Wisconsin Electric POWER COMPANY
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July 23, 1982

Mr. H. R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. R. A. Clark, Chief
Operating Reactors, Branch 3

Gentlemen:

DOCKET NOS. 50-266 AND 50-301
TRANSMITTAL OF ADDITIONAL INFORMATION
NUREG-0612-CONTROL OF HEAVY LOADS
POINT BEACH NUCLEAR PLANT

Your letters dated December 22, 1980 and February 3, 1981 requested that Wisconsin Electric Power Company review the handling of heavy loads at Point Beach Nuclear Plant and provide information as requested in Enclosure 2 to the December 22 letter. Our transmittals of September 30, 1981 and January 11, 1982 submitted our six and nine-month responses, respectively, which included the majority of information requested in your letter.

Enclosed for your review is Wisconsin Electrics response to NRC letter of December 22, 1980, Enclosure 3, question 2.1.3.d, "Evaluation of Lifting Rig Compliance with ANSI N14.6-1978." This information should be included as Appendix B to our six month response.

Please contact us if there are any questions regarding this response.

Very truly yours,

C. W. Fay

C. W. Fay

Assistant Vice President

Attachment

Copy to NRC Resident Inspector

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APPENDIX B

LIFTING RIG COMPLIANCE WITH ANSI N14.6.-1978

The following evaluation of lifting rig compliance with ANSI N14.6-1978 addresses only those sections of ANSI N14.6-1978 which are directly related to the load handling reliability of the lifting rig. This approach for determining compliance has been found acceptable by Franklin Research Center (FRC). The format of the response is compatible with the format suggested in FRC's draft Technical Evalution Report-C5257 -110/111 dated March 26, 1981 which has previously been provided to Wisconsin Electric for review and comment.

SECTION 3.1 DESIGNER'S RESPONSIBILITIES

a. Limitations on the use of the lifting devices with respect to temperature, corrosive environments, etc.

RESPONSE

The reactor pressure vessel head lift rig, the reactor pressure vessel internal, lift rig, and the reactor coolant pump motor lift rig are used only during unit shutdown. No limitations for their use with regard to temperature, corrosive environment, etc., exist.

b. Identification of critical components and definition of critical characteristics.

RESPONSE

Section 3.1.2 of ANSI N14.6-1978 specifies that the design specification shall include a critical items list, which identifies critical components and defines their critical characteristics for material, fabrication, non-destructive testing and quality assurance.

"Critical items list" is further defined in ANSI N14.6, Section 2, as:

> "Critical items list. A list that specifies the items of a special lifting device and their essential characteristics for which specified quality requirements shall apply in the design, fabrication, utilization, and maintenance of the device."

Load carrying members and welds of these special lifting devices are considered to be the critical items.

Tables A-1, A-2, A-3, A-4 and A-5 are the critical items list of parts and welds for the reactor vessel head lift rig, the reactor vessel internals lift rig, load cell and load cell linkage, and the reactor coolant

pump motor rig sling, respectively. These tables include the material identification, and the applicable volumetric and surface inspections that were performed in the fabrication of these special lifting devices. In some instances, non-destructive testing was not specified since the material selection and strength result in very low tensile stresses and, thus, non-destructive testing was not justified.

The material selection for most critical load path items was made to ASTM, ASME or special material requirements. However, the nondesigned items of the reactor coolant pump motor lift sling were selected based on their load-carrying capacities. The material requirements were supplemented by Westinghouse Electric Corporation imposed non-destructive testing, and/or special heat treating requirements for almost all of the critical items. Westinghouse required all welding, welders, and weld procedures to be in accordance with ASME Boiler and Pressure Vessel Code, Section IX. Westinghouse required a certificate or letter of compliance that the materials and processes used by the manufacturer were in accordance with the purchase order and drawing requirements. Westinghouse also performed final inspection on these devices and issued quality releases for the internals and head lifting rigs.

c. Signed stress analyses which demonstrate approriate margins of safety.

RESPONSE

Attachment B to this letter is a copy of the stress report on the head lift rig, internal lift rig and reactor coolant pump lift rig prepared for Wisconsin Electric by Westinghouse. This report details the evaluation performed on each lifting rig and includes signed stress analyses for each rig.

d. Indication of permissible repair procedures.

