

TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

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TITLE: Inspection

PAGE 1 OF 143

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Revision indicators in right margin indicate changes

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EXECUTIVE SUMMARY

Subcategory Report 80200

"Inspection"

I. SUMMARY OF ISSUES

There were 123 concerns in this subcategory which were grouped into 44 issues for evaluation. Sixteen of the issues were determined to be generic and 28 were determined to be site specific. The issues were evaluated under the following four elements: inadequate receipt inspection; procedures/inspection criteria; incomplete/inadequate instruction; and inspection responsiveness. Evaluation results fell into the following classifications:

	<u>Class</u>	<u>Issues Per Class</u>
A -	Issue cannot be verified as factual	12
B -	Issue was factual but did not describe a problem	6
C -	Issue was factual and identified a problem, but corrective action was initiated before the employee concerns evaluation of the issue was undertaken	14
D -	Issue was factual and identified a problem for which corrective action was initiated as the result of an employee concern evaluation	12

II. MAJOR FINDINGS

The evaluations conducted for this subcategory indicate that many of the inspection and test procedures used by TVA had deficient inspection and acceptance criteria. Of the 26 issues that were determined to represent

problems, 20 contained some aspect of deficient procedures. Procedures were identified that were unclear, had conflicting requirements, and did not address all regulatory and design requirements. Examples of the types of procedure deficiencies identified include:

Failure to include procedural requirements for: receipt inspection of warranty parts; calibration of certain measuring and test equipment; static head pressure considerations during hydrostatic testing; inspection of bends or exposed threads in conduit; compression fitting installation; and inspection of conax connectors for wire bend radius, torquing and use of grafoil sealant.

Unclear procedural requirements for: concrete and anchor bolt perpendicularity inspections; dry film thickness measurements of paint; some visual weld inspection attributes; and hanger location inspections.

Many of the procedure deficiencies described in this report had been previously identified and corrected by TVA. However, there was no requirement to evaluate the impact of procedure deficiencies on prior installations and determine whether reinspection and/or rework might be necessary.

The issues evaluated in this subcategory did not require a complete evaluation of all of the TVA procedures for implementing the quality assurance program. However, the procedure problems identified are consistent with the results of evaluations in other quality assurance subcategories and indicate a need for improvement in assuring that working documents such as procedures, instructions, and drawings are clear and consistent and contain all appropriate requirements.

III. Collective Significance of Major Findings

The deficiencies identified in this subcategory have contributed to some of the significant problems currently being addressed and resolved by TVA. Examples include the cable installation at WBN, welding, and instrumentation. Because TVA's inspection procedures did not fully implement regulatory and design requirements and TVA commitments and in some cases did not keep pace with the evolution of nuclear industry practices, substantial reinspection and reverification programs are now required. Individually, the impact of deficiencies in the inspection program varies. Some have had no impact, others have contributed to the need for substantial hardware rework, repair, and replacement, and some resulted in questions regarding the capabilities of inspection personnel.

IV. Cause of Major Findings

In general, the problems identified in this subcategory resulted from policies and procedures that did not adequately address inspection requirements as opposed to inadequate inspector performance. In a few cases, inspectors were not adequately trained or did not follow procedures, but this was not judged to have been the principal cause of problems. This tends to confirm the conclusion of QA subcategory 80300, "Quality Assurance Personnel" and indicates that, with a few exceptions, deficient inspection resulted from the tools provided inspectors (such as inspection requirements and acceptance criteria), rather than personnel inadequacies.

Management in engineering, construction, and quality assurance did not establish and implement a process to consistently define all requirements, ensure that they were translated into working documents, coordinate procedure requirements between and within divisions, and provide for feedback to ensure that as requirements changed or as problems were identified, procedures were kept current and consistent.

Design output documents from engineering, which were the basis for many inspection procedures and practices, did not reflect all requirements and commitments in governing documents such as codes and standards. In construction and quality control, engineering requirements were not always adequately translated into working procedures and instructions. In quality assurance, some requirements were not contained in quality assurance manuals and quality assurance audits did not, therefore, result in the identification and timely correction of problems. Additionally, the review and accountability process between and within divisions was weak which caused problems with consistency, and resulted in a situation where problems identified and resolved by one division or branch were not always communicated to and resolved by others.

V. Corrective Action For Major Findings

The specific cases identified either prior to or as a result of this evaluation have been documented and have been or are being resolved. Where necessary, reinspection programs for existing installations have been or will be accomplished, and evaluation of procedure deficiencies to determine whether reinspection/rework is necessary has been made a requirement.

In a general sense, problems with the TVA procedure system were recognized and are addressed in the corporate nuclear performance plan. In this plan, TVA has committed to revising the procedure system. The nuclear procedures branch in TVA headquarters has been tasked with this responsibility and implementation is in progress. The procedure system being developed is a five tier system which includes corporate policies, directives and, standards, and division level procedures and instructions to implement the requirements of the corporate documents. In developing this procedure system, attention needs to be focused on eliminating the causes addressed in Section IV, above, by creating an effective process for requirement definition, user involvement, inter and intra divisional coordination and standardization, and effective feedback.

Table of Contents

	Page Number
1.0 <u>CHARACTERIZATION OF ISSUE</u>	2
2.0 <u>EVALUATION METHODOLOGY</u>	4
3.0 <u>FINDINGS</u>	4
3.1 <u>Inadequate Receipt Inspection</u>	4
3.1.1 No Receipt Inspection Group	4
3.1.2 Inadequate Receipt Inspection of CSSC Items.	7
3.2 <u>Procedures/Inspection Criteria</u>	15
3.2.1 TVA Does Not Have Adequate Control Over the Quality of Specific Vendor Welds	15
3.2.2 TVA Does Not Have Adequate Controls Over the Quality of Instrument Fittings Because of Inadequate Procedures	20
3.2.3 Some of TVAs Quality Assurance Procedures Are Lacking Acceptance Criteria	24
3.2.4 Procedures Used For Quality Inspections Have Conflicting, Unclear, and Incomplete Acceptance Criteria	27
3.2.5 Notices of Indications and Maintenance Requests Do Not Have A Proper Tracking System	32
3.2.6 Excessive and Uncontrolled Procedural Revisions and Drawing Revisions Have Caused Confusion For The Craft	34
3.2.7 Supplemental Inspection Criteria Utilized By Inspectors Are Not Documented on Their Reports	37
3.2.8 Procedures May Have Been Violated When No meg/ohm Tests Were Performed on Low Voltage Cable and Wedge Bolts Were Installed Through Rebar	39
3.2.9 The Procedure Describing The Allowable Deviations From the Specified Dry Film Thickness is Sometimes Used Incorrectly	41

Table of Contents (con't)

	Page Number		
3.2.10	Electrical Inspectors Get By Only With The Help Of Procedures and Because of Their Inexperience Sometimes Accepted Unevenly Bent Conduit and Conduit having Too Many Exposed Threads At The Joints	43	
3.3	<u>Incomplete/Inadequate Inspection</u>	45	
3.3.1	Inadequate Cable Pulling Program	45	
3.3.2	Electrical Inspectors Impeded By Craft From Performing Inspections	50	
3.3.3	Inspection Performed Out of Sequence	54	
3.3.4	Hangers Installed In the Wrong Location	54	
3.3.5	Inspectors Cannot Calculate Torque Value Conversions When Using Extensions	56	
3.3.6	Numerous Incidents of Failure to Follow Procedures	59	
3.3.7	Engineering Giving the O.K. To Accept Equipment by Waiving Required Inspections	62	
3.3.8	Inspectors' Job Attitudes and Behavior Questionable	65	IR6
3.3.9	Electrical Inspections Inconsistent and/or Not Performed	67	
3.3.10	Electrical Inspection Results Not Documented	72	
3.3.11	Installation of Galvanized Junction Boxes	73	
3.3.12	Nonconforming Instrument Lines (slope/cleanliness)	74	
3.3.13	Instrument Settings Falsified or Not Documented	76	
3.3.14	Walkdowns Are Not Adequate Enough to Identify Deficiencies	78	

Table of Contents (con't)

