nuclear Licensing Administrator

CC Director, Nuclear Reactor Regulation
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ATTACHMENT

Item 1

Review the description of circumstances described in Enclosure 1 of IE Bulletin 79-05 and the preliminary chronology of the TMI-2 3/28/79 accident included in Enclosure 1 to IE Bulletin 79-05A.

a. This review should be directed toward understanding: (1) The extreme seriousness and consequences of the simultaneous blocking of both auxiliary feed-water trains at the Three Mile Island Unit 2 plant and other actions taken during the early phases of the accident; (2) The apparent operational errors which led to the eventual core damage; (3) That the potential exists, under certain accident or transient conditions, to have a water level in the pressurizer simultaneously with the reactor vessel not full of water; and (4) The necessity to systematically analyze plant conditions and parameters and take appropriate corrective action.

b. Operational personnel should be instructed to: (1) Not override automatic action of engineered safety features unless continued operation of engineered safety features will result in unsafe plant conditions (see Section 6a); and (2) Not make operational decisions based solely on a single plant parameter indication when one or more confirmatory indications are available.

c. All licensed operators and plant management and supervisors with operational responsibilities shall participate in this review and such participation shall be documented in plant records.

Response

The TMI incident was reviewed with plant personnel during the week following the occurrence. This review, which was not documented, was aimed primarily at achieving an understanding of the conditions and events which led to the fuel damage and off-site releases.

On April 19, 1979, three NRC personnel came to the plant site and conducted a review of the TMI incident with plant operating, supervisory and management personnel. This review, which has been documented, covered the areas specified in Item 1a above.

In addition to the above reviews, a memorandum stressing the points listed in (a) and (b) above will be routed as appropriate to operating, supervisory and management personnel.

Automatic operation of safeguards equipment is not permitted to be overriden when a Safety Injection Actuation Signal (SIS) is present. After the SIS has cleared, Safety Injection may be reset. Operators are being instructed not to reset Safety Injection unless all of the conditions listed below have been met:

a. The cause of the low-pressure condition is known and corrected.

b. The reactor is shutdown and will remain shutdown.

c. The following three conditions are met:

1. Tav is stable or increasing and is less than 545°F.
2. Pressurizer level is greater than 20% and is returning to normal.
3. PCS pressure is greater than 1700 psi and is returning to normal.

Item 2

Review the actions required by your operating procedures for coping with transients and accidents, with particular attention to:

a. Recognition of the possibility of forming voids in the primary coolant system large enough to compromise the core cooling capability, especially natural circulation capability.

b. Operation action required to prevent the formation of such voids.

c. Operator action required to enhance core cooling in the event such voids are formed (eg, remote venting).

Response

a. The plant's off-normal and emergency procedures are being reviewed to determine if they contain adequate instructions to permit the operators to recognize conditions which could result in void formation in the primary coolant system. Procedures for situations which result in depressurization of the PCS will be revised as necessary to permit recognition of void formation.

b. Procedures for situations which result in depressurization of the PCS will be revised as needed to include actions to prevent void formation.

To prevent void formation within the PCS, it is necessary to maintain system pressure greater than the saturation pressure associated with primary coolant temperature. Accordingly, to facilitate operations, a saturation curve will be either displayed in the Control Room or otherwise made readily available to the operators. In addition, consideration will be given to providing continuous monitoring of subcooling conditions or annunciation of approach to saturation conditions.

c. Actions to enhance core cooling will be incorporated as needed into the applicable emergency and off-normal procedures. In particular, maintaining forced flow through the core and maintaining or reestablishing the steam generators as a heat sink will be addressed.

The above actions will be completed by May 18, 1979.

Item 3

Review the containment isolation initiation design and procedures, and prepare and implement all changes necessary to permit containment isolation whether manual or automatic, of all lines whose isolation does not degrade needed safety features or cooling capability, upon automatic initiation of safety injection.

Response

The containment isolation signal is initiated by either containment High Pressure (CHP-set point 5-5.75 psig) or containment High Radiation (CHR-set point > 20R/hour). The Safety Injection Actuation Signal (SIS) is initiated by either CHP or pressurizer low pressure (set point ≥ 1593 psia). SIS does not initiate a complete isolation of containment, but does isolate the containment sump drain.

The containment isolation signal closes a number of valves, among which is the primary coolant pumps seals controlled bleed-off line. The effect that isolating the controlled bleed-off would have on PCP seal performance (and ultimately on PCP operability) is not known at this time.

The lines which could carry significant quantities of radioactive fluids out of containment are the containment sump drain and the containment ventilation exhaust lines. Because the sump drains are automatically isolated upon receipt of an SIS, and because the purge and exhaust system is required to be isolated whenever PCS temperature is above 210°F, we conclude that no additional benefit would be derived from initiation of containment isolation upon receipt of an SIS. Furthermore, the potentially deleterious effects of interrupting PCP seal bleed-off has not yet been evaluated.

