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

Report No.:	50-269/91-201, 50-270/91-201, and 50-287/91-201
Docket No.:	50-269, 50-270, and 50-287
License No.:	DPR-38, DPR-47, and DPR-55
Licensee:	Duke Power Company Nuclear Generation Department Post Office Box 1007 Charlotte, North Carolina 28201-1007
Facility Name:	Oconee Nuclear Station, Units 1, 2, and 3
Assessment at:	Charlotte, North Carolina
Assessment Conducted:	July 15 through 19, 1991

Richard P. McIntyre 12/24/91
Richard P. McIntyre, Team Leader — Date
Vendor Inspection Branch (VIB)

Other Inspectors:
S.D. Alexander, EQ and Test Engineer, VIB
L.L. Campbell, Reactor Engineer, VIB
R.K. Frahm, Jr., QA Engineer, VIB
M. Thomas, Reactor Engineer, RII

Approved by: 12/24/91
Leif J. Norrholm, Chief — Date
Vendor Inspector Branch
Division of Reactor Inspection
and Safeguards
Office of Nuclear Reactor Regulation

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	i
1 INTRODUCTION	1
2 COMMERCIAL-GRADE DEDICATION PROGRAM REVIEW	1
2.1 Procurement Program Overview	1
2.2 Procedures Review	2
2.3 Parts Classification System	8
2.4 Commercial-Grade Supplier Selection, Qualification and Survey	10
2.4.1 Supplier Selection	10
2.4.2 Supplier Qualification and Survey	10
2.4.3 Use of Third-Party Audits	13
2.5 Material Receipt, Documentation and Procedure Control	13
2.6 Fraud Detection	15
2.7 Procurement Package Review	17
2.8 Quality Assurance Departmental Audit	20
2.9 Management Involvement	21
3 PROCUREMENT TRAINING REVIEW	21
4 NUMARC COMPREHENSIVE PROCUREMENT INITIATIVE IMPLEMENTATION	21
4.1 Vendor Audits	22
4.2 Tests and Inspections	22
4.3 Obsolete Items	23
5 CONCLUSIONS	23
6 EXIT MEETING	23
APPENDIX - PERSONS CONTACTED	A-1

EXECUTIVE SUMMARY

From July 15 through 19, 1991, the Nuclear Regulatory Commission's (NRC's) Vendor Inspection Branch conducted an assessment of Duke Power Company's (DPC's) activities related to the procurement and dedication of commercial-grade items (CGIs) used in safety-related applications at the Oconee Nuclear Station (ONS), Units 1, 2, and 3. The assessment team reviewed DPC's procurement program to assess its compliance with the quality assurance (QA) requirements of Appendix B to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50) and to assess the status of DPC's implementation of the Nuclear Management and Resources Council (NUMARC) initiatives on procurement and commercial-grade dedication.

The NUMARC Board of Directors has approved procurement initiatives as described in NUMARC 90-13, "Nuclear Procurement Program Improvements," dated October 1990, which commit licensees to assess their procurement programs and take specific action to strengthen inadequate programs. The first phase of these initiatives was the NUMARC initiative on the dedication of CGIs (adopted by NUMARC in March 1989) which was scheduled to be implemented by January 1, 1990. Licensees were to meet the intent of the guidance provided in the Electric Power Research Institute (EPRI) Final Report NP-5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications (NCIG-07)," June 1988. The NRC has conditionally endorsed this guideline in Generic Letter (GL) 89-02, "Actions To Improve the Detection of Counterfeit and Fraudulently Marketed Products," March 21, 1989. The second phase of the initiatives provides a comprehensive procurement review and addresses vendor audits, tests and/or inspections, obsolescence, information exchange, and general procurement. Licensees were to review their programs by July 1, 1991, to determine, on the basis of guidance in NUMARC 90-13, if improvements were needed in these areas and to complete such improvements by July 1, 1992.

The NRC performed its assessment to determine the current status of the activities to improve the procurement program related to the industry initiatives discussed above and NRC requirements. The assessment focused on a review of procedures and representative records; interviews with DPC staff, including senior management and ONS site personnel; and observations by the assessment team members. The assessment team also held meetings with DPC's corporate management to discuss relevant aspects of commercial-grade dedication and to identify areas requiring additional information. The assessment team's observations were discussed with DPC's representatives and senior management at the exit meeting held July 19, 1991. The assessment team's specific conclusions are summarized below.

- DPC had made a significant effort to strengthen its commercial-grade dedication program since its inception in 1987 and its overall program description was generally consistent with the dedication philosophy described in EPRI NP-5652.

- The DPC program made the distinction between critical characteristics for design and critical characteristics for acceptance and stipulated that the acceptance critical characteristics are a subset of critical characteristics for design. DPC believed it was not necessary to identify and verify all critical characteristics, but only those critical characteristics for acceptance that provided reasonable assurance that the item received was

the item specified. We interpret the "item specified" to encompass attributes necessary for performance of the item's safety functions. The NRC staff's position is that Appendix B requires the licensee to verify all characteristics that are critical to ensure that the item performs its safety functions for its particular plant application.

- In its letter of May 8, 1990, regarding implementation of the NUMARC initiative on the dedication of commercial grade items, DPC decided to continue to purchase CGIs previously listed on the commercial grade items list (CGIL) and dedicate them on the basis of existing evaluations (prepared before January 1, 1990) until a new/revised evaluation was prepared for each CGI to the current program requirements. Therefore, the purchase and dedication of CGIs previously evaluated and listed on the CGIL as of January 1, 1990, were not based on the requirements of the current program, but only on a review of product and supplier performance history (EPRI Method 4). This process of phasing in the completion of reevaluations for items purchased after January 1, 1990, (but under the old program), was to be completed by December 31, 1991. The fact that CGIs procured after January 1, 1990 were being dedicated using previous program evaluations was considered a significant weakness in the DPC program for commercial-grade procurement and dedication. The large majority of CGIs dedicated after January 1, 1990, did not meet the DPC programmatic requirements in place and also did not meet the NUMARC initiative on the dedication of commercial grade items, which stated that licensee programs would meet the intent of the EPRI NP-5652 guidelines as of January 1, 1990.

- Quality Assurance Department Procedure QA-606, "Commercial Grade Surveys," required that DPC perform a survey of commercial-grade suppliers at least once every three years and did not require periodic reviews and evaluations of the supplier during this period. However, it may be necessary to perform commercial-grade surveys at a frequency other than on a triennial basis due to changes in the supplier's quality program, procedures, processes, management, or personnel performing the work activities. Commercial-grade surveys should be scheduled at a frequency commensurate with the status, importance, and complexity of the item or process being surveyed.

  Other observations concerning the commercial-grade survey process are discussed in Section 2.4.2 of the report.

- DPC's program did not provide for minimum formal documented training requirements for personnel performing quality-related activities within the commercial-grade procurement and dedication process. However, such training is considered necessary to achieve effective and consistent implementation of the program within design engineering. Therefore, this was considered a weakness.

- DPC initiated interim measures to detect counterfeit and fraudulently marketed products until the completed fraud detection program is implemented as part of the results of the NUMARC comprehensive procurement initiative review. However, DPC was not effectively implementing these measures during the receipt inspection process at ONS and no training had been conducted in these areas.

- DPC has had strong engineering involvement in its commercial-grade dedication program since it was first implemented in January 1987. This involvement consisted mainly of the performance of technical evaluations to support the purchase of CGIs. These evaluations were continually upgraded in scope and content as the program evolved. DPC design engineering, construction, quality assurance, and operations personnel became involved as the dedication program continued to evolve.

- DPC provided management support, input, and sufficient resources to improve its commercial-grade dedication program. However, the NRC staff did not agree with the DPC basis for phasing-in the new program. The DPC staff displayed great interest in the NRC team's assessment effort and management was available for consultation during the assessment.

1 INTRODUCTION

The NRC's Vendor Inspection Branch assessed Duke Power Company's (DPC's) efforts to improve programs for procuring and dedicating commercial-grade items (CGIs) used in safety-related applications. The NRC assessment team reviewed the DPC program to assess its compliance with Appendix B to 10 CFR Part 50 and to assess the status of implementation of the Nuclear Management and Resources Council (NUMARC) procurement initiatives. The assessment was performed between July 15 and 19, 1991, at the DPC general office in Charlotte, North Carolina. The assessment methodology included observations, discussions with licensee managers and corporate and site personnel, and a review of records and procedures associated with the licensee's procurement and commercial-grade dedication program.

This completes the NRC assessments at selected licensees' facilities to review their implementation of improved programs for the dedication of CGIs and to assess the improvements made in the areas covered by the NUMARC comprehensive procurement initiative program. This initiative, approved on June 28, 1990, by the NUMARC Board of Directors, directed licensees to adhere to the guidance provided in the Electric Power Research Institute (EPRI) NP-5652 Final Report, and to review and strengthen their procurement programs in accordance with specific guidance provided in NUMARC 90-13, "Nuclear Procurement Program Improvements," October 1990.

