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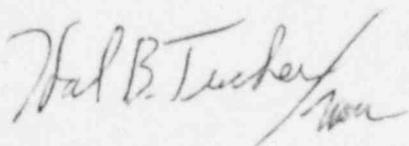
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: RII/ST/MTL
Catawba Nuclear Station
Docket Nos. 50-413 and 50-414
IE Report 50-413, -414/88-05

Dear Sir:

Please find attached a response to the Violation 413,414/88-05-01 which was identified in the subject Inspection Report.

Very truly yours,



Hal B. Tucker

LTB/6015/sbn

Attachments

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

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

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Duke Power Company
Reply to Notice of Violation
50-413/88-05-01

10 CFR Part 50, Appendix B, Criterion XVII and Section 17.2.17 of Duke Power Company Topical Quality Assurance Report collectively require that sufficient records be maintained to furnish evidence of activities affecting quality.

Contrary to the above, on August 31, 1987 through September 1, 1987 valve 1N118A was tested utilizing generic procedure IP/O/A/3820/02A, MOVATS Testing of Rotork Valve Actuators, without documenting all the action taken as a result of testing, and without documenting that procedural steps were not performed. In order to increase the actuator thrust output for valve 1N118A the Belleville spring locknut was adjusted and following this adjustment additional testing was accomplished to determine the motor actuator stall thrust value. These activities were not documented nor included in the procedure. Steps in the procedure were not being performed because either the steps were part of a procedure option that was not being utilized or the supervisor deemed them not required, and in both of these instances, there was no documentation that the steps were not being performed. Although the inspector reviewed procedure IP/O/A/3820/02A as it applied to valve 1N118A, this is a generic procedure that has been performed on at least 50 other Units 1 and 2 Rotork valve actuators. Inspector discussion with the licensee indicates that the failure to maintain sufficient records that furnish evidence of activities effecting quality associated with valve 1N118A, is common with other Rotork valves tested by procedure IP/O/A/3820/02A.

NOTE: The Notice of Violation states that following adjustment of Belleville spring locknut, additional testing was accomplished to determine the motor actuator stall thrust value. Motor stall thrust test was actually performed prior to adjustment of the locknut.

Response.

(1) Admission or Denial of Violation

Duke Power Company denies the violation.

(2) Reasons for Denial of Violation

Duke Power Company contends that sufficient records were indeed maintained to furnish evidence of activities affecting quality in accordance with the requirements of 10 CFR Part 50, Appendix B, Criterion XVII and Section 17.2.17 of Duke Power Company Topical Quality Assurance Report during use of procedure IP/O/A/3820/02A. While the actions outlining motor springpack nut adjustment and motor stall test were not included in the procedure the documented activities and recorded data are adequate to establish the before and after condition of affected components. The inclusion of these items is viewed as a procedure enhancement, however their omittance does not seem significant enough to warrant a violation.

The practices utilized in review and documentation of steps not performed were done in accordance with guidelines established for CNS Maintenance procedures. Further, these activities were ensured to be conducted in a

quality manner due to the required level of maintenance personnel training/ qualifications and supervisory involvement. The amount of documentation required was appropriate considering these personnel requirements. The basis for the violation is that activities were performed and not documented nor recognized by the procedure and it was not documented that certain procedure steps were not performed. This response will review each case and provide associated background, additional details, and technical justification or reasoning for the actions taken.

Procedure IP/0/A/3820/02A was developed to provide guidelines for calibration of Rotork valve actuators using a MOVATS based system and Rotork specific equipment developed by Duke Power Company personnel. The overall objective is to measure, adjust as necessary, and verify that actuator thrust output meets values established by Duke Power Design Engineering and/or valve manufacturers. Test methods and criteria are significantly different from that used for Limitorque actuators and industry experience does not exist for Rotork testing as it does for Limitorque. The variety of Rotork actuator types and the newly developed test methods required some degree of procedural flexibility to accommodate differences in plant configurations/installations. For this reason, it was deemed appropriate to utilize Rotork experienced maintenance personnel and to maintain a high degree of supervisory and technical support involvement during associated activities.

Case 1:

- (a) Adjustment of motor springpack nut was performed but not documented nor included in the procedure.