RESPONSE

Any repair to these lifting rigs is considered to be in the form of welding. Should pins, bolts, or other fasteners need repair, they will be replaced in accordance with the original or equivalent requirements for material and non-destructive testing. Weld repairs will be performed in accordance with the requirements identified in NF-4000 and NF-5000 (Fabrication and Examination) of the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection N.F.

SECTION 3.2 DESIGN CRITERIA

a. Use of stress design factors of 3 for minimum yield strength and 5 for ultimate stress.

RESPONSE

Information pertaining to the stress design factors for these lifting rigs is included in Section 3 of Attachment B to this letter.

b. Stress design factors for load bearing pins, links and adapters.

High strength materials (17-4 ph s/s) are used in these devices (mostly for pins, loadcell). Although the fracture toughness was not determined, the material was selected based on its excellent fracture toughness characteristics. However, the stress design factors of ANSI N14.6, Section 3.2.1 of 3 and 5, were used in the analysis and the resulting stresses are acceptable. This information is detailed in the attached stress report.

c. Slings comply with ANSI B30.9-1971.

RESPONSE

Slings (wire rope) are used only in the design of the reactor coolant pump motor lift sling. However, the wire rope is of a specific design and, thus, the device is considered a special lift device. The design weight for this lift rig is 81,000 pounds, which is larger than the total weight of the motor and lift rig (a maximum of 73,000 pounds). The detailed stress analysis for this lifting rig, included in Attachment B, indicates a factor of safety of 5 is achieved in the sling assembly, meeting the requirements for safety factors established in ANSI-B30.9, 1971.

d. Subjecting materals to dead weight testing or Charpy impact testing.

RESPONSE

Fracture toughness requirements were not identified for the materials used in the construction of these lifting rigs. However, the material selection was based on the excellent fracture toughness characteristics of the materials. Materials of construction are detailed in Section 4 of Attachment B.

SECTION 3.3 DESIGN CONSIDERATIONS

a. Consideration of problems related to lamellar tearing.

RESPONSE

Lamellar tearing was not considered during the design of these rigs. However, these lifting rigs are not susceptible to this type of joint deterioration.

b. Design shall ensure even distribution of the load.

RESPONSE

The lifting rigs were designed to ensure even distribution of the load. This can be seen in the attached stress analysis report.

d. Verification that remote actuating mechanisms securely engage or disengage.

RESPONSE

Only the reactor pressure vessel internal lifting rig employs remote actuating mechanisms. This is a long-handled tool used to engage the rig and internals. The tool depresses a spring-loaded tube and turns the engaging screw into the internals. Although no specific position indication is identified, the visual difference in the height of the top of the spring-loaded tube is sufficient indication that the internals are engaged or disengaged.

SECTION 4.1 FABRICATOR'S RESPONSIBILITIES

a. Verify selection and use of material.

RESPONSE

All critical load-carrying members of these lifting rigs required letters of compliance to specified material requirements.

b. Compliance with fabrication practices.

RESPONSE

These lifting rigs were fabricated for Westinghouse Electric Corporation. Westinghouse performed checks and inspection during various steps of manufacturing to ensure compliance with fabrication practices.

c. Qualification of welders, procedures, and operators.

RESPONSE

Westinghouse reviewed the manufacturer's welding procedures prior to use.

d. Provisions for a Quality Assurance program.

RESPONSE

A formal Quality Assurance program for the manufacturer was not required. Westinghouse reviewed the manufacturing process. This review included visual, dimensional, procedural, cleanliness, personnel qualification, etc. A Westinghouse quality release was required, which ensured conformance with the drawing requirements.

e. Provisions for identification and certification of equipment.

RESPONSE

This was provided under the Westinghouse quality release program as defined above in 4.1(d).

f. Verification that materials or servies are produced under appropriate controls and qualifications.

RESPONSE

Verification was provided under the Westinghouse quality release program as detailed above in 4.1(d).

SECTION 5.1 OWNER'S RESPONSIBILITIES

a. Implementation of a periodic testing schedule and a system to indicate date of expiration.

RESPONSE

These lifting rigs will be included in the Point Beach Preventive Maintenance system. Documented visual inspection of critical components and critical weld will be performed annually before initial use. This visual inspection will not include disassembly of the lifting rigs.

b. Provision for establishing operating procedures.

