

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

W. L. STEWART  
VICE PRESIDENT  
NUCLEAR OPERATIONS

January 31, 1984

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: 053  
PSE/PJT:jdm:1106B  
Docket Nos: 50-280  
50-281  
License Nos: DPR-32  
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY  
SURRY/UNITS 1 & 2  
COMPLIANCE WITH REGULATORY GUIDE 1.97

Veeco has performed a comparison study to evaluate the compliance of Surry Power Station's design basis to Regulatory Guide 1.97 as required by NUREG 0737, Supplement 1. The study was performed to the criteria of Regulatory Guide 1.97, Revision 3 in accordance with Section D, "Applicability." Enclosed is the report of this study.

All modifications identified in the enclosure will be completed by the end of the second refueling after July, 1985 for Units 1 and 2, respectively.

Very truly yours,

  
W. L. Stewart

Enclosure

cc: Mr. James P. O'Reilly  
Regional Administrator  
Region II  
101 Marietta Street, Suite 2900  
Atlanta, Georgia 30303

Mr. Steven A. Varga, Chief  
Operating Reactors Branch No. 1  
Division of Licensing

8402070382 840131  
PDR ADOCK 05000280  
PDR

A003  
11

VIRGINIA ELECTRIC AND POWER COMPANY TO Mr. Harold R. Denton

Mr. J. Don Neighbors  
Surry Project Manager  
Mailstop 438  
7920 Norfolk Ave.  
USNRC  
Bethesda, MD 20014

Mr. D. J. Burke  
NRC Resident Inspector  
Surry Power Station

VEPCO

SURRY POWER STATION

REG. GUIDE 1.97 REVIEW

## TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
Introduction	1
Variable List	2
Notes and Justifications	31
Attachments	
I. Indicator Table	35
II. Category I Recorders	38
III. Regulatory Guide 1.97 Review Basis	40

## INTRODUCTION

A review of instrumentation installed at Virginia Electric and Power Company's Surry Power Station has been performed to determine if the existing instrumentation complies with the intent of the range, redundancy, power supply, seismic qualification and environmental qualification requirements of Regulatory Guide 1.97, Rev. 3 (R.G. 1.97), "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident." Contained herein are the results of that review.

Also contained is the Variable List for Surry Power Station, preceded by a Guide explaining the terminology used in the List. Attachment I provides a summary of indicators by Item Number, Mark Number, Manufacturer and Type. Attachment II provides a similar summary for recorders.

In initiating the review of existing instrumentation, a baseline set of criteria was developed. To establish these criteria, the Regulatory Guide 1.97 - Revision 3 recommended design and qualification criteria were compared to the Surry Power Station design basis. Although the Surry Power Station design basis was effectively established prior to the issuance of many of the Regulatory Guides referenced in Regulatory Guide 1.97, the design conforms to the intent of the Regulatory Guides as shown by the comparison in Attachment III. Attachment III lists the required and recommended design documents of Regulatory Guide 1.97 and provides a comparison to the applicable Surry Power Station design basis.

VARIABLE LIST GUIDE

1. The following terminology applies for the Surry Power Station Variable List:

N/R - Not Required

N/A - Not Applicable

YES - Complies with the intent of Reg. Guide 1.97.

NO - Does not comply with the intent of Reg. Guide 1.97.  
- Justification is stated.

2. Control Room Display - Reg. Guide 1.97 Variables will be available on Control Board Indication and/or available for call-up via CRT displays. Exceptions will be Chemistry and Health Physics variables which will be made available to the appropriate personnel by the transmittal of data, written or verbal, and logged.

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
A-1	Steam Generator Narrow Range Level	1	Yes	Yes	Yes	No
A-2	Steam Generator Pressure	1	Yes	Yes	Yes	No
A-3	Core Exit Temperature	1	No	No	No	No
A-4	RCS Cold Leg Water Temperature	1	Yes	No	No	Yes
A-5	RCS Hot Leg Water Temperature	1	Yes	No	No	Yes
A-6	RCS Flow	1	Yes	No	No	Yes
A-7	RCS Wide Range Pressure	1	Yes	No	No	Yes
A-8	H.P.S.I. Flow	1	Yes	No	No	No
A-9	Condensate Storage Tank Water Level	1	Yes	Yes	Yes	Yes
A-10	Refueling Water Storage Tank Level	1	Yes	Yes	Yes	Yes
A-11	PORV Position Indication	1	Yes	No	No	No
A-12	Pressurizer Liquid Temp.	1	Yes	No	No	No

