November 29, 1991

Docket Nos. 50-280
and 50-281

LICENSEE: Virginia Electric and Power Company

FACILITY: Surry Power Station, Units 1 and 2

SUBJECT: MEETING SUMMARY OF OCTOBER 31, 1991

A meeting was held with the representatives of Virginia Electric and Power Company (VEPCO) and the NRC staff in Rockville, Maryland on October 31, 1991. The purposes of the meeting were to provide VEPCO the opportunity to discuss the core damage frequency (CDF) from internal flooding and the efforts underway to further reduce the CDF frequency. Meeting handouts and a list of attendees are enclosed.

VEPCO representatives summarized the bases and methodology of their internal flooding analysis, described the affected systems and components and their interim flood control measures, as well as their future plans for further improvement. The NRC staff mentioned that further analysis would be required in the future with regards to external events, such as earthquakes and fire tornadoes. More detailed information on the meeting is described in the enclosed handouts.

/s/
Bart Buckley, Sr. Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. List of Attendees
2. Meeting Handouts

cc w/enclosure:
See next page

Distribution
See next page

OFC	:LA:PDII-2	:PM:PDII-2	:D:PDII-2	:	:
NAME	:D. Miller	:B. Buckley	:H. Berkow	:	:
DATE	:11/26/91	:11/27/91	:11/29/91	:	:

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Document Name: VEPCO MEETING SUMMARY

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Enclosure 1

Attendance List for Surry IPE Meeting

October 31, 1991

NAME	AFFILIATION
Bart Buckley	NRC
Paul Guymer	HNUS
Dave Bucheit	Virginia Power
George Hubbard	NRC/NRR
Gus Lainas	NRC/NRR
Luis Reyes	NRC
James Tatum	NRC
John Schiffgens	NRC
Bill LeFave	DST/NRR
J. F. Wechselberger	OEDO
Jeffrey Shackelford	NRC/RII
Bruce Boger	NRC/NRR
Lynn Connor	Southern Technical Services
George Wrobel	RG&E
Ann Ramey-Smith	NRC/RES/PRAB
Erasmia Lois	NRC/RES/PRAB
Bill Rasin	NUMARC
Herb Fontecilla	Virginia Power
Jack Guttmann	NRC/OCM-FR
Sammy Diab	NRC/NRR/PRAB
Carl Baab	Virginia Power
Damalle Weaver	The Energy Daily
Douglas Levy	UPI
Michael T. Markley	NRC/NRR/LPEB
Ken Brockman	OCM/IS
Myron Karman	OCM/KR
Ron Hernan	NRR/PD I-4
Ken Clark	NRC/PA/RII
Frank Ingram	NRC/PA
D'Vera Cohn	Washington Post
Kevin Connaughtom	OCM/JC
John H. Flack	NRC/RES/DSIR
Paul Kirby	Daily Press
Jocelyn Mitchell	OCM/IS
Bill Ruberry	Richmond Times - Dispatch
Gail Marcus	OCM/KR
Gary M. Holahan	NRC/NRR/DST
Ashok Thadani	NRC/NRR/DST
Ron Berryman	Virginia Power - Eng
Alan Price	Virginia Power - Surry Power Station
M. L. Bowling	Virginia Power - Manager, Nuclear Licensing
W. L. Stewart	Virginia Power - Sr. V.P.- Nuclear

NAME	AFFILIATION
F. K. Moore	Virginia Power - V.P. Nuclear Energy Serv.
Frank Congel	NRC/NRR
T. Murley	NRC/NRR
Conrad McCracken	NRR/SPLB
Herbert Berkow	NRC/NRR/PDII-2
William Beckner	NRC/NRR/RAB
Albert Gibson	NRC/RII
S. A. Varga	NRR/DRPE

Meeting Summary Dated November 29, 1991

Distribution
Docket File
NRC & Local PDRs
PDII-2 RF
T. Murley
F. Miraglia
S. Varga
G. Lainas
H. Berkow
B. Buckley
D. Miller
OGC
G. Hubbard, 8-D-1
J. Tatum, 8-D-1
J. Schiffgens, 10-E-4
B. Boger, 13-E-4
A. Smith, NLN372
E. Lois, NLN372
J. Guttmann, 16-H-3
S. Diab, 10-E-4
M. Markley, 10-H-12
R. Hernan, 14-C-7
F. Ingram, 2-G-5
J. Flack, NLS324
G. Holahan, 8-E-2
A. Thadani, 8-E-2
F. Congel, 10-E-2
C. McCracken, 8-D-1
W. Beckner, 10-E-4
ACRS (10)
E. Jordan, MNBB 3701
J. Wechselberger, 17-G-21
L. Reyes, RII
A. Gibson, RII
J. Shackelford, RII
K. Clark, RII
M. Sinkule, RII