Background:

Calibration of the Rotork actuator torque/thrust output involves adjustment of the motor springpack nut. Each actuator is initially calibrated by Rotork to a specific value based upon its required application torque. Calibration is performed with the torque switch set to its maximum position so that measurements following springpack nut adjustment identify the actuator maximum torque/thrust output. Individual application torque/thrust values (less than max) can then be obtained by reducing the torque switch setting position and measuring the corresponding output. Actuator calibration is required following certain maintenance activities and is performed only by personnel who have successfully completed a "Rotork certified" training class. Calibration normally involves measurement of actuator torque output utilizing a Rotork Test Bench.

Actuator calibration can only be performed when the actuator is removed from the valve, however the Design required application thrust is dependent upon the valve packing load and can only be measured with the actuator coupled to the valve. For this reason it was sometimes desired to increase the maximum thrust output by springpack nut adjustment during the OFF valve portion of the test being performed under IP/0/A/3820/02A. This ensured that when the actuator was replaced on the valve, sufficient thrust would be available to meet the required application with only an adjustment of the torque switch setting.

Reasoning/Technical Justification:

Increased thrust output capability was desirable in some cases and as previously stated can be obtained by adjustment of the motor springpack nut. Adjustment of motor springpack nut is a routine task for "Rotork certified" maintenance personnel, however any adjustment must be followed by a torque/thrust measurement. A target value established prior to adjustment is necessary to gauge the adequacy and net effect of the adjustment. Several factors are pertinent in the selection of a target value, such as; desired vs. actual thrust output, balance between Open and Close thrust, actuator type/size, valve size and expected packing friction, and previous experience with similar actuators/valves. These items must be evaluated on a case by case basis and often additional considerations are necessary. Evaluation is better suited to Engineering rather than field personnel as the specified target thrust should be the minimum acceptable for the application. Two major reasons for the omittance of springpack nut adjustment from IP/O/A/3820/02A are considered applicable. First is the difficulty in specifying all relative criteria necessary for field personnel to establish acceptable target thrust. Second is the need to ensure that station Technical Support and Design Engineering were aware of the intended action and performed the evaluation prior to adjustment.

Conditions which may require adjustment were apparent to field personnel when measured thrust output did not match desired thrust output. Procedure steps then directed them to "contact responsible IAE Engineer". The responsible IAE Engineer (station Tech Support) then coordinated the following actions:

- Obtained previously measured "As Found" thrust at torque switch trip and total thrust
- Directed field personnel to measure and record motor stall thrust
- Reviewed applicable data and identified a potential desired target thrust
- Contacted and notified Design Engineering of applicable data
- Design reviewed application thrust requirement and agreed or proposed new target thrust
- Directed field personnel to perform springpack nut adjustment necessary to yield desired target thrust

The need for procedure steps to identify detailed method of springpack nut adjustment were not considered necessary because:

- All personnel performing adjustment were experienced "Rotork certified" and familiar with adjustment techniques
- Adjustment was performed at the direction of Tech Support personnel
- Net effect of adjustment was well known and documented - thrust output was measured and recorded before and after adjustment

Though the detailed steps of springpack nut adjustment are not documented it is evident from the recorded "As Found" and "As Left" thrust values for the associated actuator whether or not this activity was performed. Documentation of this action would have been available through the use of the "Rotork MOVATS Test Summary" form (attachment 1). This form was developed by CNS personnel to transmit all pertinent test data to appropriate Design Engineering personnel and provide an easy reference to summarize test results.

A test summary sheet was being completed for each individual actuator following final analysis of associated data. Each actuator with springpack nut adjusted would be indicated by As Left thrust greater than As Found thrust and adjustment would be noted in the Action Taken section. In addition to the Design copy a copy of this completed form was to be placed in a file along with the completed procedure and work package for each actuator.

The control and evaluation process utilized for springpack nut adjustment far exceeds the benefit or control that could be exercised by referencing adjustment through detailed procedure steps. Additionally, the use of the Test Summary form documents the fact that motor springpack nut adjustment was the method utilized to increase the actuator thrust output. By measuring and recording thrust before and after adjustment we are in effect maintaining sufficient records to furnish evidence of activities affecting quality.

