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October 19, 1982

Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Units 1 and 2
NUREG 0612 Control of Heavy Loads
Supplemental Response
NRC Docket Nos. 50-373/374

References (a): A. Schwencer letter to L. O. DelGeorge dated July 2, 1982

(b): E. D. Swartz letter to D. G. Eisenhut dated June 22, 1982

Dear Mr. Eisenhut:

Reference (a) provided the Commonwealth Edison Company with the draft Technical Evaluation Report (TER) prepared by EG&G Idaho that was based upon our initial Reference (b) control of heavy loads submittal for LaSalle County Station. This draft TER was provided for our review and comment, and was subsequently discussed with NRC Staff members and their consultants during a conference call on September 9, 1982.

As a result of our review and to document our conference call discussions, we are enclosing our response to each EG&G Idaho conclusion and recommendation as identified in the TER. It is our understanding that the Enclosure to this letter, along with our initial Reference (b) submittal, will form the basis of a final TER from EG&G Idaho for LaSalle County Station and ultimately the NRC Staff Safety Evaluation of "Phase I" of this issue.

To the best of my knowledge and belief, the statements contained herein and in the Enclosure are true and correct. In some respects these statements are not based on my personal knowledge but upon information furnished by other Commonwealth Edison employees and consultants. Such information has been reviewed in accordance with Company practice and I believe it to be reliable.

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Please address any questions that you may have concerning this matter to this office.

One (1) signed original and thirty-nine (39) copies of this letter with Enclosure are provided for your use.

Very truly yours,

E. Douglas Swartz
Nuclear Licensing Administrator

Enclosure

cc: J. G. Keppler - RIII
RIII Inspector - LaSalle
Anthony Bournia - LB2
T. H. Stickley - EG&G Idaho

5265N

ENCLOSURE

Commonwealth Edison Company

LaSalle County Station Units 1 and 2

NUREG 0612 Control of Heavy Loads -
Response to EG&G Idaho Draft TER Conclusions and Recommendations

5265N

LaSalle 1 & 2

Response for Heavy Load Overhead Handling Systems

2.2.1.c EG&G Conclusions and Recommendations

Based on the information provided EG&G concludes that the Licensee has included all applicable hoists and cranes in their list handling systems which must comply with the requirements of the general guidelines of NUREG-0612. However, EG&G does recommend that the Licensee supply a better justification for the exclusion of cranes and hoists from the referenced list. This could be done by stating the criteria that was used to justify sufficient physical separation between load impact point and safety related equipment, fuel, etc.

2.2.1.c RESPONSE

The justification for the exclusion of cranes and hoists from the list provided as Table 2.1 was included as part of the Phase II submittal provided to the USNRC dated September 22, 1981. The criteria used to justify sufficient physical separation between load impact point and safety related equipment, fuel, etc. is detailed in the aforementioned submittal. Therefore, the NRC Staff should provide EG&G Idaho with a copy of our September 22, 1981 "Phase II" submittal in order to resolve this issue.

LaSalle 1 & 2

Response for Guideline 1

2.3.1.c EG&G Conclusions and Recommendations

LaSalle Station does not comply with Guideline 1. In order to adhere to the criteria of this guideline, EG&G recommends that the Licensee should perform the following:

1. develop safe load paths for all heavy loads identified by the Licensee, similar to those already established for the drywell and reactor vessel heads, the dryer, separator, etc.

2. incorporate these load paths into load handling procedures and equipment layout drawings

3. clearly mark safe load paths on the floor or by some other means in areas where the loads are handled

4. submit verification that deviations from established load paths require written alternatives which are approved by the plant safety review committee.

2.3.1.c RESPONSE

1. Sargent & Lundy Drawing SK-5A shows load paths on the refuel floor. The reactor building refueling floor has been designed for a live load of 1000 lbs/ft^2. The entire reactor building refueling floor with the exception of the fuel pool and open reactor cavity is considered a safe load path zone. Available procedures prohibit handling or movement of heavy loads over spent fuel in the fuel pools or over the open reactor cavity unless a specific procedure has been written and approved.

2. The major load paths shown on Sargent & Lundy Drawing SK-5A have been reduced to 8-1/2" x 11" page size and are included in the appropriate load handling procedures.

2.3.1.c RESPONSE (Cont'd)

Crane operators at LaSalle move the heavy loads shown on Drawing SK-5A under the supervision of the Maintenance Foreman who will have the specific load movement procedures available at the job location during the load movement.

3. The reactor building refueling floor area, except for the spent fuel pool and reactor cavity, is considered a safe load path zone. In addition, the exact position and load path of a component may vary from outage to outage. Therefore, marking the load path on the floor is not considered necessary and could slow refueling operations.

Based on the above, the Commonwealth Edison Company does not believe that marking load paths on the refueling floor is warranted, nor do we perceive such marking will contribute to safer load movement or increased reactor safety.

