

DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

November 25, 1981

USNRC REGION II
ATLANTA, GEORGIA

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TELEPHONE AREA 704
373-4083

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

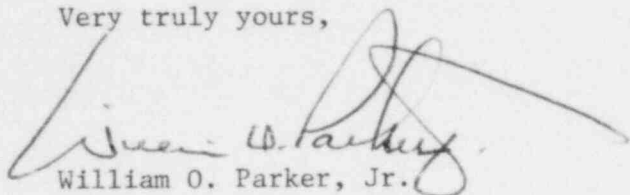
Re: McGuire Nuclear Station
Unit 2
Docket No. 50-370



Dear Mr. O'Reilly:

Pursuant to 10 CFR 50.55e, please find attached Significant Deficiency Report SD 370/81-11 concerning the use of low strength SA/A 193 B-8 studs and SA/A 194 GR8 nuts in place of higher strength material required by the pipe specification. This has been previously reported for Unit 1 as LER 369/81-165.

Very truly yours,



William O. Parker, Jr.

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Attachment

cc: Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. P. R. Bemis
NRC Senior Resident Inspector
McGuire Nuclear Station

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McGUIRE NUCLEAR STATION
SIGNIFICANT DEFICIENCY

REPORT NUMBER: SD-370/81-11

REPORT DATE: November 25, 1981

FACILITY: McGuire Nuclear Station, Unit 2

ABSTRACT:

Six-hundred (600) inches of SA 193 Grade B8 stud material and 102 SA 194 Grade 8 nuts (all 7/8" diameter), were unaccounted for. This relatively low strength, stainless steel material could have been installed in flanged joints in lieu of the specified high strength material. This report presents the investigation, evaluation, and recommendations on this deficiency.

Fifty-two (52) inches of the stud material and twenty-four (24) of the nuts have been found in Unit #1. Four hundred and sixty-five (465) inches of the stud material and seventy-two (72) of the nuts have been found in Unit #2.

Our evaluation concludes that no stud failures would have occurred if this material had gone undiscovered. Indications are, however, that fluid leakage could have occurred under faulted loading or at elevated temperatures in some cases.

These misapplied Grade B8 studs shall be replaced with high strength material with the exception of the FW System vent to the refueling water storage tank. Other corrective action to be taken includes: (1) Reviewing the use of color coding; and (2) Reviewing Construction procedures at other sites.

REPORT NUMBER: SD-370/81-11

REPORT DATE: November 25, 1981

DESCRIPTION OF PROBLEM:

Initially, 600 inches of SA 193 Grade B8 stud material and 102 SA 194 Grade 8 nuts (all 7/8" diameter) were unaccounted for and could have been installed in flanges other than those for which it was bought. The conditions that allowed an order of 7/8" low strength bolting material to be installed where high strength bolting was specified are:

1. The materials involved were a size not requiring heat code traceability. The materials should have been identified by a grade designation plus a color which designated the code classification. The materials were color coded in accordance with the Construction procedure, but because personnel had begun to consider the color code equivalent to the grade designation, some of the studs cut from threaded rod were incorrectly marked. In this particular case, B8 material was marked as B7.
2. The instructions to the inspector were to verify only the color code at bolt-up; therefore, even if these materials had been marked correctly, the low strength bolting would have been accepted on the basis of color coding.
3. This material was a special order for a specific application, and the Construction Department did not recognize that the B8 material was not interchangeable with B7 material.

REPORT NUMBER: SD-370/81-11
REPORT DATE: November 25, 1981

INITIAL REPORT:

On October 8, 1981, Mr. A. Ignatonis of NRC Region II, Atlanta, Georgia, was notified of the deficiency by Mr. W. O. Henry and D. M. Collings of Duke Power Company, Charlotte, North Carolina. This notification was a result of Potentially Reportable Item MC-81-21.

SAFETY SIGNIFICANCE:

Grade B8 stud material is not as strong as the normally specified Grade B7 stud material. Initially it was not known if the applied loads could exceed the load carrying capability of the Grade B8 material.

Our evaluation concludes that, had this deficiency gone undiscovered, no stud failures would have occurred at any load condition. This includes consideration of all required loadings, including hydrotest, internal pressure, thermal and seismic loads. However, some leakage might have occurred.