Item 4

For facilities which the auxiliary feed-water system is not automatically initiated, prepare and implement immediately procedures which require the stationing of an individual (with no other assigned concurrent duties and in direct and continuous communication with the Control Room) to promptly initiate adequate auxiliary feedwater to the steam generator(s) for those transients or accidents, the consequences of which can be limited by such action.

Response

The Palisades steam generators are sized such that they can provide approximately 16 minutes of decay heat removal following a loss of feedwater from full power. (Reference: Exxon Report XN-NF-77-18; Plant Transient Analysis of the Palisades Reactor for Operation at 2530 MW_t; submitted to NRR on July 28, 1977). Because of this, neither immediate nor automatic initiation of auxiliary feed-water flow is considered to be as critical as at TMI.

Both the Reactor Trip and Loss of Feed-Water procedures require starting of the auxiliary feed-water system in order to provide assurance that the steam generators will remain available to remove decay heat. Auxiliary feed-water flow (motor and turbine driven pumps along with control valves) is normally initiated and controlled from the Control Room. It can, however, be initiated and controlled locally.

It is the normal duty of the Control Room Operator #2 to verify plant shutdown and immediately initiate auxiliary feed-water flow on a plant trip. As a backup to this, we still have 15 minutes in which to dispatch an Auxiliary Operator to locally initiate and control auxiliary feed-water flow. Thus, Consumers Power Company concludes that we already meet the intent of Item 4.

Item 5

For your facilities, prepare and implement immediately procedures which:

a. Identify those plant indications (such as valve discharge piping temperature, valve position indication, or valve discharge relief tank temperature or pressure indication) which plant operators may utilize to determine that pressurizer power operated relief valve(s) are open, and

b. Direct the plant operators to manually close the power operated relief block valve(s) when reactor coolant system pressure is reduced to below the set point for normal automatic closure of the power operated relief valve(s) and the valve(s) remain stuck open.

Response

The power operated relief valves (PORVs) at Palisades are normally isolated from the pressurizer such that they cannot remove high energy fluids from the primary coolant system. The PORVs are placed in service only to provide overpressure protection when PCS temperature is less than 300°F. It is noted that no credit is taken for PORV operation in any of the FSAR accident analyses.

a. The following indications are available to notify the operator that a PORV may be open.

- "PORV OPEN" annunciation. This annunciator is actuated by the same relay which sends the opening signal to the PORV. (Applicable only when the overpressure protection circuit is armed.)
- PORV DISCHARGE HIGH TEMPERATURE annunciation.
- QUENCH TANK HIGH TEMPERATURE annunciation.
- QUENCH TANK HIGH-PRESSURE annunciation.
- QUENCH TANK HIGH LEVEL annunciation.

- Event Recorder. The event recorder records the open or closed position of the PORVs, as indicated by position switches on the valves.

- Open/Closed Lights. These lights are energized by position switches on the PORVs.

b. The alarm response procedure directs the operator to stop the relief flow in the event a PORV sticks open.

Item 6

Review the action directed by the operating procedures and training instructions to ensure that:

a. Operators do not override automatic actions of engineered safety features, unless continued operation of engineered safety features will result in unsafe plant conditions. For example, if continued operation of engineered safety features would threaten reactor vessel integrity then the HPI should be secured (as noted in b(2) below).

b. Operating procedures currently, or are revised to, specify that if the high-pressure injection (HPI) system has been automatically actuated because of low-pressure condition, it must remain in operation until either:

   (1) Both low-pressure injection (LPI) pumps are in operation and flowing for 20 minutes or longer; at a rate which would assure stable plant behavior; or

   (2) The HPI system has been in operation for 20 minutes, and all hot and cold leg temperatures are at least 50 degrees below the saturation temperature for the existing RCS pressure. If 50 degrees subcooling cannot be maintained after HPI cutoff, the HPI shall be reactivated. The degree of subcooling beyond 50 degrees F and the length of time HPI is in operation shall be limited by the pressure/temperature considerations for the vessel integrity.

c. Operating procedures currently, or are revised to, specify that in the event of HPI initiation with reactor coolant pumps (RCP) operating, at least one RCP shall remain operating in each loop as long as the pump(s) is providing forced flow.

d. Operators are provided additional information and instructions to not rely upon pressurizer level indication alone, but to also examine pressurizer pressure and other plant parameter indications in evaluating plant conditions, eg, water, inventory in the reactor primary system.

Response

a. Operators are not permitted to override engineered safety features. When conditions requiring engineered safety features have cleared, the engineered safety features may be reset under specified conditions. For safety injection, resetting will be permitted providing all the below listed conditions are met:

   (1) The cause of the low-pressure conditions is known and has been corrected.

   (2) The reactor is shutdown and will remain shutdown.

   (3) The following three conditions are met:

      (a) Tav is stable or increasing and is less than 545°F.
      (b) PCS pressure is greater than 1700 psi and is returning to normal.
      (c) Pressurizer level is greater than 20% and is returning to normal. (NOTE: Conditions (a) and (b) will provide a minimum of 50°F of subcooling.)

b. Plant procedures will be revised to specify that HPSI will remain in operation for a minimum of 20 minutes after automatic or manual initiation and that a minimum of 50°F of subcooling must be achieved. Prior to making these procedural changes, however, modifications must be made to the component cooling water supplies to the engineered safeguards pumps.

c. Procedures will be revised to require operation of at least one PCP in each loop following HPSI initiation. Because the safety injection actuation signal isolates the supply of cooling water to the PCP seals, a modification to change this isolation feature must be made before procedures can be revised.

d. Operating personnel are being instructed to utilize other indications in addition to pressurizer level for determining condition of the PCS.

