U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/83-31(DRS)

Docket No. 50-341 License No. CPPR-87

Licensee: The Detroit Edison Company
2000 Second Avenue
Detroit, MI 48226

Facility Name: Enrico Fermi Nuclear Power Plant, Unit 2

Inspection At: Enrico Fermi 2 Site, Monroe, MI

Enforcement Conference At: Region III Office, Glen Ellyn, IL

Inspection Conducted: November 14-18, November 28 - December 2, December 5 and 14, 1983, January 6, July 11-13, July 25-27, and August 10, 1984

Enforcement Conference Conducted: April 18, 1984

Inspectors: J. Kish for — 9/18/84 Date

W. Kropp — 9/17/84 Date

R. Schulz for — 9/18/84 Date

T. Vandel — 9-18-84 Date

for K. Ward — 9/18/84 Date

R. Westberg — 9/17/84 Date

for J. Muffett — 9/21/84 Date

Approved By: F. Hawkins, Chief
Quality Assurance Programs Section

9/18/84
Date

Inspection Summary

Inspection on November 14-18, November 28 - December 2, December 5 and 14, 1983, January 6, July 11-13, 25-27 and August 10, 1984; and Enforcement Conference on April 18, 1984 (Report No. 50-341/83-31(DRS))
Areas Inspected: Special, unannounced inspection of the licensee's action on previous inspection findings, 10 CFR 50.55(e) items, IE Bulletins, IE Circulars; follow-up on allegations; Detroit Edison audit program; Comstock audit and inspection program; Detroit Edison personnel certification/qualification; Wismer and Becker audit program and implementation; Wismer and Becker mechanical installation activities; Detroit Edison design control; Wismer and Becker calibration program and implementation; Wismer and Becker training and qualification of personnel; Wismer and Becker nonconformance control; Wismer and Becker procurement; Wismer and Becker major mechanical equipment; Comstock major electrical equipment; Detroit Edison procurement; Detroit Edison quality assurance program control; Detroit Edison corrective action system; Detroit Edison on-site design control; Comstock electrical installation control; and Detroit Edison procurement of commercial grade material. The inspection involved 458 inspector-hours on-site by six NRC inspectors and the enforcement conference involved a total of approximately 27 staff hours.
Results: Of the 23 areas inspected, no items of noncompliance or deviations were identified in 12 areas. Ten items of noncompliance were identified in the remaining 11 areas - Criterion XVII (Quality Assurance Records) - paragraph 9.b.; Criterion XVIII (Audits) - paragraphs 10.b. and 18.e.; Criterion X (Inspection) - paragraph 11.a.; Criterion XII (Control of Measuring and Test Equipment - paragraphs 13.a. and 13.b; Criterion II (Quality Assurance Program) - paragraphs 14.b and 17.b.(3); Criterion XV (Nonconforming Materials, Parts, or Components) - paragraph 15.; Criterion V (Instructions, Procedures, and Drawings) - paragraphs 17.a. and 17.b.(2); Criterion XVI (Corrective Action) - paragraphs 18.a. and 20.; Criterion VII (Control of Purchased Material, Equipment, and Services) - paragraph 19.; Criterion III (Design Control) - paragraph 24.a.

DETAILS

1. Persons Contacted

Detroit Edison Company (DECo)

P. Acharma, Director, System Completion
F. Agosti, Manager, Nuclear Operations
T. Alessi, Director, Quality Assurance
A. Alexiou, Assistant Director, Project QA
L. Bregni, Licensing Engineer
W. Fahrner, Manager, Fermi 2 Project
L. Fron, Supervisor, Nuclear Qualification
W. Holland, Vice President, Fermi 2 Project
W. Jens, Vice President, Nuclear Operations
E. Newton, Supervisor, Construction QA
S. Noetzel, Assistant Manager, Project MO
D. Spiers, Director, Field Engineering
G. Trahey, Assistant Director, Project QA
D. Wells, Manager, Quality Assurance
W. Ash, Project Quality Assurance
C. Bacon, Assistant Director, Field Engineering
J. Bragg, Procurement QA Specialist
J. Bunge, Electrical Design Site Work Leader
T. Byrd, Procurement Supervisor, PQA
D. Cawood, Corrective Action Group, CQA
J. Delli, System Completion Organization
M. Dunlop, Project Management Organization
J. Durkin, QA Engineer, Mechanical
L. Ferguson, Principal Field Engineer, I&C
J. Fischer, Project Quality Assurance
S. Fox, Lead Auditor, PQA
B. Kauppila, QA Engineer, Electrical
N. Kepler, Senior QA/QC Inspector
B. Kogan, Equipment Qualification Site Representative
J. Matley, System Completion Organization
R. McGee, Contractor Records, Turnover Supervisor
B. Miller, Supervisor, OQA
P. Nadeau, NRC Correspondence Coordinator
E. Muszkiewicz, Computer Supervisor CQA
M. Sapp, Construction Quality Assurance
A. Tonda, Design Control CQA
W. Wingfield, Supervisor Mechanical/Piping PQA
L. Fron, Supervising Engineer, Quality Engineering
Q. Duong, Assistant Supervisor, Quality Engineering
J. Thomas, Assistant Supervisor, Quality Engineering
G. Chinn, Work Leader, Quality Engineering
T. Byrd, Supervisor, Procurement QA
J. Bragg, QA Specialist
D. Hopper, Technical Specialist, Hopper & Associates
H. Whelpton, Technical Specialist, Hopper & Associates

Bechtel Power Corporation (Bechtel)

C. Cross, Process Control Supervisor
M. Hall, Construction Package Coordinator
S. Lendo, LII Electrician
J. Modney, LII Electrician
D. Ord, LII Electrician
R. Quick, Staff Assistant
A. Weedman, Project Field Engineer
B. Wickman, QC Unit Supervisor
R. Wolford, Electrical QC Level II

Nuclear Engineering Services

R. Dycus, Level I-UT

L. K. Comstock (LKC)

S. Shidner, Assistant QC Manager
D. Vanwasshenova, QC Inspection Supervisor

Wismer and Becker (W&B)

R. Abbott, Project Engineer
A. Benke, Surveillance Report Coordinator
J. Benke, NDE Supervisor
P. Edmonson, QA Auditor
D. Jantosik, Project QC Manager
C. Karlin, DDR Coordinator
D. Payne, Welding Engineer
J. Roush, Data Report Supervisor
E. Sandoval, QC Inspector
J. Shavalia, Inspector

U.S. Nuclear Regulatory Commission

P. Byron, Senior Resident Inspector
S. DuPont, Reactor Inspector

Other members of the licensee's and contractors' staffs were contacted during the course of the inspection.

2. Action on Previous Inspection Findings

a. (Open) Noncompliance (341/82-10-04): The regularly scheduled review of the status and adequacy of the quality assurance program was not being performed. It was determined that Criterion II of Appendix B continues to not be met (reference noncompliance No. 341/83-31-17(C) in paragraph 20 of this report).

b. (Closed) Noncompliance (341/83-14-01): Linear indications in welds. The inspector reviewed the final report dated August 8, 1983, NCRs, liquid penetrant (PT) reports, procedures, and weld data. A review

of records for all safety-related pipe spools was conducted. This determined that 16 welds were examined by the inspector in question. One weld that was examined was not a safety-related weld, nine were tack welds and six were fillet socket welds. The six socket welds were re-examined by PT and one weld was found to be unacceptable. The two welds that were found unacceptable as a result of this violation were repaired and were found acceptable. The one weld that was found unacceptable as a result of the reinspection was to be repaired and accepted. All of the documentation had been prepared for the repair of the weld.

3. Action on 10 CFR 50.55(e) Items

a. (Closed) 50-55(e) Item (341/79-01-EE): RHR heat exchanger relief valve capacity. The inspector reviewed the final report, dated October 21, 1983, and drawing design change notices (DCN) and found them to be acceptable.

A previous investigation had been reported to the NRC Region III by Detroit Edison (letter EF2-49822, dated September 5, 1980). At that time, the investigation disclosed a design deficiency in the size of three QA Level I relief valves (V22-2042, V22-2045 and V22-2049). Commitments were made to modify the design by replacing the three valves and associated piping. The design was modified via DCNs which required the undersized relief valves and associated piping to be replaced by appropriately sized valves.

Subsequent to the design change, a potential water hammer problem was identified in the heat exchanger in the steam condensing mode of the RHR. The steam condensing mode of the RHR and the start-up and preoperational test requirements were deleted to reduce the vulnerability to IGSCC problems with the heat exchanger tubes. This action directly affected relief valve V22-2584, which was to have replaced valve V22-2042. Deletion of the RHR steam condensing mode required removal of piping, piping supports, valves and equipment not used in the RHR system design, of which valve V22-2585 was a part. The above design changes have been implemented and were complete.

b. (Closed) 50.55(e) Item (341/80-03-EE) (28): Instrument tubing design deficiency. The inspector reviewed the final report, dated June 10, 1980, and the analysis of the safety implications and found them to be acceptable. The problem was initially reported on April 14, 1980, in a telephone call to NRC Region III. At that time, it was determined that non-seismic design criteria had been used in the design of some QA Seismic I Instrumentation and Control (I&C) tubing which was required to meet seismic requirements. As a result, a construction hold was imposed on all Seismic I I&C tubing while analysis of the design continued. Designs for construction were selectively released as each line was redesigned to the correct criteria utilizing the Small Piping Design Standard or by detailed computerized stress analysis. Tubing installed prior to the "Hold" was upgraded, as

required, per the revised drawings. Engineering issued control instructions to assure that proper analysis was completed prior to release of any affected drawings. This redesign effort continued to support the construction schedule. Edison Engineering completed their evaluation of this deficiency in the report entitled, "Design Engineering's Report of the Application of Improper Design Criteria to Safety Related I&C Tubing Systems", dated May 5, 1980.

c. (Closed) 50.55(e) Item (341/80-08-EE) (33): Power piping struts may fail if incorrectly loaded. The inspector reviewed the final report dated May 21, 1982, and found it to be acceptable. This problem was originally reported to NRC Region III on November 13, 1980. At that time, Power Piping had noted problems in possible over-stressing of pipe support beam attachments where the struts were installed off vertical position and subjected to a bending moment. The supports which required modification to correct the subject deficiency were identified. The deficient supports have been redesigned by increasing the weld between the lugs and the base plate, or by replacing the brackets with higher load rating brackets of an alternative design.

d. (Closed) 50.55(e) Item (341/82-08-EE) (57): Discrepancy between temperature limit for flushing of the RHR system and the minimum temperature specified for hydrostatic testing. The inspector reviewed the final report, dated July 9, 1982, and the stress analysis. This problem was originally reported to the NRC Region III on February 18, 1982.

During February, 1982, the Edison start-up organization at Fermi 2 requested authority to perform a hydrostatic test of the RHR service water piping system at ambient temperatures, which were well below 32°F (0°C) at the time. A review of the material specifications revealed the piping had been made to the SA106, Grade B Specification, which could fail in a brittle mode if stressed at low temperature. The RHR service water system was designed to operate at temperatures as low as 40°F. A complete analysis of the system was undertaken to determine if the system was safe to operate at the pressures and temperatures for which it was designed.