The specific areas reviewed and the team's observations are described in Sections 2 through 4 of this report. The conclusions, strengths and weaknesses are summarized in Section 5 and Section 6 describes the exit meeting. Persons contacted during the assessment are listed in the appendix.

2 COMMERCIAL-GRADE DEDICATION PROGRAM REVIEW

The assessment team reviewed DPC's programs and related commitments associated with the implementation of the NUMARC initiatives, including the program for procurement and dedication of CGIs used in safety-related applications at the ONS. "Dedication" is generally understood to mean the process by which an item, not manufactured and supplied under an approved 10 CFR Part 50, Appendix B quality assurance (QA) program, is verified to be suitable for use in a nuclear safety-related application. A commercial-grade dedication program must be conducted under an Appendix B QA program because it consists of activities affecting quality. Therefore, DPC's commercial-grade dedication program was assessed against Appendix B critiera.

2.1 Procurement Program Overview

Pursuant to the standard assessment plan, the team reviewed procurement program processes and procedures with emphasis on applicability of the dedication process for CGIs intended for safety-related applications, including incorporation of dedication approaches described in EPRI NP-5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related

Applications (NCIG-07)," issued in June 1988, as conditionally endorsed by NRC Generic Letter (GL) 89-02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products," dated March 21, 1989.

The review also included the DPC program and activities for selection and qualification of suppliers, including the use of audits and source surveillances, commercial-grade supplier surveys and source verifications, incorporation of the guidance of GL 89-02 with regard to the use of commercial-grade supplier surveys (Method 2 of EPRI NP-5652) as well as the use of supplier/item history (EPRI Method 4) if applicable, and the use of audits and surveys performed by third parties, such as those conducted by teams representing several utilities sponsored by the Nuclear Procurement Issues Council (NUPIC).

Finally, the team's review of DPC dedication activities included those performed at the ONS after receipt, including receipt inspection and other special tests and inspections under Method 1 of EPRI NP-5652.

2.2 Procedures Review

The procurement process, particularly as it related to CGIs, for ONS (as well as the other DPC nuclear plants, Catawba and McGuire) was described and prescribed by a complicated heirarchy of procedural documentation beginning at the DPC corporate level with the procedures of the Nuclear Production Department (NPD) headquartered in the DPC general office (GO) in Charlotte, North Carolina. The NPD-GO's Administrative Policy Manual (APM), Section 2.4.4.5, was the principal NPD department directive relating to procurement and dedication of CGIs. At the time of the assessment, Section 2.4.4.5 was under revision to make it more general, with more specific guidance being given in the next lower tier procedure, NPD Department Directive 3.3.6(M), "Commercial Grade Program." APM 2.4.4.5 addressed issues primarily related to plant application considerations. It established, for example, in Section 2.4.4.5(c), three categories of CGIs: Commercial Grade Category 1, direct replacement spare part; Category 2, general applications; and Category 3, future applications. However, the wording of (d.1) appeared to contradict the definitions of Categories 1 and 2 by giving engineering evaluation requirements and usage restrictions for Category 1 items further categorized (d.1.2) as those "...which list specific applications or restrictions..." which it distinguished from (d.1.3) "Category 1 direct replacement items which do not list specific applications or restrictions...." According to the wording of the category definitions, (c.1) and (c.2), CGIs approved for unrestricted or generic usage would expectedly be described as Category 2, general applications.

DPC staff explained the apparent contradiction by describing these two situations as being legitimate subcategories of Category 1, distinguished chiefly by seismic and environmental qualification considerations.. Subcategory (d.1.2), describes the requirements, including environmental and seismic, of one or a limited number of applications that have been analyzed and the CGI approved only for those specific applications and subcategory (d.1.3), describes those CGIs that have been "preapproved" as direct (i.e., like-for-like) replacements for any plant applications with technical requirements enveloped by the dedication (and qualification) of the CGI to be used. The DPC staff explanation also provided clarification of the type of items for which Category 2, general applications was created; that is items in common use, such as conduit, for which like-for-

like replacements would not necessarily be required and which have fewer (or no) seismic or environmental usage restrictions. Nevertheless, none of this was apparent to the reviewer from the text as written and the wording was somewhat ambiguous even when the intent was understood. DPC staff agreed that some clarification was required to make the procedure more conducive to meaningful compliance.

The DPC Design Engineering Department (DED), the architect/engineer for DPC, also was located at the GO in Charlotte and had most of the engineering responsibility relating to procurement and dedication. DED procedures prescribed the mechanics of the processes of (1) safety classification, including upgrading and downgrading; (2) technical evaluation, including direct replacement (like-for-like), acceptable substitute, and design change evaluations; (3) new/alternate application approval for Category 1 direct replacement CGIs, and generic application dedications (including Category 2); and (4) engineering associated with the actual dedication process, including identification of safety functions, failure modes and effects analyses (FMEAs), critical characteristic identification and selection, acceptance method and criteria selection, and establishing CGI technical procurement specifications.

The "Design Engineering Quality Assurance Manual" (DEQAM) and the "Commercial Grade Program Manual" (CGPM) were the two principal DED documents pertaining to procurement in general and procurement and dedication of CGIs in particular. The DEQAM contained several QA procedures pertinent to procurement and dedication of CGIs, including PR-102, "Acceptable Substitutes," PR-103, "Commercial Grade Items," PR-302, "Procurement," and PR-303, "Procurement of Services." The principal implementation procedures for dedication were contained in the CGPM. Chief among these, relevant to CGI procurement and dedication, were Procedure CGP-1.1, "Design Engineering Commercial Grade Technical Evaluation Procedure," and CGP-1.2, "Commercial Grade Program Procurement and Acceptance Manual - Generating and Processing of Documents," or the so-called "CGPA." These documents described the CGI procurement and dedication process (as it involved DED and NPD) for all the DPC plants.

Individual project NPD responsibilities and procedures in this area were largely limited to material requisitioning, performing some special inspections and tests, and conducting and coordinating some post-installation tests. The team briefly reviewed these procedures, with detailed review confined to DED procedures PR-103 and CGP-1.1.

One concern was identified with respect to DED Procedure PR-102, Revision 2, dated January 1, 1990. Section 1.6, which addressed authorized substitute replacement (ASR), stated that an ASR determination was initiated under the following conditions: Paragraph 1.6.1, an identical item with a different part number, paragraph 1.6.2, the original item is no longer available, paragraph 1.6.3, the original equipment manufacturer or the original equipment supplier has a new or improved item that is preferable; and paragraph 1.6.4, a change in the item (form, fit, function, material) results in a change in part number. However, if the commercial-grade manufacturer made changes in the design, material or manufacturing process without corresponding changes in model designation, part number, catalog number, or perhaps even the drawing number(s), there is not guidance provided for this situation in the procedure. In fact, such changes may not even be documented and/or controlled as the commercial-grade manufacturer may have no obligation under a quality assurance (QA) program to do so.

This is a significant problem with regard to dedication because a major portion of dedications are often based on a like-for-like determination. However, an acceptable like-for-like determination, such as described in NRC GL 91-05, "Licensee Procurement and Dedication Programs," involves the investigation and determination that the CGI is in fact identical to the original and that there have been no changes in the CGI's design, material, or manufacturing processes. Any such changes would presumably be evaluated (as in paragraph 1.6.4) for their effect on the CGI's ability to perform its safety function under all design basis conditions, but the changes first must be identified, and the conditions given in Section 1.6 of PR-102 for ASRs did not cover this situation.

Overall guidance for the new DPC program for procurement and dedication of CGIs was provided in DED QA Procedure PR-103, Revision 1, dated September 14, 1990. The statement of purpose of the procedure included the assertion that the procedure "met the intent of EPRI NP-5652...." Accordingly, the definition of acceptance was consistent with NP-5652, defining the process as the employment of methods to produce objective evidence to "provide reasonable assurance that the item received is the item specified." However, this definition was not consistent with the staff's position that Appendix B requires the licensee to verify all characteristics that are critical to ensure that item performs its safety functions for its particular plant application. This procedure also related basic components with QA Condition 1 (i.e., nuclear safety-related applications) to be procured as either "approved vendor items" (AVIs) from vendors having approved QA programs and accepting 10 CFR Part 21, or as commercial-grade items to be dedicated for safety service. Strength was added to the procedure by the requirement that QA Condition 1 items not meeting the CGI definition in 10 CFR 21.3(a)(4)(a-1) must be procured as AVIs. The commercial grade items list (CGIL) was defined as a computer database in which approved CGIs and associated, approved applications were listed as well as items evaluated to be AVIs (not meeting CGI definition and non safety-related items.)

