



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

Report Nos.: 50-390/87-03 and 50-391/87-03

Licensee: Tennessee Valley Authority  
 11B Missionary Place  
 1101 Market Street  
 Chattanooga, TN 37402-2801

Docket Nos.: 50-390 and 50-391

License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: February 2-28, 1987

Inspectors:

*G. A. Walton for*  
 G. A. Walton, Senior Resident Inspector  
 Construction

*April 30, 1987*  
 Date Signed

*P. G. Humphrey for*  
 P. G. Humphrey, Resident Inspector

*April 30, 1987*  
 Date Signed

*T. B. Powell for*  
 T. B. Powell, Resident Inspector

*April 30, 1987*  
 Date Signed

Approved by:

*S. A. Elrod*  
 S. A. Elrod, Section Chief  
 Division of TVA Projects

*May 11, 1987*  
 Date Signed

SUMMARY

Scope: This routine inspection was conducted in the areas of licensee action on inspector identified items, followup of licensee identified items, fire prevention and fire protection, preoperational test (Preop) program implementation verification, testing of pipe support and restraint systems, followup of employee allegations, concrete testing, structural welding and Inspection and Enforcement (IE) Bulletins.

Results: One Violation involving failure to take prompt and adequate corrective action and three Unresolved Items involving implementation of procedure changes, compliance with American National Standard Institute (ANSI) standards, and corrective actions (including hardware changes) for substantiated allegations.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*G. Toto, Site Director
- D. M. Lake, Construction Project Manager
- R. A. Pedde, Unit 2 Nuclear Project Manager
- \*E. R. Ennis, Plant Manager
- H. C. Johnson, WBN [Watts Bar Nuclear Plant] Quality Assurance
- J. A. McDonald, Licensing Manager
- R. C. Miles, Modifications Manager
- H. B. Bounds, Engineering Project Manager
- B. S. Willis, Operations and Engineering Superintendent
- B. F. Painter, WBN Construction
- J. P. Mulkey, Quality Assurance Supervisor
- L. Peterson, Quality Control Supervisor
- R. Norman Jr., Operations Supervisor
- \*R. D. Tolley, Design Services Manager
- J. L. Collins, Mechanical Maintenance Supervisor
- M. K. Jones, Engineering Group Supervisor
- H. M. De Souza, Electrical Maintenance Supervisor
- R. R. Grau, Preoperational Test Section Supervisor
- \*C. A. Borelli, Plant Compliance Staff, Nuclear Engineer
- \*R. D. Schulz, Licensing Supervisor
- \*B. Seay, Project Manager's Office
- \*F. Smith, Construction Engineer
- \*T. Hayes, Division of Nuclear Construction
- \*K. Ashley, Nuclear Engineer
- \*J. E. Gibbs, Assistant Project Engineer
- \*J. A. Thompson, Modifications
- \*S. W. Spencer, Licensing
- \*J. W. Coan, Assistant Project Engineer, Unit 1

Other licensee employees contacted included engineers, technicians, nuclear power supervisors, and construction supervisors.

#### \*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on March 2, 1987, with those persons indicated by an asterisk in paragraph one above. The following new items were discussed:

- o Inspector Followup Item (IFI) 390/87-03-01 and 391/87-03-01, "Failure of Control Room Heating Ventilating and Air Conditioning (HVAC) System" (paragraph 6).

- Unresolved Item (URI) 391/87-03-02, "Implementation of Procedure Change" (paragraph 10).
- Violation 391/87-03-03, "Failure to Implement Proper Corrective Actions In a Timely Manner," (paragraph 10).
- URI 390/87-03-02 and 391/87-03-04, "Compliance With American National Standards Institute (ANSI) N45.2.1," (paragraph 10).
- URI 390/87-03-03, "Unauthorized Work on Instrument Clamps," (paragraph 10).
- IFI 390/87-03-04, "Concrete Compression Testing," (Paragraph 12).

The licensee acknowledged the inspection findings with no dissenting comments. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection period.

3. Licensee Action on Previous Enforcement Items (92702)

This area was not inspected.

4. Unresolved Items

Unresolved Items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

Three new Unresolved Items were identified during this inspection and are discussed in paragraph 10.

