NRC PDR

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 1, 1979

Docket Nos.: 50-329
and 50-330

Consumers Power Company
ATTN: Mr. S. H. Howell
Vice President
212 West Michigan Avenue
Jackson, Michigan 49201

Gentlemen:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON INITIAL TEST PROGRAM

In continuing our review of the FSAR for Midland Plant Units 1 and 2, we find we need additional information and changes to proceed with our evaluation of your proposed initial test program. Enclosure 1 provides our initial (round-one) requests and available staff positions in this regard.

We will need complete and adequate responses to Enclosure 1 by May 1, 1979. If you cannot meet this date, inform us within seven days after receipt of this letter so that we may revise our schedule accordingly.

Enclosure 2 is an errata sheet for three of our previous requests which either contained ommissions, was mis-numbered, or was inadvertently omitted. We would appreciate your corrections as part of your reply.

We are experiencing a temporary delay with part 5 of our staff positions which was scheduled for issuance at this time. We anticipate issuance by March 9, 1979. Also, review priority for operating plants has resulted in delay of our requests for the Midland fire protection report until late March 1979.

Should you desire clarifications or other discussions of enclosure 1, please contact us.

Sincerely,

Steven A. Varga

Steven A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management

Enclosures:
1. Requests on Initial Tests
2. Errata

cc: See Page 2

A

Consumers Power Company

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ENCLOSURE 1

423.0 QUALITY ASSURANCE BRANCH - INITIAL TEST PROGRAM

423.1 (14.2) Our review of your preoperational test phase provided in Table 14.2-1 disclosed that several systems and design features may not be scheduled to be preoperationally tested. The staff's evaluation of your preoperational test phase was based on the following:

Comparison of your proposed test program with applicable regulations and Regulatory Guides, including Appendix J to 10 CFR 50 and Regulatory Guides 1.20, 1.41, 1.52, 1.68, 1.68.2, 1.79, 1.80, and 1.108.

Comparison of your proposed test program with the structures, systems, components, and design features included in your facility design that:

Will be relied upon for safe shutdown and cooldown of the reactor under normal plant conditions.

Will be relied upon for safe shutdown and cooldown of the reactor under faulted, upset, or emergency conditions.

Will be relied upon for establishing conformance with safety limits or limiting conditions for operation that will be included in the facilities' Technical Specifications.

Are classified as engineered safety features or will be relied upon to support or assure the operation of engineered safety features within design limits.

Are assumed to function and for which credit is taken in the accident analysis for the facility.

Will be utilized to process, store, control, or limit the release of radioactivity.

The description provided in Section 14 of the FSAR of your preoperational test phase should be expanded or modified to address your plans relative to the following:

(1) Your plans relative to in-plant preoperational testing in accordance with Regulatory Guides 1.41, 1.68.2, 1.80, and 1.108. Your response should include both identification of any regulatory position contained in the above listed guides that you do not plan to follow and technical justification for any exceptions taken. Your response should also specifically address items A.1.b.(4), A.4.b., A.5.d., A.5.q, A.7.d, A.10.c and A.10.e of Regulatory Guide 1.68 and provide a clear description of how you will satisfy the regulatory positions in Regulatory Guide 1.41 during preoperational testing of systems and components that are supplied onsite AC and DC emergency power.

The staff notes your position relative to Regulatory Guide 1.80 contained in Appendix 3A of your FSAR and disagrees with your position. This guide is applicable since it is used as a source of air for systems and components that provide a safety function. Therefore, modify your position to show that your test program will be consistent with the guide or to show that you will conduct equivalent testing for the air system and supplied loads.

Test abstracts for the above issues should be provided or modified, as appropriate.

(2) Your plans relative to in-plant preoperational testing of the following. Test abstracts should be provided or modified, as appropriate.

(1) Borated water storage tank auxiliaries including systems used for temperature control and indication and alarm functions.

(2) Leakage tests of ECCS and containment spray systems and testing of leak detection and alarm systems provided to control leakage from these systems.

(3) Testing of valves located in drain lines from rooms housing critical equipment to assure leak tightness and correct failure mode.

