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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards documents as Phase I.b of response to Section 2.1 of Encl 3 to DG Eisenhut 801222 ltr re control of heavy loads.Westinghouse analysis of lifting arrangement for reactor vessel head & upper internals expected by 830315.

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INDIANA & MICHIGAN ELECTRIC COMPANY

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September 29, 1982
AEP:NRC:0514E

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
CONTROL OF HEAVY LOADS - PHASE I.b

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

Dear Mr. Denton:

This letter and its Attachments provide Phase I.b of our response to Enclosure No. 3 to Mr. D. G. Eisenhut's letter of December 22, 1980. We committed to sending you this letter in our submittal No. AEP:NRC:0514D, dated July 12, 1982. Phase I.b addresses those cranes and hoists encompassed by Section 2.1 of the above mentioned Enclosure which were not included in our letter No. AEP:NRC:0514C dated July 18, 1982. Westinghouse's analysis of the lifting arrangement for the reactor vessel head and upper internals, also part of the response required by Section 2.1, will be submitted by March 15, 1983.

Our response to Sections 2.2 and 2.3 of Enclosure No. 3 to Mr. Eisenhut's letter, was contained in our letter No. AEP:NRC:0514A, dated August 27, 1982. Our letter addressed those cranes which handle loads in close vicinity to the spent fuel pool or to the reactor vessel (see our response to Section 2.1-3 in the Attachment to this letter). The cranes and hoists discussed in detail in this letter (Phase I.b), are considered excluded from the requirements of Sections 2.2 and 2.3 of Enclosure No. 3 to Mr. Eisenhut's letter since they do not handle loads in close vicinity to the spent fuel pool or the reactor vessel.

We are preparing our response to Section 2.4 of Enclosure No. 3 to Mr. Eisenhut's letter. As indicated in our letter No. AEP:NRC:0514D this response will constitute Phase II.b of our overall response to the "Control of Heavy Loads" issue. If analysis being performed now concerning Section 2.4 has an impact on information contained in this letter, appropriate modifications will be included with our Section 2.4 response.

A033

ATTACHMENT TO AEP:NRC:0514E

DONALD C. COOK NUCLEAR PLANT

CONTROL OF HEAVY LOADS, NUREG-0612

2.1 GENERAL REQUIREMENTS FOR OVERHEAD HANDLING SYSTEMS

"NUREG 0612, Section 5.1.1, identifies several general guidelines related to the design and operation of overhead load-handling systems in the area where spent fuel is stored, in the vicinity of the reactor core, and in other areas of the plant where a load drop could result in damage to equipment required for safe shutdown or decay heat removal. Information provided in response to this section should identify the extent of potentially hazardous load-handling operations at a site and the extent of conformance to appropriate load-handling guidance".

2.1-1. "Report the results of your review of plant arrangement to identify all overhead handling systems from which a load drop may result in damage to any system required for plant shutdown or decay heat removal (taking no credit for any interlocks, technical specifications, operating procedures, or detailed structural analysis)".

2.1-2. "Justify the exclusion of any overhead handling system from the above category by verifying that there is sufficient physical separation from any load-impact point and any safety-related component to permit a determination by inspection that no heavy load drop can result in damage to any system or component required for plant shutdown or decay heat removal".

Response:

All cranes and hoists in the Plant are listed in Tables 1 and 2. Table 1 is a listing of cranes and hoists which travel above safety-related equipment. Load drops from these cranes and hoists may result in damage to safety-related equipment (taking no credit for any interlocks, operating procedures, or detailed structural analyses). For their location see Drawings 12-5166, 12-5167, 12-5168, 12-5169, and 12-5170 (attached).

Table 2 is a listing of additional cranes and hoists which cannot damage safety-related equipment. We have verified that for these cranes and hoists, there is physical separation by distance or by physical barriers such that no heavy load drop can result in damage to systems required for plant shutdown or decay heat removal. For their location see Drawings 12-5160, 12-5167, 12-5168, 12-5169, 12-5170, and 12-5170A.

2.1-3. "With respect to the design and operation of heavy-load-handling systems in the containment and the spent-fuel-pool area and those load-handling systems identified in 2.1-1, above, provide your evaluation concerning compliance with the guidelines of NUREG-0612, Section 5.1.1. The following specific information should be included in your reply".

a. "Drawings or sketches sufficient to clearly identify the location of safe load paths, spent fuel, and safety-related equipment".

