

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401  
400 Chestnut Street Tower II

June 20, 1985

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U.S. Nuclear Regulatory Commission  
Region II  
ATTN: Dr. J. Nelson Grace, Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

Dear Dr. Grace:

Enclosed is our response to R. D. Walker's letter to H. G. Parris dated May 21, 1985 requesting a supplemental response for Inspection Report 84-52 for our Browns Ferry Nuclear Plant.

If you have any questions, please get in touch with R. E. Alsup at FTS 858-2725.

To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

*J. A. Domer*  
J. A. Domer, Chief  
Nuclear Licensing Branch

Enclosure

cc: Mr. James Taylor, Director (Enclosure)  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

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ENCLOSURE  
SUPPLEMENTAL RESPONSE  
NRC INSPECTION REPORT NOS.  
50-259/84-52, 50-260/84-52, AND 50-296/84-52  
ROGER D. WALKER'S LETTER TO H. G. PARRIS  
DATED MAY 21, 1985

Item 1

How did the incorrect verification of pinion gear installation occur, and was it attributable to inadequate training or procedures?

Response

During testing of FCV 74-12 on unit 3, the valve failed to pass timing requirements, and a maintenance request was initiated to investigate the problem. The drive motor was removed, and a loose setscrew used to secure the motor pinion gear to the shaft was discovered. The setscrew was tightened, and the valve reassembled. The pinion gear was not removed from the motor shaft during the maintenance.

Maintenance activities associated with Limitorque operators are controlled by Mechanical Maintenance Instruction (MMI) 87 (Corrective and Preventative Maintenance of Limitorque Operators). To verify motor pinion gear orientation, an exploded view of the operator (attached) is provided in the instruction. The correct pinion gear orientation is, as shown, dependent on the size and model of the Limitorque operator involved. The craftsmen involved with verifying orientation in this case misinterpreted the sketch and, consequently, verified the orientation of the gear incorrectly.

The personnel involved had received training on Limitorque operators and, therefore, would have been expected to correctly perform this task. We consider the event largely personnel error, and the craftsmen and foreman were assessed time off without pay.

Item 2

Are all Limitorque valve operators inspected by these two individuals in response to the NRC request being reinspected?

Response

A review of maintenance records indicated that this is the only valve inspection for pinion gear orientation performed by these craftsmen.

Item 3

What additional corrective actions will be, or have been taken to ensure that your initial response to the Notice of Violation is adequately implemented?