(4) Auxiliary building crane.

(5) Ventilation systems, caustic scrubbers and sump pumps (at Dow) for mitigation of chlorine spills.

(6) Leakage tests of guard pipe around suction lines from the containment sumps.

(7) Service water cooling towers and auxiliaries.

(8) Equipment and controls for remote shutdown from outside the control room.

(9) Reactor coolant system low temperature overpressure protection features.

423.2
(14.2) The staff's review of your individual preoperational test descriptions disclosed that the information provided in several of these descriptions is not sufficient for the staff to conclude that adequate testing will be performed on the systems and components covered. Expand and/or modify the test abstracts to provide the following:

(1) 14A.1.1 Main Steam Isolation Valves - Expand the abstract to show that redundancy of initiating logic, correct failure mode, and combined closure response times for instrumentation and valves will be verified. Confirm that the valves will be tested at approximately normal operating temperatures or justify testing at other conditions.

(2) 14A.1.2 Main Turbine System - Expand the abstract to show that appropriate tests will be conducted for turbine non-return, intercept and intermediate stop valves. Also show that the turbine overspeed protection system will be tested. Identify the portions of the test that will not be completed prior to fuel loading and state when the tests will be completed relative to a milestone in the test program.

(3) 14A.1.3 Condensate and Condensate Demineralizer Systems - Identify the portions that will not be completed prior to fuel loading and state when they will be completed.

(4) 14A.1.4 Feedwater System - Expand the abstract to show that condensate and feedwater heater controls, valves,

and pumps will be appropriately tested. Also confirm that main feedwater pump trip interlocks will be tested, that response times of feedwater isolation sensors, logic and valves will be demonstrated, and that system redundancy will be demonstrated for the feedwater isolation function. Identify the portions of the test that will not be completed prior to fuel loading and state when these portions will be completed.

(5) 14A.1.5 Auxiliary Feedwater System - Expand the abstract to show that the F.O.G.G. system will be tested to assure it operates per design, that the instrumentation and valves associated with the protection of the suction lines to the AFW pumps will be tested to assure redundancy, correct assignment of power supplies (electrical independence), response times within design and leak tightness of system valves. Confirm that the steam driven AFW pump will be tested over the design range of inlet steam pressures to assure the pump head/capacity will satisfy design. Address system response times.

(6) 14A.1.8 Process Steam Evaporators System - Expand the abstract to identify the testing planned for protective interlocks associated with supply and cross-tie valves from both Units 1 and 2 to the Process Steam System.

(7) 14A.1.10 Pressurizer Safety Valve Test - It is our position that the safety valves be tested in place under hot plant conditions or that justification be provided for bench testing including correlations between bench test methods and expected valve performance in service conditions.

(8) 14A.1.11 Decay Heat Removal System - Expand the abstract to show that testing will be accomplished to assure proper operation in all design modes of system operation. Also confirm the overpressure protection and isolation capability (sensors, logic and valves) from the reactor coolant system will be tested to confirm redundancy and correct assignment of power supplies (electrical independence).

(9) 14A.1.12 Low-Pressure Injection Engineered Safety Features Test - Expand the test abstract to describe how the injection flow rate into the reactor coolant system will reach steady-state values before the system becomes solid.

State how redundancy and electrical independence will be demonstrated; for system sensors, logic, and valves, state that system response times will be verified to be within design values; state that the "piggy-back" mode of operation with the high pressure injection system will be demonstrated; and define what $NPSH_a$ measurements will be obtained. Also explain or clarify test method item 3.1 and modify the acceptance criteria to provide upper and lower bounds for injection flow capability to assure injection flow capability sufficient to satisfy safety assumptions and also assure that pump flow remain below values that could compromise NPSH.

(10) 14A.1.13 Makeup, Purification, and Chemical Addition System - Expand the abstract to show that system valves will be demonstrated to operate per design to an RAS signal and that associated sensors, initiating logic, and valves will be tested to assure redundancy and electrical independence. Also indicate that redundancy and electrical independence will be demonstrated for protection features for isolation of the letdown cooler and that associated valves meet design closure times.