In addition to other pertinent definitions, such as the NP-5652 definition of commercial-grade supplier surveys, the procedure also established categories of CGIs similar to APM 2.4.4.5. The description of Category 1 CGI used the term "like-for-like" (defined as identical), but stated that the category could include approved substitutes. It required documentation of the same part number or the approved substitute, same function, same seismic qualification, environmental qualification (EQ) documents (if applicable) or qualified to the same EQ requirements, and meets or exceeds applicable codes, standards, guides, and specifications. Category 2 was described generally as applications controlled by design documents. In the definitions of original equipment manufacturer (OEM) and original equipment supplier (OES), the important distinction was drawn that the OEM of the CGI is not necessarily the OEM or OES of the component, system, or equipment of which the CGI is a part and also that the term OES refers to the original supplier of that parent component, system, or equipment. However, it was not clear if the OES also could include the OEM of the parent component, system, or equipment. Finally, the procedure strengthened the program by defining the term "conditioning" for procurement and dedication purposes as special processes other than routine setup and adjustment or installation, etc., including burn-in, calibration, tuning/adjustment, and "selection testing" [screening]. However, notably absent were definitions of design characteristics or critical characteristics, as was the EPRI NP-6406 concept of critical characterisitcs for design. Only the NP-6406 term critical characteristics for acceptance was defined, and that only as those critical

characteristics necessary to provide reasonable assurance that the item received is the item specified.

Procurement/traceability requirements were defined as acceptance requirements including, but not limited to, traceability of the item to the OEM, certificate of compliance from the supplier, or specifying standard procurement notes on the purchase request/purchase order (PR/PO), but no information was provided on the reasons for traceability.

Finally, in addition to good definitions of the acceptance methods of special tests and inspection (and post-installation tests) and source verifications, the procedure introduced the concept of periodic review of technical evaluations to ensure their continued validity. Although the recognition that technical evaluations may become invalid is important, the reasons for such obsolescence are related to specific changes in either the application requirements or scope or changes in the design, materials, or manufacturing processes of the CGI. Therefore, merely conducting periodic review, unless the CGI is being procured continuously, may not capture such events. The team questioned whether this method of validation was adequate, or should the reviews be done for each major procurement of a CGI when significant time has passed since the last review.

Some important concepts were introduced by Section 1.1 in general requirements, including documentation of technical and quality evaluations for CGIs to be used in QA Condition 1 applications to demonstrate that the item qualifies as a CGI, that the supplier is capable of producing a quality product, and that the quality of the CGI can be assured. Section 1.2 formally established periodic technical evaluation review, and Section 1.3 established that DED should evaluate all commercial-grade requests.

Section 3.3 discussed dedication on an emergency basis, but this was described as relating to maintaining station operability and for outage support as opposed to preventing or correcting situations in which safety of the plant, the plant staff, or the public may be jeopardized. Although the verbal approvals were required to be documented, the procedure did not give any specific time limits for completing evaluations or for ensuring that certain requirements are met and confirmed before release of the item for operation. This area should be reviewed in light of the audit finding, identified in QA Departmental Audit SP-90-01 (A11), concerning the inadequate dedication under an emergency verbal approval.

Section 3.4 added strength by providing a reasonable discussion of requirements for handling the reclassification of CGIs as AVIs. Section 3.5 provided the same for reclassification of QA Condition 1 applications as non-safety related; however, the reasons for some of the references to other sections in the procedure were unclear.

Section 3.7 required documentation of the identification of critical characteristics for acceptance (CCA) in the technical evaluation, and stated that their selection should be on the basis of complexity, safety function, and performance. However, the actual documentation of the safety functions, and critical characteristics for design (CCD) derived from them were not mentioned. Also, it was not clear why selection of CCA should depend on an item's performance when acceptance of an item depends on its performance or other verification of the CCA, which must consist of all those CCD that are needed to demonstrate performance of the safety function.

Section 3.8 provided a general discussion of acceptance methods for CGIs generally consistent with EPRI NP-5652. Athough, the description of Method 2, commercial-grade supplier surveys, in Section 3.8.2 stated that the survey confirms that the supplier documents its commercial quality controls, the procedure did not state that the survey must confirm that the controls are effectively implemented (as stated in GL 89-02), nor did it explicitly require that the survey confirm that the supplier's quality program actually controls the specified critical characteristics for the specific item being dedicated. In addition, the GL 89-02 guidance was omitted for situations in which there is a distributor as well as a manufacturer involved.

The description of Method 3, source verifications, in Section 3.8.3, was more appropriate to a survey and included activities such as witnessing quality activities at the supplier's facility and verifying that the selected CCA are controlled by the supplier instead of witnessing activities on the actual item being procured and verifying that its CCA have been met.

The description of Method 4, supplier/item history, in Section 3.8.4, did not allow Method 4 to be used by itself. Although the GL 89-02 provisions for applicability to specific critical characteristics and to the application were not explicitly addressed, the phrase "pertinent, industry-wide data," was used. A provision for the control of design, material, and process changes to be confirmed by audit [survey] also was missing.

Section 4.3 provided more specific guidance for dedication documentation. The guidance was fairly comprehensive, and included environmental and seismic qualification, references, surveys, safety classification, CGI determination, and design inputs. However, it did not address the following:

- CGI Categories 1,2, or 3
- parent component's safety functions
- replacement part's safety functions
- CCDs (only CCAs were addressed)
- review of design, material and/or process change history
- like-for-like determination/approved substitutes

Although Section 4.3.14 added significant strength by addressing procurement and traceability requirements, it gave no specific guidance for capturing, reviewing, and filing traceability documentation.

A brief review of the DED procurement procedure, PR-302, Revision 41, dated May 27, 1991, indicated a few discrepancies. Section 6 of PR-302, "Special Procurement Requirements," stated that these requirements would be identified in the CGIL, Appendix CGI to PR-302, or specified in documents referenced in the CGIL; yet, it was not clear why paragraphs I.b and II.b of Appendix CGI stated that Section 6 of PR-302 did not apply. Also, Appendix CGI gave two categories for dedications and their associated acceptance methods: (1) those dedications using methods 1,3, or 4 (or combinations) and (2) those dedications by method 2 alone. Also, not addressed were cases in which it would be appropriate to use method 2 in combination with other methods.

The "Design Engineering Department Commercial Grade Program Manual" (CGPM), Revision 2, dated May 9, 1990, contained CGP-1.1, "Design Engineering Commercial Grade Technical Evaluation Procedure," and CGP-1.2, "Commercial Grade Program Procurement and Acceptance Manual - Generating and Processing of Documents."

The currently effective revision of CGP-1.1, Revision 1, dated October 15, 1990, was to be used in conjunction with PR-103 for conducting and documenting the specific dedication activities involving Method 1 (including QA receipt inspection, special tests and inspections, and post-installation testing). Although, revision 1 of the procedure had incorporated guidance from EPRI NP-6406, "Technical Evaluation of Replacement Items," and had defined in Sections 4.3 and 4.4 respectively, CCA and CCD consistent with the EPRI documents, review of CGP-1.1 identified some concerns. Section 6.0, "Technical Evaluation," was not always consistent or well coordinated with PR-103. For example, it called for considering the safety functions of the parent component, the item, and credible failure modes and effects, but did not say how to document these issues, which were not addressed in the documentation requirements of PR-103.

Section 6.8.2 gave some considerations for selecting CCA as a subset of CCD on the basis of complexity, safety function, and performance. However, it then stated, as did NP-6406, that it was only necessary to verify those critical characteristics that provide reasonable assurance that the item received is the item specified.

Section 6.12 discussed acceptance methods, defining them as means to obtain objective evidence that provides reasonable assurance that (1) the supplier is capable of supplying a quality product, (2) the quality of the item can be assured, and (3) the item received is the item specified. Although this section had strengths, including addressing sampling for destructive tests and requiring documentation of inspection and test results for objective evidence, some concerns were identified. Section 6.12.2 addressed acceptance Method 2, but was not clear on requiring technical as well as QA participation and stated that the survey should be performed and documented in accordance with PR-103, however, PR-103 was weak in this area and inconsistent with the CGP-1.1 survey approval criteria. While the GL 89-02 constraints on Method 2 were included, it was not clear how CCA were to be transmitted to QA for use in surveys. Section 6.12.3 addressed Method 3 and contained similar loose language as PR-103 and stated that source verifications should be performed and documented in accordance with PR-103. This section did not address technical participation, witnessing of operations and tests on an actual item(s) being supplied, hold points, or shipping releases.

DED DEQAM QA Procedure PR-304, "Commercial Grade Items," Revision 2, effective date of May 30, 1988 (original effective date January 1, 1987), was one of the two documents that prescribed the commercial-grade program as it was currently implemented.

Commercial-grade evaluation, (other than identifying item description, application and reference information) in 1988 consisted only of (1) 10 CFR Part 21 criteria, (2) commercial grade (CG) category determination, (3) conditioning requirements, (4) EQ, (5) seismic qualification, (6) FSAR/technical specifications, and (7) testing and performance history. This procedure contained the required documentation for CG evaluations of this type and the means for listing the items on the CGIL. The other principal CG program document was DED Manual Procedure II.4.1, "Nuclear Station Commercial Grade Item Evaluation," originally effective January 2, 1987.