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
A-1	Yes	Yes	Yes	Yes	Acceptable; Note 1
A-2	Yes	Yes	Yes	Yes	Acceptable; Note 1
A-3	Yes	Yes	Yes	Yes	System to be upgraded.
A-4	Yes	Yes	Yes	Yes	RTD's to be replaced
A-5	Yes	Yes	Yes	Yes	RTD's to be replaced
A-6	Yes	Yes	Yes	Yes	Notes 1 and 2
A-7	Yes	Yes	Yes	Yes	Note 1
A-8	Yes	Yes	Yes	Yes	Relocate and replace transmitters above submergence level. Separation of flow channels required.
A-9	Yes	Yes	Yes	Yes	Acceptable
A-10	Yes	Yes	Yes	Yes	Note 1
A-11	No	Yes	Yes	Yes	System to be upgraded.
A-12	Yes	Yes	Yes	Yes	Replace present RTD with qualified dual element RTD, install a second channel.



VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
A-13	Pressurizer Level	1	Yes	Yes	Yes	Yes
A-14	Containment Hydrogen Concentration	1	Yes	Yes	Yes	Yes
A-15	Containment Intermediate Range Pressure	1	Yes	Yes	Yes	No
A-16	Indicators	1	Yes	Reference Attachment I	Reference Attachment I	N/R
A-17	Recorders	1	Yes	Reference Attachment II	Reference Attachment II	N/R
B-1	Neutron Flux	1	Yes	No	No	Yes
B-2	Control Rod Position	3	Yes	N/R	N/R	N/R
B-3	RCS Soluble Boron Concentration	3	Yes	N/R	N/R	N/R
B-4	RCS Cold Leg Water Temperature	3		Refer to Item A-4		
B-5	RCS Hot Leg Water Temperature	1		Refer to Item A-5		
B-6	RCS Cold Leg Water Temperature	1		Refer to Item A-4		

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
A-13	Yes	Yes	Yes	Yes	Acceptable
A-14	Yes	Yes	Yes	Yes	Acceptable
A-15	Yes	Yes	Yes	Yes	Note 1
A-16	N/A	Yes	Yes	Yes	Reference <u>Attachment I</u> ; Note 1
A-17	N/A	Yes	Yes	Yes	Reference <u>Attachment II</u> ; Note 1
B-1	Yes	Yes	Yes	Yes	Install new excore flux monitoring system
B-2	N/R	Yes	Yes	Yes	Acceptable
B-3	N/R	Yes	Yes	Yes	The boron concentration can be determined by the manual grab sample and/or post-accident sampling system.
B-4					Refer to Item A-4
B-5					Refer to Item A-5
B-6					Refer to Item A-4

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
B-7	RCS Pressure	1		Refer to Item A-7		
B-8	Core Exit Temperature	3		Refer to Item A-3		
B-9	Coolant Level in reactor	1	Yes	Yes	Yes	Yes
B-10	Degrees of Subcooling	2	Yes	Yes	N/R	N/R
B-11	RCS Pressure	1		Refer to Item A-7		
B-12A	Containment Sump Pump Level (Narrow)	2	Yes	Yes	N/R	N/R
B-12B	Containment Sump Water Level (Wide)	1	Yes	Yes	Yes	Yes
B-13	Containment Pressure	1	Yes	Yes	Yes	Yes
B-14	Containment Isolation Valve Position	1	Yes	Yes	Yes	Yes

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
B-7					Refer to Item A-7
B-8					Refer to Item A-3
B-9	Yes	Yes	Yes	Yes	Acceptable; Note 1
B-10	Yes	Yes	Yes	Yes	Acceptable
B-11					Refer to Item A-7
B-12A	Yes	Yes	Yes	Yes	Acceptable
B-12B	Yes	Yes	Yes	Yes	Acceptable
B-13	Yes	Yes	Yes	Yes	Acceptable
B-14	Yes	Yes	Yes	Yes	Acceptable

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
B-15	Containment Pressure	1	Yes	Yes	Yes	Yes
C-1	Core Exit Temperature	1		Refer to Item A-3		
C-2	Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	1	Yes	No	No	Yes
C-3	Analysis of Primary Coolant (Gamma Spectrum)	3	Yes	N/R	N/R	N/R
C-4	RCS Pressure	1		Refer to Item A-7		
C-5	Containment Pressure	1	Yes	Yes	Yes	Yes
C-6A	Containment Sump Water Level (Narrow)	2		Refer to Item B-12A		
C-6B	Containment Sump Water Level (Wide)	1		Refer to Item B-12B		
C-7	Containment Area Radiation	3		Refer to Item E-1		