5. Licensee Action on Inspector Identified Items (92701)

- a. (Closed) NRC Region II Potential Generic Item (PGI 87-01) identified the failure of an AC reactor trip breaker (GE Type AK2A-25-1) during surveillance testing at the Crystal River 3 plant. Based on this potential issue, the licensee performed a review to determine if these breakers are utilized at Watts Bar and the applications, if used. The reactor trip breakers at Watts Bar were found to be Westinghouse, Model W-DS416. Further review by the licensee revealed that the only application of GE Type AK2A-25-1 breakers is in the switch gear associated with the non-safety-related water treatment plant. This issue is closed.
- b. (Open) Unresolved Item (URI 390/86-24-03), "Retrievability and Auditability of Construction Records." While reviewing the test package for test 62A "Inspection of Bolted Electrical Connections for 1-MCC-213-A1-A," the inspector noted the test card was stasured as

complete and stored in the records vault but the test card did not have a test engineer or quality control signature certifying that the inspection (or test) had been performed. The inspector discussed the problem with the vault supervisor who then issued Nonconforming Condition Report (NCR) 7202. This item will be carried under the previously identified Unresolved Item dealing with retrievability and auditability of records (URI 390/86-24-03).

- c. The following items were reviewed for Units 1 and 2 in Inspection Report 390/85-03 and 391/85-04. The licensee's response applied to both units, but in the inspection report only Unit 1 items were closed. Following consultation with the inspector involved in Reports 390/85-03; 391/85-04, the Unit 2 items are addressed here:
- (Closed) Construction Deficiency Report (CDR) 391/84-06, "Improper Design Loads for Base Plates and Anchor Bolts" (10 CFR 50.55(e)). The final report was submitted on April 18, 1984, with a revised final report on October 10, 1984. The reports have been reviewed and determined to be acceptable. The inspector held discussions with responsible licensee representatives, and reviewed supporting documentation to verify that the corrective actions identified in the reports have been completed.
  - (Closed) Violation 391/84-05-03, "Failure to Follow Procedure Civil Design Standard DS -C1.7.1." The inspector has reviewed the licensee's response. TVA has committed to reviewing the remainder of Unit 1 pipe supports using the criteria initiated in the sampling program used in the IEB 79-02 review. The licensee issued a memo dated May 21, 1982, and a revision to the memorandum on March 16, 1984, stating that the methods of plate analysis in Civil Design Standard DS-C1-7.1 Rev. 0 governs. TVA has initiated a training course to assure that designers understand the baseplate analysis requirement of DS-C1.7.1.
  - (Closed) CDR 391/84-42, Destruction of EDS Support Design Calculations (10 CFR 50.55(e)). The final report was submitted on January 7, 1985. The report has been reviewed and determined to be acceptable. The inspector held discussions with responsible licensee representatives and reviewed supporting documentation to verify that the corrective action identified in the report has been completed. The licensee now considers this not to be a nonconforming condition adverse to the safe operation of the plant.
  - (Closed) Unresolved Item (URI) 391/84-05-01, Factor of safety for concrete expansion anchor bolts-IEB 79-02. The inspector reviewed TVA Inspection and Enforcement (IE) Bulletin 79-02 Final Report-Rev. 2. TVA has committed to reviewing the remainder of Unit 1 pipe supports using the criteria initiated in the sampling program used in the IEB 79-02 review.

- (Closed) Violation 391/84-05-04, Failure to follow procedure for pipe supports and baseplate design calculations. The inspector reviewed the licensee's response. TVA has upgraded its engineering training program. All training sessions are now required to be documented to assure that all personnel are aware of the engineering procedures which affect their work.

Within this area, no violations or deviations were identified.

## 6. Followup of Licensee Identified Items (92700)

### a. HVAC Fire

An event involving an electrical fire associated with the control room ventilation fan motor, air handling unit, took place on January 11, 1987, at the licensee's facility. Smoke from this fire entered the shift engineer's office, kitchen, technical support center, and the main control room. The detectors in each of the above areas alarmed with the exception of those in the main control room. The fire brigade was summoned, the source of the smoke was located and the fire extinguished.

The licensee appointed a task force to perform an in-depth review of the incident. This review disclosed the following:

- (1) The 60 horsepower fan motor power supply circuit originated in compartment 11D of the 480 volt control and auxiliary (C & A) building vent board 1A1-A and consisted of a molded case 225 Amp continuous-rated circuit breaker. The latest revision of the compartment 11D wiring diagram, 45B1770-11D, Rev. 4, shows that the circuit should be a 100 Amp continuous-rated circuit breaker for proper protective coordination, compliance with the National Electrical Code (Section 430-52), and to meet the circuit breaker manufacturer's recommendations.
- (2) Fire alarms in the main control room did not enunciate. The licensee is continuing their review in this area.
- (3) Although the automatic fire protection system, other than for HVAC components, was not called upon to function, the review disclosed that the auto-start feature of the fire pumps was intentionally disabled at the time of the incident because a large number of unintentional pump starts had been caused from welding and other work in the plant.
- (4) The console panel for the system alarm, System 13, which was open and being cooled by a portable fan at the time, had a history of failures - primarily caused by inadequate ventilation. The task group considers System 13 to be unreliable, not only from an overheating standpoint but from a human factors

standpoint. They stated that individual smoke detectors have lights to indicate an alarm but the lights are visible only from a limited angle of view and do not stay lighted after the alarm condition clears.

