



Electric Power
Research Institute

Leadership in Science and Technology

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As requested by NRC staff, Enclosure 1 provides hand-marked changes to pages of Volume II of the Utility Requirements Document. Volume III page changes are provided in Enclosure 2. A guide to the reasons for specific changes is included as an attachment to each enclosure.

Review of the Requirements Document continues in response to Draft Safety Evaluation Report issue resolution and NRC Requests for Additional Information. The enclosed hand-marked revised pages are considered working documents and are being submitted to expedite NRC closure of issues. If the formal Requirements Document revision review process necessitates modifying the enclosed hand-marked changes, the "modified" changes will be identified in the official Requirements Document revision submittal as different from these pages. Additional page changes are expected as a result of future interaction with NRC.

If you have any questions, please call John D. Trotter at 415/855-2786.

Sincerely yours,

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WATERFORD 3
DESIGN ENGINEERING TECHNICAL PROGRAM

- o Electrical Calculation Update
- o Instrumentation Setpoints Program
- o Design Basis Documentation Program
- o Computerized Cable and Conduit List
- o Fire Protection Program
- o Procurement Engineering
- o CAD and Scanner
- o Probabilistic Risk Assessment
- o Cobalt Reduction Program
- o As-Building Program
- o Nuclear Plant Reliability Data System
- o Computer Use Plan
- o Design Engineering Staffing
- o Human Factoring of Procedures

POSITION PAPERS
ENGINEERING EXCELLENCE
ELECTRICAL CALCULATION UPDATE

BACKGROUND:

The designed performance capability of the Electrical Distribution System (EDS) for nuclear plants is being audited by the NRC. This is part of a major industry wide effort by the NRC to assure the adequacy of the existing Electrical Distribution System to meet the initial and current performance capabilities. The overall program is known as EDSFI or Electrical Distribution System Functional Inspection. The Waterford 3 inspection was conducted in December 1990 - January 1991.

The results of the EDSFI for Waterford 3 are detailed in NRC Inspection Report 50-382/90-23. This report concludes that the design of the EDS to be generally adequate. However, the inspection team identified some concerns pertaining to engineering calculations containing erroneous or nonconservative assumptions and computations. The deficiencies do not preclude the EDS from performing the intended functions. However, in order to maintain the level of excellence demonstrated in all areas, Design Engineering has embarked on an ambitious program with an aggressive schedule to upgrade electrical calculations to current standards.

POSITION:

The existing design calculations were performed during the construction phase of Waterford 3. The available equipment data was used to develop the documents for procurement and installation of electrical systems. The calculations were not thoroughly updated for as built conditions after construction completion. Design Engineering Electrical initiated a calculation review program prior to the EDSFI. In order to expedite the closure of the EDSFI findings, a task force has been established to upgrade the calculations.

The objective of the calculation upgrade program is to develop a set of documents to support the design basis using the actual data for plant systems structures and major components. In addition to enhancing engineering long term efforts, the main objectives of the program are to:

- ° Resolve all open items pertaining to the EDSFI findings
- ° Resolve all open items identified by in-house reviews of engineering design considerations
- ° Provide technical justification for design bases
- ° Address industry bulletins, guidelines, etc., and upgrade calculations to current standards
- ° The design attributes of the EDS are complete, easily retrievable, verifiable and can be updated for proper configuration control management

POSITION:

The program has been divided into three phases:

Phase I: Review and upgrade approximately 45 calculations associated with safety related systems. High priority has been assigned to particular calculations associated with EDSFI findings. These findings require updating calculations for plant voltage profiles under normal operation, accident scenarios and light load conditions with varying grid voltages. The short circuit calculations associated with the evaluated voltage levels will also be updated. In addition, the emergency diesel generator loading and sequencer calculations are being finalized. In order to resolve the concerns associated with Waterford 3 batteries, new calculations have been initiated to document battery loading requirements and terminal voltages for postulated accident conditions. Battery charger sizing and DC System short circuit study, distribution panel loadings and calculations for equipment sizing are being updated.

For this task, computer programs are being used to support some of the extensive computational requirements for optimizing relay and transformer tap settings, analyzing battery profiles under varying conditions and defining plant operational requirements. An estimated expenditure of approximately 10,000 manhours is projected. This phase of the effort is expected to be completed by December 1992.

Phase II: Review and upgrade balance of safety related calculations. Some of these calculations have been affected by recent plant modifications. The change impact has been evaluated for design considerations but the calculations require enhancements to bring up the level of detail documented. This effort will expend approximately 8000 manhours and should be completed by June 1993.

Phase III: Review and upgrade selective non safety related calculations. These are design sensitive calculations that do not impact plant safe shutdown but require revisiting to ensure that design requirements associated with the original design bases for the plant and all subsequent plant modifications are clearly reflected. An estimated expenditure of approximately 10,000 manhours is projected for this effort with completion date of June 1994.

POSITION PAPER
ENGINEERING EXCELLENCE
INSTRUMENTATION SETPOINTS PROGRAM

BACKGROUND:

The need for supporting calculations and Design Basis Information are generally recognized as Nuclear Power Industry issues that must be addressed. Industry operating experiences, together with the recent increases in regulatory guidance activities, all lead the way to having a controlled methodology for the determination of safety related setpoints, and documentation of the Design Bases for these values.