On January 1, 1990, these two procedures were superseded by the new procedures, PR-103 and CGP-1.1/1.2, respectively. The team reviewed the DED Manual Procedure II.4.1, revision dated April 30, 1988, and found that it largely paralleled PR-304, but provided more detailed guidance with respect to methodology. One significant item was that this procedure required that if buying an item as a CGI did not provide any economic or scheduling benefit over the same item as an AVI or if any required conditioning (including functional qualification) was either deemed not cost effective or would adversely impact schedule, then the item was required to be purchased as an AVI.

However, the procedure failed to recognize the actual circumstances under which buying an AVI may be preferable, or at least more practical, to accept certain attributes of an item on the basis of a certificate of conformance (COC), provided adequate supporting information or documentation was provided when required and the validity of all the documentation or information, including the COC was adequately verified before placing the item in service. Allowing the use of unvalidated COCs (as well as other vendor-supplied information with no requirement for verification of validity) for acceptance and use of items in safety-related applications is contrary to the requirements of Criterion VII of 10 CFR Part 50, Appendix B. Use of validated COCs is important to assurance of the suitability of application as required by Criterion III.

DPC staff explained that as of the effective date (January 1, 1990) of the new program, all new evaluations were to be performed according to the new procedures. However, in accordance with DPC's position paper, sent by letter dated May 8, 1990, from the Vice President, Design Engineering Department, regarding the implementation of the NUMARC commercial grade item initiative, DPC decided it would continue to purchase CGIs with existing (prepared before January 1, 1990) evaluations, and dedicate them under those evaluations until a new or revised evaluation was prepared for each item. The process of preparing the phase-in reevaluations for items purchased after January 1, 1990 (but under the old program), was to be completed by December 31, 1991. During a July 26, 1991, conference call between DPC senior management and the NRC staff, DPC stated it had decided to accelerate the phase-in of the reevaluation of outstanding evaluations done under the old program to October 1, 1991, and any remaining CGIs listed on the CGIL without new evaluations completed by October 1 would be placed on hold, pending completion of a new evaluation using current program requirements.

The fact that all the new procedures discussed above were not actually being implemented for the procurement and dedication of CGIs and that newly procured CGIs were being dedicated under the previous program, was considered a significant programmatic and implementation weakness in the DPC program for commercial-grade procurement and dedication.

2.3 Parts Classification System

DED implemented the PCPARTS Program (parts classification) to assist the ONS, as well as all DPC nuclear stations, in determining the QA classification of replacement parts. DED informed the assessment team that to date the PCPARTS Program is limited to the classification of QA-1 valve parts and to selected QA-1 pump parts. The basis for the classification of the valve and pump parts are DED calculations DCP 1205.22-00-0001, Revision 4, dated March 15, 1991, and

DCP 1201.05-00-0001, Revision 4, dated March 25, 1991. The calculations identified design inputs such as the vendor drawings and parts lists and references the FSAR, ASME code cases, and some EPRI documents. Each calculation contained a flow chart to assist in determining if a part performed a safety-related function, however, the answers to the following flow chart decision-block questions were not documented:

(1) Is the part a primary pressure boundary part?
(2) Could failure of the part compromise the pressure boundary?
(3) Could failure of the part cause the valve/pump to be inoperable?
(4) Could failure of the part or interaction compromise the function of a nuclear safety-related system?

Also, questions such as the following were not asked:

(1) What is the function of the parent component?
(2) What is the function of the part?
(3) What are the failure modes of the part?
(4) What are the effects of the failure of the part?

The calculations identified many parts as being non-safety related, but did not provide a documented basis for this determination. Also, it was not clear whether consideration was given to failure of items such as gaskets and O-rings in containment isolation valves and the effects that their failure may have on containment integrity. Further, it was not clear if DED considered the effects that excessive contaminants in items classified as non-safety related could have on the integrity of the reactor coolant system or other safety-related systems.

The team determined that no procedure existed that provided guidance for classifying a part unless the part was being evaluated as part of the commercial-grade dedication process in accordance with Procedure PR-103, "Commercial Grade Items," and Section 6.3, "QA Conditions Determination," of Procedure CGP 1.1, "Design Engineering Commercial Grade Technical Evaluation Procedure." The lack of procedure control and the lack of documentation for the calculations supporting the PCPARTS Program was considered a weakness.

The team discussed the control of contaminants in detail with DED and nuclear maintenance and chemistry personnel. The team expressed a concern that the control of contaminants and the effect that contaminants may have on safety-related components and systems is an area governed by 10 CFR Part 50, Appendix A and Appendix B, and that classifying items such as gaskets, O-rings, and packing as non-safety-related excluded them from the requirements of the DPC QA program and Appendix B of 10 CFR Part 50. Therefore, the control of contaminants that may come in contact with safety-related systems or that may enter safety-related systems is then outside the scope of the DPC QA program. The team also expressed a concern regarding the fact that when an item has been classified as non-safety related (yet the Power Chemistry Materials Guide identifies restrictions on the amount of contaminants that may be present) there exist no in line QA controls or periodic QA checks for contaminants once the item has been approved for use. Also discussed was the fact that constituents of, or impurities in materials that are used in contact with safety-related items that exceed the requirements and limits specified in the Power Chemistry Materials Guide could cause deterioration as a result of corrosion processes or other reactions that would adversely affect the integrity of the item, component, or system under normal or accident conditions.

2.4 Commercial-Grade Supplier Selection, Qualification, and Survey

The team reviewed the process for selection, qualification, maintenance, and surveys of commercial-grade suppliers used to support DPC procurements. The team discussed the use of commercial-grade surveys with the QA Vendor Manager and engineers from the Equipment Engineering Section of the Engineering Support Division.

The team also reviewed selected commercial-grade surveys and the following procedures in assessing the use of EPRI NP-5652, Method 2, commercial grade survey of supplier:

- Commercial Grade Program Manual Procedure CGP 1.1, "Design Engineering Commercial Grade Technical Evaluation Procedure," Revision 1, dated October 15, 1990
- Design Engineering Quality Assurance Procedure PR-103, "Commercial Grade Items," Revision 1, dated October 25, 1990
- Quality Assurance Department Procedure QA-601, "Vendor Evaluation," Revision 20, dated May 23, 1991
- QA-602, "Vendor Surveillance Procedure," Revision 12, dated April 3, 1990
- QA-606, "Commercial Grade Surveys," Revision 1, dated January 24, 1991
- QA-607, "Vendor Performance Based Audits," Revision 0, dated April 9, 1991

2.4.1 Supplier Selection

DPC typically procured replacement items from the original equipment manufacturer or authorized distributor whether the item is a like-for-like replacement or an authorized substitute item. If the item performed a safety-related function, an attempt was made to purchase the item from a supplier who had a quality assurance program that met the requirements of Appendix B to 10 CFR Part 50 and who accepted 10 CFR Part 21 reportability responsibility. If the supplier did not accept nuclear requirements and the item met the definition of a CGI, the item was purchased commercial-grade and dedicated for safety-related use.

2.4.2 Supplier Qualification and Survey

The QA Vendor group performs commercial-grade surveys to ascertain and verify that a manufacturer or distributor of CGIs adequately controls certain characteristics that DED determined to be critical for satisfactory performance of a designated item. As part of using EPRI Method 2, the assigned DED technical evaluator (TE) reviewed existing commercial-grade surveys by DPC or the Nuclear Procurement Issues Committee (NUPIC) for products included in the survey, critical characteristics covered, and validity of the survey. The TE, when required, requested a survey and provided QA with a list of products and critical characteristics to be verified. The TE met with the assigned QA surveyor before the survey to discuss the conduct of the survey and participated in the survey when required or requested. The QA surveyor arranged and performed the survey, wrote the survey report, resolved discrepancies and

comments, and approved the report. The TE also reviewed the survey report to ensure all required information was included. Commercial-grade surveys of suppliers were performed, as a minimum, on a triennial basis with no mandatory requirements for an annual or periodic review of the suppliers program during the 3-year period.

The three commercial-grade surveys reviewed were generally consistent with the guidance provided in EPRI NP-5652 for confirming that a supplier was controlling each characteristic of the item to be purchased. However, the following observations and concerns regarding the conduct and processing of the surveys were discussed with QA Vendor and DED personnel:

(1) The commercial-grade survey for the Sika Corporation for the supply of concrete repair mortars was performed as part of CGPA-1000.00-00-0004, "SikaTop Mortar Repair Kits," Revision 0, dated June 12, 1991. The survey used EPRI Method 2 for verifying the following critical characteristics of the mortar: (1) part number, (2) shelf life, (3) compressive strength, and (4) bond strength. Although numerous statements were made in the survey report about how Sika Corporation controlled characteristics, the team could not determine if some statements were the result of the QA manual and procedure review or if they were the result of direct observation, surveillance, or record review of a given activity. DPC personnel performing the survey informed the team that most statements made in the survey report were the result of either direct observation or record review.