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
B-15	Yes	Yes	Yes	Yes	Acceptable
C-1					Refer to Item A-3.
C-2	No	Yes	Yes	Yes	Note 4
C-3	N/R	Yes	Yes	Yes	Acceptable
C-4					Refer to Item A-7
C-5	Yes	Yes	Yes	Yes	Acceptable
C-6A					Refer to Item B-12A
C-6B					Refer to Item B-12B
C-7					Refer to Item E-1

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
C-8	Effluent Radioactivity Noble Gas Effluent from Condenser Air Removal System Exhaust	3		Refer to Item E-6 and E-7		
C-9	RCS Pressure	1		Refer to Item A-7		
C-10	Containment Hydrogen Concentration	1		Refer to Item A-14		
C-11	Containment Pressure	1	Yes	Yes	Yes	Yes
C-12	Containment Effluent Radioactivity - Noble Gases from Identified Release Points	2	Yes	Yes	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
C-8					Function covered by Item E-6 & E-7
C-9					Refer to Item A-7
C-10					Refer to Item A-14
C-11	Yes	Yes	Yes	Yes	Acceptable
C-12	Yes	Yes	Yes	Yes	Acceptable



VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
C-13	Radiation Exposure Rate (inside buildings or areas, e.g., auxiliary building, reactor shield building annulus, fuel handling building, which are in direct contact with primary containment where penetrations and hatches are located)	2	Yes	Yes	N/R	N/R
C-14	Effluent Radioactivity Noble Gases (from buildings as indicated in C-13)			Refer to item E-7		
D-1	RHR System Flow	2	Yes	No	N/R	N/R
D-2	RHR Heat Exchanger Outlet Temperature	2	Yes	No	N/R	N/R
D-3	Accumulator Tank Level	2	No	No	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
C-13	Yes	Yes	Yes	Yes	Acceptable
C-14					Provided by Item E-7
D-1	Yes	Yes	Yes	Yes	Consider Category 3 variable. See Note <u>9</u>
D-2	Yes	Yes	Yes	Yes	Consider Category 3 variable. See Note <u>9</u>
D-3	Yes	Yes	Yes	Yes	Consider Category 3. See Note <u>10</u>

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
D-4	Accumulator Tank Pressure	2	Yes	No	N/R	N/R
D-5	Accumulator Isolation Valve Position	2	Yes	N/R	N/R	N/R
D-6	Boric Acid Charging (Flow)	2	Yes	No	N/R	N/R
D-7	Flow in HPI System	2		Refer to Item A-8		
D-8	Flow in LPI System	2	Yes	Yes	N/R	N/R
D-9	Refueling Water Storage Tank Level	2		Refer to Item A-10		
D-10	Reactor Coolant Pump Status	3	Yes	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
D-4	Yes	Yes	Yes	Yes	Consider Category 3. See Note <u>10</u>
D-5	Yes	Yes	Yes	Yes	Consider Category 3. See Note <u>10</u>
D-6	Yes	Yes	Yes	Yes	Transmitter to be replaced
D-7					Refer to Item A-8
D-8	Yes	Yes	Yes	Yes	Acceptable
D-9					Refer to Item A-10
D-10	N/R	Yes	Yes	Yes	Acceptable

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
D-11	Primary System Safety Relief Valve Position (including PORV valves)	2		Refer to Item A-11		
D-12	Pressurizer Level	1	No	Yes	Yes	No
D-13	Pressurizer Heater Status	2	No	No	N/R	N/R
D-14	Quench Tank Level	3	Yes	N/R	N/R	N/R
D-15	Quench Tank Temperature	3	No	N/R	N/R	N/R
D-16	Quench Tank Pressure	3	Yes	N/R	N/R	N/R
D-17	Steam Generator Level	1	Yes	No	No	Yes
D-18	Steam Generator Pressure	1		Refer to Item A-2		
D-19	Safety-Relief Valve Positions	2	No	No	N/R	N/R
D-20	Main Feedwater Flow	3	Yes	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
D-11					Refer to Item A-11
D-12	Yes	Yes	Yes	Yes	Add density compensation to reduce error and expand range of transmitters to full range allowed by taps. Note 7
D-13	Yes	Yes	Yes	Yes	Note 5
D-14	N/R	Yes	Yes	Yes	Acceptable. Existing range covers approximately 90% of tank height.
D-15	N/R	Yes	Yes	Yes	Note 6
D-16	N/R	Yes	Yes	Yes	Acceptable
D-17	Yes	Yes	Yes	Yes	Transmitters to be replaced. Notes 1 and 3
D-18					Refer to Item A-2
D-19	No	No	No	No	Install position detector and indicator
D-20	N/R	Yes	Yes	Yes	Acceptable

