

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/84-45

Construction Permit: CPPR-103

Docket: 50-382

Licensee: Louisiana Power & Light Company (LP&L)
142 Delaronde Street
New Orleans, Louisiana 70174

Facility Name: Waterford Steam Electric Station, Unit 3

Inspection At: Taft, Louisiana

Inspection Conducted: November 5-16, 1984

Inspectors: *W. L. Constable* 12/18/84
W. L. Constable
G. L. Constable, Senior Resident Inspector Date

J. E. Bess 12/19/84
J. E. Bess
J. E. Bess, Reactor Inspector Date

L. D. Gilbert 12/19/84
L. D. Gilbert
L. D. Gilbert, Reactor Inspector Date

C. E. Johnson 12/20/84
C. E. Johnson
C. E. Johnson, Reactor Inspector Date

R. P. Mullikin 12/19/84
R. P. Mullikin
R. P. Mullikin, Reactor Inspector Date

W. E. Murphy
W. E. Murphy, Reactor Inspector

12/20/84
Date

J. I. Tapia
J. I. Tapia, Reactor Inspector

12/19/84
Date

D. P. Tomlinson
D. P. Tomlinson, Senior Resident Inspector

12/19/84
Date

NRC Consultants: C. J. Haughney, Vice President Comex Corporation
M. I. Good, Comex Corporation
W. S. Marini, Resource Technical Services, Inc.

Approved: W. A. Crossman
W. A. Crossman, Chief
Reactor Project Section B

12/19/84
Date

Inspection Summary

Inspection Conducted November 5-16, 1984 (Report 50-382/84-45)

Areas Inspected: Routine, announced inspection of actions taken on previously identified inspection findings in operational quality assurance and quality control programs and during the Inquiry Team and Construction Appraisal Team inspections; closeout action regarding significant construction deficiencies; and assessment of allegations. The inspection involved 269 inspector-hours onsite by 11 NRC inspectors, including three consultants.

Results: Within the five areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Principal Licensee Employees

- *S. Leddick, Senior Vice President, Nuclear Operations
- +*R. P. Barkhurst, Plant Manager
- +*D. E. Dobson, Project Manager
- +*T. F. Gerrets, QA Manager
- *R. J. Drummond, Manager, Nuclear Services
- R. F. Burski, Manager, Engineering and Nuclear Safety
- +*W. M. Morgan, Operations QA Supervisor
- +*L. L. Bass, Project QA Engineer
- *L. F. Storz, Assistant Plant Manager, Operations and Maintenance
- *P. V. Prasankumar, Technical Support Superintendent
- *J. N. Woods, Plant Quality Manager
- *S. A. Alleman, Assistant Plant Manager, Plant Technical Support
- *J. R. McGaha, Maintenance Superintendent
- *F. J. Englebracht, Plant Administrative Manager
- R. Riser, QA Engineer
- R. I. James, QA Engineer
- G. Pittman, QA Engineer
- B. Toups, QA Engineer
- *J. B. Perez, Senior QA Representative
- R. G. Bennett, Senior QA Representative
- +*K. L. Brewster, Licensing Engineer
- *D. W. Herrin, Licensing Engineer
- +*G. E. Wuller, Licensing Engineer
- +*J. J. Zabritski, Plant QA
- +*C. L. Skinner, Plant QA
- *A. S. Lockhart, QA Consultant
- R. J. Bentley, Licensing Engineer
- R. Sandridge, QA Engineer
- J. Waters, QA Engineer
- C. D. Kelley, Operations QA
- K. W. Cook, Nuclear Support and Licensing Manager

EBASCO Services, Inc. (EBASCO)

- *M. K. Yates, Project Manager
- *J. DeBruin, Project Engineer
- K. M. O'Gara, Licensing Engineer
- J. Ciambriello, Assistant Project Engineer
- *J. Hart, Licensing Engineer
- M. McGrath, Residnet Engineer
- A. Mukherji, ESSE Principal Engineer
- G. Aliberti, Principal Engineer
- M. Harris, QA Engineer

R. Wilder, NUS Engineer
E. Livesey, ESSI I&C Engineer
N. Muller, Design Engineer
A. Carreli, Senior Draftsman

*Denotes those present at the exit interview on November 9, 1984.

+Denotes those present at the exit interview on November 16, 1984.

In addition to the above personnel, the NRC inspectors held discussions with various operations, construction, engineering, technical support, and administrative members of the licensee's staff.

2. Previously Identified Inspection Findings in Review of Operational QA/QC Programs

a. 8431-01 (Closed) Failure to Select and Review Procedures that Implement the QA Program

The corporate QA manager selected those Plant Operating Manual (POM) procedures requiring QA review and published a list of those procedures in his memorandum to the plant manager-nuclear dated August 22, 1984 (W3K84-1961, Q-3-A35.01). He further amplified this selection and the review process in his memoranda dated September 24, 1984 (W3K84-2140, Q-3-A35.01) and October 23, 1984 (W3K84-2436, Q-3-A35.01).

At the time of this inspection, LP&L QA had reviewed and will continue to review those procedures which are identified as requiring QA review prior to issuance. The initial review of plant procedures requiring LP&L QA review prior to issuance is complete. This item is considered closed.

b. 8431-02 (Closed) Programmatic Breakdown in Document Control

Selected copies of Executive Directive Manuals (EDMs), Quality Assurance Section Procedures (QASPs) Manuals, and POM volumes were examined to determine whether these copies contained current revisions of their respective procedures. The sample examined had the following results:

	<u>Sample</u>	<u>Results</u>
EDMs	2 volumes with 58 procedures total	1 missing procedure from 1 volume
QASPs	2 volumes with 100 procedures total	No discrepancies
POMs	4 volumes with 41 procedures total	No discrepancies

About 20 drawings and documents involving about 100 postings of modifications or changes were reviewed. There were 3 instances of incorrect postings and 1 drawing was missing from the control room. This area has significantly improved since May. The system appears to be working extremely well with few errors. This item is considered closed.

c. 8431-03 (Closed) Guidance for Procedure Review Not Adequate

QI-005-002, Revision 2, "Quality Review of Procedures and Work Packages," was approved on November 5, 1984. This revision added guidance requiring the procedure to verify compliance with upper tiered documents and to ensure consistency with interfacing and reference procedures. This item is considered closed.

d. 8431-04 (Closed) Provision Allowing POM Procedure Steps to be Performed in any Sequence

UNT-4-009 had been revised with the intent of more clearly stating LP&L's policy on the performance of procedure step sequences.