In addition, the Sika Corporation survey report states in part, "This facility does not have a documented QA program; however, there are documented Sika Quality Procedures (SQPs) detailing each of the various tests to be performed." However, QA Procedure PR-103, Section 3.8.2, requires that when Method 2 is used, (1) "all procurement documents shall require a Certificate of Conformance stating that the supplier will furnish the item in accordance with their DPC approved quality program," and (2) "acceptance of the item is completed by performing the QA Receipt Inspection, verifying the accompanying supplier's Certificate of Conformance...." Appendix CGI, Section II.f of PR-302 requires that the "supplier is to certify that the items were supplied under the QA Program approved by DPC and that all other requirements in the purchase order were met." The team's concern is that the supplier had no formal documented QA program; therefore, these DPC procedural requirements could not be met.

(2) The commercial-grade surveys for ITW Ramset/Red Head and distributor, POE Corporation were performed as part of CGPA-1000.00-00-0002, "Procurement Requirements for ITW Ramset/Red Head Wedge and Sleeve Concrete Expansion Anchors," Revision 0, dated December 12, 1990. The surveys were very thorough and included characteristics that DED categorized as design critical characteristics and critical characteristics for acceptance. However, POE Corporation did not have a documented QA program or procedures for performing work on the expansion anchor; instead it visually examined the anchor and stamped the length code on the end of the anchor.

(3) The commercial-grade survey for Kunkle Industries, Inc., Longeran Valve Division, for the supply of safety relief valves and replacement parts, was very thorough, but the team questioned the report statement, "traceability for commercial-grade items is maintained to storage only. After materials have been receipt inspected and approved and placed in storage, traceability is not maintained." The survey report went on to state that "traced the disc (HT #22398) to the purchase order and CMTR. The CMTR was reviewed and approved by QA." The survey report indicated that Longeran's Quality Assurance Manual, Revision 5, dated September 30, 1988, which was written to satisfy the requirements of the ASME Boiler and Pressure Vessel Code, Sections I, IV and VIII, Divisions 1 and 2, was accepted by DPC. The team asked if replacement parts such as the disc and valve body were supplied in accordance with the QA manual, if the valve disc was traceable to a PO and CMTR, and if CGI replacement parts such as O-rings and guide pins, were controlled by Longeran under a QA program other than their ASME QA manual. The team was unable to verify that Longeran supplies all safety relief valve parts in accordance with its ASME QA manual, because no Longeran POs or COCs for these parts were given to the team when requested.

The DPC procedures for conducting EPRI Method 2 activities were reviewed and the team discussed the following observations with DED and QA personnel:

(1) Section 5.2.1.b of QA-606 permits the review and acceptance of a NUPIC member's audit report to serve as the basis for DPC to accept a supplier's program and controls for verifying an item's critical characteristic(s) using EPRI Method 2. Unlike procedure QA-601, which provided detailed requirements for the review and acceptance of a NUPIC audit for Appendix B suppliers, QA-606 provided no guidance for screening NUPIC surveys or audits used for EPRI Method 2 acceptance activities.

(2) Section 5.2.2 of QA-606 provided no guidance for conducting a commercial-grade survey, other than to indicate that DED will provide the survey checklists. Other than Form QA-601A, which is primarily for Appendix B audits, there is no guidance for conducting the surveys, for the methodology used to verify critical characteristics or for what objective evidence must be documented to confirm that critical characteristics are being controlled. In addition, the instructions for using the Form QA-601A only stated, "list below or attach special checklist items or technical requirements that are to be included in the QA Program evaluations."

(3) Procedures PR-103 and CGP 1.1 provided no guidance or requirements for items not specifically reviewed during the commercial-grade survey, but may be considered to be within the scope of the representative groups of CGIs reviewed during the survey. For example, the survey at Longeran Valve included items such as a valve disc and spring, but not a valve guide pin. The survey was later used to support the procurement of a valve guide pin.

(4) Although the QA Vendor group's reaction to adverse findings associated with commercial-grade surveys was not proceduralized and was informal, it appeared satisfactory if performed as indicated. Following an evaluation

of an adverse finding resulting from a DPC survey or from reviewing a NUPIC survey, hardware related findings that may adversely affect the plant would result in a hold tag being placed on the item in the warehouse and a problem investigation report being initiated to evaluate the continued use of items installed in the plant.

(5) The use of a survey of a supplier who has no formal documented QA program, yet may have the necessary quality procedures for controlling the manufacture of the item, seems to be inconsistent with DPC procedural requirements which require the supplier's QA program be documented on both the PO and COC. This DPC procedural weakness was evident during the review of the Sika Corportation survey previously discussed.

The team concluded that the commercial-grade survey reports reviewed generally met the requirements of NP-5652; however, the entire commercial-grade survey process was not addressed procedurally in sufficient detail.

2.4.3 Use of Third-Party Audits

Approximately one-half of DPC's audits were third-party NUPIC member audits. These NUPIC audits are used in support of the DPC Appendix B evaluated suppliers list; however, NUPIC audits and surveys may be used in support of EPRI Method 2, activities. Procedural controls exist for screening NUPIC audits used for Appendix B suppliers, but not for commercial-grade suppliers. The manager of the QA Vendor group indicated that NUPIC audits and surveys would be used in the future as part of the DPC commercial-grade survey program and would be properly screened before their use.

2.5 Material Receipt, Documentation and Procedure Control

Receipt inspection of CGIs that were to be dedicated for safety-related applications at the ONS were performed by the QA Technical Support (QATS) group. The QATS group located at ONS performed two major activities; (1) reviewing requisitions and specifying appropriate QA and receipt inspection requirements and (2) performing receipt inspections and document reviews of items received. The team reviewed procedures QA-505, "Processing of Procurement Requisitions," Revision 32, dated June 6, 1991, and QAG-1, "Receipt Inspection and Control of QA Condition Materials, Parts and Components Except Nuclear Fuel," Revision 34, dated June 5, 1991; interviewed QATS personnel; and observed receipt inspections at the ONS warehouse. Additionally, the team discussed the receiving activities performed by materials personnel with the general supervisor, and reviewed Material Manual Section 4.4, "Material Receiving," with a revision date of June 16, 1989.

QATS personnel performed the following activities as part of the receipt inspection process:

- A visual examination of the item and its packaging was performed to determine if any damage occurred during shipping. When requested, a shipping damage inspection on items tied down on a vehicle was performed.

- The PO was reviewed and checked to verify that the information on the PO accurately reflected that on the corresponding approved PR, including any

changes identified as not changing technical requirements. The PO package was placed on hold until discrepancies were resolved. When acceptable, PO and requisitions were filed as quality records.

- A review of vendor supplied quality records was performed for compliance to PO requirements. The review of the records included activities such as (1) checking to ensure that the records were in agreement with procurement documents and that records were legible and not substandard or fraudulent, (2) checking to ensure an identification number was on each record so that it could be traced to the item, (3) checking required physical, chemical, and NDE reports for conformance with applicable specification and code requirements, (4) verifying that ASME Code requirements were met, (5) ensuring that NDE records and radiographic film were reviewed by a DPC Level II examiner, and (6) verifying that special design test reports had been approved by DED (e.g., cable test reports, seismic and EQ reports).

- A visual examination of the item was performed to verify that identification and markings are in accordance with procurement documents and the approved vendor records and that protection covers and seals were satisfactory.

- Performance of any special inspections and testing required by Form QA-505D, "Augmented Receipt Inspection Requirement"; performance of special inspections required by Form QAG-1E, "Receiving Inspection Instruction Sheet"; and any required miscellaneous inspections such as checking coatings, preservatives, inert gas blankets, desiccants, and cleanliness.

Upon satisfactory completion of all the described activities, a QA acceptance number was assigned to the item and the item was tagged or marked, if possible with the QA acceptance number on the item. Also, any QA-505D Forms were signed off for acceptance, and QAG-1E forms that were used were entered on the QAG-1A Form, "Receiving Inspection Report." If post-installation testing was required as part of the dedication process, the CGI was conditionally released for installation and testing, along with a QA hold tag. If testing was satisfactory, then the QA hold tag was cleared and a QA acceptance number issued and entered on the QAG-1A Form.

Following the review of the procedures, discussions with ONS personnel, and observation of warehouse receiving inspection activities, the team concluded that the ONS receiving inspection program generally contained the necessary controls required for the receipt, inspection and testing of commercial-grade items. The team considered receipt inspection actions such as the processing of purchase requisitions and the review of vendor-supplied records to be well defined and personnel performing these activities seemed to be very knowledgeable in these areas. The team also noted that although not formalized, the QATS group forwarded the results of ONS receipt inspection to the QA Vendor group, generally on a monthly basis.

The assessment team identified the following areas of the receipt inspection process that required improvement:

(1) Procedure QA-505 did not address the identification of Form QAG-1E during the requisition review process and Procedure QAG-1 did not acknowledge the use of the form. QAG-1, paragraph 4.5.2.j required any special receipt instructions (Form QAG-1E) be performed and the QAG-1E serial number

recorded on Form QAG-1A. Neither procedure QAG-1 or QA-505 defined when Form QAG-1E was to be used or who had the responsibility to determine when Form QAG-1E was applicable for the receipt inspection of an item. Form QAG-1E was referenced as a requirement only once in a commercial grade procurement and acceptance document (CGPA) that being for the receipt of molded case circuit breakers. The use of the special receiving inspection instruction sheets, Form QAG-1E, was not well defined or controlled at the ONS.