(b) Motor stall tests were performed but not documented nor included in the procedure.

Background:

As the motor springpack nut is tightened and the springpack preload increases, axial movement of the motor wormshaft requires more force and the corresponding torque/thrust output of the actuator increases. If springpack preload is too great the motor may be incapable of developing sufficient wormshaft movement to actuate the torque switch. The corresponding torque/thrust output would then be limited only by the stall capability of the motor which is dependent upon motor characteristics. When an uncontrolled stall condition occurs, motor damage normally occurs immediately.

It is often desirable to compare and establish a margin between thrust at torque switch trip and stall thrust. A sufficient margin should ensure that torque switch trip can always occur prior to the motor reaching a stall condition. Rotork tests stall values on all actuators and typically maintains a minimum of 50% margin between maximum thrust and stall thrust.

The motor stall test is very simple to perform. The thrust output is measured as the actuator is operated against load with the torque switch temporarily bypassed or inhibited. This condition is maintained for only a fraction of a second.

Reasoning/Technical Justification:

Measurement of motor stall thrust is not a routine occurrence and was performed only in conjunction with motor springpack nut adjustment. Motor

stall tests were performed only prior to adjustment rather than following adjustment as was stated in the Notice of Violation. Motor stall thrust is the single most important factor in determining if thrust output should be increased by springpack nut adjustment and in establishing the target thrust valve. While not an absolute necessity it was considered good engineering practice to measure stall thrust and establish actuator capability prior to increasing thrust output. Motor stall thrust measurement steps were not included in the procedure for the following reasons:

- Tests were conducted only by competent "Rotork certified" personnel familiar with required techniques
- Precautions on minimizing duration of stall test were verbally communicated prior to each test
- Simplicity of test does not require detailed steps and was conducted under the direction of Technical Support
- Since tests were performed only at direction of Technical Support this ensured that unnecessary tests would not be performed

Rotork documentation does contain a cautionary statement on not maintaining the motor in stall condition for longer than necessary. It is a well known fact that any electrical motor subjected to a continuous stall condition will eventually suffer damage. Rotork routinely conducts motor stall tests as a part of its actuator certification process. A Rotork publication states that during the "Life Test" of an A range actuator stall tests were performed no less than fifty times.

Though it would have been appropriate to include procedure steps and cautions to address stall tests, their absence is not seen as a sacrifice of quality. Failure to properly perform a stall test would result in motor damage and render the actuator incapable of satisfying the procedure objectives. Each actuator subject to motor stall test was subsequently proven capable of satisfying all procedure objectives.

Additionally, documentation of motor stall tests results are available though not contained with the procedure. The resulting stall thrust values for each test were recorded and retained by CNS Technical Support personnel.

Case II

- (a) Procedure steps were not performed because steps were a part of a procedure option that was not being utilized or that supervisor deemed not required.

Reasoning/Technical Justification:

As previously stated the overall objective of this procedure is to measure and verify actuator thrust meets established Design values. Also previously noted was the need for procedure flexibility to accommodate different in-plant configurations. During conversations with the NRC inspector he expressed concerns over two procedure options which were not being utilized.

- (1) Sections addressing testing of actuators which are not removed from the valve

(2) Sections addressing connection and use of MOVATS Motor Load Unit

The typical Rotork test involves removal of the actuator from the valve, however a method is available to allow testing in the event that conditions prevent actuator removal. Separate sections/steps and corresponding data blanks are included for this method and are considered "N/A" (Not Applicable) if the actuator removal method is utilized. In either case, only one of these methods will be utilized and the corresponding sections/steps and data blanks for the other method will be considered N/A. Though all uses of IP/O/A/3820/02A thus far have utilized the actuator removal method, it is desirable to retain the alternate method as it may become necessary.

The development and use of this procedure was one of the initial steps in the development and implementation of a program to establish and maintain operability of motor operated valves. Since this overall program is still under development, it is constantly subject to change. One such change involves the intended use of the MOVATS Motor Load Unit. Prior to approval of IP/O/A/3820/02A, the MOVATS Motor Load Unit was thought to be in its final stages of development and was intended to be incorporated into the CNS program when available. This unit was not required to satisfy initial operability, but was anticipated to be useful for future trending purposes so sections/steps of procedure were included to cover its connection and use.