	Page Number
3.3.15 Instrument Panel Rejected Due to Bolting Tolerances	80
3.3.16 Annulus Rack Piping Not Inspected For Thermal Expansion and Seismic Movement	80
3.3.17 Inspection and Testing of 2-FCV-0063-83, -8. -11, -185, -186, 2 FCY-072-40 and 41 Not Performed Or Incomplete Before System Turnover	82
3.3.18 Required NDE Not Performed	83
3.3.19 "Information Only" Drawings Being Used In the Field For Performing Inspections	84
3.3.20 Reject Rate Low For Civil Discipline	85
3.3.21 Improper Measuring Methods Used During Inspection of Equipment	85
3.3.22 HVAC Duct Support Inspections Were Performed Before The Issuance of the Design Drawings	87
3.3.23 Inspectors Are Not Consistent in Interpreting Established Acceptance Criteria	89
3.3.24 Employees Initialing Checklists Without Performing Work	92
3.3.25 Field Inspectors Inspect to Procedures	93
3.3.26 QC Inspection is Inadequate	93
3.3.27 Inadequate Installation of Conax Connectors	94
3.3.28 Piping Inspections Not Performed	96
3.3.29 Anchor Pull Test Results Falsified by Craft and Inspection Personnel	98
3.3.30 Reinspected Items Are Inspected by Less Qualified Personnel	99
3.3.31 Hydro Test Packages Not Properly Filled Out and Reviewed	99

Table of Contents (con't)

	Page Number
3.4 <u>Inspection Responsiveness</u>	103
3.4.1 Untimely Response by QC personnel to Requests From Craft to Perform Inspections	103
4.0 <u>COLLECTIVE SIGNIFICANCE</u>	105
5.0 <u>ATTACHMENTS</u>	106
Attachment A, "Subcategory Summary Table and List of Concerns"	106
Attachment B, "List of CATDs Issued"	106

1.0 CHARACTERIZATION OF ISSUE

The Inspection Subcategory consists of 123 concerns evaluated under 44 issues. 16 issues were generic and 28 issues were site-specific. These issues were grouped in the following four elements:

1.1 Inadequate Receipt Inspection

This element contained issues related to the receipt inspection group and receipt inspection of CSSC items.

1.2 Procedure/Inspection Criteria

This element contained issues related to TVA control over the quality of specific vendor welds; TVA controls over the quality of instrument fittings; acceptance criteria in TVA's quality assurance procedure; procedures used for quality inspections; the tracking system for Notices of Indications and Maintenance Requests; procedure and drawing revisions; supplemental inspection criteria utilized by inspectors; procedure violations regarding meg/ohm tests on low voltage cable and wedge bolts installation; incorrect use of the procedure for allowable deviations in specified dry film thickness measurements of coatings; and electrical inspector's acceptance of unevenly bent conduit and conduit having too many exposed threads at the joints.

1.3 Incomplete/Inadequate Inspections

This element contained issues related to the cable pulling program; electrical inspectors impeded by craft from performing inspections; inspections performed out of sequence; hangers installed in the wrong location; inspectors cannot calculate torque value conversions when using extensions; numerous incidents of failure to follow

procedures; engineering acceptance of equipment; inspector's job attitudes and behavior; electrical inspections inconsistent and/or not performed; electrical inspection results not documented; installation of galvanized junction boxes; nonconforming instrument lines (slope/cleanliness); instrument settings falsified or not documented; walkdowns are not adequate enough to identify deficiencies; instrument panel rejected due to bolting tolerances; annulus rack piping not inspected for thermal expansion and seismic movement; inspection and testing of valve numbers 2-FCV-0063-83, -8, -11, -185, -186, 2 FCY-072-40 and 41 was not performed or was incomplete before system turnover; required NDE not performed; "Information Only" drawings being used in the field for performing inspections; reject rate low for civil discipline; improper measuring methods used during inspection of equipment; HVAC duct support inspections were performed before the issuance of the design drawings; inspectors are not consistent in interpreting established acceptance criteria; employees initialing checklists without performing work; field inspectors inspect to procedures; some QC inspection is inadequate; inadequate installation of conax connectors; some piping inspections not performed; anchor pull test results falsified by craft and inspection personnel; reinspection by less qualified personnel than original inspection; hydro test packages not properly filled out and reviewed.

1.4 Inspection Responsiveness

This element contained issues related to untimely response by QC personnel to requests from craft to perform inspections.

The evaluated issues resulted in the following conclusion classifications: 12 issues were not verified as factual (Class A); six issues were factually accurate, but what they described were not problems (Class B); 14 issues were factual and identified problems but corrective action for the problems had been initiated before

the employees concerns evaluation of the issue was undertaken (Class C); 12 issues were factual and identified problems for which corrective action has been, or is being, taken as a result of employee concerns evaluations (Class D).

2.0 EVALUATION METHODOLOGY

General Evaluation

The Employee Concern File, Nuclear Safety Review Staff (NSRS) File, and Quality Technology (QTC) File were researched for pertinent information. A review was also performed of 10CFR50 Appendix B, Final Safety Analysis Reports (FSARs), TVA Topical Report, Nuclear Quality Assurance Manual (NQAM) and other Quality Assurance (QA) Program documents to establish the requirements and criteria relating to the issues. Interviews were held with personnel knowledgeable of procedure requirements and of actual installation and field verification actions related to the issues.

3.0 FINDINGS

3.1 Inadequate Receipt Inspection

3.1.1 Issue - No Receipt Inspection Group. The Quality Receiving Group was not established until three years ago/April 1982 (IN-85-145-001; IN-86-011-001A) (Site specific - WBN)

Specific Evaluation

This issue was evaluated at WBN.

The following documents were reviewed for applicability to the issue: TVA Division of Construction Quality Assurance Procedure (QAP) 7.01, Revision 0, "Receiving Materials, Parts, and Components," and TVA Division of Construction Quality Control Procedure (QCP) 1.6, Revisions 0 through 8, "Receipt, Inspection, Storage, Withdrawal, and Transfer of Permanent Material", and the Nuclear Power Plant Components Manual (NCM), Revisions 0, 8, 9, 11, and 12.

Discussions were held with current Materials Inspection Unit personnel and their supervisor, assistant quality supervisor for Civil, Welding, and Hangers, and former Responsible Engineering Unit (REU) representatives who had performed receiving inspection activities prior to April 1982.

A random survey of Receiving Reports, Form 209, was conducted for various types of construction materials, i.e., civil, mechanical, and electrical to determine whether these items had documented evidence of proper receipt inspection as required by the procedure.

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Discussion

The WBN Final Safety Analysis Report (FSAR) commits to receipt inspection by invoking the TVA Topical Report on QA (TVA-TR-1-75A). The commitment was implemented through various Quality Assurance Program Procedures (QAPPs), Quality Assurance Procedures (QAPs), and the NCM. Site implementation at WBN was through WBN-QCP 1.6. That

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procedure required warehouse personnel to receive and account for items on a "Receiving Report" (TVA Form 209). In cases involving "permanent material," REU personnel were notified to inspect the material and indicate acceptance by signing Form 209. When "code items" were received, REU personnel were notified and performed the required inspections in accordance with TVA Form 10084, "Inspection Checklist." Acceptance was indicated by signing both Form 10084 and Form 209.

A random survey of documentation for various items received from 1975 to 1982 was performed to determine whether the documentation provided evidence of compliance with WBN-QCP-1.6 and section 3.6 of the NCM. During the documentation survey, it was observed that not all "code items" had an inspection checklist attached to the Form 209.

Revision 0 of the NCM required that a checklist be utilized, but did not specify a particular form to be used. Later revisions of the NCM were not available in the Records Information Management System (RIMS) at the time of the QACEG evaluation. Missing revision 1 through 7 and 10 have inhibited the evaluation to the extent that the time of incorporation of Form 10084 "Inspection Checklist" is unknown. Therefore it is unknown whether or not the missing "Inspecting Checklists" constitute a procedural violation on the part of REU personnel.

ECFG Subcategory Report MC40800 was reviewed for relevancy to the issue. The report concluded that receipt inspection personnel had been trained and certified in accordance with existing procedures from 1975 until the establishment of the Materials Inspection Unit in April 1982.

Conclusion

The QACEG evaluation concluded that the issue is factual, as stated, but what it describes is not a problem (Class B). Prior to the formation of the Materials Inspection Unit in April 1982, individuals from each REU were responsible for performing receipt inspections of "permanent material" and "code items." Discussions with cognizant personnel who performed receipt inspections during the period indicated that the procedures were utilized. However, as a result of the employee concerns evaluation, a problem was discovered for which corrective action was initiated.

Causes

The cause of this problem resulted from a procedural violation, in that there was a failure to maintain historical revisions to the NCM, which is a "life of plant" document.