RESPONSE

Current Point Beach refueling procedures include procedures for the use of the reactor pressurevessel head lift rig and the reactor pressure vessel internals lift rig. The reactor coolant pump motor lift rig does not have a specific operating procedure. This lifting rig, which is essentially a sling with spreader assembly, is hooked to lugs on the reactor coolant pump motor. No other operations are required for its use, and the general procedures for the handling of heavy loads are followed.

c. Identification of subassemblies which may be exchanged.

RESPONSE

Each of these lifting rigs is unique in design. No subassemblies are exchanged between them.

d. Suitable markings.

RESPONSE

It is possible to use each lifting rig only for its designated use. Specific markings such as "RPV Head Lift Rig" are inappropriate.

e. Maintaining a full record of history.

RESPONSE

All modifications or repairs to these lifting rigs require the use of a maintenance request. Records of these maintenance requests are retained for the life of the lifting rig.

f. Conditions for removal from service.

RESPONSE

These lifting rigs will be removed from service if visual inspection reveals a fault in any critical component. Appropriate actions, either repair or replacement, and further testing will be taken before the lifting rig is returned to service.

SECTION 5.2 ACCEPTANCE TESTING

a. Load test to 150% and appropriate inspections prior to use.

RESPONSE

The reactor pressure vessel lift rig was load tested to 100% capacity prior to initial use. The reactor pressure vessel internals lift rig was not load tested prior to initial use. The design weight for this rig was 202,000 pounds. This is the weight of the lifting rig and the lower internals. The lifting of the lower internals is done infrequently (one every ten years) when the core is removed. The normal lift for this rig is the lifting of the upper internals, with a combined weight of 67,000 pounds. It is our position that the larger lift acts as a load test for the normal lift.

The reactor coolant pump motor lifting rig was not load tested prior to use.

b. Qualification of replacement parts.

RESPONSE

Replacement parts, should they be required, will be made of identical (or equivalent) material and inspections as originally required.

SECTION 5.3 TESTING TO VERIFY CONTINUING COMPLIANCE

A. Satisfying annual load test or inspection requirements.

RESPONSE

These special lifting devices are used during plant refueling on an annual basis. During plant operations, these items are inaccessible. Load testing to 150% of capacity before each use would require special fixtures and is impractical to perform. Such testing on the reactor pressure vessel head lifting rig and the internals lifting rig would exceed the crane capacity. Critical welds and parts will be visually inspected prior to initial use each outage and the results of this inspection documented. Additionally, the lifting rigs will be visually inspected on an informal basis by the operators before each use.

It is our opinion that due to the low frequency of use and the low stresses in critical items that the above items are appropriate.

b. Testing following major maintenance.

RESPONSE

In the event of major maintenance, testing will be performed on the component or components as was originally required for those components. The repaired rig will be given a 100% load test in the following manner:

a. Reactor Vessel Head Lift Rig: Prior to use and after reassembly of the head lifting rig sling assembly, visual check the clevis to leg fillet welds at the bottom end of the legs and the support lug to ring girder fillet welds on the platform. Raise the vessel head slightly above its support and hold for ten minutes. During this time, continue to visually inspect these welds. If no problems are apparent, continue to lift.

b. Reactor Vessel Internals Lift Rig: Prior to use, visually inspect the rig components and welds while on the storage stand for signs of cracks or deformation. Check all bolted joints to ensure that they are tight and secure. After connection to the upper or lower internals, raise the assembly slightly off its supoprt and hold for ten minutes. During this time, visually inspect the spacer block to spreader fillet welds. If no problems are apparent, continue to lift, monitoring the load cell readout at all times.

c. Reactor Coolant Pump Motor Lift Sling: Prior to use, visually inspect the rig components and welds for signs of cracks, deformation, kinks, or frayed ends. Check all bolted joints to ensure that they are tight and secure. After connection to the pump motor, raise the assembly slightly off its support and hold for ten minutes. During this time, visually check the spreader welds. If no problems are apparent, continue to lift.

c. Testing after application of substantial stresses.

RESPONSE

Good operating practice precludes the application of substantial stresses to these lifting rigs. If, however, stresses substantially in excess of design stresses were applied to these lifting rigs, the rigs will be inspected and tested as in 5.3(b), above.

d. Inspections by operating and non-operating or maintenance personnel.