INTERIM UPDATE ON SURRY IPE / INTERNAL FLOODING

OCTOBER 31, 1991

VIRGINIA POWER

ENCLOSURE 2

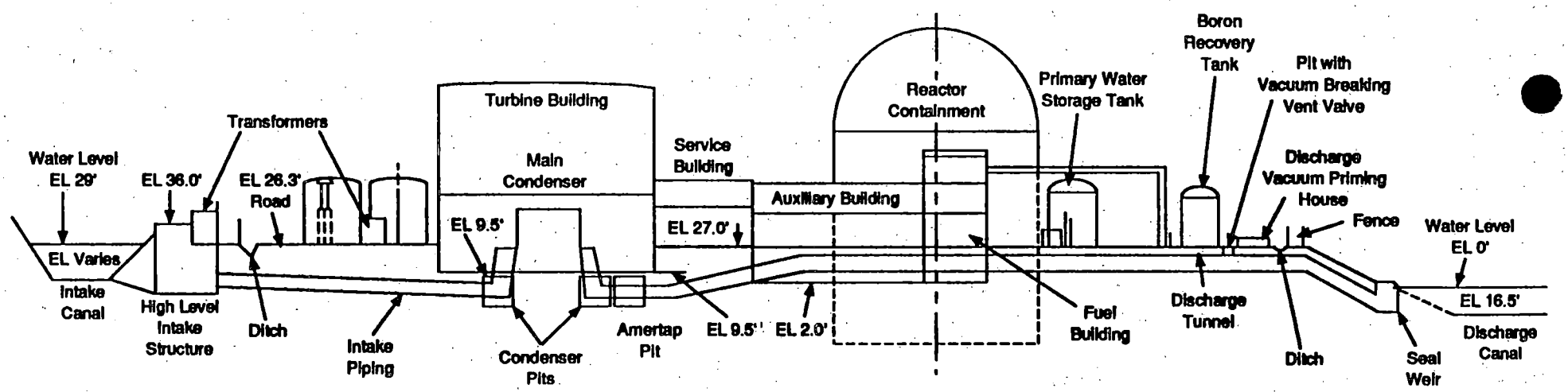
INTRODUCTION AND OVERVIEW

VIRGINIA POWER

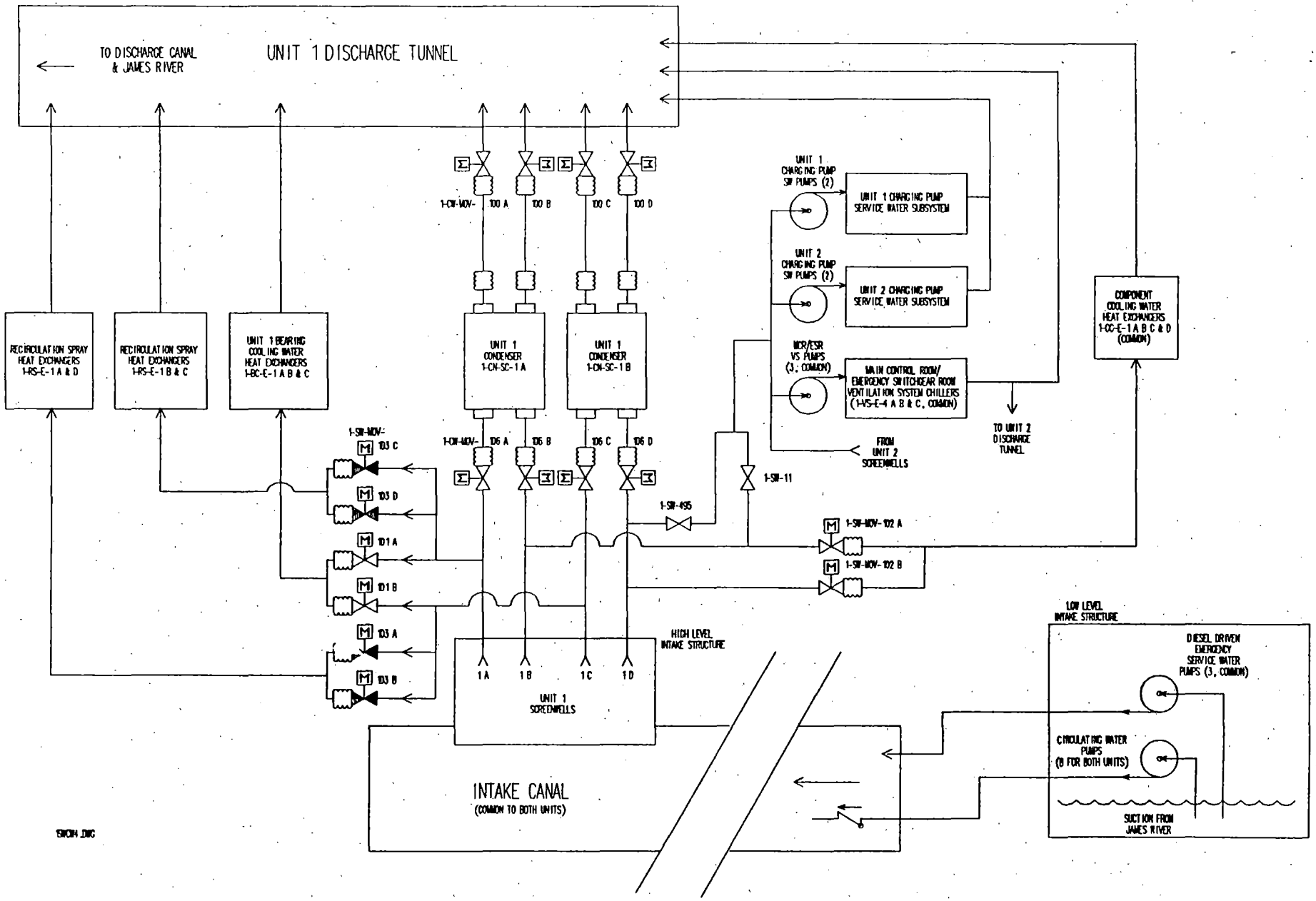
W. L. STEWART
SENIOR VICE PRESIDENT - NUCLEAR

AGENDA

INTRODUCTION AND OVERVIEW	W. L. STEWART
ORIGINAL LICENSING BASIS AND IPE / INTERNAL FLOODING CHRONOLOGY	M. L. BOWLING
ORIGINAL IPE / INTERNAL FLOODING ANALYSIS OVERVIEW AND SCOPE OF INTERNAL FLOODING REANALYSIS	R. M. BERRYMAN
INTERIM FLOOD CONTROL MEASURES	J. A. PRICE
FUTURE PLANS AND CONCLUSIONS	M. L. BOWLING