If an individual desires to perform a procedure or a portion of a procedure out of sequence, they shall first check with the supervisor. This item is considered closed.

e. 8431-05 (Closed) Unclear Determination of Quality Related and Safety Related

UNT-05-002 was revised to reference definitions in QP-005-001, "Instructions, Procedures, and Drawings." This issue of QP-005-001 has been completed and appears to contain satisfactory definitions of quality-related and safety-related. This item is considered closed.

f. 8431-06 (Closed) No Requirement Evident for Review of Corrective Maintenance Activities

Change 1 to Revision 4 of UNT-5-002, "Condition Identification and Work Authorization," (CIWA) added a requirement to Section 5.2.7.2 that the cognizant supervisor shall review CIWAs following completion of corrective maintenance to ensure that identified procedures were accomplished, that documentation was properly executed and adequate, and that discrepancies or problems such as Technical Specification or quality control violations were resolved. This item is considered closed.

g. 8431-07 (Closed) Blowing Out of Sensing Lines Without a CIWA

Interviews revealed that UNT-05-002 required initiation of a CIWA when initiating corrective action for a malfunctioning instrument. The Shift Supervisor (SS) was permitted to make discretionary exceptions when starting up fluid systems that had been drained for

maintenance in those instances by directing venting or blowing down instrument lines without a CIWA. In cases of instrument malfunction during normal operations, a CIWA would be required. This item is considered closed.

h. 8431-08 (Closed) Prompt Shift Supervisor Notification of Surveillances, Calibration, and Preventive Maintenance Status

This item involved the lack of timely notification of the SS when surveillance tests failed acceptance criteria. LP&L's written program had previously required such timely notification, but interviews indicated that this practice had not always been followed during the initial performance of surveillance tests in early 1984. During this inspection, Ss interviewed expressed confidence that this practice had been substantially improved and that they were now receiving timely notification of plant operational problems such as surveillance test results not meeting acceptance criteria. This item is considered closed.

i. 8431-09 (Closed) Incomplete Supplier Evaluator Training Record

Supplier evaluator training documentation supplied by the licensee was reviewed and indicated that supplier evaluators had been given indoctrination and training on specific LP&L QA procedures and elements. This documentation was not available during the previous inspection, but had been subsequently located. This item is considered closed.

j. 8431-10 (Closed) Procedure Revisions in Review

The NRC inspector reviewed QP-011-001, Revision 1, "Test control," and found that the procedure contained adequate administrative controls to ensure proper conduct of testing during facility operations. This item is considered closed.

3. Review of Significant Construction Deficiencies (SCDs)

a. (Closed) SCD-57, Inadequate Instrumentation and Control Installations and Turnover Documentation

The NRC staff has reviewed the corrective actions implemented by LP&L in the areas of organizational changes, reinspection, rework, retraining, and installation and turnover documentation, and supplemented by actions taken by LP&L in conjunction with the letter dated June 13, 1984, from D. G. Eisenhut to J. M. Cain (LP&L). It is determined that this SCD has been adequately addressed, corrected, and documented. This item is considered closed.

b. (Closed) SCD-60, Turnover Documentation and Inadequate Hanger Weld Problems

Upon receipt of turnover documents for System 603, Low Pressure Safety Injection, LP&L QA performed an audit of documentation for pipe support/restraint installations contained in the turnover package. Discrepancies were identified which included: installations which were not in accordance with the design documents, welds that differed from the design documents, detail drawings which did not meet AWS D1.1 requirements, and field welds which were not made per the as-built drawings. This condition indicated a breakdown in the QA programs of Tompkins-Beckwith, Inc. (T-B), EBASCO Services, Inc., and LP&L in that the T-B turnover packages which were submitted contained discrepancies between the final QA/QC certification and the actual as-built condition.

The original scope included those hangers completed and accepted prior to July 6, 1982. This amounted to 4552 hangers. The scope was later expanded to include hangers which had individual welds inspected and accepted prior to July 6, 1982, although the entire hanger had not been completed and accepted until after that date. Six hundred and fifty-two hangers were in this category. The balance of the safety-related hangers; i.e., those erected entirely after July 6, 1982, were also added to the scope as they exhibited weld deficiencies similar to those exhibited by the first two categories.

