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ComEd

February 6, 1997

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Quad Cities Station Units 1 and 2
Request for Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Basis Information
NRC Docket Numbers: 50-254 and 50-265

References: (a) J. M. Taylor letter to J. J. O'Connor dated October 9, 1996, "Request for Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability Of Design Bases Information"

(b) T. J. Maiman letter to A. B. Beach dated November 12, 1996, "Programs to Improve the Quality, Maintenance and Accessibility of the Design Bases at ComEd Nuclear Stations"

(c) T. J. Maiman letter to A. B. Beach dated January 30, 1997, "ComEd Plan for Upgrading the Quality and Access to Design Information at All Six Nuclear Stations"

This letter transmits Quad Cities Station's response to the Nuclear Regulatory Commission's (NRC) request for information under 10 CFR 50.54(f) (Reference (a)). For the reasons described in detail in the attachment, Quad Cities Station concludes that there is reasonable assurance that procedures reflect design bases and that the plant is configured and operated in a manner that is consistent with the design bases.

Quad Cities Station developed the subject response following a comprehensive assessment of its configuration management program as it applies to the design bases. The response was prepared by a multi-disciplined team of site personnel, working closely with the company's other sites and a corporate team. The response was validated by those individuals who provided input as well as their supervisors and senior managers. An independent assessment of the response was conducted by the station's Site Quality Verification organization.

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The response is structured around the five action items in the 50.54(f) request. The attachment to this letter is supplemented with three appendices.

- Appendix I, "ComEd Corporate Support to Station Design and Configuration Control Programs," discusses the support role of Corporate groups which oversee conformance with the design bases.

- Appendix II, "Design Control and Configuration Control Processes," presents a summary of the major, common processes upon which each of the six ComEd Nuclear Stations have based their programs. This appendix supports Action (a) directly.

- Appendix III, "Nuclear Fuel Services' Design Processes," discusses the role of the Corporate Nuclear Fuels Group in supporting our six nuclear stations in reload analysis and fuel management.

Current Situation

Quad Cities Station's conclusion of reasonable assurance that the plant is configured and operated consistent with its design bases is based on several factors. The station was determined to meet its design bases by ComEd and the NRC concurred with this conclusion when the plant was originally licensed. Since then, changes to the station's physical configuration and procedures have been made in accordance with programs that were designed and adopted to assure continuing consistency with the design bases. Under these programs, changes are controlled and design bases information is updated by procedure. Significant changes to the station's configuration and its operating procedures are subject to Offsite and Onsite reviews. The Station's design and configuration programs have been improved and upgraded over time.

Plant performance during normal operation, start-up, refueling, plant trips, and transients has supported that Quad Cities Station Structures, Systems and Components have been maintained consistent with its Design Bases. Additionally, surveillance testing, routine plant walkdowns by operations and engineering personnel, performance monitoring programs, and results of post maintenance and modification tests provide assurance that the plant is configured and performs per its design bases.

ComEd's assessment processes, NRC inspections and third party reviews have repeatedly probed the programs implemented to maintain the design bases. These reviews have, for the most part, corroborated that the plant's procedures accurately translate design bases information and that structures, systems, and components are consistent with their design bases. Where discrepancies have been identified, their causes and extent of occurrence have been determined, and the discrepancies have been corrected. If procedures permitted the discrepancies to occur, the procedures have been strengthened. This information leads Quad Cities Station to conclude that its configuration management program, as supported by its corrective action program, provides reasonable assurance that the procedures accurately reflect the design bases and that the structures, systems, and components are consistent with their design bases.

Future Action

Quad Cities Station recognizes that, despite the present assurance that the plant is configured and operated consistent with its design bases, actions are necessary to achieve additional assurance. The Station's assessment processes and the comprehensive assessment performed in response to this request have identified shortcomings. Implementation of Root Cause Analysis and Effectiveness Reviews needs to be strengthened to sustain materiel condition improvements. There are Design Documents not readily available which impedes corrective action implementation. Post Modification Testing needs to be enhanced to improve configuration control. The Station has not completed a comprehensive review of the UFSAR. These issues have been captured in the Station's processes for correction in a timely manner.

To alleviate any ambiguity as to our commitment to future actions regarding the quality, maintenance, and accessibility of design basis information, we have provided those commitments under separate cover to the NRC (References (b) and (c)).

In conclusion, ComEd is dedicated to the safe operation of its nuclear power plants. We clearly recognize the importance of operating and maintaining the station in conformance with the design bases. The station has processes and people in place to ensure this is the case.

Please contact us should you have any questions on the attached information.

Very truly yours,

Thomas J. Maiman
Executive Vice President
Chief Nuclear Officer

E. S. Kraft, Jr.
Site Vice President
Quad Cities Nuclear Power Station

TJM\tb

Attachment

cc: A. B. Beach, Regional Administrator - RIII
J. Callan, Executive Director for Operations
S. Collins, Director - NRR
R. Pulsifer, Quad Cities Project Manager - NRR
C. Miller, Senior Resident Inspector - Quad Cities
Office of Nuclear Facility Safety - IDNS

COUNTY OF DuPage
STATE OF Illinois

AFFIDAVIT

I, Thomas J. Maiman being first duly sworn, do hereby state and affirm that I am the Chief Nuclear Officer for Commonwealth Edison Company, that I am authorized to submit the attached letter and attachments on behalf of the company, and that the statements in the letter and attachments are true and correct to the best of my information, knowledge, and belief.

Thomas J. Maiman

Thomas J. Maiman
Executive Vice President
Chief Nuclear Officer

Subscribed and sworn before me on the 6th day of February, 1997.

My commission expires 5-19-98

"OFFICIAL SEAL"
MICHELLE KOWALKOWSKI
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 5/19/98

Michelle Kowalkowski

Notary Public

EXECUTIVE SUMMARY

Quad Cities Station, following a comprehensive assessment of its configuration management program, has concluded that there is reasonable assurance that the plant is configured and operated consistent with its design bases. This conclusion is based on the information provided herein.

Action (a): As described in action (a), Quad Cities has processes for engineering design and configuration control, including those that implement 10 CFR 50.59; 50.71(e); and Appendix B. These processes and programs are designed and implemented to provide assurance of consistency between the plant's configuration and design bases.

Action (b): As detailed in action (b), operating, maintenance and test procedures were developed and put in place as part of the initial licensing process. The procedures have since been significantly improved over time. Quad Cities performed procedure upgrade projects aimed at technical content improvements and implemented upgraded Technical Specifications. Added assurance of procedure quality is provided via the Station's corrective action program. When deficiencies are identified, work is stopped, the plant is placed in a safe condition and the deficiencies are corrected. Internal assessments and external inspections probe the effectiveness of station procedures. Results indicate that procedures are effective and are consistent with the design bases. Although issues are occasionally identified, there is reasonable assurance that the design bases requirements are translated into operation, maintenance, and test procedures.

Action (c): As described in action (c) there is reasonable assurance Quad Cities' Structures, Systems, and Components (SSCs) are configured and perform consistent with their design bases unless otherwise allowed by regulations.

When Quad Cities was licensed to operate the NRC concurred with ComEd's conclusion that there was reasonable assurance that Quad Cities Structures, Systems, and Components (SSCs) were configured in accordance with, and conformed to the plant's design bases. Quad Cities' initial performance baseline was based on certain calculations and analyses verified by preoperational tests, and start-up tests, performed by the Architect Engineers (A/E), Nuclear Steam Supply System (NSSS), or other vendors and suppliers. The plant configuration baseline was established via prestart-up walkdowns, tests, and other activities. Design bases initiatives and upgrade programs implemented over time have played a major role in upgrading the quality of the Station's design bases and performance. Normal operation of the plant as expected, and responses to abnormal conditions as planned, generate a vast body of experience that demonstrates consistency with design bases. Further confidence has also been gained as various SSCs were reviewed under targeted plant specific design bases conformance testing, special verifications and improvement efforts. Audits and inspections to confirm that equipment performs consistent with and is configured in accordance with the design bases have helped the station identify and correct deficiencies. Safety System Functional Inspections and other vertical slice audits have been of the most value because the focus of such audits is to confirm that systems will perform as designed.

Action (d): As described in action (d), Quad Cities Station processes provide a mechanism for problems and concerns to be formally documented and evaluated. Identified conditions adverse to quality are assigned a priority for timely corrective action based upon their safety significance and are subject to root cause evaluations. Station processes are also in place to prevent recurrence and to identify and correct generic implications. Identified conditions adverse to quality are assessed to determine their impact upon operability and are evaluated for reportability to the Nuclear Regulatory Commission (NRC).

Action (e): As concluded in action (e), overall, the information contained herein provides reasonable assurance that the station's processes and programs are in place and effective in maintaining the configuration of the plant consistent with its design bases.

Design bases initiatives and upgrade programs implemented over time have played a major role in upgrading the quality of the Station's design bases and performance and is discussed in some detail in action (c) (sections 3.7, 3.7.9, 3.7.11, 3.7.16 and 3.8.3). Twenty-two Design Bases Documents (DBDs) have been developed. DBD development involved identifying original plant design bases, incorporating changes, reviewing existing information, and resolving conflicts between documents. Engineers from the Nuclear Steam Supply System suppliers and Architect Engineers, assisted in the development of the DBDs. Actions have been taken to enhance the quality and availability of configuration and system design bases information. A number of design bases special verifications and improvement initiative have also been undertaken.

Future actions to be taken regarding adequacy and availability of design bases information, design control, configuration management and related areas, will be described under a separate letter.

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1.0 ACTION (a) DESCRIPTION OF ENGINEERING DESIGN AND CONFIGURATION CONTROL PROCESSES, INCLUDING THOSE THAT IMPLEMENT 10 CFR 50.59, 10 CFR 50.71(E), AND APPENDIX B TO 10 CFR 50.

1.1 Introduction

ComEd's processes for engineering design and configuration control, including those that implement 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR Part 50, are described in this section. These processes implement ComEd's configuration management model as described in Appendix I. The requirements of the ComEd's Quality Assurance Manual are reflected throughout the processes discussed below.

In the corporate office, implementation of configuration management is the responsibility of the Chief Engineer, Configuration Management, who reports directly to the Engineering Vice President. At the sites, implementation of configuration management is the responsibility of a supervisor in the Engineering Department.

The corporate office is responsible for development of Nuclear Engineering Procedures (NEP) and Nuclear Station Work Procedures (NSWP). NEPs and NWSPs provide the sites guidance on corporate expectations for configuration control processes. The major elements relevant to engineering design and configuration control are summarized in Appendix II. A matrix in the Appendix illustrates how the various processes relate to the processes for implementing 10 CFR 50.59 and 10 CFR 50.71(e).

The Quad Cities Station Administrative Procedures and the corporate NEPs and NSWPs provide the details for implementing configuration management. These station procedures specify how work is to be performed and how the station is to be operated to assure consistency with the design bases. Procedural adherence is a clearly communicated management that is reinforced by the station management.

The Nuclear Fuels Design Process is corporate-sponsored for the stations and is discussed in Appendix III.

1.2 Objectives Of Engineering Design And Configuration Control

The design and configuration control processes applicable to Quad Cities, described here and in Appendix II, meet the following objectives:

- There is adequate design control for new designs and design changes in accordance with 10 CFR 50, Appendix B,
- Design changes are properly reviewed and approved, and are designed, installed, tested and operated in a controlled manner,

- Procedures are in place to properly implement the requirements of 10 CFR 50.59 for performing safety evaluations,

- Procedures are in place to properly implement the requirements of 10 CFR 50.71(e) regarding revisions to the Updated Final Safety Analysis Report (UFSAR), and

- Responsible personnel are properly trained in the preceding processes and procedures.

The design control processes conform to Criterion III of 10 CFR 50 Appendix B, and include the following elements:

- The procedures apply to new design work and design changes (modifications and exempt changes) for safety-related and certain nonsafety-related Structures, Systems, and Components (SSCs),

- New design work (including design changes) must be reviewed for conformance with the design bases (or appropriate changes must be implemented in the licensing bases),

- New design work (including design changes) must be documented in calculations, analyses, specifications, drawings, or other controlled documents,

- New design work (including design changes) must be subject to design review,

- New design work (including design changes) must be approved by management, and

- Design changes are reflected in controlled sets of the UFSAR, Technical Specifications, Design Bases Documents (DBDs), analyses, design drawings and other design bases information.

The configuration control procedures include the following elements:

- Prior to approval, design changes are required to be evaluated for conformance with design bases,

- Changes are verified to be consistent with the design bases,

- Design changes are required to be evaluated to identify associated changes needed in operating, maintenance, testing procedures and training programs,

- Approved design changes are required to be implemented in accordance with controlled documents (e.g., work packages, installation procedures or specifications),

- Design Changes are subject to Quality Control (QC) inspections.

- Field changes are required to be evaluated and are subject to engineering approval, where appropriate,

- Temporary modifications, Operator Work-Arounds, and operation with nonconforming conditions are required to be evaluated and are subject to engineering approval, where appropriate,

- Responsible individuals who prepare and review procedures have access to and are familiar with the design bases,

- Changes to operating, maintenance, and testing procedures are reviewed to determine their conformance with design bases and other design documents,

- Changes in the plant are reviewed under 10 CFR 50.59 to determine whether an Unreviewed Safety Question (USQ) exists,

- Responsible personnel are required to receive training in the above procedure(s), and

- Affected documents, databases, and drawings are updated in a timely manner consistent with the nature of the change and the importance of the document.

The procedures for implementing 10 CFR 50.59 screenings/safety evaluations include the following elements:

- Screening for 10 CFR 50.59 applicability are performed for the following: Changes to the UFSAR and Technical Specifications, changes to design and operation, procedure changes, temporary modifications, and prolonged operation with degraded and nonconforming conditions,

- Changes which alter the plant or the procedures from their description in the Safety Analysis Report are reviewed under 10 CFR 50.59 to determine whether an USQ exists,

- Changes are required to be screened to determine whether they involve a change in the Safety Analysis Report or, Technical Specifications,

- 10 CFR 50.59 screening or safety evaluations are required to be documented,

- Safety evaluations pursuant to 10 CFR 50.59 are subject to review and approval by qualified senior personnel,

- Changes which constitute USQs and changes to the Technical Specifications are evaluated to assure that no Significant Hazard would result from their implementation and are

required to be submitted to the Nuclear Regulatory Commission (NRC) for approval as part of a license amendment application prior to implementation, and

- Responsible personnel are required to receive training in the above procedures.

The procedures for implementing the requirements of 10 CFR 50.71(e) include the following elements:

- Changes are required to be reviewed to determine whether the UFSAR needs to be updated (e.g., for permanent changes),
- The effects of safety analyses for license amendments are required to be incorporated into UFSAR updates,
- The effects of other safety analyses are required to be submitted to the NRC and to be incorporated into UFSAR updates,
- The updates to the UFSAR include not only changed information but also new analyses identified above,
- Between updates, identified changes for the UFSAR are controlled and accessible to plant personnel, and
- Responsible personnel are required to receive training in the above procedures.

1.3 Overview Of Design and Work Control Processes

The work control process at Quad Cities is designed to allow the plant to be operated and maintained while controlling and maintaining the design bases. Maintenance and modification work performed in the power block is performed within the work control process. Maintenance and modification work requires either an approved Work Request (WR) or Action Request (AR). Processes which control design and configuration can be grouped according to their primary objective:

- Work Initiation,
- Work Planning,
- Interim or Temporary Alterations (TA)s,
- Work Package Reviews,
- Work Execution, and
- Design Document Update

The processes are embodied in and implemented through either corporate or station procedures. These procedures define the way that work is initiated, planned, reviewed, and performed; establish controls that apply to work; specify how the station is to be operated; and how to maintain design bases documentation. Cross functional checks by the various review organizations provide additional assurance that configuration control is maintained. Station and corporate personnel are trained in the use of the procedures and are required by ComEd policy to comply with and adhere to procedures. If they cannot comply with a procedure or work package, they must stop work, secure the system or equipment in a safe condition, and seek clarification from their supervisor.

The work control process is briefly described below. Further details on specific processes, or process elements, are provided in Section 1.4 and Appendix II.

Work Initiation

Work may be initiated via a number of processes. For maintenance work, the AR (Section 1.4.1) is used; for engineering assistance and evaluation, the Engineering Request (ER) is used. For problem investigation and corrective action, the Problem Identification Form (PIF) (4.2.1) is used.

ARs and PIFs are promptly screened for design bases issues. Each shift, the ARs and PIFs are reviewed by the Shift Engineer or another licensed Senior Reactor Operator (SRO) for impact on operability and Technical Specifications. The licensed SRO determines if the identified problem results in a safety concern and if immediate action is required. If equipment important to safety has been identified as being degraded, an Operability Assessment is performed. A multi-disciplinary and experienced screening committee, including representatives of Operations, Engineering, and Maintenance, assign a work priority to the AR consistent with the safety significance of the request and review the AR for regulatory compliance concerns.

Work Planning

Work is planned and work packages are prepared using the work control process (Section 1.4.2). Some work may require a plant modification, a procedure change or new procedure, use of other than like-for-like replacement parts, or a setpoint change. In these cases, the design change (Section 1.4.3), procedure control (Section 1.4.4), parts replacement (Section 1.4.5), or setpoint change (Section 1.4.6) processes are used.

Part of the work analyst's responsibility is to perform a walkdown. This walkdown is performed prior to starting the work package. Discrepancies between the plant configuration and the design documents will be brought to the attention of the Engineering Department through the use of a PIF to resolve and document plant discrepancies.

Interim Actions Or Temporary Alterations

At times it is necessary to take interim action pending completion of work required to permanently correct a potential or actual condition adverse to quality. Consistency of operation

with the design bases pending completion of work is assured by performing evaluations and/or taking compensatory actions and/or documenting the temporary condition as a TA (Section 1.4.10).

Operability assessments, (Section 1.4.7) are performed to assess whether a SSC is capable of performing its specified function in its present condition and what, if any, compensatory action is required. Safety evaluations pursuant to 10 CFR 50.59 (Section 1.4.8) may be required depending on safety significance and the time required to take the permanent corrective action.

Occasionally a question will arise about a Technical Specification requirement and a clarification may be written (Section 1.4.9).

Work Package Reviews

Safety-related work packages that implement a design change, go through a review process during preparation and close-out, to verify work, including testing, is complete. These reviews are performed by various groups including, at a minimum, Engineering, Operations, and QC. This is done by identifying the WR type and the safety related function. Reviewers can also be included for special areas such as Environmental Qualification (EQ).

Work Execution

Work is executed under a controlled process with several elements. The Out of Service (OOS) (Section 1.4.11) process verifies that plant configuration is controlled consistent with the design bases during performance of maintenance activities. The actual work is controlled by an existing procedure or the work package prepared under the work control process. The Post-Maintenance Testing (PMT) and QC hold/witness points (where applicable) are factors that help assure that the work has been done properly and that the equipment conforms to functional requirements.

Technical Specification surveillances, which verify design requirements, are also controlled through the work control process. Discrepancies in acceptance criteria are required to be reported on a PIF.

Consistency between operation and the plant's design bases is maintained by the work control process. After work on an AR/WR is completed the affected equipment is returned to operation by the Equipment Return-to-Service (RTS) Process.

Design Document Updates

Design document changes may be required either to correct a deficiency, such as a deviation between the document and the as-built, or because of a design change. The Document Change Request (DCR) (Section 1.4.12) process is used to control design document changes. Other update processes exist for the UFSAR (Section 1.4.13) and DBDs (Section 1.4.14).

Vendor manual and/or operating or maintenance procedures may need to be changed based on information received from the vendor as part of the Vendor Equipment Technical Information Program (VETIP) (Section 1.4.15).

New or revised calculations may be required at various stages of different processes, and these are controlled by the Design Calculation Process (Section 1.4.16). Some calculations are prepared using computer software that is controlled by the Design Software Revision Process (Section 1.4.17).

Configuration control, accessibility, and retrievability of design bases information and change documents has been enhanced through the use of the Electronic Work Control System (EWCS) (Section 1.4.18) and development of the DBDs (Section 1.4.19). A key piece of information that is included in EWCS is Engineering Change Notices (ECNs) (Section 1.4.20) that show design and TA changes, as required.

1.4 Specific Process Elements

1.4.1 Action Requests

The AR process is utilized to document physical problems with SSCs requiring repair. Employees or contractors who identify a problem have the responsibility to have an AR initiated.

ARs are initially screened by an On-Shift review. Quad Cities site procedures specify the levels of review for the On-Shift screening and approval. The Shift Engineer (or another licensed SRO) reviews ARs to:

- Identify if the inoperable equipment affects Technical Specification operability requirements,
- Determine if the deficiency is reportable,
- Determine if the deficiency requires either immediate action or action prior to the next meeting of the Screening Committee, and
- Initiate immediate corrective actions (if deemed necessary) such as putting the plant in a safe condition, initiating an operability evaluation, or taking compensatory action.

The design and license sources available for use to perform the On-Shift review include:

- UFSAR,
- Technical Specifications,
- Operations, Maintenance, and test procedures, and

- Controlled Documentation (electrical schematic and wiring diagrams, Piping and Instrument Diagrams, other station procedures, etc.)

Following the On-Shift review, the AR is sent to the Station's Screening Committee, which includes individuals with knowledge of the plant, license or design bases. The screening process to classify, prioritize, and categorize all ARs and WRs is further described in a corporate procedure discussed in Appendix II, Process 1.

1.4.2 Work Control

The work control process is the method for implementing plant maintenance activities. The process includes identification, planning, scheduling, tracking, performance, support, testing and RTS. The corporate Modification Work Control Process is described in Appendix II, Process 5. Appropriate QC inspections, required tests, reviews, and approvals throughout the work process add a measure of confidence that design bases requirements and specifications are properly maintained between the as-built configuration and the UFSAR, Technical Specifications, and other design bases information.

Site procedures cover the following aspects of work control:

- **Work Control Process** describes the process for identifying, prioritizing and classifying work,

- **Long Range Planning And Scheduling** describes the methodology employed for periods beyond the current operating cycle to establish a long range plan,

- **Planning And Scheduling Operating Cycle Work** describes the process for selecting, prioritizing, planning and scheduling non-outage work,

- **Preparation And Control Of Work Packages** describes the process for work package preparation and approval,

- **Work Execution** describes the process for performing plant maintenance activities and the close-out of completed work packages,

- **Planning And Performance Of Critical Tasks** describes the process for performing certain evolutions/tasks designated by the Operations Manager as requiring special attention,

- **Post-Maintenance Testing** describes the process for specifying testing of equipment following maintenance,

- **Probabilistic Risk Assessment Of On-Line Maintenance Activities** describes the process for evaluating risk on system/train/component made unavailable on an operating unit,

- **Fix-It-Now Team Implementation** describes the multi-discipline team that is used to repair minor plant deficiencies, and

- **Voluntary On-Line Maintenance On Equipment Important To Safety** describes the administrative controls for on-line maintenance of Technical Specification equipment or equipment important to safety to assure that overall plant safety and reliability are enhanced by planning and preparation.

Work instructions are developed from design information and inputs from the System Engineer, craft, first line supervisors, maintenance history, station procedures, special process procedures, vendor technical information, specifications, Design Change Documents, and TA. Activities that could impact the design of the plant require engineering approval whether in the form of an approved modification, design change, TA, parts evaluation, Section XI repair, EQ approval or approved ER.

Technical Review:

Technical Review is required for complex or step-by-step work instructions prepared by the work analyst, special processes, design changes, tests, and experiments, or if the package contains unapproved procedures, or uncontrolled vendor information. The technical reviewer verifies instructions are technically acceptable, complete, and that a safety evaluation (10 CFR 50.59) is complete and in the package if required.

Other Reviews:

Once the work instructions and Technical Review are complete, then the work task is routed for QC, Inservice Inspection/Inservice Testing (ISI/IST), Authorized Nuclear Inspector (ANI), and department reviews, as required. The foreman and workers perform walkdowns, as necessary, of the task to assure it can be worked as written, including identification of required support.

Work Performance:

Work is performed per the work instructions. Where revisions are required, revisions will be performed by appropriate personnel. For work that cannot be completed, the equipment is to be placed in a safe condition, and a PIF is generated.

Post-Maintenance Testing:

PMT is used to verify that after maintenance activities have occurred, deficiencies have been corrected. It is also used to demonstrate that equipment affected by the maintenance will perform its intended function within required specifications prior to declaring equipment operable. ISI/IST

engineers also perform a review of items included in the program such as Section XI repairs, the Repair/Replacement program, the Illinois State Vessel Certificates, and NIS-2 forms.

QC performs an independent review of safety, regulatory, and code-related work packages, including WR which install design changes. QC verifies required inspections are complete, and that PIF's that are marked non-conforming are complete. The ANI also reviews appropriate code packages.

1.4.3 Design Changes

The design control process at Quad Cities Station applies to work involving design changes. Design Changes (Modifications or Exempt Changes) may be requested by any station employee or contractor in accordance with site procedures. A System Engineer reviews the request and, if the change is necessary, documentation is prepared for presentation to the Technical Review Board (TRB). The TRB is made up of senior Engineering/Maintenance and Work Control personnel to review technical aspects of design changes. When approval is granted the request becomes a Plant Design Change, and the Design Engineering Department may commence design activities. In emergent situations the above approval process may be temporarily bypassed with verbal approval of the Design Supervisor.

The Quad Cities Station design change process follows the general corporate process described in Appendix II. This includes the following:

- Roadmap to Design Control Process (Process 2),
- Design Document Change Processes (Process 3), and
- Engineering Design Change Process (Process 4).

A work package is prepared only after an approved design change package is complete. Installation is completed per station procedures as discussed in the Work Control section (1.4.2). When a design change cannot be installed in accordance with the approved design change package, a Design Engineer is contacted to disposition the problem. If a revision is required, a Design Engineer uses the appropriate process.

A Design Engineer is responsible for determining the required testing and acceptance criteria. Testing may include previously approved procedures (e.g., operating surveillances), or unique test procedures. Unique Tests are prepared if currently approved procedures will not satisfy testing requirements. Unique Tests receive an inter-disciplinary review for technical adequacy, an Onsite Review (OSR), and a safety significance review per 10 CFR 50.59.

Prior to turnover to operations, a Design Engineer verifies installation is complete per design (this may include a walkdown), testing has been performed and the results are acceptable, and items required prior to operation are complete (training, procedures, critical drawing updates, licensing changes). Operability is determined by the Shift Engineer or other SRO licensed designee.

1.4.4 Procedure Control, Update And Revision Process

Ensuring that procedures are consistent with the station's design bases and licensing documents is achieved through a procedure review process under the ComEd Quality Assurance Program. The review and approval process is described in action (b) (2.4). The following procedure processes are in action (b):

- Operating, Maintenance and Test Procedures,
- Interim Procedure Changes and Field Changes,
- Emergency Operating Procedures.

1.4.5 Parts Replacement

The Quad Cities Station parts replacement process is basically described in Appendix II for Like-For-Like or Alternate Replacement Evaluation Process. The work analyst has the primary responsibility for identifying the proper parts that are to be used. Replacement of parts and equipment that are determined not to be like for like require evaluation per NEP 11-01, ME-P6 or ME-P7, for safety related or regulatory related applications, and evaluation per QCTP 0130-07 for non-safety related applications. When the work analyst identifies a part as a change the engineering group is notified through an ER for evaluation. If it is determined a design change is required, it will be processed in accordance with the design change process previously discussed. The design change process includes 50.59 screening/safety evaluations, UFSAR, Technical Specification, and other design bases information reviews including procedural changes.

Additional checks and balances are required per site procedures. Quad Cities Station requires all dedicated (safety related or non-safety related) parts and materials intended for safety related applications be evaluated by Procurement Engineering for suitability prior to being issued for use. The station or Materials Engineering Group evaluator is responsible for preparing a concise, intelligible parts evaluation based on documented and retrievable references. The independent reviewer is responsible for conducting a thorough review of the parts evaluation presented. This is to include, but is not limited to, a review of the parts evaluation checklists for technical adequacy, accuracy, justification, completeness, and adherence to the evaluation procedures utilized in the preparation of the evaluation.

1.4.6 Control Of Setpoint/Scaling Changes

Setpoint Changes are performed utilizing the guidelines and requirements of ComEd's corporate procedure. The process is described in Appendix II, Process 9.
The Setpoint/Scaling Change process controls the alteration of the existing design or function of a system or component by increasing, decreasing, or removing an existing setpoint. The Setpoint/Scaling Change control program verifies that changes to setpoint values or scaling changes are initiated, analyzed, controlled, and documented in an approved manner. Examples of components to which the Setpoint/Scaling Change control program applies are the following:

- Process Control Instrumentation,
- Alarms, Annunciators, and Monitors,
- Electrical trips, Interlocks and Permissives,
- Overload Heater Sizing, and
- Relief and Safety Valves

Proposed changes to setpoints are reviewed for consistency with appropriate aspects of the plant's design bases. The Setpoint Change program is designed to assure that relevant design considerations are addressed prior to making changes. The impact of setpoint changes upon the station's design bases and licensing documents is controlled through detailed preparation and review processes.

Setpoint changes are prepared by qualified Design Engineering personnel. During preparation of the change, the Engineer reviews the setpoint change for impact on Technical Specifications, the UFSAR, DBDs, the Fire Protection Program, procedures, drawings, calculations, and Transient and Loss of Coolant Analysis (LOCA) Input Parameters.

Setpoint changes receive a 10 CFR 50.59 Screening/Safety Evaluation to provide the basis for determining whether the setpoint change could involve an USQ or a change to the Technical Specifications.

1.4.7 Operability Determination Process

The operability determination process is applied when the capability of an SSC to perform its specified function(s) as required by the Technical Specifications or Design Basis cannot be demonstrated or where evaluation of a degraded or nonconforming condition results in an initial judgment that the equipment is operable but further evaluation is warranted.

The process provides assurance and a method for:

- Identifying safety functions that equipment may perform,
- Evaluating the operability of failed, degraded, or deficient equipment,
- Documenting and maintaining the Operability Assessments,
- Evaluating UFSAR, Technical Specification and design bases information, and

The station administrative procedures set time limits for completion of operability determinations at 24 hours and concern screenings at 72 hours.

An Operability Issue Screening Form is used whenever the operability of an SSC is in question. The form leads the originator through a series of questions to determine if an operability concern exists. If the Operability Issue Screening determines that an operability concern exists, then an additional evaluation is completed per an Operability Determination Checklist. The checklist leads the originator through a series of questions to address, among other things, the 10 CFR 50.59 screenings/safety evaluations, and UFSAR, Technical Specification and design bases information changes.

1.4.8 10 CFR 50.59 Safety Evaluation Process

10 CFR 50.59 screening or safety evaluations are performed for proposed plant or certain procedure changes, certain interim changes, and temporary degraded or nonconforming conditions to determine whether there is an USQ or a Technical Specification impact.

Quad Cities Station uses a station procedure based on the corporate procedure to implement 10 CFR 50.59 safety evaluations. Design Engineering uses the corporate procedure. The safety evaluation process used is further described in Appendix II, Process 13.

1.4.9 Temporary Alterations

TAs are alterations to the approved design configuration of an SSC. TAs are not allowed by procedure to circumvent the process for permanent plant design changes. The TA process is defined by a corporate procedure described in Appendix II, Process 6. At Quad Cities there are additional station procedures that supplement this process.

TAs are prepared, reviewed, and approved by Engineering using a process which is very similar to the modification process. The preparer clarifies the scope of the temporary design change with the requester. The TA is prepared by marking up copies of the affected design documents, performing a 10 CFR 50.59 review, and preparing TA documentation.

Engineering is responsible for a monthly review of TAs greater than 90 days old to determine whether continued installation of the TA is technically acceptable, and that suitable progress is being made to permanently disposition the temporary configuration. The results of this review are documented.

TAs are independently reviewed by a qualified engineer and the station OSR (consisting of an Engineering Supervisor, Operating Engineers and Station Manager) prior to being approved for installation.

The Shift Engineer is responsible for initiating and reviewing the installation of TAs. TAs are independently verified to ensure the changes are correctly installed. The Shift Engineer is also responsible for ensuring post-alteration testing identified by Engineering has been performed.

1.4.10 Out Of Service Process

This process is utilized to initiate an equipment OOS and RTS. It is controlled by station procedures, and is described in Appendix II, Process 20.

Any station personnel or contractor may initiate an OOS Request to perform work safely. OOS can also be used to maintain and to control abnormal configurations. The OOS receives appropriate review before OOS cards are hung. While in place, OOSs are subjected to periodic reviews for potential impact on station operation in accordance with requirements specified in station procedures.

When work is completed, a RTS Request initiates removal of the OOS. A qualified OOS Preparer reviews controlled documents and drawings to prepare the RTS and determine repositioning requirements for equipment. The RTS is further verified and reviewed before equipment is repositioned and the OOS cards removed.

Independent verification is used throughout the OOS program. There are two OOS Preparers and each is responsible to independently review controlled documents and drawings to assure that the points of isolation and special instructions are correct. Technical Specification, Primary/Secondary Containment impact, Fire Protection/Appendix R, and other operational issues are also independently reviewed by SRO-licensed operators. The periodic review of OOS in place for more than six months ensures the OOS has received a 10 CFR 50.59 screening/evaluation to ensure the level of plant safety is not degraded by the duration of the OOS, and that the Control Room Simulator reflects the existence of the OOS.

1.4.11 Document Change Requests

The corporate model for DCRs implemented at Quad Cities Station is described in Appendix II, Process 7. DCRs may be initiated either for a design change or because of a deviation or inconsistency.

Document changes necessitated by design changes are addressed in conjunction with the associated design change. The originator of the DCR is required to fill out a Turnover/DCR Design Issues Checklist which requires the preparer to check many items, including the UFSAR, Technical Specifications, and Safety Review Boundaries for affected changes. For DCRs addressing deviations and inconsistencies, a 10 CFR 50.59 screening/safety evaluation must also be performed.

Quad Cities Station has an additional process for Critical Control Room drawings that provides for drawing change incorporation, review, approval, and issuance prior to system operation authorization. This adds an additional level of assurance that Critical Control Room drawings reflect the current design bases of the plant in a timely manner.

1.4.12 Updated Final Safety Analysis Report Update

A UFSAR change is required for changes made to the facility, equipment, analysis, procedures, programs, or organizations which results in a revision to the description included in the UFSAR. The relationship of UFSAR changes to the station design bases is controlled through detailed preparation and review processes. These processes are addressed in station procedures and are described in Appendix II, Process 19.

The safety evaluation performed at ComEd for all UFSAR changes provides an important checkpoint in the process to verify regulatory compliance and to verify that the change does not involve a USQ or a Technical Specification has been changed. An independent technical review is also provided. This provides an important administrative and technical checkpoint in the process.

1.4.13 Design Bases Document Manuals Update

The DBD Update Process is described in Appendix II, Process 10. The DBD update process is used to evaluate DBD changes and to incorporate approved changes. DBD changes result from a modification or a revision process associated with a controlled document (e.g., UFSAR change, setpoint change).

The DBDs describe the design of the plant and are updated as necessary to incorporate changes resulting from various types of modifications.

DBDs have been completed for 22 plant systems. They bring system information together and present it in a coherent manner to facilitate effective use and understanding.

1.4.14 Vendor Equipment Technical Information Program

Quad Cities has established, implemented, and maintains a continuing program to verify that vendor information for safety-related components is complete, current and controlled throughout the life of the plant, and is appropriately used in plant instructions and procedures. Further, this program includes contacting vendors supplying critical safety equipment every three years to assure that all applicable information has been received, and uses a system of direct communication with vendors for mailing technical information.

The Quad Cities VETIP program is in accordance with a corporate program described in Appendix II, Process 14. It includes processing of information received from vendors, industry sources, NRC, and other utilities that relates to the installation, operation, testing, calibration, and storage of equipment. A Vendor Document Comparison Report may be required denoting changes to a vendor manual. If technical changes are found, the Subject Matter Expert is required to identify affected Plant Procedures by the changes on the VETIP Authorization Form. Each affected department reviews the change data for impact on station procedures and other station documentation and initiates changes as required by the appropriate procedural change processes.