- (5) The manufacturer's recommendations were not followed in that preventive maintenance requiring measuring the current on each phase of the power supply to the motor on a routine basis were not included in preventive maintenance instructions.
- (6) The task force questioned if Final Safety Analysis Report (FSAR) commitments were being met in that the plant was found to be unlike that which was considered in design and for which written procedures apply. One of the doors and door frame between the auxiliary building and the main control room was missing. The battery room exhaust duct, which serves as the smoke removal duct and connects to the main control room smoke removal duct, was open at two places in the cable spreading room. A number (20 to 30) of suspended ceiling panels had been removed for construction access in the main control room, distorting the air flow in the room.

The generally accepted cause of the fire was that the motor failed due to a loose connection on one of the power supply leads ('B' Phase) forcing the other two phases of the Delta-Wound Motor to carry the power load. Eventually, a second terminal conductor overheated and separated. The remaining winding then quickly overheated and resulted in the phase 'A' and 'C' overload protectors tripping the motor contactor - but not before considerable damage to the motor insulation occurred.

This item will be identified as Inspector Followup Item (IFI 390/87-03-01, 391/87-03-01) "Failure of Control Room HVAC System."

b. Loose Electrical Bus Connections

The licensee discovered a loose bus connection at the 6900 Volt unit non-safety-related board during the annual performance of Maintenance Instruction (MI) 57.20. Upon removal of the bus insulating boot, two bolted connections were found to be inadequately torqued resulting in overheating and bus damage, which required replacement of a three-foot section of silver plated bus bar and the associated mounting hardware.

The licensee is continuing the performance of this MI on the other electrical boards as part of the required surveillance program. No other problems of this nature have been encountered.

c. Nonconformance Report (NCR) Void Issue

The inspector found that NCR 6882, Rev. 0, was voided without properly addressing the issue that valves were installed in Unit 1 with incorrect identification markings. The issue was resurrected as a result of the Employees Concern Program (ECP) and an NCR was reissued confirming the original problem.

The inspector conducted a review of the licensee's NCR log and selected NCRs from March 1984 through February 1987. Four hundred and eighty one NCRs were issued during that time frame, of which twenty-nine had been voided (number not available for reuse). A random sample of six voided NCRs for both units was reviewed and results were acceptable.

The inspector had no further concerns on this issue at this time.

7. Fire Prevention and Fire Protection - Unit 2 (42051)

During plant tours, the inspectors conducted observations of fire prevention and protection activities in areas containing combustible materials where ignition of these materials could damage safety-related structures, systems or components. The observations included verification that applicable requirements of Administrative Instruction (AI) 9.9, Rev. 17 "Torch Cutting, Welding, and Open Flame Work Permit," Security Procedure 2, Rev. 26, "Fire Protection Plan", AI 1.8, Rev. 10 "Plant Housekeeping" and Quality Control Instruction (QCI) 1.36, Rev. 13, "Storage and Housekeeping" were being implemented with regards to fire prevention and protection.

Within this area, no violations or deviations were identified.

8. Preoperational Test Program Implementation Verification - Unit 1 (71302)

The inspector conducted routine tours of the facility to make an independent assessment of equipment conditions, plant conditions, security, and adherence to regulatory requirements. The tours included a general observation of plant areas to determine if fire hazards existed and observation of other activities in progress (e.g., maintenance, pre-operational testing, etc.) to determine if they were being conducted in accordance with approved procedures. Also, observed were other activities which could damage installed equipment or instrumentation. The tours included evaluation of system cleanliness controls and a review of logs maintained by test groups to identify problems that may be appropriate for additional followup.

Within this area, no violations or deviations were identified.

9. Testing of Pipe Supports and Restraint Systems - Unit 1 (70370C)

The inspector toured areas of the Unit 1 auxiliary building and reactor building observing numerous snubbers and restraints. Visual examinations were conducted to check for deterioration and physical damage of mechanical snubbers. Visual examinations were also conducted to check for damage of base support plates, fasteners, locknuts, brackets, and clamps associated with installed pipe supports.

Within this area, no violations or deviations were identified.

10. Allegations (92701)

- a. (Open) Allegation RII-87-A-0026, "Inadequate Deficiency Report Disposition and QC Not Independent From Construction." Subsequent to the inspection period, on March 31, 1987. This allegation was transmitted to the licensee for review and to ensure appropriate action is taken.