Nonconformance Report (NCR) No. W3-4010 was issued to document the original scope of the review; i.e., 4552 hangers. Deficiencies identified in hangers accepted after July 6, 1982, were addressed in NCR No. W3-7745. The disposition of both NCRs was reviewed by the NRC staff during this inspection. Together, both NCRs encompass the entire scope of work performed by T-B. Forty-five hangers were determined to require rework. Included in the disposition of this reportable deficiency were: a walkdown performed by EBASCO engineering of 204 of the heaviest loaded hangers, and an inspection of 3528 hangers performed under Procedure No. QASP 19.7, "QA Inspection of Pipe Hangers." In addition to the review conducted by the NRC staff during this inspection, the NRC CAT team inspection also addressed this construction deficiency (see NRC Inspection Report 84-30). As a result of the reviews conducted of the hanger discrepancies, this item is considered closed.

c. (Closed) SCD-61, Linear Crack in Stainless Steel Tubing

NCR W3-3919 identified two defects in approximately 8 inches of $\frac{1}{2}$ " diameter stainless steel tubing. This NCR was reviewed in connection with Issue No. 6 in the letter dated June 13, 1984 from D. G. Eisenhut to J. M. Cain (LP&L). The NRC staff review of this issue determined that the quantity of tubing subjected to hydrostatic testing constituted a valid sample and that the absence of any

additional defects is sufficient to conclude that the identified condition reflects an isolated case. It is therefore determined that this SCD has been adequately addressed, corrected, and documented. This item is considered closed.

d. (Closed) SCD-78, American Bridge Steel Deficiencies

The NRC inspectors identified a lack of adequate installation and inspection documentation for the structural steel members of the missile protection over the east and west main steam isolation valves (MSIV) in NRC Report No. 82-29.

In order to determine if other documentation problems existed, the NRC staff requested the licensee to identify other areas in which American Bridge (AB) had installed structural steel. The licensee identified other areas in the reactor auxiliary building (RAB) and fuel handling building (FHB) that had documentation problems, and SCD-73 and SCD-78 were subsequently issued. SCD-73 concerned welding deficiencies with AB while SCD-78 addressed bolted connection deficiencies with AB. These two SCDs were later combined to develop SCD-78. The licensee's corrective action was to perform a 100 percent reinspection of all AB work identified on SCD-73 and SCD-78.

On May 26, 1983, NCR W3-6263 was issued to consolidate most of the NCRs written as a result of the documentation review. This NCR established the corrective action plan for reinspection of the structural steel connections installed by AB. Two procedures were issued which established the criteria for performing and documenting the reinspection. One procedure was applicable to bolted connections. The second procedure was applicable to welded connections.

The remaining NCRs issued during the documentation review addressed deficiencies that were not covered under the reinspection procedures or addressed areas where more than one contractor was involved in the installation. Examples of these nonconforming conditions are expansion anchor torque, welder qualifications, and control of welding electrodes.

The licensee submitted a final report to the NRC on January 31, 1984. A followup inspection was performed and documented in NRC Inspection Report No. 84-11. SCD-78 was not closed because of other problems identified. Subsequent to that, the NRC Task Force audit identified that documentation was missing concerning reinspection of framing adjacent to the steam generators. Apparently, the scope of work performed by AB had not been totally identified by LP&L for reinspection. On May 29, 1984, the NRC was notified that SCD-78 was reopened.

Upon completion of the reinspection, evaluation, and rework, the documentation was reviewed and a final report issued to the NRC on May 15, 1984.

As a result of the discovery of the omission of the steam generator framing, NCR No. W3-7736 was issued to control this deficiency. The plan of corrective action required action in three areas.

First, QC was to perform a 100 percent reinspection of connections in the steam generator framing. These inspections were to be performed and documented in accordance with procedures developed under the corrective action committed to in SCD-78.

Second, construction engineering was to review the scope of the AB work. This scoping was to be compared to the reinspections performed under SCD-78 to assure no other AB work had been omitted from the rescoping of SCD-78.

Third, a review of existing documentation was performed by QA. This review determined whether connections had been completed by AB, Ebasco Force Account, or T-B.

This reinspection is complete. Approximately 170 deficiency reports (DRs) were generated to document deficiencies or concerns noted in the reinspection. Deficiencies generally consisted of lack of material identification, loose bolts, incorrect bolting material, slotted holes, and oversize holes. The disposition of the DRs required the replacement of approximately 850 bolts.

The scoping of AB work is complete. A review of the reinspections performed under SCD-78 showed that reinspections had been completed in accordance with the corrective action stated in SCD-78 with the exception of the steam generator framing.

Discussions were held to determine the cause of the omission of the steam generator framing from the reinspections under SCD - 78. It was found that QAIRG had noted deficiencies in their documentation review of the installation documentation for the steam generator framing. At the time of initiation of SCD-78, Ebasco Force Account and T-B were working on this steel in the course of normal construction activities. It was decided not to review documentation for the framing until after these contractors had completed their work. Reinspection under SCD-78 was not possible at that time due to large amount of work in this area. No tracking document was issued to assure review of the installation documents in order to determine those AB connections not reworked by Ebasco or T-B. For this reason, SCD-78 was closed without reinspecting the steam generator framing.

To preclude the omission of items within the scope of SCDs, a joint effort in scoping of SCDs is now being performed by QA, ESSE, construction, and construction engineering when a deficiency is determined significant. This scoping will be documented and included in the SCD documentation packages.

Review of AB information requests under Issue No. 14 indicated that AB had performed rework to shop fabricated structural components to facilitate erection and fitup. They have also installed anchor plates.

In each case where performance of work by AB was indicated, a reinspection was performed, nonconforming items were evaluated and corrective action initiated. Items were tracked under the LP&L program via CIWAs.

The majority of the reinspection performed by LP&L on SCD-78 was verified by the NRC staff in previous inspections and found to be satisfactorily completed. However, the main steam restraints and the new findings identified during the scoping of AB, such as the AB information request (IR) were not covered during previous inspections. Main steam restraints are discussed in Issue No. 12 of the enclosure to the June 13, 1984, letter from D. G. Eisenhut to J. M. Cain.

EBASCO QA reviewed AB's program to determine if design changes were conveyed through informal documents such as engineering IRs on safety-related work. A 10 percent sample plan was developed, but was later increased to 100 percent because of a large number of violations by AB. There were 775 IRs. The NRC staff randomly selected IRs for examination. In some cases, the IR consisted of changing a shop weld to a field weld, and adding embeds that were secured by Hilti bolts.