1.4.15 Design Calculations

Design Engineering calculations form the basis of drawings, specifications, procedures, and other design documents which are used to modify, operate, and support the design bases for the station. The corporate process used in the preparation, review, and approval of calculations used to support Design Engineering and Analysis is described in Appendix II, Process 17.

1.4.16 Software Configuration

The Computer Software revision program applies to software that is safety-related, used to perform controlled work, used to verify Station Technical Specifications compliance, or used to comply with regulatory requirements. This process specifically describes the program to control revisions to engineering software. (See Appendix II, Process 11)

Once a need to develop or revise Engineering Software has been identified, a Software Activity Request is generated to describe the circumstances and identify the activities that need to be performed. Once the request has been reviewed and approved, a plan is generated by the software owner or designee. The plan includes identification of the software product, responsibilities and schedules, required documentation, required reviews and other similar technical and administrative items. After approval of the plan, the Software Requirement Specification is developed. The programming changes will then begin based on the documents generated above, in preparation for software testing. A preliminary test case is used to validate the Engineering Computer Program to assure that the software produces correct results for the test case.

1.4.17 Configuration Control Using Electronic Work Control System

The EWCS is an on-line workflow and database tool used at Quad Cities Station. The system is used to monitor status of ERs, WRs, Design Change Packages, ECNs, Field Change Requests, Affected Document Lists, Punchlists, drawings, calculations, and DCRs.

Configuration control of station modifications has been enhanced by the implementation of the EWCS at Quad Cities. Plant personnel have access to EWCS. The latest data on modifications, equipment, plant documentation revision status, etc. may be obtained through EWCS. Configuration Control using EWCS is described in Appendix II, Process 15.

1.4.18 Design Bases Document Development

The DBD development process is described in Appendix II, Process 16. This process governs the initial development of DBDs.

Design basis understanding and DBDs have been an important NRC expectation since the late 1980s and was the subject of a Generic Letter in 1993 which was later withdrawn. ComEd realized in the late 1980s that it needed to have better understanding, access, and control of design information.

This resulted in a plan for a DBD Program to produce DBDs for the station. A working environment was established which consisted of a DBD Management Group and a DBD Task Team. Each station developed system and topical DBD Priority lists based on the safety significance to the plant and capturing design basis information for the Nuclear Steam Supply System (NSSS) vendor supplied systems. The main writers were the original designers, which consisted of the NSSS contractor (General Electric) and the Balance of Plant Architect Engineer (Sargent & Lundy). Using the original designers resulted in more effective identification of the design bases and its supporting documents and better resolution of comments.

A critical aspect of assembling DBDs was how to determine what design information was the critical "design basis" information. The NUMARC 90-12 Design Basis Program Guidelines were used to do this and became the basis of program procedures that were issued to define the process of preparation, review, issuance, revision, and control of DBDs and open item evaluation. The resulting purpose of ComEd DBDs was established:

The DBD shall identify the Design Input Requirements, their rationale and basis, and Design Analysis for selected SSCs or topics. The DBD does not establish new Design Input Requirements or Design Analysis but is intended as an assembly of information that already exists. The DBD presents an "overview" of key Design Input Requirements and Design Analysis and also serves as a "source reference" by pointing the user to the applicable design document(s) for additional detailed information.

The scope of DBD preparation did not include plant walkdowns, detailed validations, or reconstitution of design inputs or analysis, since plant configuration and calculations were considered to be acceptable. However, the scope did include identifying and resolving conflicts in design information between existing design documents or tracking them as open items until resolved. Reviews by Systems Engineering, Operations, and Training Departments served to provide reasonable assurance that operating and testing procedures agreed with design bases requirements.

The following twenty-two DBDs have been issued for use at Quad Cities.

DBD #	Title (abbreviation)
DBD-QC-001	High Pressure Coolant Injection System
DBD-QC-002	Reactor Recirculation System
DBD-QC-003	Automatic Depressurization System
DBD-QC-004	Reactor Core Isolation Cooling
DBD-QC-006	125/250 V DC System
DBD-QC-008	Residual Heat Removal/Service Water
DBD-QC-009	Emergency Diesel Generator, Diesel Oil
DBD-QC-014	Auxiliary Power a.-4160 V Switchgear b.-480 V Distribution c.-Unit/Reserve Auxiliary Transformers
DBD-QC-028	Core Spray
DBD-QC-037	Seismic Topical Report
DBD-QC-040	Primary Containment
DBD-QC-047	Safe Shutdown Make-up System
DBD-QC-071	Control Room Heating, Ventilation, and Air Conditioning / Habitability
DBD-QC-086	Feedwater, Condensate and Reactor Water Level Control Systems
DBD-QC-094	Nuclear Boiler Instrumentation
DBD-QC-097	Design Basis Events Topical
DBD-QC-098	Single Failure Criteria Topical
DBD-QC-105	Primary Containment Support Systems
DBD-QC-122	Reactor Protection System
DBD-QC-138	Standby Gas Treatment System
DBD-QC-139	Standby Liquid Control System
DBD-QC-179	Neutron Monitoring System Average Power Range Monitors, Source Range Monitors, Intermediate Range Monitors, Traversing In-core Probes, Rod Block Monitors)

1.4.19 Engineering Change Notices

ECNs are used to communicate design changes which are included in a Design Change Package. They are initiated through the EWCS and provide for a systematic approach to support the preparation, review and approval process. The process for initiating ECNs is described in Appendix II, Process 12.

1.4.20 Plant Operations Review Committee

The PORC serves as a final review of certain changes, as required by policy, in concert with existing functions such as OSR or Root Cause Analysis (RCA). Items which receive OSR, RCA, or other review, will be considered complete and technically accurate by the preparer, prior to presentation to the PORC. The primary focus of the PORC review is to determine that the item proposed does not have a negative impact on plant safety. A secondary objective of the PORC review is to determine if the item reflects a high level of quality and professionalism. Based on this review, the PORC will make a recommendation to line management that the item under review be: Tabled for future discussion, rejected, accepted as presented, or Accepted as amended by PORC.

PORC Membership includes; the Station Manager (Chairman), Operations Manager, Engineering Manager, Radiation Chemistry Superintendent, Maintenance Superintendent, Work Planning Superintendent, Support Services Director, Regulatory Assurance Supervisor. Site Quality Verification (SQV) may participate in an overview function.

1.5 Conclusion

The programs and processes used at Quad Cities to maintain configuration control are developed and implemented in a manner consistent with industry standards and commitments. When identified, weaknesses and deficiencies will be addressed by ongoing refinements and, where applicable, expanded training requirements.

Audits, surveillances, and assessments have been conducted by SQV, responsible organizations, and third parties, and these audits, surveillances, and assessments have not identified deficiencies representing a significant breakdown of Engineering Design or Configuration Control Processes. Some programmatic deficiencies in processes and procedures have been identified and corrective action has been implemented to address and prevent recurrence of these deficiencies.

2.0 ACTION (b) RATIONALE FOR CONCLUDING THAT DESIGN BASES REQUIREMENTS ARE TRANSLATED INTO OPERATING, MAINTENANCE, AND TESTING PROCEDURES.

2.1 Introduction

The Quad Cities Station implements a comprehensive procedure preparation and revision process in accordance with applicable license and Quality Assurance requirements. This process provides assurance that appropriate design bases requirements are translated into operating (normal, abnormal, and annunciator response) procedures, maintenance procedures, and test procedures. In those relatively few cases, among the thousands of issued and active procedures, where procedures have been found not to be consistent with design bases, actions were taken to resolve them. To sustain performance improvement, the station has modified the procedure review and approval process and has performed procedure upgrades.

The basis for assurance that design bases requirements are translated into operating, testing, and maintenance procedures is:

- Original station procedures were prepared, reviewed and in many cases tested on actual hardware prior to station startup. The station's design bases were incorporated in the development of the original procedures, encompassing the combined construction and operating knowledge of the Nuclear Steam Supply System (NSSS) vendor, Architect Engineer (A/E), and ComEd,

- Procedures have been implemented in the station since initial licensing. Station operating experience using these procedures provides assurance of the adequacy of procedures and indicates their consistency with design bases,

- Subsequent to startup, new procedures and procedure revisions, whether resulting from design changes or otherwise, have been prepared that require a number of reviews (checks and balances) prior to approval for use. These checks and balances help verify new procedures and procedure revisions are consistent with the plant configuration and design bases. A standard procedure writers guide is followed for procedure development. Use of this guide provides added assurance that human factors attributes are considered in the procedure development process to aid the procedure user in error free performance of the task,

- A major procedure upgrade project was initiated to standardize procedure format and content. This effort required additional design reviews of established procedures and further verified consistency with design bases requirements,

- On an ongoing basis, plant personnel self assess the adequacy of procedures during normal use. Procedure revision processes are available to allow plant personnel to initiate procedure changes,

- Procedure deficiencies are reported, corrected and trended using the Problem Identification Form (PIF). A review of PIFs identified no significant deviations from design bases or adverse trends in this area, and

- Audits and inspections by ComEd, the Nuclear Regulatory Commission (NRC), and other external agencies have supported our conclusion, in general, that the procedure control and update process function adequately at Quad Cities.

2.2 Original Station Procedure Development

Quad Cities Station procedures were developed from procedures and specifications supplied by General Electric during the Start-up testing phase and the Pre-Operational testing phase prior to commercial operation. The procedures reflect the combined design, construction and operating experience of the NSSS supplier, the A/E and ComEd. Other nuclear plant operating experience, vendor equipment requirements, and design bases were considered in the preparation of these procedures. Many of these procedures were implemented during testing and other pre-startup activities. These procedures formed the original basis upon which the plant was licensed to operate.

2.3 Plant Operating Experience Shows Effectiveness of Procedures

Procedures have been implemented in the plant since it began operation. Plant experience in using operating, maintenance and test procedures has shown that the procedures are effective. Plant evolutions which confirm the adequacy of procedures include start-up, shutdown, plant transients and refueling operations. Simulated emergency and casualty operation using station procedures is also conducted in the Simulator during operator training.

2.4 Procedure Preparation And Revision Processes Maintain Conformance

The procedure preparation and revision process is a key element for assurance that design bases information is translated into plant procedures. Since initial issuance, procedures have continued to be developed or revised using controls established pursuant to 10 CFR 50 Appendix B. In addition, the procedure development process incorporates applicable NRC regulations, guidelines from industry sources, NRC Regulatory Guide 1.33 Rev. 2, ANSI N18.1-1971, and the ComEd Quality Assurance Manual.

Key elements of the procedure review process, including qualification requirements for personnel who perform these reviews, were established through Technical Specifications. These reviews are part of the plant procedure revision process and include Technical Review, Safety Screening/Evaluation and management approval. This multi-level/multi-discipline review by qualified personnel helps verify procedure consistency with design bases.

2.4.1 Procedure Preparation And Revision Process

The Process for developing new procedures or revising existing procedures has been strengthened since initial licensing of Quad Cities Station. The review and approval process described is identical for a new or revised permanent plant procedure that is not an editorial change.

Ensuring that procedures are consistent with the plant's design bases and licensing documents is achieved through the procedure review process, which includes the following elements:

- Independent Technical Review,
- Cross discipline review,
- Validation,
- 10 CFR 50.59 Screening/Safety Evaluation,
- On-Site Review (OSR),
- Review by the Plant Operation Review Committee (PORC), and
- Authorization

The scope of the revision and the type of procedure being revised determine which of the elements of the revision process are used for a specific procedure revision.

Independent Technical Review:

A qualified person performs a detailed review of all non-editorial procedure revisions to verify they are technically adequate and to identify which additional disciplines should also review the revision. The technical review considers plant operation, design, sequence of steps, and program/system interaction. Technical sources of information used by the reviewer include Technical Specifications, Updated Final Safety Analysis Report (UFSAR), and design bases information.

Cross Discipline Review:

A review is conducted by representatives of disciplines affected by the revision. The review is focused on aspects of the procedure relative to the reviewer's area of expertise. The Cross Discipline Review is not intended to duplicate the detailed Independent Technical Review.

Validation

A review is performed to validate usability and operational correctness. Validation will determine whether the procedure provides sufficient and understandable information to the user and is compatible with plant hardware, plant conditions, and user capabilities. This is accomplished by one of the following methods; performing the procedure on actual equipment, performing the procedure on the simulator, bench check, walkthrough, table top demonstration or discussion of the changes.

10 CFR 50.59 Screening and Safety Evaluation

The 10 CFR 50.59 screening is performed to determine whether the proposed change could involve an Unreviewed Safety Question or a change to the Technical Specifications. This screening provides a check of the procedure change against license requirements and the design bases. Personnel who perform this screening must meet the qualification requirements of ANSI N18.1-1971, which specifies the minimum education and power plant experience required to function in this role. Depending on the results of the screening, a full safety evaluation may also be required.

On-Site Review

Based on the guidance provided in Regulatory Guide 1.33, (Revision 2 February 1978), specific procedures and their revisions have been designated as requiring OSR. The OSR will:

- Conduct critical and comprehensive reviews of designated items which may affect nuclear safety,
- Provide recommendations in areas of review, investigation, and quality control phases of plant maintenance,
- Recommend actions necessary to maintain compliance with the Operating License,
- Verify conditions, situations, or actions that affect the safe operation of the plant are subjected to a safety evaluation review per 10 CFR 50.59, and
- Recommend review items, as appropriate, for Off-Site Review.
- Recommend approval to the Station Management.

Review by Plant Operation Review Committee

Selected procedures which require an OSR and are administrative procedures required by Regulatory Guide 1.33 receive a review by PORC. PORC includes senior station management who provide multiple perspectives on the adequacy of the procedure under review.

Authorization

Procedures which receive OSR require authorization by the Station Manager. Procedures which do not require OSR are authorized by the appropriate department head. Prior to final approval of the procedure, the Procedure Coordinator reviews the revision package to verify:

- Proper disciplines are included in the Technical Review Process,
- Impacted departments have reviewed the procedure, and
- The 10 CFR 50.59 Screening or Safety Evaluation is adequate, properly reviewed and documented.

2.4.2 Interim Procedure Changes And Procedure Field Changes

Station procedures can also be revised using streamlined processes: The Interim Procedure Change (IPC) and the Procedure Field Change (PFC).

The IPC is used to implement procedures for short term issues. The IPC receives full review and approval prior to use. The IPC does not require typing, writers guide enhancements, validation, or distribution to procedure storage locations. Otherwise the process is identical to the process for a permanent procedure revision described earlier, including the requirement for a 10 CFR 50.59 screening or safety evaluation.
The PFC is used to implement minor, one-time use, revisions to procedures in support of timely completion of the procedure task. The IPC is not allowed to change the procedure intent and therefore receives department approval prior to use with additional approval following use. The PFC allows "pen and ink" changes with approval from a knowledgeable management person and a Senior Reactor Operator (SRO) licensed person. Within 14 days of approval for use, the PFC is verified to have received an Independent Technical Review and is authorized by the Department Head. A PFC can only be applied to changes which do not change the intent of the procedure. A set of questions are proceduralized to direct the thought process for determining whether the change will change the intent of the procedure. The answers are reviewed by the knowledgeable management person and the SRO when the PFC is approved.

2.4.3 Emergency Operating Procedures

The Emergency Operating Procedure (EOP) program incorporates a multi-discipline approach to development and maintenance of the EOPs. The program is coordinated by Operations and overviewed by a committee with background in EOPs, Training, Engineering, and Operations. The EOPs are modeled closely after the generic guidelines developed by the Boiling Water Reactor Owners Group (BWROG). A station specific process is used to translate the generic guidelines into site specific procedures, and involves a thorough process that directs a focused review of the procedures.

This includes the following elements.

- A Control Room/Plant Walkdown verifies consistency between the EOPs and the actual plant components, controls, labeling and indications that would be used to implement the procedure steps,

- A Tabletop Review uses a procedure user group discussion format to verify procedure adequacy,

- Validation verifies the usability (sufficient understandable information is provided) and operational correctness (compatible with plant responses, hardware, and manpower) of the EOPs,

- EOP Committee review satisfies the Independent Technical and Cross Discipline review requirements specified in the station procedure review process, and

- A full 10 CFR 50.59 Safety Evaluation as well as an OSR and Approval is required for EOP revisions.

Ongoing maintenance of the procedures involves review of the following changes for impact on the EOPs and to maintain the procedures up to date with the design bases:

- Plant modifications,

- Instrument Setpoint Changes,

- Technical Specification Changes,

- Changes to procedures referenced from the EOPs, and

- Reload Licensing Submittals.

The multi-discipline approach to development and maintenance of the EOPs verifies continuing conformance with the design bases.

2.4.4 Modification Process

Where operating, maintenance, and testing procedures may be affected due to a change to the plant, the interface with the procedure change process is covered in the Design Change process. A design change requires the cognizant engineer to check for procedure changes that may be required.

Major plant modifications are reviewed at a modification scoping meeting. These meetings are attended by Maintenance, Operations, and Engineering personnel who will be involved with the

modification package. At the initial scoping and subsequent modification meetings, the technical aspects of the modification are reviewed for changes (such as setpoint, scalings, valve positioning, and pressure adjustments), that might have an impact on procedures, Technical Specifications, the UFSAR, and other design bases documents. A Modification Requirements Checklist requires the cognizant engineer to check for procedure changes that may be required because of a modification.

The modification package contains a list of procedures that have to be added or revised for that modification package. Updating, review, approval, and issuance of procedures is governed by the site procedure process and is tracked by the Modification Coordinator for closure requirements.

2.4.5 Vendor Equipment Technical Information Program

The Vendor Equipment Technical Information Program (VETIP) program includes processing of information received from vendors, industry sources, NRC, and other utilities that relate to the installation, operation, testing, calibration, and storage of equipment. A Vendor Document Comparison Report denotes changes to the manual. If technical changes are found, the Subject Matter Expert (SME) is required to identify departments affected by the change on the VETIP Authorization Form. Each department reviews the changed data for impact on station procedures and other station documentation, and initiates changes as required by the appropriate procedure change processes.

2.4.6 Operating Experience Program

The Station's Operating Experience (OPEX) program provides information to procedure owners for consideration. Procedure owners are required to review the information and identify needed corrective actions resulting from OPEX, including procedure and training improvements. The Station's OPEX process is more completely described in action (d).

2.4.7 Work Instructions

Work packages and work instructions are developed to govern work at the station. Safety-Related work packages go through a review process, including, at a minimum, System Engineering, Operations and Quality Control. The instructions were developed by a process described in action (a) that incorporates consideration of design bases information.

2.5 Procedure Upgrade Programs Provide Added Assurance

Procedure upgrade projects have been initiated over the years since initial operations. These upgrade projects provide added assurance as to the current quality of the procedures. As of December 1996, approximately 90% of permanent station procedures have been revised, either as part of an upgrade project or as part of normal station business, using the current procedure review process described in section 2.4.

2.5.1 Operating And Maintenance Procedure Upgrades And Improvements

From 1987 to 1995, an extensive Procedure Upgrade Program was implemented to review existing station procedures for format, technical content and level of detail compared to industry standards. Selected procedures were rewritten, reviewed and approved using the previously described Procedure Preparation and Revision Process.

Quad Cities Station recognizes that in the past there were issues pertaining to the quality of operating procedures at the station. Procedural quality issues led to reliance on operator training and craft capability to successfully complete some work. The procedure approval process was cumbersome and inefficient resulting in a large backlog. Quad Cities Station implemented a Course of Action which included elements to reduce procedure backlog, improve the coordination and timeliness of procedure revisions, and improve operating procedures as necessary to verify they reflect the actual configuration of the station.

2.5.2 Technical Specification Upgrade

An extensive Technical Specification Upgrade Program (TSUP), was completed which included a line-by-line examination of the Upgraded Technical Specifications. The Technical Specification requirements were compared to key plant documents such as:

- The UFSAR,
- Station procedures, and
- Technical Specification Interpretations, in existence at the time.

The TSUP was a project implemented over approximately 5 years and completed in September 1996. The project is expected to improve operator understanding of Technical Specifications. Implementation involved procedure changes, training, and updating the work tracking system. The upgraded Technical Specification provides added assurance that station procedures are consistent with the plant design bases and technical specifications.

2.5.3 Procedure Adherence Expectations

Management requires strict procedure adherence and implementation of self check concepts. As a procedure is performed, each step is designated as complete either by initialing or by recording information as specified in the procedure. When deficiencies are identified, work is stopped, the plant is put in a safe condition, and the deficiencies are corrected. Station implementation of self-check, questioning attitude and procedure adherence are monitored by management. A general indication that management expectations are being met can be drawn from the number of procedure change requests per month.

2.6 Problem Identification Analysis Provides Assurance

Procedure deficiencies are reported and trended using the PIF process. This provides an additional basis for continuous evaluation and improvement of procedures, and that design bases information is adequately translated into procedures.

In 1995 and 1996, more than 6,000 PIFs have been initiated at Quad Cities. A search of the PIF database identified less than 20 potential discrepancies between procedures and design bases. A specific review of those PIFs identified 4 which could have potentially resulted in a deviation from the design basis. None of those were determined to have safety significance or to have actually placed the SSC outside the UFSAR design. A review of NRC Violations during this same time period identified no instances where procedures were found in conflict with the design bases. These indicators support a conclusion that the processes for development and revision of procedures are functioning to translate design bases information into procedures.

2.7 Inspection And Audit Results Confirm Effectiveness

Quad Cities' procedures have also been subjected to surveillances, audits, and inspections to confirm the procedure preparation and revision process is correctly implemented and to confirm the adequacy of station procedures. Where problems were noted, effective corrective actions were taken or are being tracked to completion under the Station's Nuclear Tracking System process.

2.7.1 Internal Audits

In 1994, Quad Cities performed a substantial Systematic Assessment of issues identified through internal and external problem identification and reporting processes. The purpose was to compile, evaluate and categorize the issues for purposes of continuing improvements. Procedural adequacy was one area reviewed. Although there were 63 procedure issues identified, only six related to consistency between procedure and design bases.

Quad Cities' Site Quality Verification has performed three system audits since 1989 using the Safety System Functional Inspection philosophy. These include reviews of the 1/2 Emergency Diesel Generator (EDG) in 1989, the Safe Shutdown Makeup Pump in 1995, and the Instrument Air System in 1996. Part of the scope of these audits was to verify that design/license bases requirements were reflected in station procedures. A total of seven procedure issues related to incorporation of design/license bases information were identified which resulted in procedure and UFSAR changes:

From the 1/2 Emergency Diesel Generator Audit:

- Several discrepancies were noted involving the 4 Kv undervoltage functional test procedures. The following Technical Specification functional testing was not being performed; verifying associated alarms actuate, verifying that all non-essential loads

are shed from the buses, and verifying that 1/2 EDG cooling water pump power supply transfers. These functional tests were added to surveillance test procedures and

- A surveillance test did not exist to confirm that the 1/2 diesel generator ventilation system would be available during loss of control air. A new procedure was developed.

From the Safe Shutdown Make-up Pump Audit:

- Recommended various operations procedure enhancements utilizing available design bases information. The procedures were revised and

- No surveillance test existed to confirm design bases performance since preoperational testing. An operating surveillance was generated.

From the Instrument Air Audit (associated PIFs are not yet closed):

- Modification testing performed on the compressors did not verify the Modification Approval Letter acceptance criteria for compressor output,

- Although the procedures were correct, the UFSAR had not been updated to reflect a recent completed design change, and

- The UFSAR described a backup cooling method for which no procedure had been written.

An audit of the VETIP found a procedure weakness. The procedure requires that a SME review vendor manual revisions for applicability and for their impact on site procedures. However, there was no documented evidence to assure that a SME had reviewed vendor manual revisions for impact on station procedures, such as maintenance, testing, surveillance etc. There was no provision in the station procedure to list the affected procedures as a result of the change in vendor technical information. This deficiency is identified in a PIF.

This summary of inspections and audit reports does not describe every audit and/or finding regarding procedures and design bases requirements. It does indicate that few design bases/procedure inconsistencies have been found during audits that specifically look in detail for such discrepancies on a system-wide (or subsystem) bases. Quad Cities internal audits provide reasonable assurance that the procedure review program has been effective in translating design bases requirements into plant procedures.

2.7.2 Nuclear Regulatory Commission Inspections

Over the past several years, the NRC has inspected Quad Cities' procedures and their implementation and has identified strengths.

For example, in the SALP 12 report, the NRC noted positive steps to improve procedure quality and also noted better procedural quality in maintenance. In its Service Water System Operational Performance Inspection (SWSOPI), the NRC inspection "team noted several areas of strength: maintenance and operations procedures were generally well written; personnel in these two departments were knowledgeable of the systems; the maintenance training program was task oriented and comprehensive; and the operator training on the Residual Heat Removal Service Water and Diesel Generator Cooling Water systems was good." The team found procedures for implementing Technical Specification surveillance requirements to be well written and sufficient to accomplish the stated objectives. Quad Cities' "performance in satisfying Technical Specification surveillance and testing requirements was satisfactory [for the service water system]."

NRC also identified weaknesses. For example, the SWSOPI team noted several modification test procedure errors, such as:

- Failure to include margin for: instrument uncertainty, allowed variations in initial conditions, equipment degradation, and expected system dynamic effects; and

- Failure to establish setpoints based on the most limiting system configurations; and failure to include equipment in system flow balancing procedures.

The initial review of SWSOPI identified six items requiring corrective action which have been completed and closed by the NRC. While reviewing SWSOPI identified deficiencies, the station noted a number of lower level concerns warranting corrective action which are being tracked to closure in the corrective action program.

The 1994 Engineering and Technical Support inspection identified several post modification test problems involving missing or inadequate tests. The NRC issued a Level IV violation because of these concerns and in a routine unannounced inspection in 1994, the NRC identified a case where a feedwater flow transmitter was not properly calibrated nor were calibration procedures developed for it following its installation in late 1993. A Level IV violation was issued. The two violations were corrected.

The NRC inspected Quad Cities' EOPs in 1988 to determine whether the EOPs were technically correct, could be physically carried out in the plant, and could be correctly performed by the operators. This was a comprehensive inspection including a :

- Comparison of the generic BWROG guidelines to the Plant Specific Technical Guide,

- Comparison of the Plant Specific Technical Guide to the EOPs,

- Review of the calculations,

- Plant walkthrough of EOPs and the operating procedures referenced in the EOPs,

- Simulator observation,
- Human factors engineering review of procedures and operations,
- Interview of licensed and nonlicensed personnel who use the EOPs and Operating Procedures, and
- Review, in detail, of the primary containment venting procedures.

The inspection team identified that the station did not have a complete understanding of the EOP development process, especially verification and validation, which resulted in deficiencies in the technical bases and usability of the EOPs. The EOPs were not developed in accordance with NUREG-0899 and were not developed with a multi-disciplinary approach of sufficient manpower. In addition, the team identified specific concerns with the ability of the operators to accurately accomplish the required actions of the EOPs due to the division of control room responsibilities, the usability of the EOPs, and the adequacy of operator training.

As a result, there was a significant station effort to upgrade the EOPs. A follow-up inspection performed in 1992 focused on implementation of Revision 4 to the BWROG Guidelines, the programs for controlling and maintaining the EOPs, actions to resolve previously identified weaknesses in the EOP program (see 1988 inspection) and transition to flowchart format EOPs. The NRC noted significant improvements had been made in several areas since the 1988 EOP inspection. In the cover letter, the NRC stated, "We commend your staff for the significant improvements that have been made in several areas since the 1988 EOP inspection." The EOPs were found to be technically correct and could be accomplished using existing equipment, controls, and instrumentation. The modification prioritization procedure had been revised to verify EOP related modifications received additional weighting.

2.8 Conclusion: Rationale For Concluding Quad Cities Procedures Are Consistent With Design Bases

Original procedures at Quad Cities Station encompassed the combined construction and operating knowledge of the NSSS vendor, A/E, and ComEd. Following initial start-up, the implementation of a comprehensive procedure preparation and revision processes have been used to maintain and improve procedure content. These processes assure that procedure changes are reviewed against the station design/licensing bases, and that procedure content is maintained current with station configuration changes.

Furthermore, procedures have been developed and significantly improved since initial licensing. Quad Cities has performed procedure upgrade projects aimed at technical content improvements and implementing upgraded Technical Specifications. On an ongoing basis, station personnel self assess the adequacy of procedures during normal use. When deficiencies are identified, work is stopped, the plant is put in a safe condition and, the deficiencies are corrected.

Internal and external inspections have indicated that the station's procedures are effective and are consistent with the station's design bases. Although issues are identified from time to time, there is reasonable assurance that the design bases requirements are translated into operation, maintenance, and test procedures.

3.0 ACTION (c) RATIONALE FOR CONCLUDING THAT SYSTEM, STRUCTURE, AND COMPONENT CONFIGURATION AND PERFORMANCE ARE CONSISTENT WITH THE DESIGN BASES.

3.1 Introduction

When Quad Cities was licensed to operate by the Nuclear Regulatory Commission (NRC), that license was supported, in part, by NRC concurring with ComEd's findings that Quad Cities Structures, Systems, and Components (SSCs) are configured in accordance with, and conform to the plant's design bases. Quad Cities' initial performance baseline was based on certain calculations and analyses verified by preoperational tests, start-up tests, performed by the Architect Engineers (A/E), Nuclear Steam Supply System (NSSS), or other vendors and suppliers. The plant configuration baseline was established via prestart-up walkdowns, tests, and other activities.

Since then, Quad Cities has modified the physical, and on occasion, the operational, configuration of some of its SSCs and conducted maintenance on them. Those changes and maintenance have been conducted in accordance with processes and procedures that were designed to preserve the configuration and performance of SSCs consistent with their design bases. These processes and procedures have been described in response to actions (a) and (b) of this response

Ongoing conformance with the design bases is assured through surveillance (including Inservice Inspection (ISI) and Inservice Testing (IST)) and other tests such as, Post-Modification tests, and Post-Maintenance Tests (PMTs). Corroboration that SSCs are configured and perform consistent with their design bases is provided in several ways. A large body of experience data exists which demonstrates conformance of the SSCs with their design bases. Normal, as expected, operation of the plant, and responses to abnormal conditions, generate a vast amount of information about SSCs configuration. Over the years, the various SSCs have been reviewed for modification or maintenance, subjected to ongoing monitoring related to operation, and inspected by plant personnel, the NRC, and third parties. Where SSCs have been found to deviate from their design bases, appropriate corrective actions were implemented. These elements are discussed in more detail below.

Design bases initiatives and upgrade programs implemented over time have played a major role in upgrading the quality of the station's design bases and performance and will be discussed in some detail. Audits and inspections to confirm that equipment performs consistent with the design bases have helped the station identify and correct deficiencies. Safety System Functional Inspections and other vertical slice audits have been of the most value because the focus of such audits is to confirm that systems will perform as designed. The problem identification process supports the station's ability to identify and correct deficiencies.

Based on the sound foundation established during initial plant licensing, change control, plant operating experience, improvement initiatives, critical self assessments and external inspections over the years, it is concluded that there is reasonable assurance that the safety-related SSCs are consistent with their design bases.

3.2 Initial Determination That Configuration And Performance Were Consistent With Design Bases

Quad Cities was licensed following issuance of a NRC Safety Evaluation on August 25, 1971. In preparing its Safety Evaluation, the NRC concurred with ComEd's technical evaluation of design, fabrication, construction and test information, and determined that Quad Cities' SSCs were in accordance with applicable design and quality assurance criteria and appropriate codes and standards. Many features of the design of Quad Cities were similar to those evaluated and approved previously for other reactors under construction or in operation at the time.

Quad Cities Station's design bases were established prior to issuance of many of the industry and regulatory standards applied to newer plants. In particular, Quad Cities was constructed before the NRC codified the General Design Criteria (GDC). The GDC were issued in a draft form in July 1967 to secure comments from the industry, including whether the plants already designed and under construction could meet the criteria.

ComEd determined the intent of these criteria was satisfied through the design, installation, and testing of SSCs in accordance with applicable regulations, codes and standards at the time of construction. These codes and standards included various sections of the ASME Boiler and Pressure Vessel Code, USAS B31.1 Code for Pressure Piping, 10 CFR 50.55a , 10 CFR 50 Appendix J, 10 CFR 20 and others as described in Section 3.0 and other sections of the Final Safety Analysis Report (FSAR). Assurance that these requirements were met in design and installation was provided through application of applicable Quality Assurance requirements, preoperational and start-up tests, plant walkdowns, and studies. The culmination of these activities was approval to operate the station as reflected in the initial plant NRC Safety Evaluation Report.

3.3 Preservation Of The Station Configuration And Performance Consistent With The Design Bases

Station configuration and performance since initial plant start-up have been maintained consistent with design bases through control of physical and operational changes to the station and through ongoing monitoring of SSC performance. Plant configuration and performance can be modified through the design change process, plant maintenance, and operator manipulation of station equipment. The design change and plant maintenance processes are procedurally controlled as described in Action (a) of this response. As was presented, these processes include numerous reviews, tests, and other checks to ensure the desired result is obtained (i.e., maintain station configuration and performance consistent with the design bases).

Plant operations are performed in accordance with operating procedures which are maintained consistent with the design bases through adherence to the procedure change process described in Action (b) of this response. Ongoing plant performance is monitored through operator and other plant personnel actions as described in more detail in Section 3.4 below.

Though every attempt is made to maintain plant performance and configuration consistent with established requirements, conditions arise which require temporary configuration and/or performance of equipment outside of normal expectations. These conditions are controlled through the use of processes, as appropriate, described in Action (a) (e.g., Temporary Alteration (TA) and Operator Work-Around) and corrected through a corrective action program described in Action (d). These processes ensure an acceptable level of design consistency is maintained and ensure the plant is operated in a safe manner.

3.4 Ongoing Verification And Control Of Plant Performance

Plant performance and configuration are monitored on a routine basis to assure results consistent with design bases are being obtained. Some of the routine performance monitoring activities include plant walkdowns, surveillance testing, PMT, Post-Modification testing, the ISI Program, and implementation of the Maintenance Rule. Each of these activities is described in more detail below.

3.4.1 Plant Walkdowns And Performance Monitoring

The plant configuration is maintained in part by plant personnel performing their regular duties. Operating procedures require plant rounds to be performed on a regular basis, during which Operating Department personnel record system and equipment status. System operating parameters such as pressures, flows, temperatures, vibration, and oil levels are routinely monitored. Plant problems are identified during these walkdowns and are documented on Action Requests (ARs) for equipment deficiencies or on Problem Identification Forms (PIFs) for other types of problems. Issues potentially impacting equipment operability are brought to the attention of plant management and processed in accordance with plant procedures for assessment.

System Engineers are expected to perform regular plant walkdowns of their systems to validate system configuration and to identify system deficiencies. Informal visual walkdowns are also done on assigned systems/components during the normal course of business. A formal, documented walkdown of each assigned system is accomplished on a routine basis including interviews and discussions with shift operating personnel concerning system/component problems. The purpose of the walkdown is to identify problems that could affect system operation.

System Engineering does performance monitoring and analysis by:

- Establishing support system, SSC, and/or program performance requirements and bases,
- Establishing site monitoring activities and data tools to support identifying and preventing failures,
- Monitoring performance through routine walkdowns, data analysis, data trending, and other data collection and review activities,

- Evaluating gathered data against performance requirements to correct degrading performance,

- Defining and optimizing required maintenance actions and priority,

- Reviewing industry experience for applicability and impact on system performance,

- Documenting monitoring results in the System Engineering Notebook for future reference and development of trends, and

- Incorporating self assessment, NRC, and other inspection results for improved SSC performance.

Engineers are also in the plant on a regular basis performing walkdowns of proposed design changes or to get information to resolve engineering and maintenance issues and are well aware of expectations to identify plant problems and to document them on ARs or on PIFs. Other plant personnel are involved in the process to identify plant problems when walking through the plant and are aware of management expectations that ARs or PIFs be generated to document plant problems. Issues potentially impacting equipment operability are brought to the attention of operations management and processed in accordance with procedures for Operability Assessment.

3.4.2 Surveillance Testing

A comprehensive program of plant testing has been formulated for equipment important to safety. The program consists of performance tests of individual pieces of equipment, integrated tests of the system as a whole, and periodic tests of the activation circuitry and the performance of mechanical components to assure reliable performance upon demand throughout the plant lifetime.