4. Deviations from load handling procedures are reviewed and approved according to station Technical Specifications.

LaSalle 1 & 2

Response for Guideline 2

2.3.2.c EG&G Conclusions and Recommendations

LaSalle Station partially complies with Guideline 2. In order to comply with the remaining criteria of this guideline, the Licensee should perform the following:

1. incorporate defined safe load paths into all current procedures

2. submit certification that general handling procedure LMP-GM-9 and instructions contained on applicable drawings satisfy the guideline criteria, including safe load path definition, or incorporate these items into procedures which comply.

2.3.2.c RESPONSE

1. The individual load paths shown in Sargent & Lundy Drawing SK-5A are incorporated into the respective maintenance procedures. These procedures will be available onsite for review and inspection by the USNRC staff.

2. LaSalle County Station Procedure LMP-GM-9 will be revised to prohibit handling of heavy loads over fuel in the spent fuel pool area or over the open reactor cavity unless a specific procedure has been written directing or permitting such action.

LaSalle 1 & 2

Response for Guideline 3

2.3.3.c EG&G Conclusion and Recommendations

LaSalle Station partially complies with Guideline 3. In order to achieve full compliance, the Licensee should verify that suitable means exist to monitor crane operation conduct in accordance with ANSI B30.2-1976. In addition, when procedures have been revised to include the required formal examination, these procedures and program records should be readily available for review and inspection by the NRC staff.

2.3.3.c RESPONSE

The LaSalle County Station standard for the testing, inspection and maintenance of overhead cranes LMS-HC-01 was based on and does comply with ANSI B30.2-1976.

LaSalle 1 & 2

Response for Guideline 4

2.3.4.c EG&G Conclusions and Recommendations

LaSalle Station does not comply with Guideline 4. In order to satisfactorily comply with the criteria, the Licensee should perform the following:

1. review, evaluate and report on the design and fabrication of all special lifting devices with respect to the requirements of ANSI N14.6-1978 and Guideline 4.

2. submit verification that programs exist for all special lifting devices which satisfy the requirements of Section 5 (Acceptance Testing, Maintenance, and Assurance of Continued Compliance) of ANSI N14.6-1978.

2.3.4.c RESPONSE

1(a) The Reactor trongback and Moisture Separator Strongback are stored in a clean, dry area and are inspected for evidence of physical abuse, damage, or defects prior to each use.

The Reactor Head Strongback and Moisture Separator Strongback comply with ANSI N14.6-1978, Section 3.2.1. Stress design safety factors of two for minimum yield strength and five for ultimate strength were used in their design.

As stated in our June 22, 1981 Heavy Load Movement Report, the special lifting devices are designed according to industrial standards using good engineering practices.

2.3.4.c RESPONSE (Cont'd)

1(b) ANSI N14.6-1978 is a consensus standard developed for special lifting devices for containers weighing 10,000 pounds (4500 kg) or more for nuclear materials; i.e., spent fuel casks. It should not be applied to all special lifting devices used in a nuclear power plant.

1(c) Only a very limited amount of design information is readily available on the special lifting devices. The reactor head strongback and moisture separator strongback are proofload tested at 125% of their maximum load. Welding and coating comply with ANSI N14.6-1978. In Commonwealth Edison's judgment, any additional review and point-by-point comparison will not change our design criteria, it would simply verify that the information and explanation already provided to the NRC is correct. Based on the above, it is Commonwealth Edison's judgment that no further evaluations are warranted.

2.3.4.c RESPONSE (Cont'd)

2. LaSalle County Station procedures comply with the intent of Section 5, "Acceptance Testing, Maintenance, and Assurance of Continued Compliance" with some exceptions. In Commonwealth Edison's judgement, the periodic load testing of the special lifting devices to 150% of the maximum load is not practical nor warranted, and may invalidate any vendor product guarantees. Additionally, the logistics of moving heavy test loads into the Reactor Building to accommodate such periodic load testing are difficult.

Prior to the use of specially designed lifting assemblies, visual inspection will be performed and certain critical and accessible parts or members such as hooks and pins will be non-destructively examined at appropriate time intervals. In our judgement, the visual inspection and limited NDE are adequate to detect potential failures.

However, should an incident occur in which a special lifting device is overloaded, damaged, or distorted, an engineering assessment will be performed. This assessment will address ANSI N14.6 and include consideration of the load test up to the original procurement load test value or 150% whichever is less. The requirement to perform this assessment will be incorporated into plant procedures.

LaSalle 1 & 2

Response for Guideline 5

2.3.5.c EG&G Conclusions and Recommendations

LaSalle Station partially complies with Guideline 5. In order to fully comply, the Licensee should submit verification for the following:

1. sling selection is based upon the sum of the static and maximum dynamic loads

2. slings are marked with the "static load" which produces the maximum static and maximum dynamic loads

3. slings restricted in use to only certain cranes are clearly marked to so indicate.

2.3.5.c RESPONSE

The slings used in the LaSalle County Station are selected in accordance with ANSI B30.9-1971. These slings are not sized with a 15% dynamic loading margin. However, the analysis and effects of heavy load drops are discussed in our September 22, 1981 submittal.

It should be noted that slings and cables manufactured in accordance with ANSI B30.9 have a 30% dynamic load factor built in.