The heat numbers and analyses of all the piping, lugs and fittings in the system were collated from the documents that were on file in site QA records. The analyses were divided into "more-susceptible" or "less susceptible" materials based on the Mn/C ratio, whether the material had been normalized, and whether Charpy V-notch testing has been performed. When the Mn/C ratio was less than 3:1 and the material was neither normalized nor had impact tests run, a stress analysis was conducted on the piping in accordance with Equation 9 of subsection NC 3650 of the ASME Code. Stresses developed during an earthquake were considered during the evaluation, as were the dead weight and pressure induced stress. All of the above data was on file.

The stress analyses were further separated into "over 8000 psi" and "less than 8000 psi" ranges. The literature indicated 8000 psi was the "lower stress limit for fracture propagation", and "represents the stress level below which fracture propagation is not possible because the minimum, small amount of elastic strain energy release required for continued propagation of brittle fracture is not attained."

Nine pieces of pipe and three fittings were still suspect after this distinction was made. These were subjected to fracture mechanics analysis. The results of this analysis indicated that an initial crack of 1/4-inch deep through the pipe thickness and 1/2-inch circumferential dimension can be tolerated during the hydrostatic test. A defect this large was not credible because the welds were surface examined on this piping.

The analyses indicated the piping would not fail in a brittle manner at 40°F, either during a hydrostatic test or during operation. Therefore, DECo felt that no corrective action or special precautions during the hydrostatic test were deemed necessary and that the structure should operate safely as designed and built.

e. (Closed) 50.55(e) Item (341/82-22-EE) (71): Improper assembly of core spray pumps. The inspector reviewed the final report, dated May 27, 1983, and the associated DDR and NCR. This item was originally reported to the NRC Region III on June 15, 1982.

During startup testing of the respective pump, it was noted that the pump discharge pressure was approximately 30 pounds rather than the required 300 pounds. Disassembly of the pump revealed that the impeller had been installed on the shaft backwards. During refurbishment of this pump by a site contractor, it was noted that the pump shaft was bent. Even though the impeller itself was marked "Nut End", and the contractor's workers were aware of the marking, the impeller was improperly installed. Documents used by the contractor for replacement of the shaft did not provide sufficient instruction to ensure proper reassembly of the shaft and impeller. Byron Jackson, manufacturer of the pump, was notified of this possible deficiency in the technical manual.

The possibility of the pump being placed in service with an improperly installed impeller was slight, because according to project procedures, the pump must pass performance tests during construction, startup and maintenance activities. This incident occurred during performance testing while under construction. It triggered the investigation leading to the successful resolution to the problem.

Corrective action was complete, in that the shaft was repaired and the impeller has been reinstalled in the correct orientation via a revision to the maintenance procedure. The procedure now includes a step to verify correct orientation of the impeller. This will ensure satisfactory disassembly and reassembly in the future.

Further, DECo Project Quality Assurance has instituted a program for the review of contractor's Operation Process Travelers to ensure adequate instructions are included.

f. (Open) 50.55(e) Item (341/82-25-EE) (74): Special pipe clamps were supplied by Power Piping that did not allow movement of the sway struts making them a rigid support. There were two pipe clamps using the same identification number (SK-1014); one allows movement of the sway struts, one does not. The resolution of this item was still in-progress at the time of this inspection.

g. (Closed) 50.55(e) Item (341/82-31-EE) (80): Cracking, pitting and corrosion found on end caps for CRD - HCUs. The inspector reviewed the final report, dated August 12, 1983, surveillance reports and drawings. This was originally reported to the NRC Region III on November 17, 1982.

This item deals with cracks and pitting of the chrome plating on the end caps and cylinders found during disassembly of the subject CRD - HCU Scram Accumulators, and corrosion products found in the accumulators. The condition of the plating was caused by the presence of high oxygen water in the accumulators over a period of time. The source of the water found in the accumulators was unclear, but there was indirect evidence that the intent of the storage specification was not always maintained.

General Electric has completed an evaluation and DECo Engineering has concurred.

All 185 accumulator assemblies were returned to General Electric's facility in Wilmington, North Carolina, for further examination and refurbishment. During the refurbishing, 100% of the upper end caps were replaced with stainless steel end caps. The majority of lower end caps were also replaced with stainless steel. Ninety of the cylinders were replaced with BWR-6 type cylinders. The balance of ninety-five cylinders were refurbished to an acceptable condition. All internals were replaced as conditions warranted. Accumulator hold down straps were replaced as necessary. During disassembly for O-ring replacement, the condition of the plating on some end caps and cylinders led to a concern for the long term service life of the accumulators. A new visual plating acceptance criteria, based upon the functional needs of the various internal surfaces, has been implemented. The program developed by DECo and General Electric to refurbish all accumulators was intended to reestablish the original service life of the accumulators. The refurbished accumulators were now considered functionally equal to those HCU accumulators put into service.

h. (Closed) 50.55(e) Item (341/82-36-EE) (85): Over pressure on containment penetration bellows. The inspector reviewed the final report, dated May 27, 1983, and the engineering evaluation of penetration

assembly bellows pressure test, No. 04-1096, Revision 0. This item was originally reported to the NRC Region III on December 13, 1982.

This report concerned possible damage to the primary containment pipe penetration bellows as a result of overpressurization during pre-operational testing. The volume between the inner and outer bellows of each pipe penetration was pressure tested at 56.5 psig according to an approved procedure. A subsequent review of the manufacturer's documentation (Tube Turns) disclosed that test pressure should not exceed 35 psig.

To ensure no damage to the bellows assembly had occurred, a test program and procedure was developed by DECo to test a facsimile bellows. The object of the test was to determine bellows behavior and potential deformation resulting from overpressure. The acceptance criteria for meridional yielding and squirm, as stated in the ASME Code, Section III, Article NC36494 (B) and (C), was applied.

Based on visual observation, measured data, and the computed deformations, it was concluded that the bellows meet or exceed the acceptance criteria.

i. (Closed) 50.55(e) Item (341/82-37-EE) (86): Two Swagelok fittings lost in reactor vessel. The inspector reviewed the final report, dated October 7, 1983, an associated surveillance report, and safety analysis. This item was originally reported to Region III on December 29, 1982.

During flow induced vibration testing, three instrument line plugs (Swagelok fittings) became detached, and six others were found to be loose. The instrument lines are attached to the tops of eight instrumented steam separators. The reactor was in the pre-fuel loading stage at the time of the loss of the plugs. Additionally, the control rod drive (CRD) housings, CRD guide tubes, fuel support castings, core plate, top guide and steam separators were in place. After an extensive search, one plug was recovered from one of the guide tubes. The search was continued until it was concluded that the missing two plugs were not in the CRD housings, guide tubes, fuel support castings, core plate, steam separators or top guide. Therefore, the only locations in the pressure vessel where the lost parts may be were the annular region between the core shroud and the vessel wall or in the lower plenum.

The lost parts were comprised of a 1/4 inch instrument-line plug assembly consisting of three separate pieces (plug, nut, and plug keeper). The function of the keeper was to prevent the plug from falling through the bottom of the nut. All pieces of the assembly, except the keeper, were made of stainless steel type 316. The keeper was carbon steel.

The following DECo safety analysis was based on evaluations performed, taking the following conditions into consideration; the plug assembly remains intact, the plug assembly was disassembled and undamaged, and

the plug assembly was disassembled and deformed. The areas considered in the safety analysis were as follows: (1) bundle inlet flow blockage, (2) chemical reactions and corrosion, and (3) control rod interferences.

Any pieces in the annulus could exit through two different paths. A piece could either enter a jet pump with the driven water flow or pass through the recirculation system (recirculation pump and jet pump). The result of either flow transit was transfer of the lost parts to the lower plenum, which coincides with the other assumed location of the lost parts.

Based on DECo's experience and engineering judgement, the lost parts would pass through the recirculation pump entrained in flow streamlines that would not allow contact with the impeller blades. In a worst case scenario, the parts might cause some blemishes on the blades as they are swept through the pump. However, there would be negligible reduction in pump performance. During its traverse, however, the plug assembly could be battered and separated into its three component pieces.

Since the material of the plug and nut was stainless steel and therefore, ductile, these pieces would not break into smaller parts, but under extreme battering could possibly ball up like dough. The keeper also was ductile enough so that breakage into smaller parts was not expected. In any case, this was a conservative assumption for the keeper with regard to flow blockage. The keeper might be flattened into a single piece or compressed into the spherical shape. Both extremes have been considered in the flow blockage analysis.

Assuming that a lost part was on the bottom of the vessel, it was possible, although unlikely, that it could be swept up from the bottom of the vessel. For example, the radial component of the velocity may turn the piece and the vertical component of the velocity could lift it up toward the bottom of the core. Calculations of the average vertical and radial components of velocities have been made for typical plants, and indicate that it would be possible to lift the entire plug assembly or any of the pieces individually. There were certain factors that tend to reduce this possibility, namely:

(1) There were very few locations where the radial velocity would be high enough to sweep the piece off the narrow 1.125" gaps between guide tubes.

(2) If an object fell to the bottom of the vessel, it would tend to drift toward the vessel centerline where horizontal velocities were low and the boundary layers on the vessel may be thicker than the object. Thus the boundary layer effect would reduce the capability of the fluid to sweep the piece up off the vessel bottom for there vertical components to carry it upward.

The dimensions are such that if the plug assembly or any of the component pieces were lifted, they could pass through the smallest area through which active bundle flow must pass; only this location need be evaluated for flow reduction.

Should a piece pass through a fuel orifice, it would have to pass through the lower tie plate nosepiece and the lower tie plate to enter into the fuel channel which requires passage through holes of only 0.410" diameter. The nut and plug could pass through the orifice, but would be stopped at the lower tie plate grid. Any resultant flow blockage would be insignificant and present no safety concern. Only the keeper was small enough to pass through the lower tie plate. If the keeper did pass through the lower tie plate it might cause local boiling transition and overheating. However, it would not significantly reduce the flow in the bundle or cause serious degradation of the heat transfer condition in other areas of the fuel assembly. Even though it was possible for a minor blockage to occur by the keeper entering the fuel bundle and affecting the life of the fuel, no significant flow blockage will occur and, therefore, there was no safety concern.

To complete the safety analysis, this sequence of events has been carried one step further. Assuming that the keeper has been lifted up from the vessel bottom, passed through a fuel bundle, out the top onto the core support plate, and worked its way into the control blade opening, the consequences of impairing control rod operation were analyzed. Pieces of this size were considered in the safety assessment of lost parts and it was concluded that their interference with control rod operation was unlikely and therefore, they presented no safety concern.

Because the nut and plug were made of stainless steel, they present no threat from chemical reactions or corrosion. The keeper will corrode and disintegrate with time, but will cause no damage. Harmful substances such as active sulfur, fluorine, and chlorine or embrittling metals such as mercury, silver indium, zinc, lead bismuth, etc., are not introduced by the plug assembly.

To correct the condition, the missing Swagelok instrument line plug assemblies were replaced. All plug keepers were removed and discarded, followed by tightening of all Swagelok fittings. To prevent future loosening, all fittings were backwelded.

j. (Closed) 50.55(e) Item (341/83-11-EE) (97): Insufficient boraflex in fuel racks. The inspector reviewed the telecon to Region III which retracted the 50.55(e) (dated August 22, 1983), the NCR, and a criticality safety evaluation of manufacturing deviations in the Fermi high density spent fuel storage racks. During verification of boron attenuated fuel storage racks, eight cells were discovered to have insufficient boraflex to get an acceptable reading. DECo reported that this item was evaluated by an independent organization and that the cells with inverted poison may be used for storing fuel

with no special precaution to prevent criticality. Based on the analysis, DECo felt that no corrective action need to be taken on the spent fuel racks and that this item is not a reportable item per 10 CFR 50.55(e).