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
D-21	Auxiliary or Emergency Feedwater Flow	2	Yes	Yes	N/R	N/R
D-22	Condensate Storage Tank Level	1		Refer to Items A-9		
D-23	Containment Spray Flow	2	No	No	N/R	N/R
D-24	Heat Removal by the Containment Fan Heat Removal System	2	No	No	N/R	N/R
D-25	Containment Atmosphere	2	No	No	N/R	N/R
D-26	Containment Sump Water Temperature	2	Yes	No	N/R	N/R
D-27	Makeup Flow-in	2	Yes	No	N/R	N/R
D-28	Letdown Flow-Out	2	Yes	No	N/R	N/R
D-29	Volume Control Tank Level	2	No	No	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
D-21	Yes	Yes	Yes	Yes	Acceptable
D-22					Refer to Item A-9
D-23	No	No	-	-	Note 8
D-24	No	No	Yes	Yes	Add qualified flow transmitters and temperature elements.
D-25	Yes	Yes	Yes	Yes	Replace with qualified RTD and Rescale
D-26	Yes	Yes	Yes	Yes	Note 11
D-27	Yes	Yes	Yes	Yes	Replace with qualified transmitter
D-28	Yes	Yes	Yes	Yes	Replace with qualified transmitter
D-29	Yes	Yes	Yes	Yes	Replace with qualified transmitters; Note 12



VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
D-30	Component Cooling Water Temperature to ESF Systems	2	No	No	N/R	N/R
D-31	Component Cooling Water Flow to ESF Systems	2	No	No	N/R	N/R
D-32	High-Level Radioactive Liquid Tank Level	3	Yes	N/R	N/R	N/R
D-33	Radioactive Gas Holdup Tank Pressure	3	No	N/R	N/R	N/R
D-34	Emergency Ventilation Damper Position	2	No	No	N/R	N/R
D-35A	4160 Emergency Bus-Availability	2	Yes	Yes	No	N/R
D-35B	480 V Emergency Bus-Availability	2	No	No	No	N/R
D-35C	125VDC Status	2	Yes	Yes	Yes	N/R
D-35D	120 VAC Vital Bus Status	2	Yes	Yes	Yes	N/R
D-35E	120 VAC Semi-Vital Bus Status	2	Yes	Yes	Yes	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
D-30	No	No	Yes	Yes	Install temperature channel to monitor operation at the charging pump cooling system
D-31	No	Yes	Yes	Yes	Install flow channel to monitor charging pump cooling system
D-32	N/R	Yes	Yes	Yes	Acceptable
D-33	Yes	Yes	Yes	Yes	Rescale existing instruments
D-34	Yes	No	Yes	Yes	Install Limit switches
D-35A	Yes	Yes	Yes	Yes	For items D-35A - D35 F control room displays will be available once the Multiplex systems is installed.
D-35B	Yes	Yes	Yes	Yes	
D-35C	Yes	Yes	Yes	Yes	
D-35D	Yes	Yes	Yes	Yes	
D-35E	Yes	Yes	Yes	Yes	

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
D-35F	Emergency Diesel Generator Watts Status	2	Yes	Yes	No	N/R
E-1	Containment Area Radiation	1	Yes	Yes	Yes	Yes
E-2	Radiation Exposure Rate (inside buildings or areas where access is required to service equipment important to safety)	3	Yes	N/R	N/R	N/R
E-3	Containment or Purge Effluent	2	N/R	N/R	N/R	N/R
E-4	Reactor Shields Buildings Annulus (if in design)	2	N/R	N/R	N/R	N/R
E-5	Auxiliary Building (including any building containing primary system gases, e.g., waste gas decay tank)	2	Yes	Yes	N/R	N/R
E-6	Condenser Air Removal System Exhaust	2	N/R	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
D-35F	Yes	Yes	Yes	Yes	
E-1	Yes	Yes	Yes	Yes	Acceptable
E-2	Yes	Yes	Yes	Yes	Acceptable
E-3	N/R	N/R	N/R	N/R	Delete - Effluent discharge through <u>common plant vent</u>
E-4	N/R	N/R	N/R	N/R	Delete - Effluent discharges through <u>common plant vent</u>
E-5	Yes	Yes	Yes	Yes	Acceptable
E-6	N/R	N/R	N/R	N/R	Delete - Effluent discharges through <u>common plant vent</u>