INVESTIGATION OF DEFICIENCY:

All suspect safety related flanges in Unit #1, except 1NC-40-FL1 and 1NC-40-FL2, have been inspected. Grade B8 studs and/or Grade 8 nuts were found in the following locations:

UNIT #1

12" Vent connection on
top of the refueling
water storage tank

24 - SS nuts
52" - SS Stud Material

All suspect safety related flanges in Unit #2 have been inspected. Grade B8 studs and/or Grade 8 nuts were found in the following locations:

REPORT NUMBER: SD-370/81-11

REPORT DATE: November 25, 1981

UNIT #2

<u>JOINT DESIGNATION</u>		<u>QUALITY OF SS MATERIAL</u>
12" Vent connection on top of the refueling water storage tank (RWST)		24 - Nuts 45" - Stud Material
2RN-13-FL3	-	96" - Stud Material
2RN-13-FL4	-	96" - Stud Material
2RN-13-FL5	-	96" - Stud Material
2RN-30-FL3	-	102" - Stud Material
2SA-8-FL3	-	11" - Stud Material
2SA-9-FL3	-	17" - Stud Material

Forty-eight (48) of the one-hundred and two (102) unaccounted for Grade 8 nuts were found in the warehouse and subsequently installed in the proper location in Unit #2.

EVALUATION OF INVESTIGATION RESULTS:

Completed inspections have accounted for five-hundred and fifteen (515) inches (previously reported as 517") of Grade B8 stud material and ninety-six (96) Grade 8 nuts. This leaves eighty-five (85) inches of stud material (previously reported as 83") and six (6) nuts unaccounted for. This remainder is representative of typical construction waste.

A search of procurement records and Construction stock showed that no other Grade B8 or Grade 8 material is unaccounted for.

EVALUATION OF INVESTIGATION RESULTS: (Continued)

The 12" vent on top of the refueling water storage tank is a non-pressure, ambient temperature application. Imposed loads and thermal affects are negligible. The tank sets outside the reactor building exposed to the environment. Stainless steel bolting is desirable in this instance, for its corrosion resistance.

The analysis on Unit #1 to evaluate the applied loads on the suspect flanged joints is considered applicable to Unit #2. The flange sizes and ratings and the system design pressures and temperatures are identical. The only differences involve the exact type and location of supports or restraints, as these may vary between Units.

The Unit #1 analysis concluded that no stud failures would occur as a result of loading due to internal design pressure, hydrotest and thermal or seismic movements. The analysis did conclude that some joints could leak fluid due to loading in the faulted condition.

On this basis we conclude that no stud failures would have occurred in Unit #2 due to applied loads had the material gone undetected.

The remaining six (6) flanged joints in Unit #2 have carbon steel flanges. The stainless steel bolting material has a much higher thermal expansion than the carbon steel flange material. This creates a potential for fluid leakage due to relaxation of the joint at elevated temperatures.

CONCLUSIONS:

1. Due to the amount of Grade B8 stud material and Grade 8 nuts accounted for, we do not expect to find more of this material installed. The remainder is representative of typical construction waste.
2. The stainless steel bolting material installed on the Unit #1 and Unit #2 refueling water storage tanks is acceptable and will not be replaced.
3. If undiscovered no stud failures would have resulted from any applied loadings.

REPORT NUMBER: SD-370/81-11
REPORT DATE: November 25, 1981

CONCLUSIONS: (Continued)

4. If undiscovered, some flanges could have leaked.

CORRECTIVE ACTION TAKEN:

We have taken the following corrective actions:

1. Revised inspection instructions to require verification of material grade at bolt-up.
2. Instructed personnel involved that material grade is independent of color code.
3. Revised the appropriate Construction procedures to clarify the applications for low strength bolting.
4. Inspected all safety related applications of 7/8" bolting in Unit #2.

CORRECTIVE ACTION TO BE TAKEN:

Construction shall take the following corrective action:

1. Review the use of color codes and eliminate any improper coding.
2. Replace the stainless steel bolting with high strength material in the following joints:

2RN-13-FL3, -FL4, -FL5
2RV-30-FL3
2SA-8-FL3
2SA-9-FL3

3. Review Construction procedures at other Duke Sites to assure compliance with Design drawings and specifications.

The above action shall be completed by 2/1/82.