4. Action on IE Bulletins

a. (Closed) IE Bulletin 74-14 (341/74-14-BB): BWR relief valve discharge to suppression pool. The inspector verified that the licensee management received the IEB and that it was reviewed for applicability.

The concern of IE Bulletin 74-14, unstable steam condensation, has been incorporated into NUREG-0661. A local pool temperature limit of 200°F. has been established by the NRC in NUREG-0661 to ensure stable steam condensation during safety relief valve actuation. To comply with this requirement, a suppression pool temperature analysis was conducted by General Electric for Fermi 2. The analyses documented in the Fermi 2 Plant Unique Analysis Report meets the local pool temperature limit (200°F). The concern in I.E. Bulletin 74-14 has been adequately addressed and no additional action is required.

b. (Closed) IE Bulletin 81-02 (341/81-02-1B): Failure of gate type valves to close against differential. The inspector reviewed the final report dated September 8, 1981.

The Project Engineering Organization (PEO) for the Enrico Fermi Power Plant, Unit 2, has reviewed the unit's safety-related systems for any application of the Westinghouse gate valves described in the subject Bulletin and in its Supplement 1. As reported in Detroit Edison's response to IE Bulletin 81-02 (EF2-54,014), the PEO has ascertained that no Westinghouse (W-EMD) motor-operated gate valves were, or will be installed, or were maintained as spares for future installation. Therefore, Supplement 1 is likewise not applicable to the Fermi 2 plant.

DECo stated that it was not possible to rule out the possibility of eventually finding one W-EMD valve, but it was extremely unlikely that one will be found. In the event that DECo should locate one at a later date, it will be reviewed for modification or replacement per IE Bulletin 81-02 and Supplement 1.

c. (Open) IE Bulletin 83-05 (341/83-05-BB): Nuclear Code pumps and spare parts manufactured by the Hayward Tyler Pump Company. DECo could not find any evidence of having Hayward Tyler pumps or parts for use at Fermi. To date, a final report has not been submitted to the NRC. This item will be reviewed after the final report has been submitted.

5. Action on IE Circulars

(Closed) IE Circular 81-05 (341/81-05-CC): Self aligning rod end bushing for pipe supports. The inspector verified that the licensee management received the Circular and had reviewed it for applicability.

DECo Engineering reviewed IE Circular No. 81-05 and SER 50-80 and have determined that they were applicable to Fermi 2. The following have been implemented to ensure proper bushing installation:

(1) Field inspection of sway strut hangers have been conducted to identify loose bushings and excessive gaps between the strut paddle and pipe clamp or bracket.

(2) DDRs have been issued for the hangers with loose bushings or excessive gaps (DDR M-8086A)

(3) Repair procedures have been developed for repairing and reinstating bushings in pipe strut and snubber paddles.

(4) A training program was conducted on the repair procedures.

(5) Inspectors have been instructed to ensure that the total gap on each side of the strut assembled does not exceed 1/16" (1/8" total gap) between the spherical bearing and the pipe clamp ears or rear bracket.

The above actions address the concerns in IE Circular No. 81-05 and SER 50-80.

6. Allegation Followup

On April 1981, Wismer and Becker (W&B) QC inspectors contacted the NRC resident inspectors with several concerns. The Technical aspects of these concerns are as follows:

a. Allegation

There are problems with the welds on hanger restraint 12-B

NRC Finding

The inspector reviewed drawings and various documents and found that there was a pipe whip restraint No. B31-RR 12-B on the south side of the drywell. The inspector visually examined the welds and reviewed the applicable documentation. The welds and records were found to be acceptable. This allegation could not be substantiated.

b. Allegation 2

There are problems with the welds on the rupture restraint on the south side of the drywell with the last three identification digits of 12-B.

NRC Finding

Finding is identical to Allegation 1.

c. Allegation 3

There are problems with hanger No. P42-309 3G-01

NRC Finding

The site computer hanger control system did not indicate that a hanger with the No. P42-309 3G-01 existed. The inspector tried several combinations of these numbers and could not identify an appropriate hanger to inspect. This allegation could not be substantiated.

d. Allegation 4

There are problems with restraint 205-AE-073, Item No. 1B31G003. Additionally, below the designation B in the item number, was the number 14-2B. (The documentation indicated the number 12-2B)

NRC Finding

Of the 29 restraints designated as part of Item No. 1B31G003, the site computer hanger control system did not indicate that a restraint with the number 205-AE-073 or any numbers such as 14-2B and 12-2B existed. This allegation could not be substantiated.

e. Allegation 5

There are problems with a pipeweld on 16-18 inch carbon steel pipe near restraint P-42-3083G01. The weld has a "bad offset".

NRC Finding

The inspector reviewed the applicable records. No 16-18 inch carbon steel pipe was observed in the field. The documentation indicated all 10" pipe. The inspector examined piping welds near restraint P-42-308G01 and could not identify bad offset welds. This allegation could not be substantiated.

7. Audit Program (DECo)

A review of the licensee's audit program was conducted to determine if the program met regulatory requirements and if the licensee was effectively implementing the established program. The results of the inspection are as follows:

a. Audit System

During this inspection, the following procedures and audits were reviewed:

(1) DECo Quality Assurance Procedure No. 19, "Audits", Revision 6.

(2) DECo Project Quality Assurance Procedure No. 9.112, "Qualification and Certification of PQA Audit Personnel", Revision 1.

(3) Wismer and Becker Audit Report No.s 82-09 and 83-02

(4) Waldridge and Aldinger Audit Report No.s 82-01 and 83-03

(5) L. K. Comstock Audit Report No.s 82-07 and 83-01

The preplanned schedule of audits to be performed by the Project Quality Assurance (PQA) department was reviewed to determine that adequate audit coverage was being planned for all contractors performing safety-related work. The inspector found that only a minimal number of audits were performed each year covering all the safety-related contractors on site. In response to questions, the licensee indicated that 17 scheduled audits per year were performed and that supplementary audits were not being performed to provide additional auditing coverage or to determine the effectiveness of previously implemented corrective action. Pending further review of this matter, this is considered to be an unresolved item (341/83-31-01).

No items of noncompliance or deviations were identified.

b. Nonconformance Reporting System

The inspector also reviewed the nonconformance system utilized by the licensee (QA Procedure No. 16). The inspection revealed that a standard form was being utilized on site to provide uniform control of nonconformances. The form, included in procedure AP-VII-02, issued by Daniel International Construction, was the Deviation Disposition Request (DDR). The inspector reviewed the procedure, the required DDR logbook maintained for the entire site, and several examples of closed DDR's. It was noted that the appropriate reviews, verifications, dispositions, and follow-ups were being performed.

Several open DDR's were selected at random for review on site. Three DDR's (C-12616, E-12610, and W-12397) were reviewed for problem definition, correctness of disposition, and status.

No items of noncompliance or deviations were identified.

c. Trend Analysis Program

The Computer Analysis Program was reviewed to determine and evaluate function and performance. The program was described and controlled

in DECo Quality Assurance Procedure No. 9.171. The program was generating charts and graphs which addressed subjects ranging from status of DDR's to audit findings status. The inspector found the computer program to be a extensive source of information. The inspector concluded that the licensee had committed a large amount of resources to the setting up and operation of the trend analysis program. With proper review, the resulting documents represented a useful management tool.

The inspector reviewed the following documents during this inspection:

(1) FC/M Surveillance Finding Trend I - This chart listed the number of surveillances performed by the licensee of selected organizations beginning in January, 1982, for a period of 13 months.
(2) Surveillance Report Listing (Electrical) - This document listed all the surveillances done of Bechtel in the electrical area from November, 1981, until October, 1983.
(3) Surveillance Report Listing - This document listed all the surveillances done of Bechtel for all activities from December, 1981, until October, 1983.
(4) Quality Concern Report Status Sheet - This document listed the status of all the Quality Concern Reports generated on site from May, 1980 to the present.
(5) Audit Finding and Status Sheet - This chart listed all audit findings and the status of corrective action. The chart also specified the organization being audited and the individual charged with the responsibility for resolution of the audit findings.

No items of noncompliance or deviations were identified.

d. Findings Regarding Auditing

The review of the Audit Finding and Status Sheet revealed instances where several audit findings appeared to occur repeatedly over a period of time. Specifically, audit findings regarding lack of scheduling and/or performance of audits and surveillances were not noted. A further review of the Audit Finding and Status Sheet also revealed what appeared to be recurring findings regarding inadequate storage of QA records during the period 1981 through 1982. Pending further review, these matters are considered unresolved (341-83-31-02).

No items of noncompliance or deviations were identified.

e. Quality Concern Reports

The NRC inspector reviewed the Quality Concern Report System described in DECo Project Quality Assurance Procedure No. 9.190, Revision 0. The system had been implemented since September, 1982. It is utilized for the purpose of allowing all personnel a channel to express any concerns they have regarding quality or safety, and provides a mechanism for having their concerns resolved. A review of the Quality Concern Report Log did not indicate any unusual conditions or problems concerning quality.

No items of noncompliance or deviations were identified.

8. Audit and Inspection Program (L. K. Comstock)

a. Audits

The NRC inspectors reviewed the audit program of the onsite electrical contractor (L. K. Comstock). Specifically, the audit schedule and selected audits and associated findings were reviewed. Applicable criteria were addressed and corrective action was timely in all cases.

b. QC Inspection

During this inspection, the inspectors also made several trips to the field to review and sample techniques and practices used by QC inspection personnel. Several inspection packages were chosen at random and, with several inspectors, a walkdown was conducted to determine the scope and integrity of the inspection packages. The packages involved were in the area of hangers for conduit and installed cables. Other items which were inspected included lugs, pullboxes, welding of cable trays in the cable spreading room, and cable terminations.

No items of noncompliance or deviations were identified.

9. Personnel Certification/Qualification (DECo)

a. Auditor Qualifications

The inspectors reviewed the qualification procedures and files of the certified lead auditors that were in charge of conducting audits of safety-related contractors. DECo's Project Quality Assurance Procedure No. 9.112, Revision 1 ("Qualification of Audit Personnel"), was reviewed to ensure that the requirements of ANSI N45.2.23-1978 were appropriately specified. During review of the lead auditors' files, the inspector identified that eight of the eleven files did not contain the proper documentation as required by Procedure No. 9.112, Revision 1. Licensee personnel stated that the files were in the process of being reorganized. Subsequent review by the inspector revealed the files to be in order.

b. QC Inspector Qualifications

The qualification and certification files for licensee quality control inspectors were reviewed. The inspectors were certified in accordance with DECo Project Quality Assurance Procedure No. 9.403, Revision 2. This procedure was reviewed to ensure that it was in compliance with ANSI N45.2.6-1973.

The review identified that the sheet containing the information for "Certification of Qualification" did not contain provisions for a basis of certification in accordance with ANSI N45.2.6-1973. This standard requires that the certificate of qualification include the basis used for certification.

A review of the certification files for six QC inspectors revealed a lack of documentation to support the basis for certifying the inspectors. It was reported by licensee personnel that the same conditions existed for all the inspectors' records. This failure to maintain sufficient records to furnish evidence of the qualification of personnel is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion XVII (341/83-31-03).