Specific information to support the allegation:

1. Disposition (e.g., corrective action) of DRs is not always timely.
2. Dispositions of DRs are not always adequate as indicated by the following examples:
  - a. Disposition of DR number 52-Q-1085-7 does not address possible damage, appropriate repair if necessary, and QC reinspection.
  - b. Disposition DR number 52-Q-1085-53 does not address basic standards such as Westinghouse specification, TVA specification, and standards that potentially may be violated.
  - c. Dispositions of DR numbers 52-Q-1086-45 & 46 and 52-Q-1085-55 do not address how responsibility for the unacceptable condition was communicated to plant maintenance.
3. Because of inadequacies in QCP 1.52, the QC inspector is placed in the position of having to coordinate work such as performing system lineups, getting blocking tags removed, having craft perform prerequisites, obtaining shift engineer's approval, etc., so that tests and inspections may be performed. The above-mentioned coordination of systems are generally handled by system engineers at other facilities in the nuclear industry. Coordinating and operating systems is outside the scope of QC responsibility. DR No. 52-Q-1085-45 is an example of this problem. This DR's disposition still leaves the responsibility of coordinating with QC.



4. QC inspectors are directed to make plant tours looking for deficiencies and are further directed to document deficiencies on an observation sheet. These observation sheets are not controlled by an approved procedure which is a potential violation of 10 CFR Part 50, Appendix B.
5. Watts Bar procedure QCI 1.02-1, "Inspection Rejection Notice (IRN)" directs QC inspectors to fill out Attachment A for all instances of failed inspections (except where other programs govern. Example: QCP-1.52 DRs). Dispositions to IRNs are completed by the craftsmen per QCI 1.02-1. QCI 1.02-1 does not require engineering review or QC reinspection. This gives control of IRNs to the craft foreman responsible for the work. This control would be better placed with an engineer, such as Quality Engineer.

#### Discussion:

The inspector discussed the issue of the observation sheet not being controlled by a procedure with the site Quality Assurance (QA) Manager who provided a copy of Site Quality Assurance Staff Instruction Letter (SQA-SIL) 5.6, Rev. 1, "Monitoring Activities," of which the observation sheet was Attachment B. It was found that SQA-SIL-5.6 had not been adequately explained to the QC inspectors. The QA Manager held training with the QC inspectors on February 5, 1987 (7 days after the allegation was received), to explain the requirements of SQA-SIL-5.6.

The inspector reviewed QCI-1.02-1, Rev. 11, "Inspection Rejection Notice." This procedure is applicable to all inspection activities within the scope of the Quality Assurance Program with the exception of activities involved in maintenance, storage, and housekeeping. The indicated purpose of the QCI-1.02-1 IRN system is to identify and document failed inspections. With respect to the issue of requiring the craft foreman or craftsman to disposition IRN's, the QA Manager stated that a procedure revision to QCI-1.02-1 to make engineering responsible for dispositioning IRNs would be made to resolve this issue. The review of the implementation of this procedure change in the areas of record retention, documentation of failed inspections and design control and of the licensee's review of previously dispositioned IRN's is identified as an Unresolved Item (URI) 391/87-03-02, "Implementation of Procedure Change."

The inspector was advised that problems with QCP-1.52, Rev.6, "Preventive Maintenance," had been brought to management attention by several revision requests. Copies were obtained of procedure revision requests NQA-RR-38 dated March 13, 1986, NQA-RR-436 dated January 30, 1986, NQA-RR-37 dated April 7, 1986, and NQA-RR-144 dated January 15, 1987 - all against QCP-1.52, Rev.6. These revision requests spanning over a year's time were neither incorporated nor rejected by management. These revision requests address, in part,

the issue of QC inspectors coordinating work activities. These procedure deficiencies resulted in adverse field conditions for the inspectors using the procedures.

Failure to promptly address and/or correct these conditions is a Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" (391/87-03-03).

The inspector reviewed the licensee's compliance with ANSI N45.2-1971, "Quality Assurance Program Requirements for Nuclear Power Plants," ANSI N45.2.1-1973, "Cleaning of Fluid Systems and Associated Components During the Construction Phase of Nuclear Power Plants," and ANSI N45.2.2, "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants." TVA's QA Topical Report TVA-TR75-1, Rev. 8, Table 17D-2, "Quality Assurance Standards for Design and Construction (Regulatory Guidance) Applicable to the Watts Bar Plant," makes the following commitments to these ANSI standards and associated Regulatory Guides:

<u>Regulatory Guide</u>	<u>ANSI Standard</u>	<u>Commitment</u>
Regulatory Guide 1.28 Rev. 0, June 7, 1972	ANSI N45.2-1971	Conforms fully
Regulatory Guide 1.37 Rev. 0, March 16, 1973	ANSI N45.2.1-1973	Current activities fully conforms

