Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

June 2, 1994
3F0694-03

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

Subject: Request for a Reduced-Scope Service Water System Operational Performance Inspection

Reference: NRC to FPC letter, 3N0394-31, dated March 17, 1994, Administrative Letter 94-03

Dear Sir:

Florida Power Corporation (FPC) is submitting this letter to request NRC consideration of a reduced-scope Service Water System Operational Performance Inspection (SWSOPI) for Crystal River Unit 3 (CR-3) based upon FPC performing a self-assessment on the CR-3 systems in October 1994. The NRC has presently scheduled CR-3 for a full-scope SWSOPI in the fourth quarter of 1994. This request is consistent with the guidance provided in Administrative Letter 94-03 and in our April 5, 1994 meeting at the Region II offices. The assessment plan is described in Attachment 1. The resumes for the self-assessment team members are included in Attachment 2.

NRC Inspection Procedure 40501, "Licensee Self-Assessments Related to Area-of-Emphasis Inspections" permits the NRC to recognize a licensee's good performance and quality self-assessment program by reducing the scope of an NRC inspection in an area-of-emphasis. We believe CR-3's most recent SALP rating and FPC's plan for a self-assessment of the CR-3 service water functions are consistent with the intent of IP 40501 to reduce the resource burden on the NRC and licensees for detailed NRC inspections. To assure the NRC that CR-3 will be maintained and operated to high standards, FPC has scheduled a detailed self-assessment of the CR-3 systems that comprise the service water function beginning in October 1994.

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The plan addresses scope, schedule, and the multi-discipline team to be utilized in the assessment. FPC's assessment will fully meet the objectives of TI 2515/118, Revision 1, which is used by the NRC to conduct performance-based Service Water System inspections. The assessment will include, at least, the following activities:

1. A review and evaluation of design basis and system functional requirements including system walkdowns and design basis configuration verification;

2. Evaluation of FPC's response to GL 89-13 concerns;

3. The operation, maintenance, testing, modification, and personnel training for the Nuclear Services Seawater (RW) System; portions of the Decay Heat Closed Cycle Cooling (DC) System and Nuclear Services Closed Cycle Cooling (SW) System; and

4. Corrective actions and Quality Program activities.

FPC has established the SWSOPI Project which is led by FPC's Nuclear Operations Engineering Department. The project has an overall team leader, self-assessment team leader, FPC response team leader, and individuals assigned to the teams. The response team members will be FPC employees. The self-assessment team is composed of FPC employees, employees from other utilities with experience in service water systems, and consultants from industry including a representative from EPRI. The self-assessment team members have been selected consistent with the guidance provided in TI 2515/118 and IP 40501 and selected members have experience in conducting similar inspections. Specifics regarding the self-assessment team members and their qualifications are provided in Attachment 2.

FPC recently received a SALP 1 rating in Engineering. This rating combined with the satisfactory results from the NRC EDSFI are indicators of FPC's ability to successfully perform an area-of-emphasis assessment.

The SWSOPI self-assessment is scheduled to begin on October 3, 1994 and requires six weeks to complete. The final report describing the results of FPC's self-assessment will be provided to the NRC during the first quarter of 1995.

FPC is planning to submit a revision to our Generic Letter 89-13 response in June 1994. The revised response will describe changes FPC has made in the generic letter action items since the original submittal in early 1990.

FPC agrees that a licensee self-assessment combined with a NRC reduced scope inspection will lessen the regulatory impact/burden on a licensee while ensuring that the area of emphasis is thoroughly and appropriately evaluated.

FPC would like to receive the NRC's concurrence with our proposed self-assessment plan by July 1, 1994.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/JWT/DAS

Attachments

xc: Regional Administrator, RII
Senior Resident Inspector
NRR Project Manager

ATTACHMENT 1

ASSESSMENT PLAN

SERVICE WATER SYSTEM OPERATIONAL PERFORMANCE ASSESSMENT (SWSOPI)

OBJECTIVE: To perform a self-assessment of the Crystal River Unit 3 Raw Water (RW) System and portions of the Decay Heat Closed Cycle Cooling System (DC) and the Nuclear Services Closed Cycle Cooling System (SW). This self-assessment is to verify that the system design, operation, and performance meets the design basis and regulatory requirements.

The assessment will be conducted in accordance with the NRC Temporary Instruction (TI) for Service Water System Operational Performance Inspections (SWSOPI), TI 2515/118, Revision 1. Each design and functional area of the TI will be incorporated into the self-assessment.

ORGANIZATION: Florida Power Corporation has established the SWSOPI Project. This project will have an overall team leader, self assessment team leader, response team leader, and individuals assigned to the teams. The response team will be made up of FPC employees. The self-assessment team will be made up of FPC employees, other utility employees that took part in the NRC pilot SWSOPI assessments, consultants that have taken part in previous NRC SWSOPI inspections, and an EPRI representative that has been active in the SWSOPI area.

Information regarding the self-assessment team members and their qualifications are provided in Attachment 2. The self-assessment team meets the recommended qualifications described in TI 2515/118, section 05.01 and in IP 40501, section 03.02.b. The self-assessment team has significant design experience, knowledge of the TI, and knowledge of Generic Letter 89-13.

SCOPE: The Service Water System Operational Performance Assessment (SWSOPI) to be conducted at Crystal River Unit 3 will meet the requirements of the NRC's Temporary Instruction for Service Water System Operational Inspections TI 2515/118, Revision 1. This requires verification of:

1. The plan and actions taken in response to Generic Letter 89-13.

2. The Raw Water System and portions of the Decay Heat Closed Cycle Cooling System and the Nuclear Services Closed Cycle Cooling System are capable of fulfilling their thermal and hydraulic performance requirements and are being operated in accordance with the design.

3. That operations, maintenance, surveillance, testing, and personnel training activities are adequate to ensure the above systems are operated and maintained to be able to perform their safety-related functions.

To accomplish these activities, the TI provides a total of 46 topics divided among five subject areas that must be evaluated. The self-assessment will assess and document the evaluation results in each subject area. Should corrective actions be necessary they will be handled using FPC's Problem Report System.