Periodic surveillance testing is performed in accordance with Technical Specification requirements. The testing procedures verify that critical system performance parameters are satisfied during system operation. Testing discrepancies require evaluation for operability and conditions adversely impacting system operability are evaluated for root cause and corrective action determination via the station corrective action process.

The IST Program also assesses the operational readiness of pumps and valves that have a safety function by detecting degradation that may affect operation and whether adequate margins are maintained. The Quad Cities IST Program meets the requirements of 10 CFR Part 50 Paragraph 50.55a(f) and assures that pumps and valves that have a function important to safety or accident mitigation will perform their respective design functions when called upon.

Periodic verification of design bases capability of safety-related Motor Operated Valves (MOVs) is being conducted per Generic Letter (GL) 96-05.

3.4.3 Inservice Inspection Program

The Quad Cities ISI Program was developed to meet the requirements of 10 CFR 50.55a(g) *ISI Requirements* and ASME Section XI 1989 Edition. The scope of inspections apply to ASME Code Class 1, 2 and 3 pressure retaining components and their supports which are periodically inspected in accordance with ASME Section XI, Subsections IWB, IWC, IWD and IWF. In addition, augmented inspections are performed in accordance with GL 88-01 and NUREG 0619. The ISI Program Plan was submitted, reviewed and approved by the NRC.

3.4.4 Post-Maintenance Testing And Modification Testing

The plant work control process described in Action (a) of this response includes requirements for review of work packages prior to issue for work, and specification of PMT, as determined by the PMT coordinator, required to maintain the plant in accordance with the design and license bases. This process has been designed to ensure work is done properly and that the equipment conforms to applicable specifications.

The plant modification process requires Design Engineering to identify Construction Tests, Modification Tests, and Operability Test requirements and acceptance criteria for plant modifications. This process is part of the Modification Process described in Action (a) of this response. The testing requirements are implemented either in the work package for basic testing, or by unique tests prepared by System Engineering for more complex tests. A checklist is used to guide the engineer in developing adequate testing requirements and acceptance criteria for the design change. For more complex design changes, the engineer is guided to refer to applicable System Descriptions i.e., Design Bases Documents (DBDs), UFSAR, Operations System Training descriptions, Pre-Op tests, Vendor manuals, Specifications and other design and licensing bases documents when developing test requirements and acceptance criteria.

Recently, in response to a potential concern identified by a station employee, a random sample of completed design changes was selected from the Modifications database. The sample set include design changes between 1980 through November 1996. The sample size was 125 design changes. The intent of the reviews is to ensure adequacy of testing for the design change. Tests that are being reviewed includes, construction, design change, operational and surveillance testing. A verification process, which was developed for these reviews provides the flow chart, instructions and testing review form for documenting results. If a comment or concern is identified during the review, and cannot be resolved by the review team, it is brought to the attention of the Design Group Leads for further assistance in resolving the item. For potential operability issues, a PIF is generated by the cognizant Design Engineer and taken to the shift for an operability screening review.

The reviews for the first 25 design changes are complete. There was one example, where no testing was specified after installation of a new spring pack to a MOV. This did not result in an operability issue. Root cause will be determined through the PIF process.

3.4.5 10 CFR 50.65 Maintenance Rule Implementation

The maintenance rule requires commercial nuclear power plant licensees to monitor the effectiveness of maintenance for specific plant equipment. As a recent addition to ongoing monitoring activities, implementation of the Maintenance Rule in July of 1996 provides added assurance that SSC performance is consistent with the design bases. Routine monitoring and assessment of the performance of SSCs that contribute most significantly to plant safety provides added assurance these SSCs function as required.

The Maintenance Rule implementation and compliance program at Quad Cities uses the guidelines and requirements specified in NRC Regulatory Guide 1.160, NUMARC documents 93-01 and . -02, the ComEd Guidelines for the Maintenance Rule Implementation (Revision 0 dated January 31, 1994), and other documents.

3.5 Operational Experience Provides Assurance

Plant performance as expected during normal operation, start-up, refueling, plant trips, and transients provides assurance that Quad Cities Station SSCs have been maintained consistent with its design bases.

A review of post scram information for reactor scrams during the period of 1988 to present was conducted to determine whether systems and components performed in accordance with design and responded as expected to transients and abnormal events. Following a scram, it is standard practice to identify instances where equipment failed to respond properly. Overall, the plant has performed as expected during plant transients. Tables 1 and 2 summarize the plant response to reactor scrams and lists instances where equipment failed to respond properly.

To summarize the findings, only one specific equipment abnormality was a recurring problem following reactor scrams during the time period from 1988 to 1996. Spurious Group I isolations occurred on both units following turbine trips. The cause of this occurrence was identified in 1993 and a design change has been implemented to correct the issue.

During the time period from 1994 to present, the plant response to reactor scrams has been as designed.

TABLE 1

Post Scram Equipment Failures / System Response Abnormalities
Unit One

LER Number	Scram Date	Equipment Problems
88-016	December 5, 1988	None
89-001	April 6, 1989	Spurious Group I isolation following turbine trip
89-003	April 12, 1989	None
89-004	April 17, 1989	None
89-010	June 29, 1989	Spurious Group I isolation following turbine trip
90-004	March 3, 1990	1B Reactor Feed Pump (RFP) discharge valve failed to open Reactor Water Cleanup Isolation valve position indication failed
91 -007	July 13, 1991	None
91-025	December 11,1991	Spurious Group I isolation following turbine trip
92-004	February 7, 1992	RFP did not trip at +48 inches C Electromatic Relief Valve (ERV) did not open on manual actuation signal B Main Steam Line (MSL) flow indication erratic following scram
92-019	August 15, 1992	None
96-017	August 25, 1996	None

Table 2

Unit Two

LER Number	Scram Date	Equipment Problems
88-001	January 11, 1988	None
88-005	March 20, 1988	Spurious Group I isolation following turbine trip
88-026	October 15, 1988	None
89-005	October 12, 1989	None
90-010	October 15, 1990	U2 Diesel Generator auto started Spurious Group I isolation following turbine trip Condenser low vacuum annunciator
90-011	October 27, 1990	None
92-001	January 1, 1992	2B locked up Spurious Group I isolation following turbine trip
93-001	January 7, 1993	2A Recirculation pump post scram runback slow 2B3 Extraction Bypass valve did not open Source Range Monitors (SRMs) and Intermediate Range Monitors (IRMs) did not automatically insert 2B Feed Water Regulating Valve (FWRV) locked up
93-005	January 29, 1993	None
93-013	June 13, 1993	Spurious Group I isolation following turbine trip 2B FWRV locked up 2D Drywell Cooler tripped
93-024	December 2, 1993	None
94-005	June 24, 1994	SRM 23 failed to insert
94-006	September 9, 1994	None
95-005	August 25, 1995	None

Following an outage, safety systems and critical systems are required to have walkdowns and System Readiness Certifications completed in order to support the Unit Start-Up. The system certifications are documented in accordance with Quad Cities Policy. The scope that is required for walkdowns is based on the judgment of the Group Leader and the work scope during the outage. A detailed start-up readiness process is reviewed by PORC prior to start-up.

3.6 Design Bases Conformance Testing Program Confirms Design Bases Adherence

On its own initiative, in the last two years, the station implemented system improvements and conducted an integrated system testing program for the following systems that had a record of causing the most challenges to the plant:

- The Control Rod Drive (CRD) system was partially re-furbished and functional testing was performed on the entire system. This testing demonstrated the capability of the CRD sub-system to properly respond to a reactor SCRAM signal via timely control rod insertion and thereby met the design bases of the CRD sub-system of the RPS system,

- Maintenance was performed on the Recirculation system to upgrade the material condition of the speed control system. Functional testing was performed to demonstrate the capability of the Reactor Recirculation system control system to respond to step changes in recirculation pump speed demand resulting in changes in reactor recirculation pump speed. The post-maintenance test procedure was based upon original start-up testing for the Quad Cities Station,

- The Turbine Electro-Hydraulic Control (EHC) system has been re-furbished to improve material condition and reliability. Functional testing was performed to demonstrate the capability of the EHC system to respond to step changes in reactor pressure demand resulting in main turbine control valve position changes. The test procedure tested the stability of the Turbine EHC System to respond to plant transients and thereby prove the EHC system functionally capable of meeting the design bases criteria. The testing parameters were provided by General Electric as being capable of proving Turbine EHC pressure control functionality. The test procedure was based upon original start-up testing for the Quad Cities Station, and

- The Feedwater Level Control (FLC) system has been re-furbished to allow the system to operate in 3 element (as opposed to 1 element) control mode. The system was functionally tested to demonstrate the capability of the system to respond to step changes in reactor level demand resulting in feedwater flow rates changes. The test procedure tested the stability of the FLC to respond to plant transients and thereby prove the FLC system functionally capable of meeting the design bases criteria. The testing parameters were provided by General Electric as being capable of proving FLC reactor level control functionality. The test procedure was based upon original feedwater system start-up testing for the Quad Cities Station.

3.7 Special Verifications And Improvement Initiatives Provide Added Assurance

A number of design bases special verifications and improvement initiatives have been undertaken for the purposes of (1) examining specific aspects of the plant's conformance with its design

bases, and (2) enhancing the ability to maintain conformance on an ongoing basis. These have included one or more of the following types of activities:

- Acquiring original design information and improving its accessibility,
- Revising or establishing more specific calculations which implement the design bases (which facilitates verification on an ongoing basis),
- Verifying that plant configuration and performance is consistent with design information, and
- Establishing monitoring programs to confirm conformance with specific aspects of design on an ongoing basis.

3.7.1 Inspection And Enforcement Bulletin 79-02 Base Plates

The response to Inspection and Enforcement Bulletin (IEB) No. 79-02 included inspection, and design verification of safety-related and Category I pipe support baseplates that utilize concrete expansion anchors. The scope included acquiring available design documentation and performing testing and design calculations to verify acceptable installation of concrete expansion anchors. Additionally, inspections and walkdowns were conducted to verify that installation was in conformance with design.

Ongoing compliance has been established by implementing a station work procedure. This controls the installation of expansion anchors providing minimum embedment depth, spacing, angularity, and torque requirements for the expansion anchors for which the design is based. As a minimum, safety-related expansion anchor installations are verified by Quality Control and documented on installation checklists. Successful implementation of the procedure insures that the anchors are installed correctly and in conformance with the design bases. Any deviations from these processes are reconciled via the station's problem identification process.

3.7.2 Inspection And Enforcement Bulletin 79-14 As Builts

In response to NRC Bulletin No. 79-14 and its subsequent revision and supplements, an extensive program was implemented to verify that as-built conditions of safety-related piping systems 2 1/2 inches and larger were consistent with seismic analysis. As-built conditions were evaluated against design requirements, including Section 3.9 of the UFSAR. Extensive walkdowns and inspections were done to verify and record as-built configuration and compare it to the as-designed configuration. Discrepancies and nonconformances resulted in reanalysis of affected piping systems, modifications, and repair work, as required. To ensure ongoing compliance, design, fabrication, installation, testing, and inspection of safety related piping systems, have been incorporated into a station procedure.

3.7.3 Embedment Plates

In 1987, a discrepancy was identified at ComEd's Dresden Station between the installed and designed configuration of strip embedment plates. These plates were present throughout the plant at Quad Cities. An assessment was performed that demonstrated acceptable adequacy for loadings to support continued operation and several modifications were performed to restore design bases consistency. As a result, the station successfully identified and corrected an original construction error.

3.7.4 Generic Letter 87-11 Seismic Qualification

In response to GL 87-11, a comprehensive Seismic Qualification Program was implemented to ensure equipment required to function following a seismic event to achieve and maintain safe hot shutdown is capable of doing so. A Safe Shutdown Equipment List and Relay List defines the scope of equipment included in the program. Selected equipment was walked down using industry guidance to assess its capability to withstand a seismic event considering anchorage capacity and possible interaction between the subject equipment and adjacent equipment, systems and structures. Industry guidance was used to determine that certain equipment, such as check valves, manual valves, etc., did not require walkdown.

Equipment not meeting the Seismic Qualification Utility Group (SQUG) criteria are declared "outliers". Outliers may be resolved by analysis, test or modification. The program identified that about 20% of the equipment and 13% of the relays are outliers. The SQUG program outliers and proposed resolutions have been identified and transmitted to the NRC in June 1996. The outliers were committed to be resolved within two refueling outages, consistent with industry guidance.

To ensure ongoing compliance operating, maintenance and testing procedures include requirements to address seismic qualification of equipment or specific responses which may be needed following a seismic event. Replacement and new equipment have generally been provided to newer requirements such as Institute of Electrical Electronic Engineers Standards 344-1975. Modifications to or the addition of safety-related equipment include seismic qualification.

3.7.5 Fuse List

Quad Cities on its own initiative has implemented a fuse control program to:

- Identify installed fuses and document their adequacy,
- Conduct walkdowns to verify the correct fuse is installed, circuits are monitored, and coordination has been achieved,
- Control the application and maintenance of fuses (fuse list, station procedures, and work practices), and

- Establish fuse selection guidelines.

Approximately 90% of the safety-related fuses have been walked down and incorporated into the fuse list.

To ensure ongoing compliance, a Quad Cities Station Administrative Procedure is used for the control and maintenance of fuses. This procedure describes the steps required when an open fuse is found, when a fuse that doesn't match the design drawings is identified, or when an installed fuse is not identified on the design drawings. Procedures also ensure that affected schematics, wiring diagrams, key diagrams, station procedures, vendor manuals, fuse list, etc., are revised prior to the close out of any fuse discrepancy.

3.7.6 Generic Letter 89-10 Motor Operated Valves

In response to GL 89-10 and its supplements, Quad Cities implemented an MOV Program. As necessary, the program included design bases reconstitution, in-situ testing, and modifications. This provides added assurance that MOVs in Safety-Related Systems will perform their safety function in accordance with their design bases.

MOV testing included static, dynamic, pressure-lock, and prototype blowdown testing. MOV motor testing was also performed to determine true Alternate Current and Direct Current motor capability as a function of voltage. Motor test data and efficiency information enables ComEd to accurately predict the capability of MOV actuators.

In 1988, ComEd was the first utility to implement the Valve, Operation, Test and Evaluation System (VOTES) testing system on a large population of MOVs. Since that time, ComEd has been very active in the development and use of VOTES and other diagnostic testing systems for valves, resulting in improvements to the testing system hardware and software. This effort has resulted in identification and correction of valve and operator related problems.

Quad Cities Station has actively participated in industry forums for MOVs. This includes the MOV Users Group, the ASME OM-8 Subcommittee, the Midwest Nuclear Engineering Managers Forum MOV task force and the Kalsi Thrust/Torque Extension project. Quad Cities participation in these groups has not been limited to passive membership. Our personnel have held offices in these groups and have prepared/issued technical documents. Quad Cities will continue to actively participate in these industry efforts.

Better interface arrangements between the MOV program and other station programs are being pursued to ensure that the MOV design bases is diligently maintained in the future. These programs include the Electrical Load Management System process for voltage drop calculations (which could effect available motor / gearing capability), the load management system process for piping loads (which could effect MOV seismic analysis), and the modification process for changes to system characteristics (which could affect MOV design bases pressure and flow conditions).

A significant number of valves were modified to increase margin by installation of the upgraded components. The MOV Program provides consistency and maintains ongoing compliance.

3.7.7 Fire Protection

As a result of NRC concerns and independent assessments (by Site Quality Verification (SQV) of the Fire Protection (FP) program, Quad Cities implemented the Fire Protection Improvement Program (FPIP). The objectives of the FPIP is to validate the station's FP design bases, upgrade the station's safe shutdown analysis and other FP documentation and correct FP programmatic weaknesses. The program consists of fifty-six (56) tasks, forty-eight of which are complete and the remainder are scheduled for completion. The FPIP includes provision for updating the program and a procedure to ensure programmatic updates are processed in accordance with 10 CFR 50.71(e).

Configuration control of the fire system is maintained using the station design and configuration control process. Extensive detailed walkdowns and reviews have identified just three (3) issues where the consistency with the design bases was questioned and aggressive action was taken to resolve these issues.

The FPIP project is reviewing plant modifications since 1988. Of approximately one thousand fifty (1050) modifications, nine hundred (900) modifications have been reviewed and confirmed to be correct. Therefore, it is reasonable to conclude that the design bases requirements were correctly translated. The planned program enhancements include revision of the modification process to require an independent FP engineer review modifications to ensure that the lessons learned in the FPIP are applied. This new process will ensure that modifications to the plant that can impact the FP aspects of the design bases are consistently controlled.

3.7.8 Component Classification Upgrade

Equipment classification is important to ensure applicable quality requirements are specified and met during procurement, installation, and maintenance. The station has developed a list of safety-related components in safety-related and nonsafety-related systems. Components are classified utilizing a proceduralized methodology. Design bases discrepancies (electrical separation, containment isolation, code violation etc.), when identified, are resolved. Justification is provided for original design components remaining in place based on the original requirements at the time of installation. Also, as part of the process, an engineering evaluation, a detailed design , qualification, and licensing review is performed.

Component classification is documented for station personnel in the Master Equipment List (MEL).The MEL was initially created in 1985 to comply with the requirements of NRC GL 83-28.

The original MEL was created from existing station databases. Users of MEL (Maintenance, Procurement, Operations, and Engineering) have identified missing items, incorrect classification of component, incomplete detail, and conflicting and duplicate information. The identified errors

were corrected each time. The extent of the problems identified through various audits resulted in the initiation of the MEL upgrade program in 1991.

Relevant design and license documents and applicable industry standards have been used for performing classification evaluation. The program assures that the component function and design meets the licensing requirements and UFSAR commitments. Deviations to requirements are evaluated and corrective actions implemented.

To date 50% of the total 43 systems (originally planned) have been reviewed and updated, using classification criteria established in an approved engineering procedure to ensure ongoing compliance. A procedure defines the method to prepare, control and update the MEL and the Component Classification Binders (CCBs) for each system. The MEL and CCBs, with the exception of the Reference Section (Tab D) of the CCB, can only be updated per the Document Change Request (DCR) turnover process.

The component classification/MEL upgrade program provides a documented basis for the classification of plant components. The criteria for performing component classification evaluation are consistent with industry established guidelines. The classification process assures that the classification is consistent with the component function and design bases requirements.

3.7.9 Calculation Re-Indexing

ComEd has implemented a program to transfer the design control function from the NSSS supplier and A/E to Quad Cities. As part of this effort, and to facilitate access to some design information, ComEd acquired calculations used by the A/E in the design of many of the SSCs important to safety and shipped them to the station. To put this in perspective, approximately 13,000 hard copy documents and approximately 16,000 microfilmed documents have been turned over, approximately 80% of which are calculations or analyses.

A calculation indexing program has been initiated to identify calculation specific attributes which can be entered into the Electronic Work Control System (EWCS) database to facilitate, identification and retrieval of calculations. This program supports DBD control by identifying design calculations when such information is needed, particularly where time is important (e.g., a limiting condition for operation may apply). Additional fields of information are being provided for enhanced indexing.

3.7.10 Setpoint Control Program

A Setpoint/Control Program was developed to ensure conformance with design bases instrument settings. As part of this ongoing initiative, ComEd is:

- Developing an instrument database;
- Validating data entry by plant walkdown and document reviews;

- Developing a standard methodology for setpoint calculations;
- Classifying instruments into major categories;
- Performing setpoint analysis for selected Technical Specification (Reactor Protection System, Engineered Safety Feature) instruments;
- Acquiring calculations from suppliers;
- Reviewing station procedures, with revisions in process; and
- Establishing procedural control.

3.7.11 Updated Final Safety Analysis Report Reviews

The UFSAR was submitted for Quad Cities Station in accordance with the requirement of 10 CFR 50.71(e). The original FSAR was submitted in support of the application, as amended, for facility licenses for Units 1 and 2 at Quad Cities Station, under Section 104(B) of the Atomic Energy Act of 1954, as amended, and provided the technical information required by 10 CFR 50.34 and 50.36 of the Regulations of the United States Atomic Energy Commission governing the licensing of production and utilization facilities.

The UFSAR is an updated version of the FSAR and follows a different format than the FSAR. The FSAR was written before the issuance of Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. "In an effort to provide consistency with the industry, the UFSAR was rebaselined and reformatted in 1992 using Regulatory Guide 1.70, Revision 3, November 1978 as guidance. This UFSAR contains a description of Quad Cities Station Unit 1 and Unit 2. The UFSAR is revised periodically in accordance with 10 CFR 50.71(e).

On its own initiative Quad Cities Station in August 1996, did a review of two UFSAR sections. That review was done using the general guidance of ComEd UFSAR Conformance Review, dated April 15, 1996, and a desktop instruction. The sections reviewed were Safe Shutdown Makeup Pump (5.4.6.5) and Health Physics (12.5). The review resulted in a small number of individually low significance issues to be evaluated and tracked to closure through the station corrective action program.

During the above review a potential weakness in the process for distributing UFSAR revisions was identified; in that holders of controlled copies of the UFSAR did not receive the revised UFSAR in a timely manner. A PIF was issued for this weakness and corrective steps have been taken.

The two-chapter UFSAR conformance review was preceded by a more general self-assessment of UFSAR compliance in 1996. The purpose of that initial assessment was to identify any obvious discrepancies and resolve those discrepancies prior to performing an

in-depth, detailed review. This review resulted in approximately twenty UFSAR revision packages.

In addition, in preparation for restart from refueling outages in 1996, a review was completed to screen station open items to identify any items that may potentially impact the UFSAR or DBDs, and to determine if any operability issue existed.

This review included the following categories that were deemed to have the highest potential for placing the unit(s) outside of their design or licensing bases:

- Significant open issues,
- UFSAR open issues (Engineering and Operations review),
- Operability evaluations,
- DBD open issues,
- Nuclear Tracking System (NTS) items, and
- Design Change Packages.

Issues affecting plant operability or design bases were addressed prior to start-up. In preparation for restart, relevant data bases were also searched to identify any issues that may not have been appropriately addressed in the past. That review included, but was not limited to:

- Sargent & Lundy letters (i.e., that may or may not have been adequately incorporated into the licensing bases),
- "Canceled" modification packages (i.e., does the physical plant conform with the licensing bases?), and
- Modifications (i.e., were approved changes made on one unit, but not on the other?).

The focus of the 1996 reviews was to identify and resolve prior to restart any issues with potential operability impact. These reviews provide additional assurance that safety significant issues have been identified and resolved.

Finally, on September 10, 1996, Engineering completed a focused comparison of upgraded technical specification sections 3.5/4.5 Emergency Core Cooling System with the UFSAR (limited to values specifically mentioned in Technical Specification Upgrade Program sections 3.5/4.5). A determination was made to assess if the values (e.g., 150 psig) in the Technical Specifications were consistent with the values given in the UFSAR for that parameter. In summary, it was found that there are some apparent discrepancies that need Engineering resolution. Most are

inconsistencies or unclear information in the UFSAR, rather than major differences between the technical specification and the UFSAR. An initial Engineering review found no potential operability issues or concerns. A NTS item was initiated to submit the items noted in the review as changes to the UFSAR.

3.7.12 Environmental Qualification Walkdowns And Validations

Quad Cities Station has implemented an Environmental Qualification (EQ) program to ensure electrical equipment is capable of performing its safety function under worst case accident environment conditions. The program was established in accordance with the guidelines of NRC Office of IEB 79-01B, and the requirements of 10 CFR 50.49. The EQ program for Quad Cities Station has been reviewed and accepted by the NRC.

Equipment within the scope of the EQ program includes safety-related electrical equipment, certain nonsafety-related electrical equipment, and post-accident monitoring equipment as defined by paragraphs (b)(1), (b)(2), and (b)(3),respectively, of 10 CFR 50.49. Electrical equipment required to function in an accident environment was identified, its required functions were determined, calculations or tests were conducted to assure that the equipment would perform to required criteria in the accident environmental conditions, and walkdowns were completed. Program controls have been implemented through plant procedures and policies to control the replacement and maintenance of this equipment on an ongoing basis to assure that design bases requirements are maintained.

The existing maintenance and surveillance programs are used to specifically address the maintenance and surveillance requirements of EQ (e.g., required maintenance resulting from use of components and parts with limited qualified life). These current programs are as follows:

- Like-for-like parts are used to maintain presently installed qualified components. When identical parts are not available, an engineering analysis is performed to ensure the replacement part is qualified for the intended function and environment and

- Engineers review surveillance discrepancies.

When presently installed components, must be replaced, every effort is made to replace them with equipment qualified to NUREG 0588, Category I. In summary, implementation of the EQ program is a significant effort to validate, maintain, and improve the installed configuration.

3.7.13 Generic Letter 89-13

GL 89-13 requested a review of the Service Water System (SWS) to ensure it meets its design criteria and confirm that it will fulfill its safety functions. Quad Cities has implemented a plan to meet the intent of this GL. This included reviews of system configuration, flood protection, pipe supports, and emergency power sources.

The NRC in 1992 evaluated the GL 89-13 review and found it to be not fully satisfactory. Nonetheless, several initiatives were determined to be positive. Quad Cities has undertaken significant efforts and the program has been enhanced. Inspections and monitoring procedures are in place to assure ongoing compliance with the design bases for the system.

3.7.14 Maintenance Rule

In 1996 Quad Cities Station began implementation of a Maintenance Rule Program in accordance with NRC Regulatory Guide 1.160. The objective of the program is to assess the effectiveness of maintenance on an ongoing basis in a manner which ensures that the desired result, reasonable assurance that key SSCs are capable of performing their intended function, is consistently achieved.

In the process of implementing a maintenance rule program to meet 10 CFR 50.65 objectives and industry guidelines, Quad Cities reviewed design information to define the safety functions of risk-significant SSCs; established performance criteria to ensure capability to perform the intended functions; and reviewed current plant performance against those criteria. This implementation process supports assurance that installed SSCs will conform to the design bases.

3.7.15 Flow Accelerated Corrosion

To meet the requirements of GL 89-08, Quad Cities Station implemented a comprehensive program to analyze and inspect highly susceptible single phase and two phase flow high energy carbon steel piping. This effort contributes to plant safety and improves design bases conformance by ensuring that piping systems function as designed. Based on inspection results and better understanding of degrading mechanisms, several plant modifications have been made.

3.7.16 Design Bases Document Verification And Validation

Twenty two DBDs have been developed for Quad Cities. These systems are listed below. DBD development involved identifying original plant design bases, incorporating changes, reviewing existing design information, and resolving conflicts between documents. The process was controlled by a Writer's Guide which provided guidance to the writers for consistent format and content. Engineers from the NSSS suppliers and A/Es, helped develop the DBDs. The NSSS writers accessed their internal sources to identify the references used to support the original design. The A/E writers accessed A/E project files and ComEd databases in addition to original design bases documentation and modification files to arrive at the current design bases. Technical specifications and the FSAR/UFSAR were reviewed during the preparation of the DBDs.

Reviews were performed by ComEd and A/Es that were involved in the design and operation of the station. Reviews included Site Engineering, System Engineering, Corporate Engineering, Nuclear Fuel Services, Mechanical & Structural Design, Electrical/Instrumentation & Control Design, and the Site Training department. This provided additional checks and balances to ensure the latest design information was identified.

When the review of a draft DBD was complete, comments were compiled and a meeting was held between the NSSS writers, A/E writers, the ComEd Engineers, and others that had significant technical input. Comments were discussed to identify discrepancies, assess their significance and determine a resolution. In some cases, where original studies or calculations were unavailable, system and component specifications as well as process flow diagrams were utilized to establish the original design bases. Where supporting calculations for modifications were incomplete, an open item was generated, evaluated for significance, and prioritized for resolution. When all comments had been addressed and the remaining open items logged and tracked, the DBD was issued as a controlled design document. Reference documents used to prepare the DBDs have been indexed and copies transmitted to ComEd.

A procedure "Design Basis Documents" (Appendix II, Process 16) is used to issue, revise and validate DBDs. Ongoing maintenance of the DBD, is achieved by the station's modification procedure, "Plant Modifications" (Appendix II, Process 10) which includes DBDs as a document which may be affected in the "Modification Review Checklist". The modification process ensures that design changes are reviewed to determine their impact on the DBDs and change requests are initiated as required.

DBDs Developed:

- High Pressure Coolant Injection,
- Reactor Recirculation,
- Automatic Depression System,
- Reactor Core Isolation Cooling,
- 125/250 V DC,
- Standby Gas Treatment System,
- Standby Liquid Control,
- Control Room Heating, Ventilation, and Air Conditioning,
- Reactor Protection,
- Core Spray,
- Diesel Generator,
- Containment,
- Feed and Condensate,
- Containment Support,
- Residual Heat Removal,
- Seismic Topical,
- Single Failure Criteria,
- Auxiliary Power,
- Nuclear Instrumentation,
- Design Bases Events,
- Safe Shutdown Make-Up Water, and
- Nuclear Boiler and Reactor Pressure Vessel Instrumentation

3.7.17 Specification R-4411

Specification R-4411, General Work Specification, Maintenance/Modification Work, for Quad Cities Station, was initially issued on July 15, 1986. This specification incorporates applicable industry codes, standards, and specifications (including applicable sections from the ASME Code) and/or describes how they are to be invoked. Where appropriate the history relating back to initial construction is addressed. This general specification plus equipment specific specifications are used to perform work to maintain SSCs in accordance with design requirements.

3.7.18 Other

Other initiatives which have examined specific aspects of the station's consistency with its design bases and which are discussed elsewhere in this response include:

- Vendor Technical Information Program (VETIP) development (Action (b)),
- Procedure Upgrade Project (Action (b)),
- Upgraded Technical Specifications (Action (b)), and
- Emergency Operation Procedure development (Action (b)).

3.8 Diagnostic Evaluation Team And The Quad Cities Course Of Action Improved Station Performance, Design And Configuration Control

In August through September 1993 the NRC conducted a Diagnostic Evaluation Team (DET) inspection at Quad Cities Station. The team performed a comprehensive review of the Operation, Training, Maintenance, and Technical Support. The team identified significant programmatic and/or management weaknesses.

The Quad Cities Course of Action (COA) Improvement Plan was issued in April 1994 to set the course for station improvement. The COA was a three-year plan that is now nearing completion. Many of the improvement initiatives taken and still underway are focused on improving the station's design and configuration control processes and effectiveness.

3.8.1 Material Condition Improvements

During mid-cycle outages at both Units in November and December 1993, and during the 1994/1995 refueling outages, significant actions were taken to improve equipment and safety system performance. Hardware improvements included:

- Upgraded torus cooling valves, with valve trim to reduce vibration,
- Overhauled 2C Residual Heat Removal (RHR) Pump and reduced vibration,

- Reduced Residual Heat Removal Service Water pumps vibration,
- Recoated Unit 1 Torus,
- Added High Pressure Coolant Injection (HPCI) exhaust line sparger,
- Aligned Unit 2 HPCI pump and relieved pipe stresses,
- Overhauled Unit 1 RCIC Turbine, and
- Replaced Unit 1 DG Lube Oil Cooler.

Plant materiel condition has also been improved through the following programmatic improvements:

- Reduction of Work Request (WR) backlog,
- Improvement in the Work Process Including Package Preparation,
- Improved drawing accessibility and accuracy,
- Enhanced supporting database interfaces,
- Verification of equipment identification accuracy, and
- Development of DG preventive maintenance program.

Additional action plans have been initiated to improve the following:

- Conduct of and response to predictive maintenance analysis,
- Root cause analysis of component and system failures,
- Trending of equipment/system performance and failures, and
- Incorporation of lessons-learned from in-house and industry experience.

3.8.2 Operations Role In Correcting And Preventing Plant Problems

Quad Cities Station has held Safety Culture Seminars for Operations Department personnel. These seminars addressed individual roles and responsibilities in regard to a nuclear safety work ethic and Department practices to achieve a strong Safety Culture. The aspects of Safety Culture addressed included problem identification and resolution, Operator Work-Arounds, and the importance of control room annunciators.

The Operations Department has taken a more proactive role in clearly communicating problems and needs to Maintenance and in ensuring action items important to plant operation are reflected in the schedule. As a result, Operator Work-Around, Degraded Equipment Log entries, Caution Cards, Annunciator Problems, Control Room WRs, and other operating issues receive increased attention.

In addition, the quality of operability determinations has been improved. Operations management has taken ownership and assigned the priority to making all operability determinations. Engineering assistance is requested, as needed, to evaluate whether the affected equipment would be capable of performing its intended function. The evaluation is used by Operations in making the operability determination.

3.8.3 Enhanced Configuration And System Design Bases Information

Actions have been taken to enhance the quality and availability of configuration and system design bases information. The quality and accuracy of the station's drawings, with respect to the as-built plant configuration, have been improved through the following:

- A complete, consistently formatted selected set of critical drawings used by Operations which reflect the station's, as-built configuration has been issued,
- A Detailed System Walkdown Program of selected systems to ensure accurate as-built mechanical drawings (e.g., Process and Instrument Drawings, Control and Instrument Drawings) was completed,
- The DBDs for selected systems/topicals were issued.
- The drawing change process was enhanced to improve efficiency and responsiveness, and
- The vendor manual update process was enhanced to ensure that accurate vendor technical information is available in a timely manner and the backlog of vendor technical information was reduced.

3.8.4 Other Initiatives

The COA also includes other measures to improve station performance that relate to maintaining conformance with the design bases. These included:

- Improved access to and assessment of industry operational experience,
- Improved performance monitoring in the area of vibration, MOVs, and IST,

- Improved problem identification and root cause analysis for reporting and tracking problems, and

- Reviewed selected station procedures (e.g., HPCI procedures, MOV program procedures) to assure that they reflect the actual configuration and operation of the station.

3.9 Design Bases Related Audits And Inspections

Over time, numerous audits, assessments and inspections have been performed to review targeted areas for consistency between the plant operation, and design bases information. These internal and external reviews provide added assurance that the plant is configured and operated safely. Those most pertinent to configuration control have been reviewed for relevant information and are discussed below.

3.9.1 Audits

Modification Process

Audit coverage of this area has been consistent, with an average of over four audits per year from 1990-1996. Three related Corrective Action Records (CARs) were issued in 1995, although only five total have been issued since 1990.

Based on the audits that have been reviewed, the modification processes are adequately maintained and controlled by the station. Post-Modification testing was originally identified as a problem during a Nuclear Oversight Special Investigation performed in 1993. Issues related to older Post-Modification testing continues to be identified and resolutions are in progress.

Setpoint Changes

Five audits have been performed since 1990 relating to Setpoint Change issues and one CAR was issued in 1993.

Based on audits and CARs reviewed, the station's control of the setpoint change process provides reasonable assurance to maintain the plant design requirements.

Temporary Alterations

Thirteen audits have been performed since 1990 which relate to TA issues and five CARs have been issued (the most recent CAR was issued in 1995; the next most recent CAR was issued in 1992). Approximately two audits per year are conducted in the area of the TA process, the number of TA related problems occurring at the station has remained at essentially a constant level.

Based on audits, CARs and associated corrective actions taken, the station's control of the TA program appears to be adequate to ensure that the station maintains its design bases requirements.

However, an NRC Notice of Violation was issued to the station in September 1996 concerning the station's control of TA. As a corrective action, the TA Coordinator now reviews TAs greater than 90 days old to ensure continued applicability of safety evaluation/screening and Design Engineering evaluates the TAs for removal or possible conversion to a permanent modification. Based on these observations additional improvements in properly identifying TAs and timely removal of TAs are warranted.

Operability Assessments

Twelve audits and four surveillances have been performed, and five CARs issued since 1990 concerning the Operability Assessment process.

Based on audits, surveillances and Corrective Action Records (CARs) reviewed, the station's control of operability assessments provides reasonable assurance to maintain the plant design bases requirements.

Safety Evaluations

Thirteen audits and five surveillances have been performed, and six CARs issued since 1990 concerning the 10 CFR 50.59 process.

Based on these audits, surveillances and CARs, the 10 CFR 50.59 Safety Evaluation process used at Quad Cities Station is adequate. However, there is a history of recurring problems in the areas of inconsistent understanding of the DBDs insufficient justifications to support conclusions; availability of licensing bases documents; and inadequate training. These deficiencies have been resolved and corrective action verified to be currently effective.