(11) 14A.1.14 High Pressure Injection Engineered Safety Features Test - Expand the abstract to provide test objectives, methods and acceptance criteria for:

(a) "piggy-back" mode of operations,

(b) demonstrating redundancy and electrical independence and,

(c) thorough checkout of the swing pump and auxiliaries using both electrical power sources.

Describe how steady-state flow conditions can be established and confirmed for the proposed plant status. (Section 2 of the test prerequisites.) Also provide acceptance criteria for system response times.

(12) 14A.1.15 Core Flooding System - Expand the abstract to establish that instrumentation, controls and alarms will be verified to function in accordance with design.

(13) 14A.1.16 Reactor Building Spray System - Expand the test abstract to provide assurance that redundancy, electrical

independence and response times will be verified. Also provide assurance that system response to RAS will be demonstrated to function in accordance with design.

(14) 14A.1.17 Borated Water Storage Facility Test - Expand the abstract to provide assurance that redundancy and electrical independence will be demonstrated for the isolation valves and controls in the BWST recirculation system. Also provide assurance that heat tracing for the tank vent works as designed.

(15) 14A.1.18 Reactor Building Local Leak Rate Tests - Expand or provide an additional abstract to describe tests planned for the Penetration Pressurization System and the Containment Isolation Valve Seal Water System. Your response should include objectives, methods and acceptance criteria sufficient to assure that these systems work in accordance with design including redundancy, electrical independence, response times, and capacities.

(16) 14A.1.19 Main Condenser and Condenser Evacuation System - Expand the abstract to identify the portions that will not be completed prior to fuel loading and specify the milestones when the delayed portions will be completed.

(17) 14A.1.22 Service Water Cooling System - Expand the abstract to provide assurance that

(1) Redundancy and electrical independence will be demonstrated.

(2) Intake screens, sluice gates and level sensors and other actuation signals will be verified to function per design including redundancy and electrical independence.

(3) The "swing" pump and associated auxiliaries will be demonstrated using both power sources.

(4) Cooling tower isolation features will be demonstrated to function per design including redundancy and electrical independence.

(5) Intake screen auxiliaries and system strainers will be tested.

(6) Sensors, logic and isolation valves on the turbine building service water system function per design.

(7) Adequate margins for NPSH and vortex control are verified for the pumps at or below the level in the pump pit at which the sluice gates are designed to open automatically.

(18) 14A.1.23 Fuel Pool Cooling and Purification System - Expand the abstract to provide objectives, methods and acceptance criteria for the siphon breakers.

(19) 14A.1.24 Component Cooling Water System - Expand the abstract to provide assurance that

(1) Design heat removal capability will be verified for all heat exhangers.

(2) The "swing" pump and auxiliaries will be demonstrated to function in accordance with design including redundancy and electrical independence.

(3) Sensors, logic and isolation valves for low surge tank levels function in accordance with design including redundancy and electrical independence.

(20) 14A.1.25 Chilled Water and Safeguards Chilled Water Systems - Expand the abstract to provide assurance that

(1) Heat exhangers will be verified to satisfy design requirements.

(2) Redundancy and electrical independence for the system will be demonstrated.

(21) 14A.1.26 Ventilation Systems - Expand the abstract to provide objectives, methods and acceptance criteria that are sufficient to assure

(1) Redundancy and electrical independence will be demonstrated where appropriate.

(2) Response times for systems and isolation devices will be verified to be in accordance with design where appropriate.

(3) Air and water flows for the reactor building ventilation system will be in accordance with design for

both normal operations and simulated accident conditions.

(4) Design heat removal capability will be verified.

(5) The control room pressurization system will be tested to verify design pressure control and capacity.

(6) The sensitivities of sensors for control room isolation will be verified to be in accordance with design.

(22) 14A.1.27 HEPA Filter and Charcoal Adsorber Test - Expand the abstract to identify the specific systems or filters to be tested.

(23) 14A.1.28 Containment Combustible Gas Control - Expand the abstracts to provide objectives, methods and acceptance criteria to assure that redundancy and electrical independence will be demonstrated.

