VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

December 31, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 1022
NO/DWL:ms
Docket Nos. 50-280
50-281
50-338
50-339
License Nos. DPR-32
DPR-37
NPF-4
NPF-7

Dear Mr. Denton:

ADDITIONAL NUREG-0737 POST-TMI
REQUIREMENTS INFORMATION

This letter provides to you our submittal of responses to Items I.A.1.1 and II.K.3.17 of NUREG-0737. Enclosure 1 provides information regarding the long-term STA program required by Item I.A.1.1. Phaseout of the STA program is not addressed by Enclosure 1 since there is no current plan for the eventual phase-out of the STA program. Information on such a plan would be submitted for Staff review and approval prior to implementation.

Enclosure 2 provides the North Anna Power Station ECCS outage information required by Item II.K.3.17. As stated in our response to NUREG-0737 dated December 15, 1980 (Serial No. 985), only information for North Anna Units 1 and 2 is being provided at this time. ECCS outage information for Surry Power Station will be provided on or before March 1, 1981.

Information and responses to other NUREG-0737 items have been submitted since our previously referenced December 15, 1980 submittal. A summary of these submittals and their corresponding NUREG-0737 requirements is presented below:

Item I.C.1 - Short-Term Accident and Procedures Review

As indicated in our December 15, 1980 response to NUREG-0737, the Westinghouse Owner's Group has submitted a detailed description of a program to comply with Item I.C.1. This information was provided in a letter to Mr. S. H. Hanauer (NRC) from Mr. R. W. Jurgensen (AEP, representing the Westinghouse Owner's Group) dated December 15, 1980 (Serial No. OG-47).

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Item II.K.3.3 - Reporting of SV/RV Failures and Challenges

Vepco has submitted two Technical Specification Change Requests to the NRC for approval. These requests (Serial No. 1011 for Surry Units 1 and 2 and Serial No. 1012 for North Anna Unit 1, both dated December 23, 1980) address the necessary reporting requirement changes in the Surry and North Anna Technical Specifications.

Item III.D.3.4 - Control Room Habitability

Vepco has submitted information regarding the control room habitability review for the North Anna Power Station dated December 30, 1980 (Serial No. 1013). As stated in our December 15, 1980 response to NUREG-0737, the Surry Power Station information required for this item will be submitted in two parts. The first part will be provided on or before January 19, 1981.

The information provided in this letter and the referenced submittals will be summarized and provided as an update to the report entitled Response To NUREG-0737 Post TMI Requirements. This report, which was originally provided on December 15, 1980, will be updated approximately every three months to reflect the change in status of NUREG-0737 responses.

Very truly yours,

B. R. Sylvia
Manager - Nuclear
Operations and Maintenance

Attachments

ENCLOSURE 1

SHIFT TECHNICAL ADVISOR

TRAINING PROGRAM

SHIFT TECHNICAL ADVISOR TRAINING PROGRAM

The attached program compares favorably with the program proposed by INPO with regard to subject matter content of the education section, transient analysis and simulation; however, INPO's program is longer. STA's will be included in the VEPCO Licensed Operator Requalification Program to ensure that the STA's are provided with an understanding of operational concepts and philosophies in order that acceptance of the STA by operations personnel is enhanced. A comparison of time (contact hours) for various sections of the program follows:

COLLEGE LEVEL FUNDAMENTAL EDUCATION	VEPCO	INPO
Math	72	90
Reactor Theory	48	100
Reactor Chemistry	16	30
Materials	16	40
Thermal Sciences	40	120
Health Physics	16	40
APPLIED FUNDAMENTALS		
Reactor Technology	32	120
Instrumentation & Control	32	
Management Skills	24	40
Systems	240	200
Transient Analysis	40	30
Simulator Training	80	100
Retraining	96	80

SHIFT TECHNICAL ADVISOR
ADMINISTRATIVE REQUIREMENTS

A. Education

Personnel selected to become Shift Technical Advisors should have as a minimum a bachelor degree in an engineering or scientific discipline. Other degree disciplines will be evaluated on a case-by-case basis.

