Consumers Power Company

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April 15, 1983

Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND ENERGY CENTER PROJECT
MIDLAND DOCKET NOS 50-329, 50-330
FOLLOWUP INFORMATION FOR RESPONSE TO NRC EVALUATION OF PART I
SUBMITTAL FOR THE CONTROL OF HEAVY LOADS - NUREG-0612
FILE 0963 SERIAL 22008

Reference (A) J W Cook Letter to H R Denton, Serial 19377, Dated 2/17/83

Enclosure (1) Followup Information for Heavy Load Handling Devices
(2) Followup Information for Bechtel Supplied Special Lift Device
(3) Followup Information for B&W Supplied Special Lift Devices

Reference (A) submitted CP Co responses to the NRC/EG&G draft Technical Evaluation Report (TER) of the Midland Part I Heavy Load Study. The enclosure to Reference (A) committed CP Co to provide followup information on heavy load handling systems and special lift devices. Enclosures (1), (2) and (3) contain this followup information.

With this information, CP Co believes that the TER open items have been satisfactorily addressed and the Staff can complete their review and issue a final TER and a final safety evaluation on this subject.

James W. Cook

JWC/PEP/fms

CC RJCook, Midland Resident Inspector
RHernan, US NRC
LSRubenstein, US NRC
DBMiller, Midland Construction (3)
RWHuston, Washington

B030

oc0483-1720a131

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 22008 Dated April 15, 1983

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits the followup response to the NRC/EG&G draft technical evaluation of the Midland Part I Heavy Load Submittal.

CONSUMERS POWER COMPANY

By J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 15th day of April 1983

Beverly A. Avery
Notary Public Beverly A. Avery
Jackson County, Michigan

My Commission Expires January 16, 1985

oc0483-1720a131

HEAVY LOAD HANDLING DEVICE DESIGN INFORMATION

1. The heavy load TER requested more information on the design of some of the handling systems capable of lifting heavy loads (greater than 1700 lbs). These systems are:

   a. Filter Plug Hoist

   b. Portable Crane

   c. Rigging Beam - Snubbers

   d. Rigging Beam - Reactor Vessel Head Studs

   e. Rigging Beam - Miscellaneous Equipment (Unit 2 Containment)

   f. Rigging Beam - Letdown Coolers

   g. Rigging Beam - Shield Plugs

   The filter plug hoist has a 1 ton capacity and is used to lift a shield plug weighing 1050 lbs. The plug is not a heavy load and therefore not a NUREG-0612 concern. The hoist is designed to the requirements of ANSI B30.16-1973.

   The portable crane listed in Table 4 of the Midland Part I heavy load response does not exist.

   The snubber rigging beams are installed in Unit 1 containment and the plans to install them in Unit 2 containment have been changed. They have not and will not be used.

   The remainder of the handling devices listed above are designed to withstand the loads and forces imposed as specified in ANSI B.30.2-1976, Section 2.1.3.2.a.1. The materials used conform to the requirements of CMAA Specification 70-1975, Section 3.1. The general construction of the rigging beams is also in conformance with the applicable portions of Section 11-1.3 of ANSI B30.11-1980 and Section 1.3 of the AISC Manual of Steel Construction, Seventh Edition.

COMPARISON OF BECHTEL SUPPLIED SPECIAL LIFT DEVICE DESIGN TO SPECIFIC ANSI N14.6-1978 REQUIREMENTS

Spreader Beam Type IB

3.1.1 Spreader Beam Type IB and the loads to be lifted in a designated area are specified on the Bechtel drawings. Materials, heat treatment, fabrication practices, inspection and testing, quality assurance, documentation, records retention, and limitations regarding temperature, corrosive environments, etc, are covered in ASTM A 36-77a, A 307-80, AWS D1.1, AISC Manual of Steel Construction (Seventh Edition), and on the drawing notes.

3.1.2 Critical items for a safe lift include all structural components specified on the Bechtel drawing for spreader beam Type IB. Component material identification, qualification, control, and fabrication practices are covered in Section 3.1.1.

3.1.3 Signed stress analysis for spreader beam Type IB is included in the Bechtel calculations.

3.1.4 Component replacement would be made if repair is required.

3.2.1 Spreader lifting beam Type IB is capable of lifting three times the maximum load without exceeding the yield strength, and five times the maximum load without exceeding the ultimate strength of the materials. These safety factors include allowance for 15% dynamic loading. The yield strength is less than 80 percent of the ultimate strength.