RESPONSE

At Point Beach, these lifting rigs are operated by maintenance personnel. Maintenance personnel will also perform the visual inspections as defined above. Additional nondestructive examinations as required will be performed by qualified/certified personnel.

TABLE A-1

REACTOR VESSEL HEAD LIFT RIG

CRITICAL ITEMS LIST OF PARTS

PER ANSI N14.6-1978

Item[a]	Description	Material	Non-destructive Testing	
			Material	Finished
1,3,6,10,15	3",4" and 8" dia pins	ASTM A434 Class BD	Ultrasonic	Magnetic Particle
2	Lifting Plate	ASTM A514 or U.S.S.-T1	Ultrasonic	Magnetic Particle
4,5	Sling Assembly Link Link Lug	ASTM A237 Class A	Ultrasonic	Magnetic Particle
7,9	Clevis	ASTM A237 Class A	Ultrasonic	Magnetic Particle
8	Tripod Arm	ASTM A306 Grade 70	Ultrasonic	Magnetic Particle
11,14	Support Lug Clevis Plate	ASTM A515 Grade 70	Ultrasonic Magnetic Particle	
12	Ring Girder	ASTM A285 Grade C		
13	Lift Rod Legs	ASTM A36 (A 501)		

[a]See figure A-1

TABLE A-2

REACTOR VESSEL HEAD LIFT RIG

CRITICAL ITEMS LIST OF WELDS

PER ANSI N14.6-1978

Item[a]	Weld Description	Non-destructive Testing	
		Root Pass	Final
4,5	Side Lugs to Link (full penetration)		Radiograph Magnetic Particle
11,12	Ring Girder to Support Lug (fillet)		Magnetic Particle
14	Clevis Plate to Leg (fillet)	Visual	Magnetic Particle

(a) See figure A-1.

