DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

August 30, 1979

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

Attention: Mr. Robert L. Baer, Chief
Light-Water Reactor Project Branch No. 2

Re: McGuire Nuclear Station
Units 1 and 2
Docket Nos. 50-369, 50-370

Dear Mr. Denton:

Due to floor elevation changes in the vicinity of the McGuire containment sump, it was necessary to modify the sump screen design presented in Figures 16 and 24 of Alden Research Laboratory Report No. 29-78/M208JF which was transmitted to you on June 30, 1978 as part of Amendment 53 to the McGuire license application. Attachments 1 and 2 are marked up figures from this report showing the changes. We have reviewed these changes and have concluded that they would not adversely affect sump performance. Attachment 3 is a letter from Alden Research Laboratory to Duke Power Company which supports this conclusion.

Attachment 4 is a discussion of the net positive suction head (NPSH) available to the containment spray (CS) and residual heat removal pumps under the most limiting conditions. Attachment 5 is the data obtained from measurements taken during preoperational tests. This data was the basis for the information supplied in Attachment 4.

If you have any questions regarding any of the attached information, do not hesitate to contact us.

Very truly yours,

William O. Parker, Jr.

William O. Parker, Jr.

GAC/sch
Attachment

ELECTRICITY FOR A PROGRESSIVE PIEDMONT
5th Anniversary
DUKE POWER 1904-1979

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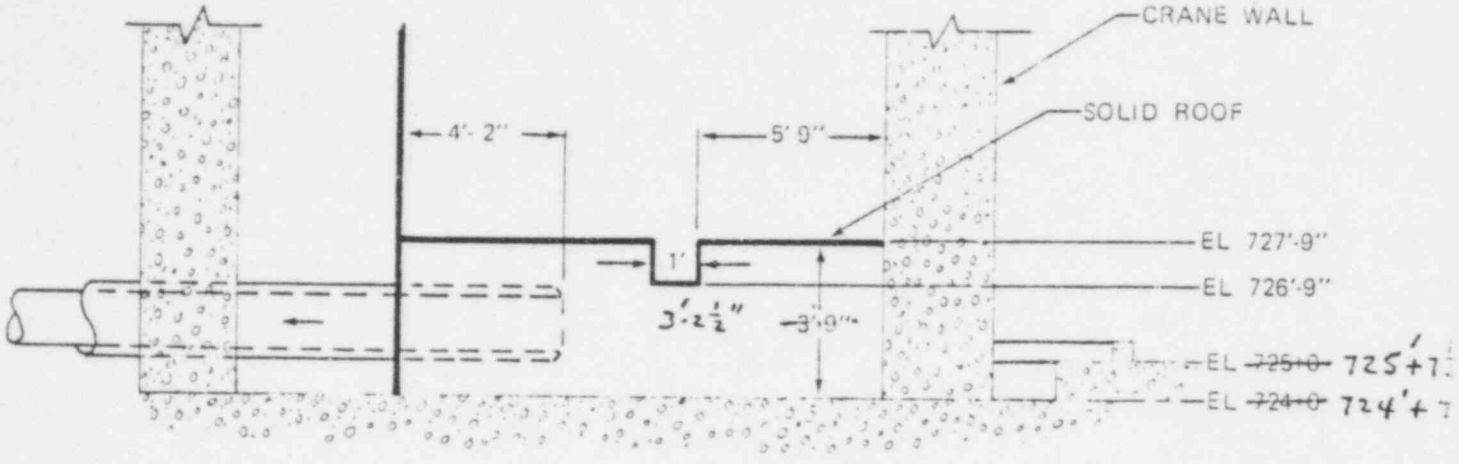
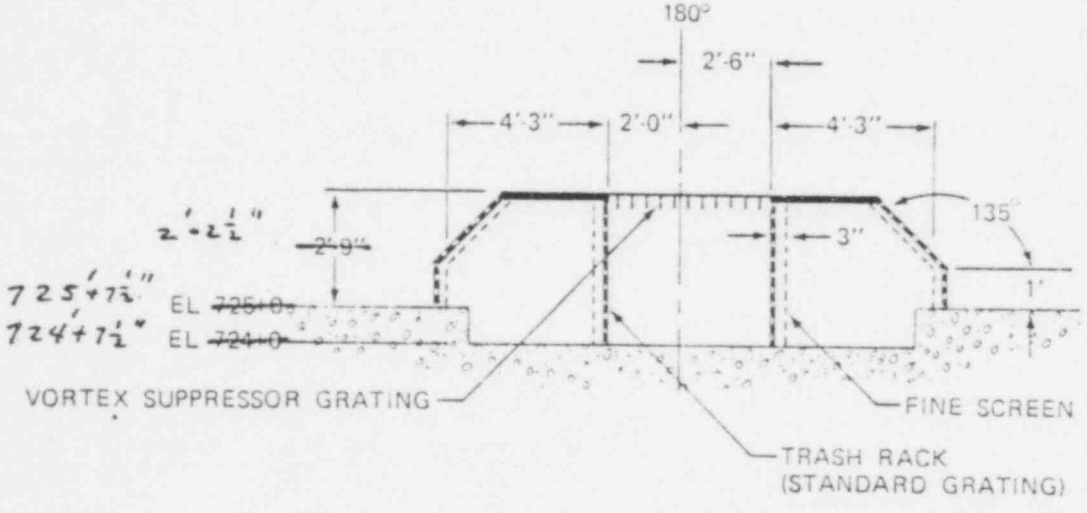