B. Experience

Prospective Shift Technical Advisors shall have a minimum of six month's experience at the station at which they will assume the duties of Shift Technical Advisor.

C. Qualification

Shift Technical Advisors will be considered qualified to perform the duties of an STA after successful completion of the Shift Technical Advisor Training Program. Successful completion shall be based upon a cumulative average of 70%, or greater, on the written examinations plus "satisfactory" on the final oral/simulator evaluation.

D. Waiver

Participation of prospective Shift Technical Advisors in selected areas of the Shift Technical Advisor Training Program may be waived. The waiver will be on a case-by-case basis with the requirement that the individual attain a score of 70%, or greater, on an equivalency examination in the subject area for which the exemption is being sought. The equivalency examination shall be prepared and administered by the station Training Center Staff. In addition, the Manager-Nuclear Operations and Maintenance shall authorize the waiver based on the results of the equivalency examination and the recommendation of the Station Manager.

I. Academic

A. Mathematics (9 days)

1. Algebra

a. Basic concepts
b. Algebraic operations
c. Linear equations
d. Exponents and radicals
e. Roots

2. Logarithms

a. Definition
b. Rules of logarithms
c. Base 10 and natural logarithms
d. Exponential and logarithmic equations

3. Geometry and Trigonometry

a. Plane geometry
b. Solid geometry
c. Trigonometric functions
d. Vectors and vector operations

4. Specialized Mathematics

a. Ratios and proportions
b. Graphing techniques
c. Systems of equations

5. Differential Calculus

a. Limits and continuity
b. Derivatives
c. Applications of derivatives

6. Integral Calculus

a. Antiderivatives
b. Definite integrals
c. Applications of integrals

7. Differential Equations

a. First order
b. Applications of first order
c. Linear equations
d. Applications of linear equations

8. Partial Differential Equations

EXAMINATION - 1 DAY

B. Reactor Theory (6 days)

1. Basic Nuclear Physics

   a. Atomic structure
   b. Nuclear terminology
   c. Properties and structure of the nucleus
   d. Mass defect and binding energy

2. Nuclear Fission

   a. Microscopic and macroscopic cross sections
   b. Fission process
   c. Reaction rates and power production
   d. Fission products

3. Neutron Kinetics

   a. Neutron sources
   b. Reactions and cross sections
   c. Neutron flux
   d. Neutron moderation
   e. Neutron multiplication (including subcritical)
   f. Diffusion theory
   g. Criticality theory

4. Reactivity Coefficients and Poisons

   a. Fuel temperature coefficient
   b. Moderator temperature coefficient
   c. Void coefficient
   d. Pressure coefficient
   e. Redistribution coefficient
   f. Xenon
   g. Samarium
   h. Boron
   i. Other poisons (control rods, structural materials, etc.)

EXAMINATION - 1 DAY

C. Chemistry (2 days)

1. Purpose

2. Terminology

3. Sources of Makeup Water

   a. Flash Evaporator
   b. Polishing Demineralizer
   c. Condensate Storage Tanks

4. Secondary Chemistry

   a. Type of chemistry control
   b. Condensor leakage effects
   c. Steam Generator chemistry problems
   d. Steam Generator corrosion
   e. Secondary chemistry specifications

5. Primary Chemistry

   a. Chemical addition
   b. Demineralization
   c. Primary chemistry specifications
   d. Nuclear reactions

D. Materials (2 days)

1. Introduction

   a. Characteristics of an "Ideal metal"
   b. Failure modes of metals
   c. Metalic structure
   d. Radiation effects on metals

2. Fuel Element Design

3. Reactor Vessel Design

4. Steam Generator Design

EXAMINATION - 1 DAY

E. Thermal Sciences (5 days)

1. Thermodynamics

   a. Laws of Thermodynamics
   b. Properties of steam and water

2. Fluid Dynamics

   a. Fluid statics
   b. Bernoulli's Equation
   c. Static and dynamic pressures
   d. Laminar and turbulent flow
   e. Two phase flow

3. Heat Transfer

   a. Fundamentals (conduction, convection, radiation)
   b. Pool boiling
   c. Forced convection boiling
   d. Departure from Nucleate Boiling (DNB)
   e. Heat exchangers