POSITION:

The existing plant setpoints control program includes administrative procedures which effectively control and maintain Waterford 3 setpoints values. These procedures currently require retrieval and review of the Design Bases for the existing setpoint value, when a setpoint change request is being processed. Enhancements to the current setpoints control program can be made to assure that cognizant personnel are better able to:

- Correctly perform setpoint calculations that will ensure adequate margins of safety.
- Retrieve the design basis for an existing setpoint value, prior to changing the setpoint. This will assure that LP&L has not overlooked an operating or design safety consideration used by the NSSS vendor or the architect engineer in the original plant design.
- Develop and properly document the design basis for new setpoints generated as part of the design change process.

Enhancements to the Waterford 3 Setpoint Control Program which are currently in the implementation stage include:

- o Development of a setpoint calculations methodology manual. This manual will establish the standard reference.
- o Modifications and additions to data bases, software, and hardware, to provide the capability to support an expanded Setpoint Documentation Program.
- o Validation of the existing values of setpoints for certain plant instrumentation and control systems. 50 Calculation packages are to be generated during the initial phase scheduled for October, 1990, with completion planned for June, 1991. The remaining calculations to be performed during this program will be identified and scheduled after the initial phase is completed.

INSTRUMENTATION SETPOINT PROGRAM
PAGE 2 OF 2

- o Training on the basic principles of setpoint calculations methodology and documentation of design bases for setpoints.

The implementation schedule for these enhancements to the Waterford 3 setpoint control program is 13 months to complete the short-term activities, and 24-36 months to complete the review of all Waterford 3 Instrumentation loops. To achieve maximum technology transfer, designated Waterford 3 personnel will work with a contractor in the actual performance of the program tasks completed in the initial phase.

POSITION PAPER
ENGINEER EXCELLENCE
DESIGN BASIS DOCUMENTATION PROGRAM

BACKGROUND:

The issue of Design Basis Documentation (DBD) is a current industry wide concern that is receiving major attention from both industry groups such as NUMARC and INPO, and the NRC. Waterford 3 has successfully completed the transition from the construction phase to the operational phase. In order to maintain the level of excellence achieved so far in plant operation it is necessary to describe, in one set of documents, the original design basis for the plant systems and structures. This information is required to ensure that plant modifications and changes to plant procedures will be performed in conformance with regulatory requirements and ultimately with public safety.

POSITION:

The objective of the Design Basis Documentation program is to develop a set of documents for the plant systems and structures which will contain the design basis and the actual design data for the system, structure, and major components. This program is intended to be a keystone in the overall plant configuration management program. Other benefits and objectives are:

- o Provide verified source documents for design modifications and performing 10CFR50.59 safety evaluations.
- o Provide a convenient roadmap to plant calculations, drawings, specifications, etc.
- o Address NRC guidance relative to the quality and completeness of Design Basis Documentation at nuclear power plants (IE Notice 84-54)

The program was divided up into six (6) phases, namely:

- Phase 1: Preparation of a writers guide and project procedures
- Phase 2: Preparation, review and publication of three (3) pilot DBDs
- Phase 3: Development of a computerized design basis data base
- Phase 4: Preparation, review and publication of ten (10) additional design basis documents
- Phase 5: Preparation, review and publication of additional design basis documents
- Phase 6: Performance of Safety System Functional Inspections (SSFI)

Phases 1 and 2 are complete; phase 3 and 4 will be completed in mid 1990.

Phases 5 and 6 are ongoing and are scheduled to continue through 1994.

POSITION PAPER
EN. VEERING EICELLEENCE
COMPUTERIZED CABLE AND CONDUIT LIST

BACKGROUND:

Information used in the design and maintenance of the W3 cable and raceway system is maintained on the following separate documents which are part of the plant configuration control: B288 CCL, Cable and Conduit List; B-316, Electrical Penetrations; B-353, Box Details; 15.89 B1, Conduit Seal List; 8.40 B3, Nuclear Penetration List; 8.40 B6, Water Seals/Barrier (Trays) List. Separate documentation also exists for seismic supports, Appendix R wrap and Reg. Guide 1.75 wrap.

Previously the CCL was maintained by Ebasco Services, Inc. and issued on a periodic basis. The last update of the CCL was issued on May 21, 1987. The computer and software used to produce the CCL are obsolete and have been dismantled. The other documents, which share common data with the CCL, are maintained manually. Most of this information is not in alphanumeric order and is difficult to find, which has contributed to discrepancies within the documents.

In 1988, NOE&C provided justification to Waterford 3 management for a computerized CCL.

POSITION:

A new database has been developed and hardware procured which allows LP&L to maintain the Cable and Conduit List. All associated information is being combined with the Cable and Conduit data into one common database.

The computerization of these documents into one database provides the following benefits.