(24) 14A.1.29 Gaseous Waste Management System - Expand the abstract to describe the testing planned for the isolation valves between the tanks and the nitrogen makeup and compressor interlocks and hydrogen detection system. Also provide acceptance criteria for the above.

(25) 14A.1.33 Emergency Diesel Fuel Oil Storage Transfer System - Expand the abstract to provide objectives, methods and acceptance criteria to assure that proper load group assignment will be demonstrated for electrically powered equipment and instrumentation.

(26) 14A.1.40 Non-Class IE AC Power Distribution Test - It is the staff's position that appropriate tests should be conducted to demonstrate the capability of offsite power sources (including internal distribution systems) to assume emergency loads. Modify the abstract to provide objectives, methods and acceptance criteria to assure that this capability will be demonstrated and that voltage levels on class IE buses remain within design values.

(27) 14A.1.42 Emergency Diesel Generator System - Expand the abstract to provide objectives, methods and acceptance criteria to assure operation in accordance with design for diesel generator operations following a simulated

start failure signal. Also confirm that design heat removal capability will be verified for system auxiliaries.

(28) 14A.1.43 Integrated Engineered Safety Features Actuation Test - Expand and/or clarify the abstract to

(1) Confirm that both the Class IE AC and DC distribution systems not under test will be completely de-energized (step 3.1.e).

(2) Confirm that all emergency conditions will be simulated using only a single energized Class IE AC and DC train with all other plant AC and DC distribution systems de-energized, e.g., refueling accident, control room isolation, containment isolation, letdown cooler isolation, steam and feedwater line break, and auxiliary feedwater actuation.

(29) 14A.1.44 Class IE Preferred AC Power Supply - Expand the abstract to include the 120 VAC Class IE Instrumentation and Control (I&C) bus or provide another abstract to describe tests planned for this system. Also provide objectives and acceptance criteria to confirm that correct failure modes/response of supplied loads from loss of both the preferred and I&C buses will be verified by testing.

(30) 14A.1.45 Class IE DC Power System - Expand the abstract to provide objectives, methods and acceptance criteria to provide assurance that

(1) A discharge test will be conducted for each battery and the results of the tests remain within design limits.

(2) Actual system loads are verified to be within design assumptions.

(3) Supplied loads will function in accordance with design at a battery terminal voltage equivalent to the acceptance criteria for the discharge load test.

(31) 14A.1.48 Vibration Monitoring - Expand the abstract to more specifically define the test objectives, test methods and acceptance criteria for the testing planned.

(32) 14A.1.49 Plant Sampling Systems - Expand the abstract to describe the testing planned to assure that installed excess-flow check valves function in accordance with design.

(33) 14A.1.52 Engineered Safety Features Actuation System - Expand the abstract to specifically identify all ESFAS subsystems to be tested. Also provide objectives, methods and acceptance criteria to provide assurance that

(1) Response times including final control devices (valves, etc.) are in accordance with design.

(2) Response to loss of power supplies is in accordance with design.

(34) 14A.1.53 Reactor Protection System - Expand the abstract to identify any RPS channels that are not scheduled to be tested preoperationally and provide acceptance criteria that assures that the total channel response times including sensors and delays associated with the process to sensor coupling (sensing lines. etc.) will be in accordance with limiting assumptions used in your safety analysis report.

(35) 14A.1.60 Reactor Building Leak Rate Test - Expand the abstract to provide objectives and acceptance criteria for Type B and C tests. It is our position that these tests be included in the preoperational test phase. Also describe the sequence to be followed in Type A testing at peak and reduced pressures. If reduced pressure testing will follow peak pressure testing, a suitable time period ($\sim$12 hours) should be provided at the reduced pressure to assure that out-gassing from structures and components will not affect test results.

(36) 14A.1.68 Turbine Bypass System - The abstract title and purpose are inconsistent and need correction.

(37) 14A.1.69 ECCS Dump to Sump Flow Test - Expand the abstract to provide assurance of redundancy and proper load groupassignment for system instrumentation, controls, and valves.