Response

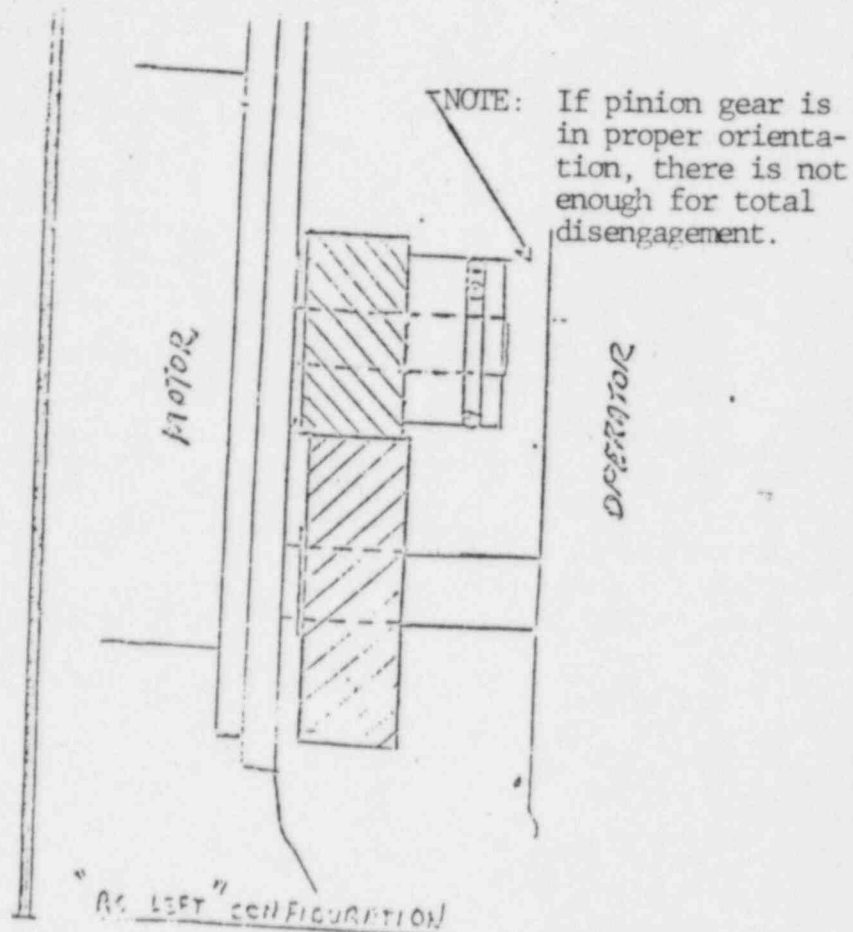
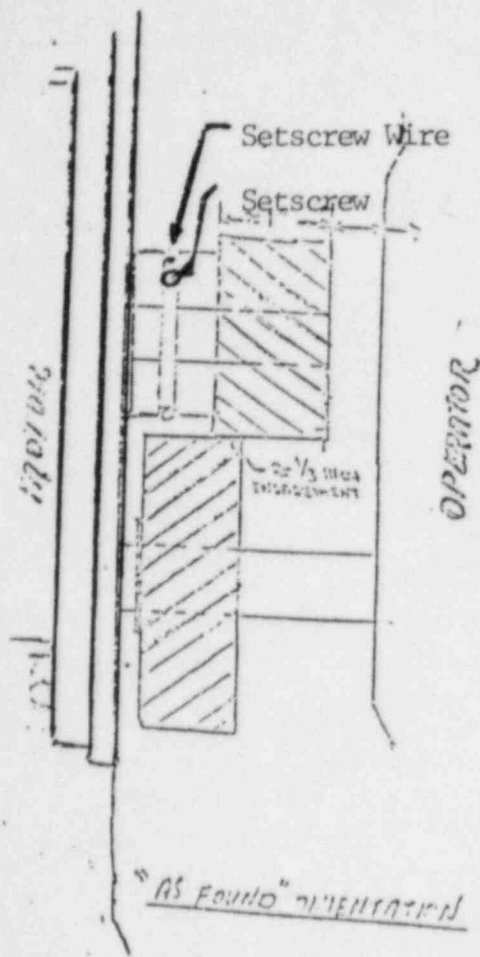
MMI-87 is being revised to ensure that inspection requirements are clearly identified. The inspection program for Limitorque operators on emergency core cooling system valves has been increased from a 20 percent sample to a full inspection. No additional reverse gears have been found to date. In addition, a comprehensive three-day training course utilizing several different Limitorque operators has been developed by our training organization. This course involves principles of operation and "hands on" practice on these operators. Feedback from participants indicates a very good course has been developed. Craftsmen and engineers who are responsible for maintenance activities on Limitorque are receiving this training.

Although not related to the particular problem discussed above, Browns Ferry has purchased two Motor Operator Valve Analysis Test Systems (MOVATS). This will greatly enhance our diagnostic capability in evaluating valve problems. Vendor sponsored training on the use of this equipment is proceeding.