4. Reactor Thermal Cycle

EXAMINATION - 1 DAY

F. Health Physics (2 days)

1. Radiation

a. Sources of radiation
b. Types of radiation
c. Effects of radiation on matter

2. Biological Effects

a. Micro (atomic) effects
b. Macro (cell) effects
c. Acute radiation effects
d. Chronic radiation effects

3. Radiation Protection

a. Time, distance, and shielding
b. Anti-contamination clothing
c. Respiratory protection

II. Applied Fundamentals

A. Reactor Technology (4 days)

1. Flux Distribution and Control

a. Axial flux distribution
b. Radial flux distribution
c. $\Delta\phi$ and axial offset
d. Hot channel factors
e. Control rods
f. Boron

2. Reactor Core

a. Core materials
b. Thermal performance
c. Core description
d. Core capability

3. Core Physics Data

a. Startup physics data
b. Core flux mapping
c. Core thermocouple mapping

4. Reactivity Procedures

a. Estimated Critical Position (ECP)
b. Shutdown Margin Calculation (OP-1F)

EXAMINATION - 1 DAY

B. Instrumentation and Control (4 days)

1. Basic Instrumentation

a. Flow measuring devices
b. Pressure measuring devices
c. Temperature measuring devices
d. Level/volume measuring devices
e. Miscellaneous measuring devices

2. Control Theory

a. Flow control circuits
b. Pressure control circuits
c. Temperature control circuits
d. Level/volume control circuits
e. Miscellaneous control circuits

EXAMINATION - 1 DAY

III. Management Skills

A. Communication (1 day)

B. Problem Solving (1 day)

C. Decisional Analysis (1 day)

IV. Systems Training (30 days)

A. Reactor Coolant System

B. Residual Heat Removal System

C. Chemical and Volume Control System

D. Nuclear Instrumentation System

1. Excore

2. Incore

E. T_{ave}/Rod Control

1. $\Delta T/T_{ave}$
2. T_{ave} Control
3. Rod Control
4. Rod Position Indication

F. Reactor Protection and Control

1. Reactor Protection - General
2. Process Protection Instrumentation
3. Overpower/Overtemperature ΔT Protection
4. Pressurizer Pressure Control and Protection
5. Pressurizer Level Control and Protection
6. Steam Dump Control
7. Steam Generator Level Control and Protection

G. Secondary Systems

1. Main Steam System
2. Steam Generators
3. Main Feedwater System
4. Main Condensate System
5. Main Turbine
6. Turbine Control and Protection
7. Steam Generator Blowdown System
8. Steam Dumps
9. Circulating Water System
10. Service Water System