- 1) Inconsistencies and errors can be identified and corrected.
- 2) Prevents duplication of component IDs.
- 3) Helps prevent most typographical errors.
- 4) Reduction in manhours for cable and raceway related activities (design and maintenance):
 - o Computer search of items is more efficient than a manual search. All information is one place, which makes it unnecessary to search multiple documents.
 - o Computer generated DRNs - Only one DRN needed for all changes. Previously, several DRNs may have been needed, one for the Cable and Conduit List and one or more for each of the other documents.
 - o Computer generated pull cards - Eliminates the chance of errors resulting from copying a routing to a pull card.

A computerized database was necessary due to the amount of data and common fields associated with the installed plant. This system provides the tools necessary to achieve accurate, cost effective configuration control.

SCHEDULE:

The computer generated Cable List was issued on May 3, 1990. The following are the scheduled issue dates for the remaining lists:

Water Seals/Barrier (Trays) List	July 31, 1990
Box List	July 31, 1990
Safeguard Cable List	October 31, 1990
Electrical Penetration List	December 31, 1990
Conduit Seal List	May 31, 1991
Nuclear Penetration List	December 31, 1991
Appendix R Data	July 31, 1992
Reg. Guide 1.75 Data	July 31, 1992

POSITION PAPER
ENGINEERING EXCELLENCE
FIRE PROTECTION PROGRAM

BACKGROUND:

Fire protection has become a significant area of concern throughout the nuclear industry, receiving attention from both insurers and the NRC. Engineering responses to deficiencies identified by these groups have always resulted in a program upgrade; Waterford 3 continues to improve its overall fire protection program.

POSITION:

The design engineering fire protection program has many objectives. Among these are:

1. Control of Design Documents
 - ° The nuclear penetration list is undergoing an upgrade to more precisely identify the functions of each penetration seal.
 - ° A study was recently completed to classify all fire walls in the plant as being Appendix A, Appendix R, and/or an insurance requirement.
 - ° The standard typical details for penetration seal design are evolving as seal requirements change with material technology.
2. Preparation of Design Change Packages
 - ° DC 3197 was prepared when problems with penetration seals were identified during a 100% seal inspection. The design is being implemented in three phases, all of which are on going.
 - ° Phase I involves the rework/installation of approximately 90 seals.
 - ° Phase I replaces 24 fire dampers with zero-clearance fire dampers.
 - ° Phase III consists of third-party fire testing, Entergy evaluation of results, and any changes in design as dictated by test results.

FIRE PROTECTION PROGRAM

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- ° DC 3268 proposes two alternatives for obtaining FM approval of the plants fire detection system.
 - ° Upgrading existing system
 - ° System changeout to new manufacturer
 - ° DC 3134 is in preparation to fireproof 3 out-of-barrier dampers and to correct problems with a part-height 1 hour fire barrier.
3. Addressing Condition Identifications
- ° Approximately 1500 CI's have been evaluated since November 1988.
4. Review of Design Change Packages
- ° Any plant modification with potential to alter the plant's capability to prevent, suppress, or extinguish a fire is reviewed by design engineering's fire protection group. This is an important part of program control.
5. Evaluations
- ° Any identified exception to a standard requirement of fire protection, may be addressed by an engineering evaluation as outlined by generic letter 86-10 (if applicable).

POSITION PAPER
ENGINEERING EXCELLENCE
PROCUREMENT ENGINEERING

BACKGROUND:

Procurement Engineering develops the technical and quality specifications to purchase replacement items. Procurement Engineering also performs technical review of procurement documents for design change material and contracted services.

POSITION:

Recently, Procurement Engineering has been a very dynamic area in the Nuclear industry. With qualified vendors becoming scarce and problems such as substandard items and fraud, the practices of the utilities' Procurement Engineering departments have been drastically affected.

Adjusting to the increased burden without a corresponding increase in resources has resulted in a number of program efficiency improvements.

- o Standard Requirement Statements
- o Evaluation Documentation Upgrade
- o Desk Guide Development and Use
- o Automated Repeat Procurements
- o EPRI Guidance Implementation

These improvements, coupled with extremely dedicated individuals, have resulted in increases in production such as supporting inventory description corrections and consolidation, and project type procurements such as bearings, breakers, and fuses.

STANDARD REQUIREMENT STATEMENTS:

Standard requirement statements were developed to automate the specification of procurement requirements as much as possible. Statements are selected by number and retrieved in text form from the computer for the purchase order.

The standard requirement statements help to achieve consistency and also serve as a checklist to assure requirements are considered. This helps assure commitments are met without the need for detailed procedures for each situation and type of item ordered.

EVALUATION DOCUMENTATION UPGRADE:

The Procurement Method Evaluation was developed to organize the thought process and help ensure procedure compliance by providing a fill-in-the-blank type evaluation. The evaluation is organized and documented so that an independent reviewer can easily determine the thought process and conclude that the procurement method is correct and appropriate.

DESKTOP GUIDE DEVELOPMENT AND USE:

The Procurement Engineering Desktop Guide was developed to provide a central retrievable location for frequently issued and updated guidance, reports, and special considerations. Some of the highlights of the Desktop Guide are the Negative Commitments report, the Standard Requirement Statement report, guidance on safety and quality classification, guidance on critical characteristics selection, and other various sections.

AUTOMATED REPEAT PROCUREMENTS:

As a result of the implementation of the Materials Management Information System (MMIS), reorders are automated. All that is required is a review to ensure the procurement meets the current procedure requirements and no unauthorized changes were made from the original procurement.

