U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

NRC Inspection Report: 50-445/89-20, 50-446/89-20 Permits: CPPR-126, CPPR-127

Dockets: 50-445, 50-446 Category: A2

Construction Permit
Expiration Dates:
Unit 1: August 1, 1991
Unit 2: August 1, 1992

Applicant: TU Electric
Skyway Tower
400 North Olive Street
Lock Box 81
Dallas, Texas 75201

Facility Name: Comanche Peak Steam Electric Station (CPSES), Units 1 & 2

Inspection At: Comanche Peak Site, Glen Rose, Texas

Inspection Conducted: March 8 through April 4, 1989

Inspection conducted by NRC consultants:

K. Graham - Parameter (paragraphs 3.a, 3.c, and 3.e, 5, and 8)

P. Stanish - Parameter (paragraphs 2.a and 2.b, 3.b. and 3.d, 4.a thru 4.c, 6 and 7)

Reviewed by: H. H. Livermore 4-18-89

H. H. Livermore, Lead Senior Inspector Date

Inspection Summary:

Inspection Conducted: March 8 through April 4, 1989 (Report 50-445/89-20; 50-446/89-20)

Areas Inspected: Unannounced, resident safety inspection of applicant's actions on previous inspection findings, follow-up on violations/deviations, action on 10 CFR Part 50.55(e) deficiencies identified by the applicant, follow-up on NRC Compliance Bulletins, conduit supports Train A and B and Train C larger than 2 inches, piping and pipe supports, containment penetrations (mechanical), and general plant areas (tours).

Results: Within the areas inspected, no significant strengths or weaknesses were identified. Two open items were identified concerning vendor notification of a need to perform a 10 CFR Part 21 review (paragraph 7) and loose shims under a support for the fuel transfer mechanism (paragraph 8).

DETAILS

1. Persons Contacted

*R. W. Ackley, Jr., Director, CECO
*J. L. Barker, Manager, Engineering Assurance, TU Electric
*D. P. Barry, Senior Manager, Engineering, Stone & Webster Engineering Corporation (SWEC)
*J. W. Beck, Vice President, Nuclear Engineering, TU Electric
*M. R. Blevins, Manager, Technical Support, TU Electric
*H. D. Bruner, Senior Vice President, TU Electric
*W. J. Cahill, Executive Vice President, Nuclear, TU Electric
*J. T. Conly, APE-Licensing, SWEC
*C. G. Creamer, Instrumentation & Control (I&C) Engineering Manager, TU Electric
*G. G. Davis, Nuclear Operations Inspection Report Item Coordinator, TU Electric
*J. C. Finneran, Jr., Manager, Civil Engineering, TU Electric
*C. A. Fonseca, Deputy Director, CECO
*W. G. Guldemond, Manager of Site Licensing, TU Electric
*T. L. Heatherly, Licensing Compliance Engineer, TU Electric
*J. C. Hicks, Licensing Compliance Manager, TU Electric
*C. B. Hogg, Engineering Manager, TU Electric
*A. Husain, Director, Reactor Engineering, TU Electric
*S. D. Karpyak, Nuclear Engineering, TU Electric
*J. J. Kelley, Manager, Plant Operations, TU Electric
*O. W. Lowe, Director of Engineering, TU Electric
*D. M. McAfee, Manager, Quality Assurance (QA), TU Electric
*S. G. McBee, NRC Interface, TU Electric
*J. W. Muffett, Manager of Engineering, TU Electric
*E. F. Ottney, Program Manager, CASE
*J. D. Redding, Executive Assistant, TU Electric
*D. M. Reynerson, Director of Construction, TU Electric
*M. J. Riggs, Plant Evaluation Manager, Operations, TU Electric
*A. H. Saunders, EA Evaluations Manager, TU Electric
*A. B. Scott, Vice President, Nuclear Operations, TU Electric
*C. E. Scott, Manager, Startup, TU Electric
*J. C. Smith, Plant Operations Staff, TU Electric
*M. R. Steelman, Licensing, TU Electric
*P. B. Stevens, Manager, Electrical Engineering, TU Electric
*J. F. Streeter, Director, QA, TU Electric
*C. L. Terry, Unit 1 Project Manager, TU Electric
*T. G. Tyler, Director of Projects, TU Electric
*R. D. Walker, Manager of Nuclear Licensing, TU Electric
*R. G. Withrow, EA Systems Manager, TU Electric
*D. R. Woodlan, Docket Licensing Manager, TU Electric
*J. E. Wren, Assistant Director QA for Administration, TU Electric

The NRC inspectors also interviewed other applicant employees during this inspection period.