EXAMINATION - 1 DAY

H. Engineered Safeguards

1. Safety Injection System

2. Containment

3. Containment Vacuum System

4. Containment Spray System

5. Recirculation Spray System

6. Consequence Limiting Safeguards

7. Auxiliary Feedwater System

J. Electrical Distribution

1. Normal Distribution

   a. 4160 vac
   b. 480 vac
   c. Screenwell distribution
   d. Lighting

2. Emergency Distribution

   a. 4160 vac
   b. 480 vac
   c. Vital Busses
   d. DC distribution

K. Primary Support Systems

1. Component Cooling Water System

2. Chilled Component Cooling Water System

3. Charging Pump Cooling Water System

4. Primary Grade Water System

5. Liquid Waste System

6. Gaseous Waste System

7. Ventilation System

8. Core Cooling Monitor

9. PORV and Safety Valve System

10. Auxiliary Shutdown Panel

11. Status Lights

12. Loose Parts Monitoring System (North Anna only)

L. Radiation Monitoring

1. General Detector Curve

2. Radiation Monitoring System

EXAMINATION - 1 DAY

V. Accident/Transient Analysis (5 days)

A. Transient Analysis Methodology

B. Core Reload Design

C. Physics Related Safety Analysis Input

D. Core Thermal Hydraulic Analysis

E. System Transient Analysis

F. Non-LOCA Transient Analysis

1. Rod withdrawal from subcritical

2. Rod withdrawal at power

3. Dropped rod

4. Feedwater System malfunction

5. Excessive load increase

6. CVCS malfunction

7. Startup of inactive reactor coolant loop

8. Loss of flow

9. Single rod withdrawal

10. Loss of normal feedwater

11. Loss of offsite power

13. Feedline break

14. Steam Generator tube rupture

15. Inadvertant Safety Injection

16. Steamline break

17. Rod ejection

18. Locked rotor (fuel performance)

G. Loss of Coolant Accident

1. Large

2. Small

H. Best Estimate Transient Analysis

1. North Anna cooldown event

2. Surry pump coastdown

3. Simulator loss of load comparison

VI. Simulator Training (10 days)

A. Malfunctions

1. Single

a. Steam Generator tube rupture
b. Loss of rod control
c. Loss of feedwater
d. Reactor/turbine/generator trip
e. Small break LOCA
f. Large break LOCA
g. Loss of RCS pressure
h. Steam Generator level malfunction
i. Uncontrolled cooldown of RCS
j. Loss of flow
k. Loss of electrical bus (4160 vac)
l. Loss of RHR

2. Multiple Malfunctions
--to be determined based on the class's performance

3. Normal Operations

a. Reactor startup
b. Reactor shutdown
c. Power maneuvers

VII. COMPREHENSIVE EXAMINATION

A. Written - 1 day

B. Oral/Simulator - 1/2 day

ENCLOSURE 2

ECCS OUTAGE REPORT

NORTH ANNA POWER STATION

UNITS 1 AND 2

ECCS OUTAGE REPORT

This report is concerned with the outages of the Emergency Core Cooling System (ECCS) of North Anna Units 1 and 2, commencing with the issuing of the fuel loading license of each unit. The data collected is presented as a response to the requirements of NUREG 0737, Item II.k.3.17-1 and will address the following four criteria as required by NUREG 0737. These four criteria are: (1) outage dates and duration of outages; (2) cause of the outage; (3) ECCS systems or components involved in the outage; (4) corrective action taken.

The primary methods utilized in collecting the data consisted of identifying the ECCS systems/components to be examined, and of reviewing all action statement logs for the appropriate time period in order to answer question no. 1, no. 3 and to an extent question no. 2. In order to answer question no. 4, and to an extent question no. 2, completed maintenance reports and periodic surveillance tests were retrieved from Station Records and reviewed. Other documents used in the review included control room operator logs, shift supervisor logs, equipment tagging reports and completed outstanding maintenance lists.

The equipment identified as ECCS equipment and the total outage duration times are as follows for each unit.

		HOURS	
Emergency Diesel Generator and Associated Subsystems	Unit 1	468	(1H Diesel)
		166.5	(1J Diesel)
	Unit 2	184.25	(2H Diesel)
		92.5	(2J Diesel)
High Head Safety Injection System	Unit 1	172	
	Unit 2	4.5	
Low Head Safety Injection System	Unit 1	44.5	
	Unit 2	88	
Refueling Water Storage Tank	Unit 1	24.5	
	Unit 2	1	
Inside and Outside Recirculation Spray	Unit 1	21.5	
	Unit 2	59.5	
Casing Cooling Systems	Unit 1	445.5	
	Unit 2	7	

		HOURS
Safety Injection Accumulators	Unit 1	24.5
	Unit 2	32
Boron Injection System	Unit 1	68.5
	Unit 2	272.5
Service Water System	Unit 1	100.75
	Unit 2	29.5