In each case, EBASCO evaluated each IR. Some welded connections required rework. Hilti bolts that could not be identified had an ultrasonic thickness (UT) test performed. The NRC staff also visually verified reworked performed. Work appeared to be complete with adequate documentation. There were no discrepancies noted in documentation and visual examination.

The following documents were reviewed:

<u>IR No.</u>	<u>Hilti Bolt</u>	<u>UT Report</u>
257	AB-71	GEO-UT-032
259	AB-70	GEO-UT-034
218	AB-69	GEO-UT-036

<u>IR No.</u>	<u>Hilti Bolt</u>	<u>UT Report</u>
219	AB-68	GEO-UT-064
541	AB-67	GEO-UT-039
28	AB-64	GEO-UT-045
29		
624		
584		

Calculation Packages for IR Nos. 624 and 584

No. 521
No. 520
No. 522

NCR-W3-7736
NCR-W3-6263

CIWA No.

018428
018163
011142
018593
018907
018934
018935
018936
018945
018979
019065
019066
019067
019068
010882
010885
010887
011075
011076
11304
11305
11306
11307
11308
11376
11375
18641

This item is considered closed.

e. (Closed) SCD-84, Tube Track Welding Deficiencies

The NRC staff review of NCR W3-6159 determined that the evaluation of typical tube track welding configurations was of sufficient scope and utilized design parameters conservative enough to assure that the existing tube track welds were adequate to perform their intended function. This review was instituted in connection with Issue No. 6 in the letter dated June 13, 1984, from D. G. Eisenhut to J. M. Cain (LP&L). It is therefore determined that this SCD has been adequately addressed, corrected, and documented. This item is considered closed.

f. (Closed) SCD-90, Electrical Conduit Overstressed

Fischbach & Moore (F&M) field fabricated and installed conduit supports in accordance with approved designs and procedures and inspected them under their QA program. However, records documenting load checks did not record the actual loads. As a result, EBASCO QA performed a surveillance to verify conduit loading and span length per the design drawings. The discrepancies identified during this surveillance resulted in this report of a significant construction deficiency. The disposition of SCD-90 included a two phase walkdown program to assess all safety-related conduits installed by F&M. The NRC staff reviewed the results of the walkdown evaluations during this inspection. As a result of this review this item is considered closed.

g. (Closed) SCD-101, Traceability of Stainless Steel Tubing

The NRC staff review of LP&L actions determined that the methods undertaken to assure that installed instrument tubing was of the appropriate wall thickness was found adequate in that all tubing subjected to ultrasonic testing was found to be the required thickness. In addition, the installations containing $\frac{1}{2}$ " tubing without material traceability were found either to be adequately justified by engineering, or, as in six cases, replaced with material containing the required traceability. These six instrument lines were replaced in accordance with commitments made in response to Issue No. 2 in the letter dated June 13, 1984, from D. G. Eisenhut to J. M. Cain (LP&L). This item is considered closed.

h. (Closed) SCD-105, Inadequate Electrical Separation

The NRC Construction Appraisal Team (CAT) discovered that many electrical raceway installations did not conform to FSAR commitments for the independence of Class 1E equipment and circuits. Deficiencies identified by the CAT indicated that the licensee's program of QC inspection of construction activities was not effective in identifying raceway separation deficiencies. The details of the deficiencies found are documented in CAT Inspection Report No. 50-382/84-07.

LP&L and EBASCO instituted a QA walkdown of all safety-related raceways to identify all deviations from the FSAR commitment to IEEE 384-1974, "Criteria for Separation of Class IE Equipment and Circuits," as endorsed by Regulatory Guide 1.75, "Physical Independence of Electric Systems."

NUS Corporation conducted an independent walkdown and identified separation deficiencies. Results of the NUS walkdown were compared with the final results of the LP&L/EBASCO QA walkdown and differences were resolved.

Each separation deficiency was evaluated by EBASCO site support engineering (ESSE) and one of the following actions was taken:

- The raceway was left "as-is" due to the low probability of a fire in one raceway being large enough and lasting long enough to cause loss of function in a cable in another raceway.
- The raceway was physically moved to allow 1 inch of separation.
- Cable tray covers were installed.
- Fire rated barriers were installed between the raceways.

The NRC staff reviewed the results of the QA walkdown and the criteria used for corrective action. The criteria appeared adequate. Ebasco procedure CP-764 was revised to require a QC inspection of nonsafety-related conduit installations to identify discrepancies in separation requirements. An NRC staff walkdown of selected areas was performed and documented in NRC Inspection Report No. 50-382/84-30. The separation deficiencies noted by the NRC staff during this walkdown had previously been identified during the LP&L/EBASCO and NUS walkdowns.

The NRC staff noted that all of the field work had not been corrected at the time of this inspection. Subsequently, LP&L informed the NRC by letter on November 21, 1984, that all corrective action was complete. This item is considered closed.

i. (Closed) SCD-108, Failure to Comply with FSAR Safe Shutdown Commitment

The NRC staff reviewed the final report submitted by the licensee dated October 30, 1984, and the status of corrective action outlined in the report. The NRC staff determined that the analysis was complete and that QA had checked it and concurred with the analysis. It was also determined that modifications and rework to the safe shutdown system had been identified and all field work had been completed. Station modification packages 187, 192, 323, and 538 are in the review cycle and will produce the required procedure and drawing revisions. Subsequent review of the station modification packages revealed that the supporting documentation was essentially complete. This item is considered closed.

j. (Closed) SCD-112, Design Changes via Memoranda

During the EBASCO QA review of J. A. Jones Speed Letters and Engineering Information Requests (EIRs), 271 items were identified that transmitted design changes without reference to formal design change documents. This correspondence was between J. A. Jones and EBASCO construction engineering. The staff review of these items determined that, for many, of the design changes no formal design change documents had been issued. The subject of these changes consisted typically of relocations of embedded items to clear interferences and the addition of rebar splices.