The inspector reviewed the following copies of DR's:

- (1) DR-52-Q-1085-55 reported that chemical and volume control system pump 2-062-PMP-104-B was dirty, missing an oil pressure gage, missing some plumbing, and had no oil in the sight-glass. The disposition to these problems was that the pump was transferred to Nuclear Power and therefore the construction Preventive Maintenance Unit (PMU) was not responsible for it's maintenance. Nuclear Power was not aware of the deficiency - which resulted in inadequate corrective action being implemented.
- (2) DR-52-Q-0186-7 addressed ventilating system fan cooler, 2-030-AHU-83-A and identified that scaffolding was found against the copper cooling coils. The disposition to this problem was to move the scaffolding to eliminate physical contact. Inspection for possible damage was not specified. No evidence or recollection of actual inspection could be found.
- (3) DR-52-Q-1085-53, dated 10/23/85, addressed dirty water in the Unit 2 Reactor Vessel. The disposition was that the Reactor Vessel was being used as a drainage sump and cleaning was not required at that time. This problem had originally been identified as Unresolved Item (URI) 391/85-41-01. URI 391-41-01 was closed in inspection report 85-43 when it was determined

that using the Reactor Vessel as a collection point for flushes was not detrimental as long as the water was not allowed to collect for a long period of time. ANSI N45.2.1, Section 5, indicates that local cleanup of contaminated [dirt, debris, etc.] areas is recommended as installation progresses; rather than one cleanup operation when installation is completed. The bottom of the Reactor Vessel was inspected and approximately 8 inches of water, construction debris, and sludge was found. Based on the condition observed, this debris had apparently been left in the reactor vessel for an extended time period. The licensee has since completed a cleanup of the Reactor Vessel per work plan PR068EZ. This is an example of an inadequate disposition as well as inappropriate corrective action being taken.

The above are examples of failures to comply with the requirements of 10 CFR Part 50, Criterion XVI, "Corrective Action," as implemented by the QA Topical Report, section 17.1.16, which requires that failures, malfunctions, deficiencies, deviations, defective materials and equipment, and nonconformances are promptly identified and corrected. These are further examples of violation 391/87-03-03.

The inspector performed further reviews of the licensee program for compliance with ANSI N45.2.1 of equipment in an in-place storage condition. The following was noted:

ANSI N45.2.1 indicates in Section 3.1 that the required cleanliness shall be specified, for any given application, in drawings or specifications. The licensee procedure QCP-1.52, Rev. 6, "Preventive Maintenance," simply specifies a cleanliness acceptance criteria that items are free of visual contamination such as dirt, oil residue, metal chips, water, etc. The licensee does not have a drawing or specification that specifies cleanliness class for any given application when equipment is in an "in-place" storage status. The inspector met with licensee's management regarding compliance with the cleanliness requirements specified in the ANSI Standard. The licensee has established a task group to thoroughly analyze compliance, or lack of, with the applicable ANSI Standards. This item is identified as URI 390/87-03-02, 391/87-03-04, "Compliance with ANSI N45.2.1" and will be reviewed for regulatory compliance after the task group completes its review.

**Conclusion:**

The specific concerns have been substantiated; however, since it was sent to the licensee for review and evaluation, it will remain open, pending review of the licensee's evaluation.

- b. (Closed) Allegation RII-86-A-0319, "Unauthorized Work on Instrument Clamps, Unit 1"

Specific information to support the allegation:

Instrument packages were being inspected by QC and noted discrepancies were sent to engineering for disposition. When the packages were dispositioned and returned, the QC inspectors revisited the equipment to implement the disposition and found that the equipment (in this case, instrument tubing clamps) had been changed. This presented further problems in that instrument lines that had been inspected and accepted were no longer in the same configuration as certified.

Discussion:

The licensee had established a reinspection program for instrument supports and was in the process of doing a 100 percent walkdown/reinspection of the supports. This reinspection was initiated to verify and correct previously identified discrepancies. A QC inspection team was assigned the task of performing the walkdown/reinspections. The walkdowns were controlled by the engineering department by generation of work packages that identified the supports and connections to be inspected. The QC inspection team performed the reinspection and noted any discrepancies from the drawing in the work package and then returned the as-installed condition report to engineering for disposition. Corrective actions, when required, were stated in the work package and returned to the field. Construction would correct the hardware, QC would inspect the corrected item, note acceptance of the corrected item and return the completed work package to engineering. At the time this allegation was made, only 24 of a total of approximately 2,000 work packages remained to be reinspected.

