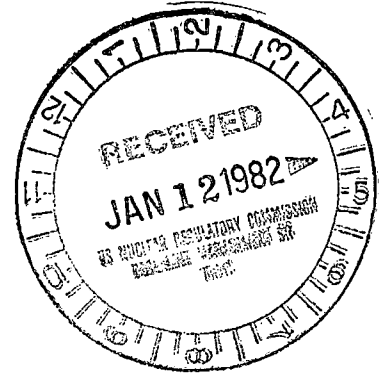




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January 4, 1982

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Operating Reactors Branch No 5  
Nuclear Reactor Regulation  
US Nuclear Regulatory Commission  
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 -  
PALISADES PLANT - SEP TOPIC III-6, SEISMIC DESIGN CONSIDERATIONS

During the meeting between the NRC, Consumers Power Co., et.al. held in Jackson on November 6, 1981, CPCo was requested to provide additional information concerning several open SEP seismic design issues for Palisades. A partial response to this request was provided in our letter of December 15, 1981. This letter provides the majority of the remaining information requested.

Attachment 1 is a copy of C-E Report TR-ESE-437, "Palisades CRDM Dynamic Analysis Report", Rev. 01. The pages affected by this Revision address the questions which were raised during the November 6 technical review meeting. Revision 0 of this report was previously submitted to the NRC by CPCo letter dated August 3, 1981.

The most important change is the clarification of a perceived large discrepancy between originally and recently computed bolt stresses. Whereas the original (1967) computation considered the shock arrestor stresses, sheets 8 through 11 of Report TR-ESE-437 address the stresses in the flange bolts between the nozzles and the CRDMs. The new Appendix to the subject report provides a true comparison between the original and the recent analysis for the shock arrestor bolts. Differences are explained by the use of a more representative dynamic model (frame structure for CRDM's in a row) in the more recent analysis.

Attachment 2 contains an update of the seismic analysis of the reactor internals which has been completed based on SSE factors of 1 g horizontal acceleration and .34 g vertical acceleration. These factors are higher than those utilized in the development of the margins previously submitted. This increase is due to an inconsistency between the seismic accelerations used for the reactor vessel and the internals. Attached is an updated summary of the calculated stress margins, based on the transmission of these increased loads to the internals from the reactor vessel.

The stability analysis requested at the meeting of November 6, 1981, is also contained in this attachment. The analysis show that there is no stability problem. The example chosen, of the longest lower support beam in the core support barrel, was felt to be the most severe case.

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a redundant train of auxiliary feedwater which is independent of the existing system and seismically qualified. The existing system would, therefore, be considered a single train with two pumps - the fully qualified motor driven pump, and the steam driven pump which would have a seismically qualified pump but a turbine driver which lacks qualification documentation. Since both motor-driven pumps will be powered from separate emergency power sources, full reliance on the turbine pump driver will no longer be necessary. It is therefore concluded that the turbine driver from P8B should be dropped from further consideration under SEP Topic III-6.

The second area which needs further amplification concerns the structural integrity of various safety-related cabinets and panels during a seismic event. We understand Dr. Stevenson's concerns, but we also believe that these concerns are somewhat over emphasized for Palisades. With the very low site seismic spectra, and the fact that building amplification of ground motion is expected to be relatively low at the locations of interest (as can also be concluded by observing floor response spectra in NUREG/CR-1833). We do not believe that panel integrity is a major concern.

Attachment 7 contains a list of the equipment which was included in the reviews of anchorage and support of safety-related electrical equipment (initiated by NRC letter of January 1, 1980). Note that essentially all control room panels are listed even though several do not have safety functions. The right-hand column of this table shows the type of anchorage which is installed on each panel. As you will note, most of the important panels have upper supports as well as floor anchors. We understand that this support configuration satisfies Dr. Stevenson's concerns for those panels. For the balance of the panels, however, calculations are not available to specifically address seismic integrity. Since normal practice for new panels is to qualify them by testing, little information exists to realistically qualify in-place panels by analysis. As we have discussed previously with the NRC, the SEP Owners Group has recognized this problem, and is conducting a program to develop this analysis methodology. Until this methodology is available, we do not believe that additional calculations are appropriate.

This subject has been discussed previously in CPCo letter dated March 27, 1981. In that letter, several points were made which support the adequacy of the existing panels until realistic modelling and calculation techniques are available. This letter states:

- " a. In the course of reviewing the equipment anchorages our consultant informally looked into some of the more obvious questions related to operability. Although this was not an exhaustive review, their opinion, based on their experience, was that the equipment with its new anchorages will survive an earthquake of the size of the Palisades SSE and will remain functional after the earthquake.
- b. Actual observed earthquake experience is that well anchored equipment of the type used at Palisades will not be damaged by an earthquake of the size of Palisades safe shutdown earthquake and will function normally afterward.