*Denotes personnel present at the April 4, 1989, exit meeting.

2. Applicant Action on Previous Inspection Findings (92701)

a. (Closed) Unresolved Item (445/8820-U-05): Paragraph NF 4724 of ASME Section III, Subsection NF, requires that, if high strength bolting is tightened by means of a calibrated wrench, a hardened washer should be used under the bolt head. The NRC inspector observed that hardened washers have not been used in conjunction with the high strength bolts (which are tightened by means of a calibrated wrench) used on NPSI snubbers to connect forward brackets and transition kits to the snubber bodies.

The applicant has provided an ASME Code Interpretation which states that hardened washers are not required when bolts are not required to be tightened to a specific bolt torque by the Design Specification or by the Design Report, but are tightened by a calibrated wrench for workmanship purposes. The NRC inspector has reviewed the Code interpretation presented; and, while it does not completely address the stated concern, the applicant's use of lockwires ensures that these bolts, and subsequently the snubbers themselves, will remain functional. This item is closed.

b. (Closed) Unresolved Item (445/8820-U-07): This item deals with the effects of seismic self-weight excitation (side loads) on the rated capacity of sway struts. Stone and Webster Corporation (SWEC) performed calculation GENX-312, Revision 0, entitled "Side Loading on Sway Struts." NRC review of this calculation is discussed in NRC Inspection Report 50-445/88-65; 50-446/88-61. The results of this calculation indicate that at maximum length and maximum load the stress levels in sway struts manufactured by NPSI are approximately equal to ASME Code allowables. This implies that any side load due to seismic accelerations perpendicular to the axis of the sway strut would cause it to be overstressed.

In response to this concern about the potential for overstressed sway struts, SWEC added the following requirement to Procedure CPPP-7, Revision 4, in Change Notice 7: "Any sway strut having a length greater than 80 percent of the maximum allowed center to center (C-C) dimension which is loaded to more than 50 percent of the rated load specified by the manufacturer shall be

reevaluated in accordance with the procedure outlined by Calculation 15454-NZ(C)-GENX-312, Side Loading on Struts, Revision 0, July 27, 1988."

To evaluate existing sway strut installations, the applicant performed a field walkdown to identify worst case examples. These examples were then analyzed in accordance with the procedure outlined in SWEC's calculation. Since all of these sway struts had an acceptable utilization factor (i.e, actual stresses below code allowables), it was concluded that the installed struts are acceptable. The NRC inspector concurs with the assessment.

Based on the actions taken by the applicant, the NRC inspector is satisfied that this item has been adequately resolved. This item is closed.

3. Review of Applicant's Actions/Responses to Violations/ Deviations (92702)

a. (Closed) Violation (445/8416-V-01): An NRC inspection of cable tray hangers was conducted during the period of May 14 through June 20, 1984. Listed below are examples identified by the NRC inspectors where cable tray hangers were installed by the craft to conditions other than those specified by the identified design documents and the QC inspectors failed to identify and document these conditions:

(1) The NRC inspectors identified two cases where three supports shared common clip angle attachments to the concrete wall. Cable Tray Hangers (CTHs) 6503, 6504, and 6505 shared a common clip angle that was not called for on drawing 2323-S-903, Detail D for Case SP4, or on Component Modification Card (CMC) 11097. CTHs 6576, 6577, and 6578 shared common clip angles that were not called for on drawing 2323-S-903, Detail D for Case SP4.

(2) The NRC inspectors identified two hangers where the dimensions did not agree with the drawings. CTHS 6632 and 6638 both have installed dimensions that are more than the $\pm$ 1/4 inch allowed tolerance from those specified in the appropriate design documents. The dimensional errors are specifically documented on NCR M84-01834. The dimensional errors of the members varied from 7/8 inch to 1 1/8 inches shorter than those shown on the FSE-00159 drawing.

(3) The NRC inspectors identified two cable tray hangers that did not have the weld configuration specified on the design drawings.

CTH 6642 and CTH 6645 both had horizontal welds at the clip angle to support connection and the design drawings specified vertical welds.