Corrective Action

The Division of Nuclear Quality Assurance (DNQA) was assigned the task of finding missing revisions to the NCM (CATD 0222-WBN-01). An exhaustive search failed to recover the missing documents and DNQA assessed the problem as being significant and issued NCO-CAR-87-003-B. The CATD will remain open until the CAR has been acceptably closed.

3.1.2 Issue - Inadequate Receipt Inspection of CSSC Items

Materials listed as "Quality," "Critical Systems, Structures, and Components" (CSSC), or otherwise required to be within

the scope of the Quality Assurance Program, may have been inadequately inspected upon receipt and may have been installed without inspection and documentation as required by the QAP (WBN-158, WI-85-100-031 and IN-86-011-001B).
(Generic-WBN-SQN)

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN, and BLN.

The following documents were reviewed for applicability to the issue: American National Standards Institute (ANSI) N45.2.13, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants"; TVA Nuclear Power Plant Components Manual (NCM), Revision 0, 8, 9, 11, and 12, section 2.6, "Receiving Inspection, Storing, Preservation, and Issuing of Code Items," and section 9.1, "QA Records", QAPP 7, Revision 0, "Control of Purchased Material, Equipment, and Services"; QAP 7.01, Revision 0, "Receiving Materials, Parts, and Components"; QCP 1.6, Revision 0, through 8, "Receipt, Inspection, Storage, Withdrawal, and Transfer of Permanent Material"; AI-5.2, Revision 12; AI-5.1, Revision 19; QCI-1.08, "Quality Assurance Records"; BF 16.4, Revision 0, "Material, Components, and Spare Parts Receipt, Handling, Storage, Issuing, Return to Storeroom, and Transfer"; QCI 1.1, Revision 0-2, "Receipt Inspection"; BNP-QCP-1.1, Revision 10, "Receiving Inspection"; BLA-9.2, Revision 12 and 13, "Receipt Inspection"; SQA 45, "Quality Control of Material and Parts and Services"; AI-11, "Receipt Inspection, Nonconforming

Items, QA level/Description Changes and Substitutions"; NQAM, Part III Section 2.1, "Procurement of Materials, Components, Spare Parts, and Services"; TVA memorandum, "Receipt Inspection of QA Equipment Supplied by Prime Supplier at no cost to TVA", (T16 851206 949) December 6, 1985; Informal Concern Report "WBN-158" dated August 7, 1986.

Discussion

The portion of the issue that deals with procurement specifications, drawings, and vendor documents not being in accordance with as-built or as-delivered configurations, and inadequate TVA review of vendor work has been addressed in QACEG Subcategory Report 80500.

The portion of the issue dealing with inadequate or lack of receipt inspection for items intended for installation in CSSC was evaluated at all four sites but found applicable only to WBN and SQN.

The issue of no receipt inspection of some CSSC items originated as a result of an employee safety concern expressed by a Procurement Quality Assurance employee on December 17, 1985. The safety concern referenced a TVA memorandum (T16 851206 949) which identified a problem with receiving General Electric supplied replacement parts for use in Class 1E electrical equipment. The memorandum indicated that existing AI's and the NQAM did not provide a method for receipt inspection and documentation of warranty parts supplied to TVA, free of charge, by a prime supplier.

WBN management initiated an investigation into the safety concern, which consisted of interviews with cognizant management personnel to determine the scope of the problem.

As a result of the management investigation, four instances were identified where vendor supplied warranty parts were received without a contract. One was received in accordance with approval procedures, one was a non-CSSC item, and two were physically segregated and locked away by the Electrical Maintenance supervisor until proper receipt inspection could be performed.

The evaluation did not identify any instances of material being installed at WBN without receipt inspection.

Discussion with cognizant personnel at SQN indicated that warranty parts supplied free of charge by vendors had been received on site in accordance with the requirements of the original contracts. Review of SQN procedures AI-11 and 3QA45 indicated that, at SQN, these site procedures contain adequate provisions for implementation of receipt inspections.

A discussion was held with a SQN receiving inspector to determine the actual flow of the overall receipt inspection process. The individual stated that items not being inspected until they are ready for installation is not a procedure violation because AI-11, paragraph 7.2.3, requires items to be inspected "Before use or installation". The individual stated that, at times, items are requisitioned out of the Power Stores Warehouse without required inspections being performed, however, these situations are identified through normal inspection processes and documented on CARs, DRs, or CAQRs as applicable. The individual also stated that the Power Operations Training Center is currently revising the receiving inspection training program to place more emphasis on the receipt inspection process.

A review was then performed of CAR, DR, and CAQR logs to determine whether there were documented instances of missed receiving inspections. The review did identify some cases of missed inspections along with cases where nonconforming items were discovered during inspection. Among the missed inspections was an item transferred from WBN to SQN and four cases where items were issued for use prior to completion of required receipt inspection. But no instances were identified where warranty parts had been installed without inspection SQN QA personnel, alerted by the number of nonconformances, initiated corrective action (retraining of Power Stores Warehouse Personnel). Discussion with the QA/QC supervisor indicates that the receipt inspection program at SQN is now operating as required.

The QACEG evaluation at BFN determined that (CSSC) Items required receiving inspection in accordance with BF16.4 "Material, Components, and Spare Parts Receipt, Handling, Storage, Issuing, Return to Storeroom, and Transfer" dated August 31, 1983 through Revision 5, dated April 28, 1987, or Quality Control Instruction (QCI) 1.1, Revision 0 through Revision 2. These procedures required the Power Stores receipt inspector to visually inspect items for shipping damage and accountability, document the results on Form BF-48 (Materials Receipt Inspection Report) and to notify Quality Control (QC) Receipt Inspection. The QC Inspector performs required inspections and documents results on Form BF-48 to signify acceptance of the item. It was noted that some dimensional inspections are performed with measuring tools which are not calibrated, and are not part of the measuring and test equipment (M&TE) Program.

A random survey of various items in the receiving area was performed to verify that the Forms BF-48 were being utilized as required by the implementing procedure.

Regarding items received without a contract and receipt inspection, the issue was not found factual based on a review of randomly selected Material Receipt Inspection Reports and more specific information from the Concerned Individual (CI) was not available.

The evaluation of the issue at BLA included discussions with (4) four cognizant personnel in the receiving group and Power Stores. A review of BNP-QCP 1.1, Revision 10 through 14, dated September 7, 1983 through March 13, 1985, titled "Receiving Inspection" and BLA 9.2, Revision 12 and 13, dated July 24, 1986 and March 3, 1987, titled "Receipt Inspection" provided details on what each item received on site must be inspected for. All items, including CSSC items and spare parts must go through the receiving department.

BLA 9.2, Revision 13 states "The purpose of this instruction is to define the responsibilities and to establish the controls for receipt inspection of all materials, components, and spare parts including those procured for the critical structures, systems, and components (CSSC). This instruction implements the NQAM Part III, Section 2.2 as it applies to receipt inspection." Receiving starts when an item arrives at the plant, before unloading or unpacking and proceeds through the process of inspections, marking, identification, and documentation prior to placing the item in storage or directly in its final location. After the items are unloaded

and unpacked another inspection is performed and the appropriate checklist is completed. The inspection is completed to verify that each item is as specified by contract and that documentation from the vendor is correct and adequate.

BNP-QCP 1.1, Revision 14, dated March 13, 1985 states in 6.2.1 "All material and equipment shall be inspected and verified to meet the specified requirements as indicated by the contract." Verification is also required to assure that the material meets the requirements of the various codes, standards, specification or other specific (TVA, NUC REGS, MIL-STD) specification requirements referenced by the contract. In some cases revisions to the vendor drawings were made and approved by the TVA Source Inspector through Engineering and the item was not accepted without the proper Engineering Change Notice.

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A memorandum dated April 29, 1986 by T. L. Howard states that the acting supervisor was contacted at BLN and after he interviewed maintenance supervisors, he felt that there was no problem in the receiving department pertaining to how items without contracts would be handled since warranty items are treated like new when they are received. They all go through the receiving department and Power Stores.

BLA 9.2 gives the Power Stores Clerk the responsibilities to receive Level III (non-safety related) items and some non-ASME items. On April 6, 1987, the Power Stores Supervisor asked the Assistant Quality Control Manager, whether all CSSC items needed to go through the Quality Control Inspectors in receiving. The reply was that all CSSC items will go through the QC Inspectors for receipt inspection.