Updated Final Safety Analysis Report Update / Change Control

Six audits and two surveillances have been performed since 1990, resulting in the issuance of one CAR concerning UFSAR update/change control. Two of the six audits and both surveillances were conducted in 1996.

Based on these audits, surveillances and CARs, there are adequate controls in place for updating the UFSAR.

Out Of Service

Sixteen audits and seven surveillances have been performed since 1990, resulting in the issuance of three CARs concerning Out of Service (OOS) equipment. The three CARs were issued in 1990 and 1991.

Based on these audits, surveillances and CARs, the OOS process as written at Quad Cities Station is acceptable. The implementation of the process had historically been weak. This is supported by the "Stop Work" on all OOS activities in 1995 and the Notice of Violation issued by the NRC

in June of 1996. Improvements in this area have led to a declining number of problems and the Operating Department is monitoring this area on a monthly basis and taking actions as appropriate.

Problem Identification Process

Twenty-nine audits and fourteen surveillances have been performed since 1990, resulting in the issuance of eighteen CARs concerning the Problem Identification process.

Based on a review of audit reports, surveillance's, and Corrective Action Records (CARs), the station's ability to maintain and control the Problem Identification Process is adequate.

Vendor Drawings

Two audits have been performed since 1990, resulting in the issuance of one CAR (in 1996) concerning Vendor Drawings.

Based on the audit reports it appears the station's control of Vendor Documents/Drawings to be included in plant Design Bases is adequate.

Design Drawings

Twelve audits have been performed since 1990, resulting in the issuance of two Open Items, one Comment, and two CARs. For each of the individual problems identified, corrective actions were taken by the station and accepted by SQV. Based upon a review of this material, reasonable assurance exists that programmatic controls for design drawings are adequate to maintain and reflect the station design.

Inservice Testing Program

The eight audits and one surveillance that have been performed since 1990 on the Inservice Testing Program have indicated the program has been successful in identifying and correcting component degradation before design bases limits have been challenged. These same audits and surveillance also indicate the administration of the program had not been as effective as necessary. The CAR's issued pertaining to the administration of the program have been acceptably addressed by the station and closed by SQV, thereby making the current administration of the Inservice Testing Program acceptable for implementing an effective program.

Seismic Design Bases

Five Quad Cities SQV audits have been performed since 1990. These audits have verified and validated aspects of seismic design bases. The audits generated four CARs which led to acceptable corrective actions. Based upon a review of this material, the station's control of seismic design bases is adequate.

Vendor Technical Information Program

Six audits have been performed since 1990, with no corresponding CARs, regarding VETIP issues. These evaluations identified large backlogs in the processing of VETIP manual revisions which have impeded the overall effectiveness of the program. However, recent efforts have reduced the backlog to zero safety related manuals and zero non-safety related manuals in engineering. This should improve the effectiveness of maintaining plant equipment in accordance with their design parameters. However, due to the recent completion of these actions the current adequacy has not been assessed.

Conclusion

Overall, these audit reports, surveillances, CAR's and corrective action documents indicate that there is reasonable assurance that design control measures are adequately maintained to assure consistency with the design bases of the plant.

3.9.2 Safety System Functional Inspections

Vertical slice type inspections conducted by the NRC at Quad Cities Station include the Service Water System Operational Performance Inspection (SWSOPI) and the Electrical Distribution System Functional Inspection (EDSFI).

3.9.2.1 Service Water System Operational Performance Inspection

From March 2 through 20, 1992, the NRC performed an announced pilot SWS operational performance inspection at Quad Cities Station. The inspection team focused on the design, operation, maintenance, surveillance, quality assurance, and corrective actions associated with the Quad Cities Station SWS.

The SWSOPI report noted a total of six (6) deficiencies which have been dispositioned and closed by the NRC. The SWSOPI team also identified that significant program improvements were required. Documentation that the improvement initiatives had been completed was not available so a PIF was written to investigate current status. The system is currently operable.

3.9.2.2 Electrical Distribution System Functional Inspection

The NRC conducted an EDSFI at Quad Cities Station from 1 April 1991 through 10 May 1991. The EDSFI was a vertical slice inspection. The principal focus was to assess the design, implementation, and engineering technical support associated with the Electrical Distribution System at Quad Cities. The inspection consisted of a selective review of design calculations, relevant procedures, representative records, installed equipment, and interviews with Engineering and Technical Staff (E&TS).

Certain commitments made to the NRC as a result of this inspection have been closed out. The remaining items are pending NRC review for closure. In 1996 the NRC performed an E&TS

evaluation which included review of the Fuse Control Program and the Breaker Coordination Program for the 250V DC, 125V DC and 120V AC systems. These programs and their implementation are subject to follow up inspection. A commitment was made to develop a plan to address degraded voltage settings. The plan was developed, and efforts are continuing.

3.10 Conclusion: Rationale For Concluding Quad Cities Station Consistent With Design Bases

The rationale for concluding that the configuration and performance of Quad Cities Station SSCs are consistent with the design bases is as follows: When Quad Cities Station was licensed to operate by the NRC, that license was supported, in part, by NRC concurrence with ComEd's findings that Quad Cities Station safety-related SSCs were configured in accordance with, and conform to the plant's design bases. Since then, Quad Cities Station has been operated, maintained, and tested, in accordance with controlled procedures designed to assure continued adherence to the design bases.

Over the years, ongoing conformance of the configuration to the design bases is verified by walkdowns, surveillance testing, inspections, and other reviews. Corroboration that SSCs are configured and perform consistent with their design bases is provided several ways. Normal operation of the plant as expected, and responses to abnormal conditions as planned, generate a vast body of experience that demonstrated consistency of the SSCs with their design bases. Further confidence in the configuration of Quad Cities Station SSCs has also been gained as various SSCs are reviewed under targeted plant specific design bases conformance testing, special verifications and improvement efforts. Finally, the station is subjected to continuing review by plant personnel, the NRC and third parties. Where SSCs have been found to deviate from their design bases, corrective actions are taken as described in section (d).

Based on all of the above, there is reasonable assurance that the safety-related SSCs are consistent with their design bases.

4.0 ACTION (d) - PROCESSES FOR IDENTIFICATION OF PROBLEMS AND IMPLEMENTATION OF CORRECTIVE ACTIONS, INCLUDING ACTIONS TO DETERMINE THE EXTENT OF THE PROBLEMS, ACTION TO PREVENT RECURRENCE, AND REPORTING TO NUCLEAR REGULATORY COMMISSION

4.1 Introduction

This section describes the processes used by the Quad Cities Station to identify problems, determine the root cause and extent of the problems identified, and report problems to the Nuclear Regulatory Commission (NRC). This section also describes the processes used to identify appropriate corrective actions, including actions to prevent recurrence. The processes described include those routinely used by personnel to report problems or concerns, as well as special programs, targeted reviews, audits and inspections.

The Quad Cities Station processes described in this section provide a mechanism for design concerns to be formally documented and evaluated. Identified conditions adverse to quality are assigned a priority for timely corrective action based upon their significance to safety, and are subjected to root cause evaluations. Problems are tracked through completion of corrective actions. Station processes are also in place to prevent recurrence of problems, and to identify and correct generic implications. Identified conditions adverse to quality are assessed to determine their impact upon operability in accordance with the Technical Specifications, and are evaluated for reportability to the NRC.

4.2 Problem Identification Form Process

The Problem Identification Form (PIF) provides a mechanism for any employee or contractor to document a condition adverse to quality or design bases concern. The intent of the PIF is to provide a simple vehicle for anyone to identify a problem. The PIF procedure also establishes controls for investigating those problems, tracking corrective actions, and reporting problems to the NRC when required.

The problem identification phase of the corrective action process also includes steps to identify and screen problems for significance, and to report as necessary (i.e., to assess impact on operability and reportability). Compensatory actions are implemented if necessary.

4.2.1 Problem Identification Form Initiation

The PIF is the primary means of problem identification used at the station. The PIF process is available for anyone to identify any problem, condition adverse to quality, or concern. Repetitive equipment failures, work process problems, programmatic deficiencies, and personnel performance problems are also identified by using PIFs. A PIF is also initiated for non-conformance issues and other events or conditions that may appear to be adverse to the safe and orderly conduct of operations at the station.

The threshold for initiating a PIF is very low. Station procedures contain guidance regarding the types of problems to be reported on PIFs. The PIF procedure instructs the reader to write a PIF when in doubt. Station management also aggressively encourages all station personnel via general employee training and reinforcement of expectations to document concerns in PIFs.

The PIF process includes provisions for the prompt identification and evaluation of operability and reportability concerns. Once a PIF is initiated, it is routed to the on-shift Shift Engineer, or designee, who is a Senior Reactor Operator (SRO). The Shift Engineer, or designee, completes an operability screening and notification review. New PIFs are reviewed each shift. The Shift Engineer, or designee, takes appropriate action to place the plant in a safe condition and/or notify the NRC as appropriate. PIFs are routed through the Station Manager for review and the assignment of investigation responsibility.

4.2.2 Event Screening Committee

The Event Screening Committee (ESC) reviews PIFs on a daily basis during the work week. The ESC is, as a minimum, comprised of Operations, Maintenance and Engineering. PIFs received since the previous meeting are routed through the ESC. The ESC reviews PIFs for:

- Operability.
- Reportability (Licensee Event Report (LER)),
- Nuclear Operations Notification (NON) applicability (ComEd's internal notification program),
- 10 CFR Part 21 applicability,
- Operating Experience (OPEX) applicability,
- Potential Maintenance Rule Functional Failure identification,
- Need for Resolution prior to Unit start-up,
- Non-conformance determination, and
- Maintenance Rework determination.

PIFs are designated by the ESC for levels of investigation (i.e., levels 1 through 4, Level 1 being the most significant). Level 1, 2 and 3 PIFs are investigated for root cause using guidance prescribed in a station procedure. Level 4 are the least significant, and require a proximate cause determination.

PIFs open while a unit is shutdown are reviewed to determine if the PIF needs to be resolved prior to allowing the unit to start-up.

4.2.3 Status Tracking And Closure

The PIF Coordinator tracks the status of PIFs in the PIF database on the station's Local Area Network. The status of overdue PIFs are reviewed by upper station management at the Plan of the Day meeting.

Level 1, 2 and 3 PIFs receive a formal root cause investigation. If the procedural requirements have not been met, the PIF and the investigation are sent back to the investigator with the deficiencies identified. These deficiencies are corrected or long term corrective actions identified before the PIF is closed. All open corrective actions for Level 1, 2 and 3 PIFs, and all LERs are tracked in the Nuclear Tracking System (NTS) if a PIF is closed before all longer term corrective actions are complete. All Level 1 and 2 PIF investigations and all LER investigations are also submitted to the Corporate Off-Site Safety Review for independent evaluation.

4.3 Other Processes That Identify Problems

4.3.1 Action Request/Work Request

Action Requests (ARs) and Work Requests (WRs) may be used by any station employee or contractor at the station to identify hardware problems and are the primary vehicles used to effect repairs and other work on plant equipment. Anyone may initiate an AR (or a PIF) on deficient equipment. The procedure directs the initiator to immediately notify the Shift Engineer if the problem could affect equipment operability. The Shift Engineer (or other licensed designee on shift) then screens the AR for operability to: (1) initiate Technical Specification required actions, initiate a PIF, and/or determine if the deficiency is reportable; then the Shift Engineer or designee, (2) determines if the deficiency requires either immediate action or action prior to the next meeting of the Screening Committee; and (3) approves the AR and forwards it to the Screening Committee, a multi-disciplined group.

During each shift, ARs are reviewed by the Shift Engineer or designated licensed SRO for impact on operability or Technical Specifications. Following the on-shift review, the AR is sent to a Screening Committee which includes individuals with knowledge of the plant licensing and design bases. The Screening Committee's review, described in detail in Action (a), provides an additional level of confidence to the screening process. The AR is then assigned to the appropriate work group and the AR is submitted to Work Control. For design changes, an Engineering Request (ER) is generated and assigned to Engineering for processing under the controls of the design change process.

4.3.2 Engineering Request

ERs are used as a method of requesting Engineering assistance in answering detailed technical questions. In some cases, engineering products are required before corrective action work can proceed. Examples include:

- Design information is needed for a work package,
- A problem in the plant requires a design change, modifying a system,
- A problem in the plant requires a Temporary Alteration,
- An exact replacement component (e.g., valve, gauge, motor) cannot be obtained and an equivalent or substitute must be used,
- Liquid sealant is required to reduce or eliminate a leak,
- A breaker arcing contact is chipped and requires a breaker functionality analysis, and
- Technical evaluation of installed lead shielding.

Multiple reviews and approvals from the System, and/or Design, and/or Site Support Engineering groups are required to effect an ER approval. The ER process assures that design bases issues are properly identified, documented, and prioritized.

4.3.3 Document Change Requests

Discrepancies between plant documentation and the as-built conditions of the plant can be identified through the As-built Document Change Request (DCR) process as described in Action (a). An "As-Built" DCR is the mechanism for administratively making a document change based on an existing condition; no field work is performed. As-Built DCRs are reviewed via a 10 CFR 50.59 screening to ensure that an Unreviewed Safety Question does not exist. The process also employs a check list for reviewing possible changes to the Updated Final Safety Analysis Review, Technical Specifications, Design Bases Documents, and other design bases information.

4.3.4 Operating Experience Reviews

Station personnel learn of potential problems at Quad Cities Station from OPEX at other stations. Industry OPEX information received from the industry sources, NRC, and suppliers such as General Electric, is processed in accordance with the Station's OPEX Program. The OPEX program is the primary means used at the station to review industry information for applicability and determine necessary follow-up actions. NONs from the other ComEd stations are reviewed within the OPEX program for applicability to Quad Cities.

A PIF is required by procedure to be generated for an OPEX item that requires immediate action. The PIF process described earlier ensures that action is taken to address the issue involved. Station management meets weekly to discuss the status of commitments and to reinforce expectations that these items be closed on time. Daily indicators are also included and discussed in the "Plan of the Day" on commitments and Level 1, 2 or 3 PIFs. Commitments and open corrective actions are tracked to completion in NTS.

OPEX material is processed using station procedures. The station electronically accesses the industry sources, NRC, and General Electric databases, downloads, and distributes new information.

OPEX material is received and screened for applicability. If applicable, it is then sent to the appropriate departments for review/response. Information determined to have vendor manual impact is forwarded to the Vendor Equipment Technical Information Program coordinator. Information not requiring a response is routed to the appropriate departments for information. The major departments in the station (Operations, Maintenance, Engineering, and Training) have assigned an individual to receive the information and distribute it within their departments. In addition, the station has created an OPEX database which is accessible to station personnel and also places the industry reference documents on the station electronic mail bulletin boards for review by personnel.

4.3.5 Operator Work-Arounds

An "Operator Work-Around" is a material or document deficiency which requires that an operator take compensatory (non-standard) action to comply with procedures, design requirements or Technical Specifications. All station personnel are responsible for identifying equipment deficiencies and for reporting these items to the appropriate Unit Supervisor (US). The US maintains an official list of Work-Arounds in the control room for the respective unit and has the authority to add newly identified items.

The Operator Work-Around Team reviews the new items on the Control Room list, prioritizes resolution in accordance with station policy, and adds the appropriate items to the data base for tracking to resolution. Completed Operator Work-Arounds are validated by the US and the Operator Work-Around Team prior to removal from the list.

The Lead Unit Planner is responsible for utilizing the Operator Work-Around list as a primary input for scheduling work as necessary to resolve the identified issues. Operator Work Arounds are tracked in the Electronic Work Control System.

4.3.6 Nuclear Operations Notifications And Technical Alert

A NON notifies other ComEd Nuclear sites of a problem or event that has occurred so that the other sites can review it for applicability. NONs summarize the nature, impact, and significance of the event and are generally published before the event investigation is completed. They are posted on a ComEd electronic mail bulletin board. A PIF is initiated for each NON published by

other sites. The ESC screens Quad Cities PIFs for potential NON candidates as part of the daily PIF review. Site Quality Verification (SQV) determines if a NON is warranted. If so, it will be prepared and/or reviewed by cognizant station personnel and posted to the electronic mail bulletin board.

The Engineering Technical Alert Program is a ComEd form of engineering feedback, identifying "lessons learned at one station" and making them available to the other stations. The Technical Alert content is sufficiently detailed information on emerging engineering issues and includes, in addition to lessons learned, solutions identified and actions needed to address the issue at other locations. Engineering Technical Alerts are treated the same as NONs. A PIF is initiated for each Engineering Technical Alert received by the station.

4.3.7 10 CFR 21 Evaluations

Purpose

The purpose of the Technical Issues Review Process is to review technical issues, particularly those having generic implications, with respect to Part 21 of Title 10 of the Code of Federal Regulations (10 CFR 21), "Reporting of Defects and Noncompliances." The process is implemented through a Technical Issues Review Committee or representative, who coordinates the actions to investigate and resolve technical issues, and provides guidance and/or solutions to engineering and licensing issues, particularly those common to more than one site.

Process Description

Weekly meetings of the Technical Issues Review Committee are held, with the stations participating via teleconference. Technical issues are identified for review from stations events, vendor notifications, design concerns, Nuclear Network entries and other industry and regulatory sources. Additionally, the Committee maintains and distributes minutes of the Technical Issues Meeting, maintains the Technical Issues (including 10 CFR 21) database, tracks and maintains files of 10 CFR 21 reports and Technical Issues Evaluations generated by the corporate office, and facilitates writing and transmittal of 10 CFR 21 reports to the NRC.

Corporate coordination of the Part 21/Technical Issues process was formally established with the creation of the Part 21/Technical Issues Committee in November 1991. The Part 21/Technical Issues Committee has responsibility for the management of the overall 10 CFR 21 process, and includes ensuring effective treatment of the issues.

Checks And Balances

One of the important checks in the 10 CFR part 21 evaluation process is the peer participation of the stations and the corporate office. This ensures a wide range of experienced engineers are involved in this process.

In addition, operability assessments involve independent people and management personnel being involved in the process, and when a reportable issue is identified, the Station Management and Vice President-Engineering are involved in the review.

4.3.8 Internal Audits/Surveillances And Special Assessments

Problems are also identified by formal audits and evaluations, necessitating corrective actions where required. Examples of established audit processes are discussed in the following subsections.

4.3.8.1 Site Quality Verification Audits And Reviews

SQV conducts audits, surveillances, special investigations and assessments, and field monitoring of day to day activities. SQV maintains a group of trained auditors and investigators who provide valuable, critical assessments to the Station Manager and Site Vice President. Significant issues that are identified by the SQV organization are promptly brought to the attention of station management.

SQV issues three level of findings to identify deficiencies (Level I, Level II, Level III). Level I and Level II findings are issued as Corrective Action Records (CARs) which require formal response and action. For CARs SQV requires a determination of what caused the problem, and an explanation of why the line organization did not self-identify the problem. SQV also requires that the station identify actions that will prevent recurrence. SQV issues PIFs for Level III findings which are those of low safety significance.

The SQV department publishes a monthly report which assesses the performance of the SALP functional areas of the station. PIF causal factor data are also trended in the report.

SQV conducts audits as required by 10 CFR 50 Appendix B. Since 1990, the SQV organization has conducted performance-based and compliance-based audits. Prior to that, audits were predominately compliance-based. This process change was implemented to enhance and strengthen the compliance-based audit approach used prior to 1990. Audits are conducted in accordance with Corporate Nuclear Oversight procedures and SQV on-site instructions. The procedures and instructions establish the methodology, requirements for planning, staffing, preparing, performing, and reporting SQV audits.

4.3.8.2 Independent Safety Engineering Group

As with SQV audits, the Independent Safety Engineering Group (ISEG) performs reviews in accordance with Nuclear Oversight procedures and SQV instructions. ISEG reports to the SQV manager. ISEG's function is to examine unit operating characteristics, NRC issuances, industry advisories, LERs, and other sources of plant design and OPEX information, which may indicate areas for improving plant safety. ISEG personnel also conduct surveillances of plant operations to provide independent verification that activities are performed correctly and human errors are reduced as much as practical and make recommendations for improving plant safety. ISEG also

assesses engineering/design, maintenance, and plant support activities. Deficiencies identified during ISEG reviews are documented on CARs or PIFs, using the same criteria as the Audit Group.

4.3.8.3 Field Monitoring Program

SQV also performs field monitoring of plant activities and processes. Observations, both positive and negative, are documented on a Field Monitoring Report (FMR). Field monitoring activities are used to provide positive feedback to the station and to highlight adverse or declining performance areas. Field monitoring activities are scheduled to cover aspects of plant design and operation, with increased focus on the poor or declining performance areas. Observations are not limited to those that are scheduled. The intent is that the schedule be flexible and changed as necessary. FMRs consist of activities such as tours of the control room and witnessing field implementation of operating, test, or maintenance procedures or sequences. Deficiencies are documented on the FMR. Significant deficiencies - and minor deficiencies that cannot be quickly corrected - are also documented on a CAR or a PIF.

4.3.8.4 Trending

The Integrated Analysis Administrator in the SQV organization performs an independent analysis of station performance information from an oversight perspective in accordance with established guidance. Trends (both positive and negative) are reported to station and Nuclear Oversight Department management via a monthly report. The Quality Control (QC) group also trends weaknesses identified during WR reviews and field inspections and provides written reports to management.

4.3.8.5 Quality Control Program

The QC group reports to the SQV Director, but is controlled by station procedures. QC performs inspections, establishes QC hold points for witnessing work, and reviews completed work packages and Nondestructive Testing data sheets. Discrepant items, such as components, parts, spares, consumables, portable test equipment, and inspection and test procedures that are identified in the field, are documented on PIFs. QC tracks these discrepancies until they are resolved.

4.3.9 Quality First Program

The Quality First Program is a program through which Nuclear Operations Division employees and contractors are able to address concerns, directly and indirectly related to quality and safety. Employees and contractors are encouraged and expected to voluntarily raise any concerns they may have in the performance of their jobs.

The Quality First Program is managed independent of the site. Individuals raising concerns may request confidentiality and every effort will be made to assure the confidential status is

maintained. Feedback will be provided to the individual raising the concern. If the individual does not agree with the resolution, the issue may be escalated to a higher level.

Supervisors are crucial to the concern-reporting process since they are in positions which receive the maximum input from the workforce regarding potential deficiencies and discrepancies. ComEd management expects supervisors and the line management team to create an atmosphere where employees can freely voice concerns. Supervisors are also expected to be sensitive to potential concerns, clarify communications to assure mutual understanding, and act upon potential concerns in a timely manner.

4.4 Root Cause Analysis

Root Cause Analyses (RCAs) are performed to understand how and why a significant incident or degradation occurred and where similar issues may apply, and to provide insight on how to prevent recurrence. Formal RCAs are required for Level 1, 2, and 3 PIFs as discussed in Section 4.2 above. Formal RCAs are also required for Level I and Level II SQV findings. A proximate cause determination is required for Level 4 PIFs, which may include Level III SQV findings.

RCAs are controlled by site procedures. These procedures provide direction with respect to data collection, conclusion determination, review of previous events and development of corrective actions. These procedures also provide direction on report content and review/approval requirements. Evaluation techniques such as barrier analysis, change analysis and event and causal factor analysis are some of the tools used when performing RCA. Formal training is conducted for Root Cause investigators on the procedures and tools for conducting RCA. Effectiveness of the Station RCA is described in Action (e).

4.5 Processes Used To Identify And Implement Corrective Action

4.5.1 Corrective Action Records

CARs are issued by SQV or by Corporate Nuclear Oversight for deficiencies identified. A CAR is a stand-alone document in which concerns identified during audits, surveillances and FMRs are documented. A CAR is issued, followed up and closed independently of the initiating audit, surveillance or FMR. SQV performs follow-ups during the corrective action development and implementation period. Only SQV can close CARs. At least one follow-up to verify the effectiveness of corrective actions is performed after the finding is closed. Effectiveness of the CAR process is evaluated in Action (e).

Three levels of findings are defined to denote the significance of findings:

- Level I A condition which does affect the safety and/or reliability of the unit(s) or a significant breakdown of the Quality Assurance Program,

- Level II A condition which may affect the safety and/or reliability of the unit(s) or a major noncompliance to the accepted Quality Assurance Program, and

- Level III A condition that probably does not affect the safety and/or reliability of the unit(s), but is a substantive deviation from implementing procedures.

Unresolved items are tracked within SQV for further follow-up and resolution.

At Quad Cities, Level III findings are currently issued as PIFs. SQV still performs a post closure follow-up to determine the effectiveness of the corrective actions. SQV can also escalate issues to different levels of management attention based on responsiveness and effectiveness.

SQV procedures require that a formal RCA be performed for Level I and Level II CARs as part of the deficient auditee's response. Corrective actions must be reviewed and approved by the Station Manager and SQV.

4.5.2 Nuclear Tracking System

Commitments are tracked in NTS which allows for a dependable tracking, searching, and follow-up system. Examples of other items tracked in NTS are Notices of Violation and LER investigations. Implementation of identified corrective actions are implemented via the processes described in Action (a).

4.6 Station Processes Used to Prevent Recurrence of Problems

4.6.1 Root Cause Determinations

As previously discussed, station procedures require that RCAs be performed for significant conditions identified by the station. Corrective actions are developed and implemented to prevent recurrence by eliminating the fundamental cause(s).

4.6.2 Effectiveness Reviews

SQV performs a follow-up review of closed findings in accordance with Nuclear Oversight procedures and SQV instructions to determine the effectiveness of the corrective actions. If SQV finds that a problem has recurred, a new CAR is issued and is escalated to management attention.

4.7 Station Processes For Reporting Problems To The Nuclear Regulatory Commission

For conditions identified as reportable, actual notification requirements are delineated in a station procedure. Guidance on reportability is provided to the Shift Engineers by the ComEd reportability manual. The manual is an event driven system of decision trees to aid in reportability determinations for 10 CFR 50.72; 50.73; 50.9; 73.71; 73.2; 40.64; 20.202; 26.73; 50.54; 50.36; and others. Typically routine reporting requirements are incorporated into appropriate programs or procedures such as annual 50.59 reports, effluent monitoring reports and ISI or IST reports.

4.8 Compensatory Measures

The PIF and AR processes described previously are used to identify equipment deficiencies. Both the PIF and AR process include review by an SRO licensed operator who will identify Technical Specification related or other regulatory related issues and ensure the proper response is taken. The response may include immediate actions, notifications, and compensatory measures as appropriate. Several programs are used to manage compensatory measures for equipment deficiencies. These include the following:

- Equipment Out of Service program.
- Operator Work-Around process.
- Operability Assessment program.
- Safety Evaluation program
- Caution Cards program
- Temporary Alteration Process

4.9 Conclusion

Quad Cities has two processes by which any station employee or contractor can identify problems or concerns. These processes are used to determine the extent of problems, identify corrective actions, identify trends, and actions to prevent recurrence. SQV and corporate oversight also conduct audits, surveillances and assessments to identify problems. The station must then identify corrective actions, including actions to prevent recurrence.

Corrective actions are implemented via the processes described in Action (a) and Action (b). The effectiveness of the corrective action processes are discussed in Action (e).

5.0 ACTION (e) - OVERALL EFFECTIVENESS OF CURRENT PROCESSES AND PROGRAMS IN CONCLUDING THAT THE CONFIGURATION OF THE PLANT IS CONSISTENT WITH THE DESIGN BASES

5.1 Introduction

As detailed in Action (a), the station has processes and programs that are designed and implemented to provide reasonable assurance of consistency between the plant's configuration and design bases. Also, as described in Actions (b) and (c), the station has reasonable assurance that its operating, maintenance and testing procedures accurately reflect the plant's design bases and that the plant's Structures, Systems and Components (SSCs) are consistent with their design bases. Finally, the station has implemented a corrective action program that identifies deficiencies, determines root causes and the extent of occurrence, implements corrective actions and evaluates the effectiveness of those corrective actions. Overall, this information provides reasonable assurance that the station's processes and programs are in place and effectively maintain the configuration of the plant consistent with its design bases.

This conclusion is corroborated by considering a cross-section of that information which shows that there is an effective configuration control program established by:

- Quality, adequacy and availability of the plant's initial Design Basis Document (DBD);
- Configuration control since licensing to assure consistency with the design bases is maintained as demonstrated by plant response to adverse conditions;
- Improvements in the availability and adequacy of documentation and to programs and processes to control changes;
- Verification of consistency between plant configuration and design bases as demonstrated by surveillance testing, plant behavior, self-assessments, Nuclear Regulatory Commission (NRC) inspections and third-party reviews;
- A corrective action program that addresses deficiencies as they are identified; and
- Continuation of activities that assure ongoing consistency between the plant and its design bases.

Reinforcement of these processes is provided by management's ongoing communication of its expectations, continuing conduct of training for its workers, sensitizing of the work force to the importance of knowing and understanding the plant's design bases, and holding individuals accountable for preserving consistency between the plant and its design bases.

5.2 Design Bases Documentation At The Time Of Licensing

When Quad Cities Station was licensed for commercial operation, the NRC concurred with ComEd's conclusion that there was reasonable assurance that the plant's configuration was in agreement with its design bases. The initial documented design bases were established consistent with the industry practices, standards and regulatory requirements being applied to nuclear power plants at that time.

Quad Cities Station was constructed before the NRC codified the General Design Criteria (GDC). Compliance with the intent of the Atomic Energy Commission's (AEC) proposed GDC as published in July 1967, is presented in Section 3.1 of the Updated Final Safety Analysis Report (UFSAR). Subsequent to the filing of the Final Safety Analysis Report, the AEC requested ComEd to demonstrate that the station's design complied with each of the final GDC published as Appendix A to 10 CFR 50 (July 1971). The response was supplied as an informative comparison and is presented in Chapter 3 of the UFSAR. Additionally, a description of the station's requirements for SSCs was included.

Prior to start-up, plant testing, maintenance, and operations procedures were prepared by the Nuclear Steam Supply System (NSSS) vendor, Architect Engineer (A/E), and ComEd. Experience at other operating nuclear plants, vendor equipment requirements, and design bases were considered in the preparation of these procedures. The plans for the Conduct of Plant Operations were developed by ComEd, reviewed and accepted by the NRC, when the plant was licensed to operate.

Original DBD was retained by the NSSS supplier, A/E and vendors. At the time Quad Cities was licensed, access to this documentation and associated technical support for modifications and operability evaluations was provided by the organizations which had custody of the documents. Subsequent evaluations of modifications showed that implementation at that time was sufficient to support plant operation and preparation of design changes. When it was not possible to retrieve a complete DBD for an operability evaluation or design change, DBDs were either prepared or reconstituted based on available input information. Overall, the available design bases documentation has proven to be sufficient to support safe plant operation.

5.3 Configuration Control To Assure Consistency With The Design Bases

Since initial licensing, configuration controls have been in place to ensure consistency with the design bases. The configuration control processes include routine and special cross-functional reviews that act as checks and balances to assure the accuracy of design bases information and provide valuable information to further strengthen station processes. When problems are identified, actions are taken to resolve the discrepancies through application of the corrective action program described in Action (d).

Configuration control processes have been described in Action (a). The rationale for their effectiveness has been explained in Actions (b) and (c). The effectiveness of these programs has improved over time as enhancements were identified and implemented.

Evidence of program effectiveness is supported by the following:

- Plant performance as expected during normal operation, start-up, refueling, plant trips, and transients provides assurance that Station SSCs have been maintained consistent with their design bases. Additionally, surveillance testing, routine plant walkdowns by operations and engineering personnel, formal performance monitoring programs, and results of post maintenance and modification tests provide assurance that the plant is configured and performs in accordance with design bases requirements. For example, during a severe storm Secondary Containment functioned as designed by relieving differential pressure on the Refueling Floor.

- A review of post scram information for reactor scrams during the period of 1988 to present was conducted to demonstrate that systems and components performed in accordance with design requirements. Systems were also evaluated for expected response to transients and abnormal events and corrective actions were taken for discrepancies that were found.

- To demonstrate conformance with System Design Bases Criteria, Quad Cities implemented system improvements and conducted an integrated system testing program for the Control Rod Drive, Feedwater, Recirculation, and the Electro-Hydraulic Control Systems. The test procedures were written using original start-up testing data and results demonstrated conformance with the associated System Design Bases Criteria.

- Furthermore, a comprehensive program of plant surveillance testing has been developed and is capable of detecting inconsistencies for equipment important to safety. The program consists of:

    - Performance tests of individual pieces of equipment;

    - Integrated tests of certain systems;

    - Periodic tests of the activation circuitry; and

    - Performance testing of mechanical components to assure performance consistent with design.

Notwithstanding the positive results cited above, a number of instances have been identified where the configuration management programs were not completely successful. Included in this population of problems were the poor assessment of the severe storm structural damage impact on plant design, the discovery of an inadequate design on the Scram Discharge Volume, in that it was not single failure proof, inadequate controls of modifications in preserving design bases of structural steel and weaknesses in the Post Modification Testing program. In these cases and others, when the problems were identified they were documented and evaluated. An appropriate course of action was established and actions were taken to address the causes and generic implications. These actions generally resulted in performance and program improvements.

5.4 Improvements To Documentation Availability And Adequacy And To Configuration Control Programs And Processes

A number of design bases improvement initiatives and upgrade programs have been undertaken for the purposes of examining specific aspects of the plant's conformance with its design bases, and enhancing the ability to maintain consistency on an ongoing basis. These initiatives have included the following activities:

- Provide original design information to improve the on-site engineers ability to access that data. Access is provided electronically to docketed information including the UFSAR. The electronic information is word searchable for ease of retrievability.

- Revising, reconstituting or establishing calculations when necessary to support the design bases,

- Verifying that plant configuration and performance is consistent with design information, and

- Establishing monitoring programs to confirm conformance with specific aspects of design on an ongoing basis.

For example, the station began conducting reviews of the UFSAR. The reviews were done using General Guidance of the ComEd UFSAR Conformance Review Docume[illegible] An Engineering review was conducted on the Safe Shutdown Make-up Pump (SSMP) system and found no potential operability issues or concerns. However, discrepancies discovered included procedure changes, inaccurate data, and unclear terminology contained in the UFSAR.

Each of these improvement initiatives were discussed in detail in Action (c). Collectively, these comprehensive reviews and enhancements have improved the station's control of design and configuration. These improvements have been integrated into normal operation.

5.5 Verification Of Design Bases Conformance By Audits, Assessments, And Inspections

Since initial licensing to operate, the station, on many occasions, has been asked to verify the consistency of the plant's configuration with its design bases. Operations and other station personnel walkdown areas of the plant. Operations, System Engineers, and other station personnel conduct a comprehensive surveillance testing program to meet Technical Specifications, and the requirements for Inservice Inspections and Inservice Testing. In addition, the station is subjected to self-assessments, assessments by Site Quality Verification (SQV), NRC inspections, and third party reviews that have addressed the consistency between the plant's configuration and its design bases. SQV's most recent audits, surveillances and responses to Corrective Action Records (CARs), concluded that the plant is configured and operated consistent with its design bases.

The recent NRC, Engineering and Technical Support Inspection, (September 1996) and the Systematic Assessment of License Performance (SALP) Report, (December 1996), identified salient issues for improvement such as Root Cause Analysis (RCA), resolution of materiel condition issues and corrective action program implementation. The station is well aware of these issues. SQV audits and other internal evaluations substantially agree with the NRC assessment. The NRC is aware that the station has identified areas for improvement and these issues are being addressed in the stations' normal corrective action processes and Operational Plan.

5.6 Corrective Action Process

The corrective action process is comprised of four elements. Problem identification, RCA, corrective action, and monitoring effectiveness of corrective actions. Collectively this process preserves the consistency of the design bases.

The primary means of problem identification is the detection of potential conditions adverse to quality by a worker or supervisor and initiation of a Problem Identification Form (PIF).

The investigation element is the conduct of a RCA to properly identify causes and recommend solutions.

The remaining elements are the implementation of corrective actions and the follow-up monitoring to assess results of the actions taken.