Approximately 2100 J. A. Jones Speed Letters and EIRs were reviewed by ESSE. Of the 2100 documents reviewed, 271 appeared to convey design changes without proper documentation. These 271 have been evaluated and researched on a case-by-case basis. One hundred and four were found to have proper documentation in the form of a FCR, DCN, NCR or specification governing J. A. Jones installations. The remainder have been determined to be acceptable as-is by way of an engineering analysis. As no rework was initiated as a result of this review, there is no impact on plant safety.

The NRC staff reviewed approximately 20 IRs by J. A. Jones Construction Company. Many of these IRs requested cutting and splicing of reinforcing steel. Some of the IRs had supporting documentation, such as a Field Change Request (FCR). Those IRs that had no supporting documentation were evaluated by ESSE engineering and many were found to be acceptable as-is.

The NRC staff also reviewed this concern for the activities of other contractors. The results of that review are documented in Supplement No. 9 of Waterford Safety Evaluation Report. This item is considered closed.

k. (Closed) SCD-114, Damage to Safety-Related Equipment Due to Waterhammers

On May 9, 1984, with safety injection system (SIS) train "A" aligned in the shutdown cooling (SDC) mode, the annunciator for "Loop 2 Shutdown Cooling System Hydraulic Isolation Valve Trouble" began to alarm intermittently. In accordance with annunciator response procedure OP-500-011, the motor breaker to the hydraulic actuator was opened for SIS Isolation Valve SI405A. On May 10, 1984, a loss of shutdown cooling flow was observed and SI405A was indicated closed with LPSI "A" pump still running. LPSI "A" pump was immediately secured. The operators were not aware that a negative pressure existed in the emergency core cooling system (ECCS). A waterhammer occurred when the refueling water storage pool (RWSP) quick opening butterfly outlet valve SI106A was opened.

On May 17, 1984, while conducting an operability check of containment spray pump (CSP) "A," personnel observed a drop in suction and discharge pressure and saw recirculation flow drop to zero. The pump was secured and valve SI106A was found closed. Due to improper verification of valve alignment prior to starting LPSI "A" and compounded by misinterpretation of communications, SI106A was opened resulting in a second waterhammer event.

The first waterhammer was caused by a low hydraulic pressure in the hydraulic system of the actuator for isolation valve SI405A. This was brought about by the rise in temperature in the hydraulic pump motor due to frequent starting. The second event can be attributed to operator error.

The validation package for this reportable deficiency was reviewed. The validation of 15 items was performed under procedure QASP 1913, "Response Validation," Revision 0, which provides direction and outlines responsibilities for validation of items reported under 10 CFR 50.55(e) and 10 CFR 21.

The NRC staff assessed the visible damage during previous inspections by performing system walkdowns. In addition, ongoing nondestructive examinations were observed.

During this inspection, the following items were reviewed by the NRC staff:

- (1) The completed rework on 20 damaged seismic restraints out of the 129 supports associated with train "A" of the emergency core cooling system.
- (2) The results of ultrasonic and dye penetrant testing performed on the affected piping.
- (3) The results of pump vibration data.
- (4) The replacement of the leaking check valve in the hydraulic system of the actuator for isolation valve SI405A.
- (5) The change to operating procedure OP-500-011, cautioning that opening of the breaker to the hydraulic pump motor will cause the affected shutdown cooling train to become inoperable.
- (6) The operating instructions generated to caution personnel concerning proper valve alignments and venting of systems prior to operation to prevent waterhammers.

Based on the review of these items, this reportable deficiency is considered closed.

1. (Closed) SCD-116, Failure of Static Uninterruptable Power Supply (SUPS) Inverters

Waterford 3 had recently experienced numerous inadvertent trips and alarms of the safety-related SUPS units which resulted in an investigation to determine the cause of the trips. A total of seven failed capacitors (style 020138) were identified of which six were found in the safety-related inverters: SUPS 3MA, 3MB, and 3MD contained one, two, and three failed capacitors, respectively. Other concerns were identified as a result of extensive troubleshooting and review of available vendor supplied information. Those concerns include: vendor technical manual deficiencies and corresponding maintenance procedure deficiencies for setting SUPS setpoint; the existence of frequency trip setpoints which could cause common mode inverter shutdown when the inverter attempts to automatically track and synchronize with the bypass source during frequency transients; and time delay circuitry setpoints covered under IE Circular 79-02.

If left uncorrected, a common mode failure of the safety-related SUPS units due to failed CVT capacitors and/or setpoint disparities could complicate the operator's ability to monitor the essential variables necessary to assure safe shutdown of the plant.

All capacitors have been replaced with newly qualified capacitors (style 020139). Voltage adjustments were successfully accomplished by Solid State Controls, Incorporated (SCI). SCI has indicated that the new replacement CVT capacitors are of improved design and higher rating. An analysis is underway by SCI to determine the cause of the failures of the CVT capacitors (style 020138).

The NRC staff verified that maintenance procedures have been revised/approved. AC/DC sensing board alignments have been completed. All technical manual revisions are being tracked via project engineering request (PER) No. 7000. SUPS frequency trip setpoints have been adjusted to preclude inadvertent trips as a result of synchronizing with the bypass source during normal and accident conditions.