Conclusion

The QACEG evaluation concluded that the issue at WBN and SQN is factual and identifies a problem which had corrective action undertaken prior to the evaluation (Class C).

As discussed, TVA management conducted an internal investigation which identified instances of vendor supplied warranty parts being shipped to WBN without contract authorization or TVA acceptance documentation. However, actual installation of any material without receipt inspection was not verified. Section 2.1 of the NQAM has been revised to address purchase of spare and replacement parts. AI-5.1 and AI-5.2 were also revised to address acceptance of "no cost" replacement parts at WBN.

Although replacement parts, covered by warranty, have always been received at SQN under the terms of the original contract, SQN procedures, AI-11 and SQA45, were revised to cover receipt inspection requirements for such parts. The fact that items were not always receipt inspected until ready for installation was allowed by AI-11. However, due to instances where items were released for installation prior to receipt inspection, warehouse personnel have been notified to halt the issuance of non-inspected items.

The issue was found not factual at BFN and BLN, although a side issue at BFN did require corrective action. CATD 80251-BFN-01 was issued to document the use of uncalibrated measuring devices while performing dimensional checks at BFN.

Cause

The cause of inadequate receipt inspection of CSSC warranty parts was that program requirements were not specified for these parts. Therefore they were received without a contract or acceptance documentation.

Corrective Action

At WBN, Section 2, of the NQAM, Part III, "Procurement of Materials, Components, Spare Parts, and Services," was revised to address purchase of spare and replacement parts. Additionally, AI-5.1 "Material Procurement and Control," and AI-5.2, "Receipt Inspection of Materials, Components, and Spare Parts," were revised to address acceptance of replacement parts supplied by vendors at no cost to TVA.

AT SQN, AI-11 and SQA-45 were revised to include receipt inspection requirements for vendor supplied warranty parts. In addition, corrective action in the form of retraining Power Stores Personnel has taken place to halt issuance of uninspected items.

As a result of a side issue at BFN, Project Engineering -- BFN has agreed to revise QCI-1.01, "Receipt Inspection," to include references to Standard Practice 17.5 and the NQAM, Volume III, Section 3.1. This responds to CATD-80251-BFN-01 and has been concurred with by QACEG.

3.2 Procedures/Inspection Criteria

3.2.1 Issue - TVA does not have adequate control over the quality of specific vendor welds.

(JAN-85-001, JLH-85-005, IN-85-001-005,
IN-85-007-003, IN-85-127-001, IN-85-297-006,
IN-85-372-001, IN-85-657-001, IN-85-246-005,
IN-85-852-001, IN-85-868-001, IN-85-960-001)
(Generic -)

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN, and BLN

The following documents were reviewed for applicability to the issue: NQAM, Part I, section 2.7, "Control of Purchased Items and Services," and section 2.10, "Inspection"; QTC Report IN-85-657-001; AI 5.2, "Receipt Inspection of Materials, Components, and Spare Parts"; QCP 4.13 FU & VM, "Fit-up and Visual Mechanical"; QCP 4.13-FU & VC, "Fit-up and Visual Civil"; QCP-1.06, "Receipt Inspection of Safety Related Items"; Process Specification 3.M.5.1, Revision 6, "Specification for examination of weld joints"; Process Specification 3.C.5.4, Revision 2, "WBN Final Visual Weld Examination"; Process Specification 3.C.5.4, Revision 2, Addition 2, "Visual Weld Inspection"; NRC letter of July 24, 1986, "Report for additional information concerning the Project Management Plan for the Department of Energy Weld Evaluation Project for the WBN, Unit 1 and 2" (AO2860728012); TVA letter of December 5, 1986 to the NRC, "Response to NRC welding questions"; SQN workplan 11777; Nondestructive Examination Procedure N-VT-4, "Liquid Penetrant Examination"; ASME Section XI, Division I, IWA 4000, 1980, Winter 1981 addenda; ANSI B31.7, 1969 edition, Summer 1970 addenda;

Welding Project Report-WP-17-SQN, RO. In addition the following vendor procurement contracts were reviewed: Bergen Patterson Hangers - Contracts 83014, 824160, and 820732; YUBA Heat Exchangers - Contract 821635; Julius Mock Escape Hatches/Manways - Contract 86188; Westinghouse/Delta Southern Accumulators - Contracts 54114 and 182062; Doors (various) - Contracts - 821144, 86331, 86100, 86267, 820423 and 85955; Tanks Opebha Welding - Contract 822272 and GE Contract 75210. At BFN - Contracts 84410, 84876, and 90936 were reviewed. AT BLN, Contracts 86289 and 823716 were reviewed. To aid in the evaluation, discussions were held with SQN Quality Assurance/Quality Control (QA/QC) personnel, the Watts Bar (WBN) Quality Control Manager, an Assistant Quality Control Manager, a Quality control Supervisor, two Welding Inspectors, and a former Materials Engineer, a Senior Materials Engineer at the Quality Assurance Knoxville Office, a Bellefonte Nuclear Plant (BLN) Welding Quality Control Supervisor, a BLN Hanger Engineering Unit Supervisor, and a Browns Ferry (BFN) Assistant Quality Control Manager.

Discussion

Through investigation of this issue at WBN, QACEG has determined that the weld acceptance criteria contained in TVA inspection procedures are somewhat more stringent than those imposed on vendors and that there is no requirement for receiving personnel to inspect components, safety-related or nonsafety-related, for welding quality. TVA's inspection of vendor components is normally performed by surveillance at the vendor shop, at some point prior to shipment. In addition, although the acceptance criteria may be different, both the vendor welding and TVA welding is required to be in accordance with the applicable code.

Due to Employee Concerns which alleged questionable welding at WBN, Units 1 and 2, the NRC in their letter of July 24, 1986, (A02860728012), has requested that TVA provide a detailed plan to address welds in vendor components. TVA's response of December 5, 1986, (L44860737) indicated that the Division of Nuclear Quality Assurance will perform an evaluation of vendor welds. It will be accomplished by evaluating generic employee concerns, past TVA Quality Indicators, and will consider industry experiences with specific vendors. In a discussion with the WBN QC Manager, reinspection of vendor welds will consider respective population sizes for various safety-related and non-safety welds identified in employee concerns.

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Therefore the specific allegation that vendor weld acceptance criteria results in poor quality vendor welds at WBN will be determined by site inspection personnel, utilizing the acceptance criteria in the various vendor procurement contracts.

Some unsatisfactory vendor welds have been identified on NCR 6345 for Employee Concern IN-85-372-002 and NCR 6947, Revision 1, for concern IN-85-852-001. The nonconforming condition cited in NCR 6345 is that "Contractor welds for stiffener plates on hatch cover appear to be undersized in places and have undercut and overlap." The NCR was dispositioned as "use-as-is" by TVA Engineering because the hatch location (RHR Sump) "is no longer an extension of the reactor building primary containment and is not safety-related. Therefore, the welds are acceptable". The disposition for NCR 6947R1 was not accepted by QC and remains open because the disposition was not adequately justified.

The nonconforming condition, "some overlap and abrupt ridges at the toe of the weld" relates to TVA Process Specification 3.M.5.1, Revision 6, "Specification for Examination of Welds Ends." This weld is safety-related and the acceptance standards stipulated in the contract in ASME Section III, Article NC 5000 requires radiographic examination. Project Engineering, in stating that a nonconformance does not exist, only considered the response from the prime vendor, Westinghouse that the tank meets the design acceptance standards set forth in Article NC-5000 which does not address the radiography requirement.

The issue is generically applicable to BFN and BLN since the same vendor has supplied welded components to these plants. Site QC personnel will perform an inspection of all welded components supplied by this vendor, Julius Mock and Sons, Brooklyn N.Y., contract numbers: BFN-84410, 84876, and 90936; BLN-86289, and 823716, to determine compliance with code requirements.

At SQN it was alleged that certain welds made by Southwestern Engineering Company (SECO) and National Valve and Manufacturing Company (NAVCO) do not meet code requirements. As stated in an unnumbered NSRS report, "Onsite Employee Concern Impact Evaluation," a survey was performed by a QC Inspector, a SECO representative, and the TVA cognizant engineer to identify the defective welds. A total of 24 welds were identified as requiring rework. SQN Work Plan 11777 was initiated and the affected welds were reworked. Verification of the rework was performed by QC and documented in the Work Plan. The un-numbered NSRS evaluation "Onsite Employee concern Impact Evaluation" indicated that the concerned employee was notified of the repair work and the employee was satisfied.