(4) The NRC inspectors identified five cable tray hangers that had wall/floor connections that did not conform to those specified by the design drawings. CTH 6567 had a bevelled washer that was improperly installed so that it actually decreased the bearing surface between the nut and the clip angle. CTH 5519 did not have 1 inch of grout under baseplate as specified by Drawing 2323-S-913, Detail 6. CTHs 5491, 5498, and 5499 had clip angles that utilized a combination of welding to embed plates and Hilti bolts for the wall or beam attachment for which there was no detail.

TU Electric issued Nonconformance Reports (NCRs) M84-01834, M84-01835, and M84-01836 to document and track resolution of the fifteen nonconforming conditions identified during the NRC inspection. Twelve of these nonconforming CTHs were dispositioned "use-as-is" and three required "rework." The NRC inspector has reviewed the closed NCRs and concludes that TU Electric has appropriately dispositioned and corrected the specific nonconforming conditions.

To resolve the generic implications of the NRC inspection findings and to avoid further violations, TU Electric has developed and is implementing a comprehensive Corrective Action Program (CAP) to validate the design and installation of cable trays and cable tray hangers. The Project Status Report (PSR) for these commodities describes in detail the extent of corrective actions required and a methodology for implementing those actions. Primary features of the CAP include:

- "Establishment of cable tray and cable tray hanger design criteria which comply with licensing commitments.

- "Development of the Design Basis Document (DBD) for CPSES cable trays and cable tray hangers, which contains the design criteria.

- "Implementation of design and hardware validations, consisting of analysis, identification and implementation of necessary modifications, and field

verifications as identified in the Post-Construction Hardware Validation Program (PCHVP).

. "Resolution of the design and hardware-related issues of CPSES cable trays and cable tray hangers, and implementation of a corrective action plan for closure of these issues."

The NRC staff has completed its audits and inspections of the cable tray and cable tray hanger design validation and third-party activities and concludes that the effectiveness and completeness of the program's implementation are sufficient to ensure that licensing commitments are satisfied and that the cable tray and cable tray hanger issues currently known to the staff are being properly resolved. Supplemental Safety Evaluation Report (SSER) 15 describes in detail the audits and inspections that were performed during the staff's evaluation of the CAP methodology.

NRC inspections of PCHVP hardware modifications with regard to implementation of the CAP for cable trays and cable tray hangers have concluded that TU Electric's corrective actions and actions to preclude recurrence of the violation are appropriate and adequate. This violation is closed.

b. (Closed) Violation (445/8426-V-01): NRC inspection identified that specifications and QC inspection procedures did not contain specific acceptance criteria for separation of redundant trains of flexible conduit, and separation requirements between conduits as contained in Specification 2323-ES-100 and that implementing procedures had not been met. The following specific conditions were identified.

(1) Flexible conduits in the Safeguards and Auxiliary buildings did not maintain the required one-inch minimum separation between trains. For example, flexible conduit C13G20208 was in contact with C13011132, and the one-inch airspace was not maintained between C13007415 and C13G07413.

(2) Flexible conduits in the safeguards and auxiliary buildings came in direct contact with uninsulated equipment in the piping system or with pipe restraints or anchors. Examples included:

(a) C13G07743 - Flex rested on the pipe bracket next to valve 1-HV-5365.

(b) C13G07744 - Flex rested on pipe next to valve 1-HV-5365.

(c) C14O21161 - Flex rested on pipe support for 1-MS-030 and 1-MS-268.

(d) C13G12499 - Flex rested on support for JB1S 455G.

(e) C13G08781 - Flex touched corner of support for valve 1-HV-4179.

(f) C12O05387 - Flex touched pipe at elbow passing near valve 1-HV-8106.

(g) C13G21323 - Flex touched flange of support next to valve 1-FV-2196.

(h) C13G06734 - Flex rested against unistrut below valve 1-FV-4537.

(i) C12G04690 - Flex rested on fire pipe.

(j) C13G06834 - Flex wrapped around adjacent support.

(k) C14G20503 - Flex rested of valve body.

(l) C12O02856 - Flex contacted valve 1-HV-2480.

As the cause of the violation, the applicant identified that the installation drawing did not contain a method for maintaining the required separation distance for flexible conduits to prevent inadvertent movement of these conduits. As a result, separation violations after inspection occurred. To resolve this problem, Design Change Authorization (DCA) 20721, Revision 1, was issued on September 18, 1984, against drawing E1-1702-02. This DCA contains an approved method for maintaining minimum separation distance between flexible conduits of different trains/channels.

