

INSPECTION REPORT

U.S. NUCLEAR REGULATORY COMMISSION
 OFFICE OF NUCLEAR REACTOR REGULATION
 DIVISION OF REACTOR INSPECTION AND SAFEGUARDS

Report No.: 50-302/89-200

Docket No.: 50-302

Licensee: Florida Power Corporation
 Post Office Box 14042
 St. Petersburg, Florida 33733

Facility Name: Crystal River Nuclear Plant, Unit 3

Inspection At: Crystal River, Florida

Inspection Conducted: April 24 through May 5, 1989

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8/3/89
 Date

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Inspection Summary

Inspection Conducted from April 24 - May 5, 1989 (Report No. 50-302/89-200)

Areas Inspected: A special, announced inspection was conducted by the Vendor Inspection Branch to review the implementation of the licensee's vendor interface program and the program for the procurement of items for use in safety-related applications at the Crystal River Nuclear Plant, Unit 3 (CR3). The inspection team reviewed the documentation of specific vendor-related technical issues, including 10 CFR Part 21 notifications received at CR3, and the documentation concerning the procurement of safety-related installed equipment, including molded-case circuit breakers.

Results: The Nuclear Regulatory Commission (NRC) inspection team identified the weaknesses discussed below in the CR3 procurement program and the interfaces between the licensee and its vendors.

- (1) Numerous instances were identified where the licensee installed commercial grade items (CGIs) in safety-related systems without adequately evaluating their suitability for use in such applications. Verification of design and manufacturing/material changes, safety functions, critical characteristics, or receipt inspection requirements beyond a part number verification, and check for physical damage was not performed. The licensee also upgraded nonsafety-related items to safety-related through the material qualification form (MQF) process, in which traceability to the original manufacturer could not be established.
- (2) The NRC inspectors identified several instances in which the licensee failed to specify the provisions of 10 CFR Part 21 as being applicable on purchase orders (POs) for items intended for use in safety-related applications, that specified that the components or items purchased must be in accordance with nuclear specification or quality assurance requirements. Such procurements were not consistent with the definition of commercial grade items in 10 CFR 21.3 and thus the procurements should have specified the applicability of 10 CFR Part 21 on nuclear safety-related procurement documents.
- (3) The NRC inspectors identified that before the inspection, the licensee had not established a formal program for the receipt, evaluation, and implementation of recommended corrective actions for incoming technical information to CR3. As a result, certain service information letters (SILs) received from the emergency diesel generator manufacturer did not receive a documented evaluation for their applicability to CR3. In addition, information contained in the technical manuals and SILs was not being used to evaluate results from inspections and tests performed on the diesels. Two examples are discussed in Section 3.4.3.

The NRC inspectors also identified several vendor communications describing potential safety concerns that were received at CR3 but were improperly and/or incompletely assessed for their applicability to CR3.

Conclusion

The procurement and vendor interface program deficiencies identified have been classified as Potential Enforcement Findings 50-302/89-200-01, 02, and 03. These findings will be referred to the NRC Region II office for appropriate action.

1. PROCUREMENT

The NRC inspection team reviewed the programs for the procurement of services and parts, components, and equipment currently installed in safety-related applications at CR3. This review addressed the procedures that govern the procurement process, as well as the methods used to upgrade (dedicate) commercial grade items (CGIs) for use in safety-related applications. A program description and the results of the review of the CR3 procurement procedures are contained in Appendix B of this report. To evaluate the implementation of the program, the NRC inspectors reviewed selected CR3 procurements of items installed in safety-related systems that were procured both as commercial grade and as safety-related from approved suppliers having a 10 CFR Part 50, Appendix B, quality assurance (QA) program. In addition, the inspectors also reviewed CR3's program to dedicate items originally purchased as nonsafety under CR3's Material Qualification Form (MQF) process.

1.1 Procurement Package Review

To evaluate the procurement of services and replacement piece-parts, components, and equipment for use in safety-related systems, the inspectors reviewed purchases made under the CR3 system during the 5 years preceding the inspection in the following areas:

- ° upgrading nonsafety material to safety-related under the MQF process
- ° spare and replacement parts procured both as safety-related and as commercial grade as recorded in CR3's fully integrated materials information system (FIMIS)
- ° safety-related procurements that supported modifications made during the last two refueling outages
- ° safety-related procurements obtained from other nuclear utilities either directly or through material brokers
- ° upgrading of molded-case circuit breakers identified through CR3's response to NRC Bulletin 88-10

Additionally, the inspectors reviewed maintenance work requests for safety-related systems to identify maintenance activities that required the use of replacement parts. From these reviews, the inspectors identified numerous components that had been installed in safety-related systems and those that had been placed in inventory for future use in safety-related applications. The inspectors then reviewed the record packages for these specific component procurements. The review concentrated on the three key criteria given below to determine if the component selection, procurement, receipt, and dedication process (CGIs only) were appropriate for the circumstances.

- Were appropriate measures implemented to meet 10 CFR Part 50, Appendix B, Criterion III requirements for selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of systems, components, and structures?
- Were appropriate measures implemented to meet 10 CFR Part 50, Appendix B, Criterion VII requirements for ensuring that equipment conforms to the procurement documents, with appropriate provisions to ensure that objective evidence of quality is furnished to the licensee and evidence produced by licensee actions, such as examination of products upon delivery, are maintained to document that the requirements and specifications are met?
- Were the requirements of 10 CFR Part 21 imposed in procurement documents when required for manufacturers/suppliers to ensure as a minimum that nonconformances or failures to comply with requirements would be reported to the licensee so that the licensee could evaluate such deviations in accordance with 10 CFR 21.21?

The NRC inspectors reviewed approximately 150 procurement packages to determine if each procurement was performed properly and to evaluate the overall effectiveness of the CR3 procurement program. On the basis of their review of these packages, the inspectors found numerous instances of improper commercial grade dedications with inadequate or nonexistent supporting documentation (testing, analysis, or inspection data) to ensure the CGIs were suitable for the intended applications. Specific examples of components purchased safety-related, commercial grade, or nonsafety, and subsequently installed in safety-related applications follow:

- (1) The examples listed below are of safety-related purchase orders (POs) for which the licensee failed to impose the requirements of 10 CFR Part 21 on the supplier because the procurement was inappropriately classified as meeting the definition of commercial grade. These procurements referenced nuclear specifications that had been referenced in the original equipment procurement, therefore they could not meet the definition of commercial grade as defined by 10 CFR 21.3(a-1).
 - POs F9024437K and F9055078K - Issued to Vitro Corporation for replacement electronic trip modules used in the emergency feedwater initiation and control (EFIC) system that were procured as safety-related. The original Babcock & Wilcox specification, referenced in the procurement document, specified conformance to the requirements of the Institute of Electrical and Electronics Engineers (IEEE) code and standard IEEE 323-1974, "Standard for Qualifying of Class 1E Equipment for Nuclear Power Generating Stations."
 - POs F9056597C and F9059680C - Issued to Drbose Steel for piping elbows used in the service water system which were required to be supplied in accordance with their ASME Section III, NCA-3800 Quality Assurance program.
- (2) The examples listed below were purchased as commercial grade and installed in safety-related applications without an adequate dedication performed.

These examples were discussed with licensee representatives during the inspection. The licensee was requested to address each item because there was no documentation to verify suitability for application, safety functions, and critical characteristics beyond that which is inherent in the part number description shown in the manufacturer's catalog. Because of the number of items identified, the licensee was unable to adequately address each issue before the conclusion of the inspection. Therefore, during the exit meeting, the NRC staff requested the licensee to participate in a management meeting to discuss the issue of operability before the restart of CR3 for several key items. This meeting was held on May 12, 1989, at the NRC Region II offices. During this meeting, the licensee demonstrated general operability of these items through post-installation and periodic maintenance testing. Purchase orders representing these key issues are identified by an asterisk in the list of examples given below.

