Consumers Power Company

Central Rail
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Stephen H. Howell
Vice President

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April 22, 1977
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Mr D W Hayes
Senior Reactor Project Inspector
Office of Inspection & Enforcement
Region III
US Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

During your April 14, 1977 visit to the Bechtel - Ann Arbor offices, you requested copies of certain documents which provide plans to evaluate the extent of damage relating to the bulging of the Unit No 2 containment liner plate. These documents could not be given to you because they are in a form which Bechtel policy requires be limited to internal Bechtel distribution. Bechtel has now provided the requested information in a documentary form which can be distributed externally and, therefore, a copy is herewith enclosed for your use.

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Bechtel Associates Professional Corporation

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Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106

April 18, 1977

BLC- 3948

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

Attention: Mr. R. C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Damaged Liner Plate
File: 0270, 0670.1, C-2167

Gentlemen:

Pursuant to your request at the liner plate meeting with the NRC on 4/14/77, we have summarized Project Engineering's direction regarding investigation of the damaged containment liner plate between azimuths 250° and 270° of Unit 2. These directions were forwarded to Bechtel construction earlier in four separate memos.

GENERAL:

1. No repairs of the damaged area and plate shall be started until Project Engineering approval is received.

RECORDS:

2. The damaged plate shall be surveyed to record the bulged profile. A sketch showing the development of the plate shall be maintained to record the location of the preliminary holes, observations noted, and to identify the position of the designated removed plate segments for later study. Photographs shall be taken as requested by Engineering.

Additional information was later requested after most of the liner plate was removed, including:

3. In the damaged area, show the existing condition with dimensions locating the embedded channels and the concrete markup of the stiffening angles. Any angles which are still embedded in concrete should be identified (length and location) on a sketch. Areas where the flange of the W14X61 columns has deformed should be described. The extent to which the liner was cut at the top should be shown. Areas where concrete has been removed more than 3" in depth and areas where concrete is intact (e.g., near the penetration assembly at El. 605/609 and near the columns and higher elevations) should be identified. The channels which were pulled out from the

concrete should be marked up and the length and location of the portions which were pulled out should be given. Information, other than what is listed above, describing the existing condition of the subject panel should be included.

4. On the same sketch the penetration assembly at El. 605/609 and the embedment at El. 691 have been covered by a 4"x4" grid. The deformation within these areas should be measured at the nodal points of the grid. In regions where the plate is not excessively deformed (as determined by the engineering representative), measurements can be taken at alternate nodal points (8" spacing rather than 4").

LINER PLATE REMOVAL:

Initial direction included:

5. Remove the damaged 1/4" liner plate between azimuths 250° and 270° except as noted below:

   Allow a six inch minimum width of 1/4" liner plate to remain attached to the following items: 1) 14 WF strong backs at azimuth 250° and 270°, 2) the 1/2 inch thickened liner plate about the penetration, 3) the bottom of the liner plate shall not be initially cut below elevation 594'-0".

   The plate shall not be removed above elevation 690' or where no further bulge is apparent as determined by the engineering representative.

6. Representative samples as selected by the structural engineering representatives shall be marked for later identification. This identification shall be noted on the developed elevation sketch. Damaged plate sections shall be retained until Project Engineering review is completed. Construction has the option to cut the plate to sizes convenient for the handling.

7. Leak chase channels may be cut as required. Precautions shall be taken to prevent foreign material from entering remaining channel.

8. The wind girder at approximately elevation 670' may be removed. Replacement is a field option inasmuch as the structural purposes of this member is now obsolete.

Later, the above direction was modified as follows:

9. Cut the buckled panel of the liner plate approximately 1" from the edge of the embedded column flange on each side of azimuths 250° and 270° top to bottom.

10. Remove the leak chase channel and 1/4" liner plate around the embedment at elevation 691'-0" and azimuth 255°-31'.

11. Test leak chase at azimuths 250° and 270°.

CONCRETE:

12. No particular attention as to the removal of the spalled concrete is required. A sample of approximately 100 lbs. of the larger size concrete rubble shall be retained, all other concrete rubble may be disposed of.

13. Clean off exposed concrete surface following all cracks to sound concrete.

BASE SLAB:

14. Clean out the debris between the liner plate and base slab.

Later, the following directions were added:

15. Chip out about an 8"x8" trench of the cover slab at the bottom of the liner plate panel. Care must be exercised not to damage the leak chase channel between the liner and the 1/2" knuckle plate and the reinforcing bars. This trench should be extended about 6" on each side of the W14X61 columns at azimuths 250 and 270 degrees. This chipping shall be done after the loose concrete above this area has been removed to preclude any debris falling into this trench. Alternately, the field can proceed with the trench before the loose material above is completely removed, providing measures to maintain the trench free of debris are provided.

16. Test leak chase between liner and knuckle plate at El. 595; also radial leak chase channels on the knuckle plate joints at azimuths 250, 260 and 270 degrees.

CORE DRILLING:

17. Remove a 5"x5" square of the 1/4" liner plate (without using a burning torch) at the following two location:

    a. Center of square at 2'-9" from the centerline of the leak chase channel at the 270° strong back toward azimuth 280°, and at elevation 598'-0".

    b. Center of square at 2'-3" from the centerline of the leak chase channel at the 250° strong back toward azimuth 240°, and at elevation 598'-0".

Take precautions to keep the concrete behind the removed squares intact.

18. At the center of the exposed squares, core drill, perpendicular to the wall, to obtain cylinderical core specimens 2.5" in diameter and 6" long. If concrete degradation is noted behind the removed squares, do not core drill and notify engineering.

19. Core drill at the hair crack at about azimuth 260° and elevation 647 on the exterior of the reactor building perpendicular to the wall to obtain cylinderical core specimens of 1.5" in diameter and in segments of 1" long; one, two or three segments maximum can be core drilled depending on how deep this crack is and is decided by engineering.

20. Note that complete records of removal and core drilling is required and that this work shall be carried out with the presence of engineering representative at the jobsite.

21. Do not fill the core-drilled examination holes until notified by project engineering.

22. Please be advised that additional core drilled holes may be requested by the project engineering representative as necessary to support our investigation.

PIPE REMOVAL:

Initial direction included:

23. Fill the water line from the bottom at a very low rate. Keep a record of the pressure and detect any leaks inside the building.

24. Chip out around pipe where leak exists to expose the leaking area of the pipe as directed by project engineering representative at jobsite; if necessary fill pipe with water again to help project engineering representative locate the leaking area.

Later, the following instructions were added:

25. Remove a section of the 2"Ø water pipe which appeared to be leaking during the hydrostatic test. Limits of such removal shall be as directed by the engineering representative at the jobsite.

26. Take photographs of the pipe section before and after removal of the pipe.

TEST BLOCKS:

27. Make 6 blocks 1'-0"x2'-0"x2'-4" each, and 3 blocks 1'-0"x2'-0"x3'-6" each, of the concrete mix used in the next lift of exterior concrete wall of containment Unit 2. These blocks should all be made from the same truck load. Also from the same truck load, make 6 test cylinders 6" diameter x 12" height for performing strength tests. Curing of the blocks should be carried out at the jobsite in a way similar to that in use for curing the walls."

The above directions have been used by Construction to obtain necessary information for the investigation of the liner plate failure, and also for the development of appropriate repair procedure alternates.

Please advise if you have further questions on this item.

Very truly yours,

for R. L. Castleberry
Project Engineer

RJM/jt
4/15/4