To identify any other separation problems in Unit 1, generic NCRs were issued. One NCR was issued for each of the buildings/areas where safety-related flexible conduits were installed. Walkdowns of these buildings/areas by QC to identify separation deficiencies in violation of the criteria of QI-QP-11.3-29 were conducted. Engineering evaluated and dispositioned each finding, and craft corrected violations by use of mechanical separators as specified in DCA 20721 Revision 1, as appropriate.

For the flexible conduit installations in Unit 2 which have yet to be installed the referenced DCA and changes identified in QI-QP-11.3-28, Revision 24, should preclude recurrence and provide for detection by inspection. For previously installed flexible conduits in Unit 2, post-construction inspection in accordance with QI-QP-11.3-40 will identify any separation violations. Training of personnel to the latest revision of procedures has been completed and is considered adequate for resolution of this problem.

The NRC inspector has reviewed DCA 20721, Revision 1, which incorporated the details and information required to obtain and maintain minimum separation required between flexible conduits. Also reviewed were NCRs E84-100309S through E84-100314S, the associated inspection reports and the Electrical Separation Deficiency Reports generated as a result of the walkdowns. In addition, Procedures QI-QP-11.3-29, QI-QP-11.3-29.1, QI-QP-11.3-28, and QI-QP-11.3-40 were reviewed and were found to have adequate criteria for inspection of electrical separation.

The NRC inspector also reviewed the Results Report for CPRT ISAP VII.c, Appendix 1, entitled "Conduits," and found that Attribute 8 addressed this specific issue and that an adverse trend had been identified. CPRT recommended that separation between conduits and redundant raceways and cable be confirmed to be adequate by reinspection. A similar corrective action was also recommended by CPRT in ISAP I.b.1 and ISAP I.b.2. To satisfy these recommendations, the applicant initiated Corrective Action Request (CAR) 87-005 which required all Class 1E cables and raceways be reinspected for conformance with the revised criteria.

Based on review of the above documents and the final report for CAR 87-005 and physical inspection for this attribute, the NRC inspector concurs that this issue has been adequately addressed. This violation is closed.

c. (Closed) Violation (445/8846-V-01): Due to an error resulting from Revision 3 of MMI-904, "Steam Generator Manway Removal and Replacement," paragraph 5.3.10 specifies installation torquing which deviates from the NSSS vendors recommendations. The error in Revision 3 of MMI-904 resulted in quality control acceptance of the torquing of high pressure flanged connections on Unit 2 steam generators which may result in the connections not performing their intended safety-related function.

TU Electric admitted to the alleged violation. Corrective steps taken consist of the following:

- Deficiency Report (DR) P-88-03387 was issued on June 28, 1988, to document deficient Step 5.3.10. The DR was subsequently dispositioned to require correction of Step 5.3.10.

- NCR 88-10921 was issued on June 28, 1988, to document the indeterminate steam generator manway cover.

- Procedure Change Notice PCN-MMI-904-R3-2 was written on June 27, 1988, to correct Step 5.3.10. The procedure change was approved on June 29 and became effective on July 8, 1988.

- An investigation verified that MMI-904, Revision 3, was not used to perform work on the Unit 1 steam generator primary or secondary manway covers or the Unit 2 primary manway covers.

The NCR has been dispositioned to require that the final torquing steps for the Unit 2 steam generator secondary manway cover be repeated to the correct sequence.

Procedure STA-202, Revision 17, "Administrative Control of Nuclear Operations Procedures," was revised on August 1, 1988, to provide guidelines for a technical review of Nuclear Operations procedures. In accordance with that procedure, MDA-201, Revision 8, "Maintenance Department Procedures," was revised to provide for a procedure writer's checklist to be used by technical reviewers. The checklist includes instructions to assure that the procedure is technically adequate, that adequate direction is provided from section to section, and that reference to other documents is correct, accurate, and current.

The NRC inspector has reviewed TU Electric's corrective actions and concurs that the procedural revision error did not impact equipment installed in Unit 1. To date, corrective actions controlled by NCR 88-10921 which are applicable to Unit 2 only, have not been implemented. Therefore, 446/8844-V-01 remains open.