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
E-7	Common Plant Vent or Multi-purpose Vent Discharging Any of Above Release (if containment purge is included)	2	Yes	Yes	N/R	N/R
E-8	Vent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves	2	Yes	Yes	N/R	N/R
E-9	All Other Identified Release Points		None Identified			
E-10	All Identified Plant Release Points (except steam generator safety relief valves or atmospheric steam dump valves and condenser air removal system exhaust). Sampling with Onsite Analysis Capability.	3	Yes	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
E-7	Yes	Yes	Yes	Yes	Acceptable
E-8	Yes	Yes	Yes	Yes	Acceptable
E-9					None Identified
E-10	N/R	Yes	Yes	Yes	Acceptable

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
E-11	Airborne Radio-halogens and Particulates (portable sampling with onsite analysis capability)	3	Yes	N/R	N/R	N/R
E-12	Plant and Environs Radiation (portable instrumentation)	3	No	N/R	N/R	N/R
E-13	Plant Environs Radioactivity (portable instrumentation)	3	Yes	N/R	N/R	N/R
E-14	Wind Direction	3	Yes	N/R	N/R	N/R
E-15	Wind Speed	3	Yes	N/R	N/R	N/R
E-16	Estimation of Atmospheric Stability	3	Yes	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
E-11	N/R	For Items E-11 - E-13, Manual documented results are available to the operator.	E-11 - E-13,		Acceptable
E-12	N/R				Purchase additional portable instrumentation to cover range to 10 <sup>4</sup> R/Hr (common to both units).
E-13	N/R				Acceptable
E-14	N/R	Yes	Yes	Yes	Acceptable
E-15	N/R	Yes	Yes	Yes	Acceptable
E-16	N/R	Yes	Yes	Yes	Acceptable



VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	VARIABLE	CATEGORY	RANGE	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	REDUNDANCY
E-17	Primary Coolant and Sump Sampling and Analysis	3	Yes	N/R	N/R	N/R
E-18	Containment Air Sample	3	Yes	N/R	N/R	N/R

VIRGINIA ELECTRIC AND POWER COMPANY  
 REG. GUIDE 1.97 VARIABLE LIST  
 SURRY POWER STATION

ITEM NUMBER	POWER SOURCE	CONTROL ROOM DISPLAY	TSC LOCATION	EOF LOCATION	REMARKS
E-17	N/R	Yes	Yes	Yes	Acceptable
E-18	N/R	Yes	Yes	Yes	Acceptable

VARIABLE LIST  
SURRY POWER STATION  
NOTES  
AND JUSTIFICATIONS

Note 1: Redundant channels are displayed on a common recorder. This does not impair the operator from obtaining the data in the event of a recorder failure. The data for each channel will be accessible to the operator via call-up from CRT's in the Control Room. The CRTs will be capable of receiving data from either of two redundant computer systems which are fed by a redundant qualified multiplex system. Additionally, many of the points are available on the existing plant computer as another backup.

Note 2: Parameter is confirmatory in nature only (running/not running), therefore we do not intend to upgrade. As a backup, item D-10 Reactor Coolant Pump current indication and RCP breaker status (open/closed) is available to the operator for each motor.

Note 3: The Steam Generator wide range level transmitters have a range of 0-575" H<sub>2</sub>O. This range covers from 14" above the tube sheet to the separators which is 97.6% of the required range which meets the intent of R.G. 1.97.

Note 4: Two independent and redundant systems are available to obtain this sample. However, only one of the two is fully environmentally and seismically qualified. This is considered adequate to meet the intent of R.G. 1.97 and no modifications are planned. RM-CH-218, 219, 118, 119 and the new Post Accident System are the systems to be used for back-up.

Note 5: Breaker position is adequate indication with pressurizer temperature and pressure available as backups. Additionally, the operating and emergency procedures reference only breaker position indication.

Note 6: One non-safety temperature indication with a range of 0-350°F is provided and considered adequate to meet the intent of this guide. The quench tank design pressure is 100 psig. Prior to attaining this pressure, the tank rupture disk will provide a relief path to the containment atmosphere. Therefore, any relief from the pressurizer safety valves will be maintained below 100 psig and a corresponding saturation temperature less than 350°F.