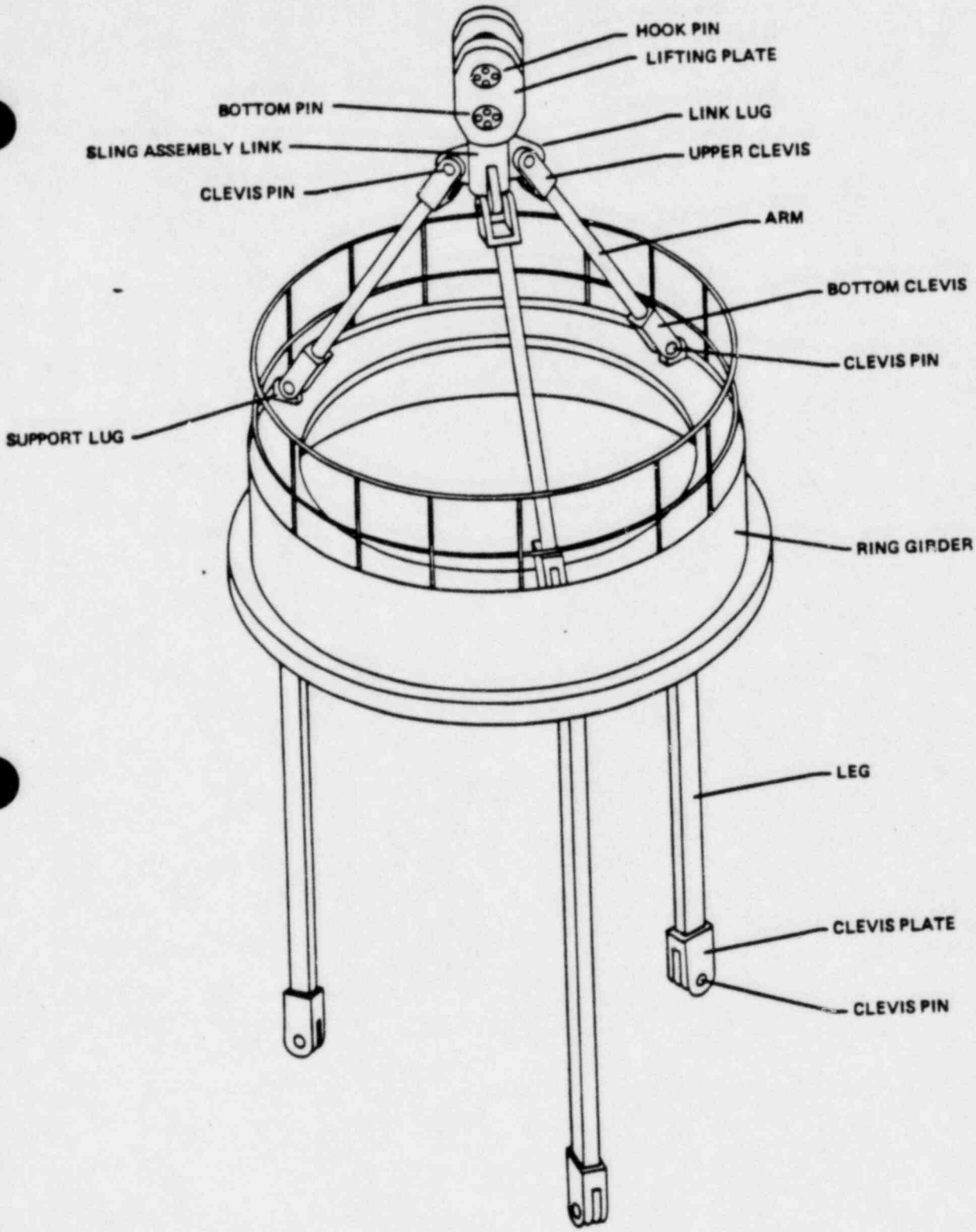

Figure A-1. Reactor Vessel Head Lift Rig

TABLE A-3

REACTOR VESSEL INTERNALS LIFT RIG,

LOAD CELL AND LOAD CELL LINKAGE

CRITICAL ITEMS LIST OF PARTS

PER ANSI N14.6-1978

Item[a]	Description	Material	Non-destructive Testing	
			Material	Finished
5	Load Cell	17-4 pH Stainless Steel, Condition H-1100	Ultrasonic	Liquid Penetrant
2	Side Plates	ASTM A515 Grade 70	Ultrasonic	
4	Load Cell Adaptors	ASTM A540 Grade B24	Ultrasonic	Magnetic Particle or Liquid Penetrant
1	Hook Pin	ASTM A304 AISI 4340	Ultrasonic	Magnetic Particle
3,8	Adaptor Pin Lift Lug Pin	ASTM A434 Class BD AISI 4340	Ultrasonic	Magnetic Particle
7	Sling Block	SA 105 Class 2	Ultrasonic	Magnetic
6,9	Sling Block Top Lugs and Side Lugs	ASTM A515 Grade 70 or ASTM A516 Grade 70		Magnetic Particle

[a]See figure A-2

TABLE A-3 (Cont)

REACTOR VESSEL INTERNALS LIFT RIG,

LOAD CELL AND LOAD CELL LINKAGE

CRITICAL ITEMS LIST OF PARTS

PER ANSI N14.6-1978

Item[a]	Description	Material	Non-destructive Testing	
			Material	Finished
10,12	Side Lug Pin Sling Leg Pin	ASTM A276 Type 304		
11	Sling Leg Adapter Screw	ASTM A515 AISI 8620 AISI 8620		Magnetic Particle
13	Spreader Spacer Block	ASTM A515 Grade 70 or ASTM A516 SA 105 Class 2	Ultrasonic Magnetic Particle	
14,15	Leg Nut, Leg, Coupling, Bottom Adapter, Lower Tube, Engaging Screw	ASTM A276 Type 304 or ASTM A312 Type 304		

(a) See figure A-2

TABLE A-4

REACTOR VESSEL INTERNALS LIFT RIG,
LOAD CELL AND LOAD CELL LINKAGE
CRITICAL ITEMS LIST OF WELDS
PER ANSI N14.6-1978

Item[a]	Weld Description	Non-destructive Testing	
		Root Pass	Final
6,7	Top Lugs to Sling Block (full penetration)	Magnetic Particle	Magnetic Particle
7,9	Side Lugs to Sling Block (full penetraton)	Magnetic Particle	Magnetic Particle
11	Sling Leg to Adaptor (fillet)	Visual	Magnetic Particle
13	Spreader Assembly (fillet)	Visual	Magnetic Particle
14	Leg Assembly Outer Tube to Adapters Outer Tube to Guide Sleeve (full penetration)	Liquid Penetrant	Liquid Penetrant

(a) See figure A-2.