Delays in availability of this unit prevented the performance of corresponding section/steps of the procedure. Since the motor load unit had no bearing on initial operability verification, these steps/sections were also considered N/A. It was also desirable to retain these sections/steps so that use of Motor Load Unit could be incorporated upon availability.

The nature of Maintenance Procedures is such that the exact field conditions to be encountered can not be specified without the use of a separate special procedure for each individual component. Since this is not feasible, it is normal to use procedures with options of the type previously described.

As a normal practice at CNS, this procedure directs the work Supervisor to "review and mark N/A steps not applicable to work being performed". The following methods were utilized and are considered adequate to document that procedure steps were not to be performed or were not being performed.

-Prior to the work package being distributed to field personnel, the work supervisor reviewed and physically marked "N/A" those data blanks/sign-offs not applicable to the test method being used. (Ex: If actuator was to be removed from valve sign-offs and data blanks associated with testing without actuator removal would be marked "N/A".) The presence of "N/A" in a sign off or data blank notifies field personnel that the corresponding steps are not to be performed.

-Upon encountering steps which can not be performed due to plant conditions, physical limitations, equipment problems, etc., field personnel contact work supervisor. (Ex: Steps referenced connection of Motor Load Unit, however, the required equipment was not

available.) If work supervisor determines that step is not applicable, he would then mark as such. Otherwise he would provide necessary direction or support to allow completion of the step. If step is determined not applicable and no sign off or data blank is included, then verbal notification from work supervisor to field personnel is sufficient to convey that step is not required.

While this procedure is somewhat confusing to persons unfamiliar with test methods and test objectives it is relatively easy for qualified persons to establish that all required steps were performed. Field personnel involved with the performance of this procedure were intimately familiar with the methods and objectives and fully aware of steps which were and were not required to be performed. A review of data traces collected with the MOVATS test equipment provides additional documentation or verification of steps which were/were not performed.

Each completed procedure and associated data traces are reviewed, analyzed and approved by Technical Support personnel. Any misuse of procedure or failure to perform or adequately document applicable procedure steps would be identified by the absence of required data or presence of unacceptable data. Following this review and approval process the completed package would be forwarded to Quality Assurance for review.

As previously noted, Maintenance procedures often contain options, sections, steps which may not be required to satisfy the procedure objective or activity being conducted. It is then the responsibility of the Work Supervisor to identify those parts not required. Final review by Work Supervisor, Technical Support and Quality Assurance include verification that the work objective was satisfied and that documentation is both available and adequate to identify activities were performed in a quality manner. All uses of IP/O/A/3820/02A will be subject to this review and approval process. This will ensure that all required steps are performed and that adequate documentation is available to justify and support steps performed and steps not performed.

(3) Corrective Actions Taken and Results Achieved

None

(4) Corrective Actions to be Taken to Avoid Further Violations

All anticipated uses of procedure IP/O/A/3820/02A have been completed. Additional test equipment and test methods are presently under development which should eliminate the need for MOVATS testing of Rotork Actuators in accordance with IP/O/A/3820/02A. Should the subsequent use of this procedure become necessary, the following revisions/changes will be incorporated prior to its use. These revisions will provide documentation of all activities in an easily retrievable, centralized location. While these revisions are considered as an enhancement to the procedure, their previous omission is not seen as a violation.

Performance of these activities will still rely heavily upon the training and qualification of field personnel and the extensive involvement of work Supervisor and Technical Support.

- (a) Guidelines, documentation and associated precautions on performing actuator motor stall thrust will be added to the procedure. Steps will

ensure that stall test is conducted only when needed and only at the direction of Technical Support personnel.

(b) Procedure steps and associated sign-offs will be added to provide record of springpack nut adjustment.

(5) Date of Full Compliance

Duke Power Company was in compliance with 10CFR Part 50, Appendix B Criterion XVII and Section 17.2.17 of Duke Power Company Topical Quality Assurance Report requirements during previous uses of procedure IP/O/A/3820/02A. Items a. and b. identified above under No. 4 Corrective Actions are considered to be procedure enhancements and will be incorporated prior to any future uses of procedure IP/O/A/3820/02A.