10. Audit Program and Implementation (Wismer and Becker)

a. Procedures Reviewed

(1) DECo Q.A. Manual, Section 19, "Audits", Revision 6
(2) Wismer and Becker Q.A. and Control Manual, Section 18, "Audits", Revision F5
(3) Wismer and Becker Audit Procedure No. WB-Q-119, Revision 1

b. Implementation

The piping audit programs of DECo and Wismer and Becker (W&B) were examined to ascertain compliance with ANSI N45.2.12, the respective quality assurance manuals, and implementing procedures and instructions. The review identified that pre-audit and post-audit conferences were held, checklists were prepared and approved by authorized personnel, objective evidence was documented, findings were documented and closed, and the proper personnel were notified of findings and their responsibilities. Audit schedules were reviewed and the following audits were included in this review:

DECo	W&B
April 21-June 1, 1982	February 8-11, 1983
December 7-17, 1982	May 10-12, 1983
	July 19-22, 1983
	September 20-22, 1983

The review indicated that the W&B audit schedules and audits did not address the W&B quality assurance program implementing procedures (i.e., WB-As, WB-Cs, WB-Es, and WB-Qs). Consequently, no audits with regard to the implementing procedures had been conducted. This failure to establish and execute a planned system of periodic audits to verify compliance with all aspects of the quality assurance program is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion XVIII (341/83-31-04(A)).

Additionally, the W&B audits did not appear to be adequate in either scope or depth. For example, the only 1983 receipt inspection audit, performed on February 8-11, addressed Criterion VII and X of 10 CFR 50, Appendix B. Specifically, the audit team reviewed only ten receipt inspection reports and five samples of material received per ASME Section III. The inspector is concerned if this sample size would give a reliable indication of the adequacy of receipt inspection. Pending further review, this matter considered open. (341/83-31-05).

11. Installation Activities (Wismer and Becker)

a. Procedures Reviewed

(1) WB-A-106, "Field Inventory Control", Revision 7
(2) WB-A-108, "Identification and Control of Materials, Parts, and Components", Revision 7
(3) WB-C-102, "Field Pipe Erection", Revision 11
(4) WB-C-105, "Concrete Anchor Installation and Testing" Revision 25
(5) WB-C-117, "Welding Joint Fit-Up", Revision 5
(6) WB-C-118, "Methods of Control and Monitoring of Pre-Heat and Interpass Temperatures", Revision 9
(7) WB-C-119, "Postweld Heat Treating", Revision 8
(8) WB-E-109, "The Traveler Package", Revision 18
(9) WB-E-112, "Weld Numbering and Identification", Revision 9
(10) WB-E-113, "Ferrite Control For Stainless Steel", Revision 4
(11) WB-E-115, "Bending Carbon Steel Pipe", Revision 9
(12) WB-E-126, "Permanent and Temporary Marking", Revision 7
(13) WB-E-127, "Mechanical and Piping Turnover", Revision 12
(14) WB-E-137, "Temporary Supports", Revision 6
(15) WB-E-139, "Pipe Support for G. E. Supply Items", Revision 7
(16) WB-E-149, "Bending Stainless Steel Pipe", Revision 9
(17) WB-Q-103, "Visual Weld Examination", Revision 13
(18) WB-Q-120, "Q.A. Records Processing", Revision 6

b. Traveler Packages/Walkdown Review

Traveler packages which control the installation activities for piping components were reviewed. The inspector verified the following attributes on the initial review:

(1) Materials specified were in accordance with the drawings
(2) Selection of welding procedure was correct for the specific application
(3) Applicable hold points were established and traveler was reviewed by engineering and quality control
(4) Welds were identified

Hold points were appropriately established for cleanliness, fit-up, pre-heat, purge, visual inspection root, final visual, and NDE. The inspector also reviewed the completed travelers to verify the following:

(a) Traceability of material
(b) Material test reports (pipe, welding materials)
(c) Code Data Reports (valves)
(d) Welding procedures qualified in accordance with ASME, Section IX
(e) Welders qualified in accordance with ASME, Section IX
(f) Hold points signed off
(g) Welding procedure impact tested for ASME Section III, NB, installations

(h) Flange control records

The following specific piping travelers were reviewed:

1. Residual Heat Removal, 24" Return Line (drawing E11-2327-1)
2. Main Steam, 3/4" Main Steam Isolation Valve Drain Lines (drawing 6WMB21-4038-1)
3. Residual Heat Removal, 18" Suppression Chamber Spray Header Line (drawing 6M721-3160-1)

The inspectors walked down portions of each of these lines and verified spool piece identification, welder identification, configuration, welds, and pipe supports. Installations were in accordance with the traveler packages and the ASME Boiler and Pressure Vessel Code.

The following hanger traveler packages were reviewed and found to be in compliance with procedures and regulatory requirements:

a. High Pressure Coolant Injection, E41-7097-G08
b. High Pressure Coolant Injection, E41-7159-G06
c. Outside Primary Containment Instrumentation Tube Supports, T49-8201-G04
d. Primary Containment Monitoring System, T50-7432-GC2

Additionally, snubber checklist E11-3160-G13, for Residual Heat Removal Piping, was reviewed and the inspector identified that pre-installation inspections (i.e., piston rod damage and fluid level in reservoir) were being performed five months prior to installation. After installation, the inspectors were not programmatically required to verify that the snubber was still in compliance with the pre-installation checks. Pending further review, this matter is considered open (341/83-31-06).

c. N-5 Documentation

Wismer and Becker N-5 Data Reports were reviewed and found to be in accordance with the ASME Boiler and Pressure Vessel Code. Accuracy of drawings and documentation was verified by system line walkdowns and the generation of a walkdown inspection checklist. The following N-5 Data Reports, corresponding systems, and associated documentation were reviewed:

(1) N-5 Serial 523, Outside Primary Containment Instrumentation Tube Supports

Documentation: Large Bore - Spool and Valves - (EF-226)
Hanger Attachments - (EF-231)
Small Bore Material - (EF-228)

(2) N-5 Serial 539, Residual Heat Removal

Documentation: Trim-Material and Welds - (EF-230)

(3) N-5 Serial 566, Compressed Air

Documentation: Instrumentation - (EF-236)
Instrumentation Weld Data - (EF-254)

(4) N-5 Serial 557, Reactor Recirculation

Documentation: Equipment - (EF-233)

d. Bending ASME Pipe

The cold bending program for 2" and under safety-related piping was reviewed to ascertain compliance with the ASME Boiler and Pressure Vessel Code, Section III. ASME Section III, NB-4000, NC-4000, and ND-4000 state that ovality of piping after bending shall not exceed 8% as determined by diameters before and after bending. Additionally, ASME Section III, NB-3000, NC-3000, and ND-3000 state that wall thickness after bending shall not be less than the minimum wall thickness required for straight pipe. Wismer and Becker qualified the procedure and the benders for small bore pipe to the ASME Code, both for ovality and wall thickness. However, W&B failed to establish an inspection program or monitoring system to ensure that (1) the qualified procedure was being employed in the field, (2) a qualified bending machine was being used for production bends, and (3) that dimensions for ovality and wall thickness were in compliance with the ASME Code. This failure to establish and execute a program for the inspection of activities relative to the cold bending program is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion X (341/83-31-07).

12. Design Control (DECo)

a. Procedures/Documentation Reviewed

(1) DECo Project Engineering Work Instruction, EG-63, "Change Control Group Work Instruction", Revision 0
(2) DECo Q.A. Manual, Section 3, "Design Control", Revision 5
(3) DECo Q.A. Manual, Section 9, "Instructions, Procedures and Drawings", Revision 4
(4) DECo Project Procedure 3.20, "Design Change Notices", Revision 6
(5) DECo Project Procedure 3.21, "Design Change Requests", Revision 6
(6) W&B "Q.A. Level 1 and Stress Pipe Supports", WB-C-114, Revision 26
(7) W&B Q.A. and Control Manual, Section 6, "Document Control", Revision F5
(8) W&B Design Change Request, WB-E-102, Revision 13
(9) W&B Master Program Document List, WB-A-112, Revision 70

b. Piping Design Change and Implementation

The piping design change program was reviewed to ascertain that the licensee had established and was implementing a program in accordance with regulatory requirements, implementing procedures, and the DECo QA manual. The review included a verification of the following:

(1) Procedures to control design requests have been established.

(2) Procedures and responsibilities for design control have been established.

(3) Responsibilities and controls to ensure that design changes will be incorporated into drawings have been established.

(4) Channels of communications between design organizations and responsible individuals have been established.

(5) Controls requiring that implementation of approved design changes be in accordance with approved procedures have been established.

The review revealed that DECo Project Procedure No. 3.21 ("Design Change Requests") allowed work to proceed in accordance with an interim or verbally approved design change request prior to documented reviews and final disposition by designated engineering personnel. Procedures or instructions did not specify that quality control inspections be performed to the final approved design change request. Procedurally, the potential exists for final inspections of installed hardware to be conducted against an interim approved design change that may not ultimately receive final approval. This uncertainty regarding the procedure, with respect to interim design change requests and inspections, potentially applies to all disciplines of work (i.e.,electrical, piping, structural, etc.). Pending further review, this matter is considered unresolved (341/83-31-08).

The following piping design change requests and design change notices were reviewed:

Design Change Requests	Design Change Notices
SB-1376	9059
SB-1333	9091
P-14528	9102
P-14540	9104
P-14542	9114
P-14551	9120
P-14552	
P-14567	
P-14468	
XI-0274	
XI-0231	
XI-0233	
XI-0251	
XI-0257	

Design Change Notice No. 9059, dated March 15, 1983, concerned the exclusion of a weld from ASME stamping requirements because a union which was attached to the reactor recirculation pump had been pur-

chased to the 1968 Pump and Valve Code. Upon further inspection, the inspector identified reviewed DECo Deviation Disposition Request No. (W)10527. The request stated that the subject union was supplied as commercial grade type 304 stainless steel by General Electric and was not accompanied by material certifications. Because the chemical and physical properties of the union were unknown to DECo, the inspector requested that they evaluate this pressure boundary item to determine its capability to meet its intended safety function. Pending further review and evaluation, this issue is considered unresolved (341/83-31-09).

The NRC inspector also reviewed several piping Document Deficiency Notices (DDNs). Document Deficiency Notice No. 1534 concerned an 18" residual heat removal valve identified on drawing 6M721-3160-1, with valve marking V8-2136. The operating and design requirements for the valve, required by the drawing, were 480 psi and 335°F. The manufacturer of the valve certified a design pressure and temperature of 450 psi and 225°F on the NPV-1 Code Data Report. (The valve was made of carbon steel and classified ASME, NC, Class 2.) The DDN's "use-as-is" disposition was based on an acceptable hydrostatic test of 1100 PSI and on ANSI B16.5, Table 3 (referenced in the ASME Boiler and Pressure Vessel Code, Section III, NC-3511). Interviews with Wismer and Becker personnel indicated that other valves were dispositioned on the same basis when the design pressure and temperatures specified on the NPV-1 Code Data Report did not meet the drawing requirements. Pending further evaluation of the code data reports, this matter is considered unresolved (341/83-31-10).

No items of noncompliance or deviations were identified.