SCHEDULE: The self-assessment will begin on October 3, 1994 and is scheduled to end on November 14, 1994. The final report will be provided to the NRC during the first quarter of 1995.

THE FOLLOWING IS AN ASSESSMENT OUTLINE (Numbers correspond to the TI).

03.01 MECHANICAL SYSTEMS ENGINEERING DESIGN REVIEW AND CONFIGURATION CONTROL.

03.01.a Do calculations exist? Is there a listing of the calculations? Are they approved? Review the calculations.

Are there procedures to control the Design functions? Are they being followed?

Determine what equipment has been bought during the last three years. Are the descriptions in the FSAR correct?

Has engineering performed a review and evaluation of the systems? What are the design limits and boundary limits of the system? Is the safety classification and EQ classification correct? Review the hydraulic models.

Are the heat exchangers susceptible to flow induced vibration or waterhammer? Were the appropriate corrosion allowances included in the design of the salt water piping? Review the Design Basis Documents.

03.01.b Are the systems configured per the FSAR? Compare the FSAR and the Technical Specifications to the drawings.

03.01.c Walkdown the systems using the flow diagrams as the basis. Have discussions with operators to determine if they know how the systems work.

03.01.d Review the analysis for single failure analysis. Has single failure analysis been incorporated into the emergency procedures and Technical Specifications?

Are there common mode failures that could be caused by lubricating fluids?

03.01.e Review flow balancing for the systems. Are there system configurations that could cause pump run out and protection that keeps it from happening?

03.01.f What design features have been included to mitigate the effects of flooding?

03.01.g Review the seismic design of the system.

03.01.h Are calculations reviewed before modifications are done? Does engineering provide the fail safe position of valves and are these in the operating procedures?

Review two or three modifications. Have there been temporary modifications made to the systems? Review them.

Are proper procedures being used when modifications are being done?

03.01.i Are all of the Generic 89-13 reviews and analysis complete? Review the response to the five areas of the Generic Letter 89-13.

Review the Enhanced Design Basis Documents in accordance with the Generic Letter 89-13.

03.01.j Is there a trending program to predict when maintenance/preventative maintenance is to be done?

03.01.k Is there a design basis for the setpoints used in the systems?

03.02 OPERATIONS

03.02.a Walk down the systems using the flow diagrams as the reference. Walk down the systems with an operator to see if operations is familiar with the system

03.02.b Are the systems being operated in accordance with the boundaries and design established by engineering?

Review operator lesson plans and make sure the design limits and boundaries are included.

Review the response to Generic Letter 89-13 item number 5 to determine if lessons learned are being incorporated into procedures.

Review the emergency operating procedures to determine if the action that operators need to take are prioritized. Review the emergency operating procedures to determine if the setpoints used have a basis.

Do procedures cover the limitations for Startup, Normal Operations and Shutdown?

Are there sufficient operating procedures for these systems?

Review how spurious alarms are handled.

Review the monitoring of the systems for radioactive leakage. Check the calibration of the instruments in these systems.

03.02.c Review the training plans for mitigation actions relative to leakage. Review the simulator training an operator receives on loss of service water.

Are training manuals sufficiently comprehensive and are they understood? Are training manuals up to date? Are the new technical specifications integrated into the training program? Review the frequency of training programs updating.

Have the commitments in Generic letter 89-13 been incorporated into the lesson plans?

03.02.d Have the systems been balanced and optimized? Review the flow balancing testing.

Are there procedures for the setting of throttled valves? Are small errors in valve line-up sheets found properly? Check closed valves to determine if they are closed.

Is there an Engineering review of valves added or deleted from the valve position list.

03.02.e Have discussions with operators to determine if they understand the systems.

03.02.f Review operation procedures to determine if proper mitigation is taken to a leak or rupture.

03.02.g Are any valves required to operate while they are submersed?

03.02.h Are there adequate procedures in place to handle the clogging of the intake screens?

03.03 MAINTENANCE

03.03.a Are there adequate procedures to insure items that are stored will not impact other equipment during a seismic event.

Walkdown the systems to insure the equipment is properly shown on the flow diagrams.

Walkdown the system to establish the material condition of the system components and their accessibility.

03.03.b Are procedures in place to cover the maintenance of the equipment in these systems?

03.03.c Do training programs include operational experiences?

Are training manuals updated timely? Are maintenance manuals adequate?

03.03.d During the system walkdowns the equipment needs to be inspected for material deterioration. Review the documents that were used to inspect for such things as bio-fouling and erosion to determine is the inspections are frequent enough and operability concerns are addressed.

03.03.e Has tube plugging been evaluated for operability?

Does the plant have good house keeping practices?

Are work request prioritized and worked in a timely manner?

Review the water quality of the closed loop systems. Is the water quality standard adequate?

03.03.f During the walkdowns, determine if the systems are routinely walkdown and equipment deterioration is identified and corrected.

Review procedures for the methodologies used for root cause analysis. Are adequate root cause analysis performed? What training is provided for root cause analysis?

03.03.g Are the training programs accredited?

Per the requirements of item 5 of the Generic letter 89-13, are operations and maintenance personnel being properly trained?

03.03.h Is there a process to insure qualified mechanics are assigned to specific jobs?

03.03.i Has FPC completed the requirements for inspecting the internals of the large bore piping per the response to the Generic Letter?

Are the portions of the Raw Water System that have low flow inspected and cleaned accordingly?

Review FPC Surveillance program to monitor the condition of the Raw Water piping.

Verify that leak testing was performed on the systems.

03.03.j Review the flow balancing testing. Are the minimum and maximum valve positions included along with instrument error accuracy?

Review the flow testing against design basis.

FPC's response to Generic letter committed to have a periodic test program for heat exchangers. Review this program.

03.04 SURVEILLANCE AND TESTING

03.04.a Determine where devices like annubars and orifices are used to establish flows. Review the calculations to ensure the correct size devices are used and calculations account for instrument errors.

Review the Technical Specifications to determine if design assumptions are verified during testing.