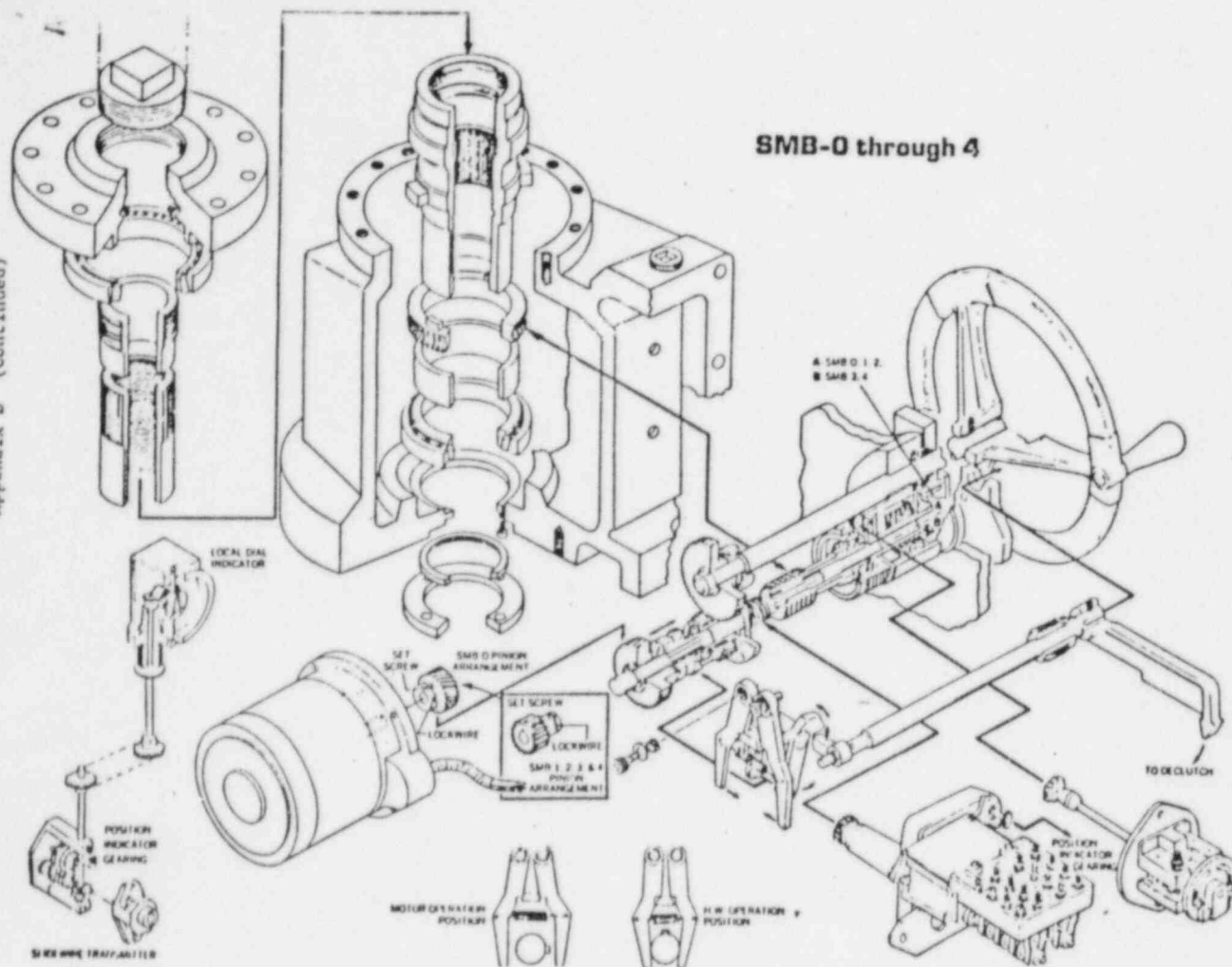
Additional Information

In regards to the relationship to valve operability and pinion gear setscrew tightness, it must be noted that both subject valves had motor pinion gears installed backwards. In this configuration, enough clearance is available for total disengagement of the motor pinion and worm shaft clutch gear (see attached figure).

If the pinion gear installation is correct, valve operability would only be affected if the setscrew was loose and the key slipped out of the key slot (or the key sheared). This is an unlikely situation. MMI-87 is being revised to ensure the key is kept in position (if loose) by pricking the end of the pinion key.



Sketch showing engagement between motor pinion gear and worm shaft clutch gear. Orientation shown at right is correct for a SMB-1 Limitorque operator like the one on FCV 74-12.



# ASSEMBLY DETAILS OF LIMITORQUE OPERATOR FOR FCV 74-12

NOTE: There are two different orientations required for motor pinion gear orientation. FCV 74-12 utilizes a SMB-1 operator.