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

ELECTRICAL POWER SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
1-H Emergency Diesel Generator	Preventative Maintenance	Completed Maintenance	09-01-78	6 hours
	Repair and re-install diesel battery racks	Fastened racks to concrete wall	12-02-78	10 hours
	Preventative Maintenance	Completed Maintenance	03-02-79 to 03-05-79	77.5 hrs
	Remove angle iron on lip of exhaust ducting outlet	Ground out pieces of angle iron	05-03-79	11 hours
	Semi-Annual Preventative Maintenance	Completed Maintenance	08-02-79	7.5 hours
	Diesel tripped on high crank-case Pressure	Pressure switch recali-brated - SAT.	02-02-80 to 02-04-80	47 hours
	Diesel tripped on Overspeed	Reset speed control governor	02-15-80 to 02-17-80	46 hours
	Diesel tripped on Overspeed	Replaced hi speed relay	03-02-80 to 03-04-80	38 hours
	Diesel tripped on Lube Oil Crank-case Low Pressure	Inspected diesel, performed periodic test	03-06-80	14 hours
	Fitting leaks at pressure switch (EG-PS-603H) inside skid mounted Control Panel	Tightened fitting and recali-brated pressure switch. Ran diesel - no leaks	03-16-80	4.5 hours
	Gasket on oil filter inside radiator house - leaking	tightened packing and plug on drain valve	03-21-80	4 hours
	Tripped on overspeed on emer. start (SI)	Replaced Governor	04-03-80 to 04-04-80	1 hour

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

ELECTRICAL POWER SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
1-H Emergency Diesel Generator	Preventative Maintenance	Complete Maintenance	04-30-80 to 05-02-80	49.5 hrs
	Tripped on overspeed - emer. start (SI)	Replace with a new modified woodward governor	05-23-80 to 05-26-80	83.5 hrs
	Preventative Maintenance	Complete Maintenance	09-22-80	6.5 hours
	Preventative Maintenance	Complete Maintenance	10-02-80 to 10-04-80	51 hours
	Remove 1H from service to install agastat in diesel output breaker	Install agastat and tested	11-16-80	5.5 hours
1-J Emergency Diesel Generator	Semi-Annual Preventative Maintenance	Complete Maintenance	11-16-78	7 hours
	Repair and re-install diesel battery racks	Fastened battery racks to concrete wall	12-02-78	10 hours
	Semi-Annual Preventative Maintenance	Complete Maintenance	02-16-79	12 hours
	Preventative Maintenance	Complete Maintenance	03-16-79	5.5 hours
	Remove angle iron on lip of exhaust ducting outlet	Ground out pieces of angle iron	05-04-79	1.5 hours
	Tripped on overspeed	Governor reset-cooldown for refuel	09-26-79 to 09-27-79	21.5 hrs

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

ELECTRICAL POWER SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
1-J Emergency Diesel Generator	Accuracy check on crankcase pressure switch	Calibrated and installed new switch	03-12-80	49.5 hrs
	Auxiliary oil pump out of service	Replaced overload assembly auxiliary contact	03-24-80	11 hours
	Preventative Maintenance	Complete Maintenance	05-22-80 to 05-23-80	27 hours
	Preventative Maintenance	Complete Maintenance	09-22-80	6 hours
	Preventative Maintenance	Complete Maintenance	10-16-80 to 10-18-80	47.5 hrs
	Remove J diesel from service to install agastats in diesel output breaker	Install agastat, perform periodic test	11-16-80	9 hours

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

HIGH HEAD SAFETY INJECTION SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
A-Charging Pump	Periodic Surveillance Test	Complete test Two pumps still available	01-27-79	10 hours
	Vent valve on suction line cracked	Crack ground out and re-welded. Two pumps remain available	05-13-79	10 hours
B-Charging Pump	Outboard Seal Leakage	*Seal replaced and pump tested. Two pumps remain available	07-14-78	72 hours
	Periodic Testing	Complete Testing Two pumps remain available	03-20-80	10 hours
	Preventative Maintenance	Complete Maintenance Two pumps still available	09-30-80 to 10-01-80	32 hours
C-Charging Pump	Blown oil seal on inboard bearing	Replace oil seal Two pumps remain available	04-03-78	13 hours
	Inboard pump seal leakage	Repair inboard mechanical seal	07-17-78	13 hours
	Oil leak on oil strainer	Oil filter retainer ring replaced. Two pumps remain available	03-19-80	12 hours

* Placement of charging pump 1B in operable status was delayed in order to shim the outboard seal to reduce charging pump 1B outboard seal leakage. During this time, 3 hours 11 minutes, only one pump was operable.

