Consumers Power Company

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Director, Nuclear Reactor Regulation
Att Mr Dennis M Crutchfield, Chief
Operating Reactors Branch No 5
US Nuclear Regulatory Commission
Washington, DC 20555

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PALISADES PLANT - SEP TOPIC VI-10.A, ELECTRICAL, INSTRUMENTATION AND CONTROL PORTIONS OF THE TESTING OF RTS AND ESF, INCLUDING RESPONSE TIME

By letter dated November 12, 1980 and June 19, 1981, the NRC transmitted for comment a draft evaluation and an SER, respectively, for SEP Topic VI-10.A. Consumers Power Company has completed its review of these documents and find them factually correct with one exception; that is, present test procedures do not provide overlapping tests for the high rate-of-change of power trip. This is not a deviation from review criteria, however, in that this trip is an anticipatory trip which is not required to protect the reactor, and therefore is not directly governed by the review criteria.

As an issue separate from the factual content of the evaluation, we take strong exception to the staff's assertion that a time response testing program under R.G. 1.118 or IEEE 338-77 is necessary. This position is based on several considerations:

First, the majority of the circuitry to be included in this type of program is electronic which would be expected to either work normally or fail completely. A failure which simply changes response time does not appear credible. Circuits which are included within this category would be switching and logic networks, bistables and instrument loops. This remains true even when the circuitry is designed to provide time delays. An example of this is the reactor protection system at Palisades in which the output bistables have a built-in time delay of 100 msec. Since this delay is a function of capacitors in the circuits, and since there is no realistic scenario which would cause capacitance to increase, circuit degradation (ie leaky capacitors) would actually be expected to reduce response time if complete failure did not occur.

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Electromechanical devices such as relays can possibly introduce time delays; but experience has shown that nearly all failures have resulted in a total failure of the device to operate. If a relay hangs up or is slow to operate, it can ultimately be expected to result in coil failure . Time delay testing

of these devices at a refueling cycle frequency would not appear to be significantly more effective in discovering problems than routine functional testing. An exception to this case exists, however, in timing devices which use cam-operated switches (eg DBA sequencers). At Palisades, the DBA and shutdown sequencers are routinely time-response tested.

As noted in NRC letter of June 30, 1981, temperature sensors can sometimes become rather slow to respond. This is generally a result of poor thermal coupling between the detector and its thermo-well in a pipe. This is not of concern at Palisades because the only temperature signals used in reactor protection circuitry are for the thermal margin/low pressure trip. This trip protects the core only during slow reactivity addition transients such as boron dilution events in which even very long temperature sensor response times do not significantly affect plant response.

Some types of pressure transmitters can display rather slow-response times, but this would be expected to also be accompanied by other symptoms such as non-linearity or lack of directional repeatability which is readily detected during normal calibrations. Since routine instrument loop calibrations at Palisades test for these characteristics, problems such as excessive pin wear, dashpot oil viscosity changes or loss of bellows fluid which could lead to slower instrument responses are readily identified. In addition, it must be pointed out that at Palisades, pressure transmitters used for safety signals are force-balanced units which do not require flow through the sensing lines for bellows displacement. This type of instrument responds very rapidly to pressure changes and is not sensitive to internal component wear or sensing line flow restrictions that can cause slow response times in other instrument types.

Second, as noted above for the DBA sequencers, response time testing is already performed on those components which are most likely to cause problems. This testing includes DBA sequencer timing, diesel generator start times and stroke times of important valves. We do not consider that an expanded time response test program would improve overall plant safety any more than the testing which is already being accomplished.

Third, the resources which would have to be expended to conduct extensive ESF time response testing on a routine basis are excessive and do not appear to be cost-effective in terms of plant safety. One plant which can be considered representative of relatively new plants, expends approximately twenty man-weeks of work on this testing during each refueling outage. Since I&C technician staffing is largely determined by the refueling outage work load, up to three additional technicians could have to be added to the plant staff for this work.

Fourth, it is not apparent that failures which have been observed in the industry's tests over the past several years would support continuation of time response testing programs as defined by R.G. 1.118 and IEEE 3.38. Essentially all failures to meet acceptance criteria that we have been able to learn about have, as expected, been associated with time delay relays or with valve stroke times. Few appear to have been associated with pressure sensors. We have been unable to learn of any timing failures which were associated with electronic circuits. Breaker failures appear to have all

been complete failures to operate. Essentially all of these failures could have been detected through normal calibration and test procedures which overlap.

We therefore submit that extensive time response testing of entire channels from sensors to loads has not contributed materially enough to plant safety to warrant the cost. The time response testing of "higher risk" components, instrument calibrations and system functional tests which are already being conducted at Palisades are considered adequate to detect circuit problems which could lead to undesirably slow response times. We believe, therefore, that the intent of current NRC guidance is being met, and that imposition of additional time response testing requirements is unwarranted.

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