Dresden Special Report No. 41
QC Special Report No. 16

Dresden Special Report No. 41

Quad Cities Special Report No. 16

REACTOR BUILDING CRANE

AND

CASK YOKE ASSEMBLY MODIFICATIONS

AEC Dockets

50-237
50-249
50-254
50-265

Commonwealth Edison Company

October, 1974

TABLE OF CONTENTS

1.0 INTRODUCTION

To preclude the possibility of dropping a spent fuel cask during handling operations over the spent fuel pool, modifications will be made to the existing Reactor Building Crane and Cask Yoke Assembly. Crane modifications shall consist of a new trolley utilizing a dual-load path hoisting system for the main hoist. This system will be available to prevent all postulated credible single-component failures over the entire supporting load path; from the cask supporting system through the redundant cask lifting yoke, the redundant hook, the dual-load path hoisting system to the crane bridge structure.

2.0 REACTOR BUILDING CRANE

2.1 Description of Modifications

The existing reactor building crane is a single trolley, overhead electrical traveling-type, with both a main hoist and auxiliary hoist. The existing trolley will be replaced by a new trolley containing a dual-load path hoist system for the main hoist and a standard arrangement for the auxiliary hoist. Design requirements are as follows:

A. The entire crane trolley and existing bridge girders will be reviewed for the revised trolley weights in conjunction with the lifted load requirements to establish compliance with CMAA #70 permissible stress ranges. Calculations to be performed by Whiting Corporation will also determine the maximum vertical loadings with impact for the bridge girders, as defined in Section 70-3 of CMAA #70. Design values for operation conditions plus seismic will be based on AICS code requirements for OBE and 90% of the minimum yield strength of the material used for DBE. The exact values will be provided by Whiting Corporation with the Component Failure Analysis for this submittal at a later date.

B. The main hoist capacity will be 125 tons and the auxiliary hoist capacity will be 5 tons. Crane stepless variable speeds (maximum) have been established as follows:

Bridge	—	50 fpm at full load
Trolley	—	33 fpm at full load
Main Hoist	—	5.75 fpm at full load
		17.25 fpm at no load
Auxiliary Hoist	—	30 fpm at full load
		90 fpm at no load

The new trolley with its dual load path hoist system weighs 116,000 lbs. which is a 25,000 lbs. increase over the weight of the existing trolley. All calculations and analysis will take this weight increase into account. The existing bridge crane and associated crane runway support structures will be evaluated to determine if any revisions will be required for handling the new trolley with its increased weight. All analyses performed relative to the cask handling procedures will base load values on the details of the National Lead 10/24 Cask. Should larger casks be placed into service, compatibility with the stipulated safety requirements will be established.

C. All crane parts shall equal or exceed design criteria as established by CMAA Specification #70, and shall be compatible with the requirements of the Occupational Safety and Health Act of 1970 and as amended in 1971, as well as ANSI B 30.2.0.

1. Motors — General Electric, open ball bearing, drip proof, solid frame, shunt wound, crane type motors, with Class B non-hydroscopic insulation, rated 30 minutes. Motors will comply with NEMA standards. Auxiliary hoist motor to be gearhead type.
2. Controllers — Existing Maxspeed 320 system for hoists, with existing transfer switch for auxiliary hoist control from main hoist. Existing Maxspeed 100 for trolley and bridge controls.
3. Switchboard — The existing units have been reused.
4. Magnetic Brakes — Two (2) General Electric IC-9528 A-103 16 inch DC magnet operated electric shoe type brakes for main hoist. Two (2) IC-9528 A-102 13 inch DC magnet operated electric shoe type brakes for auxiliary hoist.
5. Trolley Type — Four (4) motor type with welded steel frame; center to center of trolley rails shall be 17'-0".
6. Trolley Drive — Enclosed speed reducer type plus an enclosed Abart speed reducer located between motor and trolley drive.
7. Wheels — 27 inch diameter fabricated from rolled steel rim toughened material.
8. Drum — 58 inch diameter fabricated from steel materials for main hoist. 21 inch diameter fabricated from stainless steel for auxiliary hoist.

9. Hoist Ropes — Main hoist shall consist of 12 parts 1-1/4 inch diameter Monitor AAA type I.W.R.C. Auxiliary hoist shall consist of 1 part 7/8 inch diameter A 304 stainless steel with I.W.R.C. Main hoist ropes attached to a specially damped equalizer assembly with unbalanced condition limit switch cut-offs.
10. Limit Switch — Weight type control circuit switch plus screw type for upper and lower hoist limits and centrifugal overspeed switch for lowering.
11. Load Block — Dual load path type with bronze bushed sheaves for main load block and with forged steel main hook. Stainless steel yoke and hook for auxiliary hoist.
12. Trolley Brakes — One (1) IC-9516-160 and one (1) IC-9516-161 DC solenoid operated electric shoe type brakes.
13. Collectors — Double set of Insul - 8 shoe type.
14. Stops — Four (4) Spring type trolley bumpers.
15. Main Hoist Inching Drive and Controls — AC squirrel cage continuous duty 5HP motor with independent controls.
16. Load Sensing readout with high and low limit cut-offs.

D. Electrical power as presently provided for the existing Reactor Building Crane will be adequate for all operational requirements of the cask handling system.