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

LOW HEAD SAFETY INJECTION SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
B-Low Head Pump	Preventative Maintenance	Complete Maintenance	10-16-78	2 hours
	Preventative Maintenance	Complete Maintenance	11-28-78	1.5 hrs
A-Low Head Pump	Preventative Maintenance	Complete Maintenance	11-03-78	7 hours
	Preventative Maintenance	Complete Maintenance	11-28-78	2 hours
MOV 1863A Discharge to Charging Pumps	Perform Periodic Surveillance Test	Complete Testing	05-11-79	6 hours
Check Valves in SI discharge lines	Inservice Inspection - Periodic Testing	Complete testing	05-03-80	1.5 hrs
Discharge Valve 1890D	No light indication	Fuse holder tightened	05-19-80	22.5 hrs
MOV 1885D B-Pump	Valve would not electrically operate.	Replaced locking ring on light module	06-23-80	2 hours

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

QUENCH SPRAY SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Refueling Water Storage Tank	Level below specifications due to a Safety Injection	Made up to tank	04-29-78	3 hours
	Temperature >50°F due to a Safety Injection	Chillers placed in service - Temp. lowered	04-29-78	13 hours
	Boron concentration low due to a Safety Injection	Borate and make up to tank	04-29-78	2.5 hrs
	Engineering determined that an excessive column of water is being maintained in the tank	Lowered level to new specification	09-12-79	1.5 hrs
	Level low due to a safety injection	Refill Tank	*09-25-79	*Cool down for refueling
	Level low due to a safety injection	Refill Tank	04-03-80 to 04-04-80	4.5 hrs

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

RECIRCULATION SPRAY SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Casing Cooling Tank	Temperature > 50°F	Placed on chiller	09-22-78 to 09-23-78	18 hours
	Freon leak from the tank chiller unit caused the temperature to go out high.	System recharged with freon. Vendor to locate freon leak.	08-19-79	5.5 hrs
Casing Cooling Pump 3A	ΔP high as found on Periodic surviellance test	Vented pressure gage - test redone	08-12-78 to 08-17-78	120 hrs
	Preventative Maintenance	Changed oil, completed inspection	05-25-79	.5 hour
	Leakage from outboard pump seal	Bearing housing disassembled cleaned and inspected. Casing surface reground to set O-ring	6-6-79	8 hours
	Preventative Maintenance	Complete Maintenance	06-12-80	6 hours
	Preventative Maintenance	Complete Maintenance	07-03-80	3 hours
	ΔP high as found on Periodic surviellance test	Vented pressure gage - test redone	08-11-80 to 08-13-80	57 hours
Casing Cooling Pump 3B	Preventative Maintenance	Complete Maintenance	05-25-79	.5 hours
	Testing indicated pump ΔP too high	Vented pressure gage	08-27-79 to 08-29-79	54 hours

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

RECIRCULATION SPRAY SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Casing Cooling Pump 3B	Unknown	Unknown	09-14-79 to 09-20-79	139 hrs
	Preventative Maintenance	Complete Maintenance	07-26-80	3.5 hrs
Casing Cooling Tank level xmitter	Level controller frozen	Built temporary enclosure ground gage	12-29-79	5 hours
	Design change	Place heat tracing around transmitter	01-30-80	2.5 hrs
	Level xmitter not approved	Replace with a seismic approved xmitter	02-29-80 to 03-01-80	23 hours
Outside Recirc. Spray Pump A	Special testing	Completed testing	01-10-80	.5 hour
	Preventative Maintenance	Completed Maintenance	11-28-80	1.5 hrs
Outside Recirc. Spray Pump B	Periodic Testing	Completion of testing	11-07-80 to 11-08-80	15 hours
	Preventative Maintenance	Complete Maintenance	11-28-80	1.5 hrs

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

RECIRCULATION SPRAY SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Inside Recirc. Spray Pump A	Preventative Maintenance	Complete Maintenance	11-28-78	2 hours
Inside Recirc. Spray Pump B	Design change 79-S64	Fuse and fuse blocks changed out on design change	10-06-80	1 hour