- ° *PO F9041437D - Issued to Nuclear Installation Service (NIS) on February 4, 1986, for the repair of a link bar (rigid strut assembly) for seismic support of the reactor coolant pump. Although NIS had been placed on CR3's Approved Nuclear Suppliers' List (ANSL) in January 1986, because it had an ASME NA & NPT certification, it was subsequently removed from the ANSL in 1987. The inspectors noted that a review of NIS's QA manual was not performed as required by Section 7.1.3.3 of the CR3 Nuclear Procurement and Storage Manual (NPSM). The PO did not impose the requirements of 10 CFR Part 21 on the repair, but categorized the work as safety-related. The inspectors noted the licensee had developed a source inspection plan for the repair, however, documentation was not available to demonstrate that the inspection was performed. The receipt inspection plan covered only a visual inspection of the part number and a check for physical damage. No inspection was performed to verify thread engagement in the vicinity of the repaired area or structural load capacity of the assembly. Additionally, from the documentation in the PO package, it appeared that NIS subcontracted the repair work to a subvendor, Pioneer Machinery, with the authority to replace components as necessary. There were no material certifications or repair standards in the package to determine the extent of work that was actually performed.
- ° *PO F9043964C - Four hundred 7/8-inch heavy hex nuts, ASTM Grade C, were purchased from Bolt Industries for use in nonpressure-retaining applications. Receipt inspection was performed in accordance with Section 8.4.3 of the CR3 NPSM and receipt inspection plan No. 121. As a result, the nuts were found satisfactory and released for use. On April 2, 1989, a crack was visually identified in a nut being prepared for painting. A dye penetrant test was performed and indicated the crack extended through the wrenching surface of the nut. The one nut was returned because it did not comply with CR3 Procedure MP-139A and a quality materials problem report was written. At the time of the NRC inspection the licensee had not determined the application of the remaining nuts, however, work requests indicated possible use on the reactor coolant pumps. Twenty nuts were used on the moisture separator reheater lifting beam, while the rest of the nuts were held in the warehouse pending further disposition. No further testing was performed on any of the nuts.

- The following POs were for safety-related items procured as commercial grade from the original equipment manufacturer, Colt Industries, with one exception, without an adequate dedication. Dedication was limited generally to a part number verification and receipt inspection, which included a check of cleanliness and physical damage. These items were installed in the 1A and 1B emergency diesel generators (EDGs).
 - *PO F9032244K for an aluminum main bearing shell assembly
 - PO F9024863K for a blower assembly
 - PO F840247K for jacket elbow insulation
 - PO F9042129K issued to Square D Company for a class 9012, Type ACW-9, Pressure Switch
 - PO 205480K for manifold exhaust bolts
- PO F9038125V - Issued to Norton Corrosion Limited for an extended snout, 9-inch shielded Bayanode element used for cathodic protection and installed in the service water system. A review of the procurement file revealed the following deficiencies: Hardness testing upon receipt was required in the CR3 receipt inspection plan but was not addressed in the verification plan and consequently was not performed; electrical characteristics were not addressed; traceability was not established from the material manufacturer's certificate to that of the Bayanode's manufacturer's certificate; and a review for suitability of critical operating requirements was not performed.
- PO F9051657K - Issued to Babcock & Wilcox for a body rotating face (3rd stage seal) for the reactor coolant pumps (RCPs).
- PO F9041836K - Issued to Babcock & Wilcox for a seal package holder spring for the RCPs.
- *PO F9028919K - Issued to Woodward Governor Company for a governor, Model No. 9903-224 US, S/N 0286575, that was procured commercial grade and installed on the No. 1 emergency feedwater pump. Dedication was limited to a part number verification in an attempt to verify equivalency to the original governor installed. The licensee did not verify with Woodward that no material or design changes had occurred since the original procurement nor did it receive, as requested by the original PO, certification stating that the subject replacement governor met or exceeded requirements imposed on original Test Specification No. 494. The receipt inspection was limited to identification and marking, physical damage, and cleanliness. Seismic performance and mounting configuration were not addressed by the licensee because it believed this was a like-for-like replacement and, as such, would not require any evaluation.
- PO F9060133V - Issued to Abbott Associates for a 5-inch duo-check valve installed on the 1B EDG. Nuclear engineering's specific instructions, as contained in CR3's safety-related procurement

checklist form, specified an alloy separator test of the valves to confirm the material's conformance to manufacturer's catalog No. 310-4. The applicable receipt inspection plan did not incorporate this instruction; consequently the test was not performed. Inspection was limited to identification and marking, physical damage, and dimensions.

- ° PO F9021925K - Issued to York Corporation for a model HT-230 purge unit compressor that was installed in the chilled water system. A review of the procurement records identified the following deficiencies: no receipt inspection plan was provided; critical characteristics and safety function were not identified; and no basis existed for the licensee to accept a certificate of compliance from the vendor. York was approved as a safety-related commercial supplier because it had an ASME Section VIII program that covered pressure vessels; however, this appeared not to be related to the manufacture of a purge unit compressor. In addition, Section VIII requirements are not equivalent to those required for items in safety-related applications.
- ° PO FF17817V - Issued to W. R. Ladewig Company for a 200-pound-per-square-inch spring, manufactured by C. and M. Spring Engineering Company, used in a $\frac{1}{2}$ -inch Texsteam pressure relief valve that was installed in the decay heat closed cycle cooling system. A review of the procurement package revealed the following deficiencies:
 - a. The package did not contain a specification, certified functional test report from the vendor, or a configuration certificate.
 - b. The material certificate of compliance from the supplier was not traceable to the spring manufacturer's certification, which in turn was not traceable to the material manufacturer's certified material test report.
 - c. The basis for W. R. Ladewig to certify that items supplied are equal to or superior to and interchangeable with Texsteam valve parts was not evident.
 - d. The licensee's verification plan identified procedure MP-119 as the basis and criteria for a functional characteristic test; however, MP-119 does not address the full-lift or blow-down requirements, the test medium differential between air over water, or the service condition.
 - e. A letter dated June 24, 1983, from W. R. Ladewig to the licensee states that the springs are to be checked by Charles Karrh. However, this was not evident from the NRC inspector's review of the package.
 - f. The parts were procured for a Texsteam Figure 3152-2 pressure relief valve. However, the site functional test to verify characteristics for fit, operability, and reliability verified performance using a type 1452-S pressure relief valve.

The following are examples of items purchased nonsafety, upgraded, and installed in safety-related applications without an adequate dedication performed utilizing the MQF process. Since this process upgrades items initially purchased for nonsafety applications, procurement records pertinent to each purchase have not been maintained, therefore, traceability to the original equipment manufacturer (OEM) is not possible. This deficiency introduces the potential for the licensee to receive misrepresented items/components from sources other than the OEM, which is discussed in NRC Bulletin 88-10, "Nonconforming Molded-Case Circuit Breakers," issued November 22, 1988. Another deficiency existing within the MQF process, as identified by the NRC inspectors, is dedicating an MQF component or replacement part when the licensee is unable to obtain certification from the supplier that no design manufacturing or material changes have occurred. Without such assurance, certification of the components ability to meet all design and operating conditions, including seismic, is doubtful. Attributes such as the components' safety function and critical characteristics were not documented in this process. Dedication primarily consisted of a part number verification of the replacement item to determine equivalency. Documentation was not available to support the items' seismic qualification.

- ° MQF 1436-89 - Transferred three ASCO series 8321, three-way, air-operated solenoid valves, initially procured as nonsafety, from the CR4 fossil plant to CR3. These valves were installed in valves CAV-6-SV and CAV-7-SV in the chemical addition system. The basis for dedication was limited to a visual inspection, part number comparison with page 48 of ASCO's commercial grade catalog No. 31, and a continuity check of the solenoids electrical coil.
- ° MQF 1433-89 - Upgraded two series 8321 and two HT 8320A20 three-way air-operated ASCO solenoid valves. The electrical coils from the 8320 series valves were installed in the 8321 series valves that were subsequently installed in main steam valves MSV 130 and 138. The dedication basis for the four ASCO valves was limited to a visual inspection and a part number comparison to that in the ASCO commercial grade catalog.
- ° MQF 1426-88 - Upgraded 24 SB11AR, 5-amp, 125-volt pressure switches and TG10-A32BR-type transducers, both manufactured by ASCO. Characteristic verification was limited to a visual check to demonstrate that the components were not physically damaged and that the nameplate details on the components matched those on the MQF. Verification results indicated that all 24 switches were acceptable. ASCO implements an Appendix B quality assurance program during the manufacture of items procured as safety-related. However, items ordered to commercial grade requirements do not benefit from this program and have been previously reported by NRC (Information Notice 87-66) to have unacceptable performance for safety-related applications.
- ° *MQF 1413-88 - Upgraded two Agastat 7012 ac model time delay relays. Characteristic verification was limited to a visual check of the physical dimensions per the Agastat catalog and of physical damage and a verification of nameplate details, such as voltage and time range. CR3 Work Request 106190 documented the bench tests performed

on the relays to set the time delay to 10.02 and 10.07 seconds. The relays were installed in 'A' and 'B' control rod drive breaker cabinets in the "K-6" position. The seismic performance of the relays used in this application and the certification to the original configuration were not demonstrated by the licensee. In addition, Agastat does not recommend this model relay for nuclear Class 1E applications.