13. Calibration Program and Implementation (Wismer and Becker)

a. Program Review

The W&B program for control of measuring and test equipment was reviewed to verify compliance with regulatory requirements and program commitments. The following procedures were reviewed:

(1) WB-E-104, "Calibration, Certification, and Control of Measuring and Test Equipment", Revision 15.
(2) WB-E-155, "Calibration of Torque Wrenches and Torque Mulitipliers", Revision 2.
(3) WB-A-102, Handling, Storage, Shipping, and Preservation, Revision 8
(4) DECo QA Manual, Section 1, Revision 5

This review revealed the following procedural deficiencies:

(a) Calibration and adjustment intervals were not procedurally established.
(b) Issuance of calibration tools and measuring devices to the field was not controlled. (i.e., no recall system)

(c) No requirement for craft training in control of calibrated items existed.
(d) No storage requirements for calibrated items existed.

These failures (Items a. through d.) to establish measures to ensure that tools, gages, instruments, and other measuring and testing devices are properly controlled are considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion XII. (341/83-31-11(A))

b. Implementation

To assess the implementation of the calibration control program, W&B personnel were asked to produce specific calibrated items and records. As a result, numerous calibrated tools and measuring devices were identified which had been lost. Identified below are examples of the calibrated items were identified by Wismer and Becker as being lost:

(1) EF #13 - Dial Test Indicator
(2) EF #14 - Dial Test Indicator
(3) EF #16 - Dial Test Indicator
(4) EF $18 - Inside Micrometer
(5) EF #19 - Micrometer
(6) EF #20 - Micrometer
(7) EF #21 - Micrometer
(8) EF #23 - Dial Indicator
(9) EF #26 - Dial Indicator
(10) EF #27 - Micrometer
(11) EF #28 - Micrometer
(12) EF #29 - Micrometer
(13) EF #30 - Screw Pitch Gauge (reported stolen)
(14) EF #34 - Dial Caliper
(15) EF #35 - Dial Caliper
(16) EF #68 - Dial Indicator
(17) EF #74 - Dial Depth Gauge
(18) EF #82 - Dial Depth Gauge
(19) #7 - Tong Tester S/N AX51276
(20) #7b - Torg Tester S/N AX50972
(21) #9 - Oxygen Analyzer Model 244
(22) #14 - Torque Wrench
(23) #40 - Pressure Gauge 0-100 psi
(24) #95 - Oxygen Analyzer Model 244
(25) #99 - Oxygen Analyzer Biomarine Model C
(26) #134 - Strip Chart Recorder MU1063
(27) #200 - Tong Tester S/N AX49283
(28) #261 - Strip Chart Recorder 35029
(29) #429 - Torque Wrench
(30) #490 - Torque Wrench
(31) #36 - Pressure Gauge 0-100 psi
(32) #46 - Pressure Gauge 0-10,000 psi
(33) #47 - Pressure Gauge 0-10,000 psi

(34) #188 - Pressure Gauge 0-3,000 psi
(35) #193 - Pressure Gauge 0-6,000 psi
(36) #194 - Pressure Gauge 0-100 psi
(37) #198 - Pressure Gauge 0-100 psi
(38) #215 - Pressure Gauge 0-600 psi

Further review indicated that no evaluation of the validity of previous inspections or test results obtained with these items had been performed as required by ANSI N45.2, Section 13. These examples of failure to implement a calibration control program and to evaluate the validity of previous inspections and test results is a further example of noncompliance with 10 CFR 50, Appendix B, Criterion XII (341/83-31-11(B)).

14. Training and Qualification of Personnel (Wismer and Becker)

The training programs, for both craft supervisory and quality control inspection personnel were reviewed to verify compliance to regulatory requirements and Wismer and Becker Procedure No. QA-TM-1 ("Training Manual for Construction and Inspection Personnel").

The training and qualification program for quality control piping inspection personnel was found to be in compliance with ANSI N45.2.6 and Wismer and Becker Procedure No. QA-TM-1. Selected personnel were interviewed and the individuals expressed no quality concerns. The inspection of the training program for craft supervisory personnel revealed the following:

a. Selected craft supervisory personnel lacked documented training in Wismer and Becker Procedure No. WB-C-102 ("Field Pipe Erection"). The training was required and had been included in the training matrix stipulated in QA-TM-1.

In response to this concern, the licensee stated in a memorandum dated December 5, 1983, that "our detailed review of foreman training revealed that some of the many individuals trained on this project did not have documentation for that training in our files. We have initiated steps to correct this deficiency."

b. The training matrix was inadequate, in that it did not require craft supervisory personnel to be trained in procedures which contained information needed by craftsmen to meet installation requirements. Examples of these procedures were as follows:

(1) WB-E-104, "Calibration, Certification, and Control of Measurement Test Equipment"
(2) WB-E-115, "Bending Carbon Steel Pipe"
(3) WB-E-137, "Temporary Supports"
(4) WB-E-149, "Bending Stainless Steel Pipe"
(5) WB-E-155, "Calibration of Torque Wrenches and Torque Multipliers"

These failures (Items a. and b.) to provide appropriate indoctrination and training of personnel performing activities affecting quality are considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion II (341/83-31-12(A)).

15. Nonconformance Control (Wismer and Becker)

The NRC inspector reviewed this area to verify that measures had been established to ensure prompt identification and correction of conditions adverse to quality. Wismer and Becker uses the Deviation Disposition Request (DDR) system to identify and disposition nonconforming items. Approximately thirty DDR's were reviewed. Additionally, the following procedures were reviewed:

a. DECo Q.A. Manual, Section 16, Nonconforming Items, Revision 5
b. WB-E-130, "Valve Disassembly and Assembly", Revision 6
c. WB-E-138, "Deviation Disposition Request", Revision 20
d. WB-Q-113, "Quality Surveillance and Reporting of In-Process Operations", Revision 9

Deviation Disposition Request No. 5204A concerned a 3/8" high pressure coolant injection tubing line. The disposition required that .020 inches be removed because the tubing had been gouged. The wall thickness was to be measured mechanically with an acceptable minimum thickness of .036 inches. The wall thickness of the tubing was originally .049 inches. The physical measurement record stated that measurement by dial caliper or micrometer was impractical and would not be accurate (it must involve estimation). At the time of this inspection, this issue was being evaluated by engineering personnel. Pending completion of the engineering review, this issue matter is considered open (341/83-31-13).

Approximately 150 surveillance reports were also reviewed. It appeared that nine of these reports, which concerned nonconforming conditions, should have been dispositioned within the DDR system. The nine reports were as follows:

(1) 2768 - torque wrench erratic indicator, 10/12/82.
(2) 2786 - 24" drywell purge piping valve would not close completely, 10/21/82.
(3) 2787 - torque wrench erratic indicator, 10/21/82.
(4) 2912 - RHR Pump D Motor upper oil plug was leaking oil, 12/2/82. Replaced plug.
(5) 3171 - weld rod drawn against a reactor recirculation weld joint and consumed after the final visual was complete, 2/28/83. Re-examined joint.
(6) 3187 - untraceable and heavily rusted hanger clamps bolts for a main steam safety valve discharge pipe, 3/3/83.
(7) 3189 - untraceable hex bushing for compressed air - safety-related, 3/3/83. Bushing replaced.
(8) 3459 - documentation package for RHR hanger was lost, 7/8/83. Re-work/re-inspection.

(9) 3518 - untraceable pipe for primary containment pneumatic supply line, 1 1/2" Schedule 40, ASME, NC, Class 2.

The DECo Quality Assurance Manual, Section 16, states that, "Reports of nonconforming items shall be made on Deviation Disposition Request (DDR) forms to Project Engineering for dispositioning in accordance with Configuration Control Procedures." Additionally, Wismer and Becker Procedure No. WB-Q-11, "Quality Surveillance and Reporting of In-Process Operations") states that, "All practices or conditions observed that would leave the quality of hardware either indeterminate or rejectable will be reported and documented in accordance with the Deviation Disposition Request procedure."

The conditions described by the nine surveillance reports were either indeterminate or rejectable conditions at the time they were identified. This failure to process nonconforming items in accordance with documented procedures is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion XV (341/83-31-14(A)). A similar item of noncompliance was previously identified during the NRC inspection documented in IE Report No. 341/82-10 (reference Item No. 82-10-10).

Another example when nonconforming items were not processed in accordance with documented procedures involved the replacement of a valve seat. Surveillance report No. 2786 stated that 24" drywell purge piping valve No. VR-3-3011 would not close completely and required disassembly and replacement of parts per W&B Procedure No. WB-E-130 and vendor instructions. Procedure No. WB-E-130 ("Valve Disassembly and Assembly") required that a Supplemental Operation Process Traveler be used to control the disassembly and re-assembly of valves, including parts to be replaced. However, the required seat replacement was accomplished without generating Supplemental Operation Process Traveler. Therefore, the work was accomplished without quality control verification and documentation. This failure to process nonconforming items in accordance with documented procedures is considered to be a further example of noncompliance with 10 CFR 50, Appendix B, Criterion XV (341/83-31-14(B)).

Further inspection indicated the following four surveillance reports which did not appear to be properly dispositioned:

(a) Surveillance Report No. 2768 - A torque wrench, during use, was found to have an erratic indicator involving the indicator sticking and "sling shotting" past actual values. The disposition stated the wrench was returned to the vendor but failed to address where the wrench had been used previously in order to verify the acceptability of installed torque values.

(b) Surveillance Report No. 2787 - Identical to Surveillance Report No. 2768 for another torque wrench.

(c) Surveillance Report No. 3518 - A Wismer and Becker inspector identified an untraceable heat number (BZD29S) on a 1 1/2" schedule 40 pipe. The heat number on the bill of material was BZD29M. The pipe was

accepted by Wismer and Becker engineering based on the bill of material. The number BZD29S was not identified as a manufacturer's stamped heat number or a craft stenciled heat number. Based on the information provided, discrepancies exist between hardware and documentation.

(d) Surveillance Report No. 3187 - A Wismer and Becker inspector identified that clamp bolts for a main steam valve discharge pipe were heavily rusted and untraceable. Wismer and Becker engineering accepted the bolts based on the fact that the bolts were released from the hanger fabrication shop. The bolts were required to be ASTM A-307. The disposition failed to determine if the heavy rust affected structural capability or if the bolts were in fact ASTM A-307 and would meet their safety function.

Pending further review, these matters ((a) through (d)) are considered unresolved (341/83-31-15).

16. Procurement (Wismer and Becker)

Procurement documents were reviewed to verify technical adequacy, QA program requirements, 10 CFR 21 provisions, specific identification of items, and approved source of supply. The following purchase orders were reviewed:

a. 88228 - weld rod
b. 87439 - weld rod
c. 87650 - weld rod
d. 87852 - pipe
e. 87448 - fittings
f. 88132 - fittings
g. 88300 - tubing
h. 88003 - connectors

No items of noncompliance or deviations were identified.

17. Major Mechanical Equipment (Wismer and Becker)

a. Installation

The Residual Heat Removal (RHR) Heat Exchanger A (E-11-01-B-001A) was selected by the inspector to verify that the installation was in accordance with appropriate technical and quality requirements. Documents reviewed included installation travelers, cleanliness records, nonconformance records, receipt inspection reports, purchase orders and design change records. No problems were noted with these documents. The mounting of RHR Heat Exchanger A to its support frame was verified to be in compliance with technical requirements.