The allegers were concerned that inspectors were inspecting lines and making unauthorized changes to conform to the prints and therefore were invalidating previous inspection efforts. This concern was more prevalent in the instances where more than one instrument line was supported by the same clamp. (example: One line shown on a drawing in a particular walkdown package may require a yoke clamp which would fasten two lines. The second line fastened by this yoke clamp, may be shown on another drawing of a separate walkdown package as having a single clamp. By removing the yoke clamp and installing the single clamp on the second line, the first line would be left without a clamp and the walkdown inspection of this first line would then be invalidated.)

On November 21, the resident inspector reviewed the installed equipment and verified the existing hanger (clamps) discrepancies in relation to the drawings.

The resident inspector attended a meeting on November 21 with the allegers and the Site QA manager to discuss the issue. The Site QA manager immediately stopped the reinspection efforts and directed the QC supervisor to issue a deficiency report which would define the

scope of the problem and establish corrective measures.

Conclusion:

This allegation was substantiated. On February 24, 1987, the QC Supervisor advised the resident inspector that Deficiency Report DR-86-171-R was upgraded to a Corrective Action Report (CAR) CAR-87-003. A deficiency report covers isolated cases whereas a CAR covers generic items.

The CAR identified the following concerns:

- (1) Questionable clamp conditions, and unapproved use of yoke clamp, on panels O-1-1A and O-1-1B, were not dispositioned by DNE.
- (2) Some instrument lines were not clamped, due to QC inspectors replacing yoke clamps with P2024 clamps on the lines being inspected and leaving lines not assigned to the QC inspector unclamped.
- (3) Previously completed walkdown documentation for instrument lines did not reflect the actual line configuration. Yoke clamps were not documented as being removed and all hangers were not identified on various lines.

The licensee established a corrective action plan to resolve the above-listed concerns. The root cause was determined as: 1) Failure of management to properly monitor and control the work and, 2) Failure of inspectors to properly document the as-left condition of the component.

The remedial corrective actions taken by the licensee were:

- (1) The first problem involved the use of unapproved yoke clamps on panels O-L-1A and O-L-1B and the failure of DNE to disposition their use. To resolve this problem, a review was made of all lines covered by Work Plan (WP)-334-P to determine which lines involved yoke clamps. One hundred and thirteen (113) reinspection packages involved yoke clamps and a 100 percent walkdown was conducted to ensure each of these packages accurately reflected the as-built condition. Of the 113 packages, 24 yoke clamp packages had not been reinspected by QC when the walkdowns were halted to resolve this allegation. The walkdowns were re-performed to determine the validity of the allegation. Of the 89 reinspection packages reinspected a second time, 44 packages were found to be unacceptable. A change was issued to WP-334-P by the cognizant engineer to allow rework of the lines containing the unacceptable conditions.

- (2) Item two stated that some lines involved in the walkdown were left unclamped as a result of one inspector removing the yoke clamp which covers two lines and replacing it with a P2024 which covers only one line. The five lines noted on panels O-L-1A and O-L-1B as not clamped were not part of the walkdown at the time these deficiencies were noted. However, a discrepancy existed with these supports because tubing was unclamped that had previously been inspected and accepted. Engineering failed to include these in the reinspection program and reinspection packages were never issued. Nonconforming Condition Reports (NCRs) W-533-P and W-534-P were issued to address these discrepancies.
- (3) In addition to reinspecting all lines involving yoke clamps, a sample of 65 packages involving other than yoke clamps (of approximately 2,000) were inspected. Three problems were identified in this effort:
- Package C-1025 documentation reflected a P2024 clamp installed on hanger 34, but another type of clamp was actually installed, (type P2008). Hanger 37 had a P2024 clamp installed, but there was no data sheet in the package covering the hanger.
  - Package C-1016 showed P2024 clamps installed on hangers 33 and 34, but P2008 clamps were actually installed.
  - Package C-631 had a hanger that was not numbered on the controlling document and consequently not inspected.

Since all work was stopped on the instrument reinspection walkdown on or about November 21, 1986, to determine the scope of the problem and again on January 13, 1987, to resolve questions concerning the adequacy of the instrumentation program, all of the deficient packages have not been corrected. The licensee has established that once the instrumentation walkdown resumes, each of the deficient lines must be reverified.

#### GENERIC EVALUATION

The licensee has determined that, after reviewing all packages involving yoke clamps and reverification of each, it was apparent that the initial problem was not an isolated incident, therefore DR-86-171-R was upgraded to a CAR.

#### ACTIONS TO PREVENT RECURRENCE AS STATED ON THE CAR

The appropriate quality control and mechanical maintenance supervision were counseled and instructed to more closely monitor the work. As a result, quality control supervision spot checked packages

and actually reverified portions of 30 packages. Each inspector involved with the reverification process was given verbal instructions covering all aspects of the workplan.