5.6.1 Problem Identification Effectiveness

The station is effective at identifying problems. This is demonstrated by the generation of over 10,000 PIFs in the last three years. SQV started identifying the level in the organization at which PIFs are generated in April 1996. The data indicates a majority were initiated at the first line supervisor or worker level. Approximately one half of the 10 CFR 50.72 reports in 1996 were related to discovery of design bases issues during engineering reviews. Examples of the issues include, discovery that the structural steel platforms over the drywell equipment hatch did not conform to design drawings; discovery that the configuration of an installed baseplate was not capable of resisting applied design loading and a postulated fire could damage motor operated valves that are required for a safe shutdown.

Since 1990 there have been 51 audits relating to aspects of the design process. These audits resulted in the issuance of 129 Level I or Level II CARs. Repeat findings were identified in 29 of these CARs. Based on this information Quad Cities Station has concluded that deviations in the design process are being identified and that PIF and Audit processes are effective tools for identification of design issues.

5.6.2 Problem Investigation Effectiveness

The RCA program at Quad Cities Station has historically not been effective. The contributing factors to this problem include:

- The available tools were not being used,
- Trained investigators were not being utilized,
- Oversite of process was inconsistent, and
- There was a lack of ownership for the process.

To address these problems Quad Cities has:

- Assigned ownership and oversite of the RCA process to SQV,
- Assigned team leaders that are trained in RCA to lead investigations. These team leaders have overall responsibility for the RCA, and
- ComEd has established a Corrective Actions Task Force with members from each site to improve the existing process.

Quad Cities Operations Department has demonstrated effective implementation of RCA. Operations has a group of well trained and experienced individuals that perform RCA as their primary job responsibility. As an indicator of program effectiveness, in the Operations Department, Level 3 PIF events have dropped from 38 in 1995 to 15 in 1996. Radiation Protection also has shown improvement in correcting process deficiencies and Engineering has been able to correct some long-standing equipment problems. The station recognized past weaknesses in the RCA process. This was also identified in the Station's recent SALP report.

The station has started to see positive results in high quality RCAs as evidenced by teams that have conducted investigations on the Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) systems.

These efforts have resulted in an increase in the availability of HPCI and RCIC systems.

Effectiveness of corrective actions for systems and equipment are assessed via the Maintenance Rule program. The performance of SSCs important to safety are compared to pre-established performance and reliability criteria. System engineers review system performance and equipment failures quarterly. Systems that do not meet the pre-established performance criteria are classified as a(1) systems. Action plans are required for a(1) systems that include cause determinations and corrective actions for equipment failures. The quarterly system reviews are reviewed and approved by engineering management. Engineering has also completed a separate assessment of the actions plans for the a(1) systems in response to the 50.54(f) request to assure the corrective

actions completed to date provide reasonable assurance the systems will perform their intended functions.

5.6.3 Corrective Action Implementation

In the past, corrective action implementation had been a weakness. Quad Cities recognized in 1996 that many issues had been identified and placed in informal tracking systems or on uncontrolled lists. This impacted timeliness in resolving issues at Quad Cities. Issues with immediate operability were addressed in a timely manner. In some cases, however, issues with no immediate operability impact were not given sufficient priority, aggressively pursued or effectively pursued to completion.

Recognizing that some of the long-standing issues may have potential significance, Quad Cities made a thorough inventory of these types of issues prior to restarting either unit during a dual unit outage in 1996. The inventory included reviews of items such as open modifications, open DBD items, UFSAR open issues and open SQV CARs as sources of potentially long standing design bases or operability issues. Open items that were not being tracked were then documented in NTS or the PIF databases. Identified UFSAR conformance issues were resolved for both units prior to start-up. The remaining identified issues were prioritized, and are now tracked within the station's formal corrective action processes.

The timeliness of implementation of corrective actions has been effective as demonstrated by closure of approximately 6400 PIFs and Nuclear Tracking System items in 1996. Additionally, at the end of 1996 there remained just one overdue significant CAR in which corrective action had not been implemented.

These results are an indication of reasonable assurance that corrective actions are being implemented.

5.6.4 Effectiveness of Corrective Actions

SQV has performed audits twice per year specifically to evaluate the effectiveness of corrective actions. SQV also performs follow-up reviews on individual CARs. When SQV finds a repeat finding the issue is escalated to upper management attention. Repeat findings indicate corrective actions are not effective. In October 1996, SQV began requiring a formal RCA be performed for each CAR to reduce the amount of repeat findings.

The Operating Department has a self assessment program in place and has demonstrated improved performance by reducing the recurrence of significant human performance problems. The station is in the process of developing more detailed self assessment programs for other departments.

While the station's effectiveness of corrective action implementation has been weak and at times has contributed to recurring equipment and system failures, the station has reasonable assurance

that systems perform their intended function based on operational experience and other rationale discussed in Action (c).

5.6.5 Overall Effectiveness

A number of instances in RCA and corrective action effectiveness have been identified where the processes were not completely successful. In these cases appropriate actions are being taken to address them.

Based on the overall review of each element in the corrective action process, Quad Cities Station has reasonable assurance that the processes are adequate in identifying, correcting, and preventing the recurrence of significant design related problems.

5.7 Continuation Of Design Conformance Activities

While the station processes and procedures already adequately assure consistency between the configuration of the plant and its design bases, the station is aggressively pursuing further improvement. Management's ongoing communication of expectations and the ongoing implementation of worker training provides assurance that the implementation of these programs and processes will continue.

Similarly, continued application of the station's corrective action program provides assurance that these programs and processes will also continue to be enhanced. Feedback on the effectiveness of these actions will continue to be provided by self-assessments, Quality Assurance assessments, and third party reviews of the station's activities that are designed to maintain the plant's configuration consistent with the design bases. These activities are key in identifying weaknesses and providing opportunities for improvement.

5.8 Conclusion

The station has processes and programs that are designed and implemented to provide reasonable assurance of consistency between the plant's configuration and design bases. Also the station has reasonable assurance that its operating, maintenance and testing procedures accurately reflect the plant's design bases and that the plant's SSCs are consistent with their design bases. Finally the station has implemented a corrective action program that identifies deficiencies, evaluates root causes and the extent of occurrence, implements corrective actions and determines the effectiveness of those corrective actions. Overall, this information provides reasonable assurance that the station's processes and programs are in place and effectively maintain the configuration of the plant consistent with its design bases.

APPENDIX I COMED CORPORATE SUPPORT TO STATION DESIGN AND CONFIGURATION CONTROL PROGRAMS

Corporate Organizations contribute to the effectiveness of the stations' design and configuration program by providing oversight, establishing methods, procedures and standards, and facilitating information sharing. Also, Corporate Engineering has responsibility for fuel design as discussed in detail in Appendix III.

1.0 Corporate Oversight Contributes To Station Design Bases Management Effectiveness

Oversight is provided by the Chief Engineers. The Chief Engineers meet periodically at each site with the Site Engineering Manager and his staff to review detailed design packages, operability evaluations, root cause evaluations, metrics, and current issues. The objective of the reviews is to assure that the design is adequate and to promote the concepts of self-assessment in the engineering organization.

The Off-Site Review and Investigative Function resides at the Corporate Office of the Nuclear Division in the Nuclear Oversight Department's Safety Review Group. Stations submit documents to Off-Site Review in accordance with the Quality Assurance Topical Report. This includes operability assessments, Safety Evaluations, and Licensing Event Reports and a select sample of calculations. The Off-Site Review for each document requires two participants and an approval signature. Results are transmitted to the Sites. Comments, recommendations or actions are assigned as appropriate. The effectiveness of the Off-Site Review was assessed by four Site Quality Verification audits in 1996 and one evaluation conducted by the Nuclear Regulatory Commission (NRC) Region III inspectors. In all cases, Off-Site Review personnel were determined to be properly qualified and records were maintained for these individuals. Additionally, the audit teams reviewed specific Off-Site Reviews with no findings or comments. The NRC inspection had no findings. The Safety Review Group conducts quarterly self-assessments of its activities. These assessments have helped Off-Site Review provide a more in-depth questioning attitude toward Site documents which, in turn, has increased the expectation for greater document quality from the Sites. Off-Site Review performs a trend analysis on each Site's submittal and Off-Site Review's responses. This information is fed back to the Site management team.

The Nuclear Oversight Manager administers the Quality Assurance (QA) Program and Safety Review Group. This position reports directly to the Chief Nuclear Officer. The Nuclear Oversight Manager develops, maintains, and interprets the Company's QA and nuclear safety policies, procedures, and implementing directives and is responsible for the vendor audit program, for ensuring that audits of Corporate support functions are conducted, and for conducting a periodic review of the site audit program to assure that oversight of QA Program implementation is effective.

Corporate Engineering Assurance, a part of the Configuration Management organization, provides technical assurance that contracted engineering work is in conformance with ComEd's Nuclear Engineering Procedures and the QA Manual. This is accomplished through periodic audits of the A/Es in a teaming arrangement with the QA Department.

Finally, the Corporate Engineering Assurance Group coordinates the generation and reporting of performance metrics for the Engineering Department.

2.0 Corporate Engineering Methods And Standards Assure Quality Of Station Processes And Procedures

The role Engineering has had in support of station activities has transitioned over time as stations moved from construction to operation. Self assessments conducted in the early 1990s pointed to a need to further transition the role of Engineering to one with a more active focus directly at the station. A significant engineering transition began in 1994 to move ComEd into a Category 2 engineering organization (NUREG 1397) by January 1997, and Category 1 by year 2000. An Engineering Vice President position was established. ComEd established a vision that assigned to the engineering organization the primary responsibility to be accountable to prevent and solve problems. A Chief Engineering organization was established in the Corporate Office that was responsible for the establishment of standards, transfer of lessons learned from site to site, oversight of site engineering functions, and the education of the organization as the design authority. The on-site organization was fully integrated into the existing industry source ACAD 91-017 population to ensure that the engineers on-site have a common foundation in engineering fundamentals, plant systems, and site processes.

In establishing commonality among the sites in the area of tools and standards, the corporate office procured and implemented the Sargent & Lundy design standards. Common Nuclear Engineering Procedures were established and implemented (and are still in progress); computer codes likewise have been standardized. Corporate engineering responds to identified weaknesses. As a result of the NRC Independent Safety Inspection at Dresden in November 1996, which pointed out weaknesses in the oversight of the site engineering activities, on-site Engineering Assurance organizations directly reporting to the Site Engineering Manager are being established.

3.0 Corporate Engineering Facilitates Information Sharing Among Stations

Another key role of the corporate engineering is information sharing which helps prevent problems, assists in problem solving, increases knowledge of the design bases, facilitates common design modifications, and disperses results of assessment and oversight activities. The key information transfer vehicles that have been used are, a Tech Alert program, Chief Engineer oversight of station activities, the Engineering Managers Team meeting, and Engineering Peer Groups. Additionally, a daily engineering phone call, that station Engineering personnel are encouraged to participate in, is conducted to discuss emergent issues and items important to Engineering.

Tech Alerts

Tech Alerts are prepared and issued by Corporate Engineering to provide sufficiently detailed information on emerging engineering issues to share lessons-learned, solutions identified, and identify actions needed to address the issue at other locations.

Peer Groups

Peer Groups provide a mechanism to share lessons-learned, champion consistency on common issues, focus actions on key issues, prioritize activities, and elevate larger issues to the Engineering Management Team. Over 50 groups are active in the areas of management, components, generic programs, general design, and special projects. Examples of some of the contributions made by the multi-station peer groups that relate to design bases are:

The Mod Administrators Peer Group functions as an oversight committee for the issuance of common Engineering procedures for the six ComEd nuclear sites. Common processes for design changes, 10 CFR 50.59 Safety Evaluations, Temporary Alterations, etc. have been developed with valuable input based on experience gathered from a multi-site perspective.

The Electronic Drawing Coordinators Peer Group has contributed to the control and timely updating of station drawings. Most of the sites have adopted a methodology for being able to incorporate and issue revisions to drawings used in the Control Room prior to Operations Authorization of modified systems. This has enhanced the configuration control process by eliminating the need for marked up drawings in the Control Room and lowering the probability for error due to human factor considerations in reading hand marked drawings.

The Electronic Data Coordinators Peer Group has been instrumental in the consolidation and updating of equipment databases into the Electronic Work Control System. This has led to improvement programs to insure proper classification for safety related equipment.

APPENDIX II: DESIGN CONTROL AND CONFIGURATION CONTROL PROCESSES

Background

This appendix summarizes the major, common processes used at ComEd nuclear stations to control the plant's design bases and configuration, i.e., maintaining the physical plant consistent with the documented plant and with design bases. These processes are designed to ensure the design bases of the plant are maintained or modified as changes are made to the plant as a result of modifications, repairs, or equipment lineup changes. This appendix supports the description of configuration control and design control processes as required for action (a) of the 10 CFR 50.54(f) response. Those processes which are addressed through a corporate procedure Nuclear Station Work Procedures (NSWP) or Nuclear Engineering Procedure (NEP) are in place essentially in the same manner at all six nuclear stations.

Note:

The flowcharts included herein are simplified pictorial representations of the station procedures and are included to give the reader a general overview of the process. Specific information regarding the procedure should be obtained only from the controlled station procedure.

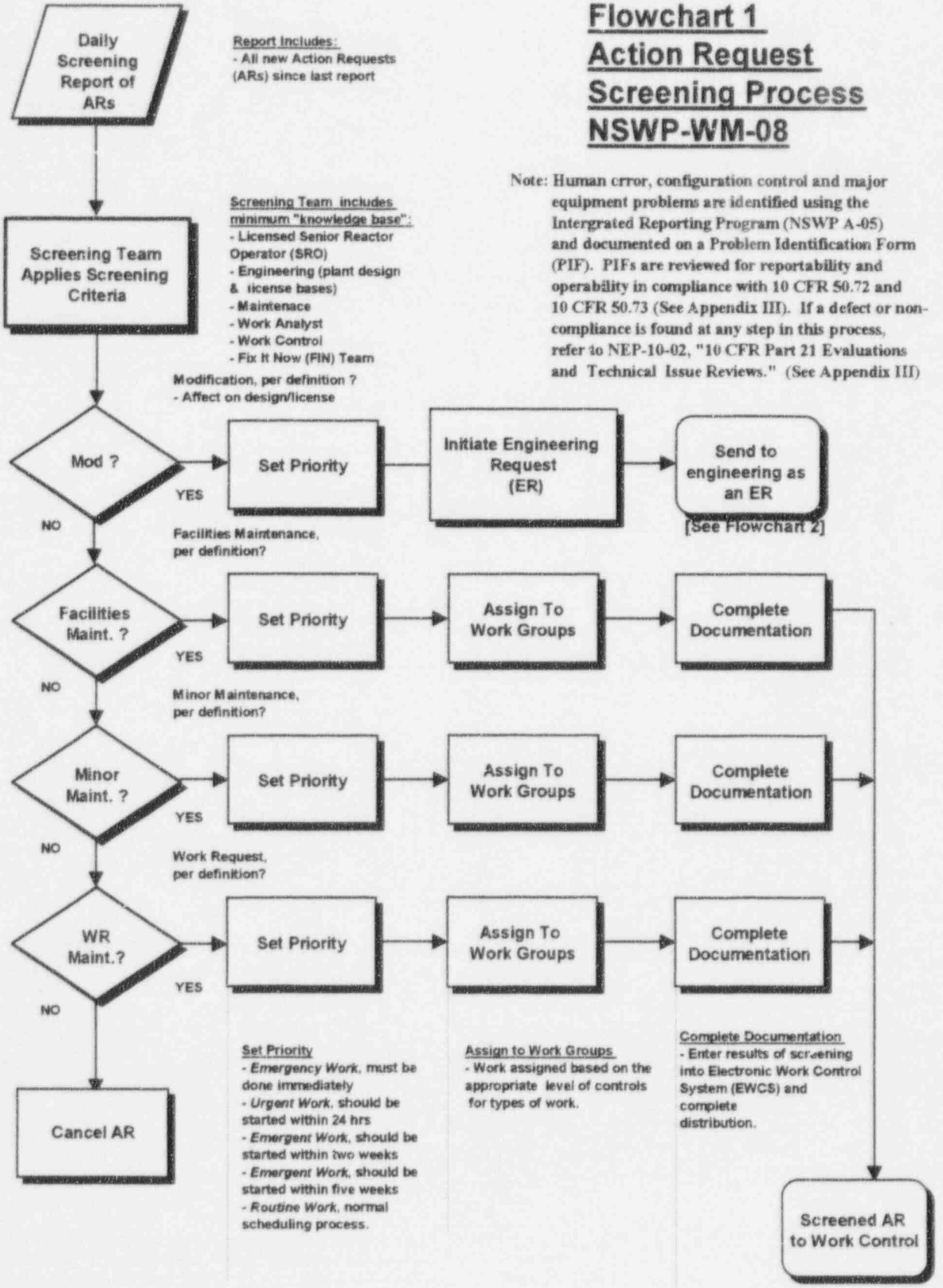
Matrix of Appendix II Processes

Page Number	Process Number	Process Description	Procedure Reference	Implements Regulatory Requirement	
				50.59	50.71(e)
1	1	Action Request Screening Process	NSWP-WM-08		
5	2	Roadmap to Design Control Process			
7	3	Design/Document Change Process Roadmap	NEP-04-(Series)		
9	4	Engineering Design Change Process	NEP-04-01/ NEP-04-02	X	X
12	5	Modification Work Control Process	NSWP-G-01 (Note 1)	X	X
14	6	Temporary Alterations	NEP-04-08	X	
16	7	Document Change Requests	NEP-08-03	X	X
18	8	Like-for-Like or Alternate Replacement Evaluation Process	NEP-11-(Series)	X	X
21	9	Setpoint Change Request	NEP-04-01	X	X
24	10	Design Basis Document Update Process	NEP-17-01		
26	11	Engineering Software Development and Revision Process	NEP-20-01		
28	12	Engineering Change Notices	NEP-08-01		
30	13	Safety Evaluation Process	Station Procedure	X	X
33	14	VETIP Processing	NEP-07-04		
34	15	Configuration Control Using EWCS	NEP-14-01		
38	16	DBD Development Process	NEP 17-01		
41	17	Calculation Process	NEP-12-02		
44	18	Operability Determination Process	Station Procedure		
47	19	UFSAR Update Process	Station Procedure	X	X
50	20	Out of Service/Return to Service Process	Station Procedure		

NOTES:

1. Applies to Field Change Request (FCR) when needed

Flowchart 1
Action Request Screening Process
NSWP-WM-08



Note: Human error, configuration control and major equipment problems are identified using the Intergrated Reporting Program (NSWP A-05) and documented on a Problem Identification Form (PIF). PIFs are reviewed for reportability and operability in compliance with 10 CFR 50.72 and 10 CFR 50.73 (See Appendix III). If a defect or non-compliance is found at any step in this process, refer to NEP-10-02, "10 CFR Part 21 Evaluations and Technical Issue Reviews." (See Appendix III)

Action Request Screening, Process 1

NSWP-WM-08

Purpose

Work that needs to be done at ComEd's nuclear stations, is initially identified and documented on an Action Request (AR) which is initiated using the Electronic Work Control System (EWCS) The AR process is intended to provide site personnel with a simple and readily accessible process to identify work that needs to be performed. This AR is "screened" to determine the safety classification of the involved equipment, the priority of the work, the work group to whom it will be assigned, and the "type" of work to be performed.

Process Description

The AR screening process begins with a review of a daily Screening Report that captures the newly generated ARs. This report summarizes the initial information provided by the initiator of the AR, identifies if the AR is related to a Problem Identification Form (PIF) and is used to determine the appropriate level of controls that are needed to implement the work. ARs can include repairs, maintenance activities, and plant modifications.

A "Screening Committee" determines the appropriate level of controls that need to be applied to the work. The committee brings a required "Knowledge Base" to the table to be used in a consensus determination. This "Knowledge Base" includes:

- Operations - has a current Senior Reactor Operator (SRO) license,
- Engineering - is knowledgeable in engineering design and plant design and license bases,
- Maintenance - Instrument Maintenance (IM), El ctrical Maintenance (EM), Mechanical Maintenance (MM) - is knowledgeable in the division and scope of work among the three maintenance departments,
- Work Analyst - is knowledgeable in work requirements and package preparation,
- Work Control (Scheduling) - is knowledgeable in work scheduling, and
- Fix It Now (FIN) - is knowledgeable in FIN Team capabilities.

In addition to the knowledge of the team, the ARs are also screened against the definitions of the work and/or work groups where the work will eventually be performed. The definitions or "types of work" are as follows:

- Modification - A planned change in plant design or operation and accomplished in accordance with requirements and limitations of applicable codes, standards, specifications, licenses, and predetermined safety restrictions. A change to an item made necessary by, or resulting in, a change in design requirements;

- Facilities Maintenance - A minor work activity conducted only on non power plant boundary or equipment. The work will not affect plant or power block Structures, Systems and Components (SSCs);

- Minor Maintenance - A work activity on Power Plant Boundary Equipment, considered routine and repetitive and within the "skill of the craft" of the maintenance work force. Additionally, minor maintenance requires an initiating work document, does not require detailed instructions, and may be performed without plant scheduling; and

- Work Request (WR) Maintenance - A work activity requiring detailed instructions and an approval process.

Once the appropriate controls have been determined, the Screening Committee will establish priorities for when the work will be completed. Priority codes and descriptions are as follows:

A Emergency work having an immediate and direct impact on the health and safety of the general public or plant personnel, poses a significant industrial hazard, or requires immediate attention to prevent the deterioration of plant condition to a possible unsafe or unstable level. This work must be done immediately.

B1 Urgent work that should be scheduled and started within 24 hours.

B2 Emergent work that should be scheduled and started within two weeks.

B3 Emergent work that should be scheduled and started within five weeks.

C Routine work that follows the normal scheduling process.

After the priority has been determined for work except for modifications, the AR is assigned to the appropriate work group, the documentation is completed by updating EWCS, and the AR is submitted to Work Control/Work Analyst. For modifications, an Engineering Request (ER) is generated and assigned to Engineering for processing under the controls of a modification.

Checks And Balances

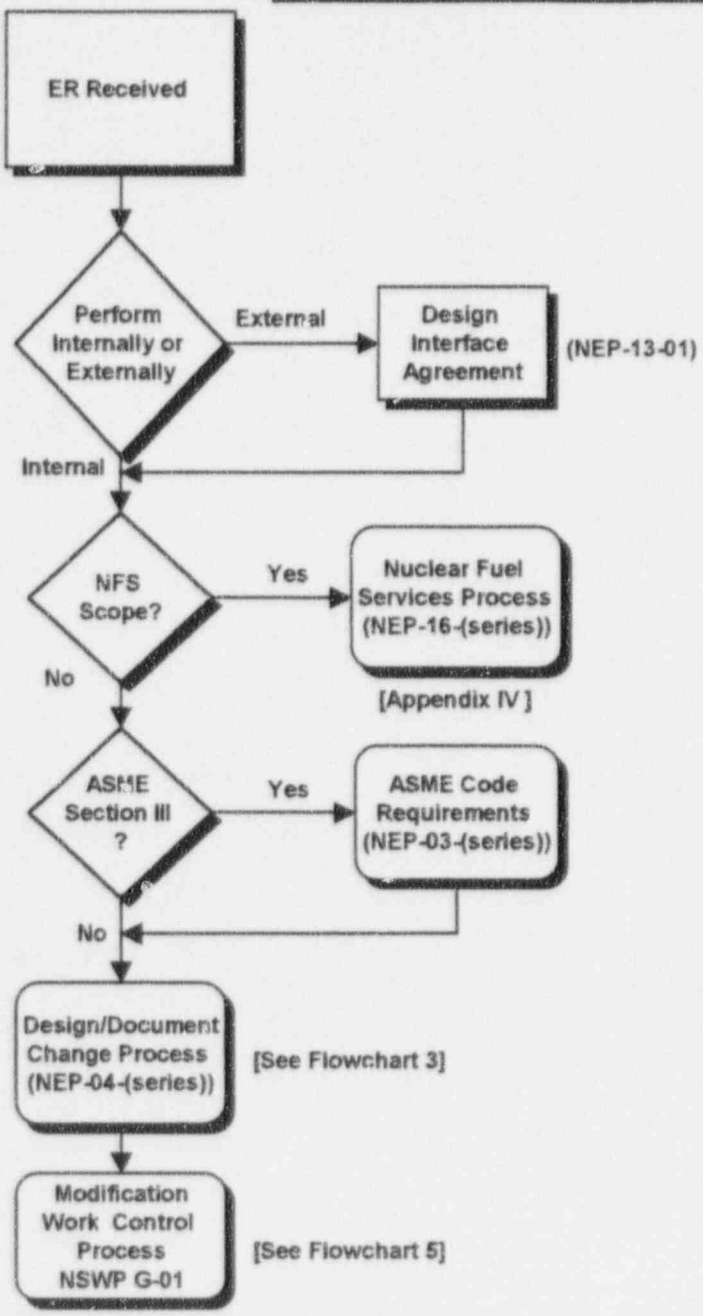
The first line of defense against potentially performing work with an inappropriate or inadequate level of control is the AR Screening Committee. The "Knowledge Base" requirements of the Screening Committee have provided an additional level of confidence to the screening process. By having Engineering participate, it provides a design and licensing bases understanding from people who often reference and interpret the appropriate source documents. If the person representing Engineering is unfamiliar with the proposed work and its affect on the design/licensing bases, they will know who to contact.

The second line of defense in ensuring that work is performed with appropriate control is the Work Analyst. Once the initial determination of "type of work" is made by the screening committee, the AR's identified as WR Maintenance are sent to a work analyst for further planning and preparation of work instructions. The review and approval of these instructions provides an additional opportunity (the third line of defense) for knowledgeable personnel to evaluate the requested work against the licensing/design bases of the plant and to ensure that no unrecognized design changes are being made.

Additionally, with recent industry and ComEd events (especially the LaSalle Service Water event) that deal with design/licensing bases issues, an increased awareness of the affects changes may have to our plants has occurred. Corporate direction was issued to the sites, directing them to strengthen their evaluation of changes against the definition of a modification and for their potential affect on the design bases of the plant. This was formalized with the recent issue of NSWP-WM-08, AR Screening.

Increased emphasis has also been placed on the definition of Facility Maintenance, Minor Maintenance, and WR Maintenance. In each of these types of work, clear boundaries have been provided to maintain the appropriate level of controls. If during the process something requires work to fall outside the predetermined boundaries, the work scope changes or the work scope increases, the work is reevaluated per the initial screening criteria. At that time, the appropriate controls (new or different controls, if applicable) are applied. This fourth line of defense then comes into play because station personnel are encouraged by management and supervision to challenge a work package they believe could be improperly classified.

Flowchart 2
Roadmap To Design Control Process



Note: Human error, configuration control and major equipment problems are identified using the Integrated Reporting Program and documented on a PIF. PIFs are reviewed for reportability and operability in compliance with 10 CFR 50.72 and 10 CFR 50.73. If a defect or noncompliance is found at any step in this process, refer to NEP-10-02, "10 CFR Part 21 Evaluations and Technical Issue Review."

Roadmap to Design Control, Process 2

Purpose

This flowchart serves as an overview roadmap of the design control process. It links the major design processes and indicates decision points that determine whether these design processes are required.

Process Description

After the need for a design activity has been identified and an ER has been forwarded to Engineering, the first thing that needs to be determined is whether or not the work will be performed internally. If the decision is made to perform the work with an external organization and to delegate design authority to that organization, a Design Interface Agreement (DIA) is required. This DIA establishes procedures among the participating design organizations for the review, approval, release, distribution and revision of documents involving design interfaces. External design organizations are required to meet the ComEd procedures for modifications in order to maintain design and configuration control.

If the scope of work to be performed involves Nuclear Fuel Services (NFS) this needs to be identified and they need to be brought into the design process. Since the design authority assigned to NFS is retained in the Corporate office, and has not been delegated to the stations, their processes, although similar to those described here, are separate, and need to be addressed separately.

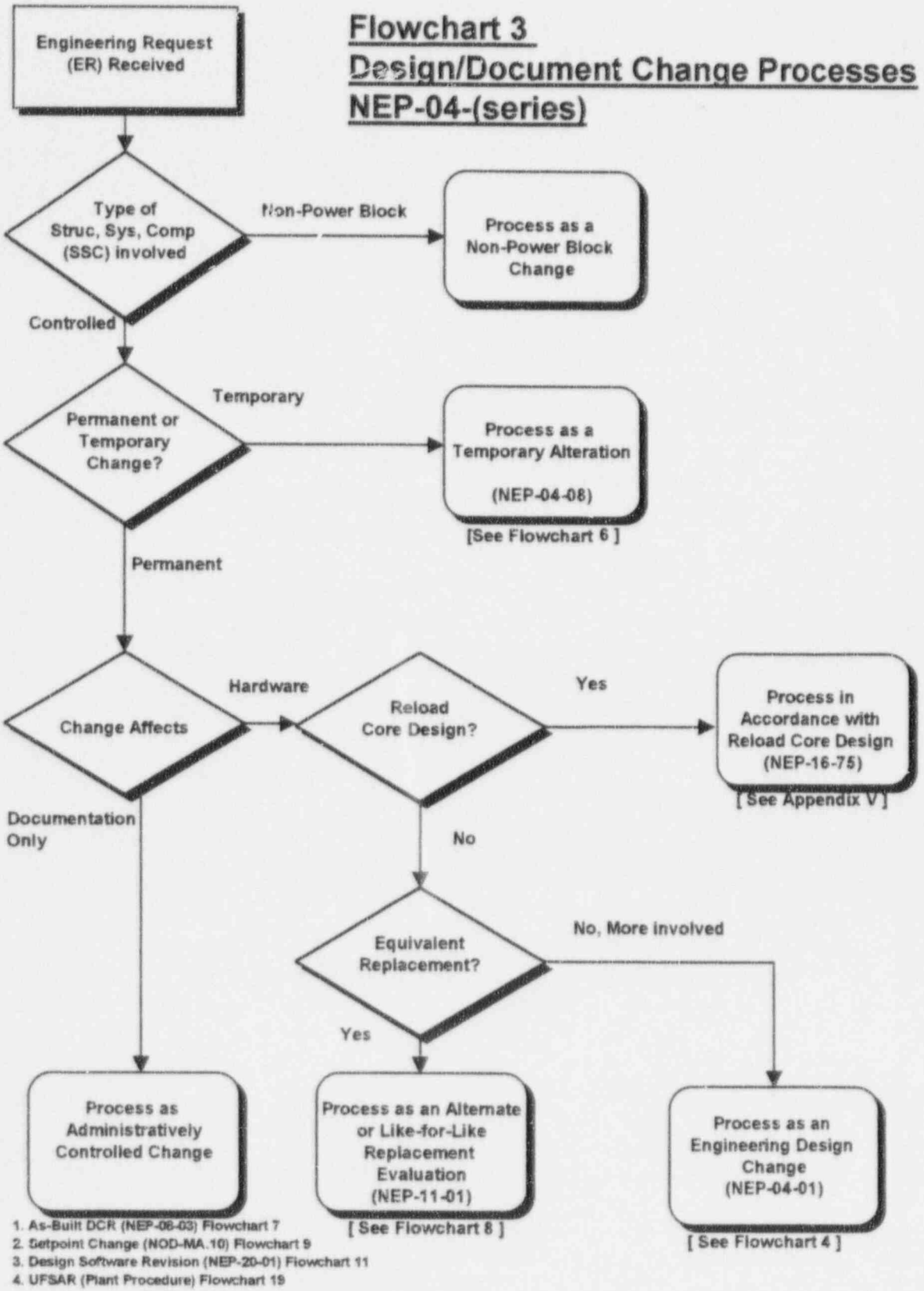
If the design involves American Society of Mechanical Engineers (ASME) Section III systems or components, a parallel series of design requirements and processes are required to be performed in addition to the design change process described here. Because these requirements pertain only to ensuring Code compliance, they are not described in more detail.

The Design Change Process and the Modification Work Control Process will be described separately in the detailed process descriptions that follow.

Checks And Balances

The checks and balances applicable to the processes represented here will be described separately in the detailed process descriptions. Human error, configuration control and major equipment problems are identified using the Integrated Reporting Program and documented on a PIF. PIFs are reviewed for reportability and operability in compliance with 10 CFR 50.72 and 10 CFR 50.73. If a design defect or noncompliance is identified, it is evaluated in accordance with NEP-10-02, "10 CFR Part 21 Evaluations and Technical Issue Reviews."

Flowchart 3
Design/Document Change Processes
NEP-04-(series)



Design/Document Change, Process 3

NEP-04-(Series)

Purpose

This flowchart serves as a roadmap to the appropriate process to be used in implementing design changes to the plant. At each decision point, a specific process that applies the appropriate level of controls to the change, is chosen. Each decision may be determined through the use of specific definitions, screening questions, and/or lists.

Process Description

Non-Power Block Changes - The first decision point determination is whether the proposed change can be processed as a Non-Power Block Changes. These are permanent changes made to SSCs that have no impact on nuclear safety, are not subject to Nuclear Regulatory Commission (NRC) regulatory requirements and are not required for the generation of electric power.

Temporary Alterations (TA) - The second decision point determines if the proposed change is permanent or temporary. TAs are defined as a planned change (non permanent) to the fit, form or function, of Controlled operable SSC, or circuit that does not conform to approved design drawings or other approved design documents. This process is described separately.

Hardware / Documentation Changes - A decision is made to determine the type of permanent change being made. Documentation changes that are clearly administrative in nature, are processed through the As-Built Document Change Requests (DCRs), Setpoint Changes, Computer Software Revisions, Updated Final Safety Analysis Report (UFSAR) Revisions or Design Bases Document (DBD) Changes. Each of these processes is described separately.

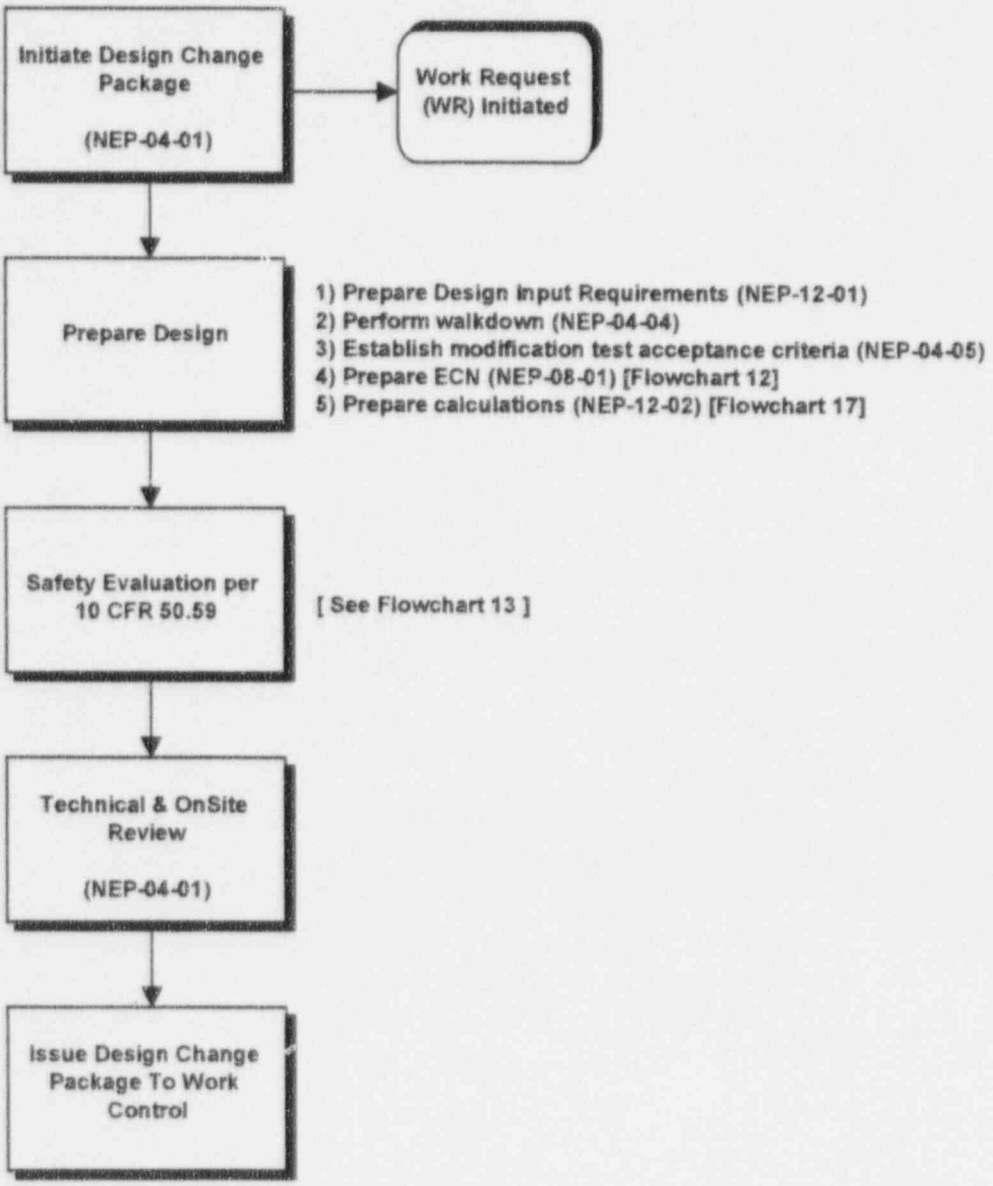
If hardware changes involve a reload core design, they are processed in accordance with NFS procedure, "Reload Core Design" (NEP-16-75). This process is described separately. Other hardware changes and documentation changes that are technical in nature, are reviewed against the definition of equivalent replacements. These include like-for-like replacements or replacements of parts, components, subcomponents, and materials the meet current interface, interchangeability, safety, fit and functional requirements of the original components. This process is described separately.