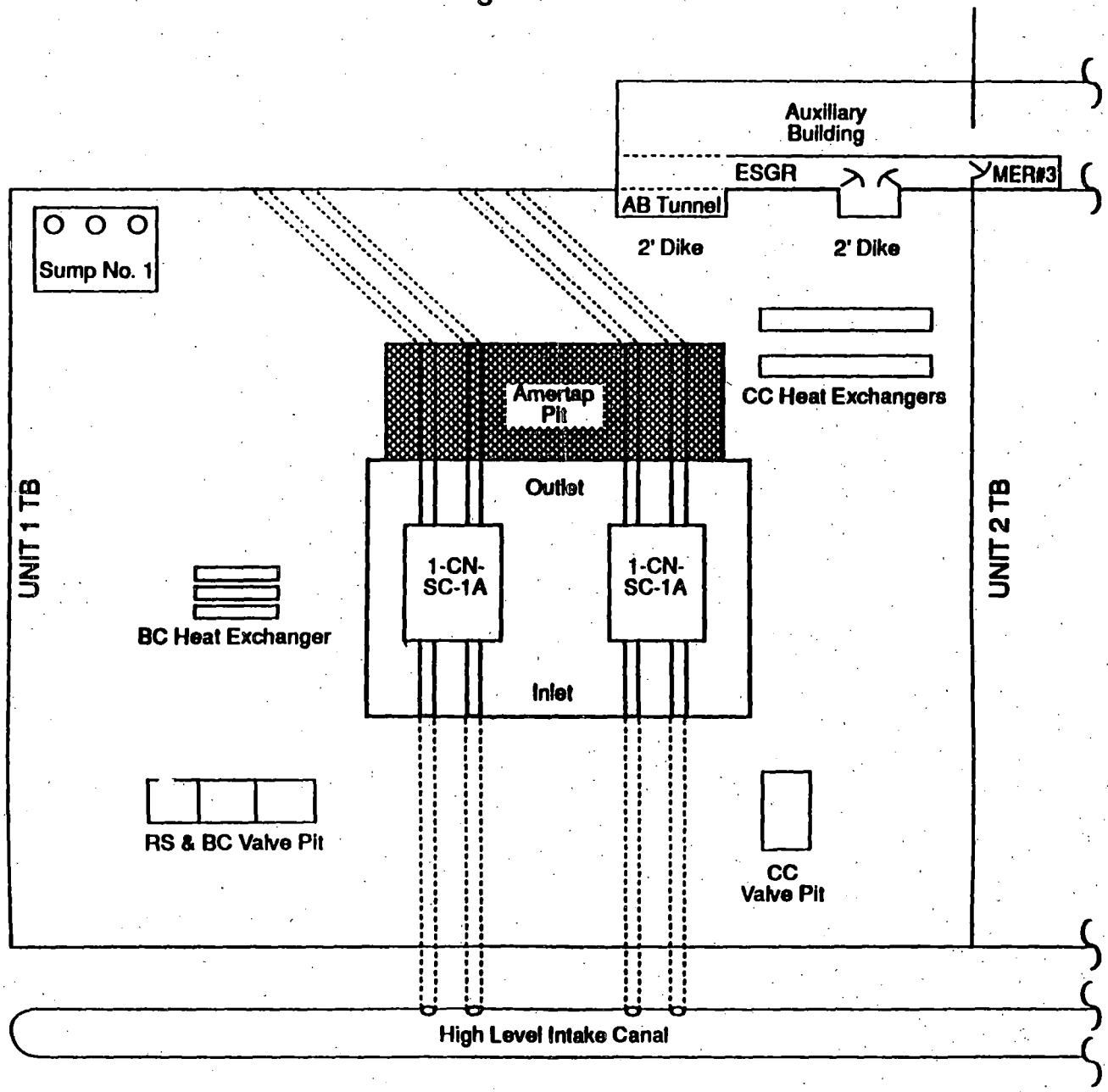


SURRY NUCLEAR POWER PLANT CROSS SECTIONAL VIEW



SIMPLIFIED FLOW DIAGRAM
CIRCULATING WATER SYSTEM
AND SERVICE WATER SYSTEM

Turbine Building Basement Plan



INTRODUCTION

- SURRY IS WELL DESIGNED, MEETS LICENSING DESIGN BASIS, AND IS CONSERVATIVELY OPERATED

- IPE INTERNAL FLOODING RESULTS WERE HIGHER THAN EXPECTED BECAUSE OF THE CONSERVATISMS IN THE ORIGINAL ANALYSIS

- A NUMBER OF PHYSICAL ENHANCEMENTS TO REDUCE THE POTENTIAL FOR INTERNAL FLOODING EVENTS AT SURRY HAVE BEEN MADE AND SEVERAL ADDITIONAL ONES ARE PLANNED

INTERNAL FLOODING ORIGINAL ANALYSIS OVERVIEW

CDF

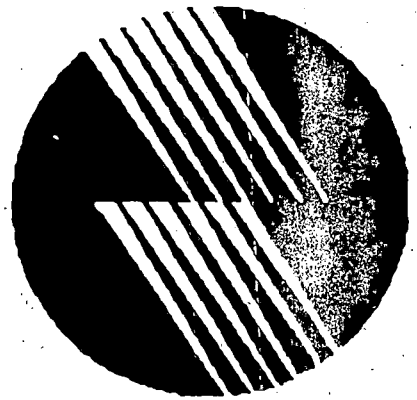
CURRENT (10/29/91) **1.7 E-4**

- **CREDIT TAKEN FOR**
  - **EXPANSION JOINT REPLACEMENT AND MOV REPLACEMENT/BOLT INSPECTION**
  - **7 OF 9 SUMP PUMPS OPERABLE**

PLANNED SHORT TERM MODIFICATIONS (BY 11/22/91) **9.9 E-5**

- **CHARGING PUMP CUBICLE DRAIN LINE BACKFLOW PREVENTION**
- **EXPANSION JOINT SHIELD INSTALLATION**

ORIGINAL LICENSING BASIS AND IPE / INTERNAL FLOODING CHRONOLOGY



VIRGINIA POWER

M. L. BOWLING
MANAGER - NUCLEAR LICENSING & PROGRAMS

OPERATING LICENSE BASIS

- ORIGINAL LICENSING BASIS - LARGE UNISOLABLE CW FAILURE NOT CONSIDERED CREDIBLE
  - CW PIPING ANALYZED FOR DBE MOVEMENT
  - PIPE RESTRAINTS LIMIT BREAK SIZE
  - HYPOTHETICAL PIPE LEAK ASSUMED 1/8" CRACK AND 180°
  - SUMP PUMP CAPACITY GREATER THAN ASSUMED LEAKAGE