423.3 (14.2) Our review of your proposed startup testing phase provided in Table 14.2-2 disclosed that several tests described in Regulatory Guide 1.68 may not be scheduled to be performed. Describe your plans and provide test summaries (or justification for nonperformance) of tests identified in items C.1.a, C.1.h, C.1.j, D.1.h and D.1.i of Regulatory Guide 1.68.

Our basis for including the generator trip test in Regulatory Guide 1.68 was to assure that the turbine generator would not exceed its design speed and to establish that the plant's electrical system would perform as designed for this transient test during which the system may be subjected to frequencies in excess of 60 Hz. To accomplish the test objectives, the generator should be disconnected from the transmission system in a manner that will result in the calculated maximum overspeed condition. Normally, this is accomplished by opening of the generator output breaker in a manner that will require a turbine generator overspeed condition to initiate closure of the steam admission or stop valves.

It is our understanding that typical designs of the trip logic for the generator output breakers will, for certain sensed plant conditions, result in a direct and simultaneous trip of the turbine stop valves. There usually are additional trips that will also open the generator output breakers without directly tripping the turbine stop valves. Therefore, the latter type of trip should be simulated to initiate the transient.

Modify Section 14.2 and the test descriptions as necessary to clarify that the generator trip test will be performed as intended by Regulatory Guide 1.68 and to either state that the turbine trip test will be performed at 100% power or provide technical justification for conducting the test at a different power level.

423.4 (14.2) Our review of startup test abstracts disclosed that the following require amplification or clarification:

(1) 14A.2.3, Reactor Coolant Flow and Flow Coastdown Test - Provide or reference specific quantitative acceptance criteria for the flow coastdown tests. Also establish specific quantitative acceptance criteria for maximum and minimum system flow rates with all pumps operating.

(2) 14A.2.4 Control Rod Drive Assembly Trip Test - It is our position that control rods be scram tested under plant conditions approximating extremes of temperature and flow at which the technical specifications will allow control rod withdrawal. It is also our position that the performance of the control rods dash-pots be verified to be in accordance with design. Modify the abstract to specifically define the temperature and flow conditions and provide acceptance criteria for dash-pot performance. Also provide acceptance criteria for axial power shaping rods performance during scram testing.

(3) 14A.3.1 Initial Criticality - Provide specific acceptance criteria.

(4) 14A.3.2 Low Power Physics Test - Expand the abstract to,

(1) Identify the rod groups where reactivity worth will be determined. If all banks are not planned to be measured, provide acceptance criteria for individual bank worths and total measured worth of rod groups that if exceeded, will require additional rod worth measurement tests.

(2) Provide test objectives and acceptance criteria for differential and integral group rod worths.

(3) Provide acceptance criteria and their bases for parameters 3.2.a, c, d, e and f.

(4) Provide acceptance criteria and a description of the test method for determining maximum stuck rod worth.

(5) 14A.4.2 Reactivity Coefficients at Power Test - Clarify the test purpose and provide (or reference) specific quantitative acceptance criteria. The acceptance criteria should provide assurance that the measured values, when corrected for measurement uncertainty, do not exceed values used in the safety analysis.

(6) 14A.4.4 Integrated Control System Tests - Expand and clarify the abstract to specifically identify the testing planned for cross-connected plant operation. The abstract should clearly describe the initial testing and transients planned for Unit 2 and the testing, including transient tests planned for Units 1 and 2

when operating in all of the various operating modes. Limiting transient tests should be proposed with acceptance criteria for Units 1 and 2 (when supplying the Unit 1 TG or process steam loads) that provide assurance that the plants will operate in accordance with design. Also, power levels for transient tests should be clearly defined.

(7) 14A.4.6 Power Imbalance Detector Correlation Test - Define the "prescribed conditions" in item 3 and clarify the proposed acceptance criteria.

(8) 14A.4.8 Loss of Offsite Power Test - It is our position that this test be conducted from an initial plant condition (for both units) of >10% generator output and that a total AC power blackout condition be simulated on the non-class IE distribution systems for a period of approximately 30 minutes. Expand and modify the test method and provide acceptance criteria for this position.