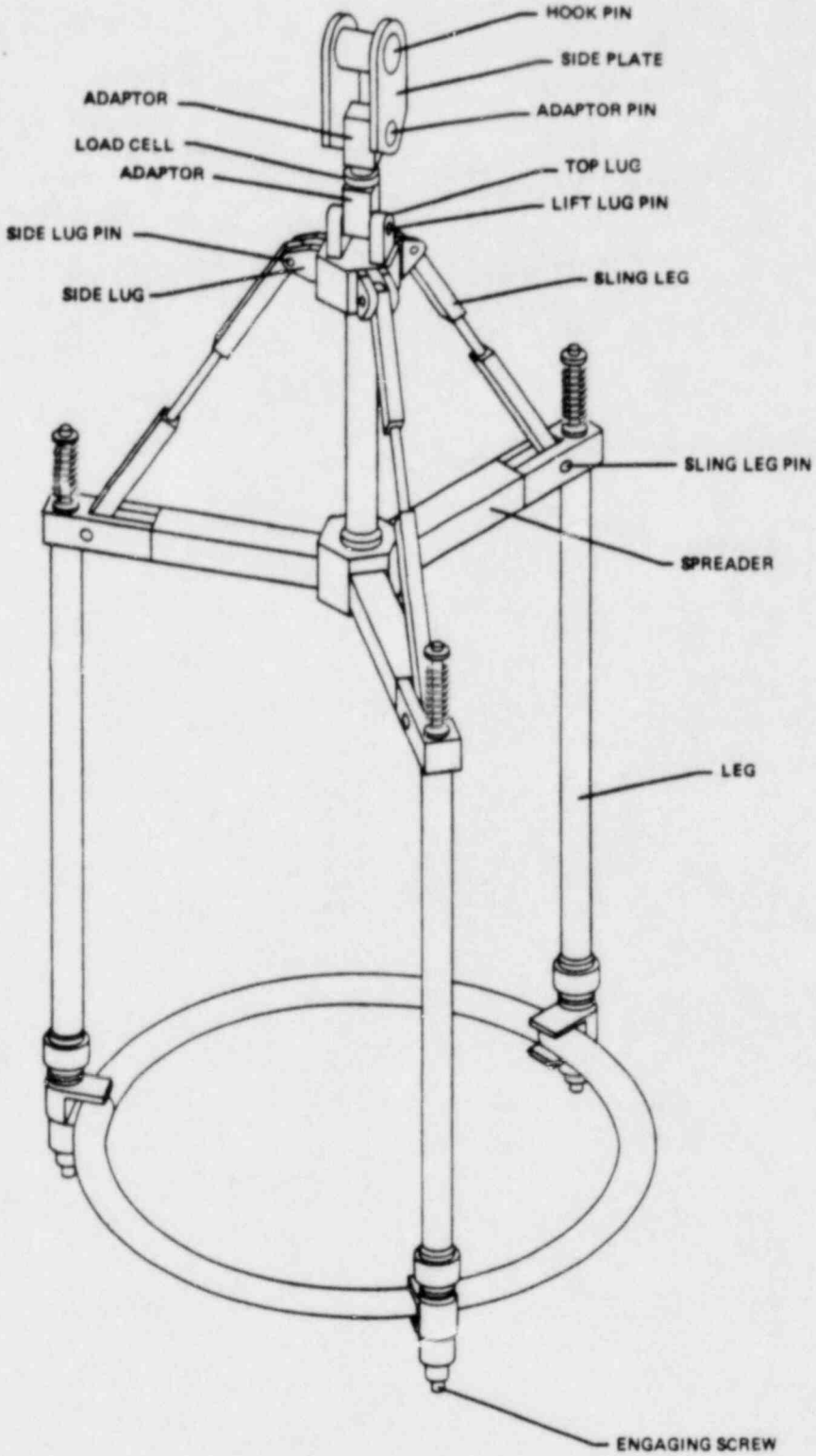

Figure A-2. Reactor Vessel Internals Lift Rig

TABLE A-5

REACTOR COOLANT PUMP MOTOR LIFT RIG

CRITICAL ITEMS LIST OF PARTS AND WELDS

PER ANSI N14.6-1978

Item[a]	Description	Material	Non-destructive Testing	
			Material	Finished
1	Spreader	ASTM A106 Grade B	Radiograph	Magnetic Particle on Welds Only
2	Side Plate	ASTM A106 Grade B		
5	Master Link	Alloy Steel Forging		
6	Sling Assembly	Improved Plow Steel Grade		
7	Shackle	Alloy Steel Forging		
8	Turnbuckle	Alloy Steel Forging		
9	Eye Hook	Alloy Steel Forging		