Response:

Except for the Containment Polar Cranes, the Auxiliary Building Crane, the Circulating Water Pump and Screen House Crane, and the Diesel Generator Cranes, all other overhead lifting devices listed in Table 1 are monorail hoists.

The Containment Polar Cranes, the Auxiliary Building Crane, the Manipulator Cranes, the New and Spent Fuel Cranes, safety-related equipment and spent fuel are not addressed here as they were previously discussed in our letters No. AEP:NRC:0514C, dated June 18, 1982, and No. AEP:NRC:0514A, dated August 27, 1982.

The Ice Condenser Crane is included in Table 2 for the following reasons:

1) The heaviest load lifted by this crane is a full ice basket (2,000 lbs. maximum). However, since there is approximately a 15 foot clearance between the top of the crane hook's travel and the top of the ice basket array and the ice basket is 48 ft long, the only credible load drop of the full basket is within it's assigned position. A 15 foot drop of a full basket would be stopped by the ice basket support structure.

2) In order to remove a basket from the Ice Condenser all the ice must first be removed or melted. Then the basket is disassembled into 12 foot sections. These sections weigh approximately 60 lbs. each. Therefore, no damage is anticipated due to the dropping one of these sections.

3) The next heaviest loads in the Ice Condenser are the air handling units. These units weigh 1,150 pounds approximately. If one of these units is dropped over the Ice Condenser, it would be stopped by the ice basket support structure. These units would not be handled outside of the ice condenser simultaneously with any fuel transfer operations. A drop of an air handling unit in the vicinity of the fuel transfer canal would have no effect on decay heat removal/or safe shutdown of the plant.

The Circulating Water Pump and Screen House Crane has within its operating area only one set of safety related equipment, the Essential Service Water Pumps. These pumps are located inside their own enclosed room. The crane's safe load path covers the entire area except that portion over the Essential Service Water Pumps Room.

The Diesel Generator Cranes are small cranes used to perform maintenance on the Diesel Generators. Because of their function these cranes cannot have assigned a safe load path. However, since the cranes are only used during maintenance, the maintained diesel is out of service and cannot be operated. The monorail hoists are used during equipment maintenance. Their function is similar to that of the Diesel Generator Cranes. These cranes and monorail hoists handle heavy loads only over components of one train of safety-related equipment. The component in the redundant train will not be affected by a load drop event and should be operable if so required by the Plant's Technical Specifications. Furthermore, as pointed out above, these devices are used mostly during maintenance periods in which no credit is taken for the equipment being worked on. Lastly, the loads, none of which exceeds 2 Tons, are handled in a careful manner and in accordance with standard plant practices. These considerations make the dropping of a heavy load an unlikely event which will, at worst, impact only one train of safety-related equipment.

b. "A discussion of measures taken to ensure that load-handling operations remain within safe load paths, including procedures, if any, for deviation from these paths".

Response:

The Circulating Water Pump and Screen House Crane does not need to carry any load over the Essential Service Water Pumps Room. In fact, except for the lift of a Circulating Water Pump from the Unit 1 area to the Unit 2 area (or vice versa), a lift pertaining to the Essential Service Water Pumps or for storage on the Essential Service Water Pumps Room roof, there is no need or reason for a lift to pass over the Essential Service Water Pumps Room. With respect to a Circulating Water Pump lift over the Essential Service Water Pumps Room, there would have to be several major deviations from the normal lifting methodology. First, special shortened rigging would have to be used; second, the railings around the top of the Essential Service Water Pumps Room would have to be removed and, third, special precautions would have to be taken to assure that the crane did not two-block and that the pump did not strike the room. These difficulties make it very unlikely that a heavy load would travel over the Essential Service Water Pumps Room. Lastly, this room was designed to withstand the impact of the crane falling on it while carrying a 30T load. Therefore, the Essential Service Water Pumps are protected from all credible load drops..

The Diesel Generator Cranes and the monorail hoists are not covered by any specific procedures for the reasons outlined in the response to 2.1-3-a.

c. "A tabulation of heavy loads to be handled by each crane which includes the load identification, load weight, its designated lifting device, and verification that the handling of such load is governed by a written procedure containing, as a minimum the information identified in NUREG-0612, Section 5.1.1(2)."

Response:

For the Circulating Water Pump and Screen House Crane the three heaviest loads are given in Table 1.