03.04.b Has there been any observation of de-alloying and if there is how is it being addressed?

Are the acceptance criteria used in surveillance procedures consistent with the design basis?

Are flow rates established by Design Engineering?

Are the radiation monitors set for normal operation?

03.04.c Was preoperational testing performed in sufficient detail for normal and abnormal conditions? Are there tests that confirm heat transfer coefficients? Was instrument error included in the testing?

03.04.d Determine what documented deficiencies have been identified and what corrective actions have been taken.

Verify that components were leak tested before starting up from the last outage.

03.04.e Review to establish that FPC commitments are being included in the ISI program. Review the ISI program to determine if we have met our last commitments.

Are the valves we take credit for mitigating accidents single failure and included in the ISI program? Review recent ISI test.

03.04.f Review the flow balancing test, have instrument accuracies been included in the test? Are instrument errors and fouling accounted for in test?

03.04.g Review surveillance procedures. Observe performance of procedure if possible.

03.04.h Review the response to Generic Letter 89-13, Item 2 and review the "Periodic testing program that was to be established." Confirm what heat exchangers FPC is including in the preventative maintenance program. What is the basis of this selection?

Are the acceptance criteria used in heat exchanger testing acceptable?

After heat exchangers are tested, is the data reviewed in a timely manner?

03.04.i Review the unavailability of equipment data that was used in the "Individual Plant Examination."

03.04.j Review the response to Generic Letter 89-13, Item 2 and review the "Periodic testing program that was to be established." Are the acceptance criteria used in heat exchanger testing acceptable?

Review the flow balance test and insure the results are within the design basis.

Review the preoperational testing and determine if the results are bounded by the design basis.

03.04.k Review the maintenance records to establish that FPC is in compliance with its response to Generic Letter 89-13, Item 1; to insure the operating cooler has had PM-112 performed on it.

Has FPC investigated possible chemical cleaning of the seawater side of the heat exchangers?

03.04.l CR-3 does not have any air-to-water heat exchangers cooled by the RW System.

03.05 QUALITY ASSURANCE AND CORRECTIVE ACTIONS

03.05.a Has the Nuclear General Review Committee reviewed the proper reports in the last year?

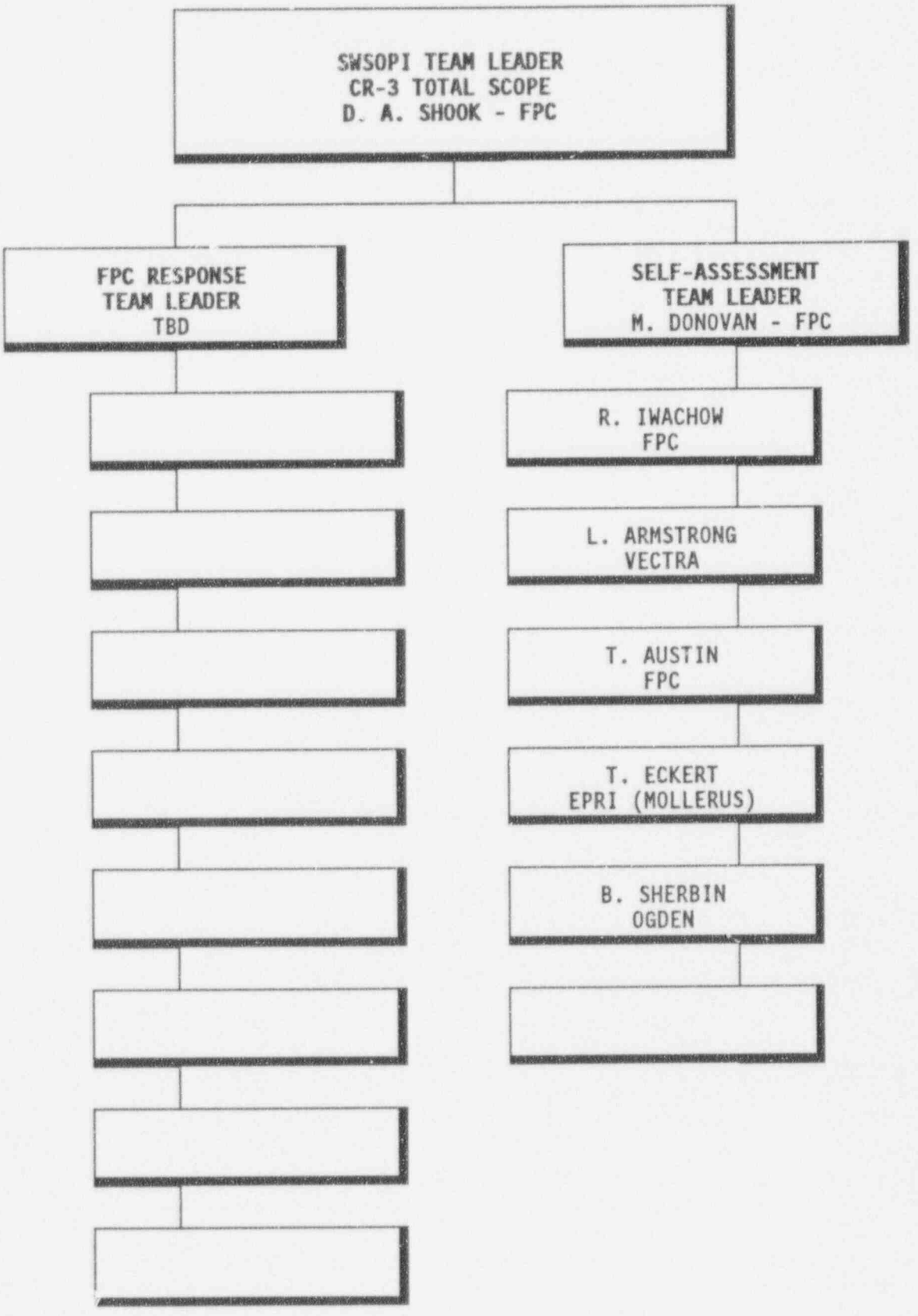
03.05.b Are the "Nuclear Plant data System (NPRDS)" reports being used during single failure analysis?