The standby liquid control storage tank was also inspected to verify compliance with technical requirements for installation. During this inspection, the following two items were noted:

(1) Two foundation bolts were not properly installed in accordance with Wismer & Becker procedure No. WB-E-106 and DECO drawing No. 6M721-3029. Specifically, there was no evidence of proper torquing by punch marking as required by procedure No. WB-E-10G or of sufficient thread engagement of the nut as required by drawing No. 6M721-3029. It appeared that the bolts had been cut off after the installation of the tank. The installation had been accepted and documented by W&B QC personnel on work traveler No. 5050-3. The tank had been transferred to DECO.

(2) Additionally, the manway cover on top of the tank was not properly secured (bolted snug tight) although the tank had been designated as a cleanliness "B" component. The improperly secured manway cover was not in accordance with Startup Instruction No. 7.8.0.01. During the inspection, licensee personnel were on top of the tank. This increased the potential of negating the cleanliness "B" status of the tank.

These failures to accomplish activities affecting quality in accordance with procedures and drawings is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion V (341/83-31-16(A)).

b. Mechanical Systems Transfer to DECo

The inspector reviewed the process for transferring mechanical systems and subsystems from W&B to DECo. The following observations were made:

(1) On June 23, 1983, an audit finding (83-06) was issued by DECo which identified that certain equipment documentation had not received a final review by W&B prior to turnover of the system. This review was intended to ensure compliance with design and the ASME Section III Code. The proposed W&B corrective action consisted of identifying, on the Unified Punch List, the equipment documentation packages which required review. On November 15, 1983, a DECo System Completion Organization (SCO) memo to Wismer and Becker stated that SCO would not accept the responsibility of clearing and signing off punchlist items. At the time of this inspection, the equipment documentation packages had not been identified on the punchlist and no alternative resolution for the finding had been proposed. Pending further review, this matter is considered unresolved (341/83-31-17).

(2) The Test and Startup Administrative Procedure Manual, paragraph 7.4.2-2(b), required a review of system documentation packages. The following systems contained equipment that had been transferred to DECo and subsequently tested without the documentation packages being reviewed:

(a) Core Spray
(b) Reactor Recirculation
(c) RHR Service Water System
(d) Emergency Diesel Generators
(e) Drywell Cooling
(f) Fuel Pool Cleaning & Cleanup
(g) Standby Liquid Control
(h) Off Gas System
(i) High Pressure Coolant
(j) Injection System
(k) Injection System
(l) Reactor Building HVAC
(m) Reactor Water Cleanup

This failure to perform activities affecting quality in accordance with procedures is considered a further example of noncompliance with 10 CFR 50, Appendix B, Criterion V (341/83-31-16(B)).

(3) The FSAR, Chapter 14 and an interpretation of the ASME Code required certain activities to be accomplished prior to system/equipment turnover to the licensee. Specifically, FSAR, paragraph 14.1.1.4 stated that when equipment, systems and subsystems receive the necessary tests during the construction test phase, the jurisdiction over the affected components is transferred to the licensee. System hydrostatic tests were identified as part of the construction test phase. Further, ASME, Section III, Interpretation III-1-77-159 stated that portions of systems may be released to the owner (licensee) provided all code requirements were completed and an N-5 Data Report form was completed for the components being turned over by the installer and his ANI. Contrary to these requirements, there were ASME, Section III, system/subsystems transferred to DECo which had not been hydrostatic tested in accordance with the Code. Examples of these systems are RHR, Core Spray and the High Pressure Coolant Injection.

Additionally, meeting minutes SU-9653, identified two systems in which testing was placed on hold to allow completion of various construction activities. The system/subsystems been transferred to DECo without completing construction as required by the FSAR, Chapter 14, paragraph 14.1.1.4. These systems were Standby Liquid Control and Reactor Building Closed Cooling Water.

These two failures to perform startup activities in accordance with instructions and procedures are considered a further example of noncompliance with 10 CFR 50, Appendix B, Criterion II (341/83-31-12(B)).

18. Major Electrical Equipment (L. K. Comstock)

a. Installation

The inspector selected two pieces of equipment from the "Q list for Major Electrical Equipment" and reviewed their installation records to verify compliance with technical and quality requirements. The Class IE 4160 volt switchgear (R-14-00-S-002C), located in the RHR complex, and the 480 volt motor control center (R16-00-5-002B), located in the reactor auxiliary building, were selected for review.

Specifically, installation drawing No. 6E72/N-37, installation travelers, Deviation Disposition Requests (DDR), nonconformance reports (NCR), maintenance records, purchase orders, receiving inspection reports, anchor inspection and test records, and weld inspection records were reviewed. The inspector also reviewed the records to verify that field design changes were incorporated and the equipment inspected for compliance to the design change document. After reviewing the installation records, the inspector obtained the latest design drawing and inspected the installed equipment to verify that the installation and workmanship was in accordance with established requirements. The following observations were made:

(1) DDR No. E-11430, issued on May 18, 1983, identified sawed off anchors for Class IE 4160 volt swithgear No.s R1400-S002A, 41400-S002B, R1400-S002C, and R1400-S00020 located in the RHR complex. The following observations were made with regard to the disposition of this DDR:

(a) The "USE-AS-IS" dispositions on November 8, 1983, and November 17, 1983, were not supported by a documented technical justification.

(b) The November 8, 1983, disposition utilized a ultrasonic test (UT) report marked for "Information Only." The individual who performed the UT stated that the report was identified as "Information Only" because the UT instrument was not calibrated and would only work lying in the flat position.

(c) The cause of the deficiency was not adequately addressed by DECo. The disposition of the DDR stated that the deficiency had occurred because the requirements of DECo specification No. 3071-226 ("Purchase and Installation of Concrete Anchors") had not been met. Not meeting the specification requirements was the deficiency, not the cause of the deficiency.

(d) Of the sixteen concrete anchors that were ultrasonically tested, seven did not meet the minimum embedment length required by specification No. 3071-226. This represented approximately 43% of the anchors inspected. There was no objective evidence that the licensee had assessed the impact of having 43% of the anchors which did not meet the minimum embedment requirements defined in the project specification.

(e) Due to the deficiencies noted above the exact status of the torque applied to the concrete expansion anchors mounting the 4160 volt switchgear was indeterminate. Initially, the licensee submitted a seismic analysis of the switchgear as mounted in the field (no setting torque on the concrete expansion anchors i.e., no preload). This initial analysis

contained some improper assumptions and therefore no conclusion could be drawn from this analysis. After the inspector contacted the licensee with our concerns about this initial analysis, the licensee asked to submit a re-analysis which addressed the inspector's concerns. The re-analysis was received on March 20, 1984.

The re-analysis demonstrated that the 4160 volt switchgear would maintain its integrity during the design basis seismic event.

(2) DDR No. E-8632B, issued on September 3, 1982, identified that the 3/8" wedge anchors were not tension tested in accordance with project specification No. 3071-226. The following observations were made regard to the disposition of this DDR:

(a) The potential use of an improper gauge on past tension testing of concrete anchors other than the 3/8" size was not addressed. The disposition stated that a gauge of proper range (0 - 2000) lbs. would be used on future concrete anchor tension testing.

(b) The disposition did not provide corrective action to ensure that specification changes, which affected inspection criteria, had been incorporated into the L. K. Comstock inspection activities. The cause of this deficiency was a result of a specification change not being incorporated into the inspection procedure for the tension testing of concrete anchors.

(3) NCR No. 83-1252, issued on December 13, 1983, identified that no installation documentation existed for Class IE 4160 volt switchgear in the RHR complex. The disposition did not provide corrective action to preclude recurrence to ensure proper installation records are maintained for future electrical equipment installations.

These failures (Items (1) through (3)) to take adequate corrective action are considered a further example of noncompliance with 10 CFR 50, Appendix B, Criterion XVI (341/83-31-18(A)).

b. NRC Ultrasonic Examination of Anchor Bolts

As a result of the problems noted with the anchors for the Class IE 4160 volt switchgear, the NRC performed UT of the anchor bolts. The examinations were conducted in accordance with DECo procedure No. WB-Q-125, "Ultrasonic Measurement of Wedge Anchor Bolts," Revision 1. The inspector found the bolt length and embedments for the Class IE 4160 volt switchgear (1400-S002A, 2B, 2C, and 2D) in agreement with the measurements noted in the disposition of DDR No. E-11436.

Anchors were also sampled to verify correct installation for other selected equipment in the RHR complex. The equipment anchors examined by UT included anchors for the Emergency Diesel Generators, Emergency Equipment Cooling Water (EECW) Make Up Surge Tanks, EECW Pumps, and EECW Heat Exchanger.

No items of noncompliance or deviations were noted.

c. Calibration

The inspector reviewed the calibration records for the pressure gauges used for tension testing of concrete anchors. The gauges were identified by a unique number traceable to the records. Gauges found out of calibration or lost were identified and an evaluation was conducted to determine acceptability of concrete anchors tested since the last calibration.

No items of noncompliance or deviations were identified.

d. Training

Seven individual training files were reviewed by the NRC inspector to verify that certification of the QC inspectors was in accordance with established requirements. The training files included resumes, tests and their results, attendance sheets for training classes, eye exams and certificates. The inspector interviewed four QC inspector for the purpose of assessing the acceptability of the training program.

No items of noncompliance or deviations were identified.

e. DECo Audits of Electrical Contractors

Files were reviewed of audits on site contractors who performed work on electrical equipment/material. The audit records reviewed were for audits conducted on L. K. Comstock in 1982 and 1983 and Bechtel in 1983. The audits of L. K. Comstock were conducted in December, 1982 (audit No. 83-01) and in March, 1982 (audit No. 82-07).

The audit of Bechtel was conducted in April-May, 1983 (audit No. 83-07). Finding No. 83-07-01D was issued during the Bechtel audit and identified Bechtel traveler packages which did not contain the latest revision of a drawing or the latest design change document. Bechtel was requested, as part of the corrective action, to assess if there was any impact on the hardware. Bechtel responded on June 13, 1983, that there was no impact on the hardware. Corrective action also consisted of Bechtel training their personnel in the processing of travelers. The audit finding was signed by the DECo audit group indicating that the corrective action implementation had been verified. A review of the documentation supporting the verification revealed the following:

(1) The acceptability of the Bechtel assessment concerning the impact on hardware was not determined by DECo. ANSI N45.2.12-1973, ("Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants") requires verification of effective corrective action (Paragraph 3.3.7).

(2) Objective evidence to substantiate that the required training was conducted by Bechtel, as identified in their proposed corrective action, did not exist.

These failures (Items (1) and (2)) to perform an adequate followup audit to verify the effectiveness of corrective action is a further example of noncompliance with 10 CFR 50, Appendix B, Criterion XVIII (341/83-31-04(B)).

19. Procurement (DECo)

The NRC inspector reviewed the procurement process for purchases designated as Quality Level I and Commercial Grade. As defined by the Quality Assurance Manual, quality level I purchases were for safety-related items and commercial grade purchases were for items obtained for quality level I applications. DECo's definition of commercial grade was consistent with the definition in 10 CFR Part 21. Commercial grade items were allowed to be purchased from an unapproved vendor. The Quality Assurance Manual required quality level I items to be purchased from a vendor having a Quality Assurance Program which complied with the pertinent provisions of 10 CFR 50, Appendix B. Purchase orders for quality level I and commercial grade items were reviewed to verify compliance with codes, standards and regulatory requirements.