For the Diesel Generator Cranes and the remaining hoists only the heaviest load is given in Table 1. This was done since only one path exists for these cranes and hoists and the heaviest load is bounding.

Each Essential Service Water Pump is accessed through the roof via its own hatchway. Since the exposed pump is already out for maintenance there would be no change in system status if it was damaged. Therefore, there is no need for special procedures with respect to the Circulating Water Pump and Screen House Crane.

For the remaining cranes and hoists, the loads are lifted using routine lifting devices. Again, we feel that there is no need for special procedures for the reasons given in our response to Section 2.1-3-a. In addition, since the Diesel Generator Cranes and all the hoists are manually powered, it is reasonable to assume that loads will not be lifted any higher than is necessary to clear any obstructions. This would tend to further minimize the effects of a load drop.

d. "Verification that lifting devices identified in 2.1-3-c, above, comply with the requirements of ANSI N14.6-1978, or ANSI B30.9-1971 as appropriate. For lifting devices where these standards, as supplemented by NUREG-0612, Section 5.1.1(4) or 5.1.1(5), are not met, describe any proposed alternatives and demonstrate their equivalency in terms of load-handling reliability."

Response:

Sections 5.1.1(4) and 5.1.1(5) of NUREG-0612 require that the load rating of the lifting device include dynamic as well as static loads in lieu of the guidelines provided in the ANSI Standards N14.6-1978 and B30.9-1971.

I&MECo does not believe that it is practical in the field to account for a dynamic load factor or that such a factor is necessary. Presumably, if such a factor was a real safety concern, the universally accepted ANSI standards would require it. We base our belief on several factors. First, the hoisting speeds at the Cook Plant are relatively slow and any contribution from a dynamic effect would not be significant. Also, any critical lifts, (e.g. reactor head lift, reactor missile shield, etc.) are always done at very slow speeds.

In addition, the following question was asked of the ANSI B30 Committee (AEP letter, to W. Berger, from T. J. Seery, dated December 18, 1981): "How are dynamic loads factored into the Rated Capacity Tables stated in ANSI Standard B30.9-1971, in particular, Tables 3 through 13 of this standard?". The reply (ASME Letter, from W. Berger to T. J. Seery, dated February 11, 1982), stated: "This standard and the tables included (using a design factor of 5) were developed over many years and have been found to be adequate for operating conditions where normal dynamic loading is encountered. Dynamic loads, as quantified numbers, are not factored into the tables, but have been found to be within limits which are covered by using a design factor of 5, when used in conjunction with the inspection requirements specified by the standard."

Finally, superimposing a dynamic load factor in addition to the existing safety factors would not be consistent with other safety factors used in crane design. For example, the hoisting rope requires a safety factor of 5 with no dynamic contribution. (Crane Manufacturers Association of America, Specification #70, Section 4.2).

Routine lifting devices (slings, ropes, chains, etc.) follow the guidelines set forth in Handbook for Riggers by W. G. Newberry, revised edition 1977. This handbook meets the intent of ANSI B30.9-1971.

Presently, at the Cook Plant, slings are checked out of one of the two tool cribs after the rigger has estimated the load weight to be picked and the rigging arrangement that is to be used. The job that is to be performed determines the type of sling used, wire rope, Tuflex, or nylon strap slings.

The wire rope slings are identified as to their lifting capacity by the diameter of rope and lifting arrangement charts provided at each crib. The Tuflex slings are color coded and the nylon straps are rated by width for their lifting capacities.

The remaining ropes and slings throughout the plant are generally used for one particular job (i.e. turbine work, vertical walls, missile blocks, etc.) and are stored in the general area close to the equipment that is lifted.

Marking of these slings would require a great deal of time and effort and would not completely eliminate the possibility of picking an incorrect sling. Markings on nylon slings would become obscured as they accumulated grease.

We consider that any further marking of the slings will not provide further assurance of the proper sling being chosen for a particular task. In summary, we feel that the present method for sling selection is adequate and that marking is unnecessary.

Special lifting devices are evaluated in Table 3.

e. "Verification that ANSI B30.2-1976, Chapter 2-2, has been invoked with respect to crane inspection, testing, and maintenance. Where any exception is taken to this standard, sufficient information should be provided to demonstrate the equivalency of proposed alternatives."