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

SAFETY INJECTION SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Accumulator C	Level > 7756 gal (T.S. limit)	Lowered level	10-02-78	1 hour
	Pressure low when accum. discharged to relief tank thru RHR relief after RHR outlet valves opened.	Returned level and pressure to limit.	03-06-79	1 hour
	Boron concentration too high due to stratification within the accumulators	Feed and bleed accumulator until within specifications	01-26-80 to 01-27-80	4 hours
	Boron concentration too high due to stratification within the accumulators	Feed and bleed accumulator until within specifications	11-24-80	2 hours
Accumulators B, C	Boron concentration too high due to stratification within the accumulators	Feed and bleed accumulator until within specifications	01-26-80	12 hours
Accumulator B	Boron concentration too high due to stratification within the accumulators	Feed and bleed accumulator until within specifications	08-01-80	2 hours
	Boron concentration too high due to stratification within the accumulators	Feed and bleed accumulator until within specifications	09-04-80	2.5 hrs
Boron Injection Tank (BIT)	Level low due to a Safety Injection	Make up to BIT	04-30-78	9 hours
	Low level due to a Safety Injection	Make up to BIT	*09-25-79	*Cooled down for refueling

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

SAFETY INJECTION SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Boron Injection Tank (BIT)	Boron concentration and temp low	Return to specification	02-23-80 to 02-24-80	8 hours
	Boron concentration level, temp low - Safety Inj.	Return to specifications	04-03-80 to 04-04-80	7 hours
	Boron concentration low	Return to specifications	05-30-80	10 hours
BIT - Check Valve 1-SI-66	Check valve failed to hold pressure for testing	Unknown	08-22-78	25 hours
BIT - 1-SI-304	Valve plugged with Boric Acid	Cleaned out line	02-13-80	9.5 hrs

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

SERVICE WATER SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Service Water Pump 1A	Preventative Maintenance - Change oil	Complete Maintenance	09-18-78 to 09-19-78	5 hours
	Preventative Maintenance - Polarization Index Ratio	Complete Maintenance	11-29-78	1.5 hrs
	Periodic Test III - Pump Tilt Measurements	Complete Measurements	05-16-79	3 hours
	Periodic Test III - Pump Tilt Measurements	Complete Measurements	01-10-80	1 hour
	Preventative Maintenance	Complete Maintenance	03-07-80	4 hours
Service Water Pump 1B	Unknown	Unknown	07-06-78	5 hours
	Hi discharge pressure as per Periodic test 75.2B	Retested using more accurate flow device	07-26-78 to 07-28-78	33.5 hrs
	Periodic Test III - Pump Tilt Measurements	Complete Measurements	03-15-79	2.5 hrs
	Periodic Test III - Pump Tilt Measurements	Complete Measurements	01-10-80	2.5 hrs
	Periodic Test III - Pump Tilt Measurements	Complete Measurements	11-24-80	.25 hrs

NORTH ANNA POWER STATION
UNIT #1
ECCS OUTAGE REPORT

SERVICE WATER SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
MOV 108A, B	Water in Limitorque	No water found, no maint-enance done	08-18-78	5 hours
Flow xmitter Service Water	Transmitter out of tolerance	Transmitter replaced and calibrated	10-29-80 to 10-30-80	37.5 hrs

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

ELECTRICAL POWER SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Emergency Diesel Gen. 2H	Preventative Maintenance	Complete Maintenance	05-28-80	7 hours
	Preventative Maintenance	Complete Maintenance	05-28-80 to 05-29-80	27 hours
	Preventative Maintenance	Complete Maintenance	08-05-80 to 08-06-80	34 hours
	Preventative Maintenance	Complete Maintenance	10-01-80 to 10-02-80	4.5 hrs
	XF-1 Jacket Heater Transformer burned out	Replaced transformer XF-1	10-15-80	4.5 hrs
2H Diesel Fuel Oil Pump	Fuel oil pump did not start	Level switch, on fuel oil tank, operation tested	10-15-80	16 hours
Emergency Diesel Gen. 2J	Diesel tripped after 20 seconds	Performed periodic test 82.1B	05-17-80	8 hours
	Preventative Maintenance	Complete Maintenance	05-28-80	15.5 hrs
	Auxiliary lube oil xformer burned out	Replaced xformer and tested - sat.	06-06-80	6.5 hrs
	Preventative Maintenance	Complete Maintenance	10-16-80 to 10-18-80	55 hours