Review the Problem Reports that have been issued during the last year for proper corrective action.

03.05.c Are assessments being performed on the systems and are the proper corrective actions being taken?

03.05.d Review audits that have been performed on the system during the last two years and determine if proper corrective actions have been taken.

03.05.e Interview operations and engineering personnel to evaluate the effectiveness of the corrective actions.


SWSOPI TEAM LEADER
CR-3 TOTAL SCOPE
D. A. SHOOK - FPC
FPC RESPONSE
TEAM LEADER
TBD
SELF-ASSESSMENT
TEAM LEADER
M. DONOVAN - FPC
R. IWACHOW
FPC
L. ARMSTRONG
VECTRA
T. AUSTIN
FPC
T. ECKERT
EPRI (MOLLERUS)
B. SHERBIN
OGDEN

ATTACHMENT 2

Resumes of self-assessment team members.

DONALD A. SHOOK, P. E.
5559 21st Avenue N.
St. Petersburg, Florida 33710
(813) 341-1859

EDUCATION:

Bachelor of Science, Electrical Engineering
University of Cincinnati, 1967

MANAGEMENT COURSES:

Management for Supervisors, by Resource, Inc., 1977
Time Management and Delegation, by T.P. Hall, 1977
Practical English and Command of Words, by English Language Institute of America, 1978
More Effective Interviewing Techniques, by Dun & Bradstreet, 1980
Kepner - Tregoe, by Florida Power Corp., 1981
Finance for Non-Financial Managers, by John Percival 1981
Managing Responsible People, by Doug Wesley, 1981
Management Development Program, by Georgia State University, 1983
How to Get Results With People, by Careertrack, 1986
Managing Differences and Agreements, by Designed Learning, Inc., 1987
Configuration Management Workshop, by INPO, 1987
Models for Management, by UA Consulting & Training Services, 1989
Project Management - Communicating, by Florida Power Corp., 1993
Project Management - Resolving Conflict, by Florida Power Corp., 1993

REGISTERED PROFESSIONAL ENGINEER:

State of Florida
State of Ohio

TECHNICAL ORGANIZATIONS:

IEEE Member
Co-Author of Three Technical Papers

EXPERIENCE: **FLORIDA POWER CORPORATION**

1993 - Present — Special assignment to manage the Service Water Operational Performance Inspection(SWSOPI) activities. This has two elements: the Self-assessment Team and the Response Team.

1992 - 1993 — Special assignment to manage the preparation for the Electrical Distribution Safety Functional Inspection(EDSFI). Be the team leader for the EDSFI.

1992 - Present — Nuclear Staff Engineer

Responsible for large multidiscipline special assignments.

1991 - 1992	Nuclear Engineering Supervisor Responsible for the Electrical Calculations Program and the Electrical Distribution Safety Functional Inspection preparation.
1989 - 1993	Special assignment to manage Environmental Qualification Enhancement Program and Electrical Calculation Enhancement Program.
1984 - 1991	Manager, Nuclear Electrical/Instrument and Control Engineering Responsible for the design of large modification and design criteria in the Electrical and I&C Engineering discipline.
1983 - 1984	Manager, Nuclear Instrument & Control Engineering Responsible for the design of large modifications and design criteria for the I&C discipline.
1982 - 1983	Supervisor, Nuclear Instrumentation & Control Engineering Responsible for designs of large I&C projects.
1981 - 1982	Nuclear Principal Electrical Engineer Responsible for large and/or difficult electrical projects. Also, performed special assignments for the department Manager.
1980 - 1981	Principal Engineer, Fossil Engineering Responsible for the Electrical Engineers performing modifications on Fossil Generating Units.
1977 - 1980	Manager, Nuclear Engineering Responsible for all Engineering designs to support Crystal River #3 Nuclear Unit (all disciplines).
1974 - 1977	Chief Electrical Engineer, Generation Engineering Responsible for all electrical designs on new and existing Generating Units (Nuclear, Fossil, and Peaking).
1968 - 1974	Various Engineering Positions Supported the electrical design activities on new and existing Generating Units (Nuclear, Fossil, Peaking).
1967 - 1968	Part of Florida Power's new Engineering Training Program. 11 months.

Résumé of Michael W. Donovan

WORK EXPERIENCE

Sept. 1987 - Present — Florida Power Corporation

Supervisor, Site Nuclear Engineering Services - Supervise personnel in the development and performance of Modification Functional Tests and Field Work Packages. Supervise personnel in the performance of maintaining the Environmental Qualification program at Crystal River Unit 3.

Mechanical Design Engineer - Develop plant modifications that meet regulatory and industry codes and standards requirements. Evaluate potential plant improvements incorporating economic evaluation, forecasting, and planning/scheduling techniques.

Engineering Instructor - Develop and present training curriculum to nuclear power plant licensed plant operators, non-licensed operators, and engineering personnel in nuclear power plant theory, thermodynamics, and operations.

Apr. 1983 - Sept. 1987 — Westinghouse Electric Corporation, Zion IL

Senior Engineer - As an NRC Certified Instructor, presented classroom and simulator curriculum to Reactor Operators, Senior Reactor Operators, Plant Engineers, and Managers. As a Lead Engineer, directed a team of Engineers to develop training curriculum that met customer time and quality standards.

Mar. 1978 - Mar. 1983 — United States Navy

Engineering Officer - Supervised the maintenance, operation, and repair of Nuclear Power Plants and Main Steam Systems. Directed the maintenance of the Chemistry and Radiological Controls for a two unit installation. Directed groups of personnel to analyze, locate, and troubleshoot malfunctioning equipment.

EDUCATION

July 1987 — MBA, Productions and Operations Management, Loyola University of Chicago

March 1978 — B.S. Nuclear Engineering, University of Florida

PROFESSIONAL QUALIFICATIONS

March 1992 — Registered Professional Engineer in the State of Florida

March 1984 — NRC certified instructor for the Zion Simulator.