Response:

This item was responded to in letter No. AEP:NRC:0514C, dated June 18, 1982. In addition, all cranes and hoists are now classified as in Standby Service ("special or infrequent service" per ANSI B30.2-1976). This reclassification supercedes that of AEP:NRC:0514C which stated that several cranes were classified as in Regular Service ("normal service" per ANSI B30.2-1976).

f. "Verification that crane design complies with the guidelines of CMAA Specification 70 and Chapter 2-1 of ANSI B30.2-1976, including the demonstration of equivalency of actual design requirements for instances where specific compliance with these standards is not provided."

Response:

The Circulating Water Pump and Screen House Crane was designed and manufactured in 1969-1970 by the Whiting Corporation according to the guidelines of E.O.C.I Specification 61 and ANSI B30.2-1967. These two standards were the predecessors of CMAA Specification 70 and ANSI B30.2-1976, respectively. In order to determine compliance, studies were made comparing the specifications under which the crane was designed and manufactured, against the more recent versions of the specifications on a item by item basis. The crane was then analyzed in those areas where a change in the specifications had occurred.

The study comparing the ANSI standard and the resulting analysis of the crane in the areas of difference indicated that the crane was in compliance. The study comparing CMAA Specification 70 with E.O.C.I. Specification 61 was performed by the Whiting Corp. and indicated several areas where detailed calculations were required to verify compliance. These calculations showed that there were four areas in which the crane did not meet CMAA Specification 70 - Revision 75, design standards. These four areas are discussed below:

1. The hoist sheave materials is ASTM A48 Class 35 cast iron instead of steel or ASTM A48-64 or later Class 40 iron, as specified in CMAA-70.

   Disposition - A design change will be initiated to install new sheaves. Please note that the reason why the sheaves are being replaced on this crane but not on the Containment Polar Cranes or on the Auxiliary Building Crane (see letter No. AEP:NRC:0514C, Section 2.1-3-f, Items 3 and 7), is that the sheaves on the Circulating Water Pump and Screen House Crane are smaller and thus the compression stress is larger.

2. The horsepower and torque rating of the hoist motor is exceeded by 4.75% when handling a rated load of 30 tons.

   Disposition - The motor has a 60 minute 70°C temperature rise rating at the rated 40 hp. At the required 41.9 hp, the motor has a 77°C temperature rise at 60 minutes. The CMAA standards for Class F insulation allow a 105°C temperature rise. Therefore, the motor will meet the temperature rise limitations and is adequate.

3. The required hoist brake torque exceeds the rated torque by 2%.

   Disposition - A design change will be initiated to modify the existing brake so that it will meet the required torque rating.

4. The longitudinal stiffeners do not meet the moment of inertia requirements.

   Disposition - A design change will be initiated to add longitudinal stiffeners to meet the moment of inertia requirements.

Table 4 identifies compliance of the Circulating Water Pump and Screen House Crane with certain areas of concern in Specification CMAA-70. This table is similar to Table 2.1.3.F.1 in our letter No. AEP:NRC:0514C dated June 18, 1982. The two "No" entries in the compliance column have been addressed in the preceding item descriptions.

g. "Exceptions, if any, taken to ANSI B30.2-1976 with respect to operator training, qualification, and conduct."

Response:

This item was responded to in our letter No. AEP:NRC:0514C, dated June 18, 1982.

TABLE 4

Circulating Water Pump and Screen House Crane

	AREA OF CONCERN	REFERENCE IN CMAA-70	REVIEWED BY WHITING CORP.	IS COMPLIANCE INDICATED?
1.	Impact Allowances	3.3.2.1.1.3	YES	YES
2.	Calculations - Torsion	3.3.2.1.3	YES	YES
3.	Longitudinal Stiffeners	3.3.3.1.2	YES	NO*
4.	Allowable Compressive Stress	3.3.3.1.3 3.3.3.3 3.4.3	YES	YES
5.	Fatigue	3.10 3.3.3.1.3	YES	YES
6.	Hoist Rope	4.2	YES	YES
7.	Drum Design	4.4.1 4.4.3.1	YES	YES
8.	Drum Design-Groove Pitch	4.4.3.2	YES	YES
9.	Gear Design	4.5	YES	YES
10.	Bridge Brake Design	4.7.2	YES	YES
11.	Hoist Brake Design	4.7.4	YES	NO*
12.	Bumper Stops	4.12	YES	YES
13.	Rules for Static Control System	5.4.6	YES	Not Applicable
14.	Restart Position	5.6.2	YES	YES

* See the response to Item 2.1-3-f.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