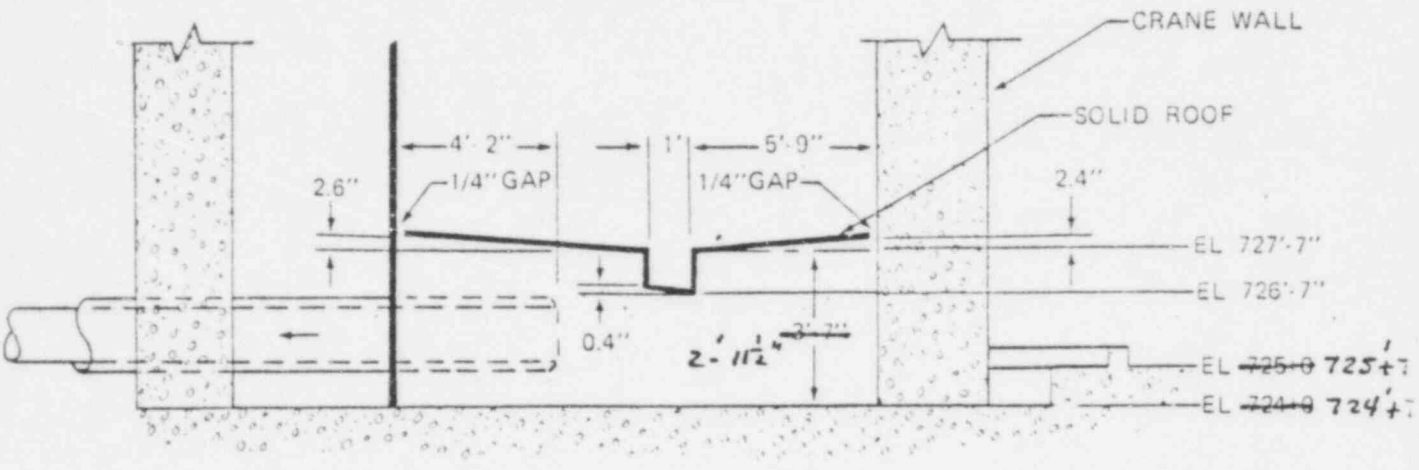
SECTION B-B



SECTION A-A

FIGURE 16 SECTIONS A-A AND B-B SHOWING THE REVISED DESIGN OF CONTAINMENT SUMP

Attachment 2



SECTION BB (FIGURE 15)

FIGURE 24 PROPOSED SLOPING TOP COVER PLATES

Attachment 3

ALDEN RESEARCH LABORATORY
WORCESTER POLYTECHNIC INSTITUTE

May 3, 1979

Duke Power Company
422 South Church Street
Charlotte, NC 28242

Attention: Mr. S.K. Blackley, Jr.
Chief Engineer
Mechanical and Nuclear Division

McGUIRE NUCLEAR POWER STATION
CONTAINMENT SUMP MODEL TESTS
MG&C/BENDS-ARL-208M

Dear Mr. Blackley:

This is in response to your letter dated April 27, 1979 requesting us to review the changes in the screen design of the McGuire Containment Sump.