An Approved Suppliers List (ASL) was maintained for vendors who were approved to furnish quality level I/ASME materials, equipment and services. Vendors of products/services who possessed current ASME certification were not required to be listed on the ASL. During the review of purchase orders (P.O.) for quality level I items, it was noted that the following items/services were procured from vendors not on the ASL.

(a) P.O. No. ID-51500 (Bolting Material - This material was procured in November, 1979, from a vendor who was not placed on the ASL until December, 1980. Placement of the vendor on the ASL was based on a condition that any material procured be verified by test. The purchase order required only a certificate of conformance. This high strength bolting material was utilized during the installation of RHR Heat Exchanger A.

(b) P.O. No.s NM-28306 and A-010276 (Printed Circuit Boards) - These printed circuit boards for the high-low voltage alarm on the 130 volt battery charger were procured from the original equipment manufacturer (OEM) who was not on the ASL. The licensee's Quality Assurance Program, FSAR Chapter 17.1 and 17.2 and Project Quality Assurance Procedure 9.206, required that quality level I items be procured from approved vendors.

(c) P.O. No. A-117317 (Reactor Recirculation Valve Replacement Stem) - The stem was procured from a vendor which was not on the ASL. Even though the vendor possessed a current ASME Certification of Authorization, the stem was procured outside the scope of the ASME code. Therefore, the vendor was required to be on the ASL as a supplier of a non-ASME quality level I item.

(d) P.O. No. 1A-85153 (Engineering Services) - The vendor was to furnish qualification test report information for valve operators. In addition, the contract stated that if any Fermi DBA conditions exceed the conditions of the type test for any component, an extrapolation (operability time, radiation, etc.) will be provided to qualify those components. This contract was not classified as a safety-related service and did not contain quality or technical requirements. This purchase order was issued to a vendor not on the ASL.

Based on the purchase orders listed above, measures had not been effectively implemented to ensure that material, equipment, and services were adequately procured. This failure to provide appropriate source selection and evaluation is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion VII (341/83-31-19).

20. Quality Assurance Program Control (DECo)

A special NRC inspection conducted from June 21 to July 2, 1982 (Report No. 50-341/82-10) resulted in item of noncompliance No. 341/82-10-04. The item concerned DECo's apparent failure to regularly review the status and adequacy of the quality assurance program as required by Criterion II of Appendix B. Subsequent review during this inspection, again established this same basic inadequacy.

During this inspection, DECo personnel stated that they considered the following activities to be responsive to this item of noncompliance:

a. 1974 audit by Daniel International
b. 1979 audit by MAC (Management Analysis Corporation)
c. 1982 Audit by MAC as an Independent Assessment of QA Program
d. QA update meetings nominally on a monthly basis since 1977
e. Project Monthly Report
f. PQA Audit Reports

Although no information was available of any direct action taken by DECo management related to the QA program, a restructuring of the QA program was accomplished after the 1979 MAC audit. The NRC inspector also reviewed a number of the monthly QA update meeting minutes (No. 31 (February 13, 1980) through No. 47 (June 2, 1981)). No definitive actions were apparent as a result of these meetings.

The 1982 MAC audit, which was scheduled and performed as a part of the committed corrective action to the item of noncompliance, was reviewed by the NRC inspector. The stated (and accomplished) objective was to review the current QA Program Manual against 10 CFR 50, Appendix B requirements

and the NRC's standard review plan. No further action had been accomplished as a result of the audit.

The review of available information revealed that the licensee was neither systematically reviewing the status and adequacy of the QA program nor had a procedure been developed to prescribe the methodology to control this activity. This failure to take effective and prompt corrective action with regard to an NRC noncompliance, is considered to be a further example of noncompliance with 10 CFR 50, Appendix B, Criterion XVI (341/83-31-18(B)).

21. Corrective Action System (DECo)

The corrective action system and its implementation were reviewed. The last corrective action report (CAR-179) was issued on April 22, 1982. No further reports have been issued. The NRC inspector reviewed Daniel procedure No. AP-VII-08, Revision 2 (June 16, 1982). Review of the corrective action log book indicated that this procedure had been useful and used adequately in the past for corrective action control. Since 1977, the yearly total of CAR's issued were as follows:

1977 - 22 reports
1978 - 66 reports
1979 - 65 reports
1980 - 13 reports
1981 - 8 reports
1982 - 3 reports

Discussions with licensee personnel indicated that a project quality assurance procedure No. 9.1601, Revision 0, had been written and approved. This procedure endorsed NQA 1601 ("Corrective Action") Revision 0. The procedure has yet to be implemented.

At the time of this inspection, it appeared that no systematic corrective action system had been in use for approximately 18 months. This matter is considered unresolved pending further review (341/83-31-20).

No items of noncompliance or deviations were identified.

22. On-Site Design Control (DECo)

The on-site design program was reviewed by the NRC inspector. During discussions with on-site design engineering personnel, the inspector was informed that a Design Change Request(DCR) form was utilized as a quick turnaround tool in addition to the normal design change system. For example, the DCRs prepared by W&B for safety-related Type I and nonsafety-related Type II and Type III changes were completed and signed by W&B engineering. These changes were then used for construction/installation and inspection. For Type I changes, an additional step of obtaining a DECo design engineer's approval was required prior to implementation of the change. This process was expedited by obtaining a verbal approval from the on-site DECo engineer. As noted on the pink copy of the DCR. If the DECo engineer was not in agreement with the change request, the entire request would be held by

the engineer for his instructions. Once the DECO engineer had verbally approved the DCL, W&B could proceed with their traveler package changes and issue the change for construction (including in-process inspection). Final inspections were withheld until the approved white copy was received.

The NRC inspector was informed that if the DECo engineer (either on-site or in Troy) rejected the change request, the entire traveler modification would be held and corrected per the engineer's instructions. The NRC inspector reviewed log books which were maintained by each engineer and an engineering group log book kept by the secretary to ensure that the pink copies could be retrieved.

DCR No. E-3919, Revision 0, was selected from the logs being reviewed. It concerned the addition of a pullbox around a 3-1/2" penetration to allow proper bending and training of cables. It was written on September 26, 1983, and contained verbal approval to proceed with installation. The hard copy continued through on-site design approvals. The approvals were dated September 28, 1983, and September 29, 1983. The white, approved copy, was received with a stamped approval date of October 3, 1983.

The NRC inspector noted that audit report No. 83283 (conducted October 3 through 6, 1983) identified the use of a DCR pink copy to make a construction change. Subsequent review indicated that the white copy had been rejected by the engineer. However, no corrective control had been taken. Although this instance involved a Type II change, the potential for a similar occurrence exists for Type I changes. Pending further review, this matter is considered unresolved (341/83-51-21).

No items of noncompliance or deviations were identified.

23. Electrical Installation Control (L. K. Comstock)

The NRC inspectors reviewed completed and in-process installation activities. The following attributes were observed:

a. Conduit and hangar installations in the auxiliary building were checked against completed QC checklists to verify completeness.

b. Cable tray installations inside the reactor building (cable spreading room) were checked and completed QC inspection checklists were compared to installed hardware, hangers, trays, and their attachments.

c. The QC inspection records of two electrical cable terminations and the installation of cables running from the core spray cabinet to the ECCS trip unit relay cabinet were reviewed to verify the completion of the QC checklist.

d. Cable de-termination, cable pull out, installation of new cables, and re-termination were observed in progress.

No items of noncompliance or deviations were identified.

24. Procurement of Commercial Grade Material (DECo)

An inspection was conducted relative to the procurement and use of commercial grade materials (CQ). The initial inspection effort in this area was conducted on November 25 through December 2, 1983. The inspection resulted in one item of noncompliance regarding inadequate technical and quality reviews during procurement and failure to qualify CQ items prior to dedication for safety-related applications. As a result of this finding, and the subsequent enforcement conference, DECo identified the deficiency per 10 CFR 50.55(e). In addition, they implemented a program to evaluate the acceptability of past CQ purchases and ensure that future purchases are properly controlled. The adequacy of DECo's actions in this regard were reviewed in detail during a subsequent inspection conducted on July 11-13 and July 25-27, 1984. The following paragraphs detail the identification, actions taken, followup, and conclusions with regard to the CQ issue.

a. NRC Identification of the CQ Issue

During the inspection conducted from November 25 through December 2, 1983, the inspector reviewed purchase orders classified as CQ. The DECo quality assurance manual stated that CQ procurement documents were reviewed to ensure that the proper catalog or industry standard information had been included. In these cases, the vendor was not required to have a QA program. The manual further stated that the DECo engineering department shall determine if (1) the subject CQ item was suitable for its intended safety-related application and (2) CQ items subject to environmental qualification requirements could be qualified by suitable testing after procurement and before use. The FSAR Chapters 17.1 and 17.2, did not discuss the procurement of CQ items which were obtained for safety-related applications.

Discussions with licensee personnel and the review of CQ purchase orders and their supporting documents revealed (1) inadequate technical and quality reviews, (2) dedication of CQ items for safety-related application prior to their qualification, and (3) procurement of quality level I (safety-related) items as CQ safety-related when they did not meet the 10 CFR 21 criteria (i.e., not subject to specification requirements and not unique to the nuclear industry).

The following purchase orders were reviewed and represent examples of the problems noted above:

(1) Purchase Order A116327, dated June 21, 1983, Wedge Type Anchors

DECo project specification No. 3071-226 ("Purchase and Installation of Concrete Anchors"), required the local distributor to submit the manufacturer's QA program for review and approval. It also stated the local distributor was subject to 10 CFR 21 requirements. This purchase order should not have been classified as CQ, but rather quality level I.

(2) Purchase Order A116996, dated October 10, 1983, Bolting Material for Drywell Conduit Supports (ASME 325)

This bolting material was procured from a supplier that was at one time on the licensee's approved suppliers list. The material was procured with a condition that it be verified by test upon receipt. The purchase order did not require certified material test reports, nor was there objective evidence that the licensee had performed testing to verify material acceptability.

(3) Purchase Order A116290, dated July 7, 1983, Cutler Hammer Pushbutton Switch for the Automatic Sequencing Cabinet

A change order was issued on August 1, 1983, which identified a new part number (SA2250X22-3 to SB2061-AC5A). This switch was dedicated for safety-related application without supporting documentation to substantiate that the switch with the new part number was qualified to perform its function.

(4) Purchase Order A115405, dated April 11, 1983 Undervoltage Relay for the 480 Volt Switchgear

This undervoltage relay was purchased for Field Modification Request Nos. 2284-A, 2285-A, and 2287-A. They pertained to load shedding of the 480 volt switchgear. The relay type was noted as 27/59 but was changed to 27R. This relay was dedicated for a safety application without supporting documentation to substantiate the new type number was qualified to perform its function.

(5) Purchase Order A116992, dated October 5, 1983, Air Tight Gasket for Repair of the Steam Tunnel Pressure Relief Doors

The requisition, dated September 14, 1983, contained equipment qualification requirements (temperature, radiation, humidity, etc.). On September 27, 1983, these requirements were deleted because the vendor did not have an approved QA program for performing equipment qualification tests. A memorandum, dated September 27, 1983, stated that this item would be punchlisted for equipment qualification evaluation. This gasket was designated for a safety application without supporting documentation to substantiate it was qualified to perform its intended function.