No slings are restricted for use on a particular crane at LaSalle County Station; therefore, no special marking of slings is required.

LaSalle 1 & 2

Response for Guideline 6

2.3.6.c EG&G Conclusion and Recommendations

LaSalle Station complies with Guideline 6 on the basis of the Licensee's statement.

2.3.6.c RESPONSE

No additional response is required.

2.3.7.C EG&G Conclusion

LaSalle County Station complies with Guideline 7, to a substantial degree, on the basis of compliance with EOCI-61 criteria. However, insufficient information has been made available to verify that the following CMAA-70 requirements have been satisfied for cranes subject to this review. The Licensee should make this information available or provide suitable justification for concluding that the requirements of CMAA-70 have been satisfied by equivalent means.

1. Hoist lifting speeds do not exceed 30 feet per minute.
2. Nonsymmetrical girder sections were not used in crane construction.
3. Any longitudinal stiffeners in use conform to the requirements of CMAA-70. and allowable h/t ratios in box girders using these stiffeners do not exceed ratios specified in CMAA-70.
4. Girders with b/c ratios in excess of 38 were not used.
5. Fatigue failure was considered in crane design and the number of design loading cycles at or near rated load is less than 20,000 cycles.
6. Maximum crane load weight plus the weight of the bottom block, divided by the number of parts of rope does not exceed 20% of the manufacturers published breaking strength.
7. Drum design calculations were based on the combination of crushing and bending loads.
8. Drum groove depth and pitch conform to the recommendations of CMAA-70.
9. Gear horsepower ratings were based on design allowables and calculation methodology equivalent to that incorporated in CMAA-70.
10. A cab-control, cab-on-trolley configuration was not used.
11. Mechanical load breaks or hoist holding brakes with torque ratings of approximately 125% of the hoist motor torque were used.
12. Crane operation under load near the end of bridge or trolley travel is not allowed or is compensated for by bumpers and stops which satisfy the intent of CMAA-70.
13. Any static control systems in use conform to the requirements of CMAA-70.
14. Controllers in use are the spring-return or momentary-contact pushbutton type or are equipped with a device which disconnects all motors on power failure and will not permit restart until the controller handle is brought to the OFF position.

2.3.7.c RESPONSE

The following information is provided to verify that CMAA-70 requirements have been satisified for each identified concern.

1. The LaSalle County reactor building refueling floor overhead crane is rated at 125 tons/10 tons with a 125-ton main hoist maximum vertical speed of 5.2 ft/min, and a 10-ton auxiliary hoist maximum vertical speed of 84 ft/min.

   The main hoist vertical speed conforms to CMAA-70 Figure 70-6. Although the auxiliary hoist vertical speed is greater than the suggested values in CMAA-70, Figure 70-6, the impact allowance value of 42 (a measure of the acceleration/deceleration of the load), is within the acceptable impact allowance range, 15% to 50%, found in CMAA-70 Subsection 3.3.2.1.1.3.

2. The shear center coincides with the centroid of the girder section, therefore, the girder sections are symmetrical.

3. The longitudinal stiffeners in use conform to the requirements of CMAA-70, Article 3.3.3.1.2 and allowable h/t ratios in box girders using the stiffeners do not exceed ratios specified in CMAA-70.

2.3.7.c RESPONSE (Cont'd)

4. The b/c ratio is designed for less than 38 for the reactor building crane.

5. Fatigue failure was considered in the design. Assuming one refueling per year for a design plant life of 40 years gives an estimated number of lifts greater than 50% of crane capacity:

   20 lifts/outage x 40 outages x 2 Units = 1600 which is much less than the 20,000 allowed in CMAA-70.

6. Reactor building crane main hook has:

   A rated load capacity = 250,000 lbs

   Block and rope weight = 10,150 lbs

   Total weight lifted = 260,150 lbs

   This is supported by 12 parts of wire rope with a published breaking strength of 123,800 lbs

   $$\frac{\text{Total weight listed/Number of parts rope}}{\text{Breaking strength of rope}} = \frac{260,150}{12 \times 123,800} = 17.5\%$$

   which is less than 20%.

7. The reactor building crane main drum is 50 inches in diameter and 20'-5 1/4" long. This depth to length configuration is far short of the requirement to consider it a beam in bending.

8. The drum groove depth and pitch conform to the recommendations of CMAA-70.

2.3.7.c RESPONSE (Cont'd)

9. The gear horsepower ratings conform to the methods and recommendations for design in CMAA-70.

10. Cab-on-trolley configuration is not used.

11. The main and auxiliary hoists have power control braking as well as two holding brakes. The brakes provided are DC magnet-operated electric shoe-type brakes with a maximum torque rating of 200% of motor torque.

12. Spring bumpers effective for both direction of travel are provided on the outboard ends of the bridge trucks. Crane runway stops with four spring-type trolley bumpers are mounted on runway girders at the ends of the runway rails.

13. The crane static control systems in use conform to the requirements of CMAA-70.

14. Momentary contact push buttons are used on the pendant control stations.