When the stop work order is lifted and prior to the walkdown being started, a documented training class will be held to cover the workplan requirements and the deficiencies noted in this CAR.

This allegation is closed. However, based on the numerous problems identified as a result of this allegation, the below listed items are identified as unresolved.

- Completion and rework of the affected instrumentation support.
- Disposition of the affected NCRs W-533-P and W-523-P.
- An engineering evaluation regarding the adequacy of a reinspection program that found three problems with a sample selection of 65. For example, are further inspections necessary?

This item is identified as URI 390/87-03-03, "Unauthorized Work On Instrument Clamps."

C. (Closed) Allegation RII-86-A-0128, "Welding On Main Loop Piping Restraints"

Specific information to support the allegation:

Main heavy restraint system supports (which the allegor referred to as the PDO Restraint) were welded using non-conforming weld rod. Allegor said that the supports are ASTM 106 and were welded using stainless steel weld rod instead of mild steel rod like 7018. The allegor stated that this occurred because flux core welding using carbon steel rod caused porosity in the weld. Stainless steel weld rod was used in the root of the welds and then covered up with carbon steel rod. The allegor added that this restraint system is also called a "cross over" for main loop piping.

Discussion:

A search of the licensee's Employee Concerns Program (ECP) records found a similar anonymous concern was received by the licensee (ECP-86-WB-418-01 and 02) on March 5, 1986. The licensee completed the investigation on September 25, 1986, and issued the completed report January 27, 1987.

### Conclusion:

The licensee determined the concern could not be substantiated due to a lack of specific component identifying information. The licensee further concluded that questions regarding the structural integrity of the PDOs are mitigated by the initiation and closure of NCRs 3001R and 3523R which resulted in the reinspection of all PDO welds. The structural integrity issue should be considered further mitigated by the engineering opinion that indicates that the use of type 308 and 309 stainless steel welding rods is normally acceptable in a carbon to carbon weld zone.

The employee concerns investigator's interviews with construction craft personnel failed to provide any additional leads. No further concerns were found during interviews with Metallurgical Engineering personnel.

The inspector's review of the report concluded that, without additional information, further investigation is not warranted. Additional information from the anonymous alleger is not possible. All PDO welds have been reinspected to resolve other identified problems and repairs were made where necessary. Therefore, this allegation is closed.

### 12. Concrete Testing (46053C)

The licensee established a concrete test program for verifying the adequacy of Category 1 structural in-place concrete by providing a comparison of the concrete pours which were placed in time periods when strengths were outside the specification with pours that were placed in time periods known to have strengths within specification. The initial test of approximately 190 locations will be made using a Windsor Probe.

The inspector witnessed the first test performed on February 10, 1987, located at 5' 6" east of West wall, 2' south of Diesel Generator Building (DGB) South wall, bottom face, Cable Tray Room. The test was identified as DG-S9F. The tests were controlled per procedure WP-19, Rev. 0, "Non-destructive Testing For Inplace Concrete." The procedure is established for compliance with American Society of Testing and Materials (ASTM) Standard Test Method C803, "Standard Test Method for Penetration Resistance of Hardened Concrete," and American National Standards Institute (ANSI) A10.3-1985, "Powder-Actuated Fastening Systems-Safety Requirements." The test was performed satisfactorily except one probe was inserted 11 inches from an existing concrete anchor. As defined in paragraph 5.2 of WBEP WP-19, Rev. 0, tests shall not be performed within 12 inches of an existing concrete anchor. The licensee issued an NCR for engineering evaluation. The other location witnessed was location ADGB-12, grid l, k,j 6' West of East end, 1' North of DGB Parapet wall, top face. The test was performed satisfactorily. The initial test evaluation by the licensee indicated some test results at some locations were inconsistent and, therefore, they were unable to conclusively



determine acceptance of the concrete. Core drilling to obtain core samples was being considered. The core samples would be used to determine actual concrete compression strength. This item is identified as Inspector Followup Item (IFI 390/87-03-04), "Concrete Compression Testing."

### 13. Structural Welding (55063C)

The inspector performed visual inspections, assisted with a weld fillet gage, of several fillet welds on the 6.9KV Diesel Generator Switch Cubicle 1 A-A. The weld requirements are specified on drawing 15 N 211-1, Rev. 0, "Electrical Equipment 6.9KV D. G. Disc Switch Cubicle Outline and General Arrangement" as 1/4 inch fillet welds, 2 inches long, 12 places. The welds connect the safety related cabinet to the sill plate and are required to keep the panel from sliding during a seismic event.