LICENSING BASIS FOLLOWING QUAD CITIES EVENT

- REVIEW ASSUMPTIONS
  - FAILURES LIMITED TO NON-SEISMIC COMPONENTS
  - CATEGORY I (SEISMIC) SYSTEMS REMAIN INTACT
  - LOSS OF OFFSITE POWER
  - NO CONCURRENT ACCIDENTS

LICENSING BASIS FOLLOWING QUAD CITIES EVENT
(continued)

- PLANT MODIFICATIONS
  - CW EXPANSION JOINT SHIELDS
  - LEVEL SWITCHES/ALARMS AND AUTO CW ISOLATION
  - DIKES, BARRIERS, AND WATER TIGHT SEALS FOR OTHER SAFETY RELATED AREAS AND VALVE PITS
  - MODIFICATION OF EXISTING DIKES
  - FLOW DIRECTING PIPE SLEEVE FOR FIRE MAIN IN TURBINE BUILDING

- NRC SER (12/18/80)
  - LAWRENCE LIVERMORE TECHNICAL EVALUATION
  - FINDING OF "DEGREE OF VULNERABILITY" MINIMIZED BY MODIFICATIONS AND PROCEDURES

IPE / INTERNAL FLOODING CHRONOLOGY

AUGUST 30, 1991	•	SUBMITTED IPE
OCTOBER 9, 1991	•	NRC BRIEFED ON IPE METHODOLOGY, CONSERVATISMS, AND FUTURE PLANS

IPE / INTERNAL FLOODING CHRONOLOGY
(continued)

- IPE INTERNAL FLOODING RESULTS INDICATE VULNERABILITY TO UNISOLABLE INTERNAL FLOODS SHOULD THEY OCCUR
- PROBABILITY OF OCCURRENCE IS NOT DIRECTLY QUANTIFIABLE BASED ON ACTUAL OPERATING EXPERIENCE, RATHER IT IS THEORETICALLY DERIVED FROM LIMITED AVAILABLE COMPONENT FAILURE DATA AND CONSERVATIVE MODELING ASSUMPTIONS
- ACTUAL PROBABILITY OF OCCURRENCE IS ACCEPTABLY LOW BECAUSE CRITICAL COMPONENTS, WHICH WILL PREVENT INTERNAL FLOODING, ARE BEING MAINTAINED THROUGH EXISTING MAINTENANCE PROGRAMS. ADDITIONALLY, SUMP PUMPS ARE RELIABLE
- PROCEDURE, PROGRAM, AND EQUIPMENT ENHANCEMENTS HAVE BEEN SCHEDULED TO REDUCE PROBABILITY OF AND ELIMINATE VULNERABILITY TO INTERNAL FLOODING
- ESTIMATED CDF TO BE < 8 E-4 TAKING CREDIT FOR FLOODING PROCEDURE REVISIONS AND 7 OF 9 SUMP PUMPS OPERABLE

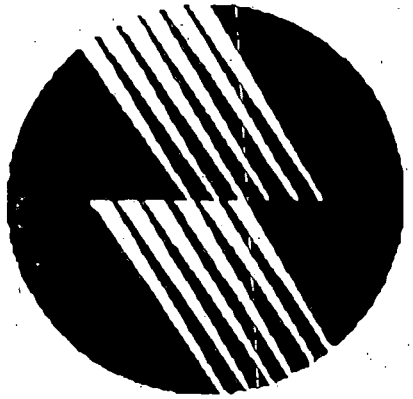
IPE / INTERNAL FLOODING CHRONOLOGY
(continued)

OCTOBER 23, 1991	• MET WITH NRC AT SURRY
OCTOBER 28, 1991	• SUBMITTED REVISED MODIFICATION SCHEDULE, COMMITMENT TO INTERNAL FLOODING REANALYSIS, AND COMMITMENT TO INTERIM MEASURES
	• PURPOSE OF REANALYSIS IS TO BETTER QUANTIFY CONSERVATISM IN ORIGINAL ANALYSIS
OCTOBER 29, 1991	• SUBMITTED REDUCED CDF FOR INTERNAL FLOODING OF 1.7 E-4 (CURRENT PLANT CONFIGURATION)
	• CREDIT TAKEN FOR REPLACEMENT OF EXPANSION JOINTS AND ASSOCIATED VALVES, VALVE BOLTING INSPECTIONS, AND 7 OF 9 SUMP PUMPS OPERABLE

IPE / INTERNAL FLOODING CHRONOLOGY
(continued)

NOVEMBER 21, 1991	• TENTATIVELY PLAN TO MEET WITH NRC TO DISCUSS INTERNAL FLOODING REANALYSIS RESULTS
NOVEMBER 22, 1991	• SCHEDULED TO SUBMIT INTERNAL FLOODING REANALYSIS RESULTS
	• SCHEDULED TO COMPLETE ADDITIONAL MODIFICATIONS BY NOVEMBER 22, 1991 TO REDUCE CONSEQUENCES

ORIGINAL IPE / INTERNAL FLOODING ANALYSIS OVERVIEW



VIRGINIA POWER

R. M. BERRYMAN
MANAGER - NUCLEAR ANALYSIS & FUEL

INDIVIDUAL PLANT EXAMINATION
SURRY UNITS 1 AND 2

- SURRY IPE PERFORMED IN ACCORDANCE WITH NRC GENERIC LETTER 88-20
- METHOD OF EXAMINATION INCLUDED DEVELOPMENT OF LEVEL 1 AND LEVEL 2 PRA MODELS FOR EACH SURRY UNIT
- IPE PERFORMED BY A PROJECT TEAM CONSISTING OF VIRGINIA POWER AND NUS CORPORATION ANALYSTS
- EXAMINATION WAS COMPREHENSIVE AND PROVIDED SIGNIFICANT INSIGHT REGARDING POSSIBLE CORE DAMAGE SEQUENCES, POTENTIAL MITIGATIVE ACTION, AND ENHANCEMENTS TO REDUCE RISK
- THE TOTAL CDF FROM INTERNAL EVENTS DERIVED FROM THE SURRY IPE WAS COMPARABLE TO THAT DOCUMENTED IN NUREG/CR-4550
- SINCE SURRY IPE REVEALED VULNERABILITY TO INTERNAL FLOODS, ADDITIONAL ANALYSIS AND REVIEW HAVE BEEN INITIATED