Based on the above purchase orders, measures had not been established to assure that CQ items dedicated for safety-related applications were qualified, prior to use, and that adequate technical and quality reviews were performed. This failure to review items, essential to the safety-related functions of the structures, systems and components, for the selection and review for suitability of application, is an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (341/83-31-22). During this inspection, appropriate action was taken to correct and prevent

recurrence of this item. Consequently, no written response is required. Details of those actions are documented in paragraph 24.c.

b. DECo Actions

On February 15, 1984, DECo telecommunicated a potential deficiency to Region III involving the use of commercial grade material for safety-related applications (CQ material) where evaluation of the material for this application was not adequately documented. This potential deficiency, which was identified during the inspection activities described in paragraph 24.a. above, was formally communicated to the NRC on March 27, 1984, in accordance with 10 CFR 50.55(e).

The 50.55(e) report identified the extent of the deficiency as 2,300 commercial grade material purchase requisitions, issued during the period 1978 through 1983, which were intended for use in safety-related systems and components. The materials included chemical, electrical, mechanical, and structural items. CQ materials for replacement use were purchased "like for like" (i.e., same manufacturer, model number or part number, dimensions, materials... etc) from suppliers, distributors, or original equipment manufacturer (OEMS).

The safety implications of the past CQ purchases were described by DECo as having a potential for less than adequate verification of the quality of the installed CQ material and the ability of that material to perform its safety-related function.

As part of their corrective action, DECo implemented a program, with a dedicated CQ engineering group, to evaluate and document past CQ purchases, new CQ purchases and OEMs. Technical interfaces for engineering and verification were established. The personnel holding positions of key responsibility were DECo employees.

The program called for all past CQ purchases to be classified by equipment, part or material type. The purchase documentation was then reviewed and a historical profile created. The actions necessary to qualify the materials were subsequently performed and the evaluation was documented. New CQ purchases are processed in a similar manner with procedural controls to ensure that each item is evaluated from an engineering and quality assurance viewpoint. In both cases, auditable records are maintained.

On May 25, 1984, DECo issued an interim report regarding the 10 CFR 50.55(e) item. This report provided an update on the original item and addressed the methodology used to justify the use of commercial grade material and replacements. The interim report identified for installed materials, that electrical equipment items represented thirty-five percent, mechanical equipment items represented five percent and structural materials represented the final sixty percent of the total item population.

The electrical materials were items such as parts of relays, breakers, transmitters, transducers, switches, valve motor operators, terminal blocks and connectors. The electrical parts consisted of approximately 150 equipment types by manufacturer and model/part number in harsh environments (LOCA conditions) associated with twenty safety-related systems. In addition, 250 equipment types by manufacturer and model/part number were identified in mild environments. Once the 150 harsh environment evaluations were completed, they were used to qualify the same material types in mild environments.

The mechanical materials were items such as gaskets, packings, seals, o-rings, grease, oil and lubricants. There were approximately 80 types of materials by manufacturer and model/part number.

The structural materials were items such as nuts, bolts, anchors and support materials (plate, shapes... etc). The structural materials were divided into three categories: mild steel, approximately ninety percent of the total items; high strength carbon steel, approximately eight percent of the total items; and stainless or potentially sensitive items, approximately two percent of the total items.

DPC used two approaches in their methodology for evaluation and documentation of past CQ purchases.

(1) Comparison Approach: This approach was primarily used to review installed electrical and mechanical parts. It consisted of the following:

(a) Review of vendor drawings, engineering data and/or vendor catalogs for replacement CQ items versus original Q items to identify possible changes in design, material and manufacturing process.

(b) Contacting the vendor (both manufacturer and supplier) to confirm that no changes or modifications were made. Purchase order numbers of both Q and CQ items were used as references. Vendor contacts were documented in letters or other appropriate memoranda.

(c) Receiving inspector reports (RIR) were retrieved to document the received part numbers. Plant test results were also retrieved to document equipment operability after installation.

(d) For certain items, additional analysis was performed to supplement the review. These analyses included items such as material degradation analysis, seismic analysis or future needs and effect analysis.

(e) For certain items, visits to vendor facilities may be performed for review of drawings and/or engineering data and to verify implementation of quality control procedures.

(f) Evaluations were documented in an auditable manner. They were similar to the equipment qualification central files which were audited and accepted by the NRC EQ Branch on December 6, 1984.

(2) Evaluation of CQ Materials: This approach was primarily used in the review of installed structural items. This approach was also used to release materials from stock, as well as to purchase new CQ materials. It consisted of the following:

(a) Establishing engineering criteria and verification requirements. Engineering criteria included critical performance characteristics, environmental and seismic requirements. Verification requirements were established to ensure that engineering criteria were met.

(b) Statistically valid sampling plans were used for the verification process where appropriate.

(c) Verification included inspection, and where appropriate, testing for hardness, strength, voltage and current, etc.

(d) Auditable records were established to support the engineering evaluations and conclusions, and the verification of criteria.

In some instances, materials purchased from OEMs were found acceptable based on testing, historical data or supplier history such as past audits, manufacturer survey (reaudit) or industry experience with a manufacturer.

The interim results of the evaluation and documentation program, as indicated in the interim 50.55(e) report indicated that to date, all items evaluated were satisfactoily confirmed for use in safety-related applications.

c. NRC Review of DECo Actions

A review of the licensee's program to evaluate and document past and present CQ purchases was conducted. The review was conducted in three phases. The first was an assessment of the written CQ program to determine if the program met regulatory and QA program requirements. The second was an assessment of the implementation of the written program. The third was to review action items from the previous two phases and to re-evaluate the finding documented in paragraph 24.a. of this report (reference Item No. 341/83-31-21).

(1) Written CQ Program

During this inspection, the following procedures were reviewed:

(a) QAPR 4, "Procurement Document Control", Revision 0
(b) NQAP 0401, "Procurement Document Control", Revision 1

(c) QAP 6, "Procurement Document Control", Revision 6
(d) PPM 3.58, "CQ Items - New Purchases", Revision 1
(e) PPM 3.59, "CQ Items - Past Purchases", Revision 1
(f) PDQE 41, "Preparation of Qualification Reports for CQ Mechanical Installed Equipment", Revision 0
(g) PI-EF-23, "Qualifying Electrical CQ Items", Revision 2
(h) Work Directive, "Development of Critical Performance Characteristics and Acceptance Criteria for CQ Items", June 18, 1984
(i) MI-M245, "Administrative Instruction - Criteria for Technical Review", Revision 1
(j) EF2-62-566, "Approved Supplier List", Revision B

The inspector determined that DECo had the following commitments per the Fermi FSAR:

1 For the construction procurement - 10 CFR 50, Appendix B

2 For operations procurement - Regulatory Guide 1.123, Revision 1-1977 and ANSI N45.2.13-1976

The licensee's written CQ program, as outlined in the QA procedures, implementing procedures, and work instructions and directives were found to be an acceptable method for implementing their commitments.

(2) CQ Program Implementation

To assess the implementation of the CQ program, purchase order line items were selected at random for review from the matrix compiled for all site CQ purchases. The sources for the matrix were DECo records, Daniels records, Warehouse Spare Parts Status Records (SPSR), new CQ items awaiting stock numbers, and yard and warehouse walkdowns. The matrix identified the following:

(a) Stock Number
(b) Manufacturer
(c) Purchase Order
(d) Line Item Number
(e) Quantity Purchased
(f) Unit Of The Item
(g) Date of Purchase
(h) Initiator Of The Purchase Order
(i) Vendor
(j) EQ/CQ File Number For Harsh Installed
(k) Proper Name of Material & Modifier
(l) Product Description
(m) Category Index Number By Discipline

Working with the purchase order number and the matrix, the licensee was able to provide qualification reports for the specific items. The inspector reviewed the following electrical

and mechanical qualification packages to verify evidence of qualification of the items and applicability of the conclusions reached by the licensee. This review included the qualification checklists, analyses, drawings or catalog sheets, purchase orders, and correspondence.

Component	Manufacturer	PO. No.
Terminal Block	Buchanan	A11628
Flex Conduit	STD Environmental Products	A110072
Amphenol Connector	Amphenol	D-54576
Wire Connector	3M Company	A-111450
Fuse	Bussman	A-116525
Lug	Bundy	A-010273
MCC Parts	ITE	D-53819
Clutch Parts	Limitorque	A-286335
Relay	Potter & Brumfield	A-059469
Resistor	Ohmite	A-116513
Pump Cooler Belts	Browning	A-116178
Bronze Bushing	Sham Rod	D-406440
Linkage	Paragon Steel	A-058816
Gasket	Nash Engineering	A-110739
Packing	Chesterton	D-421022
Compression Ring	Jamesbury	A-112504
Cyclone Separator	Borg Warner	A-116109
Stem & Disc Holder	W. Powell	A-113348
Gasket	Dragon	A-116193
Valve Stem	Rockwell	A-058238
Gasket	Rockwell	D-53293
Valve Parts	Anchor Darling	A-113535
Pressure Reducing Valve	Fischer Controls	A-113306
Gasket	Flexitallic	A-110766
Sealant	G.E.	A-110629

Structural material items were qualified generically because of large numbers of duplicate items. There were no specific packages to review; therefore, the review included the following position papers policy memo attachments, installed stock justification memos, and interim usage justification memos.

Material	Matrix Reference No.
Hilti Bolts	402.010
High Strength Bolts	426.060
Carbon Steel Structural Shapes	465.800
Stainless Steel Bolts	426.100
Stainless Steel Plate	456.300

(3) Action Items

The review of the written CQ program and its implementation indicated several areas where some minor changes were required.

The inspector requested that the licensee state the conclusions reached in the qualification packages and position papers more positively and to remove ambiguous statements such as "appears to be" or "may be qualified". These changes were made and the inspector reviewed them prior to the completion of the inspection. The inspector also requested a change to procedure No. PPM 3.59 ("CQ Items - Past Purchases") to clarify the approval and use of position papers instead of CQ checklists for structural items. This change was made and the inspector reviewed it prior to the completion of the inspection. No further response is required for these items.

The DECo 50.55(e) notification of March 27, 1984, and the interim report of May 25, 1984, were an acceptable response to the reply requested in the notice of violation (i.e., corrective action taken and results achieved; and corrective action taken to avoid further noncompliance). Further, the NRC inspection activity, as outlined in paragraph 24.c, found the corrective action acceptable and the program fully implemented. Therefore, this item is considered closed and no further response will be required.

d. Conclusion

Based on the results of the inspectors' sample of the licensee's CQ material evaluation and documentation program, it can be concluded that the installed CQ items are acceptable and that an adequate QA program is being implemented with regard to ongoing CQ purchases.

25. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during this inspection are identified in paragraphs 7.a., 7.d., 12.b., 15., 17.b., 21., and 22.

26. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the NRC or licensee or both. Open items disclosed during this inspection are discussed in paragraphs 10.b., 11.b., and 15.

27. Exit Interviews

The inspectors met with licensee management for a preliminary exit at the conclusion of the inspection on December 2, 1983. Further exit discussion meetings were held on December 5 and 14, 1983, in the Region III office and a final exit meeting was held in the Region III office on January 6, 1984. On August 10, 1984, Messrs. Westberg and Walker met with licensee representatives at the Fermi Plant to discuss the results of the CQ inspection. Licensee personnel in attendance at one or more of the meetings are listed in paragraph 1.

28. Enforcement Conference

The Region III staff met with Messrs. W. H. Jens, W. R. Holland and other members of the licensee staff for an Enforcement Conference on April 18, 1984. The items of noncompliance, as outlined in the Appendix, were summarized by the staff and the licensee provided additional information related to these findings.