Changes that are more involved, will be processed as Engineering Design Changes. These include changes to SSCs that are safety-related, subject to NRC regulatory requirements, or are necessary for electric power generation. This process is described separately.

Checks And Balances

The checks and balances that apply to the processes represented here will be discussed separately in the individual process descriptions.

Flowchart 4
Engineering Design Change Process
NEP-04-01 & NEP-04-02



Engineering Design Change, Process 4

NEP-04-01 and NEP-04-02

Purpose

This is the process used to implement "Controlled Design Changes" to the plant. These changes include changes to SSCs that are safety-related, subject to NRC regulatory requirements, or are necessary for electric power generation. This process provides the requirements for implementing changes that could potentially affect the design bases of the plant.

Process Description

Prior to initiating a planned change to the plant design or operation, ComEd management requires the following prerequisites to be performed before significant resources are expended:

- Approval of technical objectives and proposed conceptual design, including an assessment of compliance with the design and licensing bases,
- Approval of the budget and source of the funding,
- Assignment and approval of the selected design organization, and
- Assignment and approval of the installer(s) and a proposed installation schedule.

After the above prerequisites are met, a Modification Scope Meeting is held. This meeting brings together appropriate Engineering, Operations, Maintenance and Support personnel to review the scope and schedule for the modification, define responsibilities, determine deliverables, review the preliminary design, identify and confirm design inputs, perform a pre-design walkdown and resolve or identify potential concerns or problems. If the design has a low potential to significantly reduce the margin of nuclear safety and requires minimal engineering input, it is categorized as an "Exempt Change" and is processed in accordance with NEP-04-02. If the ER is approved as a Controlled Design Change, it is processed in accordance with NEP-04-01. A Design Change Package (DCP) is created through EWCS. A WR is initiated that will be used to implement the required work.

The design is then processed through a series of individual steps that include a scoping activity, field walkdowns, preparing Design Input Requirements (DIRs), engineering calculations, documents, and 50.59 safety evaluations. The DIR defines the major technical objectives, constraints and regulatory requirements that govern the development of the design. It addresses design input categories and serves as a common reference point for the preparation of the more detailed design related documents such as drawings, specifications, calculations, analysis and test specifications. Once the DCP is completed, a final Technical and On-Site Review is initiated that provides for interdepartmental reviews. This final review is not required for Exempt Changes.

After the reviews have been completed, the DCP is issued for Work Instruction preparation as the first step in the Modification Work Control Process. This process is described separately.

The design and engineering activities described in these processes are implemented at ComEd by individuals who have been trained and are qualified to perform these functions. These individuals are trained and their qualifications are documented in accordance with the NEP-15-XX series of procedures. These procedures address and comply with the requirements of ACAD 91-017, "Guidelines for Training and Qualification of Engineering Support Personnel," Rev. 1 and ANSI/ANS 3.1, "Selection, Qualification and Training of Personnel for Nuclear Power Plants." This topic is addressed in more detail in the special section of this response that addresses training and qualification.

Checks And Balances

Although there are areas within the process that provide overall reviews of the design, several specific areas provide for independent reviews against the design bases. The first area is handled through Engineering Change Notices (ECNs), which are used to develop the detailed design. Each ECN goes through an interfacing review process, an independent reviewer, and an approver. Similarly, engineering calculations are prepared to support the design indicated on ECNs and go through an interfacing review process, an independent reviewer, and an approver. A 50.59 safety evaluation is also part of the design process and provides an additional level of review. The ECN, calculation and safety evaluation process are described separately in more detail.

Walkdowns performed after installation, as described in the Modification Work Control Process, also provide another area where the design is evaluated to ensure that it has met the original design requirements. When the design is installed "out of tolerance" or an alternate design configuration is required, a FCR is generated to evaluate the differences. FCRs go through the same rigor of evaluation as the original design. Additional engineering calculations and 50.59 safety evaluations may be required.

Post Modification Testing, as discussed in the Modification Work Control Process, is the last area where the design is evaluated to ensure that it has met the original design requirements.

Modification Work Control Process

THERE IS NO FLOW CHART FOR THIS PROCESS

Modification Work Control, Process 5

Purpose

The purpose of this process is to provide the necessary controls for the development of work packages which include installation instructions, Quality Control (QC) review expectations, and post modification testing requirements prior to Operations Authorization of the modification.

Process Description

Once the DCP is issued, a Work Package is prepared that provides the necessary instructions for installation, QC reviews, and testing. During the installation phase, a pre-installation walkdown is performed, FCRs are generated for variations to installation requirements (if required), and post-installation walkdowns are performed to ensure that the modifications are installed per the construction documents.

After installation, a QC review is completed, post modification testing is performed, associated training is completed, and configuration control issues are addressed. This includes updating Critical Control Room Drawings (CCRD) and operating procedures. open items that are not needed for Operation Authorization, are identified and tracked separately for future closure.

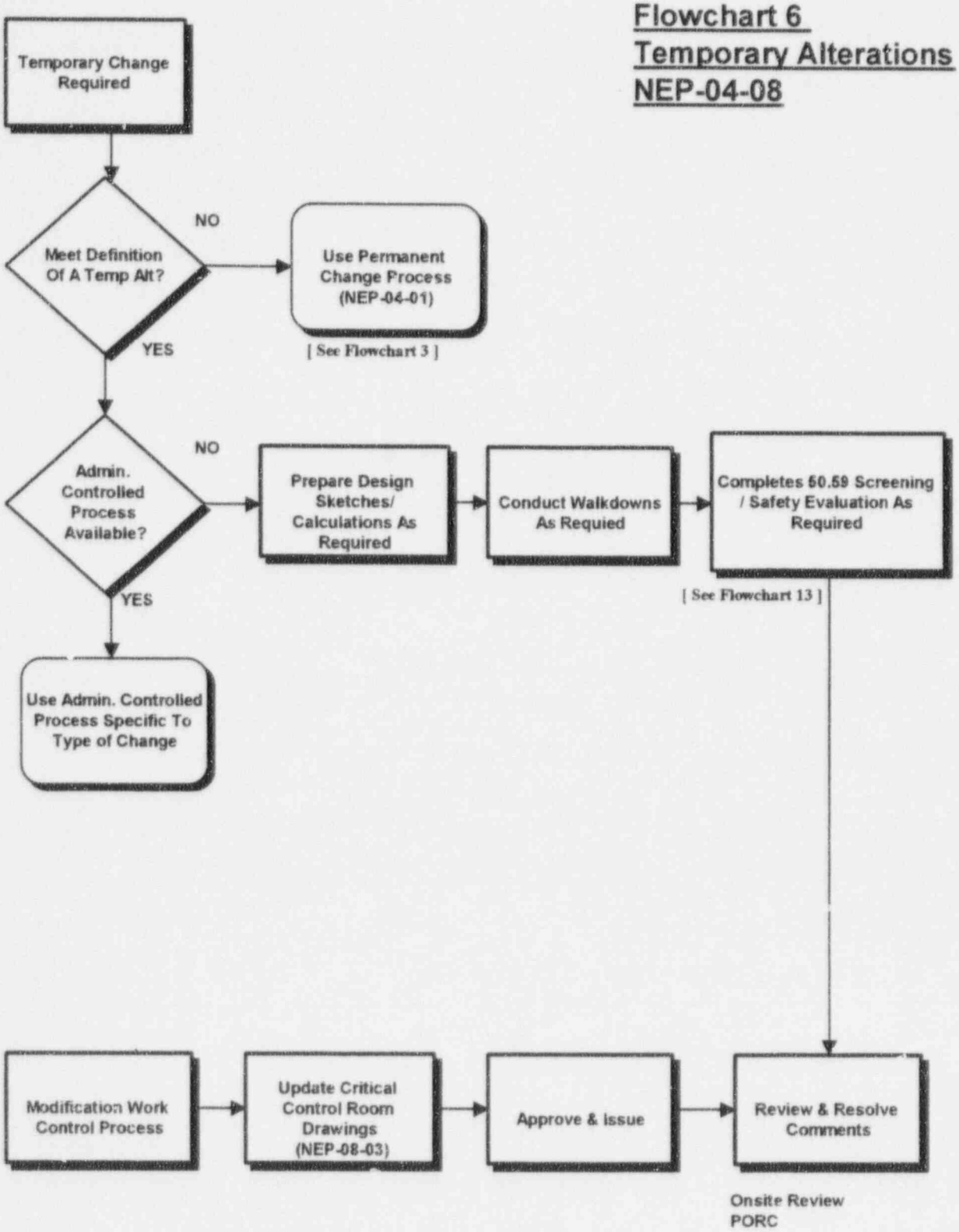
The modification is then "Operations Authorized" and a "Turnover" is issued incorporating changes to the affected design documents.

Checks And Balances

The pre-installation walkdowns provide an opportunity to evaluate the modification against the physical attributes and design considerations of other components located in same area. Changes required during this evaluation and others required during the installation, are evaluated through the FCRs. FCRs take each deviation and evaluate it against the same criteria used for the original design. This includes independent reviews and 50.59 safety evaluations, if applicable.

Post-installation walkdowns and testing are performed to ensure that the modification is installed as designed and that it functions as intended.

Flowchart 6
Temporary Alterations
NEP-04-08



Temporary Alterations, Process 6

NEP-04-08

Purpose

The TA process is intended to provide assurance that a TA made to plant equipment does not degrade plant safety/reliability or unacceptably alter the approved design configuration.

Process Description

The first step is to determine if the proposed change meets the definition of a TA. If not, the change must be processed using one of the permanent design change processes. If it does meet the definition, it can be processed as a TA or using the appropriate Administrative Controlled process that is specific to the type of change being considered.

Design sketches, waldowns, and calculations are prepared, as required for TAs. A 50.59 screening/safety evaluation is required for all TAs.

A Modification Review Checklist is completed. The design goes through an independent review process and the TA is approved and issued.

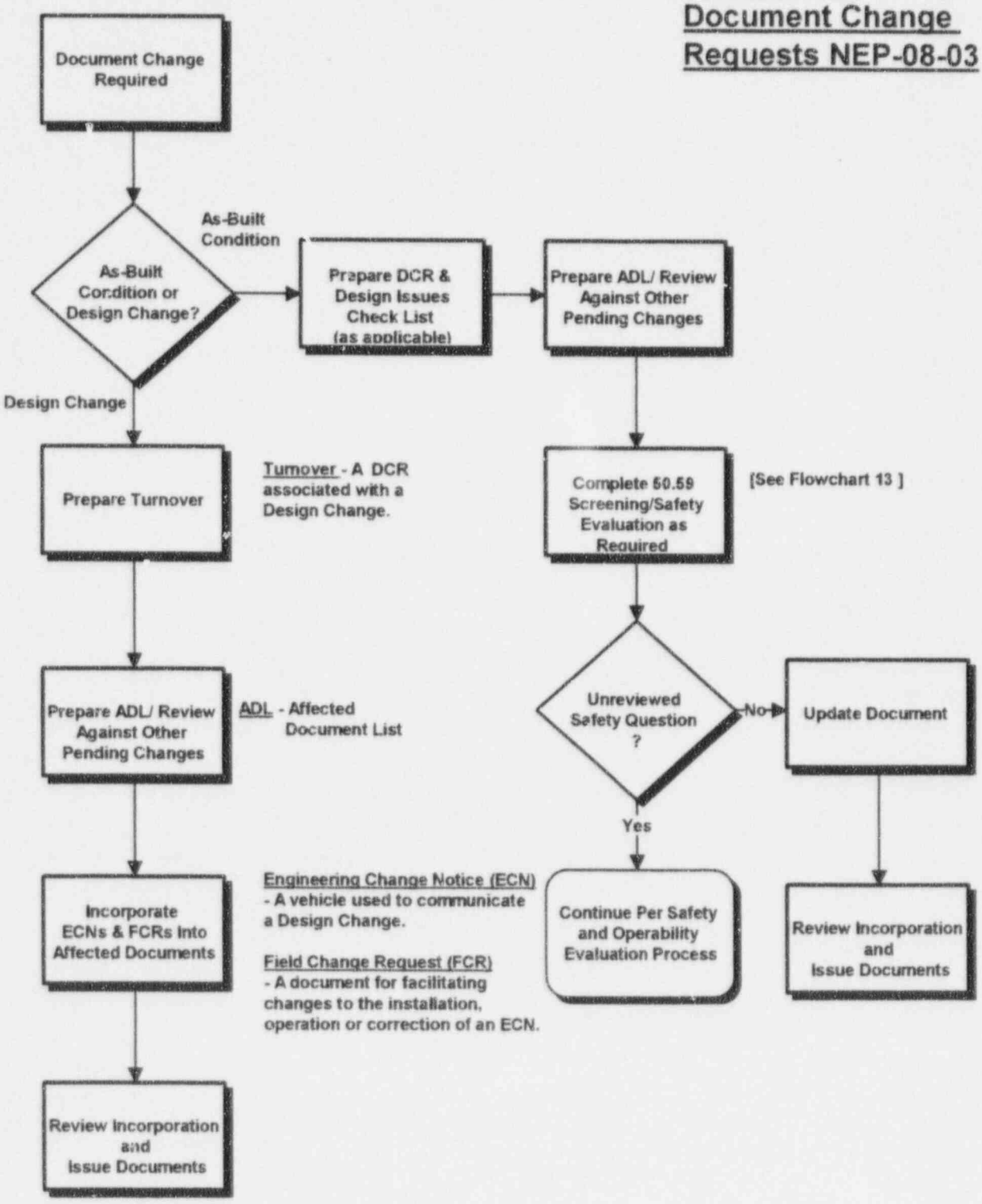
Checks And Balances

The first checkpoint involves the control to ensure that permanent changes are not processed as a TA. Permanent change processes are available that provide the appropriate level of controls. A 50.59 screening/safety evaluation is required for each TA. This process is described separately.

A Modification Review Checklist is used to ensure that plant safety and reliability are not adversely affected, proper design control is maintained through a verification that appropriate drawings and procedures are revised to reflect the temporary configuration, and that testing considerations are addressed.

TAs are required to be updated on the CCRD so that these are maintained to reflect the plant configuration.

Flowchart 7
Document Change Requests NEP-08-03



Document Change Requests, Process 7

NEP-08-03

Purpose

The DCR process is used to control incorporation of design changes or as-built information into design documents. This document is initiated through the EWCS.

Process Description

When a document change is required, two separate paths are provided depending on the source of the change. If the required change is the result of a Design Change, then an Affected Document List (ADL) is prepared and is reviewed against other pending changes. ECNs and FCRs are incorporated, and the documents are reviewed, approved, and issued.

If the required change is the result of an as-built condition, then an ADL is prepared, it is reviewed against other pending changes, and a 50.59 Screening/Safety Evaluation is prepared. If no Unreviewed Safety Question has been identified, the documents are updated, reviewed, approved, and issued.

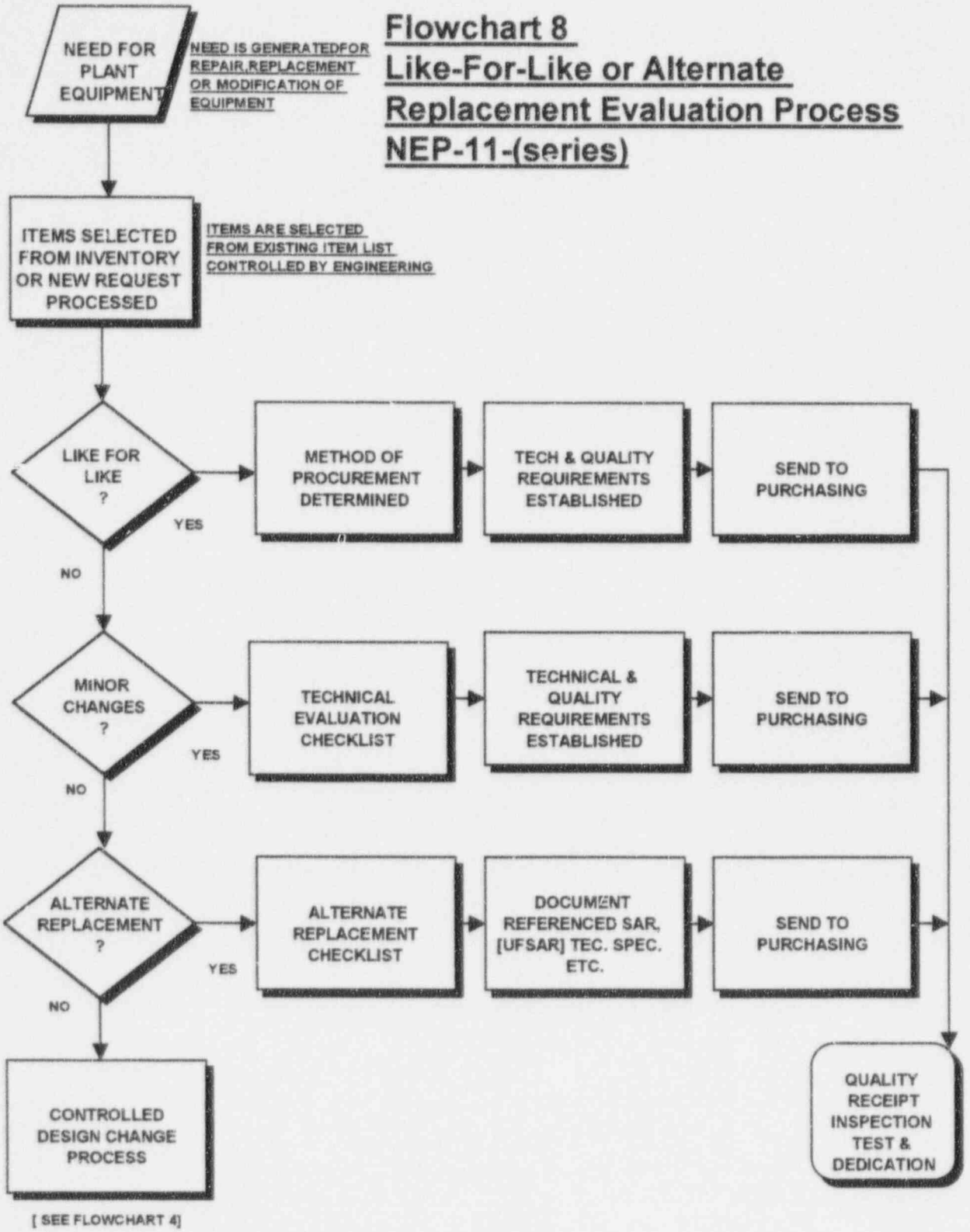
Checks And Balances

There are several areas within this process that provide additional checks for reviewing the proposed change against other pending changes and design issues. Several of these checks are accomplished through the main elements of EWCS, which are described separately.

When preparing the ADL, EWCS is used to identify outstanding changes that exist against the current revision of the document. This aids in determining the full impact of the proposed change for as-built evaluations and for combining information for document updates. A Turnover/DCR Design Issues Checklist is also provided for use in determining the impact of as-built changes in reference to several design issues.

The 50.59 Screening/Safety Evaluation process, which is described separately, is tied to processing as-built changes. When a document and physical plant mismatch is discovered, a design engineer reviews the design to ensure it is physically correct before automatically assuming the documentation is incorrect from a design perspective.

Flowchart 8
Like-For-Like or Alternate Replacement Evaluation Process NEP-11-(series)



Like-For-Like or Alternate Replacement Evaluation, Process 8

NEP-11-(Series)

Purpose

The purpose of the Material Procurement Process is to establish uniform criteria for procurement of items and services that will be used for operations, maintenance, and modification of ComEd nuclear units with the following objectives:

- Ensure installed items comply with the plant Design Bases,
- Ensure the configuration gets properly documented,
- Minimize cost to the company,
- Maximize the use of existing inventory,
- Minimize inventory,
- Minimize procurement effort, and
- Maximize the use of technically acceptable alternates.

The company received recognition on the effectiveness of its program in August 1992 by an industry independent assessment group and conferred the title of Good Practice on the material procurement dedication processes.

The scope of the process includes new and replacement items for quality related applications. The process also describes the relationship between design, qualification, procurement, dedication, and supply.

Process Description

Once the need for an item is identified, a determination is made whether an item has previously been identified for use in the specific application. If the answer is no, the design requirements for the item are established. The design requirements may apply to current design and/or those required for a design change. Design requirements are identified through: review of design document, equipment walkdown, safety classification data, technical data on form, fit and function, and design qualification documentation.

Should a replacement other than like-for-like [identical] design be required, the process directs the user to the correct procedures for continuation of the process depending on the complexity: Technical Evaluation [NEP-11-01], Alternate Replacement [NEP-11-01], or Modification [NEP-04-01]. The modification process includes a 50.59 evaluation and independent engineering review and approval. When qualification of design is required for new or replacement items, the process directs the user to the appropriate design qualification methods. Once the design, qualification and description of the items are completed, the process directs the establishment of requirements for the procurement of items through the supply process. Verification that items specified are those that are procured is through the Quality Receipt Inspection process.

The process requires the use of the following forms and checklists from NEP-11 (series):

- Component Information Form-14,
- Dedication Checklist Form-22,
- Technical Evaluation Checklist Form-23, and
- Alternate Replacement Checklist Form-24.

The checklists contain reference to design and license documents. They are derived from the following EPRI Guidelines.

> EPRI NP-5652, "Guidelines for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications [NCIG-07]"
>
> EPRI NP-6406, "Guidelines for the Technical Evaluation of Replacement Items in Nuclear Power Plants [NCIG-11]"

Checks And Balances

A number of checks and balances exist in the current process. Safety related material purchase orders are quality records and provide a link to the original equipment design specifications. The technical and quality requirements imposed on the purchase of material that reflect the design of the item are a result of the Material Engineering procedures. The process requires an independent engineer review and approval of completed work. The verification that purchase order requirements have been met is accomplished through a combination of receipt inspections, dedication testing and engineering review of test results. The receipt process includes independent QC overview. ASME code items undergo additional verification by Hartford Authorized Nuclear Inspectors with the process periodically audited to ASME 626 criteria.

The process is audited annually by ComEd Quality Verification to the appropriate requirements of 10 CFR 50 Appendix B. Corrective actions are identified and program revisions are made. The process has undergone independent review and self assessment a number of times since 1990 with corrective actions made based on the weaknesses identified.

Setpoint Change Request Process

THE SETPOINT CHANGE PROCESS DOES NOT HAVE A FLOW CHART

Setpoint Change Request, Process 9

Purpose

The goal of this process is to establish a standardized, computerized Instrument Database, with supporting documentation and a single point of control, implemented consistently at all six stations.

Process Description

The Requester completes the initiation section of the station Setpoint Change Request (SCR) Form.

Engineering Supervisor reviews the SCR to validate the safety classification, to recommend training and procedural changes, and to determine whether a modification is required. If a mod is not required, the SCR is forwarded to Operations.

Operations reviews the SCR to determine system operating impact, and forwards it to Training.

Training reviews the SCR to validate/recommend the training requirements and then returns it to Engineering.

If a modification is required or the SCR is classified as safety or regulatory related, Engineering performs a technical review and approval.

The Engineering Technical Review shall address the following items:

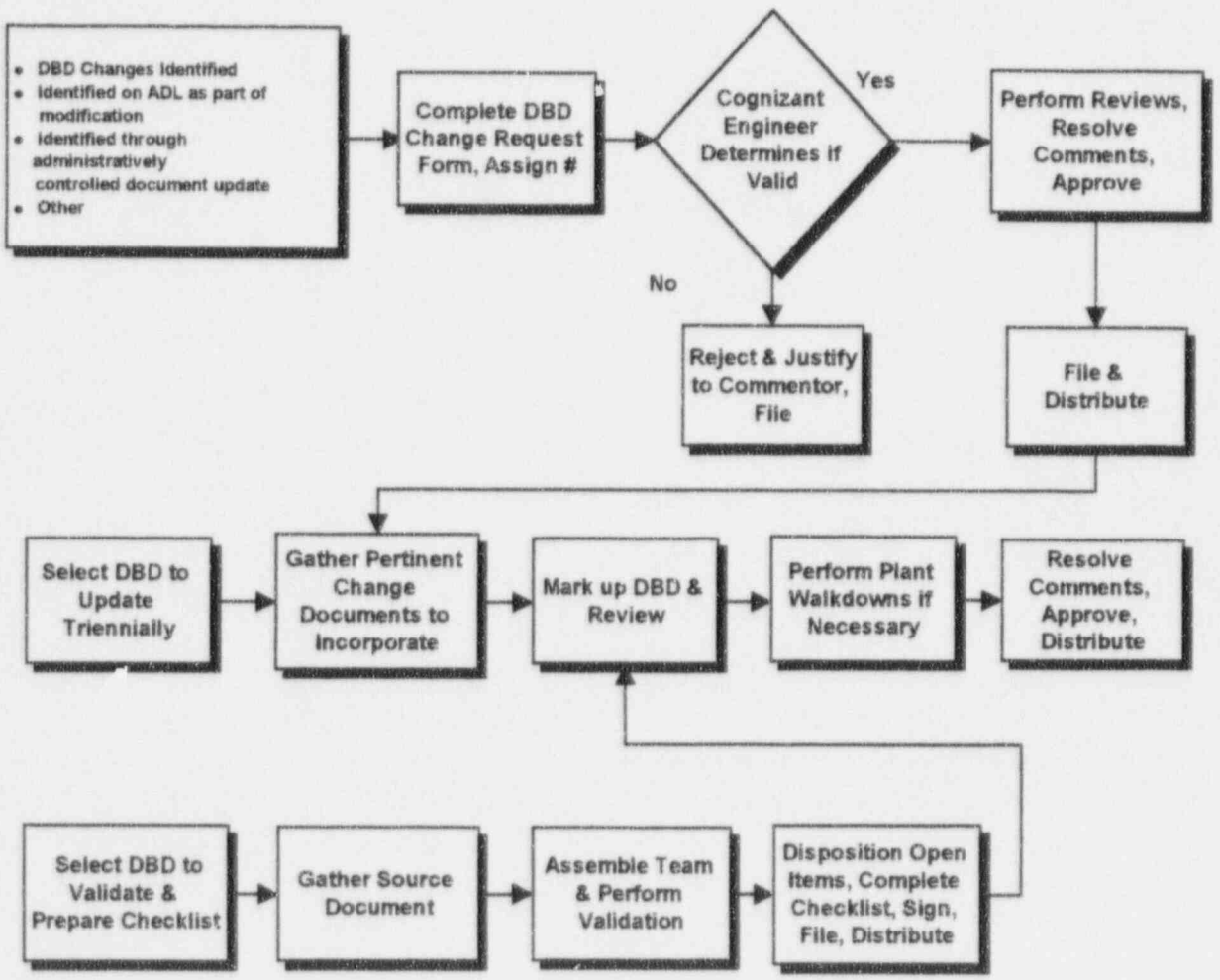
1. Performance of a safety review including a 10 CFR 50.59 safety evaluation.
2. Determination of a need for NFS review. If the change affects Reactor Protection and Control setpoints or a setpoint used as an input to the safety analysis, NFS must be notified.
3. Confirmation of compliance with applicable regulatory guidelines and Industry Standards.
4. Performance of a document review to ensure that the proposed Setpoint Change is in accordance with the design bases.
5. Confirmation of recommended training or recommending additional training.
6. Identification of Quality Assurance (QA)/QC related items and audit or inspection points.
7. Completion of human factors review, as applicable.

The setpoint change and testing is implemented per the appropriate station procedures. Close-out of a SCR is accomplished in accordance with the Setpoint and Data Change Request, and DCR Procedures. A DCR shall be initiated to update the appropriate design documents and/or data-bases.

Checks And Balances

The independent review performed by Operations and Training to determine operations and training impact of the setpoint change offers an early station perspective in the process to ensure the change is correctly processed and the impact is fully understood.

FLOWCHART 10
Design Basis Document Update Process
NEP-17-01



Design Bases Document Update, Process 10

NEP-17-01

Purpose

The DBD update process is used to evaluate DBD changes and incorporate approved changes. This process provides the controls to ensure that the change is appropriately reviewed, prior to updating the DBD.

Process Description

A DBD change can result from a modification or it can be identified through the revision process associated with an administratively Controlled Document (CD) (such as an UFSAR change, setpoint change, etc.) or it can be self-initiated as part of the normal work process or as a result of a regulatory inspection or self-assessment.

Once an evaluation of a design change has determined that a DBD is affected, the DBD is indicated on the ADL and the change is processed for an update evaluation. A DBD Change Request Form is initiated and placed into the review process. The process from this point on applies regardless of the reason for the originating change to the DBD.

The review will determine if the change is valid for incorporation. Once accepted, the change is incorporated accordingly. A final review and approval of the entire DBD revision is completed prior to issuance.

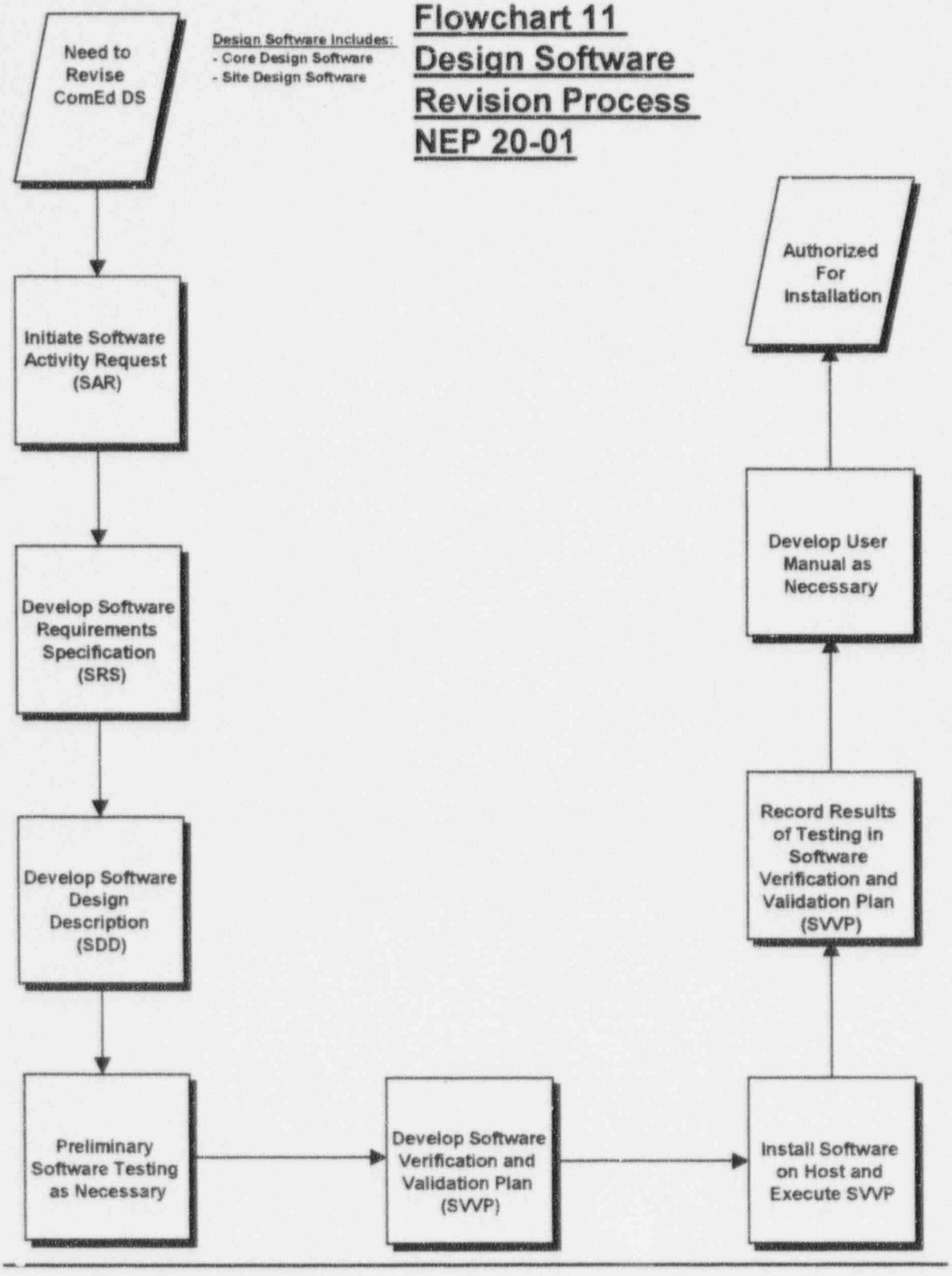
Checks And Balances

The initial review by the Cognizant Engineer is used as the main determination for the validity of the change to the DBD. Additionally, the review of other outstanding changes to ensure that this proposed change is compatible with others, is provided.

Plant walkdowns to determine the affects of these changes on other plant components in the same areas, are also performed. A triennial update will also be performed on selected DBDs to ensure that they are current.

An optional DBD Validation process may be performed for select DBDs. The results of this process are tied back to the update process described above.

Flowchart 11
Design Software Revision Process
NEP 20-01



Engineering Software Development and Revision, Process 11

NEP-20-01

Purpose

The Engineering Software Program applies to software that is safety-related used to verify Station Technical Specification compliance or used to comply with regulatory requirements not contained in the Technical Specification. This process specifically describes the steps used to control revisions to Engineering Software.

Process Description

Once a need to develop or revise Engineering Software has been identified, a Software Activity Request is filled out to describe the situation and identify the activities that need to be performed.

A Software Requirements Specification is then developed to describe:

- The functions the software is to perform,
- The software performance,
- Design constraints,
- Attributes, and
- External interfaces.

The programming change will then begin based on the documents generated above, in preparation of software testing.