- ° MQF 1346-88 - Upgraded a Curtis Model RS-8 relay socket assembly installed in the "K-7" position of the shunt trip assembly used in the reactor trip breaker control circuit. Dedication was limited to checking the dimensions and configuration with that in the Curtis catalog and a part number verification. Seismic performance was not verified because the licensee believed that a like-for-like replacement was used.
- ° MQF 1345-88 - Upgraded a Potter & Brumfield KRP 11 DG 24-volt dc (Vdc) relay used in the "K-7" position of the shunt trip assembly of the reactor trip breaker control circuit. The characteristics verification was limited to a visual check of the relay and a dimensional check against the catalog. Inspection for part number, physical damage, and a verification that the relay is rated for 24 Vdc were performed. The results of the evaluation indicated that the relay was acceptable and was tagged "Mild Environment Use." No electrical bench tests were performed to energize the relay and verify change of state of contacts before installation. In addition, seismic performance of the relay was not verified.
- ° MQF 1341-88 - Upgraded a 600 volt, three-phase, 100-ampere ITE molded-case circuit breaker, model HE 3A100, used in motor control center 3A1 to control operation of spent fuel pool pump 1A. The characteristic verification was limited to a visual inspection to compare the dimensions with those listed in the catalog, to check for physical damage, and to verify nameplate details. There was no evidence that the pump would provide the necessary flow rates. In addition, no testing was performed to verify the seismic performance of the breaker and the overall qualification of the parent component.
- ° MQF 1332-88 - Upgraded a 600 volt, three-phase, 10-ampere, HE 3A010-type, ITE molded-case circuit breaker installed in connection with valve MUV-53, located in the makeup system. Characteristic verification was limited to a visual inspection to verify the dimensions and part number and to check for physical damage.
- ° MQF 1301-87 - Upgraded a three-phase HE 3A025-type ITE molded-case circuit breaker required to replace a failed breaker on motor control center 3B1 (unit 11B), which powered a motor-operated valve located in the decay heat removal system. The characteristic verification was limited to checking the dimensions and part number.
- ° MQF 1228-87 - Upgraded a Potter & Brumfield relay that was installed in the decay heat removal system. Dedication was limited to a visual inspection to determine part number and overall configuration with the manufacturer's catalog.

- ° *MQF 1084-86 - Upgraded a single-phase, 70-ampere EH 1B070-type ITE molded-case circuit breaker that was installed in the distribution panel feeding the vital plant security system. The characteristic verification was limited to a visual inspection of the configuration with the ITE catalog, verification of part number, and physical damage.
- ° MQF 972-85 - Upgraded three Model VIIHAA three-way air-operated solenoid valves, manufactured by Johnson Controls, for use in the air damper system for the 1B EDG. Dedication was limited to a visual inspection to determine equivalency with the manufacturer's catalog.
- ° MQF 954-85 - Upgraded a Limatorque Model SMB-C actuator assembly purchased from the Harold Faust Company and installed in the reactor building spray inlet valve, BSV-3. Dedication was limited to a visual inspection to verify configuration with that on pages 21-24 of Limatorque Catalog SMBI-82C.
- ° MQF 940-85 - Upgraded four ASCO air-operated solenoid valves (Part No. HT 8321A8) that were installed on service water valves SWV-353 and SWV-354. Dedication was limited to a visual inspection with the ASCO commercial grade catalog to ensure equivalency. As pointed out previously, ASCO manufactures a safety-related item for Class 1E applications and a commercial grade item, both in the 8300 Model series. The safety-related model number is prefixed by the designation NP (e.g., NP8329) and is the only solenoid valve recommended and qualified by ASCO for nuclear use.

1.2 Review of the Licensee's Response To NRC Bulletin 88-10

The licensee responded to NRC Bulletin 88-10, "Nonconforming Molded Case Circuit Breakers," by letter 3F0380-10 dated March 7, 1989. The licensee determined that the 94 breakers stored in the warehouse were intended for installation in safety-related systems. The licensee reported to NRC that its review of the procurement documents showed 70 of the 94 breakers were traceable to the original manufacturer. Procurement documents for the remaining 24 breakers were not available. As a result, a material problem report (MPR), dated December 26, 1988, was generated by the licensee to identify the lack of traceability to the original manufacturer. The MPR recommended that the 24 breakers be sent to the current manufacturer of ITE breakers, Siemens Energy and Automation, Wilmington, North Carolina, for inspection and confirmation that they were genuine ITE breakers and that they had not been tampered with. The licensee issued PO F740081A to the Hughes Supply Company, St. Petersburg, Florida, to authorize Siemens to inspect the breakers and determine if they were manufactured by any of the ITE companies and if there was any evidence of refurbishment. Twenty-four breakers were shipped to Siemens as indicated by CR3 shipping manifest No. 293-0073, dated January 23, 1989. In a letter dated February 28, 1989, Siemens stated that the CR3 breakers were inspected by quality engineers who determined that the breakers in question were manufactured by ITE and exhibited no signs of alteration by an outside party.

During this inspection, the NRC inspectors examined 23 breakers returned by Siemens to CR3. Twenty-one of these had labels to denote that they were manufactured by ITE Imperial, the original manufacturer or ITE Gould, the first successor to ITE Imperial. The remaining two breakers, HE 3A025-type, had current Siemens Energy and Automation labels. These two breakers appeared to be new with a manufacturing date code of March 1989. A visual examination of the remaining 21 breakers revealed that they were affixed with an inspection label to indicate that Siemens tested the breakers. However, since the verification of product acceptability on these 21 breakers was performed without the benefit of a Siemens documented quality assurance program, the licensee intends to downgrade the items to nonsafety.

The NRC inspectors selected 5 of the 70 breakers that were traceable to POs placed with the Square D Company. Visual examination of the Square D and Underwriters Laboratories labels indicated that they were original and were not misrepresented or tampered with and were all in the original cartons furnished by Square D.

1.3 Upgrading of Commercial Grade Molded-Case Circuit Breakers

The licensee used the MQF process to upgrade commercial grade components, including molded-case circuit breakers. An MQF was issued as a result of a work request that may have identified an inoperable component and that documents the installation. The MQF references a component in the warehouse, originally purchased as nonsafety and with no procurement documents at hand, and outlines characteristics to be verified to dedicate the item and subsequently install it in a safety-related application. The results of the evaluation are also documented on the MQF. The licensee used a quality control issue form to obtain the breaker from the warehouse. Post-maintenance tests were conducted, in some cases, to verify the function of the component installed.

The inspectors reviewed several MQFs, which indicated that electrical bench tests were not performed to verify selected critical characteristics before the installation of the breakers. As a minimum, (1) the electrical characteristics, such as the ability of the breaker to close at the rated current and voltage for a specific time, (2) the breaker response to at least one instantaneous overload value on the manufacturer's published curve, and (3) the breaker coordination requirements (as applicable) should have been verified. Additional tests that should also have been addressed include magnetic trip calibration, trip functionality, contact resistance, insulation resistance, and a thermal trip test, but were not performed as part of the overall dedication process. As stated previously, traceability to the original equipment manufacturer cannot be established using the MQF approach.

2. QUALITY ASSURANCE AUDITS

The inspectors reviewed the licensee's Procurement and Materials Quality Assurance Program for the evaluation and control of supplier quality performance for safety-related materials, equipment, and services. The procurement and materials quality assurance group onsite has responsibility for the vendor evaluations. Suppliers of safety-related items or services that are particular to the nuclear industry are required to implement a quality assurance (QA) program in accordance with 10 CFR Part 50, Appendix B, and ANSI N45.2, as applicable to the scope of work

performed. The licensee ensures the capability of suppliers of safety-related items through performing periodic quality program evaluations (to establish initial qualification and adequacy of supplier changes thereafter) and by assessing the quality of items or services through inspection and surveillance. Qualification of supplier's QA programs may also be established by the results of evaluations conducted by other organizations, such as other nuclear utilities or the American Society of Mechanical Engineers (ASME). Commercial suppliers that provide items or services not unique to the nuclear industry are evaluated to ensure adequate control of their commercially available product. The results of supplier quality program evaluations are documented and status of suppliers is maintained on the approved nuclear suppliers list (ANSL).

