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August 25, 1982

In reply, please
refer to LAC-8524

DOCKET NO. 50-409

Director of Nuclear Reactor Regulation
ATTN: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: DAIRYLAND POWER COOPERATIVE
LA CROSSE BOILING WATER REACTOR (LACBWR)
PROVISIONAL OPERATING LICENSE NO. DPR-45
CONTROL OF HEAVY LOADS

REFERENCE: (1) NRC Letter, Eisenhut to All Licensees of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits, dated December 22, 1980
(2) DPC Letter, LAC-7573, Linder to Crutchfield, dated June 1, 1981
(3) DPC Letter, LAC-8031, Linder to Crutchfield, dated January 19, 1982
(4) DPC Letter, LAC-8114, Linder to Crutchfield, dated February 24, 1982
(5) NRC Letter, Crutchfield to Linder, dated July 29, 1982

Gentlemen:

Reference 2 addressed the interim actions of Enclosure 2 of Reference 1. Reference 4 addressed further licensee actions requested in Enclosure 3 of Reference 1. Reference 5 requested additional information. The following information is hereby submitted in response to this request.

General Guideline 4:

Compare the characteristics of special lifting devices at LACBWR with the guidelines of ANSI N14.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4500 kg) or More for Nuclear Materials." This standard applies to all special lifting devices which carry heavy loads in areas where they could be brought in proximity to or over safe shutdown equipment or irradiated fuel in the spent fuel area. For operating plants certain inspections and load tests may be accepted in lieu of certain material requirements in the standard. In addition, the stress design factor stated in Section 3.2.1.1 of ANSI N14.6 should be based on the combined maximum static and dynamic loads that could be imparted on the handling device based on characteristics of the crane which will be used. This is in lieu of the guideline in Section 3.2.1.1 of ANSI N14.6 which basesthe stress design factor on only the weight (static load) of the load and of the intervening components of the special handling device.

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A comparison of the special lifting devices at LACBWR as defined in ANSI NI4.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4500 kg) or More for Nuclear Materials" has been made.

LACBWR has no such lifting devices. The designated lifting devices for the Reactor Vessel Head, Shield Plugs and Transfer Canal Shield Plug, (listed in Table 1 of Reference 4) are unique configurations of commercial lifting devices. The designated lifting rig for both the vessel head and shield plugs is a commerical 3-part wire rope sling with appropriate clevises and turn buckles for leveling purposes. The weakest part of the lifting rig is the alloy steel oblong link at the top of the 3-part sling. It is rated at 37T with a safety factor of 5, which is more than the heaviest dynamic lift as recommended in CMAA-70.

The designated lifting device for the Transfer Canal Shield Plug (the weight listed in Table 1 of Reference 4 should be 8.6T) is made of commercial oblong links and chain shackles. The weakest part is the link with a load rating of 9.6T with a safety factor of 5, which is more than the dynamic lift as recommended in CMAA-70.

LACBWR maintains a regular inspection program, and these lifting devices are included in it. LACBWR does not have yokes and special lifting devices as defined in ANSI NI4.6-1978, however, we have used some. Those lifting rigs were verified to have been designed, fabricated, tested, and inspected by the owner. This was required in accordance with the LACBWR Quality Assurance Program.

General Guideline 5:

Compare the installation and use of general lifting devices at LACBWR with the guidelines of ANSI B30.9-1971, "Slings." However, in selecting the proper sling, the load used should be the sum of the static and maximum dynamic load. The rating identified on the sling should be in terms of the "static load" which produces the maximum static and dynamic load. If this restricts slings to use on only certain cranes, are the slings clearly marked as to the cranees with which they may be used.?

All general lifting devices in use at LACBWR are commercially fabricated, none are made by plant personnel.

The manufacturer of these slings provides a rated capacity of each sling. The rated load capacity is based on a designed safety factor of 5. Some slings are ordered to include a proof test by the manufacturer, and all slings have a tag on them stating the rated load capacity.

In rigging slings, due allowance is made for variations and unusual conditions of the sling application. In handling the load, all slack in the sling is taken up carefully before beginning the lift. The start of the lift is done at the slowest crane speed with no jerks. Acceleration and deceleration rates are as low as possible to limit dynamic loading.

If slings are attached over rough or sharp corners, then protector arcs or blocking is used to prevent sling damage.

LACBWR has no restrictions on sling-crane combinations. Rigging instructions of sling-load combinations at LACBWR insure an adequate safety marin on the sling.

General Guideline 7:

Compare the crane at LACBWR with the applicable criteria and guidelines of Chapter 2-1 of ANSI B30.2-1976, "Overhead and Gantry Cranes" and of CMAA-70, "Specifications for Electric Overhead Travelling Cranes." An alternative to a specification in ANSI B30.2 or CMAa-70 may be accepted in lieu of specific compliance if the intent of the spectification is satisfied.

The following is in response to ANSI B.30.2-1976.

Marking:

The crane is marked with the maximum load capacity.

Clearances:

Clearance between crane and building is adequate. There are no parallel or other cranes in the proximity of the LACBWR polar crane.

General Construction:

The crane support can be considered to be set on concrete; even though it is inside containment. Because it is inside, the wind and rail clamp criteria of this section do not apply.

The rails are level, and curved to create a circle for polar rotation. No runway or rail stops are utilized.

Crane Construction:

The crane structure is welded box type. The end trucks are of welded steel construction, and the trolley is of welded steel plates and shapes. Steel material was to ASTM A-36 specifications. Structural design was to the applicable requirements of the EOCI specification; except that AISC specifications were applied in the absence of EOCI requirements. The more restrictive EOCI specification for allowable unit stresses of A36 steel was used (reduced 20%) instead of the AISC specification. Welding was done in accordance with AISC and AWS standards. No modifications have been made to the crane since installation.