The three NAVCO safety injection welds specified in this issue were identified as 315D, 315E, and 316A. The welds were located in Fan Room #1, Unit 1, near valve 1-63-649 at the ceiling above the ladder access opening. Several photographs were taken by TVA Quality Assurance personnel showing actual weld conditions. The welds were determined to be unacceptable in that they violated the visual acceptance requirements of N-VT-3, "Visual Examination." Maintenance Request A-561926 describes the rework performed to correct the identified conditions. Corrective Action consisted of grinding areas identified as unacceptable and performing the necessary nondestructive examinations (LP & UT) required for final acceptance in accordance with ANSI B31.7, 1969 Edition, Summer 1970 Addenda. Work was completed on January 20, 1986, with ANI/ANII concurrence.

As part of the QACEG evaluation, an inspector from the TVA Quality Control group and a QACEG Evaluator verified weld identification and performed a visual inspection of the three welds to further substantiate corrective action and the proper closure of the Maintenance Request. This reverification concluded that all items were acceptable and that rework and reinspections were in accordance with the work instructions specified in the Maintenance Request.

Conclusion

The issue that TVA did not have adequate control over the quality of specific vendor welds is factual and presents a problem for which corrective action has been, or is being, taken as a result of an employee concerns evaluation (class D). As a result of this evaluation it was substantiated that some unsatisfactory vendor welds exist at WBN and SQN. The potential for unsatisfactory vendor welds exists at BFN and BLN.

Causes

The cause of quality problems with vendor welds is the failure of vendor control programs to result in compliance with specific code requirements and inadequate monitoring of vendor shop performance by TVA to obtain pre-shipment compliance.

Corrective Action

Quality Assurance - WBN has been directed by the NRC in their letter of July 24, 1986, to establish a vendor weld reinspection program. As this program had not been implemented at the time of this evaluation, CATD 80203-WBN-01 was issued.

Since then, the TVA Department of Nuclear Quality Assurance had initiated a plan for addressing welds in vendor-made components, which includes research of vendor contracts, drawings, and specifications. A review has been completed of applicable CAQs, NCRs, CAT Team Reports, Audit Reports on vendor welds, and employee concerns. A population of approximately 20 vendors has been established with field inspections soon to be underway. QACEG has accepted this response to CATD 80203-WBN-01.

The disposition for NCR 6345 (accept-as-is) by construction engineering only addressed the safety status of the weld and did not consider the actual weld condition. CATD 80203-WBN-02 was issued. The response by TVA to this CATD stated that no corrective action was required and that, although the condition of the weld had not been taken into consideration originally, the validity of the disposition was confirmed by field inspection to verify that substantial weld was attaching the stiffener plates to the skin plates. This response was accepted by QACEG.

The previously cited welds made by NAVCO and SECO were determined to be substandard. These welds were repaired and accepted. However, the Office of Nuclear Power (ONP) did not establish a sampling program for other welds made by NAVCO and SECO. CATD 80201-SQN-01 was issued to track the problem. ONP responded to this CATD stating that a Quality Assurance Survey was conducted by TVA which covered the majority of SECO and NAVCO welding. SECO welds were repaired as required. The survey concluded that there was no indication of an unsatisfactory performance record by NAVCO beyond the specifically identified welds and further action was unnecessary. The response has been accepted by QACEG.

The vendor that supplied welded components to WBN, Julius Mock & Sons, also supplied welded components to BFN and BLN. The respective QA departments for the two sites have been asked to determine the acceptability of the vendor supplied welds. CATD 80203-BFN-01 and 80203-BLN-01 were issued addressing the need to inspect the suspect welds. Both responses by the QA departments have agreed to perform 100 percent reinspection and issue CAQ's for any defects. The responses were accepted by QACEG.

- 3.2.2 Issue - TVA does not have adequate control over the quality of instrument fittings because of inadequate procedures. The compression fitting installation program is inadequate due to lack of adequate procedures and training of personnel in installation and inspection. (XX-85-050-001, XX-85-050-003) (Generic)

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN and BLN.

The following documents were reviewed to determine applicability to the issue: NSRS Reports I-85-329-SQN, R-85-02-SQN/WBN, IN-85-795-001, IN-85-795-002; Nonconforming Condition Report 6278; Significant Condition Report 6278; TVA Final Response to the NRC (L55 860730-816); BLN BNP-QCP4.3, "Instrument Tubing Installation"; Awareness Bulletin "Tube Fitting Awareness and Initial Training, "(L29 85-909 817); MTS-28, "Initial Tube Fitting Training," Revision 1; Process Specification 3.M13.1, "Specification for Installation and Inspection of Compression Fitting Joints in Mechanical Tubing Systems." In addition, the QACEG evaluation included discussions with personnel in Quality Assurance, Quality Control and Welding Engineering, Construction Superintendents, and a Mechanical Maintenance Supervisor.

Discussion

Quality Assurance controls as applied to the installation of instrument compression fittings have been the subject of numerous investigations at all four of TVA's nuclear sites. Results of these investigations are contained within formal reports such as NSRS Reports "I-85-329-SQN," "IN-85-795-001," "IN-85-795-002," and "R 85-02-SQN/WBN." NCR 6278 and Significant Condition Report SCR6278-S have been issued as a result of these reports. The significant condition reported was that compression fittings on instrument tubing were not installed in accordance with vendor instructions. Improperly assembled fittings can result in a "line" seal which can be broken with the slightest movement, thereby causing joint leakage. To correct this situation and to respond to NSRS recommendations, TVA has:

- ° Evaluated the issue for generic applicability to all nuclear plants.

- Instituted formal training for craft and quality control personnel involved in installation and inspection of compression fittings.

- Acquired the services of Singleton Materials Engineering Laboratory to analyze the reliability and safety of fittings which may not have been installed in accordance with the manufacturers directions, but which have achieved leak tightness.

and

- Revised, or will revise, the process specification and all affected drawings, procedures, and instructions relating to compression fitting installation.

Conclusion

The issue of inadequate controls for installing instrument compression fittings is factual and presents a problem for which corrective action has been, or is being, taken as a result of an employee concerns evaluation (class D).

Cause

The cause of TVA not having an adequate quality assurance control program for the installation instrument fittings, is the failure by engineering and construction to specify and provide adequate installation/inspection instructions and inadequate training of craft and inspection personnel. Management also failed to communicate the problem to the different sites which allowed it to remain uncorrected for an extended period of time.

Corrective Action

NSRS Reports IN-85-795-001 and I-85-329-SQN provided the following recommendations: an engineering evaluation; initiation of an NCR documenting the condition; and the training of personnel in the installation and inspection of compression fittings. Inadequate compression fitting installation was also reported to the NRC under the rules of 10CFR50.55(e) via NCR 6278. TVA transmitted their final 10CFR50.55(e) report on this subject to the NRC on July 30, 1986.

The above actions were taken by SQN and WBN management to improve compression fitting installation. However, QACEG has issued CATD 80201-SQN-02 to ONP on September 12, 1986, to identify the lack of procedural training requirements for compression fitting installation. The SQN Site Director responded on October 20, 1986, committing to revising Administrative Instruction (AI) 14 to include reference to the tube fitting training class, MTU-MMT-28 as a prerequisite for personnel involved with compression fitting installation.

TVA's commitment to the NRC to develop and issue MAI-29, "Instrument Tube Fitting and Installation," by August 15, 1986 was not accomplished. As a result, CATD 80201-SQN-03 was issued to ONP to issue MAI-29. ONP replied that the SQN Modifications Group is the responsible organization. The Modifications Manager has stated that: 1) a memorandum (SO2 861202 827) was transmitted to DNE requesting their evaluation of NCR/SCR 6278. 2) A procedure (MAI-29) will be written defining requirements for installation of tube fittings at Sequoyah. 3) Retraining requirements will be established on a frequency of one year for Modifications personnel and two years for Maintenance personnel. The CAP was concurred with by QACEG.

At BFN, in response to BFN-CAR-860083, DNE issued Procedures MMI-174 "Replacement of Compression Fittings," Revision 0, January 14, 1987, and MAI-41 "Field Routing of Instrument Impulse Lines, Sample Lines, and Control Air Lines," Revision 0, December 2, 1986, to establish installation and QC inspection criteria for compression fittings. The Knoxville Office of Engineering has written a draft engineering specification (ER-BFN-EEB-001) for instrumentation, which includes compression fittings which will be coordinated with the Watts Bar Instrumentation Program.