(9) 14A.4.10 Pseudo Dropped Rod Test - Modify the abstract to,

(1) Describe the plant conditions when the test will be conducted.

(2) Describe the length of time the rod will remain fully inserted.

(10) 14A.4.11 Pseudo Ejected Rod Test - Modify the abstract to,

(1) Define the plant conditions when the test will be performed.

(2) Clarify the test method (item 3.1).

(11) 14A.4.12 Shutdown From Outside the Control Room - The test abstract should be modified to be consistent with Regulatory Guide 1.68.2.

(12) 14A.4.14 Process Steam Startup Test - Modify the abstract to describe when the testing will be conducted (relative to fuel load dates for both units). Also describe the testing planned and provide acceptance criteria for testing the operability of valves (under simulated operating conditions) in steam supply lines to the high and low pressure evaporators and condensate return lines from the process steam system.

423.5 (14.2) Identify any of the post-fuel loading tests described in Section 14.2 which are not essential towards the demonstration of conformance with design requirements for structures, systems, components, and design features that:

(1) will be relied upon for safe shutdown and cooldown of the reactor under normal plant conditions and for maintaining the reactor in a safe condition for an extended shutdown period;

(2) will be relied upon for safe shutdown and cooldown of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions, and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions;

(3) will be relied upon for establishing conformance with safety limits or limiting conditions for operation that will be included in the facility technical specifications;

(4) are classified as engineered safety features or will be relied upon to support or assure the operations of engineered safety features within design limits;

(5) are assumed to function or for which credit is taken in the accident analysis for the facility (as described in the Final Safety Analysis Report); and

(6) will be utilized to process, store, control, or limit the release of radioactive materials.

423.6 (14.2) Table 14.2-4 lists power levels where power ascension tests will be conducted. The table is inconsistent with regulatory positions in Regulatory Guide 1.68. The table should be modified to agree with Regulatory Guide 1.68 positions or technical justification provided for exceptions.

423.7 (14.2) For the staff to complete its review of the organization and staffing of the test program, the following additional or clarifying information will be required:

The minimum qualifications requirements (educational, experience, and nuclear experience) for the following categories of personnel at the time they are assigned to the task. Your response should address all personnel

performing the tasks listed and should not be limited to only CPC personnel (e.g., Test Working Group members and augmenting personnel). Note that ANSI N45.2.6, although applicable to some categories of personnel during the construction, preoperational, and startup phases, was not intended to cover personnel in the listed categories.

(1) Personnel that supervise or direct the conduct of individual preoperational tests.

(2) Personnel that review and/or approve preoperational test procedures.

(3) Personnel that approve preoperational test results.

(4) Personnel that supervise or direct the conduct of individual startup tests.

(5) Personnel that review and/or approve startup test procedures.

(6) Personnel that approve startup test results.

ENCLOSURE 2

ERRATA

1. Our letter of February 14, 1979 forwarded a request inadvertently mis-numbered 211.187, rather than the intended 211.189.

2. The listing in footnote 1 of request 031.13 in our letter of October 13, 1978 inadvertently omitted "k) Fans" and "n) Connectors".

3. Attached request 040.113 should be added to the requests contained in our letter of February 14, 1979.

040.0 POWER SYSTEMS BRANCH

040.113 (8.2) You stated in response to item 040.84 that Midland core protection systems have as part of their design basis the loss of one reactor coolant pump flow with the reactor trip setpoints determined in part using the one pump flow coast-down curve. You further stated that this flow coast-down curve represents an equivalent system frequency decay rate of 1.8HZ/sec. Provide a description and the results of a study conducted to determine the severity of possible under-frequency conditions at the Midland site caused by system disturbances. This study should include the following:

1. Possible generation-deficient electrical island formations to determine both the frequency decay rate and the relative probability of occurrence (system under-frequency conditions generally result either from sudden loss of generating capacity or from formation of an electrical island deficient in generation).

   Out of these possible electrical island formations, identify the most likely to occur with the highest frequency decay rate.

2. A demonstration that the limiting under-frequency event was less than the rate of under frequency corresponding to the design basis reactor coolant flow coast-down curve.