Note 7: Existing level instrumentation meets the intent of this guide once temperature compensation is added. Present instrumentation covers 390" of the 500" height of the pressurizer with only the curvature portions of the vessel not being covered.

Note 8: Existing instrumentation is considered adequate. A pressure switch is installed on the discharge side of each Containment Spray Pump to monitor low pressure with annunciator alarm available in the control room.

Note 9: Considered as a Category 3 variable. The RHR system is not required to operate during post accident conditions as identified in the updated Final Safety Analysis Report Section 9.3.2.2. Additionally, RHR flow and temperature are backup variables for monitoring core cooling which can be determined from redundant and qualified temperature and pressure measurements.

Note 10: The present accumulator tank level instrumentation indicates over a range of twelve inches. This narrow range is required to obtain the accuracy needed to meet technical specification conditions and meet the intent of R.G. 1.97. Variables D-3, D-4 and D-5 are located below the flood plane after accident and environmentally qualified only for the environment that they see during normal plant operations. During power operations, the power to the accumulator isolation valve, which is open, is removed with the breaker being verified locked open by Technical Specification during start-up procedure. Therefore, accumulator pressure, level and valve position indication serve as a

means to determine accumulator status during normal operations and to ensure their capability to perform their automatic accident function which is independent of electrical signals and strictly mechanical in nature. Therefore, these variables should be classified as Category 3 and considered qualified for their intended normal operating environment functions.

Note 11: The containment sump temperature indication is not required based on the regulatory position delineated in Safety Guide 1 "Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps." Vepco's Emergency Core Cooling and Containment Heat Removal System pumps which take suction from the containment sump when the refueling water storage tank is empty were analyzed under LOCA condition in section 6.3 of the UFSAR to ensure sufficient NPSH to meet the criteria of Safety Guide 1. Vepco considers this a Category 3 variable.

Note 12: The existing range covers from 22% to 78% of tank volume. This range is satisfactory to monitor the operating range of the variable which meets the intent of R.G. 1.97.

ATTACHMENT I  
UNIT 1  
INDICATORS  
SURRY POWER STATION

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
A-1	LI-1474, 1484, 1494 LI-1475, 1485, 1495 LI-1476, 1486, 1496	Hagan	107
A-2	PI-1474, 1484, 1494 PI-1475, 1485, 1495 PI-1476, 1486, 1496	Hagan	107
A-3	Thermocouple Indicators	Honeywell	System To Be Replaced
A-6	FI-1414, 1415, 1416 FI-1424, 1425, 1426 FI-1434, 1435, 1436	Hagan Hagan Hagan	107 107 107
A-7	PI-1402, 1402-1	Westinghouse	VX-252*
A-8	FI-1940, 1943 FI-1932, 1933, 1960 FI-1961, 1962, 1963	Hagan Hagan Hagan	107 107 107
A-9	LI-CN-100, 101	Sigma	9270
A-10	LI-CS-100A, 100B LI-CS-100C, 100D	Hagan Westinghouse	107 VX-252*
A-11	YI-VMS101A, B	Sigma I11.	System to be upgraded
A-12	TI-1453	Hagan	107
A-13	LI-1459, 1460, 1461	Hagan	107
A-14	H <sub>2</sub> I-GW-104-1, 104-2	Hagan	107
A-15	PI-LM-100A, 100B PI-LM-100C, 100D	Hagan	107
B-1	NI-1-41B, 42B, 43B NI-1-44B NI-1-41C, 42C, 43C NI-1-44C NI-1-31B, 32B, 35B NI-1-36B NI-1-31B, 32D, 35D NI-1-36D	Hagan	107

\*Qualified Indicators

ATTACHMENT I (CONT'D)  
 UNIT 1  
 INDICATORS  
SURRY POWER STATION

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
B-9	LI-1-1310, 1311, LI-1-1312, 1320, LI-1-1322, 1321	Westinghouse	VX-252*
B-12B	LI-RS-151A, 151B	Westinghouse	VX-252*
C-2	RM-CH-118, 119	Victoreen	844-18
C-11	PI-LM-101A, 101B	Westinghouse	VX-252*