At BFN CATDs 80202-BFN-01, 02 and 03 were issued to the Office of Engineering to address problems remaining in the compression fitting installation program. Although procedures have been updated and training courses established, the installed hardware has not been reinspected to verify acceptable installation.

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Engineering has issued CAQRs BFP870014, BFB870305, and BFP870306 to evaluate and take corrective action on generic NCR 6278. This action is in response to CATDs 80202-BFN-01, and 02 and has been concurred with by QACEG. In response to CATD 80202-BFN-03, BFN Engineering has stated that CAQRs will be written to address similar problems in Units 1 and 2. QACEG has concurred.

At BLN, BNP-QCP 4.3, Revision 10, "Instrument Tubing Installation," detailed the inspection criteria for the installation of compression fittings. Revision 11 to BNP-QCP 4.3 deleted the requirement for inspecting compression fittings. Thirteen months later revision 13 of BNP QCP 4.3 reinstated the inspection requirement. BLN Quality Assurance must assure that there were no installations of compression

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN, and BLN.

The following documents were reviewed for applicability to the issue: BNP-QCP-10.1, "Preparation and Control of Quality Control Procedures and Construction Test Procedures"; General Specification G-43, "Support and Installation of Piping Systems in Category/Structures"; ASME Section II, Parts A, B, and C, 1974 edition; TVA Procedure BF-16.4, "Material, Components, and Spare Parts Receipt, Handling, Storage, Issuing, Return to Storeroom, and Transfer"; ANSI N45.2; Technical Instruction (TI)-50A; "ASME Section XI Preservice Inspection Program;" NSRS Report I-85-547-WBN, November 13, 1985; WBNP-Quality Control Test (QCT) 3.13, "Hydrostatic Pressure Testing of Instrument Sensing Lines"; General Specification G-37, "Testing and Balancing of Heating, Ventilating, and Air Conditioning Systems"; and QTC 4.40, "Balancing of HVAC Systems." Discussions were held with Mechanical Quality Control personnel.

Discussion

In evaluation of this issue numerous procedures were reviewed at all sites to determine if acceptance criteria, quantitative values, and Quality Control certification requirements were included (I-85-102-BLN). The procedures reviewed, including BNPQCP 3.30, (BNP QCP 10.35-D) contained a section 7.0, "Acceptance Criteria," that described the applicable qualitative inspection attributes. These procedures referenced appropriate upper-tier documents and were reviewed by Quality Assurance before issuance.

fittings during that period, May 1985 to June 1986, or provide documented evidence that installations were inspected and to what criteria. To track this, CATD 80202-BLN-01 was issued. The BLN-Quality Assurance Department responded that no program problems existed either before or after the thirteen month period and that all lines would be either hydrostatically or pneumatically tested and thus prevent any compression fitting installation problem from going undetected. QA also provided a copy of BLN Training Module and craft training report dated May 3, 1985 to demonstrate adequate training of craft personnel during the period in question. QACEG has concurred.

A generic NCR, 6278 R1 was sent to all sites, including BLN Engineering, citing possible compression fitting installation problems at all sites. BLN-Engineering responded to the NCR by stating that the problem "Does Not Exist" with no further explanation. As a result of the BLN-Engineering disposition to NCR 6278 R1, CATD 80202-BLN-02 was issued requesting an explanation to justify the answer to the NCR. BLN - Engineering replied that NCR 6278 was sent to BLN ONE and the response was for the design project and was acceptable because they did not have any discrepant drawings for compression fittings (Note - This NCR was addressed by BLN -DNC as required by Quality Bulletin QB-85-24, RIMS - C20851127645). The corrective action plan was accepted.

- 3.2.3 Issue - Certain TVA Quality Assurance Procedures are lacking acceptance criteria. The contention being that specific procedures do not provide qualitative and quantitative values sufficient to perform adequate inspections. (I-85-102-BLN, BNP-QCP 10.35-D, XX-85-102-006, IN-85-347-006, WI-85-046-02, IN-85-279-005, WI-85-013-004, XX-85-079-001, QCI-1.31-86, IN-85-849-001) (Generic)

In some cases, missing criteria reported by the concerned employee was not required by governing documents; ASME Section II has no visual examination requirements for a fabricator or installer and therefore, TVA has no applicable procedure (XX-85-102-006); the use of checklists as an inspection aid is not required by upper-tier program requirements or lower-tier implementing procedures (IN-85-347-006). BLN, however, uses checklists extensively and WBN is in process of developing a Model Inspection Plan which will implement them; TVA nondestructive Examination Procedure (NVT-1) Part C, "VT-4 Visual Examination," paragraph C.4.2 "Verification of the Setting" and C.5.2 of the same title, adequately explain range settings for mechanical and hydraulic snubbers, respectively (WI-85-046-020). The actual range for each snubber, however, is listed on the support drawing; Quality Control Instruction, QCI-1.27, "Design Information Request - Preparation and Documentation," implemented in 1980, specified methods for numbering, filing, and logging DIRs (IN-85-279-005) but, was cancelled in 1983 by Revision 3 to Quality Assurance Procedure, QAP 3.2, which stated, "in the future, Field Change Requests shall be used to obtain additional design information"; and until Revision 6 was issued to Quality Control Procedure QCP 1.47, in July 1985, no acceptance criteria for damaged rebar existed or were required in site procedures at WBN (WI-85-013-004), because nonconforming condition reports were issued for any damage encountered.

Discussions were held with mechanical Quality Control personnel at BLN, to determine if there has been any pipe alignment problems caused by pipe movement, subsequent to final pipe location verification, with temporary supports installed (XX-85-079-001). There had not been any instances

of pipe movement during subsequent installation of permanent supports. Additionally, BNPQCP-6.17, "Exposed Piping," correctly states the requirements of process specification G-43, "Support and Installation of Piping Systems in Category 1 Structures," with regard to allowing piping to be inspected for final line and grade with either temporary or permanent hangers installed.

The correct implementation of upper-tier requirements was also questioned regarding Quality Control Test Procedure QCT 4.40, "Balancing of the HVAC System," (QCI-1.31-2-86) and Quality Control Procedure WBNP-QCP 1.55, "Seals, Firestops, and Cable Coatings," (IN-85-849-001). Upper-tier requirements and Industry Standards had been correctly implemented in both instances. In the case of QCT 4.40, specifically, there are no code, standard or specification requirements for Quality Control involvement in balancing of HVAC systems. Regarding QCP 1.55, adequate requirements for inspecting the "boards" can be found in the attachments to this procedure.

Conclusion

The issue that certain Quality Procedures lacked acceptance criteria was not verified as factual (class A). The procedures reviewed in evaluating this issue had adequate acceptance criteria.

- 3.2.4 Issue - Procedures used for Quality Inspections have conflicting, unclear, and incomplete acceptance criteria resulting in inadequate inspection results. (IN-86-266-X10, IN-86-288-02, IN-85-947-006, BFN-86-033-001, BNP QCP-10.35-9, IN-85-993-005, IN-85-388-002, IN-85-259-002, IN-85-334-001, 28501620 (Generic))

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN and BLN.

The following documents were reviewed for applicability to the issue: BNP-QCP-3.4, "Electrical Cable Preparation (Termination) 600 Volts or Less and Jumper Installations"; WBNP-QCP-3.06-3, "Inspection of Cable Termination"; Modification and Addition Instruction (M&AI-7), "Cable Terminations, Splicing, and Repair of Damaged Cables"; QCP-4.10-18, "Arc Strike and Base Metal Defect Removal"; General Specification G-53, "ASME Section III and Non-ASME Section III . . . Bolting Material"; BNP-QCP-6.17, "Seismic Support Installation and Inspection"; NSRS Report IN-85-234-WBN; Standard Practice SQM1, "SQN Plant Maintenance"; QCI1.40-6, "Civil Engineering Tracking Unit"; QCI1.40-7, "N3C-912 Tracking Program."

Discussion

Requirements for clear, concise, and complete Quality Assurance/Quality Control Procedures and Instructions are defined in Section 17.1.2.4 "Quality Assurance Program Implementation" of TVA's Topical Report. This section states in part that, "The Office of Engineering and the Office of Construction prepare and maintain Quality Assurance Procedures covering those aspects of the Quality Assurance Program which require written procedures and well-defined activities."