Cabs:

The LACBWR crane has no cab; it is floor operated by pendant.

Lubrication:

All lubricating points and gear sumps are accessible by means of walkways on either side of the bridge girders.

Footwalks and Ladders:

The access ladder and maintenance walkways are designed and constructed to fit the crane and are adequate for their purpose.

Stops, Bumpers, Rail Sweeps and Guards:

There are no stops on the circular bridge rails. There are no stops or bumpers for the trolley because it travels at such a slow rate. There are rail sweeps on the bridge rails. Guards for moving shafts and gears are provided.

Brakes:

Both the main and auxiliary hoists have a mechanically driven load brake and an electrically operated holding brake. The main holding brake is rated at 150% of the rated crane capacity, and two auxiliary hoist holding brakes, each rated at 100% of the full load motor torque. The mechanical load brake is the braking means for maintaining controlled lowering speeds.

The bridge and trolley each have an automatically activated electric brake rated at 50% and 100% of full load motor torque, respectively.

The holding brakes have means to compensate for lining wear. The load brakes are eddy-current type in which braking torque, in either direction, is achieved without mechanical contact. Air cooling of the load brake is such that it may operate continously.

Electrical Equipment:

All electric motors are totally enclosed, main hoist rated for 60 minute, 75°C rise, auxiliary hoist, bridge and trolley rated for 30 minute with 55°C temperature rise. All electrical connections are made with stranded conductors of liberal size, type TW-105 and are rated at 600 volts per I.P.C.E.A. standards. All wire is run in rigid aluminum conduit.

All controllers and junction boxes are NEMA 1 enclosures. Controllers are mounted on trolley and are actuated with spring-return to off, 5-step push buttons on a pendant. Control power in pendant is 120 volts. A master control push-button switch is also on pendant.

Runway conductors are guarded.

Hoisting Equipment:

Sheave grooves on main and auxiliary hoists are smooth, close-fitting and are of proper size. Bearings are of sealed type.

Ropes are of plow steel wire cable with fiber core, 6 x 37 type, 3/4 inches diameter and 12 load supporting cables for the main hoist. Auxiliary is 7/16 inch diamter with 4 load supporting cables. The main and auxiliary hoisting cable have a breaking strength of 22.6 and 7.82 thousand pounds respectively.

Main hoisting is a sister type with center hole. it swivels freely and equipped with latches. The auxiliary hook rotates freely and is also equipped with a latch.

Warning Devices:

None are required for the LACBWR crane.

The following is in response to applicable areas of CMAA-70.

Impact Allowance:

This criterion is essentially non-applicable due to slow hoisting speeds of the LACBWR crane. The main hoist has a 5-step push-button speed control, with a maximum speed of 12 feet per minute. The auxiliary hoist can attain a speed of 25 feet per minute.

Torsional Forces:

The crane is of a box girder construction with all loads located equally between the girders, therefore, this area is not applicable.

Bending Stress:

The crane in question is located indoors, therefore, there is no wind loading calculations required.

Longitudinal Stiffeners:

None are used.

Allowable Compressive Stress:

The b/c ratio is 25.3 and therefore within the specifications of CMAA-70.

Fatigue Considerations:

This is essentially not applicable, as the crane, in 17 years of operation, has not had a load greater than 80% of the design.

Hoist Rope Requirements:

Rated capacity plus the load block does not exceed 20% of the rope breaking strength.

Drum Design:

The drum was designed to withstand the combined crushing and bending loads. The drum groove depth and pitch are in accordance with CMAA-70 specifications. The gear design has been done to the allowable maximum horsepower of the motors.

Bridge Brake Design:

The LACBWR crane has no cab, therefore, this specification is not applicable.

Hoist Brake Design:

Brakes meet the requirements of CMAA-70, (See Brakes, above).

Bumpers and Stops:

No bumpers or stops are used (See Stops, Bumpers, etc., above).

Static Control Systems:

The LACBWR crane uses magnetic controllers.

Restart Protection:

The LACBWR crane uses spring return push buttons for control systems.

Interim Protection Measure 1

Submit amended technical specifications comparable to BWR Standard Technical Specification 3.9.6.2, "Crane Travel," (Enclosure 2) to prohibit handling of heavy loads over fuel in the storage pool until implementation of measures which satisfy the guidelines of Section 5.1 of NUREG 0612.

Because of the configuration of the LACBWR FESW in the Containment Building and the polar crane spanning the entire containment diameter, there are no physical stops which prevent the crane bridge (one end or the other) from passing over the FESW.

Handling of a spent fuel transfer cask requires that it travel over spent fuel in the pool because of fuel element storage configuration.

LACBWR Technical Specification 4.2.8.5 imposes requirements for items that can be handled in or near the FESW and is quoted below:

4.2.8.5 With the exception of a spent fuel shipping cask, the core spray bundle, the transfer canal shield plug and the other components and fixtures that are normally located and used within the spent fuel storage well, no objects heavier than a fuel assembly shall be handled over the spent fuel storage well.

Other LACBWR Technical Specifications, namely 4.2.19 and 2.12.5, impose requirements for containment isolation when handling a heavy load, also FESW water levels.

We believe that the present Technical Specifications fully control the handling of heavy loads over fuel in the FESW and the LACBWR program for handling heavy loads satisfies the guidelines of Section 5.1 of NUREG 0612. No new Technical Specifications or changes are contemplated nor proposed.

If you have any further questions, please contact us.

Very truly yours,

DAIRYLAND POWER COOPERATIVE

Frank Linder

Frank Linder, General Manager

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cc: Mr. J. G. Keppler, Reg. Admin, Region III
NRC Resident Inspector