RESUME

Terry V. Austin
3831 N. Catbird Pt.
Crystal River, FL 34428

Phone:
Home: (904) 795-7265
Office: (904) 563-4515

EDUCATION

Pennsylvania State University — BSME-1974
Neshaminy Senior High School — Academic-1970

PROFESSIONAL AFFILIATION

Professional Engineer, State of Florida no. 34177
Engineer in Training, Commonwealth of Pennsylvania

SUMMARY

Twenty years of design, modification, retrofit, and maintenance for nuclear power plants. Primary responsibilities have included Design Engineering, Verification Engineering, Supervision of Engineering, Field Engineering, Welding Engineering, Test Engineering, Union Labor and Trades Supervision, Document Control Supervision, Quality Control Inspection, and Planning and Scheduling for all phases of plant operation (construction, operation, and outages).

EXPERIENCE

May 1987 - Present (May 10, 1994)

Principal Nuclear Mechanical Engineer
Florida Power Corporation, Crystal River Unit #3
Crystal River, FL

Lead Engineer in the site Mechanical Design Engineering Department (SNES), responsible for the technical output of all Mechanical Engineers in the group. In addition to performing design activities related to site modification work, additional responsibilities such as defining and controlling CR-3's Erosion/Corrosion program (PM-251), defining CR-3's Boron Corrosion program (PM-168), steam generator performance including cleaning task coordination and management, fire barrier penetration seal evaluation, evaluating pump and plant hydraulic performances, plant flooding reviews, and analysis of design basis issues.

EXPERIENCE (continued)

November 1984 - May 1987

Senior Nuclear Mechanical Engineer
Florida Power Corporation, Crystal River Unit #3
Crystal River, FL

Design/Verification Engineer of Record for many plant modifications at CR-3 while also performing routine engineering functions in the Site Nuclear Engineering Services Department. Design responsibilities expanded to the general cognizance and overview of other Mechanical/Structural Engineers in the department. Other responsibilities included special assignment projects such as Appendix "R" project coordination, RCP special tooling design and fabrication, steam generator cleaning task force, piping specification task force, and the Surry plant pipe rupture task force.

April 1984 - November 1984

Self Employed, Mechanical Engineer
TVA Engineering, Inc., Crystal River Unit #3
Crystal River, FL

Under contract with BLC Enterprises, to perform design and verification functions for the Site Nuclear Engineering Department. Scope of work included design areas such as Modifications, Field Change Notices, QC inspection reports, and Engineering Questions.

February 1977 - April 1984

Project Engineer, Maintenance and Modification Contract
Catalytic, Inc., Crystal River Unit #3
Crystal River, FL

Total responsibility for all engineering activities associated with the performance of the modification and maintenance activities at CR-3. The duration of work included four refueling outages and more than ten forced outages of significant durations. Work activities included the successful completion of over five hundred modifications to the facility.

Responsibility expanded to that of Site Manager for the final two months of the contract. This included administration of the Accounting, Planning and Scheduling, Labor, and Engineering Departments.

EXPERIENCE (continued):

December 1976 - February 1977

Field Engineer, Maintenance and Modification Contract
Catalytic, Inc., Calvert Cliffs Nuclear Station
Lusby, MA

Assisted the establishment of the modification work package program for this contract. Scope of work included authoring installation, calibration, and test procedures.

August 1976 - December 1976

Construction Engineer, Design and Installation Contract
Catalytic, Inc., U.S. Army Contract
Philadelphia, PA

Home office construction engineer providing liaison between the construction team and the design team, for the installation of an ECCS system to their floating nuclear power plant in the Panama Canal Zone. Responsibilities included the preparation of work instructions and construction material specifications.

March 1976- August 1976

Test Engineer, Service Contract
Catalytic, Inc., Peach Bottom Unit #2
Delta, PA

Performed local leak rate testing, system functional testing, and surveillance activities for Philadelphia Electric Company's testing group during one of this BWR's refueling outages.

January 1976 - March 1976

Field Engineer, Decommissioning Contract
Catalytic, Inc., Peach Bottom Unit #1
Delta, PA

Prepared work instructions for decommissioning this HTGR nuclear plant for Philadelphia Electric. Responsibilities also included assignment for the actual field decommissioning technical activities, field work planning and scheduling, and any associated troubleshooting necessary to complete phase 1 of the project on schedule and within budget.

EXPERIENCE (continued)

September 1976 - January 1976

Field Engineer, End-of-Life Contract
Catalytic, Inc., General Atomic Corporation Contract
Delta, PA

Prepared work instructions for special techniques required during the removal and shipment of primary loop components back to the designer of Peach Bottom Unit #1 for analysis and comparison to the original design predictions.

May 1974 - September 1975

Home Office Engineer, Construction Department
Catalytic, Inc.
Philadelphia, PA

Assigned to various modification and retrofit projects for Nuclear power plants including activities such as planning construction techniques and writing work instructions to implement the same. Also used regularly as a Mechanical Inspector for fabrication and testing in vendor fab shops.

PERSONAL: Age - 41, Married, 2 children, Health - Excellent, Height - 5'10", Weight - 185 lbs.

RICHARD IWACHOW

7398 Rosetree Place West
Seminole, Florida 34642
Home: (813) 398-4854
Office: (813) 866-4593

EDUCATION:

CITY COLLEGE OF NEW YORK
New York, New York

Degree: Bachelor of Technology
Graduated: January, 1973

SUMMARY:

Graduated Electro/Mechanical Engineer with advanced graduate studies in the energy and power fields. Experience includes over 20 years in project engineering, specifications, design, procurement, installation, instrumentation, piping and mechanical systems involving major nuclear power generating facilities. Associate member of the American Society of Mechanical Engineers.