The reduction of screen area of 164 square feet to 135 square feet will increase the approach velocities to the screen by about 20%, from 0.198 to 0.24 ft/sec. As the submergence of the pipe (pipe centerline still at EL 726) and the overall sump orientation are not changed, no major changes in the flow pattern to the sump and to the pipe are expected with the new changes in screen ar . Hence, the position of the vortices would be more or less the same as previously observed in the model tests. Earlier tests have showed that even with prototype velocities in the model suction pipes, the most severe vortices were of weak dye core type, and these were disrupted by the vortex suppressor gratings provided in the recommended design (Figures 15, 16, and 24 of ARL Report No. 29-78/M208JF).

Separate studies on vortex suppression gratings conducted for Duke Power at ARL and reported in ARL Report No. 62-78/M208JF (submitted tc Duke Power) have indicated that the vortex suppressor gratings recommended for the McGuire sump are capable of suppressing air-core vortices (generated by lowering the submergences far below design values), under the same discharge conditions. Hence, even if the proposed change in the screen design increases the vortex strength, the suppressor would act in eliminating the existence of any coherent core and as such no air-entraining vortices are possible.

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As no major changes in the flow pattern in the sump vicinity and at the pipe entrance are likely with the proposed screen area changes, no practical increases in the swirl or entrance losses are anticipated. However, due to the increase in approach velocity, the screen losses would be somewhat increased. The expected screen losses with the proposed screen area reduction would be about 0.6 inches of water, which is small compared to the total intake losses.

Based on the above factors, the proposed changes in the screen area will not contribute to any adverse changes in flow conditions in terms of vortexing, swirl, or inlet losses in the sump behavior relative to those predicted by ARL hydraulic model tests, reported in ARL Report No. 29-78/M208JF.

If you have any questions, please feel free to contact us.

Sincerely,

Mahadevan Padmanabhan
Lead Research Engineer
Fluid Machinery

MP/nmv

ATTACHMENT 4

Net Positive Suction Head (NPSH) Preoperational Verification Test For Containment Spray Pumps

To demonstrate that adequate NPSH is provided for the Containment Spray pumps, a preoperational test was performed simulating the injection mode (suction from the Refueling Water Storage Tank) and the test results were extrapolated to the recirculation mode which is the most limiting alignment for NPSH requirements. Actual NPSH available was determined from the following operation:

$$NPSH_{actual} = (h)_{\text{RWST or containment pressure}} - (h)_{\text{vapor pressure}} + (h)^{*}_{\text{suction pressure}} + (h)_{\text{pressure gauge elevation correction}} + (h)_{\text{fluid velocity correction}}$$

To extrapolate available NPSH from the containment sump instead of the RWST, several conservatisms were applied:

a. No increase in RWST (Containment) pressure from that present prior to the test (accident) is assumed.

b. The RWST (Sump) temperature during the test was approximately 70°F, however, a Containment sump fluid temperature of 190°F was assumed.

c. The suction pressure was extrapolated to the Containment sump floor elevation (elevation 725' + 0") instead of using the actual suction pressure due to RWST water level during the test. Also, the piping losses from the RWST which are included here are higher since the sump suction alignment utilizes shorter piping lengths. No credit is taken for the decrease in piping losses when aligned to the Containment sump. Piping losses were extrapolated from 3450 gpm (test flow) to 4000 gpm (runout flow).

d. Corrections were made for pressure gauge elevation and fluid velocity.

Using these conservative assumptions, the actual NPSH available was 32.6 feet. Since the Residual Heat Removal pumps are identical to the Containment Spray pumps and are located at the same plant elevation, the actual NPSH available from this preoperational test will apply for the RHR and CS pumps.

NOTE: *This information was obtained during the test and therefore accounts for both static head and suction piping losses.

ATTACHMENT 5

Preoperational NPSH Verification Test Data,
For Containment Spray Pumps

Pump flow rate, gpm	3450
Pump suction pressure, psig	34
Pressure gauge wrt pump suction centerline, ft	-0.9
Storage tank level, ft	25
Storage tank bottom elevation, ft	760
Sump bottom elevation, ft	725
Pump suction centerline elevation, ft	701
Storage tank water temperature, ^{o}F	approx 70