Consumers Power Company

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July 1, 1985

Director,
Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
SUPPLEMENTAL RESPONSE TO GENERIC LETTER 83-28 -
ISSUES 1.1, 1.2, AND 4.5

Consumers Power Company letter dated February 19, 1985 entitled "Palisades Plant - Revised Plan and Schedule For Completion of Actions required by Generic Letter 83-28" transmitted the plan and schedule for completion of the remaining open issues of Generic Letter 83-28. Within that correspondence, commitments were made to address Issues 1.1 and 1.2 regarding Post-Trip Review and Issue 4.5 regarding Reactor Trip System Reliability (System Functional Testing) by July 1, 1985.

Our response is provided herein.

Item 1

Issue 1.1 Post-Trip Review (Program Description and Procedure)

A program addressing the criteria of Issue 1.1 will be developed and implemented to ensure that unscheduled reactor shutdowns are properly analyzed prior to plant restart. A report describing the program will be submitted by July 1, 1985.

Response:

To ensure that unscheduled reactor shutdowns are analyzed and that a determination is made that the plant can be safely restarted, a post-trip review program has been developed. The program, implemented through the issuance of an administrative procedure provides a systematic method for diagnosing the cause(s) of a reactor trip, ascertaining the proper functioning of equipment during the trip, determining any adverse impact on plant equipment and making the determination that the plant can be safely restarted. An information copy of the subject procedure is provided in Attachment 1.

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The criteria for determining the acceptability of plant restart are delineated in the procedure, and include the completion of detailed investigation, assessment and event classification activities to support the restart decision.

The primary review and analysis responsibilities for the trip will be assigned to and performed by the Shift Engineer and Shift Supervisor, each of whom posses a Senior Reactor Operator (SRO) license. As is detailed in the procedure, certain events will involve the additional involvement of the Operations Superintendent prior to a restart decision being made by the Plant General Manager. The independent on-site safety review group will also perform an independent assessment of each reactor trip.

The procedure addresses the use of available data and information sources, and requires that documentation of the applicable plant parameters be collected in the Post-Trip Review Report. The procedure also addresses provisions to compare the event with previous reactor trips and document abnormal or unexpected plant behavior.

Requirements addressing the review of the event by the Plant Review Committee (PRC) are provided, as well as guidance regarding the convening of PRC to review the event prior to restarting the plant.

Item 2:

Issue 1.2 Post-Trip Review (Data and Information Capability)

A review of the plant data and information capability for diagnosing unscheduled reactor shutdowns will be performed. A report describing the plant's data and information capability will be submitted by July 1, 1985.

Response:

1) Capability for assessing Sequence of Events

The primary piece of equipment at the Palisades Plant for providing sequence of events information (on-off indications) is the Tennecomp Datalogger. The Tennecomp Datalogger is a computer based data acquisition, monitoring and reporting system which is capable of displaying sequence of events information with a time discrimination of 1 millisecond between events. Powered by an uninterruptible power source, the Tennecomp Datalogger monitors approximately 440 digital (status) inputs. An information listing of the monitored inputs is provided in Attachment II.

A status change for any of the monitored inputs is displayed in a printout generated by the computer. The format for displaying the information consists of a line entry which designates the time, date, identification of the input, and a word description of the status. The printout itself may be retained as a record of the sequence of events.

A secondary means of obtaining sequence of events information is provided by the Event Recorders which duplicate information provided on the Tennecomp Datalogger. The Event Recorders record status information on strip charts having a normal chart speed of 3 inches per hour. Following a turbine trip, the chart speed automatically shifts to a high speed mode of 3 inches per minute. Powered from an uninterruptible power source, the Event Recorders are capable of monitoring approximately 160 inputs through 8 strip chart drives, each able to record 20 inputs. Attachment III provides a list of the inputs monitored by the Event Recorders.

When an input channel becomes energized, the corresponding writing element providing the trace on the strip chart will deflect .1 inch laterally to the right and remain in that position until de-energized. Status information may be assessed by viewing the deflection in the strip chart trace for the given parameter. Sequence of events information may be obtained from the location of one parameter's trace deflection relative to another. Time discrimination between status inputs, however, cannot be well discerned at intervals of less than 1 second between events (high speed mode). The strip charts provide a record of the information recorded by the event recorders.

2) Capability for Assessing Time History of Analog Variables

The Tennecomp Datalogger, in addition to its sequence of events capability, also provides a time history for analog variables. The 32 monitored analog inputs are shown in Attachment IV.

A total time history of 45 minutes can be retained by the Tennecomp Datalogger surrounding a major event. Eight status inputs which represent major events will initiate collection of 15 minutes of post-trip data in addition to the normal 30 minute time history retained by the Datalogger. These major events are pressurizer high pressure, low pressure for either steam generator, low flow primary coolant loop 1, low water level in either steam generator, loss of load and turbine trip.

