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March 31, 1980
TLL 136

Director of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit I (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
IGSCC Investigation

In response to your letter of October 30, 1979, and a telecon inquiry March 6, 1980 concerning the subject issue, the information requested in Parts A, B and C is supplemented or amended as shown in the enclosure Attachment 1. Enclosure Attachment 2 supercedes a similar procedure contained in our report submitted January 4, 1980. Attachment 1 describes changes to the IGSCC investigation and repair program as reflected in the seven (7) items in the enclosure to your letter of October 30, 1979. The changes are necessary to account for state-of-the-art limitations in sizing IGSCC indications by ultrasonic examination (UT). The inability to size IGSCC indications precludes the application of conventional acceptance standards wherein permitted defect sizes may remain in the piping with monitoring for growth. The changes establish an extremely conservative approach where IGSCC is repaired on the basis of detection, not size. Any detected IGSCC must be repaired.

The content of this letter and enclosures were discussed and agreed to in principle by NRC representatives, D. DiIanni and A. Toboada via telecon March 20, 1980 with C. Cowfer and D. G. Mitchell of my staff.

Sincerely,

J. G. Herbein
Vice President
Nuclear Operations

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JGH:CDC:hah
Attachments
cc: J. T. Collins

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ATTACHMENT 1
TLL 136

ITEM BY ITEM RESPONSE TO NRC LETTER OF OCTOBER 30, 1979

1. The information requested in Item 1 regarding the repair procedure for weld buttering submitted as part of our report dated January 4, 1980 is superceded by Attachment 2 to this letter. Attachment 2 reflects the ½ inch butering dimension shown as 3/8 inch in the previous submittal. Repairs made to date have ½ inch buttering applied.

2. The information requested and provided for Item 2 is supplemented with the commitment to use low carbon (304L) material in the replaced material with ASTM or SA specification maximum allowable carbon content of 0.035%. Standard 304 or 316 material used for replacement shall be buttered as required prior to installation. Waivers regarding carbon content will be discussed with the NRC contact for this project prior to use.

3. The information requested in Item 3 was submitted in the January 4, 1980 report regarding locations which were identified as containing rejectable reflectors from the UT investigations based upon amplitude response only. After completion of more than 50 per cent of the repairs it is now evident that repairs based upon amplitude response must be supplemented with the UT indication axial location with respect to the weld. IGSCC cracking where it occurs starts in the base material 0.1-0.2 inch from the weld, it does not occur in the weld or fusion zone. Therefore, UT indications attributable to weld root geometry or other machined ID geometry adjacent to the weld root need not be repaired. The remainder of the welds (approx. 19) listed for repair will be re-investigated and repaired on the basis of indication amplitude and location. A final listing will be developed to summarize the investigations and status of all welds. The investigative UT technique will be performed using actual samples removed for repair. Four other welds including MU-170 the only makeup system weld scheduled for repair, were removed from the repair list after an error was discovered that increased UT sensitivity a factor of 2X during the UT investigations and reporting. All indications in the 4 welds fall below the 30 percent reporting level when the error was removed. The information requested in the second part of Item 3 is no longer a subject for discussion and should be deleted, all welds containing IGSCC or a UT reflector not directly determined to be ID geometry or fusion zone grain scattering shall be repaired.

4. The information requested in Item 4 was submitted in the January 4, 1980 report. As stated in Item 3 above, the UT technique used to identify the welds for repair will be supplemented by an investigative technique to identify weld root or other ID geometry. Samples already removed will provide the reference standards and UT signature references in the re-investigation. Other NDE methods, such as radiography, may be used to confirm ID geometry to support dispositioning and repair action. The techinical basis for the UT investigative technique is provided by the samples already removed for repair.

5. The information requested in Item 5 is no longer relevant since repair is based upon detection or existence of IGSCC not maximum allowable defect indication size. Suggest deletion of Item 5.

6. The information requested in Item 6 is in draft form at present. The Makeup and Purification System was included in the initial UT examinati scope and deleted from the surveillance program. Makeup is deleted because out of 900 (approximately) welds, no reportable UT indications were detected, no through-wall leakers occurred and this system is not oxygenated or a stagnant flow system. The surveillance program will initiate as a visual examination (walk down) of a system a month for each of the 3 systems involved; Spent Fuel, Decay Heat and Building Spray. Ultrasonic examination will be applied on a sample basis with frequency of examination dependent upon the category most susceptible to stress corrosion cracking. Category 1 are accessible welds with reflectors exceeding the 30 percent amplitude response attributed to ID and weld root geometry, frequency of examination shall be a 6 month basis for a minimum 3 consecutive examinations. No findings or abnormal change in previous data reported will be re-evaluated for continuance of the surveillance program after 3 consecutive examinations. Category 2 consists of welds exhibiting any reflector regardless of amplitude during the original examination of the 2000 weld population, normally dry areas and Makeup System excluded. Frequency of examination for the Category 2 welds shall be a 10 percent sample performed annually as an addition to the scheduled Inservice Inspection Program. Relevant findings shall extend the scope of the program, no relevant findings after 3 consecutive yearly examinations may be considered just cause for decreasing the frequency or discontinuing the surveillance program. Category 3 will be established for any group of welds considered susceptible to IGSCC as a result of correlations and investigations now in progress. The surveillance program may be altered when changes in system operations are implemented to reduce susceptability to IGSCC.

7. Information requested in Item 7 will follow the completion of the repair program and data correlations. This information should be available in the third quarter 1980. Interim reports of progress will be submitted to NRC as completed, e.g. destruct analysis and actual vs. reported IGSCC indications.

ATTACHMENT 2
TLL 136

Inter-Office Memorandum

GPU Service

Date: December 4, 1979

Subject: Revision 2 to TMI #1 I.D. Weld Clad Procedure (MT1.0050)

To: J. PEARCE

Location: Reading

Please note that revision 2 to the specification "Gas Tungsten Arc - Shielded Metal Arc Welding of Stainless Steel in Borated Water Piping Systems" has changed the requirement for I.D. buttering from 1.00" $\pm^{1/8"}_{0}$ wide, down to 1/2" min.

This change is being made because of the unacceptable diametral shrink produced by the wide weld, causing fit up problems. The writer contacted Mr. A. Toboda of the N.R.C., who originally requested the 1.00" wide buttering, and received concurrence to go with the 1/2" min. wide weld.

F. SCOTT GIACOBBE

FSG:brk
Atch.

cc: N. C. Kazanas
S. Levin
B. Ballard
T. Corrie
R. L. Wayne