ORIGINAL INTERNAL FLOODING ANALYSIS

- BASIC ANALYTICAL STEPS
  - DIVIDE PLANT INTO INDEPENDENT FLOOD AREAS
  - IDENTIFY MAJOR FLOOD SOURCES
  - IDENTIFY POTENTIAL INTER-AREA PROPAGATION PATHWAYS
  - SCREEN FLOOD AREAS AND POTENTIAL FLOOD PATHWAYS USING CONSERVATIVE ANALYSES
  - PERFORM DETAILED ANALYSIS OF POTENTIAL SIGNIFICANT FLOOD AREAS, SOURCES, AND SCENARIOS

ORIGINAL INTERNAL FLOODING ANALYSIS
(continued)

- FLOOD ANALYSIS ACCOUNTS FOR
  - FREQUENCY/SIZE OF FLOOD EVENT
  - FLOOD MITIGATION MEASURES (AUTO ISOLATION, DRAINS, SUMP PUMPS, FLOOD ALARMS, AND PROCEDURES)
  - RESULTING NATURE OF FLOOD INITIATED TRANSIENT AND EQUIPMENT DAMAGE
  - COINCIDENT RANDOM EQUIPMENT FAILURES AND HUMAN ERRORS
  - RECOVERY ACTIONS

RESULTS OF ORIGINAL INTERNAL FLOODING ANALYSIS

- 18 FLOOD AREAS IDENTIFIED AND SCREENED AT SURRY POWER STATION
- 6 OF THE 18 FLOOD AREAS EVALUATED IN DETAIL
- BASE CASE RESULTS

FLOOD AREA	FLOOD SOURCE	CDF/YR (BASE CASE)
UNIT 1 TURBINE BUILDING	(CW + SW)	5.9 E-4
UNIT 2 TURBINE BUILDING	(CW + SW)	4.5 E-4
UNIT 1 SAFEGUARDS BUILDING	(RWST SUPPLY)	3.1 E-5
MECHANICAL EQUIPMENT ROOM NO. 3	(SW)	3.0 E-5
AUXILIARY BUILDING	(RWST SUPPLY)	2.3 E-5
UNIT 2 SAFEGUARDS BUILDING	(RWST SUPPLY)	1.5 E-5
		1.1 E-3

