August 26, 1983

Docket No. 50-296

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

SUBJECT: IGSCC INSPECTION ORDER CONFIRMING SHUTDOWN

Re: Browns Ferry Nuclear Plant, Unit No. 3

The Commission has issued the enclosed subject Order related to intergranular stress corrosion cracking (IGSCC) inspection for the Browns Ferry Nuclear Plant, Unit No. 3. The shutdown date and the compensatory measures called for with the Order are based on voluntary commitments made by the licensee in its letter of August 19, 1983. The Order also requires an expanded scope of inspection.

A copy of this Order is being filed with the Office of the Federal Register for publication.

Sincerely,

Original signed by/

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Enclosure:
Order

cc w/enclosure:
See next page

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500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

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Re: Browns Ferry Nuclear Plant, Unit No. 3

The Commission has issued the enclosed subject Order related to intergranular stress corrosion cracking (IGSCC) inspection for the Browns Ferry Nuclear Plant, Unit No. 3.

A copy of this Order is being filed with the Office of the Federal Register for publication.

Sincerely,

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

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Docket No. 50-296

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

SUBJECT: ISSUANCE OF ORDER DIRECTING LICENSEE TO CONDUCT IGSCC INSPECTIONS

Re: Browns Ferry Nuclear Plant, Unit No. 3

The Commission has issued the enclosed subject Order necessary in view of the previously observed cracking at other operating facilities and the results of testing at your facility to date.

A copy of this Order is being filed with the Office of the Federal Register for publication.

Sincerely,

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

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Order

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OFFICE	DL:ORB#2	DL:ORB#2	DL:ORB#2	DL:AD-OR	OELD	DL:DIR	DL:ORAB
SURNAME	SNorris:ajs	RClark	DVassallo	GLainas	JLieberman	DEisenhut	GHolahan
DATE	8/26/83	8/26/83	8/26/83	8/ /83	8/26/83	8/ /83	8/26/83

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1981—335-960

Mr. Hugh G. Parris
Tennessee Valley Authority
Browns Ferry Nuclear Plant, Units 1, 2 and 3

cc:

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Chattanooga, Tennessee 37411

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	Docket No. 50-296
TENNESSEE VALLEY AUTHORITY	)	
	)	
(Browns Ferry Nuclear Plant, Unit 3)	)	

IGSCC INSPECTION ORDER
CONFIRMING SHUTDOWN

I.

The Tennessee Valley Authority, (the licensee), is the holder of Facility Operating License No. DPR-68, which authorizes the licensee to operate the Browns Ferry Nuclear Plant, Unit 3, (the facility), at power levels not in excess of 3293 megawatts thermal (rated power). The facility is a boiling water reactor located at the licensee's site in Limestone County, Alabama.

II.

As a result of inspections conducted at 18 operating Boiling Water Reactors (BWRs) in conformance to recent IE Bulletins (IE Bulletin No. 82-03, Revision 1, "Stress Corrosion Cracking in Thick-Wall, Large-Diameter Stainless Steel Recirculation System Piping at BWR Plants," and IE Bulletin No. 83-02, "Stress Corrosion Cracking in Large-Diameter Stainless Steel Recirculation System Piping at BWR Plants"), a potential safety concern regarding intergranular stress corrosion cracking (IGSCC) in primary system piping was identified. These bulletins requested selected licensees to perform a number of actions regarding inspection and testing of pipe welds.

Results of these and other inspections pursuant to IE Bulletins 82-03 and 83-02 have revealed extensive cracking in large-diameter recirculation and residual heat removal system piping. In almost every case, where inspections were performed, IGSCC was discovered and, in many cases, repairs, analysis, and additional surveillance conditions were required. In view of the foregoing and the fact that the facility is similar in design to plants where IGSCC has occurred, there is a significant potential for IGSCC to exist in this facility and this facility may not fully satisfy all applicable General Design Criteria. Therefore inspection is required to determine the extent of IGSCC and to ascertain, if necessary, the degree of remedial action.

By letter dated July 21, 1983, the staff, pursuant to 10 CFR 50.54(f), requested the licensee to provide a justification for continued operation of the facility prior to completing the inspections of IE Bulletin 83-02. The licensee responded by letter dated August 4, 1983. The licensee also attended a public meeting held in Bethesda, Maryland on August 9, 1983. In the correspondence and meeting, the following issues were discussed with the licensee: (1) costs and impacts of accelerating the inspection schedule; (2) augmented leakage monitoring program; (3) a visual inspection for leakage during shutdown; and (4) informing the reactor operators of the concern about pipe cracks and the greater potential need to implement LOCA emergency procedures and leak detection procedures.

Several areas of substantial concern exist regarding IGSCC at Browns Ferry 3. The licensee stated that they had conducted inspections for 11 welds and found no IGSCC; however, in their letter of August 4, 1983 the licensee reported that, "No previously inspected welds appear to meet the sensitivity for detection criteria specified in IEBs 83-02 or 82-03". When Browns Ferry 3 is compared to Browns Ferry 1, which has been inspected and found to have a significant IGSCC

problem, major concern develops regarding the severity of IGSCC at Browns Ferry 3. (Of note, for Browns Ferry 1, all stainless steel and bimetallic welds were inspected for the primary system. In total, approximately 50 cracks were found to date, of which about 36 are being repaired by weld overlay). This issue was discussed with the licensee and they expected that extensive IGSCC would be found in Unit 3. The piping found in all three Browns Ferry Units was supplied by the same pipe fabricator.