NRC review of corrective steps taken concludes that revision of the referenced procedures should preclude the recurrence of a similar violation. This violation is closed for Unit 1 only.

d. (Closed) Violation (445/8871-V-02): The NRC inspector observed that a Spring Hanger SI-1-336-001-S22S did not have a sight hole in the load coupling; therefore, thread engagement could not be verified. The inspector who inspected this support indicated that the thread engagement was satisfactory even though the inspection report form identifies the need for a sight hole to verify this attribute.

In response to this violation, the applicant stated that the reason for the violation was an isolated QC inspection error. This was determined by a review of QA surveillance reinspection results which indicated that the level of performance of the QC inspector in question was satisfactory.

As corrective action for this violation, NCR 88-16375 was written to document the identified discrepant condition. Also, DR C88-05345 was written to resolve the incomplete QC inspection documentation. The disposition of the DR required that all Hardware Validation Program (HVP) inspected spring hangers be reinspected to verify the presence of thread engagement sight holes. Action to prevent recurrence of this violation included retraining of ASME QC inspectors in the revised inspection requirements of CP-QAP-12.1.

The NRC inspector has reviewed the NCR and the DR as well as the revision to CP-QAP-12.1 which now specifies that witnessing of thread engagement is not acceptable and that sight holes must be used. In addition, the NRC inspector reviewed the training records for the new revision of the QC procedure, inspection reports, and construction travelers for the identified deviations and the performed inspections of the discrepancy identified by the NRC. Also, the NRC inspector reviewed other spring hanger installations and is satisfied that this issue has been adequately resolved. This violation is closed.

e. (Closed) Violation (EA-8609, Appendix B, Item I.A): NRC inspections performed from November 18, 1985, to December 18, 1985, identified that installation attributes for a number of cable tray hangers were not either correctly evaluated by walkdown engineers or correctly verified by quality control inspectors for 15 of 32 cable trays. The subject attributes related to tray were size, tray span, tray clamps, member size, weld qualitative measurements, dimensional measurements, bolt size, and member orientation. In addition, the applicant failed to perform audits of these activities.

TU Electric's response to the violation, TXX-6262, dated February 27, 1987, admitted the violation. The two aspects of the violation, (1) incorrect determination of cable tray hanger attributes by walkdown and inspection personnel and (2) failure to perform audits of those activities were addressed separately.

Corrective steps taken for item (1) included a prompt suspension of the Unit 1 CTH as-built program, and CAR 87-053 was issued to address the problem. The CAR required that QC reinspect a sample of Unit 1 and Unit 2 CTHs to determine the extent of the problem. Reinspections confirmed the NRC identified problems with the Unit 1 as-built program and determined that the Unit 2 program was being adequately implemented.

The engineering and inspection procedures governing the process of walking down the CTHs, as-builting of relevant attributes, creation of red-line drawings, and QC inspection/verification activities were completely rewritten. FVM-CS-001 was written and issued to provide a method of calibrating the design and installation of CTHs.

The NRC inspector has reviewed CAR 87-053 and FVM-CS-001 and concludes that TU Electric has taken appropriate corrective and preventive actions for item (1) of the violation. Further, NRC inspections of PCHVP activities have determined that corrective actions are being implemented adequately.

With respect to item (2) of the violation concerning QA audits, TU Electric admitted that due to a misunderstanding within the QA organization, audits of the CTH program in the area of engineering field verification were not scheduled or performed.

Corrective actions consisted of scheduling and performing audits of field verification activities. Five audits were performed in 1986 in response to the NRC inspection findings. NRC inspections of TU Electric's audit program have determined that the program is being effectively implemented.

Preventive actions consisted of the Director of QA issuing a memorandum to the Manager of QA on July 21, 1986, directing the Manager of QA to ensure that all activities conducted under the TU Electric QA Program, including those in support of the CPRT, fall within the scope of the TU Electric audit and/or surveillance program. NRC review of corrective and preventive actions

has determined that those actions are appropriate and adequate. This violation is closed.