2.1 Review of Safety-Related Supplier Evaluations

FPC evaluations of safety-related suppliers consist essentially of four elements: (1) accumulation of applicable evaluation data, (2) review of nuclear evaluations performed by others, (3) review of the supplier's QA manual, and (4) establishing the need for a supplier's facility audit. Several sources of supplier data are used to accumulate the necessary information for evaluation. Questionnaires, information requests, and quality program update requests are distributed to suppliers as necessary or appropriate for the product or service to be supplied. Procedures are requested for review as well as (or in place of) the supplier's quality assurance manual. A copy of any ASME certificate, if applicable, also is requested. The licensee's staff may be requested to provide information on the basis of their personal experience with the item or service. The supplier also is requested to provide an audit report from an accredited industry source (e.g., Coordinating Agency for Supplier Evaluation (CASE), holders of ASME certificates of authorization, NRC-licensed utilities, and CR3-approved contractors). If there is insufficient information to indicate satisfactory compliance with applicable requirements from the above mentioned sources, the supplier's QA manual is reviewed for inclusion of controls to assure compliance with all QA requirements applicable to the item or service requested.

A facility audit of the supplier's QA manual is not required when any one of the following conditions exist:

- ° A satisfactory audit of the supplier's QA program was conducted in the past 3 years and evidence of this audit may be provided by industry sources such as those listed above.
- ° The latest index of companies holding an ASME Section III certificate of authorization identifies that the supplier has been evaluated and approved for the same or similar nuclear item or service within the past 3 years.
- ° Other accredited nuclear references have confirmed (by a facility audit in the past 3 years) the effective implementation of the supplier's QA manual.
- ° ASME Section III, Paragraph NCA-3800, Material Suppliers holding valid ASME quality systems certificate (QSC) are evaluated on the basis of their QA manual, including a description for the positive identification of material and the qualification of material manufacturers. ASME QSC certificate holders are also qualified to supply nonCode, safety-related items based on the ASME accreditation.

- Suppliers approved for safety-related items also shall be evaluated for the supply of commercial grade items.

It should be noted that with respect to the above, NRC Information Notice (IN) 86-21, "Recognition of American Society of Mechanical Engineers (ASME) Accreditation Program for N Stamp Holders," dated March 31, 1986, recognizes that if ASME has surveyed the supplier and issued a certificate of authorization of appropriate scope, the licensee may place the supplier on their approved suppliers list without performing any additional evaluation of the supplier's QA program. However, this recognition applies only to the programmatic aspects of the ASME Accreditation Program and licensees are still responsible for ensuring that its supplier is effectively implementing its approved QA program. The licensee's interpretation is not consistent with the IN.

2.2 Implementation Review

The inspection reviewed eight safety-related supplier evaluation packages, relating to the safety-related nuclear procurements reviewed during the inspection. This review revealed that seven of these suppliers were placed on the ANSL on the basis of a facility audit performed by other than CR3 personnel. Procurements were subsequently made without evidence that the licensee had performed a facility implementation audit of the suppliers' quality program before issuing the purchase order. A description of these vendors and associated issues are given below.

- Vitro Corporation, Silver Spring, Maryland, supplied both safety-related and commercial grade items; however, the supplier evaluation package did not document evidence that the quality program for commercial grade items had been evaluated as required in Section 7.1.3.10(b) of CR3's Nuclear Procurement & Storage Manual (NPSM).
- Hub, Incorporated, Tucker, Georgia, supplied safety-related items; however, the supplier evaluation package did not document that the vendor's qualification audits/evaluations of sub-suppliers had been evaluated by CR3 as required in Section 7.1.3.9(c) of the NPSM.
- American Export Trading supplied ASME Code "N" stamped valves manufactured by Anchor-Darling, Williamsport, Pennsylvania, and by Hirata Valve Industry Company, Kakaski, Japan. However, neither Anchor-Darling nor Hirata Valve have been qualified by CR3 as approved suppliers and placed on the ANSL.
- Babcock & Wilcox, Lynchburg, Virginia, was audited by CR3; however, the scope of the audit and qualification did not include field repairs of in-core detectors performed under Work Authorization No. N1893D30.
- Nuclear Installation Services Company, Lakeland, Florida, supplied safety-related items to CR3; however, the supplier evaluation package did not document that the quality program manual had been reviewed as required in Section 7.1.3.3 of the CR3 NPSM.
- Colt Industries, Fairbanks Morse Engine Division, Beloit, Wisconsin, supplied safety-related items; however, the supplier evaluation package did not document that CR3 had performed an implementation audit.

2.3 Review of the CR3 Commercial Grade Supplier Evaluations

Under the licensee's program, commercial grade suppliers (catalog type items) are approved and the evaluations are documented by a vendor quality evaluation report (VQER) based on the satisfactory evaluation of a minimum of one of the following: (1) survey results indicated in the latest edition of the CASE register, (2) quality manual review documented on the VQER (MIL-Q-9858, MIL-I-45208, and ASME Section VIII, are considered by the licensee to be consistent with 10 CFR Part 50, Appendix B), and (3) product performance review data from sources such as NPRDS or INPO SEE-IN data systems, NRC Bulletins and Information Notices, NUREG-0040, or applicable Military Specification Qualified Products Lists. Suppliers of calibration services are evaluated on the basis of the suppliers' response to a calibration service questionnaire and may include a quality program manual review and/or a review of other nuclear evaluations.

A review of seven commercial grade supplier evaluation packages revealed that all seven suppliers were placed on the ANSL and subsequent procurements made without a facility audit of the supplier by CR3 to verify implementation of the supplier's quality program or to verify the basis of accepting certificates of conformance. A description of several of these suppliers and associated issues are given below.

- ° Borg-Warner was chosen to supply a compressor purge unit for the chilled water system on the basis of an evaluation of an ASME Section VIII quality program. However, this is not an adequate basis for approval, since Section VIII does not cover nonmetallic materials, electrical items, or other nonpressure retaining components of the purge unit compressor. Additionally the compressor assembly would not contain an ASME Section VIII pressure vessel component.
- ° Bolt Industries, Ocala, Florida, was chosen to supply anchor sleeves without a facility implementation audit to establish the bases for CR3 to accept a certificate of conformance.
- ° Worthington Pump Company, Harrison, New Jersey, was chosen to supply a pump impeller (PO No. F16936K) in August 1983. Worthington was qualified as an approved supplier based on a CASE audit that contained a conditional approval status from 1977 to April 1985 only for the Harrison, New Jersey facility. However, the supplier evaluation package did not document the control of procurement activities regarding certain manufacturing facilities or other restrictions noted in the CASE audit.
- ° Woodward Governor Company, Fort Collins, Colorado, was approved as a supplier on the basis of a CASE audit that contained the following quality program restrictions: (1) quality assurance (QA) does not perform design reviews; (2) outgoing purchase orders are not reviewed by QA; (3) QA does not maintain an approved list of suppliers and does not control placement of purchase orders; and (4) the Woodward audit program does not include vendors or address seismic and equipment qualification requirements. The licensee's supplier evaluation package did not document the control of procurement activities regarding the restrictions identified in the CASE audit.

- ° Automatic Switch Company (ASCO) was qualified on the basis of an audit performed by Florida Power and Light (FPL). FPL had placed a restriction on ASCO requiring that source surveillance be performed during final airtest and that operational tests be performed on completed valves. The CR3 supplier evaluation package did not document control of procurement activities regarding the restrictions noted in the FPL audit. Seven ASCO purchase orders were reviewed and none contained requirements for source inspection.

2.4 Review of the CR3 Approved Nuclear Suppliers List (ANSL)

The results of the CR3 supplier quality program evaluations are documented and the status maintained on the ANSL. Although the ANSL identifies suppliers best qualified to furnish safety-related items or services, purchases may be made under the commodity or verification methods (refer to Appendix B of this report) with companies that are not listed on the ANSL. Commercial grade commodity vendors supplying generic type items or services are not required to be on the ANSL, unless noted on the commodity evaluation sheet. A commercial grade vendor must be on the ANSL when purchases are for (1) nonstandard mill lengths or broken lots, (2) items that are not marked by the manufacturer and critical characteristics are specified that require mandatory verification upon receipt, or (3) fasteners. The inspectors reviewed the commodity evaluation sheets for PO No. F9034051C (Consolidated Electric), PO No. F9024651C (House of Treads), and PO No. F16461C (H. A. Busbee), which indicated that the supplier was required to be on the ANSL; however, the documentation showed they were not.

Nuclear supplier evaluations are valid for a period of 3 years from the date that the last facility audit was performed (may be performed by other than CR3) and evaluated. Commercial supplier evaluations are valid for a maximum period of 3 years from the actual onsite CASE "survey date" as listed in the latest revision of the CASE register or the actual date of the performance and/or the QA Manual review. Suppliers initially approved for a period of more than 1 year will receive an annual performance review. All approvals and reapprovals are incorporated into the ANSL. The ANSL itself is not used as a decision making instrument, but rather as a "listing" only. The procurement and materials quality assurance group reviews the vendor evaluation package for each purchase order and selects the approved supplier on the basis of the documented evaluation in each package.