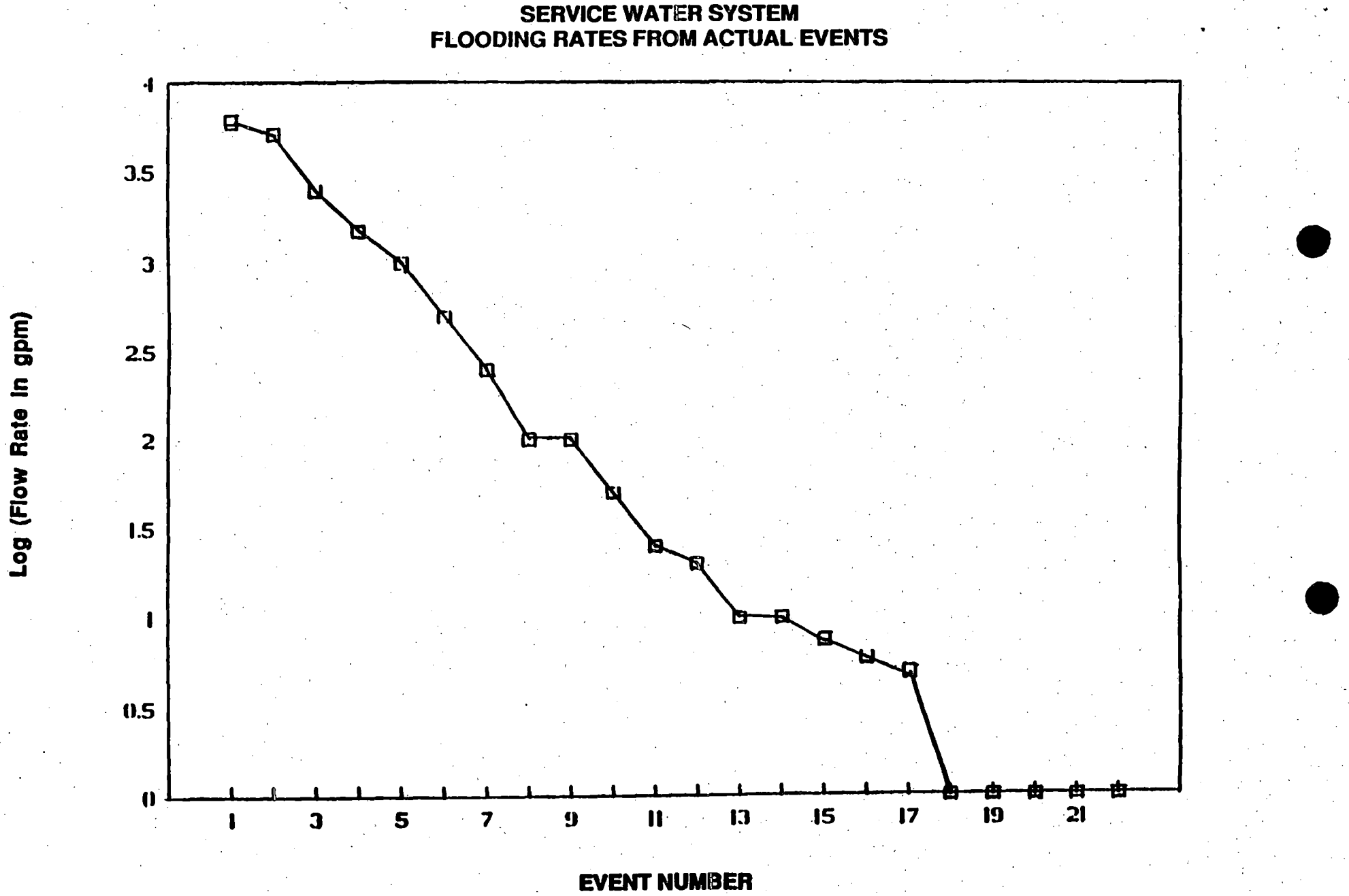
ORIGINAL INTERNAL FLOODING ANALYSIS - EVALUATION OF TURBINE BUILDING

- MOST SIGNIFICANT FLOOD INITIATORS
  - CIRCULATING WATER AND SERVICE WATER FAILURES
    - VALVE BODIES
    - EXPANSION JOINTS
    - PIPE/CONDENSER
  - SOURCES GRAVITY FED FROM INTAKE CANAL

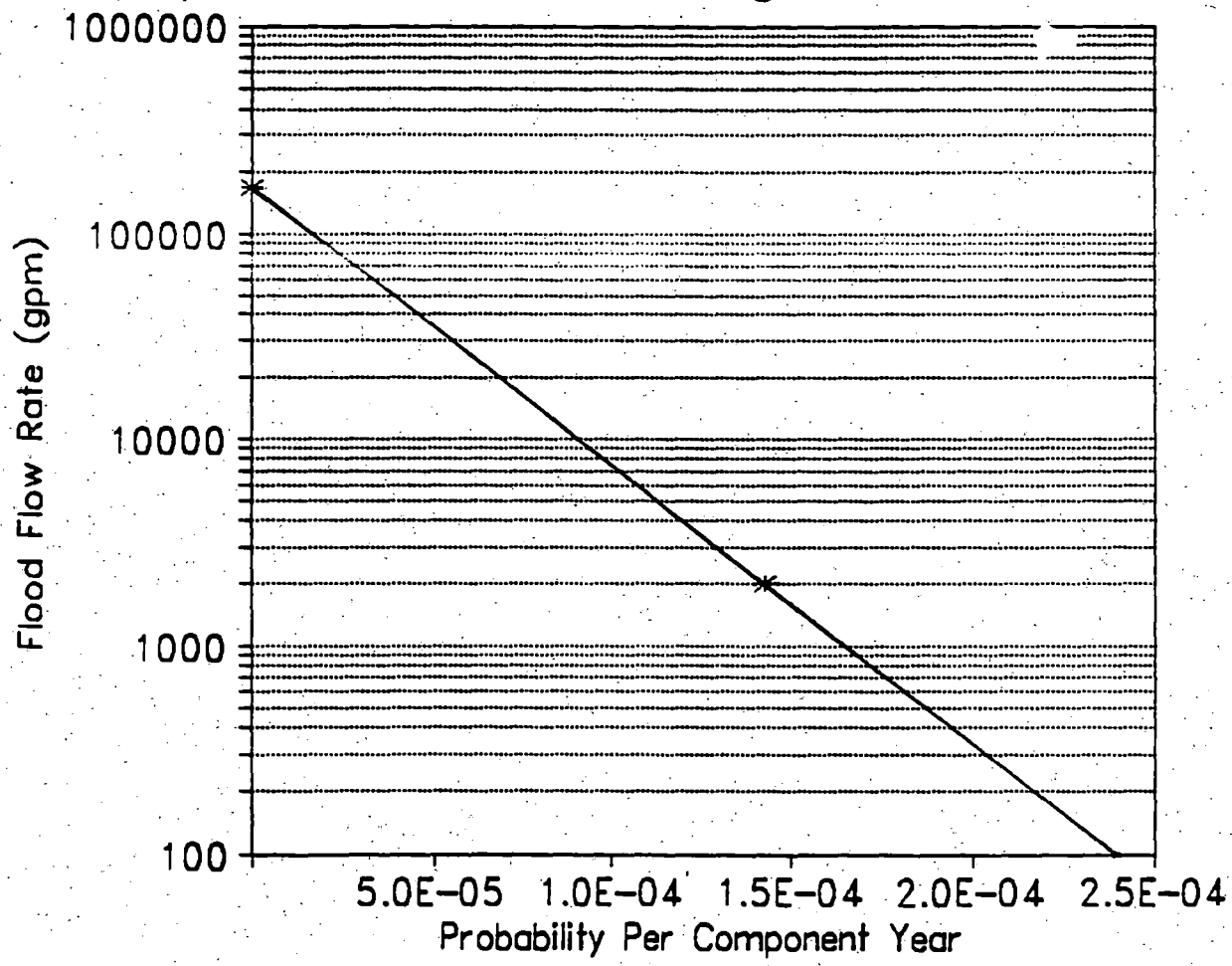
- TWO FLOOD TYPES DEFINED
  - LONG TERM ISOLABLE - CAN ONLY BE ISOLATED BY STOP LOGS (ASSUMED TO TAKE UP TO 24 HOURS)
  - SHORT TERM ISOLABLE - CAN BE ISOLATED BY CLOSING VALVES

ORIGINAL INTERNAL FLOODING ANALYSIS - EVALUATION OF FLOOD HAZARD FOR CW AND SW SYSTEMS

- EXTENSIVE SEARCH OF HISTORICAL INDUSTRY FLOODING DATA ASSOCIATED WITH CW AND SW SYSTEMS
- LOG-LINEAR RELATIONSHIP BETWEEN FLOOD FREQUENCY AND RATES UTILIZED FOR ALL CW AND SW FLOODING SOURCES
- ENGINEERING JUDGEMENT USED TO QUANTIFY THIS LOG-LINEAR RELATIONSHIP
- USE OF LOG-LINEAR RELATIONSHIP TO DETERMINE PROBABILITY OF COMPONENT FAILURES RESULTING IN MAXIMUM FLOOD RATES IS CONSERVATIVE