R. S. Hunter
Vice President

/sag
Attachment

cc: John E. Dolan - Columbus
M. P. Alexich
R. W. Jurgensen
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Charnoff
Joe Williams, Jr.
NRC Resident Inspector at Cook Plant - Bridgman

CRANES AND HOISTS WHERE A LOAD DROP CAN DAMAGE SAFETY RELATED EQUIPMENT AEP:NRC:0514E

ITEM NO.	CRANE OR HOISE CAPACITY	QTY*	LOCATION AND DRAWING**	ELECTRIC OR MANUAL POWERED	HEAVIEST LOAD & WEIGHT	REMARKS
1	AUXILIARY BUILDING CRANE – 150T/20T	1	AUXILIARY BUILDING 12-5170	ELECTRIC	SEE TABLE 2.1.3.C.1 OF LETTER AEP:NRC:0514C	MAIN HOOK – 150T AUX. HOOK – 20T
2	CONTAINMENT POLAR CRANE – 250T/35T	2	CONTAINMENT BUILDINGS 12-5170	ELECTRIC	SEE TABLE 2.1.3.C.2 OF LETTER AEP:NRC:0514C	MAIN HOOK – 250T AUX. HOOK – 35T
3	CIRCULATING WATER PUMPAND SCREEN HOUSE CRANE – 30T	1	CIRCULATING WATER PUMP AND SCREEN HOUSE 12-5167 AND 12-5168	ELECTRIC	***	
4	DIESEL GENERATOR CRANE – 2T	4	AUXILIARY BUILDING 12-5167	MANUAL	DIESEL GENERATOR PARTS – MAXIMUM 4,000 LB.	
5	RECIPROCATION CHARGING PUMP HOIST – 2T	2	AUXILIARY BUILDING 12-5167	MANUAL	PUMP FLUID BLOCK – 3,500 LB.	
6	CENTRIFUGAL CHARGING PUMP HOIST – 2T	4	AUXILIARY BUILDING 12-5167	MANUAL	PUMP CASING (BARREL) – 4,950 LB.	
7	SAFETY INJECTION PUMP HOIST – 1-1/2T	4	AUXILIARY BUILDING 12-5167	MANUAL	PUMP MOTOR – 2,450 LB.	
8	CONTAINMENT SPRAY PUMP HOIST – 4T	4	AUXILIARY BUILDING 12-5166	MANUAL	PUMP AND MOTOR – 7,575 LB.	
9	RESIDUAL HEAT REMOVAL PUMP HOIST – 3T	4	AUXILIARY BUILDING 12-5166	MANUAL	PUMP PULLOUT ASSEMBLY – 3,865 LB.	
10	MAIN STEAM VALVE HOIST – 5T	4	CONTAINMENT BUILDINGS 12-5169	MANUAL	VALVE PISTON AND SHAFT – 5,250 LB.	
11	RECIRCULATION VALVE HOIST – 3T	2	AUXILIARY BUILDING 12-5167	MANUAL	VALVE AND OPERATOR – 2,530 LB.	
12	AUXILIARY FEEDWATER PUMP HOIST – 2T	6	TURBINE BUILDING 12-5167	MANUAL	TURBINE – 3,360 LB.	

NOTES:

* WITH RESPECT TO THE HOISTS, QUANITY REFERS TO THE NUMBER OF MONORAILS PRESENT. IN SOME CASES, THE SAME HOISTING MECHANISM IS USED ON SEVERAL DIFFERENT MONORAILS. THE CRANE AND HOIST SCHEDULE (DRAWINGS 12-3891 AND 12-3891A) DELINATES WHAT HOISTING MECHANISMS SHALL BE USED ON EACH MONORAIL.

** IN SOME CASES GENERAL AREAS ENCOMPASSING THE CRANE OR HOIST GROUP ARE SHOWN AND THUS THE AREA MAY ENCOMPASS MORE THAN ONE CRANE OR HOIST IN A GROUP. ALSO, THE PLACEMENT SHOWN IS APPROXIMATE.

CRANES AND HOISTS WHERE A LOAD DROP CAN DAMAGE SAFETY RELATED EQUIPMENT AEP:NRC:0514E

NOTES: *** THE FOLLOWING ARE THE THREE HEAVIEST LOADS LIFTED BY THE CIRCULATING WATER PUMP AND SCREEN HOUSE CRANE. ALL THREE LOADS ARE PART OF THE CIRCULATING WATER PUMP:

LOAD	WEIGHT
MOTOR	31,000 LB.
MOTOR SUPPORT AND TURNING VALVES	16,000 LB.
ROTATING ELEMENT, SHROUD AND CASING (PULL-OUT ASSEMBLY)	46,000 LB.

