August 12, 1987

MEMORANDUM FOR: William G. Guldemond, Chief
Projects Branch No. 2
Division of Reactor Projects
Region III

FROM: Thomas V. Wambach, Project Manager
Project Directorate III-1
Division of Reactor Projects-III, IV, V
& Special Projects
Office of Nuclear Reactor Regulation

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SUBJECT: REVIEW OF CONSUMERS POWER COMPANY'S SAFETY EVALUATIONS FOR FACILITY CHANGES - PALISADES PLANT

The Project Manager performed a review of safety evaluations for facility changes at Palisades during a site visit from July 7 through July 9, 1987. The results of this review are summarized in the attachment. The sample of evaluations chosen were selected from the annual report submitted by Consumers Power Company by letter dated April 30, 1987 based on the summary given in the annual report. It is noted that the summary given in the annual report is no different from and no less comprehensive than the information given on the Safety Evaluation NODS Form 3104. However, the Project Manager did have the benefit of all of the other documents in the Facility Change Package.

Original signed by
Thomas V. Wambach, Project Manager
Project Directorate III-1
Division of Reactor Projects - III, IV, V
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Office of Nuclear Reactor Regulation

Attachment:
As stated

JVW

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REVIEW OF CONSUMERS POWER COMPANY
SAFETY EVALUATIONS FOR FACILITY CHANGES
FOR
PALISADES PLANT

Safety Evaluation For Changes To Facility, Procedures, And Tests

The inspector reviewed the procedure and forms used by the licensee to perform the evaluations required by 10 CFR 50.59(b)(1) to document the bases for the determination that changes to the facility, as described in the SAR, to procedures, as described in the SAR and tests or experiments not described in the SAR do not involve an unreviewed safety question. Eleven of these concluded that no unreviewed safety question was involved. One concluded that an unreviewed safety question was involved and one concluded Technical Specifications changes were required. These were submitted to NRC for review and approval, which were granted in both cases.

The procedure for reviewing these changes, administrative procedure 3.07 dated July 23, 1986, and attachments 1 through 4 were reviewed. The results of a previous review of this procedure is detailed in Inspection Report 50-255/86035. The relevancy of a finding in that inspection report that the procedure fails to specify minimum qualification requirements for personnel performing safety evaluations was demonstrated by the wide range in quality of the evaluations sampled. In addition to technical competency, training in safety evaluation writing would aid the communication of all the technical and safety issues considered to the evaluation reader, aiding the PRC members and other readers to more quickly understand and form a judgement.

The procedure also requires only that the reviewer be a PRC member or designated alternate without reference to area of expertise. If the appropriate areas of expertise are not covered, a deficient evaluation could go undetected until PRC review, delaying the modification process. Section 5.3.2 states that a change involving an unreviewed safety question may proceed with installation prior to NRC approval, provided it is not declared operable. This is misleading in that the installation, itself, may be the source of the unreviewed safety question (e.g. structural considerations, fire loadings, fire barriers, ventilation distribution and flow patterns, etc.).

The documentation of the safety evaluation according to the procedure is done on a two page NODS Form 3104. However, the inspector found that the documentation needed is usually much more if the reader is to understand the issues and the bases for conclusions. The safety evaluation is included in the facility change package given to the PRC and the complete package can be quite voluminous with much of the material not relevant to the PRC review. The inspector found, in some cases, it was time-consuming to search through all the memoranda, forms, and letters to extract relevant information when the safety evaluation was brief and just stated the conclusions. In some cases, because of time constraint of the inspection (3 days), some information was not found. The inspector believes that the task of the PRC member reviewing the facility change for the purpose of determining its effect on plant safety would be made easier and more efficient if the safety evaluation was more complete by itself. It should include a description of the change, the

purpose of the the change, the safety functions involved before change, the effect of the change on these functions including potential failure modes introduced by the change and finally the responses to the four questions pertaining to 10 CFR 50.59. Some of the safety evaluations did this even though the form used at the time of the evaluation would only require the responses to the four questions pertaining to 10 CFR 50.59 and some evaluators chose to do that. A draft of a Safety Review Form was shown to the inspector that appears to take the approach of the expanded, "stand-alone" type of safety evaluation discussed above. This also would make it easier for historical purposes (e.g. configuration management control) for future licensee personnel to keep track of why facility changes were made and what effects were or were not considered at the time.

The individual safety evaluations sampled were:

FC-613 Auxiliary Feedwater Nozzle Modification

The analysis of this piping modification, removal of the auxiliary feedwater spargers and replacement with an open-ended elbow with nozzle liner, available at the time of the safety evaluation concluded that the design met the requirements of ASME, Section III for at least 18 months or approximately 500 cycles. This apparent limitation was not addressed in the safety evaluation. More detailed analyses were performed prior to exceeding the 18 month limitation as part of the corrective action program and the results indicated the piping would meet the requirements for 20 years. The licensee stated that the piping ISI has been included in the Periodic Activity Control System with a 15 year interval. The PRC did not require this corrective action to be reported back to the Committee. It was not apparent to the inspector that consideration of the effects of thermal differential stresses on the tube bundle and support plates was addressed. The only analysis the inspector could find in the facility change package related to the stresses in the nozzle and nozzle liner. Previously the cold auxiliary feedwater was distributed by the sparger (aux. feedwater sparger or originally the main feedwater sparger) around the periphery of the steam generator. With this modification, all the cold water is delivered at one location on one side of the steam generator. The temperature differential on the steam generator internals would be especially aggravated if the water level drops below the top of the tube bundle.