The panel was not flush with the sill plate and a gap was evident, generally 3/16 inch. As stated in the applicable QCP Procedure, "Non Destructive Visual Test" (NVT)-2 and the American Welding Society (AWS) D.1.1 Code, when a gap exists, the leg of the weld shall be increased an amount equal to the gap. It appears the gap was not considered when the welding and QC acceptance was done. The inspector then requested QC to inspect this panel and the same type panels in the other diesel generator rooms. It was found that EG&G Idaho had inspected one and rejected one of the panels (1-SW-82-B/1-B). This inspection effort was done as part of the Weld Evaluation Program (WEP). Therefore, only the other three panels were inspected. The reinspection revealed several panel welds were undersize. Also, in some cases, a gap of 7/16 inch was found, which exceeds the allowable 3/16 inch.

On February 19, 1987, the licensee issued NCR W-583-P and identified the following nonconformances:

- All welds for DG1A-A, 2A-A, and 2B-B disconnect switch cubicles shown on 15N211-1 sill plate, with the exception of weld 1 for DG2A-A cubicle 2 westside, do not meet the required 1/4 inch fillet weld size. A gap exists between the cubicle sill and panel; however, the weld size was not increased by the amount of the gap.
- Per NVT-2, parts to be joined by fillet welds should not have a gap which exceeds 3/16 inch. A maximum gap of 5/16 inch is allowed when seal welding or suitable backing is provided. However, these gap tolerances were violated on several cubicles.
- Per NVT-2, undercut shall not exceed 1/32 inch. Several welds have 1/16 inch undercut.

- Cubicle DG2B-B cube number 3 weld 1 has overlap which is unacceptable per NVT-2.1.
- Drawing 15N211-1, "Sill Plan", requires the 1/4 inch fillet welds to be 2 inches long with the centerline of the weld located 4 inches from the edge of the cubicle. Several welds encroach upon or exceed the 4 inches from edge of cubicle to centerline location and are unacceptable per NVT-2.
- The welds in question were inspected for size, length, location, and obvious defects only, due to rusting of the welds and adjacent metal.

The inspector obtained the original QC inspection records for the subject panels. The records indicate the welds were inspected in accordance with WBNP-QCP 4.13 VTC, Rev. 1, and found acceptable. The records were signed by a QC inspector on January 23, 1985, and no discrepancies were noted.

The licensee has advised they are in the process of identifying all welded electrical panels for reinspection. This item is not identified as a violation because the licensee, through EG&G's inspection, had identified this problem on another panel. Subsequent to the inspection exit, the inspector questioned the gap between the switch cubicles and bolted foundations, which were also provided by the vendor, as related to seismic qualification of the cubicles. The drawings did not identify an allowed gap. This item will be included with a previously identified Unresolved Item (URI 390/86-21-05), "Fillet Weld Gap" pending further review.

#### 14. IE Bulletins (92703)

The following IE Bulletin was reviewed to ensure receipt, evaluation and appropriate implementation.

(Closed) IE Bulletin 86-03: "Potential Failure of Multiple Emergency Core Cooling Systems (ECCS) Due to Single Failure of Air Operated Valve in Minimum Flow Recirculation Line."

The licensee responded to IE Bulletin 86-03 in a letter dated November 14, 1986. In their response, the licensee stated the single failure vulnerability discussed in the IE Bulletin does not exist at Watts Bar due to the following:

- o The active ECCS consists of the safety injection system (SIS), residual heat removal system (RHRS), and the centrifugal charging portion of the chemical and volume control system.
- o The SIS has two safety injection pumps; each pump has a minimum flow recirculation line connected to a common return line to the refueling water storage tank (RWST). A motor-operated flow control valve is located in the recirculation line for each pump and in the common return line to the RWST. The valve on the common return line to the RWST is normally open and fails "as-is" and is remote-manual

controlled. Because it is the only isolation valve on the common return line from the safety injection pump discharge to the RWST (minimum flow recirculation line), the design of the control circuit is such that no spurious actuation will be able to energize the opening and closing coils for the valve operator. Emergency instructions call for the valve to be closed before transferring SI pump suction to the containment sump during recirculation mode of accident mitigation to prevent transfer of radioactively, contaminated water to the RWST. As such, this system does not represent a concern in this area.

- The RHRS has two trains and each train has its own separate and redundant minimum flow recirculation line. Each recirculation line has its own normally-closed, fail "as-is", motor-operated globe valve. The control logic for each valve is identical. With the respective RHRS pump running and switches in the normal/auto position, the valve will automatically open for flow below a prescribed setpoint. The valve can also be opened remote manual.
- Two centrifugal charging (CC) pumps share a common minimum flow recirculation line which has two motor-operated globe valves in series. These valves are normally open, remote manual controlled, and fail "as-is."

This item is closed.