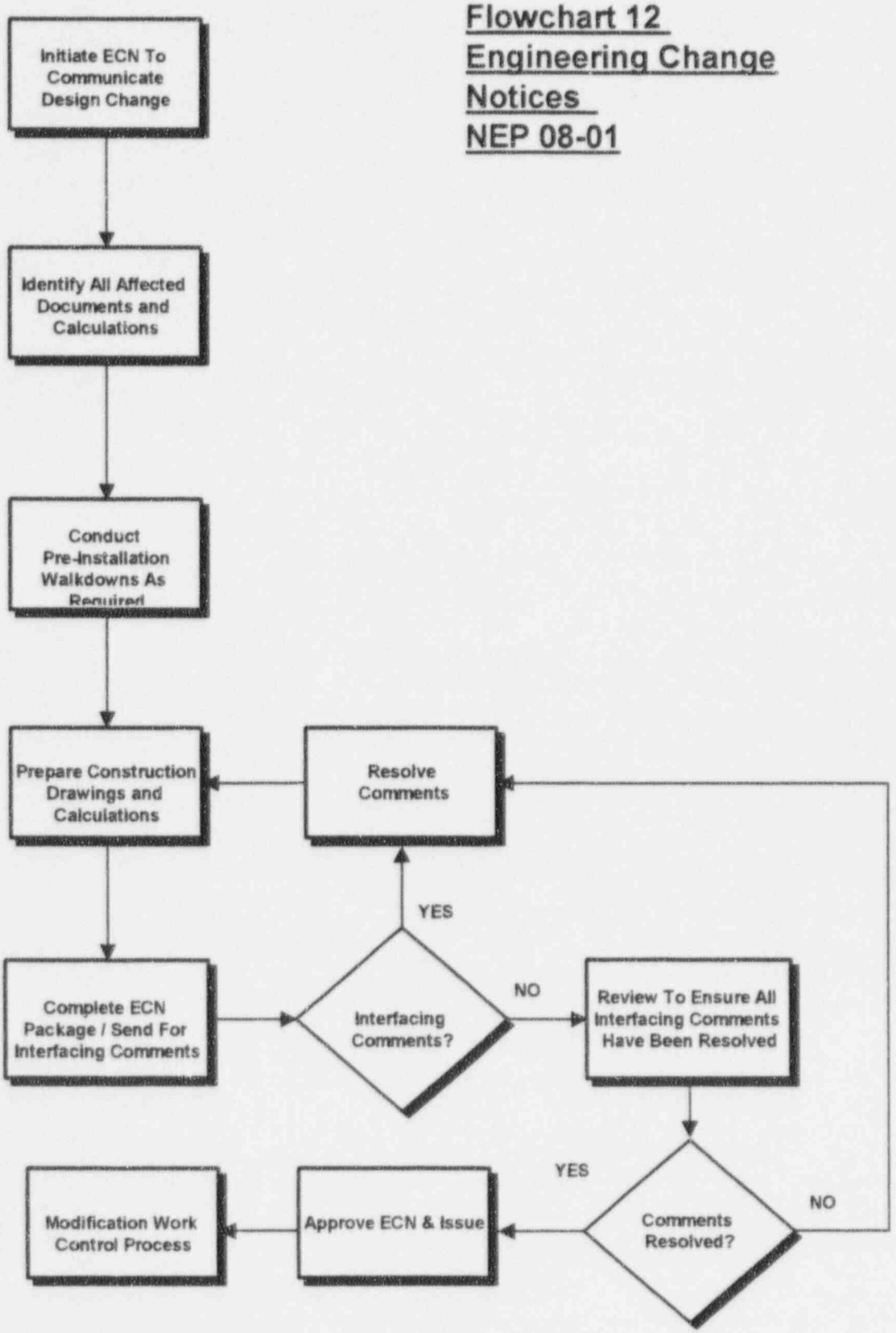
Checks And Balances

Software Verification and Validation (SVV) activities shall begin with the development of a SVV Plan which shall describe:

- Tasks and criteria for accomplishing the Verification of the Engineering Computer Program (ECP),
- Hardware and software configurations pertinent to Verification and Validation, and
- Traceability to both the software requirements and the software design.

The software shall then be installed, tested and the results documented for review in a SVV Report. A user manual, if necessary, is then prepared for review.

Flowchart 12
Engineering Change Notices
NEP 08-01



Engineering Change Notices, Process 12

NEP-08-01

Purpose

ECNs are used to communicate design changes which are included in a DCP. They are initiated through the EWCS and provide for a systematic approach to support the preparation, review and approval process.

Process Description

Once the ECN is initiated, affected documents and required calculations are identified on the ADL. Initial configuration changes/additions are prepared and pre-installation plant walkdowns are performed, as required. Detailed designs and engineering calculations are then prepared and a package is sent for interfacing comments.

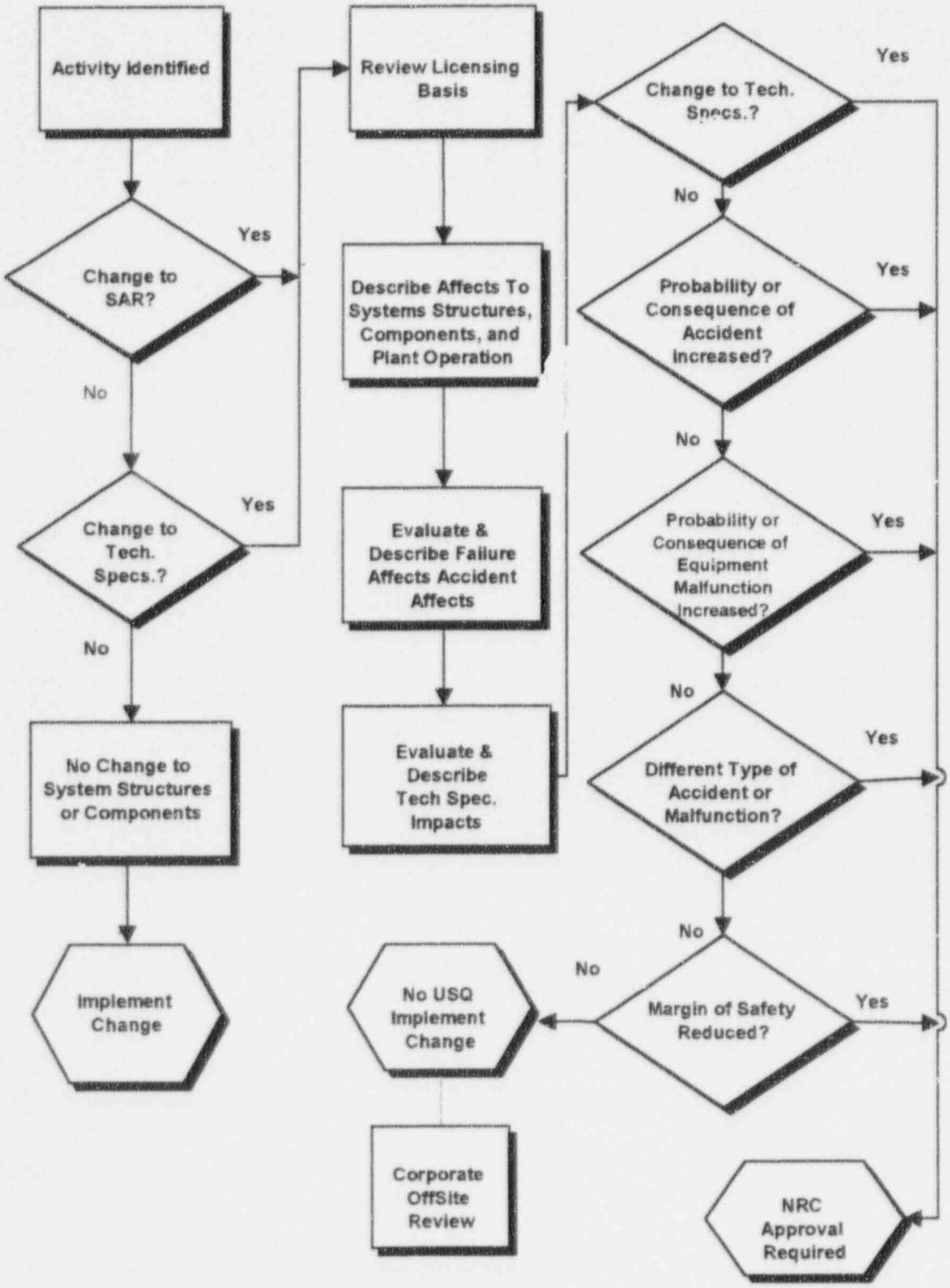
After interfacing comments have been resolved, the ECN goes through an independent review process, and is then approved and ready to be included in the DCP for forwarding to the Modification Work Control Process.

Checks And Balances

As the ADL is prepared through EWCS, pending changes are identified and evaluated for their impact to the new change/addition. This allows for an additional evaluation of previously planned changes and those which are currently underway.

The interfacing comment step provides for a technical evaluation in specific related areas that interface with the aspects of the design. The evaluation is performed by those with expertise in the specific areas and are performed independently.

Flowchart 13
Safety Evaluation Process



Safety Evaluation. Process 13

PURPOSE

The purpose is to determine and provide a documented basis for concluding if an Unreviewed Safety Question exists for a change, test, or experiment, or if a technical specification change is required.

PROCESS DESCRIPTION

Reviewers and preparers must be trained and qualified to perform Screenings and Safety Evaluations.

A Screening is performed to determine whether a safety evaluation is required per 10 CFR 50.59. The safety evaluation provides the review to determine whether an unreviewed safety question or technical specification change is involved.

The Preparer reviews the UFSAR, pending UFSAR changes, and other Licensing Bases documents and describes how the proposed activity will affect plant operations or potential equipment failures.

The Preparer identifies activities that could be affected by the change and determines if new or revised Technical Specifications are needed.

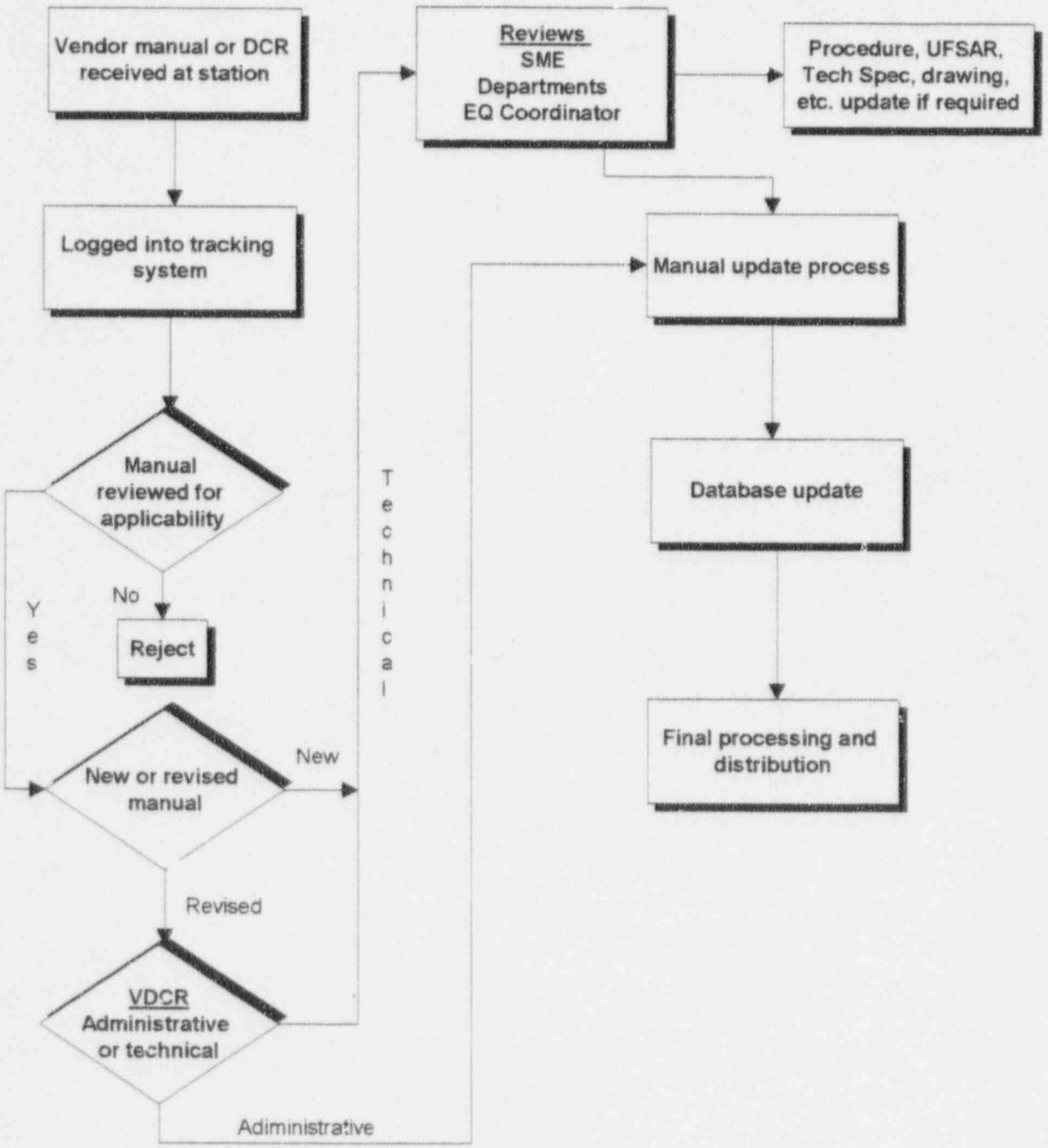
Selected completed 10 CFR 50.59 reviews are independently reviewed by the Off Site Review Group for the following:

- No Unreviewed Safety Question is involved
- All questions are properly answered
- The supporting documentation justifies conclusion
- Technical Specification change not needed

Checks And Balances

The overviews of the safety evaluations performed by the on-site Engineering Assurance Group, the off-site Corporate Regulatory Assurance Group, and the Engineering Oversight Team provide three levels of independent assessment of the quality and effectiveness of this process.

Flowchart 14
VETIP Processing
NEP-07-04



Vendor Technical Information Program, Process 14

NEP-07-04

Purpose

This process provides a methodology for the control of vendor technical information used for the installation, maintenance, operation, testing, calibration, troubleshooting, and storage of equipment. In compliance with ComEd's commitment to NRC Generic Letter 90-03, vendors supplying critical safety related components are recontacted every three years to ensure the latest manual revision is in the Vendor Technical Information Program (VETIP) system.

Process Description

Vendor manual information will be received and processed through the VETIP Coordinator at the station. The following activities will be performed for each vendor manual:

The coordinator either reviews or has the manual reviewed for applicability and to determine whether the manual is currently in use at the station.

If the new manual is a revision to an existing manual, the coordinator determines whether the change is administrative or technical and prepares a Vendor Document Comparison Report (VDCR) which summarizes the changes between the different revisions of the manual.

The VDCR and manual are forwarded to the Subject Matter Expert (SME) for review. If the SME finds the changes acceptable, then the SME approves the manual and determines if equipment qualification is required and what other station groups should be notified of the manual changes. If station procedures are affected, the appropriate department(s) is notified.

If the SME or other reviewers determine that the technical changes in the manual are not acceptable, the vendor manual is returned to the VETIP Coordinator for final disposition.

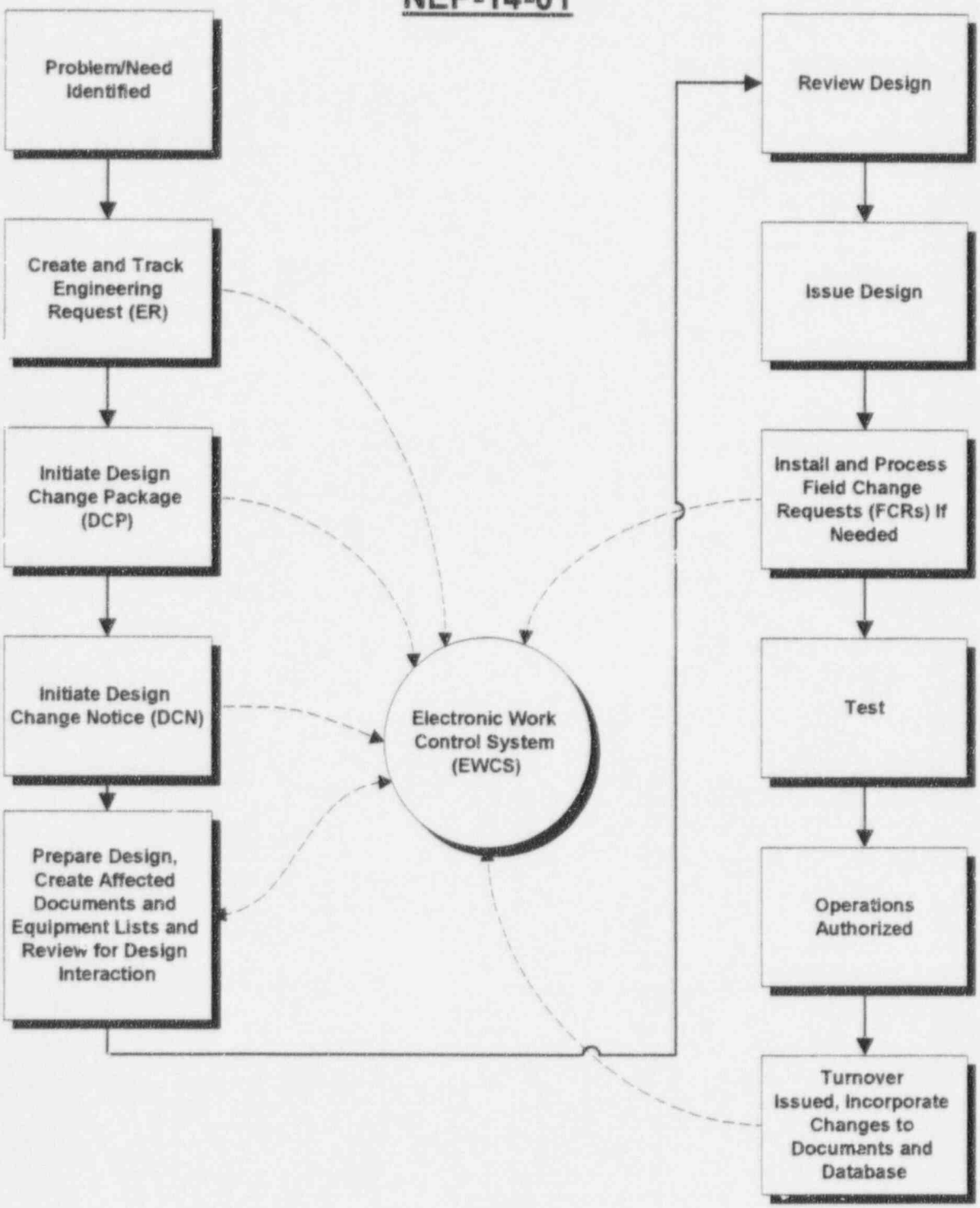
After review and approval by the SME, the VETIP coordinator updates other existing hard copies of the manual and updates databases. The original vendor information and station review/approval documents are forwarded to Central Files for retention.

Checks And Balances

The Subject Matter Expert Review concept is new and ensures the right person is reviewing the manual and no time is lost waiting for other reviews.

Common processing at each station for better control and a more consistent review and documentation of VETIP information.

Flowchart 15
Configuration Control Using EWCS
NEP-14-01



Configuration Control Using EWCS, Process 15

NEP-14-01

Purpose

The EWCS is an on-line work flow and database tool used at all six ComEd nuclear sites and the corporate offices. The elements of EWCS that are used to support configuration control are:

- Engineering Design Change Module (EDCM),
- Revision Tracking and Control (RT&C),
- CD, and
- Equipment Database.

These modules and their configuration control functions are outlined below.

Process Description

Engineering Design Change Module

This module provides for assignment and status monitoring of 5 types of change documents. These are:

ERs - Used to solicit assistance from engineering. ERs which may be closed by issuing a design change (only a small fraction of ERs become design changes) can be used to track the status of the change through the business review and technical review process.

DCPs - Used as the over all tracking package for a collection of other change documents (Design Change Notifications ((DCNs), FCRs) or as the primary package for minor changes. When used for minor changes (simple, non-safety related), DCPs require an ADL and Affected Equipment List (AEL) to track the status of impacted CDs and equipment data records through the change process.

DCNs - Primary vehicle for issuing and tracking design changes. DCNs use ADLs and AELs to identify and track the status of impacted documents and equipment data records through the change process. DCNs must be associated with an overall DCP.

FCRs - Used to issue and status field requested changes to support installation of issued DCPs. FCRs use ADLs and AELs to identify and track the status of impacted documents and equipment data records through the change process. FCRs must be associated with an overall DCP.

DCRs - Used to document as found changes and discrepancies to design documents. DCRs use ADLs and AELs to identify and track the status of impacted documents and equipment data records through the change process. Note that a Turnover, not a DCR, is the vehicle used to track closure of document and equipment data changes associated with DCPs and DCNs and is part of those respective processes.

EDCM is the primary tool for tracking design and document changes from request to closure. Design interaction is readily identified through the use of the ADL and AEL.

Revision Tracking & Control

RT&C is technically a part of EDCM since it is initiated from the AEL. RT&C provides the ability to change equipment data associated with an EDCM change object through an on-line process. Anyone in the plant can initiate a data change request with this process. RT&C creates a temporary revision of each data record flagged as affected and allows this temporary change to be prepared, reviewed and approved on-line. When the design change is installed in the plant, the approved temporary revision is electronically issued into the EWCS equipment database.

Controlled Documents

CD is used as the controlled index to important plant document including drawings, calculations, procedures, and vendor information. The search features of CD are used by engineers and others to find and retrieve (from central files or through on-line viewing for some types of documents) these documents.

Equipment Database

The Equipment Database in EWCS is a common database used by engineering, maintenance and operations at each site. Users can search this database for equipment data such as safety classification, ASME code class, or electrical class. This data feeds into the on-line maintenance WRs and out-of-service requests to control quality requirements. Engineering controls critical equipment data in this database using RT&C. Multiple legacy databases are being migrated into this database to provide access to data for:

- Master Equipment List/ Quality List Data,
- Valve Data,
- Instrument Data, and
- Fuse Data.

The Approved Model List is also an available feature of this database which can be used to effectively communicate evaluated alternate replacement components for a given application to maintenance. The Bill of Material feature is beginning to be used to provide detailed parts list for equipment in the system to greatly facilitate maintenance activities.

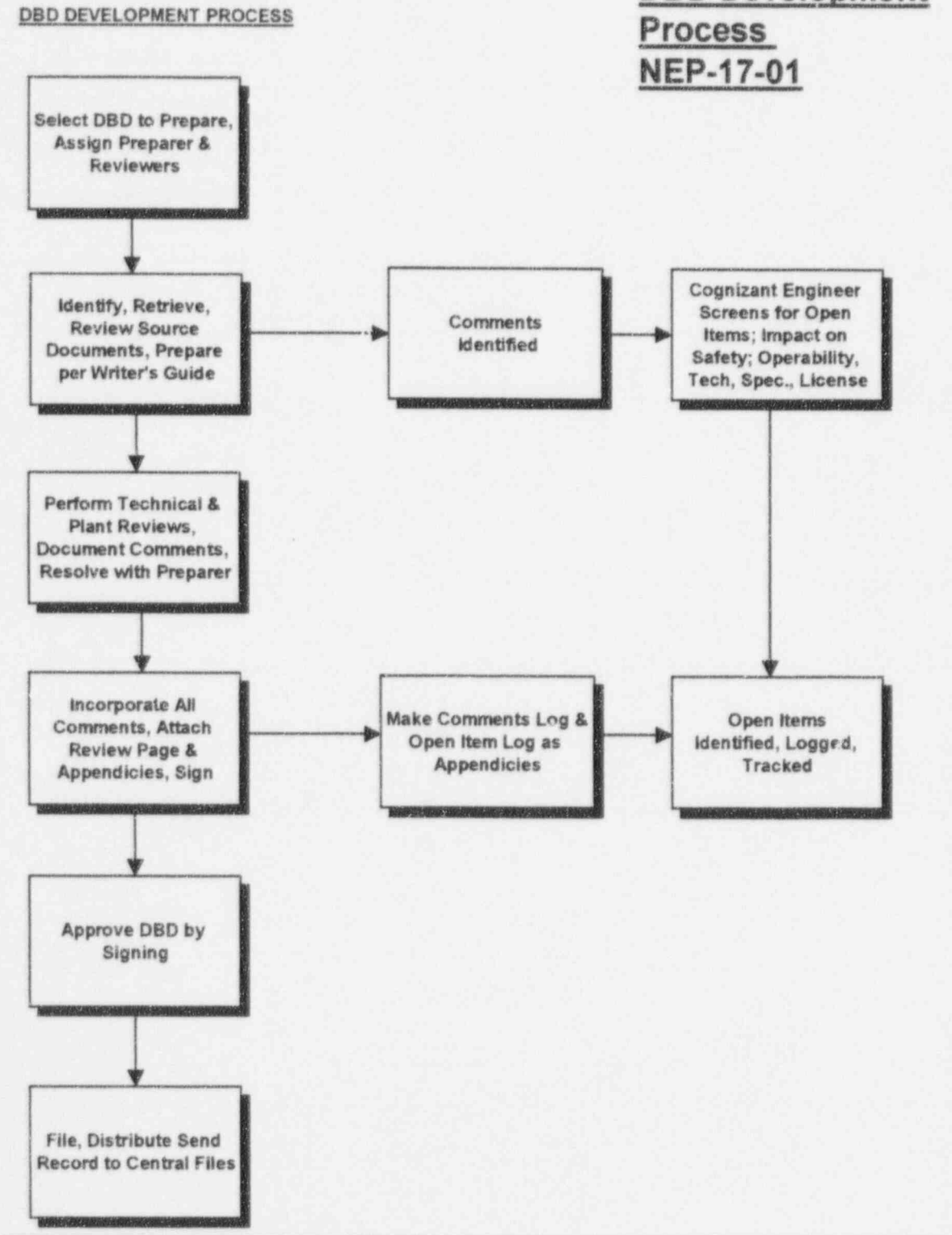
Checks And Balances

When a document is identified as affected by the change and is placed on the ADL, EDCM searches the document database for any other open change against the document and immediately notifies the user if found. This feature is also in place for equipment records placed on the AEL.

RT&C also notifies users of the EWCS equipment database when pending changes exist against the data they are viewing.

Like RT&C, CD readily identifies to the user when outstanding changes exist against the current revision of a document. When a document has been checked out for use in the field, CD automatically notifies the user when a new revision is issued.

Flowchart 16
DBD Development Process
NEP-17-01



Design Bases Document Development, Process 16

NEP-17-01

Purpose

The DBD development process is controlled by a writer's guide in NEP-17-01, which provides guidance to the writers for consistent format and content. The process includes identifying original plant design bases, incorporating changes resulting from various types of modifications, reviewing existing design information, and resolving conflicts between documents.

Process Description

Engineers from the NSSS suppliers and Balance of Plant Architect Engineers, A/E's, were utilized in the development of the various DBDs. The NSSS writers access their internal sources to identify the references used to support the original design. The A/E writers access A/E project files and ComEd databases. In addition, they review modifications to identify any impact on the design bases.

Reviews are performed by ComEd organizations and other A/E's that were involved in the design and operation of the Station. These groups include Site Engineering, System Engineering, Corporate Engineering, NFSs, Mechanical & Structural Design, Electrical/Instrumentation & Control Design, and the Site Training departments. This provides a check to ensure the latest design information is identified.

When the review of a draft DBD is complete, comments are compiled and a meeting is held between the NSSS writers, A/E writers, the ComEd Engineers, and others that had significant technical input. Comments are discussed to identify discrepancies, assess their significance and determine a resolution. In some cases, where original studies or calculations are unavailable, system and component specifications as well as process flow diagrams are utilized to establish the original design bases. Where supporting calculations for modifications are incomplete, an open item is generated, evaluated for significance, and prioritized for resolution. References used in the DBDs to support the design bases are indexed and referenced in the DBD. When comments have been addressed and the remaining open items logged and tracked, the DBD is issued.

In order to maintain the DBDs as living documents, a process is in place to ensure that design changes are reviewed to determine their impact on the DBD. This process is addressed on Flowchart 10, DBD Update Process.

Checks And Balances

Writers of DBD's are trained to recognize and report discrepancies during the writing process. DBD comments submitted by the writers and reviewers are screened by the cognizant ComEd engineer to determine their significance. Comments are either resolved and incorporated into the DBD or handled as discrepancies and prioritized for resolution. Evaluations to determine disposition of discrepancies were done by the Cognizant Engineer.

Discrepancies are evaluated and prioritized by the following Categories:

1. Safety Impact, Operability/Technical Specification Violation, Licensing Violation.
2. Deficiency in Design Change.
3. Resolution Required to Support Future Design Changes.
4. Inconsistency or Missing Documentation that is not Necessary to Resolve.

Category 1 items are immediately referred to the applicable ComEd process for performing Safety, Operability, and Reportability determinations.

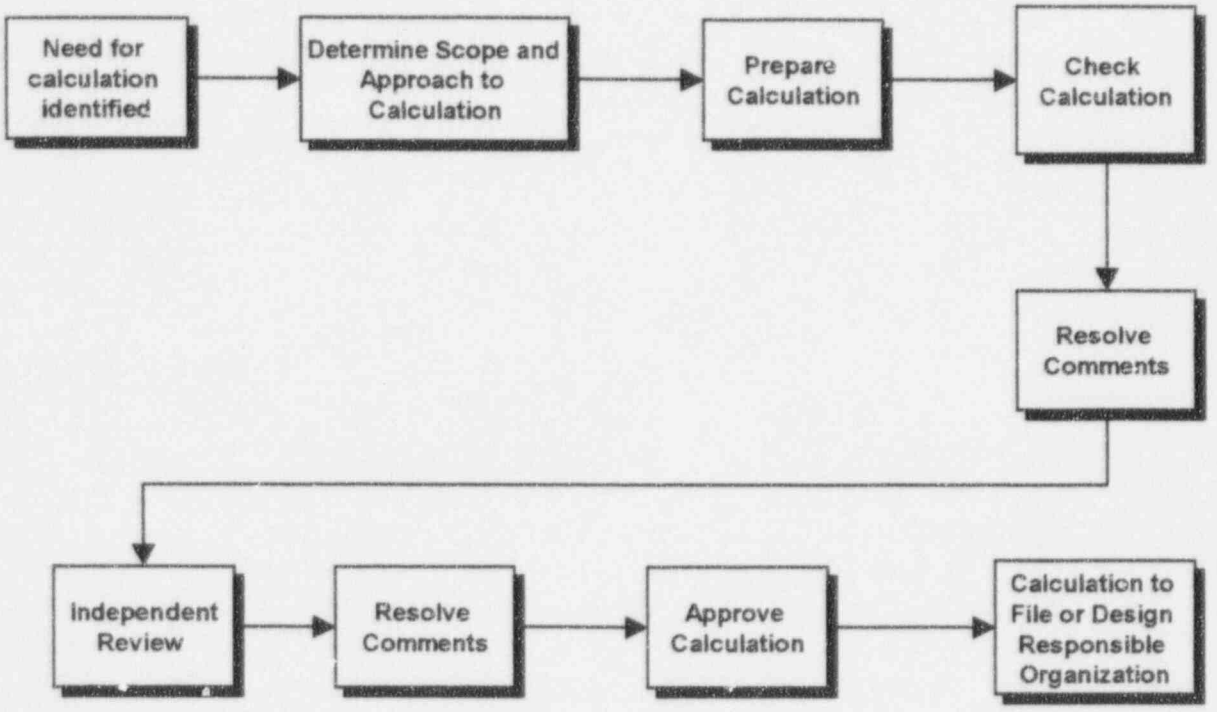
Category 2 items are evaluated and short term action plans are developed for resolution.

Category 3 items are evaluated and long term action plans are developed to resolve the discrepancy.

Category 4 items are tracked via the Open Item Log, contained within the DBD, for resolution as part of on-going activities.

Cognizant DBD Engineers are responsible to track and resolve Open Items listed against their DBD. When appropriate actions are completed, the resolution is documented, necessary DBD changes initiated, and the Open Item closed.

Flowchart 17
Calculation Process
NEP-12-02



Calculation, Process 17

NEP-12-02

Purpose

This process describes the preparation, review, and approval requirements for calculations that support Engineering Design and Analysis.

Process Description

The scope and approach to the calculation shall be established and applied.

Preparers are responsible for compiling the information and preparing the calculation in a prescribed manner for the stated purpose. Preparers shall possess discipline qualifications related to the subject matter or a specialization in the area through work experience, education, training, etc. During preparation, the Preparer shall be aware of the following which directly relate to the calculation:

Project files	Drawings
Meeting notes	Codes
Design criteria	Standards
Applicable previous calculations	Studies
System descriptions	Commitments to Regulatory Agencies

The preparer should adequately document Engineering Judgment, if applicable, to permit Reviewer to verify logic. Once the calculation is completed, the calculation may be checked prior to being submitted for an independent review. After comments generated through the independent review have been resolved, the calculation is approved and issued.

CHECKS AND BALANCES

The Supervisor/Approver may check the calculation prior to formal review for:

Format	Attributes
Completeness	Reasonableness of results
Technical adequacy	

An "Independent Review" of Calculations is performed by a qualified individual, using detailed guidance, assigned by the Supervisor. The Reviewer shall have had no influence on inputs or approaches utilized in the design development. The Reviewer is responsible to ensure the calculations:

Are complete	Meet applicable codes
Are technically adequate	Meet applicable standards
Are accurate	Meet quality requirements
Are appropriate for stated purpose	Meet licensing commitments
Have appropriate assumptions	Have reasonable output data

Calculations are reviewed by one or more of the following methods:

Detailed Design Review Method

Review calculations against design input documents to verify:

Conformance with specified configurations

Dimensions

Materials

Correctness of input parameters

Alternate Calculation Method

After ensuring that assumptions are appropriate and mathematics, input data or other calculation methods are correct, a simplified or approximate method of calculation is performed.

Qualification Testing Method

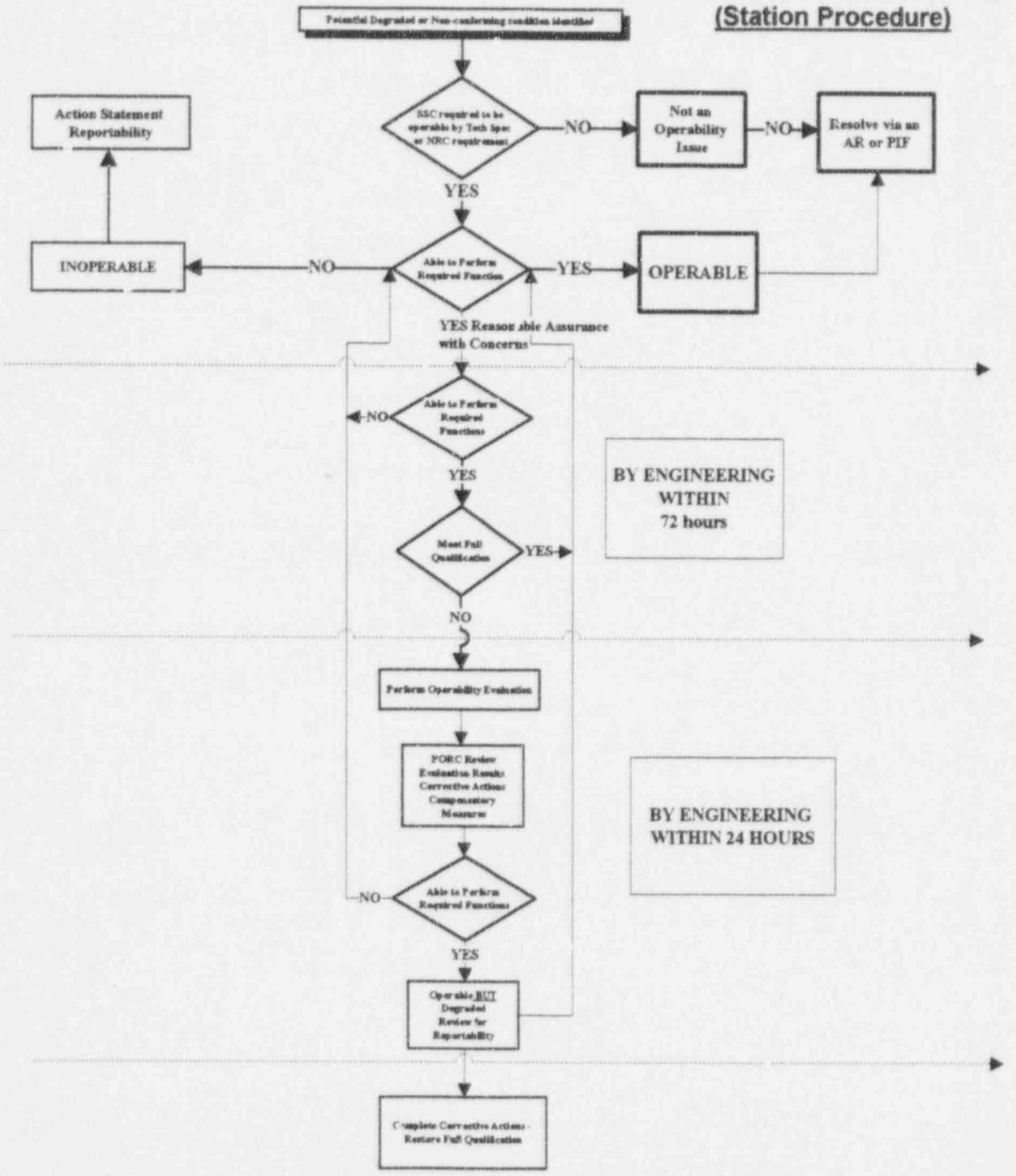
Verifying the adequacy of the calculation via a test program which demonstrates adequate performance under the most adverse operating conditions.