Cranes and Hoists Where A Load Drop Cannot Damage Safety Related Equipment

AEP:NRC:0514E

Item No.	Crane or Hoist and Capacity	Qty.*	Location and Drawing**	Electric or Manual Powered	Remarks
13	Main Turbine Building Crane – 240T/50T	1	Turbine Building 12-5169 and 12-5170	Electric	Main Hook – 240T Aux. Hook – 50T
14	Auxiliary Turbine Building Crane – 10T/4T	2	Turbine Building 12-5169 and 12-5170	Electric	Main Hook – 10T Aux. Hook – 4T
15	Machine Shop Crane – 10T	1	Service Building 12-5170A	Electric	
16	Drumming Area Crane – 5T	1	Auxiliary Building 12-5167	Electric	
17	New and Spent Fuel Handling Crane – 1T/1T	1	Auxiliary Building 12-5170	Electric	2 separate 1T hooks on a bridge bridge structure capable of supporting 2T Load
18	Ice Condenser Crane – 3T	2	Containment Buildings 12-5170	Electric	
19	Manipulator Crane – 1-1/2T/1-1/2T	2	Containment Buildings 12-5170	Electric	Fuel Gripper – 1-1/2T Aux. Hook – 1-1/2T
20	Turbine Oil Tank Crane – 5T	1	Turbine Building 12-5169	Manual	
21	Boiler Feed Pump Crane – 10T	2	Turbine Building 12-5168	Manual	
22	Spent Fuel Filter Hoist – 5T	1	Auxiliary Building 12-5168	Electric	
23	Reactor Cooplant and Seal Water Filters Hoist – 5T	2	Auxiliary Building 12-5167	Electric	
24	Refueling Water Purification Filter Hoist – 5T	1	Auxiliary Building 12-5167	Electric	
25	Concentrates, Seal Water and Ion Exchange Filters Hoist – 5T	2	Auxiliary Building 12-5167	Electric	
26	Loading Dock Hoist – 10T	1	Service Building 12-5170A	Electric	
27	Turbine Oil Tank D.C. Emergency Pump Hoist – 1-1/2T	2	Turbine Building 12-5169	Electric	

TABLE 2 (CONTINUED)

CRANES AND HOISTS WHERE A LOAD DROP CANNOT DAMAGE SAFETY RELATED EQUIPMENT

AEP:NRC:0514E

Item No.	Crane or Hoist and Capacity	Qty.*	Location and Drawing**	Electric or Manual Powered	Remarks
28	Trash Basket – 5T	2	Circulating Water Pump and Screen House 12-5167	Electric	
29	Chlorine Container Hoist – 2T	1	Plant Yard 12-5160	Electric	
30	Steel Storage Hoist – 2T	1	Turbine Building 12-5168	Electric	
31	Machine Shop Hoist – 4T	2	Service Building 12-5170A	Electric	
32	Ice Making Machine Hoist – 5T	1	Auxiliary Building 12-5170	Manual	
33	Containment Purge Supply Unit Hoist – 1-1/2T	2	Auxiliary Building 12-5170	Manual	
34	Decontamination Room Hoist – 1/2T	1	Auxiliary Building 12-5168	Manual	
35	Boiler Room Hoist – 2T	1	Turbine Building 12-5167	Manual	
36	Diesel Drive Fire Pump Hoist – 3T	2	Circulating Water Pump and Screen House 12-5167	Manual	
37	Boric Acid Batching Tank Hoist – 1/2T	1	Auxiliary Building 12-5168	Manual	
38	Welding Shop Hoist – 2T	2	Turbine Building 12-5167	Manual	
39	Trash Basket Hoist – 1T	2	Circulating Water Pump and Screen House 12-5167	Manual	
40	Turbine Oil Tank Equipment Hatch Hoist – 2T	2	Turbine Building 12-5169	Manual	
41	Moisture Separator Reheater Hoist – 3T	22	Turbine Building 12-5169	Manual	
42	Transformer, Battery Pack, and U.P.S. Hoist – 3T	1	Turbine Building 12-5169	Manual	
43	Moisture Separator Reheater Hoist – 2T	12	Turbine Building 12-5169	Manual	
44	Machine Shop Hoist – 1T	1	Service Building 12-5170A	Electric	