The licensee responded to issues raised at the meeting of August 9, 1983, in their letter dated August 12, 1983. In their August 19, 1983 letter, the licensee documented their voluntary decision to commence "an orderly shutdown of Unit 3 no later than September 6, 1983 for the purpose of inspecting piping for possible cracking as a result of Intergranular Stress Corrosion Cracking (IGSCC)".

As a result of meetings and review of information provided by the licensee, and their voluntary commitment to an early shutdown date of September 6, 1983, the schedule for conduct of these inspections has been accelerated to the maximum extent practicable. In view of the previously observed cracking at other operating facilities, the public health, safety and interest requires that the licensee's schedule for conducting these inspections and the compensatory measures proposed by the licensee be confirmed and that prior to startup the scope of the inspections be expanded as provided in Section III and appropriate remedial actions be taken.

In view of the foregoing, I have determined that the public health, safety and interest require that these actions should be implemented by an immediately effective Order, and that the compensatory measures required provide reasonable assurance that the facility can operate safely prior to conducting the inspections.

III.

Accordingly, pursuant to sections 103, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, IT IS HEREBY ORDERED EFFECTIVE IMMEDIATELY THAT:

A. Notwithstanding the current Technical Specifications for the facility and during the interim period prior to conduct of the inspection discussed in III.C below, the following compensatory measures shall be implemented:

1. The reactor coolant system leakage shall be limited to a 2 gpm increase in unidentified leakage into the drywell in any 24 hour period (leakage shall be monitored once every 8 hours). Should this leakage limit be exceeded, the unit shall immediately start an orderly shutdown. The unit shall be in cold shutdown within 24 hours. This requirement is only in effect in the run mode and is exempted during the first 24 hours in the run mode following a startup.
2. Reduce to three days the sump pump monitoring system out of service time from the present Technical Specification 3.6.C.2 limit of seven days.
3. In the event of a planned outage of greater than 72 hours duration, perform a visual sample inspection of IGSCC-susceptible piping (without insulation removal).
4. Defer all planned maintenance activities on ECCS equipment which will make that equipment inoperable except as required by Technical Specifications. For unplanned maintenance activities which will make ECCS equipment inoperable, limit the inoperable time by performing the required maintenance on a 24 hour basis. In addition, reduce the LCOs for ECCS

equipment from seven days to three days for the following Technical Specifications:

3.5.A.2	3.5.C.2
3.5.B.3	3.5.E.2
3.5.B.6	3.5.F.2

5. To improve operator awareness and response to IGSCC LOCA events, provide, as soon as possible, refresher training to all of the operators on the IGSCC phenomenon, expected system response, and required operator actions.

B. The licensee shall shutdown the facility to conduct UT examinations of the reactor coolant system piping as soon as practicable but no later than September 6, 1983.

C. The facility shall remain in cold shutdown until the Director, Office of Nuclear Reactor Regulation, finds that the licensee has satisfactorily completed the following actions or has provided adequate justification for not completing a given action.

1. To the extent practicable, the licensee shall conduct an ultrasonic examination of 100%, but in no case less than the number specified in Attachment A to the July 21, 1983 50.54(f) letters, of the welds involving 304 stainless steel piping of greater than or equal to 4" in the following systems or portions thereof:

    a. Recirculation System

    b. ASME Code Class 1 Portion of the Residual Heat Removal System

    c. ASME Code Class 1 Portion of the Core Spray System external to the reactor vessel

    d. ASME Code Class 1 Portion of the Reactor Cleanup System

2. Within 10 days of the date of this Order or prior to the commencement of the inspections required by this Order, whichever is later, the licensee shall provide to the Director, Office of Nuclear Reactor Regulation, a list of the welds specified above that it does not intend to inspect during this current outage together with a suitable technical justification for not conducting such inspections at this time. This list should identify each weld not being inspected by system, location and size.
3. All UT personnel conducting these inspections shall have received appropriate training in IGSCC inspection using cracked thick-wall pipe specimens. All Level II and III UT operators shall have successfully completed the performance demonstration tests described in IEB 83-02. The footnote on page 4 of IEB 83-02, which allowed qualification under IEB 82-03, Revision 1, is no longer applicable.
4. Based on the results of the inspections, the licensee shall take appropriate corrective actions.
5. The licensee shall provide a report of the results of the inspection and the corrective actions taken. This report should also include the susceptibility matrix for the welds examined (e.g., stress rule index, and carbon content). The written report shall be submitted to the Director, Office of Nuclear Reactor Regulation, Washington, D. C. 20555, under oath or affirmation, under provisions of Section 182a, Atomic Energy Act of 1954, as amended, with copies to the appropriate Regional Administrator and the Director of the Office of Inspection and Enforcement. Other reports generated, such as may be required by Technical Specifications, shall also be provided.

D. The Director, Office of Nuclear Reactor Regulation, may relax or rescind any of the above conditions in writing for good cause shown by the licensee.

IV.

The licensee may request a hearing on this Order within 20 days of the date of publication of this Order in the Federal Register. Any request for a hearing shall be addressed to the Director, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555. A copy shall also be sent to the Executive Legal Director at the same address. A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS ORDER.

If a hearing is to be held, the Commission will issue an Order designating the time and place of any such hearing.

If a hearing is held concerning this Order, the issue to be considered at the hearing shall be whether, on the basis of the matters set forth in Section II of the Order, the licensee should comply with the requirements set forth in Section III of this Order. This Order is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 26th day of August, 1983.