3. LICENSE/VENDOR INTERFACE

3.1 Processing of Incoming Vendor-Related Information

The NRC inspectors reviewed the processing, evaluation, and actions taken for: Babcock & Wilcox (B&W) Transient Assessment Program (TAP) Reports, B&W Potential Safety Concerns (PSC), B&W letters, Byron Jackson Service Notes and Bulletins, Colt Emergency Diesel Service Information Letters, NRC communications, and other vendor information including 10 CFR Part 21 notifications. The licensee/vendor interface process at CR3 is primarily described in CR3's Nuclear Operating, Licensing, and Administrative Procedures. The CR3 procedures for controlling this process are:

- ° NOD-06, Technical Information Program

- NL-03, Nuclear Licensing Procedure, Correspondence
- NL-06, Nuclear Licensing Procedure, Resolution of Safety Concerns
- AI-404, Review of Technical Information
- DC/RM 375, Routing and Processing Incoming Technical Information

Additional procedures are used by the licensee for specific actions associated with the process. During the inspection, the inspectors reviewed the licensee's training on these procedures and the control of technical information. Recently revised Procedures, NOD-06 and AI-404, identify areas of responsibility and describe the review and processing of most technical information received by the licensee. Procedure AI-404 outlines the tracking of the initial evaluation as well as the associated corrective actions.

Nuclear operations personnel familiar with the process are required to affix a vendor and technical information routing slip to the material received and identify applicable review requirements on the slip. During the inspectors' review of this process, it was found that several engineers interviewed were either not aware of these procedural requirements or disregarded the guidance. The primary deficiency associated with the review of AI-404 was that virtually anyone onsite could be a recipient of vendor furnished technical information to CR3. As a result, technical information may be erroneously classified as "no evaluation required," sent to document control, and filed without the benefit of an evaluation for applicability to CR3. The review indicated that vendor technical information was not properly processed, evaluated, and dispositioned. The inspectors were additionally concerned with this deficiency to follow procedures because several individuals interviewed were trained in the handling of incoming technical information previously and should have been familiar with the process. During the inspection the licensee wrote Nonconforming Operating Report 89-84 identifying similar problems resulting from a lack of training that have the potential to affect the operability of plant components and systems. However, this action appeared to have been prompted by the NRC's visit to CR3 several weeks before the inspection and, as such, credit for self-identification by the licensee has not been given.

CR3 procedures NL-06 and NL-03 define the processing and responsibilities for the control of certain correspondence within the licensing department. Specifically, this involves the review and resolution of B&W potential safety concerns (PSCs), and other related safety concerns, including internally generated issues, issues received from sources outside CR3, and compliance with 10 CFR Part 21 and 10 CFR 50.59 requirements. During the inspection, CR3 management proposed to process future reviews, evaluations, and resulting actions through a single group to ensure consistent and timely response to all future technical communications received at CR3 from suppliers.

3.2 Specific Vendor Issues

During the inspection, various vendor communications were requested and reviewed to verify proper receipt, evaluation, and disposition. The inspectors identified areas where issues were improperly evaluated and others where programmatic and specific deficiencies existed as well as concerns with the timely disposition of vendor technical issues. However, the B&W transient

assessment reports (TAPs) appeared to be properly evaluated for applicability to CR3 and, with a few notable exceptions, NRC information notices received an acceptable level of review. Examples of deficiencies in the disposition of incoming vendor furnished technical information are provided below.

(1) B&W Potential Safety Concerns (PSC)

- ° PSC 1-84 was issued to CR3 in December 1986 and dealt with a flow-induced vibration problem that could damage steam generator tubes during certain transients. The problem was originally identified in 1984 by B&W; however, owners were not alerted at that time to the potential issue for reporting or corrective action. This PSC has been opened at CR3 for over 2 years with no projected date established for completion.
- ° PSC 3-87 was issued on October 20, 1987, to alert owners of a potential problem with the repair limit for tube plugging as identified in plant Technical Specifications. The licensee closed the issue on the basis of its preliminary findings with a final evaluation scheduled for the first quarter of 1988, which was when the licensee expected B&W to complete its final evaluation. As of the date of the inspection, the licensee's evaluation is still incomplete and the scheduled due date has now been established as late 1989.
- ° PSC 9-86 was issued on March 31, 1987, to alert owners of a potential problem with Bailey-supplied potentiometers that were found to have loose internal parts. The licensee investigated the problem and found that some of the installed assemblies had free-play but were within an acceptable tolerance. The issue was closed with the commitment to add cautions to Procedures SP-112, and-113 to check for free-play during surveillance and to replace assemblies as required. This disposition was performed in January 1988; however, the cautions have still not been added to the procedures.
- ° PSC 15-86 was issued on February 16, 1987, to alert owners of a potential safety concern with pressurizer surge line thermal fatigue. The licensee closed the issue a year later as a result of the issuance of NRC Information Notice 88-80 which notified licensees of a similar problem that occurred at Trojan. The final resolution will be handled in accordance with CR3's response to NRC Bulletin 88-11. This is another example of an untimely response to a generic safety concern.

(2) Vendor Information Received At CR3

- ° Terry Turbine issued a letter on July 23, 1985, to alert owners of possible problems relating to the seismic requirements for turbine-to-pedestal bolting. The licensee evaluated the issue on April 6, 1988, and recommended inspecting the bolts during the next disassembly of the turbine. The inspectors determined this evaluation to be inadequate because it may be years before the inspection is performed, if at all. Additionally, several of the bolts and studs can be visually inspected without disassembly of the turbine to determine their identification and seismic qualification.

- General Electric Service Information Letter No. 44 was issued on June 25, 1987, to inform licensees of the need to perform HFA relay pickup voltage adjustments. Initially the licensee stated that the relays would be tested; however, the CR3 maintenance department did not agree with the original evaluation and subsequently determined that the testing was not required. This evaluation is inadequate since the HFA relay pickup voltage adjustment is necessary to ensure proper operation.
- Limitorque Corporation issued a letter on August 13, 1985, to alert licensees to a potential failure mechanism within the worm gear shaft for certain valves used at CR3. The licensee determined that the valves were not operated in the manner described in the letter so the issue was closed. This evaluation was inadequate because if the valves are operated or tested in this manner in the future the failure may occur. A caution should be added to the CR3 procedures or equipment manual to preclude the potential for this type of valve failure.
- Seven of 12 Byron Jackson Service Notes and Technical Alert Bulletins issued to CR3 were noted as being completely evaluated as required by the CR3 program. The balance of the technical bulletins issued were not fully reviewed, documented, or input into the system.
- Terry Turbine has issued several design improvements and other correspondence identifying problems and modifications applicable to its turbines. CR3 was only aware of letter Number 14, which was received by CR3 during a Terry representative's visit to CR3. The notification had never been entered into the technical information program. An improved vendor interface program should be established with Terry Turbine and other "key" manufacturers of safety-related equipment.
- Fisher Controls has issued six Fisher Anomaly Notices since 1986; however, only one notice was received by CR3 through a Fisher representative. It is currently unclear what effect the other notices may have on CR3. This is another example of the importance of maintaining formal contact with key vendors of safety-related equipment.

(3) Review of CR3's Evaluation of NRC Information Notices (INs)

- IN 87-66, "Inappropriate Application of Commercial Grade Components," was issued to alert licensees to potential problems resulting from inappropriate application of commercial grade components within qualified Class 1E electrical systems and to identify the differences in the quality and qualified life expectancy between manufacturers' nuclear and commercial grade relays and other components. The licensee determined that no action was required because the purchase, storage, and issuance of parts and materials for CR3 is controlled by CR3's Nuclear Procurement and Storage Manual. During discussions with licensee personnel, it was revealed that the above disposition was concluded without any specific program review and without the benefit of assigning any review tasks to the cognizant groups. It was also noted that the licensee's evaluation did not address the aspect of qualified or projected life expectancies of the Agastat relays,

which are two years from the date of manufacture for commercial grade 7000 series; while its safety-related counterpart, the E7000 series, has a 10-year or 25,000 cycle life expectancy. An example of a commercial grade Agastat relay upgraded by CR3 and installed in a safety-related application is described in Section 1.2 of this report.