UNIT 2

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
A-1	LI-2474, 2484, 2494 LI-2475, 2485, 2495 LI-2476, 2486, 2496	Hagan	107
A-2	PI-2474, 2484, 2494 PI-2475, 2485, 2495 PI-2476, 2486, 2496	Hagan	107
A-3	Thermocouple Indicators	Honeywell	System To Be Replaced
A-6	FI-2414, 2415, 2416 FI-2424, 2425, 2426 FI-2434, 2435, 2436	Hagan Hagan Hagan	107 107 107
A-7	PI-2402, 2402-1	Westinghouse	VX-252*
A-8	FI-2940, 2943 FI-2932, 2933, 2960 FI-2961, 2962, 2963	Hagan Hagan Hagan	107 107 107
A-9	LI-CN-200, 101	Sigma	9270
A-10	LI-CS-200A, 100B LI-CS-200C, 100D	Hagan Westinghouse	107 VX-252*
A-11	YI-VMS201A, B	Sigma III.	System to be upgraded

\*Qualified Indicators



ATTACHMENT I (CONT'D)  
 UNIT 2  
INDICATORS  
SURRY POWER STATION

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
A-12	TI-2453	Hagan	107
A-13	LI-2459, 2460, 2461	Hagan	107
A-14	H <sub>2</sub> I-GW-204-1, 204-2	Hagan	107
A-15	PI-LM-200A, 200B PI-LM-200C, 200D	Hagan	107
B-1	NI-2-41B, 42B, 43B NI-2-44B NI-2-41C, 42C, 43C NI-2-44C NI-2-31B, 32B, 35B NI-2-36B NI-2-31B, 32D, 35D NI-2-36D	Hagan	107
B-9	LI-2-1310, 1311, LI-2-1312, 1320, LI-2-1322, 1321	Westinghouse	VX-252*
B-12B	LI-RS-251A, 251B	Westinghouse	VX-252*
C-2	RM-CH-218, 219	Victoreen	844-18
C-11	PI-LM-201A, 201B	Westinghouse	VX-252*

\*Qualified Indicators

ATTACHMENT II  
UNIT 1  
RECORDERS  
SURRY POWER STATION

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
A-4	TR-1413 TR-1423 TR-1433	Westinghouse Westinghouse Westinghouse	Optimac 101 Optimac 101 PAM recorder
A-5	Uses same recorders as Item A-4		
A-13	LR-1459	Westinghouse	Optimac 101
A-14	H <sub>2</sub> R-GW-104	Westinghouse	PAM recorder
B-9	LR-1-1310	Westinghouse	Optimac 101
C-11	PR-LM-101A	Westinghouse	PAM recorder
D-17	LR-1477	Westinghouse	Optimac 101
E-1	RR-RMS 127 RR-RMS 128	Westinghouse	PAM recorder

ATTACHMENT II (CONT'D)  
 UNIT 2  
 RECORDERS  
SURRY POWER STATION

<u>ITEM NO.</u>	<u>MARK NO.</u>	<u>MANUFACTURER</u>	<u>TYPE</u>
A-4	TR-2413 TR-2423 TR-2433	Westinghouse Westinghouse Westinghouse	Optimac 101 Optimac 101 PAM recorder
A-5	Uses same recorders as Item A-4		
A-13	LR-2459	Westinghouse	Optimac 101
A-14	H <sub>2</sub> R-GW-204	Westinghouse	PAM recorder
B-9	LR-1-2310	Westinghouse	Optimac 101
C-11	PR-LM-201A	Westinghouse	PAM recorder
D-17	LR-2477	Westinghouse	Optimac 101
E-1	RR-RMS 227 RR-RMS 228	Westinghouse	PAM recorder

ATTACHMENT III  
REGULATORY GUIDE 1.97 REVIEW BASIS  
SURRY POWER STATION

1. Electrical Regulatory Guide

- a. Reg. Guide 1.89 - "Qualification of Class IE Equipment for Nuclear Power Plants.

The Surry review basis is IEEE-323-71 and 344-71 (as applicable) with the environmental and seismic conditions referenced in the test reports for existing equipment. Items addressed were reviewed under IE Bulletin 79-01B requirements.

The new equipment review basis is IE Bulletin 79-01B Category I requirements referenced in the test report or where fully qualified equipment is unavailable, the best available equipment was obtained.

- b. Reg. Guide 1.100 - "Seismic Qualification of Electric Equipment for Nuclear Power Plants."

The Surry review basis is IEEE-344-71 or seismic conditions referenced in the test reports for existing equipment.

- c. Reg. Guide 1.75, "Physical Independence of Electric Systems."

The Surry electric systems do not conform to the recommendations in Reg. Guide 1.75 since this was not in the original design criteria. New equipment will be integrated into our existing separation provisions.

- d. Reg. Guide 1.32, "Criteria for Safety Related Electric Power Systems for Nuclear Power Plants."