EXPERIENCE:

November 1984 to Present

SENIOR NUCLEAR I&C ENGINEER
Florida Power Corporation
St. Petersburg, Florida

Perform detailed engineering studies for plant modifications including cost estimates and refueling outage planning and scheduling. Prepared calculations, design inputs and safety evaluations for implementation of plant design modifications to the Emergency Feedwater Initiation and Control System, Integrated Control System, Non-Nuclear Instrumentation System and other safety-related systems. Performed engineering evaluations in support of Florida Power's Safety and Improvement Program (SPIP). Serviced as FPC's representative on the B&W Owners Group I&C Working committee. Furnish technical direction for projects and design modifications performed by outside A/E firms. Responsible for input to the capital and O&M budget process including funding and manpower forecasts. Furnish on-site engineering support for I&C engineering tasks during plant refueling outages. Functioned in the role as supporting engineer for design activities related to RG 1.97, equipment environmental qualification, high energy line break and the preparation of NCORs and License Event Reports (LER's). Instrumental in the development and implementation of CR3's setpoint methodology document. Responsible for the supervision on the performance of the safety-related instrument loop string accuracy and setpoint calculations which include insulation resistance (IR) calculations for in-plant process instrumentation designated for post-accident monitoring and Technical Specifications.

March, 1980 to November, 1984

PROJECT ENGINEER
Gilbert/Commonwealth, Inc.
Reading, Pennsylvania

Functioned in the capacity as Project Manager for Florida Power Corporation in St. Petersburg, Florida to assist on a major engineering effort regarding the modification of Crystal River Nuclear Unit 3's emergency feedwater system. Modification covers the installation of Babcock & Wilcox's automatic control scheme identified as the Emergency Feedwater Initiation and Control System (EFIC). Responsibilities entail managing the overall project cashflow, monitoring mnhour budgets and schedules, interfacing with various engineering groups, ensuring all material procurement and deliveries are met and resolving any field problems related to installation of this system within the plant.

Assumed the overall project mechanical engineering responsibilities for the continuing engineering service contract for Florida Power Corporation's Crystal River Nuclear Station, Unit 3, a 855 MW plant. These responsibilities entail supervision, development of manhour budgets and schedules, supporting and monitoring engineering design modifications to improve plant operability and ensuring that project designs are in compliance with corporate and client procedures.

March, 1980 to November, 1984

Continued

Served as Mechanical Engineer with responsibility for the preparation of studies, flow diagrams, and system design calculations for the redesign and modification of plant installed systems to improve their operability and ease of maintenance for Florida Power Corporation's Crystal River Nuclear Station, Unit 3, 855 MW. Engineered design modification for post-accident hydrogen purge system, post-accident hydrogen monitoring and sampling systems.

Assigned to aid in the design of piping systems and coordinate related field problems between engineering and construction for Cleveland Electric Illuminating Company's Perry Nuclear Power Plant, Units 1 and 2, 1200 MW each.

January, 1973 to March, 1980

PIPING AND VALVE ENGINEER
Bechtel Power Corporation
Gaithersburg, Maryland

Responsible for the application of ASME codes and ANSI Power Piping Codes, coordination of piping fabrication drawings, pipe hanger designs and piping stress analysis including Nuclear Class 1 piping, review and transmittal of approved vendor drawings, and development of a Nuclear Class 1 design specification, update of nuclear and non-nuclear piping and valve specifications. Aided in the engineering support effort for the redesign and modification of installed plant systems to improve their operability and ease of maintenance for Alabama Power Company's Joseph M. Farley Nuclear Power Plant, Units 1 and 2, 850 MW each.

June, 1972 to September, 1972

ASSISTANT MECHANICAL ENGINEER
The Port Authority of New York and New Jersey
New York, New York

Aided in the design development of fire standpipe systems and other building-related plumbing systems of the Aviation Section of the Engineering Design Department. Worked in cooperation with the Safety Inspection Division on inspection and observation of mechanical equipment rooms at the World Trade Center Building.

June, 1966 to June, 1972

ASSISTANT UTILITIES ENGINEER
Vollmer Associates
New York, New York

Responsible for the design and layout of subsurface utilities involved in the design of telephone conduit runs from central offices to various points in New York city. Organized and supervised field inspection of test pits.

Developed schematic wiring diagrams and associated equipment for an electrical engineer for various buildings and park recreational projects. Preparation of highway drawings and cross-sectional plans and subsurface utility drawings.

TECHNICAL COURSES:

Nuclear Power Plant Course; August, 1977
Plant Design Piping and Valve Course; June, 1978
Pipe Support Design Course; November, 1978
Fossil Fuel Technology Training; January, 1980
Basic Fossil Power Plant Systems Course; August, 1981
Kepner Tregoe; September, 1985
Root Cause Analyst for Power Plants; December, 1989

LORI J. ARMSTRONG

EXPERTISE

Ms. Armstrong is a Project Manager at VECTRA. She is currently responsible for all of VECTRA's design and design support activities for Zion Station's SW/CC Dual Unit Outage.

Ms. Armstrong has twelve years of experience in project management, systems design review, assessment and audit support, reactor operator training, and operations support. She has a Senior Reactor Operator certification on the Zion plant and has a broad knowledge of reactor theory, thermodynamics, system design, integration and operation. Experience includes:

- Project Manager for Zion Station's SW/CC Dual Unit Outage Project.

  This includes managing the scope, schedule and budget for the design modifications and all site activities for the outage. The scope of the modifications include the design, testing and operation of temporary spent fuel pool cooling and a temporary service water system. The SW and CC system modifications include over 200 valve replacements and some pipe reroutes. Site activities include the development of over 200 procedures covering the operation of the temporary systems, draining of SW and CC, and all startup and modification testing procedures. Ms. Armstrong also had the responsibility for the SW & CC 10 year ISI hydros and inspections as well as ensuring that the new MOVs met existing ISI/IST requirements. This responsibility included interfacing with the NRC to obtain the appropriate relief requests as well as obtaining alternate methods of inspection. VECTRA site personnel also were the test directors for the majority of these tests. As the Project Manager, Ms. Armstrong provided support for the numerous internal and NRC audits of this outage.

  Ms. Armstrong also validated the scoping of the Dual Unit Outage by performing an independent assessment of Zion's SW & CC systems. Ms. Armstrong reviewed the licensing basis and operational issues to ensure the proposed modifications met the licensing basis as well as identifying other operational issues. Some of the topics reviewed include single active failure points, system flow balancing, valve control programs, and heat exchanger performance.