FC-657 Isolation Of CCW From Containment

This evaluation was complete and well written. The change was described, the purpose of the change, the safety function, the previous design, the good features and bad features of the previous design and the proposed design and their effects on the safety function. Then the conclusions were made for the 10 CFR 50.59 considerations.

FC-576 Install 2" Auto Isolation Valve On Penetration #33

This safety evaluation consists of five sentences and two checks in "yes" boxes and 6 checks in "no" boxes. The reader must do some research to find out what system passes through penetration #33, what the previous design looked like and what the proposed design looked like. From reading other documents in the change package it was determined that there were three purposes to be fulfilled by this valve addition: 1) reduce the number of containment isolation valves for this penetration from seven to two making testing and maintenance of valves easier; 2) bring this penetration isolation valves into conformance with the FSAR (5.1.6.2 (a) of the original FSAR and 5.1.6.8 of the Updated FSAR); and 3) reduce personnel exposure by providing a means of operating the isolation valves remotely rather than manually for SI Tank sampling (a process that requires two operators and a Radiation Safety Technician to enter a hi-rad area at least monthly, potentially much more frequently when the SI check valves leak back to SI tanks). The safety evaluation presented to the PRC states: "Both the temporary modification of the installation of a manual valve and the final installation of a remotely operated control valve will decrease the probability of occurrence and the consequences of an accident and is essentially upgrading the penetration in case of an accident. The remotely operated valve will be operated from the control room or closed by CIS signal."

The "temporary" manual valve was installed fulfilling purpose (1) above. However, in a memo to file dated August 20, 1986, the remainder of the change was aborted without a safety evaluation or without returning to PRC, leaving unfulfilled purposes (2) and (3) above. When significant changes are made to a PRC approved modification (such as elimination) that invalidates the safety evaluation, a revised evaluation should be prepared and reviewed and approved by PRC.

FC-445-2 Install Motor Operators On MSIV By-Pass Valves

This evaluation did not address any potential adverse effects of this change. With control switches in the control room, the probability of operator error is increased and with electrical operation, the potential for spurious operation from hot shorts, such as from a fire, is introduced.

FC-419 Nitrogen Overpressure Addition To Hydrazine Tank

This-evaluation was acceptable.

FC-564 Addition of Alternate Safe Shutdown Panel C-150A

This evaluation did not identify that all instruments for this panel connected to RPS or ESF circuits were from the same channel and therefore separation or isolation was no problem. The statement that Technical Specifications are not affected because these instruments and controls are not in the Technical Specifications ignores the consideration of whether they should be. When a facility change involves the addition of equipment, this question should be addressed.

FC-638 Adding CCW Pumps To Normal Shutdown Sequencer

This evaluation was acceptable.

FC-639 Installation Of Isolation Switches For Alternate Shutdown Panel

This evaluation was acceptable. It concluded that an unreviewed safety question was involved because of the potential for mispositioning switches or failure of multi-contacts (63) on switches. This change was, therefore, submitted to the NRC and received approval.

T-195 PCS Mass Flow Determination

The evaluation of this test procedure was acceptable.

FC-570 Addition Of Service Water Pump Motors' Spray Deflectors

Although this evaluation does not address adverse effects on air cooling for the motors, the inspector was informed that notes written on the PRC routing sheet indicate that this issue was raised and evaluated. The cooling was adequate.

FC-510-5 Redesign Containment Purge

Since this change included Technical Specifications that restricted the use of the new system to periods when the reactor was in cold shutdown or refueling conditions, the determination of no unreviewed safety question was simplified and was acceptable. The proposed Technical Specifications were submitted to and approved by the NRC.

FC-679 Supports For Nozzle Of HC 23-3" Adjacent To SIRW Tank

The Facility Change Form for this change states that leakage is occurring at the recirculation discharge line, however, it is not known if the leakage is from the pipe or the SIRW Tank. Discussions with licensee staff indicate that observations have determined that the leakage is not from the pipe but somewhere above and is running down the tank and pipe. The leak rate is about 1 drop per minute of water with high boron content, therefore, indicating the source as the SIRW Tank. It has been determined that the minimum wall thickness of the pipe is 0.076" in a one inch arc of the circumference approximately 2 inches in height. The original wall thickness of this 3 inch pipe was approximately 0.275." This facility change provides supports, both vertical and horizontal, at this degraded portion of the pipe "to ensure no structural forces are on the pipe." The safety evaluation states that the only stresses left on the pipe will be due to pressure. This will allow the wall thickness of the pipe to be 0.033" and meet design analysis. On this basis, the evaluator determined that no unreviewed safety question was involved.

The inspector finds no discussion of the effects of stresses that would be produced at this area of supports in the case of a seismic event. In addition, it is not clear if this is the only part of the pipe suffering degradation or just the point of minimum wall thickness. It appears that a more detailed piping analysis is required than that used as a basis for this modification, that its results probably would have indicated a loss in safety margin, and, therefore, it would have required NRC review and approval.

Summary:

The procedure should be upgraded and the forms expanded to provide the PRC members and any other reviewer a more comprehensive document that allows review without digging through all the design change, quality control and other administrative documentation. This along with training, would provide more consistent, high quality evaluations.

The most general problem found involved not concentrating on what possible adverse effects could result from loss of features in the original design or from failures occurring (either human or equipment) in the new design. This is the whole thrust of 10 CFR 50.59, not what improvement can be made beyond what was approved but what reduction in safety might occur from what has been approved. If a reduction is involved, it still may be acceptable. However, the NRC must review to ensure the staff agrees that any reduction is outweighed by increase in overall plant safety.

Finally, when changes are made to a modification approved by the PRC that impacts the content or validity of the safety evaluation reviewed by the PRC, this issue should be the subject of a revised safety evaluation and be brought back to the PRC.