The 30 minute pre-trip history consists of data recorded at 1 minute intervals for the first 15 minutes, 30 second intervals for the following 10 minutes, and 5 second intervals for the final 5 minutes prior to trip. The 15 minutes of post-trip data is recorded at 5 second intervals for the initial 5 minutes following the trip, and at 1 minute intervals for the final 10 minutes.

The data format for pre/post-trip information consists of a printout with the time printed vertically down the left hand margin, and the analog parameters printed across the top of the listing. The respective analog values are shown beneath each indicated parameter, on the same line as the time indication. The printout provides a record of the event.

3) Additional Data and Information Capability

As a further aid to assess the cause of unscheduled reactor shutdowns individual strip chart plots of key parameters are also available. The parameters include reactor power, pressurizer level, pressurizer pressure, primary coolant temperature (T_{ave} and T_{cold}), and steam generator levels.

4) Planned Enhancements to Existing Capability

The plant's data and information capability will be enhanced with the addition of another computer based system known as the Critical Functions Monitor System (CFMS). The CFMS was designed to monitor remote instrumentation, display data, provide critical function alarms, and collect pre/post-trip history data. Although physically installed, the CFMS has not been fully implemented. When fully operational, the CFMS will monitor approximately 215 digital inputs and 145 analog inputs, scanning each input once each second. An information listing of the monitored inputs is provided in Attachment V.

Pre/post-trip data can be stored in two separate formats, high resolution and low resolution. High resolution data are stored every 2 seconds for all inputs for 16 hours. Data from the initial 8 hours may be transferred to magnetic tape or disc. Low resolution data are stored at 1 minute intervals for all inputs for 2 weeks. The previous week's data may also be transferred to magnetic tape or disc. High resolution data are protected for 2 hours pre-trip and 14 hours post-trip in the event of a reactor trip or Engineered Safeguard System actuation. This protection must be manually removed to resume collection of high resolution data.

Printed logs may be generated from the data stored on magnetic tape or disc. The logs will display information for up to 8 selected parameters at a time at 2 second intervals. The format consists of time and date down the left hand margin, with the selected parameters spaced horizontally across the page. The analog value for the selected parameter appears on the same line as the time/date information, under the appropriate parameter designation. Graphs may also be generated which are capable of displaying 16 hours of data.

Item 3

Issue 4.5 Reactor Trip System Reliability (System Functional Testing)

On-line functional testing of the reactor trip system is currently performed at Palisades. A report describing the program for on-line testing of the reactor trip system will be submitted by July 1, 1985.

Response:

On-line functional testing of the reactor trip system can be divided into the following 4 categories: 1) trip parameter monitoring instrumentation, 2) bistable/auxiliary trip units, 3) 2 out of 4 logic matrix, and 4) clutch power trip circuits.

1) Trip Parameter Monitoring Instrumentation

Once a shift, instrumentation channels for the various reactor protection system parameters are compared to identify and resolve potential discrepancies. The comparisons include checks of the 1) power range nuclear channels, 2) reactor coolant flow, 3) steam generator level, 4) steam generator pressure, 5) pressurizer pressure, and 6) thermal margin.

2) Bistable/Auxiliary Trip Units

On a monthly basis, a bistable trip tester is used to verify the operation of the bistable trip units for 1. steam generator level trip and pre-trip, 2. steam generator pressure trip and pre-trip, 3. pressurizer pressure trip and pre-trip, 4. reactor coolant flow trip and pre-trip, and 5. thermal margin/low pressure trip and pre-trip.

Also completed on a monthly basis, is an operability confirmation of the auxiliary trip units for: 1. containment high pressure, 2. high power, and 3. high rate of change of power.

3) 2 Out of 4 Matrix Logic

A monthly surveillance of the six 2 out of 4 Reactor Protective System logic matrices is conducted to verify proper operation. The surveillance confirms that the logic matrix relays will appropriately de-energize if the matrix continuity is interrupted.

4) Clutch Power Trip Circuits

A monthly surveillance is also performed to verify proper operation of the clutch power trip circuits. The system is designed such that two power supplies are provided for each control rod clutch power AC bus. The supplies are arranged in an auctioneering circuit to permit tripping of the power supplies during a surveillance without tripping the reactor. During the surveillance, only half the power supplies that hold the rods are tripped at a time. The half trip provides a complete method of checking the matrix relays and the clutch power supply paths. The surveillance verifies that the clutch power trip circuits operate when the logic matrix continuity is disrupted, simulating an actual trip condition.

Review of the existing intervals for on-line functional testing of the reactor trip system indicates that the current testing program is commensurate with achieving high reactor trip system availability. However, Consumers Power Company, with several other utilities, is funding an RPS/ESFAS test interval optimization study by Combustion Engineering. The study uses probabilistic risk assessment methodologies to assess the impact of changes in the test interval on the availability of the RPS and ESFAS. Appropriate Technical

Specification Changes will be requested if analysis results conclude that changes in the test interval are appropriate and justified from a nuclear safety perspective.

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Attachment