The evaluation of the issue was accomplished through review of applicable implementing procedures at all nuclear sites. The following are examples of unclear/deficient acceptance criteria..

Review of applicable cable termination and insulation inspection procedures at WBN and BLN (IN-86-266-X10) has revealed that resistance and continuity tests are required, however, they did not specify either the approved method for performing the continuity tests or when to perform them.

Resistance testing requirements had been transferred to a Quality Control Test Procedure and were adequately covered. At BFN, similar circumstances exist. At SQN, procedures contained the requirements necessary to adequately conduct the testing and inspections.

Procedures governing the hydrostatic pressure testing of instrument lines were also reviewed at all sites (IN-86-288-002) to determine if static head pressure had been taken into consideration during testing. It was found that before the 1985 revision to General Construction Specification G-29M Section 3.M.9.1 there were no requirements to include calculations for static head pressure when determining the parameters for hydrostatic testing at WBN, BFN or SQN. Evaluation at BLN has shown that BLN Construction Test Procedure 7.6, "Hydrostatic Testing," does require engineering calculations to avoid over pressurization when major elevation changes occur.

Requirements governing the removal of base metal defects (IN-85-947-006), other than arc strikes, were not addressed procedurally until March 1984, when Quality Control Instruction 4.03-1, "Base Metal Defect Removal" was issued. In May 1986, the applicable acceptance criteria was added to Quality Control Procedure 4.10-18, "Arc Strike and Base Metal Defect Removal."

At BFN (BFN-86-033-001) TVA memorandum (R42 860709 787), issued July 21, 1986, states that Modification and Addition Instruction, M&AI-23, "Support and Installation of Piping Systems in Category 1 Structures," had unclear and insufficient acceptance criteria. BFN-CAR-86-0120 was issued July 11, 1986, to identify a conflict between General Construction Specification G-29C and Nuclear Power Procedure N73M2. The QACEG evaluation disclosed that TVA has addressed procedure deficiencies in the Browns Ferry Nuclear Performance Plan (BFNPP), Section 2.4, "Procedure Upgrade," page II-35 through II-39. The BFNPP is a TVA commitment to the NRC to identify procedural deficiencies and the planned corrective actions. In this case, however, it fails to address retroactive evaluation of the quality of any hardware that may be affected by procedures deficient during installation. Similar circumstances exist at BLN, SQN, and WBN and within the respective NPPs. TVA's corporate NQAM states that CAQRs are required when procedures are found to be deficient in technical or QA content. However, like the NPPs the NQAM fails to address evaluation of hardware accepted to procedures found to have deficient acceptance criteria.

BLN Procedure BNPQCP-6.19 "Bolted Flange Connections," does not fully incorporate the Process Specification G-53, "ASME Section III and non-ASME Section III . . . Bolting Material." (BNPQCP 10.35-9) G-53 requires heat code traceability, for bolting greater than one inch diameter, for ASME III Code Class 3 and for ASME III Subsection NF bolting material supplied with a certified material test report (CMTR), while BNPQCP.6.19 requires traceability for class 1 and 2 material only.

Another example of unclear acceptance criteria can be found in Modification and Addition Instructions M&AI 4 and 5 in use at WBN (IN-85-993-005). These procedures required in-process inspection of terminal crimping operations, but only require craftsmen to notify inspectors after crimping is complete. A portion of the

issue (IN-85-388-002) states that QCI-1.40-6 Revision 0, "Civil Engineering Tracking System," contains errors and does not reflect current practice. As a result of QTC Report IN-85-388-002, Revision Request Number 295 was initiated and incorporated in Revision 1 of QCI-1.40-6 dated August 5, 1985. Another portion of the issue states that certain procedures signed by TVA and HSB supervisors are not in accordance with ASME codes (2850162003). No information helpful in resolving this could be located. Incomplete acceptance criteria or criteria incorrectly implementing upper-tier requirements, has been evaluated within this issue. 10CFR50 Appendix B and TVA's Nuclear Quality Assurance Manual require a program to review documentation. As required by procedure QCI 1.08 (IN-85-259-002 and IN-85-334-001), TVA has elected to utilize responsible engineering units to evaluate QA records. Among these evaluations are those for acceptance of records documented to superseded procedures that do not meet current requirements and those for which previously existing documentation has been lost. Proper forms exist as attachments to the QCI for documenting such evaluations.

Conclusion

The issue that procedures contained unclear, conflicting, or incomplete acceptance criteria was found factual at all four sites. This issue presents a problem for which corrective action has been, or is being, taken as a result of an employee concern evaluation (class D).

Causes

The cause of procedures containing unclear, conflicting or incomplete acceptance criteria stems from a failure by management to establish an adequate review process for procedures, specifications, drawings, and instructions.

Corrective Action

Electrical Quality Control-WBN performs continuity and resistance tests after cable terminations are completed, which violates QCI 3.06-3. In response to CATD 80206-WBN-02, Quality Assurance-WBN has stated that QCI-3.06-3 will be revised to read, "The cables shall be terminated, or reterminated if previously laid down, after continuity and insulation testing. This corrective action has been concurred with by QACEG.

WBNP-QCP-3.06-3 and BNP QCP 3.33 do not address an approved method of performing continuity verification of electrical cables. Electrical Quality Control-WBN stated, in response to CATD 80206-WBN-03, that QCP-3.06-3 will be revised incorporating requirements to check continuity using battery powered IR6 phones or an equivalent method. Connections will be made to each individual conductor and to ground at both ends to form a complete circuit. Isolation shall be checked by placing one lead on the conductor being tested and using the other lead to test all other conductors (and ground) for continuity or crosstalk. This response was concurred with by QACEG. BLN-QA stated, in response to CATD 80204 BLN-02, that BNP-QCP-3.33 will be revised to include proper methods for cable continuity verification. QACEG has concurred.

Construction Engineering - WBN, in response to CATD-80206-WBN-01, evaluated the hydro tests performed prior to Revision 6 to G29M, which invoked static head pressure considerations. Construction Engineering - WBN found no evidence that static head pressure, due to elevation differences during hydrostatic testing, created any condition adverse to quality. This response was accepted by QACEG. Mechanical Engineering SQN and Instrumentation Engineering - BFN have been tasked by CATDs 80252-SQN-01 and 80252-BFN-01 to

evaluate the static head pressure problem at those respective sites. The respective Engineering Groups have replied that a review will be conducted of "worst case" systems. Should the review reveal stress levels above code allowables or a failure, a CAQR will be written. QACEG has concurred.

The existence of deficient procedures and commitments to correct them have been identified in the Nuclear Performance Plan. However, there are no requirements in place to evaluate the quality of hardware accepted to inspection criteria found later to be deficient. The Division of Nuclear Engineering evaluated the problem in response to CATD 80252-NPS-01. The NQAM, Part I, Section 2.16, "Corrective action, will be revised to require a review for impact on hardware due to identification of documents such as procedure or specifications found to be deficient in specifying the inspection/acceptance criteria. DNQA has responded with the same statement in replying to CATD 80202-WBN-01. Site Engineering - BFN has responded to CATD 80202-BFN-04 stating that the NQAM, Part I, Section 2.16 will be revised to address specifically what actions are necessary when deficiencies are found in quality related procedures. Also, SDSP 3.7 will be revised to implement the requirements of the NQAM. This response has been accepted by QACEG.

Specification G-53 requires heat code traceability for ASME bolting material with a nominal diameter greater than one inch.

BNPQCP-6.19, Revision 3, only requires recording heat numbers for class 1 and 2 bolting material. QCP 6.19 does not incorporate the G-53 requirements for class 3 bolting material. Quality Assurance BLN provided the following corrective action for CATD 80204-BLN-01: CAQR BLP870365 has been initiated to DNE to track verification of and establishment where deficient, the ASME

requirements for the BLN project; make the necessary corrections to bring all BLN project procedures into compliance with ASME code and associated regulatory commitments. QACEG has concurred.

Quality Control Engineering verified that what was originally thought to be an editorial error in QCP 3.06-3, Revision 10, (as addressed in CATD 80208-WBN-01) was actually a title for the text that follows on the next page. QACEG has concurred.