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Attachment 3 provides additional information (5 letters) concerning the Essential Service Water Pump. This information supplements EDS Nuclear Report 02-0660-1089, "Seismic Evaluation of the Essential Service Water Pump - Palisades Nuclear Power Plant", Rev. 0, which was submitted to the NRC on December 15, 1981.

Attachment 4 provides three items related to the diesel generator fuel oil day tanks. EDS report 02-0660-1086, "Seismic Evaluation of the Emergency Diesel Generator Fuel Oil Day Tank", Rev. 0, is hereby formally submitted. An advance copy of this report was provided to the NRC during the meeting of November 6, 1981. In addition, EDS Nuclear calculations 008 and 009 (Job 0660-005-643) are provided as a supplement per Dr. Stevenson's request. Finally, since modifications were determined to be needed, a copy of Bechtel drawing 12447-060-FSK-C-104.30(Q), Rev. 1 is enclosed to show the changes planned for these tanks. Basically, the changes include grouting the space between each tank and the concrete room walls on three sides and adding stiffening beams on the fourth side to increase the ability of the tank walls to resist postulated seismic loads.

Attachment 5 provides two items related to the safety injection tank. EDS Nuclear Report 02-0660-1087, "Seismic Evaluation of Safety Injection Tank for the Palisades Nuclear Plant", Rev. 1, is provided to address the tank and its frame and hanger support system. A copy of revision 0 of this report was provided to the NRC during the November 6 meeting. Also included is a Bechtel report, "Seismic Evaluation of Containment Dome Trusses for Consumers Power Company, Palisades Nuclear Plant, South Haven, Michigan". This report addresses the seismic adequacy of the trusses from which the safety injection tank is supported.

Attachment 6 provides a copy of Bechtel drawing 5935-C-159, Rev. 5 which shows the details of the reactor coolant pump support structures. During the November 6 meeting, Dr. Stevenson expressed a concern about buckling of tall, slender columns. A conclusion could not be reached about the applicability of this concern to the reactor coolant pump support structures because the drawings showing the design details were not immediately available. Although we have been unable to locate relevant calculations which address this concern, we believe that a review of the design drawing adequately shows that this concern is not significant for Palisades. As you will note in the drawing, the pump support structure columns are 24" OD x 3/4" wall thickness and only about 4-1/2 feet tall. We do not believe that additional calculations are necessary to resolve this issue.

In addition to the above subjects, two additional areas were discussed during the November 6 meeting which are appropriate for further amplification here. The first area concerned the seismic qualification of the auxiliary feedwater pump (P8B) turbine driver. As we noted during that meeting as well as in previous correspondence, we have had difficulty obtaining qualification information from the turbine vendor. We have concluded, however, that planned modifications to the Auxiliary Feedwater System will make further qualification efforts unnecessary.

By letter dated November 2, 1981, CPCo provided to the NRC a description of planned auxiliary feedwater system modifications. A subsequent meeting was also held with the staff on December 1, 1981 to discuss these modifications in more detail. As we discussed in the letter and meeting, it is our intent to add

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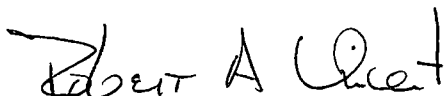
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- c. Broad bank shock tests performed on similar equipment by the Department of Defense also suggest that the equipment will remain functional at SSE seismic levels.
- d. More recent tests by certain equipment manufacturers has qualified similar equipment for much higher level earthquakes without significant modification.
- e. Earthquakes are very uncommon in Michigan and the probability of a damaging earthquake occurring in the vicinity of Palisades within the next year is very low. The cost of further expediting the program is not justifiable in light of presently known experience with this type of equipment. "

These items are still fully applicable to the present situation.

In light of the above discussion, therefore, it is the intent of CPCo to defer any additional analyses of electrical panels until the SEP Owners Group program methodology becomes available.

With the information included in this letter, it is the belief of CPCo that all open issues in Topic III-6 have now been resolved with the sole exception of electrical panel integrity. As discussed above, this final issue is being addressed under the SEP Owners Group program to develop realistic analysis methodology. We trust that the enclosed information will satisfy the staff's needs.



Robert A Vincent  
Staff Licensing Engineer

CC Administrator, Region III, USNRC  
NRC Resident Inspector - Palisades  
John D Stevenson and Assoc.

ATTACHMENTS