The above actions will be completed by May 18, 1979.

Item 7

Review all safety-related valve positions, positioning requirements and positive controls to assure that valves remain positioned (open or closed) in a manner to ensure the proper operation of engineered safety features. Also review related procedures, such as those for maintenance, testing, plant and system start-up, and supervisory periodic (eg, daily/shift checks), surveillance to ensure that such valves are returned to their correct positions following necessary manipulations and are maintained in their proper positions during all operational modes.

Response

The following systems have been reviewed with respect to valve positions, positioning requirements and positive controls as requested above:

- Auxiliary feedwater.
- Containment spray (including iodine removal system).
- Concentrated boric acid injection.
- High-pressure injection.
- Low-pressure injection.
- Containment sump recirculation (including required portions of the shutdown cooling system).

The reviews indicate that the valve positions, positioning requirements and positive controls are adequate to ensure proper operation of engineered safety features. The following items were verified:

- Failure modes (ie, fail open/closed/as is) of valves would insure proper engineered safety features operation.

- Manual valves are required by checklists to be locked in the position required for proper system operation.

- All valving required for proper system operation is included on system checklists.

Maintenance on safety-related systems is performed under administrative controls which provide assurance that systems are valved for operation upon completion of the maintenance activity. The administrative controls are implemented through the use of an Equipment Outage Request (EOR) form which must be completed before a system can be declared operable. The EOR form, through tagging orders, has provisions for verification of proper valving. Other procedures (testing and start-up/operating) have valving requirements within the procedures themselves. All applicable fixed maintenance procedures, surveillance (testing) procedures and operations procedures were reviewed in detail to verify the above statement.

Item 8

Review your operating modes and procedures for all systems designed to transfer potentially radioactive gases and liquids out of the primary containment to assure that undesired pumping, venting or other release of radioactive liquids and gases will not occur inadvertently.

In particular, ensure that such an occurrence would not be caused by the resetting of engineered safety features instrumentation. List all such systems and indicate:

a. Whether interlocks exist to prevent transfer when high radiation indication exists, and

b. Whether such systems are isolated by the containment isolation signal.

c. The basis on which continued operability of the above features is assured.

Response

Systems designed to transfer potentially radioactive gases or liquids from containment are:

- Chemical and volume control (letdown).
- Primary coolant pump seal controlled bleed-off.
- Primary coolant system sampling.
- Containment purge and exhaust.
- Containment sump drain.
- Containment vent header (waste gas header).
- Clean waste receiver tanks, vents and discharge.
- Primary system drain tank discharge.
- Containment sump recirculation.

A review of the operating modes and operating procedures for the above systems revealed that inadvertent operation is not likely to occur. Resetting of the safety injection signal will not result in inadvertent operation of any of the above systems.

a., b., and c. below are in response to Questions 8 a., b., and c. above.

a. The containment high radiation signal will result in isolation of the systems listed above (except for containment sump recirculation).

b. The containment isolation signal (initiated by either CHP or CHR) will cause isolation of the systems listed above (except for containment sump recirculation).

c. Operability of the automatic isolation valves in the above lines is verified quarterly. Monthly, the CHP pressure switches are tested to verify proper operation.

Item 9

Review and modify as necessary your maintenance and test procedures to ensure that they require:

a. Verification, by test or inspection, of the operability of redundant safety-related systems prior to the removal of any safety-related system from service.

b. Verification of the operability of all safety-related systems when they are returned to service following maintenance or testing.

c. Explicit notification of involved reactor operational personnel whenever a safety-related system is removed from and returned to service.

Response

The reviews specified above have been made. With respect to Item a., a revised Equipment Outage Request (EOR) form (see response to Item 7) will be used to ensure that testing of redundant equipment is accomplished prior to removal of safety-related equipment or systems from service for maintenance. With respect to Item b., the EOR form adequately addresses return-to-service operability checks following maintenance activities. Testing procedures include operability verifications prior to test completion. With regard to Item c., involved reactor operational personnel are explicitly informed of the operability status of safety-related equipment and systems whenever they are removed from or returned to service.

Item 10

Review your prompt reporting procedures for NRC notification to assure that NRC is notified within one hour of the time the reactor is not in a controlled or expected condition of operation. Further, at that time an open continuous communication channel shall be established and maintained with NRC.

Response

Procedures will be revised to include the above item by May 18, 1979.

Item 11

Review operating modes and procedures to deal with significant amounts of hydrogen gas that may be generated during a transient or other accident that would either remain inside the primary system or be released to the containment.

Response

An off-normal procedure which will permit dealing with hydrogen evolved during a transient or other accident will be developed by May 18, 1979.