3.2.4 The response to Section 3.2.1 is applicable.

3.2.5 The wire ropes conform to ANSI B30.9-1971.

3.2.6 Charpy impact tests on the materials are required by Specification 7220-C-233 to be in accordance with ASTM A 370.

3.3.1 Spreader beam Type IB is used in the controlled environment within the auxiliary building. The spreader beam is designed so that galling and lamellar tearing are of no concern.

3.3.4 Spreader beam Type IB is designed to ensure equal distribution of the load to all load-bearing attachment points.

3.3.5 Positive locking means are provided on spreader beam Type IB to ensure load retention for load-carrying components subject to inadvertent disengagement.

3.3.6 Remote actuating mechanisms are not used in spreader beam Type IB.

4.1.3 The structural material conforms to the technical standards of ASTM A 36-77a. Other materials provided for parts are proportioned to give comparable design factors.

4.1.4 Fabrication procedures are in accordance with accepted standard practices of AISC and AWS for good workmanship within the industry.

4.1.5 Welding procedures, welders, and welding operators are qualified in keeping with the requirements of the AWS Structural Welding Code, AWS D1.1-72.

4.1.6 The quality of workmanship is in accordance with the standard practices of the AISC and AWS.

4.1.7 A certificate of conformance is required for identification and certification of materials in accordance with the design drawing.

4.1.9 Certified materials are used by the fabricator.

5.1.3 Periodic testing of this device will be incorporated into our Periodic Activity Control System (PACS).

5.1.4 Use of this device will be covered by the procedure for the heavy load it handles.

5.1.5 This special lift device will be assigned a special tool number and will become part of our tool list. The methodology to be used for identifying limitations has not been finalized.

5.1.6 A full record history of this device will be maintained by the PAC and Maintenance Order Systems. The PACS will have scheduled inspection records while the Maintenance Order will document any repair work and retesting required.

5.1.7 The requirements for removal of this device from service will be specified in the Administrative Control of Heavy Loads Procedure - Station 1053.1.

5.1.8 At this time we have no plans to employ others to use this special lift device. If such a case arises, the user will be required to operate the device in accordance with our established procedures.

5.2.1 A load test for spreader beam Type IB of 150% of the maximum static plus dynamic load is planned prior to use.

5.2.2 Qualification of replacement parts shall be the same as the original parts.

5.3.1 This special lift device will oe subjected to the periodic testing in accordance with 5.3.1(2). The test interval will depend on how frequent the device is used.

5.3.2 The requirements for load testing after major repairs/alterations will be addressed if and when the need arises.

5.3.4 This device does not have non-load bearing functional parts, therefore, this section is not applicable.

5.3.6 This device will be visually inspected by operating personnel for indications of damage prior to each use.

5.3.7 This device will be visually inspected by maintenance personnel for indications of damage or deformation. The inspection schedule will be based on how frequent this device is used.

6.1-6.3 As noted in our Part II Heavy Load Response, lifts of some of the degasifier or demineralizer plugs could present a problem. We have no planned maintenance requiring lifts of these plugs, therefore, there are no planned lifts of critical loads for this special lift device.

COMPARISON OF B&W SUPPLIED SPECIAL LIFT DEVICE DESIGN TO SPECIFIC ANSI N14.6-1978 REQUIREMENTS

These devices are:

A. Reactor Vessel Head and Internals Handling Fixture

B. Internals Handling Extension

C. Internals Handling Adapter

D. Stud Tensioner Sling

E. New Fuel Handling Tool and Sling

F. Turnbuckle Pendant and Sling

3.1.1 Devices A,B - Materials, fabrication practices, inspection and testing requirements, as applicable, are specified on drawings.

Devices A,B - Have metal tag reflecting test load.

Devices C,D,F - Materials are specified on drawings.

3.1.2 Devices A,B,C,D,E,F - Most of the members which make up these devices will be loaded or perform a locking function, therefore, most members are considered critical.

3.1.3 Devices A,B,C - B&W has sizing calculations for these devices. They have been marked up to include dynamic load factors and the new safety margins.

Devices D,F - B&W has general calculations which include dynamic load factors and revised safety margins.

Device E - B&W has stress report which includes dynamic load factors and revised safety margins.

3.1.4 Devices A,B,C,D,E,F - There is neither a list of permissible repair procedures nor any established criteria for acceptable repair procedures or post repair testing. If repairs become necessary, appropriate actions will be taken.

3.2.1 Devices A,B - These devices are capable of lifting three times the maximum load without exceeding the yield strength, and five times the maximum load without exceeding the ultimate strength of the materials. The safety margins include a dynamic load allowance of 15% although 2.5% would be sufficient since the only crane capable of handling the loads lifted with these devices is the main hoist of the polar crane which has a hoist speed of 5 ft/min. The safety margins are based on the maximum load of the reactor vessel head plus control rod drive mechanism service structure, approximately 165 tons.