EPRI GUIDANCE IMPLEMENTATION:

The EPRI Guidance on Utilization of Commercial Grade Items in Nuclear Safety Related Applications has been incorporated into Procurement Engineering procedures and instructions. The four methods of dedication given in the EPRI Guidance are invoked. Currently, more than 160 separate procurements have been processed for commercial grade items in accordance with the EPRI Guidance.

POSITION PAPER
ENGINEERING EXCELLENCE
CAD AND SCANNER

BACKGROUND:

CAD has been an on-going objective at Waterford 3 since November, 1984. On June 10, 1988, LP&L participated in a SERI Engineering Manager's Peer group which committed to develop a system wide CAD plan. Benefits were weighed between CAD and manual drafting based on the progressive conversion of manual drawings to CAD and the creation and revision of drawings on CAD. With the implementation of CAD, an average yearly reduction of 4800 manhours of drafting time would be saved, with an estimated net-annual savings of approximately \$162,000. From these findings Waterford 3 had its CAD system purchased and delivered December, 1989. Implementation began in January, 1990.

POSITION:

During the first quarter of 1990 a scope was developed prioritizing drawings that were slated for scanning and implementing onto a CAD. Approximately 27,520 drawings are required on CAD to support the plant. They are prioritized and a schedule has been established to complete CAD implementation over a five year period. The first milestone is to scan and implement all Control Room drawings onto CAD by the end of 1990. Other priorities addressed are the development of procedures, instructions and standards for CAD, as well as implementing training and tying-in PC based design stations to CAD.

LP&L feels that placing its key drawings on CAD will provide engineering with better quality drawings, which will facilitate work with less error. In addition, new plant designs and modifications produced will be easier to develop and revise as required. The final product will be more legible for the field to interpret. Overall there will be a significant decrease in the amount of paper generated and time required to produce engineering outputs.

POSITION PAPER
ENGINEERING EXCELLENCE

PROBABALISTIC RISK ASSESSMENT

BACKGROUND:

In November 1988 the NRC issued Generic Letter 88-20 which required utilities to perform a systematic evaluation to identify any vulnerabilities to severe core damage accidents. By this time Waterford 3 had already begun the process of developing a detailed Probabalistic Risk Assessment (PRA) for core damage risk. This effort was done in cooperation with the other Entergy System nuclear plants to take advantage of common areas of work.

POSITION:

Waterford 3 is performing a detailed Level 1 PRA with a limited scope Level 2 (containment performance) analysis. Waterford 3 personnel are conducting the PRA with the assistance of one of the leading consultant organizations in the field. Utility engineers are directly involved with all aspects of the effort, including model development and evaluation of results. This ensures that technology transfer occurs so that Waterford 3 personnel fully understand the methods and are able to use the PRA for future applications.

An independent review group consisting of plant Operations and Engineering personnel has been established to review the model and ensure that it accurately reflects the plant design and performance. This will also assist in the transmittal of knowledge and information gained during the performance of the PRA to other plant staff personnel. An additional review is being conducted by an independent expert consulting firm to provide further assurance that all important aspects have been correctly addressed.

The limited scope Level 2 analysis entails using calculations performed for other similar containment designs. However, the MAAP code has been obtained to allow calculations of the Waterford 3 specific containment performance during a severe accident for certain important sequences. This will allow a more in depth understanding of the phenomena and response during a severe accident.

In addition to responding to the generic letter, the PRA can be used for other applications that can benefit from a quantification of safety impact such as: evaluating and prioritizing design changes for safety impact; supporting

Technical Specification surveillance frequency changes to improve safety; evaluating the impact of NRC safety and licensing concerns; input to equipment operability and 10CFR50.59 evaluations; input on prioritizing equipment reliability problems and maintenance activities; etc.

The PRA is scheduled to be completed and submitted to the NRC by the first quarter of 1992. As of March 1990, the system fault trees had been developed and linked for an initial solution. Further revision and enhancement will be necessary to reach a "final" solution. The initial containment analysis work should be complete by mid 1990 and an internal flooding analysis should start before the end of 1990.

POSITION PAPER
ENGINEERING EXCELLENCE
COBALT REDUCTION PROGRAM

BACKGROUND:

Studies by the Electric Power Research Institute have shown that irradiated cobalt is a major contributor to occupational radiation exposure received by nuclear plant workers. In an effort to reduce the radiological problems associated with cobalt, Waterford 3 has embarked on a program to reduce the number of components containing cobalt that come in contact with the Reactor Coolant System. Valves containing stellite and other equipment that are clad or have nickel in their base metal contain quantities of cobalt.

POSITION:

The objective of the Cobalt Reduction Program is to identify cobalt containing alloys and components in contact with (wetted) reactor coolant, calculate surface area exposure, prioritize and provide a schedule for reduction of cobalt contribution by elimination of material through replacement. The program is divided into six (6) tasks:

- Task 1: Preparation of a list of components in the Reactor Coolant, Safety Injection and Chemical Volume and Control Systems.
- Task 2: Collection of design documentation such as specifications, bill of materials and vendor drawings.
- Task 3: Review of documents to identify cobalt containing components.
- Task 4: Estimation of areas of the materials containing cobalt.
- Task 5: Perform an analysis of the rate of solution for the cobalt containing components.
- Task 6: Development of a priority list and schedule for equipment replacement.