(a)See figure A-3

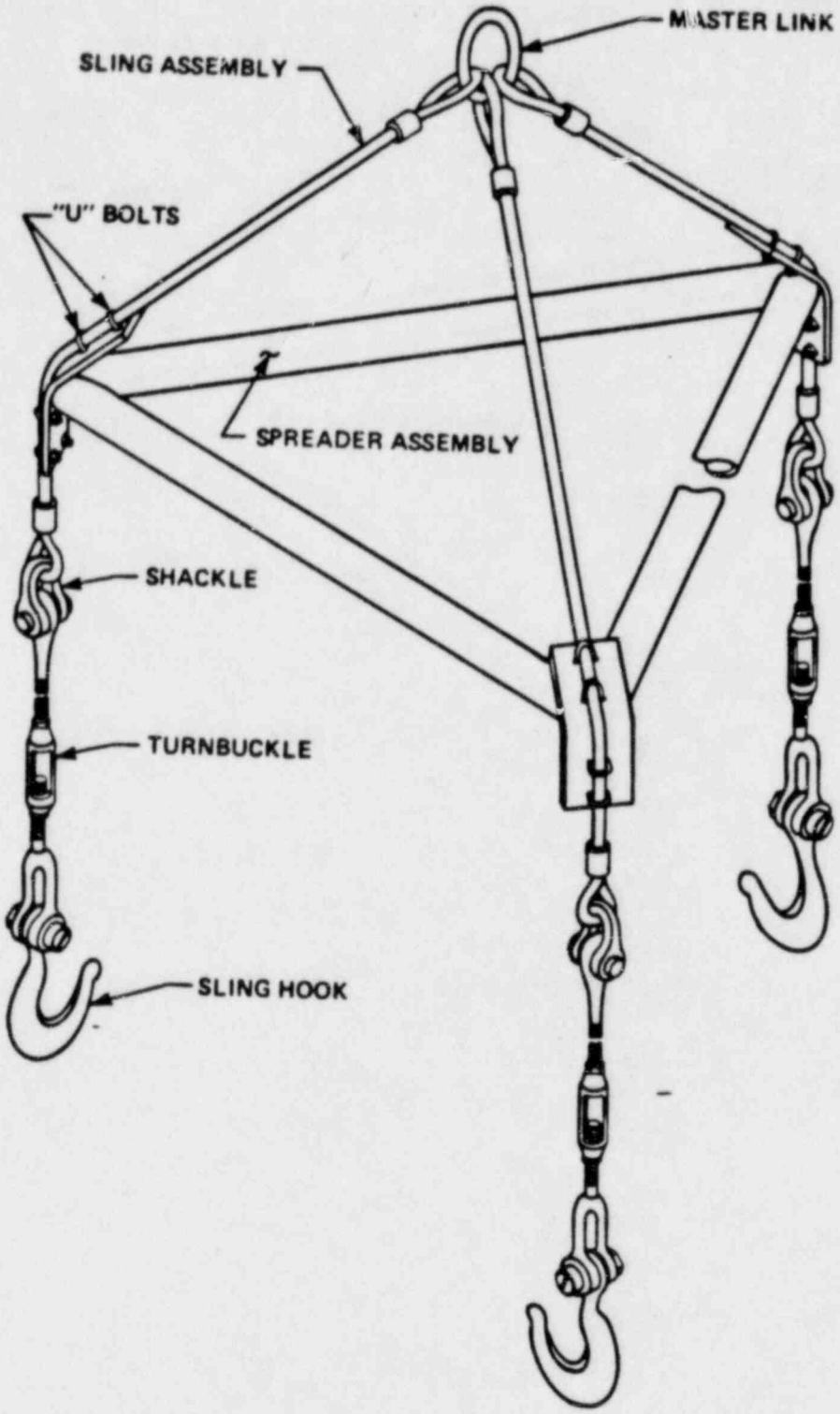

Figure A-3. Reactor Coolant Pump Motor Lift Sling