SERVICE WATER SYSTEM
FLOODING RATES FROM ACTUAL EVENTS
Log (Flow Rate In gpm)
4
3.5
3
2.5
2
1.5
1
0.5
0
1
3
5
7
9
11
13
15
17
19
21
EVENT NUMBER

CW Expansion Joint Log Linear Curve



CONSERVATISMS IN ORIGINAL INTERNAL FLOODING ANALYSIS

- ESTIMATION OF FLOOD HAZARD
  - NO MAJOR FLOODING EVENTS FOR SW VALVES/EXPANSION JOINTS AND CW INLET VALVES APPLICABLE TO SURRY
  - FLOOD FREQUENCY AT LOWER END OF RANGE CONSERVATIVELY ASSIGNED (E.G., HISTORICAL LEAKAGE FROM EXPANSION JOINTS APPROXIMATELY 1 GPM; ANALYSIS CONSERVATIVELY ASSIGNED ONE EVENT AT 100 GPM)
  - WORST CASE FLOW RATES FOR INDIVIDUAL FLOOD SEQUENCES WERE USED TO DETERMINE OPERATOR RESPONSE TIME FOR HUMAN ERROR PROBABILITIES

- WATER HAMMER EVENT ASSUMED TO RESULT IN COMPONENT FAILURE

CONSERVATISMS IN ORIGINAL INTERNAL FLOODING ANALYSIS
(continued)

- ASSUMPTIONS
  - ENTRANCE FROM TURBINE BUILDING TO ESG ROOM ASSUMED TO BE OPENED
  - LOWEST ELEVATION USED FOR ALL MCCs IN SAME AREA TO DETERMINE CRITICAL FLOOD HEIGHT
  - CONSERVATIVE MINIMUM NUMBER OF SUMP PUMPS AVAILABLE (2 OUT OF 9 PUMPS)

INTERNAL FLOODING REANALYSIS PURPOSE

- TO QUANTIFY THE CONSERVATISMS IN THE CORE DAMAGE FREQUENCY DUE TO INTERNAL FLOODING FOR THE ORIGINAL ANALYSIS BY
  - DEMONSTRATING ANALYTICALLY THAT WATER HAMMER INDUCED STRESS IS INSUFFICIENT TO CAUSE FAILURE OF RISK SIGNIFICANT COMPONENTS IN THE CW AND SW SYSTEMS
  - ANALYZING REMAINING COMPONENTS WHICH MAY STILL PRESENT A FLOOD HAZARD

INTERNAL FLOODING REANALYSIS APPROACH

- PERFORM DETERMINISTIC WATER HAMMER ANALYSIS OF CW AND SW SYSTEMS TO DETERMINE MAGNITUDE OF STRESS FOR CRITICAL COMPONENTS
- DETERMINE YIELD AND ULTIMATE STRESSES FOR CRITICAL COMPONENTS
- DEVELOP STRESS INDUCED FAILURE PROBABILITY MODEL
- REFINE DATA ANALYSIS TO DETERMINE FREQUENCY OF WATER HAMMER EVENTS, COMPONENT FAILURE PROBABILITY, AND MAXIMUM CREDIBLE FLOOD RATES
- REQUANTIFY CDF

STRESS INDUCED FAILURE PROBABILITY MODEL

- MODEL FOR FAILURE PROBABILITY VS. STRESS WILL BE BASED ON NUREG/CR-5102, "INTERFACING SYSTEMS LOCA STUDY"
- USES MAXIMUM UNCERTAINTY (EXTREME VALUE) DISTRIBUTION AS MOST DEFENSIBLE
- ASSUMES MEAN FAILURE PROBABILITY AT 90% OF ULTIMATE STRESS, BASED ON BURST TEST DATA
- ASSUMES 99th PERCENTILE AT ULTIMATE STRESS
- APPLICATION WILL ACCOUNT FOR PLANT SPECIFIC DESIGN AND OPERATING CONDITIONS

REFINED DATA ANALYSIS FOR INTERNAL FLOODING REANALYSIS

- 3 VALVE FAILURES WHICH RESULTED IN WATER HAMMER HAVE BEEN RECORDED IN U. S. NUCLEAR PLANT OPERATING HISTORY. THESE FAILURES HAVE THE FOLLOWING CHARACTERISTICS
  - PUMPED SYSTEM
  - VIBRATION/PRESSURE PULSE LEADING TO FATIGUE

- SURRY DESIGN CONDITIONS DIFFER FROM HISTORICAL FAILURE EVENTS
  - GRAVITY FED
  - NO PULSED VIBRATION

- APPLICABLE DESIGN CONDITIONS WILL BE UTILIZED TO DEVELOP REVISED FREQUENCY OF VALVE FAILURES LEADING TO WATER HAMMER EVENTS

REFINED DATA ANALYSIS FOR INTERNAL FLOODING REANALYSIS (continued)

- DETERMINE PROBABILITY OF COMPONENT FAILURES GIVEN THE STRESS THAT IS INDUCED DUE TO A POSTULATED WATER HAMMER
- SCREEN OUT COMPONENT FAILURES SHOWN TO BE NOT CREDIBLE OR VERY LOW FREQUENCY (< 1 E-6/YR)
- CALCULATE MAXIMUM FLOW RATE FOR REMAINING COMPONENTS WHICH MAY FAIL BASED ON CREDIBLE BREAK SIZE
- DETERMINE PROBABILITY OF FAILURE OF REMAINING COMPONENTS FOR A RANGE OF FLOW RATES

REQUANTIFICATION OF CDF

- CALCULATE FLOOD DAMAGE STATE FREQUENCIES BASED ON REVISED FLOOD HAZARD

- QUANTIFY EVENT TREES TO DETERMINE REVISED CDF DUE TO INTERNAL FLOODS
  - REVISED BASE CASE TO REFLECT CURRENT PLANT CONFIGURATION AND OPERATING PRACTICES
  - ADDITIONAL CASE TO REFLECT PLANNED FUTURE MODIFICATIONS