IN 88-35, "Inadequate Licensee Performed Vendor Audits," was issued to alert licensees to potential problems relating to recent instances of licensees performing inadequate audits at vendor facilities. The IN describes specific examples in which the NRC identified numerous and/or significant problems with vendor audits despite previous licensee audits that should have identified such deficiencies. The licensee indicated that it had revised Procedure QAP 30, "Vendor Audits," to add a requirement for the QA/procurement department to review the proposed vendor and product that will be audited to determine the extent of technical support required to support the audit. This action is inadequate since it did not address the concerns discussed in the IN that licensees may not be adequately implementing their QA program requirements, especially Criterion VII of 10 CFR Part 50, Appendix B. For example, the Amerace Corporation, manufacturer of Agastat 7000 series timing relays, was referenced in the IN as a supplier who failed to adequately establish and implement a QA program in several areas, as identified during an NRC inspection performed in 1986. However, CR3's evaluation of the IN did not recognize this fact, but only noted that additional auditors may be necessary to support future audits. Licensees also were reminded of their responsibility to assess the effectiveness of their contractors' quality control program by such actions as verifying the validity of and the basis for manufacturer/vendor records, such as certificates of conformance.

IN 88-56, "Potential Problems With Silicone Foam Fire Barrier Penetration Seals," was issued to alert licensees to potential problems with silicone foam (SF) sealant material used in fire barrier penetration seals. Problems with SF sealant material may result in the reduction of the fire-resistive capability for protecting safety-related redundant equipment, including electrical power and control circuits. The licensee's evaluation of the IN states that CR3's Station Procedure (SP) 407 is used on an 18-month frequency to inspect such problems. The inspection attributes of SP-407 requires that CR3 personnel verify that there are no cracks greater than 1/8-inch in width in the sealant material, no holes greater than 1-inch deep, no tears or rips, and cables are not pulled away from sealant material.

Subsequent discussions with CR3 fire protection personnel determined that contrary to SP-407, a visual observation of the SF sealant material in the fire barriers cannot, in most cases, be performed because the material is covered by 1-inch thick fire-resistant boards on both sides of wall penetrations and on the bottom of floor penetrations. The NRC inspector asked whether or not during CR3's previous 1987 and 1988 inspection activities (performed using SP-407), the fire boards had been removed to inspect the attributes delineated in the procedure. CR3 personnel stated that they had not and that the inspection was limited to only the surface of the fire-resistant board. The NRC inspectors reviewed

the previous two inspection reports (May 1987 and July 1988) performed in accordance with SP-407 and noted the following:

- Approximately 1,700 safety-related penetrations are listed.
- The May 1987 and July 1988 inspections consisted of 445 and 112 staffing hours, respectively.
- The CR3 senior fire protection engineer stated that the inspections were performed by CR3 consultants.
- The inspector who performed the 1988 inspection performed over 500 penetration seal verifications during a 1-day period.
- The validity of the inspections is questionable because strict compliance to SP-407 is not possible for penetrations where the SF sealant is covered by the 1-inch thick fire-resistant boards.

The inspector concluded that the licensee's evaluation and disposition of the IN was inadequate since SP-407, as written, cannot be implemented effectively because of the fire board material obstructing the inspection.

- o IN 86-07, "Lack of Detailed Instruction and Inadequate Observance of Precautions During Maintenance and Testing of Diesel Generator Woodward Governors." CR3 incorporated this guidance in procedures MP-117 and SP-605, "Emergency Diesel Generator's Governor and Servo-Booster Maintenance," however, SP-605 did not address filling and venting the EDG governor and adequate observance of precautions during maintenance and testing as addressed in the IN.

3.3 Timeliness of Vendor Evaluation Performed by CR3

Timely reviews, evaluations, and corrective actions for incoming technical information was the subject of a recent NRC-identified violation at CR3. During the inspection, the NRC inspectors also noted several similar examples. Several TAP reports (e.g., ANO-88-02, -03, -04, and TMI-88-01) and selected NRC information notices (e.g., IN 88-80) had not been reviewed for applicability to CR3. These communications were several months to a year old. Timely reviews for applicability are important to avoid events or equipment failures similar to those experienced at other plants.

3.4 Emergency Diesel Generator Interface

The CR3 emergency diesel generators (EDGs), Model 38TD8-1/8, were manufactured by Colt/Fairbanks Morse Engine Division (FMED) and delivered before the 1977 initial startup of CR3. Rated at 2750 Kilowatts at 0.8 power factor continuous, EDG 1A has 1784 operating hours and EDG 1B has 1408 operating hours. The engines are opposed piston, turbocharged, and generator shaft driven. The licensee has communicated directly with Colt Industries, Beloit, Wisconsin, with regard to service information, assistance, and spare/replacement parts since the original installation.

The licensee's philosophy for performing maintenance activities on the EDG engines is to accomplish relatively minor and routine tasks using CR3

maintenance personnel and complex tasks using assistance from Colt Industries. The Florida Power Corporation (FPC) Training Center trains operations and maintenance personnel on the EDGs at least once every 2 years. The instructors and the diesel system engineer are the only personnel who have attended Colt's 2-week diesel course held in Wisconsin. The CR3 operators attended courses ROT 4-6, "Emergency Diesel Generator;" ANO-105, "Emergency Diesel Generator Engine," and ANO-106, "Emergency Diesel Generator Electrical" which are conducted at the FPC Training Center. The maintenance personnel attended Lessons 07-42, "Emergency Maintenance/Emergency Diesel Generator," and 05-46, "Mechanical Maintenance Emergency Diesel Generator." The training curriculum also includes the use of event and deficiency reports such as licensee event reports, NRC information notices, 10 CFR Part 21 reports, and Institute for Nuclear Power Operations event reports to keep personnel informed of EDG engine problems.

3.4.1 Review of Colt/FMED Manuals and Other Technical Information

Colt/FMED Service Information Letters (SILs) are filed in Volume 11 of the technical manuals; however, appropriate pen and ink revisions to the manuals indicating SILs that may be applicable to the EDGs were not made. Colt Repair and Service Information Letters (R&SILs) dating from 1974 to 1980, pertaining to Model 38TD8-1/8, were not sent by Colt to the licensee. As a result, the licensee contacted Colt/FMED during the first week of the inspection to request a set of the R&SILs that it will evaluate for applicability. Some of the R&SILs, covering such topics as flexible couplings, exhaust manifold screens, and fuel header hose replacements, have been implemented by the licensee under the direction of a Colt technical representative. Colt/FMED operating and maintenance manuals at CR3 are controlled copies.

3.4.2 Review of Colt/FMED SILs

The inspectors reviewed the SILs issued by Colt/FMED that were applicable to the EDGs to determine whether they had been properly considered and implemented. The applicable documents consisted of 14 SILs (A-1 through A-17 with the exception of A-6, A-9, and A-10, which did not pertain to CR3). The licensee's procedure involves the use of CR3 Procedure AI-404, "Review of Technical Information," to evaluate vendor-supplied technical information. The most significant deficiency identified during the inspection involved six SILs that were not entered into the licensee's system until April 6, 1989, almost 2 years after receipt at CR3. As a result of this example, the NRC inspectors reviewed training records of CR3 employees who were trained in the AI-404 procedure. This review identified approximately 50 employees, including the EDG system engineer, who received training on the AI-404 procedure. An inherent weakness in the procedure is the fact that incoming technical information to CR3 can be received virtually by anyone onsite (approximately 500 employees), thereby increasing the likelihood that information could be lost or improperly categorized. As a result, the Document Control Department may never receive such information. During the inspection the licensee stated that formal contractual arrangements have recently been made with its "key" safety-related suppliers. The licensee identified one individual as the point of contact to address all technical information to help avoid future problems in this area.