4. Applicant Action on 10 CFR 50.55(e) Construction Deficiencies (92700)

a. (Closed) Construction Deficiency (SDAR CP-80-09): A review of documentation for the diesel generator piping supports revealed that the supplier had manufactured the supports without acknowledgement of the requirements of ASME Section III, Subsection NF, as required by the specification for this equipment. This issue was deemed to be reportable based on the fact that the materials used for fabrication of the supports and in-process inspection requirements of the ASME Code had not been met. Due to the above discrepancies, during a seismic event, resulting in a loss of off-site electrical sources, an inadequacy of power necessary to operate plant safety-related auxiliaries could result.

Corrective action for the deficient condition consisted of establishing compliance of the fabrication of the supports to the AISC Code. Engineering calculations have concluded that the design of the supports is in accordance with the ASME Code. All accessible welds were inspected to the requirements of American Welding Society (AWS) D1.1 by site QC personnel and inaccessible welds were dispositioned by engineering based on the relatively low percentage of allowable stress in the subject welds.

The NRC inspector has reviewed the inspection reports and their dispositions, the material certifications, design calculations, welder qualifications and weld procedures; and based on this review and inspection of the supports by the NRC inspector concludes that these supports will perform their safety-related function. This construction deficiency is closed.

b. (Closed) Construction Deficiency (SDAR CP-86-35): During an update of the active valve list by site engineering, several valves in the main steam system originally procured as manual valves were noted to be classified as active valves. This classification change required the installation of motor operators. Review of these installations by the applicant indicated that the motor operators were procured using a specification intended for the procurement of replacement operators for original equipment motor operated valves. The use of this specification (2323-MS-20D) for the procurement of these motor operators resulted in the failure to consider valve operability interfaces and the effects on the seismic qualification of the manual valves as originally

purchased. Further evaluation by the applicant, concluded that the modified active valves do not meet operability requirements. Therefore, this issue was determined to be reportable.

To correct the identified deficiency, design changes were developed under design modification (DM) 86-106 and PPF-2-1029 to modify the existing design. This modification included the addition of new air-operated valves and returning the existing valves to their original manually operated condition.

The NRC inspector reviewed DCA 25470, Revision 7, which details the necessary changes to the affected piping and the construction travelers for the installation of the four Unit 1 valves and modification of the original valves. The NRC inspector also performed a physical inspection to confirm that the work had been completed.

Based on the above actions, the NRC inspector concurs that this issue has been adequately addressed. This construction deficiency is closed.

c. (Closed, Unit 1 only) Construction Deficiency (SDAR CP-87-48): Engineering review of cable tray transverse clamps identified a condition of mixing the inside clamp (type "C") on one side of the cable tray and the outside transverse clamp (types "A" and "G") on Cable Tray Hangers CTH-1-1743, CTH-1-1973, CTH-1-2070, CTH-1-2352, CTH-1-6794, and CTH-1-7204. This issue was deemed to be reportable because this combination of tray clamps may allow transverse movement of the trays during a seismic event. This could result in an inability of the associated safety-related systems to perform as required for safe operation and systems shutdown.

As corrective action, a 100% verification of installed clamp combinations was performed by a walkdown to identify any additional unacceptable clamp combinations which required corrective action. NCR CM-87-3301 was initiated and dispositioned to add an additional clamp to the unacceptable combinations. After physical modification of all affected cable tray hangers, drawings were revised to reflect the corrected conditions.

The NRC inspector has reviewed Impell Report 11-0210-0017, Revision 0, which evaluated the deficiency, established the root cause, and established the corrective action. The cause was determined to be lack of clarity or inadequate detail in clamp design criteria. The NRC inspector also reviewed Field Verification Method (FVM) CPE-EB-FVM-CS-100, Revision 0, entitled "Field

Verification Method Cable Tray Hanger Walkdown for Clamp Identification for Unit 1," and the NCRs generated as a result of the walkdowns.

Based on the above reviews and inspections of cable tray supports, the NRC inspector concurs that this issue has been adequately addressed. This construction deficiency is closed for Unit 1 only.

5. Follow-up on NRC Compliance Bulletins (92703)

(Closed, Unit 1 only) NRC Compliance Bulletin 88-05, Supplements 1 and 2: "Nonconforming Materials Supplied by Piping Supplies, Inc. at Folsom, New Jersey and West Jersey Manufacturing Co. at Williamstown, New Jersey."

NRC issued Bulletin 88-05 in May 1988, regarding alleged falsification of Certified Material Test Reports (CMTRs) by West Jersey Manufacturing Company (WJM) and Piping Supplies, Inc. (PSI). Bulletin 88-05 required nuclear power plants to identify, locate, and replace material manufactured by WJM or PSI or perform testing to assure that this material meets applicable ASME Code and specification requirements.