The Surry review basis is "IEEE Std. 308-71, Criteria for Class IE Electric Systems for Nuclear Power Generating Stations."

- e. Reg. Guide 1.118 - "Periodic Testing of Electric Power and Protection Systems." This Regulatory Guide invokes the requirements of IEEE 388-75, which are applicable to protection systems. The display information required by Regulatory Guide 1.97 is not considered to be part of the protection system and does not require all of the testing specified in IEEE 388-75. The plant equipment being used for compliance with Regulatory Guide 1.97 - Revision 3 has been designed to incorporate testing capabilities with testing frequencies being in accordance with the applicable Technical Specifications.

## 2. Quality Assurance Regulatory Guides

The Vepco Topical Report, Quality Assurance Program Operations Phase, VEP-1-44 previously approved by the NRC, addresses the conformance of Vepco Operational Quality Assurance Program to Quality Assurance Standards, Requirements and Guides.

- a. Regulatory Guide 1.28 - "Quality Assurance Program Requirements (Design and Construction)".

This Regulatory Guide is not considered a part of the Quality Assurance program. This guide and the standard it endorses have been superseded by R. G. 1.33 (Rev. 2, 2/78) and ANSI N18.7-1976.

- b. Regulatory Guide 1.30 - "Quality Assurance Requirements for the Installation Inspection, and Testing of Instrumentation and Electric Equipment" (8/72). The Vepco Q.A. Program complies with the requirements of Regulatory Guide 1.30 and ANSI N45.2.4-1972-Installation, Inspection and Testing Requirements of Instrumentation and Electrical Equipment during the Construction of Nuclear Power Generating Stations with the clarifications contained in table 17.2.0 of the Topical Report.

- c. Regulatory Guide 1.38 - "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-cooled Nuclear Power Plants (Rev. 2, 5/77)".

The Vepco Q.A. Program conforms to the requirements of Regulatory Guide 1.38 and ANSI N45.2.2 - 1972 - Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants during the Construction phase. Clarifications are contained in table 17.2.0 of the Topical Report.

- d. Regulatory Guide 1.58 - "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel" (Rev. 1, 9/80). Vepco's program complies with this guide and ANSI N45.2.6 - 1978 - "Qualification of Inspection, Examination and Testing Personnel for the Construction Phase of Nuclear Power Plants." Clarifications are contained in table 17.2.0 of the Topical Report.

- e. Regulatory Guide 1.64 - Quality Assurance Requirements for the Design of the Nuclear Power Plants (Rev. 2, 6/76). The Vepco Q. A. Program conforms to the requirements of Regulatory Guide 1.64 and ANSI N45.2.11 - 1974 - Quality Assurance Requirements for the Design of Nuclear Power Plants. Clarifications are contained in Table 17.2.0 of the Topical Report.

- f. Regulatory Guide 1.74 - Quality Assurance Terms and Definitions (2.74). The Vepco Q. A. Program conforms to the requirements of Regulatory Guide 1.74 and ANSI N45.2.10 - 1973 - Quality Assurance Terms and Definitions. Clarifications are contained in Table 17.2.0 of the Topical Report.
- g. Regulatory Guide 1.88 - Collection Storage and Maintenance of Nuclear Power Plant Quality Assurance Records (Rev. 2, 10/76). The Vepco Q. A. program complies with this guide and ANSI N45.2.9-1974 Collection, Storage and Maintenance of Nuclear Power Plant Quality Assurance Records for Nuclear Power Plants as clarified in Table 17.2.0 of the Topical Report.
- h. Regulatory Guide 1.123 - Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants (Rev. 1, 7/77). The Vepco Q. A. Program conforms to the requirements of Regulatory Guide 1.123 and ANSI N45.2.13 - 1976 - Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants. Clarifications are contained in Table 17.2.0 of the Topical Report.



- i. Regulatory Guide 1.144 - Auditing of Quality Assurance Programs for Nuclear Power Plants (Rev. 1, 9/80). The Vepco, Q. A. Program conforms to the requirements of Regulatory Guide 1.144 and ANSI N45.2.12 - 1977 - Requirements for Auditing of Quality Assurance Programs of Nuclear Power Plants. Clarifications are contained in Table 17.2.0 of the Topical Report.
  
- j. Regulatory Guide 1.146 - Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants (Rev. 0, 8/80). The Vepco Q. A. Program conforms to the requirements of Regulatory Guide 1.146 and ANSI N45.5.2.23 - 1978 - Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants. Clarifications are contained in Table 17.2.0 of the Topical Report.