(2) QAG-1 required that vendor-supplied quality records be reviewed for misleading, substandard, or fraudulent information and that during the visual examination, no obvious indications that the items were used, misrepresented or supplied with inadequate or unacceptable documentation be identified. Procedure QAG-1 incorrectly referenced Appendix A of EPRI NP-6629, "Guidelines For the Procurement and Receipt of Items for Nuclear Power Plants, NCIG-15)," instead of Appendix C, "Identifying Substandard/Fraudulent Items." Form QAG-IE was being used to detect fraudulent items and documentation rather than NCIG-15, although recent Appendix B and commercial-grade QA Condition 1 receiving inspection reports (Form QAG-1A) did not list fraud detection on Form QAG-1E as a required special instruction. According to QATS personnel, the QAG-1E special receiving inspection instruction sheet for fraud detection would be applicable for all QA Condition 1 items. Discussions with QATS personnel revealed that there was no formal training, other than reading QAG-1, Revision 34, for performing receipt inspection. Section 2.6 of this assessment report discusses in further detail the fraudulent products detection program at ONS.

(3) As written, QAG-1 required signoff and approval of the receiving inspection report before the conditional release of a commercial-grade item for post-installation testing. Section 4.6.2 required when the QA hold tag is cleared, a QA acceptance number was to be issued. This number was then entered on the signed-off and approved Form QAG-1A without any requirement for review and approval of any additional information entered on a previously signed-off and approved quality record.

The team considered this a potential weakness in the receipt inspection process because the one signoff for receipt inspection activities could result in certain activities being inadvertently omitted.

(4) Procedural requirements for the procurement of ASME Section III items as small products and the procurement of structural steel as addressed in procedure QA-505 appeared inadequate. However, the QA vendor group said that Section 5.5, "Procurement of Code Items as Small Products," of QA-505 was incorrect and would be deleted and that Section 5.6, "Structural and Miscellaneous Steel," was being rewritten to address commercial-grade procurement and dedication requirements.

2.6 Fraud Detection

The team reviewed the changes made in the DPC procurement program for the detection and exclusion of fraudulent, counterfeit, and refurbished material in response to NRC Information Notice (IN) 89-70, "Possible Indications of Misre-

presented Vendor Products," including Supplement 1, and Generic Letters (GL) 89-02, "Actions To Improve the Detection of Counterfeit and Fraudulently Marketed Products," and 91-05, "Licensee Commercial-Grade Procurement and Dedication Programs." DPC had implemented a comprehensive operating experience program within the Nuclear Production Department for the review and distribution of NRC and other industry information. IN 89-70 and its supplement were distributed to the Quality Assurance Department, the Design Engineering Department, and numerous other functional groups to review for awareness only, as opposed to review for accountability and problem avoidance. The generic guidance provided in these documents had not been fully incorporated into applicable receipt inspection procedures or instructions, nor had formal training been conducted to assure that receipt inspectors were aware of and were routinely checking for potentially fraudulent products.

A fraud detection program implementation plan, was developed, as part of the NUMARC comprehensive procurement initiative (CPI) to detect potentially fraudulent products. Guidelines were developed and will be placed in the Nuclear Procurement Engineering Program (NPEP) Manual scheduled to be approved by January 1, 1992. These guidelines summarized the intent of IN 89-70, including Supplement 1 and Appendix C to EPRI NP-6629 "Guidelines for the Procurement and Receipt of Items for Nuclear Power Plants (NCIG-15)." The complete fraud detection and CPI program was planned to be implemented, including detailed training, by March 1, 1992.

DPC was using a standard clause it had developed with each 10 CFR Part 50, Appendix B, and commercial-grade purchase order. The clause stated that only new items shall be supplied and that used or refurbished material is unacceptable. Additionally, a receiving inspection instruction sheet, Form QAG-1E was developed to assist in the fraud detection of molded case circuit breakers (MCCBs) during receipt inspection. Commercial grade procurement and Acceptance requirements (CGPAs) were used to provide receipt inspectors with the requirements for Method 1 acceptance (special tests and inspections) of MCCBs for each of DPC's commercial-grade suppliers. These documents referred the inspector to the QAG-1E for fraud detection characteristics.

Another QAG-1E had been developed to assist receipt inspectors in generic fraud detection, referencing Appendix C to EPRI NP-6629. As previously stated, QAG-1 does not reference the QAG-1E and it incorrectly references Appendix A to EPRI NP-6629 for guidance in detecting fraudulent products. Therefore, there was no procedural requirement or direct connection to consult the QAG-1E or any other document during the inspection process for the detection of potentially fraudulent products, aside from MCCBs as described above. Also, there was no provision for receipt inspection to specifically document the performance of a fraud detection inspection for each item upon receipt, other than listing the QAG-1E on the receiving inspection report. There was no documented, formal training completed for the receipt inspectors on fraud detection.

DPC informed the team that it was considering revising Procedure QAG-1 to include a detailed appendix on fraud detection and modifying the receipt inspection report (Form QAG-1A) to include a check-off block for fraud detection. This procedure change would be followed by formal training.

In conclusion, at the time of the assessment, DPC had initiated measures to detect counterfeit and fraudulently marketed products in response to GL 89-02 and IN 89-70, but were not effectively implementing these measures during the

receipt inspection process. This is considered a program weakness. The proposed corrective actions to the present fraud detection program, as noted above, could provide adequate controls to aid in the detection of fraud until the complete fraud detection and CPI program is implemented.

2.7 Procurement Package Review

The assessment team reviewed several procurement and dedication packages for both the electrical and mechanical disciplines to assess the effectiveness of the implementation of the DPC dedication program, including documentation of technical evaluations, identification of safety functions and critical characteristics, and the methods chosen to verify the critical characteristics selected. The team also tried to determine if the necessary procedural controls were in place to ensure that quality characteristics would be correctly translated into procurement documents. The selected individual procurement and dedication packages reviewed are discussed below.

(1) Commercial Grade Item Evaluation (CGD), CGD-1005.00-01-0001, Revision 2, dated January 30, 1991, was prepared for the dedication of carbon steel concrete expansion wedge anchors manufactured by ITW Ramset/Red Head and distributed by the POE Corporation. EPRI Method 2, commercial grade survey of supplier, was used to verify all identified critical characteristics. However, only the part number and the vendor-supplied documentation were reviewed during the standard receipt inspection of the item. There were no Method 1 tests, inspections, or measurements required. The team discussed with DPC that items such as anchors and fasteners purchased from Appendix B suppliers generally are dimensionally inspected on a sample basis during receipt, especially when the manufacturer allows the distributor to affix the marking that indicated the length of the anchor.

DPC purchased the concrete expansion wedge anchors from POE Corporation. The distributor received the anchors from the manufacturer, sorted and marked them, and then shipped them to the buyer. Contrary to the requirements of PR-302, Appendix CGI, PR-103, Section 3.8.2, and CGP 1.1, Section 6.12.2, POE Corporation performed work (marked length identification) and supplied the anchors without having a documented QA program or procedures to control work activities. Also, contrary to these requirements, neither the purchase requisition nor the purchase order required that POE's certificate of conformance (COC) identify POE's commercial quality controls and program governing its work activities.

(2) CGD-2002.08-04-0013, Revision 1, dated January 22, 1991, was prepared for the dedication of a relief valve guide pin supplied by the Longeran Valve Division of Kunkle Industries, Incorporated. EPRI Method 2, was the method identified to verify the critical characteristics, part number, dimensions, and material with no additional Method 1 inspections or tests identified. The team was given a copy of the DPC commercial grade items list, dated July 11, 1991, which listed data for CGD-2002.08-04-0013, guide pin for Longeran relief valve, Model 34-H-204, Size 2XJX2-1/2. There were no procurement or tracebility requirements listed that required a COC stating that the item was manufactured in accordance with Longeran's Quality Assurance Manual, Revision 5, dated September 30, 1988, or any

Longeran QA program. However, the DPC Commercial Grade Items List Data Input Form for CGD 2002.08-04-0013 did identify unique procurement and traceability requirements and a required COC.

There was no documented basis or evaluation supporting the applicability of the Longeran commercial-grade survey for the procurement of the relief valve guide pin. Section 2.4.2 of this report provides additional discussion on the use of the Longeran Valve survey for the relief valve guide pin.

(3) CGD 2012.01-07-0002, Revision 0, dated June 21, 1991, was prepared for the, dedication of Texaco Premium RB grease. A concern on use of sampling a CGI's critical characteristics when using EPRI Method 1, inspection and testing was identified. The CGD, as well as the commercial grade procurement and acceptance (CGPA) for CGPA 2000.00-00-0062, Revision 0, dated May 16, 1991, required procurement of grease from a "single lot/batch number and each container should have a minimum 14 ounce product volume." The CGPA continued by permitting the testing of the grease for penetration, dropping point, chlorides, fluorides, and sulfates to be by sampling with MIL-STD-105D as the basis for sample plan. Checking the labels affixed to the tubes received was the sole basis to conclude that lot/batch homgeneity existed. The team concluded that there were insufficient requirements provided in the CGD to ensure that lot/batch homogeneity existed.