Supplement 1 to NRC Bulletin 88-05 was issued in June 1988. This supplement limited the scope to fittings and flanges and changed reporting requirements for operating plants.

Supplement 2 to NRC Bulletin 88-05 was issued in August 1988. Supplement 2 allowed operating plants to suspend document reviews and testing. Plants under construction were required to continue bulletin activities and reporting requirements were revised. Also, a third manufacturer, Chews Landing Metal Manufacturers, Inc. (CLM) was named.

NRC Inspection Report 50-445/88-56; 50-446/88-52 describes TU Electric's methodology for evaluating material received and/or installed which was supplied by the vendors named above.

TU Electric supported and participated in the NUMARC/EPRI generic test program and attended meetings and training sessions prior to performing any field testing. All test data obtained by TU Electric was submitted to NUMARC for incorporation into their data base for review and analysis.

NRC inspectors reviewed field test procedures and witnessed TU Electric's performance of field hardness testing utilizing an Equotip Impact Device, Type D. Two hardness tests performed as directed by Work Order C88000750 were witnessed. These test were performed in accordance with applicable requirements.

The following is a summary of TU Electric's test results:

- Total of 238 pipe flanges were tested, either by CPSES or an independent test lab.
- All physical, chemical, and magnetic testing on SA-182 F304 stainless steel flanges was acceptable.
- Twelve installed (Unit 1) SA-105/SA-350 LF2 flanges had low hardness readings (116 BHN lowest).
- Eight installed (Unit 1) SA-105/SA-350 LF2 flanges had high hardness readings (213 BHN highest).
- Independent lab test results on SA-105/SA-350 LF2 flanges were within the expected variances documented by the AISI Survey.

TU Electric's evaluation of test results resulted in the following conclusions:

a. Low Hardness Results

- The lowest hardness reading of 116 BHN was evaluated utilizing the NUMARC best fit conversion method and was found to be acceptable.
- Stress analysis was performed on each installed flange using its worst case tensile strength and was found to be acceptable for intended service.

b. High Hardness Results

- High hardness in the ranges found during testing was evaluated and is not considered a concern for the following reasons:

  (1) SA-105 material does not have an upper limit on hardness unless the material has been liquid quenched or is too small for a .250" diameter tensile test specimen.

  (2) Other recognized standards (AWS D1.1) apply hardness values as high as 265 BHN to fabricated, welded, and installed items.

  (3) Weldability is proven by acceptable weld inspections, hydrostatic testing, and items having sustained bolt-up loads.

TU Electric concludes as a result of site activities, and issuance of the final NUMARC Report addressing NRC

Bulletin 88-05 that a safety concern does not exist. This conclusion is based upon:

a. NUMARC Generic 88-05 Program
b. Completed Stress Analysis
c. Laboratory Test Data
d. AISI Study

With respect to ASME material compliance, TU Electric has established assurance that the applicable material complies with ASME/ASTM criteria. This conclusion is based upon:

a. NUMARC's finding that "over 99.5 percent of the components tested exhibited test results indicative of the correct ASME/ASTM specified materials."

b. CPSES Testing Results

c. AISI Study

Engineering Report ER-ME-18, Revision 0, dated October 10, 1988, and its attachments, provides a detailed summary of the actions performed by TU Electric in response to the NRC bulletin. Based upon a review of the engineering report and subsequent discussions with TU Electric personnel, the NRC inspector concludes that all material installed in Unit 1 and common areas is acceptable and should perform its intended safety function. This conclusion is also applicable to material stored in warehouses that has not been issued.

For material installed in Unit 2, TU Electric's conclusions relative to acceptability of this material were based on test results for material installed in Unit 1 which are not from the same heats in all cases. Therefore, the NRC staff advised that the applicant's conclusions for the untested material were unacceptable and the bulletin will remain open until all heats of material installed in Unit 2 have been tested and determined to be acceptable.