INTERIM FLOOD CONTROL MEASURES

VIRGINIA POWER

J. A. PRICE
ASSISTANT STATION MANAGER -
NUCLEAR SAFETY & LICENSING

INTERIM FLOOD CONTROL MEASURES

- NO CREDIT TAKEN FOR INTERIM MEASURES IN CDF REDUCTION
- INTERIM FLOOD WATCH PROGRAM - VT2 QUALIFIED PERSONNEL
- TURBINE BUILDING SUMP PUMP MEASURES
- STOP LOG INSTALLATION ADMINISTRATIVE CONTROLS

INTERIM FLOOD CONTROL MEASURES
(continued)

- FLOOD WATCH PROGRAM
  - NO OTHER ASSIGNED DUTIES
  - TRAINED ON POTENTIAL FLOOD SOURCES
  - COMMUNICATIONS ESTABLISHED WITH SHIFT SUPERVISOR

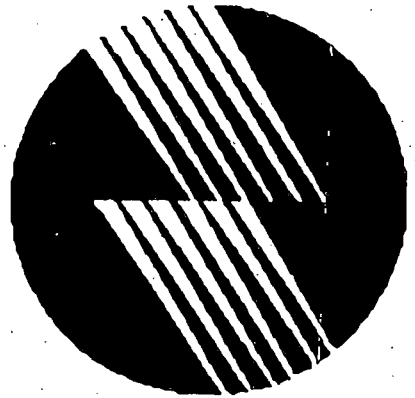
INTERIM FLOOD CONTROL MEASURES
(continued)

- TURBINE BUILDING SUMP PUMP MEASURES
  - TWO DIESEL DRIVEN PUMPS (~1,200 GPM EACH) ONSITE
  - BY PROCEDURE, TURBINE BUILDING OPERATOR CHECKS ALL THE 9 PUMPS EACH SHIFT
  - ADMINISTRATIVELY REQUIRE 9 OF 9 PUMPS OPERABLE
  - ENTER 7 DAY ADMINISTRATIVE ACTION STATEMENT FOR UNITS IF PUMPS OUT OF SERVICE OR IMPLEMENT COMPENSATORY MEASURES
  - PRIORITY GIVEN TO ANY REQUIRED MAINTENANCE

INTERIM FLOOD CONTROL MEASURES
(continued)

- STOP LOG INSTALLATION CONTROLS
  - DEDICATED CRANE OPERATOR AND RIGGERS - ONSITE 24 HOURS PER DAY
  - DEDICATED CRANE AND STOP LOGS AT HIGH LEVEL INTAKE STRUCTURE AT ALL TIMES

FUTURE PLANS AND CONCLUSIONS



VIRGINIA POWER

M. L. BOWLING
MANAGER - NUCLEAR LICENSING & PROGRAMS

ADDITIONAL PHYSICAL MODIFICATIONS

- CHARGING PUMP CUBICLE DRAIN LINE MODIFICATION TO PREVENT BACKFLOW EITHER BY PLANNED INSTALLATION OF BACKFLOW DEVICES OR BY TEMPORARY INSTALLATION OF BLANK FLANGES BY NOVEMBER 22, 1991
- FLOW SHIELD INSTALLATION ON SIX EXPANSION JOINTS IN SERVICE WATER SUPPLY LINES FOR BEARING COOLING AND COMPONENT COOLING BY NOVEMBER 22, 1991
- INSTALLATION OF SUBMERSIBLE OPERATORS FOR BC/CC MOVs (REQUIRES RISK REDUCTION/BENEFIT ANALYSIS IN VIEW OF FLOW SHIELD INSTALLATION)
- RELOCATION OF POWER SOURCE FOR EXISTING TB SUMP PUMPS

ONGOING ACTIVITIES

- IMPROVED SUMP PUMP RELIABILITY - MAINTAIN AT LEAST 7 PUMPS OPERABLE - AS AN INTERIM MEASURE, MAINTAINING 9 PUMPS OPERABLE
- INSPECTION PROGRAM AND SERVICE LIFE REPLACEMENT PROGRAM FOR EXPANSION JOINTS
- INSPECTION PROGRAM FOR VALVE BOLTING
- PROCEDURE REVISIONS FOR ISOLATION OF CW AND SW PIPING FOR MAINTENANCE DURING OUTAGES

CONCLUSIONS

- IPE IS A USEFUL TOOL FOR IDENTIFYING POTENTIAL AREAS OF CONCERN
- SURRY MEETS LICENSING BASIS
- CDF FOR INTERNAL FLOODING IN THE IPE SUBMITTAL IS OVERSTATED BASED ON
  - RECOGNITION OF ONGOING INSPECTION, REPLACEMENT, AND MAINTENANCE PROGRAMS FOR KEY VALVES AND EXPANSION JOINTS
  - GREATER NUMBER OF SUMP PUMPS ACTUALLY AVAILABLE
- CURRENT CDF DUE TO INTERNAL FLOODING IS 1.7E-4 PER REACTOR YEAR USING ORIGINAL ANALYSIS METHODOLOGY

CONCLUSIONS
(continued)

- CDF DUE TO INTERNAL FLOODING WILL BE FURTHER REDUCED BY NOVEMBER 22, 1991 TO AT LEAST 9.9 E-5 PER REACTOR YEAR USING ORIGINAL ANALYSIS METHODOLOGY
- INTERNAL FLOODING REANALYSIS WILL QUANTIFY THE CONSERVATISMS IN THE ORIGINAL ANALYSIS AND IS EXPECTED TO RESULT IN A MORE REALISTIC, BUT STILL CONSERVATIVE, ESTIMATE OF CDF DUE TO INTERNAL FLOODING
- IN THE INTERIM, ADMINISTRATIVE CONTROLS AND ADDITIONAL SUMP PUMP CAPABILITY HAVE BEEN IMPLEMENTED TO FURTHER REDUCE ANY POTENTIAL CONSEQUENCES SHOULD A FLOODING EVENT OCCUR