Tasks 1 through 4 are approximately 75% complete. The scheduled completion date is September, 1991.

Tasks 5 and 6 are scheduled for completion in 1992.

In an ongoing effort to reduce the number of cobalt containing materials added to the plant, Design Engineering personnel consider cobalt reduction as a design input in the preparation of design changes. Additionally, Procurement Engineering routes material requisitions containing cobalt to Design Engineering to determine an acceptable equivalent material.

POSITION PAPER
ENGINEERING EXCELLENCE
AS-BUILDING PROGRAM

BACKGROUND:

The as-building program was developed at Waterford 3 to implement interim controls over the outstanding construction as-built redline information, and to incorporate the information into the corresponding latest revisions of the Waterford 3 drawings. Twenty six topic documents were identified in December, 1987 as the initial scope; an engineering task force developed a program plan to assess the topics and recommend priorities. Twenty three topics were selected for accomplishing over a four year period beginning in 1988. Interim controls were established early to ensure existing redline information is referred for its applicability by drawing users, and is incorporated into updated drawings.

POSITION:

The program was proceduralized in NOEP-319 in August, 1988. Six of the twenty-three topics were accomplished in 1988, nine in 1989, six others in 1990, and the remaining two are working in 1991. Although the scoped twenty-three-topic-program is nearing completion, some open items have surfaced; this minor open item work scope is being considered for completion in 1992. Actual program costs through 1991 will approach \$2 million.

POSITION PAPER
ENGINEERING EXCELLENCE
NUCLEAR PLANT RELIABILITY DATA SYSTEM (NPRDS)

BACKGROUND:

The Nuclear Plant Reliability Data System (NPRDS) provides equipment performance information to support plant operations, maintenance, performance monitoring, reliability studies, and risk assessments. Waterford 3 maintains the site data needed for the NPRDS database through component failure records. Access to the NPRDS database is available at ten work stations throughout the plant site. "Hands on" training has been provided to key personnel.

POSITION:

Effective use and maintenance of the NPRDS database provides many benefits. Examples of these are realized in component failure analysis/root cause determination; improved job plans for the plant maintenance program; industry experience incorporated into the design change program, improvement of training and plant safety efforts, and provides an industry-wide equipment locator database is used for expediting replacement parts.

A site training program for plant staff personnel which provides an overview of the NPRDS program and highlights the following topics:

1) Information Retrieval

Information queries and report generation have been reduced to a few simple questions asked of the user by the system's software program. At Waterford 3, 10 access ID numbers have been assigned to site departments that require the use of the NPRDS to support their job functions. A library of manuals and software discs is assigned to each computer workstation. This allows for information retrieval from the NPRDS at many locations without delay.

2) Equipment Locator

NPRDS allows an on-line search for equipment which is identical; similar; or has matching component engineering data. This feature is utilized by the purchasing department's expeditors, system engineers and job planners and is available at each group's work location.

3) Component Failure Analysis Report (CFAR);

The CFAR Report identifies those components whose failure rate is higher than the failure rate of similar component types in the industry. It is distributed quarterly. The CFAR report is enhanced to include a breakdown by system in addition to component type breakdown. The Work Authorization (WA) number, which took corrective action, is also added to aid in further review and evaluation. The availability engineer is the point of contact for coordination followup action.

Several design changes have been identified for equipment which exceeded industry failure rates. These modifications will improve the efficiency, safety and reliability of our plant. Additionally, industry-wide reliability monitoring through CFAR failure trends provides maintenance input to improve equipment maintenance and monitoring techniques.

The engineering records for over five thousand components that can have an impact on the NPRDS database are maintained and revised by a process which includes the review of documents. These include: Work Authorizations, Design Changes, Document Revision Notices, and Engineering Evaluations (i.e., PEIRs, SPEERS, etc.). Changes required for engineering records of NPRDS reportable components are entered on the Station Information Management System (SIMS), as well as the NPRDS database.

A review of new maintenance items is performed by the Plant Manager at the "Plan-of-the-Day" (POD) meeting. Followup action to new failures includes researching NPRDS and SIMS history records for identification of previous failures of like equipment.

Reporting is performed in accordance with the NPRDS Reporting Guidance Manual. Technical input is collected from the 1st Line Supervisor through the work package and engineering input via Maintenance Engineering. The engineering input form, the work package and the corrective maintenance history form are used to supply supporting data to the failure report. Applicable PRE's and LER's are also used. Failure reports are routinely transmitted to Waterford 3 availability engineer and the responsible system engineers. The NPRDS Coordinator is the primary technical point of contact.

POSITION PAPER
ENGINEERING EXCELLENCE
COMPUTER USE PLAN

BACKGROUND:

Nuclear Operations Engineering & Construction is composed of diverse groups with varied functions such as Design Engineering, Construction, Programs, Modification Control, etc. This diversity in function and personalities resulted in an inconsistent and disparate approach to purchasing computer hardware and software. In addition, this approach did not give sufficient regard to current and long range budgeting.