The time delay setpoints for high rectifier output CD voltage and high inverter output AC voltage have been adjusted to preclude the simultaneous shutdown of the rectifier assembly and the inverter unit as a result of an AC input overvoltage condition (IE Circular 79-02). The following change to the Waterford 3 FSAR has been initiated:

Table 8.3-2 (SUPS Inverters Setpoint)

	<u>Previous</u>	<u>Revised</u>
Commercial Power Available Free Running	±.5%	±1.3%

Contingent on NRR approval of the referenced change, this item is considered closed.

m. (Closed) SCD-117, Limitorque Limit Switch and Motor Space Heaters

During the inspection of limitorque motor operated valves for motor operation, it was discovered that documentation was not available which assured seismic qualification of the subject heaters. Further investigation revealed that the space heaters were non-Class 1E and energized from Class 1E circuits. Since the functions of the heaters is not safety-related and the heaters are not qualified in accordance with IEEE-323 and 344 criteria, there is a potential concern that nonqualified heaters may adversely affect the Class 1E power supply. Limitorque has also stated that the valves have been environmentally qualified without the space heaters. Space heaters for Limitorque operators are intended to prevent condensation during long periods of storage or nonuse in an uncontrolled environment. Separate heaters are provided for limit switch compartments and motor compartments. Heater function is not safety-related and heaters are not intended to replace periodic inspection or maintenance. However, in order to reduce maintenance, many heaters are energized during normal operation to minimize potential condensation within the compartments. Limitorque has advised that limit switch compartment heaters consist of an inorganic ceramic core with a wire wound or film resistive element completely encapsulated by a ceramic glaze. This type of heater has been subjected to seismic acceleration up to 12g. with no structural damage to the heater. Limitorque has stated that the failure mode of this type of heater normally results in an open circuit and will not short its power supply. The degree of uncertainty in this statement does not provide a high confidence level for use of these heaters in Class 1E applications without adequate isolation.

The failure of the space heaters could result in a short circuit adversely affecting the Class 1E power supply to the motor operated valve. This could render the capability of the valve to perform the intended safety function indeterminate and compromise the integrity of the Class 1E power supply. Therefore, if left uncorrected, this condition could adversely affect the safe operation of the plant.

Since the valves were environmentally qualified without the space heaters, the motor and limit switch space heaters were disconnected from the Class 1E power supply to ensure that safety-related circuits are not adversely affected by the failure of the space heaters. The motor and limit switch space heaters for four valves are double isolation protected through the presence of a fuse and a circuit breaker; therefore, no corrective action was required. The NRC inspectors randomly selected 23 motor operated valves with the non-Class 1E heaters and verified that the space heaters were disconnected from the Class 1E power supplies. This item is considered closed.

m. (Closed) SCE-118, Failure to Meet PPS/Plant Computer Interface Design Criteria

While trouble shooting an apparent grounding condition on the PMC which was causing an intermittent grounding condition in the PPS, a failed "mercury wetted relay" was discovered in the PMC loop. Subsequently, a failure mode and effects analysis (FMEA) was performed assuming a common mode failure of other mercury wetted relays. An analysis determined that the tying together of the commons or collecting them to ground could bypass one of two dropping resistors in the transmitter current loop, altering the analog process input signals. The analog process input signals affected are steam generator 1 and 2 level, steam generator 1 and 2 pressure, and containment pressure for each of the four protection channels. It appears that this failure mode event never occurred but was simulated in the field, confirming the results of this analysis.

A common mode failure in the nonsafety plant computer circuitry for the steam generator level and pressure setpoint inputs for all four channels would result in the generation of conservatively lower process input signals. A common mode failure for the high containment pressure setpoint inputs for all four channels would result in the generation of lower than actual process input signals and the failure to initiate reactor trip when containment pressure exceeds the setpoint value (5 psig). Therefore, if left uncorrected, the safety of the plant would be adversely affected.

LP&L obtained the concurrence from both CE and EBASCO that disconnecting the PPS analog setpoint signal cables from the plant computer is acceptable and satisfies the isolation concern. The NRC staff verified that a total of eight PPS analog setpoint signal cables were disconnected from the plant computer. This item is considered closed.

o. (Closed) PRD 179, LP&L Maintenance Welding Program Deficiencies

The NRC staff reviewed the welding program deficiencies and the licensee's evaluation for reportability. The program deficiencies were considered to be minor and have been corrected. The deficiencies are considered to be nonreportable per 10 CFR 50.55(e). This item is considered closed.

4. Allegations

a. Inadequate Fire Wrap

Allegation: It is alleged that the applicant was installing fire wrap that was inadequate because during the sewing process, the internal Cerawool blanket was being cut by the machine, leaving an

area along the stitch line that was only the thickness of two layers of the Siltemp material. Further, the fabricator was using nylon thread in the blanket fabrication progress.

Findings: The NRC staff examined samples of insulated Heymc blanket fabricated offsite under B&B insulation requirements. The severed Cera blanket filler condition was found to be isolated to the $\frac{1}{2}$ " blankets. This was discussed with representatives of the applicant and on June 20, 1984, the applicant notified the NRC of this condition in Potentially Reportable Deficiency (PRD) No. 174.

PRD-174 described the separation of the Cera blanket filler material in the $\frac{1}{2}$ " Insulco Heymc blanket used to develop the equivalent of 1-inch air space protection to the electrical raceways. The separation occurred during handling as a result of the Cerablanket filler being compressed during stitching between the outer layers of Siltemp material.

Applied Physics performed an analysis in New York and determined that two layers of the Siltemp material alone will provide enough of a thermal barrier when installed between two raceways to prevent a fault in the cable of one raceway from damaging the cables of the other raceway. The results of this analysis satisfy the separation requirements of Regulatory Guide 1.75 as committed to by the FSAR.

This deficiency was initially identified as a potential Part 21 based on the fact that these blankets were being fabricated offsite. EBASCO QA found that these blankets were being fabricated under B&B Construction Procedures and quality program at an offsite location. As these blankets were being fabricated for this site under the quality program of B&B, it is not reportable per Part 21.

Conclusion: Based on these evaluations the applicant considered this condition as not reportable pursuant to 10 CFR 50.55(e) and/or Part 21.