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

ELECTRICAL POWER SYSTEM
(continued)

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Emergency Diesel Gen. 2J	Diesel batteries failed Periodic test	Recalculated test by normalizing data	12-01-80	6.25 hrs

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

HIGH HEAD SAFETY INJECTION SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Charging Pump 1C	Outboard pump seal leaking	Shutdown pump - repair seal Two pumps remain available	10-08-80	4.5 hrs
Safety Injection Pump 1A	Fitting on seal supply leaks	Repair fitting (tighten and test)	06-10-80	10 hours
	Lamp test design change mod.	Complete modification	07-01-80 to 07-03-80	41 hours
Safety Injection Pump 1B	Lamp test design change mod.	Complete modification	07-01-80 to 07-03-80	41 hours
	Relief valve on discharge line lifting at too low a pressure	Pulled valve, adjusted lift-setting and placed back in system	09-19-80	12.5 hrs
MOV 2890 A, C LHSI Discharge Valves	Packing Leaks	Tighten Packing	07-28-80	.5 hour
MOV 2862 A MOV 2885A MOV 2864A	Packing Leaks	Tighten Packing	07-28-80	.5 hour
MOV 2890B MOV 2862B MOV 2885B	Packing Leaks	Tighten Packing	10-30-80	.5 hour

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

RECIRCULATION SPRAY SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Casing Cooling Pump 3A	Preventative Maintenance	Complete Maintenance	06-13-80	3 hours
Casing Cooling Pump 3B	Preventative Maintenance	Complete Maintenance	06-21-80	4 hours
Recirc. Spray Pump 2A	Lamp Test Modification	Modification Complete	06-29-80 to 06-30-80	9 hours
Recirc. Spray Pump 2B	Lamp Test Modification	Modification Complete	06-24-80 to 06-25-80	15.5 hrs
Inside Recirc. Spray Pump 1A	Lamp Test Modification	Modification Complete	06-30-80 to 07-01-80	32.5 hrs
Inside Recirc. Spray Pump 1B	Mechanical Linkage on breaker 24J1-2 for pump - did not operate	Breaker removed, cleaned and replaced. Tested satisfactorily	11-25-80	2.5 hrs

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

QUENCH SPRAY SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Refueling Water Storage Tank	Boron concentration > 2105 PPM	Feed and bleed tank until within limits	09-09-80	1 hour

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

SAFETY INJECTION SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Accumulator A, B, C	Boron concentration >2100 PPM	Feed and bleed until within specs.	08-07-80 to 08-13-80	In Mode 5 - Acc. not needed
Accumulator A	Boron concentration >2100 PPM	Feed and bleed until within specs.	09-11-80 to 09-12-80	27.5 hrs
Accumulator C	Boron concentration > 2100 PPM	Feed and bleed until within specs.	10-09-80	1.5 hrs
	Boron concentration > 2100 PPM	Feed and bleed until within specs.	10-09-80	3 hours
Boron Injection Tank (BIT)	Boron concentration low	Batch to Boric Acid Storage tank	05-20-80 to 05-21-80	25 hours
	Boron concentration low	Batch to Boric Acid Storage tank	05-21-80 to 05-26-80	120 hrs
	Boron concentration low	Batch to Boric Acid Storage tank	05-27-80 to 06-02-80	124 hrs
		Batch to Boric Acid Storage tank	10-08-80	.5 hour
		Batch to Boric Acid Storage tank	10-20-80	3 hour

NORTH ANNA POWER STATION
UNIT #2
ECCS OUTAGE REPORT

SERVICE WATER SYSTEM

COMPONENT	CAUSE OF OUTAGE	CORRECTIVE ACTION	OUTAGE DATES	OUTAGE DURATION
Service Water Pump 1A	Lamp Test Modification	Complete Modification	06-29-80	8 hours
Service Water Pump 1B	Lamp Test Modification	Complete Modification	06-23-80 to 06-24-80	21.5 hrs