POSITION:

In an effort to develop consistency in computer applications throughout NOEC, the computer use plan was developed. It is a long range plan which establishes a logical and consistent approach to purchasing computer hardware and software. To effectively develop this approach, support from Information Systems was obtained.

The plan outlines the present configuration of existing computers within the organization. In addition, it describes NOEC's long term computer requirements and implementation plan to become a self sustaining engineering organization. Implementation of the plan consists of several phases. This phased approach provides a logical method for budget planning of future computer needs. Additionally, development of the plan establishes consistent administrative controls for requesting computer software and hardware. It provides a streamlined process for the initiation, review and approval of computer requests.

POSITION PAPER
ENGINEERING EXCELLENCE
DESIGN ENGINEERING
STAFFING

BACKGROUND:

The Design Engineering organization staffing has been impacted by several factors during the transition from plant construction to operations. The initial direction was to depend upon the original Architect Engineer for design support. Then, in August 1988 the decision was made to staff up the in-house Design Engineering organization. However, full staffing was then impacted by the uncertainty due to the SERI consolidation issues.

POSITION:

As of October 1, 1989 the decision has been made to fully staff the Waterford 3 Design Engineering Organization to its authorized level of 82 people. Aggressive recruiting efforts have been made thru the use of outside recruiters and increased staffing of the Human Resources organization. By the end of 1990, Design Engineering was essentially fully staffed.

**POSITION PAPER
ENGINEERING EXCELLENCE
HUMAN ENGINEERING OF DESIGN ENGINEERING PROCEDURES**

BACKGROUND:

The history of the procedures program for Design Engineering has been dynamic. Organization changes have prompted heavy impacts on the program, e.g., changing from Project Management to Nuclear Operations Engineering, then later combining Nuclear Operations Engineering and Nuclear Operations Construction into a single department - NOEC, and most recently splitting the NOEC organization into Design Engineering and a Plant Modifications and Construction organization. Through the changes the procedures for the organization(s) have withstood audits by Quality Assurance and audits from agencies external to Entergy Operations.

However, internally the need for procedure enhancements from a human factors standpoint was recognized. An approved strategic plan exists for developing needed engineering "tools" and resources. In early 1989 an NOEC Procedures Task Force identified the scope of the procedure effort strategic plan to include drafting 27 new procedures, revising 50 existing procedures and enhancing 9 procedures for human factors only. ABB Impell Corporation was contracted to provide human engineering services applied to the NOEC procedures administration program, and to specific NOEC procedures.

POSITION:

- A human engineered procedure administration program (including a Writer's Guide) was made effective.
- ABB Impell Corporation completed the human engineering services to the NOECs and NOECIs (new and revisions) as scheduled during 1990.
- Six remaining NOECs and one NOEI are scheduled for dispositioning (deletion or conversion to NOECs) by June 15, 1991.
- A database has been developed on the AS/400 network, as a tool to help coordinate and provide information about procedures and their administration.
- Procedures' forms are being scanned into a program soon to be available on the AS/400 network to make them electronically available for users.

WATERFORD 3
DESIGN ENGINEERING TRAINING

- o Technical Staff & Managers Training Program
- o Performance of 10CFR50.59 Safety Evaluation
- o Design Guides

POSITION PAPER
ENGINEERING EXCELLENCE
TECHNICAL STAFF & MANAGERS TRAINING PROGRAM

BACKGROUND:

The Technical Staff & Managers Training Program was implemented in 1987. The intent of the program is to provide the necessary training to all Technical Staff and Managers in an effort to enhance job knowledge and performance.

The program consisted of initial training courses which required completion within six months of assignment to a Technical Staff & Managers Position. These initial courses are listed below.

- Site Required Training, e.g., GET Radiation Training
- Nuclear Operations Organization
- Plant Reference Material/Document Control
- Technical Specifications Overview
- Codes/Standards Overview
- Equipment Qualification Overview
- Danger Tagging
- Condition Identification/Work Authorization
- Quality Assurance/Quality Control
- Plant Modification
- ALARA Training
- Station Information Management System
- Designated Procedures
- Nuclear Power Plant Fundamentals

POSITION:

The existing Technical Staff & Managers Program is currently being enhanced. In addition to the courses listed above the following initial training courses are being incorporated into the program. As a result, completion of the initial training has been extended to two years.

TECHNICAL STAFF & MANAGERS TRAINING PROGRAM
(Continued)

POSITION: (Continued)

- Applied Fundamentals
 - Thermal Sciences
 - Electrical Sciences
 - Materials Sciences
 - Nuclear Reactor Physics
 - Plant Chemistry
 - Process Control
- Systems Training
 - Plant Systems and Components
 - Plant Operations and Simulator
- FSA's
 - Safety Analysis
 - Technical Specification Review
- 50.59 (Offered at two levels)
 - Certification (2-3 days)
 - Overview (4 hours)
 - Recertification
- Management Training

The enhanced program will also include continuing training. Currently the core requirements have been identified as shown below.