The applicant also pursued the question of use of the nylon thread. They determined from the fabricator that this thread is used in the assembly process to provide strength during fabrication and installation. The NRC staff found this to be an acceptable practice and does not degrade the qualification of the assemblies for use as Regulatory Guide 1.75 separation material.

b. Excessive Use of "Come-Alongs" During Pre-Weld Fitup of Piping

Allegation: It is alleged that there was excessive use of "come-alongs" during the pre-weld fitup of 12" schedule 160 stainless steel pipe being installed in the reactor coolant system inside the containment building.

Findings: On October 30 and 31, 1984, the Region IV office was contacted by an individual who expressed concerns with certain construction practices utilized at the Waterford 3 site. He stated that because he was present when the alleged improper fitup occurred, he felt that he could identify the welds from construction drawings.

The NRC staff provided general drawings to aid the allegor in his identification of the questionable welds.

From the general drawings provided, the allegor indicated that his main concerns were with the safety injection piping shown on drawings RB SI-ISO-IC-1124 and RB ISO-IC-673. He stated that multiple "come-alongs" were used to align piping spools during the fitup and tack welding operations. He stated that there was excessive strain placed on the pipe by these devices and that the pipe was "cold sprung" into its pre-weld position. This may lead to the problem of uncalculated stresses being induced into the piping system.

The NRC staff was familiar with the section of piping referred to by the allegor. From the size, schedule, and location of the piping described it was determined that the pipe in question was the safety injection line that begins at safety injection tank 1B and terminates at the 30" discharge line from reactor coolant pump 1B. This pipe begins as a 12" schedule 160 pipe at approximately elevation 50'. At approximately elevation 22', it penetrates the secondary shield wall, terminating at approximately elevation 13' where it enters the 30" reactor coolant loop piping. The allegor stated that he witnessed the cold-spring of the pipe at FW-3 (Drawing IC-1124) and strongly suspected that FW-1 (Drawing IC-673) was also cold-sprung prior to welding. He stated further that the vertical run of piping was approximately 7" off plumb prior to welding. The allegor stated that only one weld on drawing IC-1124 (FW-3) and one weld on drawing IC-673 (FW-1) were cut and rewelded to aid in the alignment of the pipe.

The NRC staff requested access to construction drawings, as-built drawings, and all pertinent construction records associated with both sections of safety injection piping as shown on the above drawings. These were provided and a thorough review was conducted. The records indicate that a considerable amount of time and effort was dedicated to the installation of these two lines. The two joints cited were, indeed, removed and rewelded, but so were several others. A chronological listing of the piping welds and all rewelding was compiled for drawing IC-1124:

<u>QC Fitup</u>	<u>Identification</u>	<u>Status</u>	<u>Final Accept</u>
01/12/79	FW-4	original	
03/07/79	FW-5	original	Yes
03/08/79	FW-8	original	

<u>QC Fitup</u>	<u>Identification</u>	<u>Status</u>	<u>Final Accept</u>
04/10/79	FW-2	original	
06/07/79	FW-3	original	
06/26/79	FW-1	original	
08/14/79	FW-2	first cut/weld	
08/22/79	FW-7	original	Yes
04/15/80	FW-9	original	Yes
11/18/80	FW-6	original	Yes
11/24/80	FW-4	first cut/weld	Yes
12/04/80	FW-3	first cut/weld	
12/10/80	FW-3	second cut/weld	
06/02/81	FW-8	first cut/weld	Yes
07/17/81	FW-15	original	Yes
08/14/81	FW-1	first cut/weld	Yes
09/01/81	FW-2	second cut/weld	Yes
11/05/81	FW-16	original	Yes
11/08/81	FW-3	third cut/weld	Yes

The following are welds on Drawing IC-673:

04/21/80	FW-1	original	
03/30/81	FW-1	first cut/weld	Yes
04/21/81	FW-2	original	Yes

NOTE: These are total weld cut-outs and no weld metal repairs are included in these lists.

By reviewing the NCRs and FCRs associated with these welds, the NRC staff was able to ascertain that the cutting and rewelding was done for alignment and fitup purposes. One shop fabricated weld (SW-D) was cut because of an alignment problem, was rewelded and redesignated as FW-15. Due to the number of cuts and rewelds performed on the vertical section of pipe, material was lost and it became necessary to add an extra spool piece to the line. This was accomplished by making an additional cut, adding a "pup piece" to the line and adding FW-16 to the drawing. As the dates on the above table show, FW-16 and FW-3, which encompass the "pup piece" were the closure joints on this section of pipe. Inspection records for the fitup of each of these joints indicate that the pipe was in a free hanging condition and that no "come-alongs" or other devices were used as alignment aids for vertical or lateral restraints on the pipe. Because of the weight of the "pup piece" two "come-alongs" with nylon slings were necessary to maneuver it into place and maintain its position during the tack welding operation. Although "come-alongs" were used for the manipulation of the piping spools throughout the fitting and welding of the line, records indicate that as each joint was tacked and welded, no forces were applied other than those necessary for support of the pieces being installed.

The alleged concern over the possibility of the 12" line, shown on drawing IC-673 having been cold-spring, is addressed in FCR-MP-1036. FW-1 was performed and then later removed because of misalignment encountered at FW-2. The pipe was reoriented to its proper position, tacked into place, and welded. All of these steps were witnessed and verified by QC personnel.

The nature of the NCRs and FCRs associated with these systems along with the large number of welds that had to be cut and rewelded have led the NRC inspectors to two conclusions: (1) it is apparent that insufficient care was taken in the early stages of piping installation, and (2) it appears that there was a concerted effort during the later stages to assure proper fit of the pipe to avoid the possibility of misalignment and cold-spring.

