

I. ROOT CAUSE

- 1) Major root cause was ineffective program for specifying and controlling torque switch settings.
- 2) A contributing cause was torque switch improperly installed due to lack of adequate guidance in procedures and training.

II. SHORT TERM ACTIONS (PRIOR TO RESTART)

- A) Perform Inspection/Movats testing on B31-F031A/B - field testing is complete.
- o F031B testing has verified that generated stem thrust was lower than the specified target thrust and that the torque switch was improperly installed. Torque switch was replaced, torque switch setting was increased to the value specified by Engineering, MOVATS testing was reperformed-results are being evaluated.
 - o F031A testing has determined that its torque switch was also incorrectly set. Field verification has indicated that the torque switch installation was correct (i.e. not preloaded)
- B) An Engineering list of torque switch settings for safety related valves has been generated. The following actions will be completed.
1. Nuclear Engineering will validate torque switch setting data by design review.
 2. Verification of actual torque switch settings for fifty-nine MOVs by documentation review or field inspection. Documentation will be reviewed for the thirty-three MOV's for which MOVATS testing has been previously performed, the remainder will be field inspected. The field inspection will include the torque switch settings, torque switch installation and which operators have limiter plates installed.
 3. Reconciliation of any identified discrepancies.
 4. Determine if additional Engineering review or field inspection is required based on discrepancies discovered during actions 1 and 2 above.
 5. Torque switch settings to be specified as controlled information and placed under the current design control program.
- C) Engineering to determine if other design changes have been implemented which could have impacted torque switch settings or torque switch installation. Additional actions may be developed based on the review.
- D) Maintenance Procedures used for torque switch installation have been reviewed by site personnel, Limitorque and Stone & Webster. Procedures will be revised as necessary.
- E) Maintenance & QC personnel have been trained, with Limitorque representatives present, in the proper torque switch installation methods and adjustments.
- F) Applicable industry and site documentation has been reviewed to identify related experiences. The documents identified will be used to ensure that the long term corrective action addresses all identified problems.

III. LONG TERM ACTIONS

- A) Torque switch settings for non-safety related MOV's will be reviewed by Engineering. After validation of settings the information will be included as controlled information and controlled under the existing design control program.
- B) Preventative/Corrective Maintenance programs will be reviewed with respect to work activities and controls for MOV's. Procedures will be revised as necessary to ensure activities which can affect torque switch or limit switch settings are correct and comply with current configuration control practices.
- C) The post maintenance testing program will be reviewed and revised as necessary to provide confidence of valve operability after maintenance.
- D) The root cause analysis for the first B31-F031B stroke failure will be assessed to determine if any improvements to our root cause analysis methodology are necessary.
- E) All applicable procedures will be reviewed to assure that MOV's and their settings will be properly controlled from procurement to installation.
- F) The ongoing training program will be updated to incorporate applicable lessons learned.