- Industry Events
- Selected Plant Modifications
- Plant/Department On-The-Job Training
- Vendor/Specialty Training/Position Specific
- Department Required Reading

In addition to the Technical Staff & Managers Training Program described above, the Design Engineering organization has placed additional emphasis on training in order to enhance the capabilities of the Design Engineering Staff. The training initiative summarized below is an ongoing effort to strengthen engineering practices and programs to achieve engineering excellence.

- Root Cause Analysis and Human Performance
- Setpoint Methodology Training
- DBD Use Training

POSITION PAPER
ENGINEERING EXCELLENCE

**PERFORMANCE OF 10CFR50.59 SAFETY
EVALUATIONS**

BACKGROUND:

Improving the performance of 10CFR50.59 safety evaluations has received greater emphasis in the nuclear industry as configuration control and Technical Specification restructuring programs progressed. NUMARC has led an extensive effort to develop guidelines for the industry on the performance of safety evaluations, culminating with the issuance of NSAC-125 in June 1989.

POSITION:

Recognizing the benefit of better 10CFR50.59 evaluations, Waterford 3 established a task group (before the NUMARC guidelines were complete) to develop an enhanced procedure for performing 10CFR50.59 evaluations. This included guidelines to assist personnel in the performance of evaluations (NOP-013, "10CFR50.59 Safety and Environmental Impact Evaluations"). The improved procedure is used by all departments at Waterford 3, thereby eliminating the inconsistencies that exist between departments. The guidelines provide specific information to clarify when a 10CFR50.59 safety evaluation is required and what should be considered in the evaluation. They are similar to and use many of the concepts from the NUMARC guidelines in NSAC-125.

Successful completion of a training course on the procedure, guidelines, and actual evaluations is required by all personnel who perform or review 10CFR50.59 safety evaluations. Significant effort was spent by Waterford 3 expert personnel to develop a comprehensive and plant specific course. The formal training takes two days and concentrates on examples to illustrate key points. Emphasis has been placed on providing complete documentation of the considerations and conclusions reached.

Full implementation of these program enhancements has been completed and personnel in all plant departments have been trained. An increased awareness of the requirements to perform a 10CFR50.59 safety evaluation has resulted. The level of documentation, quality, and thoroughness of evaluations has also improved.

POSITION PAPER
Engineering Excellence
Design Guides

BACKGROUND:

During the design, specification and construction phases of Waterford Unit 3, the Architect Engineer utilized standard corporate design criteria developed during years of power plant experience. This information was organized and controlled on a discipline basis. It is LP&L's intention, as part of the transition plan, to obtain and review this "original" input and produce desk top guides for Mechanical, Electrical, Civil and Instrumentation & Control.

POSITION:

Nuclear plant design has been enhanced significantly since 1974 when much of the design for Waterford 3 was begun. However, plant modifications and evaluations often require repeated reference to certain basic industry design practices. If this data is updated, condensed and organized in a desk top guide, a very useful tool can be provided to the engineering group. For example, pipe sizing, wall thickness, material selection, pressure drop calculations, valve choice, insulation and routing are standard mechanical duties. Both the experienced design engineer and those who are new to the discipline will benefit technically by being issued their own set of guides. Economic savings will be also realized as access to key reference material will be within easy reach.

It is the intent that these documents be true desk top guides. They are not to replace the approved requirements which govern plant design such as modification procedures, FSAR, and the plant drawings. They will be maintained by the applicable discipline.

A detailed sample design guide has been prepared for the Mechanical discipline. It is comprised of the applicable original A/E mechanical guides, summary project lists, and key industry publications considered very useful for retrofit design reference. The Electrical discipline has collected a significant volume of A/E design guides and equipment reference material. They are presently organizing this data. I&C and Civil departments are in the review stage prior to document selection.

Design Engineering intends to bulk purchase certain industry publications which form a subsection of these discipline design guides and issue them to its engineers by the middle of this year. Development of the desk top design guides will continue throughout the year. Our goal is to issue revision 0 of the four design guides by the end of 1991.

Drafting standards common to all engineering and design production have been developed and will be issued shortly as part of the design guide program.

WATERFORD 3
DESIGN ENGINEERING SELF ASSESSMENT

- o Assessment of Design Engineering Program
- o Safety System Functional Inspection
- o Regulatory Guide 1.97 Activities

POSITION PAPER
ENGINEERING EXCELLENCE
DESIGN ENGINEERING
PROGRAM ASSESSMENT

BACKGROUND:

The documentation of design basis and analysis for each of our nuclear units was based on standards and expectations at the time of plant construction. This level of design documentation was given extensive review at the time and should be considered generally adequate from a licensing standpoint. However, our growing understanding of the importance of a well documented and controlled design process has led to evolving expectations on our part and the NRC's. In keeping with our on-going quest for engineering excellence, each site Design Engineering Department is involved in a program to upgrade design basis and analysis documentation.

POSITION:

Entergy Operations will perform a Design Engineering Program Assessment of the Waterford 3 Design Engineering organization. This assessment will be performed by utilizing Peer Group teams composed of members from ANO, Grand Gulf and Waterford 3. These teams will evaluate the major program areas including all engineering disciplines and cross disciplines. Example of programs to be evaluated include: Drafting/As-Built, Fire Protection, ISI, Accident Analysis, Erosion/Corrosion, System Design, Pipe Design, Setpoint Controls/Calculations, EQ, and Seismic II/I.