- Consultant for Service Water System Issues

  Ms. Armstrong has been a consultant to many utilities with respect to GL 89-13 compliance, macro and microbiological fouling issues, and cost effective Service Water System Improvements. In doing so, Ms. Armstrong has reviewed many SW systems. Ms. Armstrong has also participated in EPRI's Service Water System Reliability Improvement Seminars.

- Project Manager for Commonwealth Edison Service Water Projects.

  This includes GL-89-13 compliance projects as well as Zion DET response activities. These activities included the Single Active Failure Review, CCW heat exchanger performance optimization, heat exchanger test procedures, and silt reduction studies. Ms. Armstrong also prepared Zion Station's Service Water Reference Document compiling the design basis prior to the generation of the DBD. Ms. Armstrong is also a key person providing technical consulting for the Service Water System regarding stagnant lines and flushing criteria, inspection frequencies, and checklists for the review of maintenance practices, procedures, and training.

- Ms. Armstrong is qualified as the team lead for VECTRA's TQR program. A TQR (Technical Quality Review) is an independent review of the technical projects to ensure appropriate technical output is achieved.

- Member of the CECo Service Water Task Force which is responsible for coordinating the responses of the six CECo station to GL-89-13.

- Senior Engineer, Expert System Knowledge Base Development.

  Ms. Armstrong assisted in the development of a knowledge base for an expert system based on the Zion Residual Heat Removal System. Ms. Armstrong wrote technical information describing the design and functions of the system. She utilized her operational expertise on a team that developed a complex malfunction table listing RHR failures, symptoms and expected operator actions.

  All of this RHR system information was used to develop a prototype expert system assisting the operator with diagnosis of abnormal events. Ms. Armstrong also had lead responsibility for the development of an expert system for monitoring corrosion/erosion problems in the Service Water System. Ms. Armstrong has written a technical description of the Zion Service Water System and has provided the expert information necessary to form a corrosion monitoring knowledge base for this project.

- Project Engineer, Zion SPDS

  Ms. Armstrong was the lead engineer performing a review of the Zion Safety Parameter Display System to determine compliance with NUREG 0737 Supplement 1 and NUREG 1342. Ms. Armstrong also assisted with the review on Byron's and Braidwood's Safety Parameter Display System.

- Senior Instructor, Westinghouse Electric

  Prior to joining VECTRA, Ms. Armstrong was employed by an NSSS vendor as a Senior Instructor. She was involved in classroom instruction, simulator instruction and text material development. Classroom and simulator experience includes more then 2500 hours of nuclear power plant operation presented to operators, technical staff, and radiation protection personnel. Ms. Armstrong was instrumental during three CECo INPO accreditation visists as well as participating in simulator upgrade activities.

EDUCATION

B.A., Chemistry
Carthage College

REGISTRATIONS

Certification as PWR Senior Reactor Operator Instructor
issued by the NRC.

PROFESSIONAL MEMBERSHIP

Member American Nuclear Society

WILLIAM C. SHERBIN, P.E.

EDUCATION

B.S.M.E., Bucknell University, 1971
M.S.M.E., University of Maryland, 1973

PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, Maryland and Commonwealth of Pennsylvania

PROFESSIONAL EXPERIENCE

Ogden Environmental and Energy Services Co., Inc.
1987 - present

Principal Consultant. Mr. Sherbin has 23 years of mechanical engineering experience and has worked for the past 13 years in the nuclear power industry. His principal duties involve design inspection activities for nuclear utility clients. These activities include Service Water System Operational Performance Inspections (SWSOPIs) and Safety System Functional Inspections (SSFIs). He has participated in utility-sponsored SSFIs at Palo Verde (service water and electrical distribution systems), Browns Ferry (RHR service water), Susquehanna (emergency service water), Davis-Besse (emergency diesel generators), Calvert Cliffs (LPSI), Fermi 2 (HPCI and LPCI), Point Beach Units 1 and 2 (emergency diesel generators), Vermont Yankee (HPCI and emergency diesel generators), Trojan (HVAC), Palisades (component cooling), Grand Gulf (fuel pool cooling and HPCS), River Bend (HPCS), and D. C. Cook (HVAC and containment spray). At FitzPatrick, Indian Point 3, and Palo Verde, Mr. Sherbin participated in emergency service water SWSOPIs and supported their GL 89-13 response efforts. He also participated in utility-sponsored Maintenance Inspections at Calvert Cliffs, San Onofre, and Palo Verde. He was a consultant to the NRC on an SSFI follow-up inspection at the Cooper Nuclear Station, and participated in Safety Systems Outage Modification Inspections at Sequoyah and Calvert Cliffs. Mr. Sherbin has provided Design Basis Document verification for Palo Verde and calculation verification for Calvert Cliffs. He recently completed an assignment at Calvert Cliffs where he was assigned to the Independent Safety Evaluation Group and conducted root cause investigations related to problems with instrument air systems and MOVs. He also has assisted BG&E in a year-long review of reactor vessel low temperature overpressurization (LTOP) issues.

In the area of motor operated valve inspections, Mr. Sherbin developed the mechanical and maintenance sections for an MOV inspection module used by the NRC. In addition, as a member of a Fermi inspection team, in the area of maintenance, he identified problems associated with the setting and control of motor operated valve torque and limit switches.

Independent Consulting Engineer, 1985 - 1987

Mr. Sherbin was a Program Manager for Liberty Technology in Philadelphia, and assisted in the development of a prototype valve operator test and evaluation system (VOTES). He served as a consulting engineer at the Nine Mile Point 2 Nuclear Station in Oswego, New York. He was a Senior Engineer in the Technical Support Group and was responsible for reviewing SOERs, SERs, and IE Notices and Bulletins. A detailed analysis of events was submitted to the Operations Department regarding the examination of equipment design and procedures with regard to their impact on safety and licensing.