(4) CGD-3011.04-04-0001, Revision 1, dated July 19, 1989, was prepared for the procurement of a temperature controller, RTD Input, 4-20 mA Output, supplied by Love Controls Corporation. This CGD, as well as several others reviewed, was prepared by DPC prior to January 1, 1990, but was reviewed to determine the quality of the CGD evaluations that were being used for the dedication of CGIs procured after January 1, 1990.

The CGD documentation package stated: "Justification for Testing/ Performance History method: Love Controls Corporation has been incorporated since 1970 and has been producing quality merchandise for industry ever since. McGuire nuclear station has been using the subject item (1) since 1981 with an acceptable work history. An NPRDS report taken on March 21, 1989 concluded that there have been no generic problems associated with the subject item (See A7).... Conclusion: Based on the information obtained and documented in this evaluation, the Love Controls Analog Temperature Controller's items (1) & (2) are acceptable for use in QA condition 1 applications when procured as commercial grade. They may be used as a direct replacement (Category 1) part, or, when properly evaluated and documented, used in new (Category 3) applications. For any applications where the subject items are part of the NSSS system, then it must be purchased as indicated in the Westinghouse S.P.I.N.... Attachment 7 consists of the NPRDS failures report run on 3/21/89. In this report, 33 failures were recorded and documented. Note: This report covers any of the temperature controllers in the 54 series. Most of the reported cases were due to maintenance problems, i.e.; loose connections, dust/dirt in assembly, scale calibrations, etc. Oconee, McGuire, and Catawba all have maintenance procedures that regularly check the temperature controllers and should keep these kind of problems minimal. Of the few failures that

were reported of the indicators themselves (would not calibrate, blown fuse, alarm relays, etc.), no generic problems were determined. Therefore, from this report it can be concluded that the Love Temperature Controllers 54-838-834-8160-8187-8173-8174 and 54-838-834-8134-8169-8174 show no generic problems and are acceptable for use at Duke Power Company."

The team questioned the validity of many of these statements. Of the 33 failures reported, 13 were the result of the temperature controller being out of calibration, of which 10 were replaced because they could not be recalibrated and another 12 had to be replaced because they could not pass surveillance testing as a result of worn parts. The team also questioned the basis for the traceability to the environmental and seismic qualifications and stated that these traceability issues were not sufficiently addressed in the CGD.

This CGD was a good example of earlier (before January 1, 1990) technical evaluations that formed the basis for the dedication of the CGIs on the CGIL and were used to procure CGIs after January 1, 1990. These evaluations were really only a review of product and supplier performance history (EPRI Method 4) and did not implement the other EPRI NP-5652 dedication methods that are requirements of the current DPC dedication program.

(5) CGD-3014.01-24-0001, Revision 2, dated June 17, 1991, was prepared for the dedication of GE molded case circuit breakers (including auxiliary switches & shunt trips). Review of this file identified several concerns. There were reference problems such as NEMA AB2-76 instead of-84, no reference to AB4-1991, and reference to Section 5.5 (which did not exist) of the GE MCCB application guide, GET2779G. The instantaneous magnetic (IM) function definition and caution in the CGD were contrary to the test method given. The dedication was not application specific, so only some general safety functions were listed. The list of critical characteristics and acceptance methods did not address verification of trip-free operation, interrupting capacity, and insulation resistance. Also, there were no requirements for full-load hold-in capability and no individual pole resistance test. Only a thermal time delay overload test at 300 percent of nominal was specified. Some maximum clearing times were given, not from the time-current curves, and no minimum values were given to be used unless nuisance tripping has occurred. Also, it was not clear how the issue of the full-load rating expectation versus the GE standard rating for 80 percent continuous load (greater than 3 hours) in an enclosure at 25C per UL-489 was addressed.

For the IM trip test, the trip value of 65 percent of the "expected trip point" is an inadequate acceptance criterion because (1) expected value was undefined and (2) the expected result should be no trip at the lowest test value. The origin of the values in the table of trip currents was unclear and tolerances were not evident. Also only the high values were specified which is contrary to the station procedure as well as NEMA standards. For testing at one setting only, it was not clear that the design setting was used or even known. The tolerances given on these values were extremely restrictive (+/-5 or 15 percent) and not likely achieveable. There were no post-installation tests specified for motor starting/running. The explanation of this test was different from the station procedure and did not make sense.

For historical perspective, the team reviewed an earlier version of this MCCB dedication plan that had apparently been used until recently. CGD-3014.01-24-0001, Revision 0, dated October 2, 1989, GE molded case circuit breakers (including auxiliary switches and shunt trips) was based primarily on review of performance history which the team considered inadequate by itself. Additionally, the performance history consisted of a search of the nuclear plant reliability data system (NPRDS) maintained by the Institute for Nuclear Power Operations (INPO) and a somewhat simplistic interpretation of the results. The NPRDS reporting threshold, particularly as interpreted by subscribers, may be too high to capture the majority of relevant MCCB failures and it is also typically very difficult from a scan of an NRPDS record printout to determine in many cases exactly what component actually failed and how, without contacting the reporting party for details and clarification.

DPC had ordered an assortment of GE MCCBs from Mill Power Supply Company of Charlotte under PO A04447-70, dated January 23, 1991. After some initial uncertainity as to whether any MCCBs on this PO had been received, DPC determined that ONS had in fact received them, but DPC was unable to produce any inspection and test records on them during the assessment. The team was not able to determine under which version of the dedication documents described above these MCCBs were dedicated.

In summary, the review of the selected individual procurement packages revealed that (1) safety functions specific to the particular application were not always clearly identified, (2) critical characteristics were not adequately identified as dictated by safety function, (3) all appropriate critical characteristics were not selected for verification, and (4) acceptance testing to verify those characteristics that were selected was not always adequately performed. In addition, as discussed previously, the technical evaluations performed under the previous program requirements that formed the basis for the CGI dedication, were only a review of performance and supplier history.

2.8 Quality Assurance Departmental Audit

Quality Assurance (QA) Departmental Audit SP-90-01 (All) was conducted during November 19, 1990, through January 24, 1991, to evaluate the adequacy and effectiveness of the DPC commercial-grade program for activities performed after January 1, 1990. The audit looked at the QA program to evaluate the adequacy of the procedural guidance and direction, as well as the technical adequacy of numerous commercial grade item evaluations (CGDs) performed by different groups within DPC for various nuclear stations. The audit report was dated April 1, 1991.

The audit appeared to be an extensive, thorough, performance-based audit that documented several pertinent findings and observations in both the commercial-grade dedication program and its implementation. The team verified that all findings had been responded to by the appropriate departments, however, time limitations made it impossible to evaluate the identified corrective actions. If appropriate corrective actions were implemented for all the findings, the audit should be beneficial in upgrading the DPC commercial-grade dedication program.

2.9 Management Involvement

Management had played a significant role in the evolution of the commercial-grade dedication at DPC, as well as overall industry evaluation, through participation on the NUMARC Board of Directors and the NUMARC nuclear plant equipment procurement (NPEP) working group. DPC management also was active in the review, assessment, and implementation of the NUMARC CPI. The resources were made available to put together a task force and a review team from several different departments to make recommendations on how to implement the CPI. As discussed earlier in the Executive Summary, DPC management made the decision to phase-in the reevaluation of commercial-grade evaluations in existence as of December 31, 1989, and continued to use these evaluations to dedicate CGIs procured after January 1, 1990. These earlier evaluations did not meet the requirements of the current dedication program, which was supposed to be consistent with the EPRI NP-5652 guidelines. Although, in retrospect, DPC might reconsider this decision, management documented their basis for phasing-in the new program in a position paper and letter dated May 8, 1990, and later updated that position on July 5, 1991.

3 PROCUREMENT TRAINING REVIEW

The team reviewed the indoctrination and training of personnel involved in the procurement and dedication process at DPC, placing particular emphasis on the Design Engineering Department (DED). Formal training was provided to DED personnel involved in the procurement and dedication process when the revised commercial-grade program became effective on January 1, 1990. The team reviewed the training records for applicable DED personnel and verified that the DED personnel had received training on the applicable procedures used for commercial-grade procurement and evaluations.

However, during further review of DPC's training, the team discovered that there were no minimum formal training requirements for DED personnel performing commercial-grade dedication activities. Individuals who joined those groups that performed the CGI evaluations within DED received training on an individual basis from their immediate supervisors. During discussions with the team, DED personnel stated that although there was no documented program that described the minimum training requirements, it was the responsibility of the individual's immediate supervisor to ensure that adequate training was provided before the individual performed any CGI evaluations. DED personnel further stated that although individuals became familiar with applicable procurement procedures when they joined the various groups, the training was primarily on-the-job training. An individual's knowledge of the commercial-grade procurement process and the applicable procedures was determined once they had become involved in preparing CGI evaluations. However, the team concluded that with the different groups within DED performing CGI evaluations, it would be beneficial if minimum training requirements were specified and documented. This would be one way of ensuring consistency in the training provided to individuals within DED involved in the performance of CGI evaluations. The team considered the lack of minimum training requirements a weakness in the DPC dedication program.