Device B - The three pins of this device are made of material whose yield strength is greather than 80% of the ultimate strength (87-90%). Using a 2.5% dynamic load factor, the safety factors to ultimate range from 8.5 to 10.2.

Device C - This device is capable of lifting 2.4 times the maximum load without exceeding the yield strength, and 4.8 times the maximum load without exceeding the ultimate strength of the materials. The safety margins include a dynamic load allowance of 15% although 2.5% would be sufficient since the only crane capable of handling the loads lifted with this device is the main hoist of the polar crane which has a hoist speed of 5 ft/min. The safety margins are based on the maximum load of the core support assembly (CSA), approximately 130 tons. The limiting part for the 2.4 safety factor to yield are the turnbuckles and the limiting part for the 4.8 safety factor to ultimate are the rods. In addition, the rod material yield strength is 82% of the ultimate strength and the ultimate strength of the pins used with this device is unknown. Using a 2.5% dynamic load factor, the safety factor to yield of the turnbuckles is 2.7 and the safety factor to ultimate of the rods is 5.4. Assuming a yield strength for the pins of 90% of ultimate, the safety factor of the pins to ultimate is 7.5.

Devices D,E,F - These devices are capable of lifting three times the maximum load without exceeding the yield strength, and five times the maximum load without exceeding the ultimate strength of the materials. The safety margins include a dynamic load allowance of 15% for devices D & F and 18.5% for Device E.

3.2.4 Devices A,B,C,D,E,F - See the responses given in 3.2.1 above.

3.2.5 Devices A,B,C - This section is not applicable to these devices.

Devices D,F - Slings used with these devices conform to ANSI B30.9-1971 requirements.

Device E - Sling was purchased to lift the required load and tested to 3 times the load.

3.2.6 Devices A,B,C,D,F - No drop weight or Charpy impact tests were performed for the materials used in the fabrication of these devices.

Device E - This section is not applicable since paragraph AM 218 of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 2 does not address impact testing of stainless steel.

3.3.1 Devices A,B,C,D,F - There are no lamellar tearing problems.

Device E - Lamellar tearing does not apply to this device.

3.3.4 Devices A,B,C,D,F - These devices are designed to ensure equal distribution of the load to all load-bearing attachment points.

Device E - Symmetry of load being lifted assures compliance.

3.3.5 Devices A,B,C,D,F - Positive locking means are provided on these devices to ensure load retention for load-carrying components subject to inadvertant disengagement.

Device E - Projections on grapples prevent opening before load is relaxed.

3.3.6 Devices A,B,D,F - No actuating mechanisms are used to engage or disengage these devices.

Devices C (Latch Block),E - Actuating mechanisms are used to engage or disengage these devices.

4.1.3 Devices A,B,C,E,F - Certificates of conformance are available which state that the materials used in fabrication are in accordance with the device drawings and stress reports.

Device D - A certificate of conformance for material is not available.

4.1.4 Devices A,B,C,F - Certificates of conformance are available which state that these devices were fabricated in accordance with the detail drawings and fabricator quality assurance specifications.

Devices D,E - Certificates of conformance for fabrication are not available.

4.1.5 Devices A,B,C - Welding procedures, welders and welding operators were qualified in accordance with ASME Boiler and Pressure Vessel Code - Section IX.

Device E - Welding qualification standard was MIL-Q.9858A.

Devices D,F - No welding involved on these devices.

4.1.6 Devices A,B,C (Except Turnbuckles), F (Turnbuckle Pendants Except Turnbuckles) - The fabricator operated in accordance with quality assurance specifications which were written in accordance with the ASME Boiler and Pressure Vessel Code - Section I and VIII.

Devices C (Turnbuckles Only), D,F (Wire Rope and Turnbuckles) - The parts for these devices were standard stock items that are widely used for load handling operations. They were purchased from suppliers such as Roebling, Crosby-Laughlin, Cleveland City Forge, US Steel, etc. Fabrication was under the quality assurance program followed by these

suppliers. Suppliers were not requested to comply with 10 CFR 50, App B.

Device E - The Fabricator quality assurance standards were in accordance with MIL-Q.9858A. The Fabricator was not requested to comply with 10 CFR 50, App B.

4.1.7 Devices A,B,C,D,E,F - Material identification is provided by the detail drawings. Certification of materials is provided by the Certifications of Conformance except for device D. See 4.1.3 response above.

4.1.9 Devices A,B,C,D,E,F - No special requirements were invoked on the suppliers. See 4.1.3 and 4.1.4 responses above.

5.1.3 Devices A,B,C,D,E,F - Periodic testing of these devices will be incorporated into our Periodic Activity Control System (PACS).