The inspectors reviewed the licensee's evaluation, implementation, and corrective actions for the 14 Colt/FMED SILs pertinent to the CR3 EDGs and the results are as follows:

- ° A-1, Scavenging Air Blower Rotor Clearances When Using The Turbo Blower Parallel Scavenging Air System
Evaluation - Proper blower operation is essential to reliability of the EDG.
Action - A change to procedure SP-605, "Emergency Diesel Generator Engine Inspection/Maintenance" was performed. The inspectors' review of SP-605 revealed a provision to inspect the blower and measure rotor clearances. However, no acceptance criteria had been established by the licensee to verify acceptability even though the SIL provided acceptance criteria.
- ° A-2, Blower Installation
Evaluation - Proper blower operation is critical to performance of the EDG.
Action - Add notes to procedure SP-605. A review of SP-605 revealed no reference to SIL A-2 or precautions to take after installation of the blower and before engine startup.
- ° A-3, Inlet Air Check Valve Lubrication (turbocharger air inlet duct)
Evaluation - Proper operation of the inlet air check valve is essential for operability of the EDG.
Action - Add to Preventative Maintenance (PM) program. Lubrication of the inlet air check valve was implemented by the licensee for both EDGs.
- ° A-4, Generator Bearing Insulation
Evaluation - EDG reliability may be impaired with possible degradation of the generator bearing insulation.
Action - Add this information to the PM program. It was observed that the licensee did not implement the action recommended.
- ° A-4, Rev. 2, (Issued February 20, 1989)
Evaluation - Failure to check bearing insulation could lead to a failure to detect insulation breakdown, which may result in a crankshaft bearing failure.
Action - Incorporate into PM-123 scheduled for completion by March 22, 1989. Recommended action was not accomplished as of the date of the inspection.
- ° A-5 Engine Run-In Procedure
Evaluation - Proper engine break-in (new or after repair) is essential to increase reliability of the EDGs.
Action - Add to the Colt technical manual and procedure SP-605. A review by the inspectors identified that SIL A-6 had not been referenced in the procedure.
- ° A-5, Rev. 1, (Issued June 22, 1987) This SIL was placed into the system during the inspection in accordance with AI-404 "Review of Technical Informatic." on April 25, 1989. No evaluation had been performed as of

the date of the inspection. Credit for self-identification has not been given to the licensee since this issue appears to have been prompted by the NRC inspectors' visit.

- ° A-7, Air Inlet Housing
Evaluation - A loose baffle plate could impair air flow which would decrease engine reliability.
Action - The licensee stated that the baffle bolts were checked on a six month interval by the EDG system engineer, however, documentation was not available to support this inspection. The licensee stated that the item will be incorporated in a CR3 procedure in accordance with NE-86-0054, scheduled to be completed by May 30, 1989. As of the inspection, this action had not been accomplished.
- ° A-8, Rotor Housing Clearances
Evaluation - Proper blower operation is essential to EDG reliability.
Action - The SIL was filed in Volume II of the Colt Technical Manual. Procedure SP-605 contains a requirement to inspect blower rotor-to-housing measurements but contains no acceptance criteria to properly evaluate the measurements nor does it refer the technician to the SIL, which does contain acceptance criteria.
- ° A-11 to A-16, (Issue date June 22, 1987) During the inspection, it was identified that these SILs were in the possession of the EDG system engineer and were not entered in the licensee's technical information system per procedure AI-404 until April 6, 1989. As a result, no evaluation had been performed while in the possession of the system engineer. The licensee is presently evaluating the significance and applicability of these SILs.

A-11, Timing Chain Inspection
A-12, Marking of Lubricating Oil Level Bayonet Gages
A-13, Piston Ring Combination
A-14, Water Treatment for Engine Cooling System
A-15, Annealing Copper Gaskets
A-16, Removal of Anti-Freeze from Engine Lubricating Oil System
- ° A-17, Fuel System (Issued April 22, 1989) This SIL was placed into the licensee's system on April 25, 1989. No evaluation had been performed as of this inspection.

As a result of their review of Colt technical information, the inspectors concluded that the licensee had not performed complete and timely evaluations of information provided by Colt/FMED. In addition, the licensee's system for receipt, tracking, evaluating, and disposition of EDG technical information was deficient and should be reviewed and improved to ensure that all such information is properly received, evaluated, dispositioned, and referenced, as applicable, in the appropriate diesel manuals. At the conclusion of the inspection, the licensee stated that a formal program has recently been established with Colt/FMED to ensure that all technical information pertinent to CR3 EDGs is

received and processed through a central individual. A similar arrangement has also been established with Babcock & Wilcox, the nuclear steam system supplier, and Brown Boveri, the supplier of electrical switchgear. This action taken by the licensee is primarily in response to the recommendations given in NRC Generic Letter 83-28.

3.4.3 Review of CR3 EDG Procedures

The inspectors reviewed the following procedures and found that they were inadequate with respect to their ability to provide appropriate acceptance criteria for determining that important activities have been satisfactorily accomplished. These inadequacies are examples that contributed to PEF 89-200-03.

- ° Results of testing conducted on December 9, 1987, under SP-354B, "Monthly Functional Test of the Emergency Diesel Generator EDG-1B," Revision 18, documented variations in individual cylinder exhaust temperatures of 280°F, while the differential cylinder exhaust temperature is limited to 250°F by the vendor's technical manual. A review of testing performed on June 28, 1988, conducted to Revision 21 of the procedure also contained a variation greater than 250°.
- ° SP-605, "Emergency Diesel Generator Engine Inspection/Maintenance," Revision 16, dated March 6, 1986, lacked quantitative acceptance criteria for performing an effective inspection of the EDG blower assembly. Revision 20, dated September 23, 1987, also lacked acceptance criteria for blower-to-casing clearance measurements. The blower assembly was inspected by the licensee on September 29, 1987, and determined to be satisfactory despite a lack of documentation certifying the basis for acceptance. Although acceptance criteria were provided by SILs A-1 and A-8, the procedure had not been revised to incorporate the criteria or reference the SILs.

3.4.4 EDG Housekeeping

In general, housekeeping of EDGs 1A and 1B was poor. The inspectors inspected the EDGs on April 25 and 29, 1989, and found oil dripping from the ejectors and related piping. According to CR3 Procedure SP-300, "Operating Daily Surveillance Log," excess oil should be wiped up three times daily. The inspectors informed the licensee of this finding during the inspection and corrective action was committed to by CR3 management.

APPENDIX A

PERSONS CONTACTED

Florida Power Corporation

W. Wilgus, Vice President, Nuclear Operations
G. Boldt, Vice President, Nuclear Production
E. Renfro, Director, Nuclear Operations Material and Control
R. Widell, Director, Nuclear Operations Site Support
G. Westafer, Director, Engineering Quality Assurance
E. Simpson, Director, Engineering and Projects
P. McKee, Director, Nuclear Plant Operations
W. Rossfeld, Manager, Nuclear Compliance
K. Wilson, Manager, Nuclear Licensing
C. Tillman, Manager, Material Control
R. Watts, Manager, Purchasing and Contracting
G. Becker, Manager, Site Nuclear Engineering Services
K. Baker, Manager, Nuclear Engineering Assurance
M. Harmon, Manager, Nuclear Records Management
D. Kurtz, Manager, Quality Audits
S. Johnson, Manager, Site Nuclear Services
P. Tanguay, Manager, Nuclear Operations Engineering
C. Ingram, Manager, Nuclear Projects
K. Lancaster, Manager, Site Nuclear Quality Assurance
L. Tiscione, Manager, Nuclear Procurement Engineering Services
G. Oberndorfer, Manager, Procurement and Material Quality Assurance
E. Froats, Nuclear Licensing Supervisor
L. Moffatt, Nuclear Safety Supervisor
L. Floyd, Nuclear Document Control Supervisor
P. Breedlove, Nuclear Records Management Supervisor
M. Williams, Nuclear Regulatory Specialist
J. Cooper, Nuclear Technical Support Superintendent
J. Tunstill, Senior Nuclear Licensing Engineer
D. Nusbickel, Senior Nuclear Electrical Procurement Engineer
S. Ulm, Nuclear Engineering Assurance
E. Good, Senior Nuclear Licensing Engineer

Nuclear Regulatory Commission

*E. William Brach, Chief, Vendor Inspection Branch (VIB), Office of Nuclear Reactor Regulation
*E. Baker, Chief, Reactive Inspection Section No. 1, VIB
*F. Jape, Chief, Quality Programs Section, Region II
*R. Crlenjak, Chief, Reactor Projects Section 2B, Region II
*P. Holmes-Ray, Senior Resident Inspector, CR3
*J. Tedrow, Resident Inspector, CR3

* Attended exit meeting

APPENDIX B

PROCUREMENT PROCESS AND PROCEDURES

The procurement of material, equipment, services, storage, and issue of all items used at CR3, except nuclear fuel, is governed by procedures contained in the Nuclear Procurement and Storage Manual. The manual defines responsibilities of individual departments and provides interfacing of regulatory and Florida Power Corporation (FPC) requirements relating to procurement, storage and material issue activities.

It should be noted that materials, equipment, and services; including replacement components and "piece-parts" classified by CR3 as safety-related, are subject to the requirements of 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," and 10 CFR Part 21, "Reporting of Defects and Noncompliance." It should also be noted that these requirements apply to facilities licensed under 10 CFR Part 50, regardless of the original basis or quality assurance (QA) standard under which the facility was constructed.