Review of Repetitive Calculations

Review previously approved calculations in terms of purpose, methodology, assumptions, and design inputs. Verify that differences will not affect the comparison and that conclusions are consistent.

Calculations are approved by the Supervisor or an experienced individual designated by the Supervisor. The Approver is responsible for the overall quality of the calculation.

Flowchart 18
Operability Determination Process
(Station Procedure)



Operability Determination, Process 18

Station Procedure

Purpose

Operability determinations are performed when the capability of a SSC to perform its specified function(s) as required by the Technical Specifications or UFSAR cannot be unequivocally demonstrated or where a degraded or nonconforming condition results in a judgment that the equipment is operable but there are remaining concerns or uncertainties. Station procedures address the detailed process; however, the stations procedures generally agree with the guidance provided in NRC Generic Letter 91-18 and the approach described here.

Process Description

Issue Screening

When an operability issue is identified, Operations expeditiously performs an operability determination.

Completion of the operability determination will determine if the SSC is:

- Operable with no concerns,
- Inoperable. Review for reportability, and
- Operable with potential concerns. This determination will require a Concern Screening to be performed by Engineering.

Concern Screening

Concern Screenings are performed by knowledgeable qualified Engineers to determine whether an operability concern exists. Screenings are performed using detailed guidance.

Completion of the concern screening will determine if the SSC is:

- Inoperable,
- Operable, and
- Concern confirmed, perform operability evaluation.

Operability Evaluation

Operability evaluations are performed by knowledgeable qualified Engineers using detailed guidance.

Completion of the Operability Evaluation will determine:

- If compensatory actions are required to maintain functionality and
- If corrective actions are required to restore full qualification.

Reviews

The Operability evaluation is reviewed by Engineering and Station Management.

Plant Operations Review Committee

The Plant Operations Review Committee (PORC) review is a safety/quality review of the Engineering evaluation, compensatory measures and corrective actions. The final determination of operability is made by the Shift Engineer.

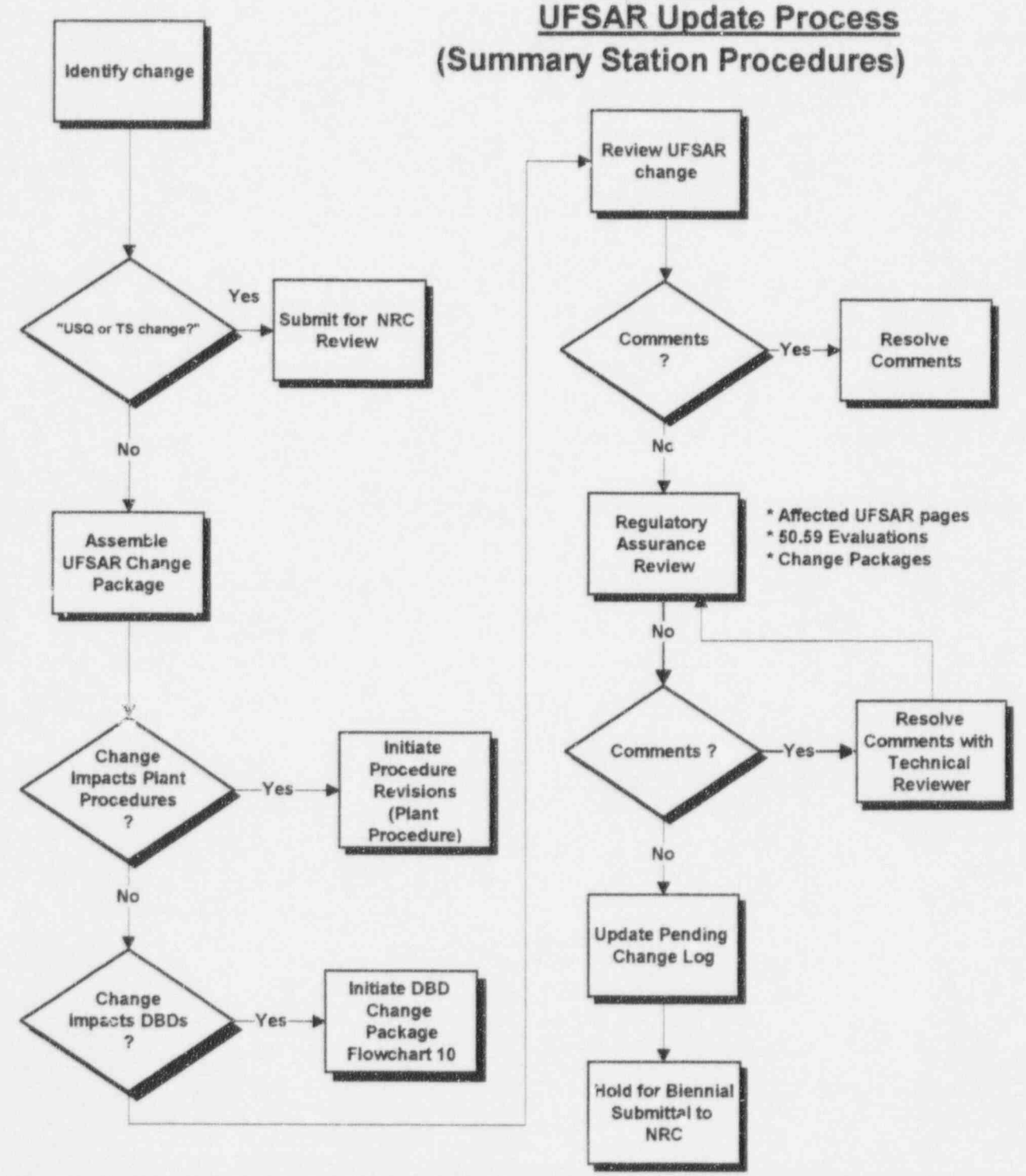
Closure

An operability determination is open as long as the degraded or non-conforming condition exists. The operability can only be "closed" when it can be shown that the SSC has been repaired or modified to meet the original full qualification or the design bases has been changed via a modification and/or UFSAR change so that the "as-found" condition now meets full qualification.

Checks And Balances

An Operability Evaluation is subjected to review by the PORC.

Flowchart 19
UFSAR Update Process
(Summary Station Procedures)



Updated Final Safety Analysis Report Update Review, Process 19

Station Procedure

Purpose

Changes made to the facility, equipment, analysis, procedures, programs, or organizations which change the description included in the UFSAR, require a UFSAR Change to be initiated. The relationship impact of UFSAR changes to the station design bases is controlled through detailed preparation and review processes as described below:

Process Description

Changes to the UFSAR can result from the design change modification process (where they are identified in the ADL), a general UFSAR update program, UFSAR reviews associated with the normal work process, regulatory, assessments, self-assessments or other processes. The process addressed here and depicted on flowchart 19 summarizes the UFSAR update process.

10 CFR 50.59 Safety Evaluation

10 CFR 50.59 Safety Evaluations are performed to determine if the UFSAR Change could involve an Unreviewed Safety Question or a change to the Technical Specifications.

All UFSAR Changes receive, as appropriate, a 10 CFR 50.59 Safety Evaluation, or 10 CFR 50.59 screening, or are covered by a previous 10 CFR 50.59 evaluation.

10 CFR 50.59 Screenings are performed and reviewed by individuals meeting the qualification requirements of ANSI N18.1-1971, Standard for Selection and Training of Nuclear Power Plant Personnel.

Technical Review

UFSAR changes receive a Technical Review to verify that the proposed information is technically correct. Technical Reviews are performed by individuals knowledgeable in the subject matter.

The ComEd QA manual Topical Reports and QCAP 1000-05 requires that Technical Reviewers meet the applicable experience requirements of Sections 4.2 and 4.4 of ANSI N18.1-1971, Standard for Selection and Training of Nuclear Power Plant Personnel.

- Technical changes are any changes that result from analyses, re-analyses, or a design change that does not result in a physical change of the plant. Technical reviews evaluate the impacts on:

- Personnel Safety,
- Operations,
- Adequacy of Design,
- Sequence of Logical Steps, and
- Program Interaction

On-Site Review

On-Site Reviews are performed by at least two individuals who collectively possess background and qualification in the subject matter. The QA manual Topical Report and QCAP 1000-05 requires that On-Site Review personnel meet the applicable experience requirements of Sections 4.2 and 4.4 ANSI N18.1-1971. As detailed in QCAP 1000-04 the On-Site Review function assures an evaluation of:

- Technical Specifications requirements,
- UFSAR requirements and commitments,
- Nuclear Safety issues,
- 10 CFR 50.59 Safety Evaluations for Technical Specification and UFSAR application,
- Procedures as detailed in Regulatory Guide 1.33,
- Radioactive Release Evaluation Reports, and
- Changes to the Emergency Plan.

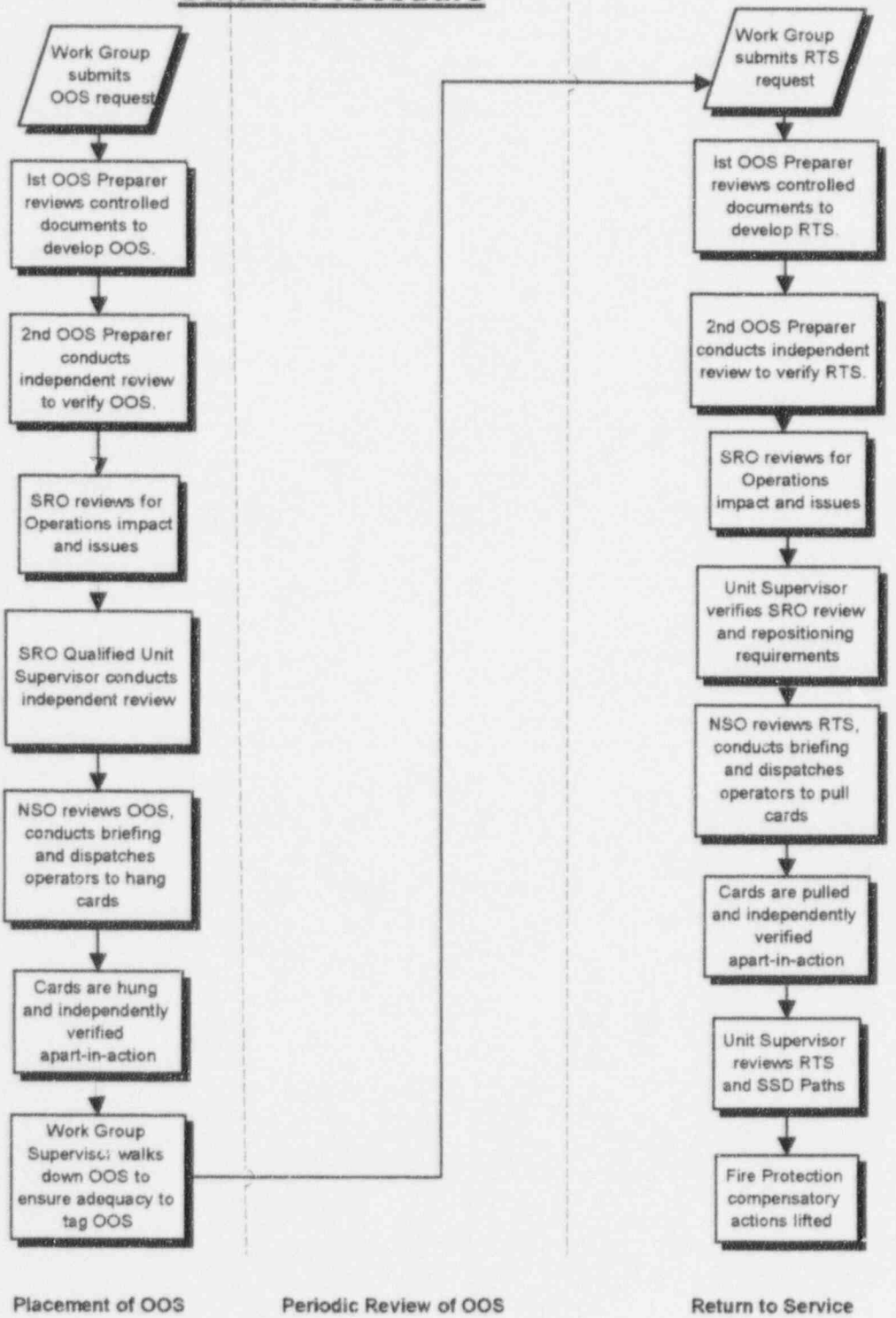
Additional categories requiring On-Site Review are detailed in the procedure.

Checks And Balances

The safety evaluation performed at ComEd for all non-editorial UFSAR changes provides an important checkpoint in the process to ensure regulatory compliance and maintain design control.

In addition, all UFSAR changes reviewed and approved by cognizant personnel. This provides an important administrative and technical checkpoint in the process.

Flowchart 20
Out-of-Service/Return-to-Service Process
Station Procedure



Out Of Service/Return To Service, Process 20

Station Procedure

Purpose

This process provides an overview of the common approach utilized to initiate and remove an equipment Out of Service (OOS). The detailed control procedures are station procedures, and are unique to each station.

Process Description

The following is an outline of the equipment OOS and Return-to-Service (RTS) process. It is controlled via station procedures.

Placement Of Out Of Service

Any station personnel may initiate an OOS Request to perform work safely on station equipment or to otherwise maintain and control abnormal configurations. This process is managed through ComEd's EWCS.

1. Work Groups requesting the OOS are responsible to sufficiently define the scope of the work to allow the Operations Department to develop an adequate OOS.

2. Qualification requirements are established for individuals who prepare and review OOS. Controlled documents and drawings are used to ensure accuracy of prepared OOS. When controlled drawings are unavailable, the OOS will be walked down in the field to ensure accuracy. A second qualified OOS Preparer independently verifies the OOS as correct.

3. The OOS is reviewed by an SRO licensed operator to identify Technical Specification, Primary/Secondary Containment related, fire protection/Appendix R and other issues.

4. A SRO licensed Unit Supervisor in the Control Room conducts an independent review to evaluate the impact of the OOS on plant conditions and the probabilistic risk assessment for the Unit.

5. A Reactor Operator licensed Nuclear Station Operator (NSO) reviews the OOS is correct for the current plant conditions and will brief the Operations personnel positioning equipment and hanging the OOS cards.

6. Both licensed and non-licensed operators may place OOS cards. Cards are hung and then independently verified apart-in-action unless waived by Unit Supervisor.

7. The Work Group Supervisor is responsible to verify the OOS has been correctly hung and is adequate for the scope of the work.

Periodic Review Of Out Of Service

While in place OOS are subjected to periodic reviews for potential impact on station operation in accordance with requirements specified in station procedures.

Return-To-Service

When work is completed, a RTS Request initiates removal of the OOS.

1. A qualified OOS Preparer reviews controlled documents and drawings to prepare the RTS and determine repositioning requirements for equipment.

2. A second OOS Preparer verifies the RTS is correct.

3. RTS is SRO reviewed to identify potential Technical Specification/Containment issues.

4. RTS is verified by the Unit Supervisor to ensure Technical Specification/Containment issues have been satisfied and that equipment repositioning requirements are appropriate.

5. A NSO will review the RTS and brief the operators who will reposition equipment and remove the OOS cards.

6. All equipment is repositioned and OOS cards are removed with independent verification apart-in-action unless waived by Unit Supervisor.

7. The Unit Supervisor reviews the RTS to restore Safe Shutdown Paths and to ensure actions are properly completed and notifies the Fire Marshall for termination of fire protection compensatory measures.

Checks And Balances

Independent verification is used throughout the OOS program. There are 2 OOS Preparers and each is responsible to independently review controlled documents and drawings to satisfy themselves that the points of isolation and special instructions are correct. Technical Specification, Primary/Secondary Containment impact fire protection/Appendix R and other operation impact and issues are also independently reviewed by SRO licensed operators. When equipment is positioned and cards are hung during OOS or RTS, 2 operators are normally assigned to perform independent verification apart-in-action. The review by both the Unit Supervisor and NSO considers potential impacts of the OOS or RTS on the current plant configuration. The Work Group Supervisor is responsible to ensure that the OOS is appropriate for the scope of work to ensure protection of the equipment as well as personnel safety. The periodic review of OOS ensures that OOS have received a 10 CFR 50.59 Screening/Evaluation to ensure the level of plant safety is not degraded by the duration of the OOS, equipment is maintained in the correct OOS position and that the Control Room Simulator adequately reflects the impact of the OOS on the configuration of the plant.

APPENDIX III NUCLEAR FUEL SERVICES DESIGN PROCESSES

The Nuclear Fuel Services (NFS) Department is the ComEd Corporate Engineering organization providing production services, as discussed below, to the ComEd nuclear stations. In the past, its functions were performed by a separate service organization that was not a part of corporate engineering and was under separate management. Consequently, when NFS was merged into the Nuclear Engineering Services Department under the direction of the Engineering Vice President, it already had unique processes and procedures that were migrated with it to the new organization. This Appendix addresses those NFS processes that impact design bases and configuration control.

In addition, NFS has an important role in establishing and maintaining the design bases. Establishing new reactor fuel designs, evaluating new fuel vendors, overseeing changes to the core configuration, and changes to core components. Changes to the refueling cycles can have impacts on the thermal-hydraulic and transient analysis that form the bases of the safety analyses and evaluations. These important roles are discussed in this Appendix.

1.0 Organization and Responsibilities:

The NFS Department has lead responsibility for Core Reload Design and other reactor core components for all six nuclear stations. The NFS Chief Nuclear Engineer and the NFS Supervisors plan, direct and monitor all activities related to Core Reload Design. The NFS Chief Nuclear Engineer reports directly to the Engineering Vice President.

The Site Vice President and Senior Station Management are responsible for providing oversight review and concurrence with the reactor core design. This includes significant changes in unit operation philosophy (such as 24 month cycles) and fuel design changes. Additionally, they supply corporate and station goals to be used in the design of the reload (such as the cycle startup/shutdown dates and anticipated operating capacity factor).

The Station Reactor Engineer administers the on-site Core Reload Design activities related to design input, fuel and component handling, core loading, startup testing and operations support. The Reactor Engineer reports indirectly to the Site Engineering Manager and takes functional direction from the NFS Chief Nuclear Engineer in matters related to Core Reload Design. The Site Engineering Manager is responsible for engineering activities at the station. Site Engineering provides input to the Core Reload Design process by identifying any plant modifications or changes which may affect the Core Reload Design.

The On-Site Review function is responsible for the review of changes to procedures, equipment or systems as described in the Safety Analysis Report. On-Site Review is responsible for performing a review of the Core Reload Design 50.59 package and/or any license amendments produced in the Core Reload Design process. Off-Site Review is responsible for fulfilling the Off-Site Review and Investigative Function, including the review of changes to procedures, equipment or systems as described in the Safety Analysis Report. Off-Site Review is responsible for

performing a review of the Core Reload Design 50.59 package and/or any license amendments produced in the Core Reload Design process.

The Fuel Vendors are responsible for the mechanical design and fabrication of the fuel assemblies, Loss of Coolant Accident (LOCA) Analysis of record and maintenance of the Core Reload Design capabilities required by the Fuel Contract and Vendor Interaction Procedures or Guidelines. Fuel Vendors must maintain approved Quality Assurance programs for their design work, which may include some or all of the nuclear design and safety analysis scope if requested.

2.0 Core Reload Design Control Process (Process 1):

Note: For the purpose of this discussion, the term "Fuel Vendor" is applied to the organization responsible for the fabrication of the fuel and delegated to perform the required core design and licensing analyses. ComEd currently performs the core design analyses, including:

- Reload Design Safety Evaluation,
- Updated Final Safety Analysis Report (UFSAR) Changes,
- Technical Specification development,
- Technical Specification Amendment preparation,
- Nuclear Regulatory Commission (NRC) Review and Approval,
- Perform Review of Critical Parameters, and
- LOCA Analysis Parameter Evaluation.

The Reload Design Initialization (RDI) process sets the scope and ground rules for the reload design. The RDI process is broken into two parts:

a) The RDI process identifies plant changes such as modifications, Technical Specification amendments and setpoint changes which could potentially affect the design or schedule. The RDI also identifies any fuel design changes or first-of-a-kind applications.

b) The RDI process also determines how the proposed reload design would affect the plant. The RDI process identifies any supporting activities which must occur to support the reload design. Supporting activities include setpoint changes, license amendments, training, procedure changes, special tests and others. The RDI process tracks to completion or resolution each of these changes.

The assumptions and conditions identified in the RDI process are applied in the Core Reload Design process. The Reload Design Safety Evaluation (10 CFR 50.59 for the reload design) confirms that these inputs do not create an unreviewed safety question. The assumptions and conditions are again reviewed prior to criticality.

NFS completes a separate evaluation for any new fuel or core component designs, verifies that the final Fuel Assembly Design Package and Nuclear Design Report properly reflects the fuel assembly dimensional and neutronic designs established for the reload, and transmits the reload licensing documents to the station as a Nuclear Design Information Transmittal.

A Station On-Site Review and Off-Site Review are conducted on the Core Reload Design 50.59 package.

Upon completion of the core loading, the core configuration is verified by the performance of an as-loaded fuel assembly serial number surveillance. Typically, an underwater camera is used and the results are video taped. The Reload Licensing Loading Pattern, used for all licensing evaluations, is the acceptance criteria bases for this review.

During the latter stages of the refuel outage, the station performs an On-Site Review of the outage activities. A subsection of this review is a verification that the assumptions used for the design, analysis, and supporting activities are still appropriate considering the actual conditions and that the required supporting activities are completed or will be completed as required.

Upon completion of the refuel outage, startup tests are performed in accordance with the station's Technical Specifications or other administrative controls. Tests are performed as required by the Core Reload Design process; results of these tests are evaluated to provide assurances that the design is valid by comparing test results to design values for key parameters.

3.0 Nuclear Fuel and Component Design and Fabrication Control Process (Process 2):

The Fuel and Component Design and Fabrication Control Process involves the technical review of all significant changes to the fuel assembly. This design review covers the potential impact of the change on plant safety and transients, interfaces, reliability, and performance.

Uranium enrichment and burnable absorber content vary from cycle to cycle to accommodate cycle energy requirements. These parameters are specified by NFS and may be included under this process if their values are outside previously utilized ranges and there is a possible affect on safety or transient analysis, fuel rod performance, etc.

For Significant Design Changes, a more rigorous review process is required.

A Design Review Team is formed consisting of NFS personnel, appropriate station personnel and, when needed, appropriate technical experts from outside NFS. Documentation of the review is maintained including notes or minutes, as appropriate, from the meetings and telecommunications with vendor personnel or expert consultants on the design change when appropriate.

The Design Review Team thoroughly reviews the design change and all documentation provided by the vendor to support the change. Information such as design analyses, design bases, prototype testing, Lead Test Assembly experience, the vendor's qualification of the design change and fuel fabrication process changes associated with the design change are typically included in the evaluations.

If the design change is acceptable to the Design Review Team, station concurrence with the change is obtained. Significant design changes are reviewed and approved by Senior Station Management.

4.0 Nuclear Fuel Services Controlled Work Process (Process 3):

Controlled Work includes calculations or analyses, formal evaluation, review, response or recommendation including changes which are:

- Important to safety in the design or operation of a fuel rod, fuel assembly, or reactor core, or in the design or operation of a plant system, subsystem or component; or
- Used to generate information which will be sent to the NRC in support of ComEd submittals; or
- Used to support an NFS, Station or other ComEd department Safety Evaluation, Significant Hazards Evaluation, Technical Specification or Final Safety Analysis Report change or interpretation thereof; or
- Used in the generation of Special Nuclear Material accountability information.

All Controlled Work receives an Independent Review by a qualified Engineer.

Special reviews are required for:

- First-of-a-kind application of a substantially new methodology or design,
- First application of a Special Controlled Analysis or Special External Analysis that is particularly significant, or that has a direct and significant impact on a Technical Specification or that is required for NRC submittal, and
- Special Analyses or safety reviews or recommendations that would result in a major change in station operation, Special Nuclear Material accountability, or reactivity management.

5.0 Review of Problem Identification Forms

A review was performed of NFS generated Problem Identification Forms (PIFs) from 1993 to November 8, 1996. Nearly 50% of the NFS generated PIFs were associated with the Reload Design Process (RDP). Over the three and a half year period, nearly half of the design bases deficiencies were equally distributed in the areas of the licensing bases documents (UFSAR and Technical Specifications), databases (typically computer data files) and procedures. The remaining 50% are associated with the design bases process itself. Approximately 10% of the reload design process PIFs were categorized as significant and received a heightened level of investigation.

The RDP PIFs covered a spectrum of issues; from minor errors caught during the Independent Review process to significant process deficiencies that resulted in notable process enhancements. The age of the deficiencies also ranged widely; from inaccuracies in currently open evaluations to original licensing bases analyses.

Significant design bases process enhancements that resulted from RDP PIF investigations include:

- Created a transient input parameter list,
- Created a reload design initialization/control procedure,
- Developed reload interaction agreement with Fuel Vendor for pertinent fuel rod design information,
- Upgraded procedure for Controlled Work to improve required handling and review of all external documents including those classified as routine design,
- Changed the threshold for writing PIFs to require that any anomalies identified consistent with a "controlled work" review be PIFs, and
- Developed a Quality Software Control Process. The various stages of testing, validation, operation, maintenance and upgrades were defined and a list of approved quality software developed, communicated and maintained.

6.0 Summary of Major Audit Findings and Corrective Action

NFS and the Nuclear Engineering Groups participate in audits of the ComEd nuclear stations, fuel and core component vendors and licensing analyses Architect Engineers. Some of the external audits are conducted as a joint audit by a collection of utilities. All audits are undertaken periodically or as a special review as the result of an adverse trend.

Some of the more significant findings (Level II) are listed as follows:

- Using a procedure which is not approved to make changes to controlled documents without making a revision change to the document,

- Reference files used during testing of a revision to the Core Monitoring Software were not completely reviewed, and

- The calculation notebook to support the application of TIP machine data substitution methodology was not completed.

As part of the transition to Siemens Power Corporation (SPC) ATRIUM-9B fuel at ComEd's Boiling Water Reactors (BWRs), increased vendor special audits and technical reviews have been and are continuing to take place at SPC's offices/facilities due to the introduction of the new fuel type and licensing methodologies. Examples of these include a technical review of the LaSalle Equipment Out Of Service Analysis and a technical review of the Quad Cities LOCA/ECCS analysis.

The Reload Design Process has also received both internally and externally originated audits. These audits are initiated both periodically as well as when a trend is identified. Over the last few years, the Reload Design Process has been the subject of numerous internal and industry sources audits as well as two NRC inspections. Overall, the Reload Design Process has been found by ComEd and concurred by the NRC to be satisfactory.

Communications between the station personnel and NFS was a strength and included:

- The weekly conference call with the Lead Nuclear Engineers from the stations,

- A single NFS contact for each station contributed to effective and efficient communications, and

- Direct access (using the paging system and home telephone numbers) and availability of Technical Staff NFS personnel during off-normal hours and weekends.

These are common to BWR and Pressurized Water Reactor. However, weaknesses were also identified such as:

- Most communication for special circumstances and unique issues appear to be verbal;

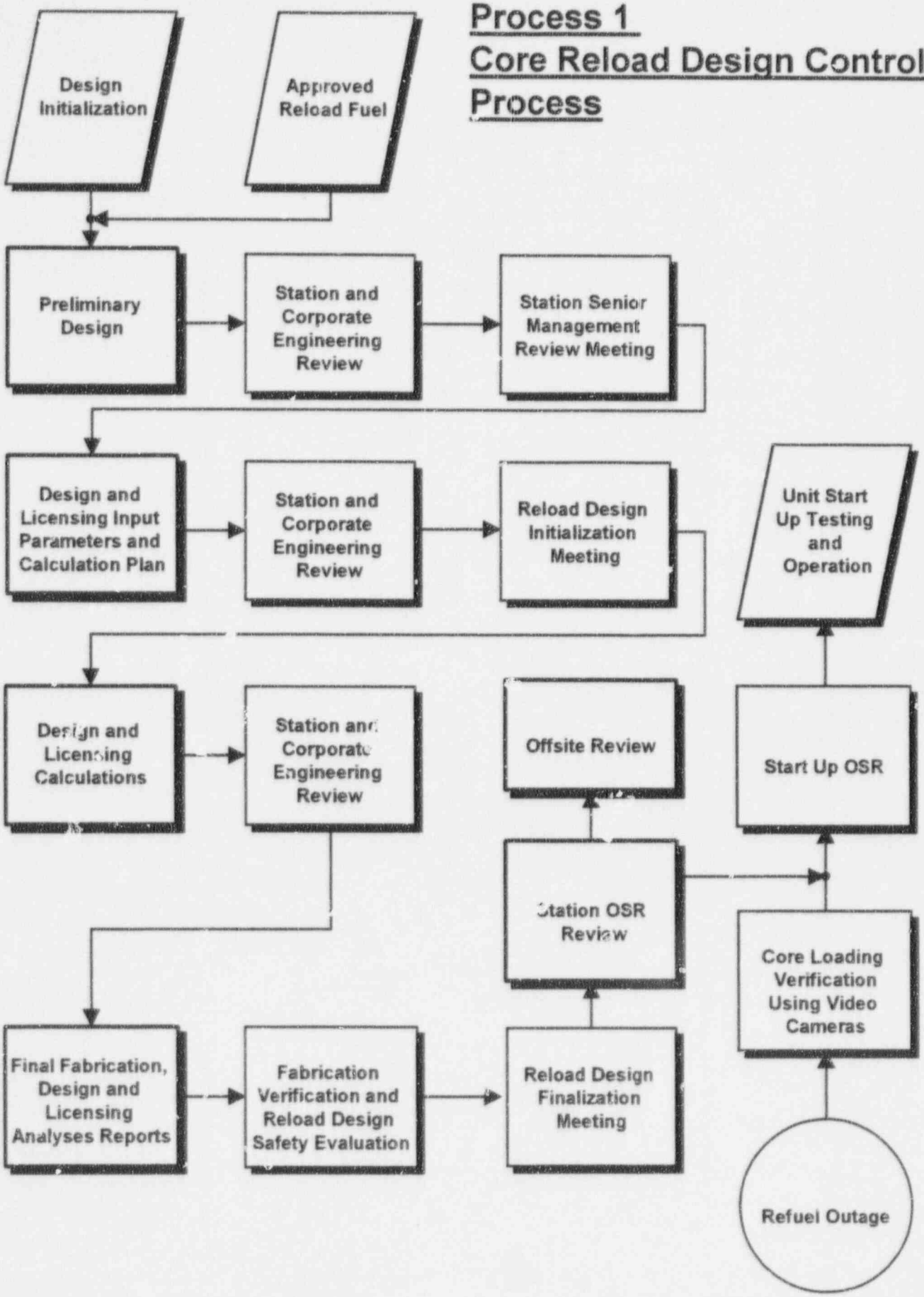
- Training and qualification was identified as a contributing cause to the reactivity control problem; and

- ... deficiencies were identified in the areas of Qualified Nuclear Engineer (QNE) training and self-assessment. The QNE training deficiencies involved a lack of clear ownership of the QNE requirements. The self-assessment process was of limited benefit to the NFS organization, primarily because this effort was still in the initial stages of development.

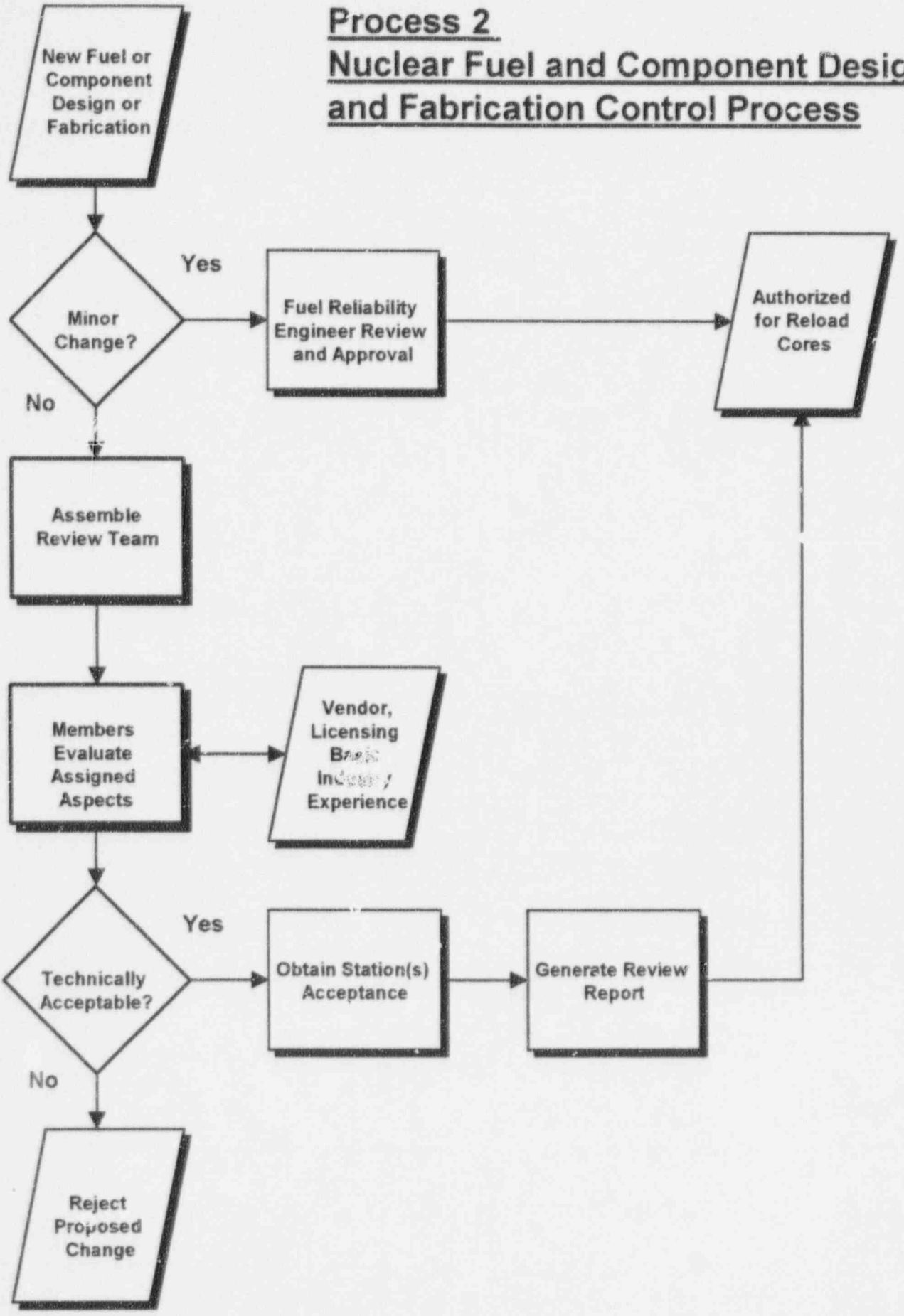
These weaknesses have been corrected.

In addition to corrective actions and process improvements undertaken in response to audits and regulatory findings, NFS is planning to implement a proactive process improvement that was identified from recommendations made at an industry managers conference. A review meeting with Senior Station Management is being added to the Core Reload Design Process. This review meeting provides Senior Station Management oversight review and approval of the core reload design including significant changes in unit operation philosophy and fuel design changes.

Process 1
Core Reload Design Control Process



Process 2
Nuclear Fuel and Component Design and Fabrication Control Process



Process 3
Nuclear Fuel Services
Controlled Work Process