5.1.4 Devices A,B,C,D,E,F - Use of these devices will be covered by the procedures for the heavy loads they handle.

5.1.5 Devices A,B,C,D,E,F - These devices will be assigned a special tool number and will become part of our tool list. The methodology to be used for identifying limitations has not been finalized.

5.1.6 Devices A,B,C,D,E,F - A full record history of these devices will be maintained by the PAC and Maintenance Order Systems. The PACS will have scheduled inspection records while the Maintenance Order will document any repair work and retesting required.

5.1.7 Devices A,B,C,D,E,F - The requirements for removal of these devices from service will be specified in the Administrative Control of Heavy Loads Procedure - Station 1053.1.

5.1.8 Devices A,B,C,D,E,F - At this time we have no plans to employ others to use these special lift devices. If such a case arises, the user will be required to operate the device in accordance with our established procedures.

5.2.1 Devices A,B,C,F - Initial load tests performed were 150% of the maximum static load and test hold time was 3 minutes. Static load for these devices was taken as CSA plus plenum, approximately 193 tons. There are no requirements or situations where the CSA and plenum will be lifted together, therefore, the maximum load for devices A,B,F is the head plus CRDM service structure, and for device C is the CSA. The actual load tests were in excess of 150% of maximum load plus 15% dynamic load factor. NDT of critical areas, including all load bearing welds was performed. This NDT met the requirements of Section 5.5.1 of ANSI N14.6-1978. NDT acceptance standards were those written by the fabricator.

Device D - No load test was performed. Because of safety factors of 4.07 to yield and 10.19 to ultimate, with a 15% dynamic load allowance, no load test is considered necessary.

Device E - The tool was tested to 250% of maximum load and the sling to 300% of maximum load. Dye penetrant inspection was performed on the welds.

5.2.2 Devices A,B,C,D,E,F - This section does not apply to these devices.

5.3.1 Devices A,B,C,D,E,F - These devices will be subjected to periodic testing in accordance with 5.3.1(2). The test interval will depend on how frequent the device is used.

5.3.2 Devices A,B,C,D,E,F - The requirements for load testing after major repairs/alterations will be addressed if and when the need arises.

5.3.4 Devices A,B,C (except latch box) D,E,F - These devices do not have non-load bearing functional parts therefore this section is not applicable.

Device C (latch box) - The latch box is functionally checked by procedure prior to use.

5.3.6 Devices A,B,C,D,E,F - These devices will be visually inspected by operating personnel for indications of damage prior to each use.

5.3.7 Devices A,B,C,D,E,F - These devices will be visually inspected by maintenance personnel for indications of damage or deformation. The inspection schedule will be based on how frequent the device is used.

6.1-6.3.2 Devices A,B,C,D,F - These devices do not handle critical loads therefore the requirements of this section do not apply.

Device E - Handling of a loaded failed fuel container with this device is considered extraordinary maintenance. There are no planned lifts of critical loads for this device.

NRC LICENSING CORRESPONDENCE - RECORD SUMMARY

DATE: April 15, 1983

DOCKET NUMBERS 50-329, 50-330
MIDLAND UNITS 1 & 2

SUMMARY: (State why letter is written)

This letter forwards to the NRC, CP Co followup information to the open item of the NRC/EG&G draft technical evaluation of the Midland Part I Heavy Load Submittal.

COMMITMENTS MADE: (LCP items will be made for these items by Safety & Licensing; Site commitments will be identified separately).

1. Load test Bechtel supplied special lift device - Spreader Beam Assembly IB.

2. Breakdown of how two commitments from Part I heavy load response will be implemented. These commitments were to inspect, maintain and test special lift devices in accordance with the requirements of Sections 5.1 and 5.3 of ANSI N14.6-1978.

PREVIOUS NRC/CPCO CORRESPONDENCE (References)

JWC letters to HRD, Serials 14928, 15979 and 19377 dtd 12/21/81, 2/26/82 & 2/17/83, respectively.
NRC ltr-TMN and to JWC dated 8/16/82

File/UFI No

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INDIVIDUALS PROVIDING INFORMATION (Including Consultants)

B&W
Bechtel
GBiby

CONCURRENCES (normally name of section or department head and name of any site personnel who concurred)

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ORIGINATOR (Preparer)

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SPECIAL DISTRIBUTION

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To Whom:

INDIVIDUALS ASSIGNED RESPONSIBILITY FOR IMPLEMENTING COMMITMENTS:

1. Bechtel
2. GTPollard

LCP item(s) this correspondence closes:

None

Attachments or Enclosures?

Yes X How Many? 3

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