A facility licensed by the NRC under 10 CFR Part 50 may choose to procure parts, equipment, or services for use in safety-related applications from suppliers who do not maintain a 10 CFR Part 50, Appendix B, QA program, provided the facility institutes its own measures to ensure that the procured materials are of adequate quality and suitability for normal operating, seismic, and harsh environmental conditions. In the course of inspecting the CR3 procurement program and its implementation, the NRC inspection team reviewed the following sections of the CR3 Nuclear Procurement and Storage Manual.

<u>Section</u>	<u>Title</u>
1.0	Administration of the Nuclear Procurement and Storage Manual
2.0	Classification of Items and Services for CR3
3.0	General Requirements for Procurement Documents
4.0	Purchases of NonSafety-Related (NSR) Items and Services
5.0	General Purchase Requirements of Safety-Related (SR) Items and Services
6.0	Safety-Related Procurement Methods
7.0	Evaluation and Control of Supplier Quality Performance
8.0	Receipt of Shipments and Receiving Inspection
9.0	Disposition of Nonconforming Items
10.0	Notification and Investigation of Nonconformances Discovered After Acceptance of Items for Use
11.0	Handling of Material (SR and NSR)
13.0	General Requirements for Storage of Items
16.0	Obtaining Items From Stores

As previously stated, the overall procurement process at CR3 is governed by the Nuclear Procurement and Storage Manual. Administrative controls of the manual are contained in Section 1.0, "Administration of the Nuclear Procurement and

Storage Manual" which describes the responsibilities of various organizations in implementing the manual.

FPC management designated responsibility for the development, issuance, control, and revision of the manual to the Nuclear Procurement and Storage Committee. The committee consists of representatives from various departments: Nuclear Engineering, Quality Programs, Nuclear Operation Materials Purchasing and Contracting, Nuclear Operation Material Control, and Nuclear Plant Maintenance. The committee monitors the effectiveness and adequacy of the manual. All revisions to the manual require the committee's approval.

All items or services procured for application in CR3 are classified as "safety-related (SR)" or "nonsafety-related (NSR)" for CR3 according to Section 2.0, "Classification of Items and Services." The fully integrated materials information system (FIMIS) provides specific engineering classifications of SR and NSR for each material part number. Items for SR applications are procured using the methods described in Section 6.0, "Safety-Related Procurement Methods." The methods are:

- "D" - specification method
- "V" - verification method
- "K" - catalog method
- "C" - commodity method

The specification or "D" procurement method is used when specific controls are required during the manufacture of SR items or services. The controls are implemented to ensure that all technical and quality assurance requirements for the item purchased or service performed are met. Because the items have unique design or specification requirements, they cannot be procured on the basis of a manufacturer's catalog or industry standards alone. This method is the most restrictive method for the procurement of SR items or services and is one of the two methods FPC may use to impose 10 CFR Part 21 requirements on the supplier of safety-related products or services procured. Specifications for those items or services procured using the "D" method are provided by an assigned nuclear engineering design engineer. Those specifications include technical requirements, applicable codes and standards, drawings, procedures, inspections, tests, acceptance criteria, documentation, and qualification requirements (environmental and seismic) as applicable. The supplier also must be on the approved nuclear suppliers list (ANSL).

The verification or "V" procurement method is the second method whereby 10 CFR Part 21 requirements may be imposed on the supplier of the item or service procured. This method is used to purchase SR items or services when the supplier does not produce items under an Appendix B, QA program. Unlike the "D" method the vendor is not required to be on the ANSL. Therefore, thorough identification of design requirements and verification by FPC is required to ensure that critical characteristics are acceptable. The Nuclear Engineering Department identifies pertinent requirements on a SR procurement requisition checklist form. The procurement checklist should identify all critical characteristics and the methods to verify such critical characteristics. The Procurement Quality Assurance Department will review the requisition and prepare the requirements to be reviewed during receipt inspection (Section 8.0 of the manual) or during source inspection (Section 8.0 of the manual). This method can be used to procure both safety-related and commercial grade items.

Commercial grade items are also purchased for application in SR systems under the catalog or "K" procurement method. Items may be purchased under this method when the manufacturer's published product description is adequate for meeting the technical requirements of FPC. The item or service may be purchased direct from the manufacturer or through a distributor. However, if purchased from a distributor, the distributor must furnish the item in full accordance with the catalog and the manufacturer of the item must be on the ANSL. The Nuclear Engineering and Procurement Quality Assurance Departments must identify critical characteristics and a method for verifying such characteristics to ensure an adequate dedication.

The final method for purchasing SR items or services for application at CR3 is the commodity or "C" procurement method. This method allows for the procurement of commercially available items or services and only is used when the Nuclear Engineering Department has established that the item or service will not prevent SR systems from performing intended design functions. Items purchased using this method are generally produced in accordance with nationally recognized codes and standards. As in the purchase of all SR items or services at CR3, the Nuclear Engineering Department is responsible for evaluating the item or service being procured for the safety applications it must perform. In doing so the engineer must identify critical operating requirements, applicable codes and standards, traceability, and documentation requirements. The Nuclear Engineering and Procurement Quality Assurance Department shall develop an appropriate receipt inspection plan in accordance with Section 8.4.3 of the manual. Proper establishment and verification of the above requirements provides a method for dedicating the item for use in the SR application for which it was intended.

To determine if a specific item or component is SR or NSR, it is necessary to refer to the CR3 safety listing. When items or services are required, the Nuclear Procurement Engineering Department must review all plant-initiated procurement requisitions and FIMIS documents to verify that the correct safety classification is applied. Section 2.3.3 of the manual describes the conditions under which services may be classified as SR.

When situations occur where SR items are not available, FPC may upgrade NSR items for use in SR systems. This upgrade is performed according to Section 9.1 of the manual, "Disposition of NSR Items for SR Use (or Storage): Material Qualification." The department desiring to use the material or a design engineer may request that allegedly identical NSR items be evaluated as replacements for SR items. Reviews are performed by several departments (Nuclear Procurement Engineering, Procurement Quality Assurance, and Nuclear Materials) to determine the adequacy of the item. The various departments must identify key elements to establish suitability: method of traceability, characteristics critical to safety, acceptance criteria for evaluating verification results, special marking or instructions that should be attached, and any special test equipment or instrumentation required for verification.

The NRC inspection team reviewed approximately 150 SR procurement packages to establish the overall adequacy of the procurement process discussed in the preceding paragraphs. The Nuclear Procurement and Storage Manual contains many key elements that, if implemented properly, are essential for ensuring the proper procurement of items or services for SR application. A review of the

procedures revealed several programmatic deficiencies. In addition, a review of individual procurements identified numerous instances in which these practices resulted in the installation of parts of unverified quality in SR applications. Examples of these are discussed in Section 1.1 of this inspection report. The elements missing in the licensee's program that would be necessary for adequate dedication would include, but are not limited to: (1) establishing traceability of the component to its original manufacturer; (2) definition of the safety function of the item to be dedicated and the conditions under which it must perform; (3) identification of critical characteristics or attributes, beyond a part number description, considered vital to the item's ability to perform as required under all design conditions; (4) review and technical evaluation of any changes in design, process, and materials and of any effect on the suitability for nuclear applications under all design conditions; (5) methods for receipt inspection and testing sufficient to demonstrate that critical characteristics are met; and (6) detailed requirements for documentation of these actions.

In implementing the CR3 dedication program, the licensee failed in most cases to establish traceability. Although many nonapproved or nonverified vendors provided certificates of conformance (COC), the licensee accepted them without substantiating the validity or basis of the COC, or verifying the vendors' ability to make such certifications beyond a "desk" audit of the vendor. This was particularly relevant in the cases of NSR items upgraded to SR via the licensee's material qualification form process, for which traceability to the original manufacturer cannot be assured since procurement records for items originally purchased as NSR were not required to be maintained. In practice, no engineering or technical evaluation, of form, fit, and function beyond verification of part number and nameplate data were documented. Therefore, under this system, the process of dedicating or upgrading commercial grade material for safety-related application at CR3 lacks crucial elements. As a result, the process fails to provide the assurance otherwise associated with manufacturing under a 10 CFR Part 50, Appendix B, QA program that is audited and approved by the licensee, and the assurance, under 10 CFR Part 21, that any deviations from technical procurement specifications would, as a minimum, be reported to the licensee for evaluation of the potential for creating a substantial safety hazard.

It should be noted that the licensee has committed to revise its procurement program and procedures for commercial grade procurement, especially in the areas of identification of critical characteristics and vendor surveys beyond a desk review of the vendor's QA manual. These revisions are expected to be fully implemented by July 1989.