Proto-Power Corporation, 1983 - 1985

Mr. Sherbin spent two years on-site at Public Service Electric and Gas Company's Salem Nuclear Generating Station in New Jersey. He was under a contract with Proto-Power Corporation to provide engineering services to the Nuclear Engineering Department and was a Senior Engineer in the Systems Analysis Group. While in this position, he was responsible for preparing mechanical safety evaluations of nuclear plant primary and secondary systems, including reactor protection, chilled water, service water, HVAC systems, and seismic and vibration analyses. The evaluations and analyses were performed in accordance with ASME Codes, IEEE Standards, and NRC Regulation Guide compliance.

General Electric Company, Nuclear Energy Division, 1980 - 1983

Senior Engineer. Mr. Sherbin was responsible for seismic and dynamic qualification of nuclear plant equipment supplied to the utilities by GE. Complete equipment qualification documents were developed for the utilities and NRC seismic auditors. These documents included vibration test data, plant seismic response spectra, and the development of conceptual methodologies for the basis of the seismic and dynamic qualification of the equipment. Mr. Sherbin represented GE for seismic audits at Hanford, Limerick, Shoreham, Grand Gulf, Perry, and Susquehanna Nuclear Stations.

Westinghouse Electric Corporation, 1971 -1980

Senior Engineer, Heating and Cooling Division, and Design Engineer, Aerospace Division. While in the Heating and Cooling Division, Mr. Sherbin developed components and system for solar thermal energy conversion. These components and systems were used in more than two dozen experimental solar heating and cooling systems. While in the Aerospace Division, he was an engineering designer of mechanical equipment, including precision gear boxes for radar, servo mechanisms and hydraulic control systems. All of this equipment was certified for the thermal and vibration environments encountered in shipborne and aerospace applications.

MOLLERUS ENGINEERING CORPORATION

TIMOTHY ECKERT

SUMMARY

Mr. Eckert has over nineteen years experience in the nuclear power industry. Considerable engineering design experience, obtained while working with an NSSS vendor, is balanced with a utilities' technical support perspective. In addition to his extensive design, testing and system engineering experience, he thoroughly understands cooling water, corrosion, and the many facets of heat exchangers, having managed EPRI's Service Water Assistance Program (SWAP) for three years.

PROFESSIONAL EXPERIENCE

As Vice President of **Mollerus Engineering Corporation**, Mr. Eckert opened and is managing the company's newest office, located in Charlotte, North Carolina. He is personally responsible for the Service Water issues being worked.

TU Electric Company, Comanche Peak Steam Electric Station

As the manager of EPRI's SWAP office, Mr. Eckert managed a clearinghouse of information on Service Water systems at nuclear power plants. SWAP's Technical Library was built up to 1500 technical documents under his direction, and represents the collective experience of nuclear utilities for field-proven solutions and recommendations into the various service water issues. In addition to performing literature searches and detailed utility surveys, he traveled to multiple plant sites giving individualized assistance on service water programs, heat exchanger testing, and effective water treatment programs.

As principal engineer and NSSS Group Leader for Results Engineering Systems, Mr. Eckert performed a group lead function for seven engineers that comprised the NSSS Group. In this capacity, he assigned work and performed technical reviews on work going out. In addition to the role of ECCS system engineer, he was the chairman of the CPSES *Corbicula* Task Force and spearheaded engineering's efforts to obtain corrosion protection for the raw water cooled heat exchangers.

As the system engineer for the ECCS and CCW/SW systems, Mr. Eckert performed procedure reviews, design mod field support, Problem Report evaluations, and other system engineer functions. He developed the Radioactive Systems Leakage Inspection program and wrote most of the implementing procedures. As the Inservice Testing (IST) Coordinator for a two year period, Mr. Eckert initiated the development of the program procedure and a computerized IST database.

General Electric Company, Nuclear Energy Division

As the Responsible Test Engineer, Mr. Eckert designed the test hardware and loop piping, specified and shakedown tested instrumentation systems, wrote test plans and procedures, and performed the steam/water and air/water tests to demonstrate the design adequacy of the Emergency Core Cooling Systems of the GE BWRs 4, 5, and 6.

General Electric Company, Nuclear Energy Division (continued)

As a Program Engineer on the Steam Generator system of the Clinch River Breeder Reactor Project, Mr. Eckert had the main duties of performing (1) calculations of the blow down times for evaporators and superheaters following a sodium-water reaction, (2) thermal-hydraulic analyses on the sodium dump tank, and (3) heat loss calculations of the steam generator system for HVAC sizing.

EDUCATION

University of Texas at Austin
B.S., Mechanical Engineering, with honors (Nuclear Engineering minor), 1974
Kepner-Tregoe GENCO II Problem Solving Analysis
NACE Corrosion Courses: *Basic Corrosion, Protective Coatings and Linings, Cathodic Protection*

REGISTRATION

Professional Engineer, State of California
Professional Engineer, State of Texas

PROFESSIONAL RECOGNITION

Member, American Society of Mechanical Engineers
Member, ASME Working Group on Inservice Testing of Heat Exchangers (OM-21)
Member, Tau Beta Pi Association, Texas Alpha Chapter
Member, Pi Tau Sigma Association

PROFESSIONAL PUBLICATIONS

T. Eckert, *Preparing for a Service Water System Operability Performance Inspection*, (a white paper), July 1993.

B. Lube, T. Eckert, editors, *Electric Utility Service Water System Reliability Improvement, A Compendium of Presentations*, Library of Congress 92-70060, EPRI TR-101541, July 1993.

D.G. Schumacher, T. Eckert, J.A. Findlay, *BWR Refill-Reflood Program -- Test Results: CCFL-Refill System Effects, 30° Sector*, NUREG/CR-2568, EPRI NP-2374, GEAP-22046, January 1984.

T. Eckert, *BWR Refill-Reflood Program -- Core Spray Distribution Final Report*, NUREG/CR-1707, EPRI NP-1580, GEAP-24844, April 1981.

T. Eckert, *BWR Refill-Reflood Program -- Core Spray Distribution Experimental Task Plan*, NUREG/CR-1558, EPRI NP-1523, GEAP-25272, February 1981.