6. Conduit Supports Train A & B and Train C Larger than 2 Inches (48053)

In this inspection period, the NRC inspector selected a sample of four calculation packages performed by Ebasco to assess the adequacy and accuracy of their analyses and to ensure that these conduits will maintain their structural integrity. The calculations selected were:

Calculation	Conduit
11497	1" C12G11497
14604	1 1/2" C12G14604
16172	2" C13G16172
11564	3" C12K11564

In these analyses, the NRC inspector's review included verification that the data collected in the walkdown as part of PCHVP had been adequately evaluated and incorporated into the analysis - such as actual dimensions between supports, locations of junction and pull boxes, and location of conduit fittings, etc. Also reviewed was the identification and documentation of analysis assumptions and that they were reasonable. Another facet of this review was to insure that the input to the computer analysis for the conduit as well as the conduit supports was accurately transferred from the source document. For example, the support loads from the conduit analysis are correctly input in the support analysis, and the correct forces and moments from the support analysis are used to evaluate the adequacy of the support welds, anchor bolts, and baseplates.

The results of the NRC review revealed no areas where the Ebasco calculations for the conduit and conduit supports listed above were deficient. In fact, these calculations were well presented, well organized, and appeared to be complete and address all the items that should have been considered. No violations or deviations were identified.

7. Piping and Pipe Supports (50090)

During this inspection period, the NRC identified two issues concerning the application of pipe supports which have been adequately addressed for this jobsite; however, the need to review these issues for reportability under the requirements of 10 CFR Part 21 may not have been considered. One issue involves the use of low-strength bolting (ASTM-A-307) for connecting transition kits and forward brackets to snubber bodies. Calculations performed by SWEC indicate that these bolts are overstressed at maximum load (for certain sizes). The other issue concerns the application of side loads on sway struts. Again, calculations have indicated that in certain instances an overstressed condition may result in a seismic event. These two issues may be indicative of a failure of the vendor to account for all the possible design conditions. The applicant has advised that the vendor has been notified and is performing a Part 21 review. This is an open item pending review of the applicant's written notification to the vendor (445/8920-O-01).

In the Inspection Summary for NRC Inspection Report 50-445/89-12; 50-446/89-12, a potential weakness was identified in SWEC's quality program related to the backdating of signature authority for certain quality documents (paragraph 3.f of the subject report). In this inspection period, additional information was provided by SWEC which indicates that they are in compliance with their approved project procedures. Based on our review of the additional documentation provided, the NRC inspector concluded that adequate controls are in place and no program weakness exists in this area.

8. Containment Penetrations (Mechanical) Work Observation (53053)

The purpose of this inspection was to determine whether work or work activities associated with containment penetrations was performed adequately.

Work activities associated with mechanical containment penetrations are very limited at this time due to past completion of construction activities. The NRC inspector verified by walkdown of penetrations located above elevation 832' in the Unit 1 containment building that those penetrations are being properly protected from damage and that they appear to meet applicable design and construction requirements. No discrepancies related to configuration and quality of welding were noted.

The NRC inspector performed a detailed physical inspection of the mechanical penetration located in the containment building refueling transfer canal which provides a seal between the fuel transfer tube and the transfer canal liner plate.

The following drawings were reviewed and compared with field installation of the commodity:

2323-SI-0511
2323-SI-0512
2323-SI-0513
MS-71A-3 (CP1-FHEXTT-04)

NRC review and inspection concludes that the mechanical containment penetration installation is in accordance with the design drawing requirements.

During review of the fuel transfer tube penetration, the NRC inspector identified a problem with the installation of shims under a pedestal baseplate which supports the track on which the fuel transfer mechanism operates. The NRC inspector observed the shims to be loose and moveable by hand which could impact stability of the fuel transfer carriage during refueling operations. This condition has been identified to

TU Electric management. Work Request NQDR-U1-01388 was issued to resolve the NRC identified condition. This is an open item pending further NRC inspection (445/8920-O-02).

9. Plant Tours (50090, 48053)

The NRC inspectors made frequent tours of Unit 1 and common areas of the facility to observe items such as housekeeping, equipment protection, and in-process work activities. No violations or deviations were identified and no items of significance were observed.

10. Open Items

Open items are matters which have been discussed with the applicant, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or applicant or both. Two open items disclosed during the inspection are discussed in paragraphs 7 and 8.

12. Exit Meeting (30703)

An exit meeting was conducted April 4, 1989, with the applicant's representatives identified in paragraph 1 of this report. No written material was provided to the applicant by the inspectors during this reporting period. The applicant did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. During this meeting, the NRC inspectors summarized the scope and findings of the inspection.