The fact that the massive weight of the components being installed necessitates the use of lifting and manipulating equipment and the question of possible misuse of the equipment for alignment in excess of that allowable by the applicable specifications and instructions could be posed. Attachment 1 to FCR-MP-1735 contains two tables which state the amount of misalignment that can be tolerated in various diameters and wall thicknesses of pipes being joined. The values for each size of pipe are given with respect to its flexibility or the sum of piping lengths perpendicular to the direction of the misfit variation. For closure welds this length shall be the distance from the closure weld to the first rigid restraint preventing pipe motion in that particular direction on either side of the closure weld. Records of QC inspections performed indicate that these tolerances were met.

The alleged recalled that only one weld on each of two isometric drawings were cut and rewelded to correct the misalignment encountered during installation. As noted in the above chronological tabulation, this was not the case. It is quite possible that the alleged was aware of only two cut and rewelded joints. The NRC staff review shows that considerably more rework was performed on this system and that each reworked joint was QC inspected prior to welding. It appears that every effort was made to correct any misalignment, thereby minimizing the potential for cold spring in the piping.

Conclusion: Based upon the results of the review performed by the NRC staff and the information stated above, this allegation could not be substantiated.

c. Removal of Fire Wrap for Conduit Inspection

Allegation: The alleged stated that protective fire wrap had been removed for an electrical separation inspection of conduits per a CIWA and reinstalled per CIWA-11001 with numerous conduits not being inspected.

Findings: The NRC staff reviewed CIWA-11001 which was located in the field due to the work being in progress. The CIWA did require cable tray/conduit wrap to be installed. CIWA-11001 stated that it was a followup to CIWA-18689. This CIWA called for the removal of fire wrap to install conduit clamps to cable trays and not to inspect for separation. CIWA-10666 did call for separation inspections.

The NRC staff noted that the fire wrap was for adherence to 10 CFR 50, Appendix R requirements. When B&B Insulation, Inc., originally installed the fire wrap they found several cases where conduits were attached to the cable trays. When this occurred, B&B documented the conduits on their engineering inspection reports (EIRs).

As part of the corrective action on SCD-105, LP&L needed to determine whether any of the conduits within the wrap were violating the 1-inch separation criteria. To do this, LP&L and EBASCO used the B&B EIRs to determine which cables within the wrap required separation (these EIRs were reviewed by the NRC staff). When the fire wrap was removed, the EBASCO QC inspector needed to look for separation violations on only a few conduits and not all. Thus, it could appear to an observer that some conduits were not inspected, whereas, the determination to inspect only certain conduits was made previously.

The NRC staff reviewed CIWA-10666 and the QC verification of cable separation that was required. It appears unlikely that the subject conduits could go uninspected before the fire wrap was reinstalled.

Conclusion: Based on the above investigation, the NRC staff determined that this allegation has neither safety significance nor generic implications.

5. Licensee Action on Inquiry Team Inspection Findings

a. (Closed) Unresolved Item (382/8434-02)

This item involved the need to have adequate documentation for the certification of some GEO construction testing personnel and to analyze for any generic implications. This issue has been resolved under the closure process for Issue 20 in the D. G. Eisenhut letter of June 13, 1984, to J. M. Cain (LP&L). This unresolved item is considered closed.

b. (Closed) Unresolved Item (382/8434-04)

This item concerned the NRC inspection of the EBASCO QA Records Group inspection finding for work by AB. This issue has been resolved under the closure process for NRC Inspection Report No. 50-382/84-30 (CAT inspection followup) and SCD-78. This unresolved item is considered closed.

c. (Closed) Unresolved Item (382/8434-07)

This item concerned the need for LP&L to review comments made by LP&L QA construction and confirm that all deficiencies were identified and corrected during the system transfer process. This issue has been resolved under the closure process for Issue 21 in the D. G. Eisenhower letter of June 13, 1984, to J. M. Cain (LP&L). This unresolved item is considered closed.

d. (Closed) Unresolved Item (382/8434-08)

This item concerned the need to resolve the evaluation and disposition of all outstanding undersized welds for systems 36-1, 36-3, 46-14, 46-E, and NCR W3-7680. This issue has been resolved under the closure process for Issue 21 in the D. G. Eisenhower letter of June 13, 1984, to J. M. Cain (LP&L) and SCD-74. This unresolved item is considered closed.

6. Licensee Action on Construction Assessment Team Inspection Findings

a. (Closed) Open Item (382/8430-02)

This item involved design changes being performed without an adequate design change document being issued. This issue has been resolved under the closure process for Issue 14 in the D. G. Eisenhower letter of June 13, 1984, to J. M. Cain (LP&L). This open item is considered closed.

b. (Closed) Open Item (382/8430-03)

This item concerned lower tier corrective action reports not being upgraded to NCR status. This issue has been resolved under the closure process for Issue 6 in the D. G. Eisenhower letter of June 13, 1984, to J. M. Cain (LP&L). This open item is considered closed.

c. (Closed) Unresolved Item (382/8430-04)

This item concerned a number of documentation discrepancies and deviations from procedures and specification requirements for IEW (Braddock) post weld heat treatment (PWHT) charts. The discrepant conditions identified by Ebasco were documented on LCIWA 18986. The identified discrepancies were resolved by obtaining the required data from IEW, and through engineering evaluation. All concerns were resolved with no impact on the installed hardware. This finding does not appear to have any safety significance. This unresolved item is considered closed.

d. (Closed) Open Item (382/8430-05)

This item involved discrepancies in cadwelder testing. This issue has been resolved under the closure process for Issue 11 in the D. G. Eisenhut letter of June 13, 1984, to J. M. Cain (LP&L). This open item is considered closed.

7. Exit Interview

The NRC inspectors met with the licensee representatives (denoted in paragraph 1) on November 9 and at the conclusion of the inspection on November 16, 1984. The NRC inspectors summarized the purpose, scope, and findings of the inspection.