MAI-4, Revision 5, and MAI-5, Revision 8, failed to address in-process inspections for lug crimping prior to the use of raychem heat shrink tubing. Modifications Branch - WBN stated that both procedures will be revised to clarify that this is a QC inspection holdpoint. This does not constitute a quality problem since the first inspection in both procedures require verification signatures that the lug has been inspected for adequate crimping, wire insertion, etc. Without this verification no lugged termination would be considered complete and would not be acceptable (CATD 80208-WBN-02) The response was accepted by QACEG.

- 3.2.5 Issue - Notice of Indications (NOIs) and Maintenance Requests do not have a proper tracking system. This results in the originator not knowing the status of the document at any given time. (XX-85-102-008) (Generic)

Specific Evaluation

This issue was evaluated at WBN, SQN, BFN and BLN

The following documents were reviewed for applicability to the issue: NQAM, Part II, section 2.1, "Plant Maintenance"; NQAM, Part III, section 1.1, "Document Control"; Standard Practice SQM2, Revision 19 and 22, "Maintenance Management System"; SI-114,

Section 17.0, Revision 4, "Inservice Inspection Program"; AI9.2, "Maintenance Requests"; TI-50A, "ASME Section XI Preservice Inspection Program"; BLN Standard Practice 10.2 "Processing and Scheduling Maintenance Requests."

Discussion

This issue has been evaluated at all four of TVA's nuclear plants. At SQN, NOIs are controlled by Surveillance Instruction SI-114.1 "Inservice Inspection Program" which provides for notification to the issuing organization of the disposition assigned. MRs are controlled by Standard Practice SQM-2, "Maintenance Management System." This procedure requires the responsible unit to notify the Maintenance Scheduling Unit when changes or cancellations of MRs occur. There is no mention of notifying the originator of such changes or cancellations.

A review of Technical Instruction TI-50A, "ASME XI Preservice Inspection Program" at WBN and SI4.6 "Inservice Inspection Program" at BFN showed that NOIs are generated by the Nondestructive Examination (NDE) Inspection Section and approved for issuance by the section representative.

These documents state that upon completion of corrective action, the NDE section representative verifies completion and signs the NOI for closure. Therefore, the NDE Inspection Section is the only group involved with the generation, inspection, and closure of NOIs.

At WBN a review of Administrative Instruction AI 9.2, "Maintenance Requests," did not show a requirement that the originating department be notified of the disposition of an MR. If the disposition involves inspection of the work by a group other than the originator, the group performing the inspection is responsible

for documenting and closing the MR. However, if an MR is rejected or cancelled at any point it shall be marked "rejected" and the second copy returned to the originator. At BFN, MR initiators are also notified prior to cancellation of an MR.

At BLN discussions were held with the Maintenance Superintendent and BLN Standard Practice 10.2, "Processing and Scheduling Maintenance Requests," was reviewed to determine if MR initiators were notified of the MR status. It was determined that if an MR is denied, it is returned to the originating department with a justification for not performing the work.

Conclusion

At SQN this issue was found factual and a problem for which corrective action has been, or is being, taken as the result of an evaluation (class D).

Standard Practice SQM2 does not provide MR or work request (WR) status information to the initiating individual or organization.

Note: MRs are being replaced by WRs at SQN.

At WBN, BFN, and BLN a similar problem does not exist since applicable implementing procedures require copies of rejected or cancelled MRs to be returned to the originator and NOIs always stay within the inservice/preservice inspection group. Completed MRs are statused and become permanent plant documents available for review upon request.

Causes

The cause of Maintenance Requests not having a proper tracking system is that procedure SQM2 does not provide MR or WR status information to the originator.

Corrective Action

The SQN Site Director responded to CATD 80202-SQN-01 on October 20, 1986, and committed to revise SQM2 to incorporate provisions for notifying the originating section of rejected or cancelled WRs. SQM2, Revision 22, Punchlist Item Number 7, dated February 10, 1987, was issued and states: "According to section F.2 of this instruction CSSC WRs can be dispositioned by cancellation." Also, it states "cancelled WRs are not QA records and may be discarded." To enhance the WR process and provide feedback to the originator, the originating section will be notified of the reason WRs are rejected or cancelled." This revision provides justification as to why a WR is cancelled and enables the originator to challenge inappropriate cancellation or rejections. QACEG has concurred.

- 3.2.6 Issue - Excessive and uncontrolled procedural revisions and drawing revisions have caused confusion for the craft. (SQP-86-009-X03, IN-85-171-001, IN-85-445-008, IN-86-307-001, QCP 10.35-8-261, IN-85-903-001, QCP-10.35-8-34, QCP 10.35-8-30, IN-85-596-004, QCP 10.35-8-27) (Generic)

Specific Evaluation

This issue was evaluated at WBN, SQN, and BLN

The following documents were reviewed for applicability to the issue: AI-4, "Preparation, Review, Approval, and Use of Plant Instructions"; NSRS Report I-85-452-WBN; TVA Quality Assurance Program Plan (QAPP); Series 3GA0059-00, "Notes for Field Fabrication and Installation of Pipe Supports in Category I Structures "

Discussion

Appendix B to 10CFR50 requires that documents affecting quality, including changes thereto, be controlled to ensure they are reviewed for adequacy, approved for release by authorized personnel, and distributed to, and used at, the location where the activity is performed. This QACEG evaluation, through review of industry standards, regulatory requirements, design documents, and upper-tier documents, did not identify any limitations as to the number of times a procedure can be revised.

Evaluation of this issue included review of numerous procedures and instructions at WBN, SQN and BLN. Procedure revisions were accomplished when required to implement improved industry standards, NRC regulations, design requirements, and upper-tier document changes including clarifications and correction of typographical errors as well as management organizational changes. Procedural revisions were and are accomplished within the confines of accepted and approved, standards, policies, programs, and procedures.

Evaluation of this issue included review of the "Mechanical Hanger Drawing General Notes," 47A050 Series and discussions with personnel involved with hanger inspection and the Department of Nuclear Construction (DNC). DNC stated that revisions to general drawing notes are controlled by Field Change Requests which must be generated and approved by Engineering.

QACEG's evaluation consisted of a review of hanger specification notes, implementing procedures regarding commitments for hanger support installation/inspection and requirements for design document changes. Also, interviews were held with cognizant personnel in the Hanger Engineering Unit (HEU), Hanger Quality Control (HQC), and Division of Nuclear Engineering (DNE) BLN.

Revisions of the documents reviewed were, in some cases, frequent, however, discussions of the various changes with the HEU Group Leader, and a DNE BLN site support engineer, revealed that the changes would not require a reinspection of past installations. The DNE site engineer stated that Construction Specification changes, resulting from Revision Requests by Construction or Specification Revision Notices by DNE, were used for resolving conflicts of interpretation, editorial revisions, or changes to less stringent tolerances. With proper justification, none of these situations would require reinspection of past support installations.

Hanger specification notes contained in drawing series 3GA0059-00 "Notes for Field Fabrication and Installation of Pipe Supports in Category I Structures" were also reviewed with the HEU Group Leader. These notes changed frequently throughout the period of support installation beginning in

late 1977. Note changes/additions make reference to a Field Change Request (FCR) number. These FCRs are approved by DNE subsequent to the completion and documentation of design activities necessary to justify and/or substantiate the change. This is in accordance with instructions in Quality Assurance Procedure DNC-QAP-3.1 "Field Change Request," Revision 10.

During the discussion concerning specification changes, the HEU Group Leader identified two situations where note additions to drawings 3GA0059-00-04B and 3GA0059-00-18 caused past installations to be in question. However, Nonconforming Condition Reports (NCR) 4641 and 4815 were issued to document the possibility that past installations may not have been in accordance with the added criteria. Another specification change which could possibly jeopardize the validity of past installations was identified during an interview with the HQC supervisor and an inspector. The inspector stated that load point location dimensions of support installations, as detailed in the tolerance notes on drawing 3GA059-00-06A before October 24, 1985, would be rejectable since the tolerances on this drawing are more stringent than the tolerances used for inspection. On October 24, 1985, note I.15.A for "Interior Angular Bracing Tolerances," was added to the above noted drawing. Before this date, load point location dimensions X_1 or X_2 (X_{1A} or X_{2A} etc.) as depicted on this drawing were inspected using the tolerances specified for "kneebraces" - 3GA0059-00-04B, Note I.9.B.1 and 2, $\pm 1/2$ inch for Grinnell Drawings and $+1/2$ inch, $-1/4$ inch for TVA drawings. These tolerances are less stringent than both the originally referenced tolerance of ASME Section III, Subsection NA, Appendix K and the present reference to note