Through the use of Peer Groups, expertise gained from recent assessments at both ANO and Grand Gulf can be utilized in order to identify strengths and weaknesses in the Waterford 3 Program. Further this approach will emphasize systemwide excellence which can be gained as a result of the formation of Entergy Operations.

This effort is to be headed by the Waterford 3 Design Engineering Manager and projected to be completed by August 31, 1991.

POSITION PAPER
ENGINEERING EXCELLENCE
SAFETY SYSTEM FUNCTIONAL INSPECTIONS

BACKGROUND:

Waterford 3 has been proactive to assess both functionality of safety systems, and programs that govern the facets of a given system (e.g. design, modification, maintenance, procedures, training, procurement, and quality assurance). As early as 1984 Torrey Pines was contracted to inspect the Emergency Feedwater system. Then in mid-1986 an internal audit of the Reactor Auxiliary Building HVAC system was performed by Quality Assurance, modeled after the early SSFI's done at Turkey Point, Pilgrim, and ANO, and internal audits at MP&L and TVA. In late 1988, Main Line Engineering Associates, assisted by a number of LP&L personnel, conducted a technical review of the design change program, and also an SSFI of the Component Cooling Water system; that inspection's Executive Summary states, "The combined review involved nearly 4 weeks of actual on-site inspection time and employed deep-vertical-slice and team interaction techniques similar to USNRC inspection programs." And in September of 1990 Main Line Engineering Associates was again contracted to perform an SSFI on the Emergency Diesel Generator system, with the assistance of a number of Entergy Operations personnel.

POSITION:

The above inspections have been self imposed; and have been valuable in identifying improvement opportunities and establishing confidence in the Waterford 3 systems' functionality and governing programs and design bases. Inspection results have contributed to a progressive improvement in the overall design program at Waterford 3. Recommendations have resulted in enhanced design control procedures to better document original design basis and technical justification for changes. And occasionally results identify needed improvements in field hardware or design basis documentation. Examples of this are the following needs identified during the EDG SSFI, and cited again during the EDSFI:

- reevaluate the EDG loading calculation for accident analysis
- reevaluate the EDG fuel requirement calculation for accident analysis
- establish the basis for the undervoltage relay settings
- define the battery room temperature requirements

Ongoing accomplishment of the inspections' resultant open items is an important contributor toward our strive for excellence at Waterford 3. This program is intended to continue in the future with the next SSFI scheduled for June, 1992 on the Chemical and Volume Control system. Future SSFI's are expected to be performed depending upon the needs of the Design Basis Documentation program.

POSITION PAPER
ENGINEERING EXCELLENCE
REGULATORY GUIDE 1.97 ACTIVITIES

BACKGROUND:

The Waterford 3 Design Engineering and Licensing Departments identified discrepancies regarding the 1983 submittal and the Waterford configuration in the first quarter of 1990. Design Engineering began activities to address these issues at the point of identification.

In August 1990, an audit of the Waterford configuration against the submittal and revision 2 was completed by the NRC. Six deviations were identified.

POSITION:

- O The new submittal for compliance with Revision 3 was transmitted to the NRC February 28, 1991
- O Temporary labelling of the Control Room panels was completed on January 31, 1991
- O Procedure NOECP-309, Design Inputs, was revised to specifically require a RG 1.97 review
- O The Post Accident Monitoring Equipment Labelling Program will be updated and maintained. The maintenance of this program will be ensured by having one accurate RG 1.97 list which uniquely identifies the instruments, and any additional plant changes will be required to have a review of RG 1.97 conducted in accordance with NOECP-309. DC-3283 will be implemented by December 31, 1991 and will verify and update the instrument labelling on the control panels.
- O The FSAR will be revised by inserting a new table which will accurately reflect and uniquely identify RG 1.97 instrumentation and its availability for different scenarios for example, station blackout. The Licensing Document Change Form (LDCR) to revise the FSAR will be approved by December 31, 1991.
- O The training department will revise appropriate lesson plans and train operators not only to identify RG 1.97 instrumentation but to assure that operations personnel maintain an awareness of RG 1.97 to an extent required to assure procedural changes are consistent with the licensing basis. This training will be an ongoing training, and the lesson plans and initial training will be completed by June 1, 1992.

REGULATORY GUIDE 1.97 ACTIVITIES

PAGE 2

- O The engineering departments will develop lesson plans and train engineering personnel to achieve an awareness of the RG 1.97 and station blackout licensing basis. This training will be an ongoing training, and the lesson plans and initial training will be completed by June 1, 1992.

- O Upgrade recorders for Category 1 compliance during Refuel 5 for:
 - Hot leg temperature
 - Cold leg temperature
 - Condensate storage pool level
 - Steam generator wide range level
 - Pressurizer level

- O Add RG 1.97, type and category to the SIMS database. ECD September 1, 1991

Waterford 3 continues to address the importance of compliance with the requirements of NUREG 0737, supplement 1 and Regulatory Guide 1.97. As noted above, the action plan activities will be complete after the 5TH refueling outage.