CRANES AND HOISTS WHERE A LOAD DROP CANNOT DAMAGE SAFETY RELATED EQUIPMENT

ITEM NO.	CRANE OR HOIST AND CAPACITY	QTY.*	LOCATION AND DRAWING**	ELECTRIC OR MANUAL POWERED	REMARKS
45	MACHINE SHOP HOIST – 1/2T	1	SERVICE BUILDING 12-5170A	ELECTRIC	
46	ELECTRICAL SHOP HOIST – 2T	2	TURBINE BUILDING 12-5167	ELECTRIC	
47	CONDENSATE BOOSTER PUMP MOTOR HOIST – 1-1/2T	1	TURBINE BUILDING 12-5167	MANUAL	
48	OIL STORAGE ROOM HOIST – 1T	1	TURBINE BUILDING 12-5167	MANUAL	
49	TURBINE CONTROL FLUID TANK HOIST – 1-1/2T	2	TURBINE BUILDING 12-5168	MANUAL	
50	HOT MACHINE SHOP HOIST – 3T	1	AUXILIARY BUILDING 12-5170	ELECTRIC	
51	COMPACTOR ROOM HOIST – 1T	1	CONCRETE MIXING BUILDING 12-5168	MANUAL	
52	DRUM LOADING DOCK HOIST – 2T	1	AUXILIARY BUILDING 12-5168	ELECTRIC	

NOTES: * WITH RESPECT TO THE HOISTS, QUANITY REFERS TO THE NUMBER OF MONORAILS PRESENT. IN SOME CASES, THE SAME HOISTING MECHANISM IS USED ON SEVERAL DIFFERENT MONORAILS. THE CRANE AND HOIST SCHEDULE (DRAWINGS 12-3891 AND 12-3891A) DELINATES WHAT HOISTING MECHANISMS SHALL BE USED ON EACH MONORAIL.

** IN SOME CASES GENERAL AREAS ENCOMPASSING THE CRANE OR HOIST GROUP ARE SHOWN AND THUS THE AREA MAY ENCOMPASS MORE THAN ONE CRANE OR HOIST IN A GROUP. ALSO, THE PLACEMENT SHOWN IS APPROXIMATE.

TABLE 3

EVALUATION OF SPECIAL LIFTING DEVICES

AEP:NRC:0514E

LOAD LIFTED	CRANE USED	DESIGNED BY	APPROXIMATE WEIGHT OF LOAD LIFTED	EVALUATION
SPENT FUEL SHIPPING CASK	AUXILIARY BUILDING CRANE	FUTURE	110T	(FUTURE)
RADIATION PROTECTION SHIELDS (CEILING AND WALL)	AUXILIARY BUILDING CRANE	AEP	55T	MEETS THE INTENT OF ANSI N14.6 – 1978. EXCEPT FOR SECTIONS 3.2.1, 5.2, 5.3 AND 6. THE CRITERIA USED FOR EACH OF THESE SECTIONS ARE GIVEN BELOW: 3.2.1 – SAFETY FACTOR EQUAL TO 1.5. DESIGNED USING AISC SPECIFICATION FOR DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS, DATED FEBRUARY 12, 1969. 5.2 & 5.3 – LOAD TEST EQUAL TO 110% OF MAXIMUM LOAD. 6. – NOT COMPLIED WITH.
MISSILE SHIELDS (CEILING AND WALL)	CONTAINMENT POLAR CRANE	AEP	28T TO 87T	MEETS THE INTENT OF ANSI N14.6 – 1978 EXCEPT FOR SECTIONS 3.2.1, 5.2, 5.3 AND 6. THE CRITERIA USED FOR EACH OF THESE SECTIONS ARE GIVEN BELOW: 3.2.1 – SAFETY FACTOR EQUAL TO 2. DESIGNED USING AISC MANUAL OF STEEL CONSTRUCTION (7TH EDITION). 5.2 & 5.3 – LOAD TEST EQUAL TO 110% OF MAXIMUM LOAD. 6. – NOT COMPLIED WITH.
REACTOR VESSEL HEAD	CONTAINMENT POLAR CRANE	WESTINGHOUSE	148.5T	LATER, BY WESTINGHOUSE
UPPER INTERNALS	CONTAINMENT POLAR CRANE	WESTINGHOUSE	58T	LATER, BY WESTINGHOUSE