4 NUMARC COMPREHENSIVE PROCUREMENT INITIATIVE IMPLEMENTATION

The assessment team reviewed the status of DPC's implementation of the NUMARC CPI as described in NUMARC 90-13, "Nuclear Program Improvements," approved June 28, 1990, by the NUMARC Board of Directors (DPC's Senior Vice President of

the Nuclear Production Department is a member of the Board of Directors). This initiative committed licensees to assess their procurement programs and take specific actions to strengthen inadequate programs. The CPI called for licensees to complete their reviews by July 1, 1991, and to complete implementation by July 1, 1992. These guidelines are summarized in the enclosure to a Commission paper, "NUMARC Initiatives on Procurement," (SECY 90-304), dated August 24, 1990.

DPC established a CPI review team in July 1990, with representatives from the Design Engineering Department, Nuclear Production Department, and Quality Assurance. Representatives were later added from the Purchasing and Construction Maintenance Department. The CPI team developed a position paper, issued on March 4, 1991, which summarized DPC's approach for implementation of the CPI. The results of the review and assessment phase were documented in a licensee internal memorandum dated July 5, 1991. The CPI team agreed to develop a new corporate level manual (Nuclear Procurement Engineering Program) to incorporate procedures required to implement the CPI. The following discussion describes DPC's strategy for implementation of the CPI.

4.1 Vendor Audits

Quality Assurance will perform a review of original equipment manufacturers (OEMs) and authorized suppliers to identify those with a proven performance record. The existing audits or other documentation providing a basis for procurement from those suppliers will continue to be used until the audit in effect until July 1, 1992, expires.

For those OEMs and authorized suppliers not having a proven performance record, and for all other suppliers, a list of equipment and materials procured from each will be screened to determine if a performance-based audit (PBA), special inspection and/or testing should be performed. These improvements will be implemented in order to support any procurements made on or after July 1, 1992. The screening process had not been developed as of this assessment, but DPC personnel stated that a screening process will be developed before July 1, 1992.

DPC personnel stated that, when developed, the screening process will be based on vendor history, item complexity and function, and the extent to which other verification methods such as inspection and/or testing will be performed. PBAs will be used, as appropriate, for vendor audits performed by other utilities and utility-based auditing organizations such as NUPIC. When a PBA is performed, the items that are more complex and perform a function important to plant safety will be targeted. DPC planned to continue to participate in joint audit activities through NUPIC. All audits will be conducted on a triennial basis. Also, DPC will continue with a source inspection program (during production, testing, or final inspection) to supplement the audit program.

4.2 Tests and Inspections

DPC will use a screening process to determine if special inspection and/or testing is appropriate. The determination will be based on such things as supplier/product performance history, item complexity and function, traceability, type of audit performed on the supplier, other testing routinely performed before putting equipment in service, type of test and test equipment required, and the frequency

and/or quality of orders. Special inspection/testing will not normally be performed on products from a supplier that was subjected to a PBA unless the PBA indicates a need for special inspection and/or testing.

Guidelines for fraud detection had been developed. The guidelines, based on Appendix C to EPRI NP-6629, were completed by QA in May 1991. The guidelines will be placed in the Nuclear Procurement Engineering Program Manual. The manual is scheduled to be approved by 1992, and training on the fraud detection guidelines is scheduled to be completed by March 1, 1992.

4.3 Obsolete Items

DPC's current practice was to establish traceability to the OEM when items were procured through channels other than the OEM or an authorized distributor (i.e., surplus market). Procedures were being revised to reflect this practice and to require the performance of tests and/or inspections if traceability to the OEM could not be established.

DPC's acceptable substitutes program identified the process for evaluating replacement items. The procedure for this program will be reviewed by DPC to determine if any improvements are needed.

5 CONCLUSIONS

The licensee had made a significant effort to upgrade its commercial-grade dedication program since its inception in January 1987; however, needs for improvement were identified in a number of areas. Of most significance was DPC's failure to fully implement its new program requirements as of January 1, 1990, for CGIs previously evaluated and listed on the commercial grade items list. DPC decided to phase-in the reevaluation of these CGIs using past program requirements, with completion by December 31, 1991. A specific weakness identified in program implementation was not verifying all characteristics identified as critical.

The assessment team found strengths in areas such as engineering involvement in the dedication process, past and present industry involvement, and overall program consistency with the dedication philosophy described in EPRI NP-5652. Also, DPC's achievements in the area of the review of the NUMARC comprehensive procurement initiatives were acceptable and the quality, experience level, attitude, and dedication of its personnel was evident.

6 EXIT MEETING

On July 19, 1991, the assessment team conducted an exit meeting with members of the DPC staff and management at the Charlotte North Carolina general office. Persons contacted during the assessment are listed in the appendix to this report. During the exit meeting, the team summarized the scope of the assessment and the observations. Throughout the assessment, the team met with DPC management and their staff to discuss concerns. The license did not identify any information as proprietary.

APPENDIX

PERSONS CONTACTED

Duke Power Company

* H. Tucker, Senior Vice President, Nuclear Production
* T. McMeekin, Vice President, Design Engineering
* M. Tuckman, Vice President, Nuclear Operations
* G. Grier, Vice President, Quality Assurance
* K. Caraway, Senior Engineering Supervisor, Design Engineering (DE)
* P. McBride, Engineering Supervisor, DE
  R. Harris, Engineering Supervisor, DE
* D. DeMart, Engineering Supervisor, DE
* J. Richards, Senior Engineer, DE
  R. Oakley, Senior Engineer, DE
* T. Wyke, Chief Engineer, DE
* J. Peele, Division Project Manager, DE
  S. Lindsey, Technical Assistant Manager, Nuclear Production (NP)
* J. Temple, Procurement Supervisor, NP
* P. Herran, Nuclear Maintenance Manager, NP
* S. Benesole, Engineering Supervisor, NP
  S. Grier, Engineer, NP
  A. Haghi, Engineer, NP
  J. Sites, Materials Manager, NP/Oconee
  B. Millsaps, Maintenance Engineer, NP/Oconee
* L. Davison, Director, Services General Office, Quality Assurance (QA)
* R. Robinson, QA Manager, Vendors
  G. Miller, QA Technical Assistant Manager
* R. Smith, General Manager, Purchasing
  C. Ballard, Purchasing Agent, Purchasing
  S. Schronce, Material Specialist
  M. Wells, Material Specialist

Nuclear Regulatory Commission

* G. Zech, Acting Deputy Director, Division of Reactor Inspection and Safeguards, NRR
* J. Johnson, Deputy Director, Division of Reactor Projects, Region II
* U. Potapovs, Section Chief, Vendor Inspection Branch, NRR
* R. McIntyre, Team Leader, NRR
* S. Alexander, EQ and Test Engineer, NRR
* L. Campbell, Reactor Engineer, NRR
* R. Frahm, Quality Assurance Engineer, NRR
* M. Thomas, Reactor Engineer, Region II

NUMARC

* A. Marion, Manager

*Attended Exit Meeting on July 19, 1991

January 2, 1992

DISTRIBUTION:
Docket Files 50-269, 50-270 and 50-287
PDR
LPDR
VIB R/F
DRIS R/F
SVarga
GLainas
WRussell
FMiraglia
BGrimes
LNorrholm
UPotapovs
RMcIntyre
LCampbell
SAlexander
RFrahm
RPettis
CVanDenburgh
GCwalina
DMatthews
MBoyle
LWiens
CHehl, RI
WHodges, RI
LReyes, RII
AGibson, RII
EMerschoff, RII
JJohnson, RII
FJape, RII
MThomas, RII
AHerdt, RII
HMiller, RIII
EGreenman, RIII
BBeach, RIV
SCollins, RIV
RZimmerman, RV

OFC	:RIS1:VIB:DRIS	:RIS2:VIB:DRIS	:RIS1:VIB:DRIS	:SPS:VIB:DRIS	:REGION I
NAME	:RMcIntyre	:SAlexander	:LCampbell	:RFrahm	:MThomas
DATE	: 12/20/91	:12/24/91	:12/24/91	:12/24/91	:12/24/91

OFC	:SC:RIS1:VIB	:VIB:DRIS:NRR	:TECH EDITOR	:D:DRIS:NRR	:PDR/I/II NRR
NAME	:UPotapovs	:LNorrholm	:DGable	:BGrimes	:LWeins
DATE	:12/24/91	:12/24/91	:12/12/91	:12/24/91	:12/30/91

OFC	:D:DRPI/II:NRR	:	:	:	:
NAME	:SVarga	:	:	:	:
DATE	:1/2/92	:	:	:	:

OFFICIAL RECORD COPY